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ORBITAL RADIATION STUDY FOR INCLINED CIRCULAR TRAJECTORIES

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Orbital Radiation Study for Inclined Circular Trajectories

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1. Introduction

At the request of and with support from the Naval Research Laboratory*, a comprehensive study was conducted to determine the space radiation environment of a series of high inclination geocentric orbits for a mission duration of five years.

Following the precedent established ~~with previous studies~~, the external (surface incident) charged particle radiation, predicted for the satellite was determined by orbital flux integration for six independent trajectories, (~~see section 3~~). The latest standard models of the environment were used in the calculations, (~~see~~ section 5).

Magnetic field definitions for the six nominal circular trajectories were obtained from a current field model, (~~see section~~ 3).

Spatial and temporal variations or conditions affecting the static environment models were considered and accounted for, wherever possible.

Finally, limited shielding and dose evaluations were performed for simple infinite slab and spherical geometries.

Results, given in graphical and tabular form, are analyzed, explained, and discussed. Conclusions are presented and commented on.

2. SPECIFICATION OF ORBITS

The analysis was based on nominal circular orbits with inclination of 60 degrees and altitudes of 1667, 2593, 3889, 5186, 6389, and 10371 kilometers.

3. GENERATION OF TRAJECTORIES

Six separate flight path emphemerides were generated for the specified orbits with the GEODYN-BLCONV System[1] for trajectories of 24-hour duration defined at 1-minute intervals. The length of simulated orbit time and the integration stepsize were especially selected so as to provide sufficient point density to insure an adequate sampling of the ambient radiation environment when flying the trajectories through the models. The trajectories were subsequently converted from geodetic polar to magnetic B-L coordinates with McIlwain's INVAR program of 1965[2] and the field routine ALLMAG,[3] which now utilizes the BARRACLOUGH 1975 field model.[4] The field computations were extrapolated to the tentative mission epoch of 1989.5 with linear time terms representing secular variations of the field.

4. FLIGHT PATH EXPOSURE TO TRAPPING DOMAINS

The specified nominal flight-path configurations display a significant characteristic of high inclination orbits in magnetic L-space: they traverse almost the entire terrestrial radiation belt twice during each revolution, moving back and forth through regions of low L values (the inner zone: $1.0 < L \leq 2.8$), regions of high L values (the outer zone: $2.8 < L < 12$), and

*This work funded by the Naval Electronics Systems Command under the NRL Nuclear Survivability/Vulnerability Program.

regions outside the trapping domain (external). Occasionally, some revolutions will also enter regions of space where no particle trapping can occur because of atmospheric cut-off conditions; that is, trajectory segments may have a combination of magnetic B and L values that place them outside the atmospheric cut-off limits of the models.

These excursions and the "external" visitations afford the satellite an amount of flux-free time, which may be of substantial duration (see section 11, C).

5. TRAPPED PARTICLE ENVIRONMENT MODELS

The fluxes in this study were obtained from current NSSDC models: the solar maximum AE6 for the inner zone electrons5, the new interim model AEI7 for the outer zone electrons[6], and the solar maximum version of the new AP8 model[7] for energetic trapped protons. It should be noted that the interim AEI7 does not reflect solar cycle variations in its present state. However, this model was issued in two versions, the AEI7-HI and the AEI7-LO, in order to account for differences in the data sets used in their construction. The LO version was used in this effort. All models describe an average static environment at a given epoch.

6. ORBITAL FLUX INTEGRATIONS

Orbital flux integrations were performed with the UNIFLUX[8] and the SOFIP[9] systems. UNIFLUX provides L-band distributions and exposure times with B-L bin breakdown, while SOFIP provides the dose and shield data.

7. GEOMAGNETIC SHIELDING AND SOLAR FLARE PROTONS

Low altitude high inclination orbits experience a significant amount of geomagnetic shielding from cosmic rays of solar or galactic origin in the energy range $E > 10$ MeV. Therefore, it may be assumed that the spacecraft will only intermittently be exposed to the unattenuated interplanetary solar flare proton intensities of all energies above 10 MeV. To a first approximation, the fluxes may also be considered omnidirectional and isotropic, probably to within 10-15%.

Usually, geomagnetic shielding effects on geocentric missions are being evaluated with simple rigidity considerations because of substantial diurnal variations in the cutoff latitude associated with geomagnetic tail effects (2-4 degrees) and storm-induced changes (> 4 degrees). The simple analysis used here assumed that energetic solar protons of all energies above 10 MeV have free access to all magnetospheric regions external to a dipole shell of L=5 earth radii, which is equivalent to a cut-off latitude of about 63 degrees.

Predictions of solar flare proton fluxes at 1 AU are obtained as a function of mission duration $\underline{\tau}$ and confidence level $\underline{Q}$* on the basis of a probabilistic analysis[10] using a modified type of Poisson statistics by a computerized model SOLPRO[11] that includes the distinction between "ordinary" (OR) and

*Q denotes the degree of confidence one wishes to assign to the results, namely that for the specified mission duration the calculated fluences are the smallest values which will not be exceeded by actually encountered intensities.

"anomalously large" (AL) events and the probability of occurrence of the latter. Both AL- and OR- event fluences are non-linear functions of Q and τ. For these predictions, only high quality comprehensive satellite measurements (not ground observations) are being used, covering almost the entire 20th solar cycle. There have been indications that descriptions of the solar flare environment in interplanetary space (at 1 AU), derived from interpretations and extrapolations of ground based measurements, have not been very accurate.

It should be noted that the statistics cannot predict when an AL event will occur; only the probability that one will occur in a given length of time. And it must be remembered that a single AL event will impart its total fluence within two to four days.

This implies that for unmanned satellites with mission durations of $\tau \geq 1$ year, OR-event fluences are not significant because probabilistic theory predicts the possible occurrence of at least <u>one</u> AL event, even for the lowest allowable confidence level (Q=80%).

8. <u>FLUX DATA: TYPE, QUALITY, AND VARIATIONS</u>

The trapped particle flux data available from the models represent omnidirectional, integral intensities that one would expect to obtain as average values over periods in excess of six months. But over most regions of magnetospheric space ($L \geq 2$ earth radii), short term excursions can vary from these values by factors of 10^2 to 10^3, depending on the particle energies and on the type and intensity of the causative event. These variations do affect the investigated missions because their trajectories enter regions of space where L is greater than 2 earth radii. Also, trapped particle populations experience changes due to: (a) local time (LT) dependence, and (b) solar cycle dependence. Both are of some consequence to these missions. The former is significant for spacecraft that sample regions of $L > 5$ earth radii, which are visited by the specified missions. To compensate for these variations, the model provides LT-averaged values, which should yield an adequate approximation for missions of long duration ($\tau \geq 1$ year). The solar cycle variations have been taken into account by selecting the appropriate models for each period, where available.

Generally, solar cycle variations have opposite effects on each particle species:

	Solar Min	Solar Max
Electrons	lower	higher
Protons	higher	lower

The solar cycle changes, as derived from a comparison of the corresponding models, are functions of energy <u>E</u> and magnetic parameter <u>L</u>. For the inner zone electrons, they may range from a factor of 1 to a factor of 5.

Protons are only affected in the vicinity of the atmospheric cutoff regions. No changes of consequence have been observed in the heart of the proton trapping domain. Proton changes have about the same range as those of the electrons.

It is necessary to emphasize that the calculations, although based on the best data available for the past epochs, can only serve as approximations for the future.

It also should be noted that a basic uncertainty factor of 2 is defined for the flux values of the AP8 and the AE5 models, while the AE6 is characterized by an average uncertainty factor of 5. No uncertainty factor has yet been defined for the interim AEI7.

9. DOSE AND SHIELDING EVALUATION

Doses were calculated from the total orbit integrated, surface incident, omnidirectional, integral fluences by existing shielding codes[12], as functions of various aluminum shield thicknesses and geometries.

A simple procedure was followed, not involving solid angle sectoring or three-dimensional ray tracing considerations. Instead, a simple two-dimensional geometry with a cosine law for the incident spectra, and a three-dimensional spherical geometry were considered. (See comment in section 11D-III)

Bremsstrahlung calculations were performed with the same codes.

10. RESULTS: PRESENTATION DESCRIPTION

This section describes the form and format in which the results, derived from the Orbital Flux Integration (OFI) process, are presented for practical use. Except where otherwise specified, all particle data in this report relate to integral, omnidirectional fluxes or fluences.

A. Tabular Presentations

The outcome of all calculations is summarized in Tables 1 to 60. The tables are arranged in six sets, where every set pertains to one specific type of data. The first two sets have two similar members for every trajectory considered in the study: one for trapped protons and one for electrons, in that order. The next three sets contain only one member for each trajectory. The sixth set contains three similar members for each trajectory. A more detailed description of the tables is provided in the following paragraphs.

I. L-band Tabulations: Tables 1-12

Tabulation of total orbit-integrated fluence distributions by L-bands for selected energy thresholds, in units of particles per square centimeter, normalized to 5 MeV and .5 MeV for protons and electrons, respectively.

The tables contain 48 L-bands of equal size covering the range from L=1.0 to L > 10.4 earth radii in constant increments of .2 earth radii.

II. Spectral Profiles: Tables 13-24

Tabulation of average orbit-integrated spectral distributions. Composite spectra are given in units of: fluxes per square centimeter per second, fluxes per square centimeter per day, and total fluences per specified mission duration (5 years). For the electrons, the latter are also given in terms of inner and outer zone contributions. Functionally derived differential fluxes are listed in the last columns for both species of particles.

Total orbit-integrated spectra in percent, for energy intervals ΔE corresponding to the energy levels of the L-band tables, are also given in terms of average instantaneous and daily intensities.

An exposure index (for the normalization energies used in the L-band tables) is listed for nine successive intensity ranges varying by one order of magnitude, in terms of processed exposure duration (in hours) and total number of particles accumulated while in that intensity range for the indicated number of hours.

III. Peaks and Totals Per Orbit: Tables 25-30

These tables contain the absolute instantaneous peak fluxes and the total fluences accumulated during each successive revolution, as obtained from the nominal trajectories for the investigated flight duration (24 hours of mission time).

Specifically, there are nine columns on these tables. Column 1 is an orbit counting device, based on:

a) the orbit period when the trajectory is circular and lies in the equatorial plane;
b) the physical perigee in all elliptical flight-path cases; and,
c) the equatorial crossing for circular inclined trajectories.

Column 2 gives the peak flux. Columns 3, 4 and 5 indicate the spacecraft position in geocentric coordinates at which the predicted peak flux was encountered. Columns 6, 7 and 8 determine respectively the relative orbit time and the magnetic B-L coordinates for this event. For the purpose of orbital radiation studies, all simulated trajectories start at t_o = hours. Finally, the last column indicates the total predicted flux to be encountered during that particular orbit. It is advisable to disregard the last line on this table because many times that orbit is incomplete and the fluxes or positions shown do not correspond to true peaks.

IV. Time-Accounting and Exposure-Analysis: Tables 31-36

The "EXPOSURE-ANALYSIS" summary indicates what percent of its total lifetime T the satellite spends in "flux-free" regions of space, what percent of its total lifetime it spends in high intensity proton and electron domains, and while so exposed, what percent of its total flux it accumulates.

In the context of this study, the term "flux-free" applies to all regions of space where trapped particle fluxes are less than one proton or electron per square centimeter per second, having energies $E > 5$ MeV, and $E > .5$ MeV, respectively. By definition, this includes all regions external to the Van Allen radiation belts.

The concept of "trapped particle fluxes" is meant to include stably trapped, pseudo trapped, and transient fluxes, as long as they are part of or contained in the environment models used and, in the case of transients or pseudos, their sources are considered powerful enough to supply them continuously in substantial numbers.

Similarly, as "high intensity" are defined those regions of space where the instantaneous, integral, omnidirectional, trapped-particle flux is greater than 10^3 protons with energies E > 5. MeV, and greater than 10^5 electrons with energies E > 5. MeV.

The values given in these tables are statistical averages, obtained over extended intervals of mission time. However, they may vary significantly from one orbit to the next, when individual revolutions are considered.

The "TIME-ACCOUNT" breakdown shows what percent of its total time the satellite spends in the "inner zone" ($1.0 \leq L < 2.8$) and in the "outer zone" ($2.8 \leq L \leq 11.0$) electron trapping domains, and also the percent of time spent in regions external to the latter ($L > 11.0$).

It should be noted that the confinement of the outer zone within the boundary of the L=11.0 earth radii volume is arbitrary and has no physical meaning. It is intended only as a simplification to facilitate the calculations. The region considered "external" in this study ($L > 11.0$) is still partially a domain of the outer zone, at least as far out as L=12.0 earth radii, according to the current environment models.

A last item on this table: the inner zone time is further subdivided into two parts: the percentage of time spent outside ($L < 1.1$) and inside ($1.1 \leq L < 2.8$) the trapping domain.

V. Solar Proton Fluences and Exposure Factor: Tables 37-42

For the specified mission duration τ (printed in the sub-title), and dipole cut-off shell (L=5 earth radii, shown in the header), this table lists the solar proton fluence-spectra (in units of particles per square centimeter) at five discrete confidence levels Q (given at the top of each column).

The exposure factors (in percent of total mission duration) obtained from the geomagnetic shielding analysis are also listed for four dipole cut-off shell values (in earth radii).

VI. Total Dose and Components: Tables 43-60

These tables list doses in units of $rads_{AL}$ as a function of aluminum shield thickness, given in three ways: range s in grams per square centimeter, depth t in millimeters, and depth t in mils.

Electron, bremsstrahlung, and proton contributions to the overall sumtotal dose are given separately. Electron and proton doses are further broken down into their respective constituents; namely, inner zone and outer zone for the former, trapped and solar flare for the latter.

The specific mission duration for which the doses have been calculated is indicated in the table headline.

Caution: the AL-event solar flare protons are not contributed gradually over the investigated mission duration (τ = 5 years) but are imparted in toto in a relatively short burst, that is, within approximately 2-4 days per AL event.

B. Graphical Presentation

Some of the tabulated data are also plotted in Figures 1 to 36, and 49 to 102 with additional Figures 37 to 48 containing plots of flight path data. Positional flux and dose data are plotted in Figures 103-162. As with the tables, the computer plots are arranged in eight sets, where again each set pertains to one specific type of data. The first three sets have two similar members for each trajectory investigated: one for each particle species. The next two sets (fourth and fifth) contain one member for each trajectory considered. The sixth set contains nine similar members for each trajectory, providing three graphs (for respective depth ranges) for each of three geometries. The seventh set contains two similar members for each trajectory: one for each particle species. Finally, the last set has eight members for each trajectory.

I. Time and Flux Histograms: Figures 1-12

These plots show two curves superimposed on the same graph; [illegible]ely, one each for the variables "time" and "flux". Both are given on a [illegible]-log scale as functions of the parameter L (earth radii), within the ran[illegible] $1 < L \leq 10$, and for constant L-bands of .1 earth radius width. The plots [illegible]:

a) by a plain curve, the characteristic trajectory inte[illegible]ities as obtained from the orbital integration process in terms of averaged integral particle fluxes above a given energy.
b) by a contour marked with suymbols, the percent total lifetime (%T) spent in each L interval.

The logarithmic ordinate relates to the time-flux variables. The printed numbers are powers of 10 and pertain to the fluxes; the scale values for the time curves are given in the upper part of the ordinate label: from 10^{-3} to 10^{2} percent of T, the type of particles, their integral energy, and the units, are all given in the lower part of the label. The label on the top of the graph identifies the trajectory.

II. Spectral Profiles: Figures 13-24

A graphical presentation of the final composite spectral distribution, obtained from the orbital integration process. The plots are semi-log graphs, where the abscissa is a linear energy scale for integral particle energies E, in MeV, and the ordinate is a logarithmic scale for the fluxes, given in daily averages for energies greater than E; the printed scale values are powers of 10.

III. Peaks Per Orbit: Figures 25-36

Here the absolute peak intensities, encountered per period (1 period = 1 revolution = 1 orbit), are plotted for the duration of the flight-time processed in the analysis. The logarithmic ordinate, with scale values in powers of 10, relates to instantaneous particle fluxes of the environment at the indicated energy thresholds, while the abscissa is a linear orbit enumeration.

IV. Trajectory World Map Projections: Figures 37-42

These graphs depict the surface trace of the geocentrically projected subsatellite positions. The trajectories are plotted for several revolutions on a global map produced by a Miller Cylindrical Projection method. The contours of the continents have been omitted for clarity. The positions of equatorial crossing, of physical perigee, or of period commencement are indicated by numbers identifying the orbits shown in the graphs. For all trajectories, the distance between successive sequential numbers is a measure of the orbit precession.

V. Flight Path Tracing in B-L Space: Figures 43-48

Plots showing trajectory traces in B-L space on a semi-log scale. Several orbits are depicted, each identified by its sequential number. The magnetic equator is entered on all plots. The logarithmic ordinate relates to the field strength B in gauss; the printed values are exponents of 10. L is given in earth radii on the linear abscissa.

VI. Dose-Depth Curves by Geometry: Figures 49-102

Plots of final depth-dose values for the indicated mission duration. Normally, these plots show composite curves for bremsstrahlung, combined electrons (inner and outer zone), combined protons (trapped and solar flare), and sumtotal of all contributions. In the present case, the respective contours consist of inner and outer zone electrons separately and of trapped and solar flare protons, separately, of composite bremsstrahlung, and the sumtotal.

For ease of use and in order to provide a greater resolution at the more sensitive range of depths (namely the thinner shields) three plots have been generated per processed trajectory, for shield-ranges and subdivisions increasing by one order of magnitude.

The logarithmic ordinate, with scale values in powers of 10, relates to aluminum dose in units of rads. The linear abscissa is the shield thickness, given in three different units: range s in grams per square centimeter, depth t in millimeters, depth t in mils.

VII. Positional Flux Plots: Figures 103-114

Plots of instantaneous omnidirectional trapped particle fluxes (electrons and protons) at (up to 10) specified threshold energy levels (>MeV), for a selected orbit (usually worst case revolution through heart of SAA).

The logarithmic ordinate, with scale values in powers of 10, relates to the number of particles per square centimeter per second. The linear abscissa is the relative time, in minutes or hours , from the beginning of the selected orbital pass.

VIII. Positional Dose Plots: Figures 115-162

Plots of instantaneous omnidirectional trapped particle dose values at (up to 10) specified shield thicknesses (omnidirectional isotropic incidence, cosine-theta distribution) for a selected orbit (usually worst case revolution through heart of SAA). Separate plots are generated (if present) for: electron dose (including bremsstrahlung), proton dose, and total dose (no solar proton contributions are included) for dose at transmission surface of aluminum slab shields, dose in semi-infinite aluminum medium, and dose at center of aluminum spheres.

The logarithmic ordinate, with scale values in powers of 10, relates to the respective dose in units of rads-aluminum. The linear abscissa is the relative time, in minutes or hours, from the beginning of the selected orbital pass.

11. RESULTS: ANALYSIS AND DISCUSSION

In this section, some of the presented tabular or graphical study-results are discussed, with occasional comments as to their use, limits, and applications.

A. Spectral Profiles

Characteristic features of the near earth radiation environment are strong altitude and inclination dependencies. However, at high inclination values ($30° < i < 90°$) small changes in inclination will not produce changes in flux levels and spectral distributions as significant as those produced by small changes in altitude. The greatest inclination dependent variations occur in the range $0° \lesssim i \lesssim 30°$.

I. Protons: The protons exhibit relatively hard, almost uniform spectra in the investigated inclination-altitude regime.

It should be noted that a characteristic softening of the high energy tail of the spectrum appears at the 6389 km altitude orbit, near E > 400 MeV, as a consequence of the limit of the volume of space occupied by these particles. The extent of the proton trapping domain along the magnetic equator is inversly related to their energy. This is strikingly demonstrated by the spectrum of the 10371 km altitude orbit, which falls off sharply at about E > 100 MeV and which indicates that according to the standard model there are no protons with energies E > 150 MeV contained in the region of space sampled by this trajectory.

II. Electrons: The electrons show complex variable spectra. Inner zone and outer zone average, orbit-integrated, composite intensities rise non-uniformly with altitude, particularly at energies above 3.75 MeV with differences reaching up to several orders of magnitude at E > 6 MeV. Spectra extend to higher energies as height increases.

The inner zone spectra fall rapidly off to zero flux in the energy range from 4 to 5 MeV and they are therefore more benign then their harder outer-zone counterparts, which extend to energies of about 7 MeV.

At low altitudes (1667 abd 2593 km), the inner zone contributions prevail up to about E > 2.75 MeV, but for all energies E > 2 MeV the inner zone spectra are always softer than the outer zone spectra (in agreement with the models).

However, at high altitudes (e.g. the 10371 km orbit), the inner zone contributions become insignificant even at low energies (.1 < E(MeV) < .7).

B. Peaks Per Orbit

The absolute peaks per revolution have been obtained for standard processing energies: E > 5. MeV for protons and E > .5 MeV for electrons. Other energy selections produce different peak curves in an inverse relationship: lower energies yield higher and more expanded contours, and vice versa.

Peak contours of inclined circular trajectories display amplitude variations and sometimes discontinuities (flux-free time) that follow periodic patterns based on the daily cycle of revolutions. For fixed energies, amplitudes and discontinuities are function of: (a) inclination i, and (b) altitude h.

Variations in either i or h may produce significant changes in the amplitude of the peak curves and in the duration of the discontinuities: up to several orders of magnitude for the former, and completely eliminating the latter.

For the investigated trajectories at the given, fixed, inclination (i = 60°), the following observations can be made:

a) protons: at the processed energy of E > 5 MeV only small variations are obtained for the low altitude orbits at 1667 and 2593 km; the difference between maximum and minimum peak intensity predicted is about a factor of 6 ar l 3, respectively. These differences disappear at higher altitudes, while at the same time the peak flux levels rise by about two orders of magnitude, from $\sim 7\times10^4$ particles per square centimeter at 1667 km to $\sim 7\times10^6$ particles per square centimeter at 5186 km.

b) electrons: at the processed energy of E > .5 MeV the electron peaks appear very similar to those of the protons, as described in the previous paragraph. But the electron peak fluxes start at higher levels and reach an upper limit at the same altitude as the protons only with smaller differences: from $\sim 3\times10^6$ particles per square centimeter at 1667 km to $\sim 1\times10^7$ particles per square centimeter at 5186 km.

C. Flux-Free Time

Some comments on this topic have been provided in the previous section and in section 10/IV. Here a more detailed discussion will be given.

Flux-free time (FFT) intervals are an important feature of certain orbital configurations. They may occur over short orbit segments (partial FFT per period) or over the entire length of a revolution (total FFT per period). In terms of geomagnetic geometry, the FFTs establish the duration for which the trajectory lies outside the trapping domain of the corresponding particle species, evaluated at the given energies. Or conversely, they are a measure of the degree to which the trajectory is exposed to the charged particle trapping domains.

The number of consecutive flux-free orbits of circular trajectories is primarily a function of altitude and inclination and to a lesser degree a function of particle energy. Of the investigated flight paths, and for the selected energies (electrons: E > .5 MeV, protons: E > 5. MeV), none shows any completely flux-free revolutions per day. The total FFT, which derives completely from partially exposed revolutions (see "Exposure Analysis," Tables #31 to 36), in percent of total mission duration, can be summarized as follows:

Altitude (km)	Protons (E > 5. MeV)	Electrons (E > .5 MeV)
1667	22%	2%
2593	24%	3%
3889	30%	4%
5186	35%	6%
6389	39%	7%
10371	51%	11%

Higher energies will yield longer FFTs because the more energetic particles occupy a smaller volume of space.

D. Dose and Shielding

The calculated doses display features characteristic of the terrestrial radiation environment: at medium-to-high shield thicknesses, small contributions from relatively benign and low intensity electron spectra combined with major contributions from comparatively hard and intense proton spectra; at thin shield thicknesses the electrons predominate.

Depending on altitude, the proton doses prevail for shield thicknesses from greater than 16 to greater than 200 mils of aluminum. At high altitudes (e.g. 10371 km orbit) the opposite is true: protons are the major dose contributors only for shield thicknesses of less than 5 mils of aluminum.

Significant, however, is the fact that for aluminum the proton dose is only a weak function of shield thickness, as it shows very little attenuation over the evaluated depth range. Thus, in order to get an appreciable reduction in the dose, say by one order of magnitude, a 20-fold increase in shield thickness is necessary. The same is true for the bremsstrahlung dose. However, at low altitudes, in comparison to the proton contributions, the bremsstrahlung dose is so small (about 2 orders of magnitude lower) that it may be disregarded.

I. Decay and Degradation

The total doses obtained for each of the six investigated trajectories for the five year mission duration are substantial. In terms of electronics decay or materials degradation, the doses to be experienced on this mission inside the satellite, that is, behind a skin of about 80 mils of equivalent aluminum, are severe even for insensitive components or equipment:

Altitudes (km)	Spherical Dose
1667	~294K rads
2593	~1093K rads
3889	~1558K rads
5186	~1266K rads
6389	~1099K rads
10371	~1682K rads

II. Contamination and Interference

It should be remembered, that the direct or indirect effects of the radiation environment may also be a nuisance in terms of instrument interference or measurement contamination. If such is the case, some remedies may be available.

III. Possible Improvements

In the event that the magnitude of total dose or degree of radiation penetration behind the skin of the satellite is of importance to the mission, four possibilities exist to reduce the radiation effects on instrument and components:

a) build or design an instrument less sensitive to radiation and construct the on-board and/or on-ground data processing software to remove or suppress radiation-induced noise
b) change the orbit by any combination of the elements eccentricity, altitude, and inclination so as to achieve a more benign environment
c) change the mission epoch: solar max for reduced proton intensities, solar min for reduced electron intensities
d) provide increased shielding either by geometry or by weight or by a combination of both;

by geometry: perform a 3-D analysis (solid angle sectoring) and rearrange other equipment on board the satellite in order to provide maximum protection to sensitive part over greatest possible fraction of solid angle.*

by weight: place additional shields around sensitive part as needed. Clearly options (a), (b), and (d) are most readily accesible.

*A powerful computer package for complex radiation shielding and transport calculations is now operational at GSFC. It is capable of addressing such topics as: (a) material mixtures, cross sections for protons, electrons, heavy charge particles, and neutrons, including source spectra and response functions; (b) source geometry, detector geometry, surfaces, rays, bodies, regions, body intersections, body unions, simple meshes, design bodies, spacecraft rays, with diverse features such as combinatorial options, translate-rotate-replicate capabilities, etc.; (c) heavy charged particle applications-1D transport by numerical integration, small volume pulse height (soft errors), 3D ray trace sectoring, 3D adjoint Monte Carlo; (d) electron bremsstrahlung-1D transport by numerical integration and by adjoint Monte

Carlo, small volume pulse height, 3D ray trace sectoring, 3D forward and adjoint Monte Carlo, energy deposition, charging distributions.

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8, AE6, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. IGE-TRN 1975 * TIMF= 1989.5 **
** VEHICLE : NVLX1:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 1667KM ** APOGEE= 1667KM ** B/L ORBIT TAPE: 105446 ** PERIOD= 1.995 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

PROTONS

** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX OF ENERGY GREATER THAN 5.000MEV **

ENERGY LEVELS >(MEV)	L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S											
	1.0-1.2	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	1.05E 00	1.16E 00	1.30E 00	1.75E 00	3.56E 00	1.10E 01	2.77E 01	1.39E 02	6.97E 02	3.60E 03	1.67E 04	7.49E 04
2.000	1.02E 00	1.05E 00	1.18E 00	1.46E 00	2.15E 00	3.45E 00	4.87E 00	7.61E 00	1.28E 01	1.91E 01	3.17E 01	5.01E 01
5.000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
8.000	9.80E-01	9.03E-01	8.27E-01	6.54E-01	5.01E-01	3.82E-01	3.16E-01	2.57E-01	1.87E-01	1.44E-01	7.97E-02	1.29E-02
10.00	9.65E-01	8.38E-01	7.23E-01	4.87E-01	3.23E-01	2.21E-01	1.69E-01	1.29E-01	8.14E-02	5.52E-02	2.44E-02	2.51E-03
25.00	8.72E-01	5.69E-01	4.31E-01	1.82E-01	8.00E-02	3.24E-02	1.59E-02	8.98E-03	2.89E-03	0.0	0.0	0.0
50.00	7.46E-01	4.20E-01	3.02E-01	1.06E-01	3.01E-02	7.29E-03	2.18E-03	6.81E-04	0.0	0.0	0.0	0.0
100.0	5.43E-01	2.59E-01	1.73E-01	4.38E-02	7.63E-03	1.39E-03	1.67E-04	0.0	0.0	0.0	0.0	0.0
500.0	2.32E-02	6.25E-03	2.23E-03	8.98E-05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	1.06E 06	2.64E 08	1.57E 08	6.44E 07	3.40E 07	2.17E 07	1.10E 07	5.46E 06	1.51E 06	4.14E 05	1.25E 05	5.65E 04

ENERGY LEVELS >(MEV)	L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S											
	3.4-3.6	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	3.85E 05	1.98E 07	2.10E 07	1.13E 07	1.10E 07	6.54E 06	2.23E 06	2.41E 06	4.41E 06	2.61E 06	2.69E 06	1.06E 06
2.000	1.38E 02	5.22E 03	2.62E 03	4.99E 02	2.39E 02	4.89E 01	2.66E 00	0.0	0.0	0.0	0.0	0.0
5.000	1.00E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	6.45E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ENERGY LEVELS >(MEV)	L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S											
	5.8-6.0	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	3.25E 05	3.30E 05	2.25E 04	1.49E 04	3.09E 04	3.42E 03	1.25E 02	3.69E 00	0.0	0.0	0.0	0.0
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ENERGY LEVELS >(MEV)	L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S											
	8.2-8.4	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8*	*9.8-10.0*	*10.0-10.2*	*10.2-10.4*	*10.4-OVR*
.1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1

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*************************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VLTIES AP8; AE6, AEI7 FOR SOLAR MAXIMUM      ***      UNIFLUX OF 1979  **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0   **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  PARRAC,JOUGH ET.AL. I6F-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NMAX1S-MAX ** INCLINATION= 60DEG ** PERIGEE= 1667KM ** APOGEE= 1667KM ** B/L ORBIT TAPE: TU5AA6 ** PERIOD= 1.995 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
*************************************************************************************************************************************
                        ********************************** ELECTRONS LO **********************************
                        ** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX OF ENERGY GREATER THAN .5000MEV **
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ENERGY LEVELS >(MEV)	L - B A N D S (M A G N E T I C			S H E L L		P A R A M E T E R		I N	E A R T H		R A D I I)	L - B A N D S
	1.0-1.2	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	2.52E 01	3.40E 01	3.59E 01	5.00E 01	6.19E 01	1.05E 02	1.60E 02	6.30E 01	1.32E 01	7.23E 00	5.92E 00	5.73E 00
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	8.33E-02	1.22E-01	1.64E-01	5.79E-02	1.66E-02	9.81E-03	1.10E-02	2.11E-02	5.89E-02	3.26E-01	3.86E-01	4.45E-01
1.500	2.41E-02	4.08E-02	6.49E-02	2.06E-02	4.38E-03	1.56E-03	1.54E-03	4.07E-03	1.90E-02	1.67E-01	1.96E-01	2.27E-01
2.000	1.15E-02	1.79E-02	2.61E-02	7.82E-03	1.02E-03	3.59E-04	2.72E-04	8.02E-04	5.07E-03	6.56E-02	9.99E-02	1.16E-01
3.000	1.36E-03	1.79E-03	2.05E-03	3.90E-04	4.53E-05	4.57E-06	0.0	4.45E-06	2.41E-04	3.34E-02	3.96E-02	4.57E-02
4.000	0.0	1.57E-05	1.48E-05	4.82E-06	2.95E-07	0.0	0.0	0.0	0.0	8.40E-03	8.46E-03	8.94E-03
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.41E-04	3.80E-04	4.45E-04
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	5.17E 06	1.21E 10	8.25E 09	2.15E 09	7.55E 08	1.94E 08	5.92E 07	2.90E 07	1.23E 07	3.68E 07	2.20E 08	5.86E 08

ENERGY LEVELS >(MEV)	L - B A N D S (M A G N E T I C			S H E L L		P A R A M E T E R		I N	E A R T H		R A D I I)	L - B A N D S
	3.4-3.6	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	6.34E 00	5.94E 00	4.70E 00	3.81E 00	3.59E 00	3.33E 00	3.48E 00	3.65E 00	3.80E 00	3.86E 00	3.92E 00	3.94E 00
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	4.87E-01	5.28E-01	5.23E-01	4.95E-01	4.90E-01	4.80E-01	4.59E-01	4.43E-01	4.07E-01	3.56E-01	3.16E-01	3.01E-01
1.500	2.46E-01	2.50E-01	2.30E-01	2.01E-01	1.91E-01	1.76E-01	1.66E-01	1.59E-01	1.44E-01	1.24E-01	1.07E-01	9.91E-02
2.000	1.24E-01	1.18E-01	1.01E-01	8.20E-02	7.45E-02	6.44E-02	5.99E-02	5.72E-02	5.13E-02	4.29E-02	3.65E-02	3.26E-02
3.000	4.82E-02	4.63E-02	3.83E-02	2.89E-02	2.42E-02	1.84E-02	1.47E-02	1.25E-02	9.75E-03	7.16E-03	5.40E-03	4.30E-03
4.000	8.81E-03	8.05E-03	6.53E-03	5.02E-03	4.44E-03	3.67E-03	3.27E-03	3.02E-03	2.62E-03	2.15E-03	1.77E-03	1.43E-03
5.000	4.70E-04	4.54E-04	3.83E-04	3.04E-04	2.73E-04	2.29E-04	2.03E-04	1.26E-04	1.57E-04	1.22E-04	9.66E-05	7.62E-05
6.000	1.11E-07	4.31E-07	9.07E-07	5.48E-07	4.34E-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	5.80E 08	5.16E 08	5.54E 08	5.17E 08	4.36E 08	5.52E 08	1.98E 08	1.17E 08	1.83E 08	1.62E 08	1.62E 08	6.84E 07

ENERGY LEVELS >(MEV)	L - B A N D S (M A G N E T I C			S H E L L		P A R A M E T E R		I N	E A R T H		R A D I I)	L - B A N D S
	5.8-6.0	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	3.96E 00	4.28E 00	5.39E 00	6.00E 00	6.89E 00	7.59E 00	9.75E 00	1.29E 01	1.69E 01	2.28E 01	3.35E 01	4.49E 01
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	2.77E-01	2.63E-01	2.35E-01	2.23E-01	2.04E-01	1.82E-01	1.58E-01	1.45E-01	1.32E-01	1.13E-01	9.00E-02	7.03E-02
1.500	8.62E-02	7.80E-02	6.17E-02	5.55E-02	4.72E-02	3.99E-02	3.17E-02	2.73E-02	2.36E-02	2.01E-02	1.62E-02	1.12E-02
2.000	2.68E-02	2.31E-02	1.62E-02	1.38E-02	1.09E-02	8.72E-03	6.37E-03	5.14E-03	4.19E-03	3.57E-03	2.92E-03	1.78E-03
3.000	2.88E-03	2.29E-03	1.39E-03	1.11E-03	7.74E-04	4.90E-04	2.57E-04	1.59E-04	8.57E-05	0.0	0.0	0.0
4.000	9.65E-04	7.56E-04	4.32E-04	3.39E-04	2.17E-04	1.12E-04	4.07E-05	0.0	0.0	0.0	0.0	0.0
5.000	5.00E-05	3.64E-05	3.22E-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	6.15E 07	6.23E 07	2.17E 07	1.15E 07	1.94E 07	1.25E 07	8.55E 06	3.37E 06	2.77E 06	1.58E 06	7.16E 05	5.35E 05

ENERGY LEVELS >(MEV)	L - B A N D S (M A G N E T I C			S H E L L		P A R A M E T E R		I N	E A R T H		R A D I I)	L - B A N D S
	8.2-8.4	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8**	9.8-10.0*	10.0-10.2*	10.2-10.4*	10.4-CVR*
.1000	5.79E 01	7.12E 01	9.93E 01	1.35E 02	1.72E 02	2.43E 02	0.0	0.0	6.28E 02	1.49E 03	1.16E 04	2.73E 03
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	0.0	0.0	1.00E 00	1.00E 00	0.0	0.0
1.000	5.35E-02	4.22E-02	2.73E-02	2.23E-02	1.71E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.500	4.83E-03	1.58E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.000	4.44E-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	3.17E 05	2.16E 05	1.27E 05	4.41E 04	4.45E 04	1.94E 04	0.0	0.0	3.40E 03	7.42E 02	0.0	0.0

TABLE 2

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****************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM     ***     UNIFLUX OF 1979   **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:    FOR PROTONS (AP8) - UF= 1.0;   FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0   **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. 166-TPM 1975 * TIME= 1989.5 **
** VEHICLE : NW X2:S-MAX  ** INCLINATION= 60DEG ** PERIGEE= 2593KM ** APOGEE=  2593KM ** B/L ORBIT TAPE: JD5446 ** PERIOD=  2.349 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
****************************************************************************************************************************
                         ********************************   PROTONS   ********************************
                         ** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX OF ENERGY GREATER THAN F.000MEV **
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ENERGY LEVELS >(MEV)	*1.0-1.2*	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
	L - B A N D S	(M A G N E T I C		S H E L L		P A R A M E T E R		I N	E A R T H	R A D I I)	L - B A N D S	
.1000	0.0	1.23E 00	1.41E 00	1.91E 00	3.64E 00	1.05E 01	3.98E 01	1.51E 02	6.94E 02	3.67E 03	1.48E 04	8.16E 04
2.000	0.0	1.14E 00	1.25E 00	1.54E 00	2.19E 00	3.48E 00	5.06E 00	7.99E 00	1.32E 01	2.11E 01	3.22E 01	5.56E 01
5.000	0.0	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
8.000	0.0	8.38E-01	7.36E-01	5.98E-01	4.64E-01	3.69E-01	3.07E-01	2.48E-01	1.86E-01	1.37E-01	9.82E-02	2.95E-02
10.00	0.0	7.34E-01	5.84E-01	4.14E-01	2.79E-01	2.06E-01	1.61E-01	1.22E-01	8.11E-02	5.16E-02	3.07E-02	7.01E-03
25.00	0.0	4.02E-01	2.12E-01	1.02E-01	5.16E-02	2.74E-02	1.42E-02	6.08E-03	3.42E-03	5.23E-04	0.0	0.0
50.00	0.0	2.73E-01	1.25E-01	5.21E-02	1.78E-02	6.16E-03	1.99E-03	8.51E-04	9.13E-05	0.0	0.0	0.0
100.0	0.0	1.59E-01	6.93E-02	2.21E-02	4.97E-03	1.23E-03	2.33E-04	5.36E-06	0.0	0.0	0.0	0.0
500.0	0.0	3.27E-03	1.06E-03	9.86E-05	3.06E-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	3.12E 08	2.22E 09	6.24E 08	2.25E 08	1.14E 08	5.65E 07	2.18E 07	7.16E 06	2.26E 06	6.08E 05	1.67E 05

ENERGY LEVELS >(MEV)	*3.4-3.6*	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
	L - B A N D S	(M A G N E T I C		S H E L L		P A R A M E T E R		I N	E A R T H	R A D I I)	L - B A N D S	
.1000	3.34E 08	4.40E 06	8.35E 07	3.79E 07	2.98E 07	2.86E 07	1.87E 07	2.36E 07	1.45E 07	1.12E 07	5.53E 06	4.20E 06
2.000	1.09E 02	9.98E 02	6.94E 03	1.56E 03	4.38E 02	1.14E 02	1.82E 01	0.0	0.0	0.0	0.0	0.0
5.000	1.00E 00	1.00E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	3.95E 04	1.88E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ENERGY LEVELS >(MEV)	*5.8-6.0*	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
	L - B A N D S	(M A G N E T I C		S H E L L		P A R A M E T E R		I N	E A R T H	R A D I I)	L - B A N D S	
.1000	3.44E 06	1.11E 06	1.11E 06	2.61E 05	2.58E 05	2.33E 04	1.58E 04	1.11E 03	2.53E 02	6.20E 00	1.91E 00	0.0
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ENERGY LEVELS >(MEV)	*8.2-8.4*	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8*	*9.8-10.0*	*10.0-10.2*	*10.2-10.4*	*10.4-OVR*
	L - B A N D S	(M A G N E T I C		S H E L L		P A R A M E T E R		I N	E A R T H	R A D I I)	L - B A N D S	
.1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 3

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********************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AEI7 FOR SOLAR MAXIMUM       ***      UNIFLUX OF 1979   **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:    FOR PROTONS (AP8) - UF= 1.0;   FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0      **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL   4:   BARRACLOUGH ET.AL. 16E-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NMLX2:S-MAX  ** INCLINATION= 60DEG ** PERIGEE= 2593KM ** APOGEE=  2593KM ** B/L ORBIT TAPE: ID5AA6 ** PERIOD=  2.349 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
********************************************************************************************************************************
                         *********************************   ELECTRONS LC   *********************************
                         ** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX OF ENERGY GREATER THAN .5000MEV **
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ENERGY LEVELS >(MEV) — L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S

ENERGY LEVELS >(MEV)	*1.0-1.2*	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	0.0	3.11E 01	3.24E 01	4.16E 01	5.15E 01	8.38E 01	1.32E 02	7.43E 01	1.38E 01	7.41E 00	6.07E 00	5.77E 00
.5000	0.0	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	0.0	1.53E-01	1.59E-01	5.96E-02	1.70E-02	9.79E-03	1.05E-02	2.08E-02	5.67E-02	3.21E-01	3.78E-01	4.47E-01
1.500	0.0	5.39E-02	6.36E-02	2.13E-02	4.53E-03	1.58E-03	1.47E-03	3.96E-03	1.82E-02	1.63E-01	1.92E-01	2.29E-01
2.000	0.0	2.36E-02	2.88E-02	8.15E-03	1.06E-03	1.65E-04	2.75E-04	7.88E-04	4.82E-03	8.25E-02	9.78E-02	1.17E-01
3.000	0.0	2.07E-03	1.96E-03	4.07E-04	4.85E-05	8.83E-06	0.0	7.87E-06	2.97E-04	3.20E-02	3.85E-02	4.59E-02
4.000	0.0	1.63E-05	1.40E-05	5.56E-06	9.11E-07	0.0	0.0	0.0	7.27E-06	7.93E-03	8.32E-03	8.95E-03
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.05E-04	3.66E-04	4.48E-04
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.64E-08
NORMFLUX=	0.0	1.17E 10	5.77E 10	1.40E 10	3.71E 09	9.46E 08	2.87E 08	1.12E 08	4.76E 07	1.33E 08	4.02E 08	9.26E 08

ENERGY LEVELS >(MEV)	*3.4-3.6*	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	6.37E 00	6.05E 00	4.62E 00	3.86E 00	3.54E 00	3.33E 00	3.48E 00	3.67E 00	3.80E 00	3.86E 00	3.92E 00	3.94E 00
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	4.93E-01	5.24E-01	5.21E-01	4.96E-01	4.88E-01	4.80E-01	4.59E-01	4.41E-01	4.11E-01	3.61E-01	3.19E-01	2.98E-01
1.500	2.47E-01	2.50E-01	2.28E-01	2.04E-01	1.88E-01	1.76E-01	1.66E-01	1.58E-01	1.46E-01	1.26E-01	1.08E-01	9.75E-02
2.000	1.23E-01	1.19E-01	5.97E-02	6.41E-02	7.27E-02	6.43E-02	6.00E-02	5.65E-02	5.19E-02	4.37E-02	3.67E-02	3.19E-02
3.000	4.84E-02	4.69E-02	3.78E-02	3.02E-02	2.32E-02	1.83E-02	1.47E-02	1.22E-02	9.56E-03	7.42E-03	5.45E-03	4.11E-03
4.000	8.72E-03	8.14E-03	6.43E-03	5.18E-03	4.30E-03	3.66E-03	3.27E-03	2.99E-03	2.66E-03	2.20E-03	1.78E-03	1.37E-03
5.000	4.74E-04	4.58E-04	3.78E-04	3.13E-04	2.65E-04	2.29E-04	2.03E-04	1.84E-04	1.60E-04	1.26E-04	9.72E-05	7.28E-05
6.000	1.10E-06	2.65E-06	2.41E-06	1.93E-06	9.61E-07	8.11E-08	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	1.11E 09	1.08E 09	1.13E 09	7.72E 08	6.99E 08	7.91E 08	5.02E 08	5.46E 08	3.34E 08	2.86E 08	1.65E 08	1.41E 08

ENERGY LEVELS >(MEV)	*5.8-6.0*	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	3.96E 00	4.13E 00	5.25E 00	6.06E 00	7.04E 00	7.79E 00	9.31E 00	1.29E 01	1.63E 01	2.30E 01	3.00E 01	4.57E 01
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	2.82E-01	2.67E-01	2.39E-01	2.22E-01	1.99E-01	1.77E-01	1.60E-01	1.45E-01	1.25E-01	1.12E-01	9.64E-02	7.01E-02
1.500	8.92E-02	8.07E-02	6.38E-02	5.51E-02	4.56E-02	3.81E-02	3.25E-02	2.72E-02	2.41E-02	2.00E-02	1.73E-02	1.12E-02
2.000	2.81E-02	2.44E-02	1.71E-02	1.37E-02	1.04E-02	8.24E-03	6.61E-03	5.12E-03	4.31E-03	3.56E-03	3.12E-03	1.78E-03
3.000	3.18E-03	2.46E-03	1.51E-03	1.11E-03	7.11E-04	4.35E-04	2.81E-04	1.65E-04	1.15E-04	4.47E-05	0.0	0.0
4.000	1.06E-03	8.20E-04	4.76E-04	3.39E-04	1.94E-04	9.70E-05	5.32E-05	0.0	0.0	0.0	0.0	0.0
5.000	5.56E-05	4.13E-05	1.87E-05	9.25E-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	1.33E 08	4.66E 07	8.03E 07	3.04E 07	4.54E 07	1.47E 07	2.30E 07	7.58E 06	5.93E 06	4.92E 06	1.39E 06	4.11E 05

ENERGY LEVELS >(MEV)	*8.2-8.4*	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8**	9.8-10.0*	10.0-10.2*	10.2-10.4*	10.4-CVR*
.1000	5.52E 01	8.10E 01	9.57E 01	1.30E 02	1.73E 02	2.43E 02	3.32E 02	4.50E 02	6.54E 02	2.02E 03	2.82E 03	2.58E 04
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	0.0
1.000	5.81E-02	3.79E-02	3.21E-02	2.38E-02	1.71E-02	5.97E-03	0.0	0.0	0.0	0.0	0.0	0.0
1.500	8.05E-03	1.44E-03	3.90E-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.000	1.12E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	7.91E 05	6.34E 04	1.88E 05	1.91E 05	2.75E 04	2.91E 04	1.67E 04	2.40E 03	3.11E 03	2.28E 02	4.47E 02	0.0

TABLE 4

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8, AE6, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 168-TERM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX3:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 3889KM ** APOGEE= 3889KM ** B/L ORBIT TAPE: TD5445 ** PERIOD= 2.876 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
****

******************************* ELECTRONS ********************************
** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX OF ENERGY GREATER THAN 5.000MEV **
****

L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S

ENERGY LEVELS >(MEV)	*1.0-1.2*	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	0.0	0.0	1.52E 00	2.20E 00	4.35E 00	1.31E 01	5.20E 01	1.90E 02	6.92E 02	3.32E 03	1.53E 04	6.43E 04
2.000	0.0	0.0	1.32E 00	1.68E 00	2.38E 00	3.74E 00	5.63E 00	8.71E 00	1.42E 01	2.31E 01	3.68E 01	5.75E 01
5.000	0.0	0.0	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
8.000	0.0	0.0	6.55E-01	5.36E-01	4.16E-01	3.43E-01	2.88E-01	2.35E-01	1.77E-01	1.30E-01	9.19E-02	6.46E-02
10.00	0.0	0.0	4.71E-01	3.41E-01	2.30E-01	1.82E-01	1.47E-01	1.13E-01	7.59E-02	4.84E-02	2.81E-02	1.61E-02
25.00	0.0	0.0	7.85E-02	4.23E-02	2.60E-02	1.82E-02	1.14E-02	6.86E-03	3.07E-03	9.82E-04	0.0	0.0
50.00	0.0	0.0	3.39E-02	1.59E-02	7.66E-03	3.71E-03	1.52E-03	6.92E-04	1.52E-04	0.0	0.0	0.0
100.0	0.0	0.0	1.60E-02	6.63E-03	2.32E-03	7.59E-04	1.89E-04	4.21E-05	0.0	0.0	0.0	0.0
500.0	0.0	0.0	1.92E-04	5.20E-05	3.48E-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	1.99E 09	9.45E 09	1.82E 09	5.24E 08	1.65E 08	6.37E 07	2.04E 07	6.07E 06	1.44E 06	4.39E 05

L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S

ENERGY LEVELS >(MEV)	*3.4-3.6*	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	2.44E 05	1.18E 06	2.68E 08	1.42E 08	1.10E 08	7.97E 07	5.83E 07	5.40E 07	4.50E 07	1.59E 07	1.66E 07	8.23E 06
2.000	9.67E 01	2.71E 02	2.99E 04	5.93E 03	1.52E 03	3.35E 02	7.26E 01	5.79E 00	0.0	0.0	0.0	0.0
5.000	1.00E 00	1.00E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	1.87E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	4.61E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	1.42E 05	1.67E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S

ENERGY LEVELS >(MEV)	*5.8-6.0*	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	6.85E 06	4.30E 06	5.06E 06	1.12E 06	5.60E 05	2.72E 05	5.58E 04	2.36E 04	6.70E 03	1.63E 03	6.89E 01	1.82E 01
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S

ENERGY LEVELS >(MEV)	*8.2-8.4*	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8*	*9.8-10.0*	*10.0-10.2*	*10.2-10.4*	*10.4-OVR*
.1000	1.54E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 5

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UP) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UP= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UP= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 168-TERM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX3:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 3889KM ** APOGEE= 3889KM ** B/L ORBIT TAPE: TD5446 ** PERIOD= 2.876 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-6067 **

ELECTRONS LC

** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX OF ENERGY GREATER THAN .5000MEV **

L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S

ENERGY LEVELS >(MEV)	*1.0-1.2*	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	0.0	0.0	3.12E 01	3.28E 01	3.87E 01	6.50E 01	9.83E 01	3.30E 01	1.40E 01	7.65E 00	5.98E 00	5.72E 00
.5000	0.0	0.0	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	0.0	0.0	1.05E-01	5.65E-02	1.71E-02	9.77E-03	1.06E-02	2.06E-02	5.48E-02	3.11E-01	3.83E-01	4.45E-01
1.500	0.0	0.0	4.03E-02	2.00E-02	4.58E-03	1.57E-03	1.48E-03	3.90E-03	1.72E-02	1.57E-01	1.95E-01	2.27E-01
2.000	0.0	0.0	1.77E-02	7.53E-03	1.07E-03	3.62E-04	2.73E-04	7.71E-04	4.51E-03	7.95E-02	9.89E-02	1.16E-01
3.000	0.0	0.0	9.99E-04	3.72E-04	4.93E-05	1.01E-05	2.33E-06	1.79E-05	2.67E-04	3.06E-02	3.90E-02	4.57E-02
4.000	0.0	0.0	9.35E-06	5.30E-06	1.40E-06	0.0	0.0	0.0	1.39E-05	7.62E-03	8.35E-03	8.93E-03
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.71E-04	3.68E-04	4.44E-04
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.01E-07
NORMFLUX=	0.0	0.0	2.47E 10	1.07E 11	2.16E 10	4.27E 09	1.05E 09	4.57E 08	1.83E 08	2.96E 08	7.82E 08	1.35E 09

ENERGY LEVELS >(MEV)	*3.4-3.6*	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	6.35E 00	5.94E 00	4.61E 00	3.84E 00	3.54E 00	3.34E 00	3.45E 00	3.66E 00	3.80E 00	3.86E 00	3.92E 00	3.94E 00
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	4.90E-01	5.29E-01	5.20E-01	4.96E-01	4.89E-01	4.81E-01	4.62E-01	4.42E-01	4.09E-01	3.58E-01	3.16E-01	2.96E-01
1.500	2.46E-01	2.50E-01	2.27E-01	2.03E-01	1.89E-01	1.77E-01	1.67E-01	1.59E-01	1.45E-01	1.24E-01	1.07E-01	9.63E-02
2.000	1.24E-01	1.18E-01	9.95E-02	8.33E-02	7.28E-02	6.50E-02	6.03E-02	5.71E-02	5.16E-02	4.32E-02	3.62E-02	3.14E-02
3.000	4.83E-02	4.63E-02	3.77E-02	2.97E-02	2.33E-02	1.88E-02	1.51E-02	1.24E-02	9.84E-03	7.26E-03	5.33E-03	3.98E-03
4.000	8.76E-03	8.04E-03	6.41E-03	5.12E-03	4.31E-03	3.72E-03	3.31E-03	3.00E-03	2.64E-03	2.17E-03	1.75E-03	1.32E-03
5.000	4.74E-04	4.54E-04	3.77E-04	3.10E-04	2.65E-04	2.32E-04	2.06E-04	1.86E-04	1.59E-04	1.24E-04	9.54E-05	7.08E-05
6.000	2.39E-06	2.71E-06	2.40E-06	1.91E-06	1.52E-06	1.16E-06	5.61E-08	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	1.97E 09	1.83E 09	2.49E 09	2.00E 09	1.92E 09	1.60E 09	1.17E 09	1.03E 09	8.48E 08	3.12E 08	3.51E 08	1.96E 08

ENERGY LEVELS >(MEV)	*5.8-6.0*	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	3.96E 00	4.30E 00	5.14E 00	6.13E 00	7.10E 00	7.64E 00	9.82E 00	1.27E 01	1.72E 01	2.34E 01	3.07E 01	4.10E 01
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	2.79E-01	2.62E-01	2.41E-01	2.21E-01	1.97E-01	1.81E-01	1.53E-01	1.46E-01	1.31E-01	1.11E-01	9.50E-02	7.73E-02
1.500	8.71E-02	7.76E-02	6.51E-02	5.45E-02	4.49E-02	3.94E-02	3.16E-02	2.76E-02	2.35E-02	1.99E-02	1.72E-02	1.31E-02
2.000	2.72E-02	2.30E-02	1.76E-02	1.35E-02	1.02E-02	8.57E-03	6.35E-03	5.23E-03	4.20E-03	3.57E-03	3.11E-03	2.23E-03
3.000	2.97E-03	2.27E-03	1.57E-03	1.08E-03	6.78E-04	4.74E-04	2.58E-04	1.74E-04	1.12E-04	8.44E-05	0.0	0.0
4.000	9.96E-04	7.53E-04	5.02E-04	3.31E-04	1.82E-04	1.09E-04	4.77E-05	1.94E-05	0.0	0.0	0.0	0.0
5.000	5.20E-05	3.67E-05	2.11E-05	1.13E-05	1.31E-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	1.82E 08	1.31E 08	1.88E 08	5.81E 07	5.12E 07	4.32E 07	2.41E 07	1.98E 07	1.48E 07	1.19E 07	2.00E 06	3.05E 06

ENERGY LEVELS >(MEV)	*8.2-8.4*	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8*	*9.8-10.0*	*10.0-10.2*	*10.2-10.4*	*10.4-OVR*
.1000	5.52E 01	7.49E 01	1.10E 02	1.19E 02	1.65E 02	2.64E 02	2.84E 02	4.77E 02	6.03E 02	1.04E 03	3.84E 03	4.93E 04
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	0.0
1.000	5.78E-02	4.27E-02	2.93E-02	2.71E-02	1.85E-02	8.66E-03	3.95E-03	0.0	0.0	0.0	0.0	0.0
1.500	8.03E-03	1.82E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.000	1.12E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	1.10E 06	4.47E 05	5.07E 04	2.32E 05	1.62E 05	1.94E 04	1.64E 04	5.84E 03	5.82E 03	1.56E 03	1.46E 02	0.0

TABLE 6

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE8, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE8) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY IBVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET AL. [illegible] 1975 * TIM = 1989.5 **
** VEHICLE : NAVSTAR-MAX ** INCLINATION= 60DEG ** PERIGEE= 5186KM ** APOGEE= 5186KM ** [illegible] ** PERIOD = 3.438 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,T.(301)-344-8067 **

PROTONS

** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX OF ENERGY GREAT THAN 5.000 MEV **

L - B A N D S (MAGNETIC SHELL PARAMETER IN EARTH RADII) L - B A N D S

ENERGY LEVELS >(MEV)	*1.0-1.2*	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	0.0	0.0	0.0	3.18E 00	5.48E 00	1.50E 01	5.78E 01	2.21E 02	[illegible]	3.26E 03	1.44E 04	6.23E 04
2.000	0.0	0.0	0.0	2.12E 00	2.59E 00	3.98E 00	6.15E 00	5.64E 00	1.56E 01	2.50E 01	4.06E 01	6.50E 01
5.000	0.0	0.0	0.0	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
8.000	0.0	0.0	0.0	4.40E-01	3.79E-01	3.19E-01	2.60E-01	2.20E-01	[illegible]	1.2[illegible]E-01	6.06E-02	6.26E-02
10.00	0.0	0.0	0.0	2.48E-01	1.57E-01	1.61E-01	1.30E-01	1.03E-01	7.0[illegible]E-02	4.40E-02	2.57E-02	1.58E-02
25.00	0.0	0.0	0.0	1.68E-02	1.36E-02	1.14E-02	8.71E-03	5.64E-03	[illegible]E-03	[illegible]E-04	0.0	0.0
50.00	0.0	0.0	0.0	5.18E-03	3.10E-03	1.97E-03	1.07E-03	5.42E-04	1.55E-04	0.0	0.0	0.0
100.0	0.0	0.0	0.0	1.64E-03	9.48E-04	4.27E-04	1.45E-04	4.12E-05	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	1.02E-05	2.64E-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	3.82E 09	1.54E 10	2.50E 09	[illegible]	1.64E 0[illegible]	4.66E 07	1.2[illegible] 07	3.38 06	7.38 05

L - B A N D S (MAGNETIC SHELL PARAMETER IN EARTH RADII) L - B A N D S

ENERGY LEVELS >(MEV)	*3.4-3.6*	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	2.18E 05	8.27E 05	6.24E 06	2.50E 08	2.97E 08	1.23E 08	1.06E 08	7.66E 07	6.75E 07	4.44 07	2.96 07	2.05 07
2.000	1.04E 02	2.12E 02	1.02E 03	1.34E 04	4.49E 05	4.34E 02	1.21E 02	1.26E 01	0.0	0.0	0.0	0.0
5.000	1.00E 00	1.00E 00	1.00E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	4.30E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	1.06E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	2.19E 05	3.63E 04	2.60E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

L - B A N D S (MAGNETIC SHELL PARAMETER IN EARTH RADII) L - B A N D S

ENERGY LEVELS >(MEV)	*5.8-6.0*	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	1.41E 07	1.08E 07	9.03E 06	2.50E 06	1.65E 06	5.15E 05	2.9[illegible] 05	1.24E 05	4.4[illegible] 04	6.0[illegible] 03	3.64 03	1.26 02
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

L - B A N D S (MAGNETIC SHELL PARAMETER IN EARTH RADII) L - B A N D S

ENERGY LEVELS >(MEV)	*8.2-8.4*	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8*	*9.8-10.0*	*10.0-10.2*	*10.2-10.4*	*10.4-OVF*
.1000	1.03E 02	3.24E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 7

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTE ... [illegible] ... UNIFLUX OF 1975 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - [illegible] 1.0; ... ELECTRONS (AE[illegible]) - UF= 1.0) **
** MAGNETIC COORDINATES B AND L COMPUTED BY [illegible] OF 1972 WITH ALLMAG, MODEL [illegible] ... EPOCH 1975 ... **
** ~~VEHICLE~~ [illegible] ** INCLINATION= 60DEG ** PERIGEE= 5100KM ** APOGEE= [illegible]KM ** [illegible] ** [illegible] **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC, ... [illegible] (301)-344-6067 **
****
******************************** ELECTRONS [illegible] ********************************
** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX [illegible] ... [illegible] **
****

ENERGY LEVELS >(MEV)	L-BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS *1.0-1.2*	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	0.0	0.0	0.0	2.59E 01	3.10E 01	4.91E 01	7.2[illegible] 01	4.8[illegible] 01	1.[illegible] 01	7.7[illegible] 00	[illegible]	5.7[illegible] 00
.5000	0.0	0.0	0.0	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00 00	1.00 00
1.000	0.0	0.0	0.0	2.8[illegible]E-02	1.59E-02	7.50E-03	1.0[illegible]E-02	2.04E-0[illegible]	[illegible]	3.1[illegible]E-01	2.97E-01	4.48E-01
1.500	0.0	0.0	0.0	9.23E-03	4.10E-03	1.09E-03	1.47E-03	3.85E-0[illegible]	1.7[illegible]E-0[illegible]	1.57E-01	1.56E-01	2.29E-01
~~2.000~~	~~0.0~~	0.0	0.0	2.45E-03	9.42E-04	3.60E-04	2.74E-04	7.58E-04	4.61E-03	7.85E-02	9.98E-02	1.17E-01
3.000	0.0	0.0	0.0	1.20E-04	4.29E-05	1.04E-0[illegible]	[illegible]E-06	1.81E-0[illegible]	[illegible]E-04	[illegible]E-02	[illegible]	4.59E-02
4.000	0.0	0.0	0.0	2.71E-06	1.30E-06	2.49E-07	0.0	0.0	2.02E-0[illegible]	7.61E-0[illegible]	[illegible]E-03	3.55E-03
~~5.000~~	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.58E-04	2.70E-04	4.49E-04
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]E-07	1.8[illegible]E-06
NORMFLUX=	0.0	0.0	0.0	3.58E 10	1.1[illegible] 11	1.76E 10	[illegible] 09	1.55 09	[illegible]	6.12 08	1.56 09	1.83 0[illegible]

ENERGY LEVELS >(MEV)	L-BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS *3.4-3.6*	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	6.36E 00	5.51E 00	4.66E 00	3.65E 00	3.56 00	3.30E 00	3.45 00	3.67 00	3.8[illegible] 00	3.8[illegible] 00	[illegible]	3.64 00
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00 00	1.00E 00	1.00E 00	1.00E 00	1.00 00	1.00 00
1.000	4.90E-01	5.30E-01	5.22E-01	4.56E-01	4.89E-01	4.50E-01	4.6[illegible]-01	4.41E-01	4.12E-01	3.6[illegible]E-01	3.30E-01	2.56E-01
1.500	2.46E-01	2.50E-01	2.29E-01	2.04E-01	1.89E-01	1.75E-01	1.67E-01	1.58E-01	1.47E-01	1.27E-01	1.09E-01	[illegible]E-02
~~2.000~~	~~[illegible]~~	1.18E-01	1.00E-01	8.37E-02	7.32E-02	6.42E-02	5.63E-02	5.65E-02	5.21E-02	4.42E-02	3.70E-02	3.14E-02
3.000	4.63E-02	4.61E-02	3.80E-02	3.00E-02	2.35E-02	1.83E-02	1.51E-02	1.22E-02	1.00E-02	7.5[illegible]E-03	[illegible]E-03	3.98E-03
4.000	8.75E-03	8.01E-03	6.48E-03	5.15E-03	4.34E-03	3.65E-03	3.31E-03	2.55E-03	2.67E-03	2.2[illegible]E-03	1.81E-03	1.3[illegible]E-03
~~5.000~~	4.74E-04	4.52E-04	3.80E-04	3.11E-04	2.67E-04	2.26E-04	2.06E-04	1.88E-04	1.62E-04	1.28E-04	9.92E-05	7.07E-05
6.000	2.40E-06	2.71E-06	2.42E-06	1.92E-06	1.53E-06	1.20E-06	7.03E-07	4.44E-0[illegible]	0.0	0.0	0.0	0.0
NORMFLUX=	2.34E 09	2.42E 09	2.67E 09	3.47E 09	4.57E 09	2.30E 09	1.57 0[illegible]	1.3[illegible] 09	1.16 0[illegible]	8.0[illegible] 0[illegible]	[illegible].71 0[illegible]	4.44 08

ENERGY LEVELS >(MEV)	L-BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS *5.8-6.0*	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	3.56E 00	4.32E 00	5.03E 00	6.22E 00	7.02E 00	7.77E 00	9.42 00	1.26E 01	1.62 01	2.24 01	3.0[illegible] 01	4.31 01
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00 00	1.00E 00	1.00E 00	1.00E 00	1.00 00	1.00 00
1.000	2.81E-01	2.62E-01	2.43E-01	2.20E-01	2.00E-01	1.77E-01	1.60E-01	1.46E-01	1.35E-01	1.14E-01	9.54E-02	7.4[illegible]E-02
1.500	3.82E-02	7.73E-02	6.61E-02	5.35E-02	4.59E-02	3.63E-02	3.24E-02	2.77E-02	2.41E-02	2.0[illegible]E-02	1.72E-02	1.21E-02
~~2.000~~	~~1.77E-02~~	2.28E-02	1.60E-02	1.32E-02	1.05E-02	8.26E-03	6.58E-03	5.24E-03	4.32E-03	3.62E-03	3.10E-03	1.56E-03
3.000	3.66E-03	2.25E-03	1.62E-03	1.07E-03	7.24E-04	4.45E-04	2.93E-04	1.77E-04	1.1[illegible]E-04	5.44E-05	4.5[illegible]E-05	0.0
4.000	1.03E-03	7.44E-04	5.15E-04	3.26E-04	2.20E-04	1.01E-04	[illegible]E-05	2.05E-05	0.0	0.0	0.0	0.0
~~5.000~~	5.39E-05	3.62E-05	2.19E-05	1.13E-05	5.48E-06	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	3.46E 08	3.04E 08	2.56E 08	1.03E 08	1.13E 08	6.24E 07	6.46E 07	5.48E 07	[illegible] 07	[illegible] 06	9.[illegible] 06	9.82 05

ENERGY LEVELS >(MEV)	L-BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS *8.2-8.4*	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8*	*9.8-10.0*	*10.0-10.2*	*10.2-10.4*	*10.4-OVF*
.1000	5.55E 01	7.11E 01	5.53E 01	1.30E 02	1.72 02	2.11E 02	2.83 02	4.40 02	6.18 0[illegible]	1.6[illegible] 0[illegible]	5.79 0[illegible]	5.44 04
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00 00	1.00E 00	1.00E 00	1.00E 00	1.00 00	0.0
~~1.000~~	5.87E-02	4.56E-02	3.23E-02	2.43E-02	1.73E-02	1.16E-02	7.37E-03	0.0	0.0	0.0	0.0	0.0
1.500	7.93E-03	5.31E-03	1.04E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
~~2.000~~	~~1.07E-03~~	6.19E-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
~~5.000~~	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	1.81E 06	3.46E 05	3.73E 05	1.63E 05	1.46 05	2.10E 04	1.3[illegible] 04	2.37 04	[illegible] 03	1.76 03	5.65 01	0.0

TABLE 8

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE5, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 1GE-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLXS15-4A; ** INCLINATION= 60DEG ** PERIGEE= 6389KM ** APOGEE= 6389KM ** C/L ORBIT TAPE: 105446 ** PERIOD= 3.988 **
** FOR INFORMATION OR EXPLANATION CONTACT M.J. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
****

PROTONS

** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX OF ENERGY GREATER THAN 0.00MEV **

ENERGY LEVELS >(MEV)	L - BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L - BANDS											
	1.0-1.2	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	0.0	0.0	0.0	0.0	9.69E 00	1.91E 01	6.35E 01	2.47E 02	5.13E 02	3.08E 03	1.34E 04	5.16E 04
2.000	0.0	0.0	0.0	0.0	3.27E 00	4.39E 00	6.73E 00	1.06E 01	1.15E 01	2.61E 01	4.31E 01	6.80E 01
5.000	0.0	0.0	0.0	0.0	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
8.000	0.0	0.0	0.0	0.0	3.31E-01	2.97E-01	2.46E-01	2.05E-01	1.61E-01	1.20E-01	6.15E-02	6.16E-02
10.00	0.0	0.0	0.0	0.0	1.63E-01	1.44E-01	1.14E-01	9.28E-02	6.57E-02	4.24E-02	2.32E-02	1.55E-02
25.00	0.0	0.0	0.0	0.0	8.50E-03	7.06E-03	6.11E-03	4.70E-03	2.40E-03	8.58E-04	0.0	0.0
50.00	0.0	0.0	0.0	0.0	1.43E-03	9.77E-04	6.55E-04	4.01E-04	1.41E-04	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	3.66E-04	2.08E-04	9.21E-05	3.25E-05	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	3.66E-07	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	4.81E 09	1.39E 10	1.09E 09	3.74E 08	5.07E 07	2.66E [illegible]	5.52E 06	1.52E 06

ENERGY LEVELS >(MEV)	L - BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L - BANDS											
	3.4-3.6	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	2.01E 05	7.53E 05	2.75E 06	3.65E 08	2.91E 08	2.63E 08	1.34E 08	1.33E 08	1.15E 08	[illegible]7.26E 07	5.54E 07	3.06E 07
2.000	1.15E 02	2.13E 02	3.72E 02	1.67E 04	4.02E 03	6.66E 02	1.31E 02	2.29E 01	0.0	[illegible]	0.0	0.0
5.000	1.00E 00	1.00E 00	1.00E 00	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	0.0	0.0
8.000	5.19E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	1.32E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	3.47E 05	5.40E 04	1.08E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ENERGY LEVELS >(MEV)	L - BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L - BANDS											
	5.8-6.0	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	1.82E 07	1.72E 07	1.12E 07	4.50E 06	2.52E 06	1.00E 06	5.71E 05	1.06E 05	4.41E 04	1.33E 04	5.30E 03	8.78E 02
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ENERGY LEVELS >(MEV)	L - BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L - BANDS											
	8.2-8.4	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8*	*9.8-10.0*	*10.0-10.2*	*10.2-10.4*	*10.4-OVR*
.1000	6.57E 02	1.31E 02	1.78E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 9

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL., IGF-TRM 1975 * TIME= 1989.5 **
** VEHICLE : [illegible] ** INCLINATION= [illegible] ** PERIGEE= 6384KM ** APOGEE= 6384KM ** [illegible] ORBIT TAPE: T0544E ** PERIOD= 3.988 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

ELECTRONS LO

** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX OF ENERGY GREATER THAN .5000MEV **

L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S

ENERGY LEVELS >(MEV)	*1.0-1.2*	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	0.0	0.0	0.0	0.0	3.22E 01	4.04E 01	5.81E 01	3.93E 01	1.40E 01	7.77E 00	5.56E 00	5.75E 00
.5000	0.0	0.0	0.0	0.0	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	0.0	0.0	0.0	0.0	1.07E-02	9.76E-03	1.05E-02	2.10E-02	5.46E-02	3.10E-01	3.84E-01	4.46E-01
1.500	0.0	0.0	0.0	0.0	2.04E-03	1.55E-03	1.46E-03	4.03E-03	1.70E-02	1.56E-01	1.55E-01	2.28E-01
2.000	0.0	0.0	0.0	0.0	4.71E-04	3.60E-04	2.75E-04	8.04E-04	4.47E-03	7.66E-02	9.50E-02	1.17E-01
3.000	0.0	0.0	0.0	0.0	1.72E-05	9.92E-06	4.10E-06	1.94E-05	1.36E-04	3.03E-02	3.91E-02	4.58E-02
4.000	0.0	0.0	0.0	0.0	6.27E-07	3.51E-07	0.0	0.0	1.75E-05	7.57E-03	6.34E-03	8.94E-03
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.53E-04	3.66E-04	4.45E-04
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.74E-07	1.80E-06
NORMFLUX=	0.0	0.0	0.0	0.0	2.72E 10	7.02E 10	1.23E 10	3.91E 09	1.30E 09	1.28E 09	2.07E 09	2.82E 09

L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S

ENERGY LEVELS >(MEV)	*3.4-3.6*	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	6.36E 00	5.90E 00	4.66E 00	3.84E 00	3.53E 00	3.32E 00	3.47E 00	3.67E 00	3.80E 00	3.66E 00	3.91E 00	3.94E 00
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	4.91E-01	5.30E-01	5.22E-01	4.56E-01	4.83E-01	4.78E-01	4.60E-01	4.40E-01	4.27E-01	3.58E-01	3.24E-01	2.98E-01
1.500	2.46E-01	2.50E-01	2.29E-01	2.03E-01	1.84E-01	1.74E-01	1.67E-01	1.56E-01	1.44E-01	1.24E-01	1.11E-01	9.78E-02
2.000	1.24E-01	1.10E-01	1.01E-01	6.32E-02	7.24E-02	6.36E-02	6.00E-02	5.68E-02	5.12E-02	4.32E-02	3.78E-02	3.20E-02
3.000	4.83E-02	4.60E-02	3.82E-02	2.96E-02	2.30E-02	1.79E-02	1.48E-02	1.22E-02	9.73E-03	7.26E-03	5.77E-03	4.16E-03
4.000	8.74E-03	8.00E-03	6.51E-03	5.11E-03	4.28E-03	3.61E-03	3.28E-03	2.98E-03	2.62E-03	2.17E-03	1.66E-03	1.38E-03
5.000	4.74E-04	4.52E-04	3.82E-04	3.09E-04	2.64E-04	2.26E-04	2.04E-04	1.84E-04	1.57E-04	1.24E-04	1.03E-04	7.44E-05
6.000	2.39E-06	2.71E-06	2.43E-06	1.50E-06	1.51E-06	1.19E-06	9.43E-07	2.27E-07	0.0	0.0	0.0	0.0
NORMFLUX=	3.19E 09	3.11E 09	3.65E 09	4.11E 09	4.17E 09	4.58E 09	2.46E 09	2.31E 09	2.02E 09	1.77E 09	1.04E 09	6.38E 08

L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S

ENERGY LEVELS >(MEV)	*5.8-6.0*	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	3.96E 00	4.30E 00	5.08E 00	6.02E 00	7.01E 00	7.80E 00	9.39E 00	1.25E 01	1.41E 01	2.38E 01	3.27E 01	4.21E 01
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	2.81E-01	2.62E-01	2.42E-01	2.23E-01	2.00E-01	1.76E-01	1.60E-01	1.45E-01	1.35E-01	1.11E-01	5.16E-02	7.55E-02
1.500	8.85E-02	7.77E-02	6.59E-02	5.56E-02	4.60E-02	3.79E-02	3.24E-02	2.74E-02	2.44E-02	1.55E-02	1.66E-02	1.23E-02
2.000	2.79E-02	2.30E-02	1.36E-02	1.36E-02	1.06E-02	3.16E-03	6.58E-03	5.18E-03	4.41E-03	3.57E-03	2.69E-03	2.02E-03
3.000	3.11E-03	2.28E-03	1.61E-03	1.13E-03	7.25E-04	4.31E-04	2.78E-04	1.73E-04	1.03E-04	8.06E-05	3.61E-05	0.0
4.000	1.04E-03	7.54E-04	5.14E-04	3.47E-04	1.99E-04	9.57E-05	5.06E-05	2.55E-05	5.72E-06	0.0	0.0	0.0
5.000	5.47E-0[illegible]	3.71E-05	2.20E-05	1.22E-05	6.74E-05	1.16E-06	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	4.23E 08	4.53E 08	3.45E 08	1.81E 08	1.38E 08	1.08E 08	1.05E 08	3.44E 07	2.11E 07	1.10E 07	7.30E 06	1.93E 06

L - B A N D S (M A G N E T I C S H E L L P A R A M E T E R I N E A R T H R A D I I) L - B A N D S

ENERGY LEVELS >(MEV)	*8.2-8.4*	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8*	*9.8-10.0*	*10.0-10.2*	*10.2-10.4*	*10.4-OVR*
.1000	5.35E 01	7.12E 01	9.47E 01	1.25E 02	1.72E 02	2.42E 02	3.36E 02	4.62E 02	5.91E 02	1.22E 03	3.35E 03	6.57E 04
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	5.58E-02	4.54E-02	3.48E-02	2.57E-02	1.55E-02	8.97E-03	2.22E-03	0.0	0.0	0.0	0.0	0.0
1.500	7.94E-03	5.01E-03	1.22E-03	1.70E-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.000	1.04E-03	5.63E-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	2.39E 06	1.52E 06	5.02E 05	4.22E 05	2.95E 05	7.28E 04	5.74E 04	4.62E 04	1.03E 04	3.04E 03	5.87E 02	8.11E 01

TABLE 10

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE4, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVAR-A OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 1X8-TOM 1975 * TIME= 1989.5 **
** VEHICLE : NVLXAI ** INCLINATION= 60DEG ** PERIGEE=10371KM ** APOGEE= 10371KM ** ORBIT TAPE: 105446 ** PERIOD= 5.692 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

** PROTONS **

** SPECTRAL DISTRIBUTION : NORMALIZED BY FLUX OF ENERGY GREATER THAN 5.00MEV **

ENERGY LEVELS >(MEV)	L-BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS *1.0-1.2*	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.62E 02	6.32E 02	2.27E 03	5.98E 03	3.53E 04
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.60E 01	3.03E 01	2.58E 01	4.60E 01	7.72E 01
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.53E-01	1.76E-01	1.09E-01	7.01E-02	5.65E-02
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.99E-02	5.01E-02	3.67E-02	2.24E-02	1.36E-02
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.42E-03	1.03E-03	5.48E-04	2.56E-04	9.72E-06
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.27E-05	4.16E-05	1.58E-05	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.67E-06	1.07E-06	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.77E 09	2.77E 09	4.50E 08	6.10E 07	1.03E 07

ENERGY LEVELS >(MEV)	L-BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS *3.4-3.6*	*3.6-3.8*	*3.8-4.0*	*4.0-4.2*	*4.2-4.4*	*4.4-4.6*	*4.6-4.8*	*4.8-5.0*	*5.0-5.2*	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	1.31E 05	5.06E 05	1.64E 06	6.52E 06	5.83E 06	3.24E 08	3.02E 08	2.71E 09	1.11E 09	1.55E 08	1.34E 08	1.08E 08
2.000	1.32E 02	2.07E 02	3.72E 02	4.46E 02	1.11E 04	2.02E 03	7.36E 01	5.87E 01	0.0	0.0	0.0	0.0
5.000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	4.35E-02	2.77E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	[illegible]	1.30E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	1.7?E 06	2.73E 05	4.52E 04	7.49E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ENERGY LEVELS >(MEV)	L-BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS *5.8-6.0*	*6.0-6.2*	*6.2-6.4*	*6.4-6.6*	*6.6-6.8*	*6.8-7.0*	*7.0-7.2*	*7.2-7.4*	*7.4-7.6*	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	[illegible] 07	3.2?E 07	2.57E 07	1.83E 07	1.15E 07	5.29E 06	1.47E 06	7.29E 05	1.07E 05	4.34E 04	2.51E 04	9.18E 03
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ENERGY LEVELS >(MEV)	L-BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS *8.2-8.4*	*8.4-8.6*	*8.6-8.8*	*8.8-9.0*	*9.0-9.2*	*9.2-9.4*	*9.4-9.6*	*9.6-9.8*	*9.8-10.0*	*10.0-10.2*	*10.2-10.4*	*10.4-OVR*
.1000	2.7?E 03	1.3?E 03	6.07E 02	5.25E 01	1.19E 02	1.10E 01	0.0	0.0	0.0	0.0	0.0	0.0
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 11

** ORBITAL FLUX STUDY WITH [illegible] PARTICLE ENVIRONMENTS: VETTE [illegible] AE17 [illegible] *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS [illegible] FOR PROTONS (AP8) [illegible] ELECTRONS (AE8) - UF= 1.0 **
** MAGNETIC COORDINATES [illegible] 1972 WITH ALLENBY [illegible] 1975 * TIME= 1989.5 **
** VEHICLE [illegible] ** INCLINATION= [illegible] ** PERIGEE=10371KM ** APOGEE= 10371KM ** [illegible] ORBIT TAPE: 705447 ** PERIGO= [illegible] **
** FOR INFORMATION [illegible] EXPLANATION CONTACT [illegible] STASSINOPOULOS AT NASA-GODDARD [illegible] MARYLAND 20771, TEL.(301)-344-8067 **

ELECTRONS [illegible]
** SPECTRAL DISTRIBUTION: NORMALIZED BY FLUX OF [illegible] **

L - BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS

ENERGY LEVELS >(MEV)	*1.0-1.2*	*1.2-1.4*	*1.4-1.6*	*1.6-1.8*	*1.8-2.0*	*2.0-2.2*	*2.2-2.4*	*2.4-2.6*	*2.6-2.8*	*2.8-3.0*	*3.0-3.2*	*3.2-3.4*
.1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	[illegible]	[illegible]	6.11E 00	5.74E 00
.5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	[illegible]	1.00E 00	1.00E 00	1.00E 00
1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	[illegible]	2.55E-01	3.76E-01	4.46E-01
1.500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	[illegible]	1.49E-01	1.91E-01	2.28E-01
2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	4.73E-03	7.46E-02	5.71E-02	1.16E-01
3.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	[illegible]	2.59E-02	3.81E-02	4.57E-02
4.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	[illegible]	7.38E-03	8.23E-03	8.93E-03
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.26E-04	3.54E-04	4.44E-04
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	1.16E-06	1.78E-06
NORMFLUX=	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[illegible]	[illegible]	1.25E 10	5.52E 09	8.46E 09

L - BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS

ENERGY LEVELS >(MEV)	*3.4-3.6*	[illegible]	*3.8-4.0*	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	*5.2-5.4*	*5.4-5.6*	*5.6-5.8*
.1000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.92E 00	3.94E 00
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.41E-01	[illegible]	[illegible]	3.19E-01	2.98E-01
1.500	2.46E-01	[illegible]	2.29E-01	[illegible]	[illegible]	1.76E-01	[illegible]	1.58E-01	[illegible]	[illegible]	1.08E-01	9.73E-02
2.000	[illegible]	[illegible]	[illegible]	8.32E-02	7.24E-02	6.44E-02	[illegible]	[illegible]	[illegible]	4.34E-02	3.65E-02	3.18E-02
3.000	4.82E-02	[illegible]	[illegible]	[illegible]	2.33E-02	[illegible]	1.51E-02	[illegible]	[illegible]	7.33E-03	5.50E-03	4.10E-03
4.000	[illegible]	[illegible]	[illegible]	5.11E-03	4.32E-03	[illegible]	3.31E-03	[illegible]	[illegible]	2.18E-03	1.75E-03	1.37E-03
5.000	4.74E-04	[illegible]	[illegible]	3.05E-04	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.92E-05	7.33E-05
6.000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.24E-07	[illegible]	0.0	0.0	0.0
NORMFLUX=	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.40E 09

L - BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS

ENERGY LEVELS >(MEV)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	*7.6-7.8*	*7.8-8.0*	*8.0-8.2*
.1000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.67E 00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.25E 01
.5000	[illegible]	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	[illegible]	[illegible]	[illegible]	[illegible]	2.01E-01	[illegible]	[illegible]	1.46E-01	[illegible]	1.13E-01	[illegible]	7.50E-02
1.500	[illegible]	7.72E-02	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.03E-02	1.74E-02	1.18E-02
2.000	[illegible]	[illegible]	[illegible]	[illegible]	1.07E-02	8.51E-03	[illegible]	5.22E-03	4.16E-03	3.64E-03	3.15E-03	1.86E-03
3.000	[illegible]	[illegible]	1.61E-03	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.35E-05	0.0
4.000	[illegible]	7.42E-04	5.14E-04	[illegible]	2.05E-04	1.07E-04	[illegible]	[illegible]	[illegible]	0.0	0.0	0.0
5.000	[illegible]	[illegible]	[illegible]	[illegible]	6.31E-06	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.04E 07

L - BANDS (MAGNETIC SHELL PARAMETER IN EARTH RADII) L-BANDS

ENERGY LEVELS >(MEV)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	*10.4-CVR*
.1000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.17E 02	[illegible]	[illegible]	[illegible]	[illegible]	6.52E 04
.5000	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00	1.00E 00
1.000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	0.0	0.0	0.0	0.0
1.500	[illegible]	[illegible]	[illegible]	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.000	[illegible]	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NORMFLUX=	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.56E 02	9.48E 01

TABLE 12

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*****************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AEI7 FOR SOLAR MAXIMUM      ***      UNIFLUX OF 1979    **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0    **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. 168-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NM X1:S-MAX  ** INCLINATION= 60DEG ** PERIGEE= 1667KM ** APOGEE=  1667KM ** B/L ORBIT TAPE: TD5AA6 ** PERIOD=  1.995 **
** FOR INFORMATION OR EXPLANATION CONTACT L.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
*****************************************************************************************************************************
                              *****************     PROTONS     *****************
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***** SPECTRUM IN PERCENT DELTA ENERGY *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/SEC	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-2.000	2.094E 05	1.809E 10	61.185
2.000-5.000	3.344E 03	2.889E 08	0.977
5.000-8.000	1.381E 03	1.193E 08	0.404
8.000-10.00	6.501E 02	5.617E 07	0.190
10.00-25.00	1.757E 03	1.518E 08	0.514
25.00-50.00	7.729E 02	6.678E 07	0.226
50.00-100.0	7.951E 02	6.870E 07	0.232
100.0-500.0	1.120E 03	9.674E 07	0.327
500.0-OVER	2.354E 01	2.034E 06	0.007
TOTAL	2.192E 05	1.894E 10	64.061

***** EXPOSURE INDEX: ENERGY>5.000 MEV *****

INTENSITY RANGES #/CM**2/SEC	EXPOSURE DURATION (HOURS)	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	5.233	0.0
1.E0-1.E1	0.933	2.280E 04
1.E1-1.E2	2.617	3.863E 05
1.E2-1.E3	3.583	6.405E 06
1.E3-1.E4	6.967	1.037E 08
1.E4-1.E5	4.667	4.511E 08
1.E5-1.E6	0.0	0.0
1.E6-1.E7	0.0	0.0
1.E7-OVER	0.0	0.0
TOTAL	24.000	5.616E 08

**** COMPOSITE ORBIT SPECTRUM ****   TAU= 5.00000 YEAR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTEG.FLUX #/CM**2/SEC	AVERAGED INTEG.FLUX #/CM**2/DAY	AVERAGED INTEG.FLUX #/CM**2/TAU	AVERAGED DIFFER.FLUX #/CM**2/SEC/KEV
.4000E-01	3.422E 05	2.956E 10	5.395E 13	2.566E 03
.7000E-01	2.723E 05	2.354E 10	[illegible] 13	1.950E 03
.1000E 00	2.192E 05	1.894E 10	3.456E 13	1.486E 03
.5000	3.720E 04	3.214E 09	5.866E 12	1.462E 02
1.000	1.631E 04	1.409E 09	2.571E 12	[illegible] 01
2.000	9.843E 03	8.505E 08	1.552E 12	5.190E 00
3.000	8.242E 03	7.121E 08	1.300E 12	1.486E 00
4.000	7.216E 03	6.235E 08	1.138E 12	9.470E-01
5.000	6.500E 03	5.616E 08	1.025E 12	6.299E-01
6.000	5.964E 03	5.153E 08	9.404E 11	4.979E-01
8.000	5.119E 03	4.423E 08	8.071E 11	3.608E-01
10.00	4.469E 03	3.861E 08	7.046E 11	2.632E-01
15.00	3.620E 03	3.128E 08	5.709E 11	1.452E-01
20.00	2.981E 03	2.575E 08	4.700E 11	8.764E-02
25.00	2.711E 03	2.342E 08	4.275E 11	5.656E-02
30.00	2.471E 03	2.135E 08	3.896E 11	3.872E-02
35.00	2.324E 03	2.008E 08	3.664E 11	3.048E-02
40.00	2.187E 03	1.889E 08	3.448E 11	2.667E-02
45.00	2.053E 03	1.778E 08	3.246E 11	2.446E-02
50.00	1.938E 03	1.675E 08	3.056E 11	2.217E-02
60.00	1.742E 03	1.505E 08	2.747E 11	1.657E-02
80.00	1.410E 03	1.218E 08	2.223E 11	1.483E-02
100.0	1.143E 03	9.877E 07	1.803E 11	1.196E-02
150.0	6.789E 02	5.866E 07	1.070E 11	6.969E-03
200.0	4.061E 02	3.509E 07	6.403E 10	4.075E-03
250.0	2.510E 02	2.169E 07	3.958E 10	2.432E-03
300.0	1.557E 02	1.345E 07	2.455E 10	1.486E-03
350.0	9.678E 01	8.362E 06	1.526E 10	9.183E-04
400.0	5.331E 01	5.213E 06	9.539E 09	5.657E-04
500.0	2.354E 01	2.034E 06	3.711E 09	2.212E-04

TABLE 13

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*******************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM      ***      UNIFLUX OF 1979      **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP6) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0   **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. 166-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NMLX1:S-MAX  ** INCLINATION= 60DEG ** PERIGEE= 1667KM ** APOGEE= 1667KM ** B/L ORBIT TAPE: T05A46 ** PERIOD= 1.995 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
*******************************************************************************************************************************
                                        ****************  ELECTRONS LO  ****************
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***** SPECTRUM IN PERCENT DELTA ENERGY *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/SEC	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-.5000	1.028E 07	8.886E 11	67.075
.5000-1.000	2.698E 05	2.331E 10	1.783
1.000-1.500	3.735E 04	3.227E 09	0.247
1.500-2.000	1.347E 04	1.164E 09	0.089
2.000-3.000	8.336E 03	7.202E 08	0.055
3.000-4.000	1.901E 03	1.642E 08	0.013
4.000-5.000	3.229E 02	2.790E 07	0.002
5.000-6.000	1.873E 01	1.618E 06	0.000
6.000-OVER	1.461E-02	1.263E 03	0.000
TOTAL	1.062E 07	9.172E 11	70.164

***** EXPOSURE INDEX: ENERGY>.5000 MEV *****

INTENSITY RANGES #/CM**2/SEC	EXPOSURE DURATION (HOURS)	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	0.517	0.0
1.E0-1.E1	0.050	7.418E 02
1.E1-1.E2	0.133	2.284E 04
1.E2-1.E3	0.717	1.359E 06
1.E3-1.E4	3.467	6.154E 07
1.E4-1.E5	6.083	9.148E 08
1.E5-1.E6	10.800	1.343E 10
1.E6-1.E7	2.233	1.421E 10
1.E7-OVER	0.0	0.0
TOTAL	24.000	2.862E 10

****** COMPOSITE ORBIT SPECTRUM ****** TAU= 5.00000 YR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTLG.FLUX **TOTAL** #/CM**2/SEC	AVERAGED INTEG.FLUX **TOTAL** #/CM**2/DAY	**** AVERAGED INTEGRAL FLUENCE **** * TOTAL #/CM**2/TAU	= INNER ZONE #/CM**2/TAU	+ OUTER ZONE * #/CM**2/TAU	AVERAGED DIFFER.FLUX **TOTAL** #/CM**2/SEC/KEV
.4000E-01	1.611E 07	1.337E 12	2.386E 15	2.316E 15	6.930E 13	8.982E 04
.7000E-01	1.265E 07	1.093E 12	1.595E 15	1.540E 15	5.523E 13	7.710E 04
.1000E 00	1.062E 07	9.172E 11	1.674E 15	1.630E 15	4.425E 13	6.937E 04
.2000	4.920E 06	4.251E 11	7.758E 14	7.486E 14	2.720E 13	3.900E 04
.3000	2.086E 06	1.802E 11	3.289E 14	3.121E 14	1.688E 13	1.795E 04
.4000	8.124E 05	7.019E 10	1.281E 14	1.156E 14	1.251E 13	6.832E 03
.5000	3.312E 05	2.862E 10	5.222E 13	4.293E 13	9.302E 12	2.470E 03
.6000	2.127E 05	1.838E 10	3.354E 13	2.560E 13	7.937E 12	1.029E 03
.7000	1.415E 05	1.223E 10	2.231E 13	1.553E 13	6.782E 12	5.258E 02
.8000	1.023E 05	8.839E 09	1.613E 13	1.033E 13	5.802E 12	3.135E 02
.9000	7.892E 04	6.818E 09	1.244E 13	7.475E 12	4.969E 12	2.046E 02
1.000	6.141E 04	5.306E 09	9.683E 12	5.422E 12	4.260E 12	1.401E 02
1.250	3.832E 04	3.311E 09	6.042E 12	3.259E 12	2.784E 12	7.297E 01
1.500	2.405E 04	2.078E 09	3.793E 12	1.964E 12	1.829E 12	4.251E 01
1.750	1.593E 04	1.376E 09	2.512E 12	1.303E 12	1.208E 12	2.585E 01
2.000	1.058E 04	9.140E 08	1.668E 12	8.655E 11	8.025E 11	1.596E 01
2.250	7.626E 03	6.587E 08	1.202E 12	5.874E 11	6.148E 11	1.109E 01
2.500	5.528E 03	4.776E 08	8.716E 11	3.989E 11	4.727E 11	8.443E 00
2.750	3.378E 03	2.919E 08	5.326E 11	1.682E 11	3.644E 11	6.128E 00
3.000	2.242E 03	1.937E 08	3.535E 11	7.186E 10	2.817E 11	4.125E 00
3.250	1.313E 03	1.135E 08	2.071E 11	2.161E 10	1.855E 11	2.567E 00
3.500	8.168E 02	7.057E 07	1.288E 11	6.515E 09	1.223E 11	1.532E 00
3.750	5.241E 02	4.528E 07	8.264E 10	1.969E 09	8.068E 10	1.009E 00
4.000	3.416E 02	2.951E 07	5.386E 10	5.865E 08	5.328E 10	7.311E-01
4.500	7.972E 01	6.888E 06	1.257E 10	3.030E 07	1.254E 10	2.480E-01
5.000	1.875E 01	1.620E 06	2.956E 09	0.0	2.956E 09	7.008E-02
5.500	1.898E 00	1.640E 05	2.993E 08	0.0	2.993E 08	6.878E-03
6.000	1.461E-02	1.263E 03	2.304E 06	0.0	2.304E 06	1.324E-04
6.500	0.0	0.0	0.0	0.0	0.0	0.0
7.000	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 14

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. IGE-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX2:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 2593KM ** APOGEE= 2593KM ** B/L ORBIT TAPE: 1D5A46 ** PERIOD= 2.349 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC, CODE 601, GREENBELT, MARYLAND 20771, TEL.(301)-344-8067 **

PROTONS

***** SPECTRUM IN PERCENT DELTA ENERGY *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/SEC	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-2.000	9.239E 05	7.982E 10	61.418
2.000-5.000	2.356E 04	2.035E 09	1.566
5.000-8.000	1.324E 04	1.144E 09	0.880
8.000-10.00	6.431E 03	5.557E 08	0.428
10.00-25.00	1.396E 04	1.206E 09	0.928
25.00-50.00	3.184E 03	2.751E 08	0.212
50.00-100.0	2.099E 03	1.814E 08	0.140
100.0-500.0	2.485E 03	2.147E 08	0.165
500.0-OVER	3.981E 01	3.440E 06	0.003
TOTAL	9.889E 05	8.544E 10	65.739

***** EXPOSURE INDEX: ENERGY>5.000 MEV *****

INTENSITY RANGES #/CM**2/SEC	EXPOSURE DURATION (HOURS)	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	5.850	0.0
1.E0-1.E1	3.250	6.540E 03
1.E1-1.E2	1.350	2.086E 05
1.E2-1.E3	1.583	2.684E 06
1.E3-1.E4	2.483	4.133E 07
1.E4-1.E5	9.283	1.441E 09
1.E5-1.E6	3.200	2.096E 09
1.E6-1.E7	0.0	0.0
1.E7-OVER	0.0	0.0
TOTAL	24.000	3.580E 09

**** COMPOSITE ORBIT SPECTRUM **** TAU= 5.00000 YEAR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTEG.FLUX #/CM**2/SEC	AVERAGED INTEG.FLUX #/CM**2/DAY	AVERAGED INTEG.FLUX #/CM**2/TAU	AVERAGED DIFFER.FLUX #/CM**2/SEC/KEV
.4000E-01	1.504E 06	1.300E 11	2.372E 14	1.072E 04
.7000E-01	1.213E 06	1.048E 11	1.912E 14	8.340E 03
.1000E 00	9.889E 05	8.544E 10	1.559E 14	6.282E 03
.5000	1.971E 05	1.703E 10	3.107E 13	6.963E 02
1.000	9.869E 04	8.527E 09	1.556E 13	1.308E 02
2.000	6.500E 04	5.616E 09	1.025E 13	2.941E 01
3.000	5.444E 04	4.704E 09	8.585E 12	9.623E 00
4.000	4.703E 04	4.064E 09	7.416E 12	6.859E 00
5.000	4.144E 04	3.580E 09	6.534E 12	5.168E 00
6.000	3.699E 04	3.196E 09	5.832E 12	4.550E 00
8.000	2.820E 04	2.436E 09	4.447E 12	3.549E 00
10.00	2.177E 04	1.881E 09	3.432E 12	2.484E 00
15.00	1.406E 04	1.215E 09	2.217E 12	1.122E 00
20.00	9.292E 03	8.028E 08	1.465E 12	5.740E-01
25.00	7.808E 03	6.746E 08	1.231E 12	3.063E-01
30.00	6.584E 03	5.689E 08	1.038E 12	1.767E-01
35.00	6.023E 03	5.203E 08	9.496E 11	1.211E-01
40.00	5.512E 03	4.762E 08	8.691E 11	9.824E-02
45.00	5.047E 03	4.361E 08	7.959E 11	8.509E-02
50.00	4.624E 03	3.995E 08	7.292E 11	7.038E-02
60.00	4.093E 03	3.536E 08	6.454E 11	5.027E-02
80.00	3.212E 03	2.775E 08	5.064E 11	3.840E-02
100.0	2.525E 03	2.182E 08	3.982E 11	2.982E-02
150.0	1.424E 03	1.230E 08	2.245E 11	1.605E-02
200.0	8.067E 02	6.970E 07	1.272E 11	8.786E-03
250.0	4.868E 02	4.206E 07	7.676E 10	5.002E-03
300.0	2.943E 02	2.542E 07	4.640E 10	2.962E-03
350.0	1.781E 02	1.539E 07	2.809E 10	1.786E-03
400.0	1.080E 02	9.331E 06	1.703E 10	1.080E-03
500.0	3.981E 01	3.440E 06	6.277E 09	3.571F-04

TABLE 15

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*************************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS; VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM      ***      UNIFLUX OF 1979    **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;   FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0    **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. IGS-TPM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX2:S-MAX  ** INCLINATION= 60DEG ** PERIGEE= [illegible]KM ** APOGEE= 25[illegible]KM ** O/L ORBIT TAPE: 105A46 ** PERIOD= 2.349 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
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                                      ****************   ELECTRONS LO   ****************
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***** SPECTRUM IN PERCENT DELTA ENERGY *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/SEC	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-.5000	3.662E 07	3.078E 12	67.636
.5000-1.000	9.452E 05	8.166E 10	1.795
1.000-1.500	1.124E 05	9.712E 09	0.213
1.500-2.000	4.160E 04	3.594E 09	0.079
2.000-3.000	2.826E 04	2.442E 09	0.054
3.000-4.000	4.319E 03	3.731E 08	0.003
4.000-5.000	6.008E 02	5.191E 07	0.001
5.000-6.000	3.445E 01	2.976E 06	0.000
6.000-OVER	1.051E-01	9.080E 03	0.000
TOTAL	3.676E 07	3.176E 12	69.786

***** EXPOSURE INDEX: ENERGY>.5000 MEV *****

INTENSITY RANGES #/CM**2/SEC	EXPOSURE DURATION (HOURS)	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	0.683	0.0
1.E0-1.E1	0.067	6.756E 02
1.E1-1.E2	0.167	2.926E 04
1.E2-1.E3	0.267	3.654E 05
1.E3-1.E4	0.800	1.750E 07
1.E4-1.E5	4.283	6.635E 08
1.E5-1.E6	9.817	1.540E 10
1.E6-1.E7	7.917	8.176E 10
1.E7-OVER	0.0	0.0
TOTAL	24.000	9.785E 10

****** COMPOSITE ORBIT SPECTRUM ****** TAU= 5.00000 YR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTEG.FLUX **TOTAL** #/CM**2/SEC	AVERAGED INTEG.FLUX **TOTAL** #/CM**2/DAY	**** AVERAGED INTEGRAL FLUENCE **** * TOTAL #/CM**2/TAU	= INNER ZONE #/CM**2/TAU	+ OUTER ZONE * #/CM**2/TAU	AVERAGED DIFFER.FLUX **TOTAL** #/CM**2/SEC/KEV
.4000E-01	[illegible] 07	[illegible] 13	[illegible] 16	[illegible] 15	1.332E 14	3.166E 05
.7000E-01	4.396E 07	3.798E 12	6.532E 15	6.828E 15	1.036E 14	2.719E 05
.1000E 00	3.670E 07	3.176E 12	5.796E 15	5.713E 15	8.295E 13	2.441E 05
.2000	1.693E 07	1.491E 12	2.649E 15	2.59[illegible]E 15	5.063E 13	1.344E 05
.3000	7.132E 06	6.162E 11	1.125E 15	1.093E 15	3.121E 13	6.151E 04
.4000	2.810E 06	2.428E 11	4.432E 14	4.201E 14	2.311E 13	2.360E 04
.5000	1.132E 06	9.784E 10	1.786E 14	1.614E 14	1.717E 13	8.602E 03
.6000	7.113E 05	6.146E 10	1.122E 14	9.751E 13	1.465E 13	3.595E 03
.7000	4.613E 05	3.983E 10	7.365E 13	6.017E 13	1.252E 13	1.827E 03
.8000	3.252E 05	2.810E 10	5.128E 13	4.057E 13	1.072E 13	1.073E 03
.9000	2.459E 05	2.124E 10	3.877E 13	2.960E 13	9.179E 12	6.828E 02
1.000	1.872E 05	1.618E 10	2.952E 13	2.165E 13	7.871E 12	4.490E 02
1.250	1.182E 05	1.021E 10	1.863E 13	1.349E 13	5.143E 12	2.234E 02
1.500	7.482E 04	6.464E 09	1.180E 13	8.415E 12	3.379E 12	1.298E 02
1.750	4.979E 04	4.302E 09	7.852E 12	5.619E 12	2.233E 12	8.362E 01
2.000	3.322E 04	2.870E 09	5.237E 12	3.755E 12	1.483E 12	5.133E 01
2.250	2.338E 04	2.020E 09	3.686E 12	2.551E 12	1.135E 12	3.804E 01
2.500	1.653E 04	1.428E 09	2.607E 12	1.734E 12	8.726E 11	2.997E 01
2.750	8.528E 03	7.368E 08	1.345E 12	6.720E 11	6.727E 11	1.989E 01
3.000	4.954E 03	4.280E 08	7.812E 11	2.613E 11	5.199E 11	1.131E 01
3.250	2.658E 03	2.296E 08	4.191E 11	7.683E 10	3.422E 11	6.022E 00
3.500	1.574E 03	1.360E 08	2.481E 11	2.263E 10	2.255E 11	3.227E 00
3.750	9.856E 02	8.515E 07	1.554E 11	6.680E 09	1.487E 11	1.982E 00
4.000	6.354E 02	5.490E 07	1.002E 11	1.975E 09	9.821E 10	1.383E 00
4.500	1.475E 02	1.274E 07	2.326E 10	1.526E 08	2.310E 10	4.634E-01
5.000	3.455E 01	2.985E 06	5.448E 09	0.0	5.448E 09	1.139E-01
5.500	3.001E 00	2.593E 05	4.732E 08	0.0	4.732E 08	1.315E-02
6.000	1.051E-01	9.080E 03	1.657E 07	0.0	1.657E 07	6.946E-04
6.500	0.0	0.0	0.0	0.0	0.0	0.0
7.000	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 16

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8, AE6, AEI7 FOR SOLAR MAXIMUM        ***      UNIFLUX OF 1979      **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:    FOR PROTONS (AP8) - UF= 1.0;   FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0     **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL   4:  BARRACLOUGH ET.AL. 168-TPM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX3:S-MAX   ** INCLINATION= 60DEG ** PERIGEE= 3889KM ** APOGEE=  3889KM ** B/L ORBIT TAPE: TD5446 ** PERIOD=  2.876 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
****************************************************************************************************************************************
                                    *****************      PROTONS      *****************
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***** SPECTRUM IN PERCENT DELTA ENERGY *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/SEC	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-2.000	2.547E 06	2.201E 11	62.270
2.000-5.000	1.482E 05	1.281E 10	3.624
5.000-8.000	7.726E 04	6.676E 09	1.889
8.000-10.00	3.075E 04	2.657E 09	0.752
10.00-25.00	4.745E 04	4.099E 09	1.160
25.00-50.00	4.418E 03	3.817E 08	0.108
50.00-100.0	1.559E 03	1.347E 08	0.038
100.0-500.0	1.139E 03	9.841E 07	0.028
500.0-OVER	1.019E 01	8.804E 05	0.000
TOTAL	2.858E 06	2.470E 11	69.868

***** EXPOSURE INDEX: ENERGY>5.000 MEV *****

INTENSITY RANGES #/CM**2/SEC	EXPOSURE DURATION (HOURS)	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	7.233	0.0
1.E0-1.E1	0.283	7.943E 03
1.E1-1.E2	1.117	1.725E 05
1.E2-1.E3	1.467	2.107E 06
1.E3-1.E4	1.833	2.735E 07
1.E4-1.E5	3.817	6.138E 08
1.E5-1.E6	7.883	1.200E 10
1.E6-1.E7	0.367	1.407E 09
1.E7-OVER	0.0	0.0
TOTAL	24.000	1.405E 10

**** COMPOSITE ORBIT SPECTRUM **** TAU= 5.00000 YEAR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTEG. FLUX #/CM**2/SEC	AVERAGED INTEG. FLUX #/CM**2/DAY	AVERAGED INTEG. FLUX #/CM**2/TAU	AVERAGED DIFFER. FLUX #/CM**2/SEC/KEV
.4000E-01	4.091E 06	3.535E 11	6.451E 14	2.504E 04
.7000E-01	3.399E 06	2.937E 11	5.360E 14	1.996E 04
.1000E 00	2.858E 06	2.470E 11	4.507E 14	1.536E 04
.5000	7.807E 05	6.745E 10	1.231E 14	2.134E 03
1.000	4.567E 05	3.946E 10	7.201E 13	4.816E 02
2.000	3.108E 05	2.686E 10	4.901E 13	1.318E 02
3.000	2.459E 05	2.125E 10	3.877E 13	5.660E 01
4.000	1.985E 05	1.715E 10	3.131E 13	4.251E 01
5.000	1.626E 05	1.405E 10	2.564E 13	3.267E 01
6.000	1.345E 05	1.162E 10	2.122E 13	2.773E 01
8.000	8.532E 04	7.372E 09	1.345E 13	1.843E 01
10.00	5.457E 04	4.715E 09	8.605E 12	1.119E 01
15.00	2.339E 04	2.021E 09	3.688E 12	3.703E 00
20.00	1.009E 04	8.719E 08	1.591E 12	1.334E 00
25.00	7.126E 03	6.157E 08	1.124E 12	5.572E-01
30.00	5.049E 03	4.362E 08	7.961E 11	2.683E-01
35.00	4.316E 03	3.729E 08	6.805E 11	1.584E-01
40.00	3.692E 03	3.190E 08	5.822E 11	1.163E-01
45.00	3.161E 03	2.731E 08	4.984E 11	9.226E-02
50.00	2.708E 03	2.340E 08	4.270E 11	6.808E-02
60.00	2.278E 03	1.968E 08	3.592E 11	3.995E-02
80.00	1.616E 03	1.396E 08	2.548E 11	2.686E-02
100.0	1.149E 03	9.929E 07	1.812E 11	1.836E-02
150.0	5.659E 02	4.890E 07	8.924E 10	7.381E-03
200.0	2.801E 02	2.420E 07	4.416E 10	3.645E-03
250.0	1.605E 02	1.387E 07	2.531E 10	1.856E-03
300.0	9.218E 01	7.964E 06	1.454E 10	1.023E-03
350.0	5.304E 01	4.583E 06	8.364E 09	5.853E-04
400.0	3.059E 01	2.643E 06	4.823E 09	3.367E-04
500.0	1.019E 01	8.804E 05	1.607E 09	1.120E-04

TABLE 17

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*****************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AEI7 FOR SOLAR MAXIMUM      ***    UNIFLUX OF 1979    **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0     **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. 168-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX3:S-MAX  ** INCLINATION= 60DEG ** PERIGEE= 3889KM ** APOGEE=  3889KM ** B/L ORBIT TAPE: 1D5446 ** PERIOD=  2.876 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
*****************************************************************************************************************************
                              ****************   ELECTRONS LC   ****************
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***** SPECTRUM IN PERCENT DELTA ENERGY *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/SEC	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-.5000	6.301E 07	5.444E 12	66.906
.5000-1.000	1.860E 06	1.607E 11	1.975
1.000-1.500	1.258E 05	1.087E 10	0.134
1.500-2.000	4.716E 04	4.075E 09	0.050
2.000-3.000	2.600E 04	2.247E 09	0.028
3.000-4.000	5.953E 03	5.143E 08	0.006
4.000-5.000	1.150E 03	9.934E 07	0.001
5.000-6.000	6.729E 01	5.814E 06	0.000
6.000-OVER	2.923E-01	2.525E 04	0.000
TOTAL	6.508E 07	5.623E 12	69.100

***** EXPOSURE INDEX: ENERGY>.5000 MEV *****

INTENSITY RANGES #/CM**2/SEC	EXPOSURE DURATION (HOURS)	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	1.000	0.0
1.E0-1.E1	0.033	5.056E 02
1.E1-1.E2	0.100	1.287E 04
1.E2-1.E3	0.283	4.808E 05
1.E3-1.E4	0.300	4.814E 06
1.E4-1.E5	2.617	5.170E 08
1.E5-1.E6	10.717	2.051E 10
1.E6-1.E7	8.950	1.574E 11
1.E7-OVER	0.0	0.0
TOTAL	24.000	1.785E 11

****** COMPOSITE ORBIT SPECTRUM ****** TAU= 5.00000 YR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTEG.FLUX **TOTAL** #/CM**2/SEC	AVERAGED INTEG.FLUX **TOTAL** #/CM**2/DAY	**** AVERAGED INTEGRAL FLUENCE **** * TOTAL #/CM**2/TAU	= INNER ZONE #/CM**2/TAU	+ OUTER ZONE* #/CM**2/TAU	AVERAGED DIFFER.FLUX **TOTAL** #/CM**2/SEC/KEV
.4000E-01	9.418E 07	8.137E 12	1.485E 16	1.460E 16	2.519E 14	5.809E 05
.7000E-01	7.824E 07	6.760E 12	1.234E 16	1.214E 16	2.010E 14	4.955E 05
.1000E 00	6.508E 07	5.623E 12	1.026E 16	1.010E 16	1.612E 14	4.399E 05
.2000	2.965E 07	2.562E 12	4.675E 15	4.576E 15	9.970E 13	2.373E 05
.3000	1.264E 07	1.092E 12	1.992E 15	1.930E 15	6.224E 13	1.085E 05
.4000	5.047E 06	4.361E 11	7.958E 14	7.497E 14	4.622E 13	4.347E 04
.5000	2.066E 06	1.785E 11	3.257E 14	2.913E 14	3.443E 13	1.678E 04
.6000	1.067E 06	9.221E 10	1.683E 14	1.389E 14	2.943E 13	6.897E 03
.7000	5.879E 05	5.080E 10	9.271E 13	6.752E 13	2.519E 13	3.103E 03
.8000	3.796E 05	3.280E 10	5.986E 13	3.828E 13	2.158E 13	1.549E 03
.9000	2.766E 05	2.390E 10	4.362E 13	2.511E 13	1.851E 13	8.700E 02
1.000	2.061E 05	1.781E 10	3.250E 13	1.660E 13	1.590E 13	5.305E 02
1.250	1.283E 05	1.109E 10	2.023E 13	9.915E 12	1.032E 13	2.536E 02
1.500	8.034E 04	6.941E 09	1.267E 13	5.936E 12	6.732E 12	1.461E 02
1.750	5.148E 04	4.448E 09	8.117E 12	3.703E 12	4.414E 12	8.913E 01
2.000	3.317E 04	2.866E 09	5.231E 12	2.322E 12	2.909E 12	5.372E 01
2.250	2.328E 04	2.011E 09	3.671E 12	1.449E 12	2.223E 12	3.541E 01
2.500	1.655E 04	1.430E 09	2.609E 12	9.051E 11	1.705E 12	2.522E 01
2.750	1.040E 04	8.989E 08	1.640E 12	3.296E 11	1.311E 12	1.766E 01
3.000	7.170E 03	6.195E 08	1.131E 12	1.201E 11	1.011E 12	1.208E 01
3.250	4.470E 03	3.862E 08	7.048E 11	3.596E 10	6.649E 11	7.962E 00
3.500	2.861E 03	2.472E 08	4.512E 11	1.337E 10	4.378E 11	5.069E 00
3.750	1.859E 03	1.606E 08	2.931E 11	4.494E 09	2.886E 11	3.483E 00
4.000	1.217E 03	1.052E 08	1.920E 11	1.519E 09	1.905E 11	2.579E 00
4.500	2.860E 02	2.471E 07	4.510E 10	1.151E 08	4.499E 10	8.969E-01
5.000	6.758E 01	5.839E 06	1.066E 10	0.0	1.066E 10	2.127E-01
5.500	5.365E 00	4.635E 05	8.460E 08	0.0	8.460E 08	2.499E-02
6.000	2.923E-01	2.525E 04	4.609E 07	0.0	4.609E 07	1.692E-03
6.500	0.0	0.0	0.0	0.0	0.0	0.0
7.000	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 18

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******************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTE'S AP8; A 6, A 17 FOR SOLAR MAXIMUM      ***     UNIFLUX OF 1979    **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR  [illegible]  ZON  ELECTRONS (AE) - UF= 1.0   **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG. MODEL  4:  BARRAL [illegible]  TIME= 1962.5 **
** VEHICLE : NWE24:S-MAX   ** INCLINATION= 0000.0 ** PERIGEE= 5180KM ** APOGEE=  5180KM ** [illegible] 5446 ** PERIOD =  3.438 **
** FOR INFORMATION OR EXPLANATION CONTACT J.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771, TEL.(301)-344-8057 **
******************************************************************************************************************************
                                        ****************     PROTONS     ****************
                                        *************************************************
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***** SPECTRUM IN PERCENT DELTA ENERGY *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/SEC	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-2.000	5.544E 06	4.790 11	65.757
2.000-5.000	4.650E 05	4.150 10	5.752
5.000-8.000	1.627E 05	1.406 10	1.930
8.000-10.00	4.684E 04	4.047 09	0.556
10.00-25.00	4.826E 04	4.170 09	0.572
25.00-50.00	2.820E 03	2.436 08	0.033
50.00-100.0	5.844E 02	5.049 07	0.007
100.0-500.0	2.634E 02	2.276 07	0.003
500.0-OVER	9.555E-01	8.255 04	0.000
TOTAL	6.291E 06	5.435 11	74.610

***** EXPOSURE INDEX: ENERGY>25.000 MEV *****

INTENSITY RANGES #/CM**2/SEC	EXPOSURE DURATION (HOURS)	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	6.400	0.0
1.E0-1.E1	0.350	1.038 04
1.E1-1.E2	0.663	1.240 05
1.E2-1.E3	1.433	2.109 06
1.E3-1.E4	1.717	2.553 07
1.E4-1.E5	3.033	4.577 08
1.E5-1.E6	5.267	6.413 09
1.E6-1.E7	2.517	1.365 10
1.E7-OVER	0.0	0.0
TOTAL	24.000	2.259 10

**** COMPOSITE ORBIT SPECTRUM **** TAU= [illegible] 0000 Y A [illegible]

ENERGY LEVELS >(MEV)	AVERAGED INTEG.FLUX #/CM**2/SEC	AVERAGED INTEG.FLUX #/CM**2/DAY	AVERAGED INTEG. FLUX #/CM**2/TAU	AVERAGED DIFFER. FLUX #/CM**2/SEC/MEV
.4000-01	8.431E 06	7.285 11	1.329 15	4.229 04
.7000E-01	7.242E 06	6.257 11	1.142 15	3.475 04
.1000	6.291E 06	5.435 11	9.919 14	2.755 04
.5000	2.175E 06	1.879 11	3.429 14	4.671 03
1.000	1.265E 06	1.093 11	1.995 14	1.327 03
2.000	7.464E 05	6.449 10	1.177 14	4.063 02
3.000	5.186E 05	4.481 10	8.181 13	1.909 02
4.000	3.662E 05	3.164 10	5.775 13	1.276 02
5.000	2.615E 05	2.259 10	4.123 13	8.714 01
6.000	1.883E 05	1.627 10	2.969 13	6.102 01
8.000	9.877E 04	8.533 09	1.557 13	3.068 01
10.00	5.193E 04	4.487 09	8.188 12	1.488 01
15.00	1.780E 04	1.538 09	2.807 12	3.876 00
20.00	6.111E 03	5.280 08	9.636 11	1.098 00
25.00	3.666E 03	3.167 08	5.780 11	4.092 -01
30.00	2.205E 03	1.905 08	3.477 11	1.775 -01
35.00	1.733E 03	1.497 08	2.733 11	9.674 -02
40.00	1.364E 03	1.179 08	2.151 11	6.573 -02
45.00	1.075E 03	9.291 07	1.696 11	4.765 -02
50.00	8.488E 02	7.333 07	1.338 11	3.180 -02
60.00	6.709E 02	5.796 07	1.058 11	1.668E-02
80.00	4.204E 02	3.632 07	6.629 10	9.373 -03
100.0	2.644E 02	2.284 07	4.169 10	5.536 -03
150.0	1.134E 02	9.800 06	1.788 10	1.516E-03
200.0	4.897E 01	4.231 06	7.722 09	7.663 -04
250.0	2.533E 01	2.188 06	3.994 09	3.473 -04
300.0	1.315E 01	1.137 06	2.074 09	1.724 -04
350.0	6.850E 00	5.919 05	1.080 09	8.937 -05
400.0	3.590E 00	3.102 05	5.661 08	4.663 -05
500.0	9.559E-01	8.259 04	1.507 08	1.264E-05

TABLE 19

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS VERSUS APOGEE ... FOR SOLAR MAXIMUM *** UNIFLUX ... 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED ... THIS RUN ... FOR PROTONS (AP8) ... 1.0 ... ZONE ... ELECTRONS ... 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG ... 1960.0 **
** VEHICLE ... MVL ... S-MAX ** INCLINATION= 90DEG ** PERIGEE= 5150KM ** APOGEE= ... KM ** ... 3.438 **
** FOR INFORMATION OR EXPLANATION CONTACT ... STASSINOPOULOS AT NASA-GSFC ... GREENBELT, MARYLAND 20771, ... (301)-344-8067 **

ELECTRONS ...

***** SPECTRUM IN PERCENT DELTA ENERGY *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/SEC	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-.5000	6.503E 07	5.618E 12	96.613
.5000-1.000	2.055E 06	1.613E 11	3.124
1.000-1.500	1.161E 05	1.003E 10	0.116
1.500-2.000	4.445E 04	3.840E 09	0.045
2.000-3.000	2.046E 04	1.768E 09	0.021
3.000-4.000	7.805E 03	6.747E 08	0.008
4.000-5.000	1.713E 03	1.480E 08	0.002
5.000-6.000	1.007E 02	8.704E 06	0.000
6.000-OVER	4.711E-01	4.070E 04	0.000
TOTAL	6.732E 07	5.816E 12	[illegible].130

***** EXPOSURE INDEX: ENERGY>0.5000 MEV *****

INTENSITY RANGES #/CM**2/SEC	EXPOSURE DURATION (HOURS)	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	1.367	0.0
1.E0-1.E1	0.050	1.165E 03
1.E1-1.E2	0.150	3.141E 04
1.E2-1.E3	0.150	2.766E 05
1.E3-1.E4	0.267	3.882E 06
1.E4-1.E5	1.000	2.053E 08
1.E5-1.E6	9.767	1.773E 10
1.E6-1.E7	10.350	1.467E 11
1.E7-OVER	0.900	3.319E 10
TOTAL	24.000	1.97[illegible] 11

****** COMPOSITE ORBIT SPECTRUM ****** TAU ... YR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTEG. FLUX **TOTAL** #/CM**2/SEC	AVERAGED INTEG. FLUX **TOTAL** #/CM**2/DAY	AVERAGED INTEGRAL FLUENCE TOTAL #/CM**2/TAU	INNER ZONE #/CM**2/TAU	OUTER ZONE #/CM**2/TAU	AVERAGED DIFF. FLUX **TOTAL** #/CM**2/SEC/MEV
.4000E-01	9.881E 07	8.537E 12	1.558E 16	1.515E 16	3.851E 14	6.226E 05
.7000E-01	8.152E 07	7.043E 12	1.285E 16	1.254E 16	3.132E 14	5.261E 05
.1000	6.732E 07	5.816E 12	1.061E 16	1.037E 16	2.458E 14	4.717E 05
.2000	2.966E 07	2.563E 12	4.677E 15	4.523E 15	1.548E 14	2.414E 05
.3000	1.270E 07	1.097E 12	2.002E 15	1.905E 15	9.727E 13	1.078E 05
.4000	5.305E 06	4.583E 11	8.365E 14	7.641E 14	7.246E 13	4.516E 04
.5000	2.289E 06	1.978E 11	3.610E 14	3.069E 14	5.415E 13	1.852E 04
.6000	1.020E 06	8.808E 10	1.616E 14	1.157E 14	4.615E 13	7.451E 03
.7000	5.286E 05	4.567E 10	8.334E 13	4.397E 13	3.938E 13	3.079E 03
.8000	3.378E 05	2.918E 10	4.336E 13	1.461E 13	3.366E 13	1.410E 03
.9000	2.473E 05	2.137E 10	3.504E 13	1.024E 13	2.880E 13	7.511E 02
1.000	1.907E 05	1.647E 10	3.006E 13	5.350E 12	2.467E 13	4.583E 02
1.250	1.185E 05	1.024E 10	1.866E 13	2.782E 12	1.590E 13	2.314E 02
1.500	7.454E 04	6.440E 09	1.175E 13	1.451E 12	1.030E 13	1.354E 02
1.750	4.706E 04	4.066E 09	7.424E 12	7.147E 11	6.709E 12	8.121E 01
2.000	3.009E 04	2.599E 09	4.744E 12	3.530E 11	4.391E 12	4.126E 01
2.250	2.240E 04	1.936E 09	3.532E 12	1.918E 11	3.341E 12	2.808E 01
2.500	1.684E 04	1.455E 09	2.656E 12	1.045E 11	2.551E 12	1.940E 01
2.750	1.265E 04	1.093E 09	1.995E 12	4.106E 10	1.954E 12	1.539E 01
3.000	9.624E 03	8.315E 08	1.517E 12	1.618E 10	1.501E 12	1.299E 01
3.250	6.320E 03	5.460E 08	9.965E 11	6.571E 09	9.900E 11	1.003E 01
3.500	4.161E 03	3.595E 08	6.561E 11	2.678E 09	6.534E 11	6.943E 00
3.750	2.745E 03	2.372E 08	4.229E 11	1.095E 09	4.218E 11	4.989E 00
4.000	1.814E 03	1.568E 08	2.861E 11	4.502E 08	2.856E 11	3.794E 00
4.500	4.275E 02	3.693E 07	6.740E 10	1.116E 07	6.739E 10	1.340E 00
5.000	1.012E 02	8.745E 06	1.559E 10	0.0	1.559E 10	3.148E-01
5.500	7.796E 00	6.736E 05	1.229E 09	0.0	1.229E 09	3.695E-02
6.000	4.711E-01	4.070E 04	7.428E 07	0.0	7.429E 07	2.648E-03
6.500	0.0	0.0	0.0	0.0	0.0	0.0
7.000	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 20

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*******************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM   ***   UNIFLUX OF 1979  **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:  FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0  **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRAQ[illegible] ET.AL. 168-TERM 1975 * TIME= 1989.5 **
** VEHICLE [illegible] INCLINATION= 60.05 ** PERIGEE= 6389KM ** APOGEE= 6389KM ** B/L ORBIT TAPE: 105446 ** PERIOD= 3.688 **
** FOR INFORMATION OR EXPLANATION CONTACT J.G. STASSINOPOULOS AT NASA-GSFC, CODE 601, GREENBELT, MARYLAND 20771, TEL.(301)-344-8067 **
*******************************************************************************************************************
                                   *****************     PROTONS     *****************
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***** SPECTRUM IN PERCENT DELTA ENERGY *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/SEC	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-2.000	1.140E 07	9.851E 11	70.879
~~2.000-5.000~~	~~8.731E 05~~	~~7.544E 10~~	~~5.428~~
5.000-8.000	1.721E 05	1.487E 10	1.070
8.000-10.00	3.762E 04	3.250E 09	0.234
10.00-25.00	3.357E 04	2.901E 09	0.209
25.00-50.00	1.517E 03	1.311E 08	0.009
50.00-100.0	1.574E 02	1.7[illegible]E 07	0.001
100.0-500.0	5.6[illegible]E 01	4.842E 06	0.000
500.0-OVER	2.038E-02	1.761E 03	0.000
TOTAL	1.252E 07	1.082E 12	77.870

***** EXPOSURE INDEX: ENERGY>5.000 MEV *****

INTENSITY RANGES #/CM**2/SEC	EXPOSURE DURATION (HOURS)	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	9.293	0.0
1.E0-1.E1	0.3[illegible]	6.505E 03
1.E1-1.E2	1.000	1.319E 05
1.E2-1.E3	1.350	2.125E 06
1.E3-1.E4	1.650	2.464E 07
1.E4-1.E5	2.667	4.346E 08
~~1.E5-1.E6~~	~~4.717~~	~~7.727E 09~~
1.E6-1.E7	2.800	1.258E 10
1.E7-OVER	0.0	0.0
TOTAL	24.000	2.117E 10

**** COMPOSITE ORBIT SPECTRUM ****   TAU= 3.00000 YEAR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTEG.FLUX #/CM**2/SEC	AVERAGED INTEG.FLUX #/CM**2/DAY	AVERAGED INTEG.FLUX #/CM**2/TAU	AVERAGED DIFFER.FLUX #/CM**2/SEC/KEV
.4000E-01	1.609E 07	1.390E 12	2.5[illegible]E 15	6.845E 04
.7000E-01	1.413E 07	1.221E 12	2.228E 15	5.808E 04
.1000E 00	1.252E 07	1.082E 12	1.574E 15	4.777E 04
.5000	4.702E 06	4.062E 11	7.414E 14	1.001E 04
1.000	2.475E 06	2.138E 11	3.902E 14	3.033E 03
2.000	1.118E 06	9.661E 10	1.763E 14	9.656E 02
3.000	6.659E 05	5.753E 10	1.050E 14	7.617E 02
4.000	4.018E 05	3.472E 10	6.336E 13	2.034E 02
5.000	2.450E 05	2.117E 10	3.864E 13	1.166E 02
6.000	1.507E 05	1.302E 10	2.376E 13	6.644E 01
8.000	7.296E 04	6.304E 09	1.150E 13	2.634E 01
10.00	3.534E 04	3.054E 09	5.573E 12	1.143E 01
15.00	1.088E 04	9.397E 08	1.715E 12	2.514E 00
20.00	3.350E 03	2.895E 08	5.283E 11	6.825E-01
25.00	1.770E 03	1.530E 08	2.792E 11	2.376E-01
30.00	9.368E 02	8.094E 07	1.477E 11	9.798E-02
35.00	6.745E 02	5.828E 07	1.064E 11	5.033E-02
40.00	4.662E 02	4.201E 07	7.667E 10	3.202E-02
45.00	3.509E 02	3.031E 07	5.532E 10	2.128E-02
50.00	2.534E 02	2.190E 07	3.996E 10	1.295E-02
60.00	1.869E 02	1.615E 07	2.947E 10	5.812E-03
80.00	1.021E 02	8.823E 06	1.610E 10	2.517E-03
100.0	5.606E 01	4.844E 06	8.840E 09	1.488E-03
150.0	2.065E 01	1.784E 06	3.256E 09	4.191E-04
200.0	7.719E 00	6.669E 05	1.217E 09	1.437E-04
250.0	3.417E 00	2.952E 05	5.388E 08	5.750E-05
300.0	1.525E 00	1.318E 05	2.405E 08	2.459E-05
350.0	6.693E-01	5.783E 04	1.055E 08	1.177E-05
400.0	3.157E-01	2.728E 04	4.978E 07	5.503E-06
500.0	2.038E-02	1.761E 03	[illegible]	5.938E-07

TABLE 21

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**************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTE AP8 ...; AE17 ... MAXIMUM      ***     UNIFLUX OF 1979   **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:  FOR PROTONS (AP8) - UF= 1.0;  FOR ... ZON  ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRAGLIOH  ... 168-TRM 1975 * TIME= 1989.5 **
** VEHICLE ... INCLINATION= 60DEG ** PERIGEE= 6389KM ** APOGEE= 6389KM ** ... ORBIT TAPE: 105446 ** PERIOD=  3.988 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
**************************************************************************************************************************
                                   ****************  ELECTRONS LC  ****************
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***** SPECTRUM IN PERCENT DELTA ENERGY *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/SEC	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-.5000	5.423E 07	4.[illegible]E 12	46.66[illegible]
.5000-1.000	1.590E 06	1.365E 11	1.931
1.000-1.500	1.369E 05	1.183E 10	0.165
1.500-2.000	5.302E 04	4.581E 09	0.074
2.000-3.000	2.558E 04	2.210E 09	0.071
3.000-4.000	1.025E 04	8.855E 08	0.012
4.000-5.000	2.323E 03	2.007E 08	0.003
5.000-6.000	1.353E 02	1.169E 07	0.000
6.000-OVER	[illegible]E-01	[illegible]E 04	0.000
TOTAL	5.583E 07	4.824E 12	67.163

***** EXPOSURE INDEX: ENERGY>.5000 MEV *****

INTENSITY RANGES #/CM**2/SEC	EXPOSURE DURATION (HOURS)	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	1.567	0.0
1.E0-1.E1	0.100	1.622E 03
1.E1-1.E2	0.283	5.423E 04
1.E2-1.E3	0.367	5.526E 05
1.E3-1.E4	0.383	5.428E 06
1.E4-1.E5	0.600	7.784E 07
1.E5-1.E6	7.683	1.557E 10
1.E6-1.E7	13.117	1.436E 11
1.E7-OVER	0.0	0.0
TOTAL	24.000	1.56[illegible]E 11

****** COMPOSITE ORBIT SPECTRUM ****** TAU= 5.00000 YR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTEG.FLUX **TOTAL** #/CM**2/SEC	AVERAGED INTEG.FLUX **TOTAL** #/CM**2/DAY	**** AVERAGED INTEGRAL FLUENCE **** * TOTAL #/CM**2/TAU	= INNER ZONE #/CM**2/TAU	+ OUTER ZONE * #/CM**2/TAU	AVERAGED DIFFER.FLUX **TOTAL** #/CM**2/SEC/KEV
.4000E-01	8.311E 07	7.180E 12	1.310E 16	1.256E 16	5.479E 14	5.518E 05
.7000E-01	6.807E 07	5.882E 12	1.077E 16	1.030E 16	4.337E 14	4.678E 05
.1000E 00	5.583E 07	4.824E 12	8.804E 15	8.459E 15	3.460E 14	4.151E 05
.2000	2.252E 07	1.945E 12	3.551E 15	3.336E 15	2.142E 14	1.960E 05
.3000	9.264E 06	8.004E 11	1.461E 15	1.327E 15	1.338E 14	8.054E 04
.4000	3.979E 06	3.437E 11	6.273E 14	5.272E 14	1.001E 14	3.272E 04
.5000	1.808E 06	1.562E 11	2.851E 14	2.100E 14	7.511E 13	1.348E 04
.6000	8.703E 05	7.519E 10	1.372E 14	7.344E 13	6.379E 13	5.560E 03
.7000	5.099E 05	4.405E 10	8.040E 13	2.614E 13	5.426E 13	2.416E 03
.8000	3.612E 05	3.121E 10	5.695E 13	1.074E 13	4.622E 13	1.183E 03
.9000	2.816E 05	2.433E 10	4.441E 13	4.995E 12	3.942E 13	6.886E 02
1.000	2.282E 05	1.972E 10	3.598E 13	2.315E 12	3.367E 13	4.692E 02
1.250	1.434E 05	1.239E 10	2.261E 13	9.660E 11	2.164E 13	2.664E 02
1.500	9.131E 04	7.889E 09	1.440E 13	4.074E 11	1.399E 13	1.623E 02
1.750	5.891E 04	5.090E 09	9.289E 12	1.943E 11	9.095E 12	5.748E 01
2.000	3.829E 04	3.308E 09	6.038E 12	9.294E 10	5.945E 12	5.658E 01
2.250	2.883E 04	2.491E 09	4.546E 12	4.495E 10	4.501E 12	3.483E 01
2.500	2.184E 04	1.887E 09	3.444E 12	2.174E 10	3.423E 12	2.435E 01
2.750	1.662E 04	1.436E 09	2.620E 12	9.033E 09	2.613E 12	1.560E 01
3.000	1.271E 04	1.098E 09	2.004E 12	3.032E 09	2.001E 12	1.680E 01
3.250	8.411E 03	7.267E 08	1.326E 12	1.337E 09	1.325E 12	1.312E 01
3.500	5.575E 03	4.817E 08	8.791E 11	3.950E 08	8.785E 11	9.159E 00
3.750	3.700E 03	3.197E 08	5.834E 11	2.692E 08	5.832E 11	6.650E 00
4.000	2.459E 03	2.125E 08	3.878E 11	1.236E 08	3.877E 11	5.116E 00
4.500	5.767E 02	4.983E 07	9.094E 10	0.0	9.094E 10	1.815E 00
5.000	1.359E 02	1.174E 07	2.143E 10	0.0	2.143E 10	4.223E-01
5.500	1.023E 01	8.835E 05	1.612E 09	0.0	1.612E 09	4.896E-02
6.000	6.284E-01	5.430E 04	9.909E 07	0.0	9.909E 07	3.519E-03
6.500	0.0	0.0	0.0	0.0	0.0	0.0
7.000	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 222

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: [illegible] *** UNIFLUX OF 1979 **
** UNCERTAINTY [illegible] (AF(E) - UF= 1.0 **
** MAGNETIC [illegible] 1977 [illegible] 1975 * TIME= 1989.5 **
** VEHICLE [illegible] ** INCLINATION= [illegible] ** PERIGEE=[illegible] ** APOGEE= [illegible] ** [illegible] TAPE: [illegible] ** PERIOD= 5.992 **
** FOR INFORMATION [illegible] CONTACT [illegible] AT NASA-GODDARD [illegible] (301)-344-8067 **

PROTONS

***** SPECTRUM [illegible] *****

ENERGY RANGES >(MEV)	INTEGRATED TOTAL FLUX #/CM**2/[illegible]	AVERAGED TOTAL FLUX #/CM**2/DAY	SPECTRUM PERCENT
.1000-2.[illegible]	[illegible] 07	[illegible] 1[illegible]	[illegible]
2.000-[illegible]	[illegible]	[illegible]	[illegible]
5.000-8.000	[illegible]	[illegible]	[illegible]
8.000-1[illegible]	[illegible]	[illegible]	[illegible]
10.00-25.00	[illegible]	[illegible]	[illegible]
25.00-50.00	[illegible]	[illegible]	[illegible]
50.00-100.0	2.[illegible]	1.7[illegible]	[illegible]
100.0-500.0	[illegible]	[illegible] 03	[illegible]
500.0-OVER	0.0	0.0	0.0
TOTAL	[illegible]	[illegible] 1[illegible]	[illegible]

***** [illegible] *****

INTENSITY RANGE	[illegible]	TOTAL # OF ACCUMULATED PARTICLES
ZERO FLUX	[illegible]	0.0
1.E[illegible]-1.E[illegible]	[illegible]	1.[illegible] 04
1.[illegible]	1.[illegible]	1.[illegible]
1.[illegible]	1.[illegible]	1.744[illegible]
1.[illegible]	1.[illegible]	[illegible] 07
1.[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
1.[illegible]	[illegible]	0.0
1.[illegible]	[illegible]	0.0
TOTAL	[illegible]	[illegible]

**** COMPOSITE ORBIT [illegible] **** [illegible] YEAR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTEG.FLUX #/CM**2/SEC	AVERAGED INTEG.FLUX #/CM**2/DAY	AVERAGED [illegible]	AVERAGED DIFF. FLUX #/CM**2/SEC/MEV
.40000E-01	7.[illegible] 07	[illegible] 1[illegible]	1.[illegible] 1[illegible]	[illegible].747 05
.70000E-01	6.713E 07	[illegible] 12	1.[illegible] 1[illegible]	[illegible].411 05
.10000	[illegible] 07	[illegible] 12	[illegible]	[illegible].074 05
.[illegible]000	[illegible] 07	1.[illegible] 1[illegible]	[illegible]	[illegible] 04
1.000	7.[illegible] 06	[illegible] 11	1.11[illegible]	1.4[illegible] 04
2.000	1.1[illegible] 0[illegible]	[illegible] 1[illegible]	1.[illegible] 1[illegible]	[illegible] 03
3.000	4.112E 05	[illegible] 10	[illegible]	[illegible] 02
4.000	1.4768E 05	1.[illegible] 10	[illegible] 1[illegible]	1.[illegible] 02
5.000	[illegible] 04	4.[illegible] 0[illegible]	[illegible].4[illegible]1[illegible] 1[illegible]	5.[illegible] 01
6.000	1.[illegible]34E 04	1.[illegible]71E 0[illegible]	[illegible] 1[illegible]	1.654[illegible] 01
8.000	7.[illegible] 03	[illegible].11[illegible] 0[illegible]	1.11[illegible] 1[illegible]	[illegible].7[illegible] 00
10.00	2.[illegible]01E 03	[illegible]	4.1[illegible] 11	1.1[illegible] 00
15.00	5.[illegible]77E 0[illegible]	[illegible] 07	[illegible] 1[illegible]	1.7[illegible]-01
20.00	1.[illegible]	1.1[illegible] 07	[illegible]	[illegible].61[illegible]-02
25.00	[illegible] 01	[illegible]	[illegible]	1.[illegible]-02
30.00	[illegible].1[illegible] 01	1.[illegible] 0[illegible]	3.[illegible]	[illegible].47[illegible]-03
35.00	1.1[illegible] 01	1.[illegible]	1.[illegible]	1.[illegible]-03
40.00	[illegible].7[illegible] 00	[illegible] 0[illegible]	1.[illegible] 0[illegible]	7.7[illegible]-04
45.00	3.776[illegible] 00	[illegible] 0[illegible]	[illegible] 0[illegible]	4.14[illegible]-04
50.00	2.12[illegible] 00	1.[illegible] 05	[illegible] 0[illegible]	[illegible].12[illegible]-04
60.00	1.[illegible]06E 00	[illegible] 04	1.[illegible] 0[illegible]	7.1[illegible]-05
80.00	[illegible]-01	[illegible] 04	4.[illegible] 0[illegible]	1.7[illegible]-05
100.0	[illegible]-02	[illegible]	1.540[illegible] 0[illegible]	[illegible]-06
150.0	0.0	0.0	0.0	0.0
200.0	0.0	0.0	0.0	0.0
250.0	0.0	0.0	0.0	0.0
300.0	0.0	0.0	0.0	0.0
350.0	0.0	0.0	0.0	0.0
400.0	0.0	0.0	0.0	0.0
500.0	0.0	0.0	0.0	0.0

TABLE 23

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS [illegible] ** UNIFLUX OF 1979 **
** UNCERTAINTY FACTOR [illegible] ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC [illegible] TIME= 1989.5 **
** VEHICLE [illegible] ** INCLINATION= [illegible] ** PERIOD= 5.592 **
** FOR INFORMATION [illegible] STATION CONTACT [illegible] (771.TEL.(301)-344-8067 **

ELECTRONS [illegible]

***** [illegible] *****

ENERGY RANGES >(MEV)	AVERAGED TOTAL FLUX #/CM**2/[illegible]	[illegible] TOTAL FLUX /CM**2/DAY	[illegible]
~~.1000-.5000~~	~~1.244E 07~~	[illegible] 11	42.[illegible]
.5000-1.000	1.1[illegible]	[illegible]	4.31[illegible]
1.000-1.500	[illegible]	[illegible]	1.[illegible]
~~1.500-2.000~~	1.[illegible]	1.[illegible] 10	[illegible]
2.000-3.000	[illegible]	[illegible]	[illegible]
3.000-4.000	[illegible] 04	2.[illegible]	[illegible].111
4.000-5.000	[illegible]	[illegible]	[illegible]
5.000-6.000	3.[illegible]	[illegible] 07	[illegible]
~~6.000-OVER~~	~~1.61[illegible]~~	~~1.[illegible]~~	[illegible]
TOTAL	1.21[illegible]	1.[illegible] 12	46.[illegible]

***** EXPOSURE INDEX: ENERGY>.5000 MEV *****

INTENSITY ~~RANGES~~ #/(CM**2/SEC)	[illegible] DURATION ([illegible])	TOTAL [illegible] ACCUMULATED PARTICLES
ZERO FLUX	2.700	0.0
1.E0-1.E1	[illegible]	5.512[illegible] 0[illegible]
1.E1-1.E2	[illegible]	[illegible].6[illegible] 04
1.E2-1.E3	[illegible]	5.78[illegible]
1.E3-1.E4	[illegible]	[illegible].412[illegible]
~~1.E4-1.E5~~	~~[illegible]~~	~~[illegible].47[illegible]~~ [illegible]
1.E5-1.E6	2.[illegible]7	4.19[illegible]
1.E6-1.E7	1[illegible].7[illegible]	1.37[illegible] 11
~~1.E7-OVER~~	[illegible]	0.0
TOTAL	[illegible]	1.42[illegible] 11

****** [illegible] ****** TAU= [illegible].00000 YR(S)

ENERGY LEVELS >(MEV)	AVERAGED INTEGRAL FLUX **TOTAL** #/CM**2/SEC	AVERAGED INTEGRAL FLUX **TOTAL** #/CM**2/DAY	**** [illegible] ORBITAL FLUENCE **** TOTAL #/CM**2/[illegible]	[illegible] #/CM**2/TAL	OUTER ZONE* #/CM**2/TAL	AVERAGED DIFFER.FLUX **TOTAL** #/CM**2/SEC/KEV
.4000E-01	[illegible] 07	2.1[illegible]	[illegible]	[illegible]	1.70[illegible] 15	3.045E 03
.7000E-01	1.[illegible] 07	1.4[illegible]	[illegible]	[illegible]	1.[illegible] 15	1.590E 05
.1000	1.[illegible]	1.[illegible]	[illegible]	[illegible]	[illegible] 14	1.224E 05
.2000	[illegible]	[illegible] 11	[illegible] 14	[illegible] 14	[illegible].0C4[illegible] 14	4.C9HE 04
.3000	[illegible]	[illegible] 11	[illegible]	[illegible] 14	[illegible] 14	1.780E 04
.4000	[illegible]	[illegible] 11	[illegible]	[illegible]	2.[illegible]15[illegible] 14	[illegible].343F 03
.5000	1.[illegible]	1.4[illegible] 11	[illegible] 14	[illegible]	1.[illegible] 14	5.111E 03
.6000	1.31[illegible]	1.1[illegible] 11	[illegible]	[illegible]	1.[illegible] 14	3.221E C3
.7000	1.[illegible]	[illegible] 10	1.[illegible]	[illegible]	1.36[illegible] 14	2.394E 03
.8000	[illegible]	[illegible] 10	1.[illegible] 14	1.[illegible]	1.14[illegible] 14	1.893E 03
.9000	[illegible]	[illegible] 10	1.[illegible] 14	[illegible]	[illegible].70[illegible] 13	1.436E 03
1.000	[illegible]	9.[illegible] 10	[illegible]	[illegible] 12	[illegible] 13	1.C61E 03
1.[illegible]	[illegible]	[illegible] 10	[illegible]	[illegible] 12	[illegible] 13	6.169E 02
1.[illegible]	[illegible]	1.[illegible] 10	[illegible]	1.165[illegible] 12	[illegible].531F 13	3.681E 02
1.750	1.[illegible]	1.714 10	2.[illegible]	[illegible] 11	2.33[illegible] 13	2.405E 02
[illegible]	1.[illegible]	[illegible]	1.[illegible]	[illegible] 11	1.[illegible] 13	1.428E 02
[illegible]	7.641F 04	[illegible]	1.[illegible]	1.[illegible] 11	1.1[illegible] 13	8.931E 01
[illegible]	[illegible]	[illegible]	[illegible] 12	[illegible]	[illegible] 12	6.310E 01
[illegible]	4.[illegible]	[illegible]	7.[illegible]	[illegible]	7.[illegible] 12	5.136E C1
[illegible]	[illegible] 04	[illegible]	[illegible]	1.[illegible] 10	[illegible] 12	4.458E 01
[illegible]	[illegible] 04	1.[illegible]	[illegible]	[illegible] 09	[illegible] 12	3.518E 01
[illegible]	1.[illegible] 04	1.[illegible]	[illegible]	[illegible] 09	2.4[illegible] 12	2.478E 01
[illegible]	1.[illegible]	[illegible]	1.[illegible]	[illegible] 09	1.[illegible] 12	1.833E 01
4.000	[illegible]	[illegible]	1.[illegible]	1.[illegible]	1.C[illegible] 12	1.443E 01
4.[illegible]	1.[illegible] 03	1.336[illegible] 08	2.43[illegible] 11	[illegible]	2.43[illegible] 11	5.0C4E 00
[illegible]	3.[illegible]	[illegible] 07	[illegible] 10	[illegible]	[illegible] 10	1.C59E 00
[illegible]	[illegible] 01	[illegible] 06	[illegible]	[illegible]	[illegible] 09	1.214E-01
[illegible]	1.[illegible]	1.[illegible]	2.[illegible]	[illegible]	2.[illegible] 08	8.982E-03
[illegible]	0.0	0.0	0.0	0.0	0.0	0.0
7.[illegible]	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 24

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM   ***   UNIFLUX OF 1979   **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:  FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0  **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. IEF-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVXI:S-MAX ** INCLINATION= 0.0DEG ** PERIGEE= 1667KM ** APOGEE= 1667KM ** O/L ORBIT TAPE: TO5AAA ** PERIOD= 1.995 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
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PROTONS

** TABLE OF PEAK AND TOTAL FLUXES PER PERIOD : ENERGY >5.000MEV **

PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	POSITION AT WHICH ENCOUNTERED LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD(B) (GAUSS)	LINE(L) (E.R.)	TOTAL FLUX PER ORBIT #/CM**2/ORBIT
1	2.242E 04	-105.988	-16.16	1660.73	1.10000	0.14931	1.31	4.287E 07
2	2.505E 04	11.407	-18.42	1668.46	3.66666	0.14983	1.61	4.647E 07
3	5.055E 04	-22.565	-24.89	1669.64	5.81667	0.13519	1.60	6.826E 07
4	6.828E 04	-49.059	-18.70	1668.46	7.65000	0.12346	1.39	7.565E 07
5	4.500E 04	-77.238	-14.99	1667.57	9.26666	0.13283	1.33	4.773E 07
6	2.156E 04	-106.760	-13.85	1667.54	11.26667	0.14828	1.29	2.301E 07
7	1.158E 04	-97.822	4.33	1567.14	11.98333	0.16432	1.27	1.600E 07
8	1.772E 04	36.526	-3.47	1559.00	14.96667	0.15982	1.32	2.601E 07
9	2.803E 04	13.543	-17.58	1660.64	17.03999	0.15097	1.55	3.860E 07
10	4.855E 04	-20.076	-10.98	1559.73	18.99998	0.13241	1.40	5.559E 07
11	6.722E 04	-46.922	-17.30	1660.93	21.03331	0.12475	1.38	6.666E 07
12	4.704E 04	-74.998	-20.99	1561.84	23.04999	0.13218	1.35	5.422E 07

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM   ***   UNIFLUX OF 1979   **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:  FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0  **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. IEF-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVXI:S-MAX ** INCLINATION= 0.0DEG ** PERIGEE= 1667KM ** APOGEE= 1667KM ** O/L ORBIT TAPE: TO5AAA ** PERIOD= 1.995 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
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ELECTRONS LO

** TABLE OF PEAK AND TOTAL FLUXES PER PERIOD : ENERGY >.500MEV **

PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	POSITION AT WHICH ENCOUNTERED LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD(B) (GAUSS)	LINE(L) (E.R.)	TOTAL FLUX PER ORBIT #/CM**2/ORBIT
1	1.921E 06	-100.023	-26.32	1663.30	1.16667	0.15511	1.40	2.188E 09
2	2.091E 06	16.775	-8.10	1667.20	3.93333	0.14921	1.41	1.839E 09
3	2.657E 06	-16.744	-14.71	1667.87	5.88333	0.13417	1.46	2.561E 09
4	2.951E 06	-53.606	-26.28	1669.92	7.80000	0.12773	1.45	3.266E 09
5	2.277E 06	-86.674	-27.67	1670.28	[illegible]	0.14[illegible]	1.41	2.[illegible]31E 09
6	1.643E 06	-68.224	3.18	1666.99	9.98333	0.15377	1.43	1.674E 09
7	1.020E 06	-97.322	4.33	1567.14	11.98333	0.16432	1.27	1.264E 09
8	1.581E 06	79.074	-8.06	1659.40	15.99999	0.15744	1.39	1.660E 09
9	2.137E 06	9.498	-9.83	1559.52	16.99998	0.14711	1.43	2.350E 09
10	2.701E 06	-18.748	-13.57	1560.13	19.01666	0.13372	1.43	2.719E 09
11	3.007E 06	-44.013	-22.40	1562.15	21.06667	0.12643	1.44	3.277E 09
12	2.633E 06	-70.254	-29.53	1564.00	23.09999	0.13483	1.43	3.095E 09

TABLE 25

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTE'S AP8; AE6; AE17 FOR SOLAR MAXIMUM     ***     UNIFLUX OF 1979      **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF = 1.0     **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. IGF-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX2:S-MAX  ** INCLINATION= 60DEG ** PERIGEE= 2593KM ** APOGEE= 2593KM ** B/L ORBIT TAPE: 105446 ** PERIOD=  2.349 **
** FOR INFORMATION OR EXPLANATION CONTACT L.G. STASSINOPOULOS AT NASA-GSFC, CODE 601, GREENBELT, MARYLAND 20771, TEL.(301)-344-8067 **
****************************************************************************************************************************************
                              *************************        PROTONS       *************************
                              ** TABLE OF PEAK AND TOTAL FLUXES PER PERIOD : ENERGY >5.000MEV **
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PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	POSITION AT WHICH ENCOUNTERED LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD(B) (GAUSS)	LINE(L) (E.R.)	TOTAL FLUX PER ORBIT #/CM**2/ORBIT
1	1.524E 05	-110.840	-12.36	2586.65	1.26667	0.10417	1.43	3.335E 08
2	2.084E 05	8.454	-3.59	2592.97	4.66667	0.10256	1.50	7.726E 08
3	3.353E 05	-28.675	-7.59	2593.17	6.93333	0.09362	1.50	5.059E 08
4	3.182E 05	-68.455	-15.95	2594.16	9.26667	0.09461	1.49	4.510E 08
5	1.780E 05	-101.492	-11.16	2593.65	11.65000	0.10507	1.44	2.630E 08
6	1.246E 05	-133.589	-4.13	2593.15	14.05000	0.11237	1.41	2.169E 08
7	1.551E 05	29.297	2.82	2565.61	15.23333	0.10765	1.43	2.673E 08
8	2.420E 05	-2.863	-4.24	2585.65	17.63332	0.09978	1.50	3.302E 08
9	3.496E 05	-36.018	-9.08	2586.33	20.01666	0.09263	1.50	4.021E 08
10	3.230E 05	-66.824	-18.26	2557.95	22.43330	0.09443	1.50	3.551E 08

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTE'S AP8; AE6; AE17 FOR SOLAR MAXIMUM     ***     UNIFLUX OF 1979      **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF = 1.0     **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. IGF-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX2:S-MAX  ** INCLINATION= 60DEG ** PERIGEE= 2593KM ** APOGEE= 2593KM ** B/L ORBIT TAPE: 105446 ** PERIOD=  2.349 **
** FOR INFORMATION OR EXPLANATION CONTACT L.G. STASSINOPOULOS AT NASA-GSFC, CODE 601, GREENBELT, MARYLAND 20771, TEL.(301)-344-8067 **
****************************************************************************************************************************************
                              *************************      ELECTRONS LO    *************************
                              ** TABLE OF PEAK AND TOTAL FLUXES PER PERIOD : ENERGY >.5000MEV **
                              ******************************************************************
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PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	POSITION AT WHICH ENCOUNTERED LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD(B) (GAUSS)	LINE(L) (E.R.)	TOTAL FLUX PER ORBIT #/CM**2/ORBIT
1	3.978E 06	-106.609	-16.74	2587.65	1.30000	0.10704	1.46	9.964E 09
2	4.455E 06	8.454	-3.59	2592.97	4.66667	0.10256	1.50	9.550E 09
3	5.348E 06	-29.931	-9.79	2593.36	6.96667	0.09320	1.52	1.220E 10
4	5.212E 06	-63.455	-15.95	2594.16	9.26667	0.09461	1.49	1.141E 10
5	4.136E 06	-103.691	-15.54	2594.21	11.61667	0.10632	1.45	8.402E 09
6	3.475E 06	-135.675	-8.55	2593.43	14.01667	0.11350	1.42	7.594E 09
7	4.036E 06	31.356	-1.61	2585.77	15.26667	0.10814	1.46	8.132E 09
8	4.721E 06	-3.896	-2.03	2585.77	17.61669	0.09963	1.48	9.748E 09
9	5.423E 06	-36.018	-9.08	2586.33	20.01666	0.09288	1.50	9.598E 09
10	5.267E 06	-66.824	-18.26	2587.55	22.43330	0.09443	1.50	1.038E 10

TABLE 26

ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979
UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0
MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 168-TERM 1975 * TIME= 1989.5
VEHICLE : NVLX3:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 3889KM ** APOGEE= 3889KM ** B/L ORBIT TAPE: TD5446 ** PERIOD= 2.876
FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067

PROTONS

TABLE OF PEAK AND TOTAL FLUXES PER PERIOD : ENERGY >5.000MEV

PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	POSITION AT WHICH ENCOUNTERED LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD(B) (GAUSS)	LINE(L) (E.R.)	TOTAL FLUX PER ORBIT #/CM**2/ORBIT
1	7.915E 05	-116.821	-8.64	3883.25	1.51667	0.07270	1.63	1.789E 09
2	1.017E 06	-6.359	-1.58	3888.94	5.73333	0.06554	1.69	2.064E 09
3	1.131E 06	-54.035	-11.38	3889.61	8.61667	0.06315	1.70	2.215E 09
4	8.878E 05	-97.604	-12.17	3889.78	11.38333	0.06951	1.65	1.551E 09
5	7.358E 05	-136.630	-2.15	3889.07	14.35000	0.07492	1.61	1.296E 09
6	8.772E 05	20.726	4.36	3882.80	15.76667	0.06982	1.65	1.436E 09
7	1.081E 06	-18.984	-3.69	3882.77	18.71666	0.06420	1.70	1.581E 09
8	1.120E 06	-57.750	-13.91	3883.96	21.68330	0.06330	1.70	1.731E 09

ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979
UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0
MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 168-TERM 1975 * TIME= 1989.5
VEHICLE : NVLX3:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 3889KM ** APOGEE= 3889KM ** B/L ORBIT TAPE: TD5446 ** PERIOD= 2.876
FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067

ELECTRONS LO

TABLE OF PEAK AND TOTAL FLUXES PER PERIOD : ENERGY >.5000MEV

PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	POSITION AT WHICH ENCOUNTERED LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD(B) (GAUSS)	LINE(L) (E.R.)	TOTAL FLUX PER ORBIT #/CM**2/ORBIT
1	7.329E 06	-116.821	-8.64	3883.25	1.51667	0.07270	1.63	2.389E 10
2	8.795E 06	-5.566	0.22	3888.93	5.75000	0.06589	1.68	2.483E 10
3	9.214E 06	-54.937	-13.17	3889.83	8.50000	0.06300	1.71	2.648E 10
4	8.318E 06	-96.970	-10.37	3889.58	11.40000	0.06954	1.65	2.085E 10
5	7.695E 06	-136.630	-2.15	3889.07	14.35000	0.07492	1.61	1.745E 10
6	8.280E 06	20.726	4.36	3882.80	15.76667	0.06982	1.65	1.934E 10
7	9.024E 06	-18.984	-3.69	3882.77	18.71666	0.06420	1.70	1.832E 10
8	9.175E 06	-57.750	-13.91	3883.96	21.68330	0.06330	1.70	2.140E 10

TABLE 27

ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTE AP8 [illegible] AE[illegible] FOR SOLAR MAXIMUM *** UNIFLUX OF 1979
UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF = 1.0; FOR ELECTRONS (AE[illegible]) - UF = 1.0
MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH MCILWAIN MODEL [illegible] EPOCH [illegible] * TIME = 1979.5
~~VEHICLE~~ : NVLX4:S-MAX ** INCLINATION = 60.00 ** PERIGEE = 5180KM ** APOGEE = 5180KM ** PERIOD = 3.436
FOR INFORMATION OR EXPLANATION CONTACT [illegible] STASSINOPOULOS AT NASA-GSFC, CODE 601, GREENBELT, MARYLAND 20771, TEL.(301)-344-5067

[illegible]
TABLE OF PEAK AND TOTAL FLUXES PER PERIOD : [illegible]

PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD (B) (GAUSS)	LINE (L) (E.R.)	TOTAL FLUX PER PERIOD #/CM**2/PERIOD
1	1.379E 06	-122.412	-5.[illegible]	5180.[illegible]	1.73333	0.05124	1.[illegible]	[illegible] 09
2	1.581E 06	-23.555	-3.4	5180.01	[illegible]	0.0455[illegible]	1.[illegible]1	[illegible] 09
3	1.558E 06	-79.677	-12.76	5180.[illegible]	10.16[illegible]7	0.046[illegible]	1.[illegible]	[illegible]14 09
4	1.474E 06	-128.318	-5.47	5180.20	12.63333	0.05155	1.62	[illegible] 09
5	1.516E 06	26.374	4.08	5180.01	15.41667	0.04657	1.65	2.554[illegible] 09
6	1.562E 06	-22.270	-3.2[illegible]	5180.46	16.93330	0.05519	1.[illegible]0	[illegible] 09

ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTE AP8 [illegible] AE[illegible] FOR SOLAR MAXIMUM *** UNIFLUX OF 1979
UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF = 1.0; FOR ELECTRONS (AE[illegible]) - UF = 1.0
MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH MCILWAIN MODEL [illegible] EPOCH [illegible] * TIME = 1979.5
~~VEHICLE~~ : NVLX4:S-MAX ** INCLINATION = 60.00 ** PERIGEE = 5180KM ** APOGEE = 5180KM ** PERIOD = 3.436
FOR INFORMATION OR EXPLANATION CONTACT [illegible] STASSINOPOULOS AT NASA-GSFC, CODE 601, GREENBELT, MARYLAND 20771, TEL.(301)-344-5067

ELECTRONS EO
TABLE OF PEAK AND TOTAL FLUX PER PERIOD : ENERGY >.5000 MEV

PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD (B) (GAUSS)	LINE (L) (E.R.)	TOTAL FLUX PER PERIOD #/CM**2/PERIOD
1	1.049E 07	-122.412	-5.[illegible]	5180.69	1.73333	0.05124	1.83	3.346 10
2	1.045E 07	-176.656	4.89	5180.01	3.10000	0.05444	1.75	[illegible].518 10
3	1.021E 07	-79.677	-12.76	5180.[illegible]	10.16667	0.046[illegible]	1.66	3.125 10
4	1.051E 07	-128.318	-5.47	5180.20	12.63333	0.05155	1.62	3.5[illegible] 10
5	1.034E 07	25.745	5.59	5180.00	15.40000	0.04512	1.65	2.202 10
6	1.049E 07	-175.813	4.8[illegible]	5180.14	17.23331	0.05420	1.79	2.34[illegible] 10

TABLE 28

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AFB: AE6, AE17 FOR SOLAR MAXIMUM      ***     UNIFLUX OF 1979    **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0     **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  CAIN&CLOUGH ET.AL. 16E-TERM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX515 MAX ** INCLINATION= 60DEG ** PERIGEE= 6389KM ** APOGEE=  6389KM ** B/L ORBIT TAPE: 105446 ** PERIOD=  3.988 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
*******************************************************************************************************************************
                          ************************     ELECTRONS LO     ************************
                          ** TABLE OF PEAK AND TOTAL FLUXES PER PERIOD : ENERGY > .500 MEV **
                          ******************************************************************
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PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	POSITION AT WHICH ENCOUNTERED LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD(B) (GAUSS)	LINE(L) (E.R.)	TOTAL FLUX PER ORBIT #/CM**2/ORBIT
1	8.432E 06	84.573	9.11	6389.46	0.11667	0.04099	1.57	3.215E 10
2	8.357E 06	168.059	7.50	6384.34	5.88333	0.04075	1.57	3.174E 10
3	8.830E 06	107.424	9.02	6384.51	9.85000	0.04227	1.55	2.594E 10
4	7.880E 06	-155.538	0.42	6389.01	15.95000	0.03953	1.55	2.028E 10
~~5~~	~~7.009E 06~~	-158.437	1.72	6389.03	15.96667	0.03950	1.55	1.535E 10
6	4.672E 06	144.507	9.31	6389.48	20.04999	0.03410	1.56	2.490E 10

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*******************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AFB: AE6, AE17 FOR SOLAR MAXIMUM      ***     UNIFLUX OF 1979    **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0     **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  CAIN&CLOUGH ET.AL. 16E-TERM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX515 MAX ** INCLINATION= 60DEG ** PERIGEE= 6389KM ** APOGEE=  6389KM ** B/L ORBIT TAPE: 105446 ** PERIOD=  3.988 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
*******************************************************************************************************************************
                          ************************     PROTONS     ************************
                          ** TABLE OF PEAK AND TOTAL FLUXES PER PERIOD : ENERGY > 0.000 MEV **
                          ******************************************************************
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PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	POSITION AT WHICH ENCOUNTERED LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD(B) (GAUSS)	LINE(L) (E.R.)	TOTAL FLUX PER ORBIT #/CM**2/ORBIT
1	1.508E 06	84.573	9.11	6389.46	0.11667	0.04099	1.57	4.071E 09
2	1.504E 06	169.06[illegible]	7.50	6384.34	5.38333	0.04075	1.57	4.412E 09
3	1.625E 06	106.500	10.31	6384.67	9.83333	0.04004	1.55	3.515E 09
4	1.376E 06	-158.539	0.42	6389.01	15.75000	0.03953	1.55	2.766E 09
~~5~~	~~1.440E 06~~	-158.437	1.72	6389.03	15.96667	0.03950	1.55	2.663E 09
6	1.510E 06	144.507	9.31	6389.48	20.04999	0.03410	1.56	3.351E 09

TABLE 29

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE8, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR OUTER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET AL. [illegible] 1975 * TIME= 1989.5 **
** VEHICLE 1 NVLX615 MAX ** INCLINATION= 40DEG ** PERIGEE=10371KM ** APOGEE= 10371KM ** I/O ORBIT TAPE: 105446 ** PERIOD= 5.592 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

PROTONS

** TABLE OF PEAK AND TOTAL FLUXES PER PERIOD : ENERGY > 5.00 MEV **

PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	POSITION AT WHICH ENCOUNTERED LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD(B) (GAUSS)	LINE(L) (E.R.)	TOTAL FLUX PER ORBIT #/CM**2/ORBIT
1	4.462E 05	83.555	8.66	10371.43	0.16667	0.01761	2.61	1.516E 09
2	4.816E 05	122.176	10.54	10367.95	8.78333	0.01310	2.58	1.346E 09
3	3.667E 05	34.227	4.87	10367.39	14.68333	0.01560	2.68	7.092E 08
4	4.523E 05	172.243	5.77	10371.19	18.03331	0.01771	2.60	1.012E 09

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE8, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR OUTER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET AL. [illegible] 1975 * TIME= 1989.5 **
** VEHICLE 1 NVLX615 MAX ** INCLINATION= 40DEG ** PERIGEE=10371KM ** APOGEE= 10371KM ** I/O ORBIT TAPE: 105446 ** PERIOD= 5.992 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

ELECTRONS IC

** TABLE OF PEAK AND TOTAL FLUXES FOR PERIOD : ENERGY > [illegible] MEV **

PERIOD NUMBER	PEAK FLUX ENCOUNTERED #/CM**2/SEC	POSITION AT WHICH ENCOUNTERED LONGITUDE (DEG)	LATITUDE (DEG)	ALTITUDE (KM)	ORBIT TIME (HOURS)	FIELD(B) (GAUSS)	LINE(L) (E.R.)	TOTAL FLUX PER ORBIT #/CM**2/ORBIT
1	3.358E 06	-26.404	-42.64	10379.46	5.13333	0.02056	4.00	4.524E 10
2	3.573E 06	-119.557	-43.73	10377.84	11.13333	0.02774	4.04	3.579E 10
3	3.677E 06	46.760	-39.14	10372.61	15.56667	0.03272	4.04	2.609E 10
4	3.174E 06	-34.154	-43.77	10377.55	21.43333	0.02066	4.01	3.278E 10

TABLE 30

TABLE _

NVLXI:S-MAX

CIRCULAR

INCLINATION: 60 DEG

PERIGEE: 1667 KM

APOGEE: 1667 KM

**** EXPOSURE ANALYSIS ****

	PROTONS (E>5.000MEV)	ELECTRONS ED (E>.5000MEV)
PERCENT OF TOTAL LIFE-TIME SPENT IN FLUX-FREE REGIONS* OF SPACE :	21.81 %	2.16 %
PERCENT OF TOTAL LIFE-TIME SPENT IN HIGH-INTENSITY REGIONS+ OF VAN ALLEN BELTS :	48.47 %	54.31 %
PERCENT OF TOTAL DAILY FLUX ACCUMULATED IN HIGH-INTENSITY REGIONS:	98.79 %	96.58 %

****

* <1 PARTICLE/CM**2/SEC

\+ >1.E5 EL/CM**2/SEC OR 1.E3 PR/CM**2/SEC

TABLE _

NVLXI:S-MAX

CIRCULAR

INCLINATION: 60 DEG

PERIGEE: 1667 KM

APOGEE: 1667 KM

* PERCENT OF TOTAL LIFETIME SPENT INSIDE AND *

* OUTSIDE THE TRAPPED-PARTICLE RADIATION BELT *

INNER ZONE (1.0 < L < 2.8)	-TI-*	:	67.99 %
OUTER ZONE (2.8 < L < 11.0)	-TO-	:	30.35 %
EXTERNAL (L > 11.0)	-TE-	:	1.67 %
TOTAL		:	100.00 %

*TIME IN INNER ZONE MAY BE SUBDIVIDED AS FOLLOWS:

OUTSIDE TRAPPING REGION : 0.0 %
(1.0 < L < 1.1)

INSIDE TRAPPING REGION : 67.99 %
(1.1 < L < 2.8)

TABLE 31

TABLE _	
NVLX215-MAX	
CIRCULAR	
INCLINATION : 60 DEG	
PERIGEE : 2593 KM	
APOGEE : 2593 KM	

**** EXPOSURE ANALYSIS ****

	PROTONS	ELECTRONS EC
	(E>5.000MEV)	(E>.5000MEV)
PERCENT OF TOTAL LIFE-TIME SPENT IN FLUX-FREE REGIONS* OF SPACE :	[illegible] %	[illegible] %
PERCENT OF TOTAL LIFE-TIME SPENT IN HIGH-INTENSITY REGIONS+ OF VAN ALLEN BELTS :	62.30 %	73.[illegible] %
PERCENT OF TOTAL DAILY FLUX ACCUMULATED IN HIGH-INTENSITY REGIONS:	[illegible] %	96.3[illegible] %

****

* <1 PARTICLE/CM**2/SEC

\+ >1.E5 EL/CM**2/SEC OR 1.E3 PR/CM**2/SEC

TABLE _	
NVLX215-MAX	
CIRCULAR	
INCLINATION : 60 DEG	
PERIGEE : 2593 KM	
APOGEE : 2593 KM	

* PERCENT OF TOTAL LIFETIME SPENT INSIDE AND *
* OUTSIDE THE TRAPPED-PARTICLE RADIATION BELT *

INNER ZONE -TI-* (1.0 < L < 2.8)	:	62.43 %
OUTER ZONE -TO- (2.8 < L < 11.0)	:	35.[illegible]5 %
EXTERNAL -TE- (L > 11.0)	:	2.2[illegible] %
TOTAL	:	100.[illegible] %

*TIME IN INNER ZONE MAY BE SUBDIVIDED AS FOLLOWS:

OUTSIDE TRAPPING REGION (1.0 < L < 1.1)	:	0.0 %
INSIDE TRAPPING REGION (1.1 < L < 2.8)	:	62.43 %

TABLE 32

TABLE _

NVLX3:S-MAX
CIRCULAR
INCLINATION: 60 DEG
PERIGEE: 3889 KM
APOGEE: 3889 KM

**** EXPOSURE ANALYSIS ****

	PROTONS (E>5.000MEV)	ELECTRONS LO (E>.5000MEV)
PERCENT OF TOTAL LIFE-TIME SPENT IN FLUX-FREE REGIONS* OF SPACE :	30.14 %	4.17 %
PERCENT OF TOTAL LIFE-TIME SPENT IN HIGH-INTENSITY REGIONS+ OF VAN ALLEN BELTS :	57.92 %	81.94 %
PERCENT OF TOTAL DAILY FLUX ACCUMULATED IN HIGH-INTENSITY REGIONS:	99.98 %	99.71 %

****

* <1 PARTICLE/CM**2/SEC
+ >1.E5 EL/CM**2/SEC OR 1.E3 PR/CM**2/SEC

TABLE _

NVLX3:S-MAX
CIRCULAR
INCLINATION: 60 DEG
PERIGEE: 3889 KM
APOGEE: 3889 KM

* PERCENT OF TOTAL LIFETIME SPENT INSIDE AND *
* OUTSIDE THE TRAPPED-PARTICLE RADIATION BELT *

INNER ZONE -TI-* (1.0 < L < 2.8)	:	54.51 %
OUTER ZONE -TO- (2.8 < L < 11.0)	:	42.08 %
EXTERNAL -TE- (L > 11.0)	:	3.40 %
TOTAL	:	100.00 %

*TIME IN INNER ZONE MAY BE SUBDIVIDED AS FOLLOWS:

OUTSIDE TRAPPING REGION (1.0 < L < 1.1)	:	0.0 %
INSIDE TRAPPING REGION (1.1 < L < 2.8)	:	54.51 %

TABLE 33

TABLE _

NVLX4:S-MAX

CIRCULAR

INCLINATION: 60 DEG

PERIGEE: 5166 KM

APOGEE: 5166 KM

**** EXPOSURE ANALYSIS ****

	PROTONS (E>5.00MEV)	ELECTRONS LO (E>.5000MEV)
PERCENT OF TOTAL LIFE-TIME SPENT IN FLUX-FREE REGIONS* OF SPACE +	36.00 %	6.0[illegible] %
PERCENT OF TOTAL LIFE-TIME SPENT IN HIGH-INTENSITY REGIONS+ OF VAN ALLEN BELTS :	53.65 %	87.57 %
PERCENT OF TOTAL DAILY FLUX ACCUMULATED IN HIGH-INTENSITY REGIONS+	44.99 %	99.86 %

****

* <1 PARTICLE/CM**2/SEC

+ >1.E5 EL/CM**2/SEC OR 1.E3 PR/CM**2/SEC

TABLE _

NVLX4:S-MAX

CIRCULAR

INCLINATION: 60 DEG

PERIGEE: 5166 KM

APOGEE: 5166 KM

* PERCENT OF TOTAL LIFETIME SPENT INSIDE AND *
* OUTSIDE THE TRAPPED-PARTICLE RADIATION BELT *

INNER ZONE -TI-* (1.0 < L < 2.8)	:	48.33 %
OUTER ZONE -TO- (2.8 < L < 11.0)	:	46.67 %
EXTERNAL -TE- (L > 11.0)	:	5.00 %
TOTAL	:	100.00 %

*TIME IN INNER ZONE MAY BE SUBDIVIDED AS FOLLOWS:

OUTSIDE TRAPPING REGION (1.0 < L < 1.1)	:	0.0 %
INSIDE TRAPPING REGION (1.1 < L < 2.8)	:	48.33 %

TABLE 34

TABLE _

ANALYSIS-MAX
CIRCULAR
INCLINATION: 60 DEG
PERIGEE: 6389 KM
APOGEE: 6389 KM

**** EXPOSURE ANALYSIS ****

	PROTONS (E>55.000MEV)	ELECTRONS (E>0.5000MEV)
PERCENT OF TOTAL LIFE-TIME SPENT IN FLUX-FREE REGIONS* OF SPACE :	[illegible] %	6.53 %
PERCENT OF TOTAL LIFE-TIME SPENT IN HIGH-INTENSITY REGIONS+ OF VAN ALLEN BELTS :	50.14 %	86.67 %
PERCENT OF TOTAL DAILY FLUX ACCUMULATED IN HIGH-INTENSITY REGIONS:	66.66 %	99.05 %

****

* < 1 PARTICLE/CM**2/SEC

\+ > 1.55 EL/CM**2/SEC OR 1.53 PR/CM**2/SEC

TABLE _

ANALYSIS-MAX
CIRCULAR
INCLINATION: 60 DEG
PERIGEE: 6389 KM
APOGEE: 6389 KM

* PERCENT OF TOTAL LIFETIME SPENT INSIDE AND *
* OUTSIDE THE TRAPPED-PARTICLE RADIATION BELT *

INNER ZONE -TI-* (1.0 < L < 2.8)	:	42.36 %
OUTER ZONE -TO- (2.8 < L < 11.0)	:	51.94 %
EXTERNAL -TE- (L > 11.0)	:	5.69 %
TOTAL	:	100.00 %

*TIME IN INNER ZONE MAY BE SUBDIVIDED AS FOLLOWS:

OUTSIDE TRAPPING REGION (1.0 < L < 1.1)	:	0.0 %
INSIDE TRAPPING REGION (1.1 < L < 2.8)	:	42.36 %

TABLE 35

TABLE _

NVE XRIT-MAX

CIRCULAR

INCLINATION: 45 DEG

APOGEE: 10371 KM

PERIGEE: 10371 KM

**** EXPOSURE ANALYSIS ****

	PROTONS (E>5.00 MEV)	ELECTRONS (E>0.50 MEV)
PERCENT OF TOTAL LIFE-TIME SPENT IN FLUX-FREE REGIONS* OF SPACE :	56.67 %	11.25 %
PERCENT OF TOTAL LIFE-TIME SPENT IN HIGH-INTENSITY REGIONS+ OF VAN ALLEN BELTS :	37.9? %	40.42 %
PERCENT OF TOTAL DAILY FLUX ACCUMULATED IN HIGH-INTENSITY REGIONS:	66.66 %	99.93 %

****

* <1 PARTICLE/CM**2/SEC

+ >1.E? EL/CM**2/SEC OR 1.E? PR/CM**2/SEC

TABLE _

NVE XRIT-MAX

CIRCULAR

INCLINATION: 45 DEG

APOGEE: 10371 KM

PERIGEE: 10371 KM

* PERCENT OF TOTAL LIFETIME SPENT INSIDE AND *
* OUTSIDE THE TRAPPED-PARTICLE RADIATION BELT *

INNER ZONE -TI-* (1.0 < L < 2.8)	:	16.53 %
OUTER ZONE -TE- (2.8 < L < 11.0)	:	72.71 %
EXTERNAL -TE- (L > 11.0)	:	10.42 %
TOTAL	:	100.00 %

*TIME IN INNER ZONE MAY BE SUBDIVIDED AS FOLLOWS:

OUTSIDE TRAPPING REGION (1.0 < L < 1.1)	:	0.0 %
INSIDE TRAPPING REGION (1.1 < L < 2.8)	:	16.88 %

TABLE 36

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*****************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AEI7 FOR SOLAR MAXIMUM    ***    UNIFLUX OF 1979    **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0   **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. 168-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NW X1:S-MAX  ** INCLINATION= 60DEG ** PERIGEE= 1667KM ** APOGEE=  1667KM ** B/L ORBIT TAPE: 105446 ** PERIOD= 1.995 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601. GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
*****************************************************************************************************************************
                                  ****** ENERGETIC SOLAR PROTON FLUENCE ******
                                  *****  FOR CUTOFF DIPOLE SHELL L=5 ER  *****
                                  ************* (PARTICLES/CM**2)*************
                                  ********************************************
```

******************MISSION DURATION T=60. MONTHS ******************

ENERGY LEVELS >(MEV)	CONFIDENCE LEVEL Q(%) 80	85	90	95	99
10.0	5.636E 09	5.636E 09	7.515E 09	9.394E 09	1.315E 10
20.0	3.865E 09	3.865E 09	5.153E 09	6.441E 09	9.017E 09
30.0	2.650E 09	2.650E 09	3.533E 09	4.416E 09	6.183E 09
40.0	1.817E 09	1.817E 09	2.423E 09	3.028E 09	4.239E 09
50.0	1.246E 09	1.246E 09	1.661E 09	2.076E 09	2.907E 09
60.0	8.542E 08	8.542E 08	1.139E 09	1.424E 09	1.993E 09
70.0	5.857E 08	5.857E 08	7.809E 08	9.762E 08	1.367E 09
80.0	4.016E 08	4.016E 08	5.355E 08	6.693E 08	9.371E 08
90.0	2.754E 08	2.754E 08	3.671E 08	4.589E 08	6.425E 08
100.0	1.888E 08	1.888E 08	2.517E 08	3.147E 08	4.405E 08
110.0	1.295E 08	1.295E 08	1.726E 08	2.158E 08	3.021E 08
120.0	8.877E 07	8.877E 07	1.184E 08	1.479E 08	2.071E 08
130.0	6.086E 07	6.086E 07	8.115E 07	1.014E 08	1.420E 08
140.0	4.173E 07	4.173E 07	5.564E 07	6.955E 07	9.738E 07
150.0	2.862E 07	2.862E 07	3.815E 07	4.769E 07	6.677E 07
160.0	1.962E 07	1.962E 07	2.616E 07	3.270E 07	4.578E 07
170.0	1.345E 07	1.345E 07	1.794E 07	2.242E 07	3.139E 07
180.0	9.224E 06	9.224E 06	1.230E 07	1.537E 07	2.152E 07
190.0	6.325E 06	6.325E 06	8.433E 06	1.054E 07	1.476E 07
200.0	4.337E 06	4.337E 06	5.782E 06	7.228E 06	1.012E 07

GEOMAGNETIC DIPOLE CUTOFF SHELL	SHIELDING PERCENT EXPOSURE TIME
L>4	16.18
L>5	11.18
L>6	7.71
L>7	5.76

TABLE 37

****
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 16E-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NM X2IS-MAX ** INCLINATION= 60DEG ** PERIGEE= 2593KM ** APOGEE= 2593KM ** B/L ORBIT TAPE: ID5A46 ** PERIOD= 2.345 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
****

****** ENERGETIC SOLAR PROTON FLUENCE ******
***** FOR CUTOFF DIPOLE SHELL L=5 ER *****
************* (PARTICLES/CM**2)*************
****

******************MISSION DURATION T=60. MONTHS ******************

ENERGY LEVELS >(MEV)	CONFIDENCE LEVEL Q(%) 80	85	90	95	99	GEOMAGNETIC DIPOLE CUTOFF SHELL	SHIELDING PERCENT EXPOSURE TIME
10.0	6.651E 09	6.651E 09	8.868E 09	1.109E 10	1.552E 10	L>4	19.37
20.0	4.561E 09	4.561E 09	6.081E 09	7.601E 09	1.064E 10	L>5	13.19
30.0	3.127E 09	3.127E 09	4.169E 09	5.212E 09	7.296E 09	L>6	9.44
40.0	2.144E 09	2.144E 09	2.859E 09	3.574E 09	5.003E 09	L>7	7.22
50.0	1.470E 09	1.470E 09	1.960E 09	2.450E 09	3.430E 09		
60.0	1.008E 09	1.008E 09	1.344E 09	1.680E 09	2.352E 09		
70.0	6.912E 08	6.912E 08	9.216E 08	1.152E 09	1.613E 09		
80.0	4.739E 08	4.739E 08	6.319E 08	7.899E 08	1.106E 09		
90.0	3.250E 08	3.250E 08	4.333E 08	5.416E 08	7.582E 08		
100.0	2.228E 08	2.228E 08	2.971E 08	3.714E 08	5.199E 08		
110.0	1.528E 08	1.528E 08	2.037E 08	2.546E 08	3.565E 08		
120.0	1.048E 08	1.048E 08	1.397E 08	1.746E 08	2.444E 08		
130.0	7.183E 07	7.183E 07	9.577E 07	1.197E 08	1.676E 08		
140.0	4.925E 07	4.925E 07	6.567E 07	8.208E 07	1.149E 08		
150.0	3.377E 07	3.377E 07	4.503E 07	5.628E 07	7.879E 07		
160.0	2.315E 07	2.315E 07	3.087E 07	3.859E 07	5.403E 07		
170.0	1.588E 07	1.588E 07	2.117E 07	2.646E 07	3.704E 07		
180.0	1.089E 07	1.089E 07	1.451E 07	1.814E 07	2.540E 07		
190.0	7.464E 06	7.464E 06	9.952E 06	1.244E 07	1.742E 07		
200.0	5.118E 06	5.118E 06	6.824E 06	8.530E 06	1.194E 07		

TABLE 38

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**************************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM     ***    UNIFLUX OF 1979    **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:    FOR PHOTONS (AP8) - UF= 1.0;   FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0   **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. 168-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX3:S-MAX  ** INCLINATION= 60DEG ** PERIGEE= 3889KM ** APOGEE=  3889KM ** B/L ORBIT TAPE: TD5446 ** PERIOD=  2.876 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
**************************************************************************************************************************************
                                                 ****** ENERGETIC SOLAR PROTON FLUENCE ******
                                                 *****  FOR CUTOFF DIPOLE SHELL L=5 ER  *****
                                                 ************  (PARTICLES/CM**2) ************
                                                 ********************************************
```

ENERGY LEVELS >(MEV)	80	85	90	95	99
	****************MISSION DURATION T=60. MONTHS ****************		CONFIDENCE LEVEL , (%)		
10.0	8.367E 09	8.367E 09	1.116E 10	1.394E 10	1.952E 10
20.0	5.737E 09	5.737E 09	7.649E 09	9.561E 09	1.339E 10
30.0	3.934E 09	3.934E 09	5.245E 09	6.556E 09	9.178E 09
40.0	2.697E 09	2.697E 09	3.596E 09	4.495E 09	6.293E 09
50.0	1.849E 09	1.849E 09	2.466E 09	3.082E 09	4.315E 09
60.0	1.268E 09	1.268E 09	1.691E 09	2.113E 09	2.959E 09
70.0	8.694E 08	8.694E 08	1.159E 09	1.449E 09	2.029E 09
80.0	5.962E 08	5.962E 08	7.949E 08	9.936E 08	1.391E 09
90.0	4.088E 08	4.088E 08	5.450E 08	6.813E 08	9.538E 08
100.0	2.803E 08	2.803E 08	3.737E 08	4.671E 08	6.540E 08
110.0	1.922E 08	1.922E 08	2.562E 08	3.203E 08	4.484E 08
120.0	1.318E 08	1.318E 08	1.757E 08	2.196E 08	3.075E 08
130.0	9.035E 07	9.035E 07	1.205E 08	1.506E 08	2.108E 08
140.0	6.195E 07	6.195E 07	8.260E 07	1.033E 08	1.446E 08
150.0	4.248E 07	4.248E 07	5.664E 07	7.080E 07	9.912E 07
160.0	2.913E 07	2.913E 07	3.883E 07	4.854E 07	6.796E 07
170.0	1.997E 07	1.997E 07	2.663E 07	3.329E 07	4.660E 07
180.0	1.369E 07	1.369E 07	1.826E 07	2.282E 07	3.195E 07
190.0	9.389E 06	9.389E 06	1.252E 07	1.565E 07	2.191E 07
200.0	6.438E 06	6.438E 06	8.584E 06	1.073E 07	1.502E 07

GEOMAGNETIC DIPOLE CUTOFF SHELL	SHIELDING PERCENT EXPOSURE TIME
L>4	26.18
L>5	16.60
L>6	12.43
L>7	9.51

TABLE 39

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*****************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE8, AE17 FOR SOLAR MAXIMUM    ***    UNIFLUX OF 1979     **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE8) - UF= 1.0    **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. 108-TSN 1975 * TIME= 1989.5 **
** VEHICLE & NALPATE MAX  ** INCLINATION= 60DEG ** PERIGEE= 5186KM ** APOGEE=  5186KM ** R/E ORBIT PAR : 1.8444 ** PERIOD=  3.438 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND  20771.* L.(301)-344-8067 **
*****************************************************************************************************************************
                                  ****** ENERGETIC SOLAR PROTON FLUENCE ******
                                  ***** FOR CUTOFF DIPOLE SHELL L=5 ER  *****
                                  ************* (PARTICLES/CM**2)*************
                                  ********************************************
```

ENERGY LEVELS >(MEV)	******MISSION DURATION T=60. MONTHS ****** CONFIDENCE LEVEL Q(%) 80	85	90	95	99
10.0	1.061E 10	1.061E 10	1.414E 10	1.708E 10	2.475E 10
20.0	7.273E 09	7.273E 09	9.657E 09	1.212E 10	1.697E 10
30.0	4.567E 09	4.567E 09	6.649E 09	8.311E 09	1.164E 10
40.0	3.415E 09	3.415E 09	4.555E 09	5.699E 09	7.976E 09
50.0	2.345E 09	2.345E 09	3.126E 09	3.908E 09	5.471E 09
60.0	1.608E 09	1.608E 09	2.143E 09	2.679E 09	3.751E 09
70.0	1.102E 09	1.102E 09	1.470E 09	1.837E 09	2.572E 09
80.0	7.556E 08	7.556E 08	1.008E 09	1.260E 09	1.764E 09
90.0	5.182E 08	5.182E 08	6.910E 08	8.637E 08	1.209E 09
100.0	3.553E 08	3.553E 08	4.738E 08	5.922E 08	8.291E 08
110.0	2.436E 08	2.436E 08	3.249E 08	4.061E 08	5.685E 08
120.0	1.671E 08	1.671E 08	2.227E 08	2.784E 08	3.898E 08
130.0	1.145E 08	1.145E 08	1.527E 08	1.909E 08	2.673E 08
140.0	7.854E 07	7.854E 07	1.047E 08	1.309E 08	1.833E 08
150.0	5.385E 07	5.385E 07	7.180E 07	8.975E 07	1.257E 08
160.0	3.693E 07	3.693E 07	4.923E 07	6.154E 07	8.616E 07
170.0	2.532E 07	2.532E 07	3.376E 07	4.220E 07	5.908E 07
180.0	1.736E 07	1.736E 07	2.315E 07	2.893E 07	4.051E 07
190.0	1.190E 07	1.190E 07	1.587E 07	1.984E 07	2.777E 07
200.0	8.162E 06	8.162E 06	1.088E 07	1.360E 07	1.904E 07

GEOMAGNETIC SHIELDING DIPOLE CUTOFF SHELL	PERCENT EXPOSURE TIME
L>4	32.85
L>5	21.34
L>6	15.62
L>7	11.74

TABLE 40

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*****************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETIES AE8: AE6. AEI7 FOR SOLAR MAXIMUM      ***     UNIFLUX OF 1979    **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;  FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0    **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  4:  BARRACLOUGH ET.AL. 166-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLRE-S-MAX ** INCLINATION= 60DEG ** PERIGEE= 6389KM ** APOGEE= 6389KM ** B/L ORBIT TAPE: TD544E ** PERIOD= 3.988 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
*****************************************************************************************************************************
                                   ****** ENERGETIC SOLAR PROTON FLUENCE ******
                                   *****  FOR CUTOFF DIPOLE SHELL L=5 EP  *****
                                   ************* (PARTICLES/CM**2)*************
                                   ********************************************
```

MISSION DURATION T=60. MONTHS

ENERGY LEVELS >(MEV)	CONFIDENCE LEVEL Q(%) 80	85	90	95	99
10.0	1.288E 10	1.288E 10	1.718E 10	2.147E 10	3.006E 10
20.0	8.833E 09	8.833E 09	1.178E 10	1.472E 10	2.061E 10
30.0	6.057E 09	6.057E 09	8.076E 09	1.009E 10	1.413E 10
40.0	4.153E 09	4.153E 09	5.537E 09	6.921E 09	9.690E 09
50.0	2.847E 09	2.847E 09	3.797E 09	4.746E 09	6.644E 09
60.0	1.952E 09	1.952E 09	2.603E 09	3.254E 09	4.556E 09
70.0	1.339E 09	1.339E 09	1.785E 09	2.231E 09	3.124E 09
80.0	9.179E 08	9.179E 08	1.224E 09	1.530E 09	2.142E 09
90.0	6.294E 08	6.294E 08	8.392E 08	1.049E 09	1.469E 09
100.0	4.316E 08	4.316E 08	5.754E 08	7.193E 08	1.007E 09
110.0	2.959E 08	2.959E 08	3.945E 08	4.932E 08	6.904E 08
120.0	2.029E 08	2.029E 08	2.705E 08	3.382E 08	4.734E 08
130.0	1.391E 08	1.391E 08	1.855E 08	2.319E 08	3.246E 08
140.0	9.539E 07	9.539E 07	1.272E 08	1.590E 08	2.226E 08
150.0	6.541E 07	6.541E 07	8.721E 07	1.090E 08	1.526E 08
160.0	4.485E 07	4.485E 07	5.980E 07	7.474E 07	1.046E 08
170.0	3.075E 07	3.075E 07	4.100E 07	5.125E 07	7.175E 07
180.0	2.108E 07	2.108E 07	2.811E 07	3.514E 07	4.920E 07
190.0	1.446E 07	1.446E 07	1.928E 07	2.409E 07	3.373E 07
200.0	9.913E 06	9.913E 06	1.322E 07	1.652E 07	2.313E 07

GEOMAGNETIC DIPOLE CUTOFF SHELL	SHIELDING PERCENT EXPOSURE TIME
L >4	37.71
L >5	25.56
L >6	18.08
L >7	13.82

TABLE 41

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*************************************************************************************************************************
** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM      ***      UNIFLUX OF 1979   **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE:   FOR PROTONS (AP8) - UF= 1.0;   FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0   **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL  :  BARRACLOUGH ET.AL. 168-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLMGIS MAX ** INCLINATION= 60DEG ** PERIGEE=1037 KM ** APOGEE= 1037 KM ** FAL ORBIT TAPE: 105444 ** PERIOD=  5.993 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
*************************************************************************************************************************
                                    ****** ENERGETIC SOLAR PROTON FLUENCE ******
                                    *****  FOR CUTOFF DIPOLE SHELL L=5 ER  *****
                                    ************* (PARTICLES/CM**2)*************
                                    ********************************************
```

******************MISSION DURATION T=60. MONTHS *****************

ENERGY LEVELS >(MEV)	CONFIDENCE LEVEL Q(%) 80	85	90	95	99
10.0	2.009E 10	2.009E 10	2.679E 10	3.349E 10	4.689E 10
20.0	1.378E 10	1.378E 10	1.837E 10	2.296E 10	3.215E 10
30.0	9.447E 09	9.447E 09	1.260E 10	1.575E 10	2.204E 10
40.0	6.478E 09	6.478E 09	8.637E 09	1.080E 10	1.511E 10
50.0	4.441E 09	4.441E 09	5.922E 09	7.402E 09	1.036E 10
60.0	3.045E 09	3.045E 09	4.061E 09	5.076E 09	7.106E 09
70.0	2.088E 09	2.088E 09	2.784E 09	3.480E 09	4.872E 09
80.0	1.432E 09	1.432E 09	1.909E 09	2.386E 09	3.341E 09
90.0	9.817E 08	9.817E 08	1.309E 09	1.636E 09	2.291E 09
100.0	6.731E 08	6.731E 08	8.975E 08	1.122E 09	1.571E 09
110.0	4.615E 08	4.615E 08	6.154E 08	7.692E 08	1.077E 09
120.0	3.165E 08	3.165E 08	4.220E 08	5.275E 08	7.384E 08
130.0	2.170E 08	2.170E 08	2.893E 08	3.617E 08	5.063E 08
140.0	1.488E 08	1.488E 08	1.984E 08	2.480E 08	3.472E 08
150.0	1.020E 08	1.020E 08	1.360E 08	1.700E 08	2.380E 08
160.0	6.995E 07	6.995E 07	9.327E 07	1.166E 08	1.632E 08
170.0	4.796E 07	4.796E 07	6.395E 07	7.994E 07	1.119E 08
180.0	3.289E 07	3.289E 07	4.385E 07	5.481E 07	7.674E 07
190.0	2.255E 07	2.255E 07	3.007E 07	3.758E 07	5.262E 07
200.0	1.546E 07	1.546E 07	2.062E 07	2.577E 07	3.608E 07

GEOMAGNETIC DIPOLE CUTOFF SHELL	SHIELDING PERCENT EXPOSURE TIME
L>4	52.15
L>5	35.86
L>6	25.37
L>7	22.22

TABLE 42

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 166-TPM 1975 * TIME= 1989.5 **
** VEHICLE : NVLXI'S-MAX ** INCLINATION= 60DEG ** PERIGEE= 1667KM ** APOGEE= 1667KM ** B/L ORBIT TAPE: TD5A46 ** PERIOD= 1.995 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC.CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

*** DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ***

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	OUTER ZN. (RADS-AL)	TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	SOLAR+ (RADS-AL)	TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	2.257E 07	6.399E 05	2.321E 07	9.854E 03	6.960E 05	9.988E 02	6.970E 05	2.392E 07
0.02	0.07	3.	1.257E 07	3.977E 05	1.297E 07	7.803E 03	3.580E 05	1.014E 03	3.590E 05	1.333E 07
0.03	0.11	4.	7.784E 06	2.882E 05	8.072E 06	6.271E 03	2.659E 05	1.025E 03	2.669E 05	8.345E 06
0.04	0.15	6.	5.084E 06	2.247E 05	5.309E 06	5.167E 03	2.163E 05	1.033E 03	2.174E 05	5.531E 06
0.05	0.19	7.	3.436E 06	1.834E 05	3.620E 06	4.337E 03	1.864E 05	1.038E 03	1.875E 05	3.812E 06
0.06	0.22	9.	2.385E 06	1.544E 05	2.539E 06	3.698E 03	1.655E 05	1.041E 03	1.666E 05	2.710E 06
0.07	0.26	10.	1.693E 06	1.330E 05	1.826E 06	3.201E 03	1.490E 05	1.042E 03	1.500E 05	1.983E 06
0.08	0.30	12.	1.228E 06	1.166E 05	1.345E 06	2.810E 03	1.359E 05	1.041E 03	1.370E 05	1.485E 06
0.09	0.33	13.	9.096E 05	1.037E 05	1.013E 06	2.499E 03	1.250E 05	1.038E 03	1.261E 05	1.142E 06
0.10	0.37	15.	6.875E 05	9.331E 04	7.808E 05	2.249E 03	1.160E 05	1.034E 03	1.170E 05	9.001E 05
0.20	0.74	29.	1.063E 05	4.532E 04	1.517E 05	1.158E 03	6.901E 04	8.766E 02	6.989E 04	2.227E 05
0.30	1.11	44.	3.981E 04	2.688E 04	6.669E 04	8.020E 02	5.057E 04	7.004E 02	5.127E 04	1.188E 05
0.40	1.48	58.	2.045E 04	1.675E 04	3.719E 04	6.197E 02	4.062E 04	5.860E 02	4.120E 04	7.902E 04
0.50	1.85	73.	1.202E 04	1.079E 04	2.281E 04	5.085E 02	3.456E 04	5.025E 02	3.508E 04	5.840E 04
0.60	2.22	87.	7.512E 03	7.192E 03	1.470E 04	4.330E 02	3.061E 04	4.384E 02	3.105E 04	4.619E 04
0.80	2.96	117.	3.124E 03	3.533E 03	6.657E 03	3.362E 02	2.545E 04	3.469E 02	2.580E 04	3.279E 04
1.00	3.70	146.	1.241E 03	1.907E 03	3.148E 03	2.762E 02	2.235E 04	2.833E 02	2.264E 04	2.606E 04
1.25	4.63	182.	3.022E 02	8.947E 02	1.197E 03	2.269E 02	1.980E 04	2.268E 02	2.003E 04	2.145E 04
1.50	5.56	219.	5.063E 01	3.851E 02	4.358E 02	1.934E 02	1.795E 04	1.859E 02	1.813E 04	1.876E 04
1.75	6.48	255.	6.355E 00	1.473E 02	1.537E 02	1.691E 02	1.654E 04	1.556E 02	1.670E 04	1.702E 04
2.00	7.41	292.	6.679E-01	4.904E 01	4.971E 01	1.507E 02	1.535E 04	1.306E 02	1.548E 04	1.568E 04
2.50	9.26	365.	1.670E-03	3.086E 00	3.087E 00	1.245E 02	1.350E 04	9.677E 01	1.360E 04	1.372E 04
3.00	11.11	437.	0.0	5.038E-02	5.038E-02	1.067E 02	1.209E 04	7.480E 01	1.216E 04	1.227E 04
3.50	12.96	510.	0.0	1.291E-05	1.291E-05	9.355E 01	1.098E 04	5.797E 01	1.104E 04	1.113E 04
4.00	14.81	583.	0.0	0.0	0.0	8.338E 01	1.008E 04	4.665E 01	1.013E 04	1.021E 04
4.50	16.67	656.	0.0	0.0	0.0	7.517E 01	9.309E 03	3.785E 01	9.347E 03	9.422E 03
5.00	18.52	729.	0.0	0.0	0.0	6.834E 01	8.636E 03	3.096E 01	8.667E 03	8.735E 03
6.00	22.22	875.	0.0	0.0	0.0	5.753E 01	7.523E 03	2.153E 01	7.545E 03	7.603E 03
8.00	29.63	1167.	0.0	0.0	0.0	4.269E 01	5.911E 03	1.118E 01	5.922E 03	5.965E 03
10.00	37.04	1458.	0.0	0.0	0.0	3.287E 01	4.804E 03	6.266E 00	4.810E 03	4.843E 03

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AEI7: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AEI7-HI FAVORS VAMPOLA'S FIT TO OVI-19 DATA WHILE AEI7-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

\>> THE AEI7-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU (UNATTENUATED, INTERPLANETARY)
FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO.,Q=90%: # OF AL EVENTS=4
89.82% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>230 MEV.

TABLE 43

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VERSIONS AP8, AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 16F-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX2:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 250.KM ** APOGEE= 2593KM ** B/L ORBIT TAPE: TD5446 ** PERIOD= 2.349 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

*** DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ***

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	OUTER ZN. (RADS-AL)	TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	SOLAR+ (RADS-AL)	TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	7.905E 07	1.199E 06	8.025E 07	3.414E 04	4.844E 06	1.179E 03	4.845E 06	8.513E 07
0.02	0.07	3.	4.384E 07	7.425E 05	4.458E 07	2.693E 04	2.798E 06	1.197E 03	2.799E 06	4.741E 07
0.03	0.11	4.	2.717E 07	5.364E 05	2.770E 07	2.162E 04	2.150E 06	1.210E 03	2.152E 06	2.988E 07
0.04	0.15	6.	1.782E 07	4.174E 05	1.822E 07	1.783E 04	1.765E 06	1.219E 03	1.766E 06	2.001E 07
0.05	0.19	7.	1.210E 07	3.400E 05	1.244E 07	1.494E 04	1.512E 06	1.225E 03	1.513E 06	1.396E 07
0.06	0.22	9.	8.450E 06	2.859E 05	8.736E 06	1.274E 04	1.323E 06	1.228E 03	1.324E 06	1.007E 07
0.07	0.26	10.	6.045E 06	2.460E 05	6.291E 06	1.103E 04	1.167E 06	1.230E 03	1.168E 06	7.469E 06
0.08	0.30	12.	4.419E 06	2.156E 05	4.635E 06	9.677E 03	1.041E 06	1.228E 03	1.042E 06	5.686E 06
0.09	0.33	13.	3.299E 06	1.916E 05	3.490E 06	8.604E 03	9.343E 05	1.225E 03	9.355E 05	4.435E 06
0.10	0.37	15.	2.514E 06	1.724E 05	2.686E 06	7.740E 03	8.458E 05	[illegible] 03	8.471E 05	3.541E 06
0.20	0.74	29.	4.131E 05	8.368E 04	4.967E 05	3.962E 03	4.045E 05	1.034E 03	4.055E 05	9.062E 05
0.30	1.11	44.	1.601E 05	4.965E 04	2.098E 05	2.732E 03	2.507E 05	8.265E 02	2.515E 05	4.640E 05
0.40	1.48	58.	8.446E 04	3.093E 04	1.154E 05	2.105E 03	1.764E 05	6.916E 02	1.771E 05	2.946E 05
0.50	1.85	73.	5.069E 04	1.993E 04	7.061E 04	1.724E 03	1.356E 05	5.930E 02	1.361E 05	2.085E 05
0.60	2.22	87.	3.208E 04	1.328E 04	4.536E 04	1.466E 03	1.111E 05	5.174E 02	1.116E 05	1.584E 05
0.80	2.96	117.	1.343E 04	6.519E 03	1.995E 04	1.136E 03	8.242E 04	4.094E 02	8.283E 04	1.039E 05
1.00	3.70	146.	5.255E 03	3.516E 03	8.770E 03	9.313E 02	6.742E 04	3.343E 02	6.775E 04	7.745E 04
1.25	4.63	182.	1.214E 03	1.646E 03	2.860E 03	7.635E 02	5.643E 04	2.677E 02	5.670E 04	6.032E 04
1.50	5.56	219.	1.884E 02	7.066E 02	8.950E 02	6.497E 02	4.921E 04	2.193E 02	4.943E 04	5.097E 04
1.75	6.48	255.	2.229E 01	2.687E 02	2.910E 02	5.673E 02	4.408E 04	1.836E 02	4.427E 04	4.513E 04
2.00	7.41	292.	2.285E 00	8.844E 01	9.072E 01	5.050E 02	3.993E 04	1.542E 02	4.009E 04	4.068E 04
2.50	9.26	365.	6.396E-03	5.362E 00	5.369E 00	4.165E 02	3.387E 04	1.142E 02	3.398E 04	3.440E 04
3.00	11.11	437.	0.0	1.022E-01	1.022E-01	3.562E 02	2.963E 04	8.827E 01	2.572E 04	3.008E 04
3.50	12.96	510.	0.0	6.676E-05	6.676E-05	3.119E 02	2.655E 04	6.841E 01	2.662E 04	2.693E 04
4.00	14.81	583.	0.0	0.0	0.0	2.775E 02	2.415E 04	5.506E 01	2.421E 04	2.449E 04
4.50	16.67	656.	0.0	0.0	0.0	2.498E 02	2.213E 04	4.467E 01	2.217E 04	2.242E 04
5.00	18.52	729.	0.0	0.0	0.0	2.268E 02	2.039E 04	3.654E 01	2.043E 04	2.065E 04
6.00	22.22	875.	0.0	0.0	0.0	1.905E 02	1.753E 04	2.541E 01	1.756E 04	1.775E 04
8.00	29.63	1167.	0.0	0.0	0.0	1.438E 02	1.346E 04	1.319E 01	1.347E 04	1.361E 04
10.00	37.04	1458.	0.0	0.0	0.0	1.080E 02	1.073E 04	7.395E 00	1.074E 04	1.084E 04

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AE17: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE.
FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AE17-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AE17-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AE17-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU
(UNATTENUATED, INTERPLANETARY)
FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO.,C=90%: # OF AL EVENTS=4
86.81% GEOMAGNETIC SHIELDING APPLIED

NOTE: C DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 44

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8, AE6, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 168-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX3:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 3889KM ** APOGEE= 3889KM ** B/L ORBIT TAPE: TD3446 ** PERIOD= 2.876 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

*** DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ***

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	OUTER ZN. (RADS-AL)	TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	SOLAR+ (RADS-AL)	TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	1.405E 08	2.330E 06	1.429E 08	6.093E 04	2.544E 07	1.483E 03	2.544E 07	1.684E 08
0.02	0.07	3.	7.772E 07	1.453E 06	7.917E 07	4.794E 04	1.478E 07	1.506E 03	1.478E 07	9.400E 07
0.03	0.11	4.	4.818E 07	1.056E 06	4.924E 07	3.846E 04	1.081E 07	1.522E 03	1.082E 07	6.009E 07
0.04	0.15	6.	3.164E 07	8.249E 05	3.246E 07	3.169E 04	8.417E 06	1.533E 03	8.419E 06	4.091E 07
0.05	0.19	7.	2.154E 07	6.743E 05	2.222E 07	2.660E 04	6.348E 06	1.541E 03	6.650E 06	2.889E 07
0.06	0.22	9.	1.507E 07	5.665E 05	1.564E 07	2.268E 04	5.708E 06	1.545E 03	5.710E 06	2.137E 07
0.07	0.26	10.	1.077E 07	4.902E 05	1.126E 07	1.961E 04	4.802E 06	1.547E 03	4.803E 06	1.608E 07
0.08	0.30	12.	7.833E 06	4.303E 05	8.264E 06	1.719E 04	4.099E 06	1.545E 03	4.101E 06	1.238E 07
0.09	0.33	13.	5.794E 06	3.830E 05	6.176E 06	1.524E 04	3.526E 06	1.541E 03	3.528E 06	9.720E 06
0.10	0.37	15.	4.350E 06	3.448E 05	4.695E 06	1.368E 04	3.068E 06	1.535E 03	3.069E 06	7.778E 06
0.20	0.74	29.	4.896E 05	1.680E 05	6.576E 05	6.813E 03	1.060E 06	1.301E 03	1.061E 06	1.726E 06
0.30	1.11	44.	1.366E 05	9.967E 04	2.363E 05	4.625E 03	5.144E 05	1.040E 03	5.154E 05	7.564E 05
0.40	1.48	58.	6.290E 04	6.189E 04	1.248E 05	3.535E 03	2.973E 05	8.699E 02	2.982E 05	4.265E 05
0.50	1.85	73.	3.533E 04	3.966E 04	7.499E 04	2.883E 03	1.962E 05	7.459E 02	1.969E 05	2.748E 05
0.60	2.22	87.	2.124E 04	2.628E 04	4.753E 04	2.446E 03	1.430E 05	6.508E 02	1.437E 05	1.936E 05
0.80	2.96	117.	8.089E 03	1.279E 04	2.088E 04	1.890E 03	8.852E 04	5.149E 02	8.903E 04	1.118E 05
1.00	3.70	146.	2.904E 03	6.865E 03	9.769E 03	1.546E 03	6.405E 04	4.205E 02	6.447E 04	7.579E 04
1.25	4.63	182.	6.187E 02	3.203E 03	3.822E 03	1.264E 03	4.829E 04	3.367E 02	4.863E 04	5.371E 04
1.50	5.56	219.	9.579E 01	1.372E 03	1.468E 03	1.072E 03	3.903E 04	2.759E 02	3.931E 04	4.185E 04
1.75	6.48	255.	1.270E 01	5.207E 02	5.334E 02	9.329E 02	3.299E 04	2.310E 02	3.322E 04	3.468E 04
2.00	7.41	292.	1.524E 00	1.708E 02	1.724E 02	8.275E 02	2.838E 04	1.939E 02	2.857E 04	2.957E 04
2.50	9.26	365.	4.939E-03	1.021E 01	1.022E 01	6.780E 02	2.220E 04	1.436E 02	2.234E 04	2.303E 04
3.00	11.11	437.	0.0	2.004E-01	2.004E-01	5.763E 02	1.836E 04	1.110E 02	1.847E 04	1.905E 04
3.50	12.96	510.	0.0	1.650E-04	1.650E-04	5.020E 02	1.583E 04	8.605E 01	1.592E 04	1.642E 04
4.00	14.81	583.	0.0	0.0	0.0	4.447E 02	1.400E 04	6.926E 01	1.407E 04	1.451E 04
4.50	16.67	656.	0.0	0.0	0.0	3.987E 02	1.251E 04	5.619E 01	1.256E 04	1.296E 04
5.00	18.52	729.	0.0	0.0	0.0	3.607E 02	1.127E 04	4.597E 01	1.131E 04	1.167E 04
6.00	22.22	875.	0.0	0.0	0.0	3.010E 02	9.292E 03	3.197E 01	9.324E 03	9.625E 03
8.00	29.63	1167.	0.0	0.0	0.0	2.197E 02	6.646E 03	1.659E 01	6.663E 03	6.883E 03
10.00	37.04	1458.	0.0	0.0	0.0	1.667E 02	5.019E 03	9.302E 00	5.028E 03	5.195E 03

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AEI7: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AEI7-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AEI7-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AEI7-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU
(UNATTENUATED, INTERPLANETARY)
FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO., Q=90%: # OF AL EVENTS=4
83.40% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 45

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTE'S AP8, AE6, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1981 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. IGS-TRW 1975 * TIME= 1989.5 **
** VEHICLE 1 NM RATE-MAX ** INCLINATION= 60DEG ** PERIGEE= 6100KM ** APOGEE= 6100KM ** ALL ORBIT TAPE: 1.5446 ** PERIOD= 3.438 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC, CODE 601, GREENBELT, MARYLAN 20771, TEL.(301)-344-8067 **

*** DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ***

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	ELECTRONS* OUTER ZN. (RADS-AL)	ELECTRONS* TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	PROTONS SOLAR+ (RADS-AL)	PROTONS TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	1.441E 08	3.595E 06	1.477E 08	6.331E 04	6.928E 07	1.880E 03	6.928E 07	2.170E 08
0.02	0.07	3.	7.887E 07	2.291E 06	8.082E 07	4.939E 04	3.453E 07	1.909E 03	3.454E 07	1.154E 08
0.03	0.11	4.	4.845E 07	1.635E 06	5.009E 07	3.952E 04	2.215E 07	1.530E 03	2.215E 07	7.228E 07
0.04	0.15	6.	3.180E 07	1.284E 06	3.309E 07	3.255E 04	1.542E 07	1.544E 03	1.542E 07	4.854E 07
0.05	0.19	7.	2.171E 07	1.052E 06	2.276E 07	2.735E 04	1.145E 07	1.554E 03	1.145E 07	3.424 07
0.06	0.22	9.	1.524E 07	8.878E 05	1.613E 07	2.334E 04	8.851E 06	1.559E 03	8.853E 06	2.500E 07
0.07	0.26	10.	1.092E 07	7.665E 05	1.168E 07	2.020E 04	6.905E 06	1.561E 03	6.907E 06	1.867E 07
0.08	0.30	12.	7.946E 06	6.733E 05	8.619E 06	1.771E 04	5.622E 06	1.559E 03	5.624E 06	1.426E 07
0.09	0.33	13.	5.856E 06	5.996E 05	6.457E 06	1.571E 04	4.557E 06	1.554E 03	4.559E 06	1.107E 07
0.10	0.37	15.	4.364E 06	5.400E 05	4.904E 06	1.409E 04	3.826E 06	1.545E 03	3.828E 06	8.746E 06
0.20	0.74	29.	3.425E 05	2.620E 05	6.045E 05	6.965E 03	1.011E 06	1.650E 03	1.012E 06	1.624E 06
0.30	1.11	44.	5.641E 04	1.544E 05	2.108E 05	4.712E 03	4.226E 05	1.318E 03	4.239E 05	6.393E 05
0.40	1.48	58.	1.867E 04	9.523E 04	1.139E 05	3.596E 03	2.181E 05	1.103E 03	2.192E 05	3.366E 05
0.50	1.85	73.	8.867E 03	6.065E 04	6.932E 04	2.933E 03	1.319E 05	9.457E 02	1.329E 05	2.051E 05
0.60	2.22	87.	4.463E 03	3.987E 04	4.442E 04	2.490E 03	8.974E 04	8.251E 02	9.057E 04	1.375E 05
0.80	2.96	117.	1.299E 03	1.927E 04	2.057E 04	1.926E 03	4.920E 04	6.528E 02	4.985E 04	7.235E 04
1.00	3.70	146.	3.540E 02	1.028E 04	1.068E 04	1.576E 03	3.233E 04	5.331E 02	3.286E 04	4.512E 04
1.25	4.63	182.	8.091E 01	4.720E 03	4.801E 03	1.288E 03	2.220E 04	4.269E 02	2.263E 04	2.877E 04
1.50	5.56	219.	1.455E 01	2.046E 03	2.061E 03	1.092E 03	1.664E 04	3.458E 02	1.699E 04	2.014E 04
1.75	6.48	255.	2.456E 00	7.780E 02	7.805E 02	9.499E 02	1.322E 04	2.928E 02	1.352E 04	1.525E 04
2.00	7.41	292.	3.655E-01	2.554E 02	2.558E 02	8.420E 02	1.075E 04	2.458E 02	1.100E 04	1.210E 04
2.50	9.26	365.	1.079E-03	1.519E 01	1.519E 01	6.890E 02	7.685E 03	1.821E 02	7.871E 03	8.575E 03
3.00	11.11	437.	0.0	2.088E-01	2.088E-01	5.851E 02	5.872E 03	1.406E 02	6.112E 03	6.698E 03
3.50	12.96	510.	0.0	2.582E-04	2.582E-04	5.093E 02	4.931E 03	1.091E 02	5.041E 03	5.550E 03
4.00	14.81	583.	0.0	0.0	0.0	4.509E 02	4.217E 03	8.780E 01	4.305E 03	4.756E 03
4.50	16.67	656.	0.0	0.0	0.0	4.041E 02	3.661E 03	7.184E 01	3.733E 03	4.137E 03
5.00	18.52	729.	0.0	0.0	0.0	3.654E 02	3.212E 03	5.827E 01	3.270E 03	3.636E 03
6.00	22.22	875.	0.0	0.0	0.0	3.046E 02	2.527E 03	4.093E 01	2.567E 03	2.872E 03
8.00	29.63	1167.	0.0	0.0	0.0	2.221E 02	1.672E 03	2.104E 01	1.693E 03	1.915E 03
10.00	37.04	1458.	0.0	0.0	0.0	1.683E 02	1.193E 03	1.179E 01	1.204E 03	1.373E 03

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AEI7: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE.
FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AEI7-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AEI7-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AEI7-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOURCE: SOLAR FLARE PROTONS AT 1 AU
(UNATTENUATED, INTERPLANETARY)
FOR CUTOFF CIRCLE SHELL OF 5 E.R.

FOR TAU=6C.MC.,Q=SC%: # OF AL EVENTS=4
78.56% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND >200 MEV.

TABLE 46

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL., IGF-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NVLXS15 MAX ** INCLINATION= 60DEG ** PERIGEE= 6380KM ** APOGEE= 6389KM ** B/L ORBIT TAPE: 105444 ** PERIOD= 3.888 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

*** DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ***

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	ELECTRONS* OUTER ZN. (RADS-AL)	ELECTRONS* TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	PROTONS SOLAR+ (RADS-AL)	PROTONS TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	1.159E 08	5.027E 06	1.209E 08	5.222E 04	1.158E 08	2.233E 03	1.158E 08	2.368E 08
0.02	0.07	3.	6.068E 07	3.125E 06	6.381E 07	3.984E 04	4.667E 07	3.319E 03	4.667E 07	1.105E 08
0.03	0.11	4.	3.633E 07	2.270E 06	3.860E 07	3.146E 04	2.572E 07	2.744E 03	2.572E 07	6.435E 07
0.04	0.15	6.	2.334E 07	1.776E 06	2.511E 07	2.571E 04	1.564E 07	2.361E 03	1.565E 07	4.055E 07
0.05	0.19	7.	1.568E 07	1.453E 06	1.713E 07	2.150E 04	1.072E 07	2.073E 03	1.072E 07	2.798E 07
0.06	0.22	9.	1.087E 07	1.227E 06	1.209E 07	1.831E 04	7.767E 06	2.379E 03	7.770E 06	1.588E 07
0.07	[illegible]	10.	[illegible] 06	[illegible] 06	8.768E 06	1.584E 04	5.814E 06	2.181E 03	5.817E 06	1.466E 07
0.08	0.30	12.	5.564E 06	9.304E 05	6.494E 06	1.390E 04	4.527E 06	2.379E 03	4.529E 06	1.104E 07
0.09	0.33	13.	4.070E 06	8.285E 05	4.899E 06	1.235E 04	3.593E 06	2.173E 03	3.595E 06	8.537E 06
0.10	0.37	15.	3.010E 06	7.487E 05	3.759E 06	1.110E 04	2.920E 06	2.36[illegible]E 03	2.922E 06	6.690E 06
0.20	0.74	29.	2.086E 05	3.603E 05	5.689E 05	5.598E 03	6.822E 05	2.004E 03	6.842E 05	1.259E 06
0.30	1.11	44.	2.726E 04	2.110E 05	2.382E 05	3.832E 03	2.667E 05	1.601E 03	2.683E 05	5.104E 05
0.40	1.48	59.	7.117E 03	1.296E 05	1.368E 05	2.945E 03	1.298E 05	1.340E 03	1.312E 05	2.709E 05
0.50	1.85	73.	2.822E 03	8.234E 04	8.517E 04	2.410E 03	7.470E 04	1.147E 03	7.585E 04	1.634E 05
0.60	2.22	87.	1.3[illegible]E 03	5.414E 04	5.545E 04	2.050E 03	4.864E 04	1.002E 03	4.965E 04	1.071E 05
0.80	2.96	117.	3.317E 02	2.599E 04	2.632E 04	1.589E 03	2.451E 04	7.928E 02	2.531E 04	5.322E 04
1.00	3.70	146.	8.566E 01	1.381E 04	1.390E 04	1.303E 03	1.457E 04	6.475E 02	1.561E 04	3.082E 04
1.25	4.63	182.	1.011E 01	8.407E 03	8.423E 03	1.068E 03	9.499E 03	5.165E 02	1.002E 04	1.751E 04
1.50	5.56	219.	2.616E 00	2.747E 03	2.750E 03	9.076E 02	6.645E 03	4.318E 02	7.070E 03	1.073E 04
1.75	6.48	255.	3.523E-01	1.048E 03	1.049E 03	7.912E 02	4.976E 03	3.556E 02	5.332E 03	7.171E 03
2.00	7.41	292.	2.602E-02	3.448E 02	3.448E 02	7.028E 02	3.424E 03	[illegible]	4.122E 03	5.170E 03
2.50	9.26	365.	0.0	2.039E 01	2.039E 01	5.774E 02	2.494E 03	2.212E 02	2.715E 03	3.313E 03
3.00	11.11	437.	0.0	3.067E-01	3.067E-01	4.922E 02	1.816E 03	1.710E 02	1.987E 03	2.475E 03
3.50	12.96	510.	0.0	3.431E-04	3.431E-04	4.300E 02	1.423E 03	1.229E 02	1.565E 03	1.995E 03
4.00	14.81	583.	0.0	0.0	0.0	3.819E 02	1.187E 03	1.056E 02	1.290E 03	1.672E 03
4.50	16.67	656.	0.0	0.0	0.0	3.433E 02	9.955E 02	8.659E 01	1.082E 03	1.425E 03
5.00	18.52	729.	0.0	0.0	0.0	3.113E 02	8.489E 02	7.179E 01	9.197E 02	1.231E 03
6.00	22.22	875.	0.0	0.0	0.0	2.608E 02	6.344E 02	4.922E 01	6.837E 02	9.445E 02
8.00	29.63	1167.	0.0	0.0	0.0	1.920E 02	3.867E 02	2.555E 01	4.122E 02	6.042E 02
10.00	37.04	1458.	0.0	0.0	0.0	1.469E 02	2.559E 02	1.433E 01	2.742E 02	4.211E 02

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AE17: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AE17-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AE17-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AE17-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU (UNATTENUATED, INTERPLANETARY) FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU= 60.MO., Q= 90%: # OF AL EVENTS= 4
74.43% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 47

** ~~ORBITAL~~ FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTEL AE8: AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY IN KAGA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET AL., IGS-WM 1975 * TIME= 1989.5 **
** ~~VEHICLE * NVEHICLES MAX ** INCLINATION= 90DEG ** PERIGEE=1034KM ** APOGEE= 1037KM ** B/L ORBIT TAPE: 105446 ** PERIOD= 5.002~~ **
** FOR INFORMATION OR EXPLANATION CONTACT ... STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

*** DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ***

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S ~~[illegible]~~	T ~~[illegible]~~	T ~~[illegible]~~	ELECTRONS* INNER ZN. ~~(RADS-AL)~~	ELECTRONS* OUTER ZN. (RADS-AL)	ELECTRONS* TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	PROTONS SOLAR + (RADS-AL)	PROTONS TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	1.543E 07	1.451E 07	3.034E 07	1.424E 04	1.521E 08	[illegible] 03	1.521E 08	1.824E 08
0.02	0.07	3.	7.507E 06	8.895E 06	1.640E 07	1.282E 04	3.050E 07	3.65[illegible] 03	3.051E 07	4.691E 07
0.03	0.11	4.	4.620E 06	6.295E 06	1.092E 07	8.914E 03	1.025E 07	3.774E 03	1.025E 07	2.126E 07
0.04	0.15	6.	2.166E 06	3.843E 06	6.011E 06	7.680E 03	6.344E 06	3.762E 03	6.348E 06	1.237E 07
0.05	0.19	7.	2.317E 06	3.914E 06	6.230E 06	6.736E 03	2.191E 06	2.779E 03	2.195E 06	8.432E 06
0.06	0.22	9.	1.768E 06	3.271E 06	5.039E 06	6.122E 03	1.257E 06	2.79[illegible] 03	1.260E 06	6.305E 06
~~0.07~~	~~0.26~~	~~10.~~	~~[illegible] 06~~	2.861E 06	4.191E 06	5.584E 03	8.177E 05	3.790E 03	8.215E 05	5.018E 06
0.08	0.30	12.	1.117E 06	2.443E 06	3.560E 06	5.157E 03	5.606E 05	3.784E 03	5.644E 05	4.130E 06
0.09	0.34	13.	9.140E 05	2.162E 06	3.076E 06	4.799E 03	4.105E 05	3.772E 03	4.143E 05	3.495E 06
0.10	0.37	15.	7.584E 05	1.937E 06	2.695E 06	4.497E 03	3.080E 05	3.75[illegible] 03	3.117E 05	3.012E 06
0.20	0.74	29.	1.705E 05	9.068E 05	1.078E 06	2.913E 03	4.778E 04	3.12[illegible] 03	5.091E 04	1.132E 06
0.30	1.11	44.	4.256E 04	5.254E 05	5.694E 05	2.220E 03	1.522E 04	2.50[illegible] 03	1.762E 04	5.884E 05
0.40	1.48	58.	1.423E 04	3.241E 05	3.384E 05	1.311E 03	6.425E 03	2.09[illegible] 03	8.515E 03	3.497E 05
0.50	1.85	73.	6.703E 03	2.084E 05	2.151E 05	1.535E 03	3.213E 03	1.791E 03	5.004E 03	2.216E 05
~~0.60~~	~~2.22~~	~~87.~~	~~3.549E 03~~	1.365E 05	1.425E 05	1.340E 03	1.832E 03	1.564E 03	3.396E 03	1.472E 05
0.80	2.96	117.	1.165E 03	5.830E 04	5.937E 04	1.081E 03	7.534E 02	1.2[illegible] 03	1.965E 03	7.244E 04
1.00	3.70	146.	3.265E 02	3.689E 04	3.722E 04	9.171E 02	3.822E 02	1.0[illegible] 03	1.391E 03	3.952E 04
1.25	4.63	182.	7.282E 01	1.736E 04	1.743E 04	7.791E 02	2.012E 02	5.084E 02	7.100E 02	1.922E 04
1.50	5.56	219.	1.510E 01	7.519E 03	7.534E 03	6.828E 02	1.174E 02	6.617E 02	7.792E 02	8.996E 03
1.75	6.48	255.	2.603E 00	2.883E 03	2.885E 03	6.116E 02	7.309E 01	5.505E 02	6.236E 02	4.120E 03
2.00	7.41	292.	2.628E-01	9.433E 02	9.435E 02	5.569E 02	4.934E 01	4.659E 02	5.166E 02	2.019E 03
2.50	9.26	365.	0.0	5.343E 01	5.343E 01	4.780E 02	2.404E 01	3.477E 02	3.717E 02	9.032E 02
~~3.00~~	~~11.11~~	~~437.~~	~~0.0~~	~~4.921E-01~~	~~4.921E-01~~	4.233E 02	1.348E 01	2.666E 02	2.80[illegible] 02	7.046E 02
3.50	12.96	510.	0.0	6.662E-04	8.662E-04	3.822E 02	8.564E 00	2.087E 02	2.173E 02	5.995E 02
4.00	14.81	583.	0.0	0.0	0.0	3.432E 02	5.722E 00	1.664E 02	1.721E 02	5.213E 02
4.50	16.67	656.	0.0	0.0	0.0	3.219E 02	3.988E 00	1.35[illegible] 02	1.390E 02	4.609E 02
5.00	18.52	729.	0.0	0.0	0.0	2.985E 02	2.813E 00	1.126E 02	1.125E 02	4.115E 02
6.00	22.22	875.	0.0	0.0	0.0	2.602E 02	1.419E 00	7.643E 01	7.785E 01	3.380E 02
8.00	29.63	1167.	0.0	0.0	0.0	2.048E 02	2.966E-01	3.945E 01	3.974E 01	2.445E 02
10.00	37.04	1458.	0.0	0.0	0.0	1.658E 02	5.244E-03	2.234E 01	2.235E 01	1.882E 02

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
~~NO UNCERTAINTY FACTOR WAS APPLIED~~ TO THE MODEL DATA.

AE17: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AE17-HI FAVORS VAMPOLA'S FIT ~~TO OV1-19 DATA WHILE AE17-LO IS MORE REPRESENTATIVE~~ OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> ~~THE AE17-LO VERSION WAS USED FOR THESE~~ CALCULATIONS <<

** PROTON MODEL:

~~AP8-MAC: TRAPPED PROTONS-SOLAR MAX~~
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU (UNATTENUATED, INTERPLANETARY) FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO..Q=50%: # OF AL EVENTS=4
60.14% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 48

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8, AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF = 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. IGE-TRM 1975 * TIME= 1989.5 **
** VEHICLE : [illegible] ** INCLINATION= 60DEG ** PERIGEE= 1667KM ** APOGEE= 1667KM ** B/L ORBIT TAPE: ID5446 ** PERIOD= 1.995 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC, CODE 601, GREENBELT, MARYLAND 20771, TEL.(301)-344-8067 **

DOSE IN SEMI-INFINITE ALUMINUM MEDIUM

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	OUTER ZN. (RADS-AL)	TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	SOLAR+ (RADS-AL)	TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	3.468E 07	9.742E 05	3.566E 07	1.646E 04	6.960E 05	9.988E 02	6.970E 05	3.637E 07
0.02	0.07	3.	1.924E 07	6.002E 05	1.984E 07	1.155E 04	3.580E 05	1.014E 03	3.590E 05	2.021E 07
0.03	0.11	4.	1.188E 07	4.320E 05	1.232E 07	8.705E 03	2.655E 05	1.025E 03	2.665E 05	1.259E 07
0.04	0.15	6.	7.745E 06	3.351E 05	8.081E 06	6.864E 03	2.163E 05	1.033E 03	2.174E 05	8.305E 06
0.05	0.19	7.	5.225E 06	2.722E 05	5.497E 06	5.568E 03	1.864E 05	1.038E 03	1.875E 05	5.690E 06
0.06	0.22	9.	3.619E 06	2.282E 05	3.847E 06	4.618E 03	1.655E 05	1.041E 03	1.666E 05	4.018E 06
0.07	0.26	10.	2.564E 06	1.959E 05	2.760E 06	3.907E 03	1.490E 05	1.042E 03	1.500E 05	2.914E 06
0.08	0.30	12.	1.856E 06	1.712E 05	2.027E 06	3.307E 03	1.359E 05	1.041E 03	1.370E 05	2.168E 06
0.09	0.33	13.	1.371E 06	1.518E 05	1.523E 06	2.950E 03	1.250E 05	1.038E 03	1.261E 05	1.652E 06
0.10	0.37	15.	1.034E 06	1.363E 05	1.170E 06	2.624E 03	1.160E 05	1.034E 03	1.170E 05	1.290E 06
0.20	0.74	29.	1.564E 05	6.526E 04	2.216E 05	1.309E 03	6.901E 04	8.766E 02	6.989E 04	2.928E 05
0.30	1.11	44.	5.766E 04	3.845E 04	9.612E 04	9.111E 02	5.057E 04	7.004E 02	5.127E 04	1.483E 05
0.40	1.48	58.	2.937E 04	2.384E 04	5.321E 04	7.081E 02	4.062E 04	5.860E 02	4.120E 04	9.512E 04
0.50	1.85	73.	1.720E 04	1.529E 04	3.249E 04	5.842E 02	3.456E 04	5.025E 02	3.508E 04	6.815E 04
0.60	2.22	87.	1.072E 04	1.015E 04	2.087E 04	5.001E 02	3.061E 04	4.384E 02	3.105E 04	5.242E 04
0.80	2.96	117.	4.456E 03	4.954E 03	9.409E 03	3.924E 02	2.545E 04	3.469E 02	2.580E 04	3.560E 04
1.00	3.70	146.	1.775E 03	2.667E 03	4.441E 03	3.256E 02	2.235E 04	2.833E 02	2.264E 04	2.740E 04
1.25	4.63	182.	4.347E 02	1.253E 03	1.688E 03	2.705E 02	1.980E 04	2.268E 02	2.003E 04	2.198E 04
1.50	5.56	219.	7.259E 01	5.409E 02	6.135E 02	2.329E 02	1.795E 04	1.859E 02	1.813E 04	1.898E 04
1.75	6.48	255.	9.107E 00	2.075E 02	2.166E 02	2.055E 02	1.654E 04	1.556E 02	1.670E 04	1.712E 04
2.00	7.41	292.	9.686E-01	6.944E 01	7.040E 01	1.846E 02	1.535E 04	1.306E 02	1.548E 04	1.574E 04
2.50	9.26	365.	2.621E-03	4.489E 00	4.492E 00	1.546E 02	1.350E 04	9.677E 01	1.360E 04	1.375E 04
3.00	11.11	437.	0.0	7.624E-02	7.624E-02	1.338E 02	1.209E 04	7.480E 01	1.216E 04	1.230E 04
3.50	12.96	510.	0.0	1.985E-05	1.985E-05	1.182E 02	1.098E 04	5.797E 01	1.104E 04	1.116E 04
4.00	14.81	583.	0.0	0.0	0.0	1.058E 02	1.008E 04	4.665E 01	1.013E 04	1.024E 04
4.50	16.67	656.	0.0	0.0	0.0	9.571E 01	9.309E 03	3.785E 01	9.347E 03	9.442E 03
5.00	18.52	729.	0.0	0.0	0.0	8.725E 01	8.636E 03	3.096E 01	8.667E 03	8.754E 03
6.00	22.22	875.	0.0	0.0	0.0	7.380E 01	7.523E 03	2.153E 01	7.545E 03	7.619E 03
8.00	29.63	1167.	0.0	0.0	0.0	5.531E 01	5.911E 03	1.118E 01	5.922E 03	5.978E 03
10.00	37.04	1458.	0.0	0.0	0.0	4.289E 01	4.804E 03	6.266E 00	4.810E 03	4.853E 03

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AE17: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE.
FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AE17-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AE17-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AE17-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU
(UNATTENUATED, INTERPLANETARY)
FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO.,Q=90%: # OF AL EVENTS=4
88.82% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 49

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VEITES AP8; AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: HARRACLOUGH ET AL. IGE-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NW X2:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 2593KM ** APOGEE= 2593KM ** B/L ORBIT TAPE: 305A46 ** PERIOD= 2.349 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC, CODE 601, GREENBELT, MARYLAND 20771, TEL.(301)-344-8067 **

************* DOSE IN SEMI-INFINITE ALUMINUM MEDIUM *************

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	ELECTRONS* OUTER ZN. (RADS-AL)	ELECTRONS* TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	PROTONS SOLAR+ (RADS-AL)	PROTONS TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	1.215E 08	1.826E 06	1.233E 08	5.692E 04	4.844E 06	1.179E 03	4.845E 06	1.282E 08
0.02	0.07	3.	6.710E 07	1.121E 06	6.822E 07	3.981E 04	2.798E 06	1.197E 03	2.799E 06	7.106E 07
0.03	0.11	4.	4.147E 07	8.044E 05	4.227E 07	2.996E 04	2.150E 06	1.210E 03	2.152E 06	4.445E 07
0.04	0.15	6.	2.711E 07	6.225E 05	2.774E 07	2.362E 04	1.765E 06	1.219E 03	1.766E 06	2.953E 07
0.05	0.19	7.	1.839E 07	5.048E 05	1.889E 07	1.916E 04	1.512E 06	1.225E 03	1.513E 06	2.042E 07
0.06	0.22	9.	1.282E 07	4.227E 05	1.324E 07	1.589E 04	1.323E 06	1.228E 03	1.324E 06	1.458E 07
0.07	0.26	10.	9.147E 06	3.625E 05	9.509E 06	1.344E 04	1.167E 06	1.230E 03	1.168E 06	1.069E 07
0.08	0.30	12.	6.672E 06	3.166E 05	6.989E 06	1.158E 04	1.041E 06	1.228E 03	1.042E 06	8.042E 06
0.09	0.33	13.	4.970E 06	2.806E 05	5.250E 06	1.014E 04	9.343E 05	1.225E 03	9.355E 05	6.196E 06
0.10	0.37	15.	3.777E 06	2.518E 05	4.029E 06	9.016E 03	8.458E 05	1.220E 03	8.471E 05	4.885E 06
0.20	0.74	29.	6.065E 05	1.205E 05	7.270E 05	4.464E 03	4.045E 05	1.034E 03	4.055E 05	1.137E 06
0.30	1.11	44.	2.316E 05	7.102E 04	3.026E 05	3.092E 03	2.507E 05	8.265E 02	2.515E 05	5.573E 05
0.40	1.48	58.	1.212E 05	4.403E 04	1.652E 05	2.398E 03	1.764E 05	6.916E 02	1.771E 05	3.447E 05
0.50	1.85	73.	7.246E 04	2.824E 04	1.007E 05	1.976E 03	1.356E 05	5.930E 02	1.361E 05	2.388E 05
0.60	2.22	87.	4.580E 04	1.874E 04	6.454E 04	1.690E 03	1.111E 05	5.174E 02	1.116E 05	1.778E 05
0.80	2.96	117.	1.917E 04	9.140E 03	2.831E 04	1.324E 03	8.242E 04	4.094E 02	8.263E 04	1.125E 05
1.00	3.70	146.	7.525E 03	4.916E 03	1.244E 04	1.097E 03	6.742E 04	3.343E 02	6.775E 04	8.129E 04
1.25	4.63	182.	1.747E 03	2.306E 03	4.053E 03	9.098E 02	5.643E 04	2.677E 02	5.670E 04	6.166E 04
1.50	5.56	219.	2.703E 02	9.927E 02	1.263E 03	7.823E 02	4.921E 04	2.193E 02	4.943E 04	5.147E 04
1.75	6.48	255.	3.195E 01	3.787E 02	4.106E 02	6.897E 02	4.408E 04	1.836E 02	4.427E 04	4.537E 04
2.00	7.41	292.	3.314E 00	1.253E 02	1.286E 02	6.190E 02	3.993E 04	1.542E 02	4.009E 04	4.083E 04
2.50	9.26	365.	1.002E-02	7.802E 00	7.812E 00	5.177E 02	3.387E 04	1.142E 02	3.398E 04	3.451E 04
3.00	11.11	437.	0.0	1.536E-01	1.536E-01	4.473E 02	2.963E 04	8.827E 01	2.972E 04	3.017E 04
3.50	12.96	510.	0.0	1.026E-04	1.026E-04	3.944E 02	2.655E 04	6.841E 01	2.662E 04	2.701E 04
4.00	14.81	583.	0.0	0.0	0.0	3.527E 02	2.415E 04	5.506E 01	2.421E 04	2.456E 04
4.50	16.67	656.	0.0	0.0	0.0	3.186E 02	2.213E 04	4.467E 01	2.217E 04	2.249E 04
5.00	18.52	729.	0.0	0.0	0.0	2.901E 02	2.039E 04	3.654E 01	2.043E 04	2.072E 04
6.00	22.22	875.	0.0	0.0	0.0	2.449E 02	1.753E 04	2.541E 01	1.756E 04	1.780E 04
8.00	29.63	1167.	0.0	0.0	0.0	1.828E 02	1.346E 04	1.319E 01	1.347E 04	1.365E 04
10.00	37.04	1458.	0.0	0.0	0.0	1.413E 02	1.073E 04	7.395E 00	1.074E 04	1.088E 04

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AE17: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE.
FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AE17-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AE17-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AE17-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU
(UNATTENUATED, INTERPLANETARY)
FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO.,Q=90%: # OF AL EVENTS=4
86.81% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 50

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTE, AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTON (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL: [illegible] (BARRACLOUGH ET.AL. 10-TERM 1975 * TIME= 1989.5 **
** VEHICLE : NVLX3:S-MAX ** INCLINATION= 60DEG ** PERIGEE= [illegible]KM ** APOGEE= [illegible]KM ** B/L ORBIT TAPE: T05446 ** PERIOD= 2.876 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

************* DOSE IN SEMI-INFINITE ALUMINUM MEDIUM *************

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	t (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	ELECTRONS* OUTER ZN. (RADS-AL)	ELECTRONS* TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	PROTONS SOLAR+ (RADS-AL)	PROTONS TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	2.160E 08	3.544E 06	2.195E 08	1.013E 05	2.544E 07	1.480E 03	2.544E 07	2.451E 08
0.02	0.07	3.	1.190E 08	2.19[illegible] 06	1.212E 08	7.073E 04	1.473E 07	1.506E 03	1.478E 07	1.360E 08
0.03	0.11	4.	7.356E 07	1.58[illegible]E 06	7.514E 07	5.324E 04	1.031E 07	1.522E 03	1.082E 07	8.601E 07
0.04	0.15	6.	4.820E 07	1.230E 06	4.943E 07	4.198E 04	8.417E 06	1.533E 03	8.419E 06	5.789E 07
0.05	0.19	7.	3.277E 07	1.001E 06	3.377E 07	3.404E 04	6.845E 06	1.541E 03	6.850E 06	4.065E 07
0.06	0.22	9.	2.288E 07	5.402E 05	2.372E 07	2.621E 04	5.709E 06	1.545E 03	5.713E 06	2.946E 07
0.07	0.26	10.	1.632E 07	7.221E 05	1.704E 07	2.381E 04	4.302E 06	1.547E 03	4.303E 06	2.137E 07
0.08	0.30	12.	1.186E 07	6.317E 05	1.2[illegible]9E 07	2.045E 04	4.099E 06	1.545E 03	4.1[illegible]E 06	1.661E 07
0.09	0.33	13.	8.756E 06	5.607E 05	9.317E 06	1.765E 04	3.526E 06	1.541E 03	3.528E 06	1.286E 07
0.10	0.37	15.	6.563E 06	5.036E 05	7.067E 06	1.580E 04	3.068E 06	1.535E 03	3.069E 06	1.015E 07
0.20	0.74	29.	7.259E 05	2.420E 05	9.679E 05	7.562E 03	1.060E 06	1.301E 03	1.061E 06	2.037E 06
0.30	1.11	44.	1.990E 05	1.426E 05	3.416E 05	5.169E 03	5.144E 05	1.040E 03	5.154E 05	8.622E 05
0.40	1.43	58.	9.068E 04	8.813E 04	1.788E 05	3.968E 03	2.973E 05	8.699E 02	2.982E 05	4.810E 05
0.50	1.85	73.	5.071E 04	5.622E 04	1.069E 05	3.230E 03	1.962E 05	7.459E 02	1.969E 05	3.072E 05
0.60	2.22	87.	3.043E 04	3.711E 04	6.754E 04	2.805E 03	1.430E 05	6.508E 02	1.437E 05	2.140E 05
0.80	2.96	117.	1.158E 04	1.794E 04	2.952E 04	2.197E 03	8.852E 04	5.149E 02	8.903E 04	1.207E 05
1.00	3.70	146.	4.167E 03	9.601E 03	1.377E 04	1.318E 03	6.405E 04	4.205E 02	6.447E 04	8.006E 04
1.25	4.63	182.	8.511E 02	4.487E 03	5.378E 03	1.505E 03	4.829E 04	3.367E 02	4.863E 04	5.551E 04
1.50	5.56	219.	1.373E 02	1.927E 03	2.064E 03	1.250E 03	3.903E 04	2.759E 02	3.931E 04	4.266E 04
1.75	6.48	255.	1.818E 01	7.338E 02	7.520E 02	1.134E 03	3.299E 04	2.310E 02	3.322E 04	3.510E 04
2.00	7.41	292.	2.206E 00	2.420E 02	2.442E 02	1.015E 03	2.838E 04	1.939E 02	2.857E 04	2.983E 04
2.50	9.26	365.	7.73[illegible]E-03	1.486E 01	1.487E 01	8.433E 02	2.220E 04	1.436E 02	2.234E 04	2.320E 04
3.00	11.11	437.	0.0	3.007E-01	3.007E-01	7.245E 02	1.836E 04	1.110E 02	1.847E 04	1.920E 04
3.50	12.96	510.	0.0	2.536E-04	2.536E-04	6.359E 02	1.583E 04	8.605E 01	1.592E 04	1.656E 04
4.00	14.81	583.	0.0	0.0	0.0	5.663E 02	1.400E 04	6.926E 01	1.407E 04	1.463E 04
4.50	16.67	656.	0.0	0.0	0.0	5.097E 02	1.251E 04	5.61[illegible]E 01	1.256E 04	1.307E 04
5.00	18.52	729.	0.0	0.0	0.0	4.626E 02	1.127E 04	4.597E 01	1.131E 04	1.177E 04
6.00	22.22	875.	0.0	0.0	0.0	3.883E 02	9.232E 03	3.1[illegible]2E 01	9.324E 03	9.713E 03
8.00	29.63	1167.	0.0	0.0	0.0	2.871E 02	6.646E 03	1.659E 01	6.663E 03	6.950E 03
10.00	37.04	1458.	0.0	0.0	0.0	2.199E 02	5.019E 03	4.30[illegible]E 00	5.024E 03	5.248E 03

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AE17: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AE17-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AE17-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AE17-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PHOTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU
(UNATTENUATED, INTERPLANETARY)
FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO., ϰ=90%: # OF AL EVENTS=4
83.40% GEOMAGNETIC SHIELDING APPLIED

NOTE: ϰ DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 51

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTED APOS ALOS AEI7 FOR SOLAR MAXIMUM *** SOLAR FLUX OF 1981 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN [illegible] FOR PROTONS (APO) = [illegible] 1.00 [illegible] ELECTRONS (A[illegible]) = UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH GEOMAG [illegible] [illegible] [illegible] TIME = 1[illegible] **
** ~~VEHICLE I NVL~~ [illegible] ** INCLINATION= [illegible] ** PERIGEE= 5[illegible]KM ** APOGEE= 5[illegible]KM ** [illegible] ** PERIOD= 3.438 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC, CODE 601, GREENBELT, MARYLAND 20771, TEL.(301)-344-[illegible]7 **

*** DOSE IN SEMI-INFINITE ALUMINUM MEDIUM ***

*** MISSION DURATION: 5.0000 Y A (S) ***

SHIELD THICKNESS (ALUMINUM) S (G/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	OUTER ZN. (RADS-AL)	TOTAL (RADS-AL)	BREMSST - RAHLUNG TOTAL (RADS-AL)	PROTONS TRAPP ** (RADS-AL)	FLARE + (RADS-AL)	TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	2.215E 08	5.476E 06	2.27[illegible] 08	1.04[illegible] 05	6.[illegible] 07	[illegible] 03	6.528 07	[illegible].564 08
0.02	0.07	3.	1.203E 08	3.755E 06	1.227[illegible] 08	7.264E 04	3.45[illegible] 07	1.909[illegible] 03	3.454 07	1.55[illegible] 08
0.03	0.11	4.	7.358E 07	2.457E 06	7.6[illegible] 07	5.46[illegible] 04	2.215 07	1.9[illegible] 03	2.215 07	9.664 07
0.04	0.15	6.	4.647E 07	1.914E 06	5.03[illegible] 07	4.30[illegible] 04	1.542 07	1.940[illegible] 03	1.542 07	6.585 07
0.05	0.19	7.	3.204E 07	1.561E 06	3.46[illegible] 07	3.5[illegible] 04	1.145 07	1.[illegible] 03	1.145 07	4.66E 07
0.06	0.22	9.	2.315E 07	1.312E 06	2.44[illegible] 07	2.904[illegible] 04	8.551 06	[illegible] 03	8.55[illegible] 06	3.395 07
~~0.07~~	~~0.26~~	10.	1.656E 07	1.129E 06	1.769 07	2.454E 04	6.505 06	1.961 03	6.567 06	2.465 07
0.08	0.30	12.	1.204E 07	9.8[illegible]E 05	1.303 07	2.10[illegible] 04	5.0[illegible] 06	[illegible] 03	5.024 06	1.868 07
0.09	0.33	13.	8.870E 06	8.741E 05	9.74[illegible] 06	1.839E 04	4.557 06	1.[illegible]4F 03	4.559 06	1.426 07
0.10	0.37	15.	6.601E 06	7.889E 05	7.390 06	1.627E 04	3.826 06	1.564E 03	3.828 06	1.123 07
0.20	0.74	29.	5.125E 05	3.775E 05	8.90[illegible] 05	7.704E 03	1.311 06	1.[illegible] 03	1.312 06	2.511 06
0.30	1.11	44.	6.222E 04	2.210E 05	3.042E 05	5.201E 03	4.226 05	1.[illegible] 03	4.225 05	7.334 05
0.40	1.48	58.	2.720E 04	1.357E 05	1.62[illegible] 05	4.051E 03	2.161 05	1.10[illegible] 03	2.172 05	3.861 05
0.50	1.85	73.	1.255E 04	8.604E 04	9.859E 04	3.335E 03	1.219 05	9.457[illegible] 02	1.229 05	2.348 05
~~0.60~~	~~2.22~~	87.	6.430E 03	5.646E 04	6.289E 04	2.80[illegible]E 03	8.974E 04	8.251F 02	9.057 04	1.563F 05
0.80	2.96	117.	1.665E 03	2.704E 04	2.891E 04	2.233E 03	4.920 04	6.[illegible] 02	4.965 04	8.100 04
1.00	3.70	146.	5.666E 02	1.438E 04	1.499E 04	1.803E 03	3.[illegible] 04	5.[illegible] 02	3.266 04	4.567 04
1.25	4.63	182.	1.163E 02	6.656E 03	6.81[illegible] 03	1.534E 03	2.220 04	4.28[illegible] 02	2.26[illegible] 04	3.097F 04
1.50	5.56	219.	2.080E 01	2.975E 03	2.59[illegible] 03	1.314E 03	1.664 04	3.4[illegible] 02	1.69[illegible] 04	2.170 04
1.75	6.48	255.	3.567E 00	1.056E 03	1.10[illegible] 03	1.154E 03	1.322 04	2.52[illegible] 02	1.352 04	1.577F 04
2.00	7.41	292.	5.238E-01	3.618E 02	3.624 02	1.032E 03	1.075 04	[illegible].45[illegible] 02	1.100 04	1.239F 04
2.50	9.26	365.	1.658E-03	2.211E 01	2.211E 01	8.567E 02	7.685 03	1.421 02	7.671 03	8.750 03
~~3.00~~	~~11.11~~	437.	0.0	4.480E-01	4.480E-01	7.353E 02	5.974 03	1.466E 02	6.112 03	6.848 03
3.50	12.96	510.	0.0	3.970E-04	3.970E-04	6.440E 02	4.931 03	1.061F 02	5.041 03	5.685F 03
4.00	14.81	583.	0.0	0.0	0.0	5.73[illegible]E 02	4.217 03	8.780 01	4.305 03	4.875 03
4.50	16.67	656.	0.0	0.0	0.0	5.164E 02	3.661 03	7.124E 01	3.733 03	4.239E 03
5.00	18.52	729.	0.0	0.0	0.0	4.683E 02	3.212 03	5.827 01	3.270 03	3.739E 03
6.00	22.22	875.	0.0	0.0	0.0	3.9[illegible]E 02	2.527 03	4.0[illegible] 01	2.567 03	2.960 03
8.00	29.63	1167.	0.0	0.0	0.0	2.934E 02	1.672 03	2.104E 01	1.693 03	1.984E 03
10.00	37.04	1458.	0.0	0.0	0.0	2.2[illegible]E 02	1.193 03	1.175 01	1.204 03	1.427F 03

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AEI7: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE.
FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AEI7-HI FAVORS VAN ALLEN'S FIT TO OV1-19 DATA WHILE AEI7-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AEI7-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

~~AP8-MAC:~~ TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOURCE: SOLAR FLARE PROTONS AT 1 AU
(UNATTENUATED, INTERPLANETARY)
[illegible] CUTOFF [illegible] SHELL [illegible] F.R.

[illegible] (J.[illegible] DESCR: # OF AL EVENTS=4
[illegible] GEOMAGN [illegible] SHIELDING APPLI[illegible]

NOTE: [illegible] DENOTES THE DEGREE OF CONFIDENCE [illegible] [illegible] TO [illegible] RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE [illegible] BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA EITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATEL-LITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 52

** ORBIT A FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AF8; AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 168-TERM 1975 * TIME= 1989.5 **
** VEHICLE : NVLKSIS MAX ** INCLINATION= 60DEG ** PERIGEE= 6380KM ** APOGEE= 6380KM ** B/L ORBIT TAPE: 106446 ** PERIOD= 3.608 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

************* DOSE IN SEMI-INFINITE ALUMINUM MEDIUM *************

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	OUTER ZN. (RADS-AL)	TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	SOLAR + (RADS-AL)	TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	1.782E 08	7.653E 06	1.859E 08	3.561E 04	1.158E 06	[illegible] 03	1.158E 06	3.018E 08
0.02	0.07	3.	5.256E 07	4.716E 06	9.768E 07	5.793E 04	4.667E 07	2.71[illegible] 03	4.667E 07	1.444E 08
0.03	0.11	4.	5.551E 07	3.403E 06	5.891E 07	4.304E 04	2.572E 07	2.744E 03	2.572E 07	8.467E 07
0.04	0.15	6.	3.555E 07	2.647E 06	3.823E 07	3.376E 04	1.584E 07	[illegible] 03	1.565E 07	5.411E 07
0.05	0.19	7.	2.387E 07	2.157E 06	2.602E 07	2.735E 04	1.072E 07	[illegible] 03	1.073E 07	3.676E 07
0.06	0.22	9.	1.652E 07	1.814E 06	1.833E 07	2.268E 04	7.767E 06	2.379E 03	7.770E 06	2.612E 07
0.07	0.26	10.	1.170E 07	1.560E 06	1.326E 07	1.919E 04	5.814E 06	2.3[illegible] 03	5.817E 06	1.910E 07
0.08	0.30	12.	8.436E 06	1.367E 06	9.803E 06	1.652E 04	4.527E 06	[illegible] 03	4.529E 06	1.435E 07
0.09	0.33	13.	6.165E 06	1.214E 06	7.379E 06	1.446E 04	3.553E 06	[illegible] 03	3.556E 06	1.099E 07
0.10	0.37	15.	4.556E 06	1.090E 06	5.646E 06	1.283E 04	2.920E 06	[illegible] 03	2.922E 06	8.591E 06
0.20	0.74	29.	3.132E 05	5.194E 05	8.326E 05	6.251E 03	6.822E 05	[illegible] 03	6.842E 05	1.523E 06
0.30	1.11	44.	4.047E 04	3.022E 05	3.427E 05	4.311E 03	2.667E 05	1.601E 03	2.683E 05	6.153E 05
0.40	1.48	58.	1.044E 04	1.848E 05	1.952E 05	3.342E 03	1.298E 05	1.330E 03	1.312E 05	3.297E 05
0.50	1.85	73.	4.109E 03	1.168E 05	1.209E 05	2.755E 03	7.470E 04	1.149E 03	7.585E 04	1.996E 05
0.60	2.22	87.	1.650E 03	7.656E 04	7.839E 04	2.359E 03	4.664E 04	1.062E 03	4.665E 04	1.304E 05
0.80	2.96	117.	4.769E 02	3.647E 04	3.695E 04	1.850E 03	2.451E 04	7.929E 02	2.531E 04	6.411E 04
1.00	3.70	146.	1.293E 02	1.932E 04	1.945E 04	1.534E 03	1.497E 04	6.475E 02	1.561E 04	3.659E 04
1.25	4.63	182.	2.320E 01	8.974E 03	8.997E 03	1.271E 03	9.497E 03	5.18[illegible] 02	1.002E 04	2.029E 04
1.50	5.56	219.	3.747E 00	3.859E 03	3.863E 03	1.091E 03	6.645E 03	4.248E 02	7.070E 03	1.202E 04
1.75	6.48	255.	5.457E-01	1.477E 03	1.478E 03	9.601E 02	4.976E 03	3.556E 02	5.332E 03	7.769E 03
2.00	7.41	292.	5.552E-02	4.884E 02	4.885E 02	8.600E 02	3.824E 03	2.396E 02	4.123E 03	5.471E 03
2.50	9.26	365.	0.0	2.968E 01	2.968E 01	7.163E 02	2.454E 03	2.312E 02	2.715E 03	3.461E 03
3.00	11.11	437.	0.0	5.950E-01	5.950E-01	6.169E 02	1.816E 03	1.710E 02	1.987E 03	2.604E 03
3.50	12.96	510.	0.0	5.275E-04	5.275E-04	5.427E 02	1.433E 03	1.325E 02	1.565E 03	2.108E 03
4.00	14.81	583.	0.0	0.0	0.0	4.845E 02	1.183E 03	1.066E 02	1.290E 03	1.774E 03
4.50	16.67	656.	0.0	0.0	0.0	4.370E 02	9.955E 02	8.65[illegible] 01	1.082E 03	1.519E 03
5.00	18.52	729.	0.0	0.0	0.0	3.974E 02	8.489E 02	7.07[illegible] 01	9.197E 02	1.317E 03
6.00	22.22	875.	0.0	0.0	0.0	3.348E 02	6.344E 02	4.93[illegible] 01	6.837E 02	1.018E 03
8.00	29.63	1167.	0.0	0.0	0.0	2.492E 02	3.867E 02	2.55[illegible] 01	4.122E 02	6.614E 02
10.00	37.04	1459.	0.0	0.0	0.0	1.922E 02	2.559E 02	1.4[illegible] 01	2.742E 02	4.664E 02

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AE17: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE.
FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AE17-HI FAVORS VANECLAIS FIT TO OV1-19 DATA WHILE AE17-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AE17-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8 MAX TRAPPED PROTONS SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU (UNATTENUATED, INTERPLANETARY) [illegible] CUTOFF DIPOLE SHELL OF 5 E.R.

FOR [illegible] Q=90%: # OF AL EVENTS=4 [illegible] GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES [illegible] TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 53

** ORBIT A FLUX STUDY WITH [illegible] AP8MAC AND AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED [illegible] (AE8) - UF= 1.0 FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED [illegible] WITH ALLMAG MODEL [illegible] T.AL. 16F-TPM 1575 * TIME= 1989.5 **
** VEHICLE [illegible] ** INCLINATION [illegible] ** APOGEE [illegible] KM ** [illegible] ORBIT TAPE: TD544E ** PERIOD= 5.992 **
** FOR INFORMATION OR EXPLANATION CONTACT [illegible] AT [illegible] MARYLAND 20771, TEL.(301)-344-8067 **

*** DOSE IN SEMI-INFINITE ALUMINUM MEDIUM ***

*** MISSION DURATION: [illegible] YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	ELECTRONS* OUTER ZN. (RADS-AL)	ELECTRONS* TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	PROTONS SOLAR+ (RADS-AL)	PROTONS TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	[illegible]372E 07	2.274E 07	4.64[illegible] 07	2.[illegible]54E 04	1.521E 0[illegible]	[illegible] 03	1.521E 0[illegible]	1.555E 08
0.02	0.07	3.	1.147E 07	1.344E 07	2.490E 07	1.64[illegible] 04	3.050E 07	3.69[illegible] 03	3.051E 07	5.543E 07
0.03	0.11	4.	7.026E 06	9.459E 05	1.645E 07	1.311E 04	1.035E 07	3.734E 03	1.035E 07	2.685E 07
0.04	0.15	6.	4.600E 06	7.233E 06	1.203E 07	1.103E 04	4.344E 06	3.76[illegible] 03	4.348E 06	1.639E 07
0.05	0.19	7.	3.500E 06	5.818E 06	9.319E 06	9.583E 03	2.191E 06	3.779E 03	2.195E 06	1.152E 07
0.06	0.22	9.	2.664E 06	4.843E 06	7.507E 06	8.501E 03	1.257E 06	3.79[illegible] 03	1.260E 06	8.776E 06
0.07	0.26	10.	2.[illegible]60E 06	4.132E 06	6.223E 06	7.661E 03	8.177E 05	3.795E 03	8.215E 05	7.052E 06
0.08	0.30	12.	1.677E 06	3.593E 06	5.271E 06	6.992E 03	5.606E 05	3.784E 03	5.644E 05	5.842E 06
0.09	0.33	13.	1.370E 06	3.171E 06	4.541E 06	6.447E 03	4.105E 05	3.772E 03	4.143E 05	4.962E 06
0.10	0.37	15.	1.139E 06	2.834E 06	3.969E 06	5.995E 03	3.080E 05	3.762E 03	3.117E 05	4.287E 06
0.20	0.74	29.	2.539E 05	1.307E 06	1.561E 06	3.707E 03	4.778E 04	3.123E 03	5.091E 04	1.616E 06
0.30	1.11	44.	6.234E 04	7.520E 05	8.154E 05	2.757E 03	1.533E 04	2.600E 03	1.783E 04	8.359E 05
0.40	1.48	58.	2.072E 04	4.614E 05	4.821E 05	2.210E 03	6.425E 03	2.090E 03	8.515E 03	4.928E 05
0.50	1.85	73.	9.656E 03	2.953E 05	3.050E 05	1.955E 03	3.213E 03	1.791E 03	5.004E 03	3.118E 05
0.60	2.22	87.	5.117E 03	1.960E 05	2.011E 05	1.609E 03	1.832E 03	1.564E 03	3.396E 03	2.061E 05
0.80	2.96	117.	1.537E 03	9.575E 04	9.729E 04	1.294E 03	7.534E 02	1.23[illegible] 03	1.985E 03	1.006E 05
1.00	3.70	146.	4.688E 02	5.157E 04	5.204E 04	1.099E 03	3.832E 02	1.0[illegible] 03	1.391E 03	5.453E 04
1.25	4.63	182.	1.044E 02	2.430E 04	2.440E 04	9.360E 02	2.012E 02	8.084E 02	1.010E 03	2.635E 04
1.50	5.56	219.	2.159E 01	1.056E 04	1.058E 04	8.249E 02	1.174E 02	6.617E 02	7.792E 02	1.219E 04
1.75	6.48	255.	3.730E 00	4.063E 03	4.066E 03	7.430E 02	7.309E 01	5.5[illegible] 02	6.236E 02	5.433E 03
2.00	7.41	292.	4.127E-01	1.337E 03	1.337E 03	6.803E 02	4.934E 01	4.6[illegible] 02	5.166E 02	2.536E 03
2.50	9.26	365.	0.0	7.786E 01	7.786E 01	5.897E 02	2.404E 01	3.477E 02	3.717E 02	1.039E 03
3.00	11.11	447.	0.0	1.488E 00	1.488E 00	5.258E 02	1.368E 01	2.666E 02	2.802E 02	8.075E 02
3.50	12.96	510.	0.0	1.332E-03	1.332E-03	4.767E 02	8.584E 00	2.0[illegible] 02	2.173E 02	6.940E 02
4.00	14.81	583.	0.0	0.0	0.0	4.368E 02	5.722E 00	1.664E 02	1.721E 02	6.098E 02
4.50	16.67	656.	0.0	0.0	0.0	4.031E 02	3.989E 00	1.351E 02	1.390E 02	5.421E 02
5.00	18.52	729.	0.0	0.0	0.0	3.740E 02	2.813E 00	1.10[illegible] 02	1.135E 02	4.875E 02
6.00	22.22	875.	0.0	0.0	0.0	3.264E 02	1.419E 00	7.643E 01	7.785E 01	4.042E 02
8.00	29.63	1167.	0.0	0.0	0.0	2.577E 02	2.886E-01	3.945E 01	3.974E 01	2.975E 02
10.00	37.04	1458.	0.0	0.0	0.0	2.094E 02	5.244E-02	2.234E 01	2.235E 01	2.318E 02

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AEI7: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AEI7-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AEI7-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AEI7-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU (UNATTENUATED, INTERPLANETARY) FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO.,Q=50%: # OF AL EVENTS=4 (0.19% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 54

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8, AE6, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. IGE-TRM 1975 * TIME= 1989.5 **
** VEHICLE : NWX11:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 1667KM ** APOGEE= 1667KM ** B/L ORBIT TAPE: ID5A46 ** PERIOD= 1.995 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

*************** DOSE AT CENTER OF ALUMINUM SPHERES ***************

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	ELECTRONS* OUTER ZN. (RADS-AL)	ELECTRONS* TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	PROTONS SOLAR+ (RADS-AL)	PROTONS TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	1.145E 08	3.173E 06	1.177E 08	4.585E 04	2.963E 06	1.958E 03	2.965E 06	1.207E 08
0.02	0.07	3.	7.880E 07	2.124E 06	8.095E 07	3.763E 04	1.282E 06	1.978E 03	1.284E 06	8.230E 07
0.03	0.11	4.	5.582E 07	1.602E 06	5.743E 07	3.081E 04	9.140E 05	1.996E 03	9.160E 05	5.837E 07
0.04	0.15	6.	4.083E 07	1.281E 06	4.211E 07	2.590E 04	7.326E 05	2.016E 03	7.347E 05	4.287E 07
0.05	0.19	7.	3.029E 07	1.062E 06	3.135E 07	2.214E 04	6.143E 05	2.037E 03	6.163E 05	3.199E 07
0.06	0.22	9.	2.268E 07	9.039E 05	2.358E 07	1.904E 04	5.530E 05	2.060E 03	5.551E 05	2.415E 07
0.07	0.26	10.	1.711E 07	7.838E 05	1.789E 07	1.644E 04	5.019E 05	2.084E 03	5.040E 05	1.841E 07
0.08	0.30	12.	1.300E 07	6.899E 05	1.369E 07	1.428E 04	4.618E 05	2.112E 03	4.639E 05	1.417E 07
0.09	0.33	13.	9.969E 06	6.148E 05	1.058E 07	1.251E 04	4.287E 05	2.137E 03	4.309E 05	1.103E 07
0.10	0.37	15.	7.683E 06	5.519E 05	8.235E 06	1.102E 04	3.982E 05	2.186E 03	4.004E 05	8.646E 06
0.20	0.74	29.	1.123E 06	2.824E 05	1.405E 06	5.031E 03	2.437E 05	2.550E 03	2.462E 05	1.656E 06
0.30	1.11	44.	3.881E 05	1.915E 05	5.796E 05	3.426E 03	1.789E 05	2.245E 03	1.811E 05	7.642E 05
0.40	1.48	58.	1.966E 05	1.356E 05	3.321E 05	2.647E 03	1.419E 05	1.937E 03	1.438E 05	4.786E 05
0.50	1.85	73.	1.197E 05	9.590E 04	2.156E 05	2.168E 03	1.168E 05	1.732E 03	1.185E 05	3.364E 05
0.60	2.22	87.	7.975E 04	6.803E 04	1.478E 05	1.848E 03	1.015E 05	1.553E 03	1.030E 05	2.526E 05
0.80	2.96	117.	4.008E 04	3.591E 04	7.599E 04	1.444E 03	8.205E 04	1.294E 03	8.334E 04	1.608E 05
1.00	3.70	146.	2.113E 04	2.123E 04	4.236E 04	1.194E 03	6.954E 04	1.103E 03	7.064E 04	1.142E 05
1.25	4.63	182.	7.809E 03	1.236E 04	2.016E 04	9.878E 02	6.100E 04	9.323E 02	6.194E 04	8.399E 04
1.50	5.56	219.	1.865E 03	6.923E 03	8.788E 03	8.459E 02	5.488E 04	7.850E 02	5.567E 04	6.530E 04
1.75	6.48	255.	2.881E 02	3.353E 03	3.641E 03	7.425E 02	5.106E 04	6.960E 02	5.175E 04	5.614E 04
2.00	7.41	292.	4.025E 01	1.479E 03	1.519E 03	6.640E 02	4.816E 04	6.130E 02	4.877E 04	5.095E 04
2.50	9.26	365.	1.594E-01	1.396E 02	1.397E 02	5.540E 02	4.297E 04	4.529E 02	4.342E 04	4.412E 04
3.00	11.11	437.	0.0	5.702E 00	5.702E 00	4.813E 02	3.907E 04	3.833E 02	3.946E 04	3.994E 04
3.50	12.96	510.	0.0	3.573E-03	3.573E-03	4.292E 02	3.575E 04	3.068E 02	3.605E 04	3.648E 04
4.00	14.81	583.	0.0	0.0	0.0	3.893E 02	3.344E 04	2.498E 02	3.369E 04	3.408E 04
4.50	16.67	656.	0.0	0.0	0.0	3.571E 02	3.160E 04	2.165E 02	3.181E 04	3.217E 04
5.00	18.52	729.	0.0	0.0	0.0	3.302E 02	2.983E 04	1.818E 02	3.002E 04	3.035E 04
6.00	22.22	875.	0.0	0.0	0.0	2.871E 02	2.689E 04	1.329E 02	2.703E 04	2.731E 04
8.00	29.63	1167.	0.0	0.0	0.0	2.294E 02	2.234E 04	7.739E 01	2.242E 04	2.265E 04
10.00	37.04	1458.	0.0	0.0	0.0	1.350E 02	1.368E 04	2.815E 01	1.371E 04	1.384E 04

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AEI7: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV. THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AEI7-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AEI7-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AEI7-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU (UNATTENUATED, INTERPLANETARY)
FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO.,Q=90%: # OF AL EVENTS=4
88.82% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 55

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUCH ET.AL. 16E-TRM 1975 * TIME= 1989.5 **
** VEHICLE : MMX2:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 2593KM ** APOGEE= 2593KM ** B/L ORBIT TAPE: ID5446 ** PERIOD= 2.349 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC.CODE 601, GREENBELT, MARYLAND 20771.TEL.(301)-344-8067 **

*************** DOSE AT CENTER OF ALUMINUM SPHERES ***************

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	OUTER ZN. (RADS-AL)	TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	SOLAR+ (RADS-AL)	TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	4.035E 08	5.961E 06	4.095E 08	1.593E 05	1.848E 07	2.311E 03	1.848E 07	4.281E 08
0.02	0.07	3.	2.754E 08	3.980E 06	2.794E 08	1.299E 05	9.379E 06	2.334E 03	9.381E 06	2.889E 08
0.03	0.11	4.	1.943E 08	2.994E 06	1.973E 08	1.061E 05	7.153E 06	2.355E 03	7.155E 06	2.046E 08
0.04	0.15	6.	1.420E 08	2.390E 06	1.444E 08	8.915E 04	5.978E 06	2.379E 03	5.981E 06	1.505E 08
0.05	0.19	7.	1.055E 08	1.978E 06	1.075E 08	7.619E 04	5.151E 06	2.404E 03	5.153E 06	1.127E 08
0.06	0.22	9.	7.924E 07	1.680E 06	8.092E 07	6.553E 04	4.704E 06	2.431E 03	4.706E 06	8.569E 07
0.07	0.26	10.	6.006E 07	1.455E 06	6.151E 07	5.662E 04	4.283E 06	2.456E 03	4.285E 06	6.586E 07
0.08	0.30	12.	4.588E 07	1.279E 06	4.716E 07	4.920E 04	3.928E 06	2.493E 03	3.931E 06	5.114E 07
0.09	0.33	13.	3.540E 07	1.138E 06	3.654E 07	4.310E 04	3.614E 06	2.522E 03	3.616E 06	4.020E 07
0.10	0.37	15.	2.747E 07	1.021E 06	2.849E 07	3.799E 04	3.314E 06	2.580E 03	3.317E 06	3.185E 07
0.20	0.74	29.	4.250E 06	5.213E 05	4.771E 06	1.726E 04	1.736E 06	3.010E 03	1.739E 06	6.527E 06
0.30	1.11	44.	1.518E 06	3.536E 05	1.871E 06	1.168E 04	1.110E 06	2.650E 03	1.113E 06	2.996E 06
0.40	1.48	58.	7.878E 05	2.504E 05	1.038E 06	8.995E 03	7.811E 05	2.286E 03	7.834E 05	1.831E 06
0.50	1.85	73.	4.919E 05	1.772E 05	6.691E 05	7.353E 03	5.772E 05	2.044E 03	5.792E 05	1.256E 06
0.60	2.22	87.	3.351E 05	1.257E 05	4.608E 05	6.262E 03	4.604E 05	1.833E 03	4.623E 05	9.293E 05
0.80	2.96	117.	1.729E 05	6.633E 04	2.392E 05	4.887E 03	3.248E 05	1.527E 03	3.263E 05	5.704E 05
1.00	3.70	146.	9.161E 04	3.920E 04	1.308E 05	4.038E 03	2.479E 05	1.302E 03	2.492E 05	3.840E 05
1.25	4.63	182.	3.265E 04	2.279E 04	5.544E 04	3.334E 03	1.998E 05	1.100E 03	2.009E 05	2.596E 05
1.50	5.56	219.	7.180E 03	1.275E 04	1.993E 04	2.852E 03	1.696E 05	9.264E 02	1.705E 05	1.933E 05
1.75	6.48	255.	1.031E 03	6.166E 03	7.197E 03	2.501E 03	1.521E 05	8.213E 02	1.529E 05	1.626E 05
2.00	7.41	292.	1.375E 02	2.694E 03	2.831E 03	2.235E 03	1.394E 05	7.234E 02	1.401E 05	1.452E 05
2.50	9.26	365.	5.766E-01	2.470E 02	2.475E 02	1.863E 03	1.176E 05	5.345E 02	1.181E 05	1.202E 05
3.00	11.11	437.	0.0	1.053E 01	1.053E 01	1.617E 03	1.021E 05	4.523E 02	1.026E 05	1.042E 05
3.50	12.96	510.	0.0	1.543E-02	1.543E-02	1.441E 03	9.050E 04	3.621E 02	9.086E 04	9.230E 04
4.00	14.81	583.	0.0	0.0	0.0	1.305E 03	8.326E 04	2.948E 02	8.356E 04	8.486E 04
4.50	16.67	656.	0.0	0.0	0.0	1.195E 03	7.795E 04	2.555E 02	7.820E 04	7.940E 04
5.00	18.52	729.	0.0	0.0	0.0	1.104E 03	7.316E 04	2.146E 02	7.337E 04	7.447E 04
6.00	22.22	875.	0.0	0.0	0.0	9.584E 02	6.533E 04	1.568E 02	6.549E 04	6.645E 04
8.00	29.63	1167.	0.0	0.0	0.0	7.635E 02	5.313E 04	9.132E 01	5.323E 04	5.399E 04
10.00	37.04	1458.	0.0	0.0	0.0	4.467E 02	3.117E 04	3.322E 01	3.120E 04	3.165E 04

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AE17: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AE17-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AE17-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AE17-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU (UNATTENUATED, INTERPLANETARY) FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO.,Q=90%: # OF AL EVENTS=4
86.81% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 56

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8; AE6, AEI7 FOR SOLAR MAXIMUM *** UNIPLIX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL. 1BE-TRM 1975 * TIME= 1989.5 **
** VEHICLE : MVLX3:S-MAX ** INCLINATION= 60DEG ** PERIGEE= 3889KM ** APOGEE= 3889KM ** B/L ORBIT TAPE: TL5446 ** PERIOD= 2.876 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

DOSE AT CENTER OF ALUMINUM SPHERES

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	OUTER ZN. (RADS-AL)	TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	SOLAR+ (RADS-AL)	TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	7.204E 08	1.152E 07	7.320E 08	2.847E 05	9.228E 07	1.967E 03	9.228E 07	8.245E 08
0.02	0.07	3.	4.885E 08	7.731E 06	4.962E 08	2.310E 05	5.151E 07	2.536E 03	5.151E 07	5.483E 08
0.03	0.11	4.	3.440E 08	5.843E 06	3.498E 08	1.885E 05	3.943E 07	2.963E 03	3.944E 07	3.895E 08
0.04	0.15	6.	2.515E 08	4.682E 06	2.562E 08	1.584E 05	3.206E 07	2.992E 03	3.207E 07	2.884E 08
0.05	0.19	7.	1.873E 08	3.890E 06	1.912E 08	1.356E 05	2.671E 07	3.023E 03	2.671E 07	2.180E 08
0.06	0.22	9.	1.413E 08	3.315E 06	1.446E 08	1.165E 05	2.361E 07	3.057E 03	2.361E 07	1.683E 08
0.07	0.26	10.	1.076E 08	2.879E 06	1.105E 08	1.011E 05	2.070E 07	3.093E 03	2.070E 07	1.313E 08
0.08	0.30	12.	8.273E 07	2.537E 06	8.526E 07	8.798E 04	1.831E 07	3.135E 03	1.832E 07	1.037E 08
0.09	0.33	13.	6.405E 07	2.263E 06	6.631E 07	7.709E 04	1.626E 07	3.173E 03	1.626E 07	8.265E 07
0.10	0.37	15.	5.011E 07	2.033E 06	5.214E 07	6.789E 04	1.440E 07	3.245E 03	1.440E 07	6.661E 07
0.20	0.74	29.	6.292E 06	1.045E 06	7.337E 06	2.989E 04	5.720E 06	3.766E 03	5.724E 06	1.309E 07
0.30	1.11	44.	1.565E 06	7.118E 05	2.277E 06	1.978E 04	2.954E 06	3.333E 03	2.957E 06	5.254E 06
0.40	1.48	58.	6.524E 05	5.045E 05	1.157E 06	1.505E 04	1.730E 06	2.875E 03	1.733E 06	2.905E 06
0.50	1.85	73.	3.724E 05	3.559E 05	7.283E 05	1.223E 04	1.094E 06	2.571E 03	1.096E 06	1.837E 06
0.60	2.22	87.	2.408E 05	2.512E 05	4.920E 05	1.040E 04	7.757E 05	2.306E 03	7.780E 05	1.280E 06
0.80	2.96	117.	1.129E 05	1.312E 05	2.440E 05	3.119E 03	4.541E 05	1.921E 03	4.561E 05	7.062E 05
1.00	3.70	146.	5.414E 04	7.690E 04	1.310E 05	6.721E 03	3.002E 05	1.638E 03	3.018E 05	4.396E 05
1.25	4.63	182.	1.713E 04	4.447E 04	6.161E 04	5.556E 03	2.134E 05	1.364E 03	2.148E 05	2.819E 05
1.50	5.56	219.	3.549E 03	2.479E 04	2.834E 04	4.751E 03	1.650E 05	1.165E 03	1.661E 05	1.992E 05
1.75	6.48	255.	5.475E 02	1.197E 04	1.252E 04	4.163E 03	1.389E 05	1.033E 03	1.399E 05	1.566E 05
2.00	7.41	292.	8.674E 01	5.219E 03	5.306E 03	3.715E 03	1.208E 05	9.544E 02	1.217E 05	1.308E 05
2.50	9.26	365.	4.625E-01	4.738E 02	4.743E 02	3.085E 03	9.205E 04	6.724E 02	9.272E 04	9.628E 04
3.00	11.11	437.	0.0	2.016E 01	2.016E 01	2.664E 03	7.334E 04	5.689E 02	7.395E 04	7.664E 04
3.50	12.96	510.	0.0	3.621E-02	3.621E-02	2.361E 03	6.111E 04	4.554E 02	6.157E 04	6.393E 04
4.00	14.81	583.	0.0	0.0	0.0	2.130E 03	5.414E 04	3.705E 02	5.451E 04	5.664E 04
4.50	16.67	656.	0.0	0.0	0.0	1.944E 03	4.939E 04	3.214E 02	4.971E 04	5.165E 04
5.00	18.52	729.	0.0	0.0	0.0	1.790E 03	4.537E 04	2.699E 02	4.564E 04	4.743E 04
6.00	22.22	875.	0.0	0.0	0.0	1.544E 03	3.903E 04	1.973E 02	3.923E 04	4.077E 04
8.00	29.63	1167.	0.0	0.0	0.0	1.220E 03	2.953E 04	1.149E 02	2.964E 04	3.086E 04
10.00	37.04	1458.	0.0	0.0	0.0	7.072E 02	1.527E 04	4.178E 01	1.531E 04	1.601E 04

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AEI7: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AEI7-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AEI7-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AEI7-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOURCE: SOLAR FLARE PROTONS AT 1 AU (UNATTENUATED, INTERPLANETARY) FOR CUTOFF DIPOLE SHELL OF - E.R.

FOR TAG=(G.M., Q=90%: # OF AL EVENTS=4
99.40% GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 57

** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTES AP8, ALO, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1981 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AP8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG MODEL 4: BARRACLOUGH ET.AL. 168-TERM 1975 * TIME= 1989.5 **
** VEHICLE : NAVSTAR-MAX ** INCLINATION= 60DEG ** PERIGEE= 5160KM ** APOGEE= 5160KM ** RAD ORBIT TAPE: TR5446 ** PERIOD= 3.438 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MD YLAND 20771,TEL.(301)-344-6067 **

*************** DOSE AT CENTER OF ALUMINUM SPHERES ***************

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	ELECTRONS* OUTER ZN. (RADS-AL)	ELECTRONS* TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	PROTONS SOLAR+ (RADS-AL)	PROTONS TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	7.485E 08	1.778E 07	7.667E 08	2.979E 05	2.725E 08	[illegible]	2.725E 08	1.040E 09
0.02	0.07	3.	4.582E 08	1.154E 07	5.101E 08	2.381E 05	1.408E 08	3.723E 03	1.408E 08	6.512E 08
0.03	0.11	4.	3.470E 08	9.036E 06	3.561E 08	1.932E 05	9.651E 07	[illegible]	9.651E 07	4.532E 08
0.04	0.15	6.	2.522E 08	7.255E 06	2.595E 08	1.621E 05	7.127E 07	[illegible]	7.128E 07	3.309E 08
0.05	0.19	7.	1.676E 08	6.039E 06	1.937E 08	1.388E 05	5.430E 07	[illegible]	5.400E 07	2.478E 08
0.06	0.22	9.	1.420E 08	5.156E 06	1.471E 08	1.199E 05	4.413E 07	[illegible]	4.413E 07	1.514E 08
0.07	0.26	10.	1.088E 08	4.485E 06	1.132E 08	1.040E 05	3.555E 07	2.522E 03	3.556E 07	1.493E 08
0.08	0.30	12.	8.419E 07	3.959E 06	8.815E 07	9.073E 04	2.990E 07	[illegible]	2.990E 07	1.181E 08
0.09	0.33	13.	6.564E 07	3.537E 06	6.917E 07	7.965E 04	2.514E 07	4.022E 03	2.515E 07	9.440E 07
0.10	0.37	15.	5.172E 07	3.181E 06	5.491E 07	7.022E 04	2.113E 07	4.114E 03	2.113E 07	7.611E 07
0.20	0.74	29.	5.547E 06	1.641E 06	7.188E 06	3.064E 04	6.190E 06	4.800E 03	6.195E 06	1.341E 07
0.30	1.11	44.	6.734E 05	1.112E 06	1.965E 06	2.012E 04	2.750E 06	4.225E 03	2.754E 06	4.759E 06
0.40	1.48	58.	2.481E 05	7.835E 05	1.032E 06	1.527E 04	1.442E 06	3.646E 03	1.446E 06	2.493E 06
0.50	1.85	73.	1.130E 05	5.498E 05	6.628E 05	1.241E 04	8.352E 05	3.260E 03	8.385E 05	1.514E 06
0.60	2.22	87.	6.262E 04	3.859E 05	4.486E 05	1.055E 04	5.574E 05	2.922E 03	5.603E 05	1.019E 06
0.80	2.96	117.	2.161E 04	1.954E 05	2.210E 05	8.255E 03	2.952E 05	2.435E 03	2.977E 05	5.269E 05
1.00	3.70	146.	8.004E 03	1.159E 05	1.239E 05	6.845E 03	1.790E 05	2.076E 03	1.810E 05	3.118E 05
1.25	4.63	182.	2.164E 03	6.649E 04	6.865E 04	5.667E 03	1.167E 05	1.754E 03	1.184E 05	1.927E 05
1.50	5.56	219.	4.813E 02	3.654E 04	3.743E 04	4.849E 03	8.368E 04	1.477E 03	8.516E 04	1.274E 05
1.75	6.48	255.	5.425E 01	1.766E 04	1.756E 04	4.248E 03	6.651E 04	1.110E 03	6.762E 04	9.002E 04
2.00	7.41	292.	1.552E 01	7.804E 03	7.824E 03	3.791E 03	5.485E 04	1.154E 03	5.605E 04	6.766E 04
2.50	9.26	365.	1.171E-01	7.070E 02	7.071E 02	3.144E 03	3.767E 04	8.624E 02	3.852E 04	4.237E 04
3.00	11.11	437.	0.0	2.992E 01	2.992E 01	2.711E 03	2.752E 04	7.212E 02	2.825E 04	3.103E 04
3.50	12.96	510.	0.0	5.599E-02	5.599E-02	2.400E 03	2.157E 04	5.774E 02	2.215E 04	2.455E 04
4.00	14.81	583.	0.0	0.0	0.0	2.163E 03	1.837E 04	4.700E 02	1.884E 04	2.100E 04
4.50	16.67	656.	0.0	0.0	0.0	1.973E 03	1.627E 04	4.035E 02	1.667E 04	1.865E 04
5.00	18.52	729.	0.0	0.0	0.0	1.815E 03	1.456E 04	3.422E 02	1.490E 04	1.672E 04
6.00	22.22	875.	0.0	0.0	0.0	1.565E 03	1.196E 04	2.501E 02	1.221E 04	1.378E 04
8.00	29.63	1167.	0.0	0.0	0.0	1.236E 03	8.316E 03	1.456E 02	8.462E 03	9.698E 03
10.00	37.04	1458.	0.0	0.0	0.0	7.171E 02	3.754E 03	5.357E 01	3.807E 03	4.524E 03

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AEI7: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AEI7-HI RANGES VANDELAYS FIT TO OV1-19 DATA WHILE AEI7-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AEI7-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

+ SOLAR PROTON MODEL:

SOURCE: SOLAR FLARE PROTONS AT 1 AU (UNATTENUATED, INTERPLANETARY) FOR CUTOFF LIMITED SHELL OF 5 E.R.

FOR TAU=EC.MC.,Q=90%: # OF AL EVENTS=4 76.5% OF MAGNITUDE SET BEING APPLI

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIED MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 58

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** ORBITAL FLUX STUDY WITH COMPOSITE PARTICLE ENVIRONMENTS: VETTED AE8; AE6, AEI7 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS (UF) APPLIED FOR THIS RUN ARE: FOR PROTONS (AE8) - UF= 1.0; FOR INNER ZONE ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES B AND L COMPUTED BY INVARA OF 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL., 1975 * TIME= 1989.5 **
** VEHICLE ANALYSIS MAX ** INCLINATION= 40DEG. ** PERIGEE= 6380KM ** APOGEE= 6380KM ** OUTPUT TAPE: 105446 ** PERIOD= 1.688 **
** FOR INFORMATION OR EXPLANATION CONTACT E.G. STASSINOPOULOS AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **
****

**************** DOSE AT CENTER OF ALUMINUM SPHERES ****************

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (ALUMINUM) S (GM/CM**2)	T (MM)	T (MILS)	ELECTRONS* INNER ZN. (RADS-AL)	ELECTRONS* OUTER ZN. (RADS-AL)	ELECTRONS* TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	PROTONS SOLAR + (RADS-AL)	PROTONS TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	6.200E 08	[illegible] 07	6.450E 08	2.492E 05	5.187E 08	4.427E 03	5.163E 08	1.163E 09
0.02	0.07	3.	3.578E 08	1.665E 07	4.143E 08	1.936E 05	2.226E 08	4.571E 03	2.226E 08	6.371E 08
0.03	0.11	4.	2.688E 08	1.256E 07	2.413E 08	1.545E 05	1.335E 08	[illegible] 03	1.335E 08	4.150E 08
0.04	0.15	6.	1.909E 08	1.075E 07	2.309E 08	1.281E 05	8.666E 07	4.607E 03	8.667E 07	2.875E 08
0.05	0.19	7.	1.389E 08	8.305E 06	1.473E 08	1.089E 05	5.365E 07	[illegible] 03	[illegible] 07	2.063E 08
0.06	0.22	[illegible]	1.03[illegible]E 08	7.127E 06	1.106E 08	9.349 04	4.405E 07	[illegible] 03	4.405E 07	1.547E 08
0.07	0.26	11.	[illegible] 07	6.197E 06	8.451E 07	8.086E 04	3.344E 07	4.763 03	3.344E 07	1.180E 08
0.08	0.30	12.	6.00[illegible]E 07	5.470E 06	6.553E 07	7.039E 04	2.640E 07	[illegible] 03	2.641E 07	9.201E 07
0.09	0.33	13.	4.645E 07	4.887E 06	5.133E 07	6.177E 04	2.137E 07	[illegible] 03	2.138E 07	7.277E 07
0.10	0.37	15.	3.623E 07	4.399E 06	4.073E 07	5.450E 04	1.738E 07	4.997E 03	1.739E 07	5.817E 07
0.20	0.74	29.	3.622E 06	2.271E 06	5.894E 06	2.439E 04	4.353E 06	5.329E 03	4.359E 06	1.032E 07
0.30	1.11	44.	4.664E 05	1.525E 06	2.016E 06	1.633E 04	1.834E 06	5.112E 03	1.840E 06	3.871E 06
0.40	1.48	58.	1.118E 05	1.072E 06	1.183E 06	1.253E 04	9.153E 05	[illegible] 03	9.198E 05	2.116E 06
0.50	1.85	73.	4.228E 04	7.494E 05	7.917E 05	1.023E 04	5.072E 05	[illegible] 03	5.112E 05	1.313E 06
0.60	2.22	87.	2.041E 04	5.250E 05	5.454E 05	8.716E 03	3.272E 05	[illegible] 03	3.308E 05	8.849E 05
0.80	2.96	117.	5.592E 03	2.702E 05	2.762E 05	6.817E 03	1.627E 05	[illegible] 03	1.657E 05	4.487E 05
1.00	3.70	146.	1.572E 03	[illegible] 05	[illegible] 05	5.648E 03	9.301E 04	[illegible] 03	9.553E 04	2.555E 05
1.25	4.63	182.	4.611E 02	8.913E 04	8.959E 04	4.678E 03	5.653E 04	2.131E 03	5.906E 04	1.533E 05
1.50	5.56	219.	8.975E 01	4.944E 04	4.953E 04	4.002E 03	3.846E 04	1.794 03	4.025E 04	9.379E 04
1.75	6.48	255.	1.720E 01	2.400E 04	2.402E 04	3.509E 03	2.907E 04	[illegible] 03	3.066E 04	5.818E 04
2.00	7.41	292.	1.53[illegible]E 00	1.053E 04	1.053E 04	3.133E 03	2.280E 04	[illegible] 03	2.420E 04	3.797E 04
2.50	9.26	365.	0.0	5.526E 02	9.526E 02	2.604E 03	1.415E 04	[illegible] 03	1.518E 04	1.874E 04
3.00	11.11	437.	0.0	[illegible] 01	3.978E 01	2.250E 03	9.548E 03	[illegible] 02	1.042E 04	1.271E 04
3.50	12.96	510.	0.0	7.421E-02	7.421E-02	1.997E 03	7.049E 03	[illegible] 02	7.750E 03	9.747E 03
4.00	14.81	583.	0.0	0.0	0.0	1.805E 03	5.771E 03	[illegible] 02	6.342E 03	8.147E 03
4.50	16.67	656.	0.0	0.0	0.0	1.650E 03	4.954E 03	4.949E 02	5.449E 03	7.100E 03
5.00	18.52	729.	0.0	0.0	0.0	1.522E 03	4.312E 03	[illegible] 02	4.728E 03	6.250E 03
6.00	22.22	875.	0.0	0.0	0.0	1.317E 03	[illegible] 03	[illegible] 02	3.672E 03	4.989E 03
8.00	29.63	1167.	0.0	0.0	0.0	1.046E 03	2.133E 03	1.765E 02	2.315E 03	3.361E 03
10.00	37.04	1458.	0.0	0.0	0.0	6.121E 02	4.421E 02	[illegible] 01	5.064E 02	1.519E 03

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AEI7: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE. FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER AND LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AEI7-HI AVERS VAMPOLA'S FIT TO OV1-19 DATA WHILE AEI7-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AEI7-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

\+ SOLAR PROTON MODEL:

SOLPRO: SOLAR FLARE PROTONS AT 1 AU (UNATTENUATED, INTERPLANETARY) FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO.,Q=50%: # OF AL EVENTS=4 [illegible] GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 59

** ORBITAL FLUX STUDY WITH [illegible] PARTICLE ENVIRONMENTS: VETTES AE8: AE6, AE17 FOR SOLAR MAXIMUM *** UNIFLUX OF 1979 **
** UNCERTAINTY FACTORS [illegible] APPLIED FOR THIS RUN AE[illegible] [illegible] FOR PROTONS (AP[illegible]) - UF= 1.0: FOR [illegible] ELECTRONS (AE6) - UF= 1.0 **
** MAGNETIC COORDINATES [illegible] COMPUTED [illegible] 1972 WITH ALLMAG, MODEL 4: BARRACLOUGH ET.AL., IGRF-TRM 1975 * TIME= 1989.5 **
** VEHICLE [illegible] ** INCLINATION= [illegible] ** APOGEE= [illegible] KM ** APOGEE= 10371KM ** [illegible] ORBIT TAPE: TD5444 ** PERIOD= 6.092 **
** FOR INFORMATION OR EXPLANATION CONTACT [illegible] AT NASA-GSFC,CODE 601, GREENBELT, MARYLAND 20771,TEL.(301)-344-8067 **

**************** DOSE AT CENTER OF ALUMINUM SPHERES ****************

*** MISSION DURATION: 5.0000 YEAR(S) ***

SHIELD THICKNESS (AL) [illegible]			ELECTRONS* [illegible] ZN. (RADS-AL)	[illegible] ZN. (RADS-AL)	TOTAL (RADS-AL)	BREMSSTRAHLUNG TOTAL (RADS-AL)	PROTONS TRAPPED** (RADS-AL)	SOLAR + (RADS-AL)	TOTAL (RADS-AL)	TOTAL DOSE ALL SOURCES (RADS-AL)
0.01	0.04	1.	[illegible] 07	7.[illegible] 07	1.[illegible] 08	[illegible] 04	9.[illegible] 08	7.1[illegible] 03	9.535E 08	1.123E 09
0.02	0.07	3.	4.922E 07	4.[illegible] 07	[illegible] 07	5.100E 04	2.125E 08	7.[illegible] 03	2.125E 08	3.119E 08
0.03	0.11	4.	3.195E 07	3.6[illegible] 07	[illegible] 07	4.151E 04	9.054E 07	7.[illegible] 03	9.05[illegible] 07	1.486E 08
0.04	0.15	5.	2.2[illegible] 07	2.[illegible] 07	5.111E 07	3.366E 04	3.[illegible] 07	7.34[illegible] 03	3.531E 07	6.646E 07
0.05	0.19	7.	1.721E 07	2.41[illegible] 07	4.040E 07	3.156E 04	1.759E 07	7.[illegible] 03	1.759E 07	5.842E 07
0.06	0.22	[illegible]	1.35[illegible] 07	1.9[illegible] 07	3.307E 07	2.93[illegible] 04	9.772E 06	7.[illegible] 03	9.780E 06	4.288E 07
0.07	[illegible]	[illegible]	[illegible] 07	1.[illegible] 07	2.774E 07	2.575E 04	6.233E 06	7.697E 03	6.240E 06	3.404E 07
0.08	0.30	12.	9.00[illegible] 06	1.474E 07	2.377E 07	2.350[illegible] 04	4.182E 06	7.[illegible] 03	4.190E 06	2.758E 07
0.09	0.33	13.	7.557E 06	1.31[illegible] 07	2.066E 07	2.179E 04	3.008E 06	7.[illegible] 03	3.015E 06	2.370E 07
0.10	0.37	15.	[illegible] 06	1.172E 07	1.807E 07	2.026E 04	2.309[illegible] 06	[illegible] 03	2.317E 06	2.041E 07
0.20	0.74	2[illegible].	1.970E 06	5.8[illegible] 06	7.791E 06	1.267E 04	3.945E 05	[illegible] 03	3.626E 05	6.167E 06
0.30	1.11	44.	6.164E 05	3.919E 06	4.436E 06	9.66[illegible] 03	1.205[illegible] 05	7.[illegible] 03	1.285E 05	4.576E 06
0.40	1.48	5[illegible].	1.917E 05	2.643E 06	2.835E 06	7.870E 03	5.259E 04	6.[illegible] 03	5.952E 04	2.902E 06
0.50	1.85	73.	6.447E 04	1.8[illegible] 06	1.9[illegible] 06	6.618E 03	2.632E 04	6.[illegible] 03	3.248E 04	1.977E 06
0.60	2.22	[illegible]	[illegible] 04	1.313E 06	1.361E 06	5.706E 03	1.495E 04	5.541E 03	2.045E 04	1.387E 06
0.80	2.96	117.	1.765E 04	6.539E 05	7.116E 05	4.512E 03	6.148E 03	4.62[illegible] 03	1.077E 04	7.269E 05
1.00	3.70	136.	[illegible] 03	4.102E 05	4.167E 05	3.787E 03	3.025E 03	3.92[illegible] 03	6.945E 03	4.274E 05
1.25	4.63	1[illegible]2.	[illegible]	2.383E 05	2.40[illegible] 05	3.195E 03	1.561E 03	3.2[illegible] 03	4.859E 03	2.482E 05
1.50	5.56	[illegible]	4.[illegible] 02	1.342E 05	1.347E 05	2.7[illegible] 03	9.543E 02	2.[illegible] 03	3.819E 03	1.413E 05
1.75	6.48	[illegible]	1.103E 02	6.597E 04	6.608E 04	2.480E 03	5.822E 02	2.41[illegible] 03	2.990E 03	7.155E 04
2.00	7.41	292.	1.459E 01	2.906E 04	2.908E 04	2.248E 03	3.9[illegible] 02	2.1[illegible] 03	2.501E 03	3.383E 04
2.50	9.26	365.	0.0	2.543E 03	2.543E 03	1.924E 03	2.025E 02	1.67[illegible] 03	1.881E 03	6.349E 03
3.00	11.11	437.	0.0	5.491E 01	5.491E 01	1.714E 03	1.101E 02	1.343E 03	1.453E 03	3.267E 03
3.50	12.96	510.	0.0	1.850E-01	1.850E-01	1.5[illegible] 03	6.914E 01	1.1[illegible] 03	1.177E 03	2.745E 03
4.00	14.81	583.	0.0	0.0	0.0	1.457E 03	4.621E 01	9.[illegible] 02	9.549E 02	2.412E 03
4.50	16.67	656.	0.0	0.0	0.0	1.367E 03	3.292E 01	7.645E 02	7.974E 02	2.164E 03
5.00	18.52	72[illegible].	0.0	0.0	0.0	1.289E 03	2.[illegible] 01	6.514E 02	6.772E 02	1.966E 03
6.00	22.22	875.	0.0	0.0	0.0	1.157E 03	1.256E 01	4.786E 02	4.912E 02	1.648E 03
8.00	29.63	1167.	0.0	0.0	0.0	9.680E 02	6.954E 00	2.72[illegible] 02	2.789E 02	1.247E 03
10.00	37.04	14[illegible].	0.0	0.0	0.0	6.123E 02	2.963E-01	9.524E 01	9.553E 01	7.078E 02

* ELECTRON MODELS:

AE6: INNER ZONE-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

AE17: OUTER ZONE-INTERIM MODEL WITHOUT SOLAR CYCLE DEPENDENCE.
FOR ENERGIES ABOVE 1.5 MEV, THIS MODEL CONTAINS UPPER & LOWER LIMIT VALUES TO ACCOUNT FOR DISCREPANCY BETWEEN EXISTING DATA SETS. THE AE17-HI FAVORS VAMPOLA'S FIT TO OV1-19 DATA WHILE AE17-LO IS MORE REPRESENTATIVE OF ALL THE DATA SETS PRESENTLY AVAILABLE TO NSSDC.

>> THE AE17-LO VERSION WAS USED FOR THESE CALCULATIONS <<

** PROTON MODEL:

AP8-MAC: TRAPPED PROTONS-SOLAR MAX
NO UNCERTAINTY FACTOR WAS APPLIED TO THE MODEL DATA.

+ SOLAR PROTON MODEL:

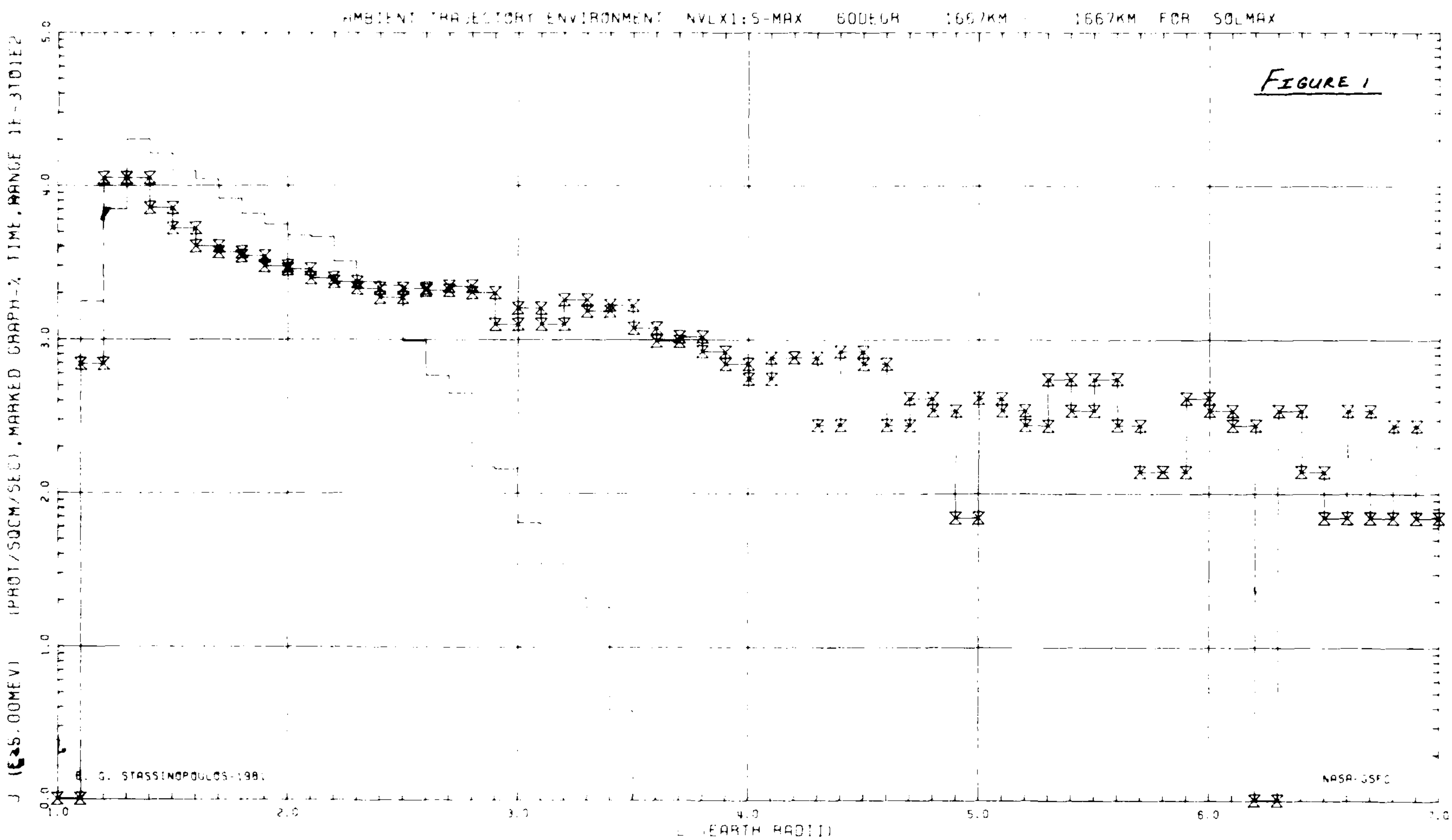
SOLPRO: SOLAR FLARE PROTONS AT 1 AU
(UNATTENUATED, INTERPLANETARY)
FOR CUTOFF DIPOLE SHELL OF 5 E.R.

FOR TAU=60.MO.,Q=90%: # OF AL EVENTS=4
69.1° GEOMAGNETIC SHIELDING APPLIED

NOTE: Q DENOTES THE DEGREE OF CONFIDENCE ONE WISHES TO ASSIGN TO RESULTS, NAMELY THAT FOR THE SPECIFIC MISSION DURATION THE CALCULATED FLUENCES ARE THE SMALLEST VALUES WHICH WILL NOT BE EXCEEDED BY ACTUALLY ENCOUNTERED INTENSITIES.

IT IS NOT ADVISABLE TO EXTRAPOLATE THE SOLAR PROTON SPECTRA NEITHER TOWARDS LOWER NOR TOWARDS HIGHER ENERGIES BECAUSE THE DATA SETS USED IN THE CONSTRUCTION OF THE MODEL (SATELLITE MEASUREMENTS MADE DURING THE 20TH SOLAR CYCLE: 1964-1975) DO NOT CONTAIN INFORMATION FOR E<10 AND E>200 MEV.

TABLE 60



AMBIENT TRAJECTORY ENVIRONMENT NVLX1:S-MAX 600EGR 1667KM 1667KM FOR SOLMAX
FIGURE 1
J (E>5.00MEV) (PROT/SQCM/SEC),MARKED GRAPH-% TIME,RANGE 1E-31D1E2
L (EARTH RADII)
E. G. STASSINOPOULOS-198.
NASA-GSFC
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0

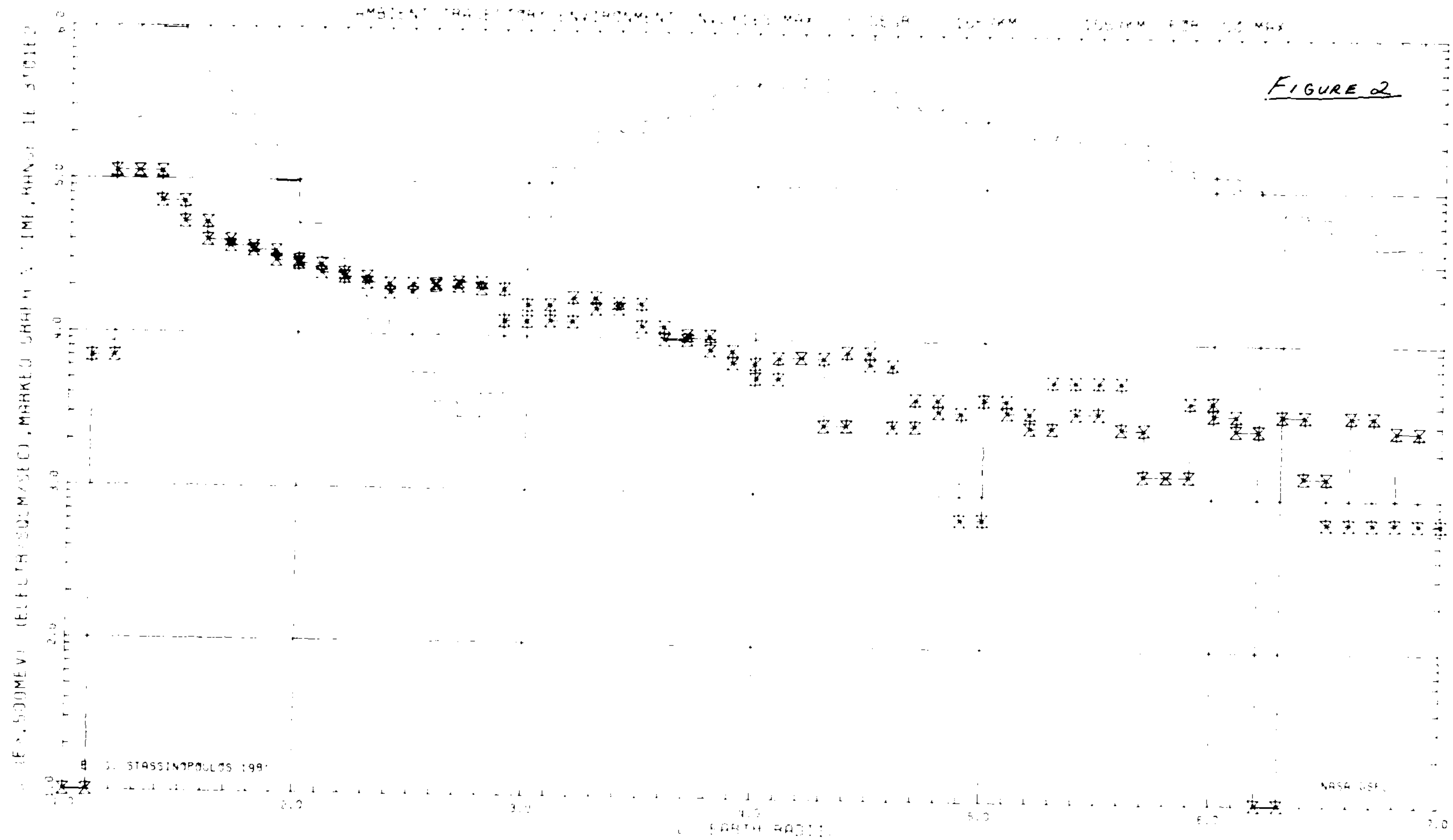


FIGURE 2
EARTH RADII
NASA GSFC

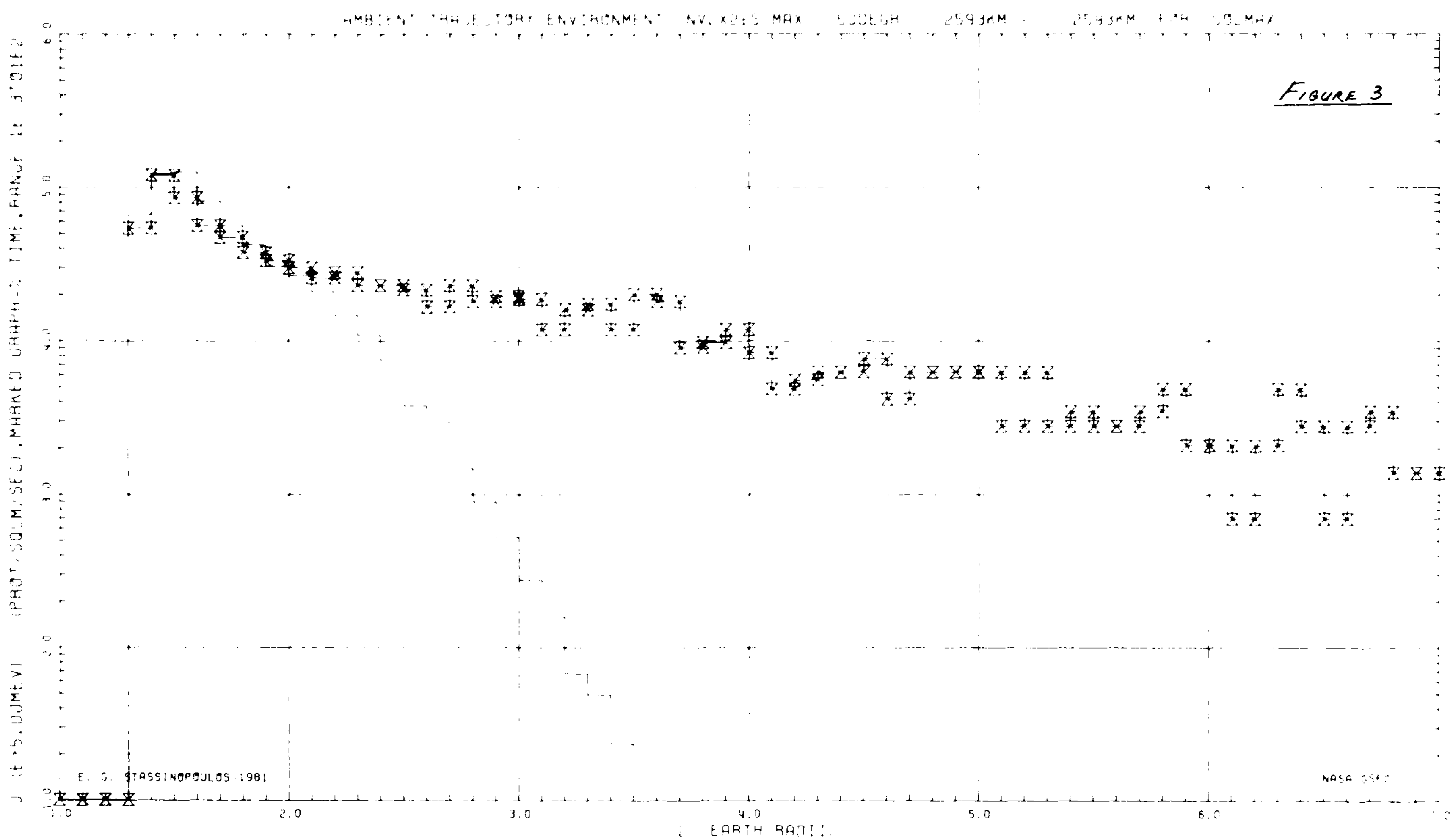

E. G. STASSINOPOULOS 1981
NASA GSFC
EARTH RADII
1.0
2.0
3.0
4.0
5.0
6.0
4.0
5.0
6.0

FIGURE 3

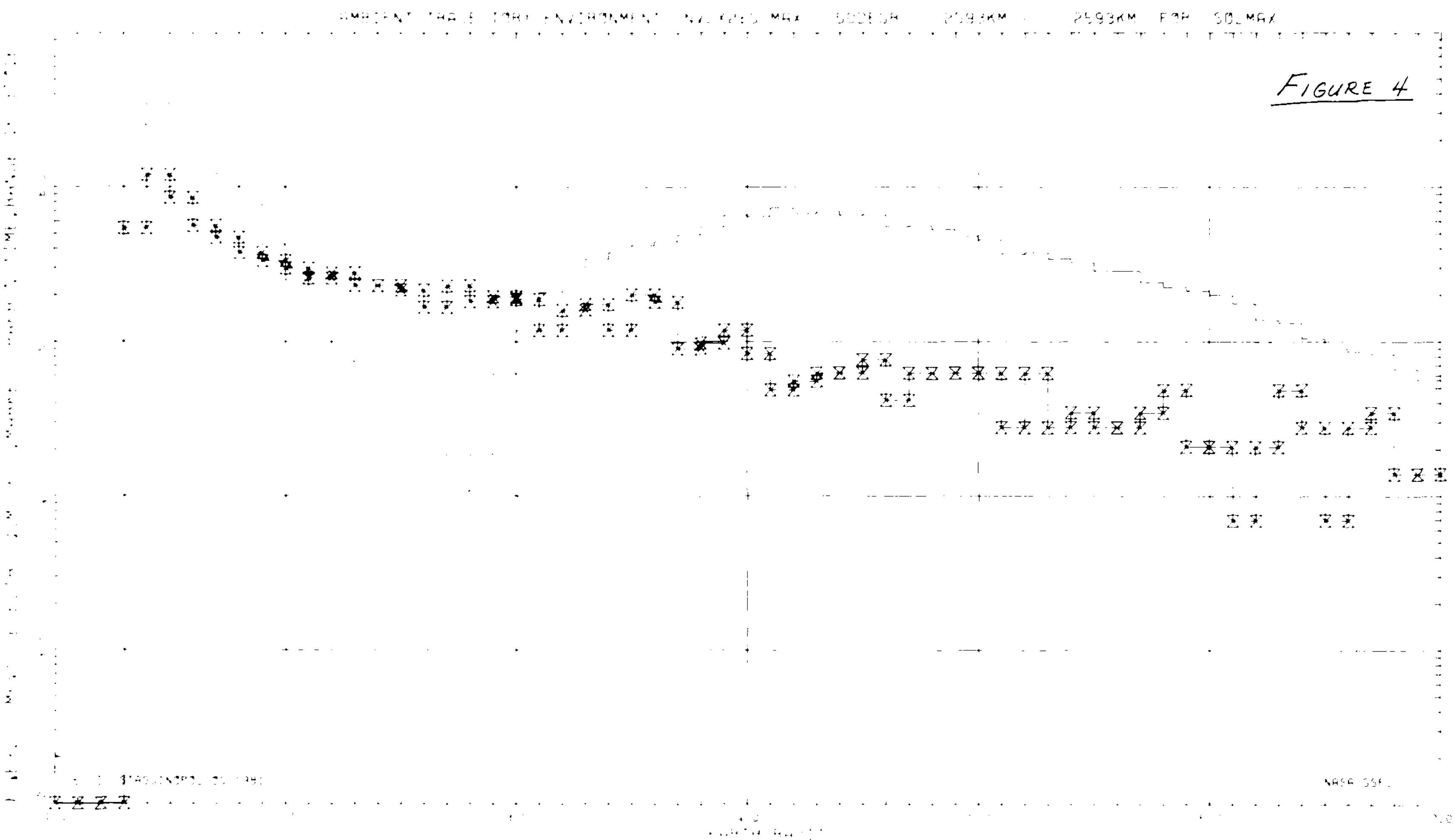


FIGURE 4

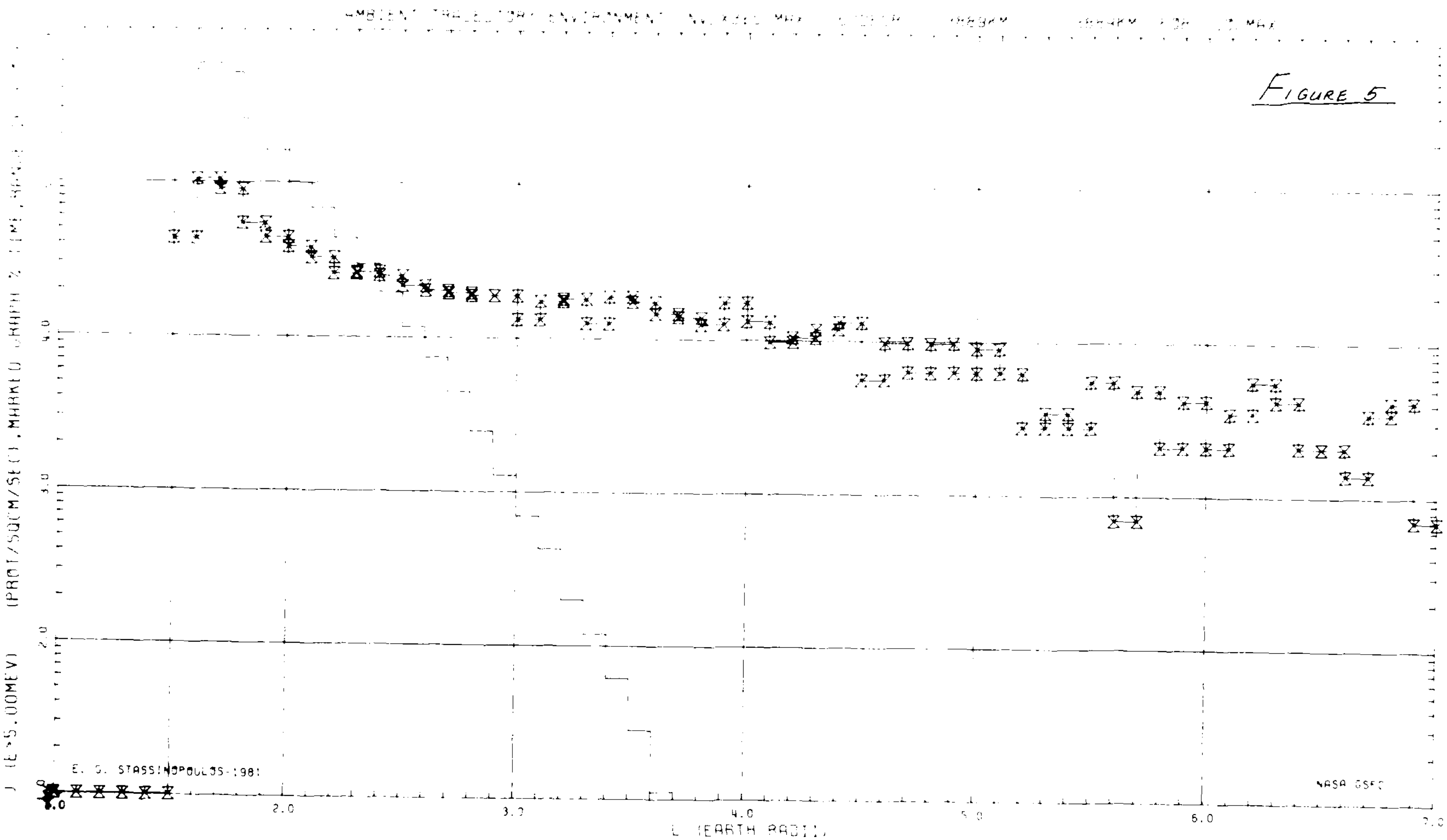
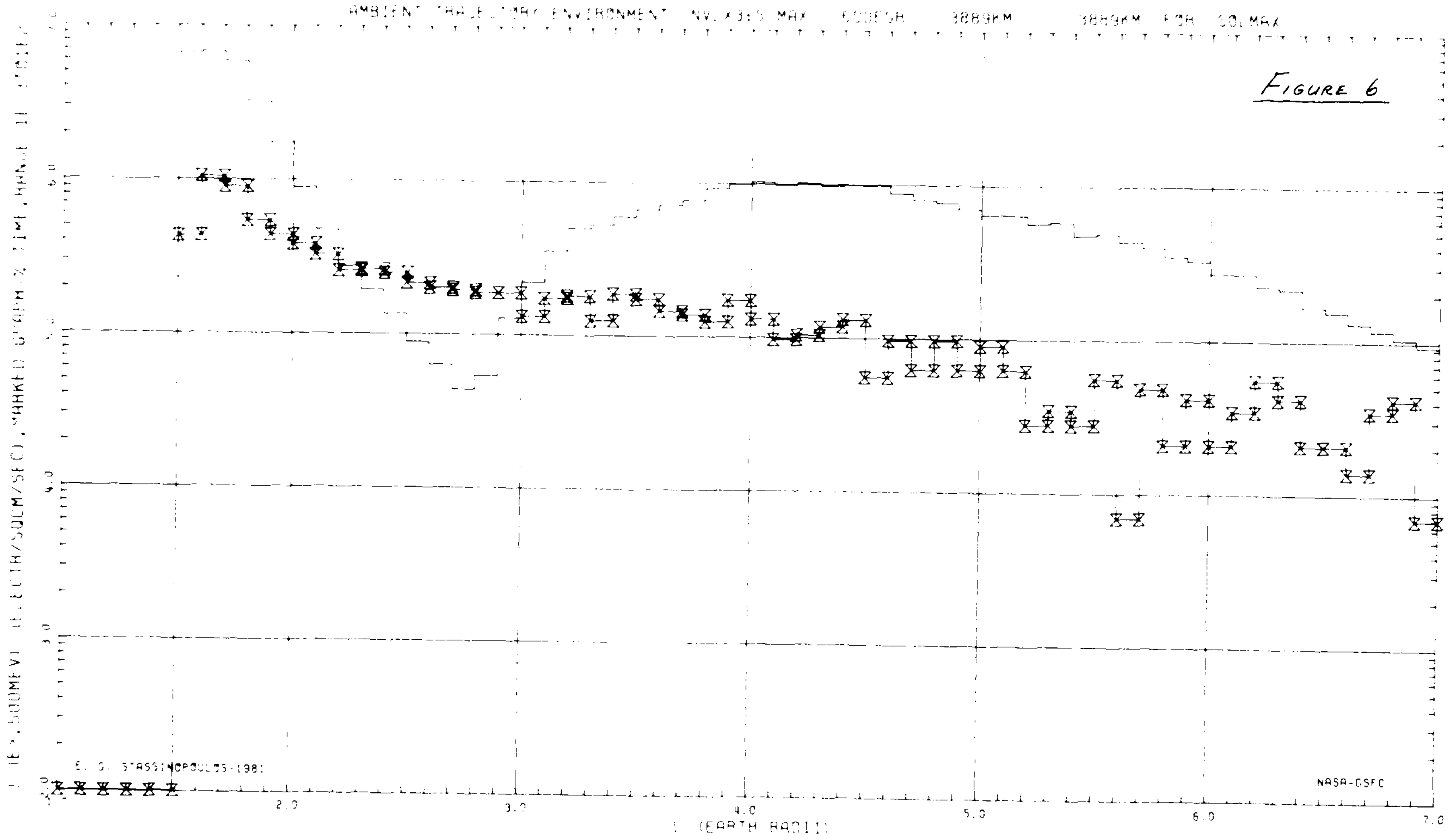


FIGURE 5
J (E>5.00MEV) (PROT/SQCM/SEC), MARKED GRAPH
L (EARTH RADII)
2.0
3.0
4.0
5.0
6.0
7.0
E. G. STASSINOPOULOS-1981
NASA GSFC



AMBIENT TRAJECTORY ENVIRONMENT
FIGURE 6
E. G. STASSINOPOULOS 1981
NASA-GSFC
L (EARTH RADII)
2.0
3.0
4.0
5.0
6.0
7.0

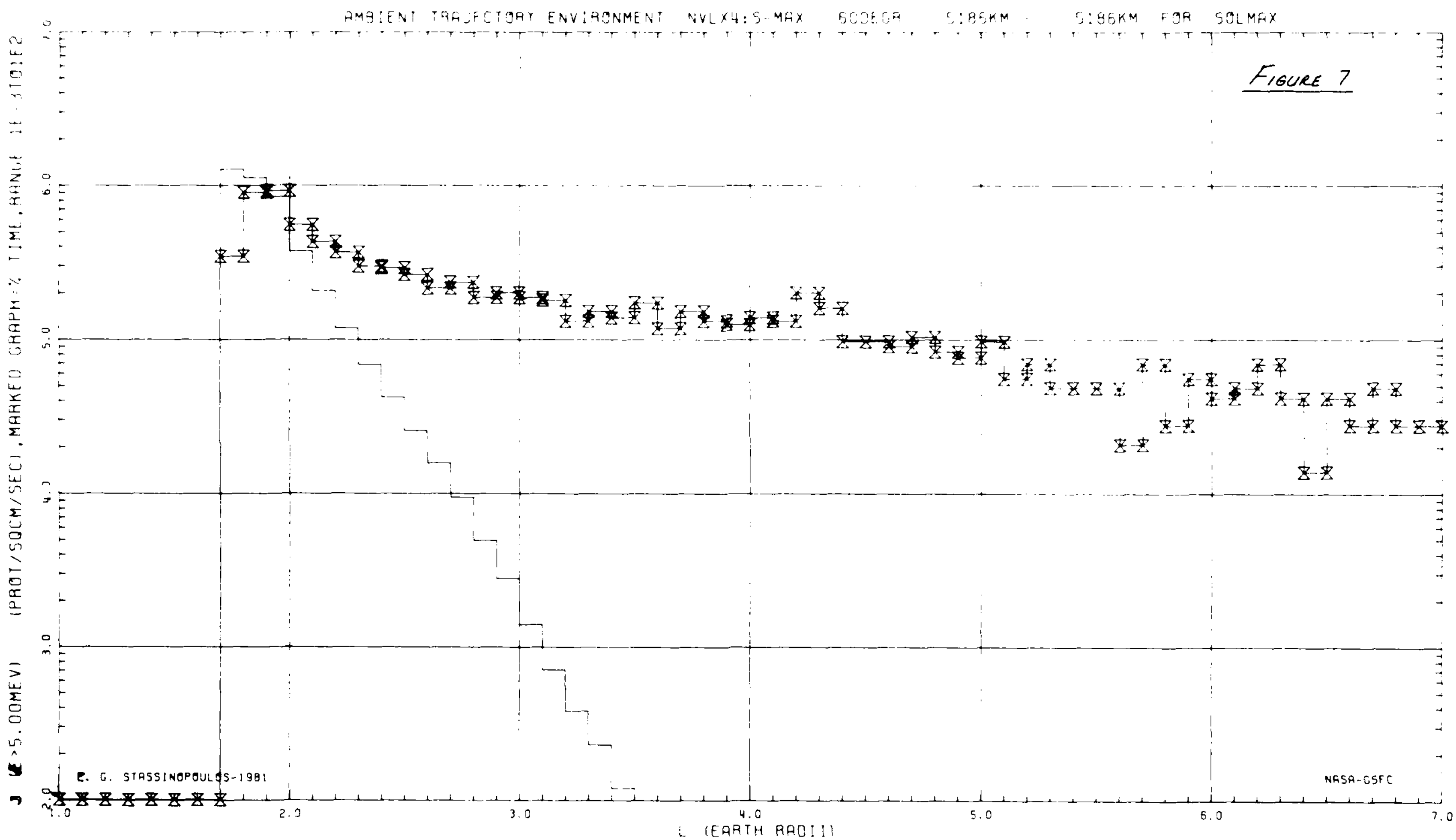
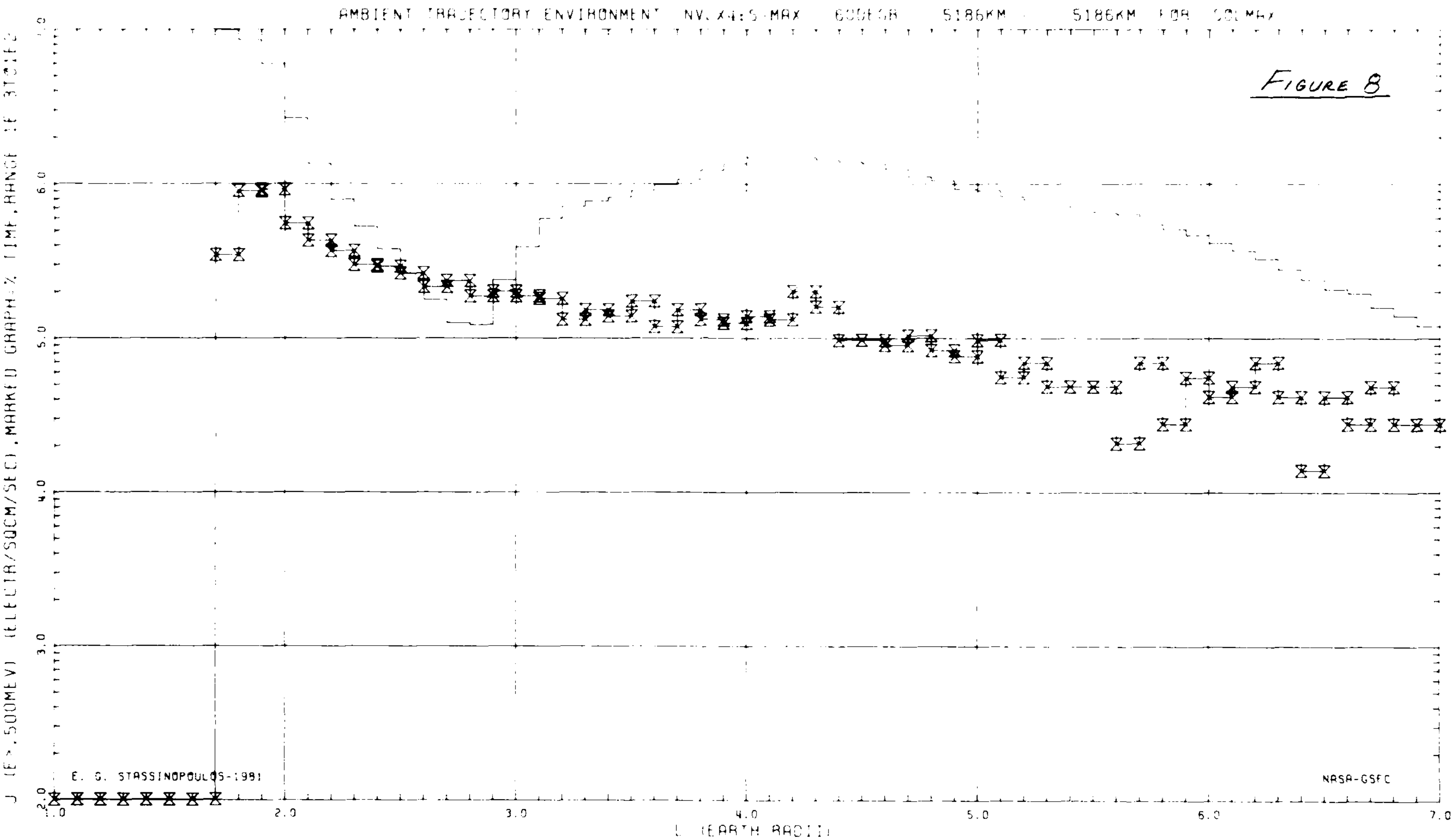
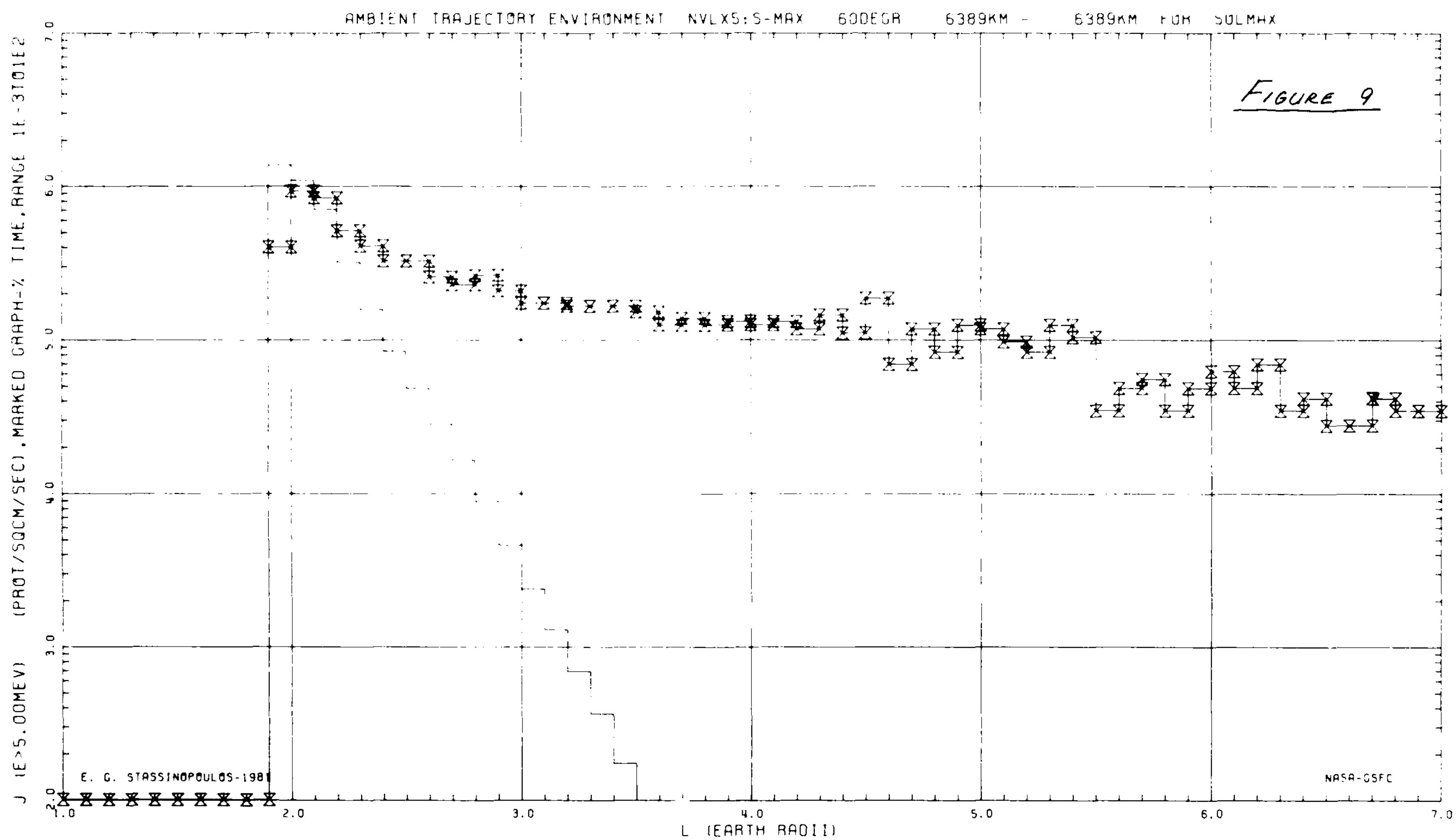
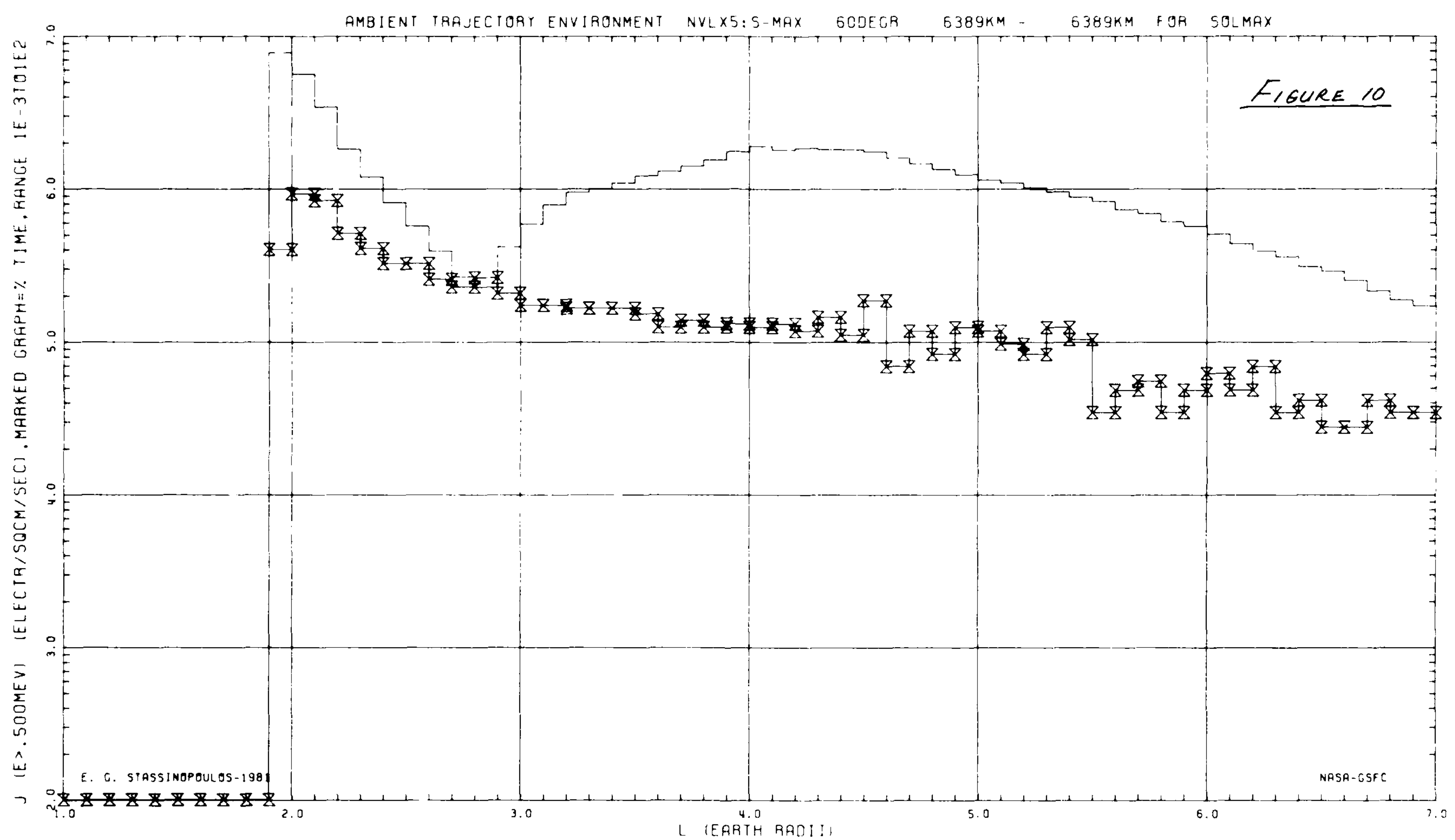

AMBIENT TRAJECTORY ENVIRONMENT NVLX4:S-MAX 60DEGR 5185KM 5186KM FOR SOLMAX
J >5.00MEV) (PROT/SQCM/SEC), MARKED GRAPH=% TIME,RANGE IE 3101E2
7.0
6.0
5.0
4.0
3.0
2.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
L (EARTH RADII)
E. G. STASSINOPOULOS-1981
NASA-GSFC

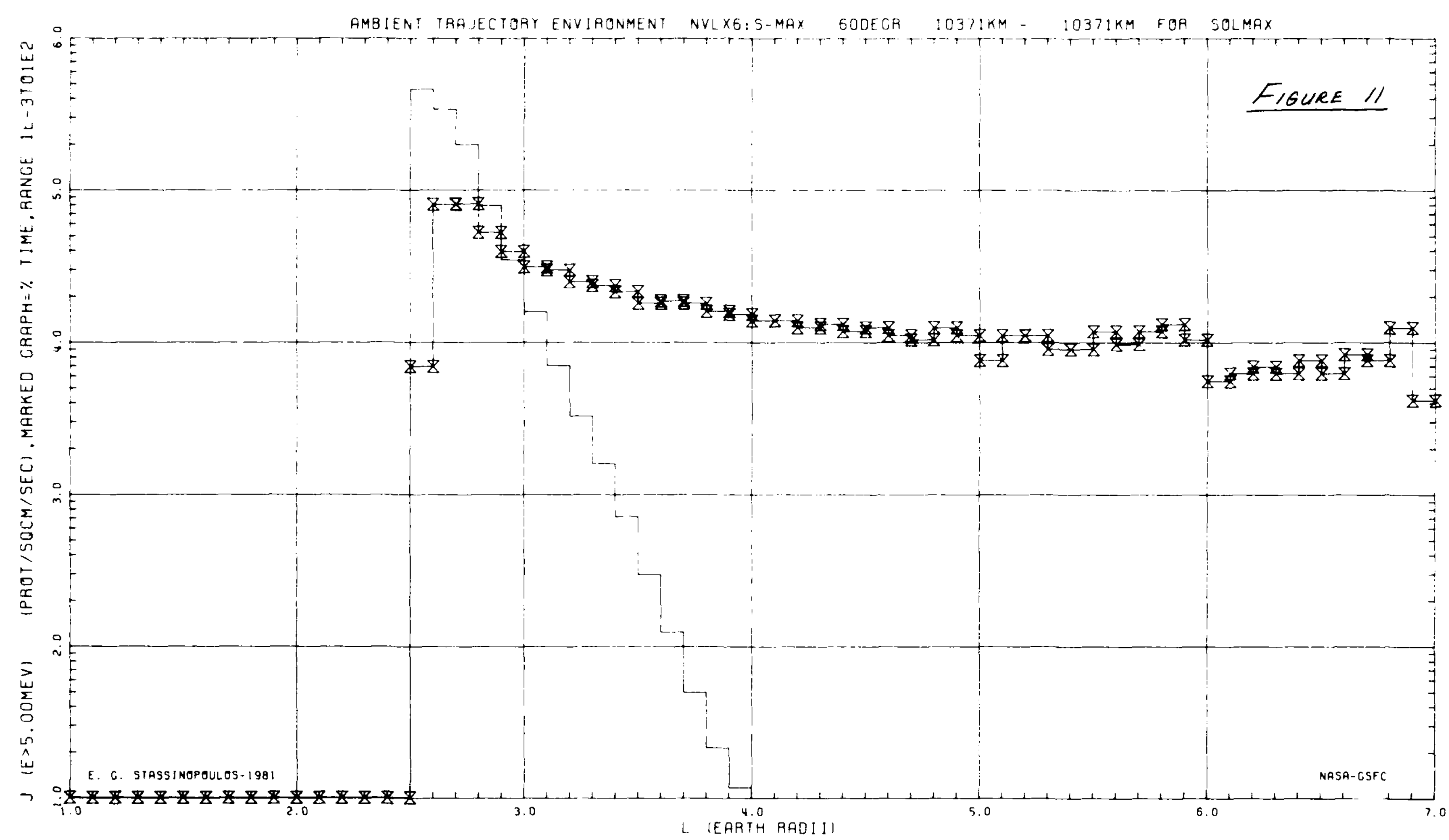
FIGURE 7

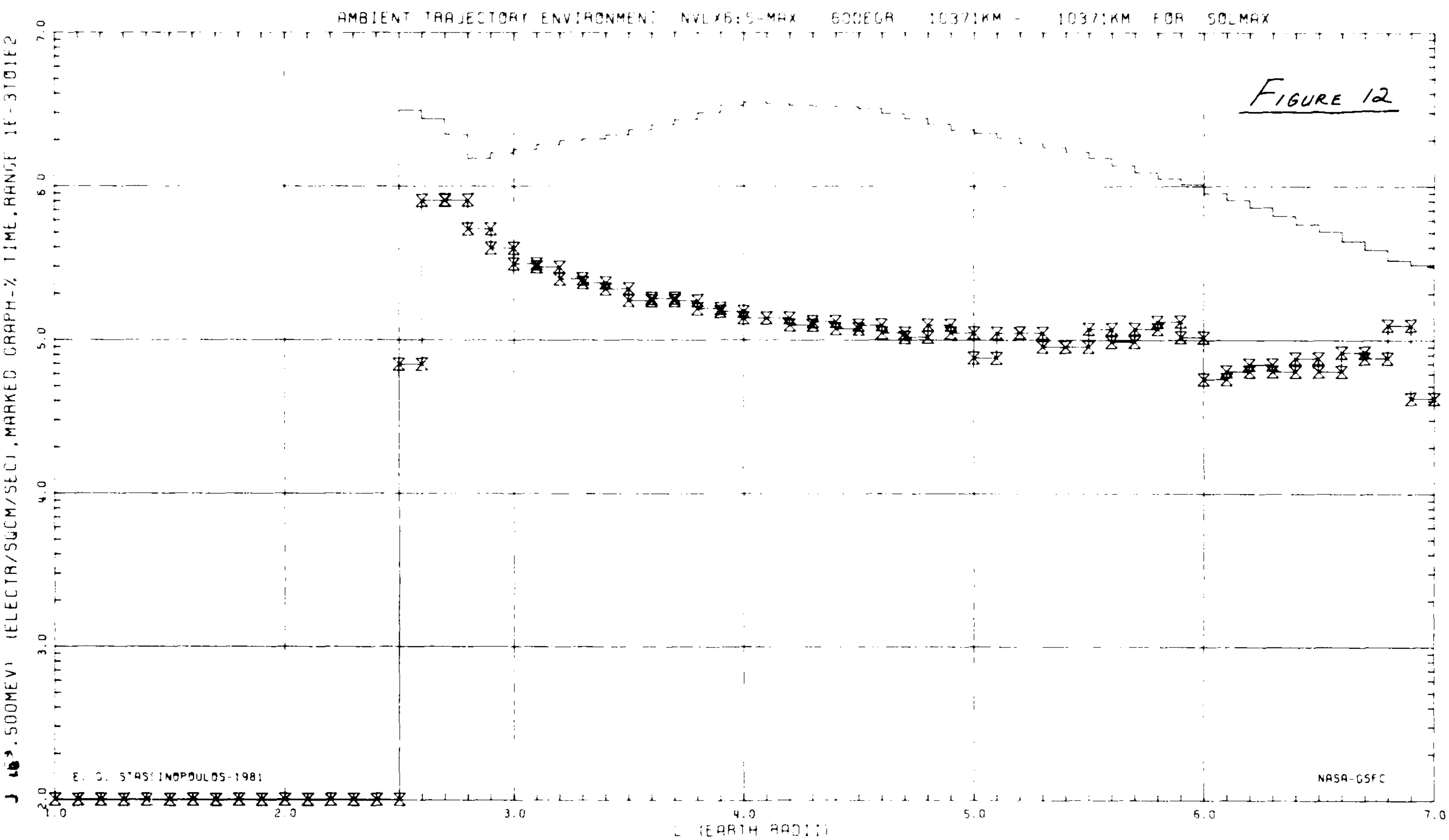


AMBIENT TRAJECTORY ENVIRONMENT NV.X4:S-MAX 60DEGB 5186KM 5186KM FOR SOLMAX
FIGURE 8
E. G. STASSINOPOULOS-1991
NASA-GSFC
L (EARTH RADII)
1.0
2.0
3.0
4.0
5.0
6.0
7.0

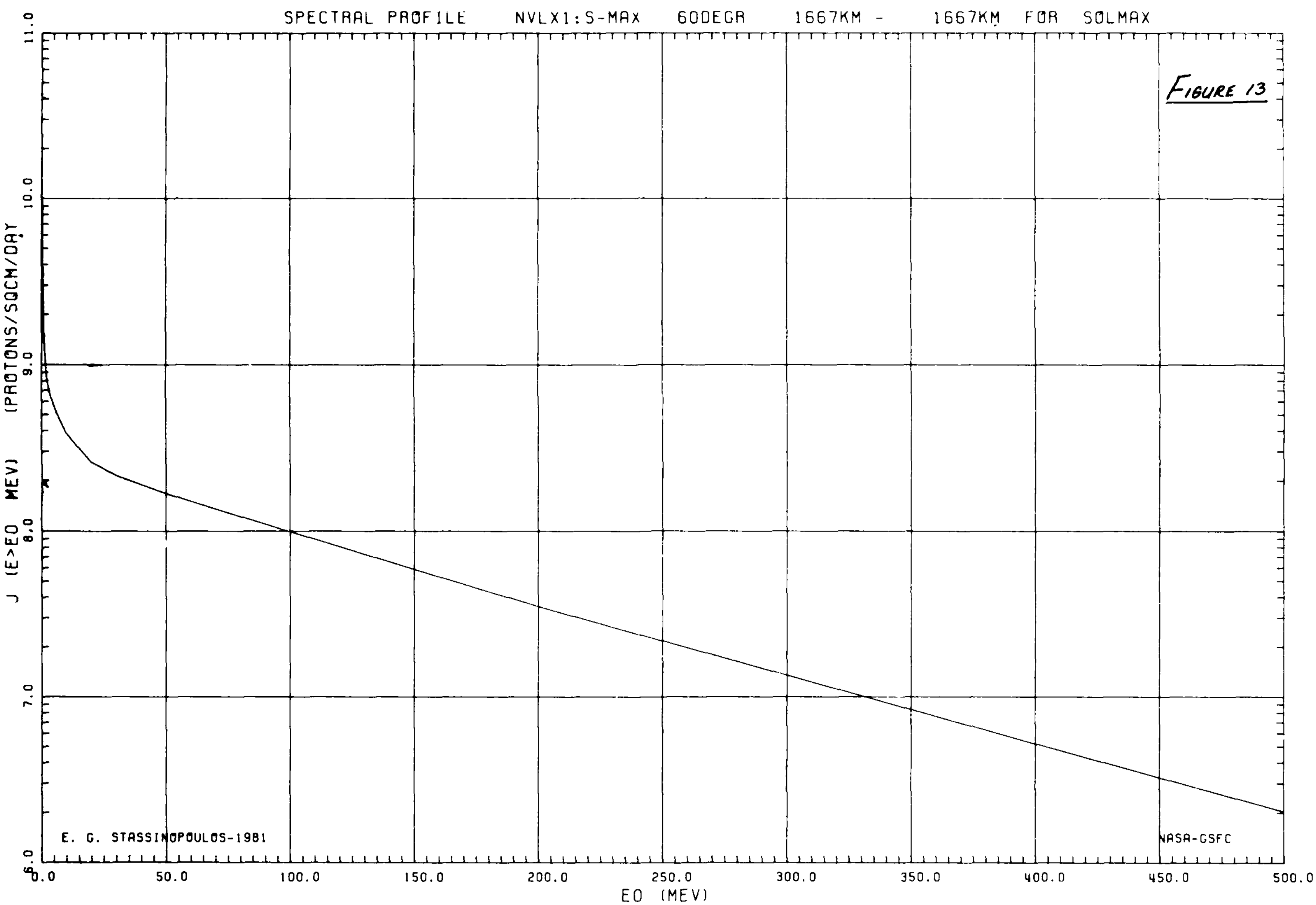

AMBIENT TRAJECTORY ENVIRONMENT NVLX5:S-MAX 60DEGR 6389KM - 6389KM FOR SOLMAX
FIGURE 9
J (E>5.00MEV) (PROT/SQCM/SEC),MARKED GRAPH-% TIME,RANGE 1E-3TO1E2
L (EARTH RADII)
E. G. STASSINOPOULOS-1981
NASA-GSFC
2.0
3.0
4.0
5.0
6.0
7.0
1.0


AMBIENT TRAJECTORY ENVIRONMENT NVLX5:S-MAX 60DEGR 6389KM - 6389KM FOR SOLMAX
FIGURE 10
J (E>.500MEV) (ELECTR/SQCM/SEC),MARKED GRAPH=% TIME,RANGE 1E-3TO1E2
L (EARTH RADII)
E. G. STASSINOPOULOS-1981
NASA-GSFC
2.0
3.0
4.0
5.0
6.0
7.0
1.0

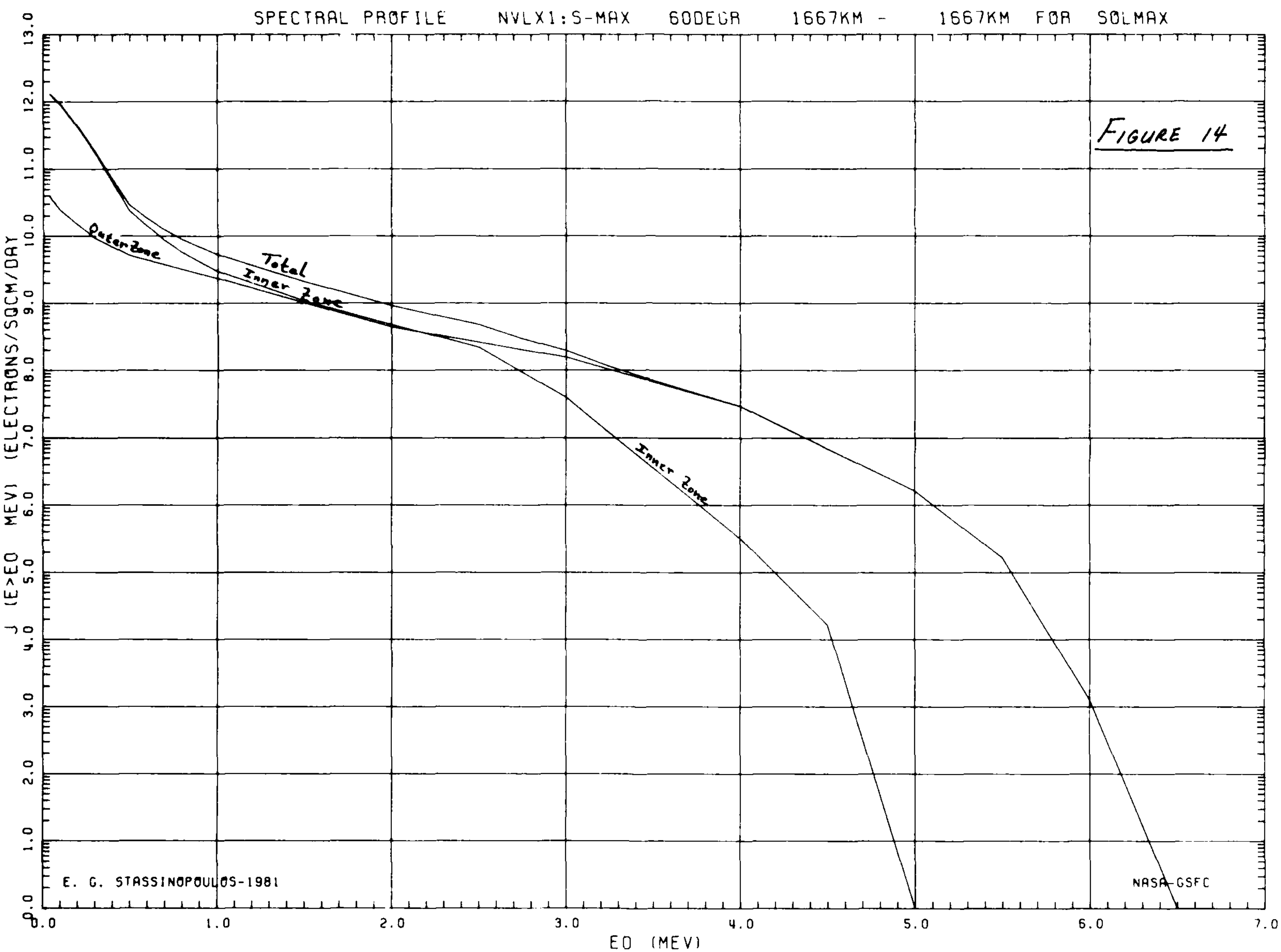

AMBIENT TRAJECTORY ENVIRONMENT NVLX6:S-MAX 60DEGR 10371KM - 10371KM FOR SOLMAX
FIGURE 11
J (E>5.00MEV) (PROT/SQCM/SEC),MARKED GRAPH=% TIME,RANGE 1L-3TO1E2
L (EARTH RADII)
E. G. STASSINOPOULOS-1981
NASA-GSFC
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0



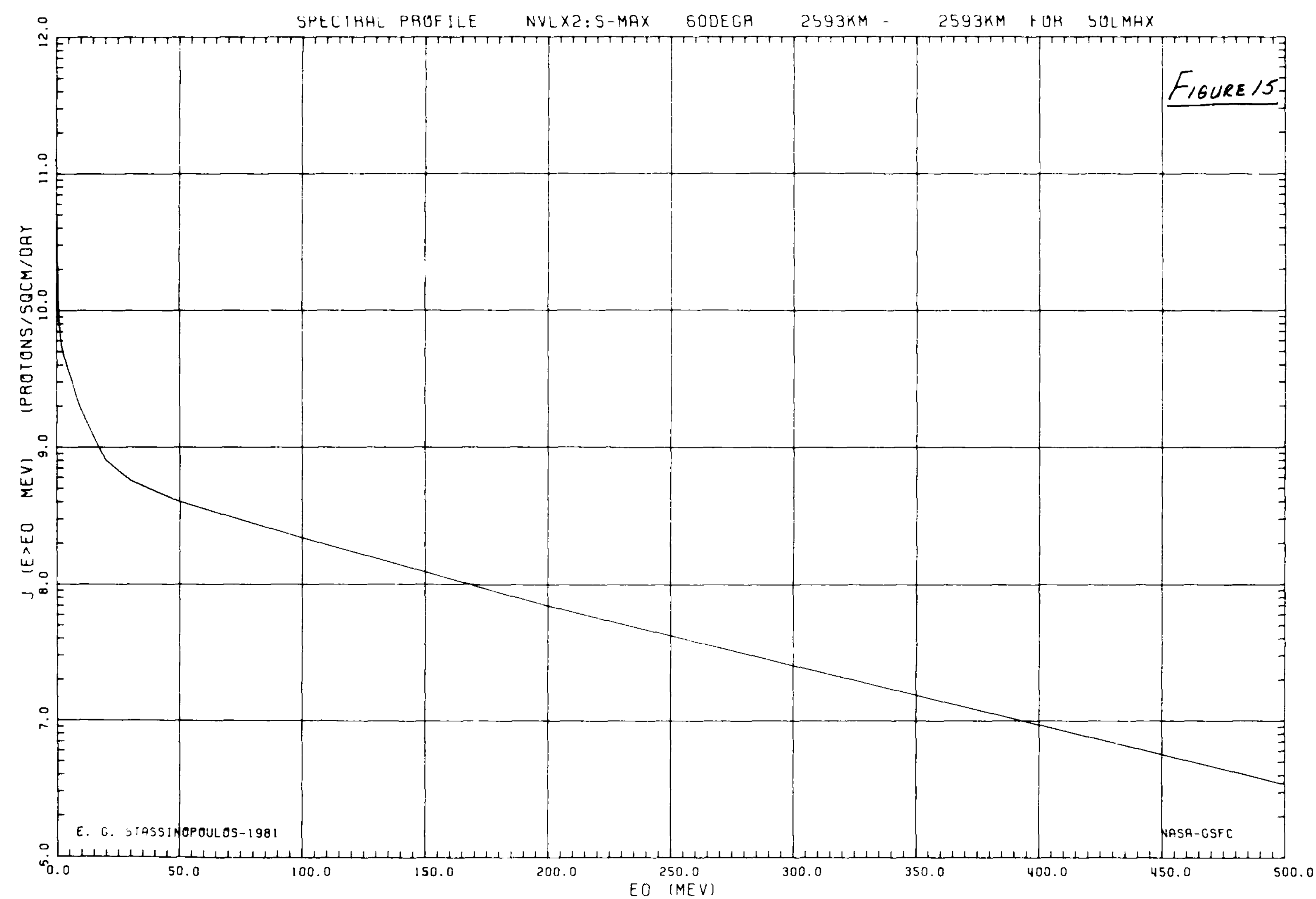
AMBIENT TRAJECTORY ENVIRONMENT NVLX6:S-MAX 600EGR 10371KM - 10371KM FOR SOLMAX
FIGURE 12
J (>.500MEV) (ELECTR/SQCM/SEC), MARKED GRAPH-% TIME, RANGE 1E-31D1E2
L (EARTH RADII)
E. G. STASSINOPOULOS-1981
NASA-GSFC
1.0
2.0
3.0
4.0
5.0
6.0
7.0

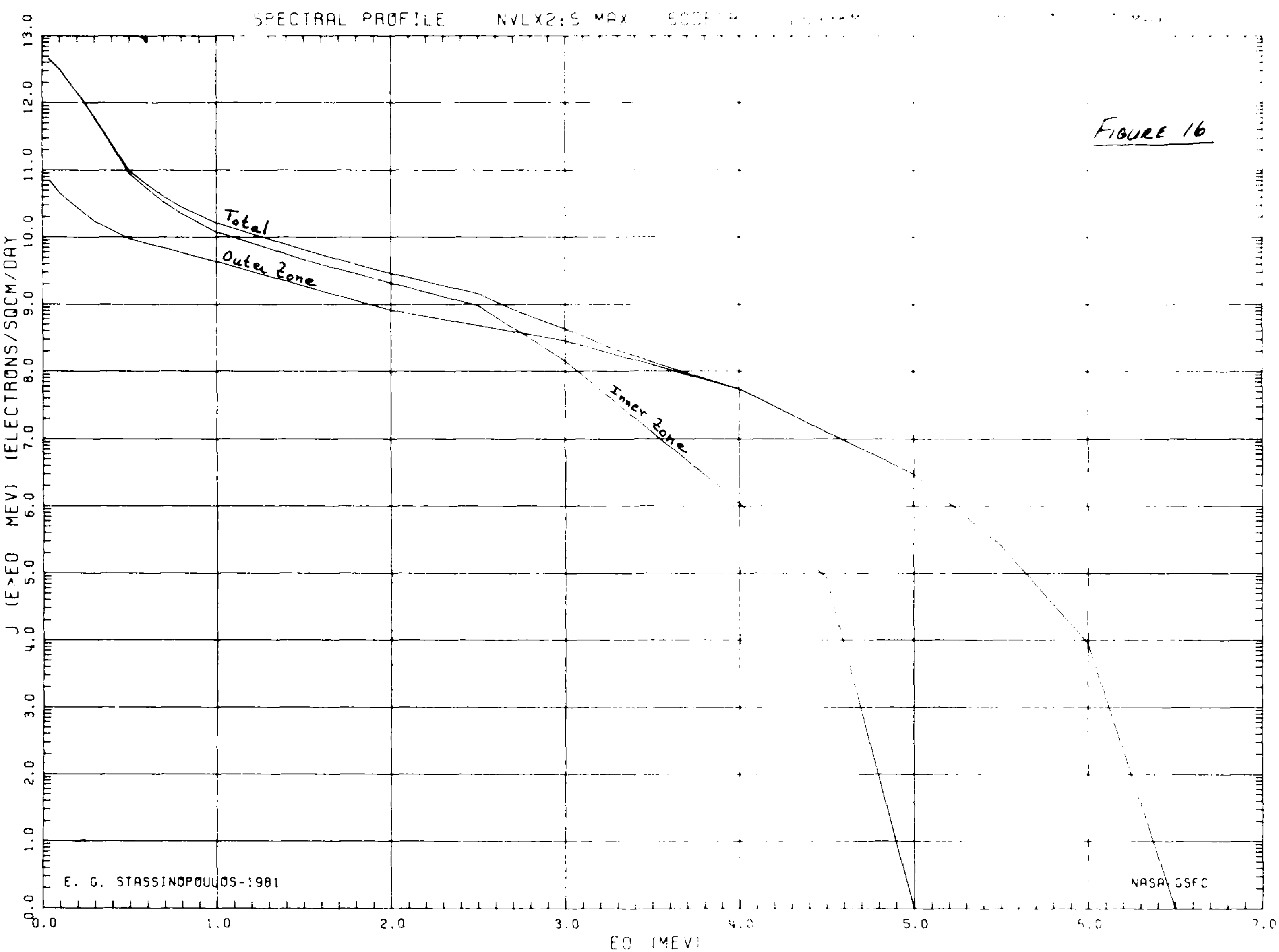


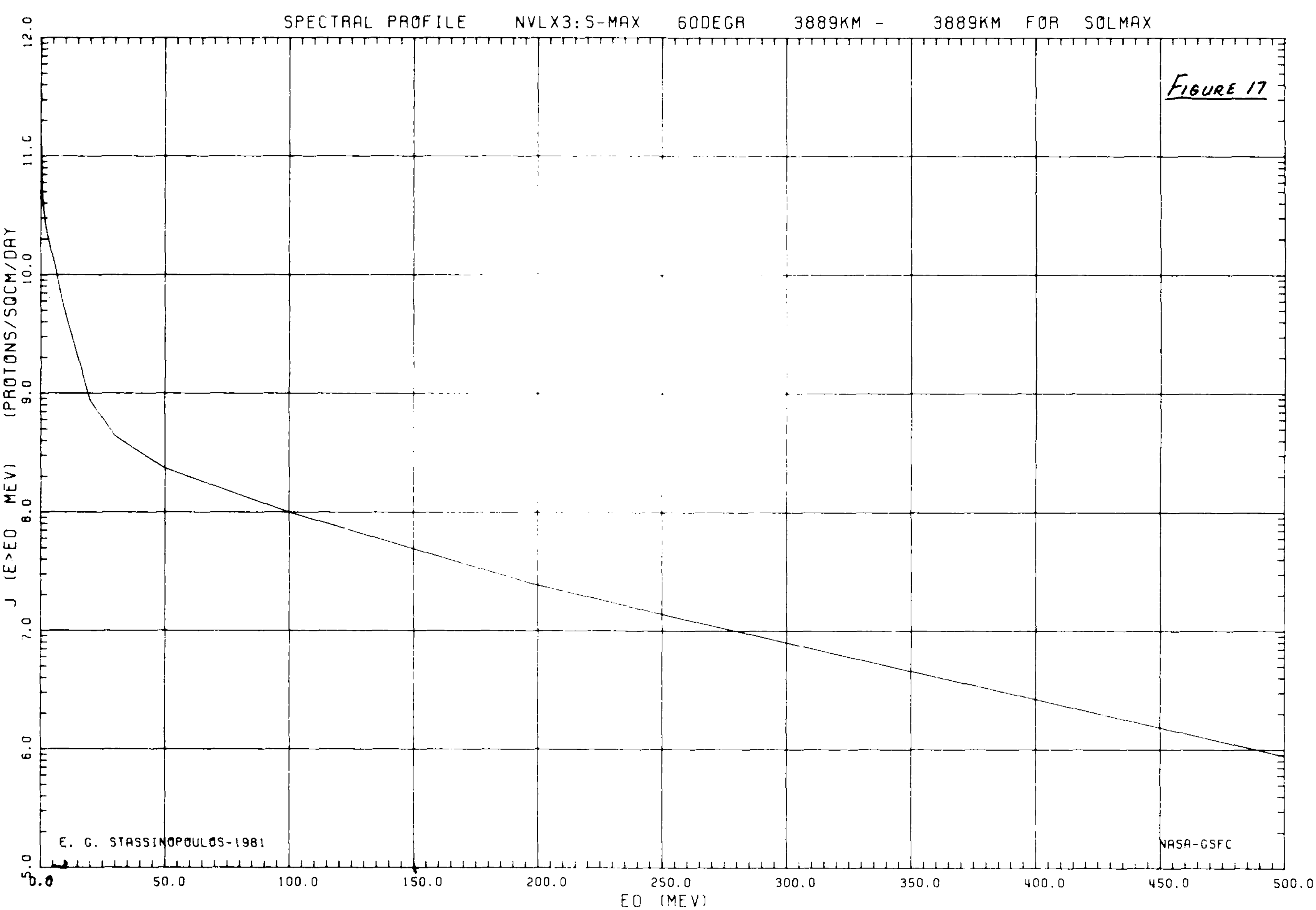
SPECTRAL PROFILE NVLX1:S-MAX 60DEGR 1667KM - 1667KM FOR SOLMAX
FIGURE 13
J (E>EO MEV) (PROTONS/SQCM/DAY
EO (MEV)
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
6.0
7.0
8.0
9.0
10.0
11.0
E. G. STASSINOPOULOS-1981
NASA-GSFC

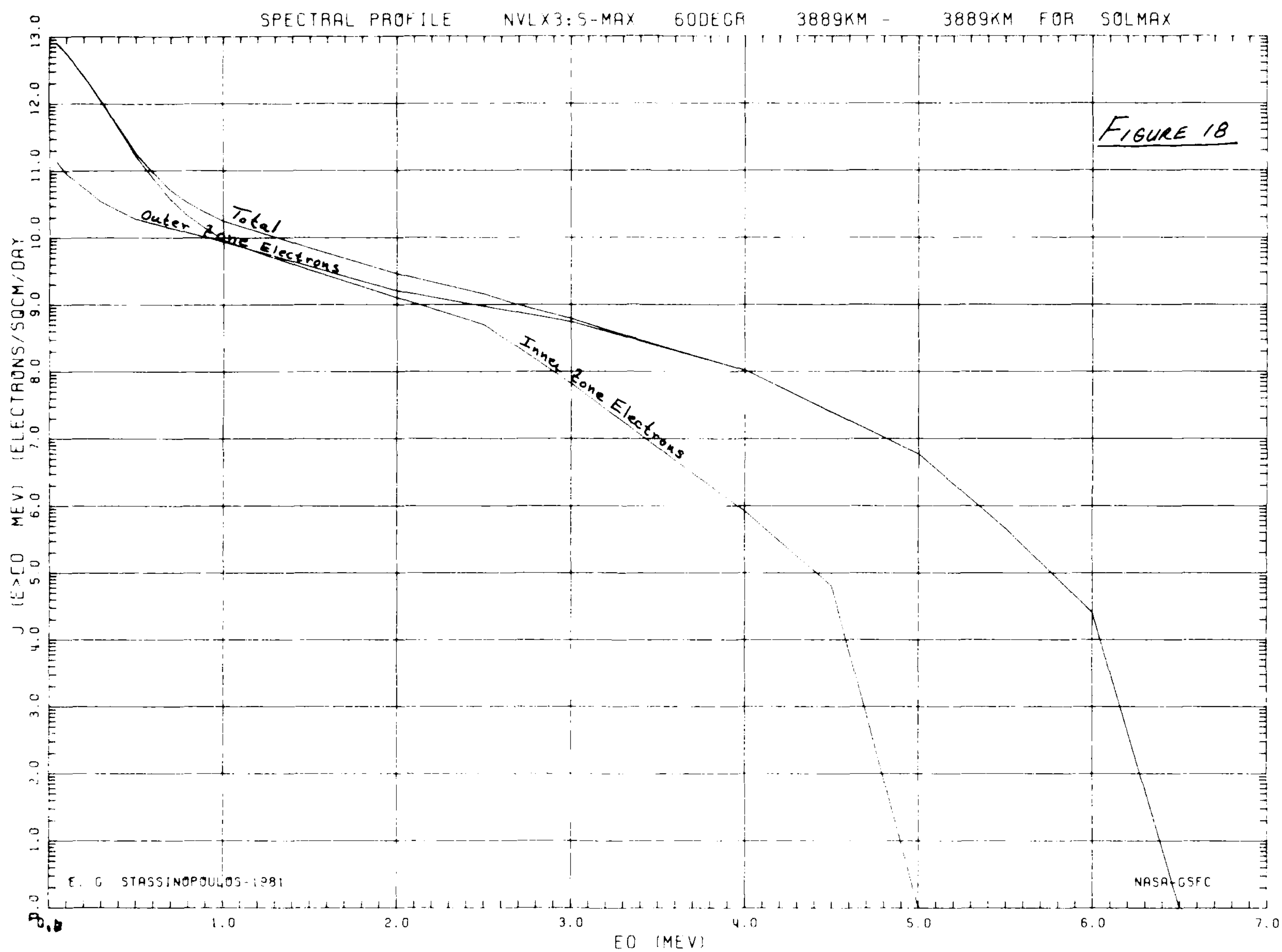


SPECTRAL PROFILE NVLX1:S-MAX 60DEGR 1667KM - 1667KM FOR SOLMAX
FIGURE 14
Total
Inner Zone
Outer Zone
Inner Zone
J (E>EO MEV) (ELECTRONS/SQCM/DAY
EO (MEV)
E. G. STASSINOPOULOS-1981
NASA-GSFC
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0


SPECTRAL PROFILE NVLX2:S-MAX 60DEGR 2593KM - 2593KM FOR SOLMAX
FIGURE 15
J (E>EO MEV) (PROTONS/SQCM/DAY
12.0
11.0
10.0
9.0
8.0
7.0
5.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
EO (MEV)
E. G. STASSINOPOULOS-1981
NASA-GSFC


SPECTRAL PROFILE NVLX2:S MAX
FIGURE 16
Total
Outer Zone
Inner Zone
J (E>EO MEV) (ELECTRONS/SQCM/DAY
EO (MEV)
E. G. STASSINOPOULOS-1981
NASA-GSFC


SPECTRAL PROFILE NVLX3:S-MAX 60DEGR 3889KM - 3889KM FOR SOLMAX
FIGURE 17
J (E>EO MEV) (PROTONS/SQCM/DAY
EO (MEV)
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
E. G. STASSINOPOULOS-1981
NASA-GSFC



SPECTRAL PROFILE NVLX3:S-MAX 60DEGR 3889KM - 3889KM FOR SOLMAX
FIGURE 18
Total
Outer Zone Electrons
Inner Zone Electrons
J (E>EO MEV) (ELECTRONS/SQCM/DAY)
EO (MEV)
E. G. STASSINOPOULOS-1981
NASA-GSFC

AD-A141 849 ORBITAL RADIATION STUDY FOR INCLINED CIRCULAR TRAJECTORIES(U) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION GREENBELT MD GO.. E G STASSINOPOULOS

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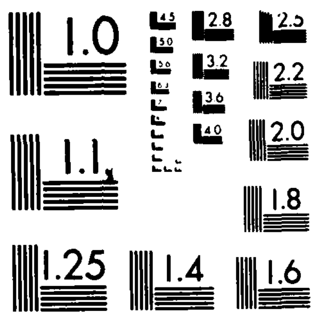
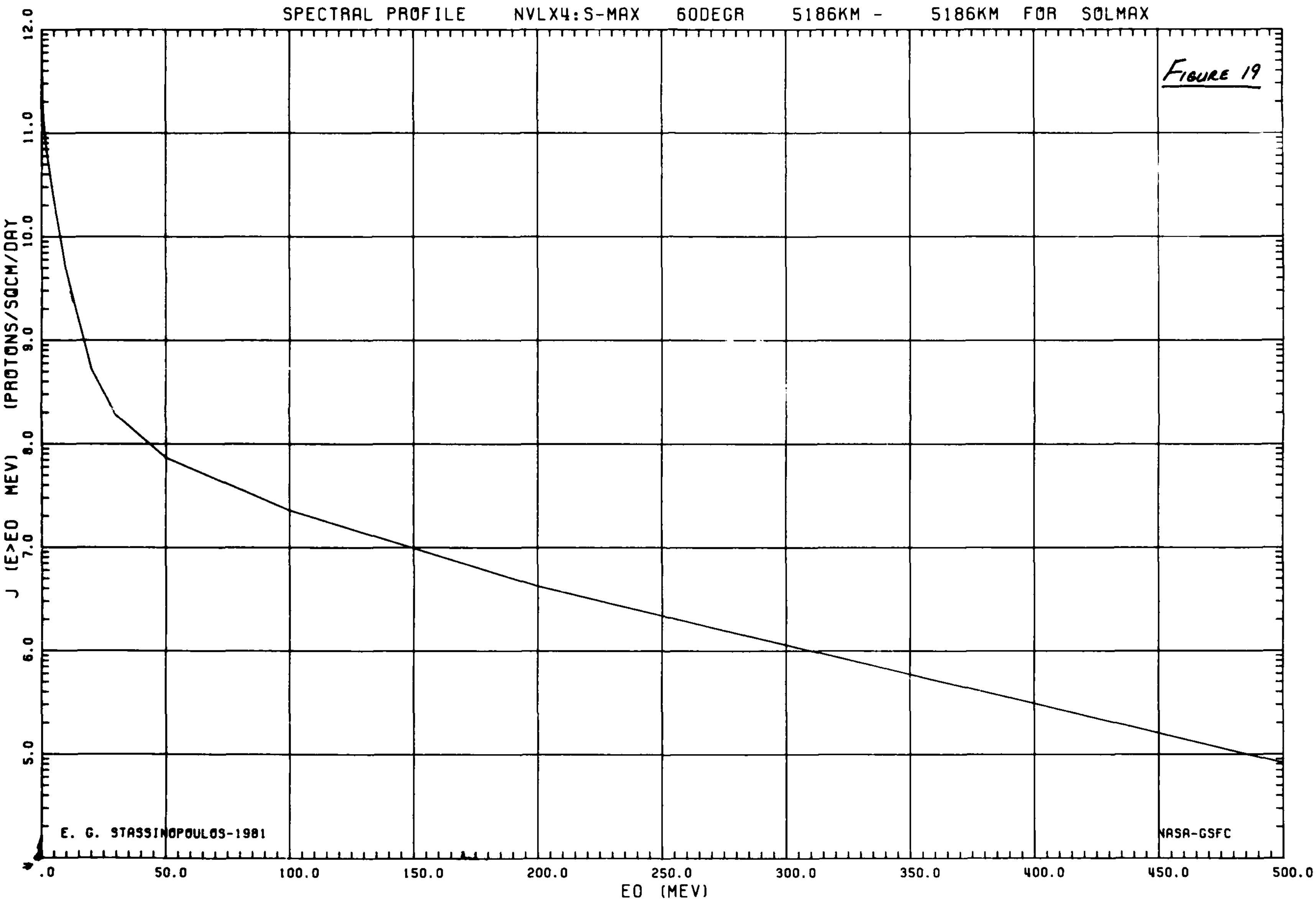
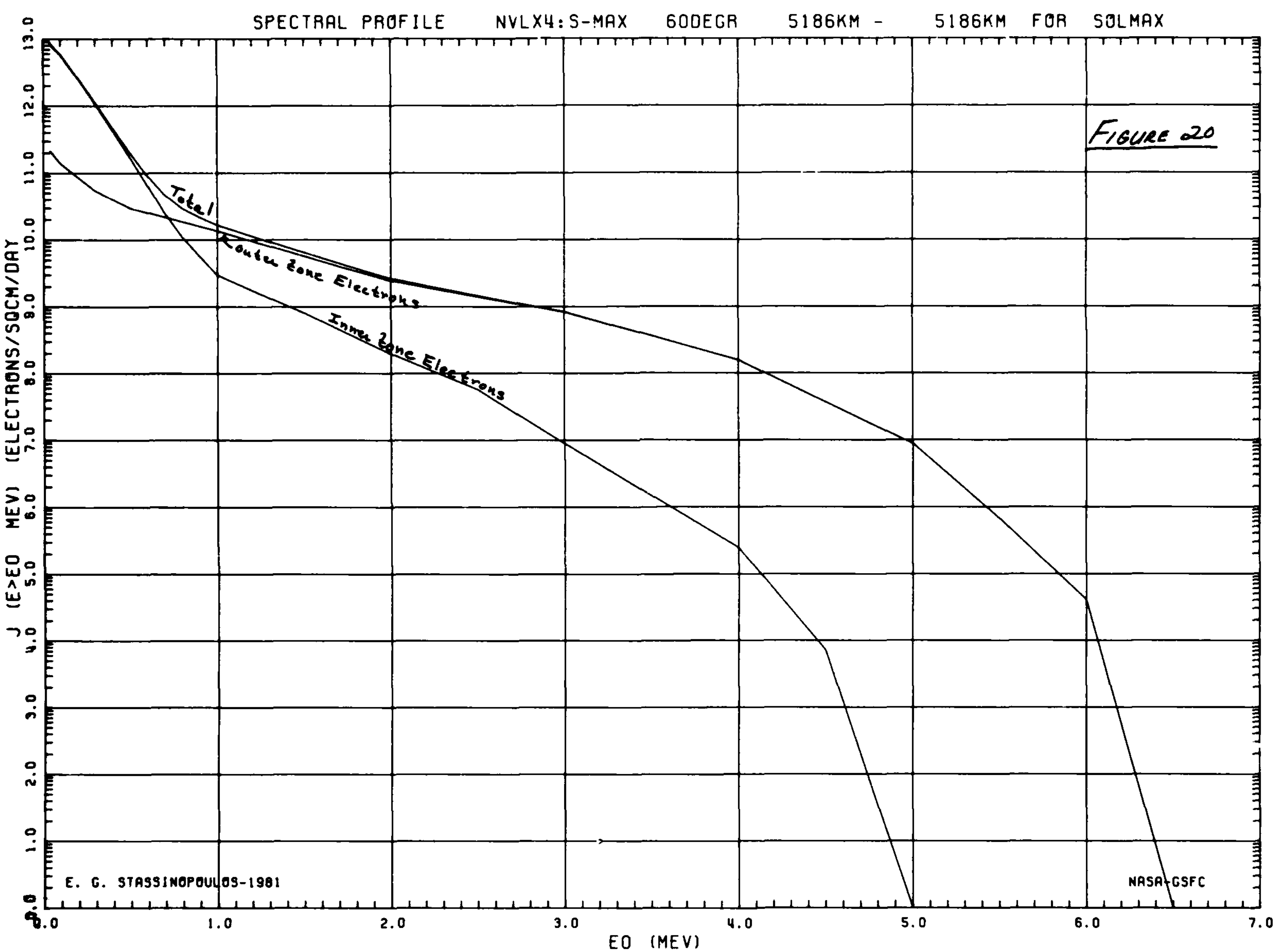
UNCLASSIFIED NOV 81 NASA-GSFC-X-601-81-28 F/G 22/3 NL



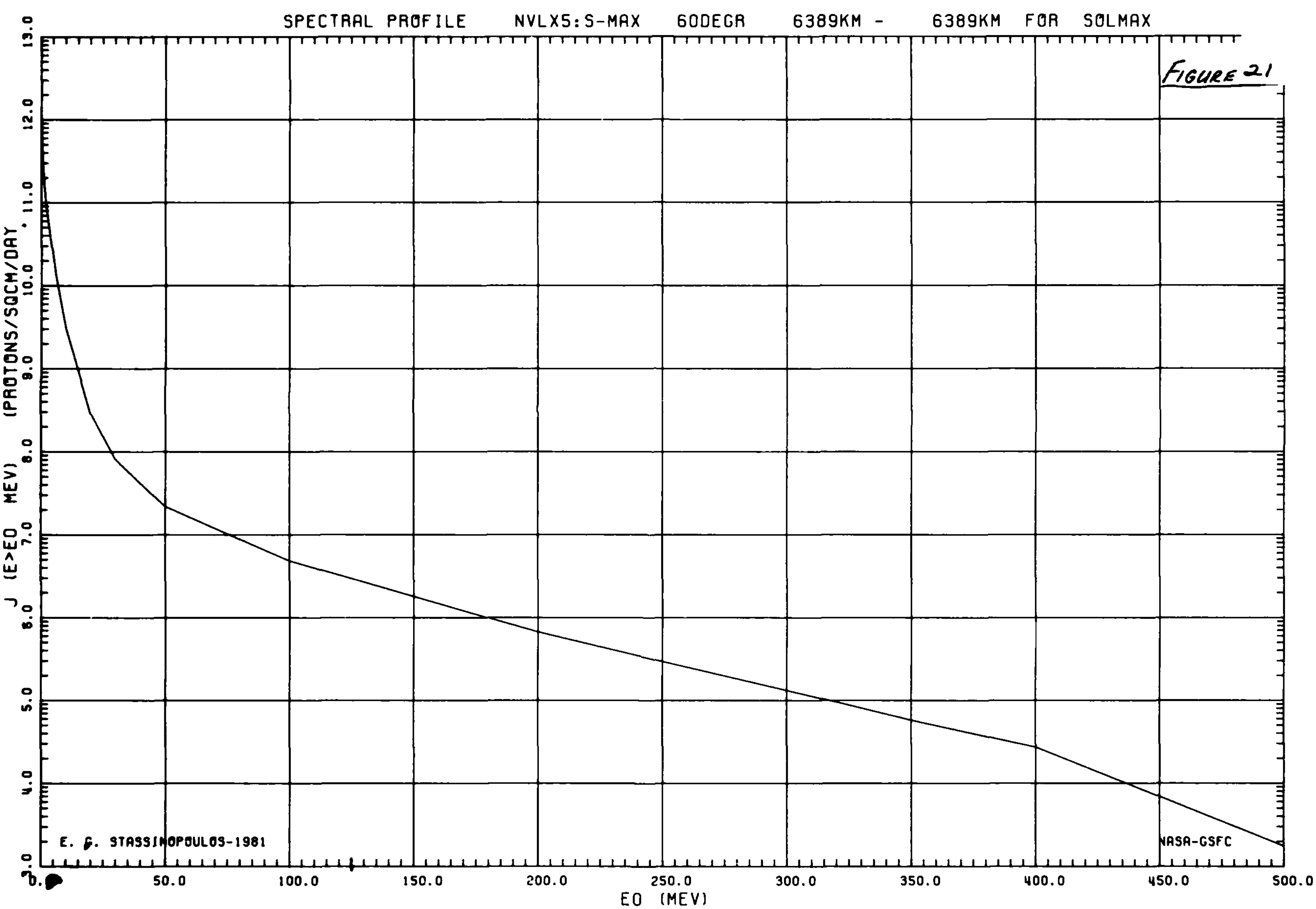
MICROCOPY RESOLUTION TEST CHART

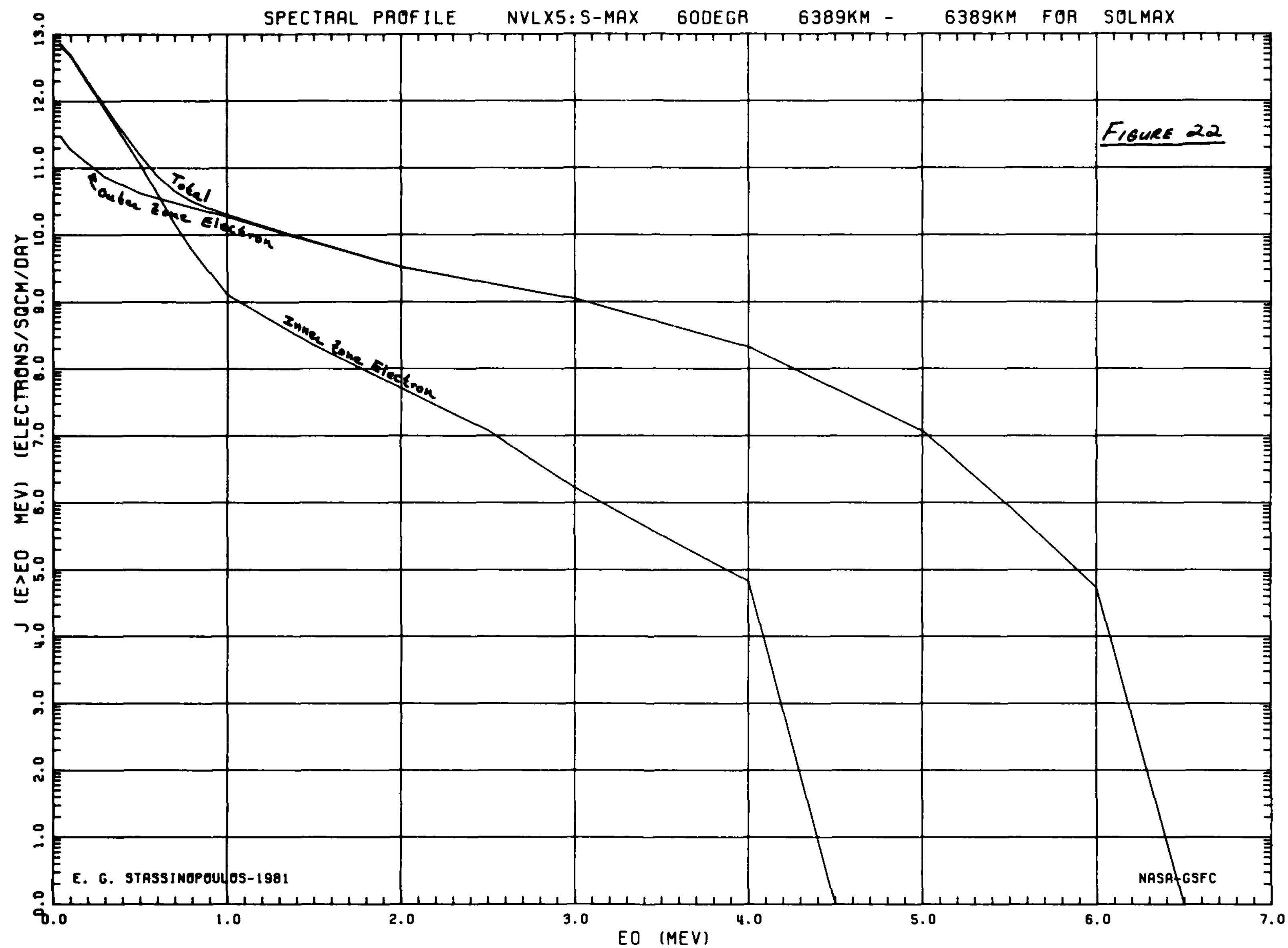
NATIONAL BUREAU OF STANDARDS 1963 A

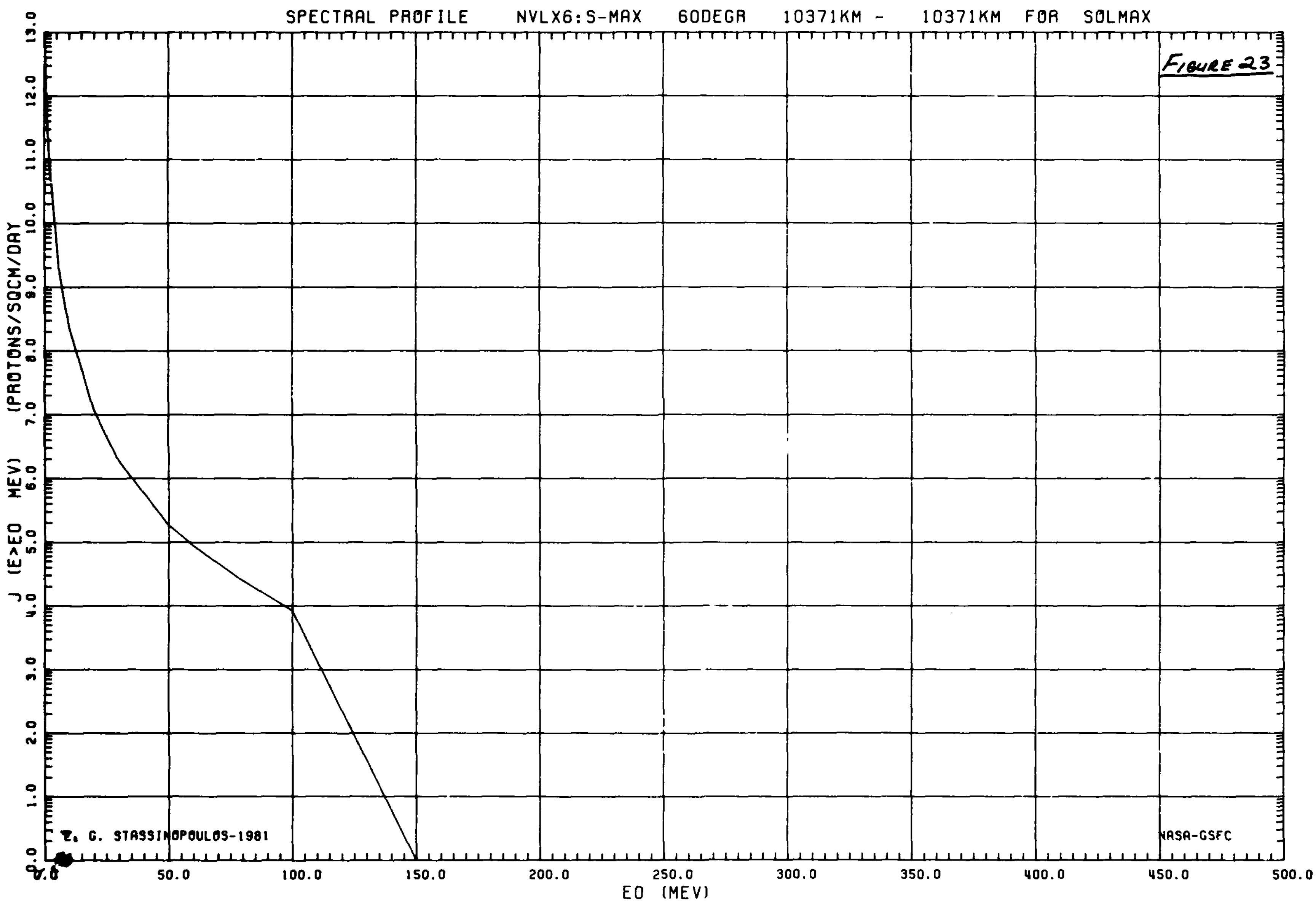

SPECTRAL PROFILE NVLX4:S-MAX 60DEGR 5186KM - 5186KM FOR SOLMAX
Figure 19
J (E>EO MEV) (PROTONS/SQCM/DAY
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
EO (MEV)
E. G. STASSINOPOULOS-1981
NASA-GSFC



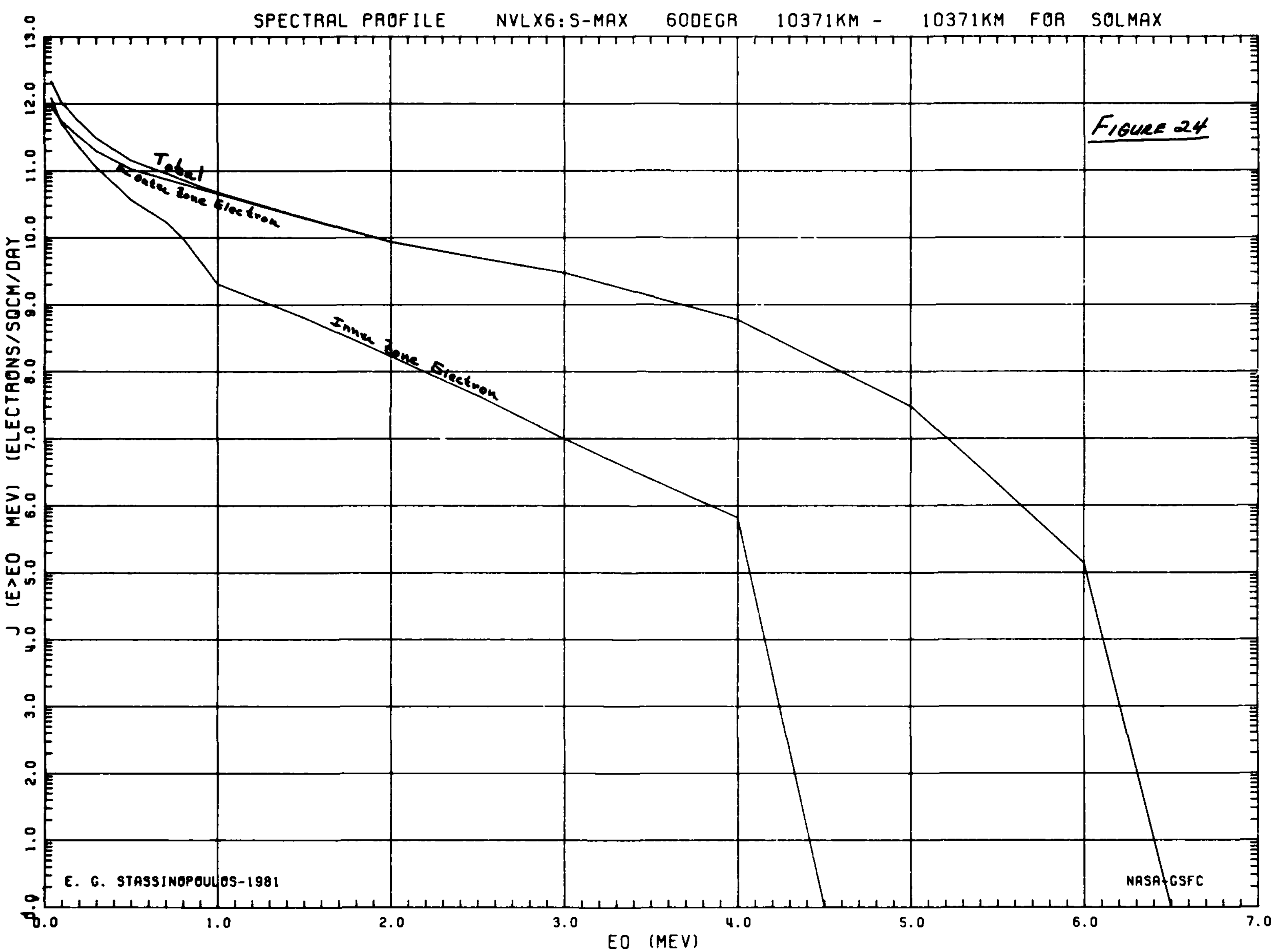
SPECTRAL PROFILE NVLX4:S-MAX 60DEGR 5186KM - 5186KM FOR SOLMAX
Figure 20
Total
Outer Zone Electrons
Inner Zone Electrons
J (E>EO MEV) (ELECTRONS/SQCM/DAY
EO (MEV)
E. G. STASSINOPOULOS-1981
NASA-GSFC


SPECTRAL PROFILE NVLX5:S-MAX 60DEGR 6389KM - 6389KM FOR SOLMAX
FIGURE 21
J (E>EO MEV) (PROTONS/SQCM/DAY)
EO (MEV)
E. G. STASSINOPOULOS-1981
NASA-GSFC
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
0.
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0

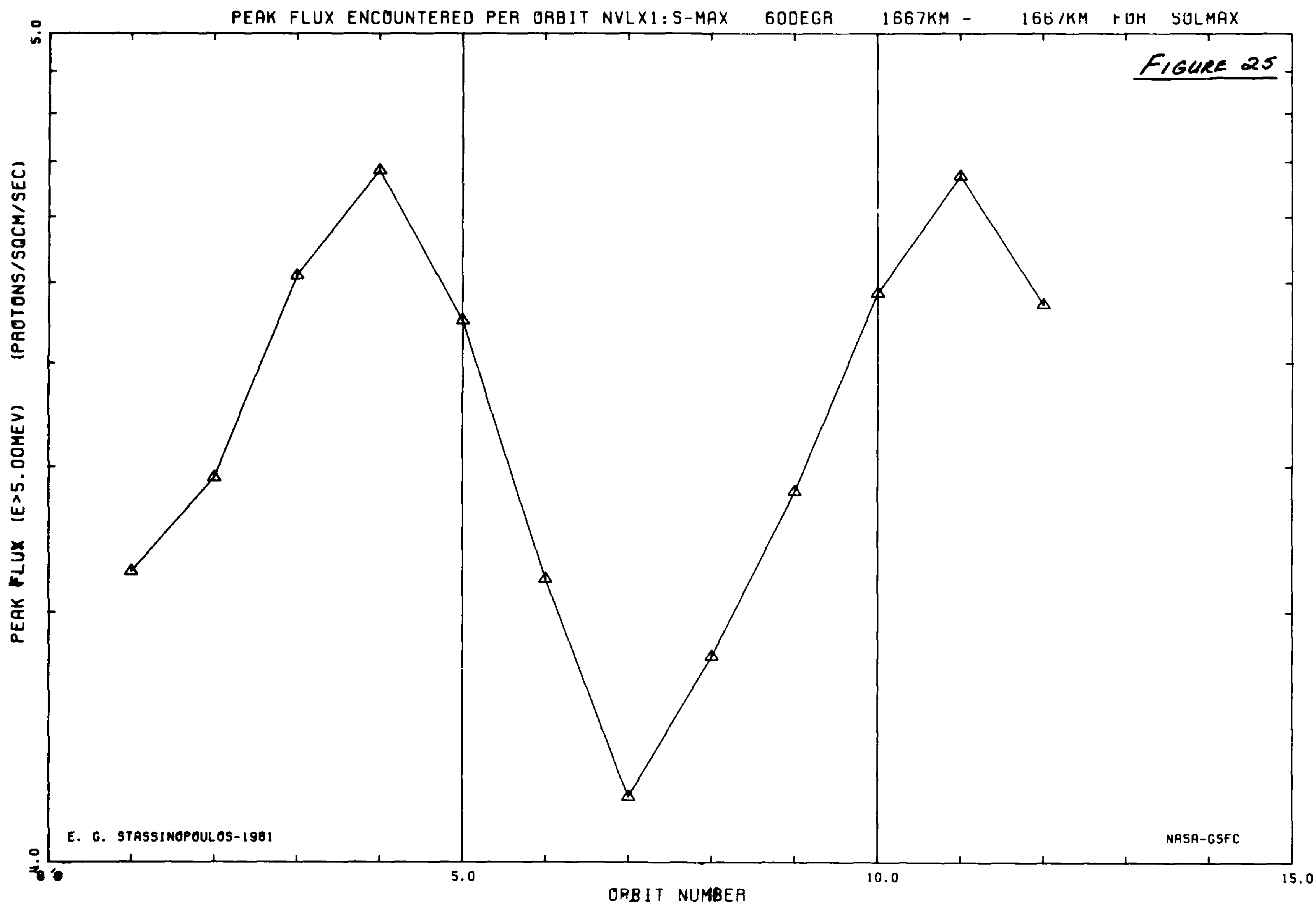

SPECTRAL PROFILE NVLX5:S-MAX 60DEGR 6389KM - 6389KM FOR SOLMAX
FIGURE 22
J (E>EO MEV) (ELECTRONS/SQCM/DAY)
EO (MEV)
Total
Outer Zone Electron
Inner Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0

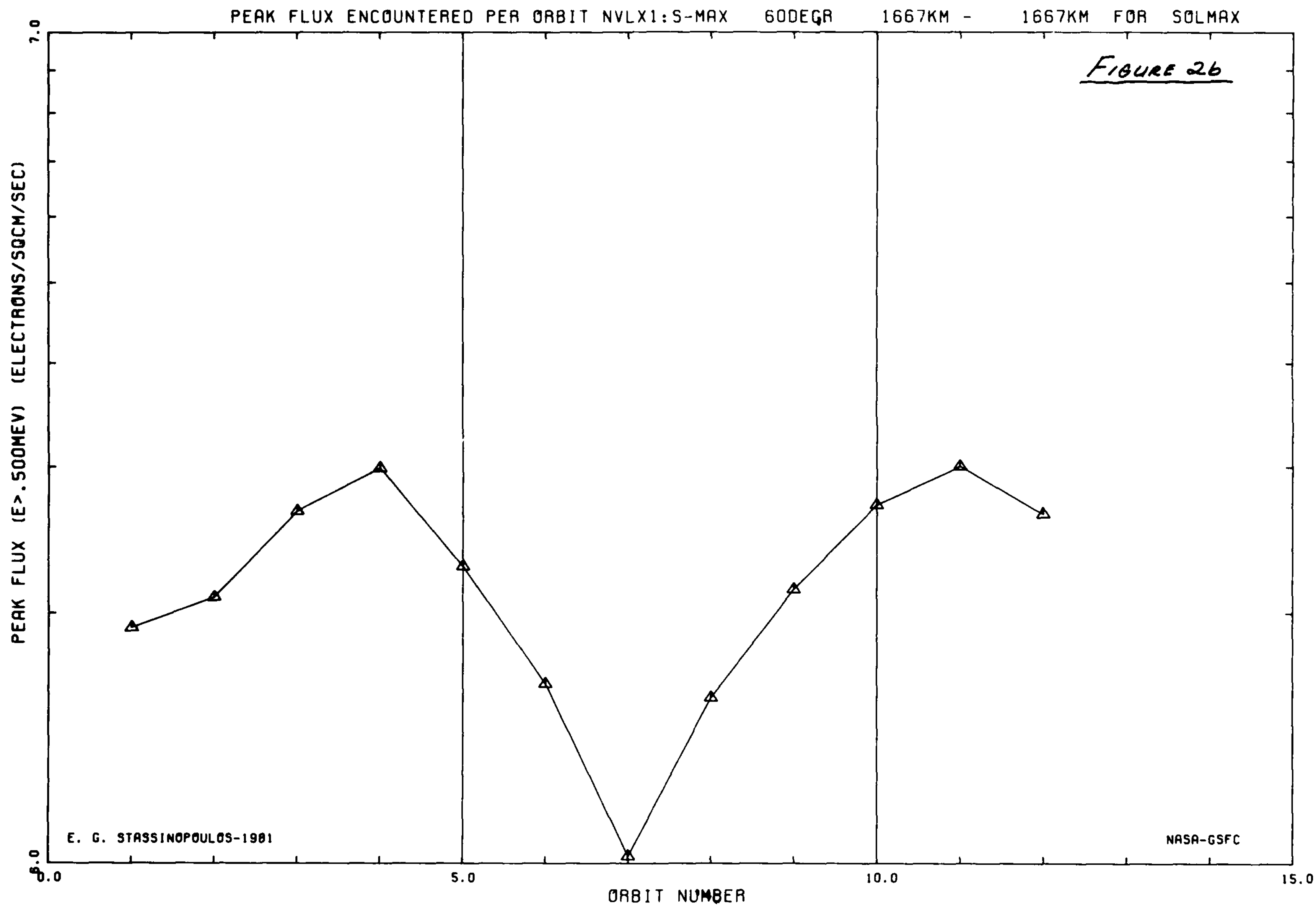


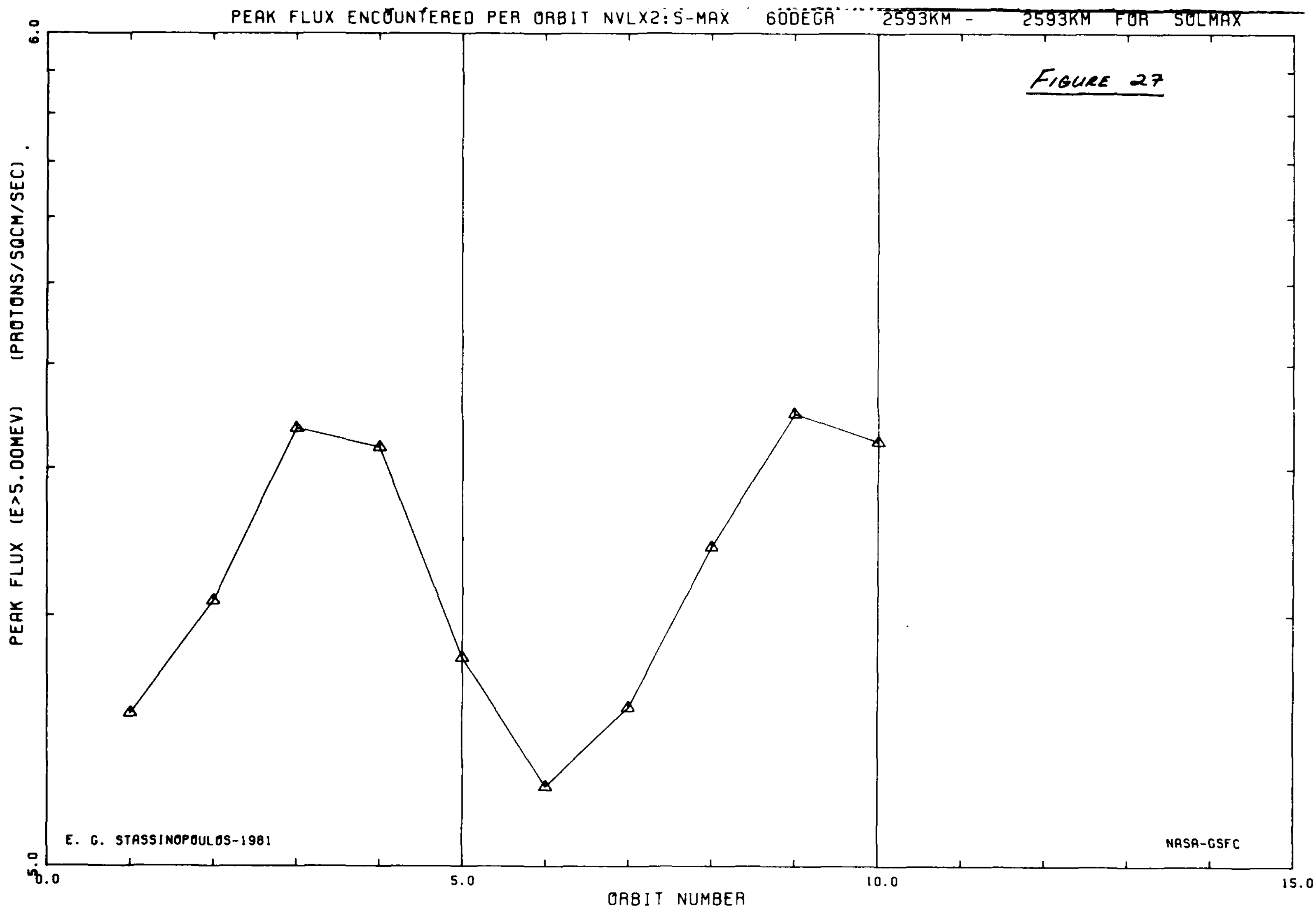
SPECTRAL PROFILE NVLX6:S-MAX 60DEGR 10371KM - 10371KM FOR SOLMAX
FIGURE 23
J (E>EO MEV) (PROTONS/SQCM/DAY)
EO (MEV)
E. G. STASSINOPOULOS-1981
NASA-GSFC
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0



SPECTRAL PROFILE NVLX6:S-MAX 60DEGR 10371KM - 10371KM FOR SOLMAX
Figure 24
Total
Outer Zone Electron
Inner Zone Electron
J (E>EO MEV) (ELECTRONS/SQCM/DAY)
EO (MEV)
E. G. STASSINOPOULOS-1981
NASA-GSFC


PEAK FLUX ENCOUNTERED PER ORBIT NVLX1:S-MAX 60DEGR 1667KM - 1667KM FOR SOLMAX
FIGURE 25
PEAK FLUX (E>5.00MEV) (PROTONS/SQCM/SEC)
5.0
0.0
5.0
10.0
15.0
ORBIT NUMBER
E. G. STASSINOPOULOS-1981
NASA-GSFC


PEAK FLUX ENCOUNTERED PER ORBIT NVLX1:S-MAX 60DEGR 1667KM - 1667KM FOR SOLMAX
FIGURE 26
PEAK FLUX (E>.500MEV) (ELECTRONS/SQCM/SEC)
7.0
6.0
0.0
5.0
10.0
15.0
ORBIT NUMBER
E. G. STASSINOPOULOS-1981
NASA-GSFC


PEAK FLUX ENCOUNTERED PER ORBIT NVLX2:S-MAX 60DEGR 2593KM - 2593KM FOR SOLMAX
FIGURE 27
PEAK FLUX (E>5.00MEV) (PROTONS/SQCM/SEC)
6.0
5.0
0.0
5.0
10.0
15.0
ORBIT NUMBER
E. G. STASSINOPOULOS-1981
NASA-GSFC

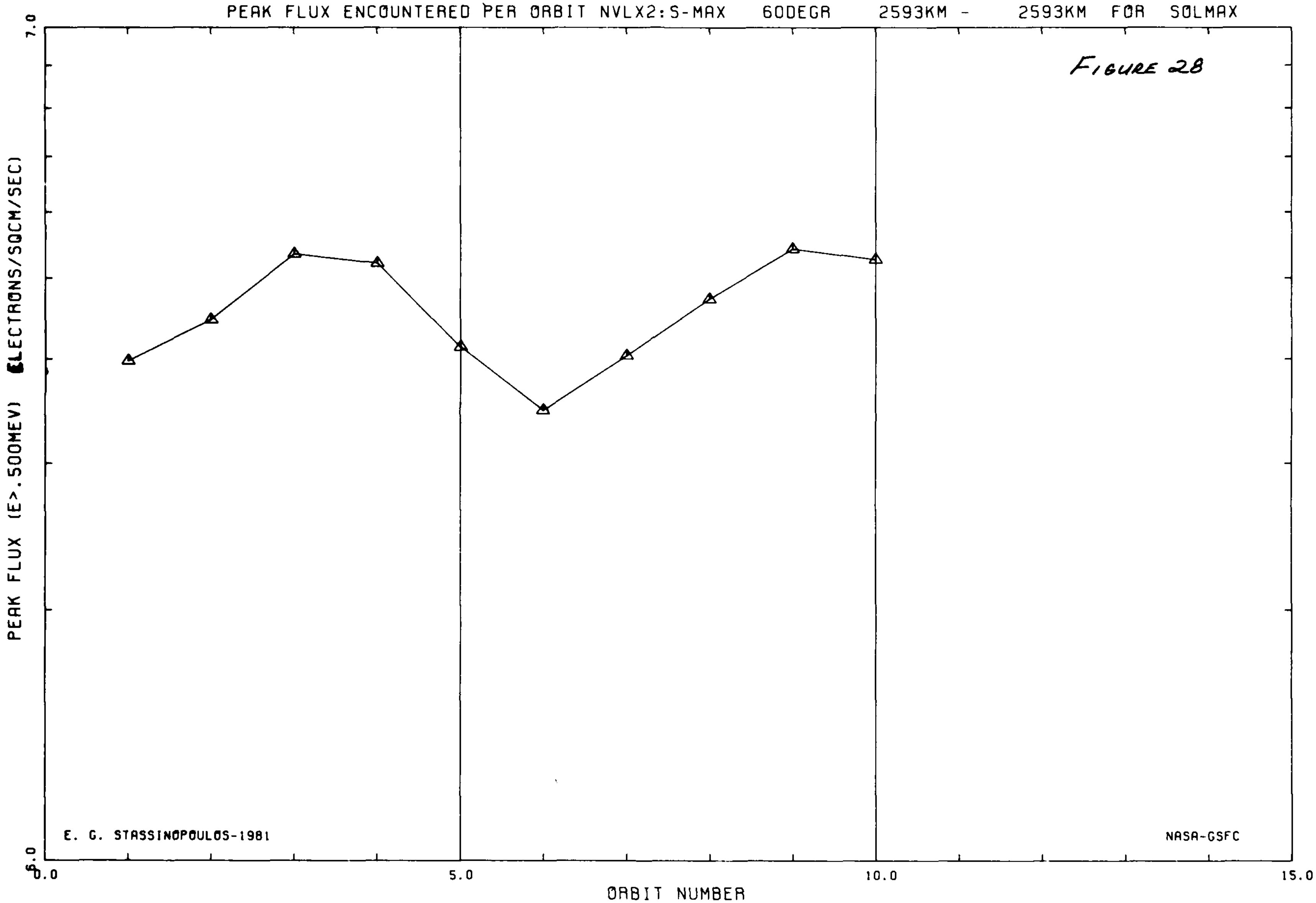
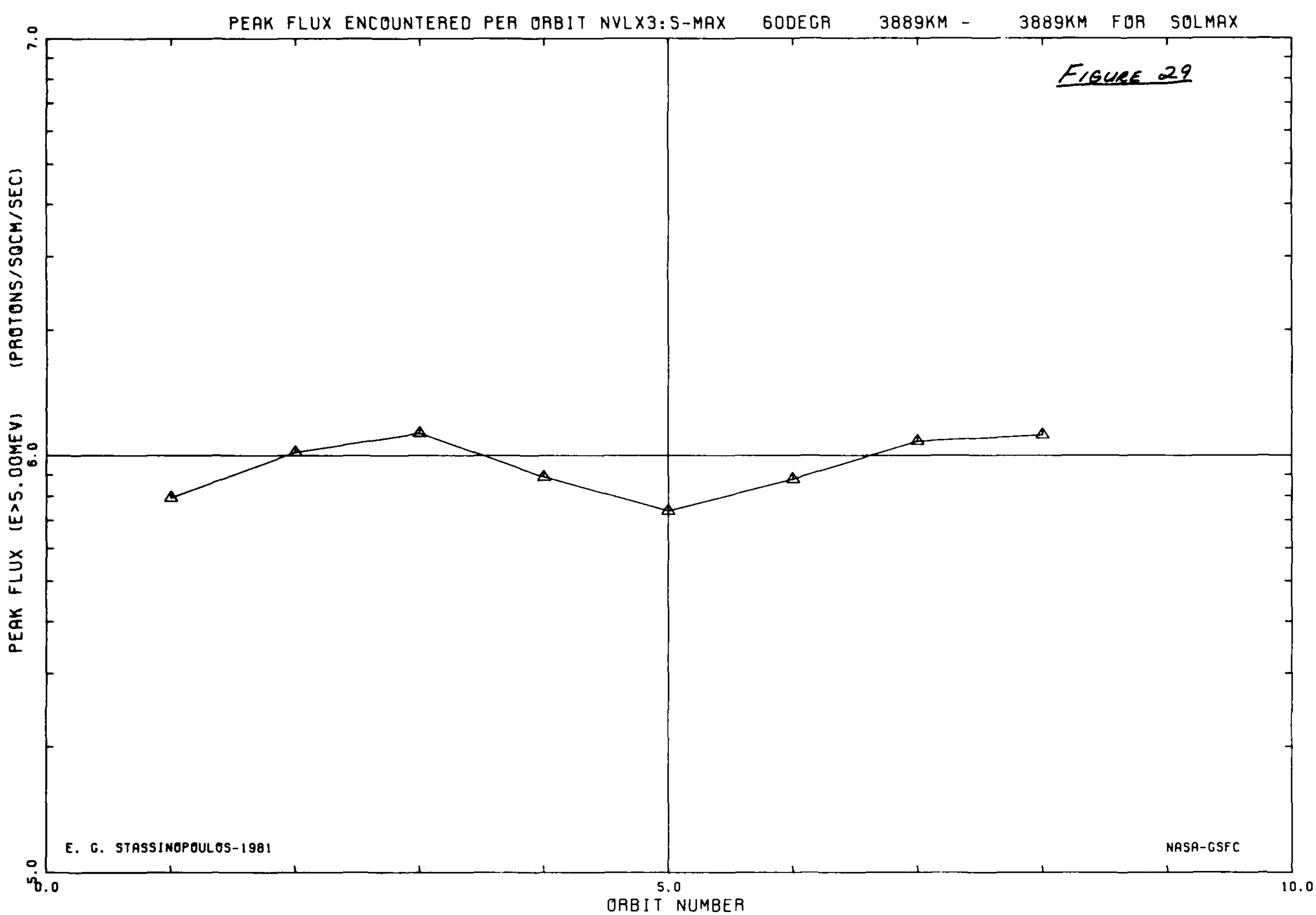
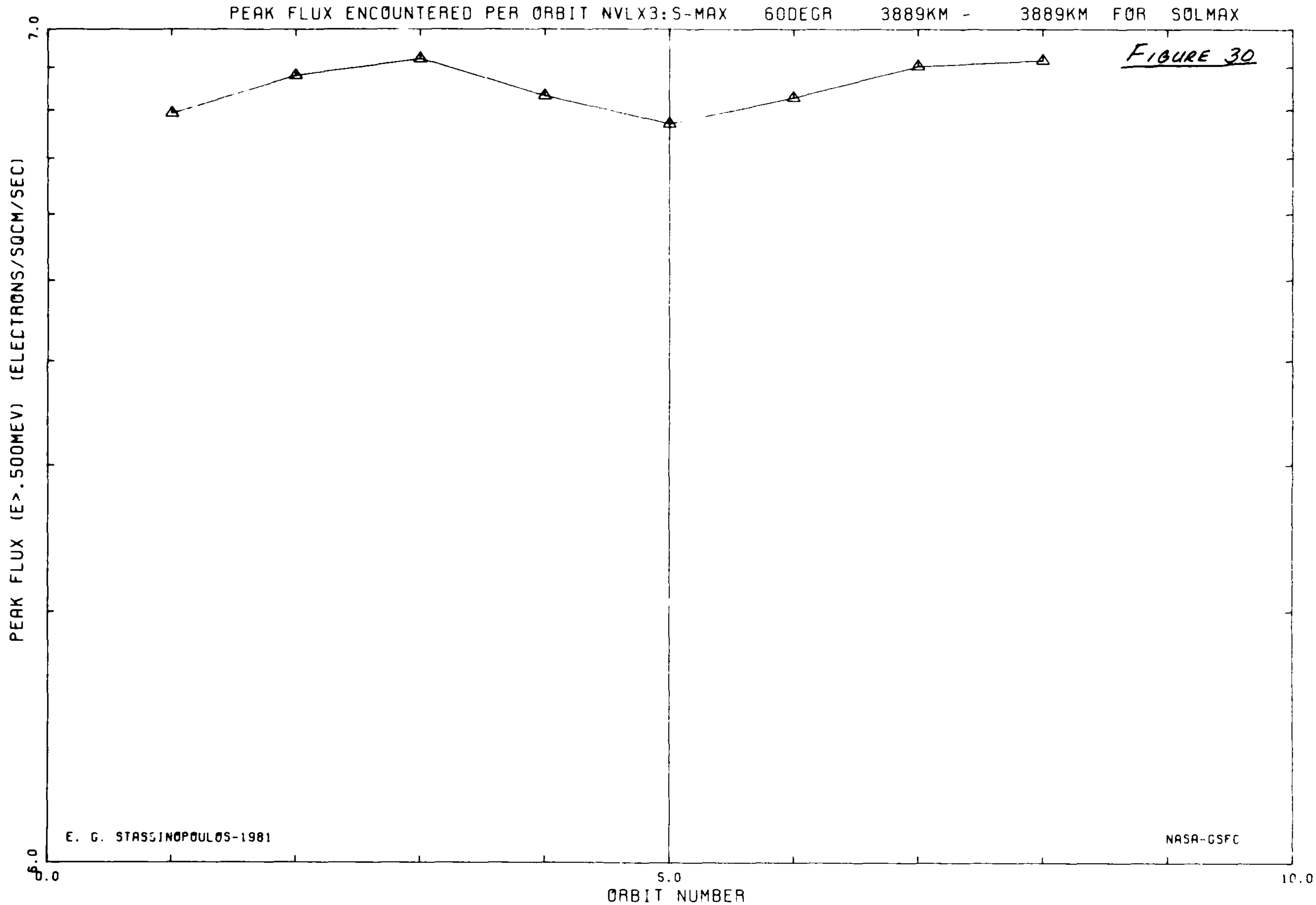

PEAK FLUX ENCOUNTERED PER ORBIT NVLX2:S-MAX 60DEGR 2593KM - 2593KM FOR SOLMAX
PEAK FLUX (E>.500MEV) ELECTRONS/SQCM/SEC)
7.0
6.0
0.0
5.0
10.0
15.0
ORBIT NUMBER
E. G. STASSINOPOULOS-1981
NASA-GSFC

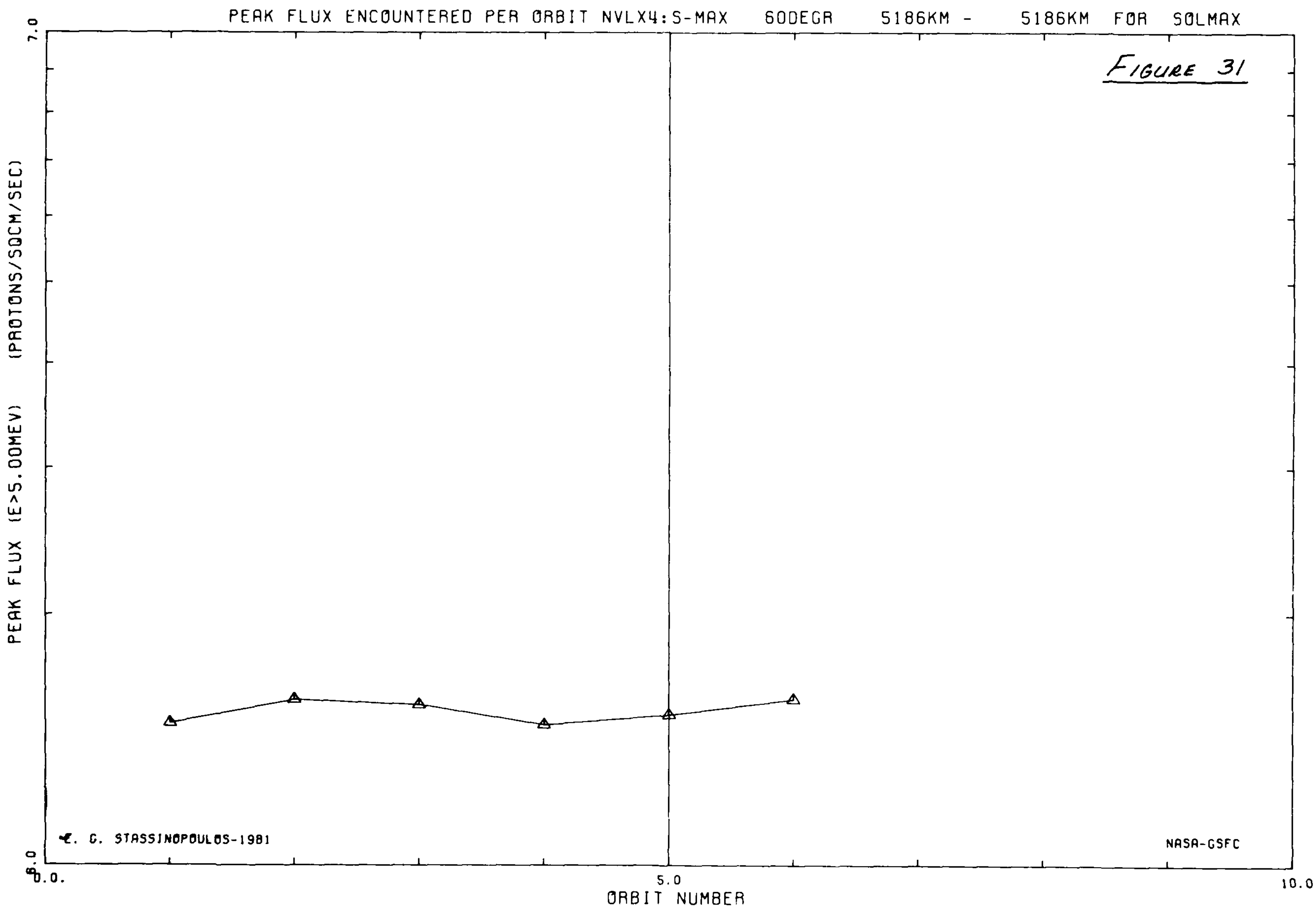
FIGURE 28


PEAK FLUX ENCOUNTERED PER ORBIT NVLX3:S-MAX 60DEGR 3889KM - 3889KM FOR SOLMAX
FIGURE 29
PEAK FLUX (E>5.00MEV) (PROTONS/SQCM/SEC)
7.0
6.0
5.0
0.0
5.0
10.0
ORBIT NUMBER
E. G. STASSINOPOULOS-1981
NASA-GSFC

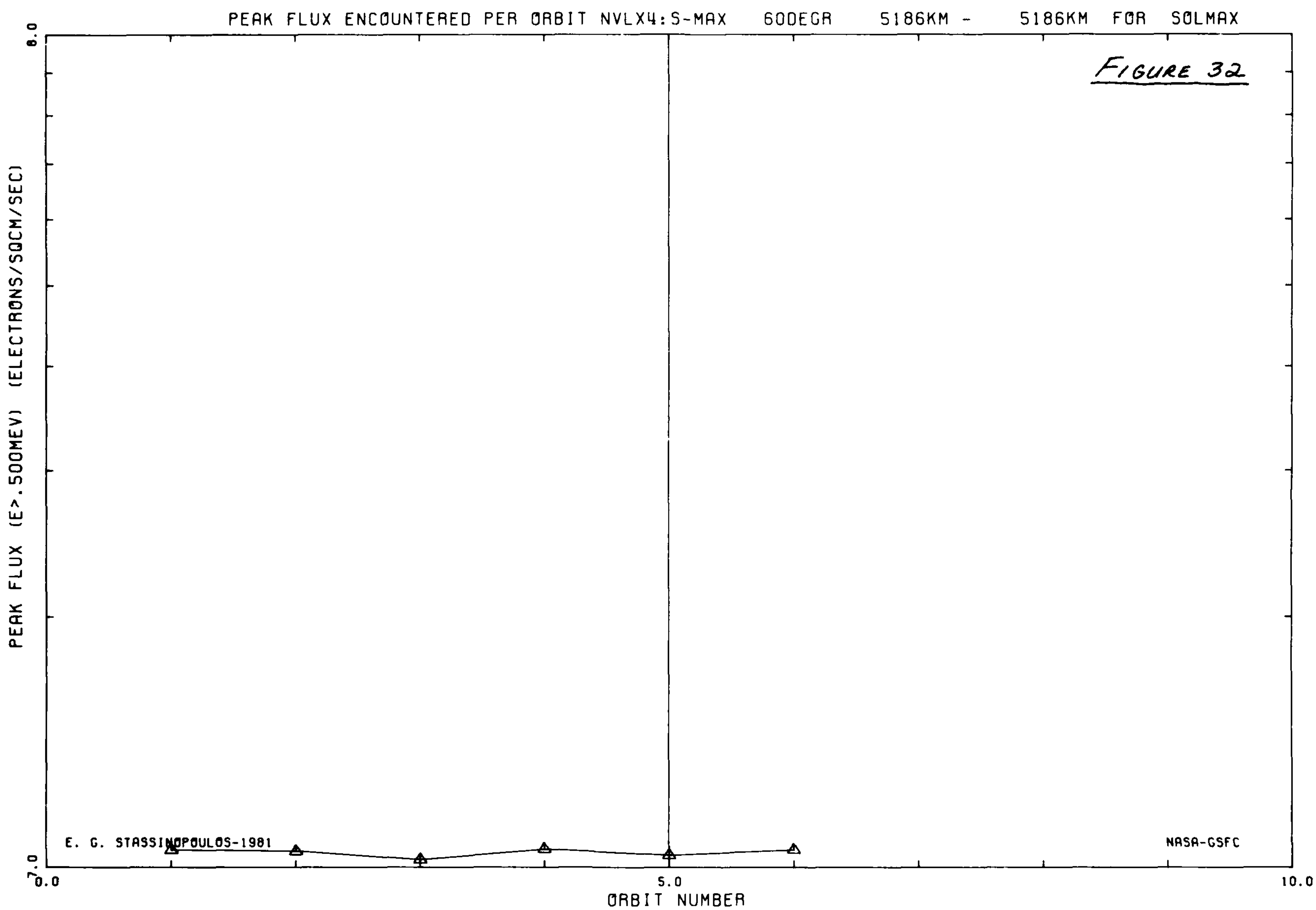


PEAK FLUX ENCOUNTERED PER ORBIT NVLX3:S-MAX 60DEGR 3889KM - 3889KM FOR SOLMAX
7.0
6.0
0.0
5.0
10.0
ORBIT NUMBER
PEAK FLUX (E>.500MEV) (ELECTRONS/SQCM/SEC)
E. G. STASSINOPOULOS-1981
NASA-GSFC

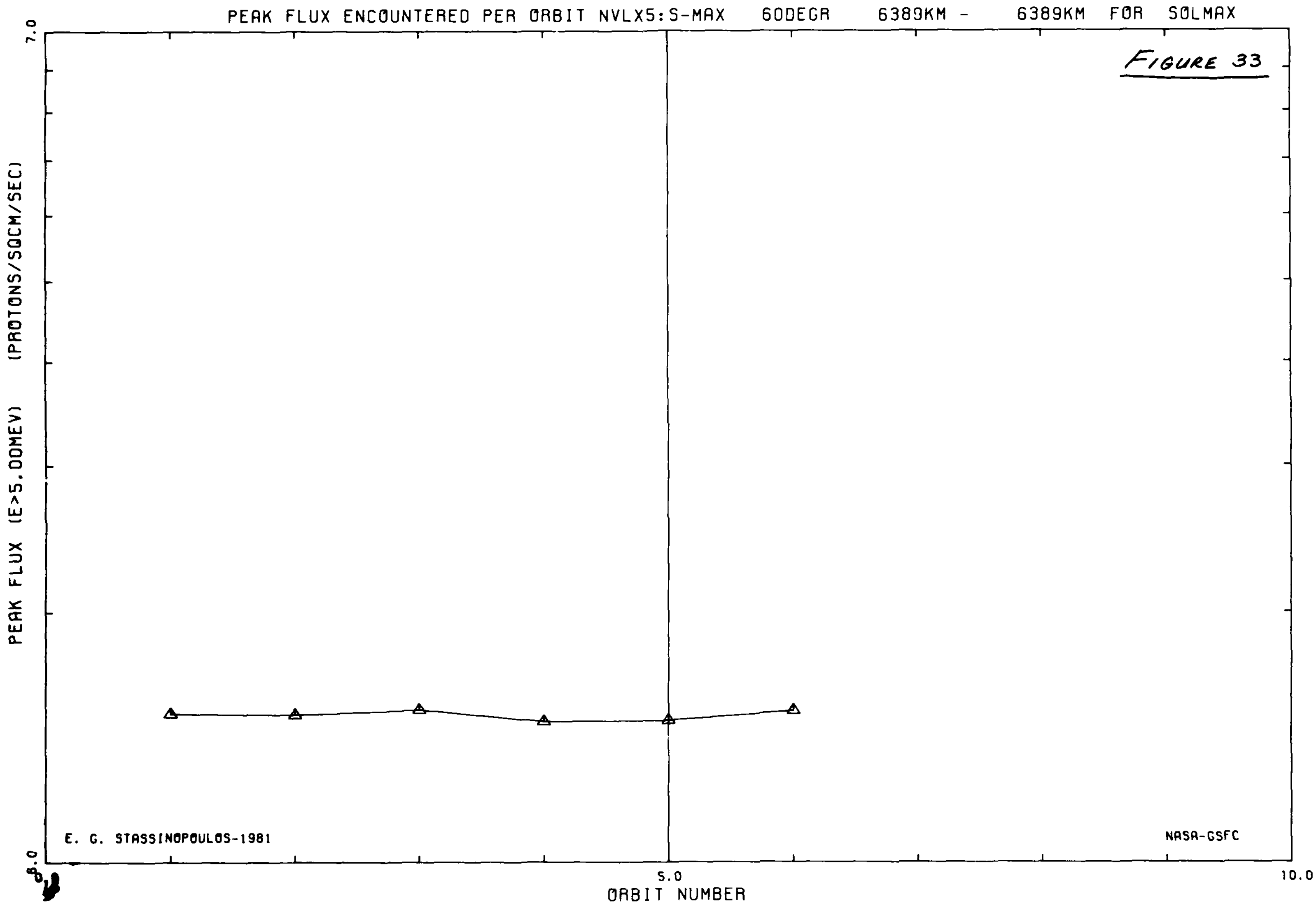
FIGURE 30

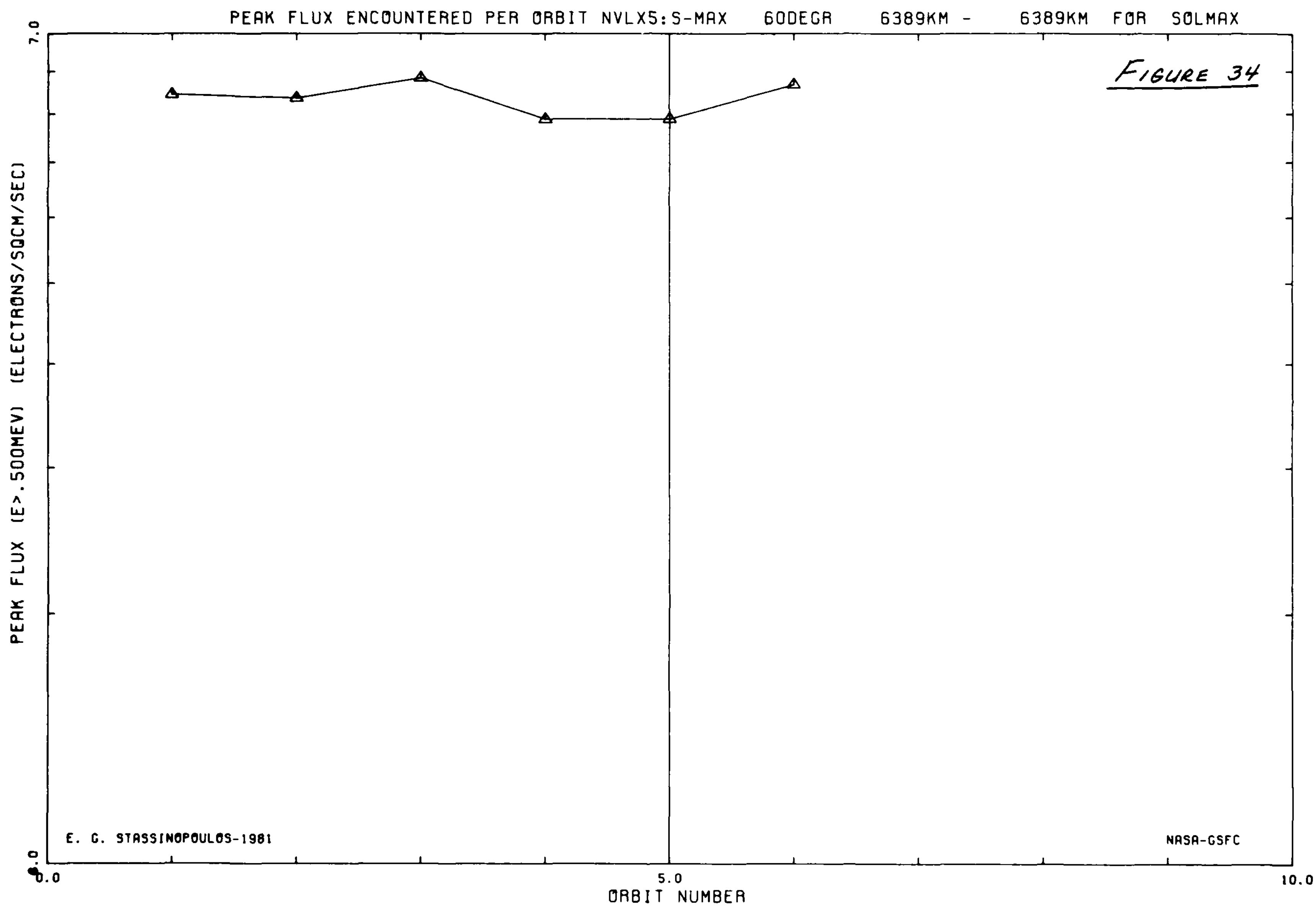


PEAK FLUX ENCOUNTERED PER ORBIT NVLX4:S-MAX 60DEGR 5186KM - 5186KM FOR SOLMAX
FIGURE 31
PEAK FLUX (E>5.00MEV) (PROTONS/SQCM/SEC)
7.0
8.0
0.0
5.0
10.0
ORBIT NUMBER
C. G. STASSINOPOULOS-1981
NASA-GSFC

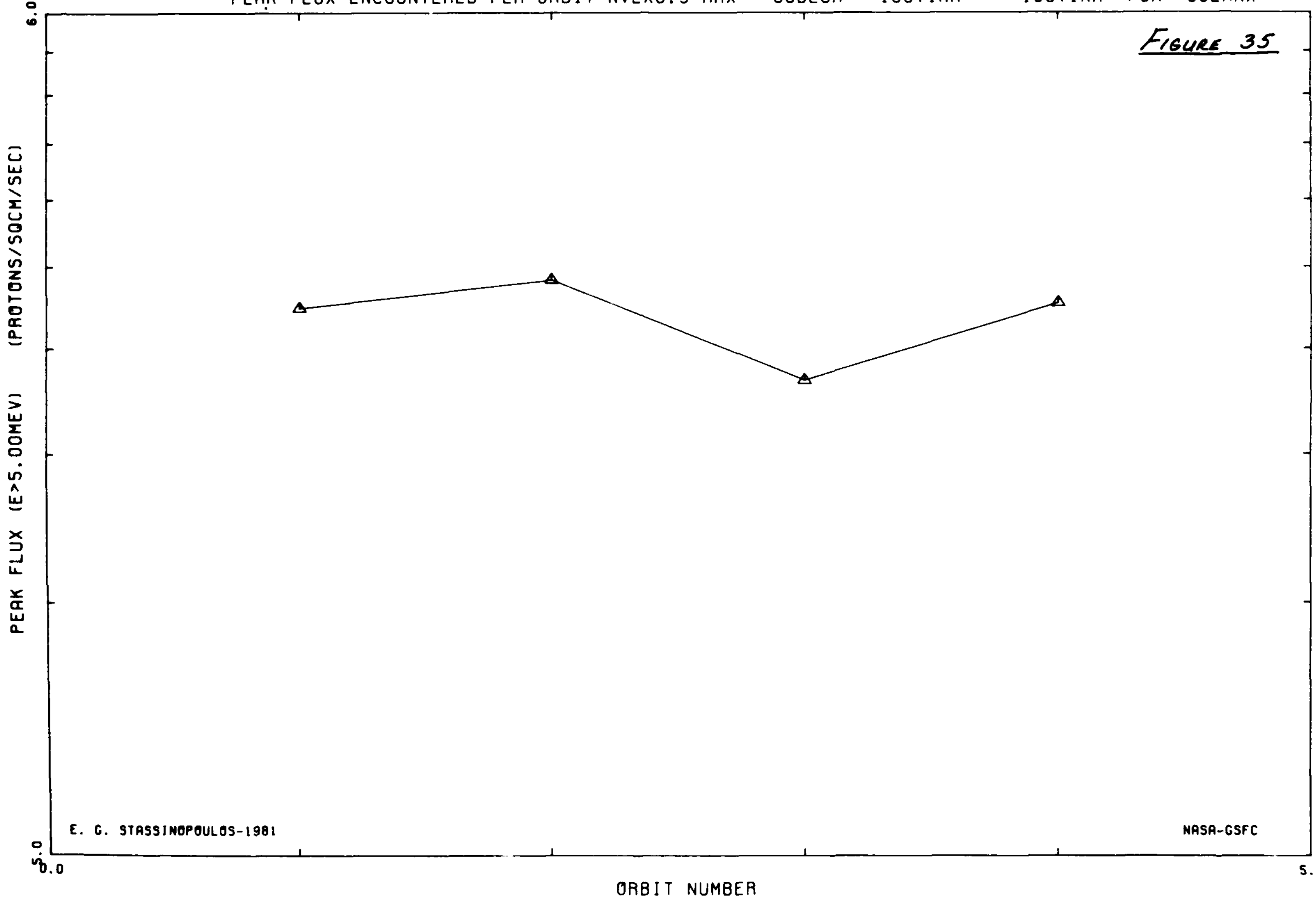


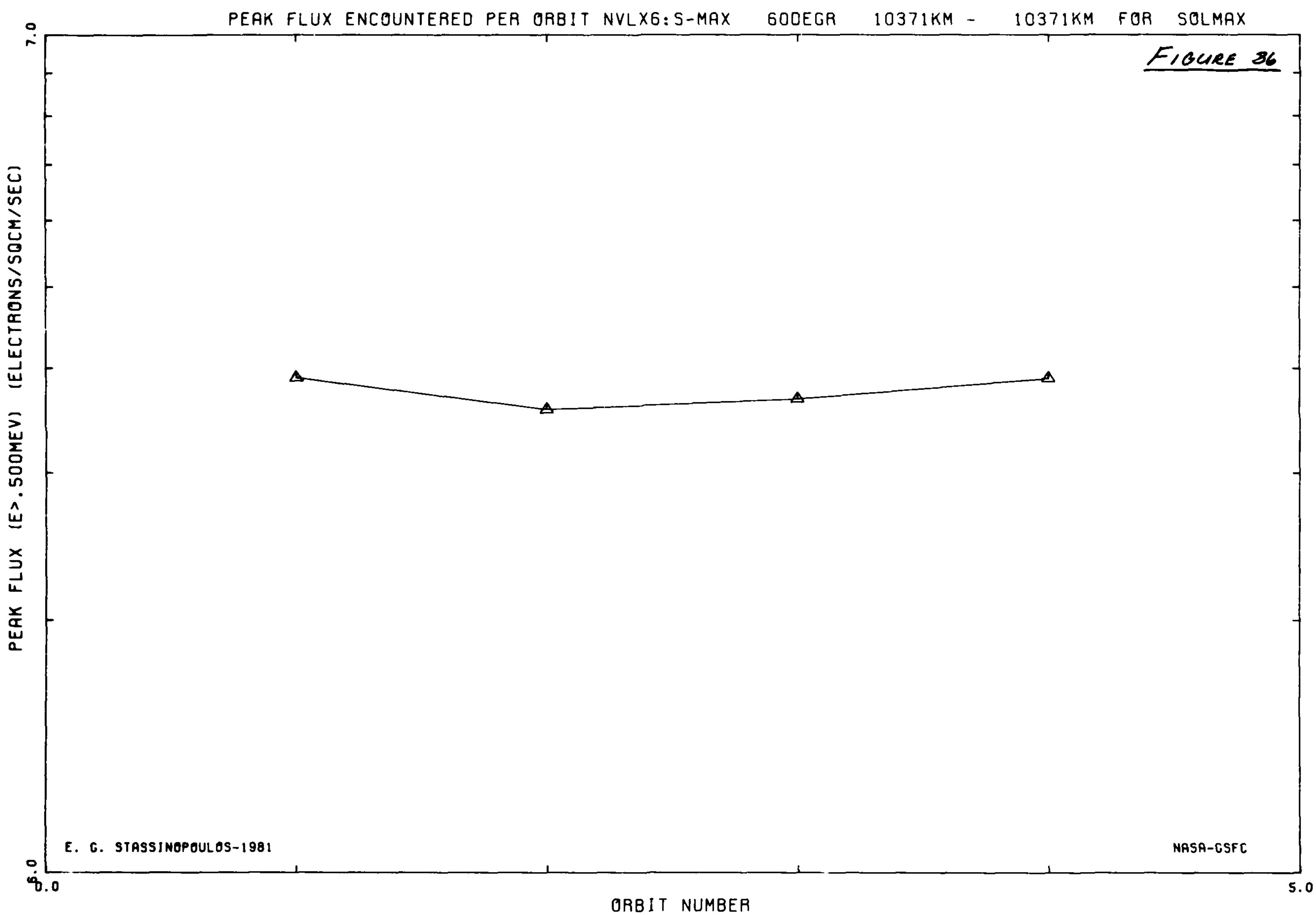
PEAK FLUX ENCOUNTERED PER ORBIT NVLX4:S-MAX 60DEGR 5186KM - 5186KM FOR SOLMAX
FIGURE 32
PEAK FLUX (E>.500MEV) (ELECTRONS/SQCM/SEC)
8.0
7.0
0.0
5.0
10.0
ORBIT NUMBER
E. G. STASSINOPOULOS-1981
NASA-GSFC

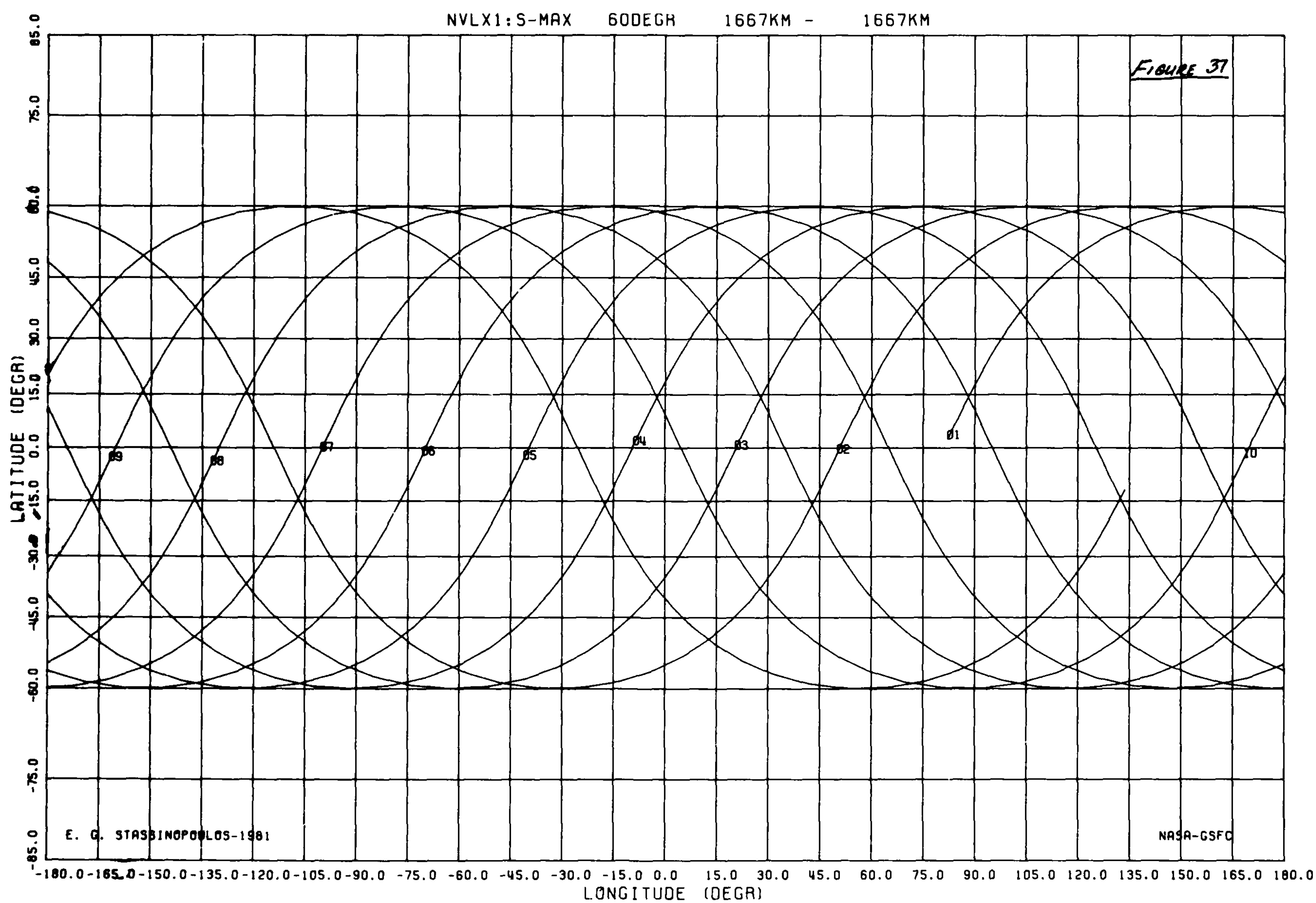

PEAK FLUX ENCOUNTERED PER ØRBIT NVLX5:S-MAX 60DEGR 6389KM - 6389KM FØR SØLMAX
PEAK FLUX (E>5.00MEV) (PROTONS/SQCM/SEC)
7.0
8.0
5.0
10.0
ØRBIT NUMBER
E. G. STASSINØPOULØS-1981
NASA-GSFC
FIGURE 33

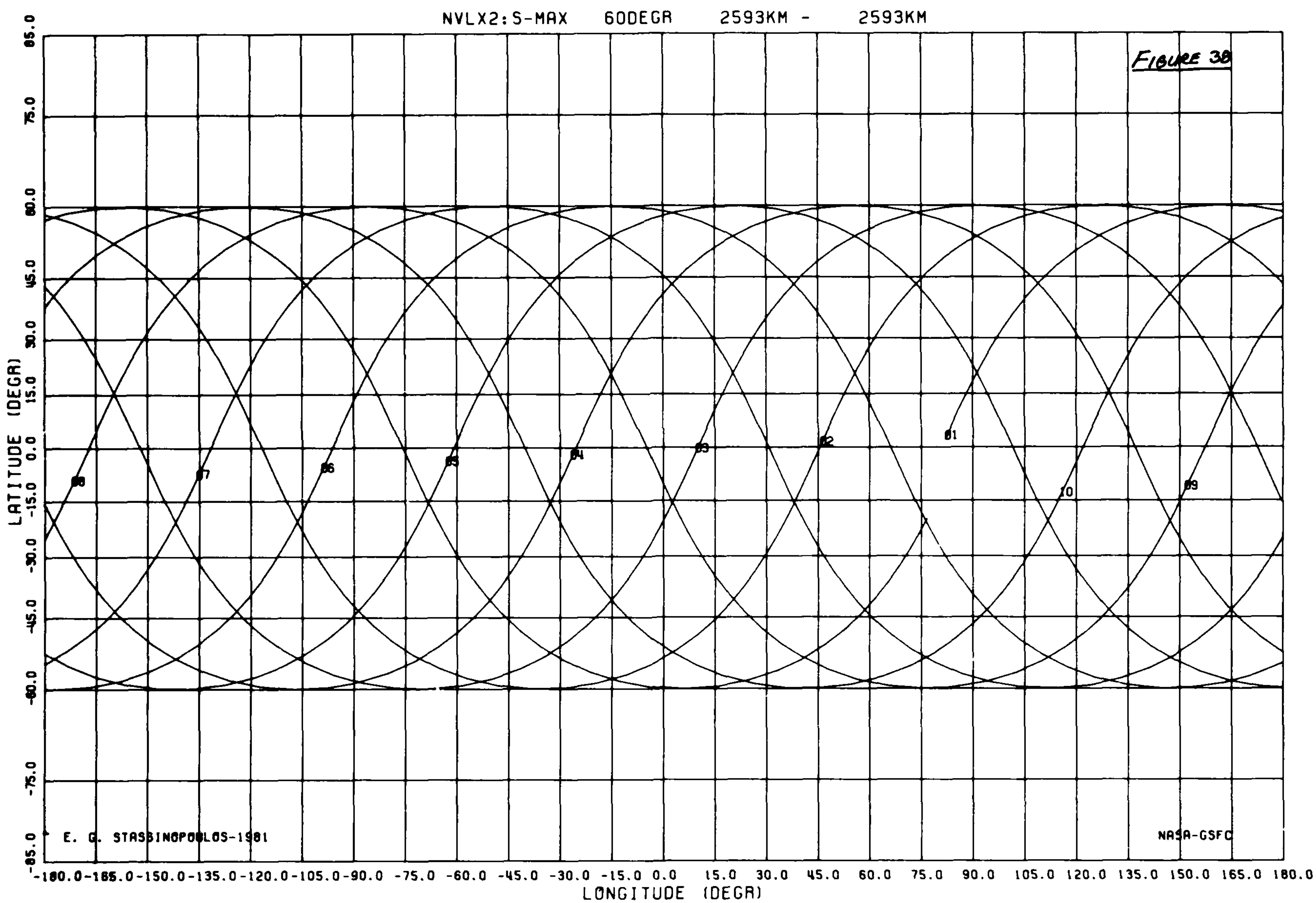

PEAK FLUX ENCOUNTERED PER ORBIT NVLX5:S-MAX 60DEGR 6389KM - 6389KM FOR SOLMAX
FIGURE 34
PEAK FLUX (E>.500MEV) (ELECTRONS/SQCM/SEC)
7.0
0.0
5.0
10.0
ORBIT NUMBER
E. G. STASSINOPOULOS-1981
NASA-GSFC

PEAK FLUX ENCOUNTERED PER ORBIT NVLX6:S-MAX 60DEGR 10371KM - 10371KM FOR SOLMAX

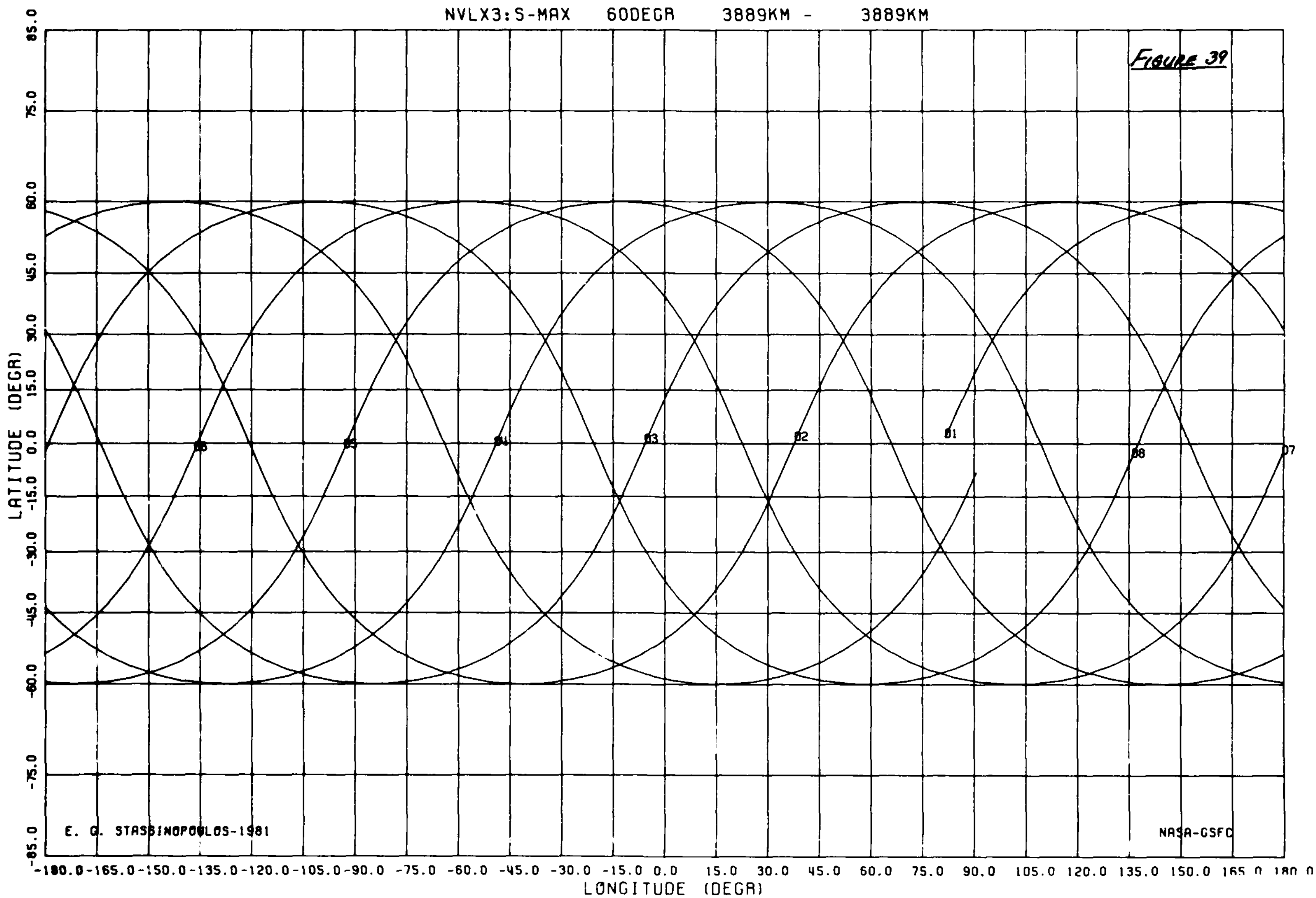


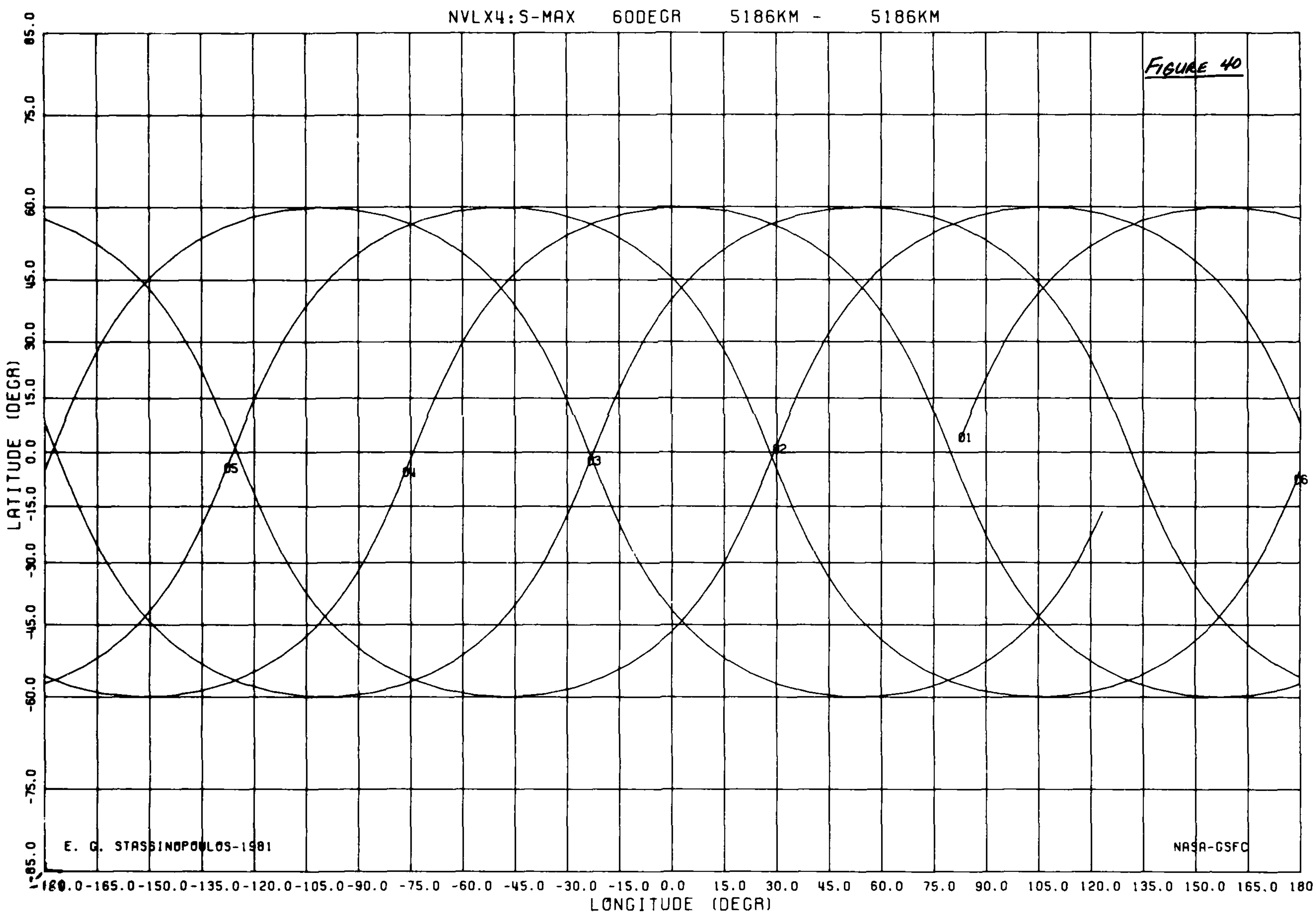

PEAK FLUX ENCOUNTERED PER ORBIT NVLX6:S-MAX 60DEGR 10371KM - 10371KM FOR SOLMAX
FIGURE 36
PEAK FLUX (E>.500MEV) (ELECTRONS/SQCM/SEC)
7.0
6.0
0.0
5.0
ORBIT NUMBER
E. G. STASSINOPOULOS-1981
NASA-GSFC

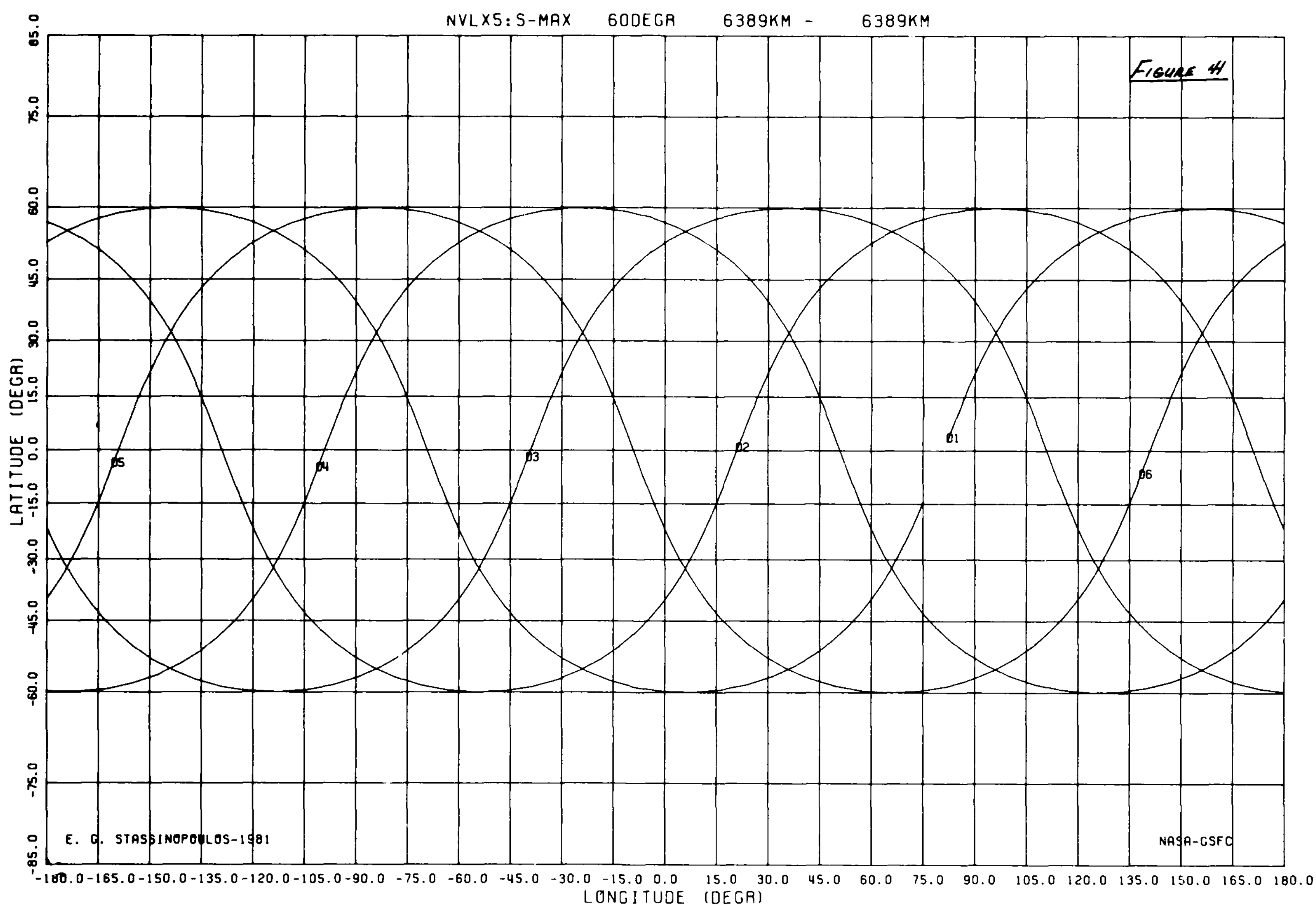

NVLX1:S-MAX 60DEGR 1667KM - 1667KM
FIGURE 37
LATITUDE (DEGR)
LONGITUDE (DEGR)
E. G. STASSINOPOULOS-1981
NASA-GSFC
01
02
03
04
05
06
07
08
09
10

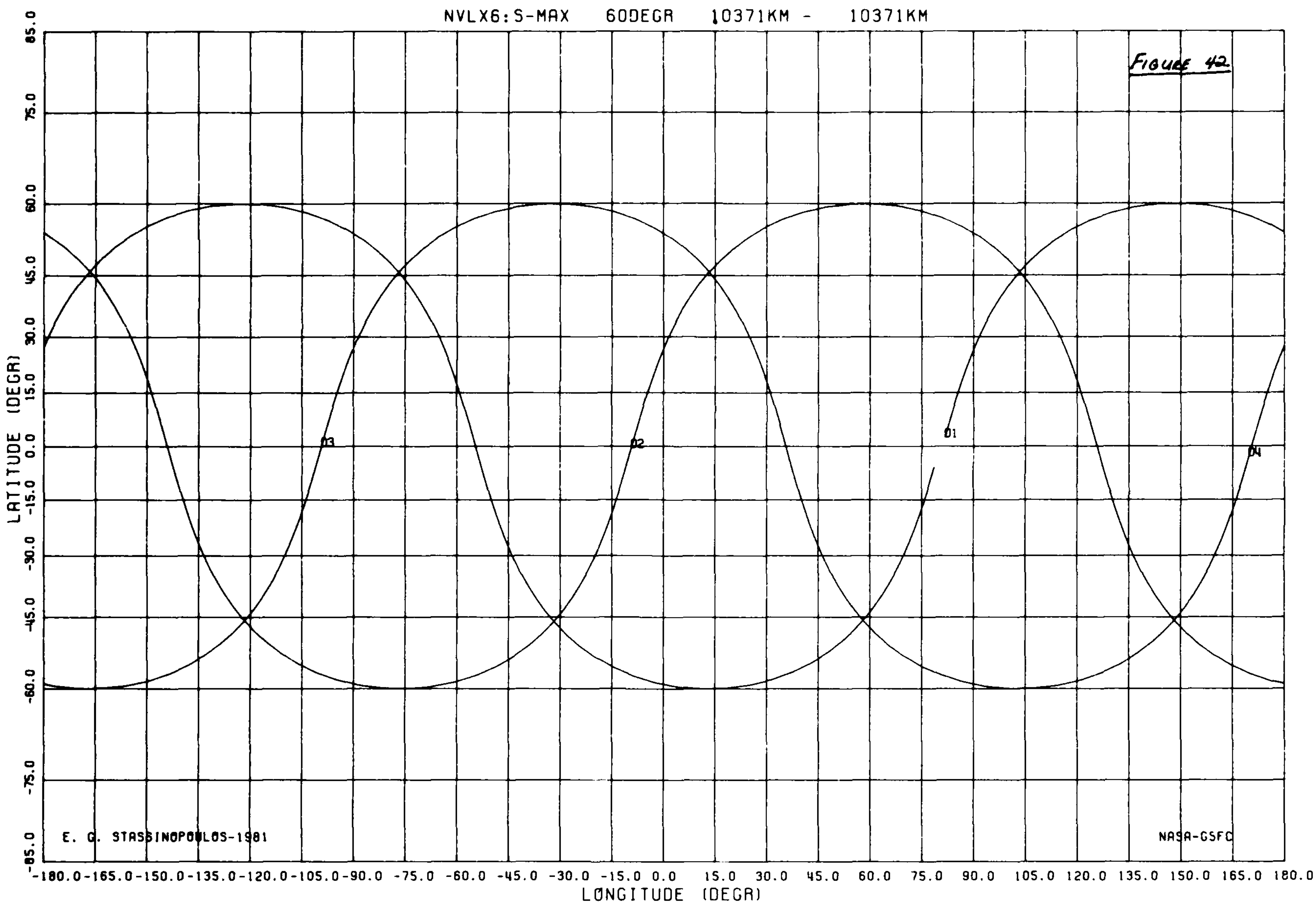


NVLX2:S-MAX 60DEGR 2593KM - 2593KM
FIGURE 38
LATITUDE (DEGR)
85.0
75.0
60.0
45.0
30.0
15.0
0.0
-15.0
-30.0
-45.0
-60.0
-75.0
-85.0
E. G. STASSINOPOULOS-1981
NASA-GSFC
-180.0 -165.0 -150.0 -135.0 -120.0 -105.0 -90.0 -75.0 -60.0 -45.0 -30.0 -15.0 0.0 15.0 30.0 45.0 60.0 75.0 90.0 105.0 120.0 135.0 150.0 165.0 180.0
LONGITUDE (DEGR)

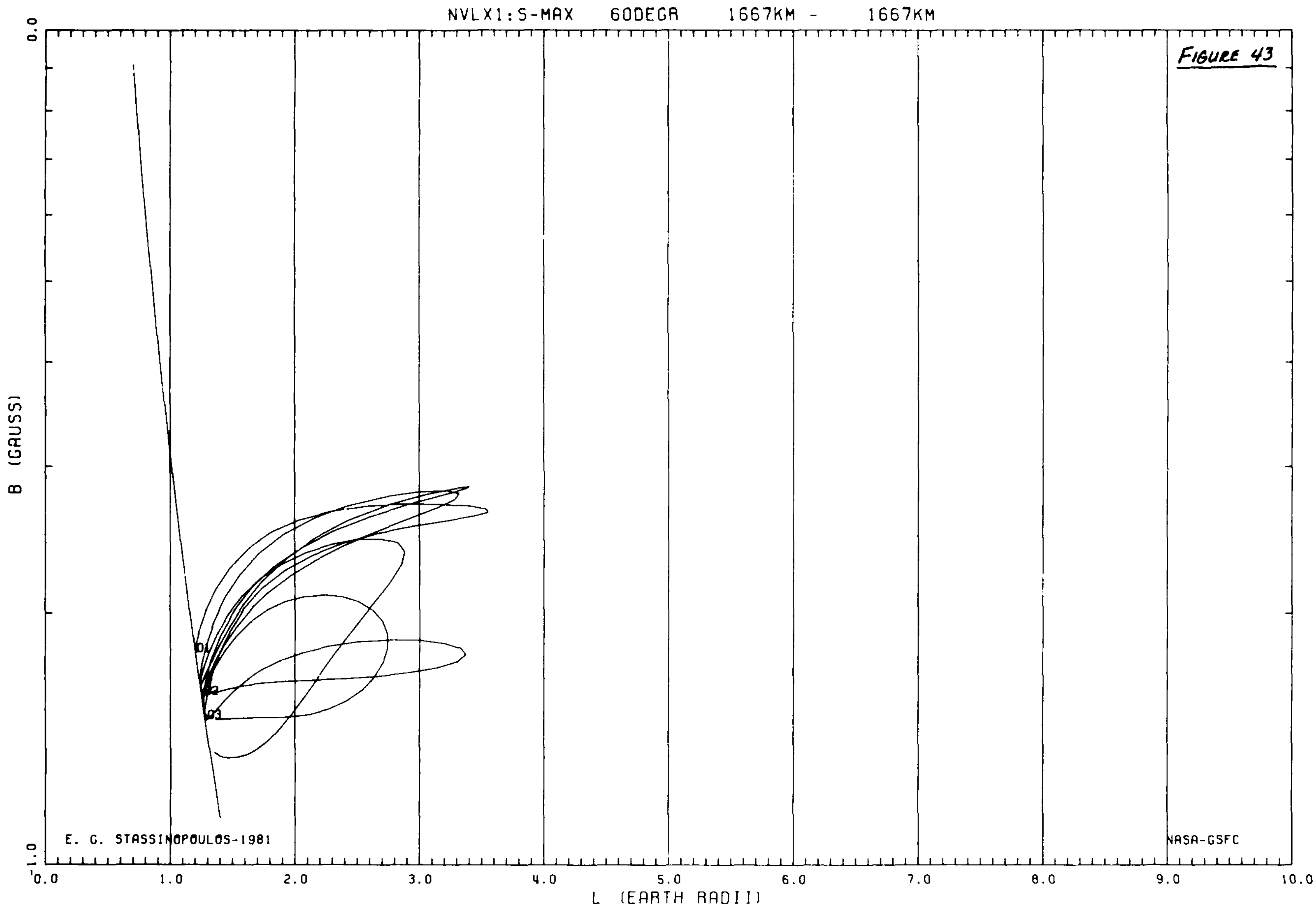

NVLX3:S-MAX 60DEGR 3889KM - 3889KM
FIGURE 39
LATITUDE (DEGR)
85.0
75.0
60.0
45.0
30.0
15.0
0.0
-15.0
-30.0
-45.0
-60.0
-75.0
-85.0
01
02
03
04
05
06
07
08
E. G. STASSINOPOULOS-1981
NASA-GSFC
-180.0 -165.0 -150.0 -135.0 -120.0 -105.0 -90.0 -75.0 -60.0 -45.0 -30.0 -15.0 0.0 15.0 30.0 45.0 60.0 75.0 90.0 105.0 120.0 135.0 150.0 165.0 180.0
LONGITUDE (DEGR)


NVLX4:S-MAX 60DEGR 5186KM - 5186KM
FIGURE 40
LATITUDE (DEGR)
LONGITUDE (DEGR)
01
02
03
04
05
06
E. G. STASSINOPOULOS-1981
NASA-GSFC


NVLX5:S-MAX 60DEGR 6389KM - 6389KM
FIGURE 41
LATITUDE (DEGR)
85.0
75.0
60.0
45.0
30.0
15.0
0.0
-15.0
-30.0
-45.0
-60.0
-75.0
-85.0
01
02
03
04
05
06
E. G. STASSINOPOULOS-1981
NASA-GSFC
-180.0 -165.0 -150.0 -135.0 -120.0 -105.0 -90.0 -75.0 -60.0 -45.0 -30.0 -15.0 0.0 15.0 30.0 45.0 60.0 75.0 90.0 105.0 120.0 135.0 150.0 165.0 180.0
LONGITUDE (DEGR)



NVLX6:S-MAX 60DEGR 10371KM - 10371KM
FIGURE 42
LATITUDE (DEGR)
85.0
75.0
60.0
45.0
30.0
15.0
0.0
-15.0
-30.0
-45.0
-60.0
-75.0
-85.0
-180.0 -165.0 -150.0 -135.0 -120.0 -105.0 -90.0 -75.0 -60.0 -45.0 -30.0 -15.0 0.0 15.0 30.0 45.0 60.0 75.0 90.0 105.0 120.0 135.0 150.0 165.0 180.0
LONGITUDE (DEGR)
01
02
03
04
E. G. STASSINOPOULOS-1981
NASA-GSFC


NVLX1:S-MAX 60DEGR 1667KM - 1667KM
FIGURE 43
B (GAUSS)
0.0
1.0
L (EARTH RADII)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
E. G. STASSINOPOULOS-1981
NASA-GSFC
01
02
03

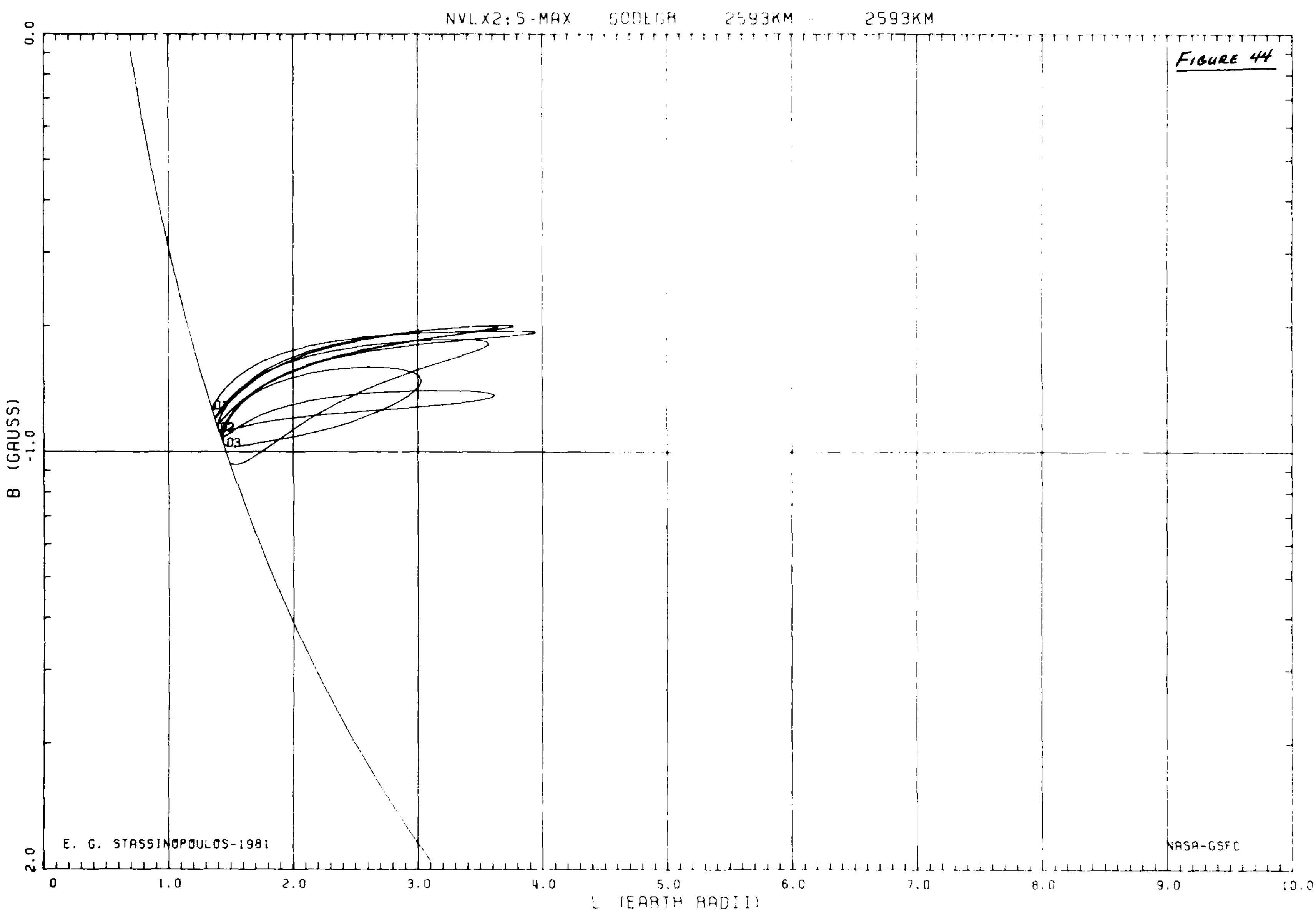
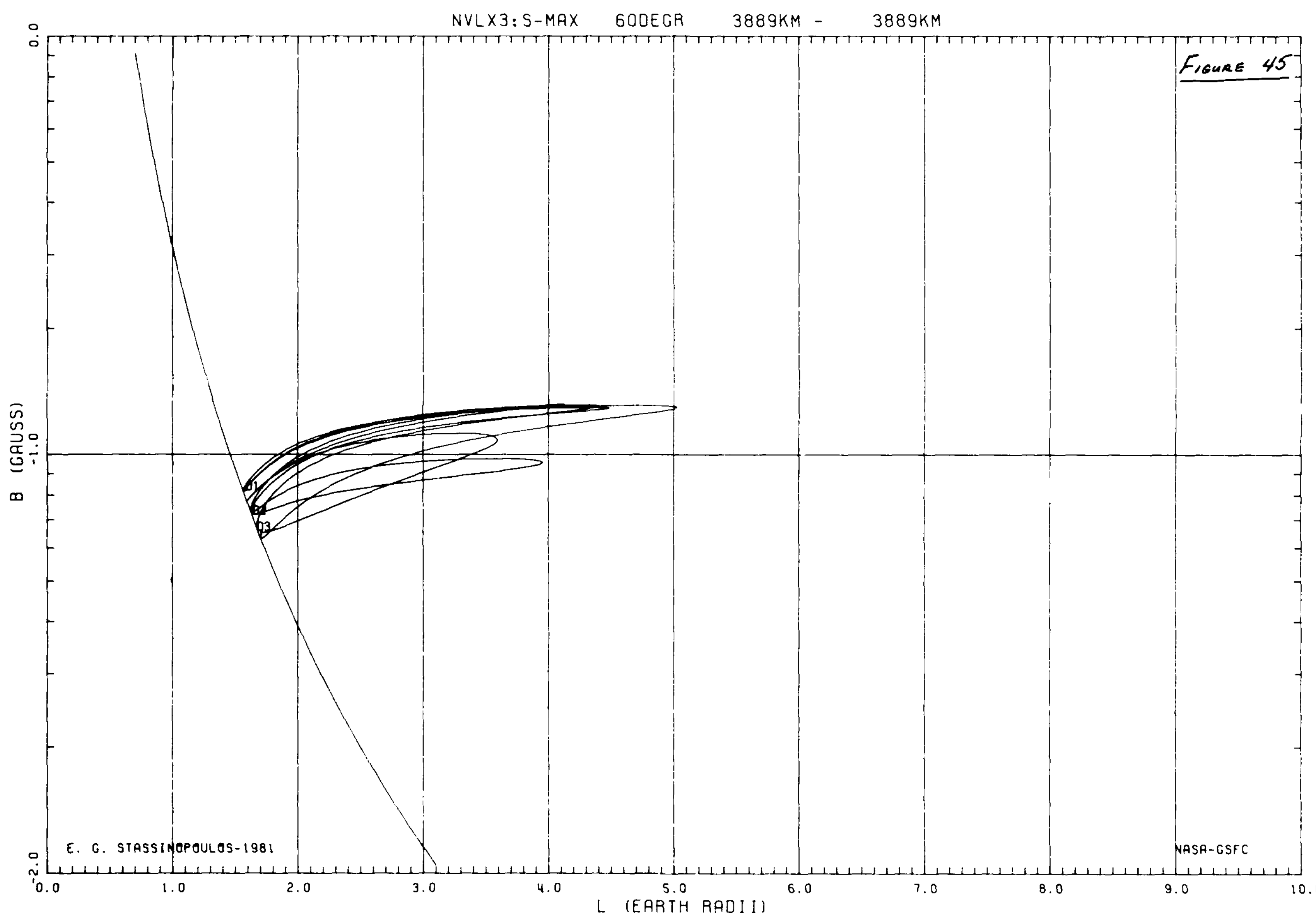
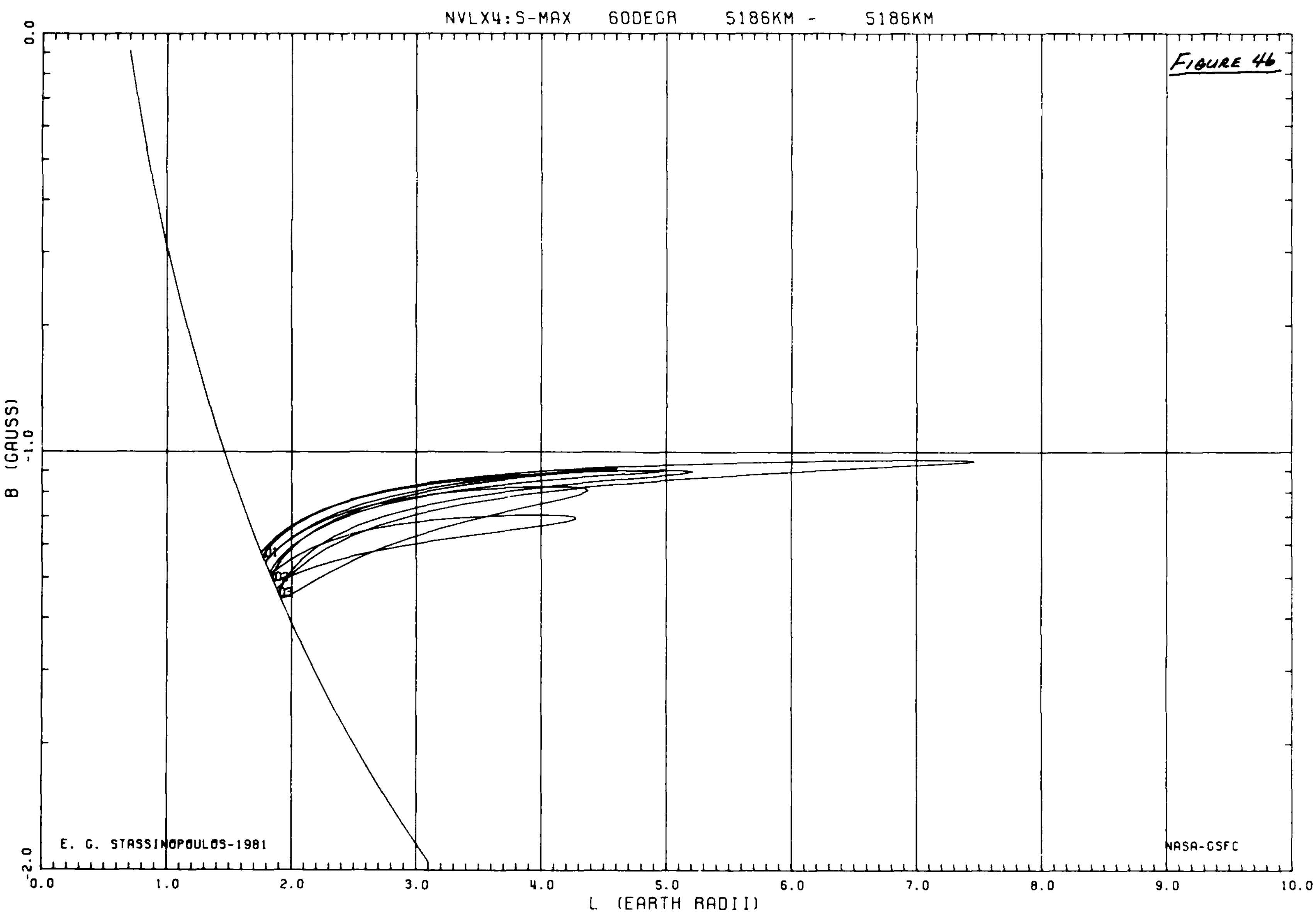
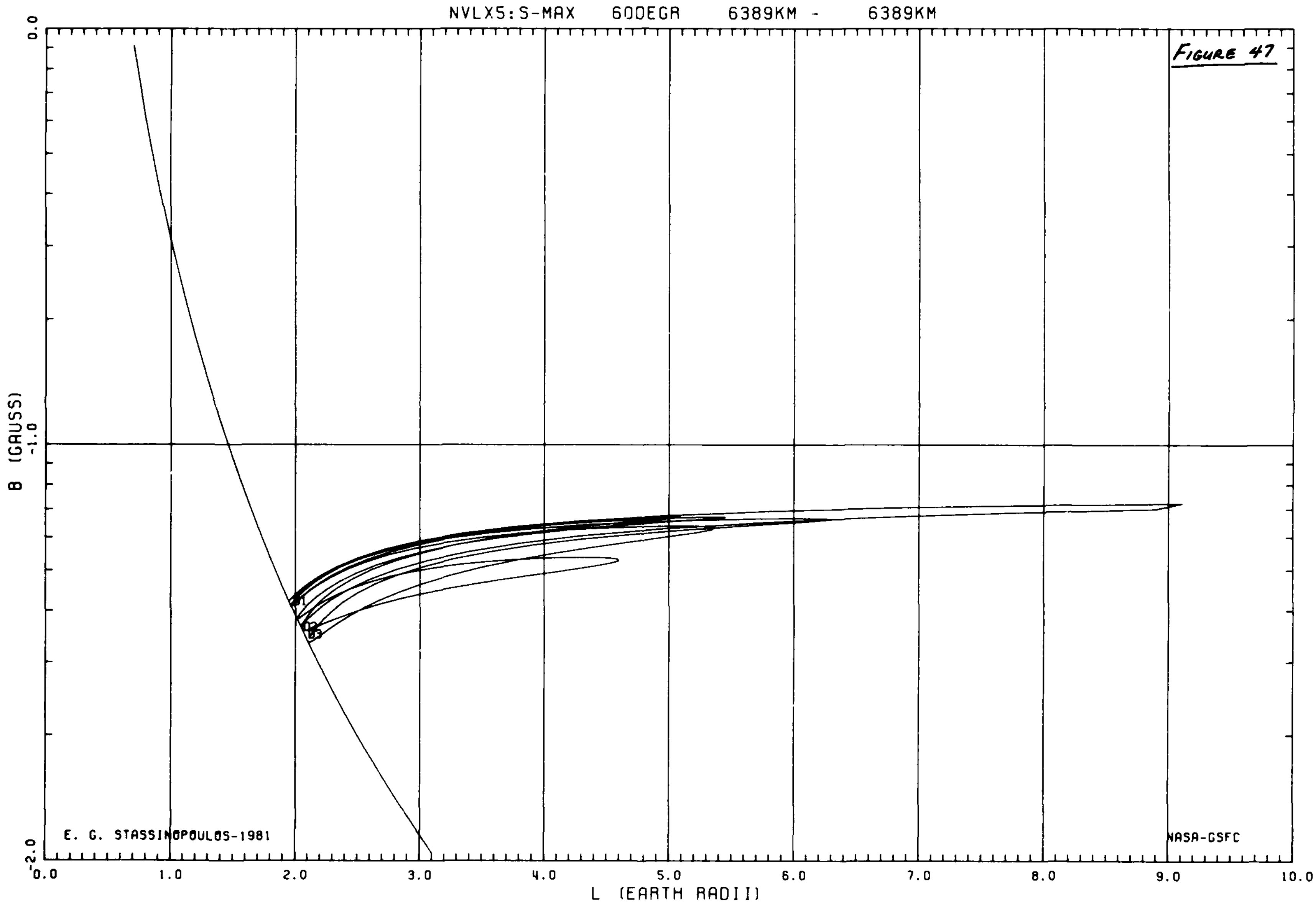

NVLX2:S-MAX 60DEGR 2593KM - 2593KM
B (GAUSS)
0.0
-1.0
2.0
L (EARTH RADII)
0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0
01
02
03
E. G. STASSINOPOULOS-1981
NASA-GSFC

FIGURE 44


NVLX3:S-MAX 60DEGR 3889KM - 3889KM
FIGURE 45
B (GAUSS)
0.0
-1.0
-2.0
L (EARTH RADII)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
E. G. STASSINOPOULOS-1981
NASA-GSFC


NVLX4:S-MAX 60DEGA 5186KM - 5186KM
FIGURE 46
B (GAUSS)
0.0
-1.0
-2.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
L (EARTH RADII)
E. G. STASSINOPOULOS-1981
NASA-GSFC


NVLX5:S-MAX 60DEGR 6389KM - 6389KM
FIGURE 47
B (GAUSS)
0.0
-1.0
-2.0
L (EARTH RADII)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
E. G. STASSINOPOULOS-1981
NASA-GSFC

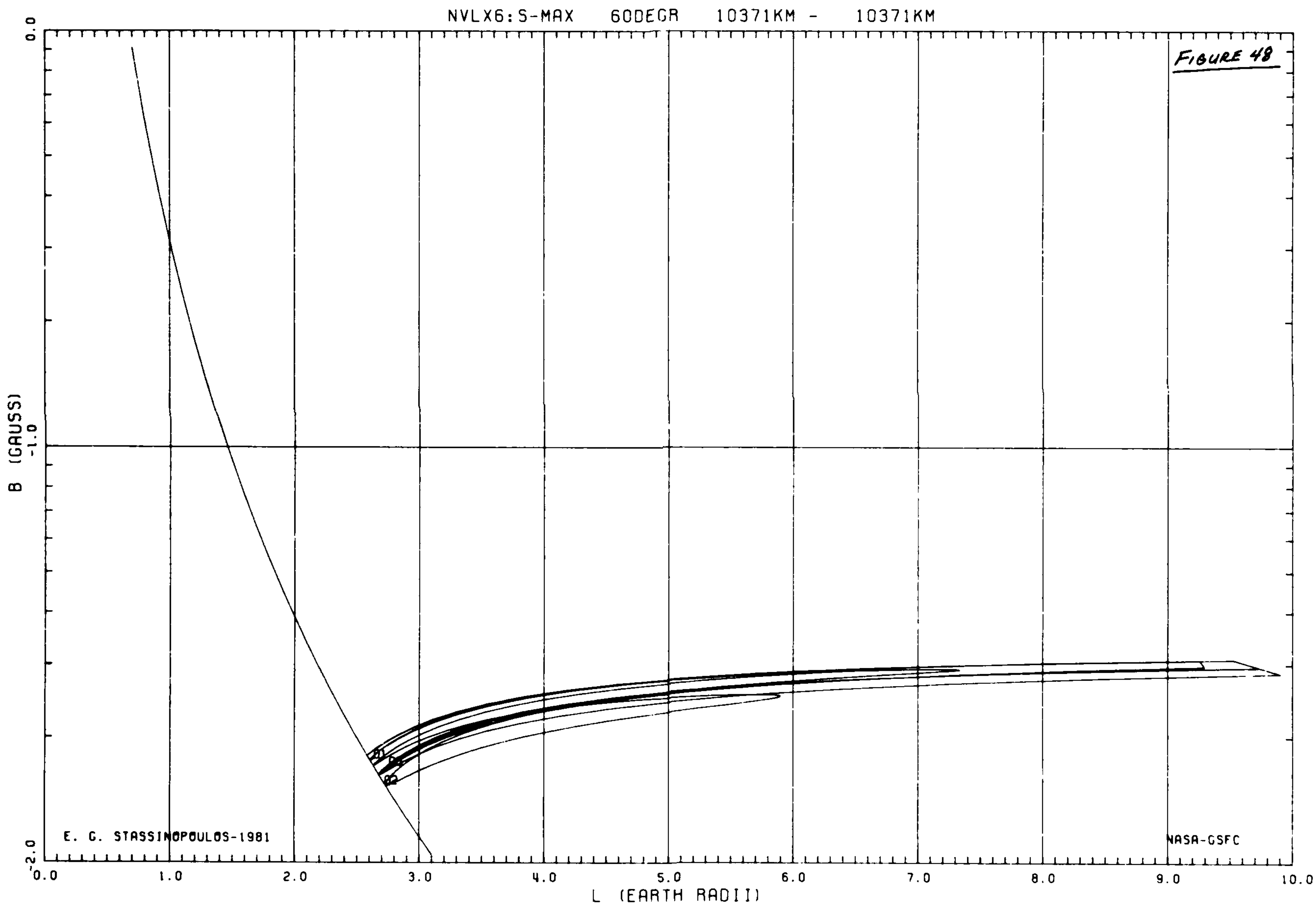

NVLX6:S-MAX 60DEGR 10371KM - 10371KM
FIGURE 48
B (GAUSS)
0.0
-1.0
-2.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
L (EARTH RADII)
E. G. STASSINOPOULOS-1981
NASA-GSFC

FIGURE 49

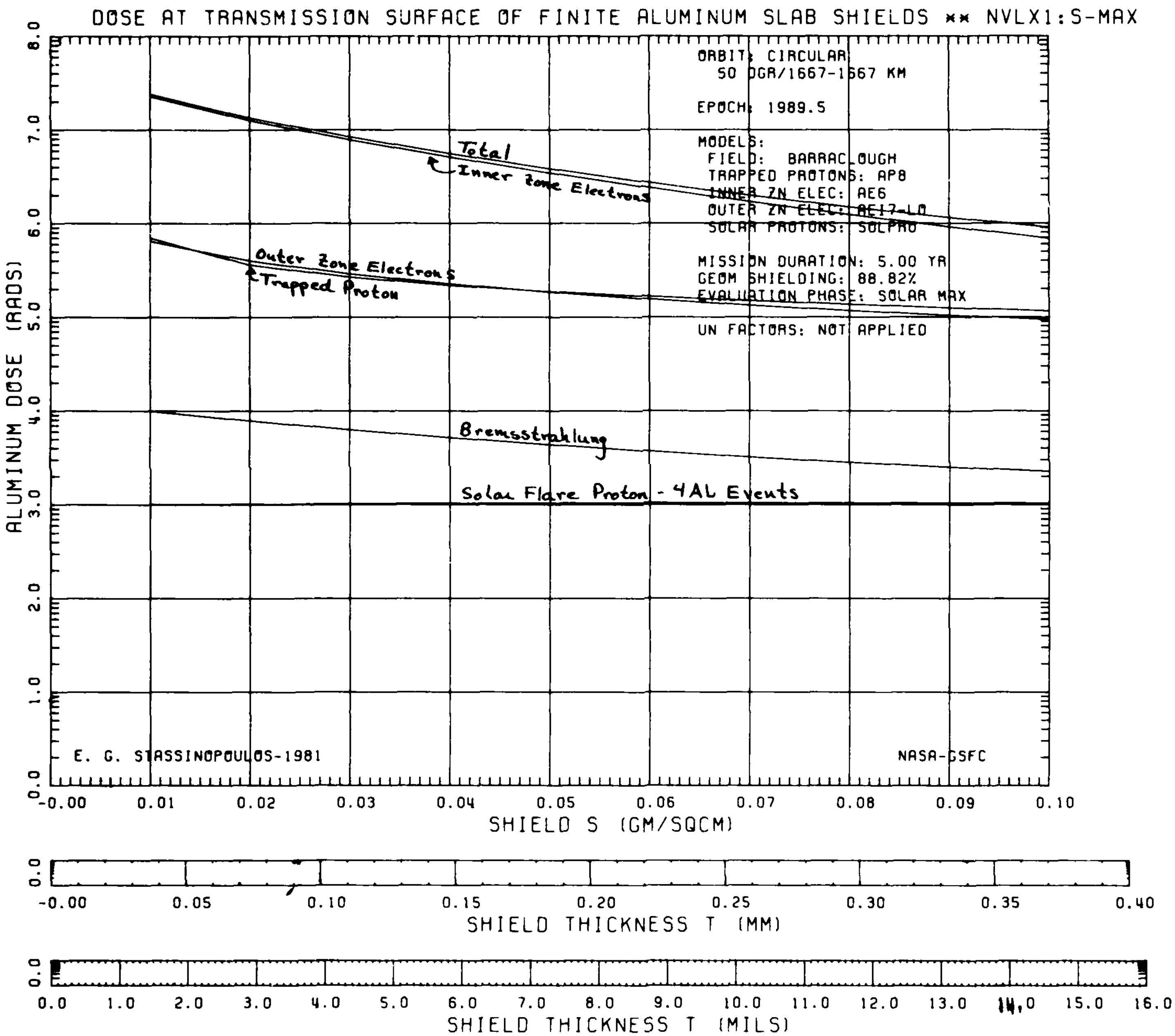

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX1:S-MAX
ORBIT: CIRCULAR
50 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 88.82%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electrons
Outer Zone Electrons
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
SHIELD S (GM/SQCM)
-0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
SHIELD THICKNESS T (MM)
-0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
SHIELD THICKNESS T (MILS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0

FIGURE 50

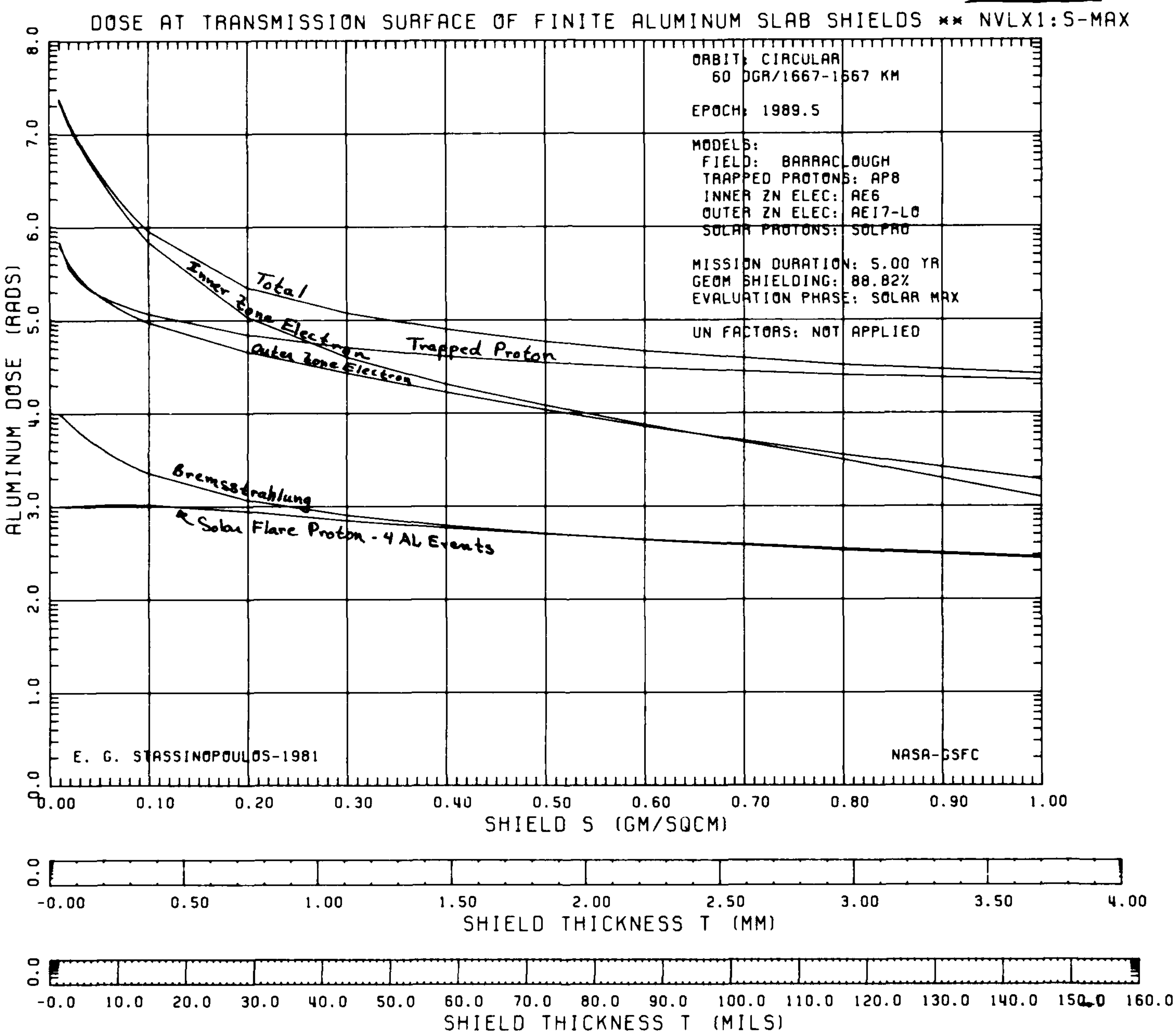
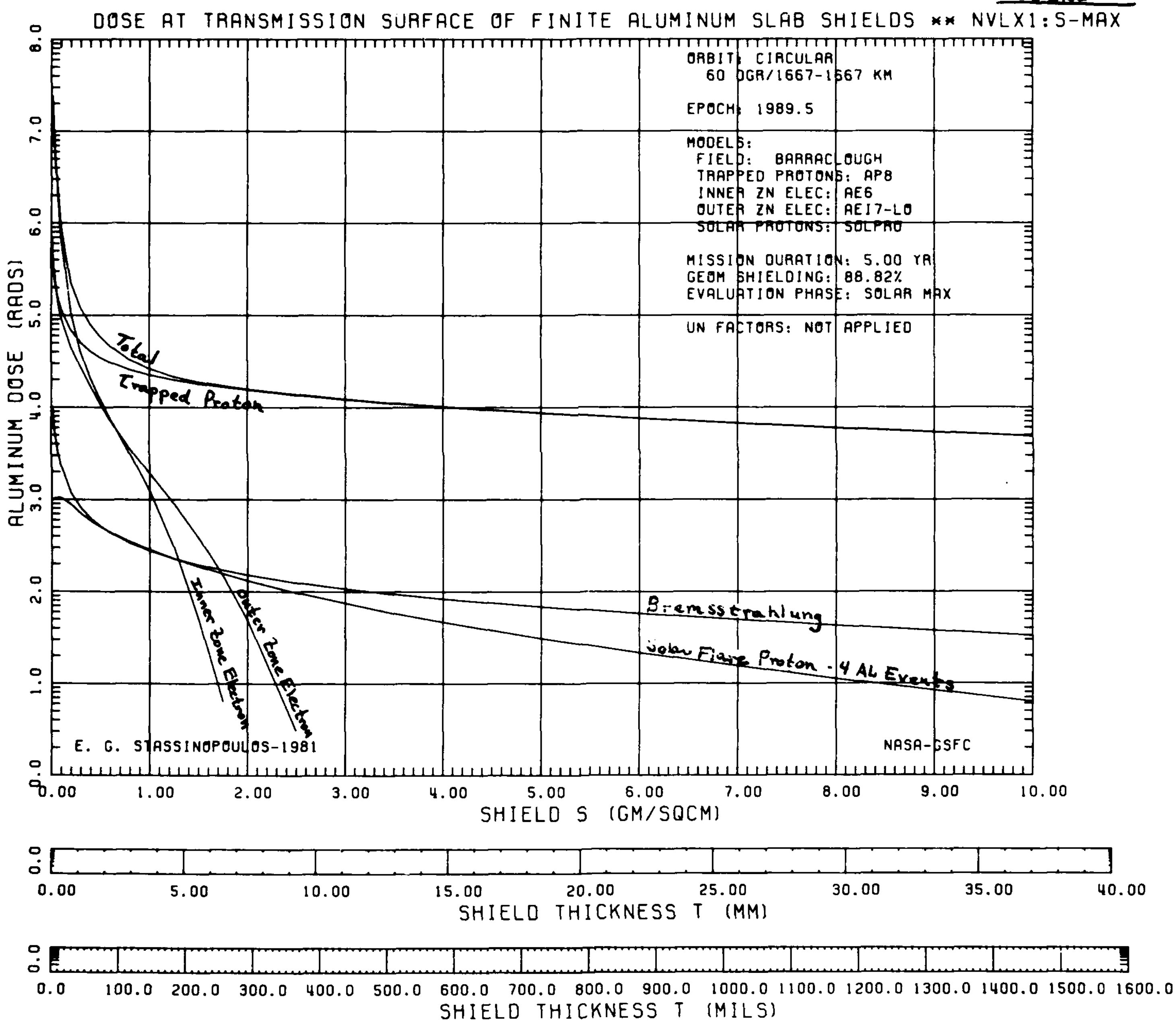
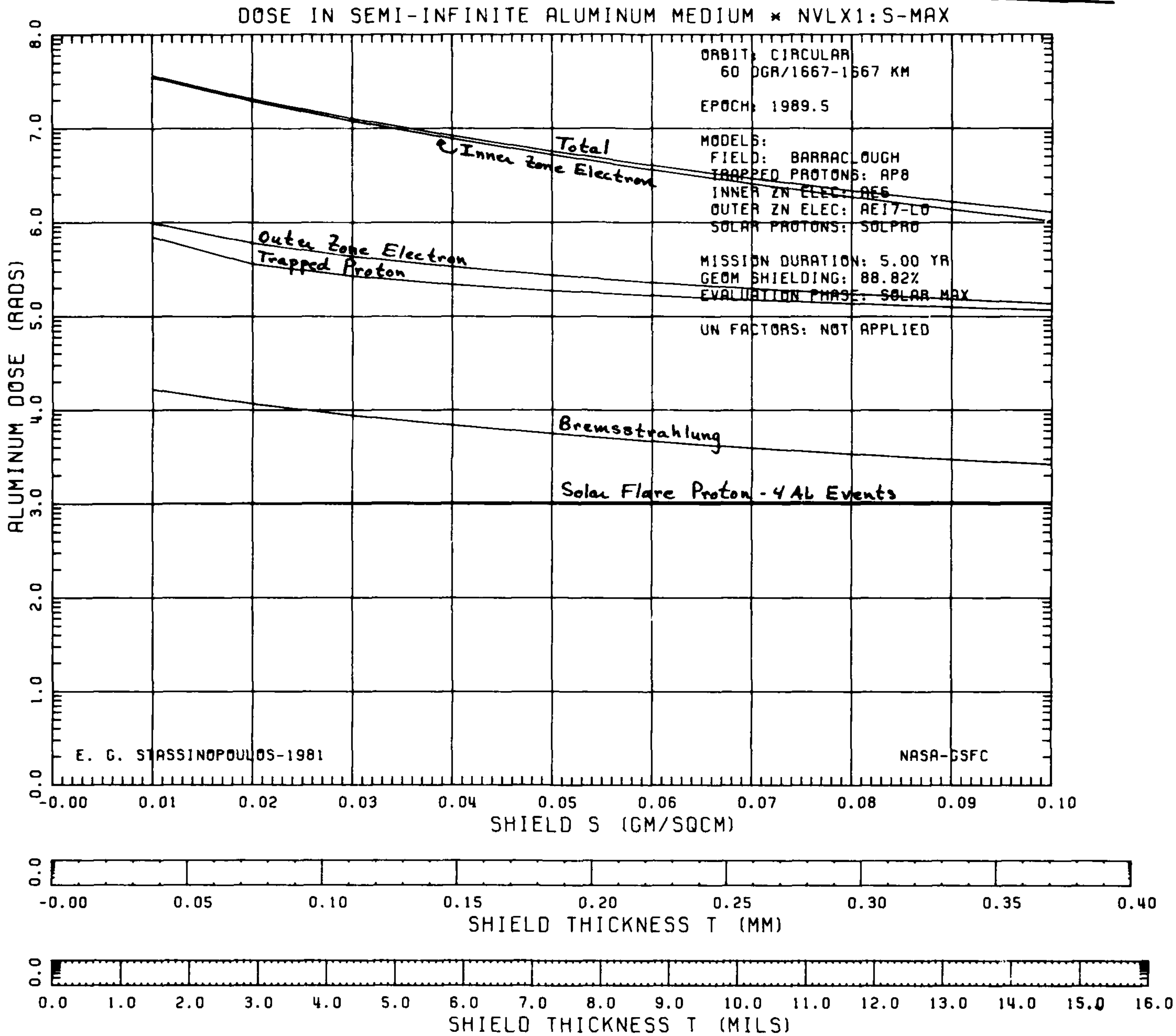

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX1:S-MAX
ORBIT: CIRCULAR
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 88.82%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

FIGURE 51



DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX1:S-MAX
ORBIT: CIRCULAR
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 88.82%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Inner Zone Electron
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD S (GM/SQCM)
0.0
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MM)
0.0
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0
SHIELD THICKNESS T (MILS)

FIGURE 52



DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX1:S-MAX
ORBIT: CIRCULAR
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 88.82%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Outer Zone Electron
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
-0.00 0.01 0.02 0.03 0.04 0.05 0.06 0.07 0.08 0.09 0.10
SHIELD S (GM/SQCM)
-0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40
SHIELD THICKNESS T (MM)
0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0
SHIELD THICKNESS T (MILS)

FIGURE 53

DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX1:S-MAX

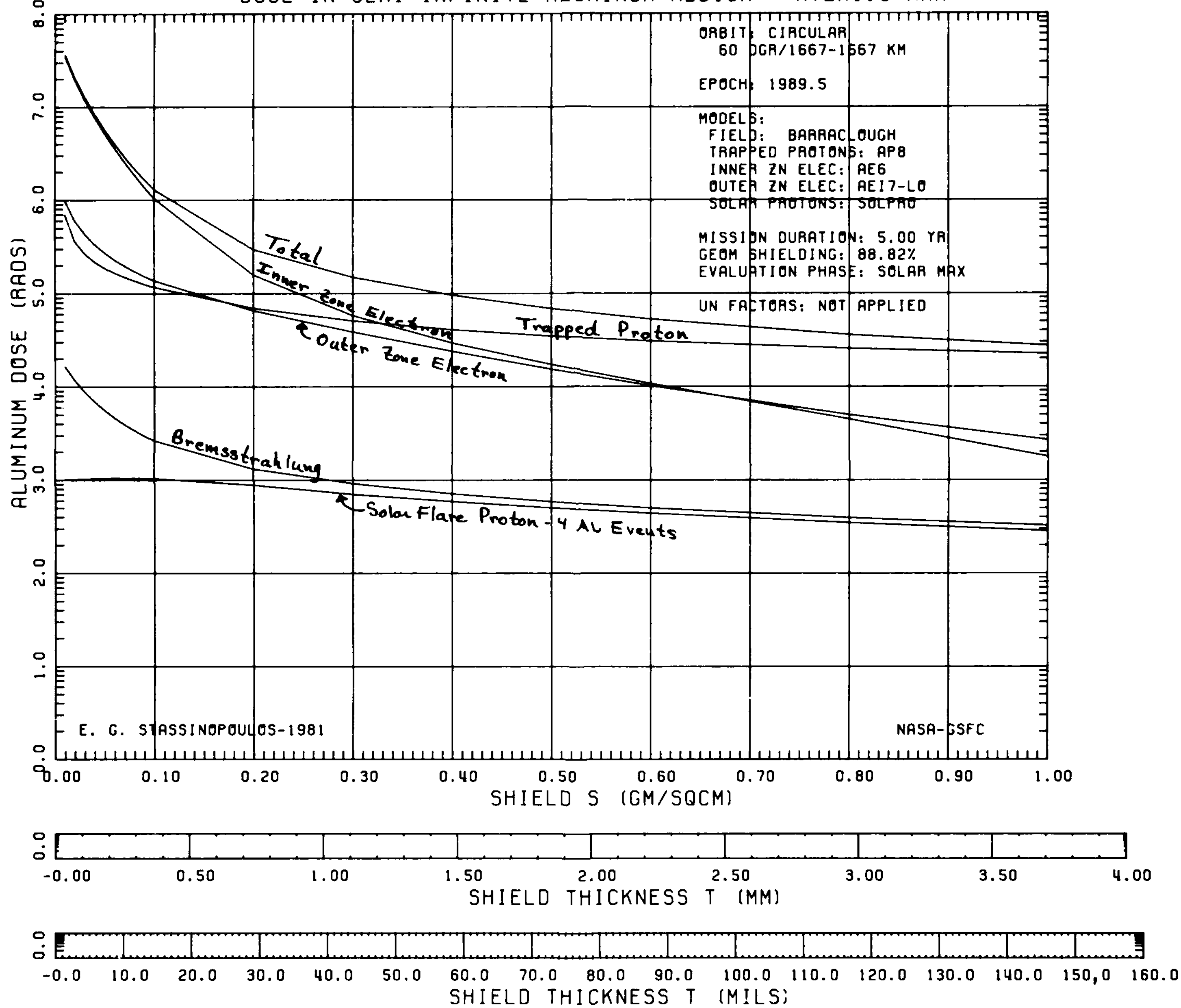


FIGURE 54

DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX1:S-MAX

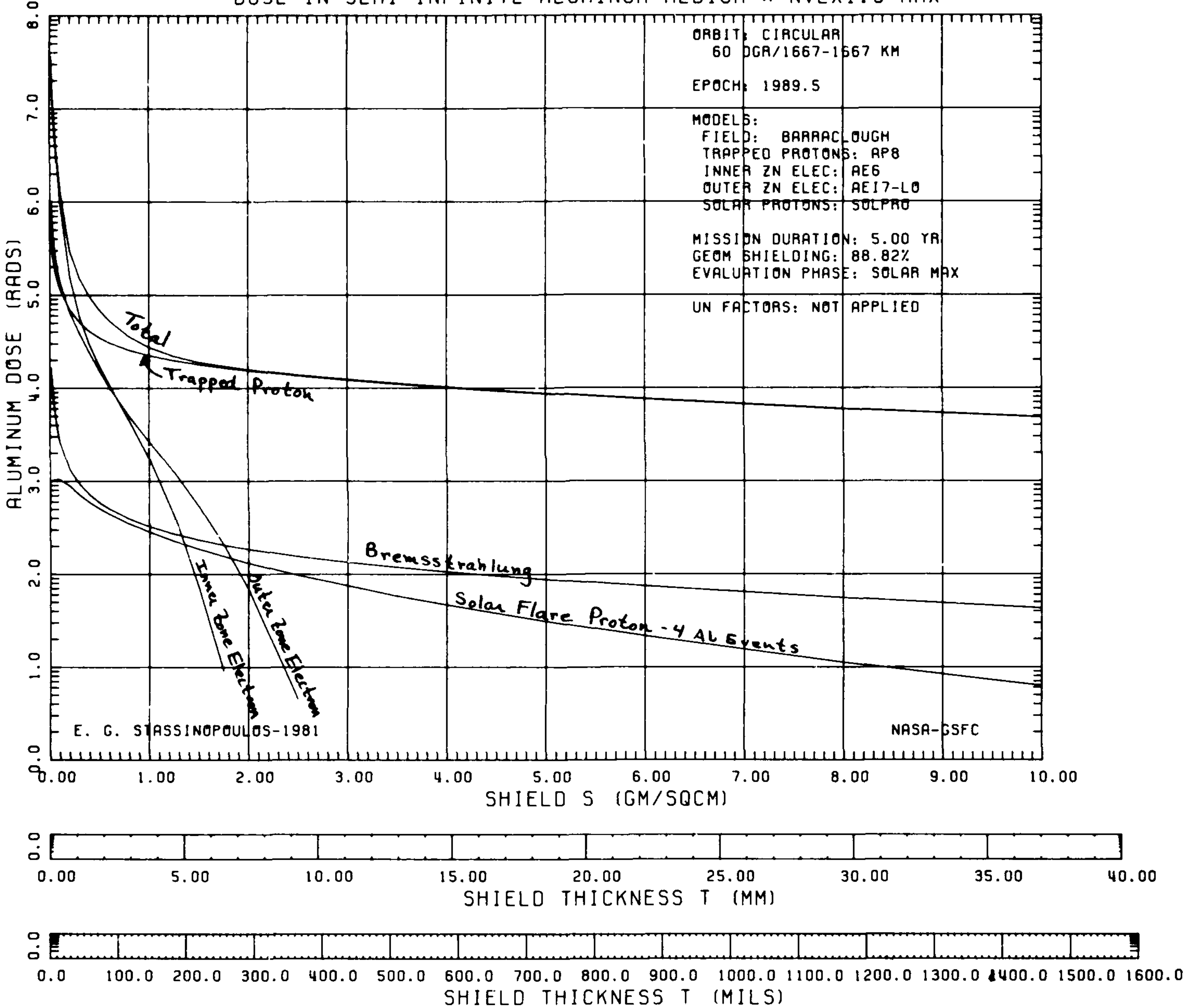


Figure 55

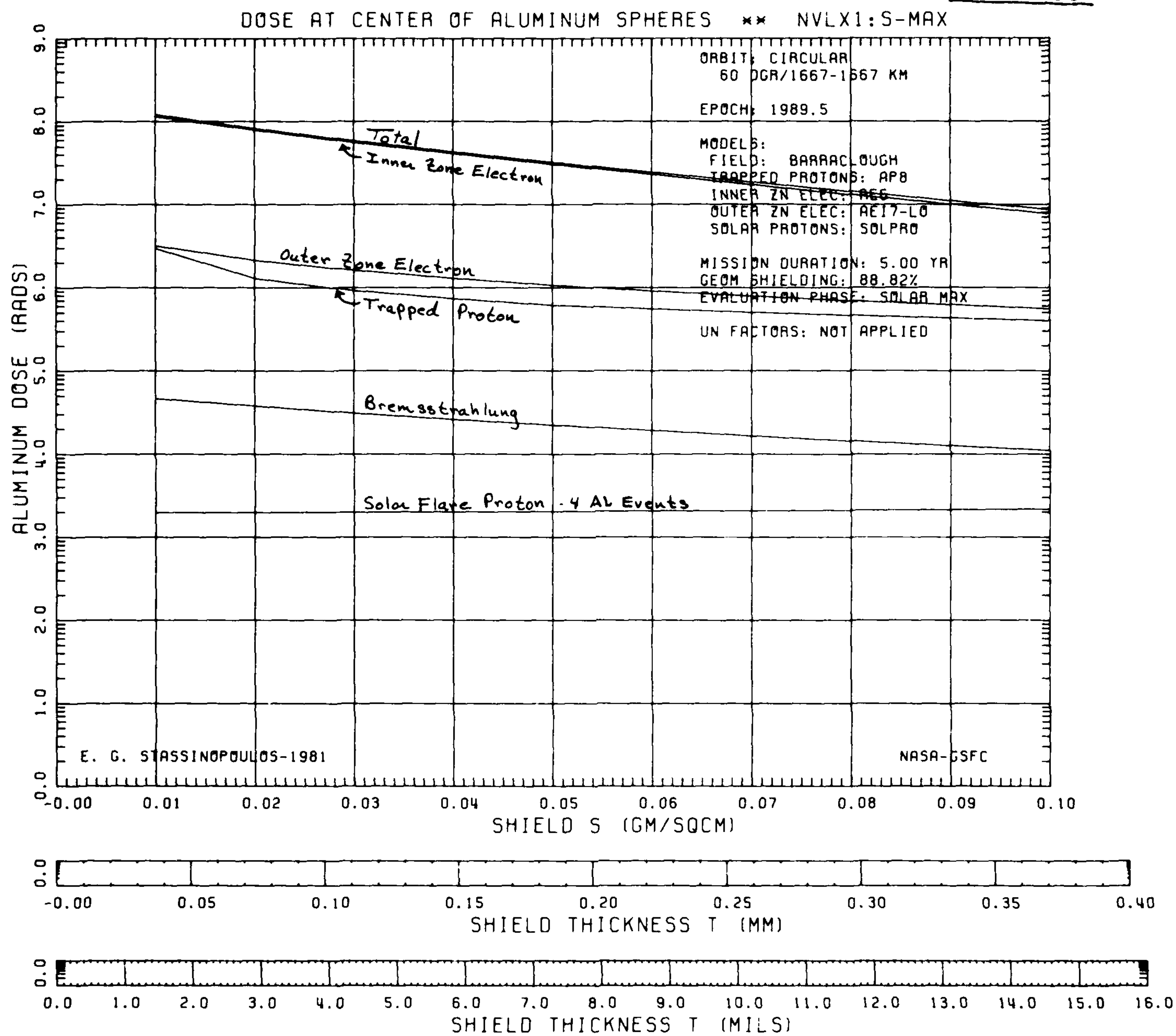

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX1:S-MAX
ORBIT: CIRCULAR
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 88.82%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Outer Zone Electron
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
-0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
SHIELD S (GM/SQCM)
0.0
-0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
SHIELD THICKNESS T (MM)
0.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
SHIELD THICKNESS T (MILS)

FIGURE 56

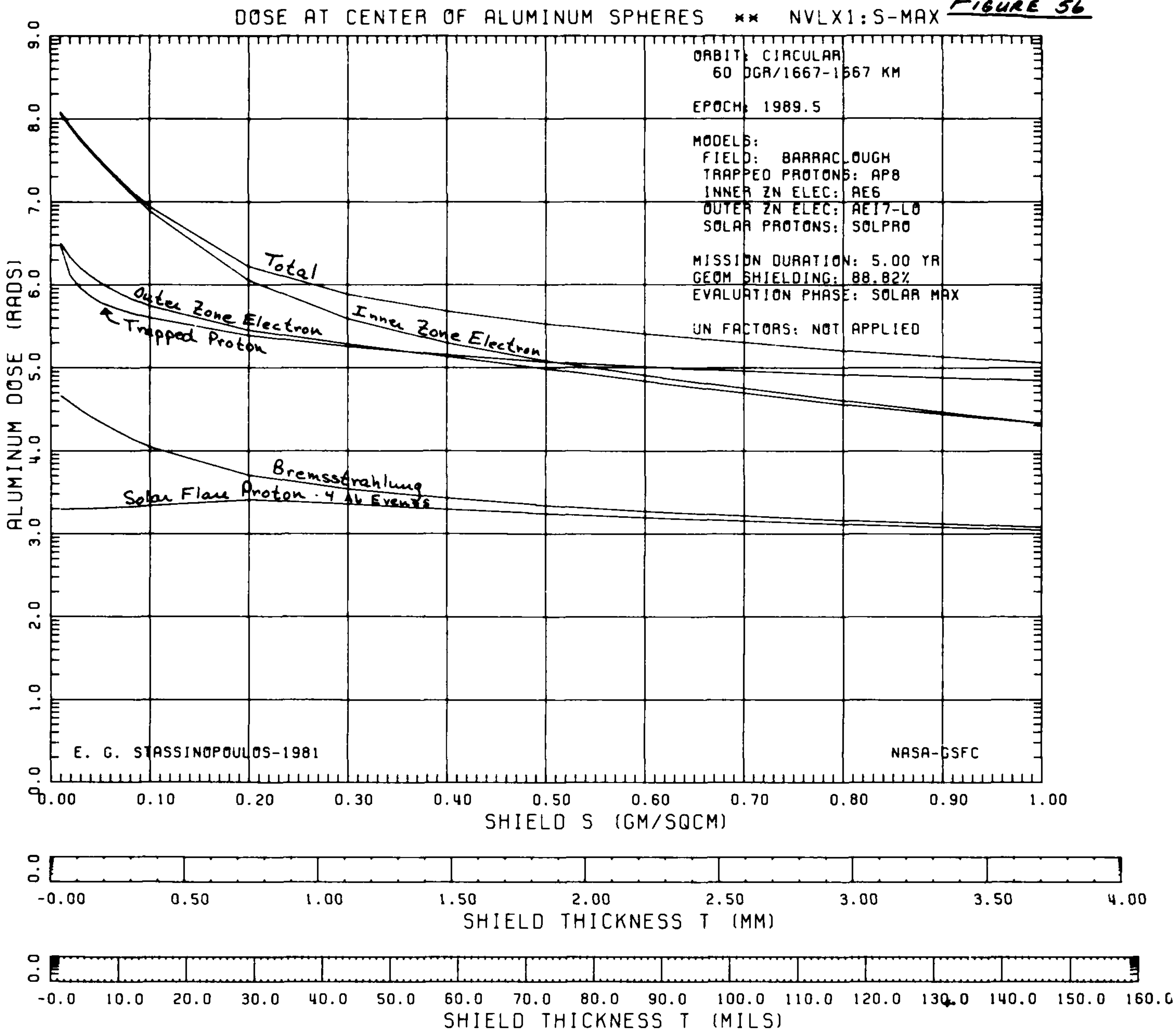

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX1:S-MAX
ORBIT: CIRCULAR
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 88.82%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Outer Zone Electron
Trapped Proton
Bremsstrahlung
Solar Flare Proton · 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

FIGURE 57

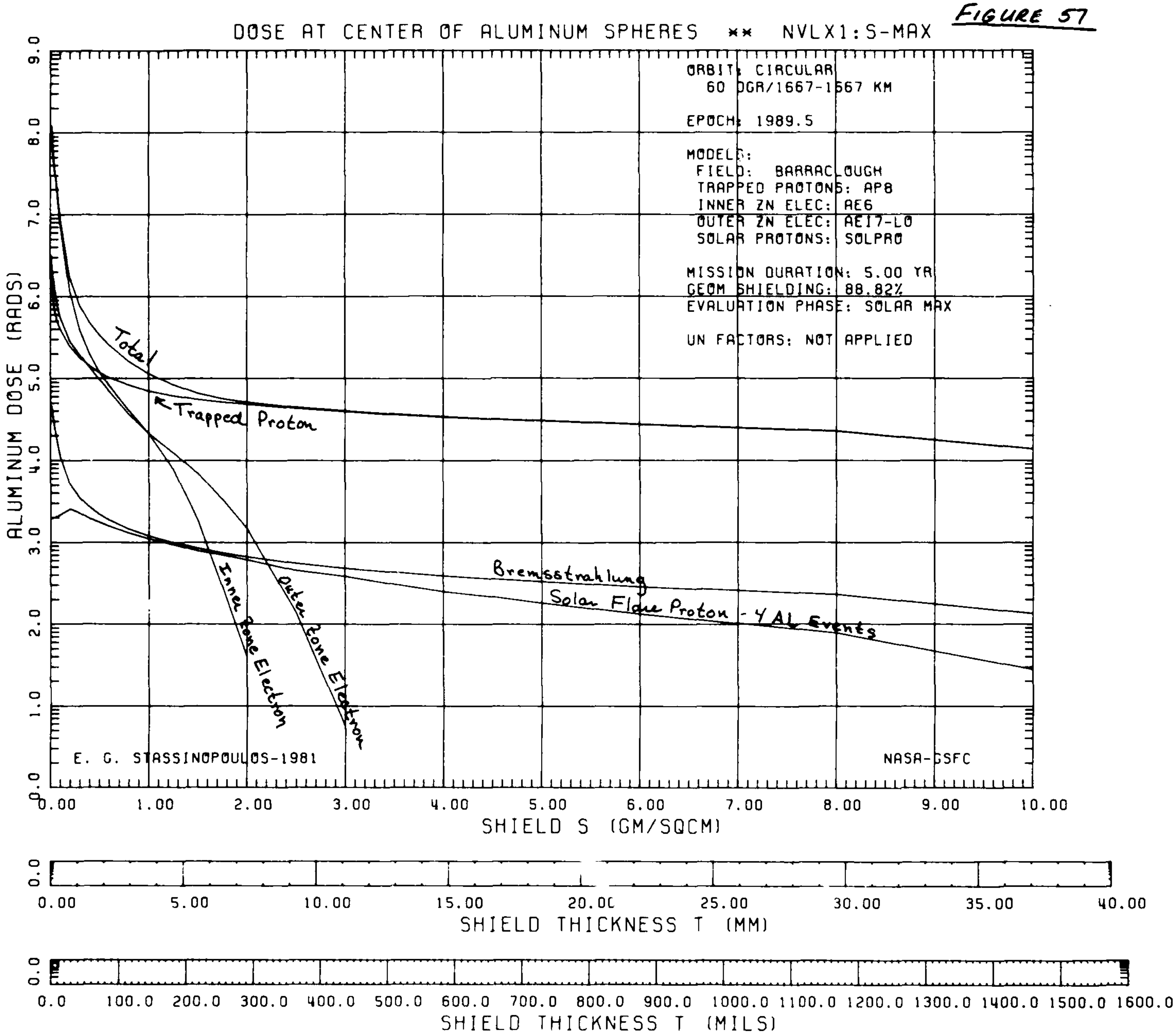

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX1:S-MAX
ORBIT: CIRCULAR
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 88.82%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Inner Zone Electron
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
SHIELD S (GM/SQCM)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD THICKNESS T (MM)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MILS)
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0

FIGURE 58

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX2:S-MAX

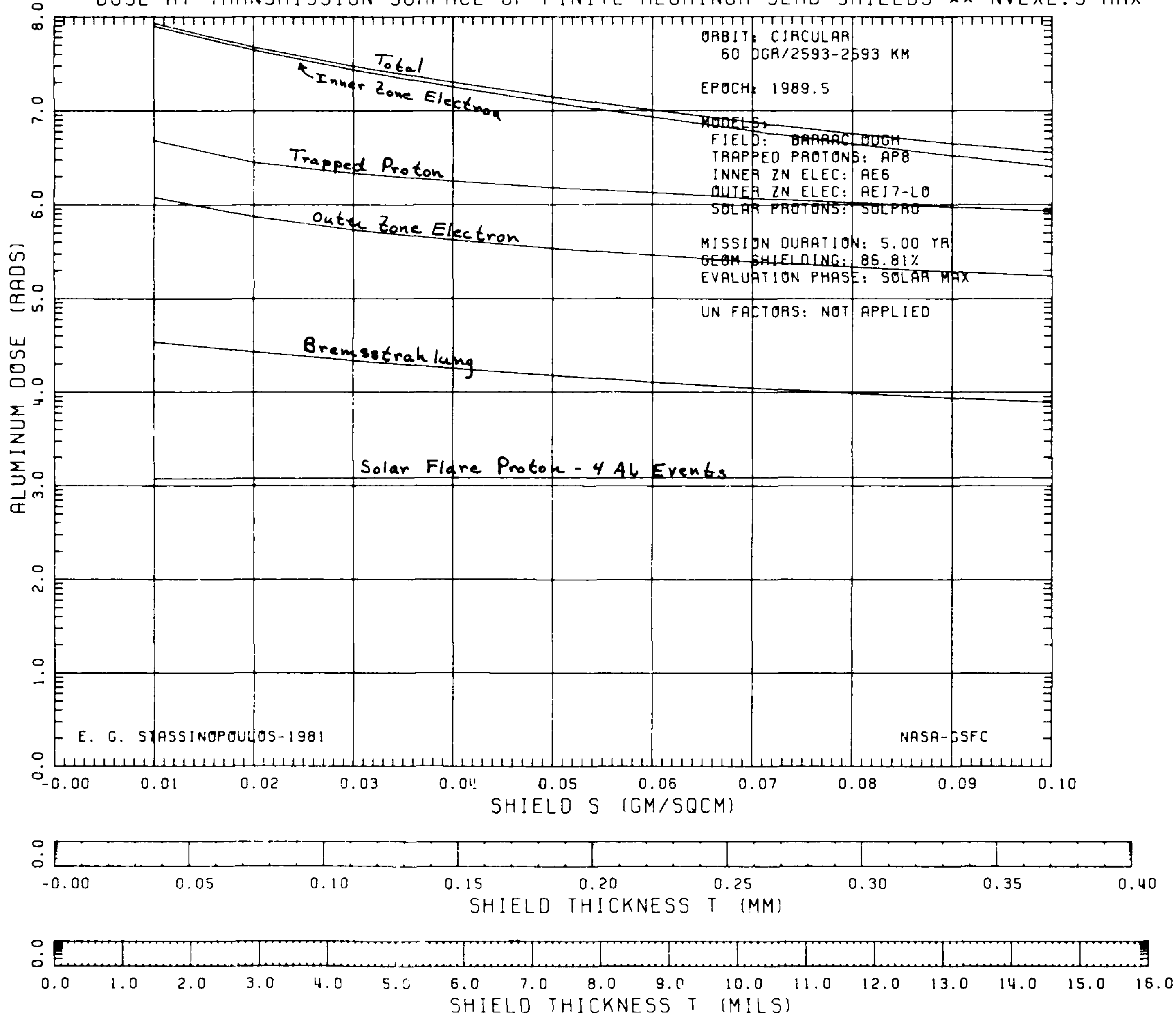


Figure 59

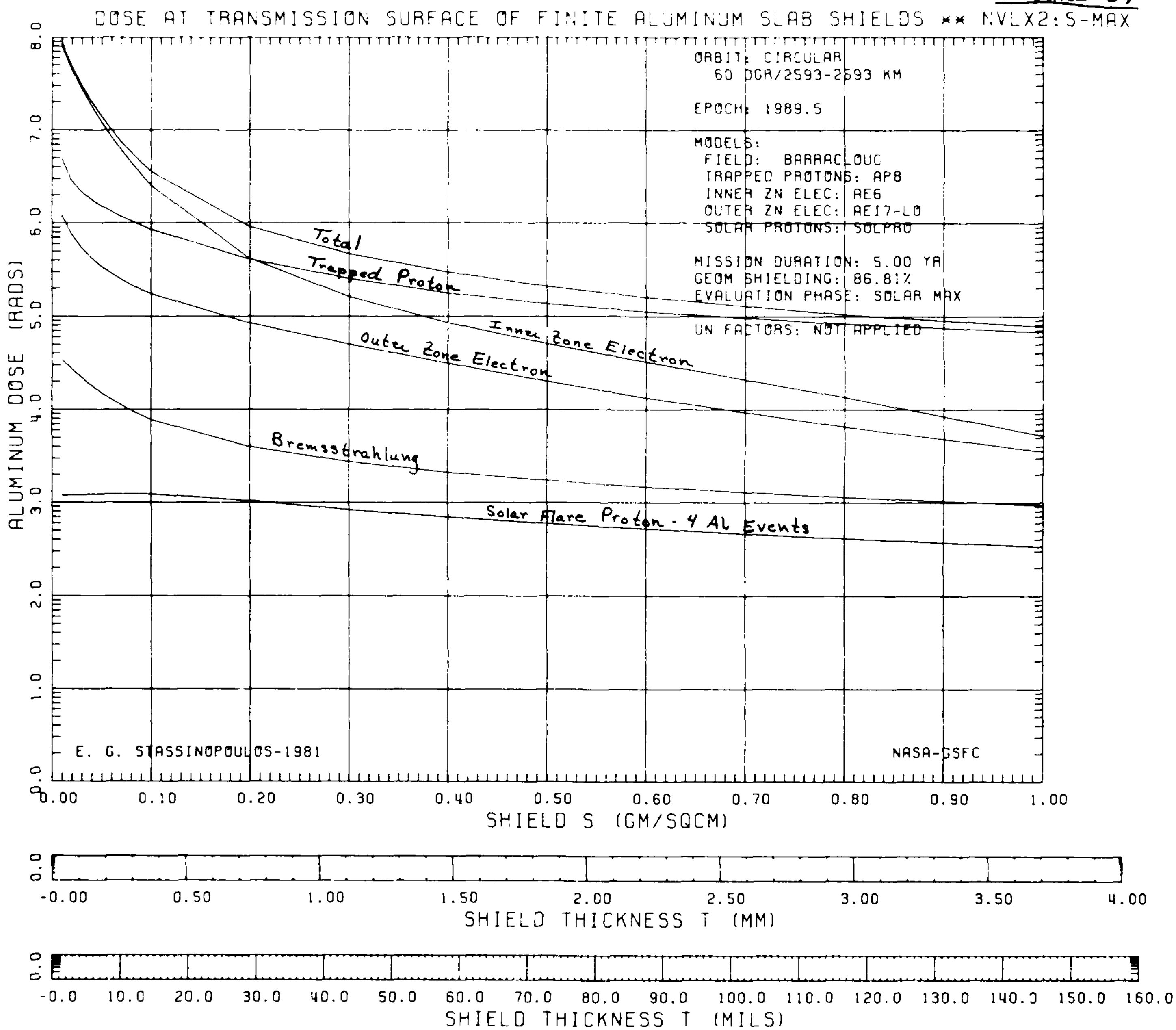
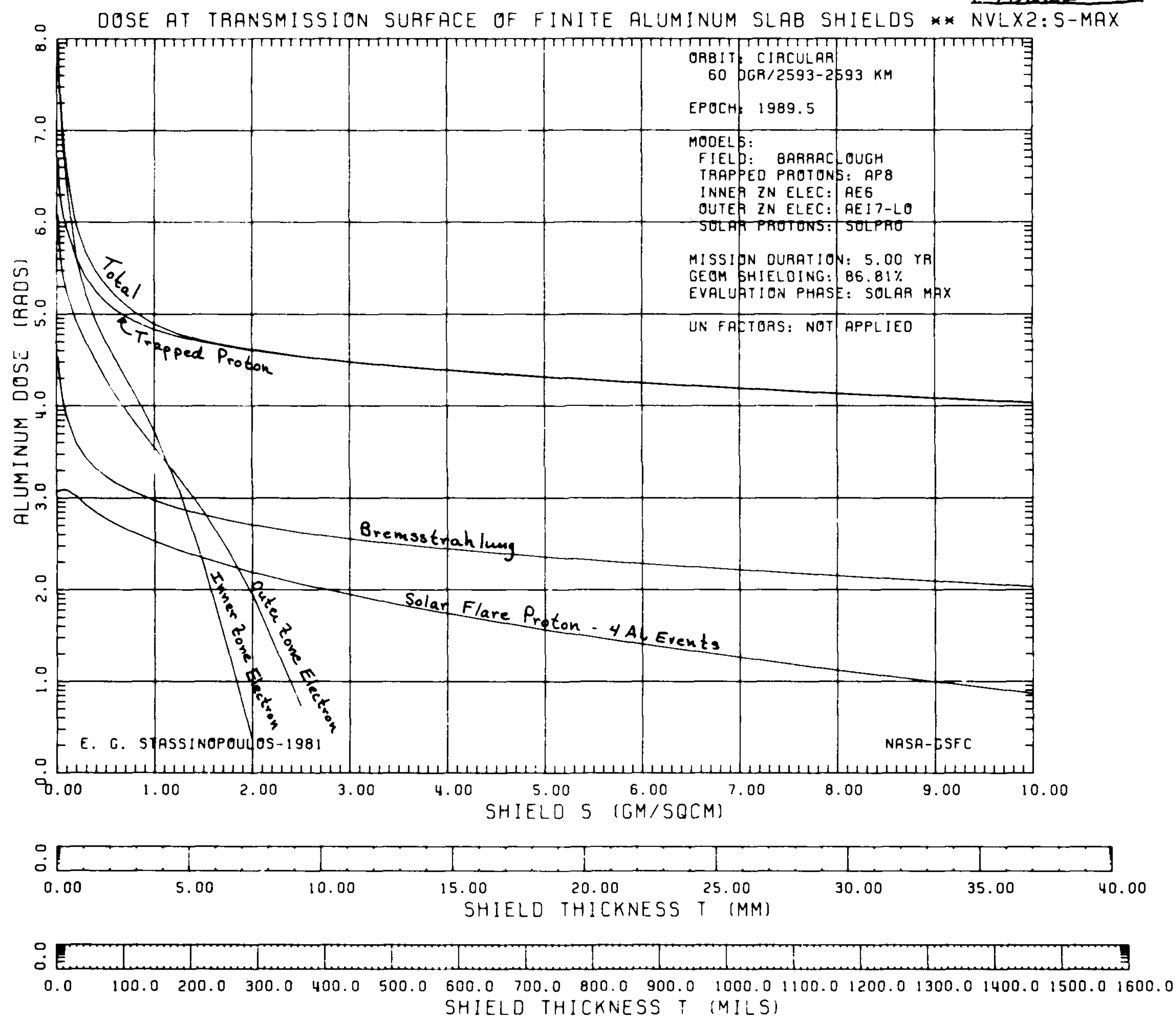

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX2:S-MAX
ORBIT: CIRCULAR
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUC
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 86.81%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Inner Zone Electron
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

FIGURE 60



DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX2:S-MAX
ORBIT: CIRCULAR
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 86.81%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
Inner Zone Electron
Outer Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD S (GM/SQCM)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MM)
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0
SHIELD THICKNESS T (MILS)

Figure 61

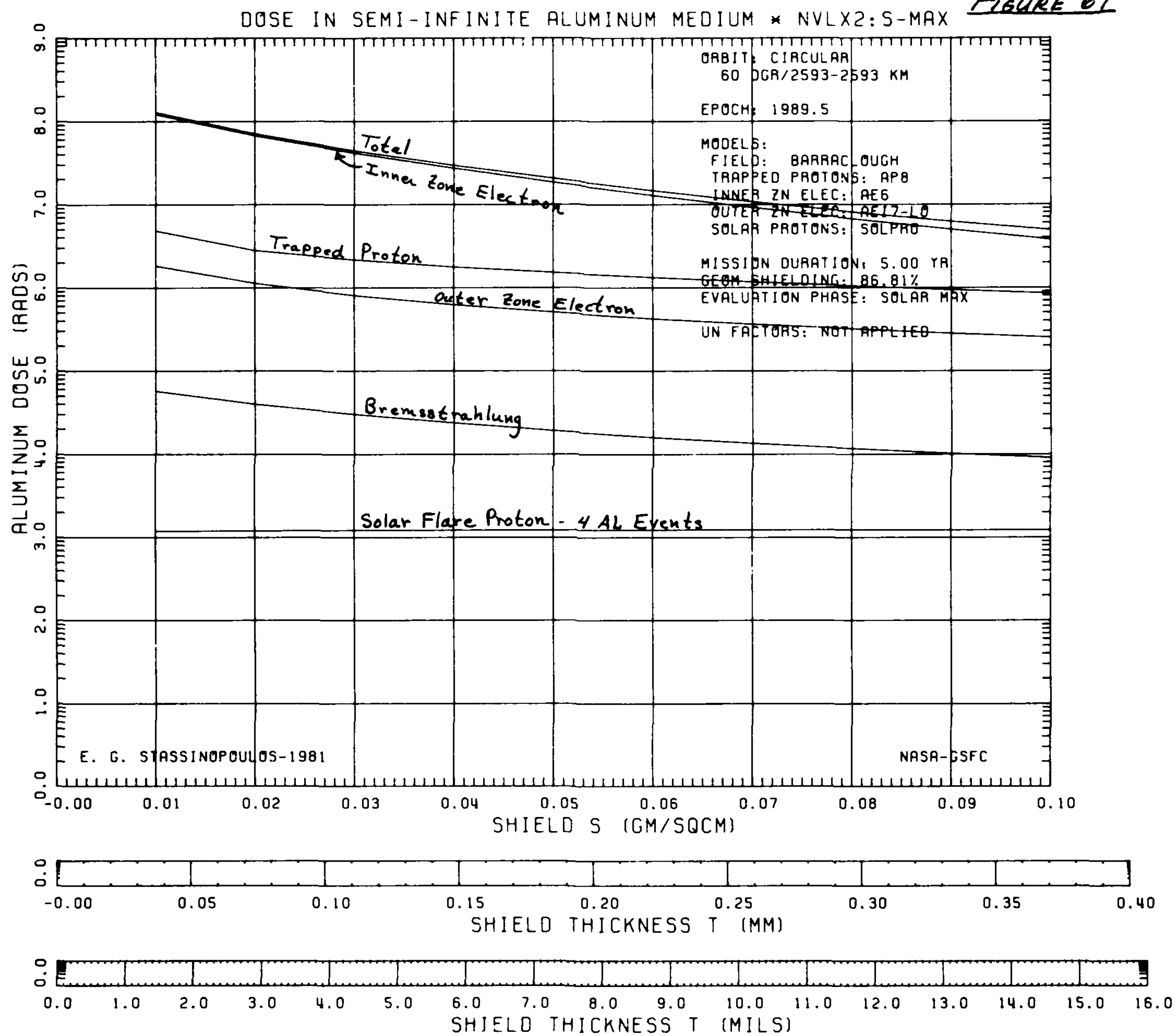

DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX2:S-MAX
ORBIT: CIRCULAR
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 86.81%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
-0.00 0.01 0.02 0.03 0.04 0.05 0.06 0.07 0.08 0.09 0.10
SHIELD S (GM/SQCM)
-0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40
SHIELD THICKNESS T (MM)
0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0
SHIELD THICKNESS T (MILS)

FIGURE 62

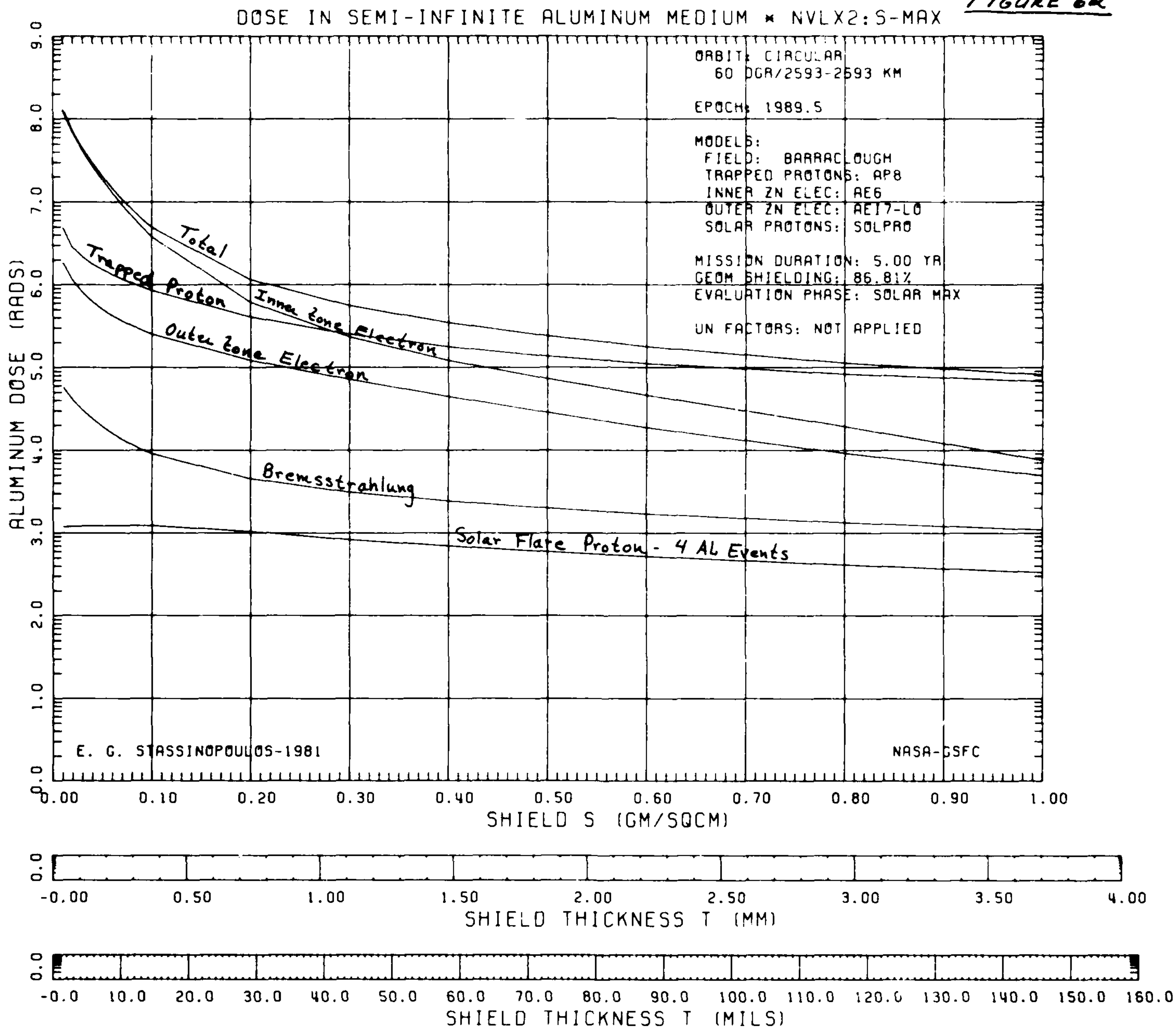

DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX2:S-MAX
ORBIT: CIRCULAR
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 86.81%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Inner Zone Electron
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

FIGURE 63

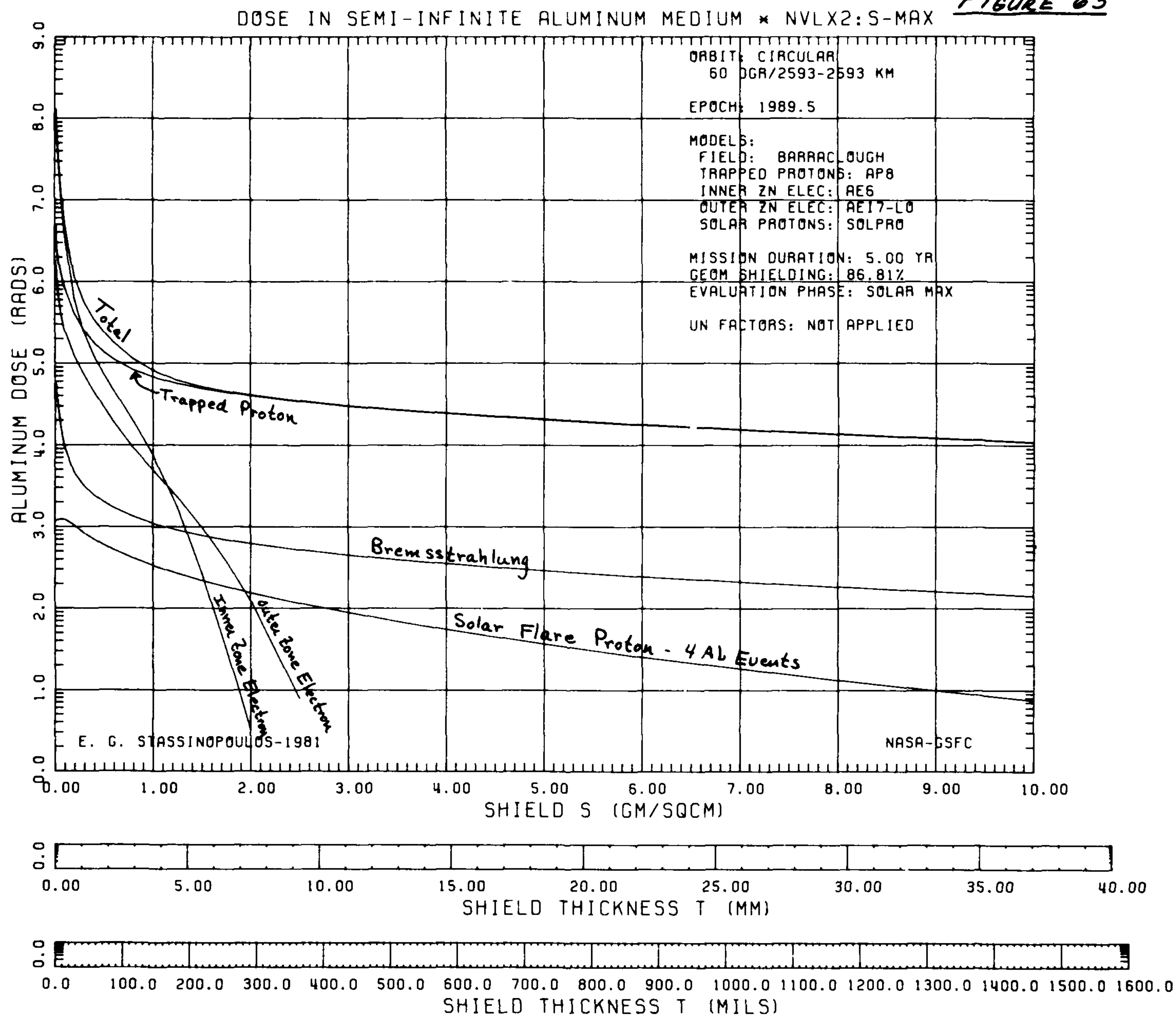
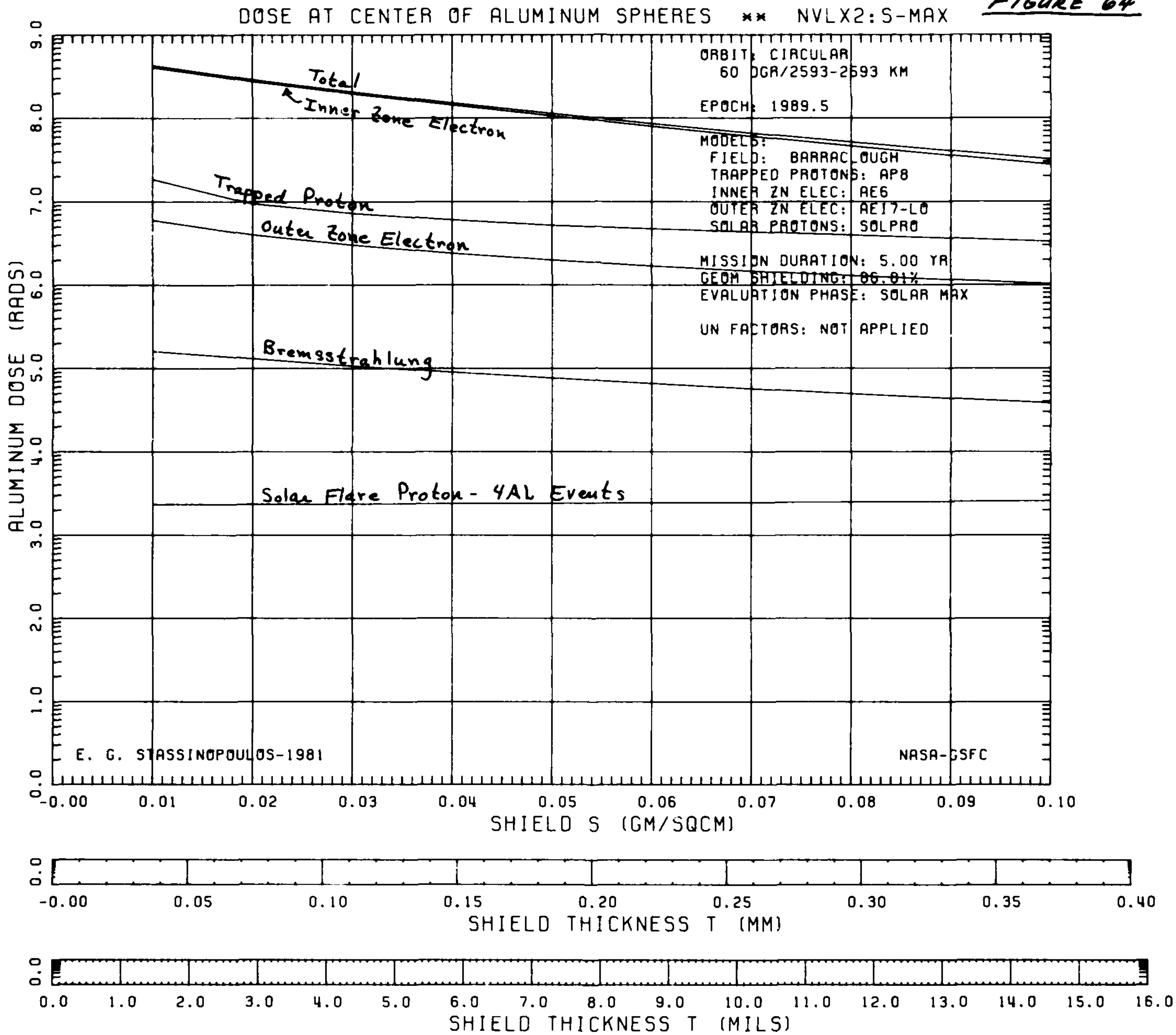
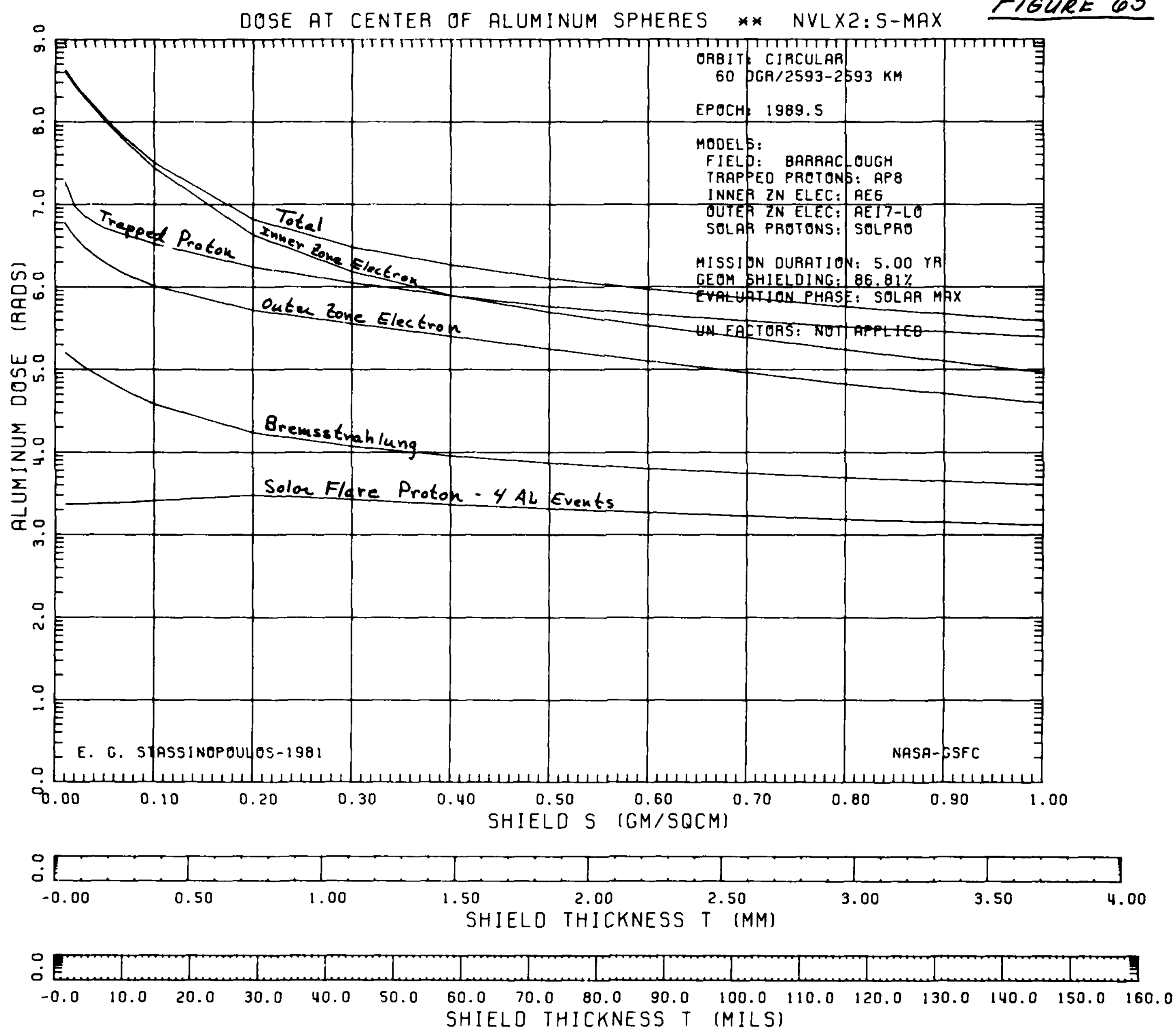

DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX2:S-MAX
ORBIT: CIRCULAR
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 86.81%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
Inner Zone Electron
outer Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00 1.00 2.00 3.00 4.00 5.00 6.00 7.00 8.00 9.00 10.00
SHIELD S (GM/SQCM)
0.00 5.00 10.00 15.00 20.00 25.00 30.00 35.00 40.00
SHIELD THICKNESS T (MM)
0.0 100.0 200.0 300.0 400.0 500.0 600.0 700.0 800.0 900.0 1000.0 1100.0 1200.0 1300.0 1400.0 1500.0 1600.0
SHIELD THICKNESS T (MILS)

FIGURE 64



DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX2:S-MAX
ORBIT: CIRCULAR
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 86.01%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
-0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
SHIELD S (GM/SQCM)
0.0
-0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
SHIELD THICKNESS T (MM)
0.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
SHIELD THICKNESS T (MILS)

FIGURE 65



DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX2:S-MAX
ORBIT: CIRCULAR
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 86.81%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

FIGURE 66

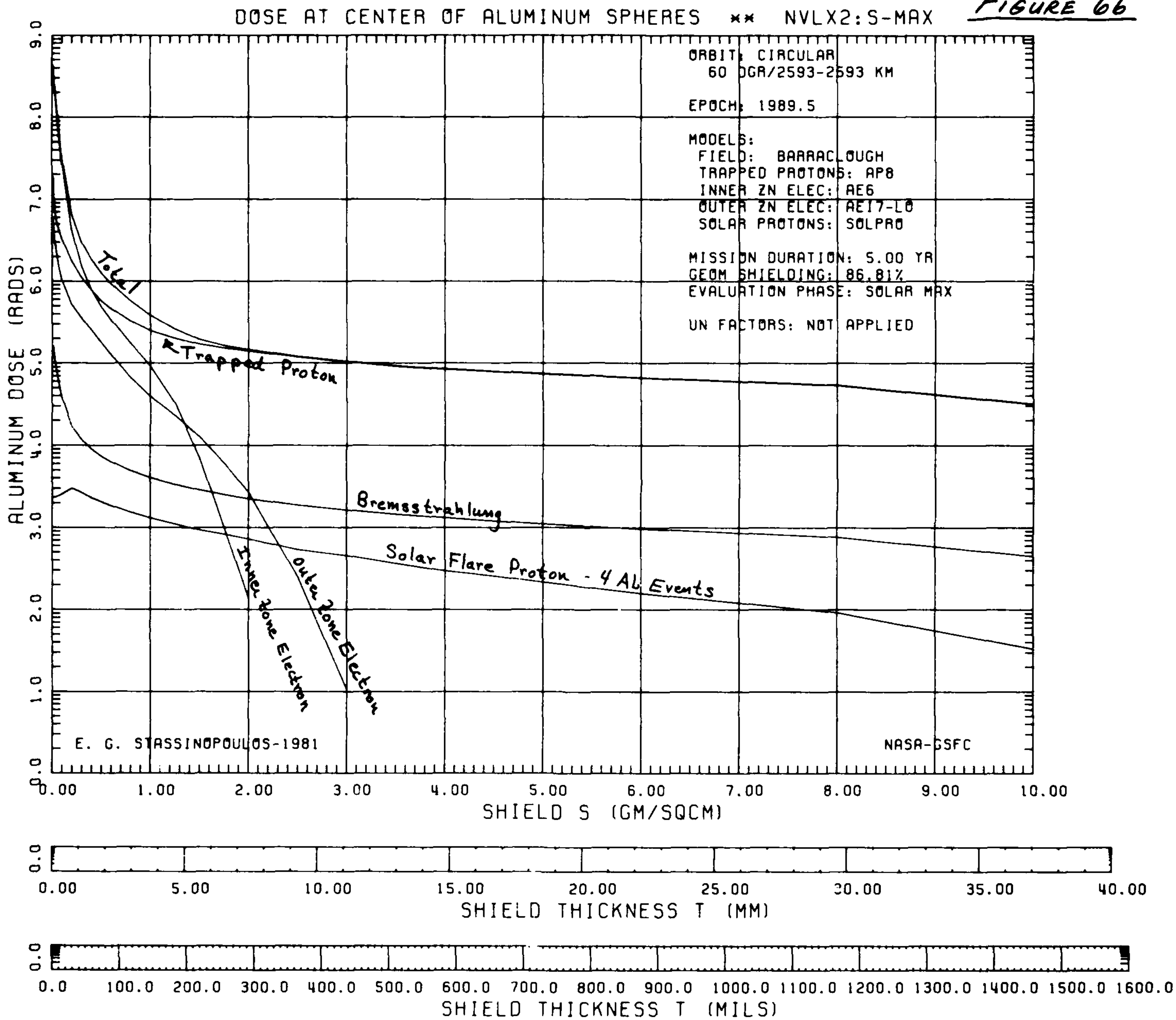
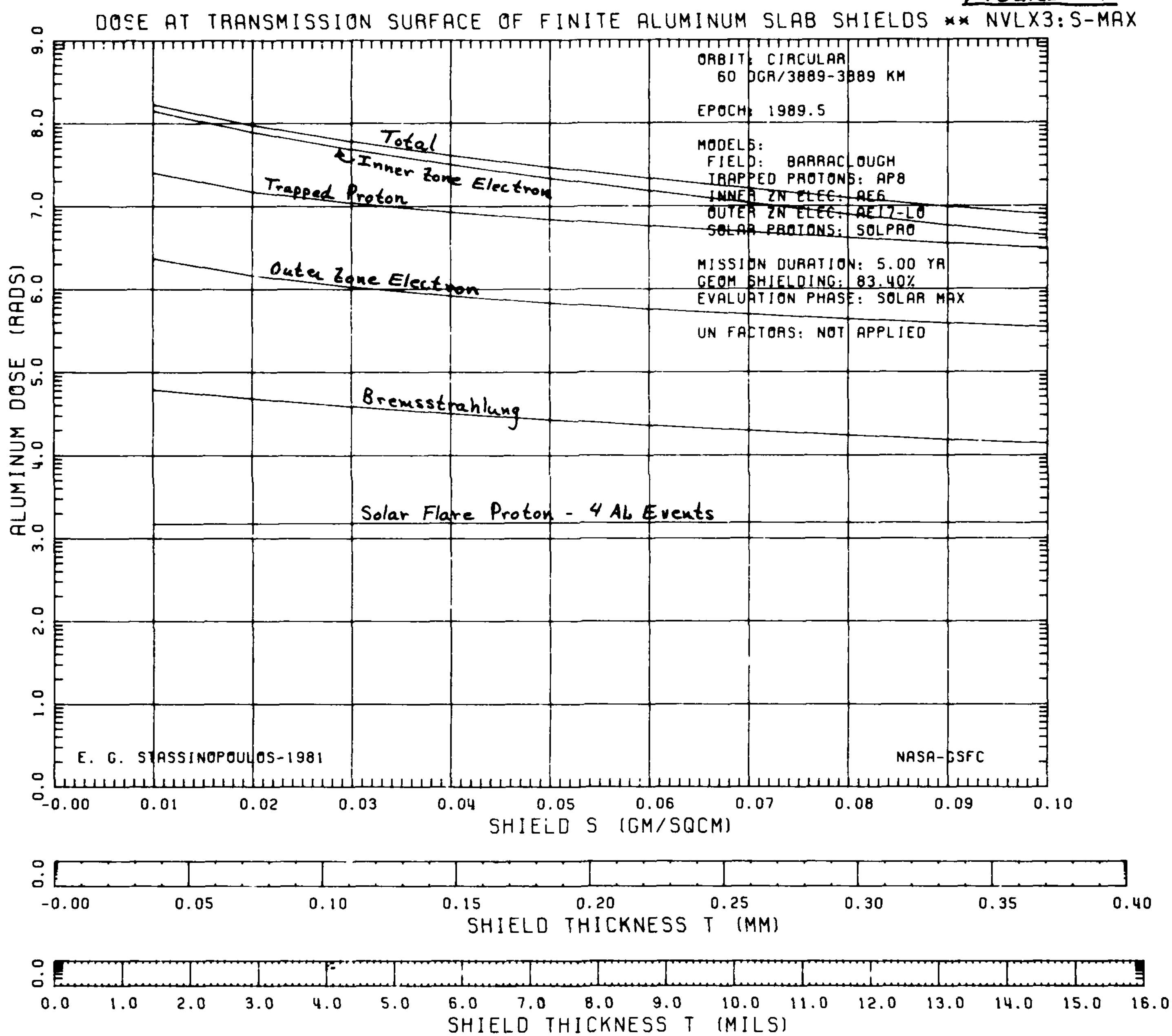
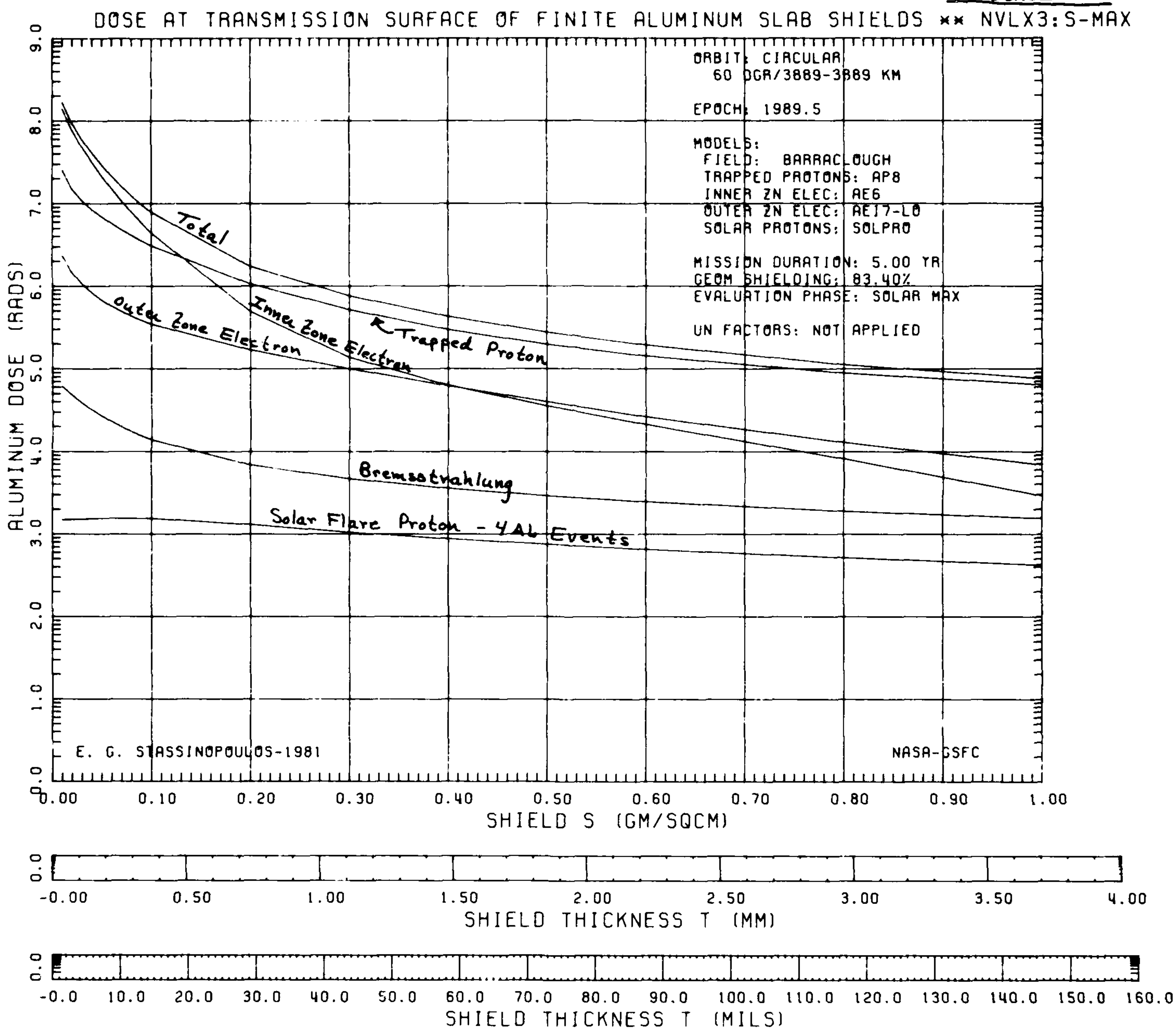

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX2:S-MAX
ORBIT: CIRCULAR
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 86.81%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
Inner Zone Electron
Outer Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD S (GM/SQCM)
0.0
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MM)
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0
SHIELD THICKNESS T (MILS)

Figure 67



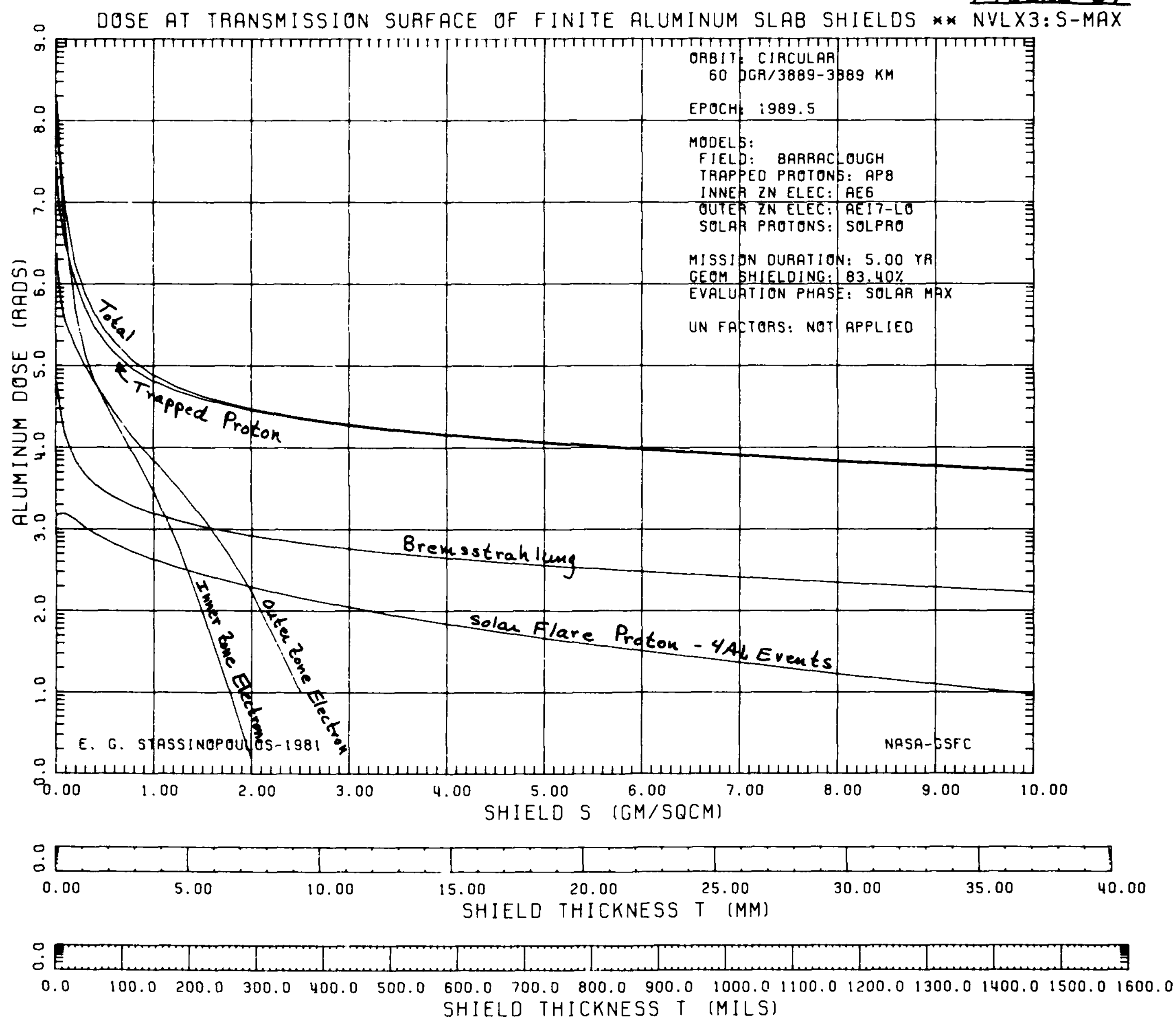
DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX3:S-MAX
ORBIT: CIRCULAR
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 83.40%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0
-0.00 0.01 0.02 0.03 0.04 0.05 0.06 0.07 0.08 0.09 0.10
SHIELD S (GM/SQCM)
-0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40
SHIELD THICKNESS T (MM)
0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0
SHIELD THICKNESS T (MILS)

FIGURE 68



DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX3:S-MAX
ORBIT: CIRCULAR
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 83.40%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Inner Zone Electron
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

Figure 69



DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX3:S-MAX
ORBIT: CIRCULAR
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 83.40%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4AL Events
Inner Zone Electrons
Outer Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD S (GM/SQCM)
0.0
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MM)
0.0
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0
SHIELD THICKNESS T (MILS)

FIGURE 70

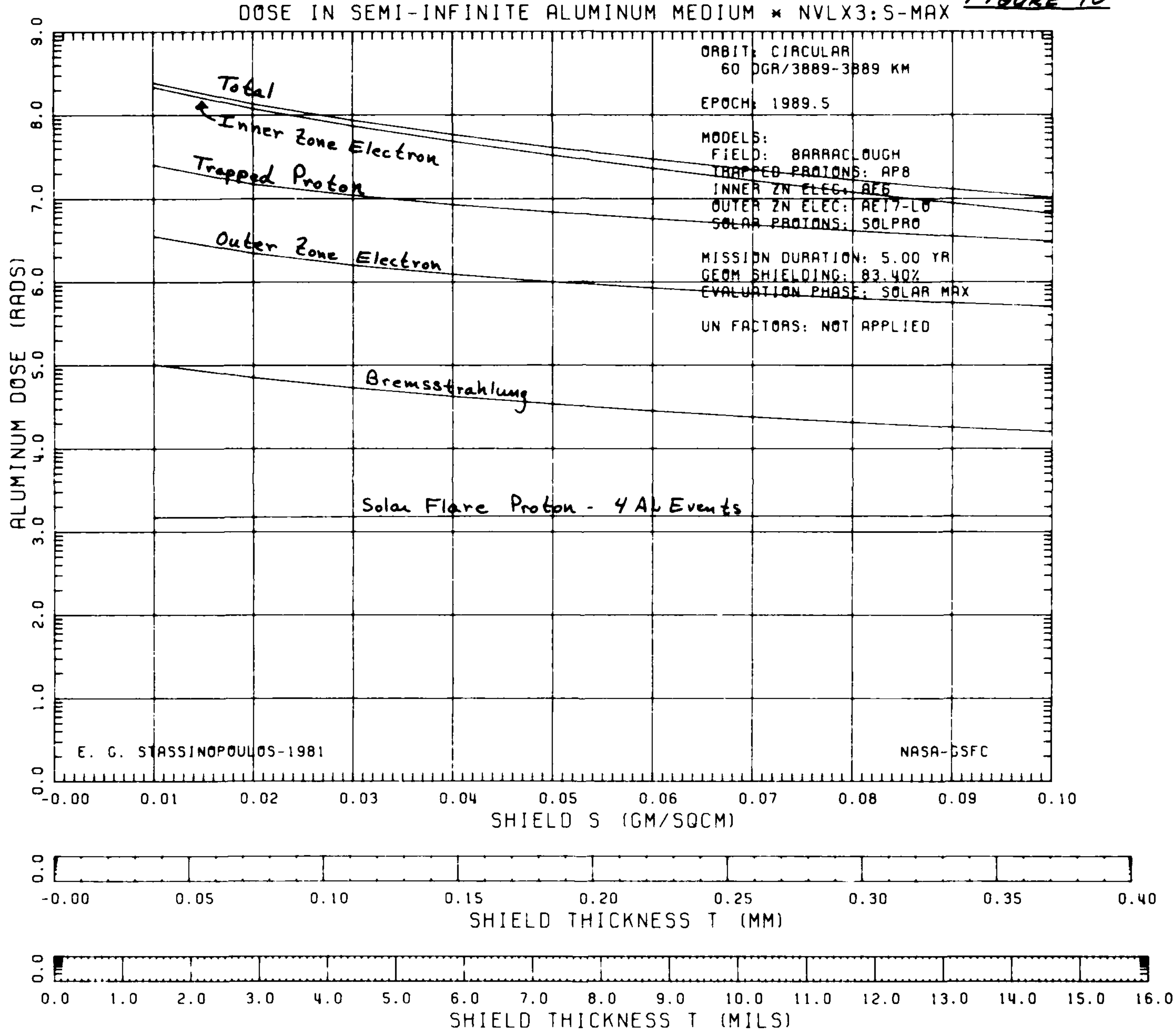
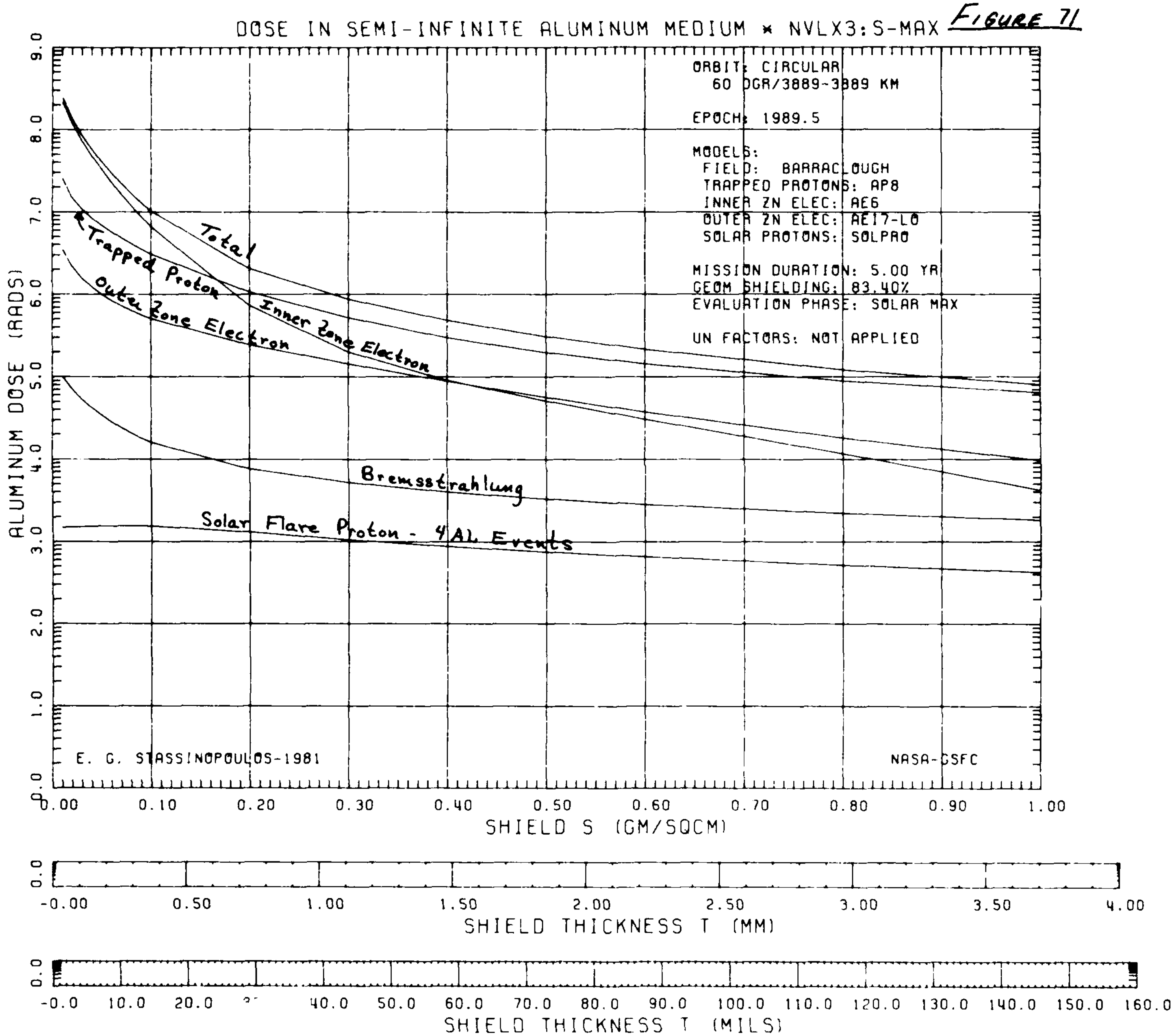
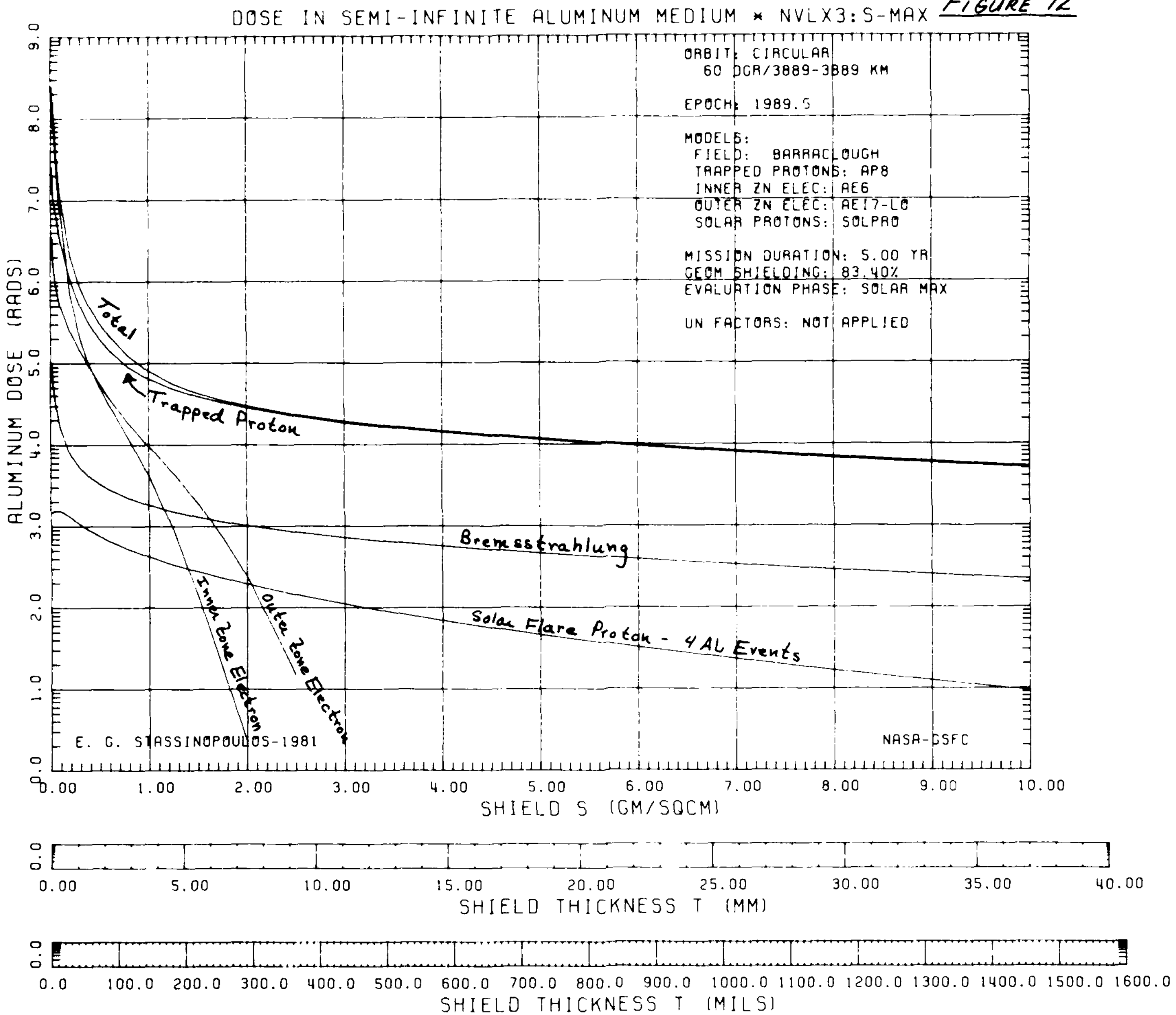

DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX3:S-MAX
ORBIT: CIRCULAR
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 83.40%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

FIGURE 71



DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX3:S-MAX
ORBIT: CIRCULAR
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 83.40%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Inner Zone Electron
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

FIGURE 72



DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX3:S-MAX
ORBIT: CIRCULAR
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 83.40%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Inner Zone Electron
Outer Zone Electron
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

FIGURE 73

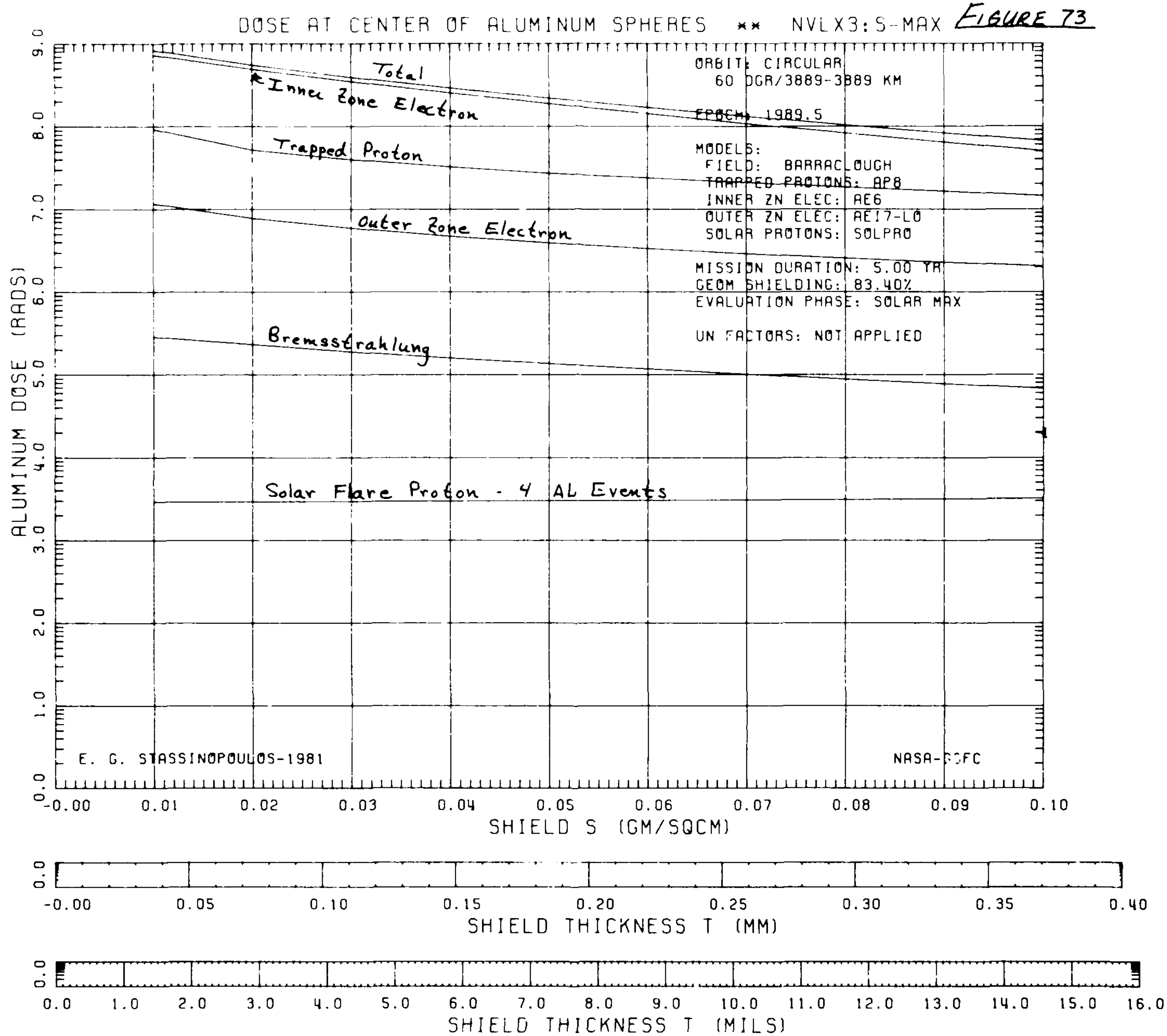
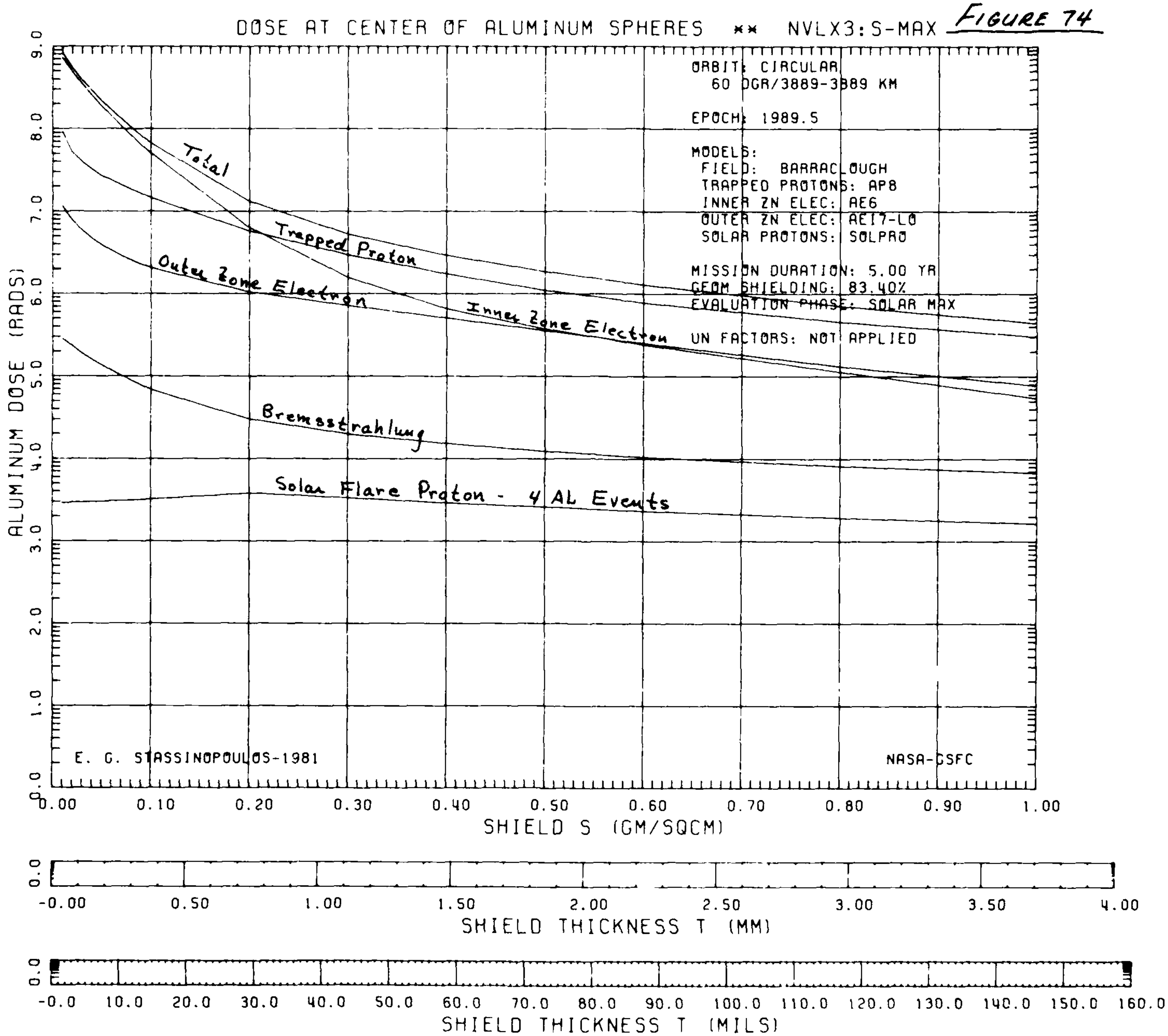

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX3:S-MAX
ORBIT: CIRCULAR
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 83.40%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

FIGURE 74



DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX3:S-MAX
ORBIT: CIRCULAR
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 83.40%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Outer Zone Electron
Inner Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

FIGURE 75

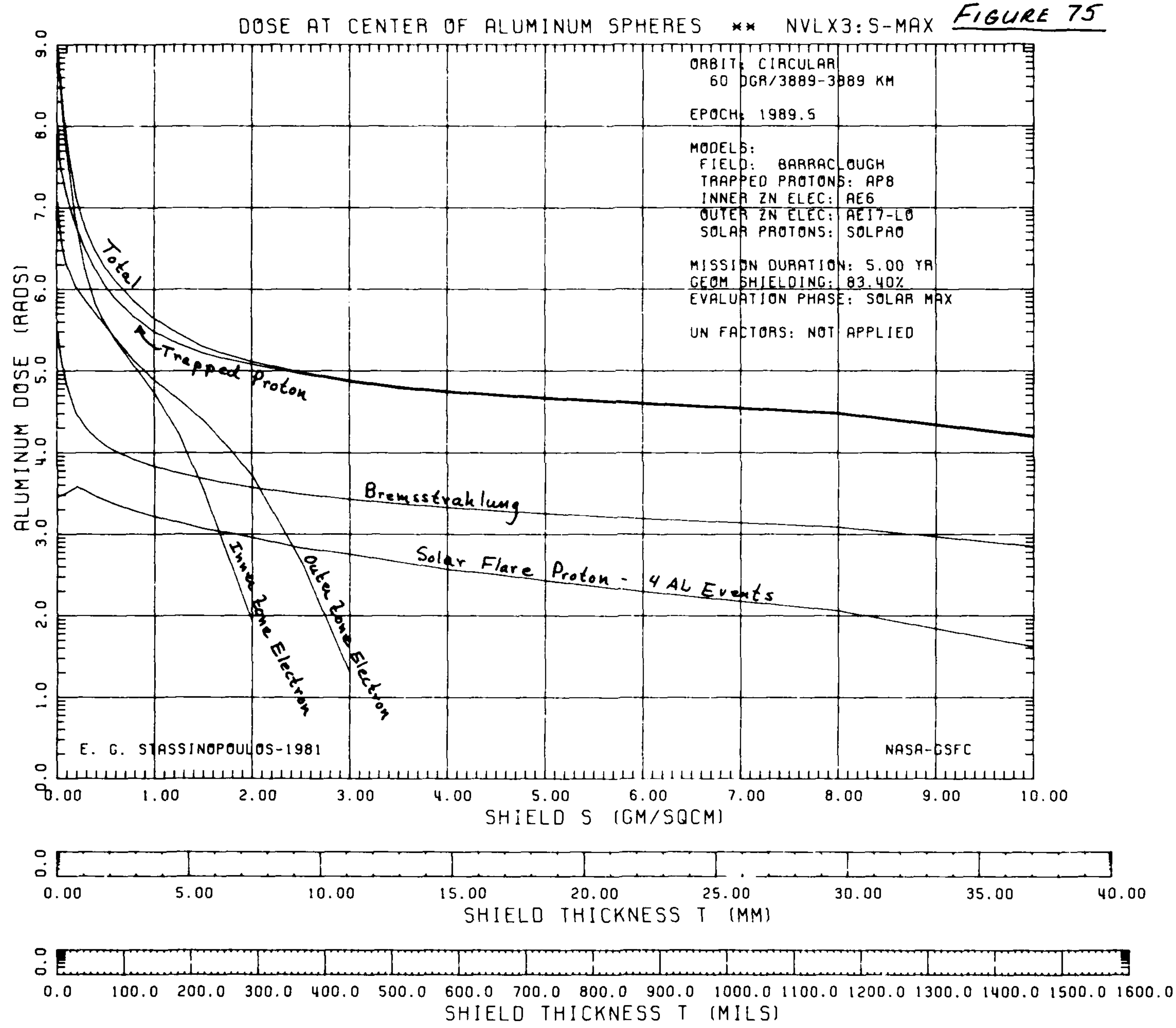

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX3:S-MAX
ORBIT: CIRCULAR
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 83.40%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
Inner Zone Electron
Outer Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD S (GM/SQCM)
0.0
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MM)
0.0
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0
SHIELD THICKNESS T (MILS)

FIGURE 76

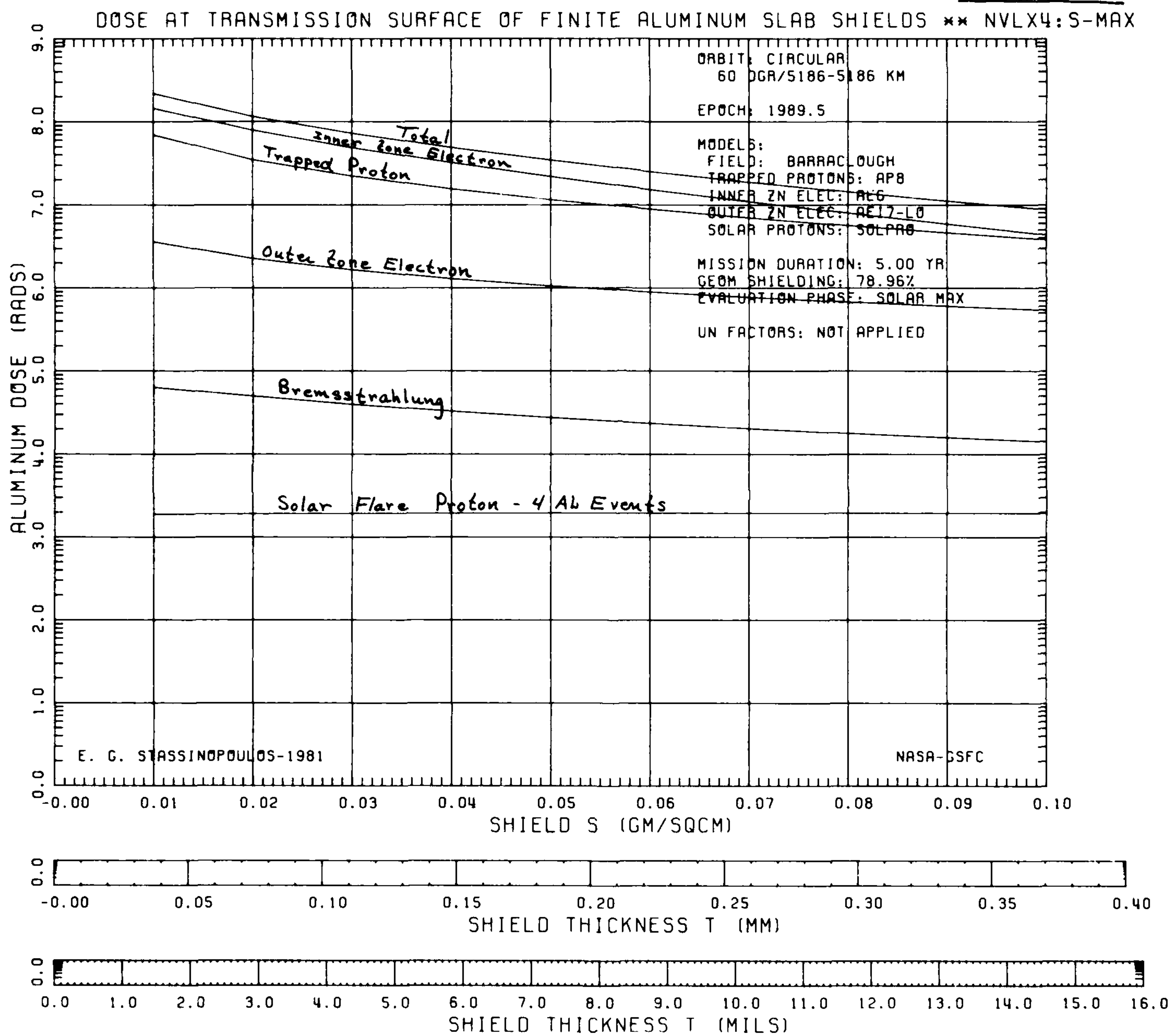

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX4:S-MAX
ORBIT: CIRCULAR
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 78.96%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

FIGURE 77

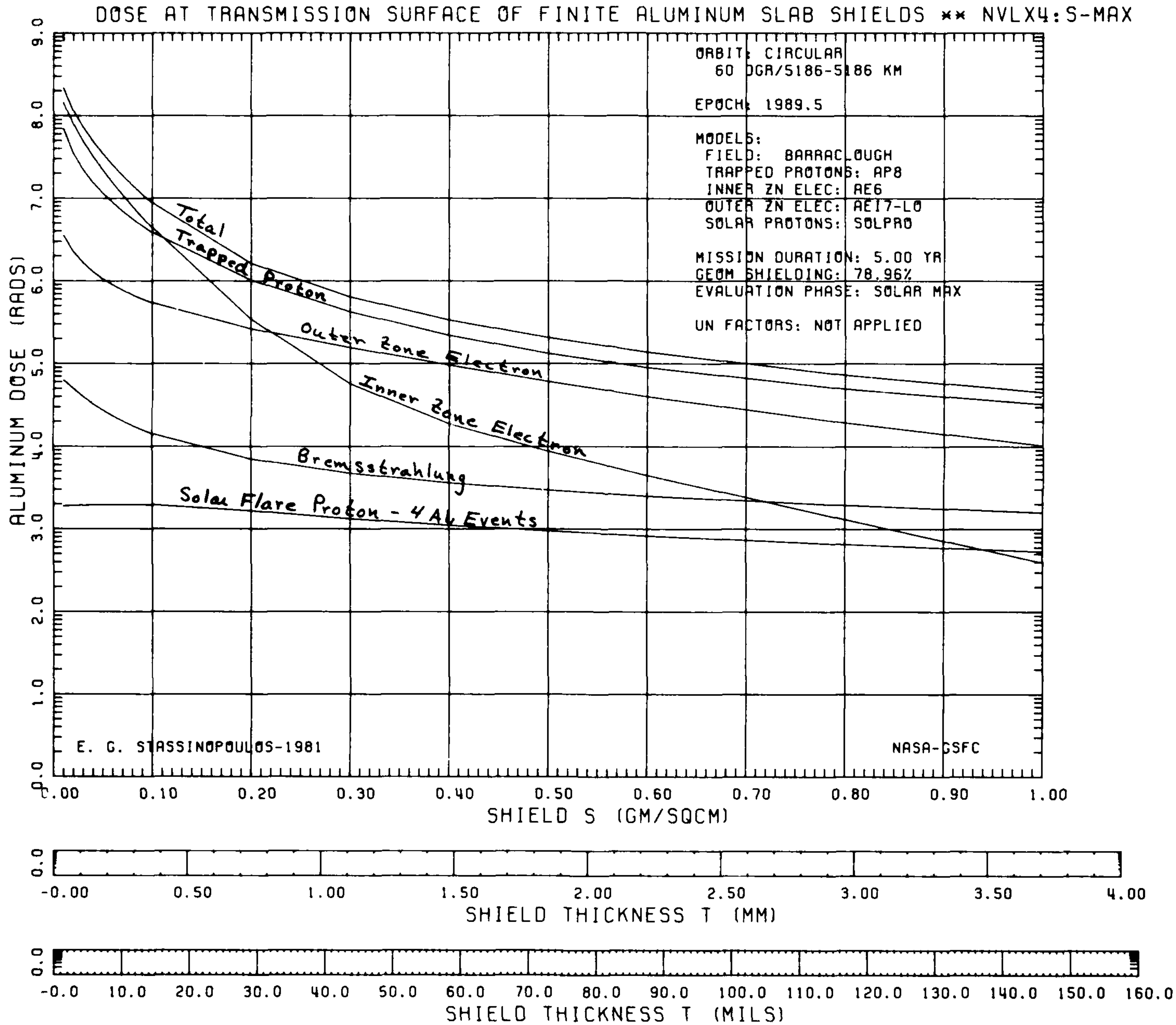
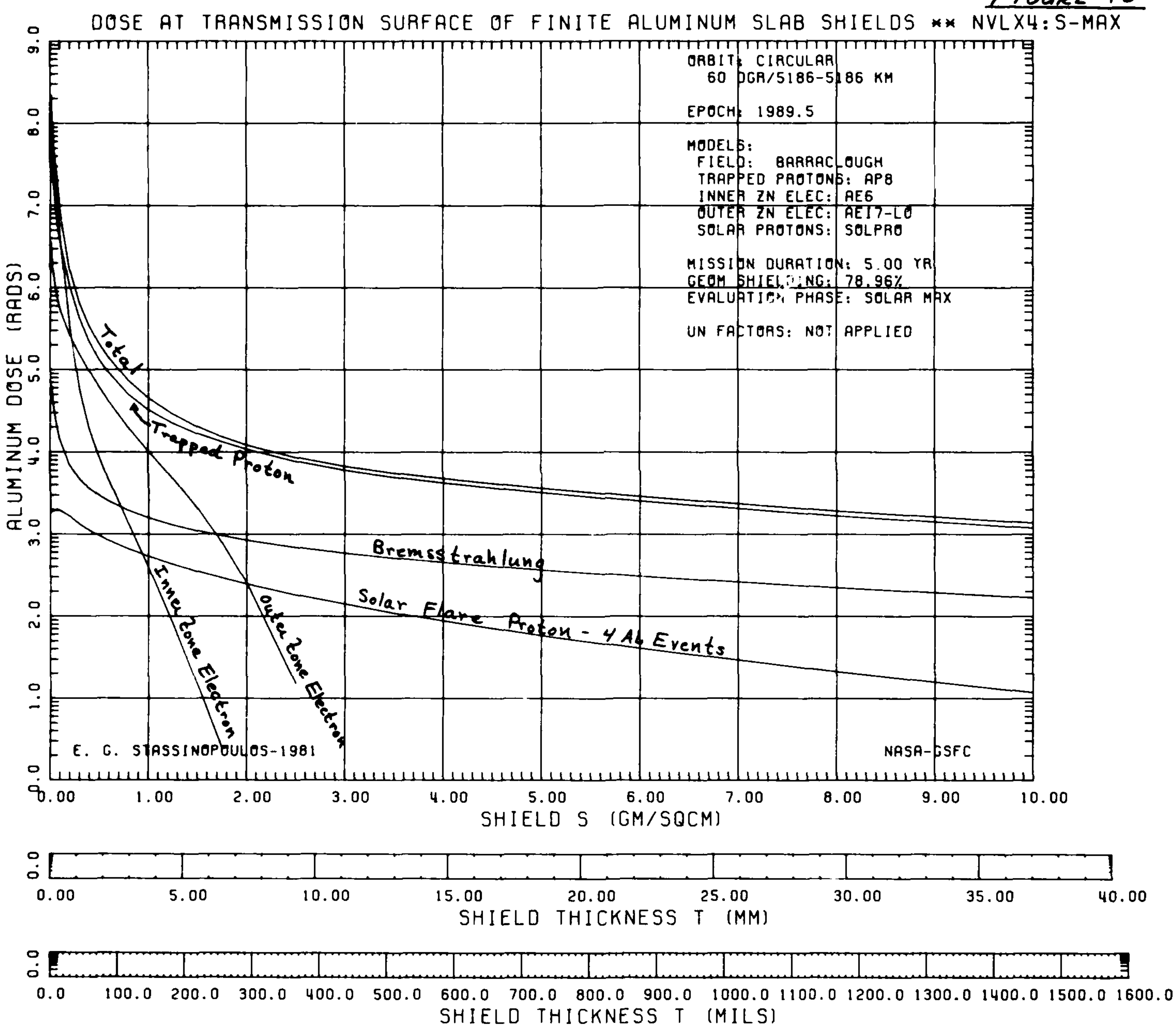

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX4:S-MAX
ORBIT: CIRCULAR
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 78.96%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Outer Zone Electron
Inner Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

Figure 78



DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX4:S-MAX
ORBIT: CIRCULAR
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
Inner Zone Electron
Outer Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
SHIELD S (GM/SQCM)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD THICKNESS T (MM)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MILS)
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0

FIGURE 79

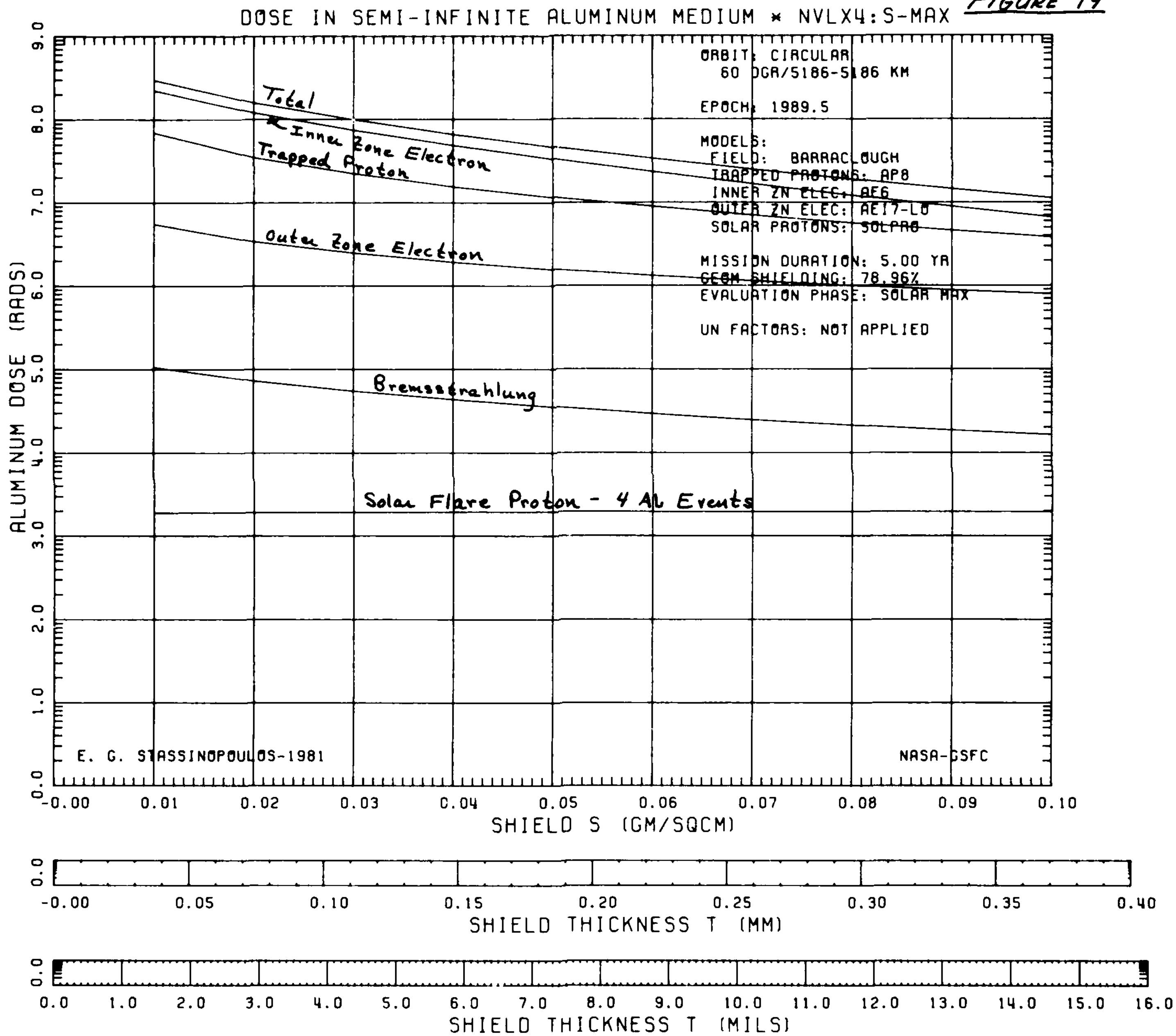
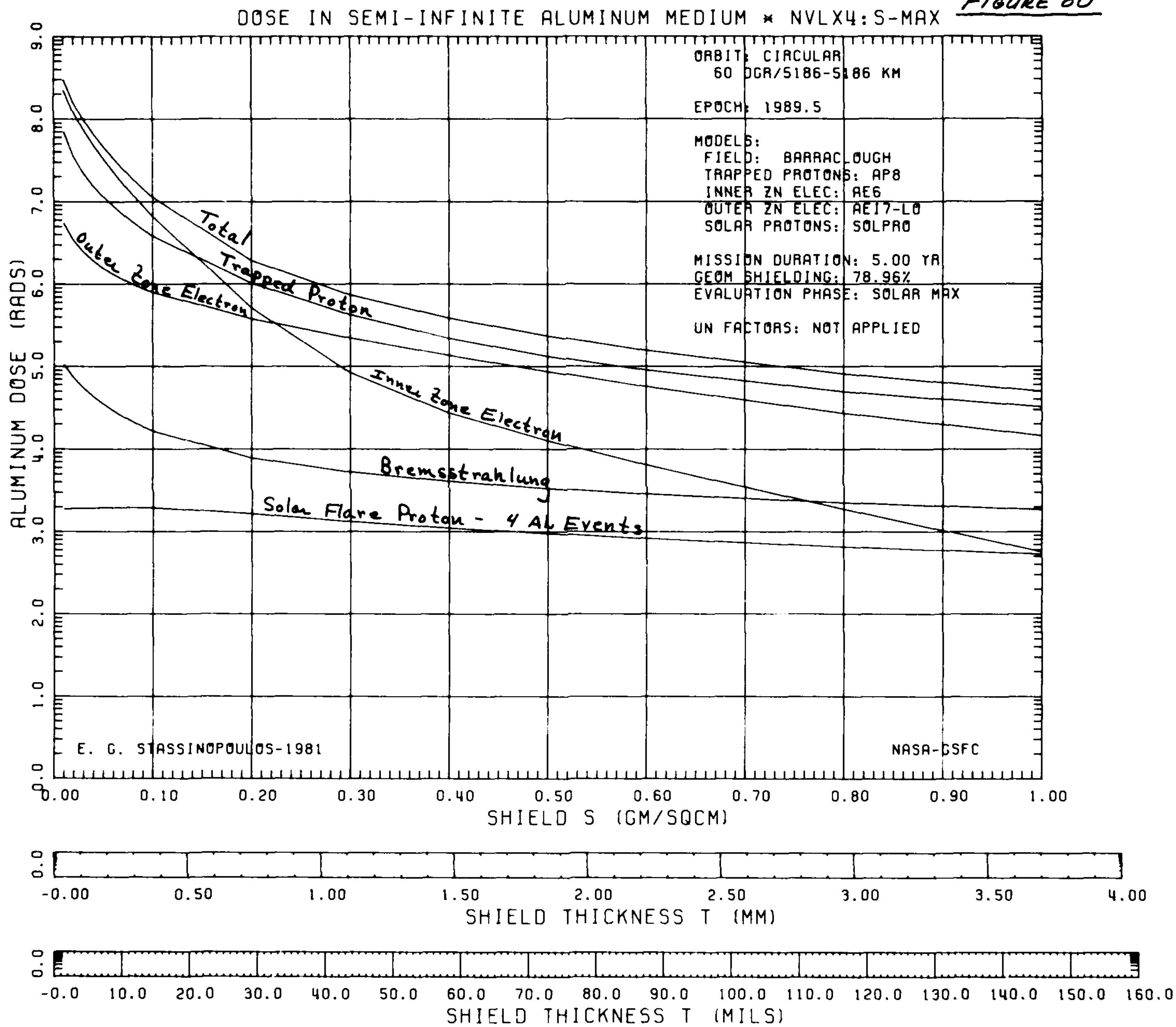

DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX4:S-MAX
ORBIT: CIRCULAR
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 78.96%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

Figure 80



DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX4:S-MAX
ORBIT: CIRCULAR
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 78.96%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Outer Zone Electron
Inner Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
ALUMINUM DOSE (RADS)
E. G. STASSINOPOULOS-1981
NASA-GSFC
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

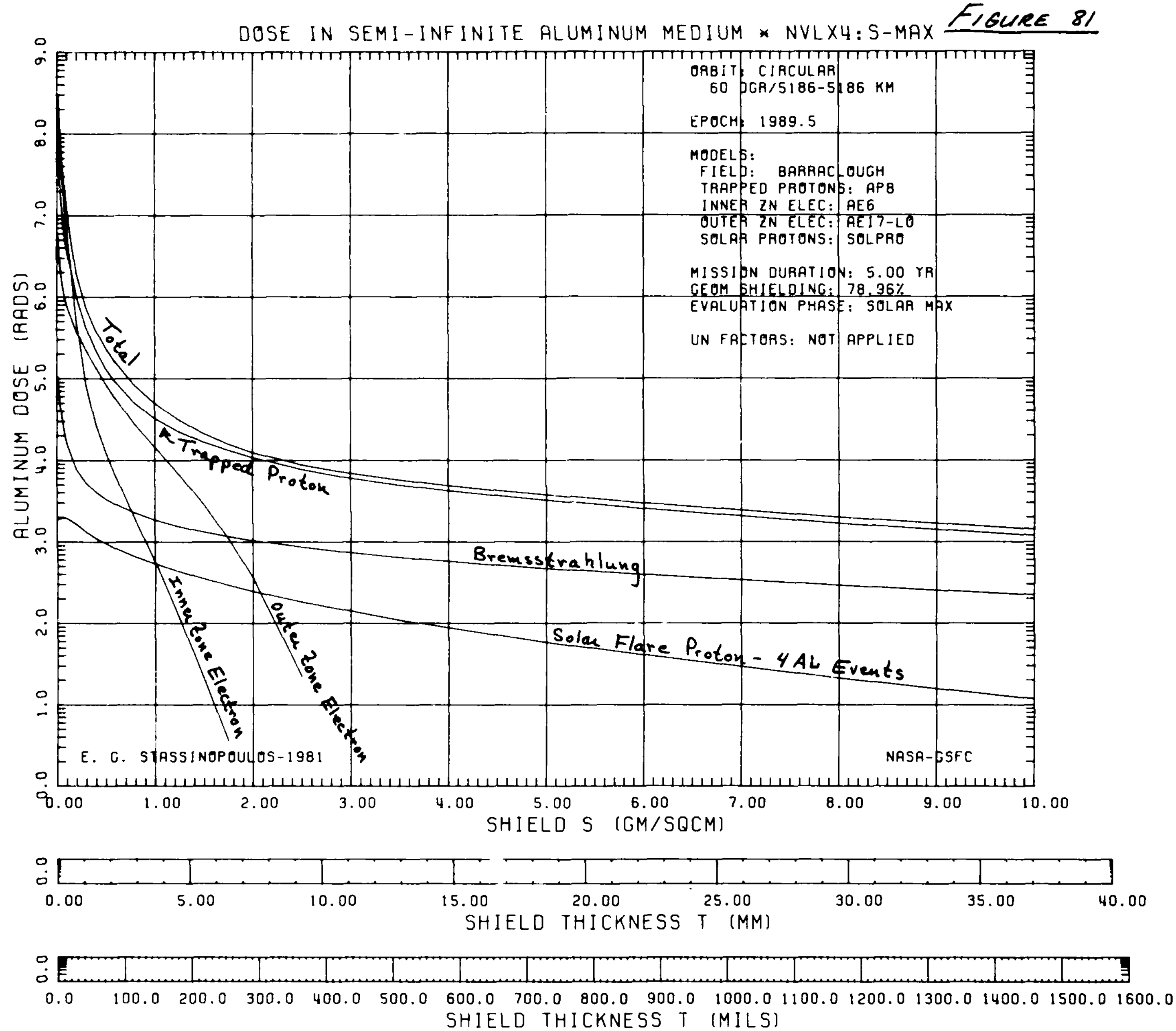
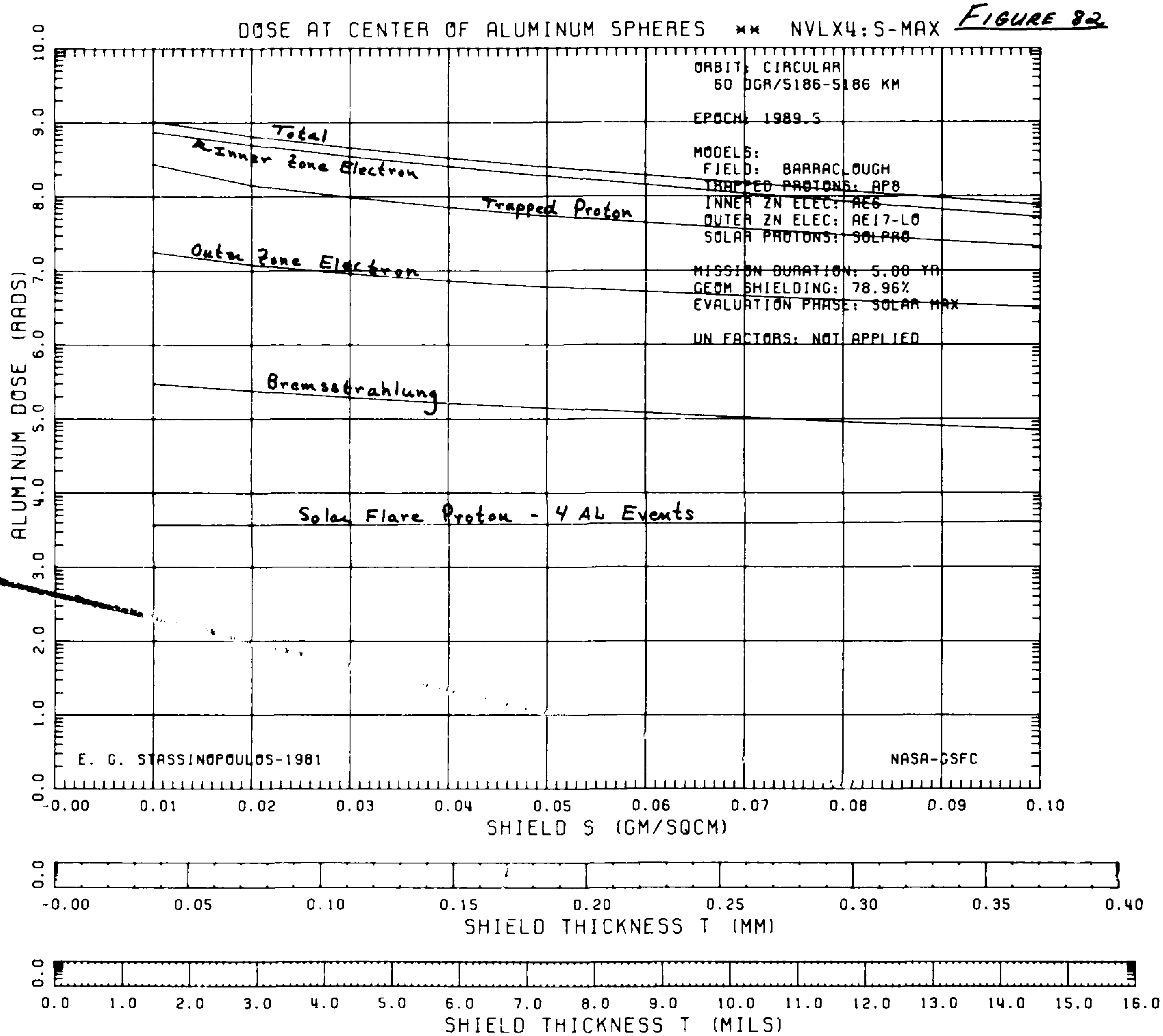


FIGURE 81
DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX4:S-MAX
ORBIT: CIRCULAR
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 78.96%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Inner Zone Electron
Outer Zone Electron
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

FIGURE 82



DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX4:S-MAX
ORBIT: CIRCULAR
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 78.96%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
ALUMINUM DOSE (RADS)
E. G. STASSINOPOULOS-1981
NASA-GSFC
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

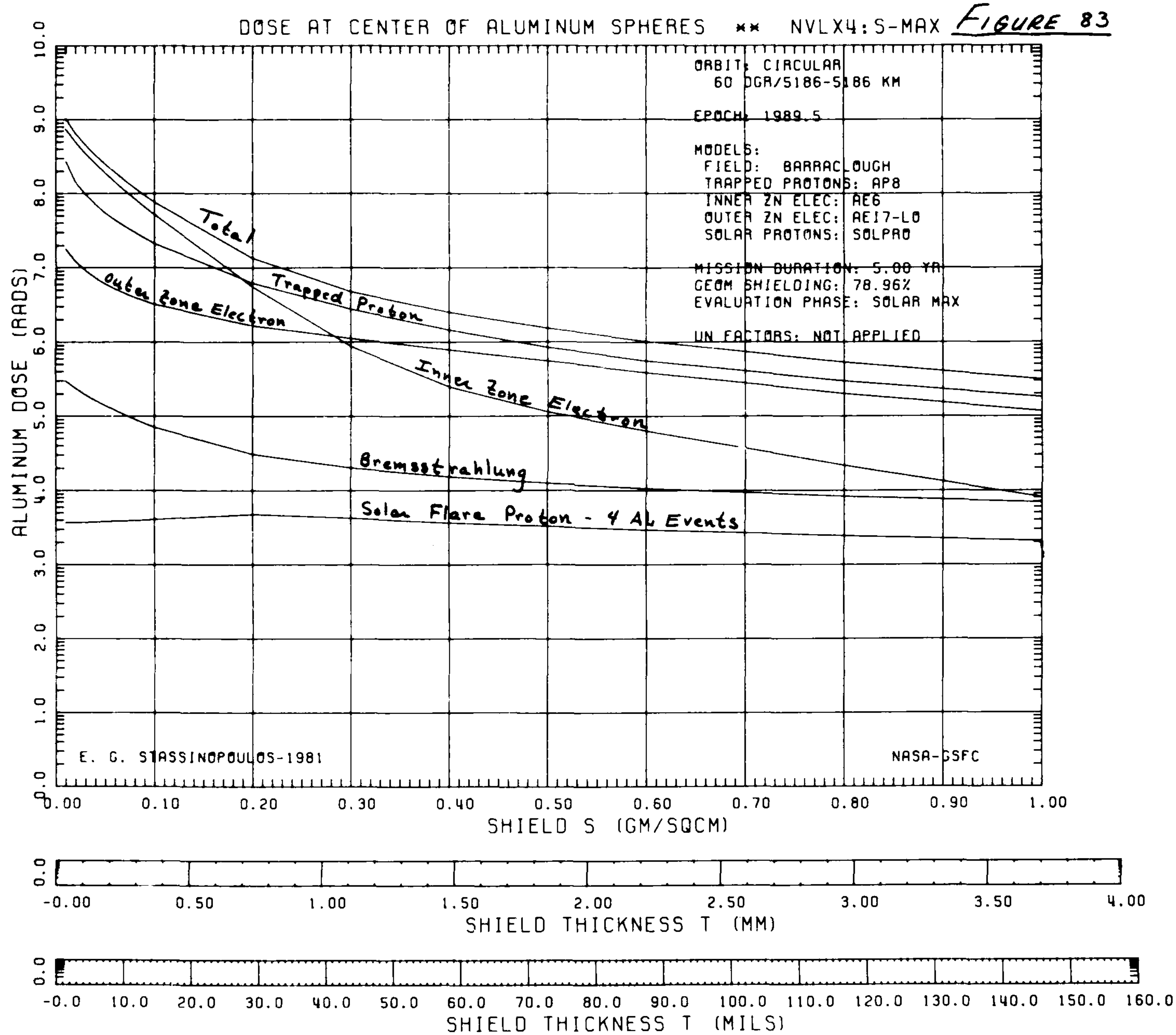
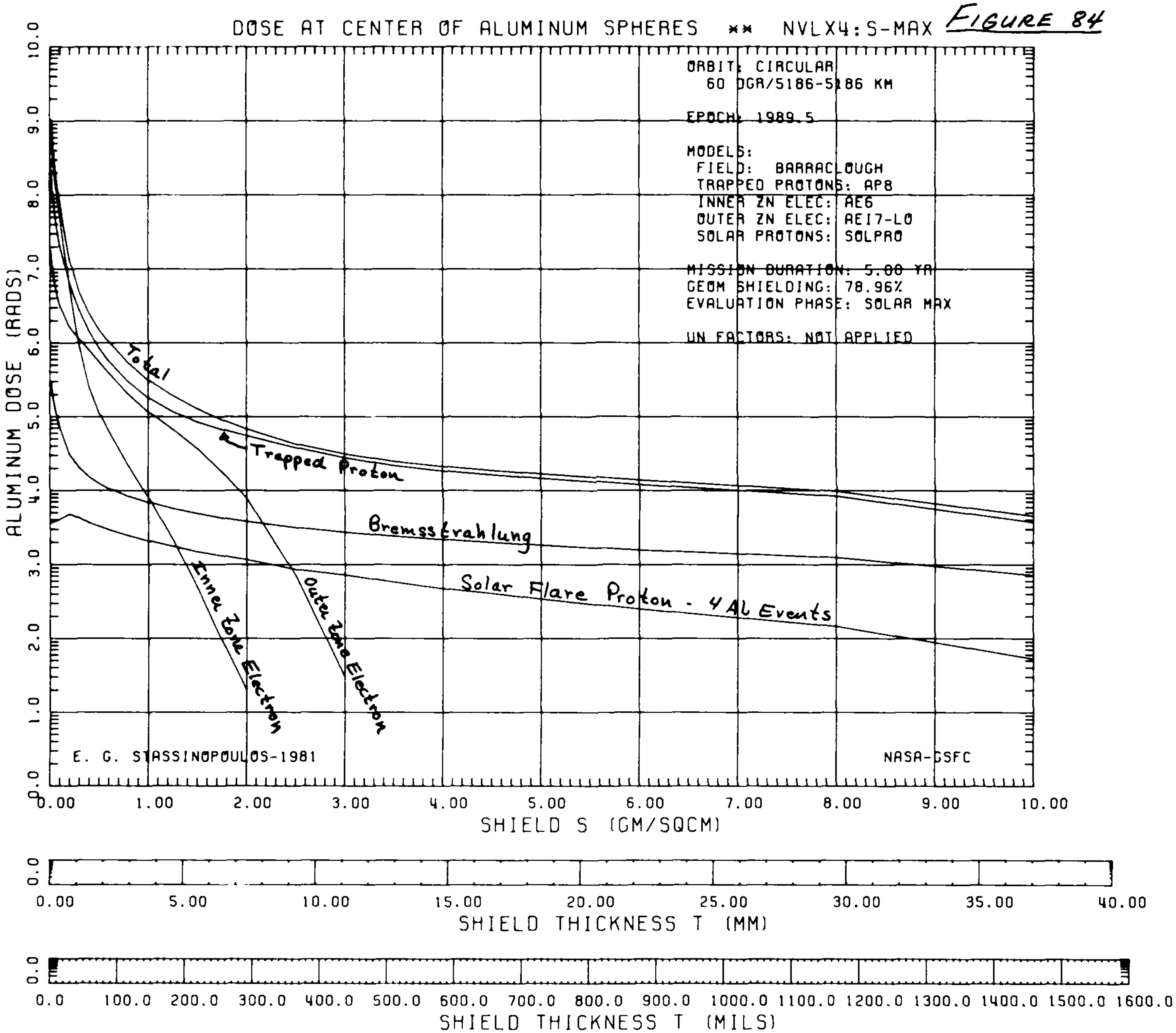

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX4:S-MAX
FIGURE 83
ORBIT: CIRCULAR
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 78.96%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Outer Zone Electron
Inner Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

FIGURE 84



DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX4:S-MAX
ORBIT: CIRCULAR
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 78.96%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
Inner Zone Electron
Outer Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

Figure 85

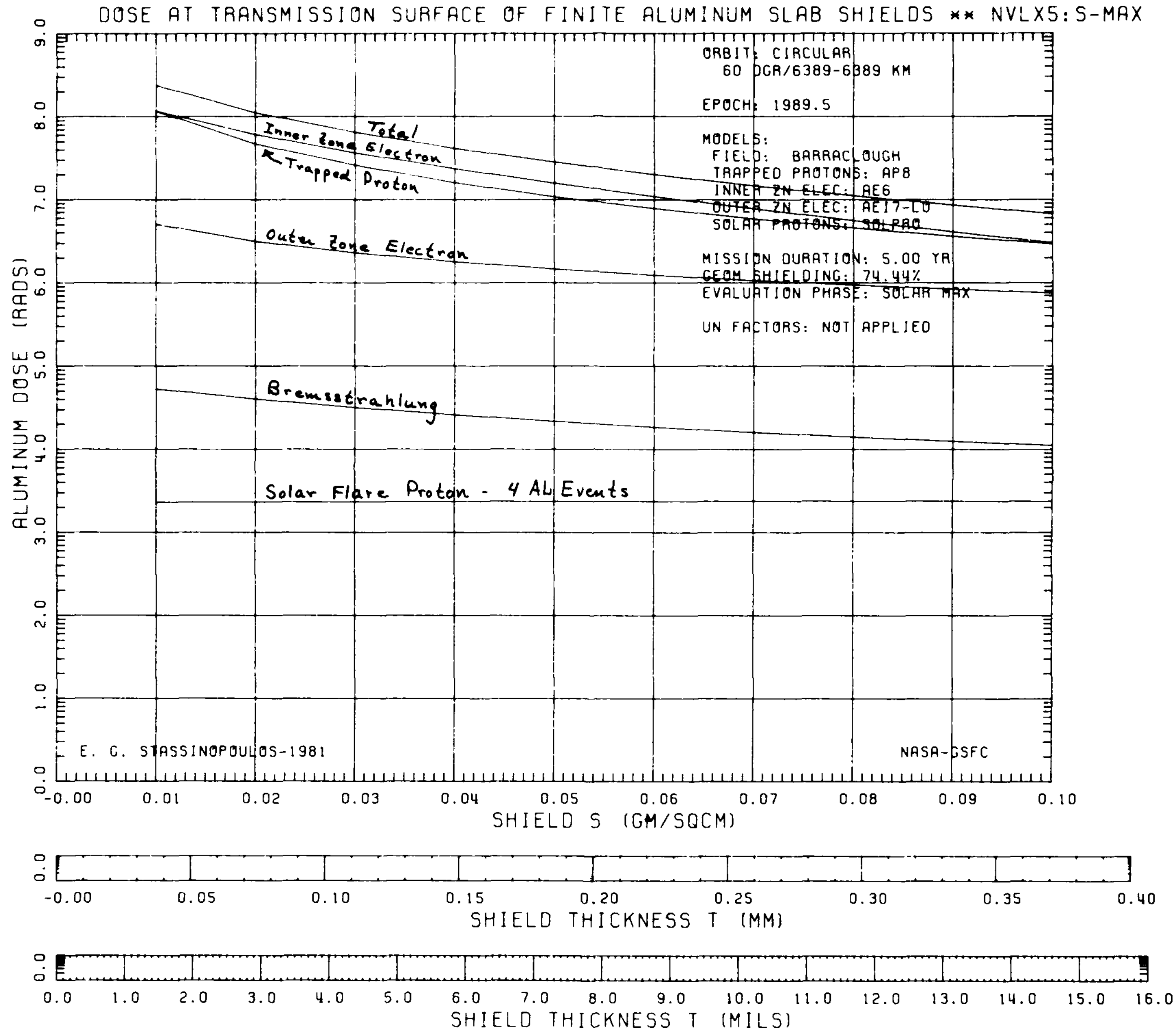

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX5:S-MAX
ORBIT: CIRCULAR
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 74.44%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
-0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
SHIELD S (GM/SQCM)
0.0
-0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
SHIELD THICKNESS T (MM)
0.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
SHIELD THICKNESS T (MILS)

FIGURE 86

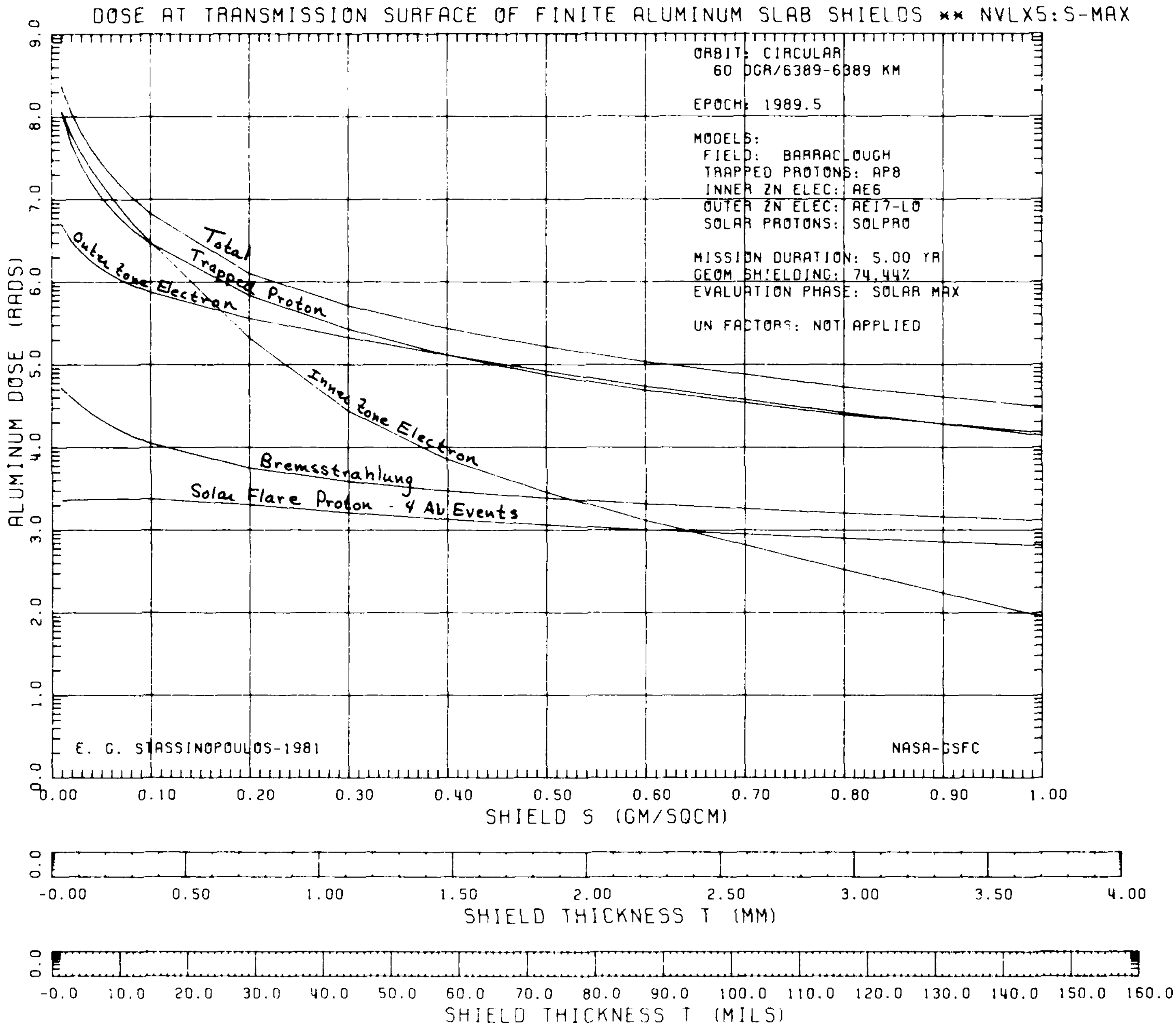

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX5:S-MAX
ORBIT: CIRCULAR
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 74.44%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Outer Zone Electron
Inner Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

Figure 87

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX5:S-MAX

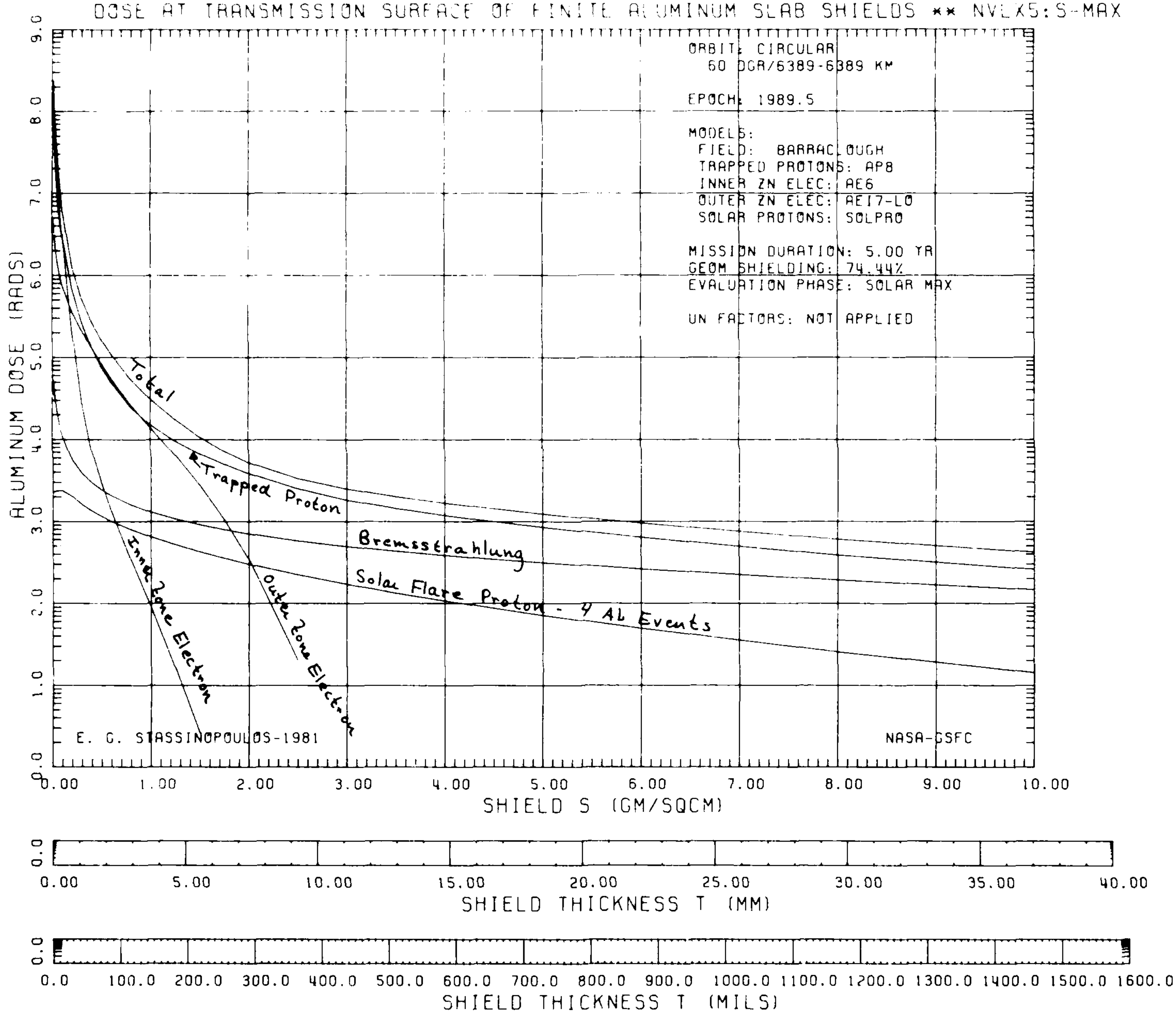
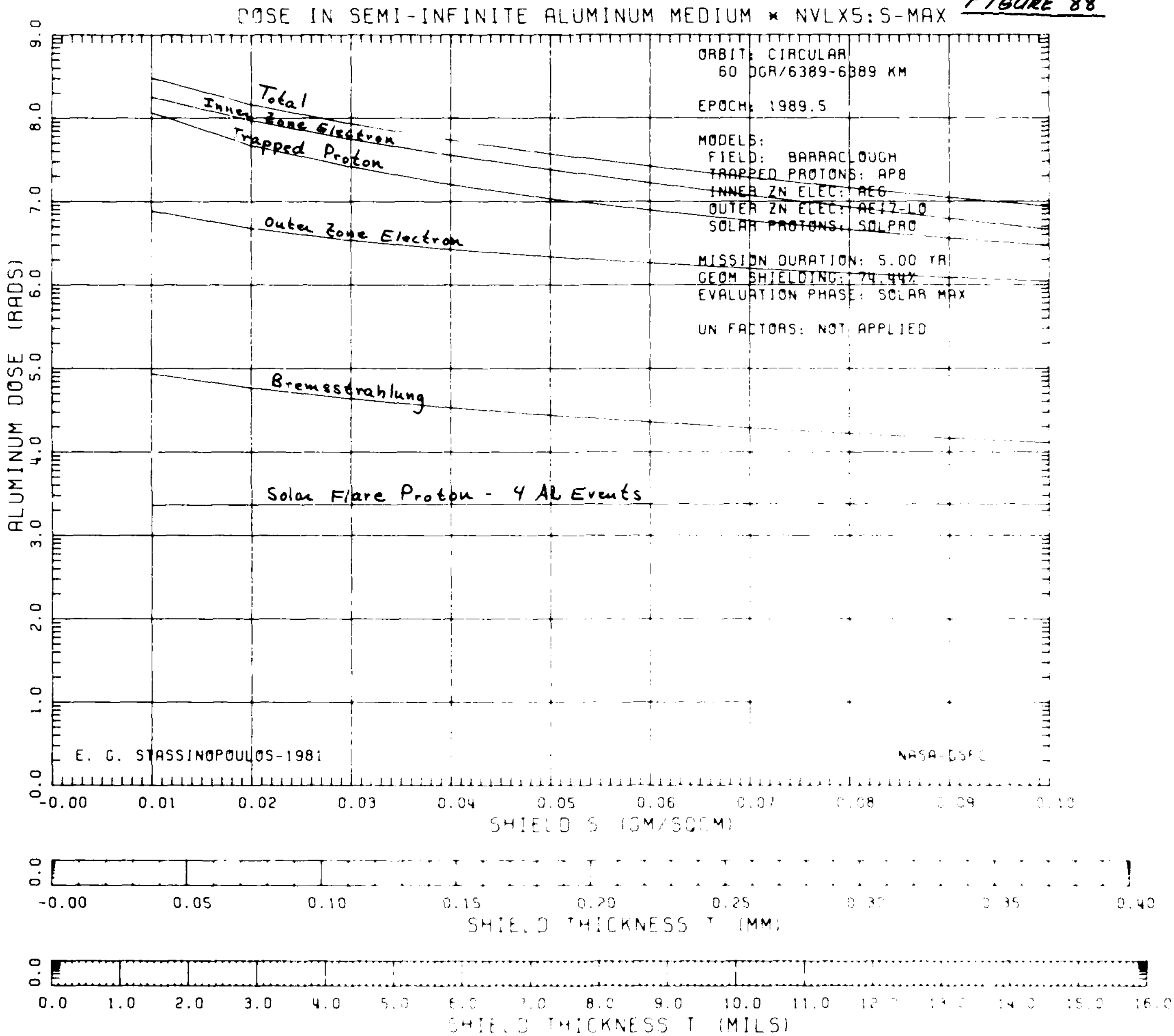


Figure 88


DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX5:S-MAX
ORBIT: CIRCULAR
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 79.44%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

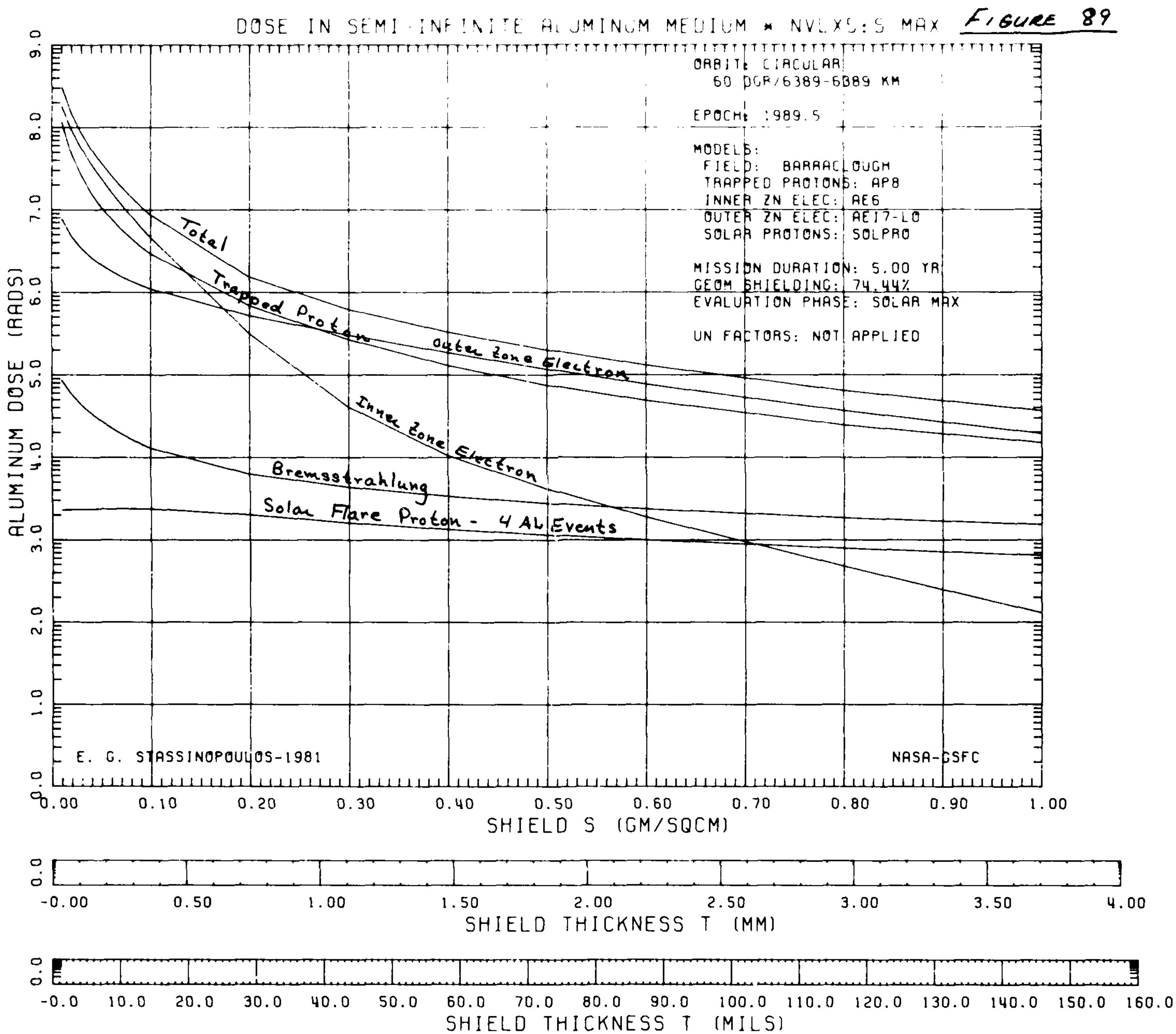
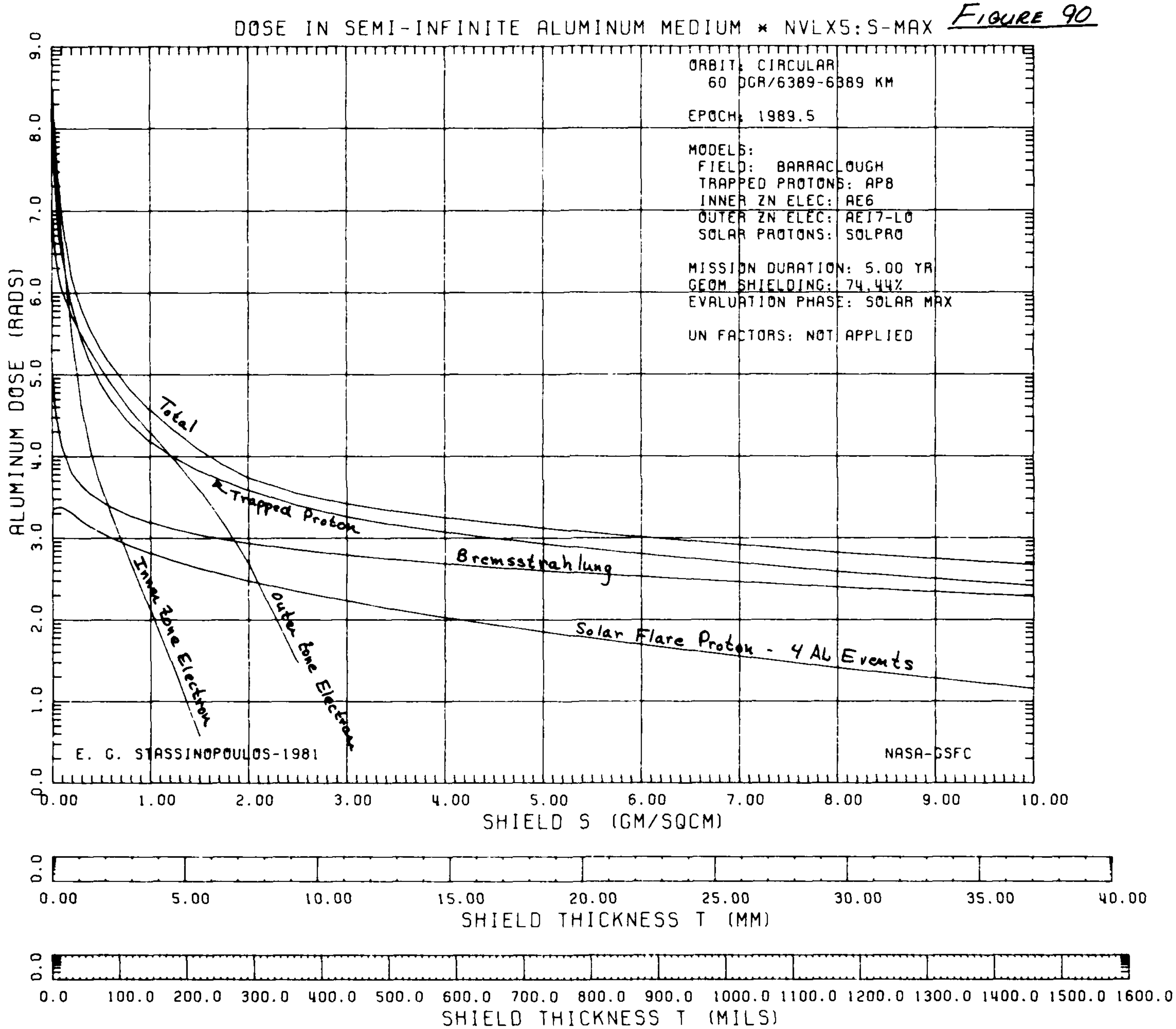

DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLXS:S MAX
FIGURE 89
ORBIT: CIRCULAR
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 74.44%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Outer Zone Electron
Inner Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

FIGURE 90



DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX5:S-MAX
ORBIT: CIRCULAR
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 74.44%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Inner Zone Electron
Outer Zone Electron
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD S (GM/SQCM)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MM)
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0
SHIELD THICKNESS T (MILS)

FIGURE 91

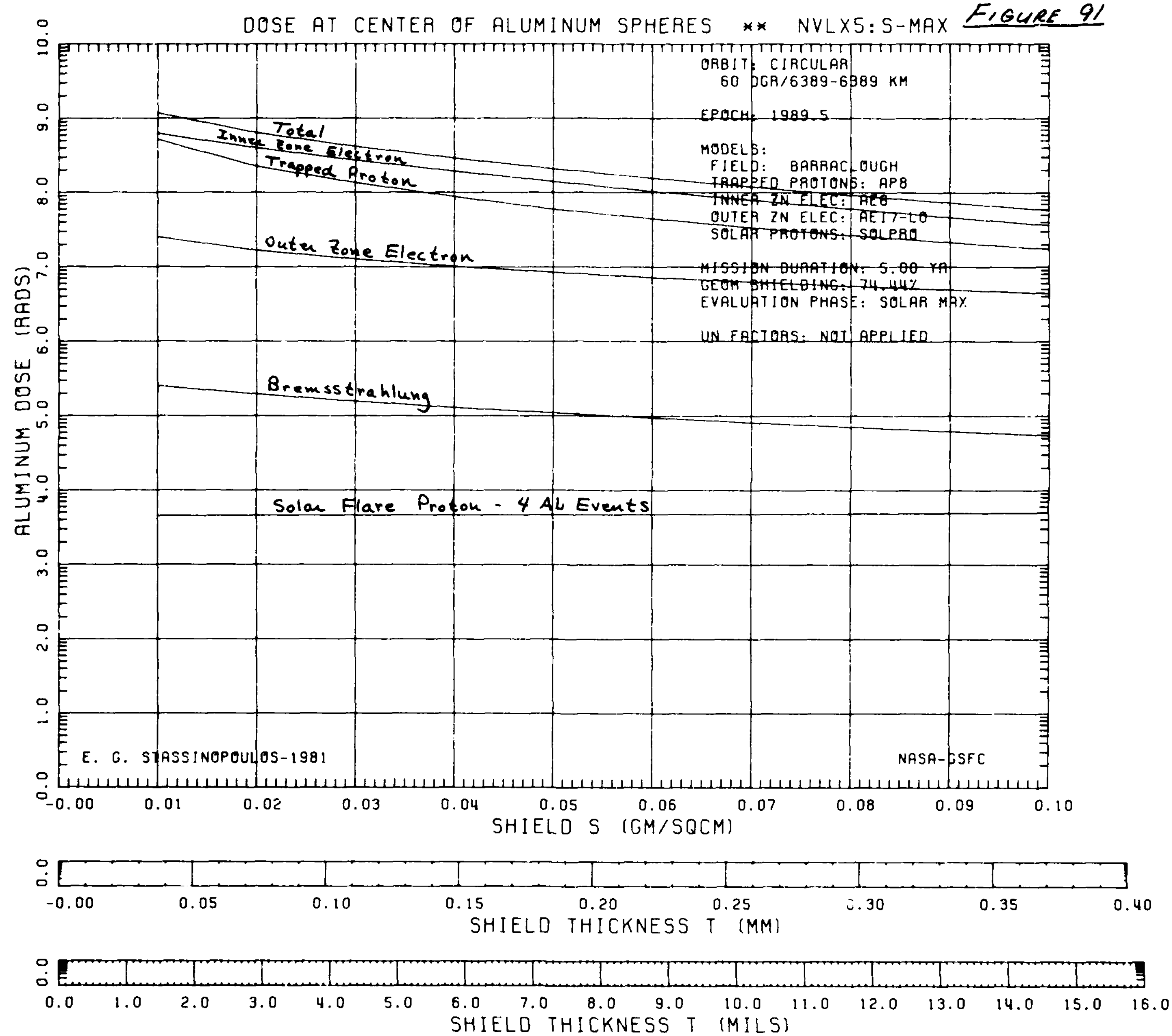

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX5:S-MAX
ORBIT: CIRCULAR
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE8
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 74.44%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Trapped Proton
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
-0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
SHIELD S (GM/SQCM)
0.0
-0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
SHIELD THICKNESS T (MM)
0.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
SHIELD THICKNESS T (MILS)

FIGURE 92

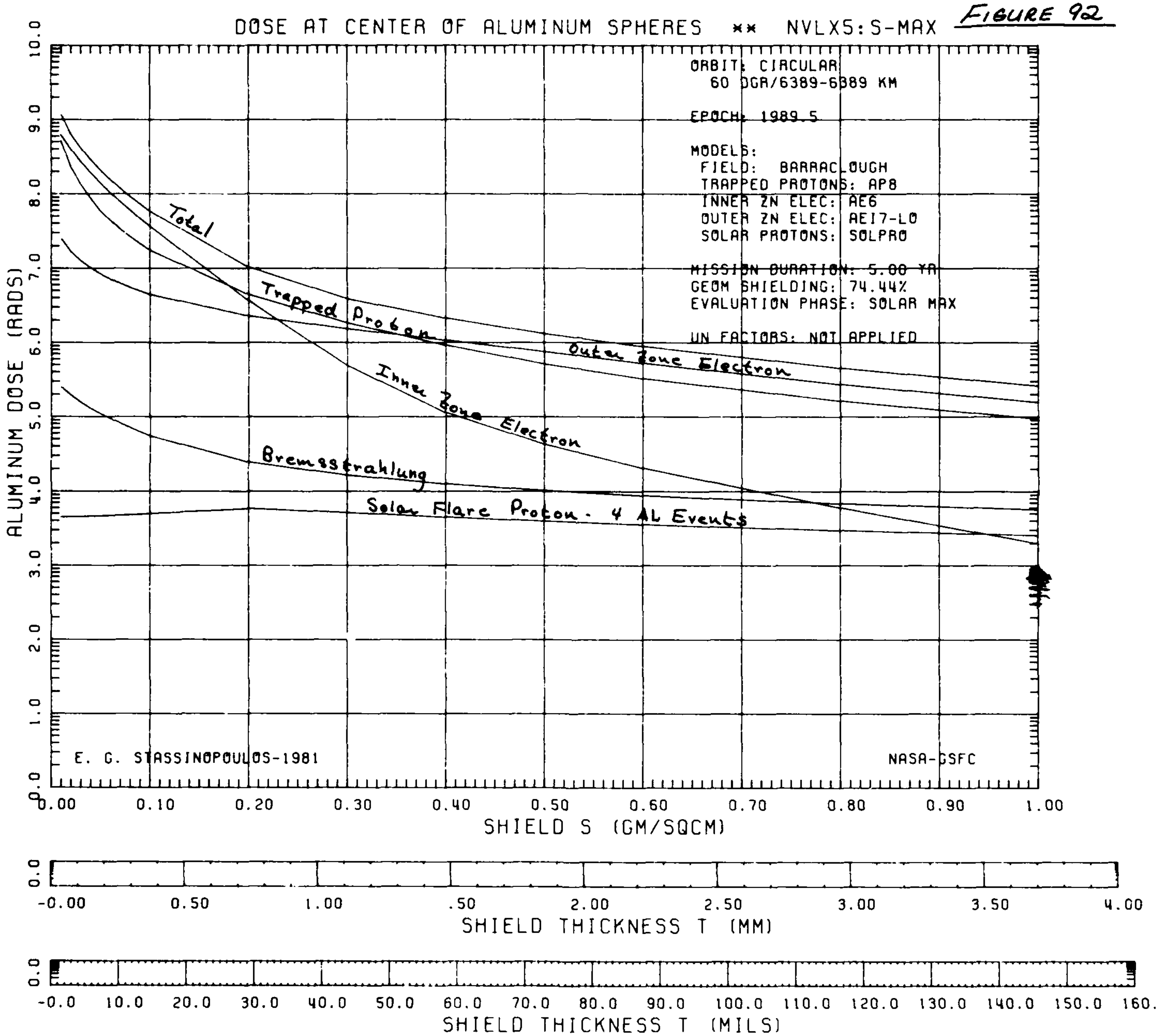

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX5:S-MAX
ORBIT: CIRCULAR
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 74.44%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Outer Zone Electron
Inner Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
-0.00
0.50
1.00
.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

FIGURE 93

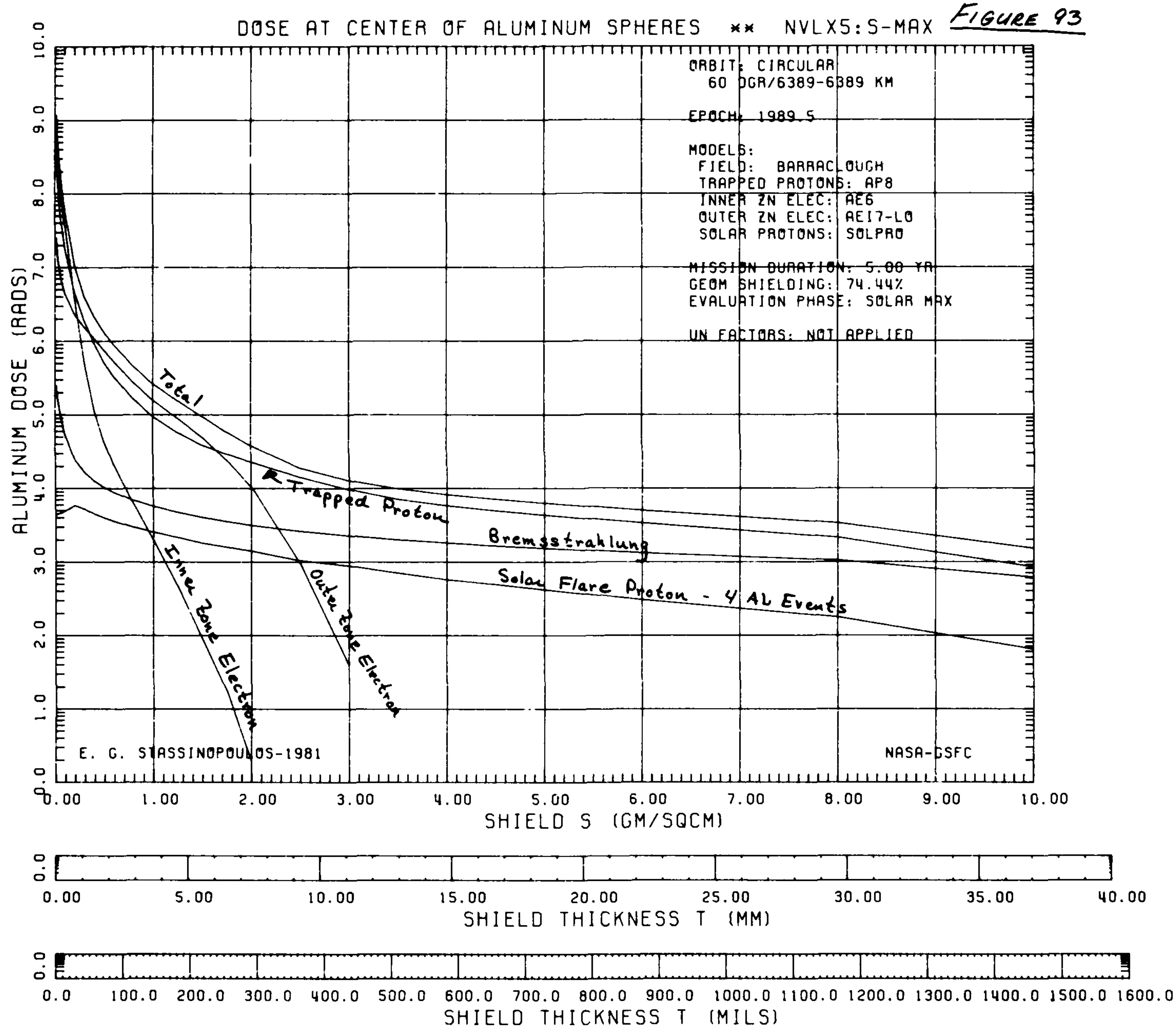

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX5:S-MAX
ORBIT: CIRCULAR
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 74.44%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
Inner Zone Electron
Outer Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD S (GM/SQCM)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MM)
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0
SHIELD THICKNESS T (MILS)

FIGURE 94

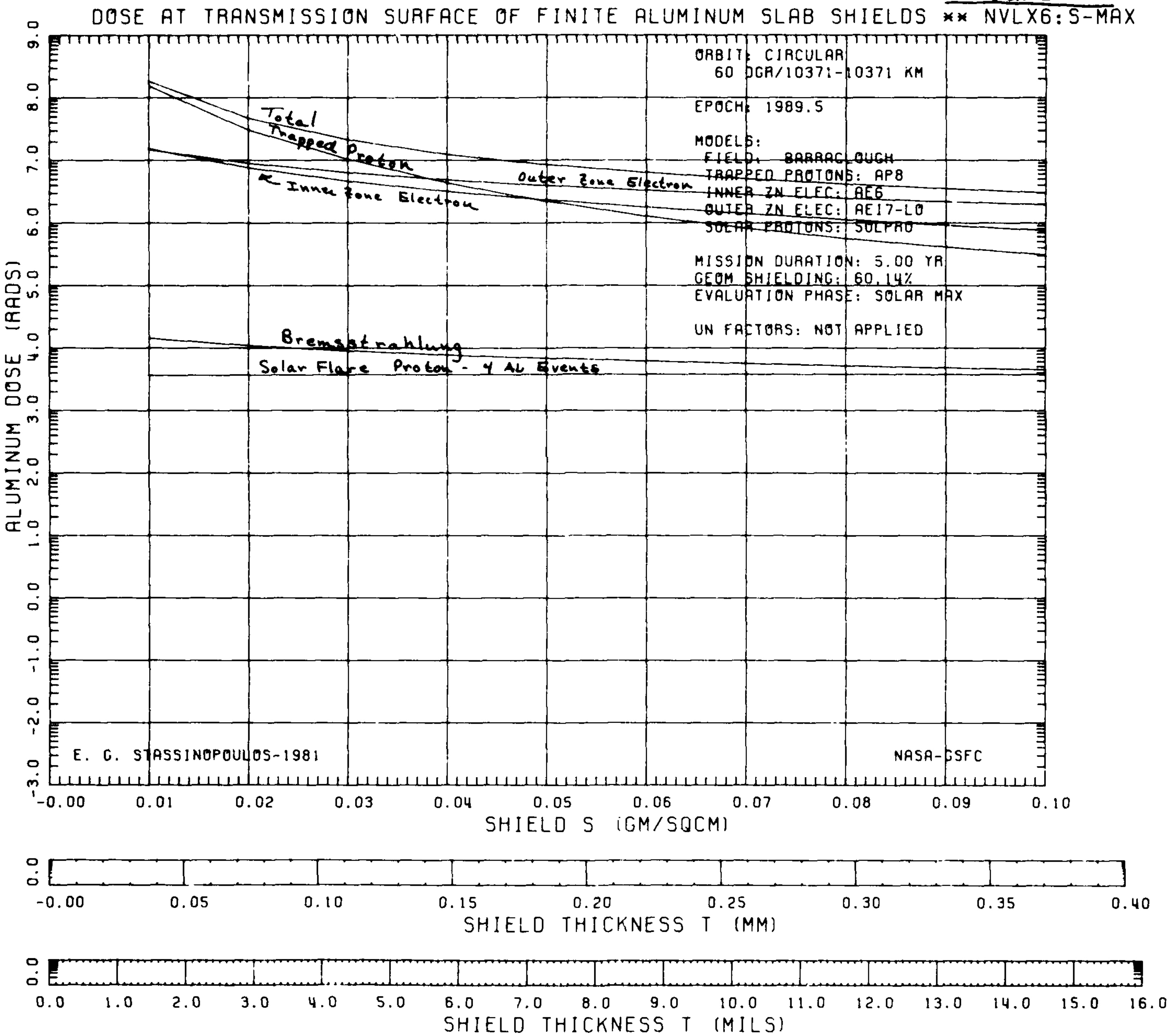

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX6:S-MAX
ORBIT: CIRCULAR
60 DGR/10371-10371 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 60.14%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Inner Zone Electron
Outer Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

Figure 95

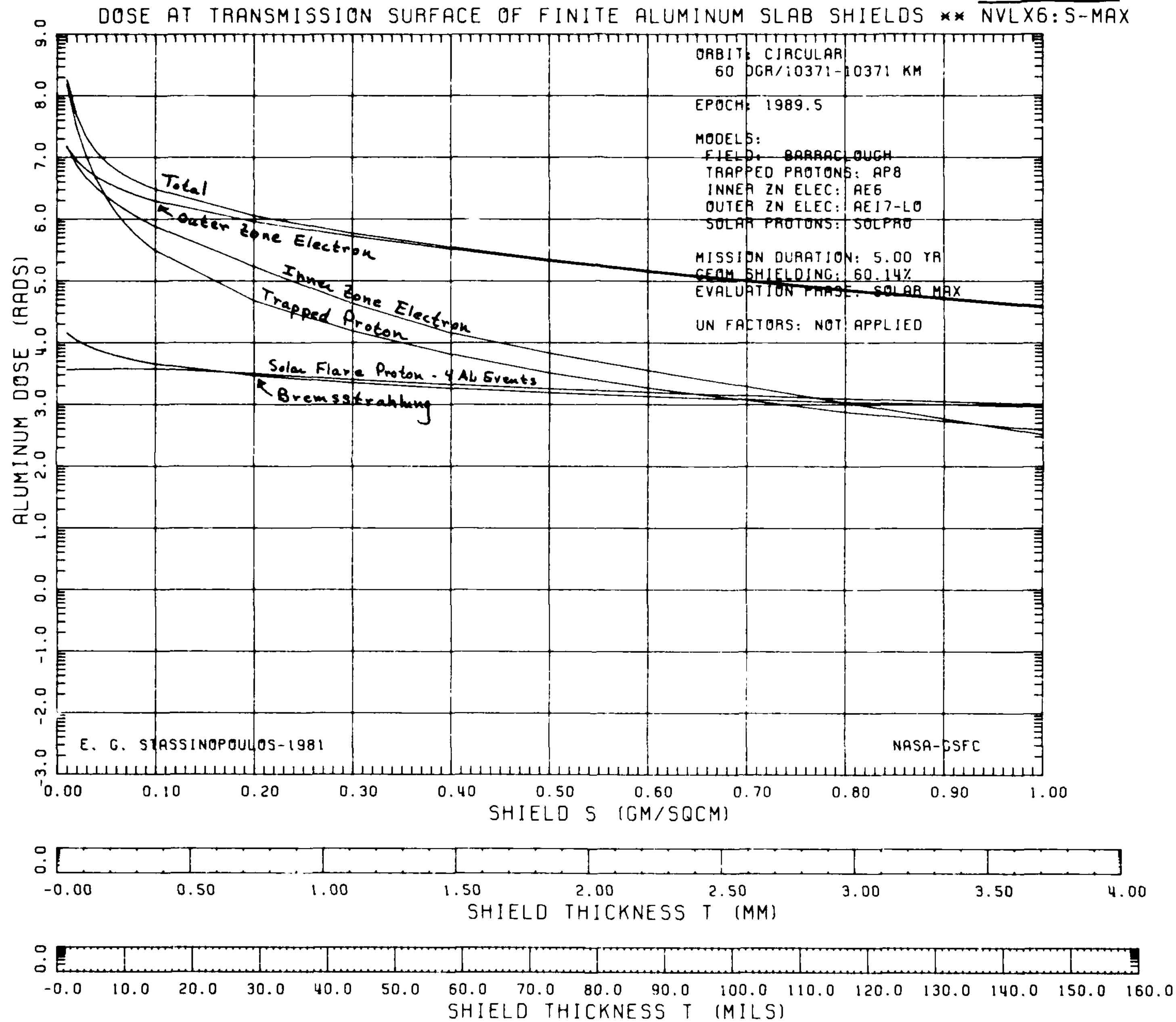
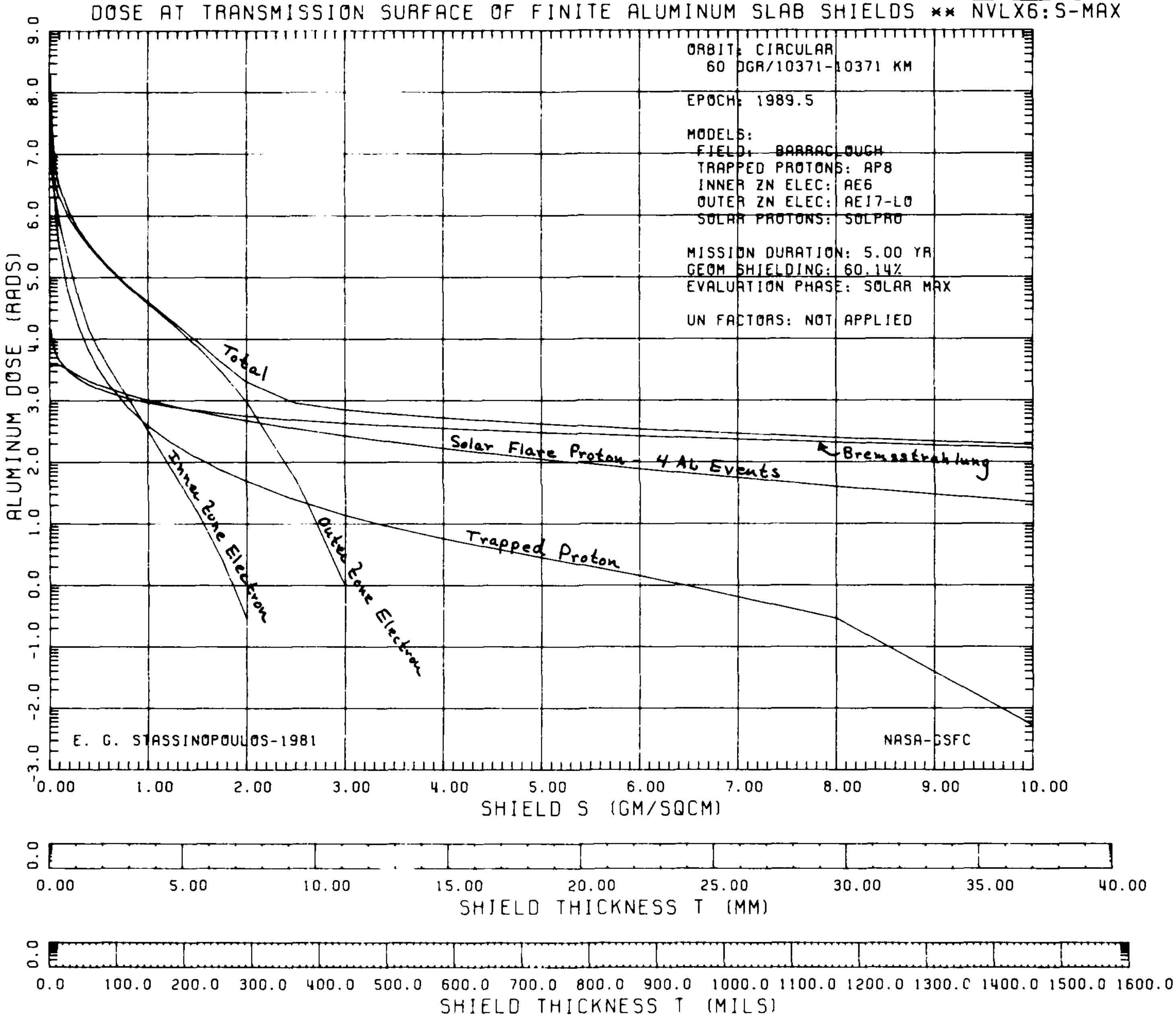

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX6:S-MAX
ORBIT: CIRCULAR
60 DGR/10371-10371 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 60.14%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Outer Zone Electron
Inner Zone Electron
Trapped Proton
Solar Flare Proton - 4 AL Events
Bremsstrahlung
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

Figure 96


DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS ** NVLX6:S-MAX
ORBIT: CIRCULAR
60 DGR/10371-10371 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 60.14%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Solar Flare Proton - 4 AL Events
Bremsstrahlung
Trapped Proton
Inner Zone Electron
Outer Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

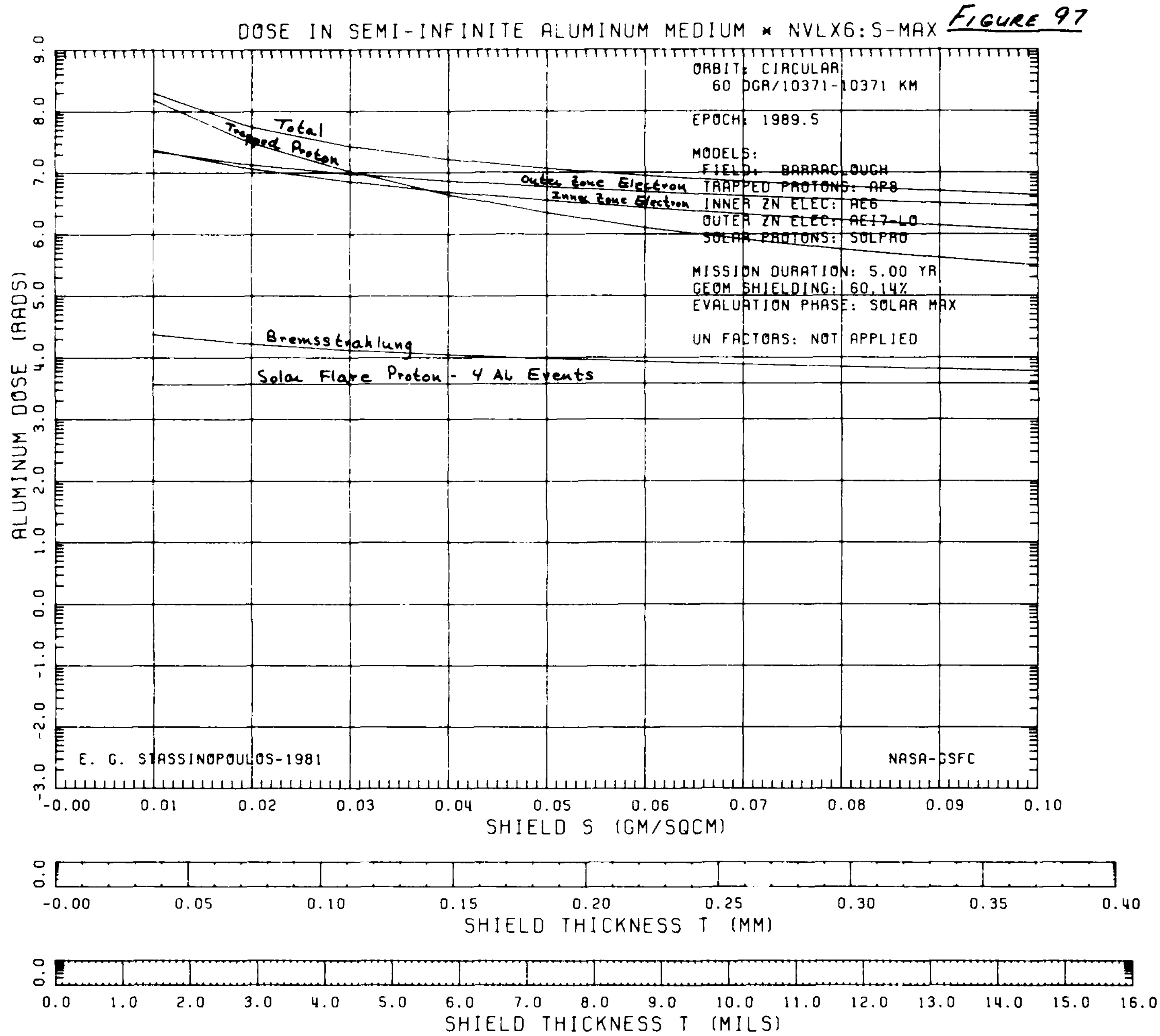
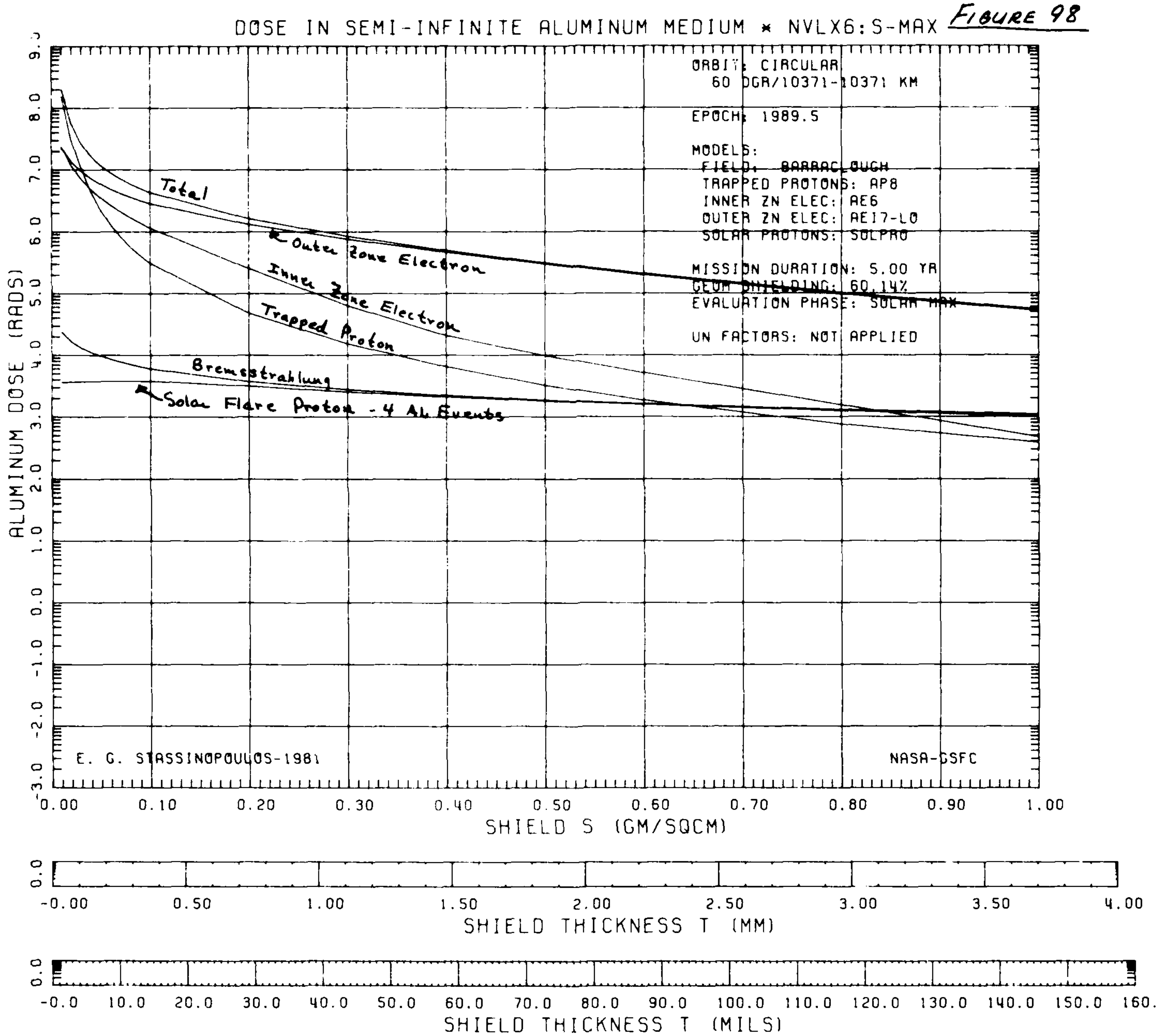
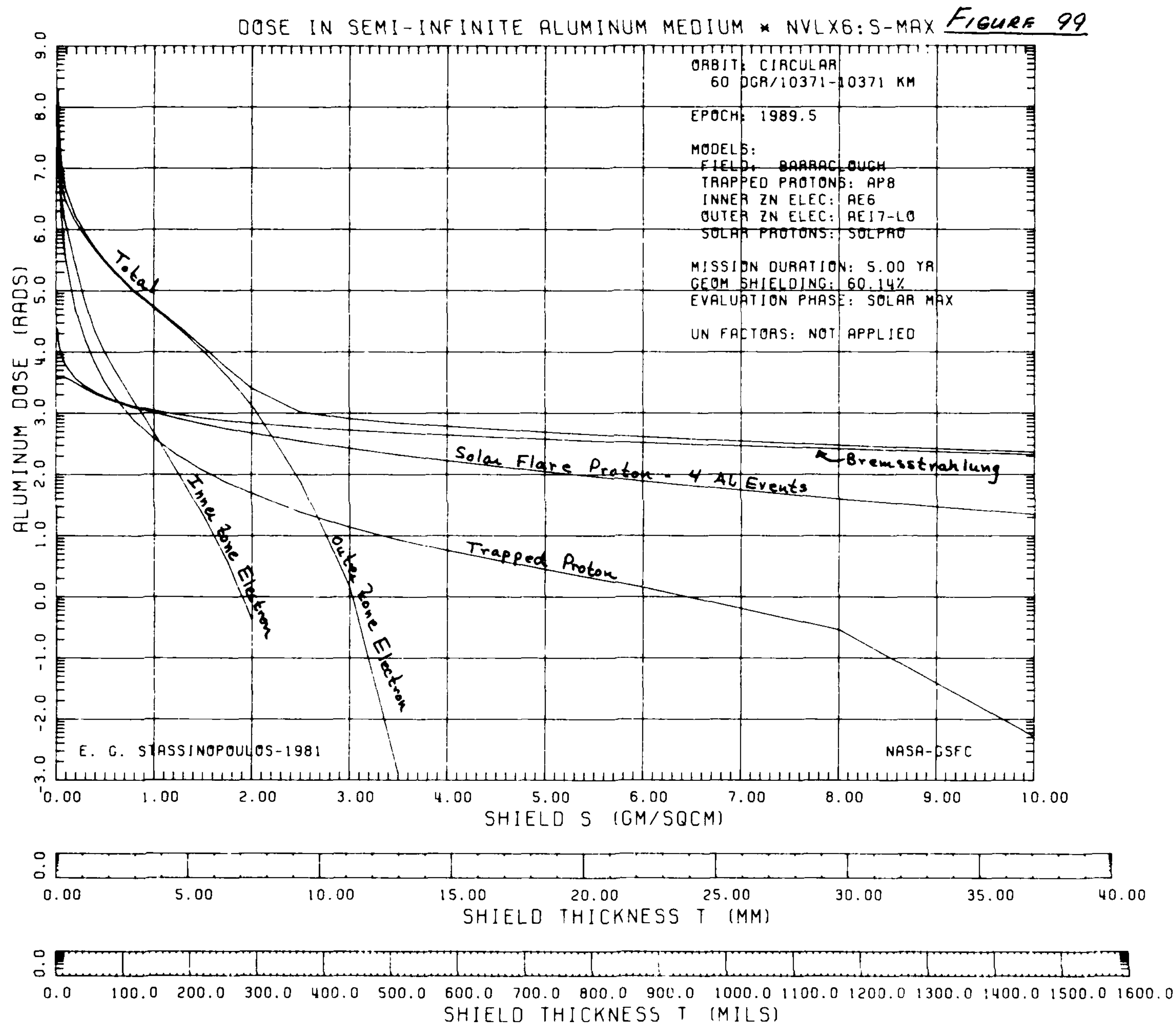

DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX6:S-MAX
FIGURE 97
ORBIT: CIRCULAR
60 DGR/10371-10371 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 60.14%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Trapped Proton
Outer Zone Electron
Inner Zone Electron
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
SHIELD S (GM/SQCM)
SHIELD THICKNESS T (MM)
SHIELD THICKNESS T (MILS)

FIGURE 98



DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX6:S-MAX
ORBIT: CIRCULAR
60 DGR/10371-10371 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 60.14%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Outer Zone Electron
Inner Zone Electron
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
SHIELD S (GM/SQCM)
0.0
-0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
SHIELD THICKNESS T (MM)
0.0
-0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
SHIELD THICKNESS T (MILS)

FIGURE 99



DOSE IN SEMI-INFINITE ALUMINUM MEDIUM * NVLX6:S-MAX
ORBIT: CIRCULAR
60 DGR/10371-10371 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 60.14%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Inner Zone Electron
Outer Zone Electron
Trapped Proton
Solar Flare Proton - 4 AL Events
Bremsstrahlung
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD S (GM/SQCM)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MM)
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0
SHIELD THICKNESS T (MILS)

DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX6:S-MAX *FIGURE 100*

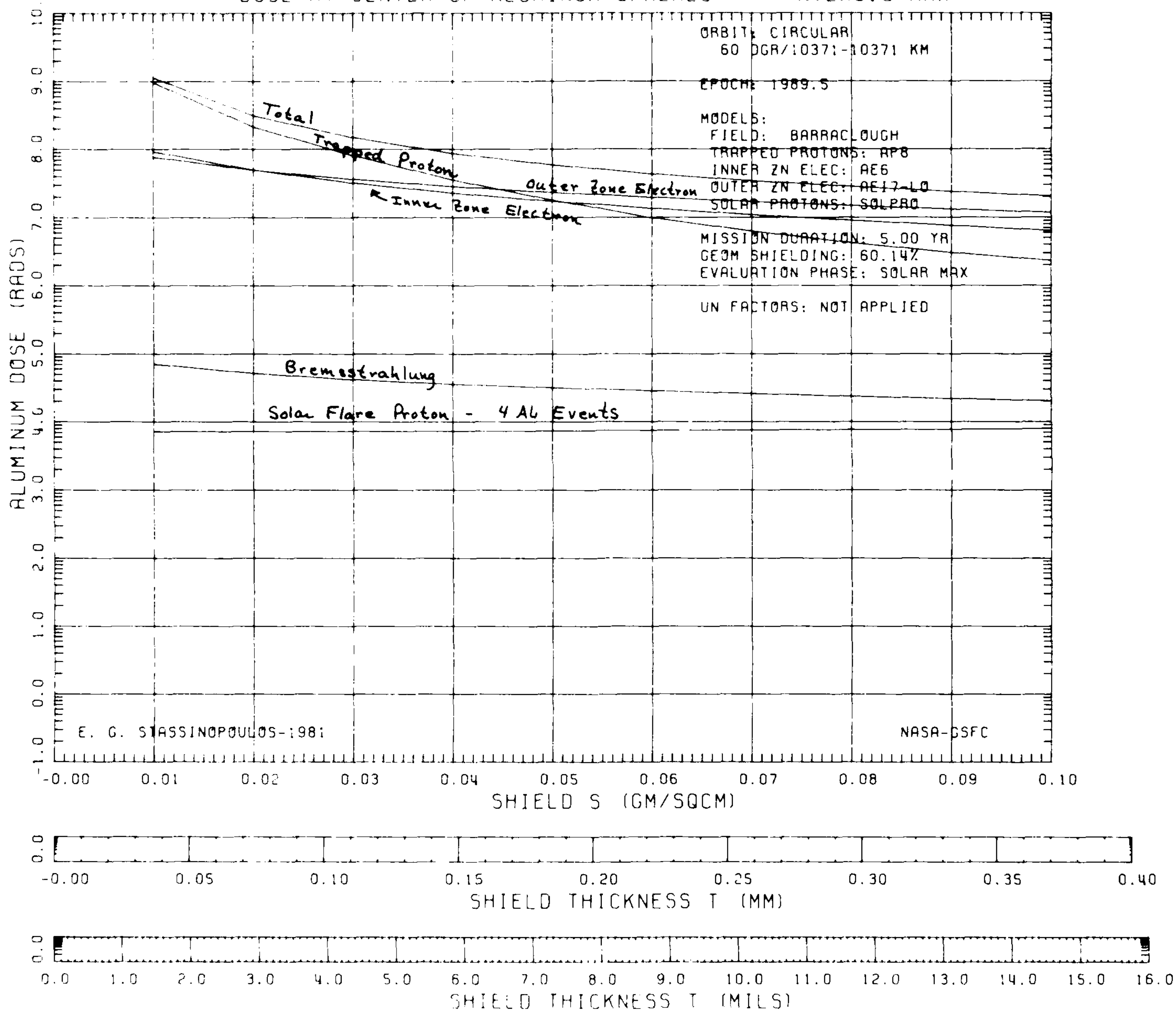
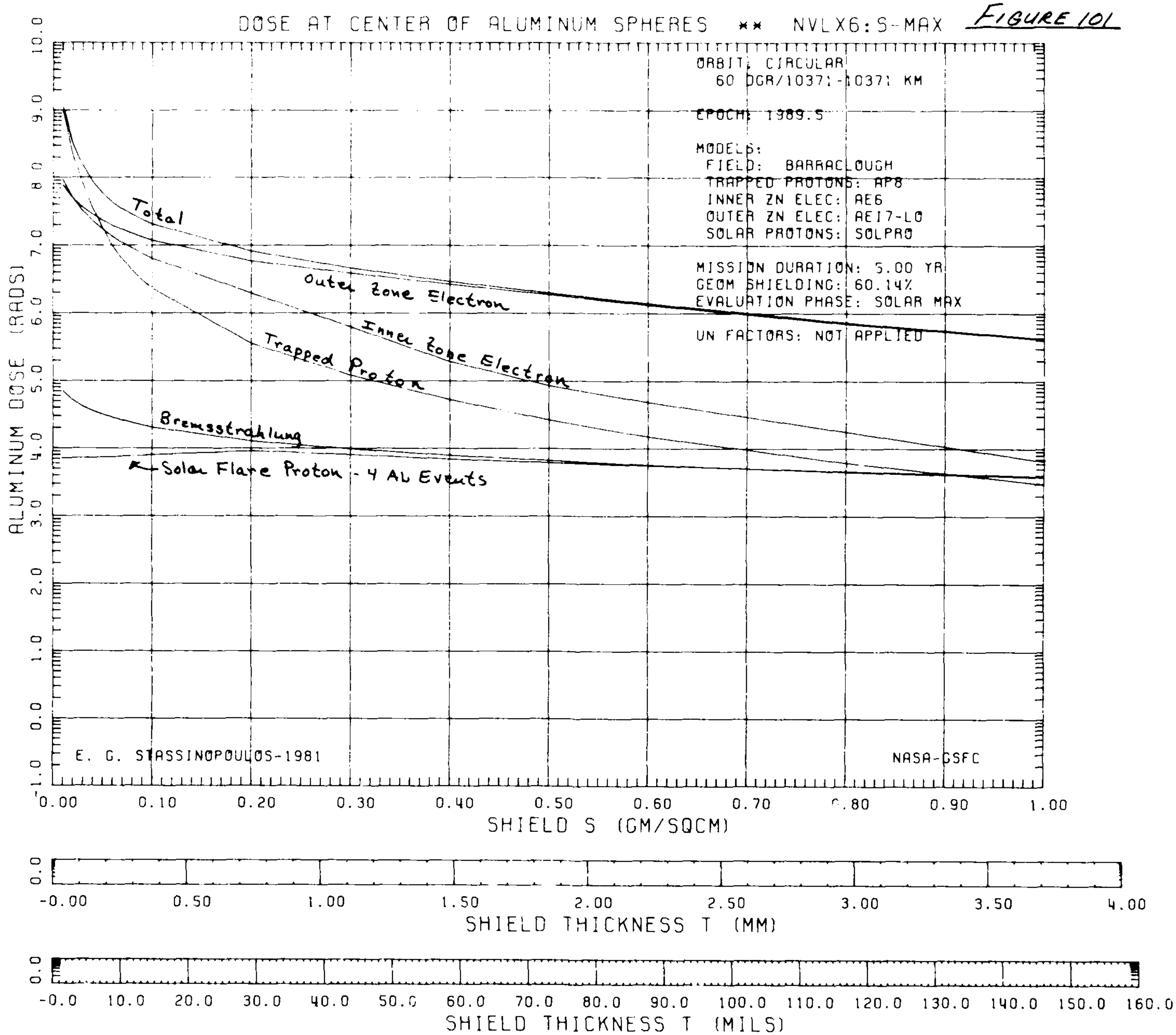
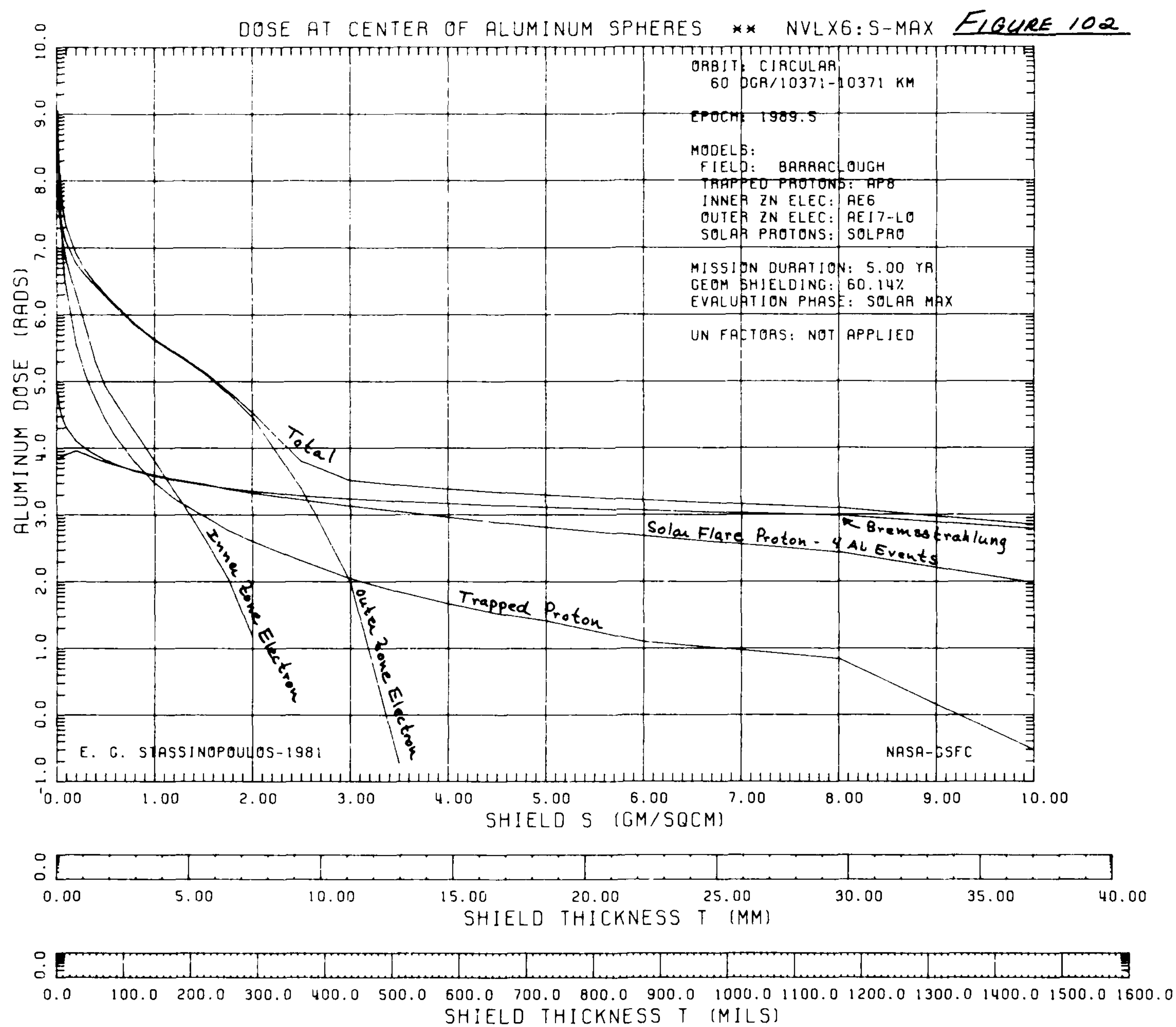
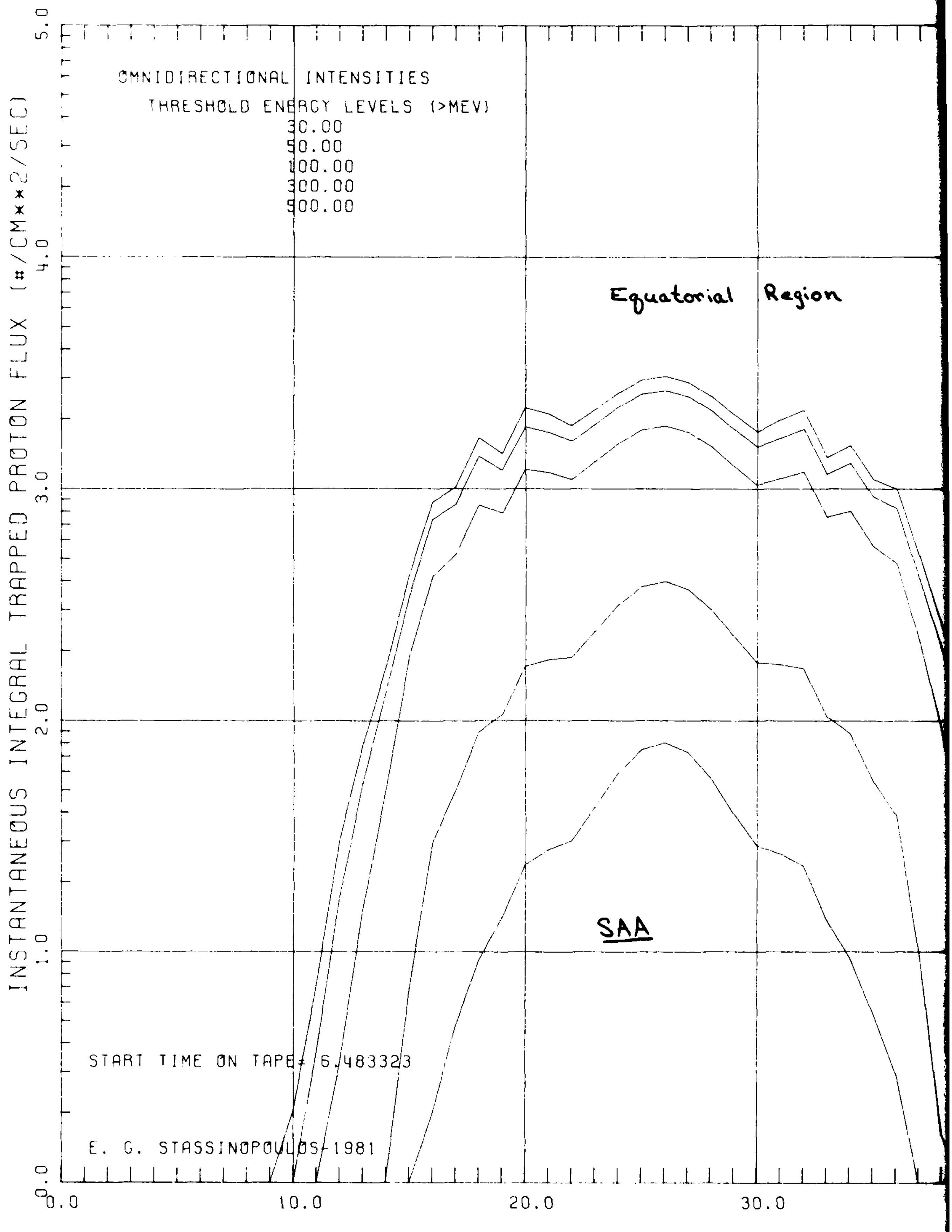


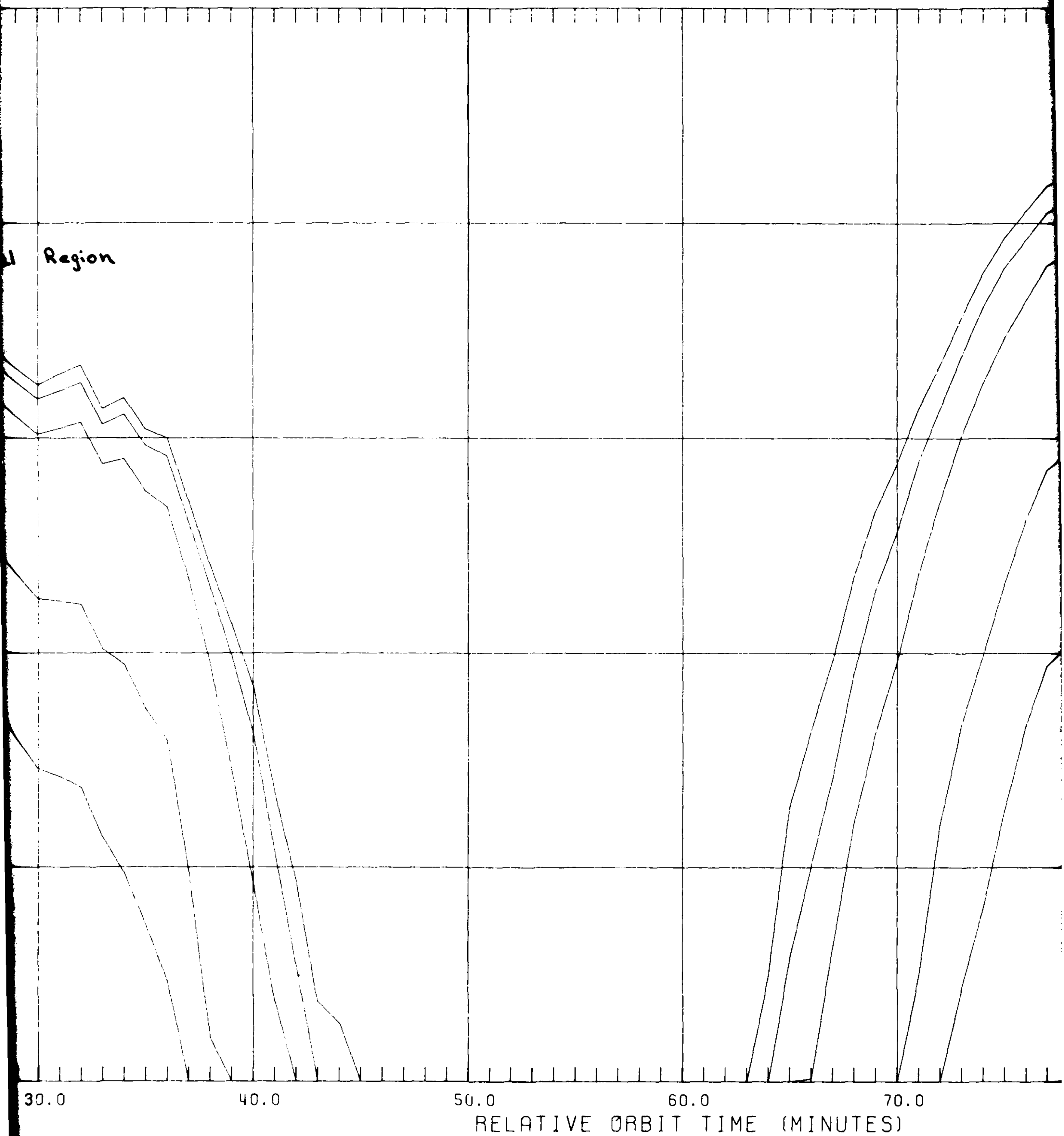
FIGURE 101


DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX6:S-MAX
ORBIT: CIRCULAR
60 DGR/1037:-1037: KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 60.14%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Outer Zone Electron
Inner Zone Electron
Trapped Proton
Bremsstrahlung
Solar Flare Proton - 4 AL Events
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
-1.0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
SHIELD S (GM/SQCM)
0.0
-0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00
SHIELD THICKNESS T (MM)
0.0
-0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 100.0 110.0 120.0 130.0 140.0 150.0 160.0
SHIELD THICKNESS T (MILS)

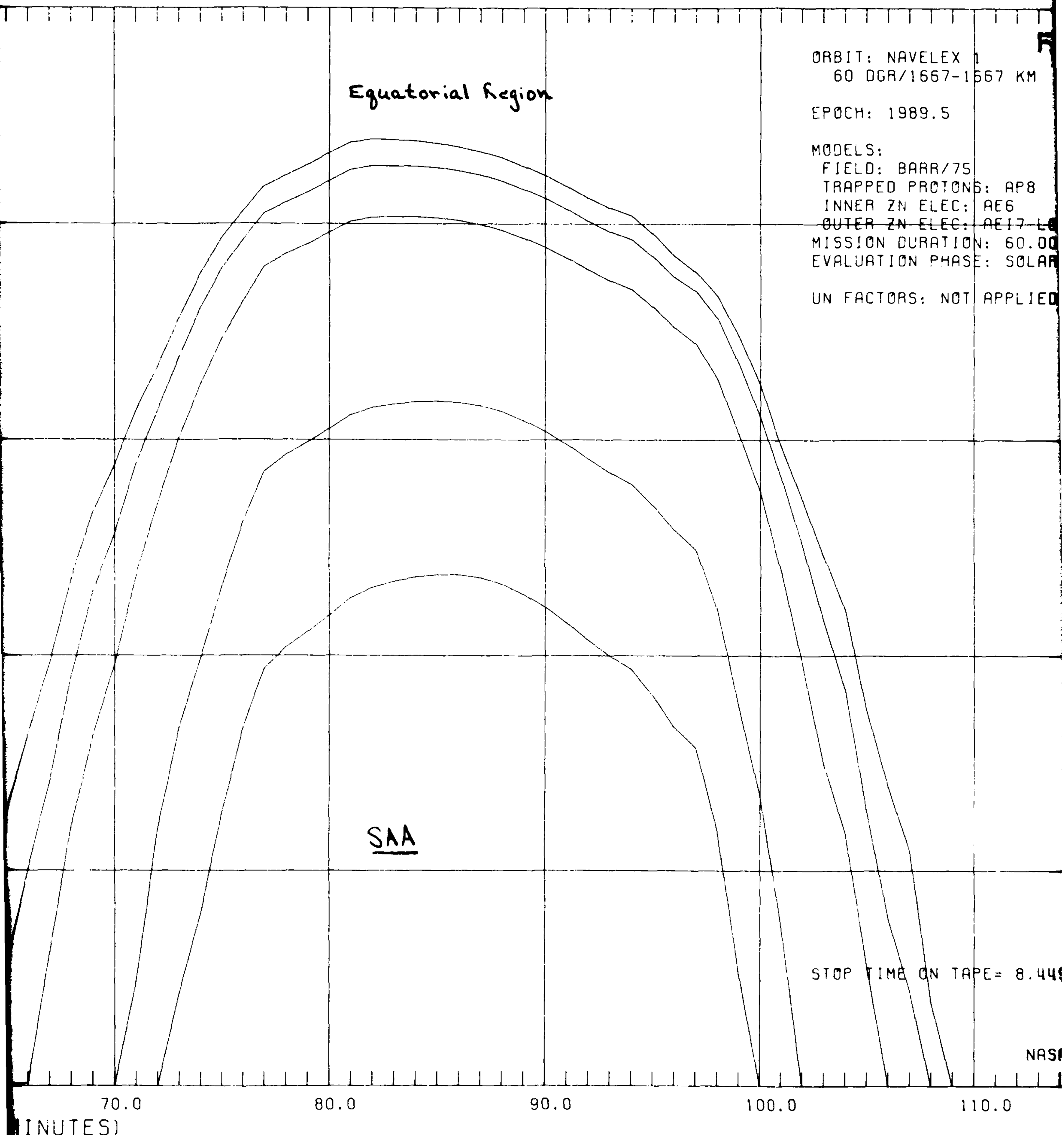


DOSE AT CENTER OF ALUMINUM SPHERES ** NVLX6:S-MAX
FIGURE 102
ORBIT: CIRCULAR
60 DGR/10371-10371 KM
EPOCH: 1989.5
MODELS:
FIELD: BARRACLOUGH
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
SOLAR PROTONS: SOLPRO
MISSION DURATION: 5.00 YR
GEOM SHIELDING: 60.14%
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Total
Bremsstrahlung
Solar Flare Proton - 4 AL Events
Trapped Proton
Inner Zone Electron
Outer Zone Electron
E. G. STASSINOPOULOS-1981
NASA-GSFC
ALUMINUM DOSE (RADS)
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
SHIELD S (GM/SQCM)
0.0
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
SHIELD THICKNESS T (MM)
0.0
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
1600.0
SHIELD THICKNESS T (MILS)


OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
30.00
50.00
100.00
300.00
500.00
Equatorial Region
SAA
START TIME ON TAPE= 6.483323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL TRAPPED PROTON FLUX (#/CM**2/SEC)
0.0
1.0
2.0
3.0
4.0
5.0
0.0
10.0
20.0
30.0



Region
30.0
40.0
50.0
60.0
70.0
RELATIVE ORBIT TIME (MINUTES)


ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-L
MISSION DURATION: 60.00
EVALUATION PHASE: SOLAR
UN FACTORS: NOT APPLIED
Equatorial Region
SAA
STOP TIME ON TAPE= 8.44
NAS
70.0
80.0
90.0
100.0
110.0
INUTES)

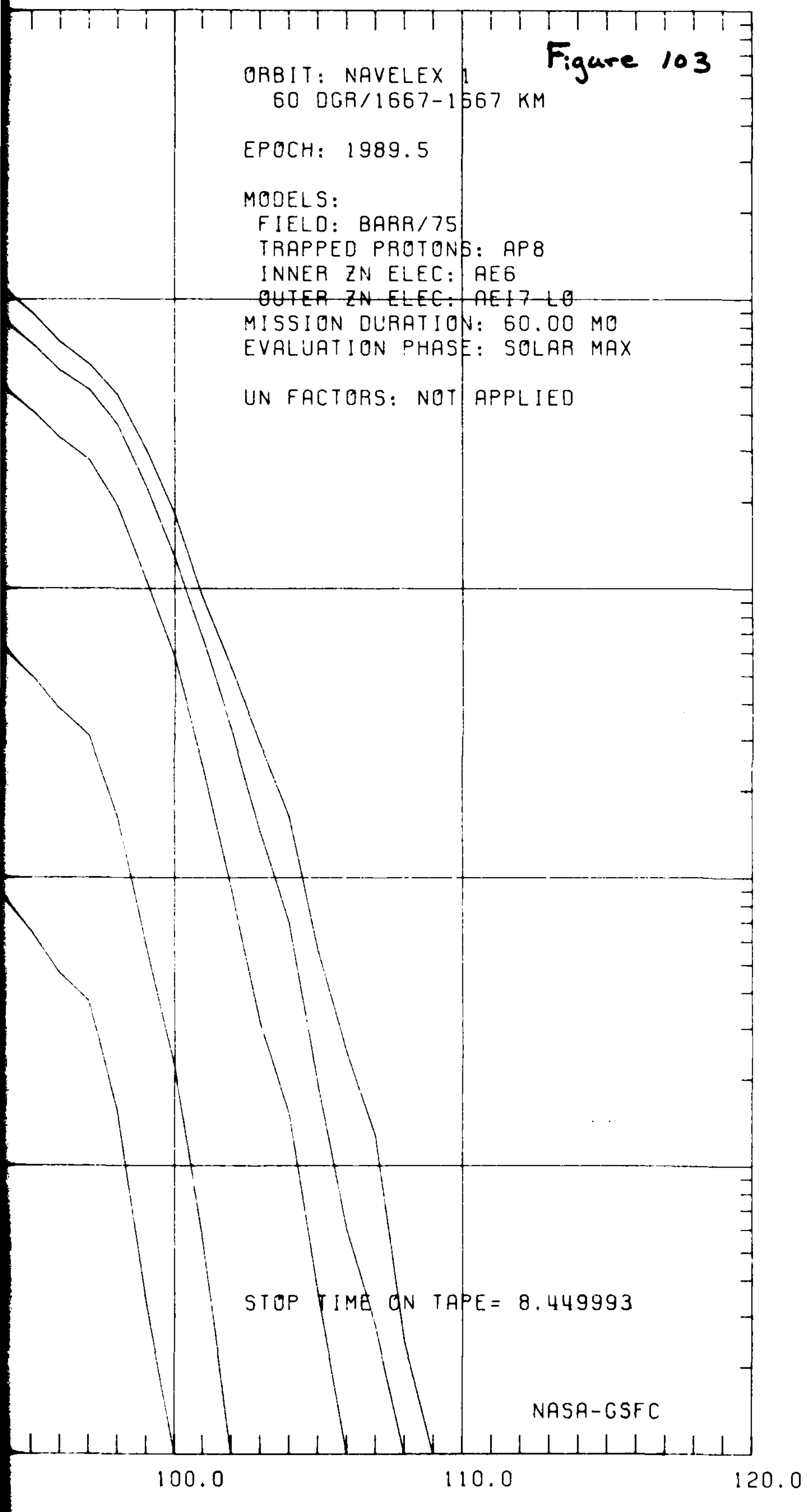
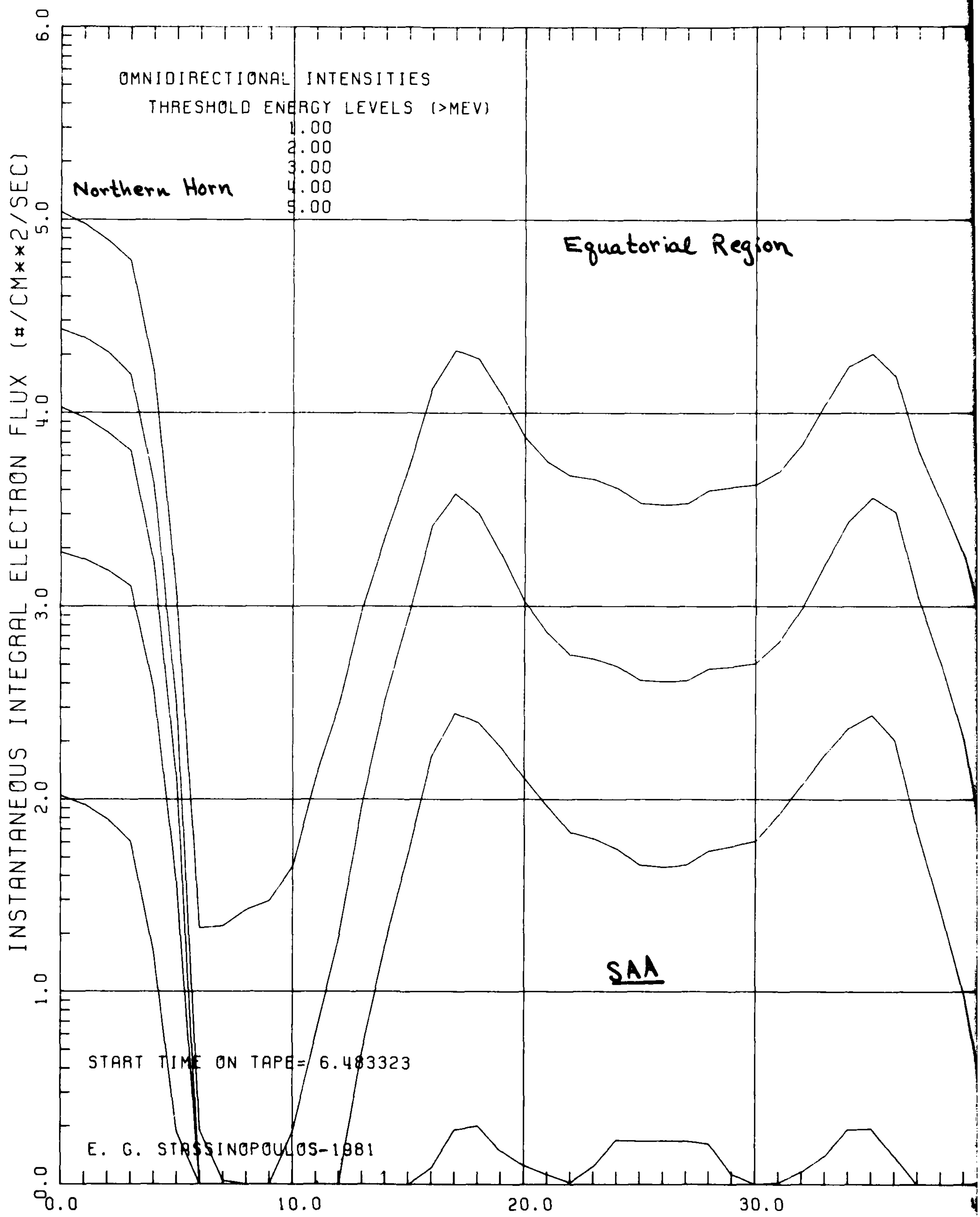
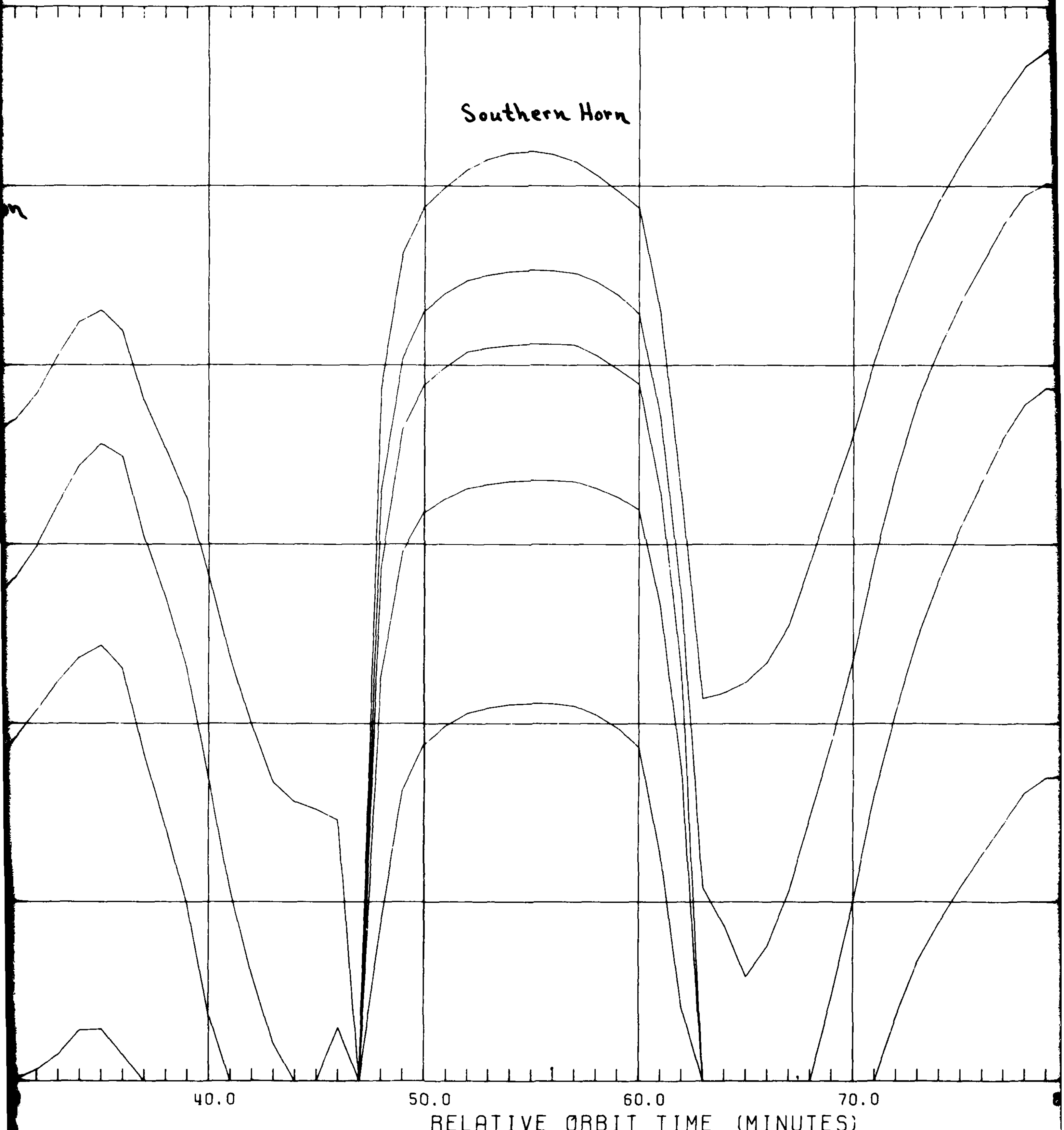
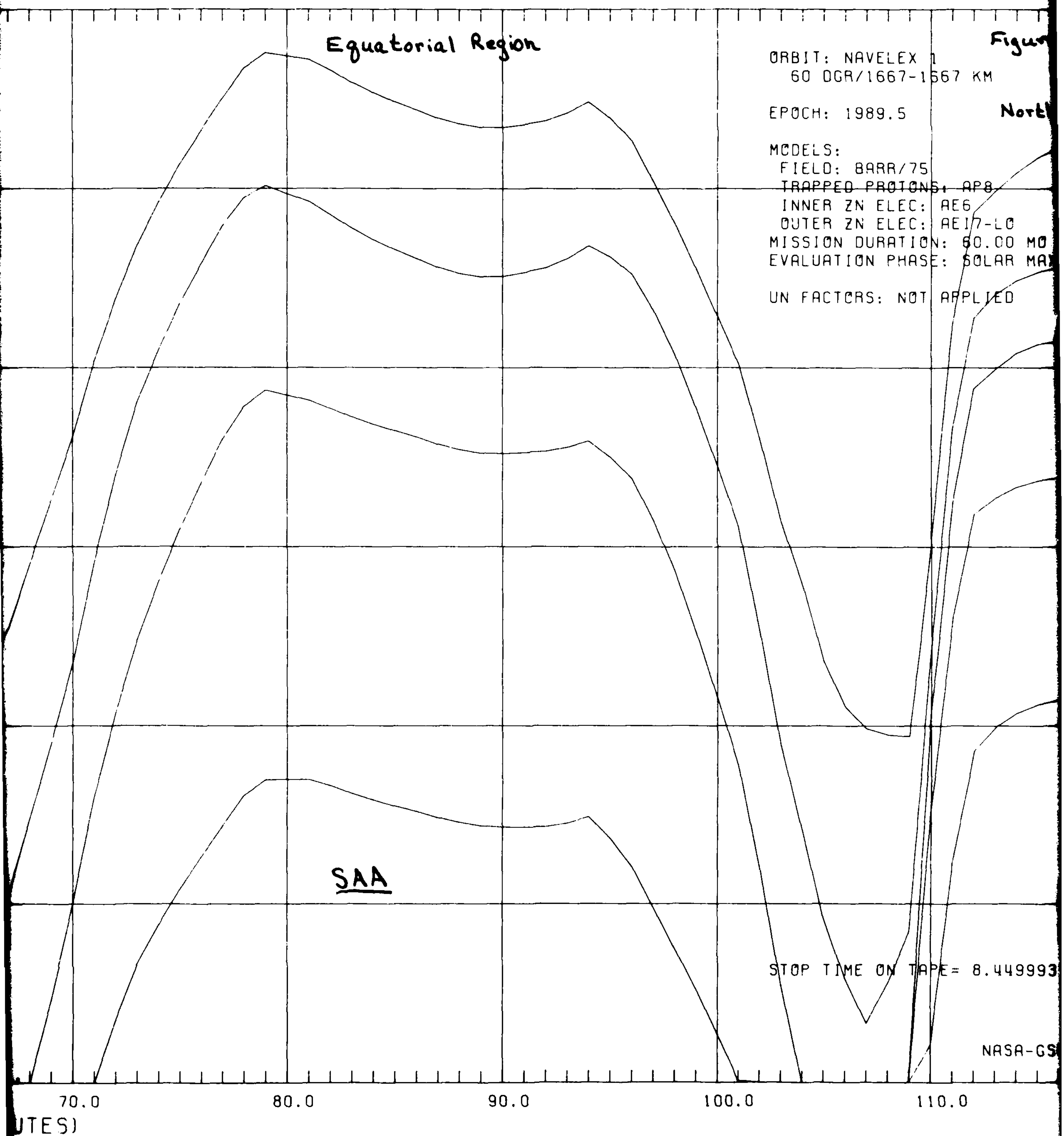


Figure 103
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 8.449993
NASA-GSFC
100.0
110.0
120.0



OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
1.00
2.00
3.00
4.00
5.00
Northern Horn
Equatorial Region
SAA
START TIME ON TAPE= 6.483323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL ELECTRON FLUX (#/CM**2/SEC)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
0.0
10.0
20.0
30.0


Southern Horn
40.0
50.0
60.0
70.0
RELATIVE ORBIT TIME (MINUTES)



Equatorial Region
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MA
UN FACTORS: NOT APPLIED
SAA
STOP TIME ON TAPE= 8.449993
NASA-GS
70.0
80.0
90.0
100.0
110.0
UTES)

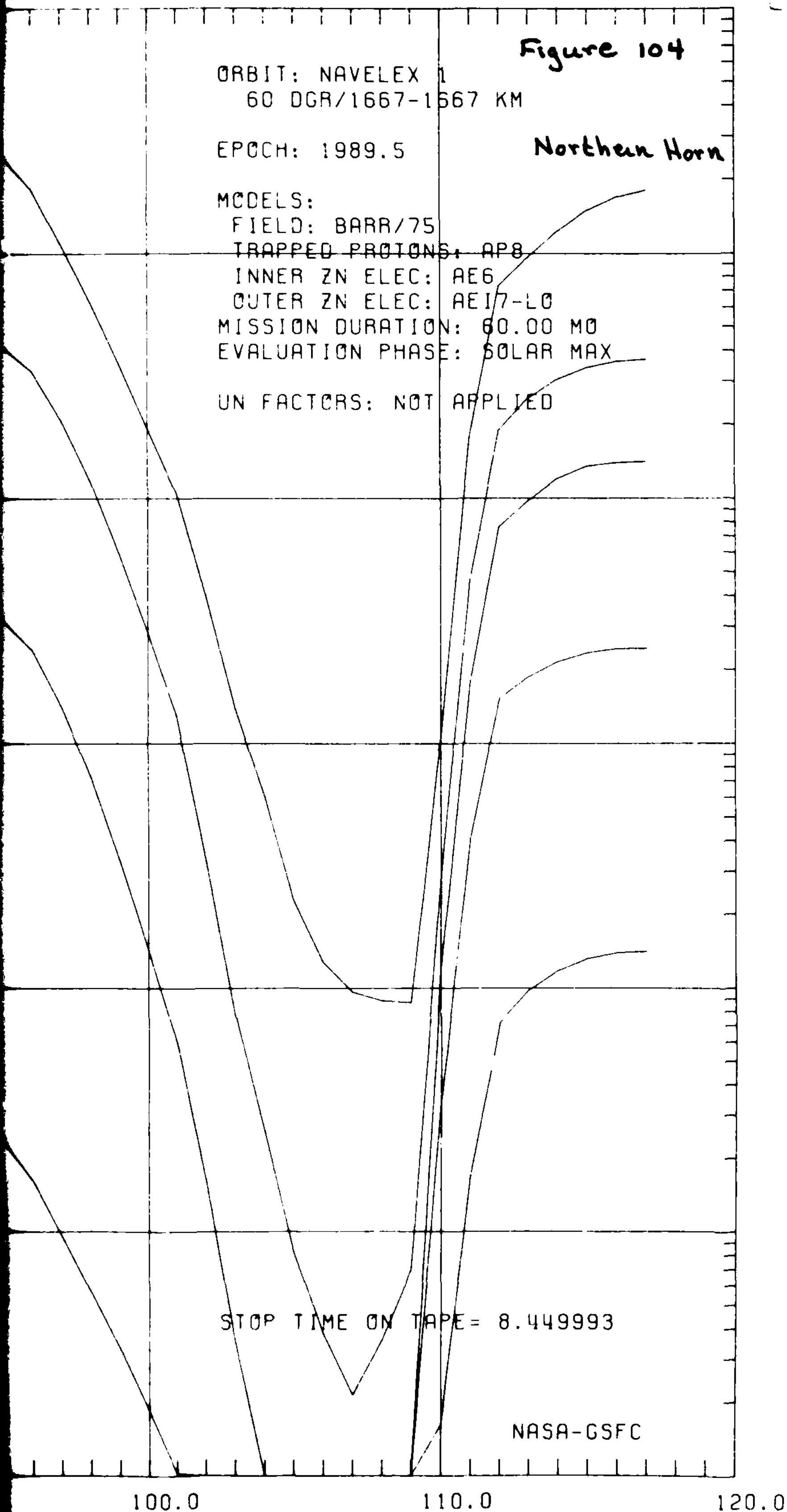
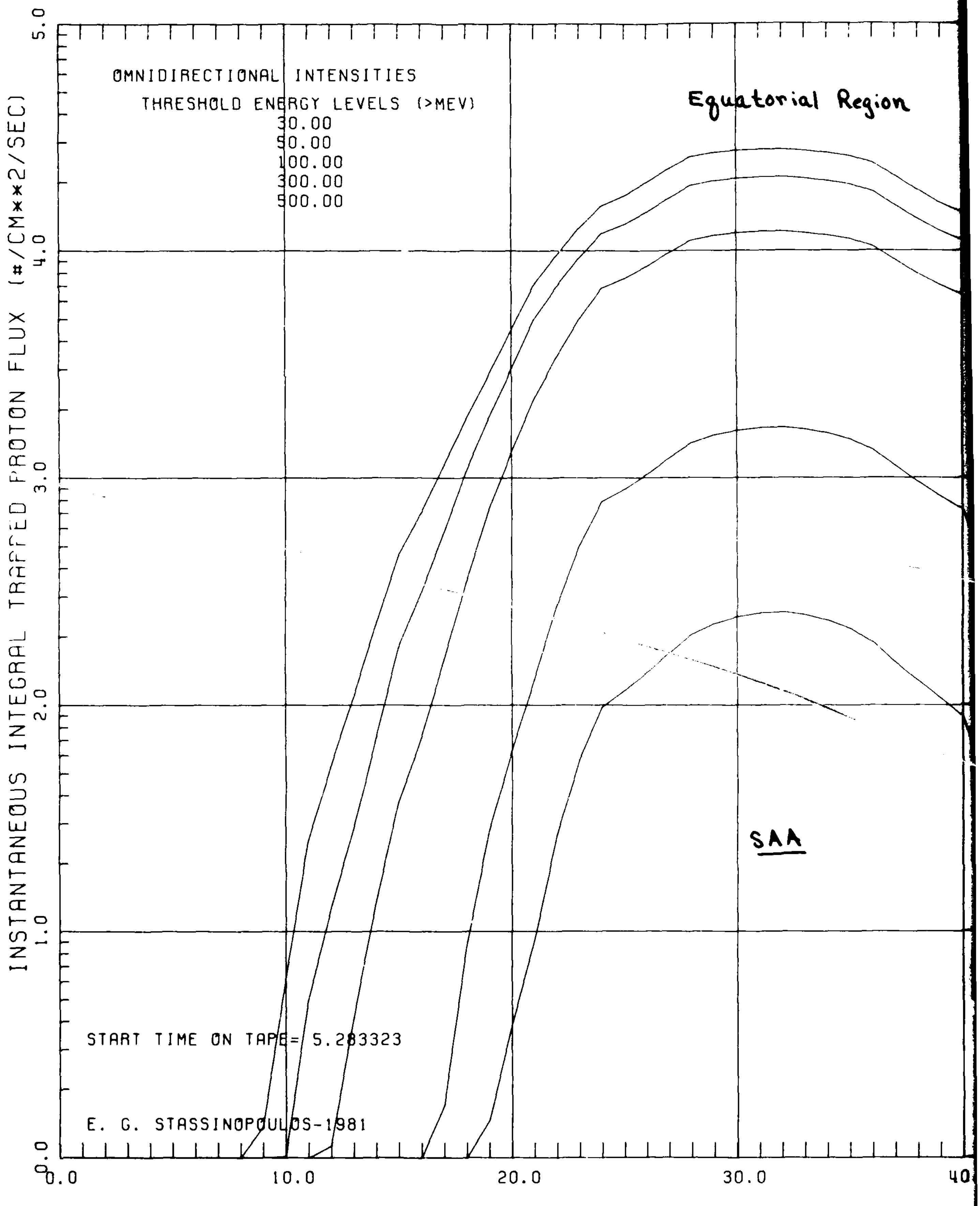
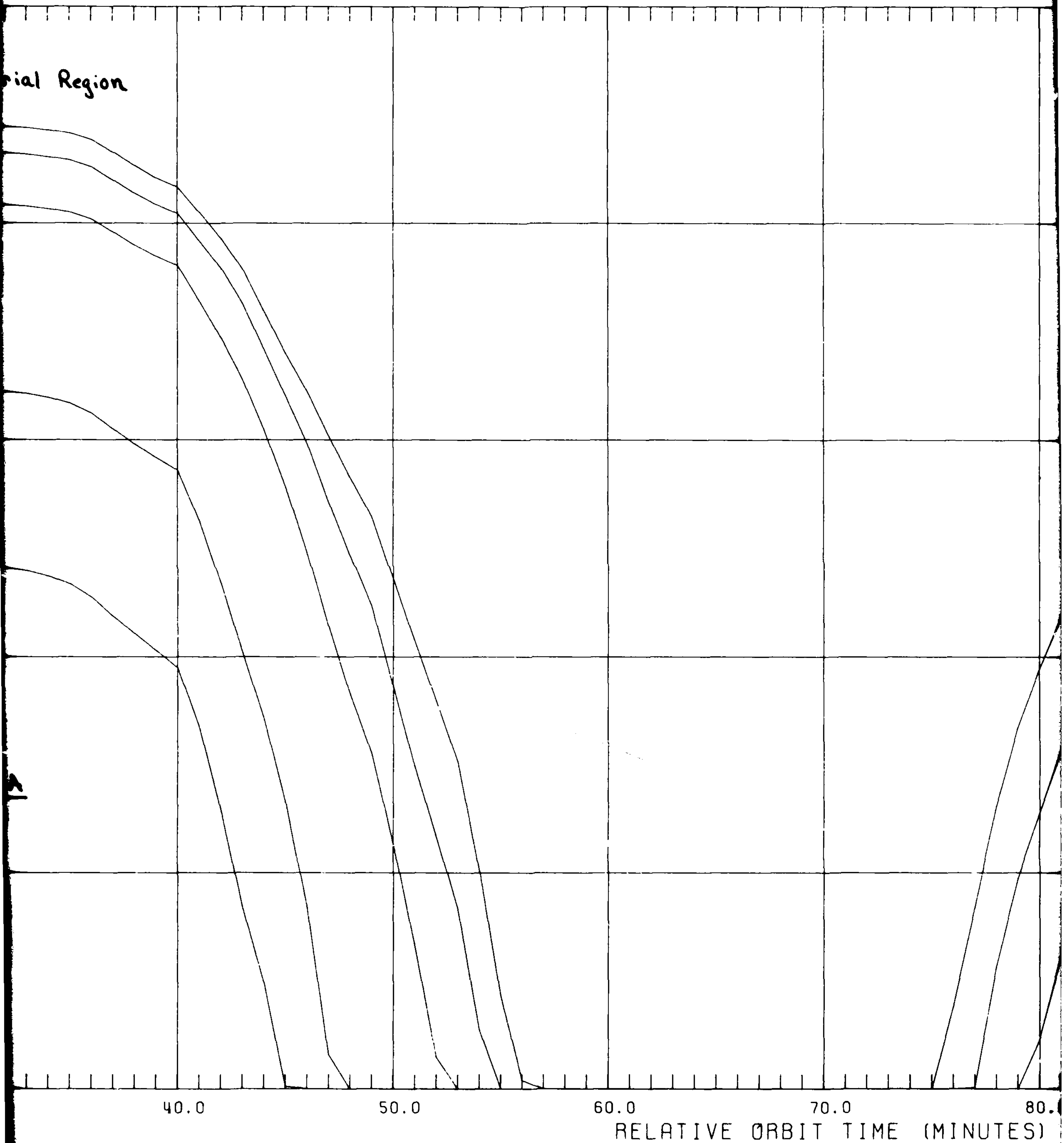
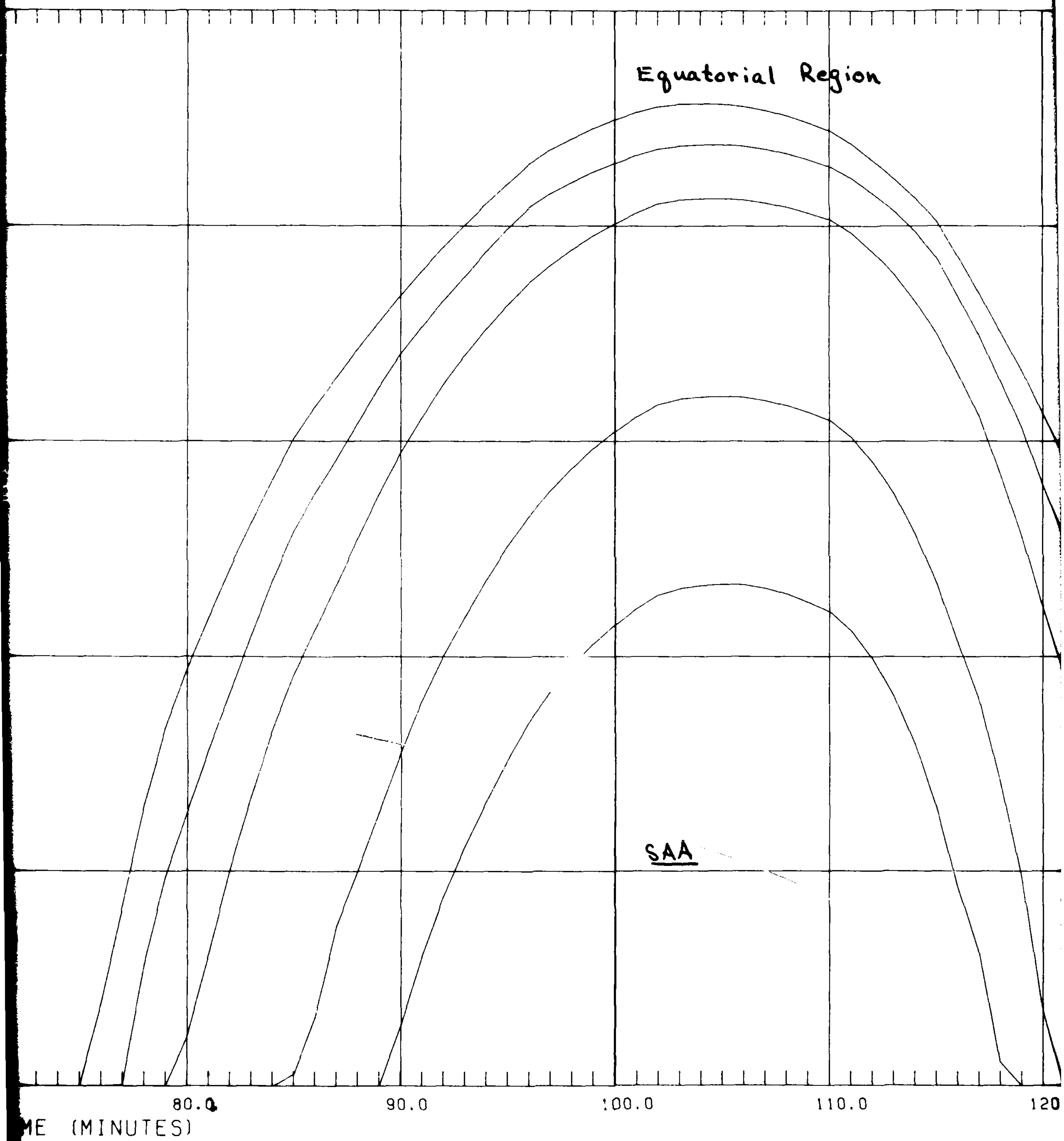


Figure 104
Northern Horn
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 8.449993
NASA-GSFC
100.0
110.0
120.0



OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
30.00
50.00
100.00
300.00
500.00
Equatorial Region
SAA
START TIME ON TAPE= 5.283323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL TRAPPED PROTON FLUX (#/CM**2/SEC)
0.0
1.0
2.0
3.0
4.0
5.0
0.0
10.0
20.0
30.0
40


ial Region
40.0
50.0
60.0
70.0
80.
RELATIVE ORBIT TIME (MINUTES)


Equatorial Region
SAA
80.0
90.0
100.0
110.0
120
ME (MINUTES)

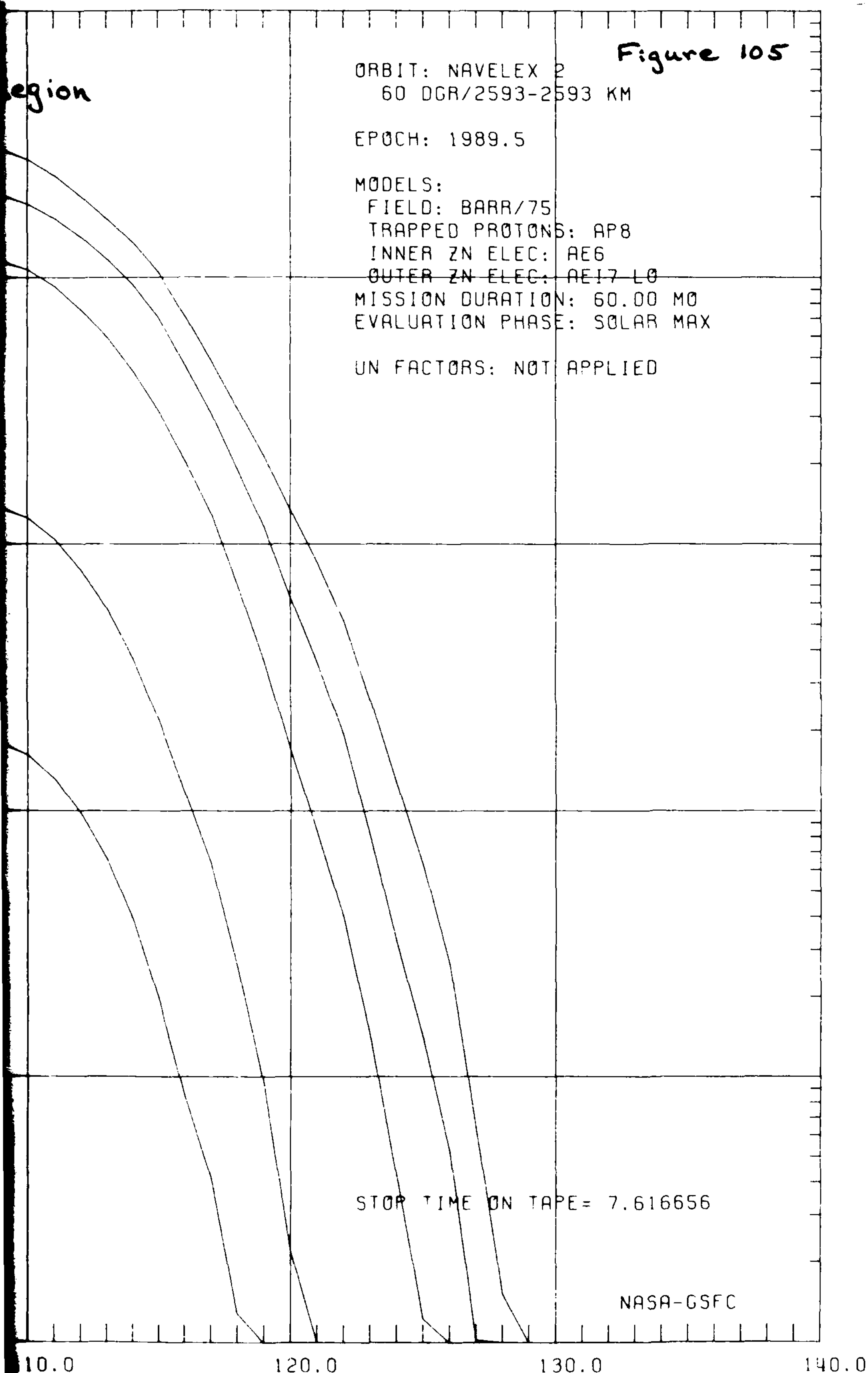
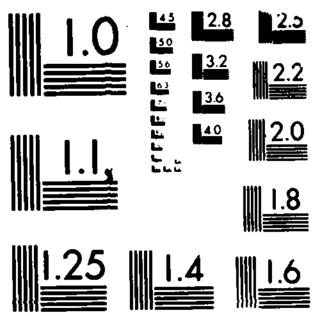


Figure 105
egion
ORBIT: NAVELEX 2
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 7.616656
NASA-GSFC
10.0
120.0
130.0
140.0

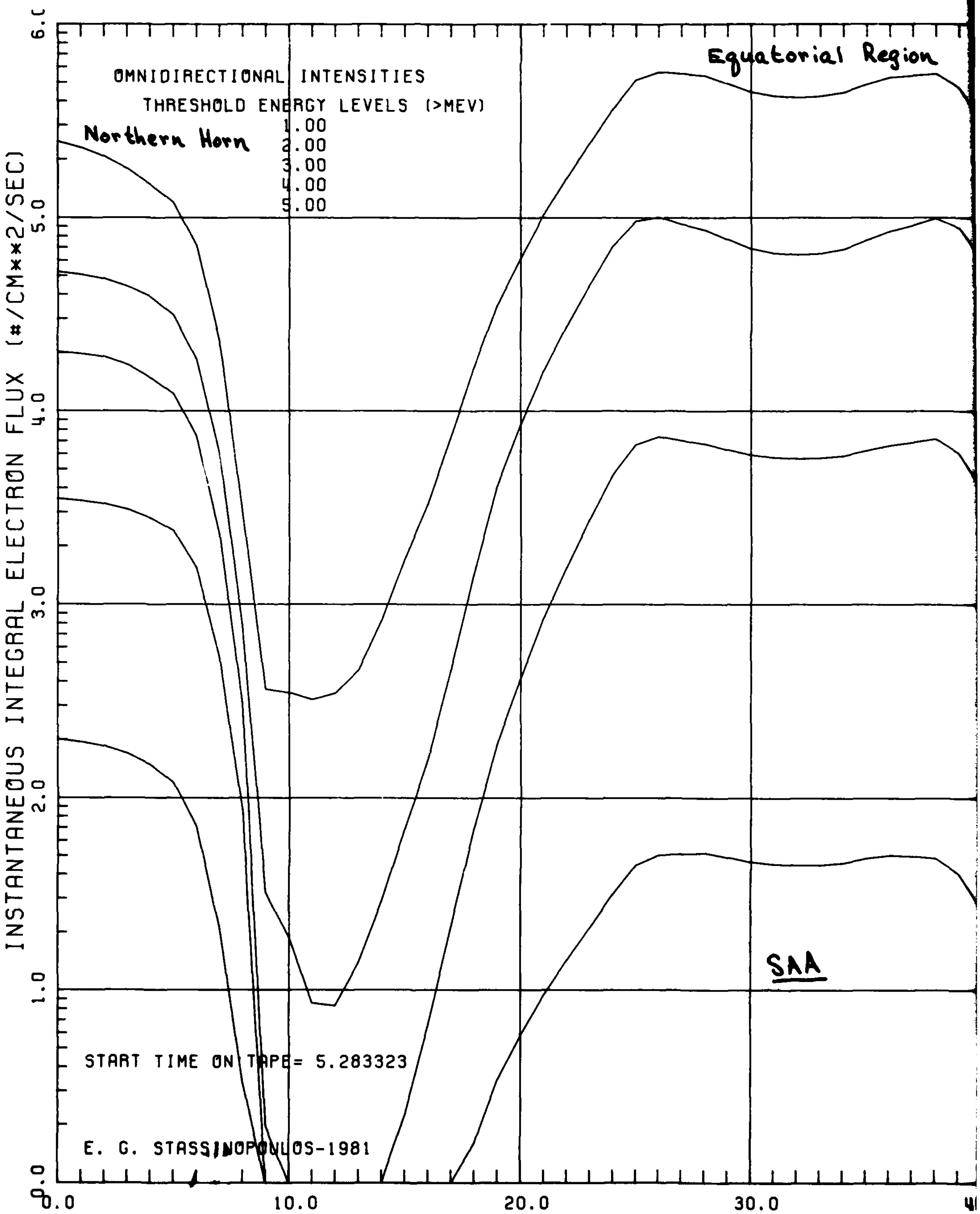
AD-A141 849 ORBITAL RADIATION STUDY FOR INCLINED CIRCULAR TRAJECTORIES(U) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION GREENBELT MD GO.. E G STASSINOPOULOS

3/5

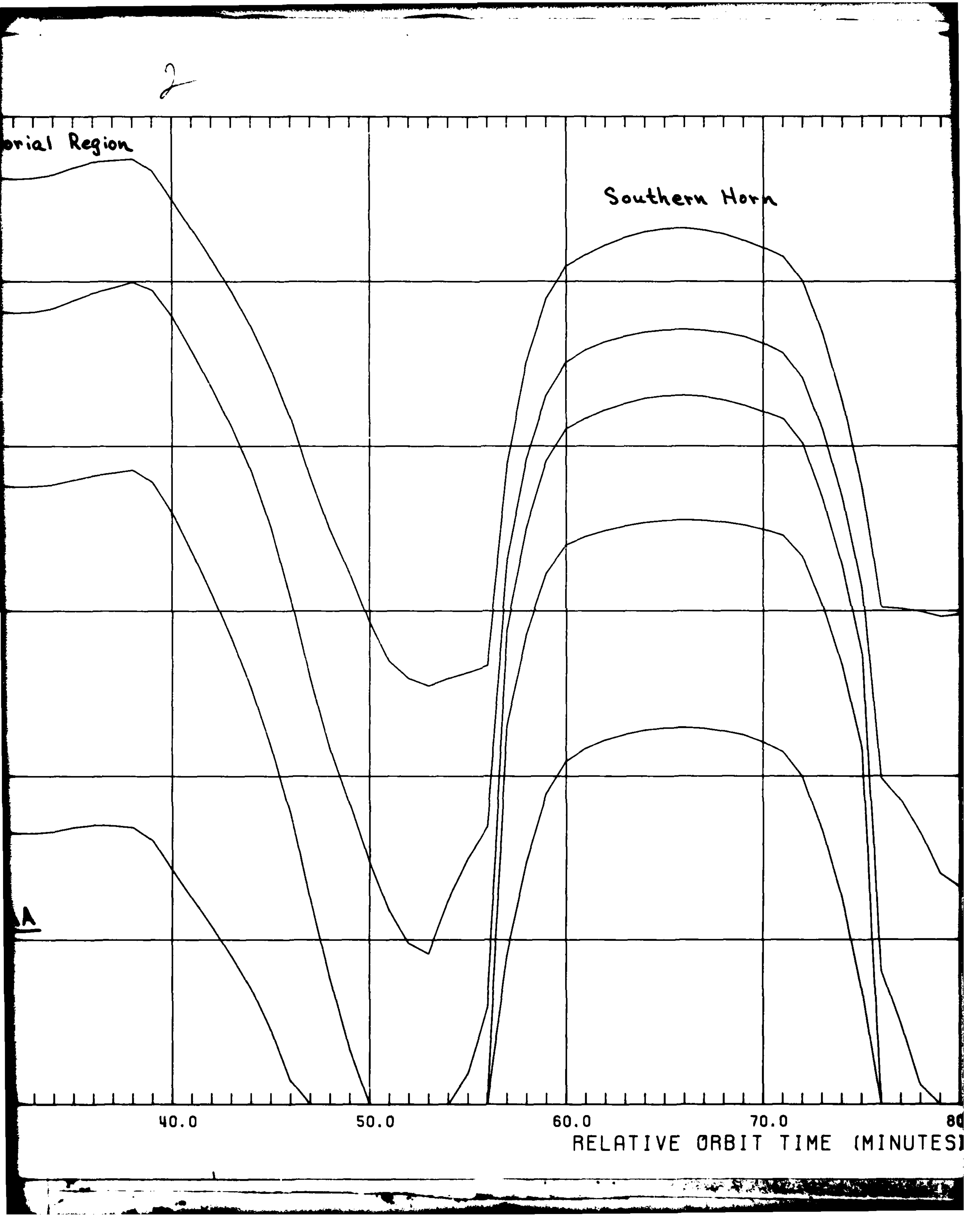
UNCLASSIFIED NOV 81 NASA-GSFC-X-601-81-28 F/G 22/3 NL



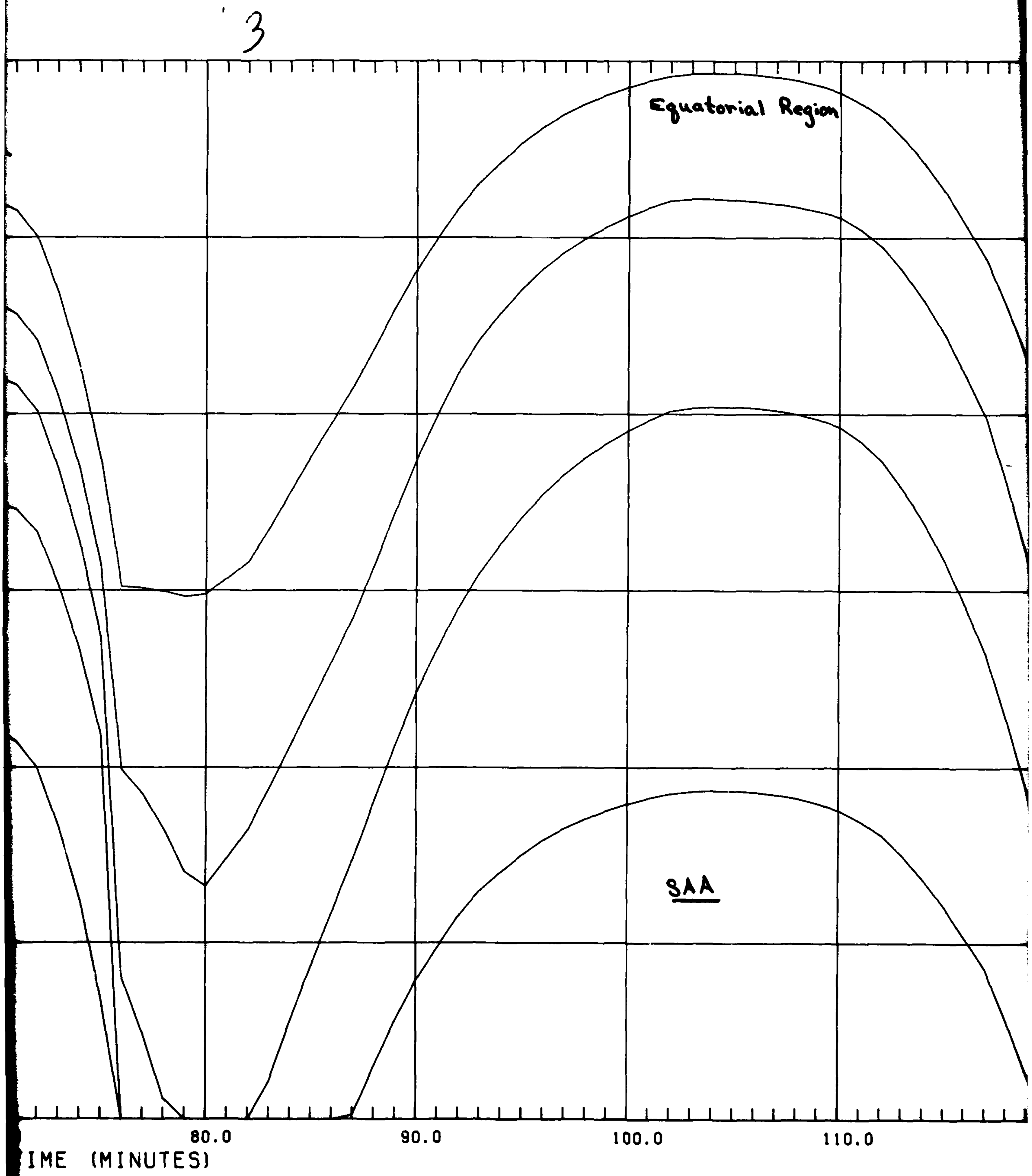
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



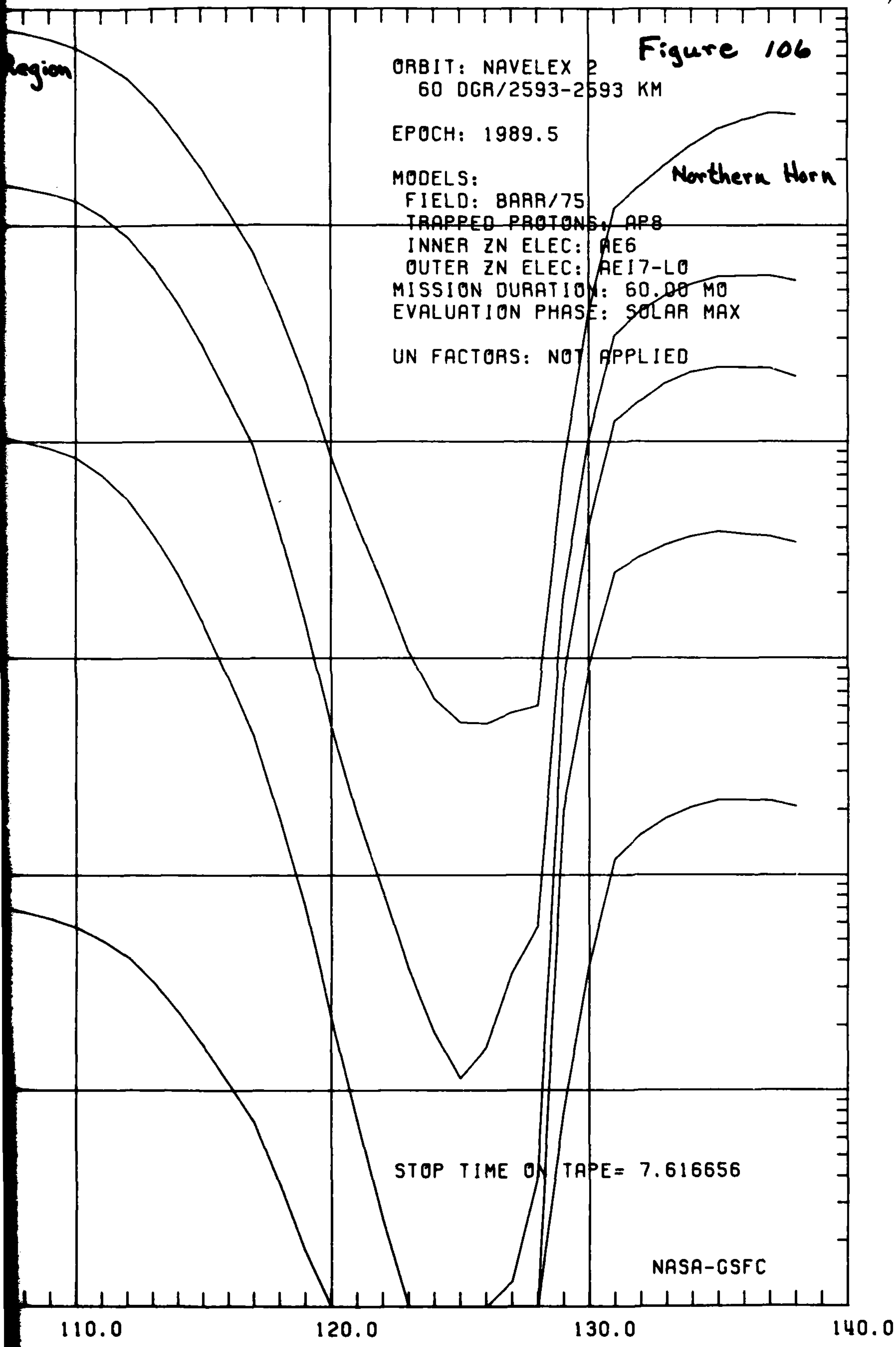
OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
1.00
2.00
3.00
4.00
5.00
Northern Horn
Equatorial Region
SAA
START TIME ON TAPE= 5.283323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL ELECTRON FLUX (#/CM**2/SEC)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
10.0
20.0
30.0



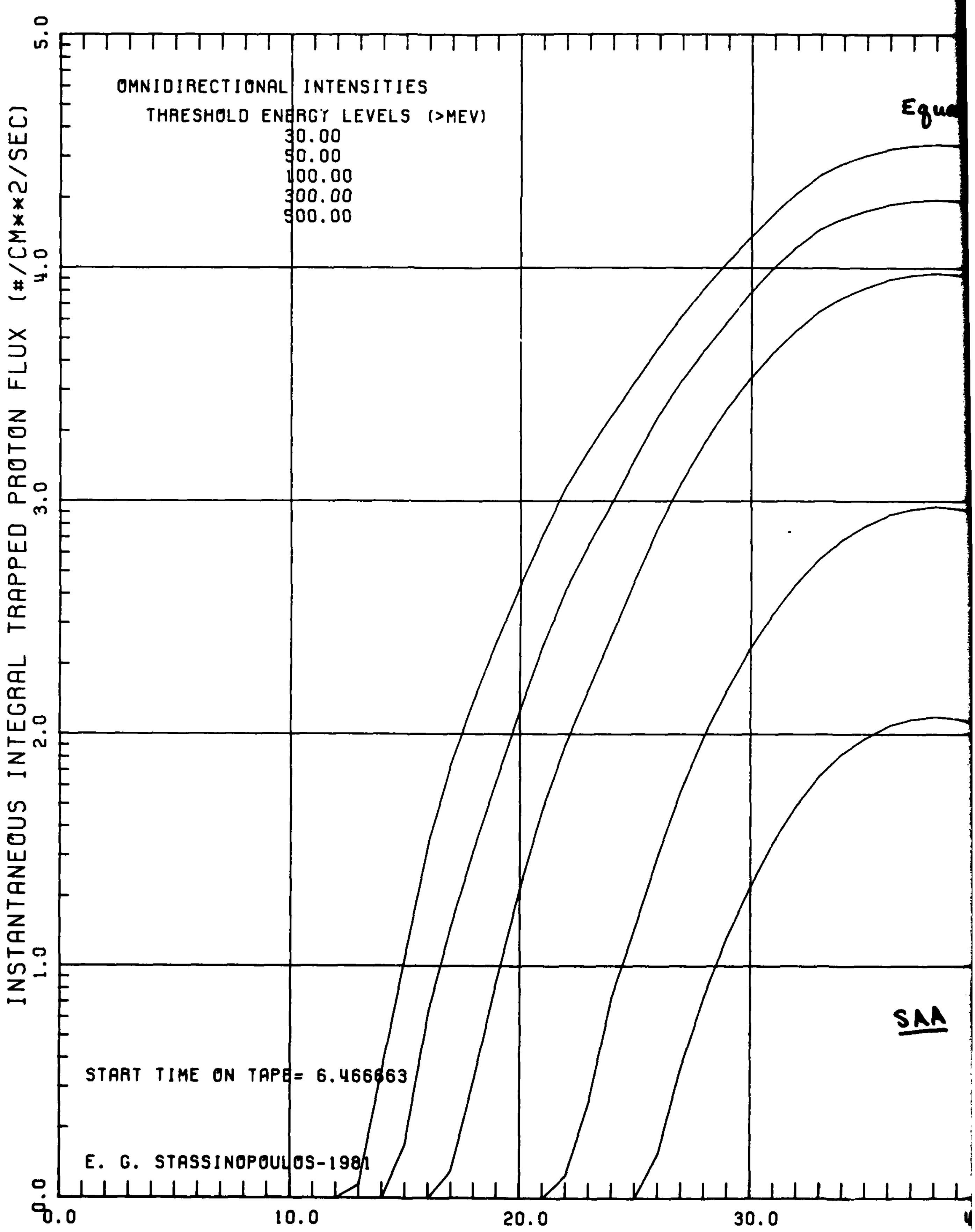
2
orial Region
Southern Horn
A
40.0
50.0
60.0
70.0
80
RELATIVE ORBIT TIME (MINUTES)


3
Equatorial Region
SAA
80.0
90.0
100.0
110.0
IME (MINUTES)

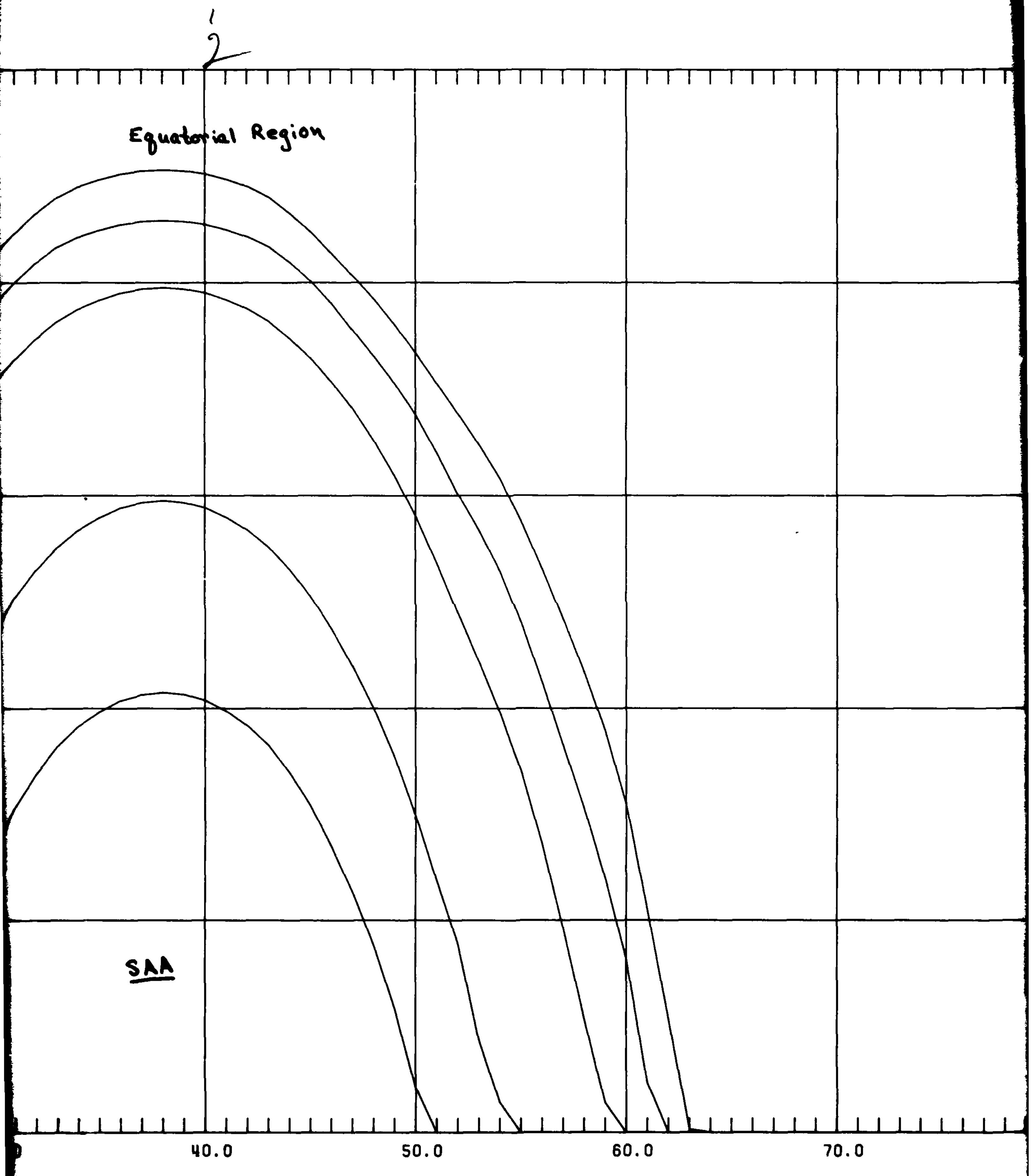
4



Region
Figure 106
ORBIT: NAVELEX 2
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 7.616656
NASA-GSFC
110.0
120.0
130.0
140.0

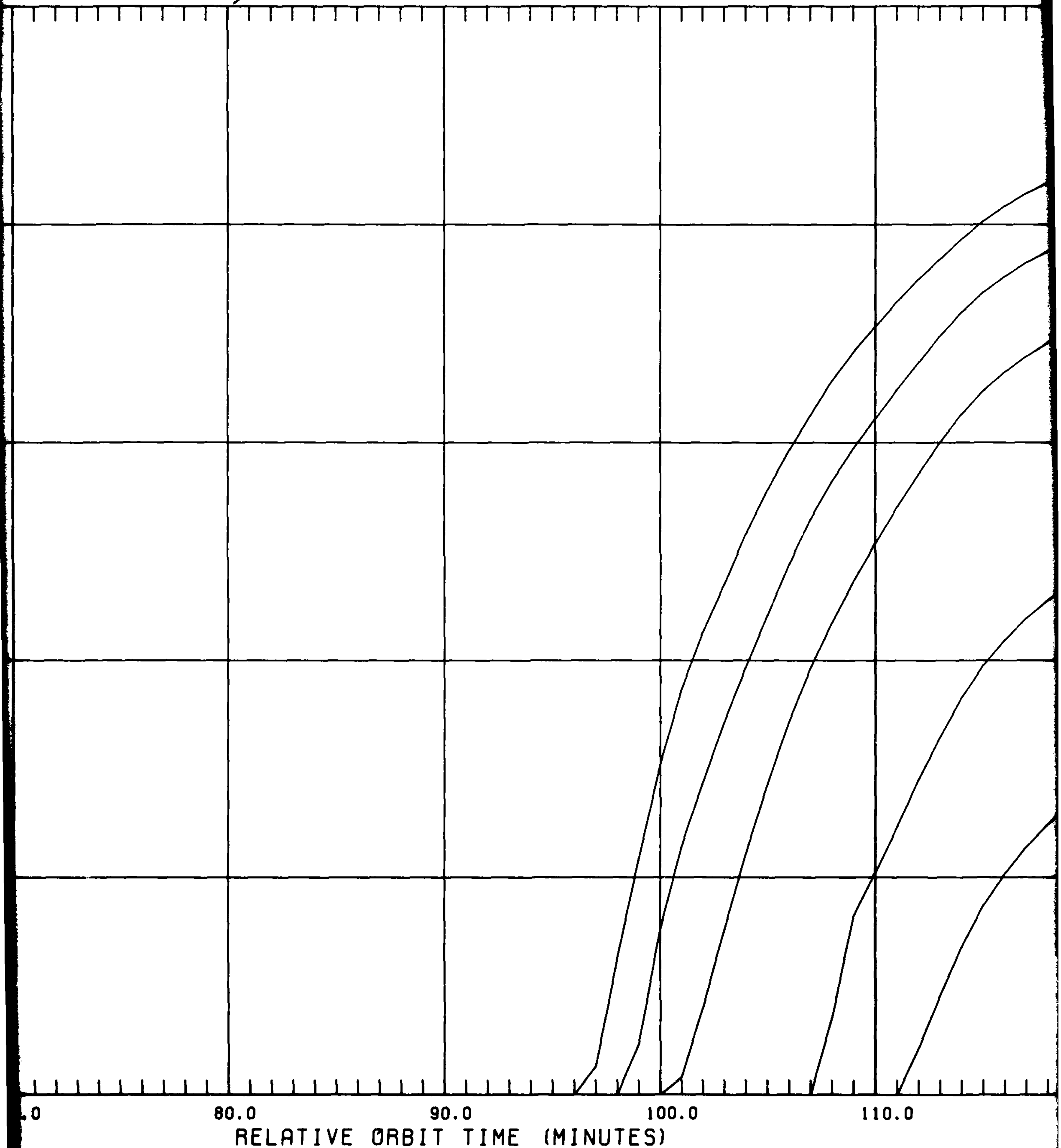


OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
30.00
50.00
100.00
300.00
500.00
Equa
SAA
START TIME ON TAPE= 6.466663
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL TRAPPED PROTON FLUX (#/CM**2/SEC)
0.0
1.0
2.0
3.0
4.0
5.0
10.0
20.0
30.0

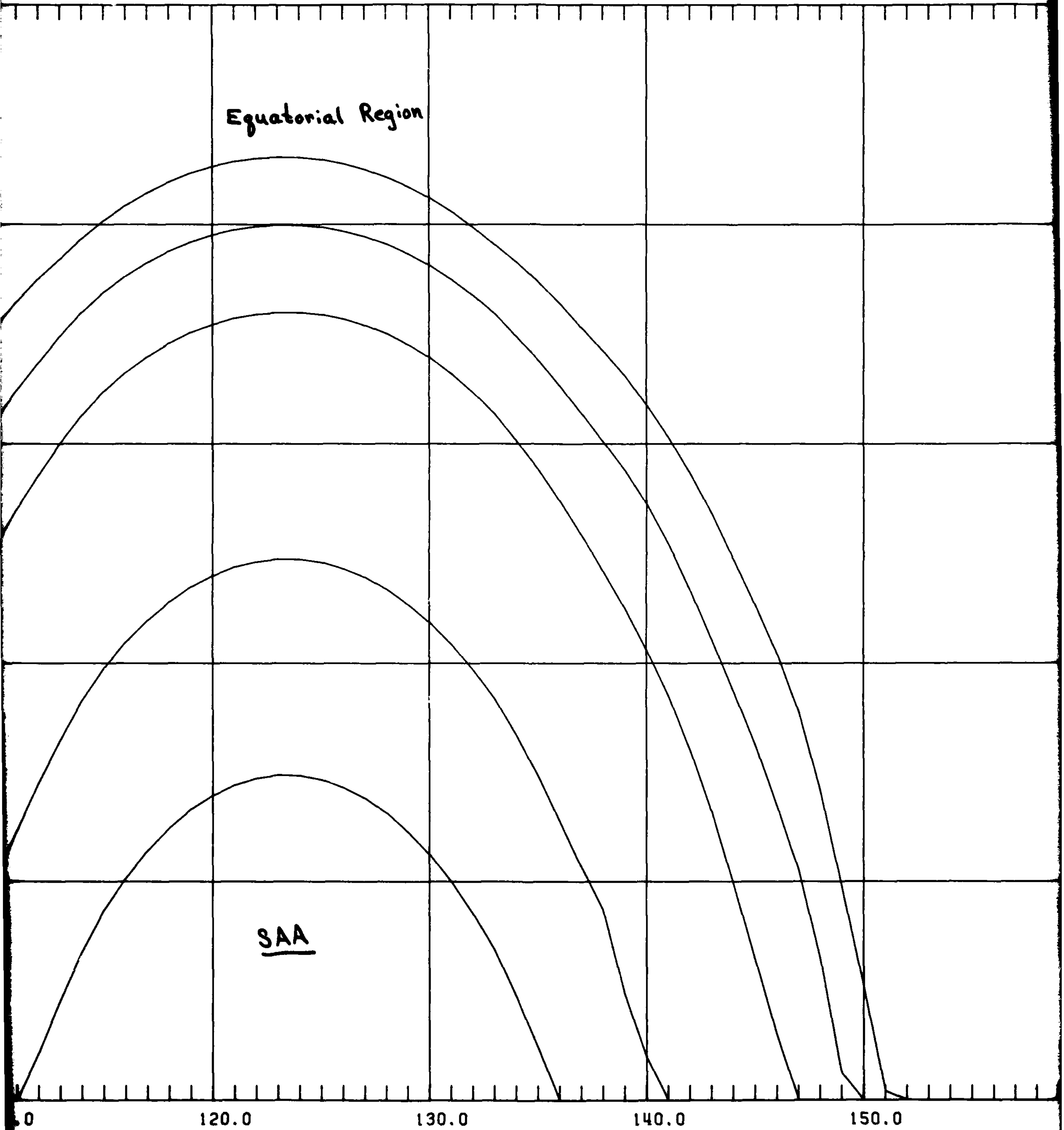


1
2
Equatorial Region
SAA
40.0
50.0
60.0
70.0

.3



'4



5

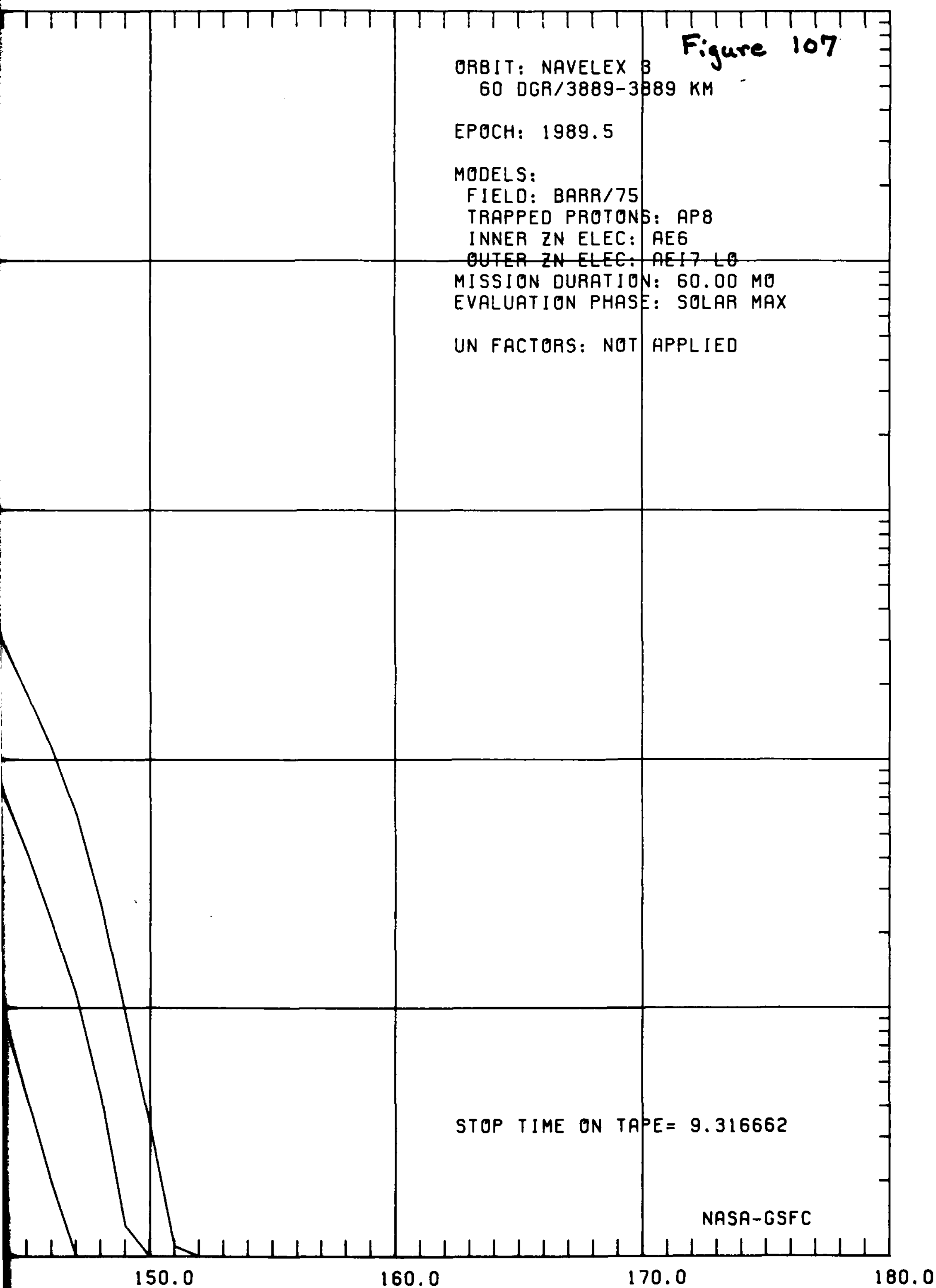
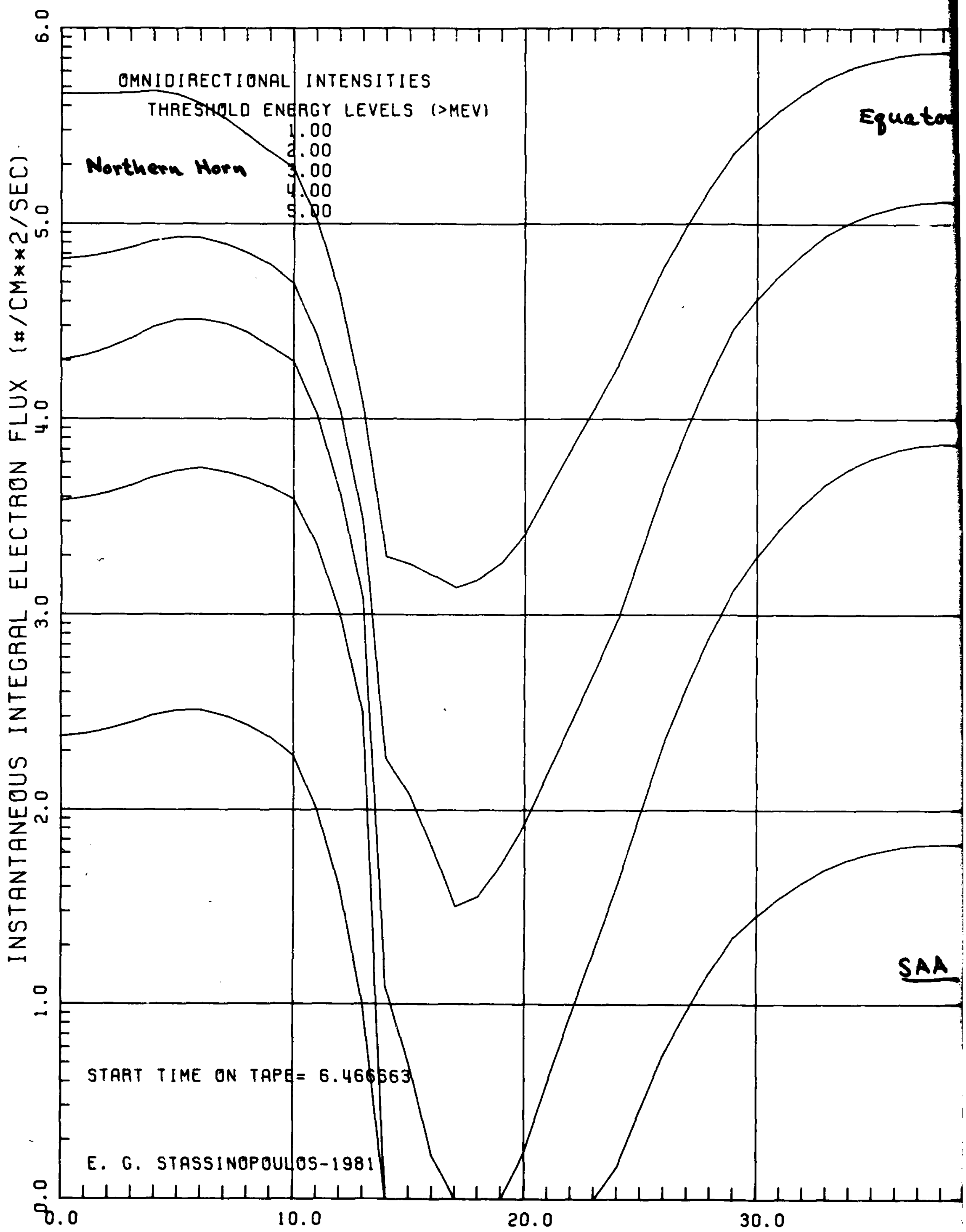
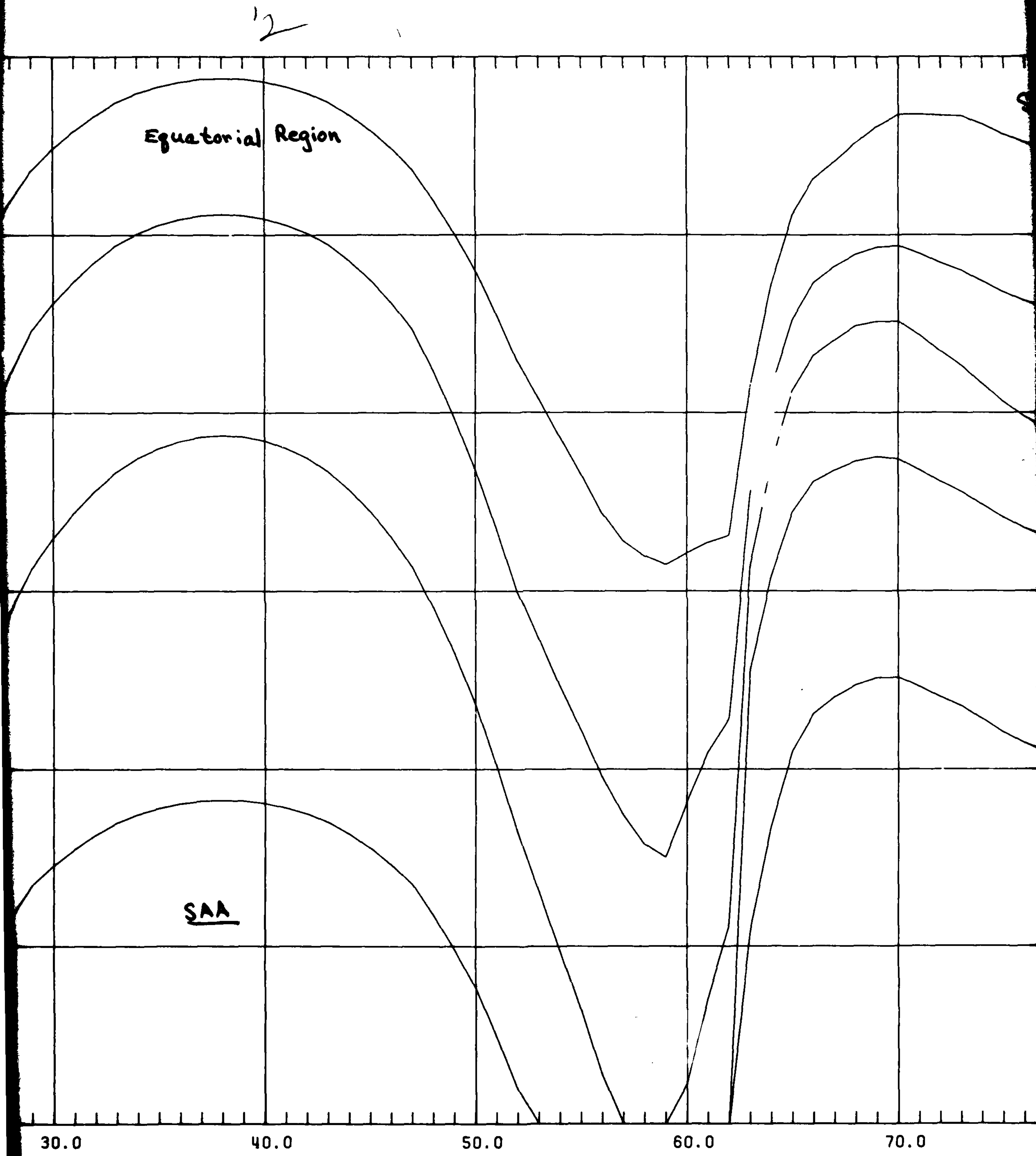


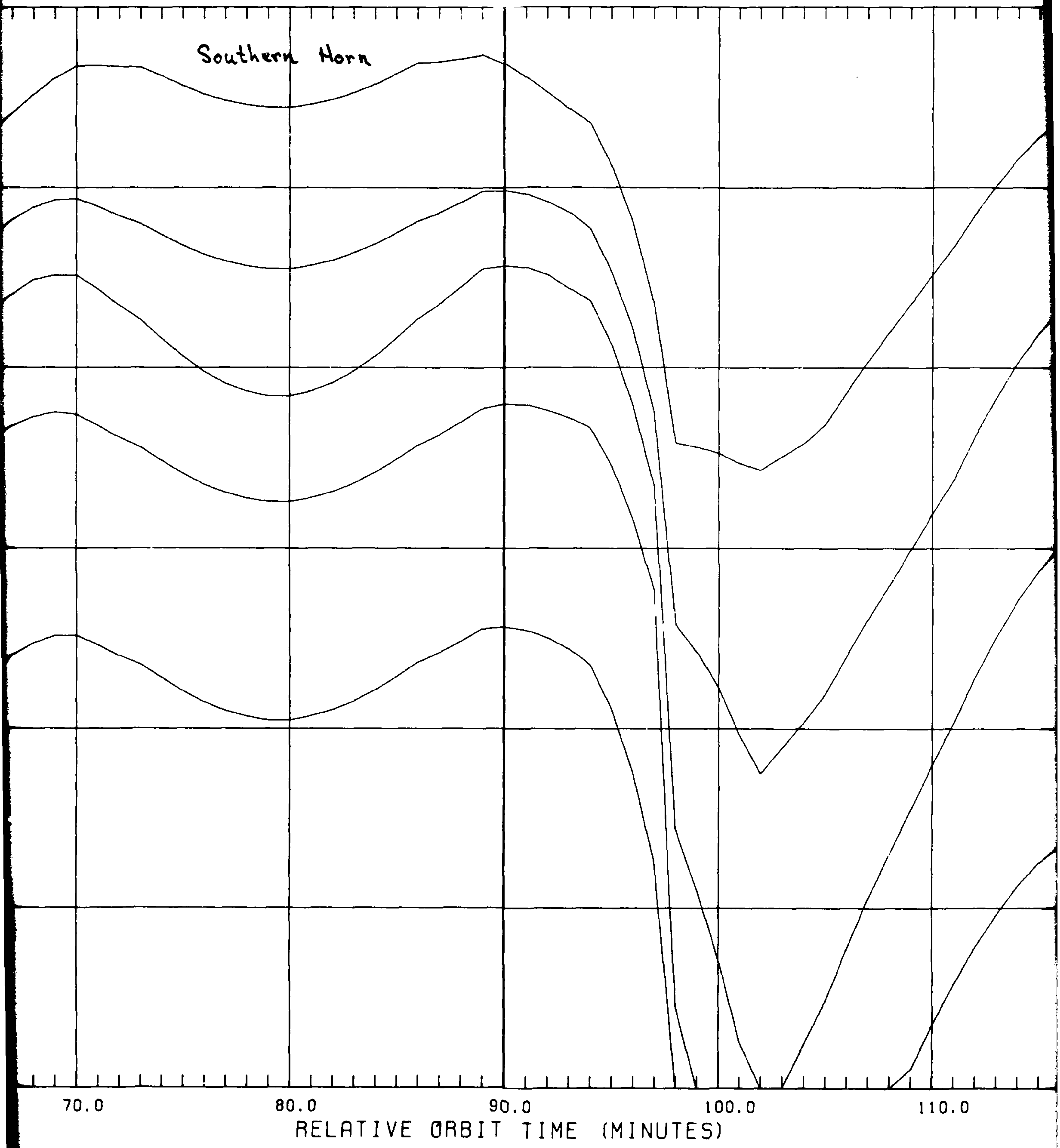
Figure 107
ORBIT: NAVELEX 3
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 9.316662
NASA-GSFC
150.0
160.0
170.0
180.0


OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
1.00
2.00
3.00
4.00
5.00
Northern Horn
Equator
SAA
START TIME ON TAPE= 6.466563
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL ELECTRON FLUX (#/CM**2/SEC)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
0.0
10.0
20.0
30.0

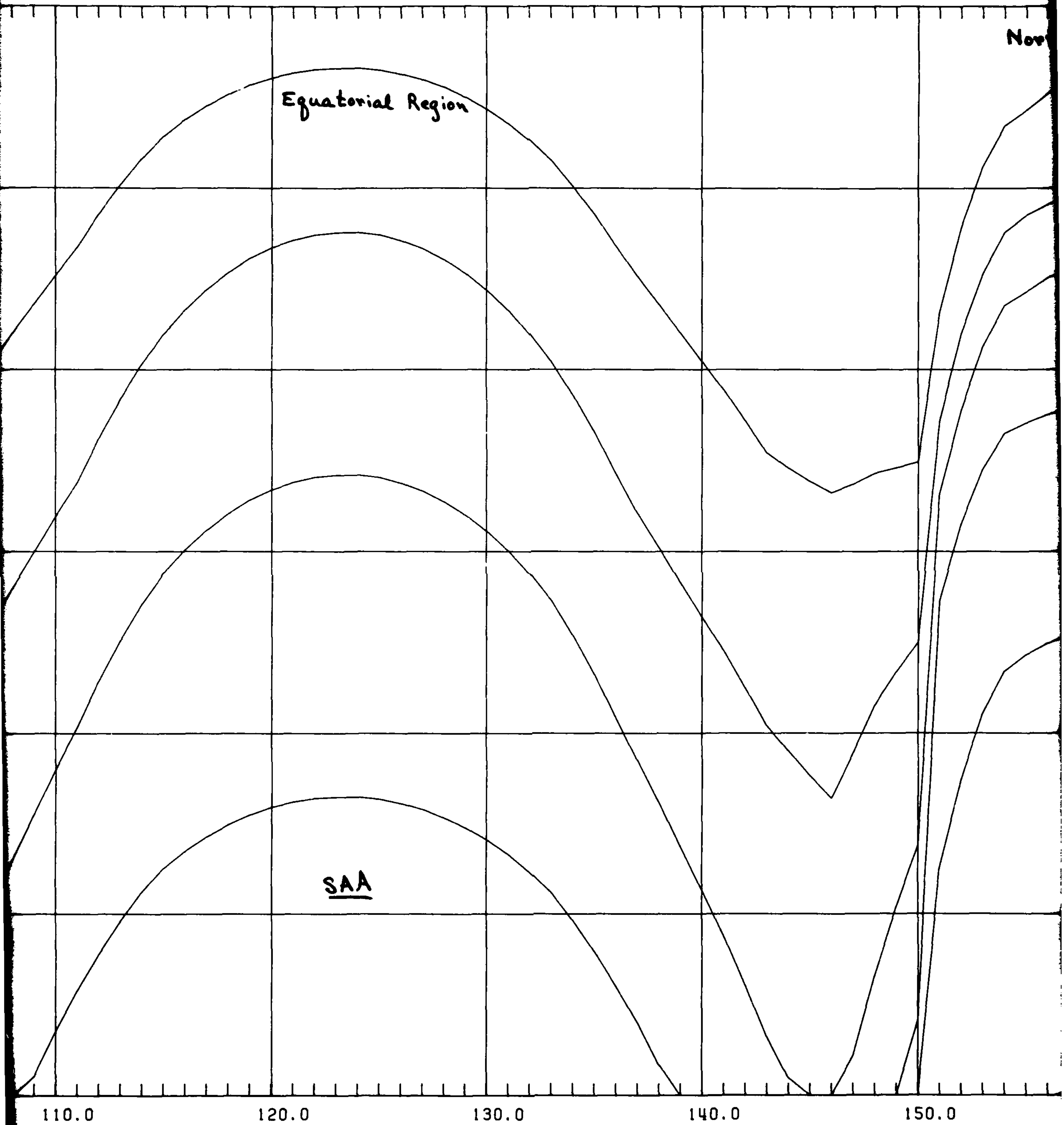


'2
Equatorial Region
SAA
30.0
40.0
50.0
60.0
70.0

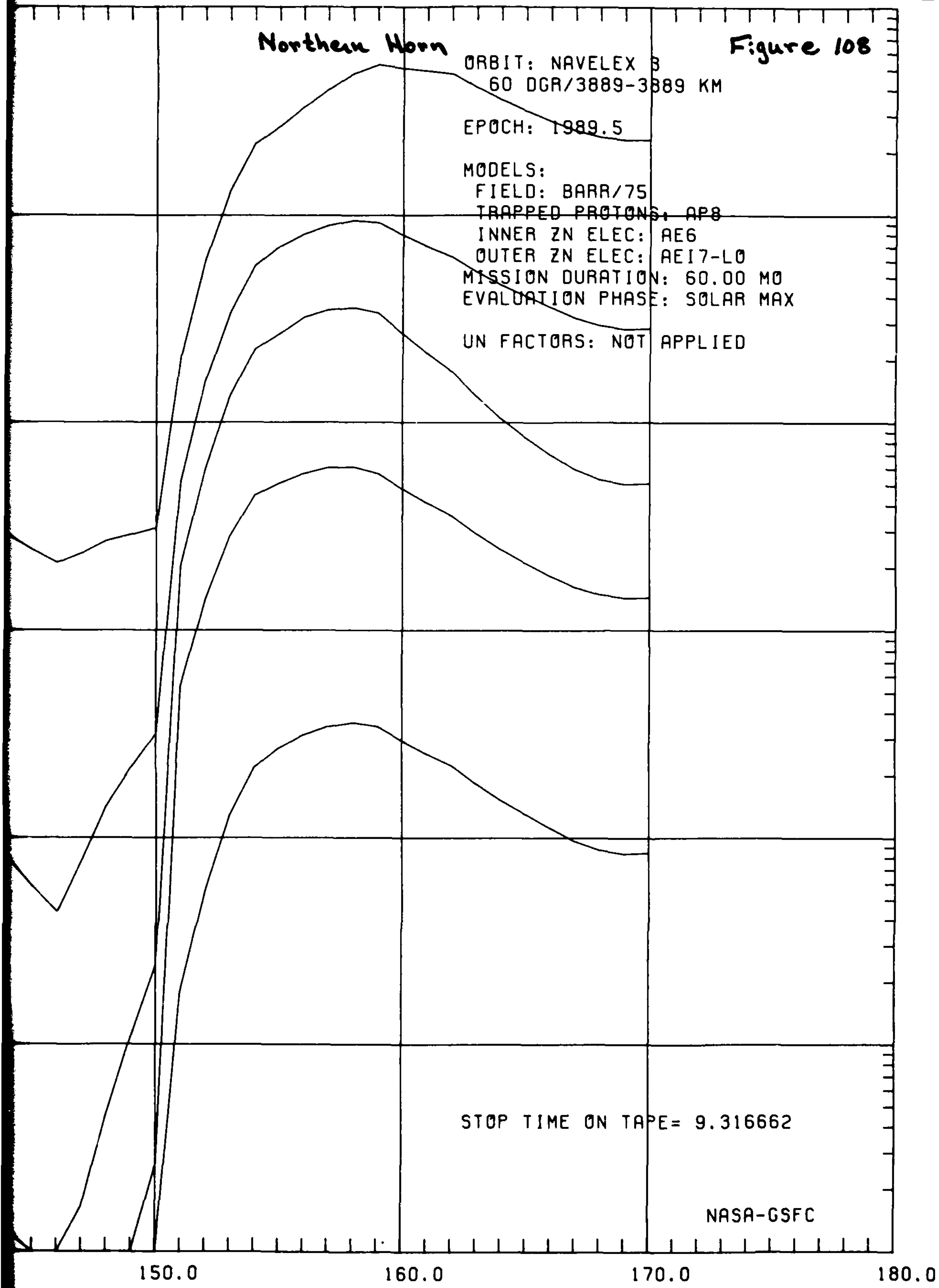
'3

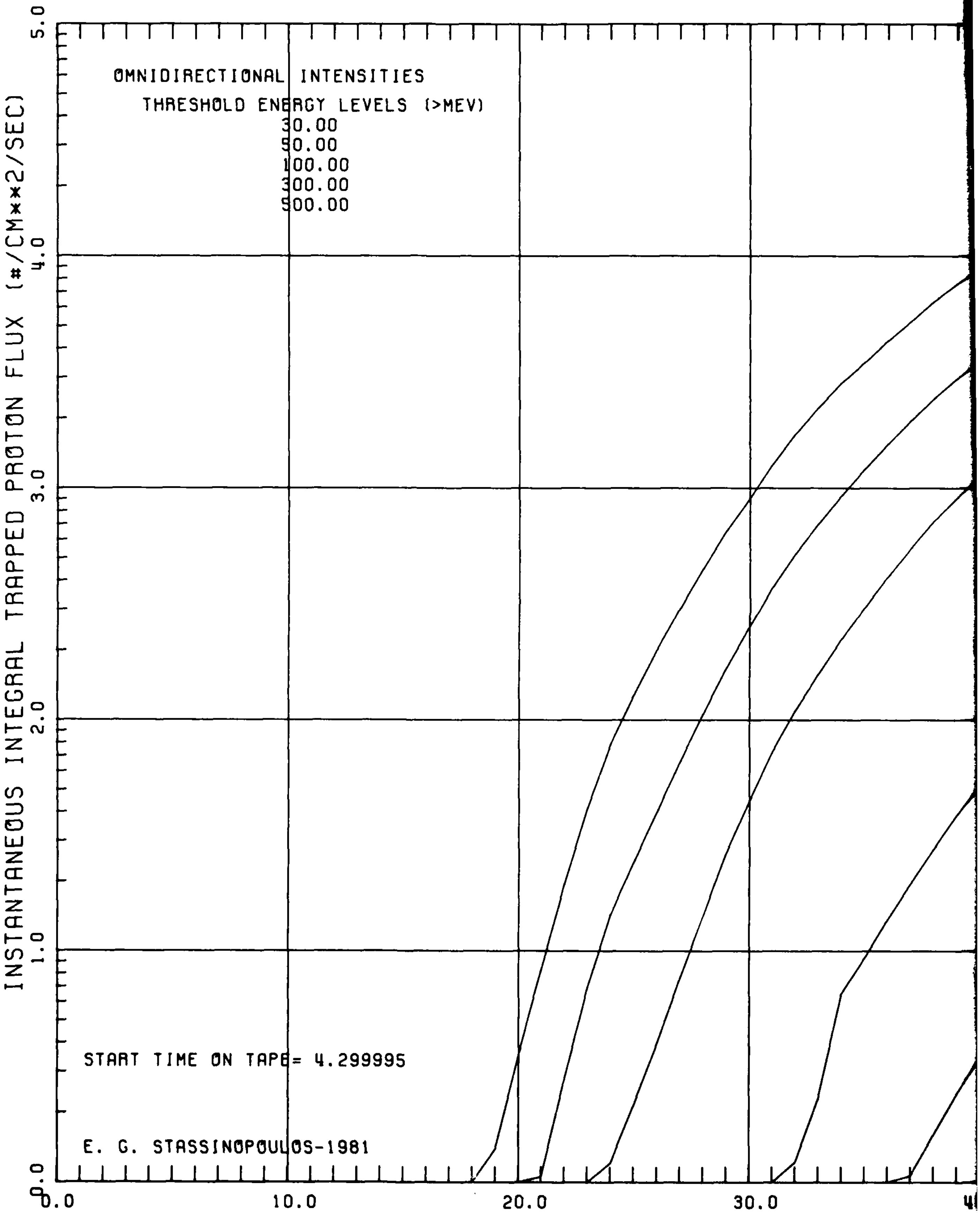

Southern Horn
70.0
80.0
90.0
100.0
110.0
RELATIVE ORBIT TIME (MINUTES)

4

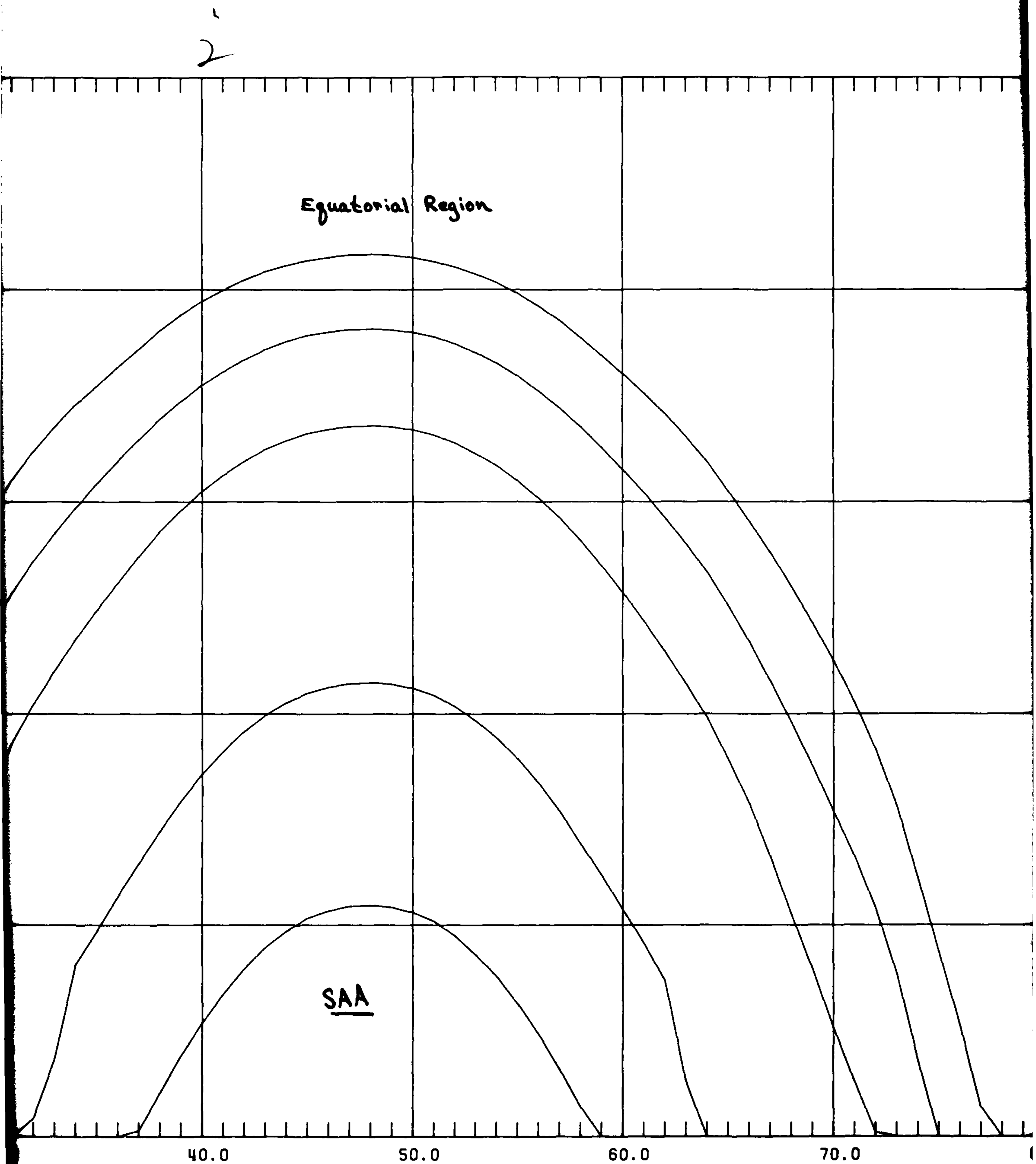


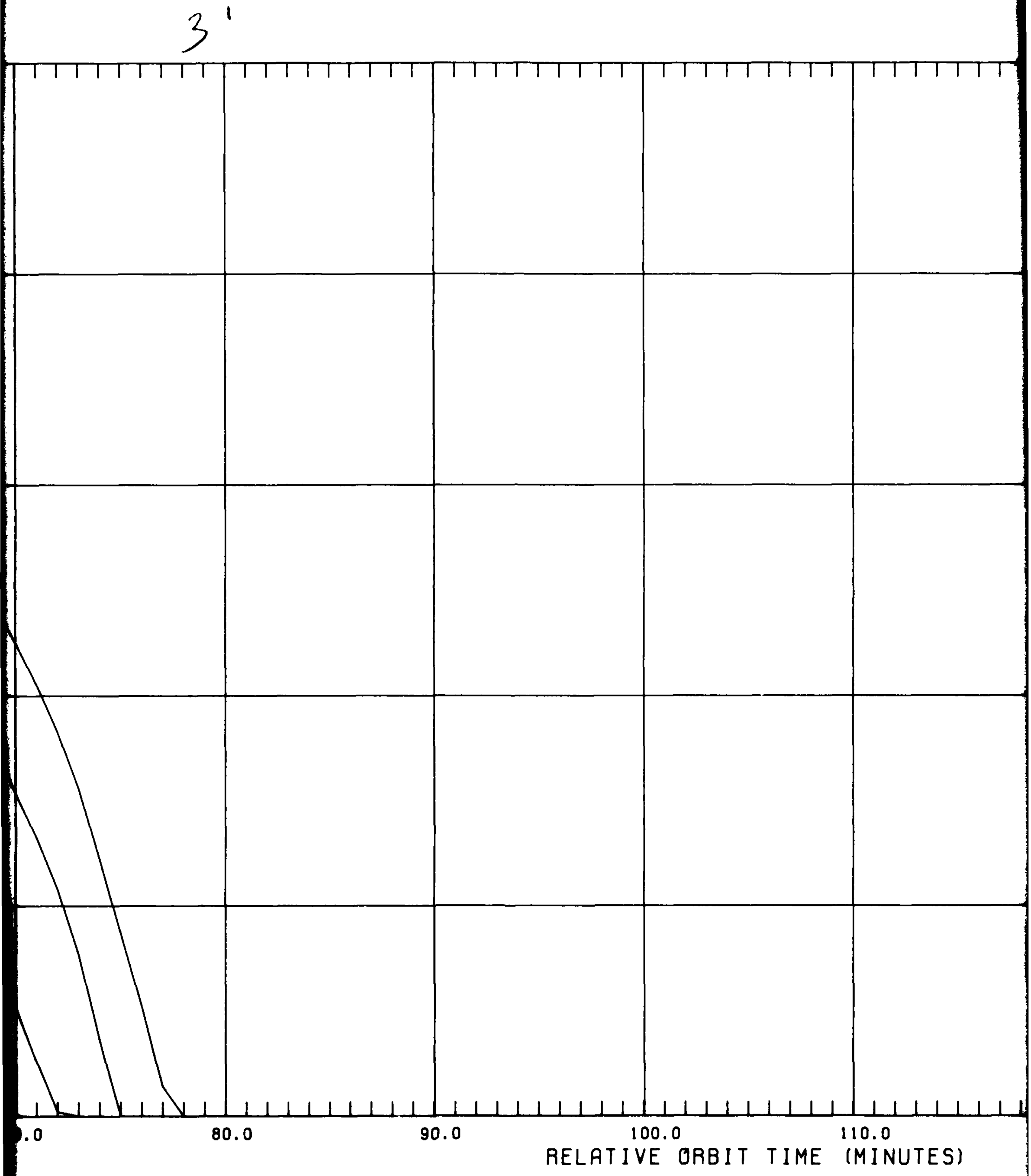
5

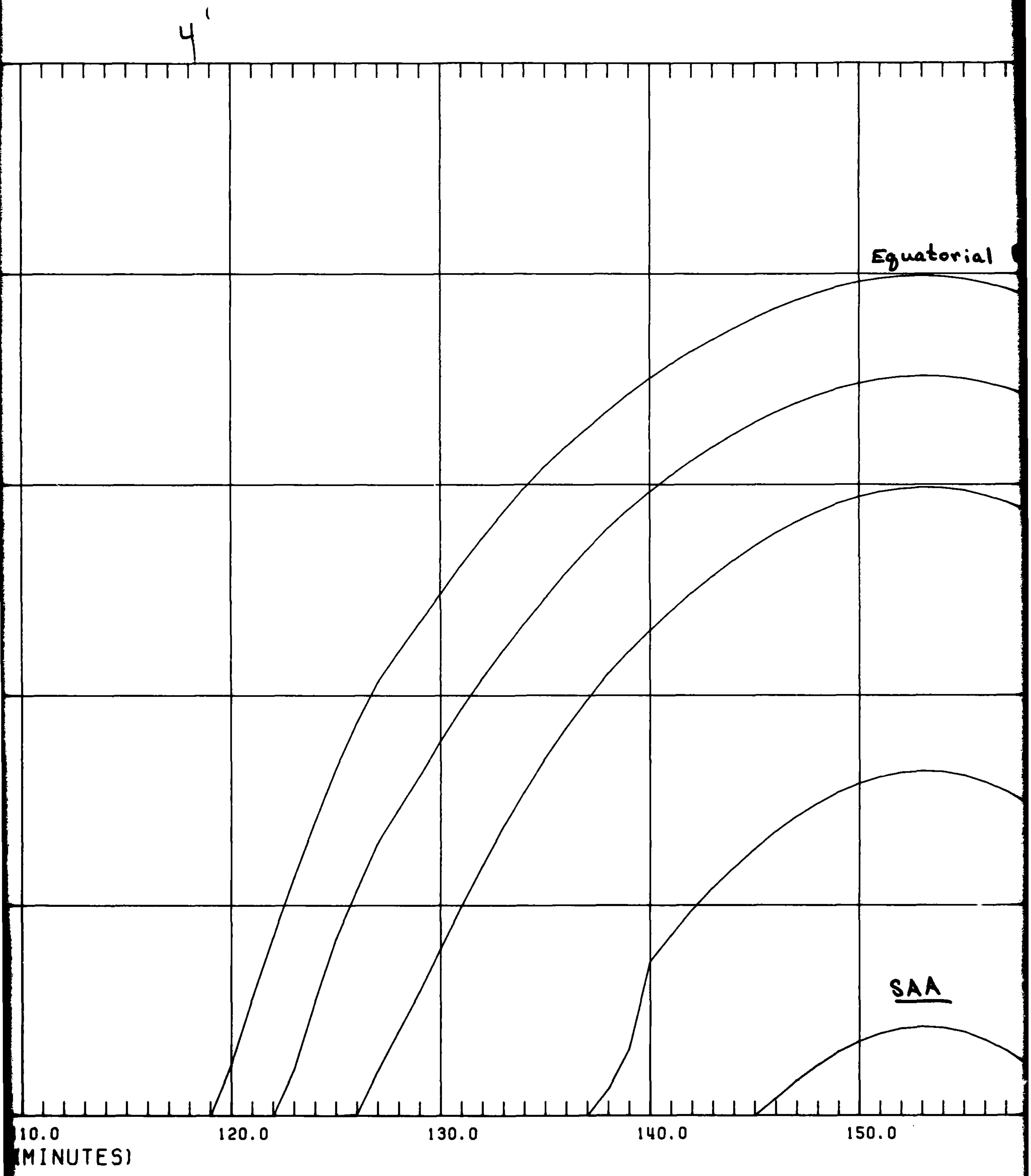

Northern Horn
Figure 108
ORBIT: NAVELEX 3
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 9.316662
NASA-GSFC
150.0
160.0
170.0
180.0



OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
30.00
50.00
100.00
300.00
500.00
START TIME ON TAPE= 4.299995
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL TRAPPED PROTON FLUX (#/CM**2/SEC)
0.0
1.0
2.0
3.0
4.0
5.0
0.0
10.0
20.0
30.0

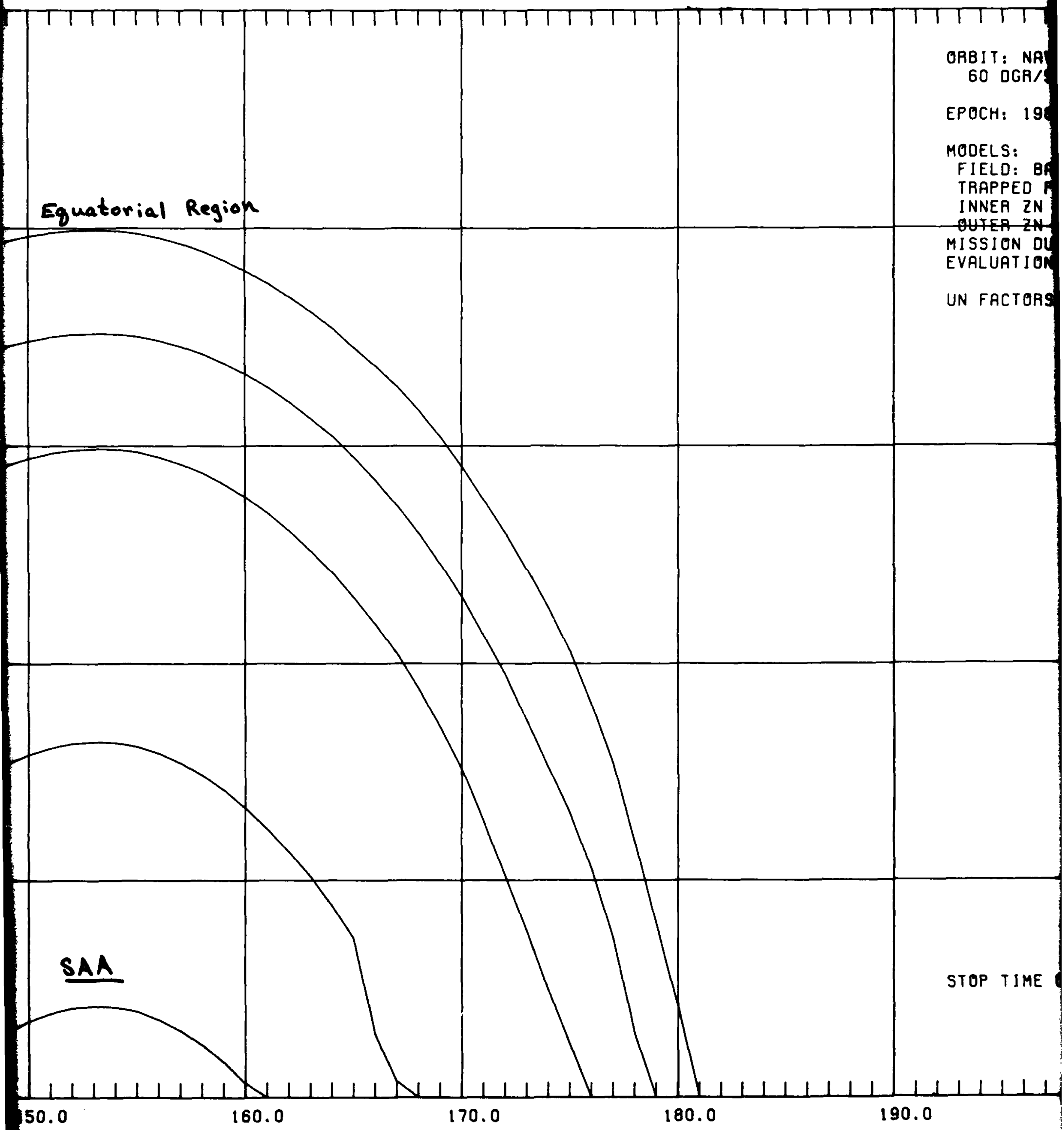

2
Equatorial Region
SAA
40.0
50.0
60.0
70.0


3'
.0
80.0
90.0
100.0
110.0
RELATIVE ORBIT TIME (MINUTES)



4
Equatorial
SAA
10.0
120.0
130.0
140.0
150.0
(MINUTES)

5



ORBIT: NA
60 DGR/
EPOCH: 19
MODELS:
FIELD: B
TRAPPED
INNER ZN
OUTER ZN
MISSION DU
EVALUATION
UN FACTORS
Equatorial Region
SAA
STOP TIME
150.0
160.0
170.0
180.0
190.0

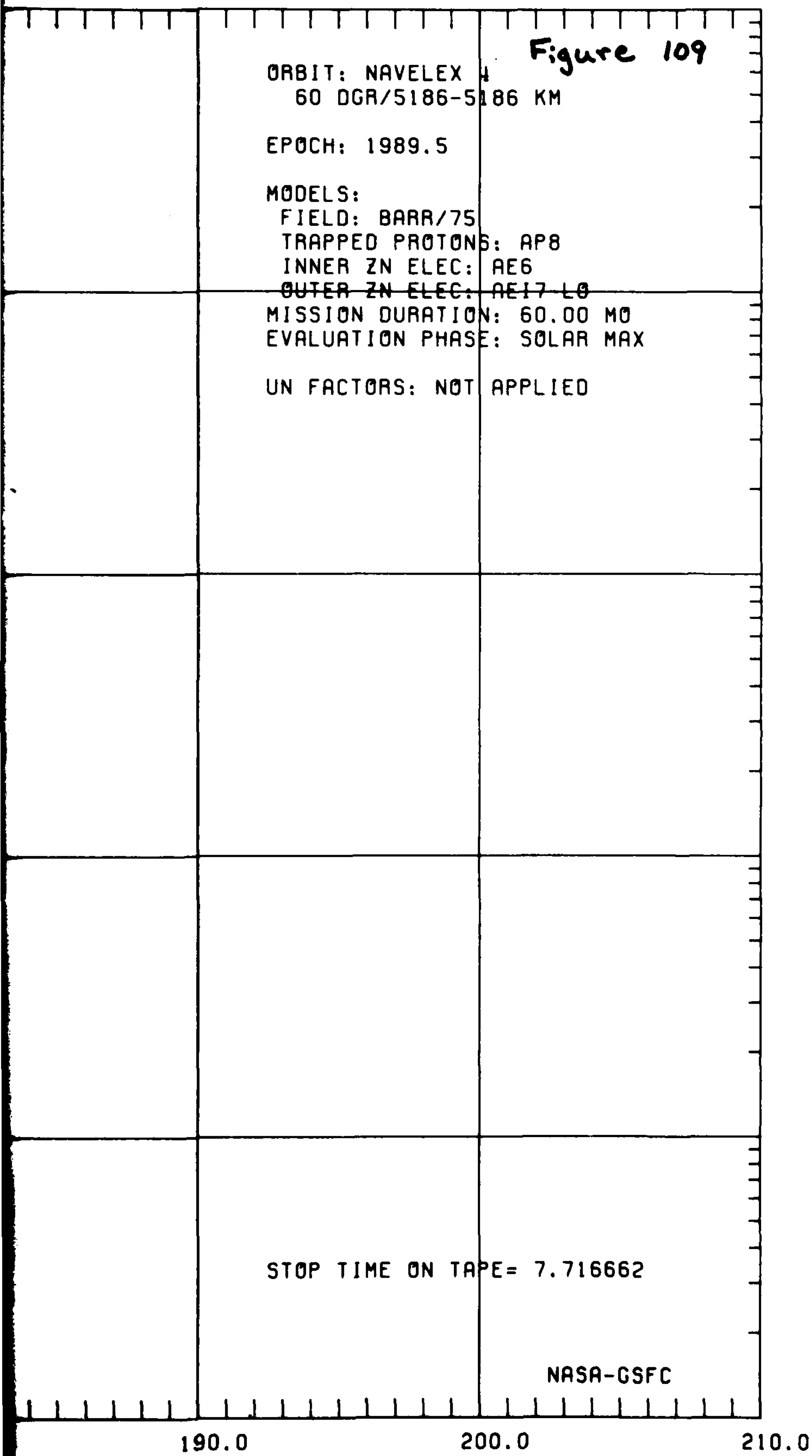
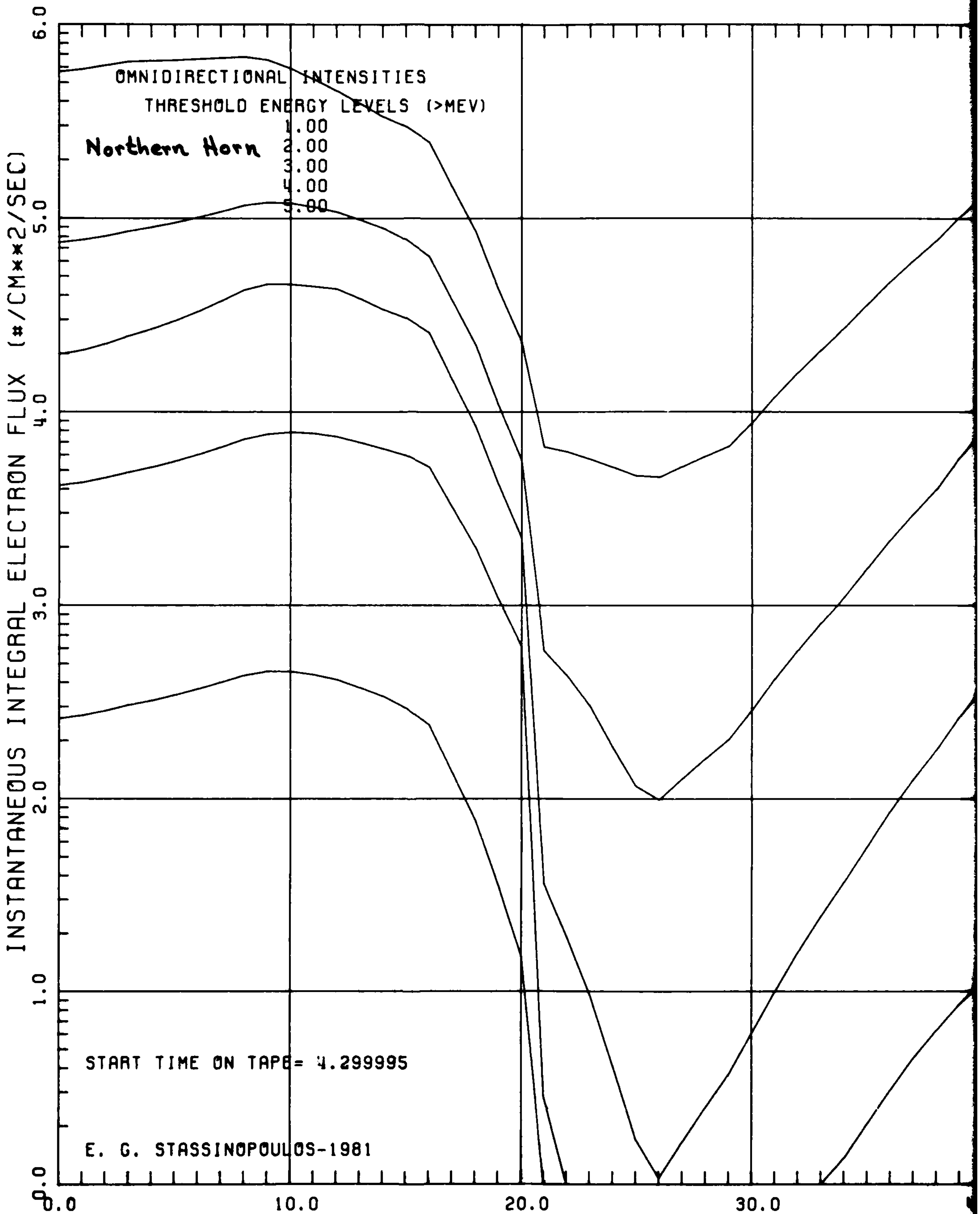
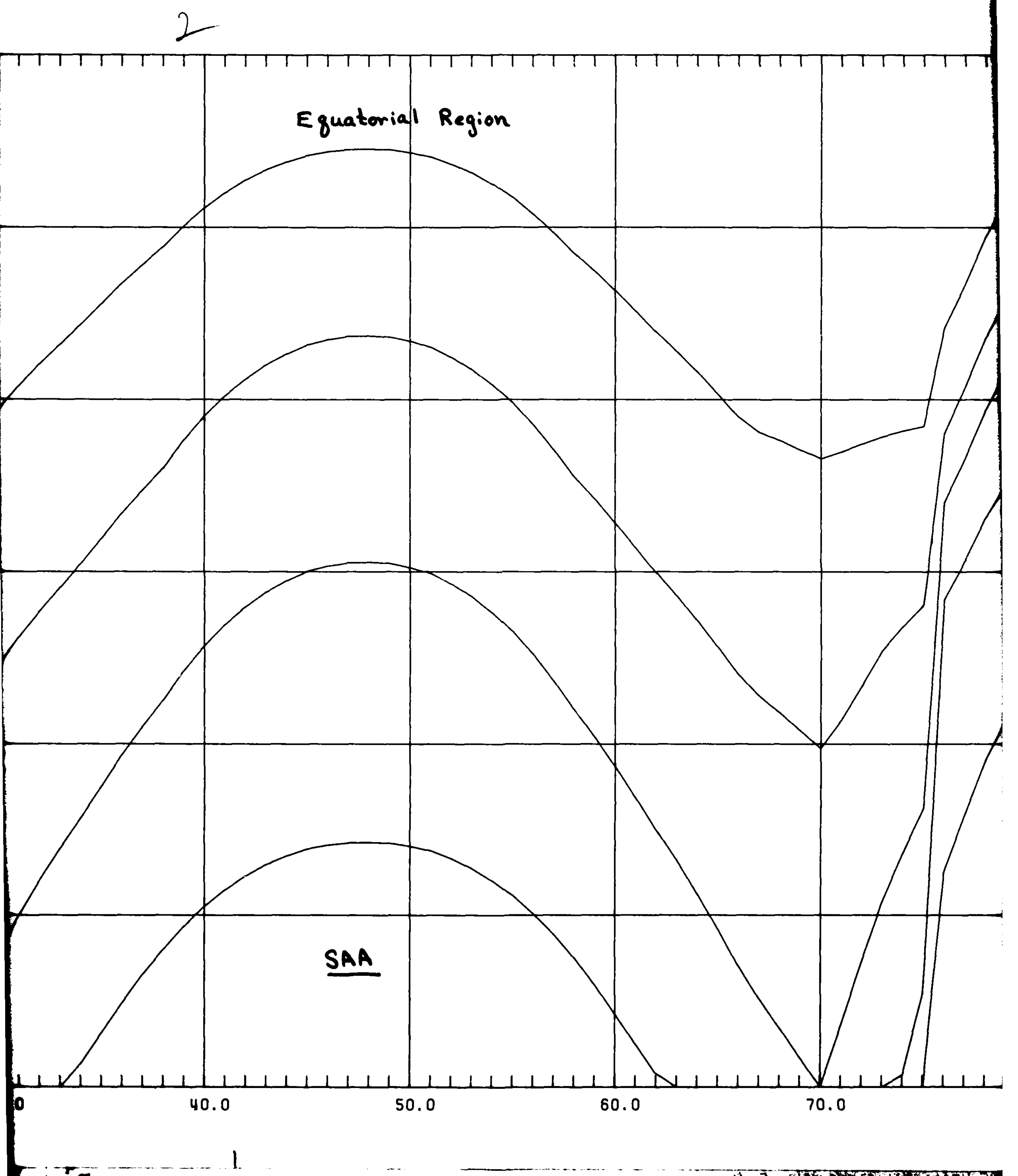


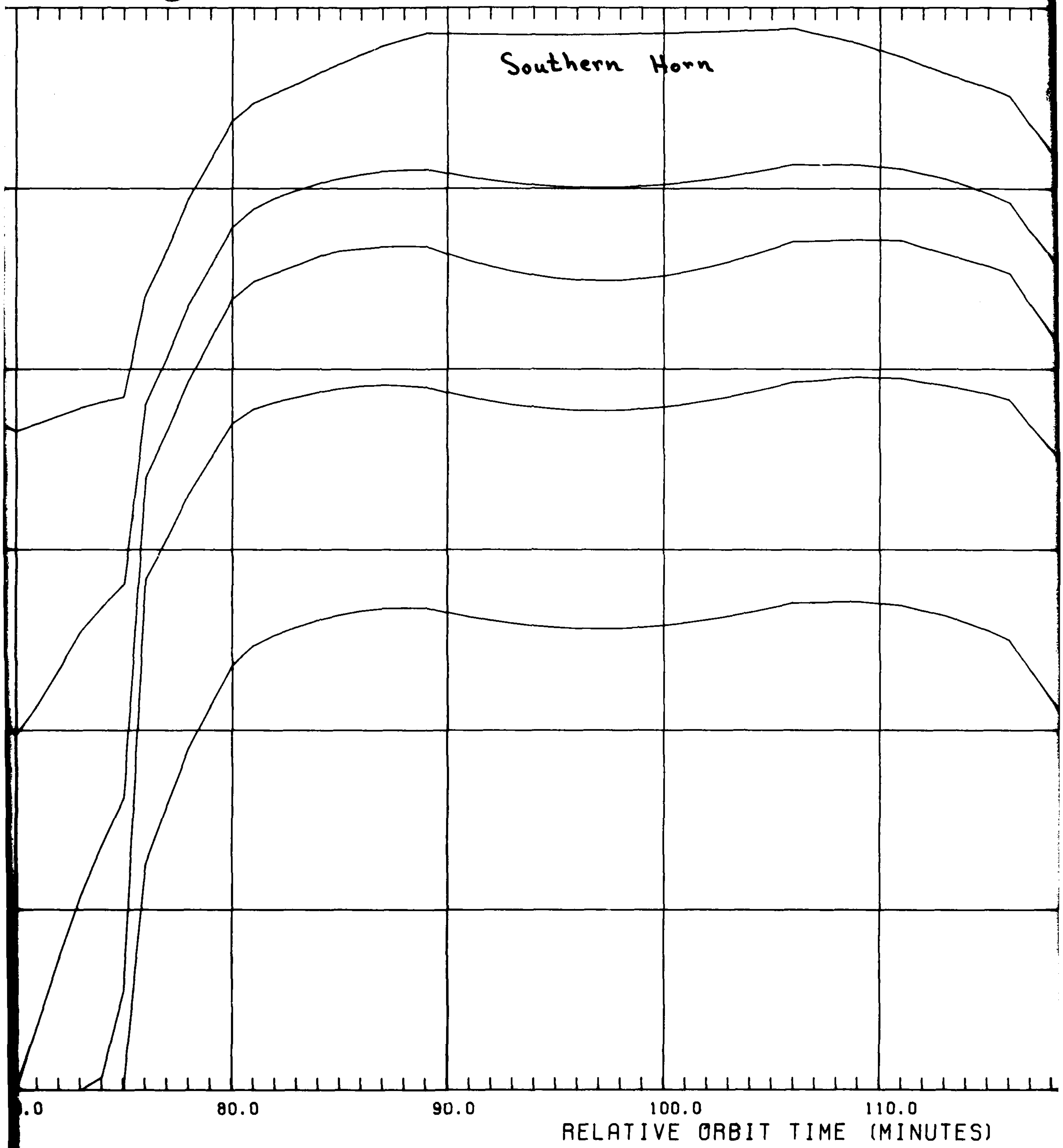
Figure 109
ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 7.716662
NASA-GSFC
190.0
200.0
210.0

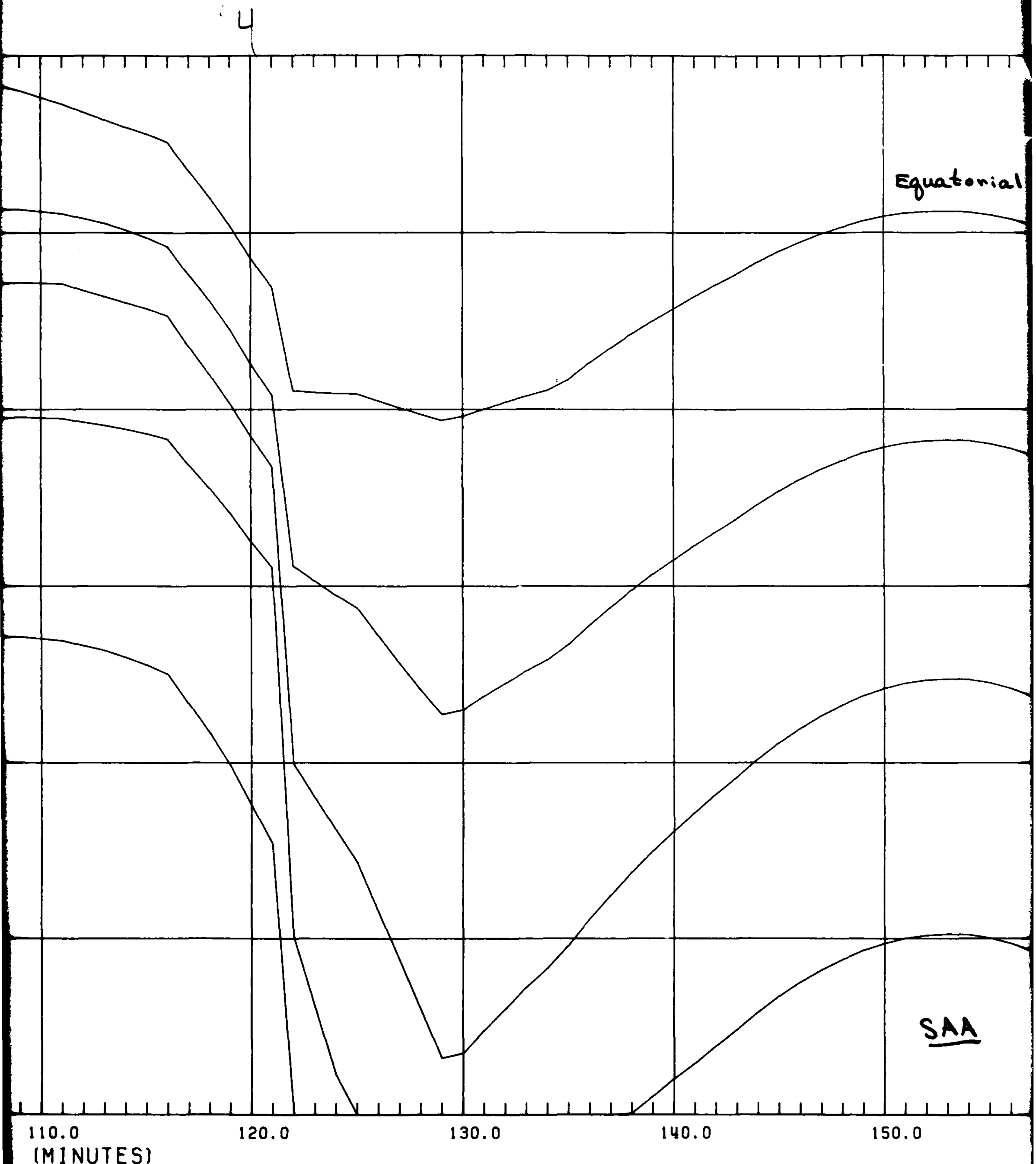


OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
1.00
2.00
3.00
4.00
5.00
Northern Horn
INSTANTANEOUS INTEGRAL ELECTRON FLUX (#/CM**2/SEC)
START TIME ON TAPE= 4.299995
E. G. STASSINOPOULOS-1981
0.0
1.0
2.0
3.0
4.0
5.0
6.0
10.0
20.0
30.0

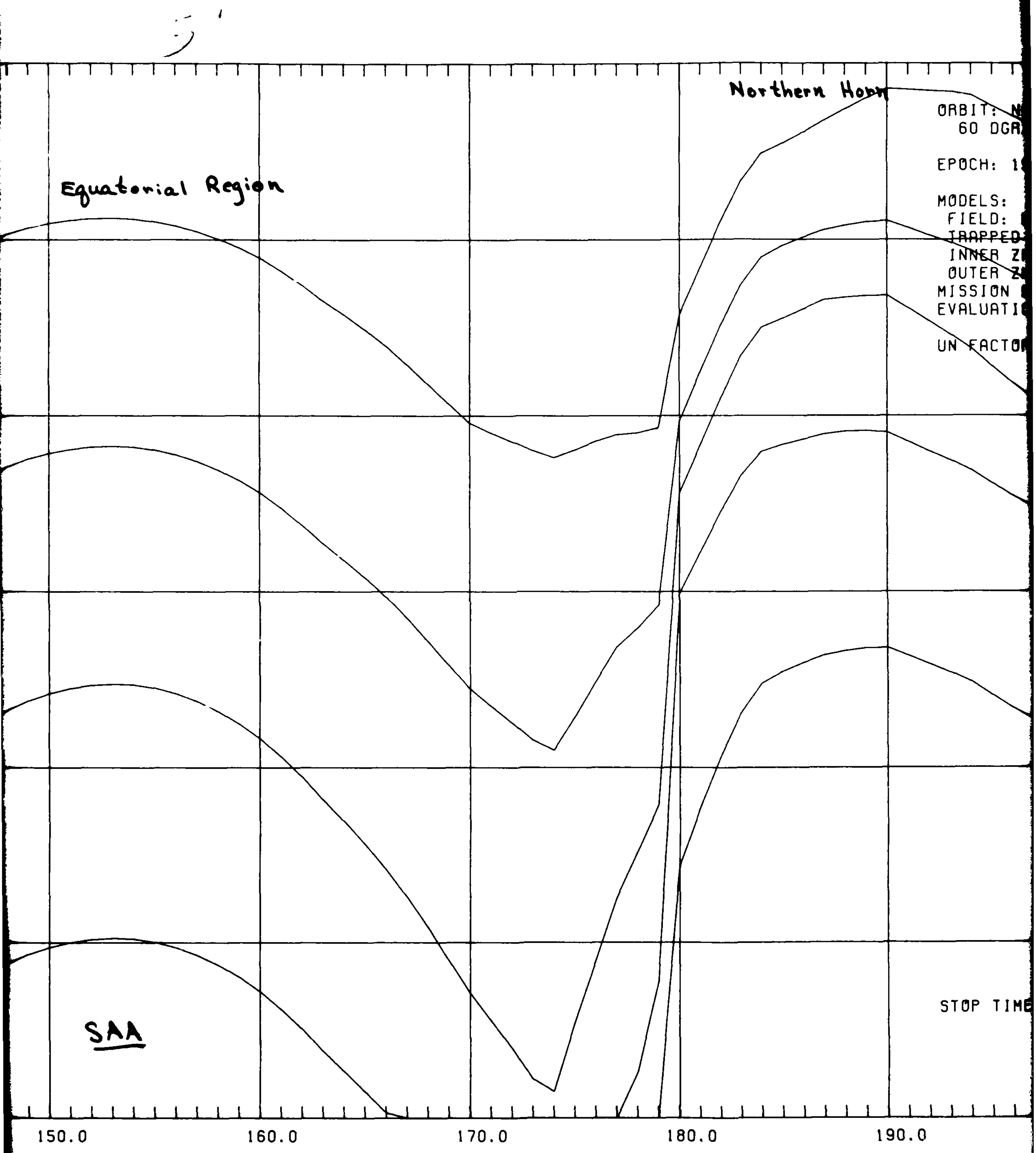

2
Equatorial Region
SAA
40.0
50.0
60.0
70.0
1

3'

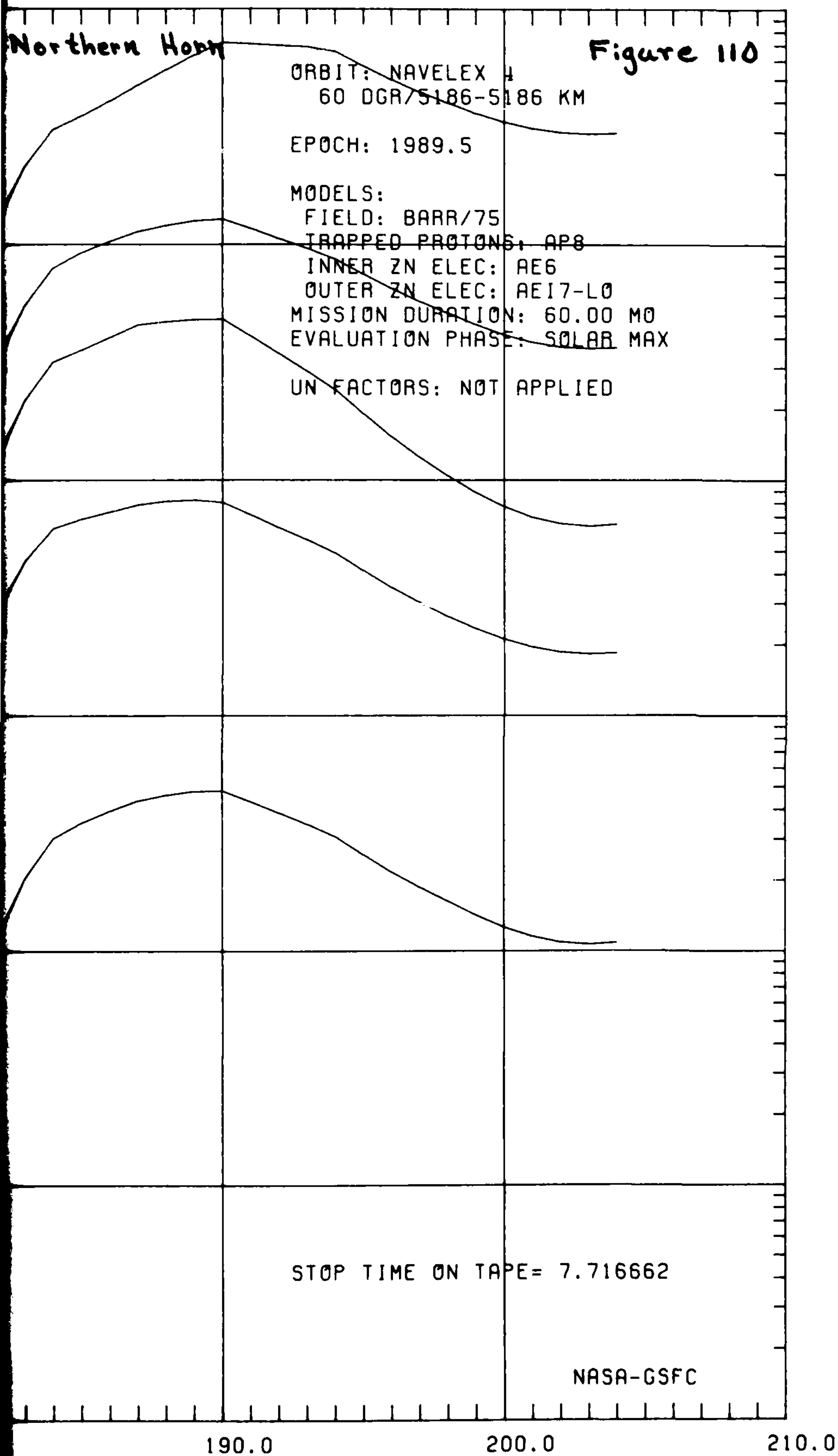

Southern Horn
.0
80.0
90.0
100.0
110.0
RELATIVE ORBIT TIME (MINUTES)

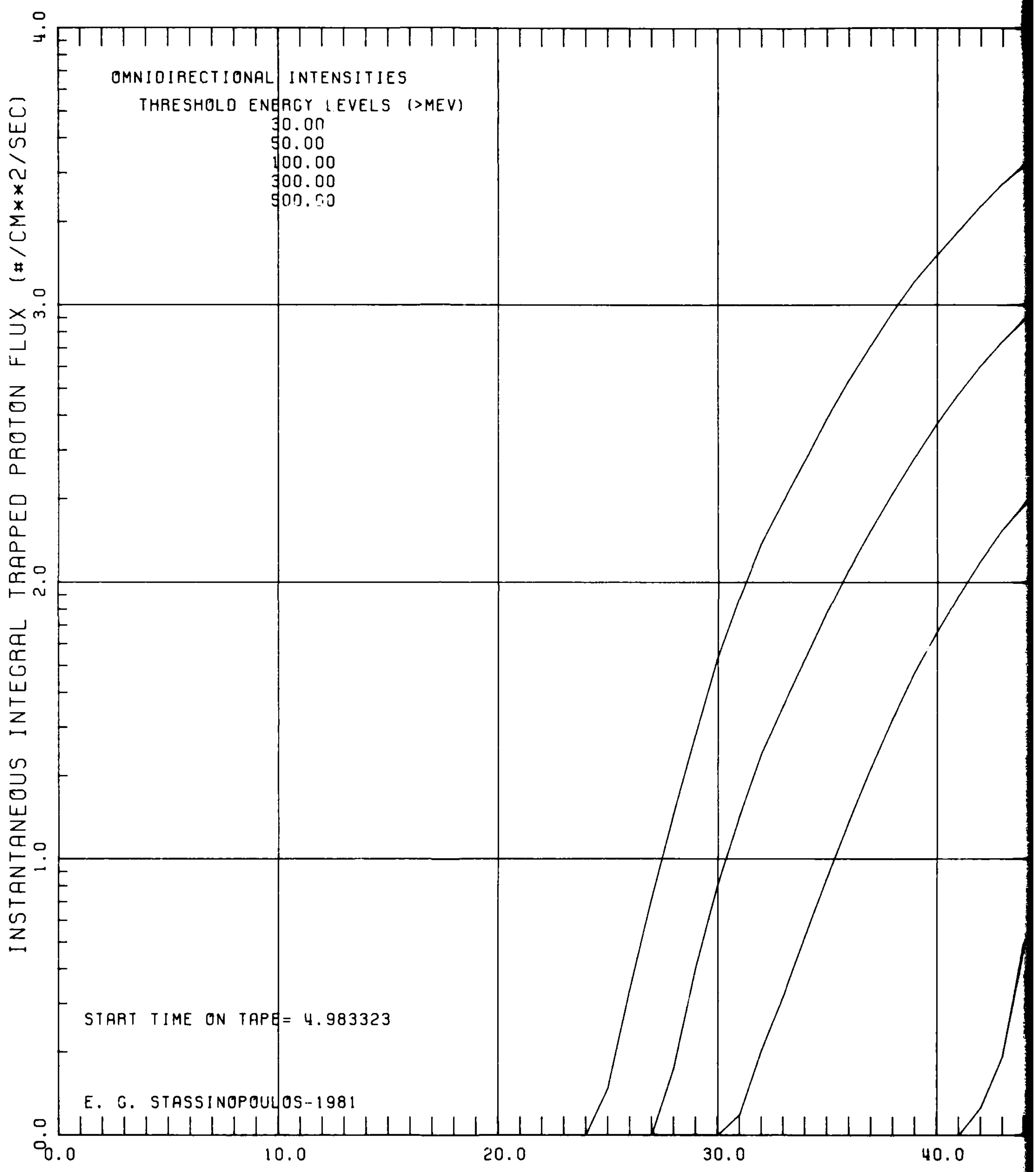


4
Equatorial
SAA
110.0
120.0
130.0
140.0
150.0
(MINUTES)



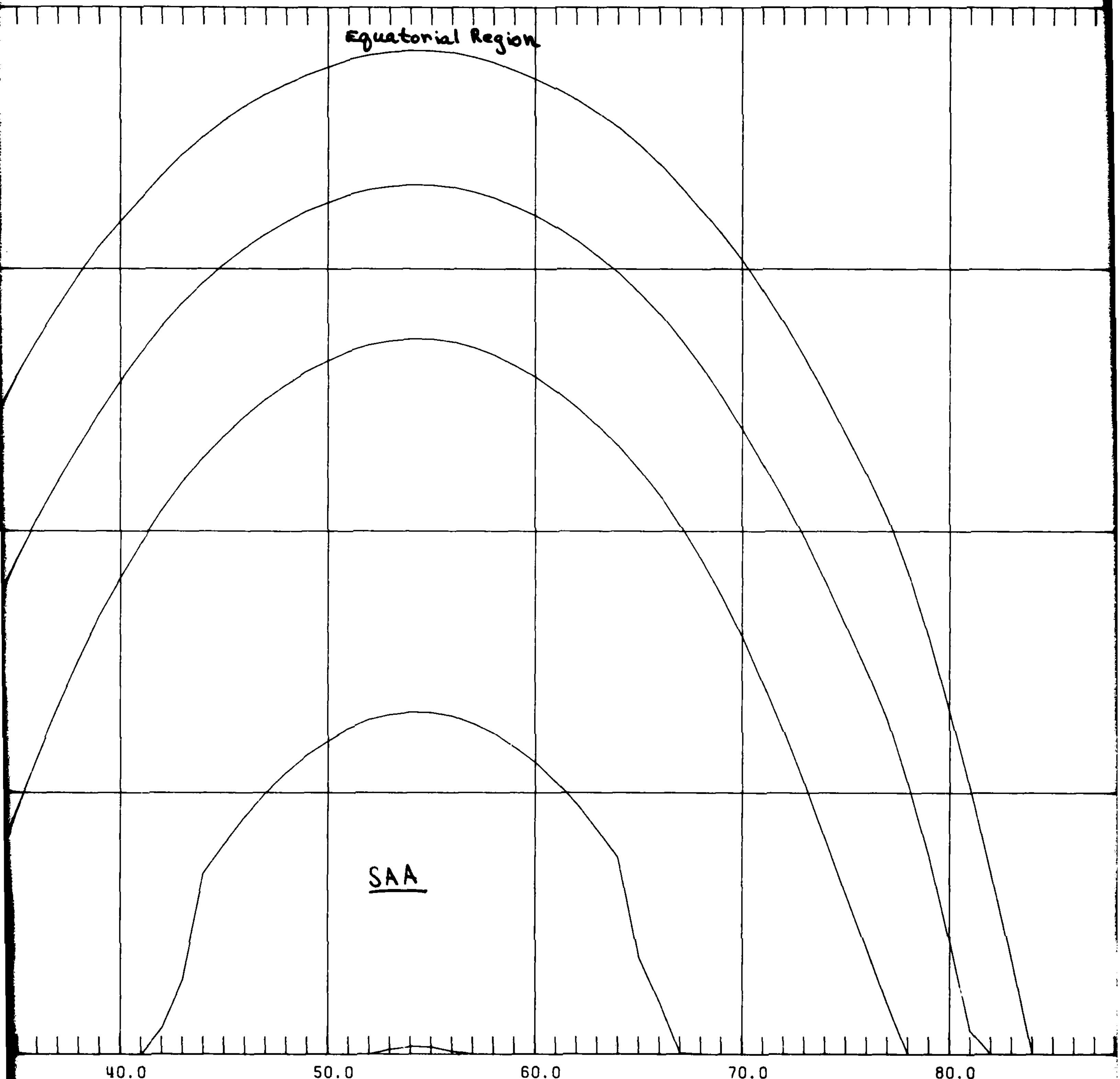
Northern Horn
Equatorial Region
SAA
ORBIT: N
60 DGR
EPOCH: 1
MODELS:
FIELD:
TRAPPED
INNER Z
OUTER Z
MISSION
EVALUATI
UN FACTO
STOP TIME
150.0
160.0
170.0
180.0
190.0

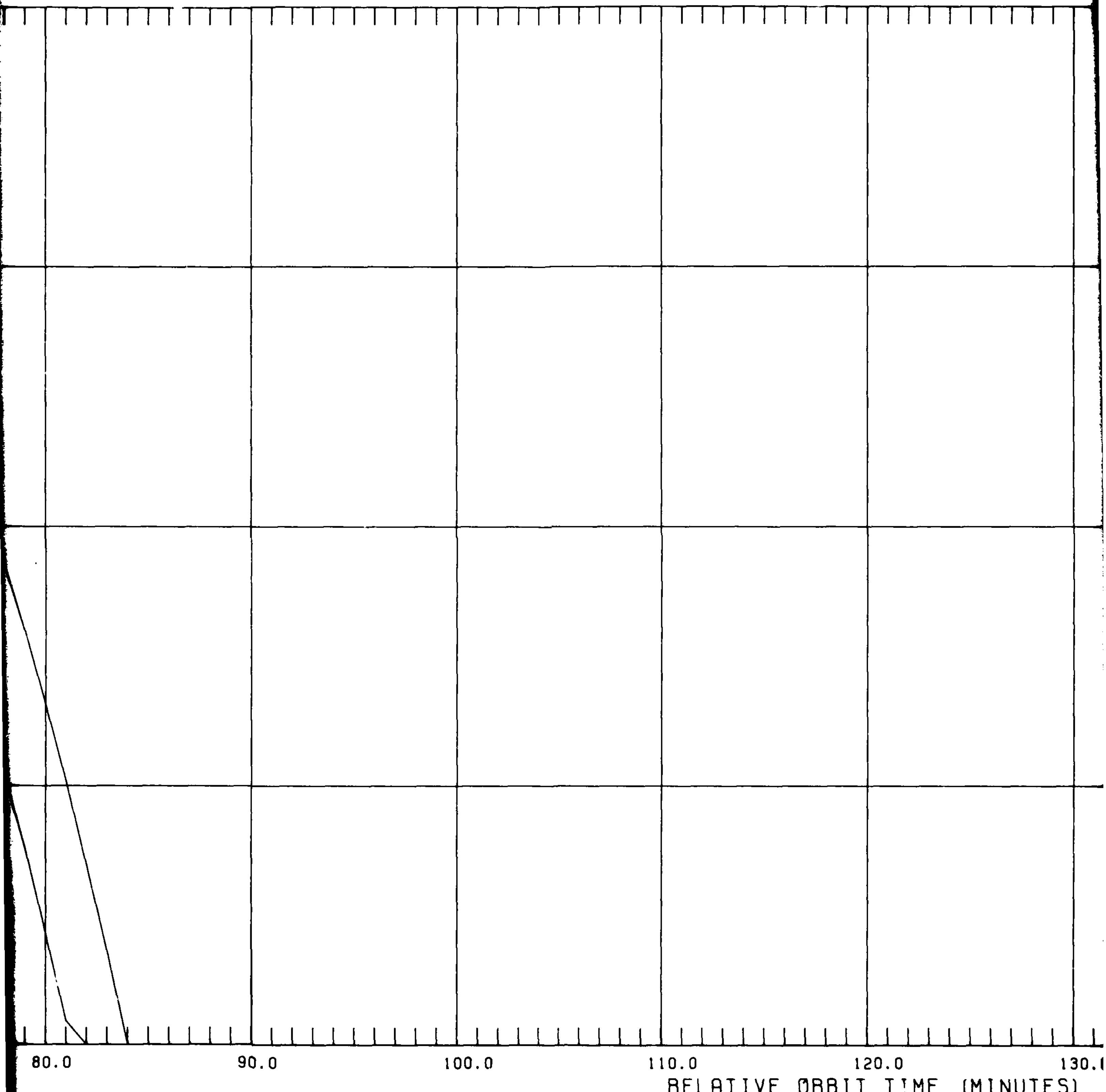

Northern Horn
Figure 110
ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 7.716662
NASA-GSFC
190.0
200.0
210.0



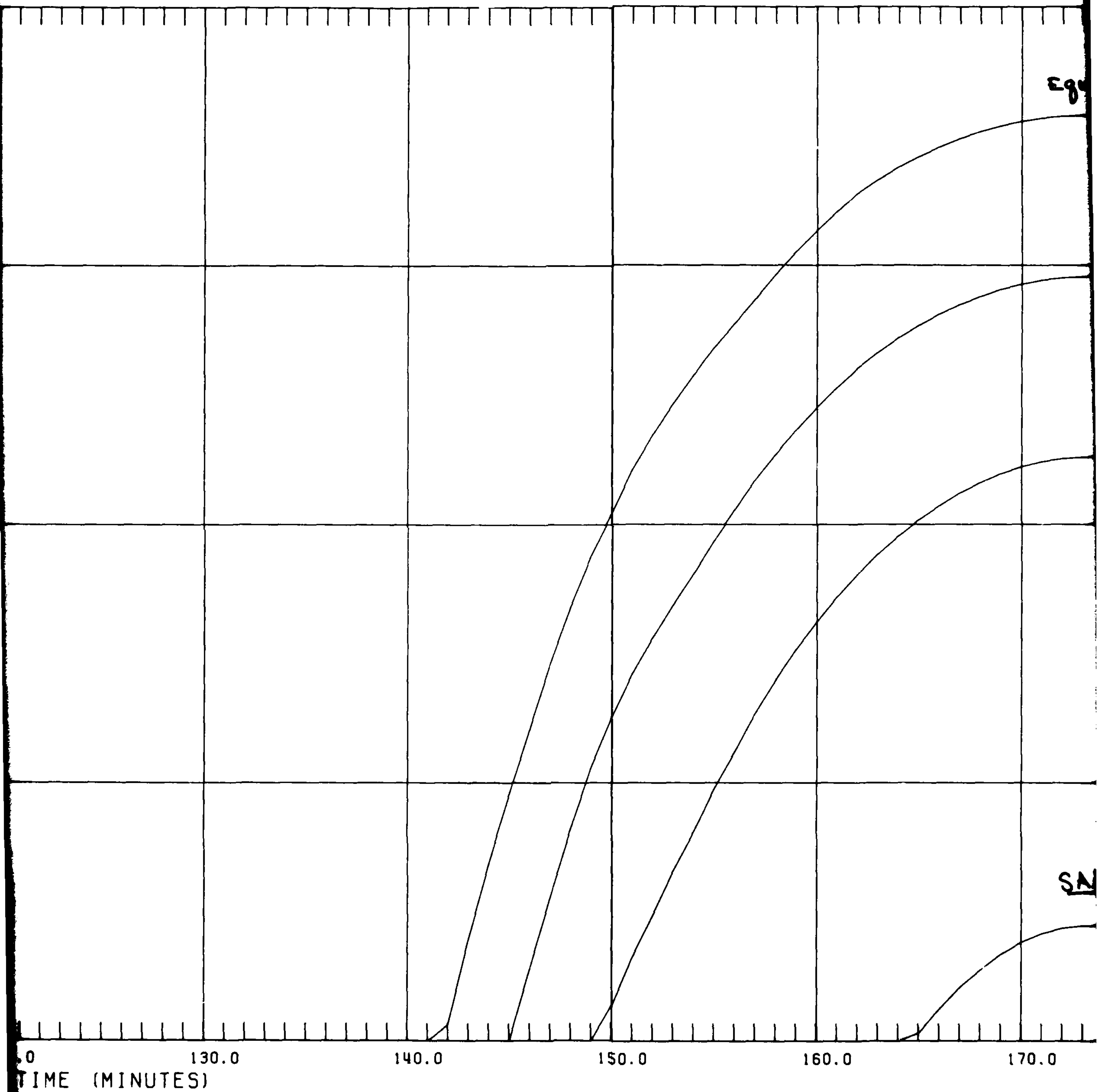
OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
30.00
50.00
100.00
300.00
500.00
START TIME ON TAPE= 4.983323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL TRAPPED PROTON FLUX (#/CM**2/SEC)
0.0
1.0
2.0
3.0
4.0
0.0
10.0
20.0
30.0
40.0

2'

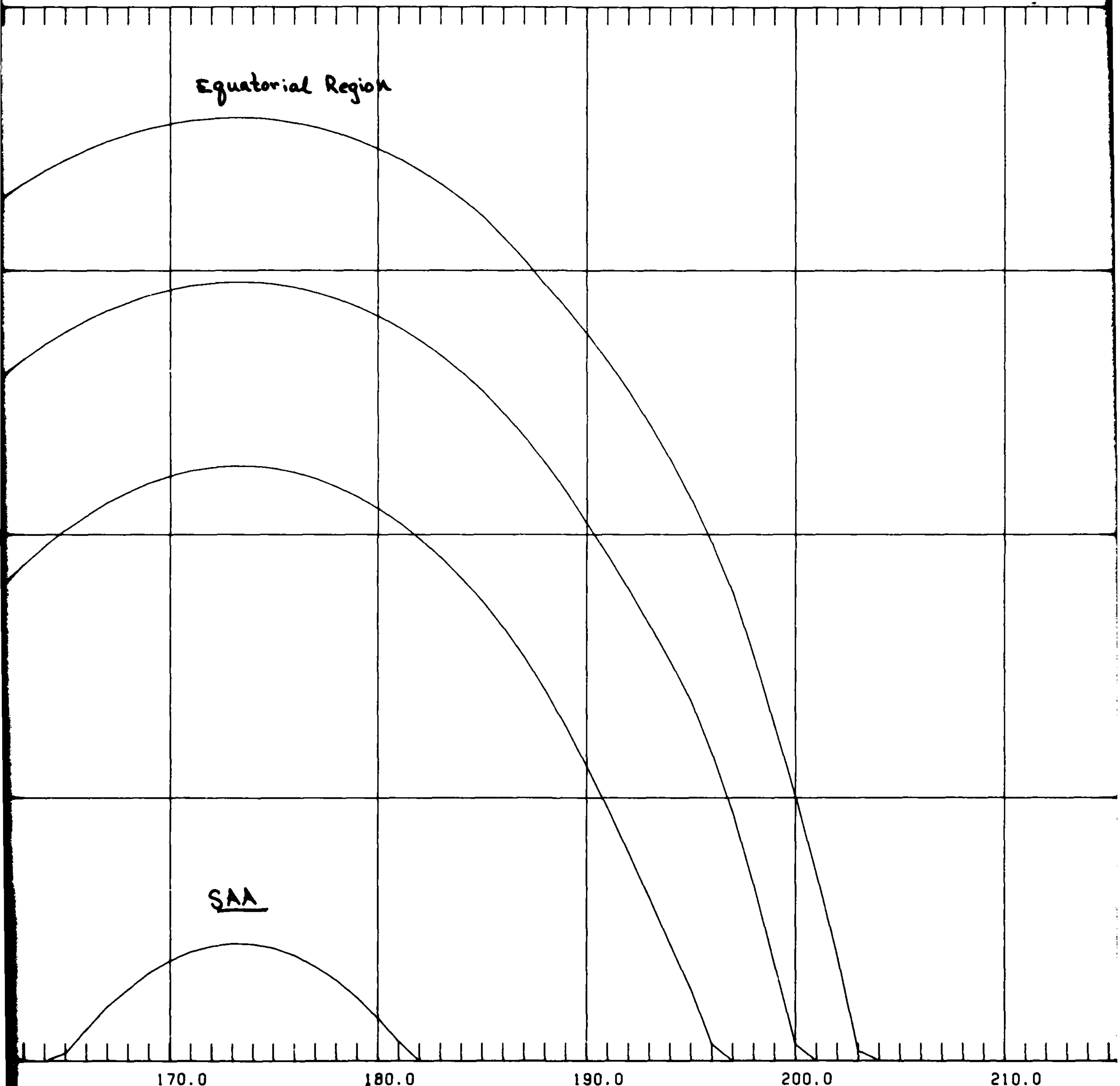



80.0
90.0
100.0
110.0
120.0
130.
RELATIVE ORBIT TIME (MINUTES)

4



5



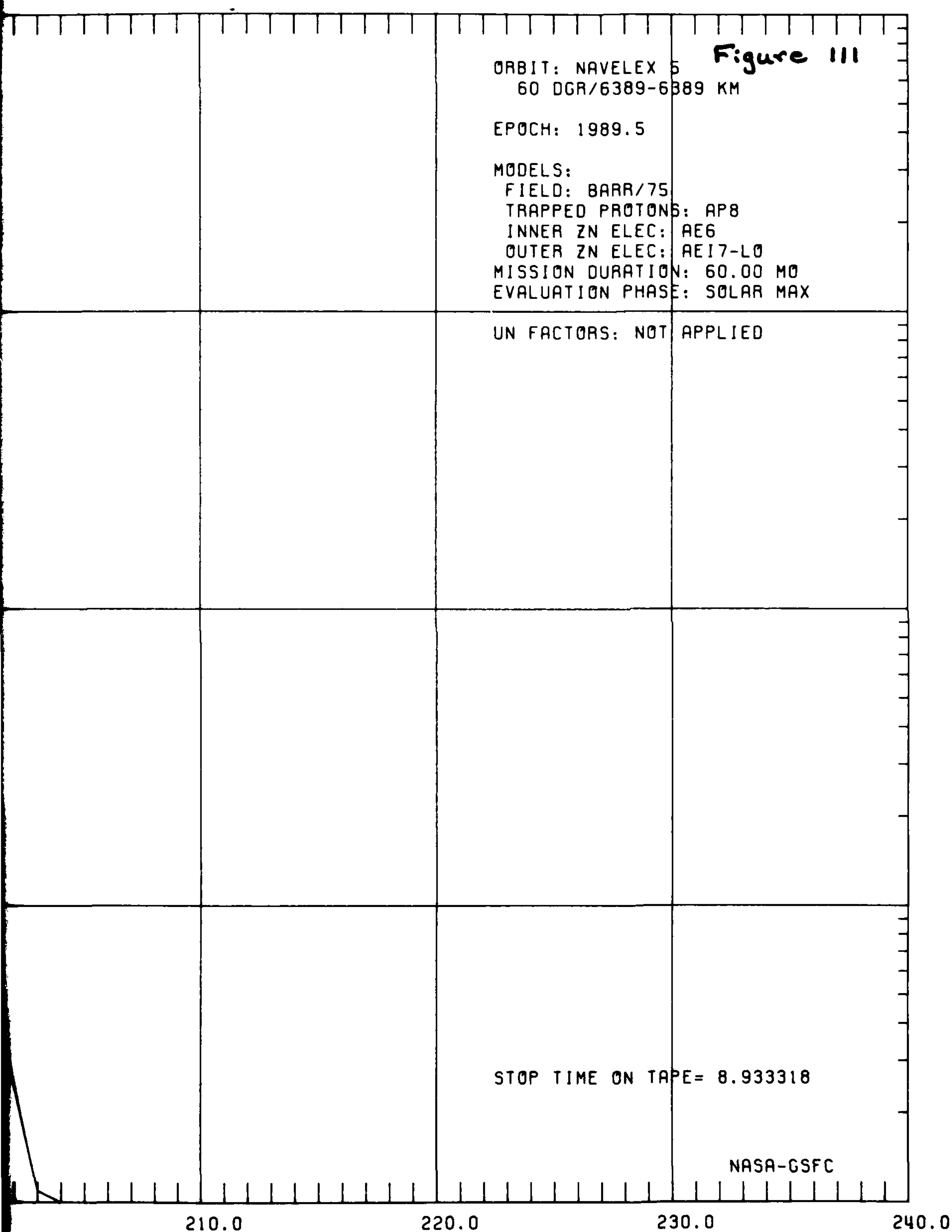
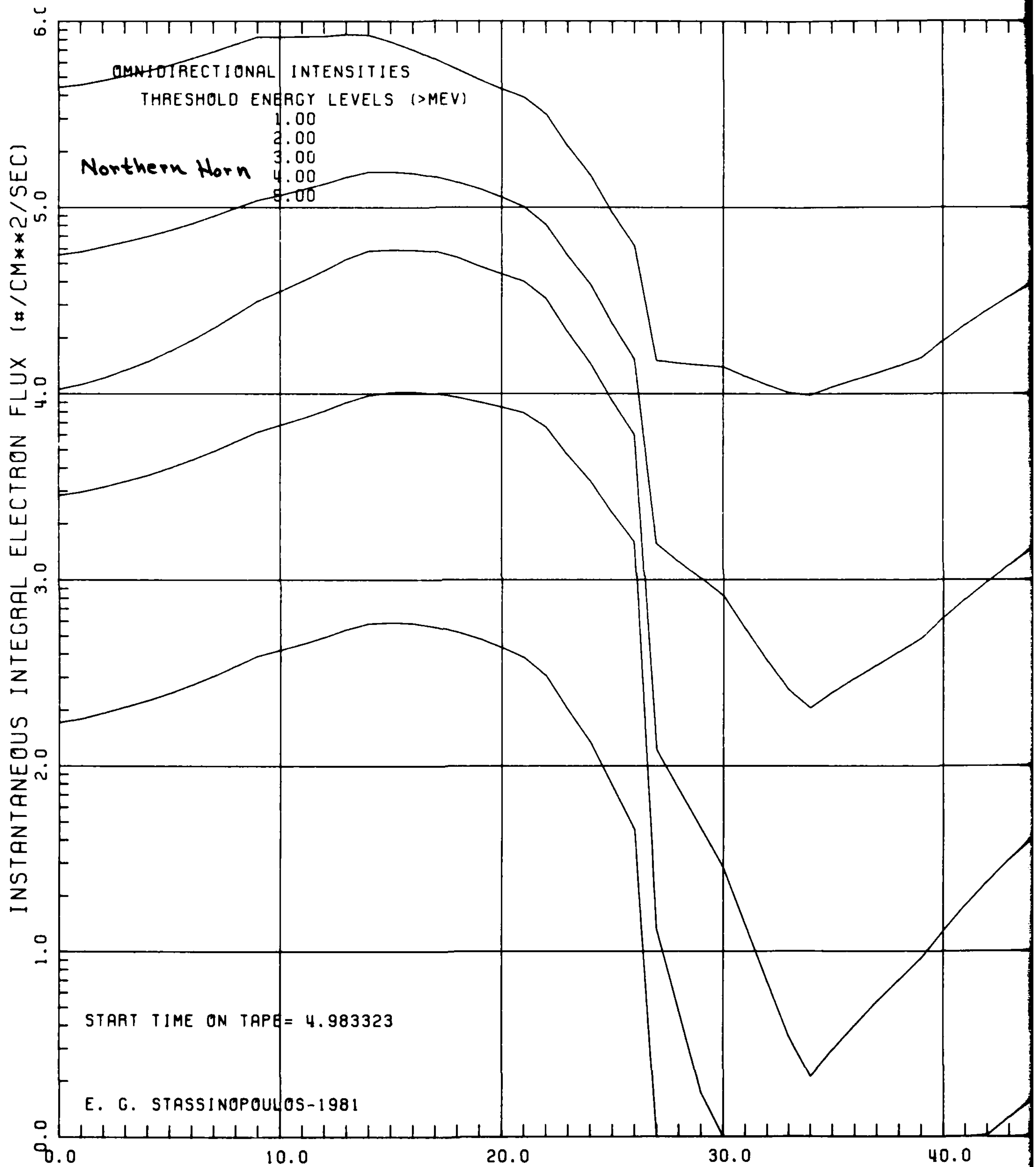
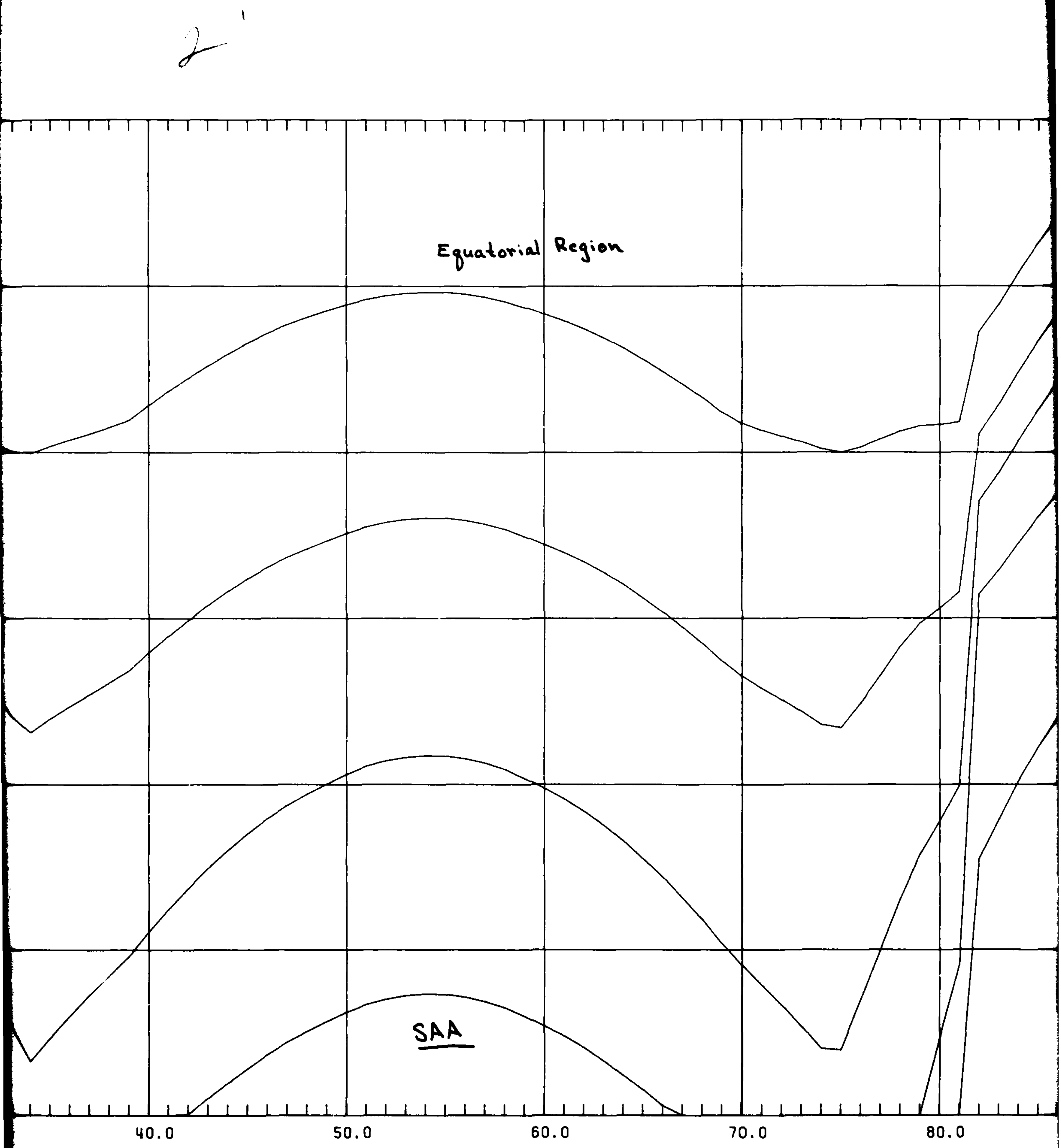
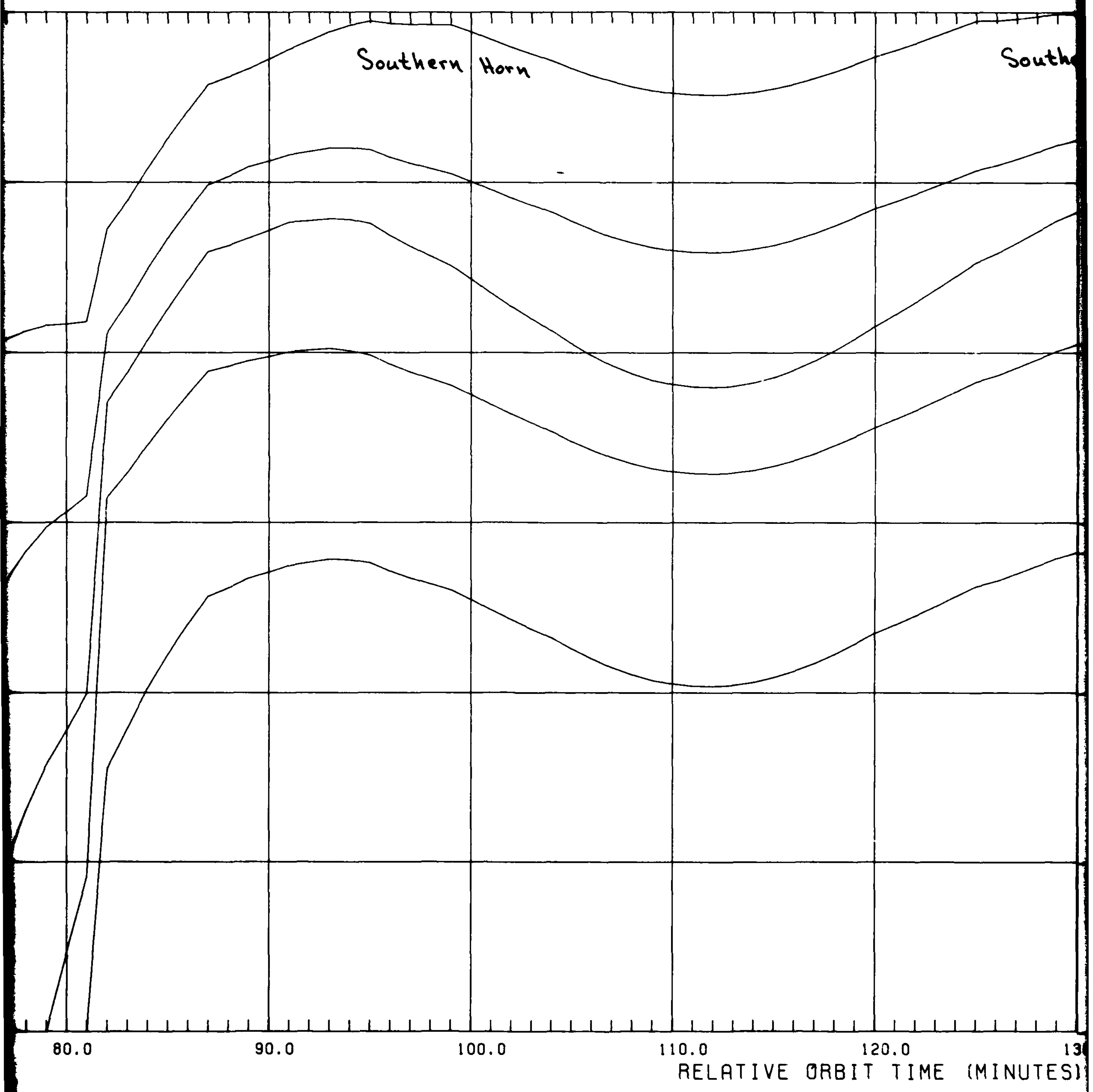


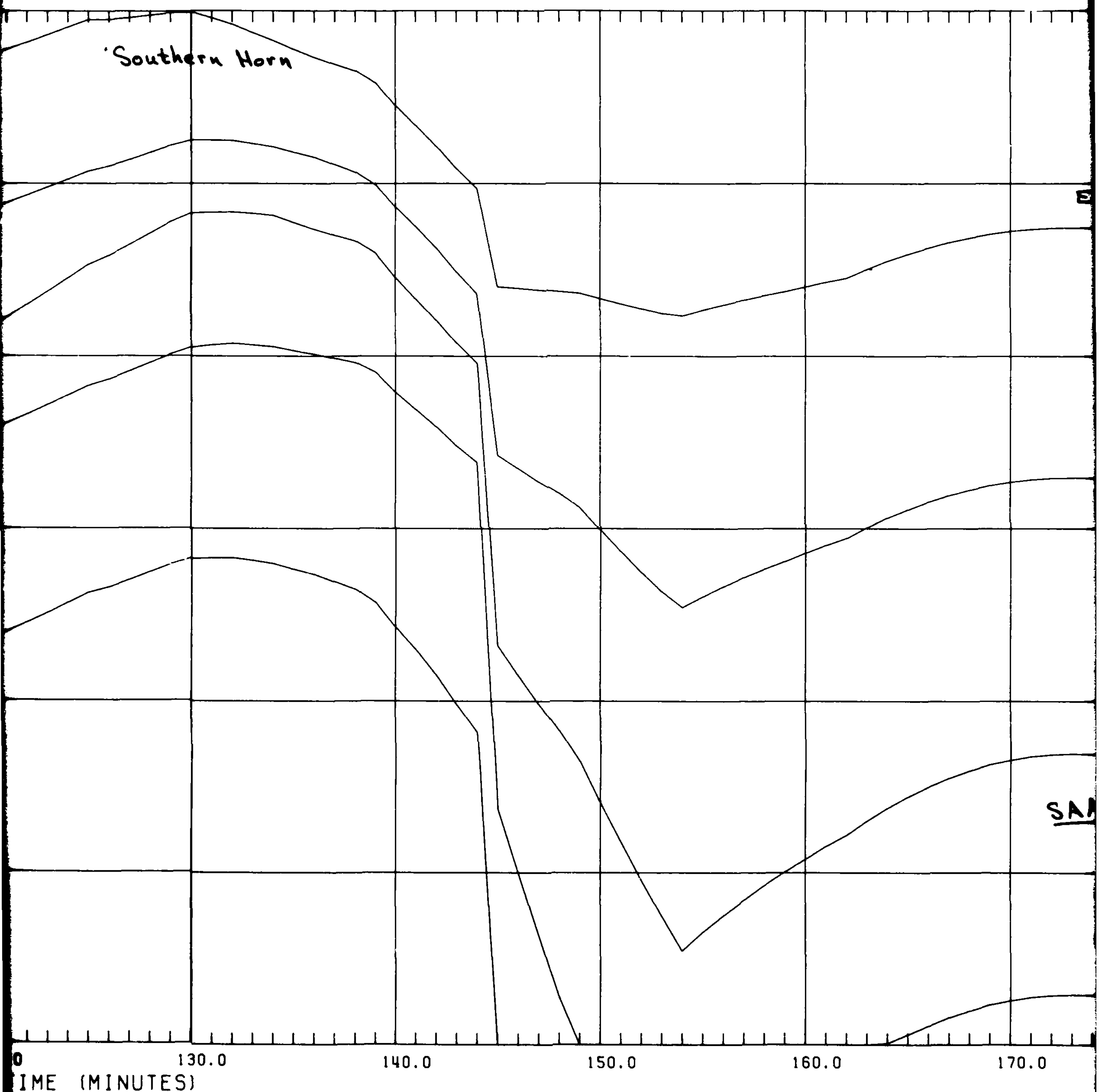
Figure 111
ORBIT: NAVELEX 5
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 8.933318
NASA-GSFC
210.0
220.0
230.0
240.0

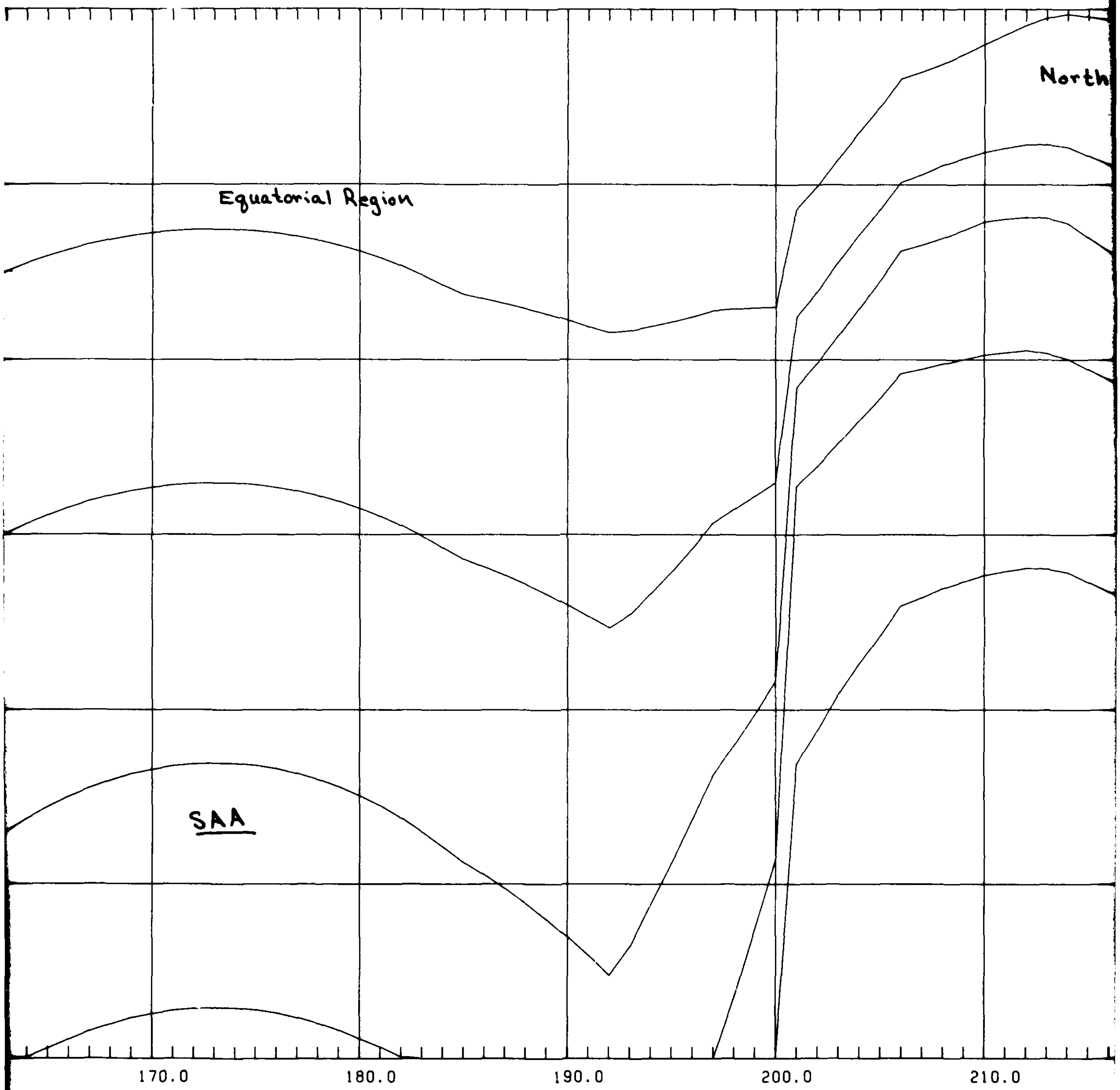

OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
1.00
2.00
3.00
4.00
5.00
Northern Horn
START TIME ON TAPE= 4.983323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL ELECTRON FLUX (#/CM**2/SEC)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
10.0
20.0
30.0
40.0


2
Equatorial Region
SAA
40.0
50.0
60.0
70.0
80.0


Southern Horn
South
80.0
90.0
100.0
110.0
120.0
RELATIVE ORBIT TIME (MINUTES)

4




North
Equatorial Region
SAA
170.0
180.0
190.0
200.0
210.0

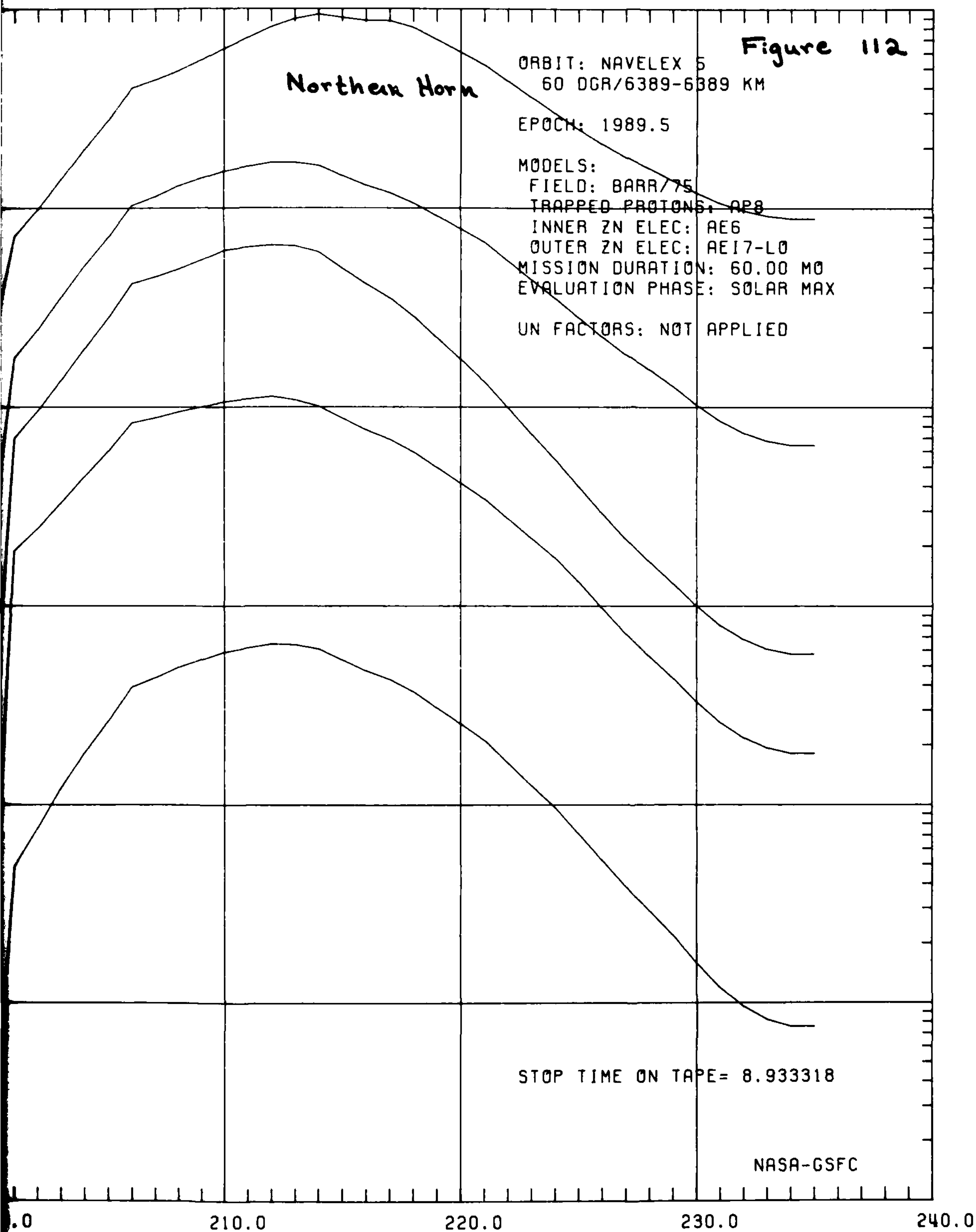
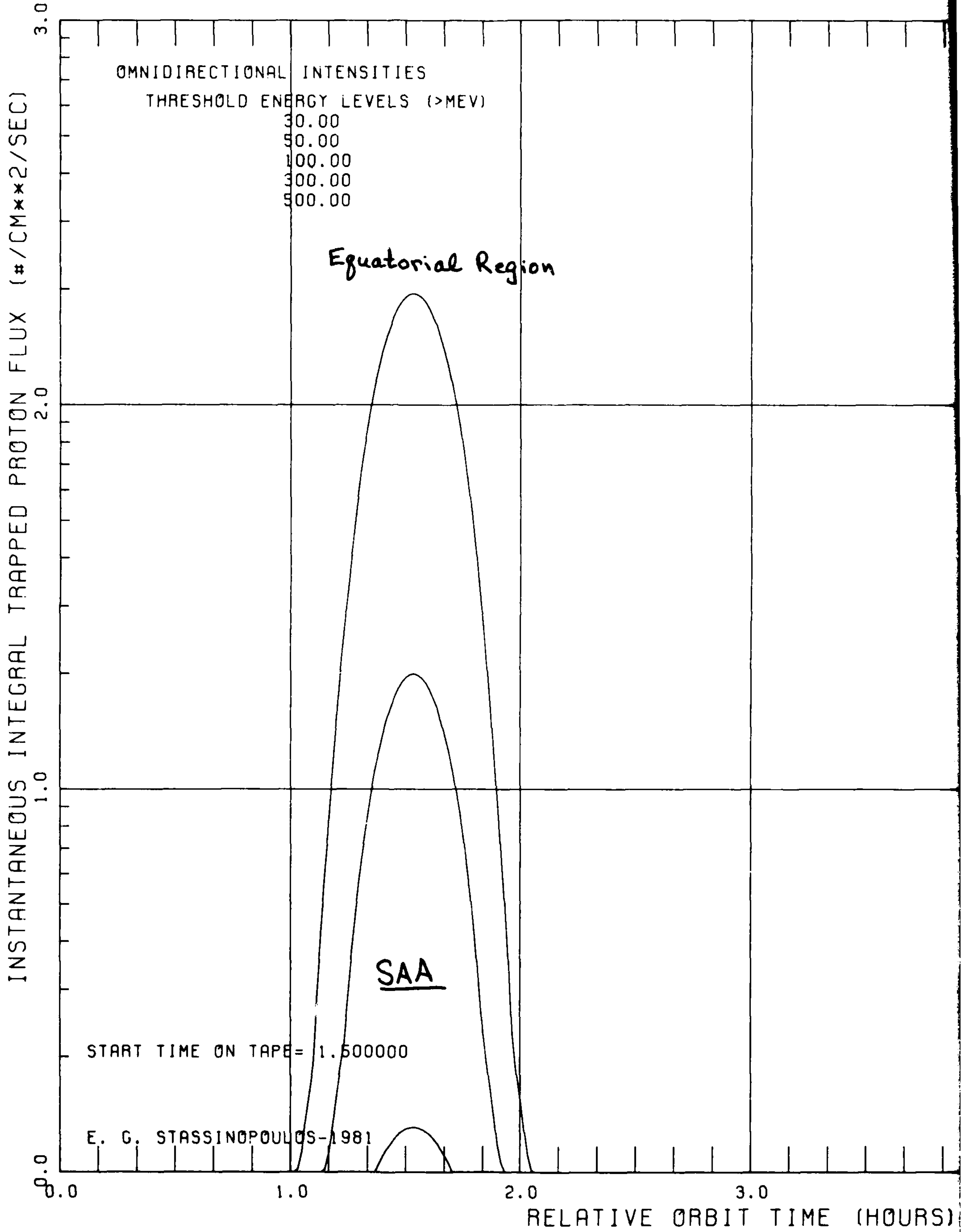


Figure 112
Northern Horn
ORBIT: NAVELEX 5
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 8.933318
NASA-GSFC
.0
210.0
220.0
230.0
240.0



OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
30.00
50.00
100.00
300.00
500.00
Equatorial Region
SAA
START TIME ON TAPE= 1.500000
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL TRAPPED PROTON FLUX (#/CM**2/SEC)
0.0
1.0
2.0
3.0
0.0
1.0
2.0
3.0
RELATIVE ORBIT TIME (HOURS)

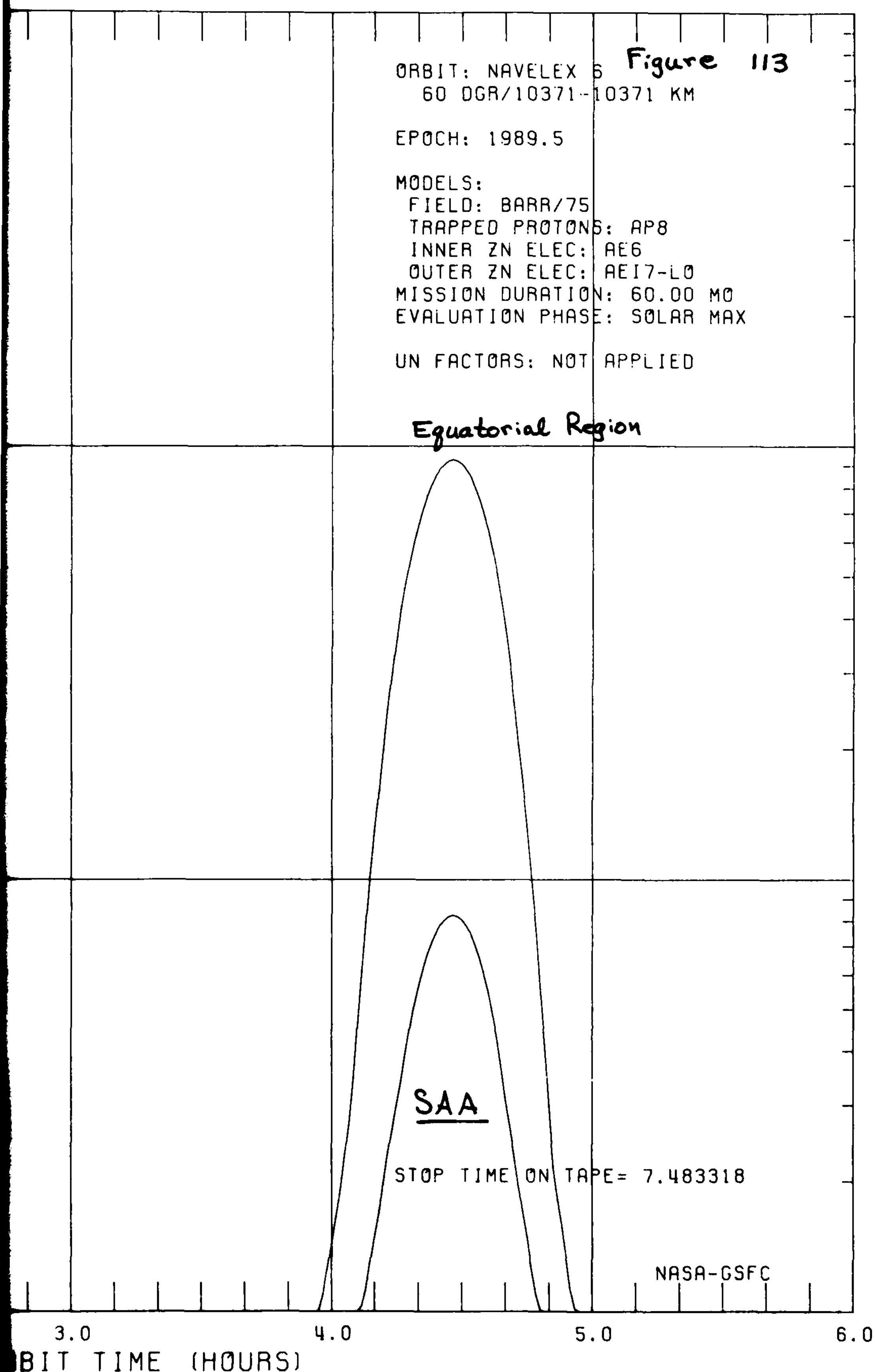
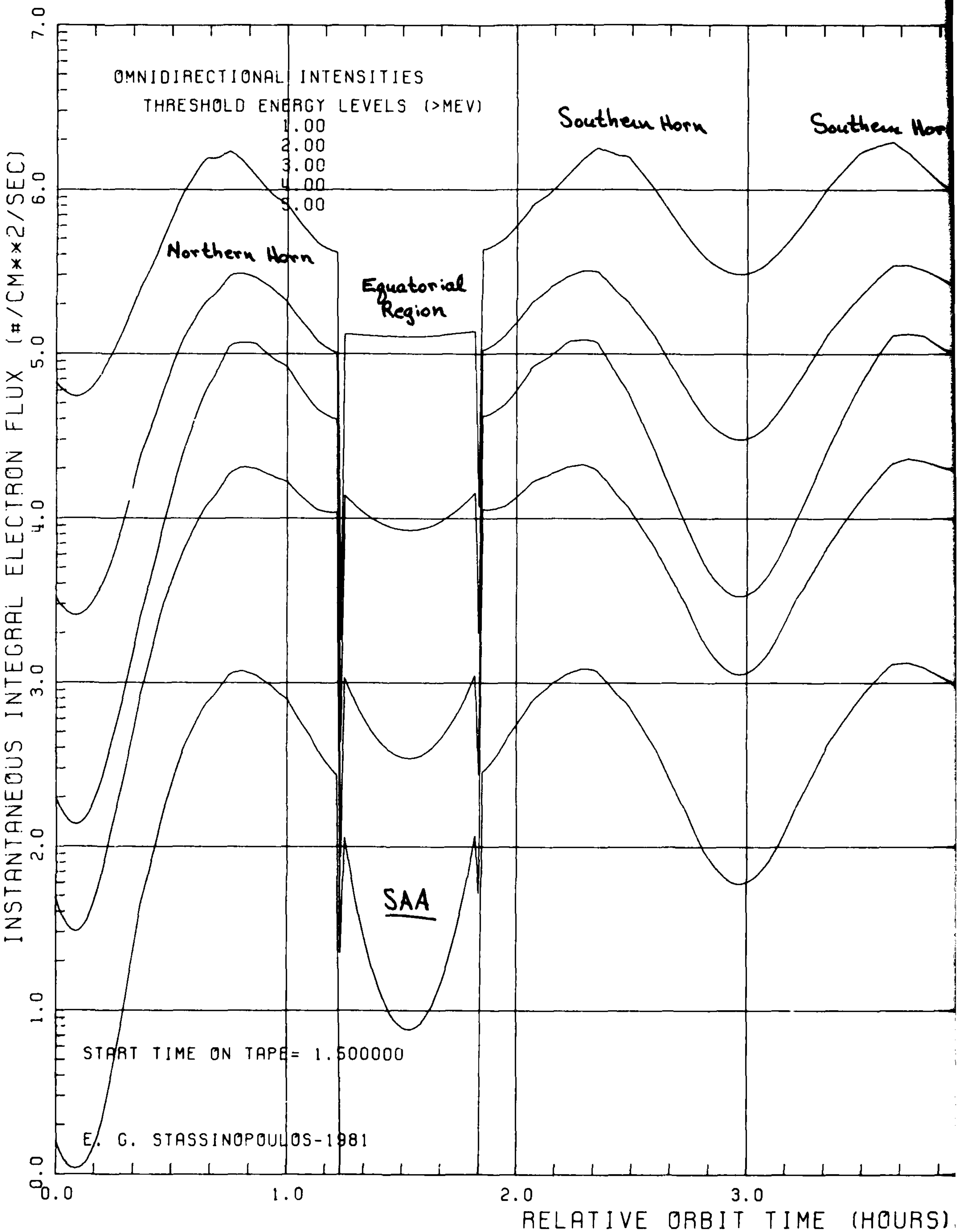
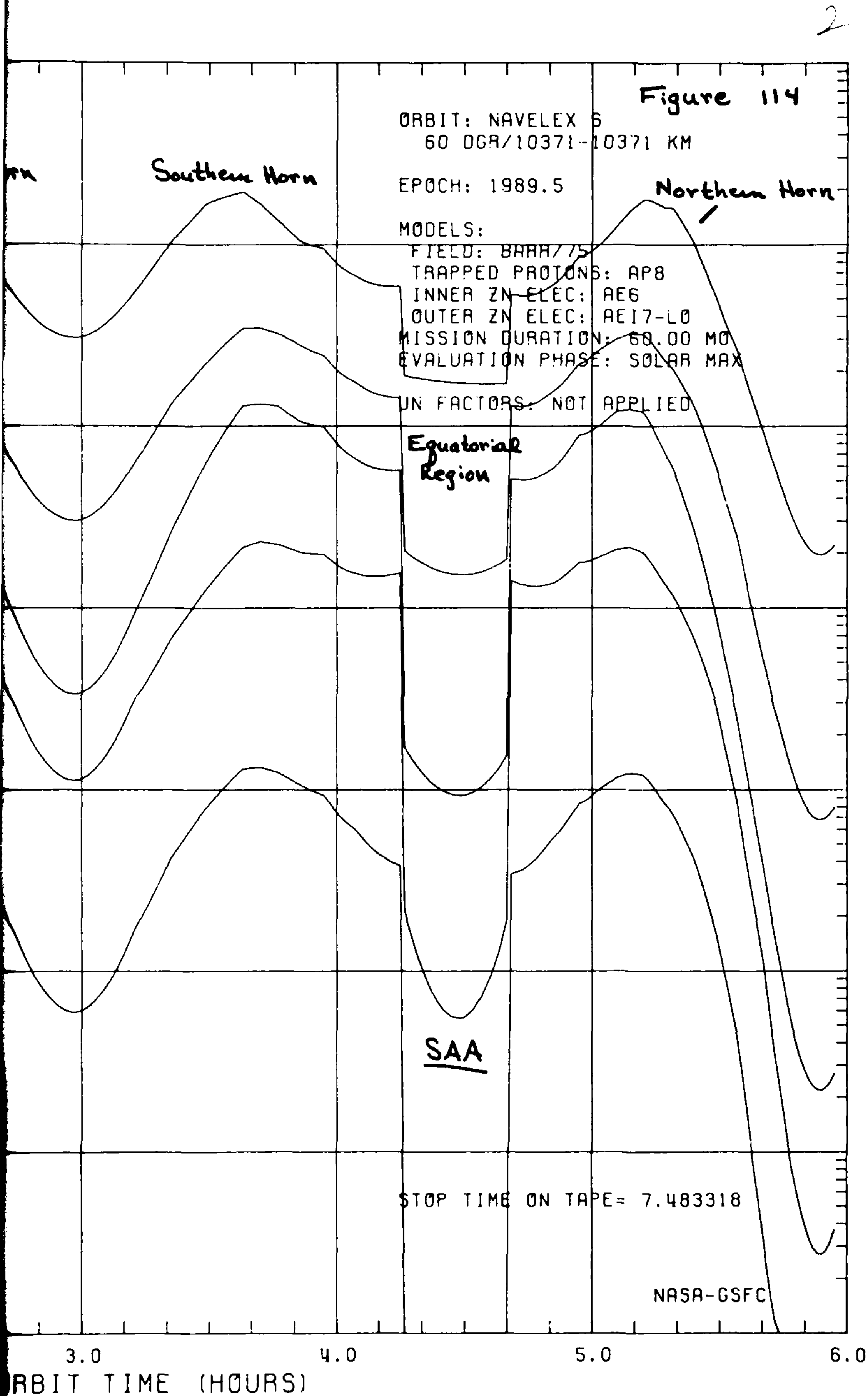
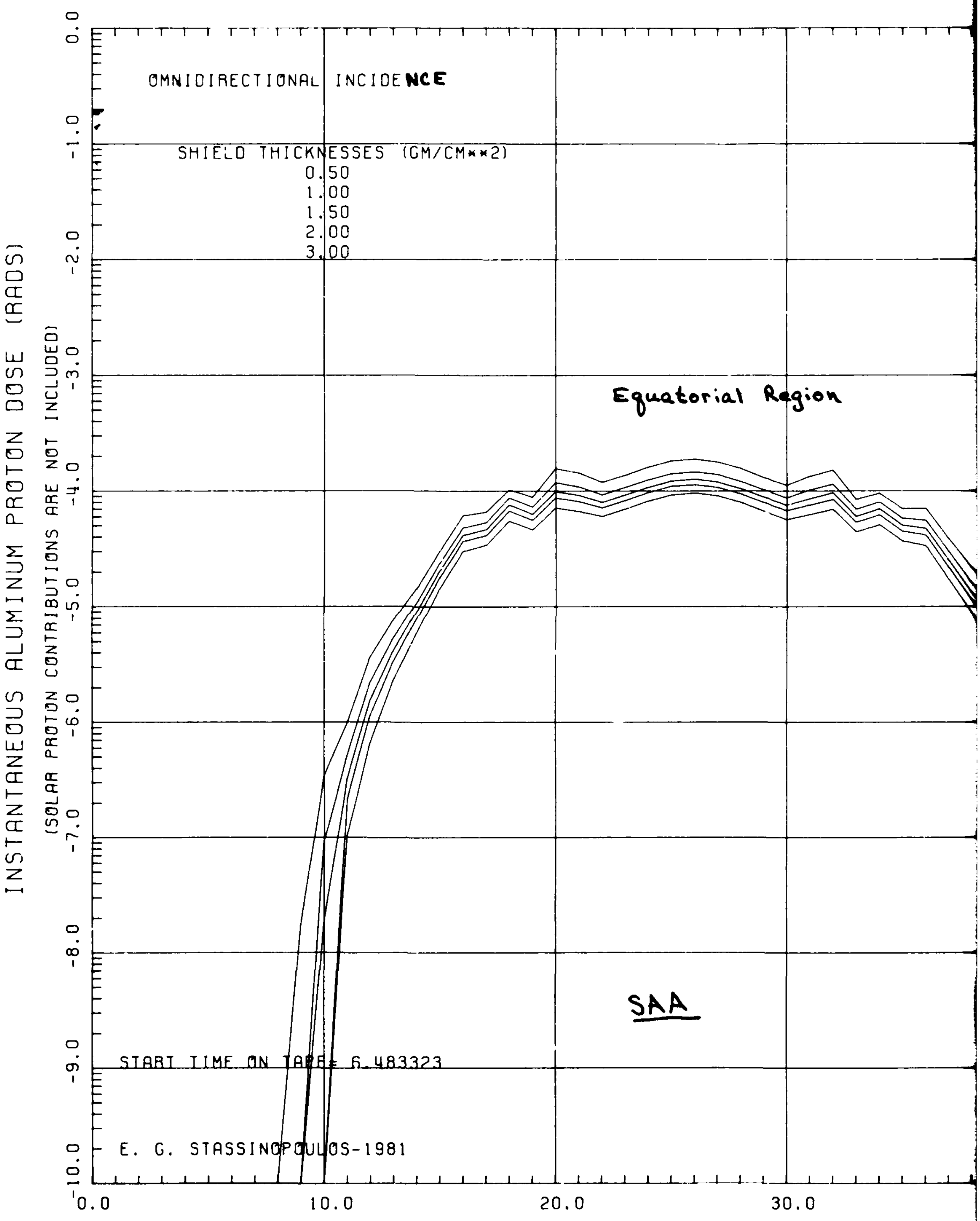


Figure 113
ORBIT: NAVELEX 6
60 DGR/10371-10371 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Equatorial Region
SAA
STOP TIME ON TAPE= 7.483318
NASA-GSFC
3.0
4.0
5.0
6.0
BIT TIME (HOURS)


OMNIDIRECTIONAL INTENSITIES
THRESHOLD ENERGY LEVELS (>MEV)
1.00
2.00
3.00
4.00
5.00
Northern Horn
Southern Horn
Southern Horn
Equatorial Region
SAA
START TIME ON TAPE= 1.500000
E. G. STASSINOPOULOS-1981
INSTANTANEOUS INTEGRAL ELECTRON FLUX (#/CM**2/SEC)
RELATIVE ORBIT TIME (HOURS)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0



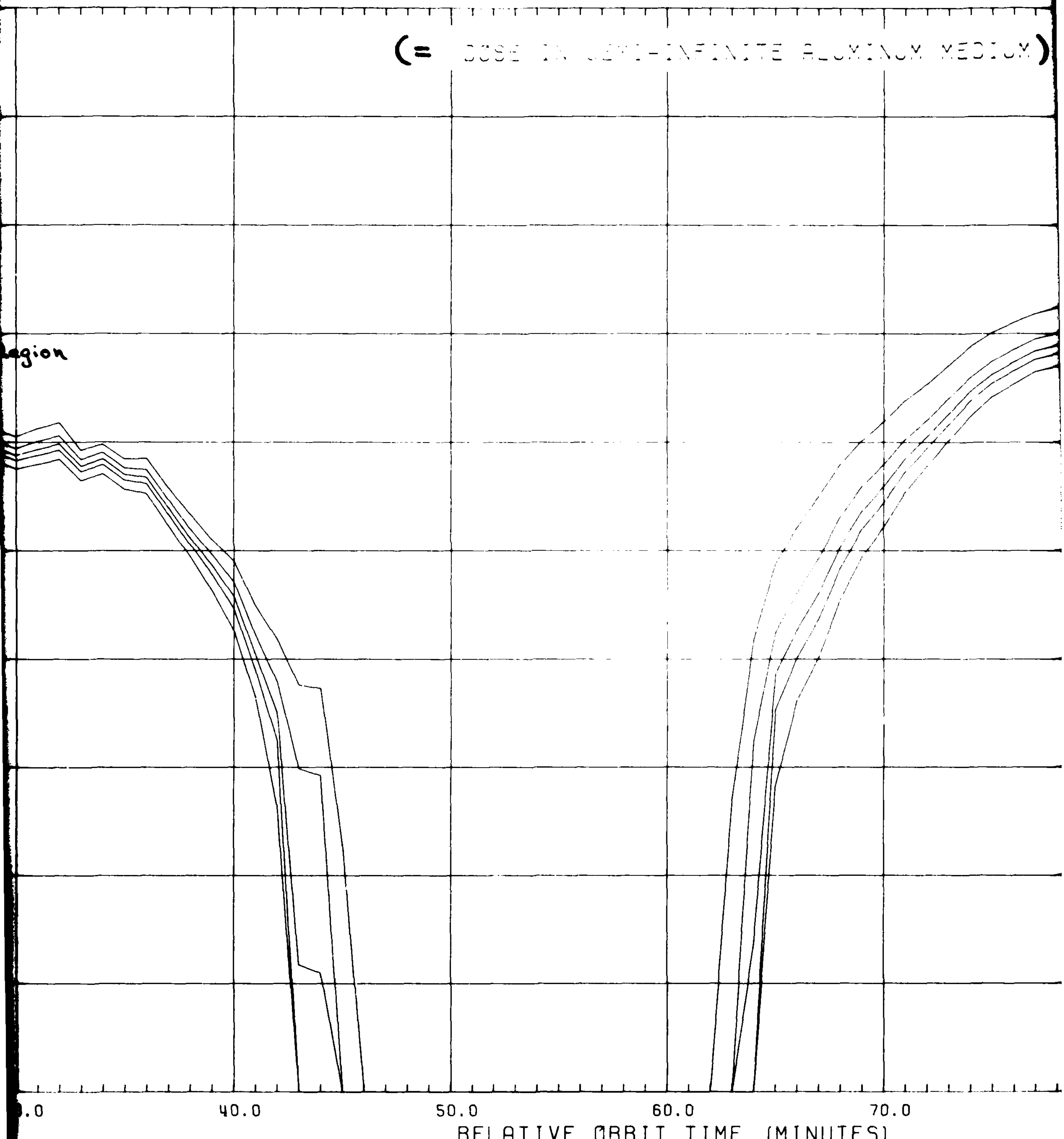
2
Figure 114
ORBIT: NAVELEX 6
60 DGR/10371-10371 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Southern Horn
Northern Horn
Equatorial Region
SAA
STOP TIME ON TAPE= 7.483318
NASA-GSFC
3.0
4.0
5.0
6.0
RBIT TIME (HOURS)



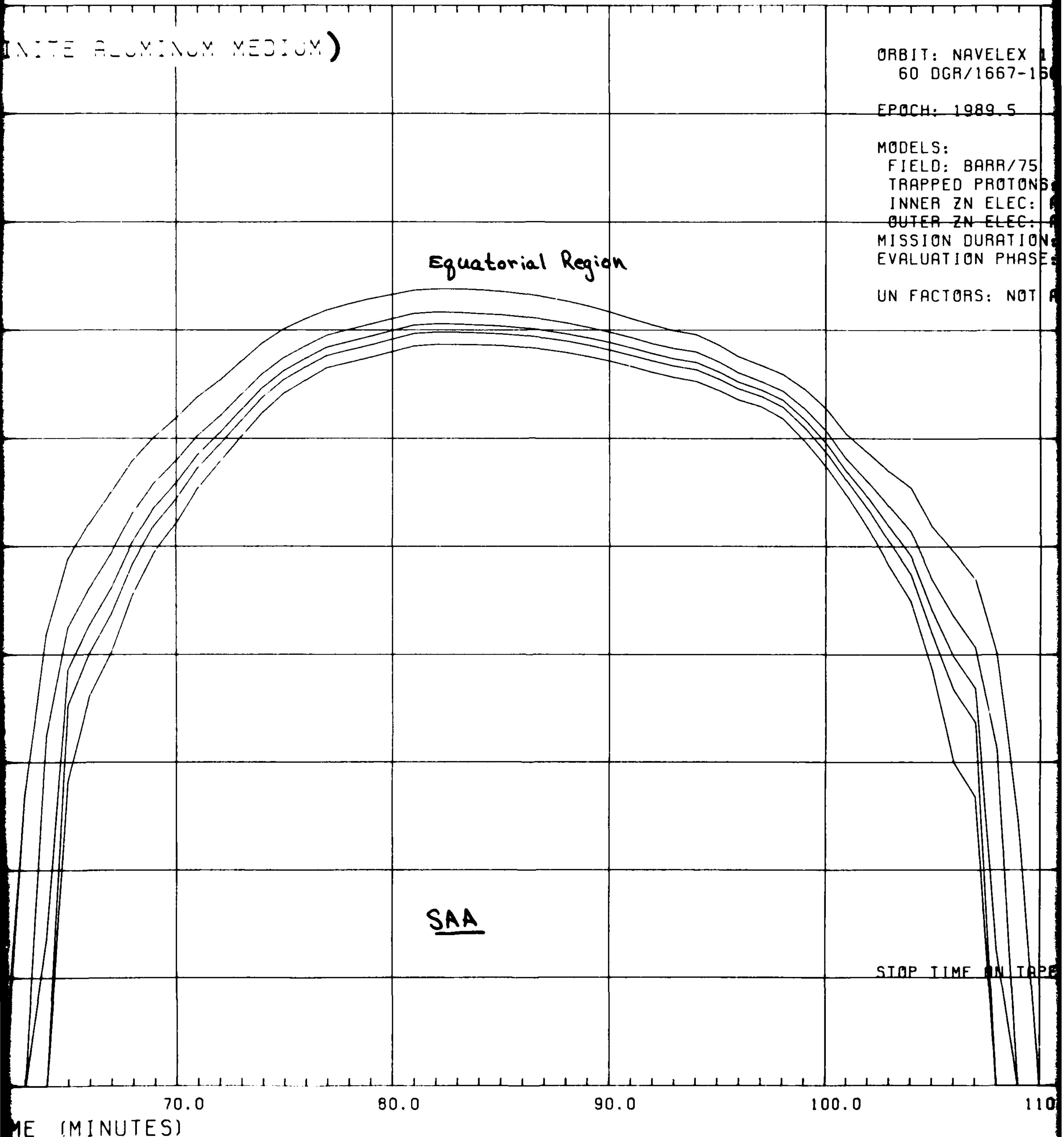
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Region
SAA
START TIME ON TAPE= 6.483323
E. G. STASSINOPOULOS-1981
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
10.0
20.0
30.0

2

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLA



OF FINITE ALUMINUM SLAB SHIELDS



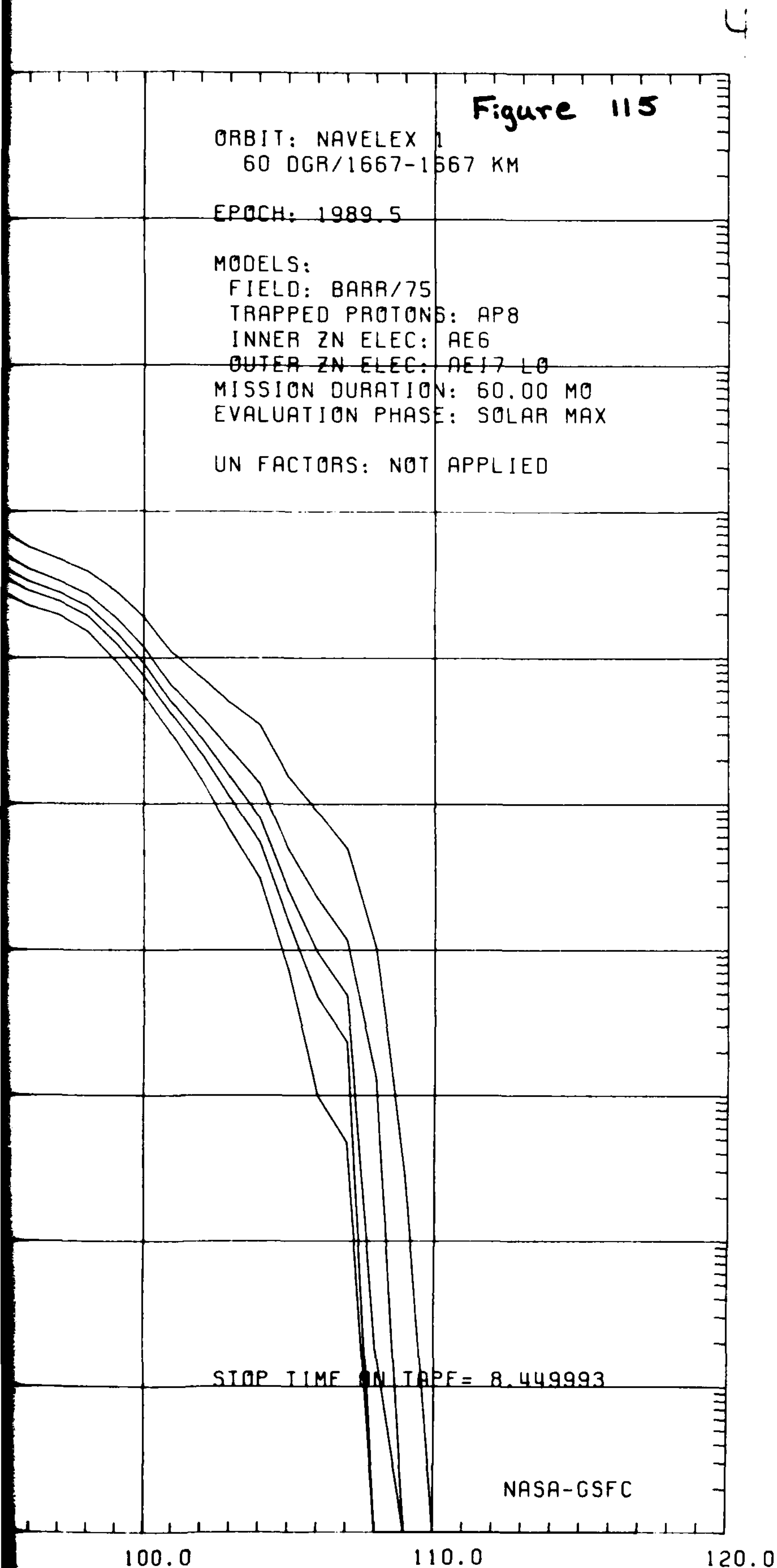
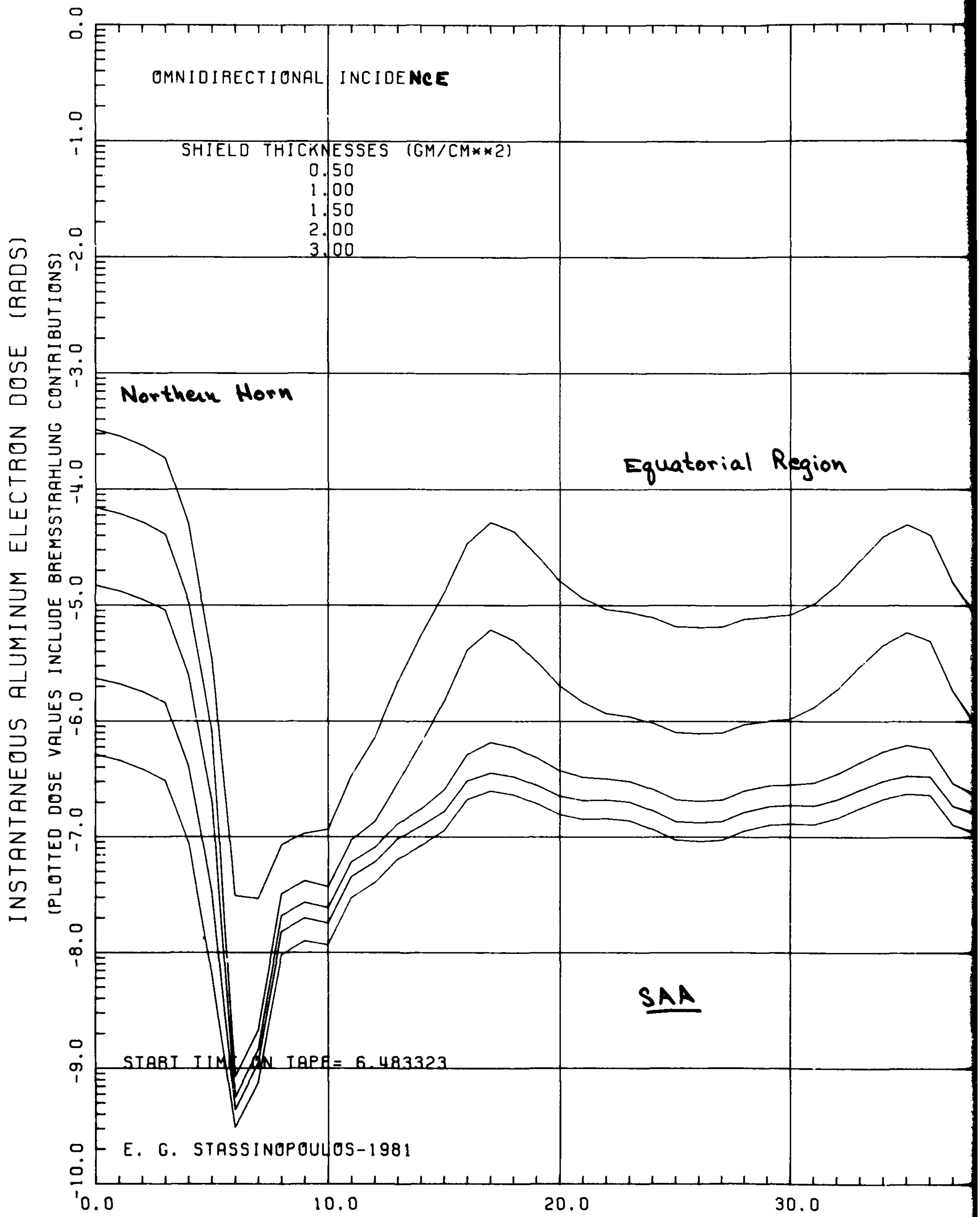
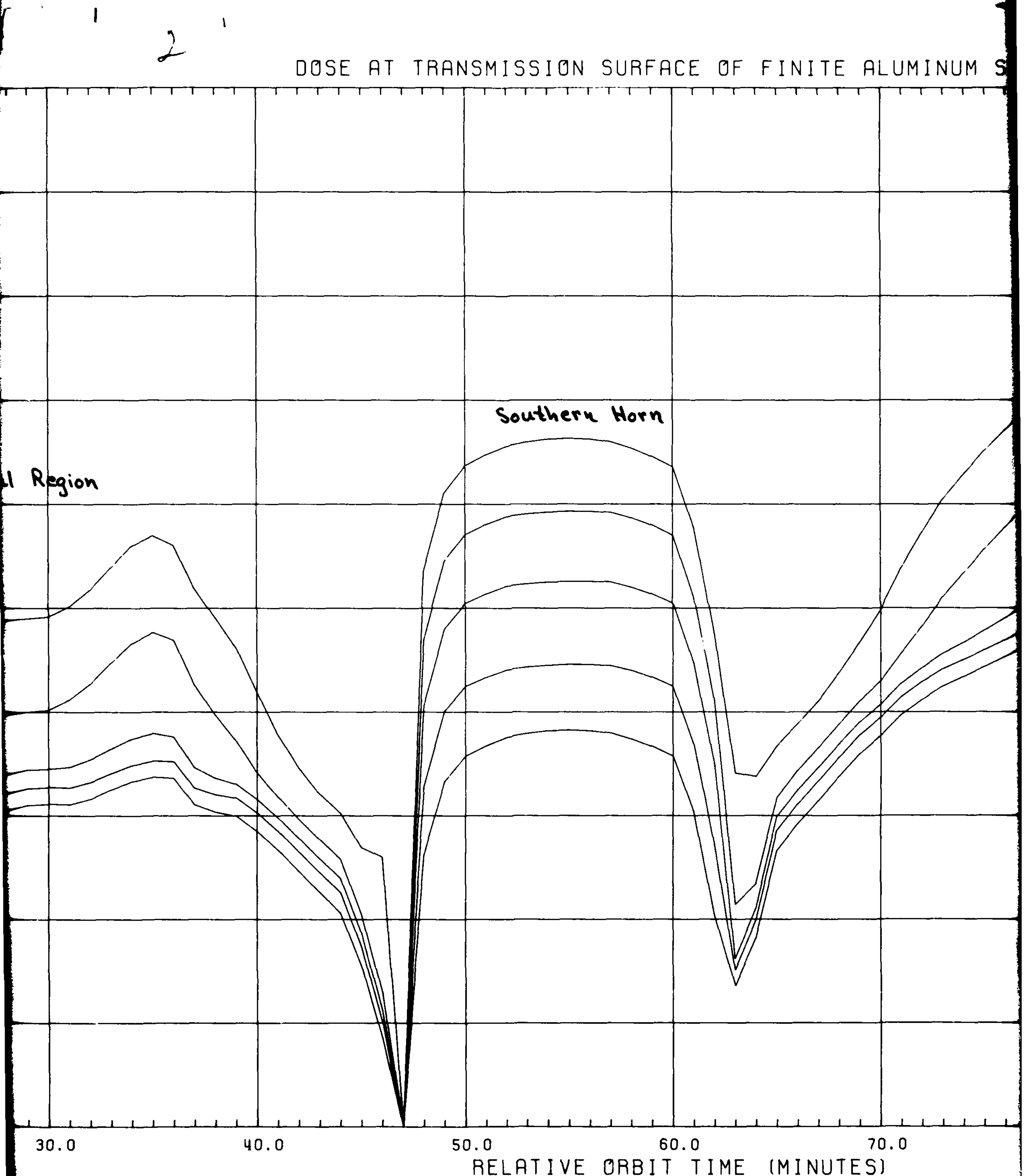


Figure 115
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AE17 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 8.449993
NASA-GSFC
100.0
110.0
120.0

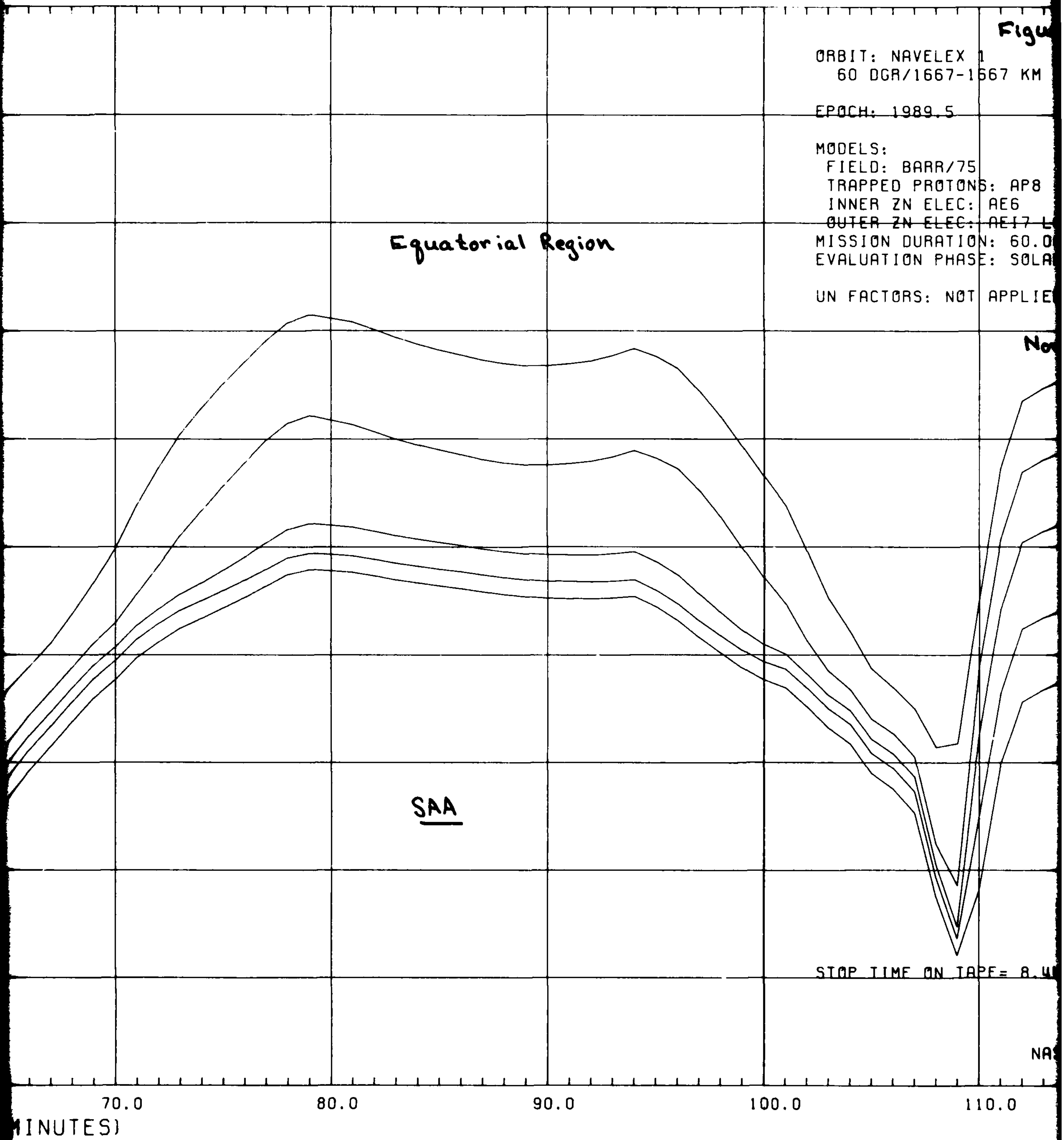


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial Region
SAA
START TIME ON TAPE= 6.483323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0


2
DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM S
Southern Horn
l Region
30.0
40.0
50.0
60.0
70.0
RELATIVE ORBIT TIME (MINUTES)

3

INITE ALUMINUM SLAB SHIELDS



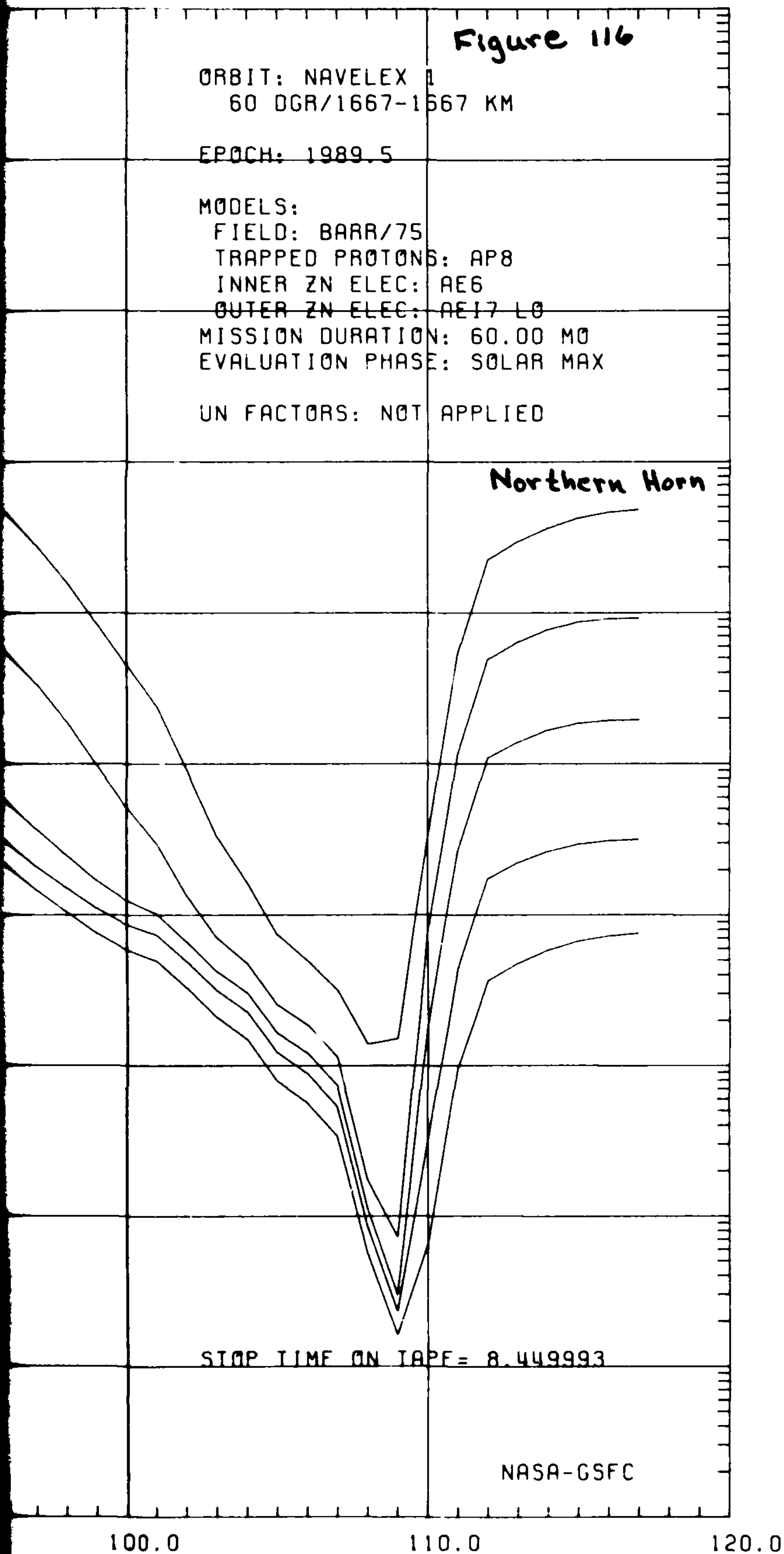
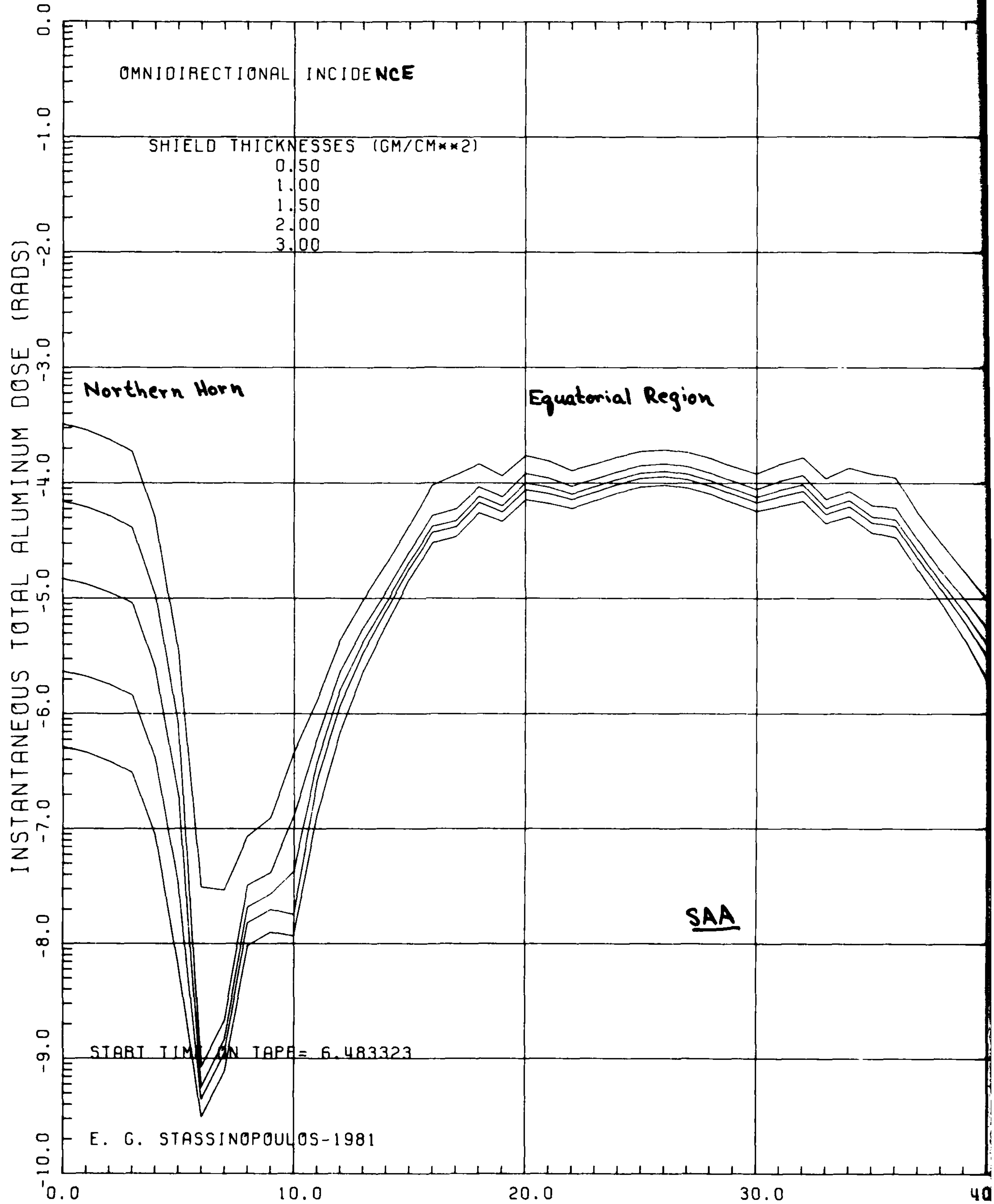
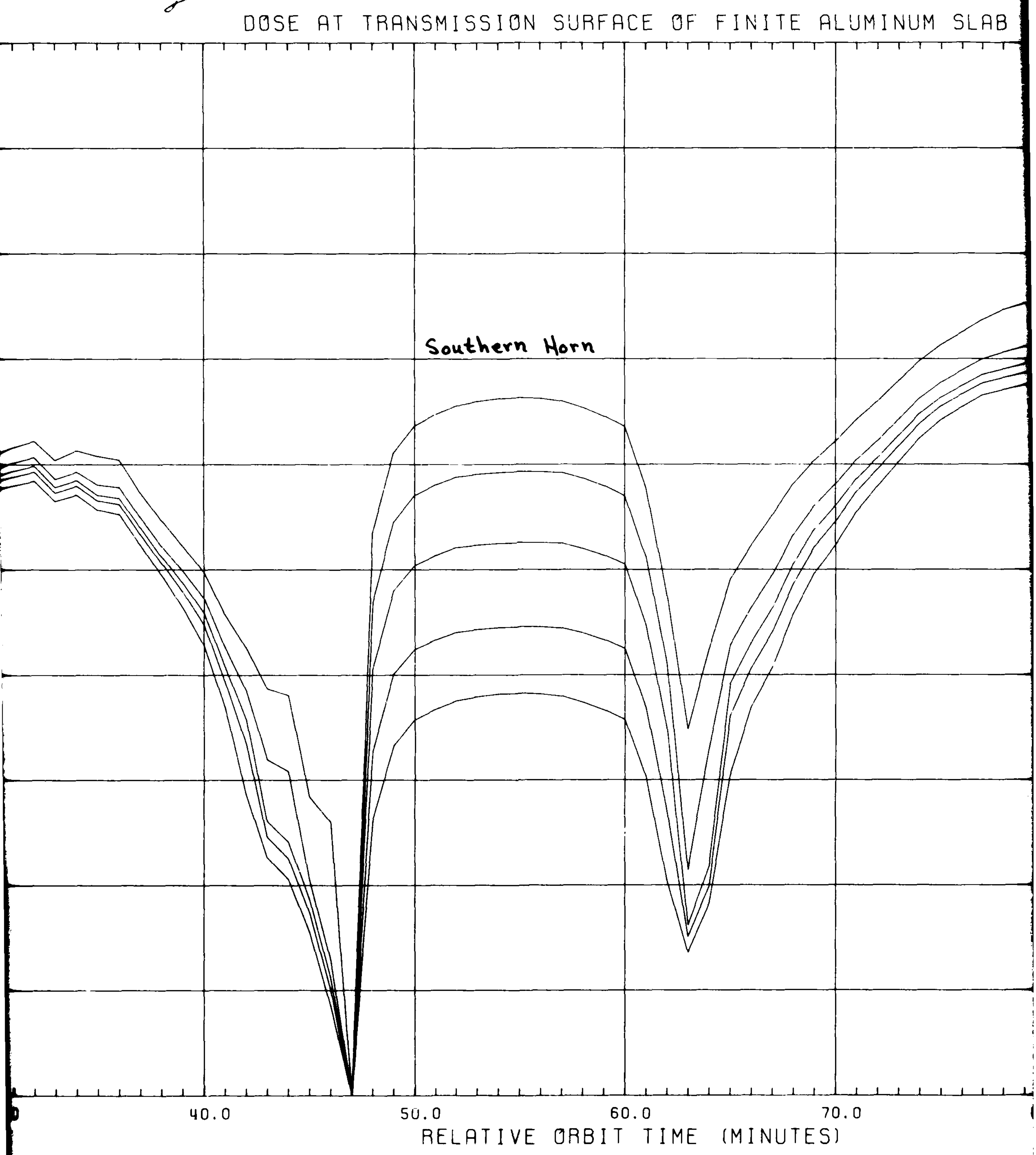


Figure 116
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 8.449993
NASA-GSFC
100.0
110.0
120.0

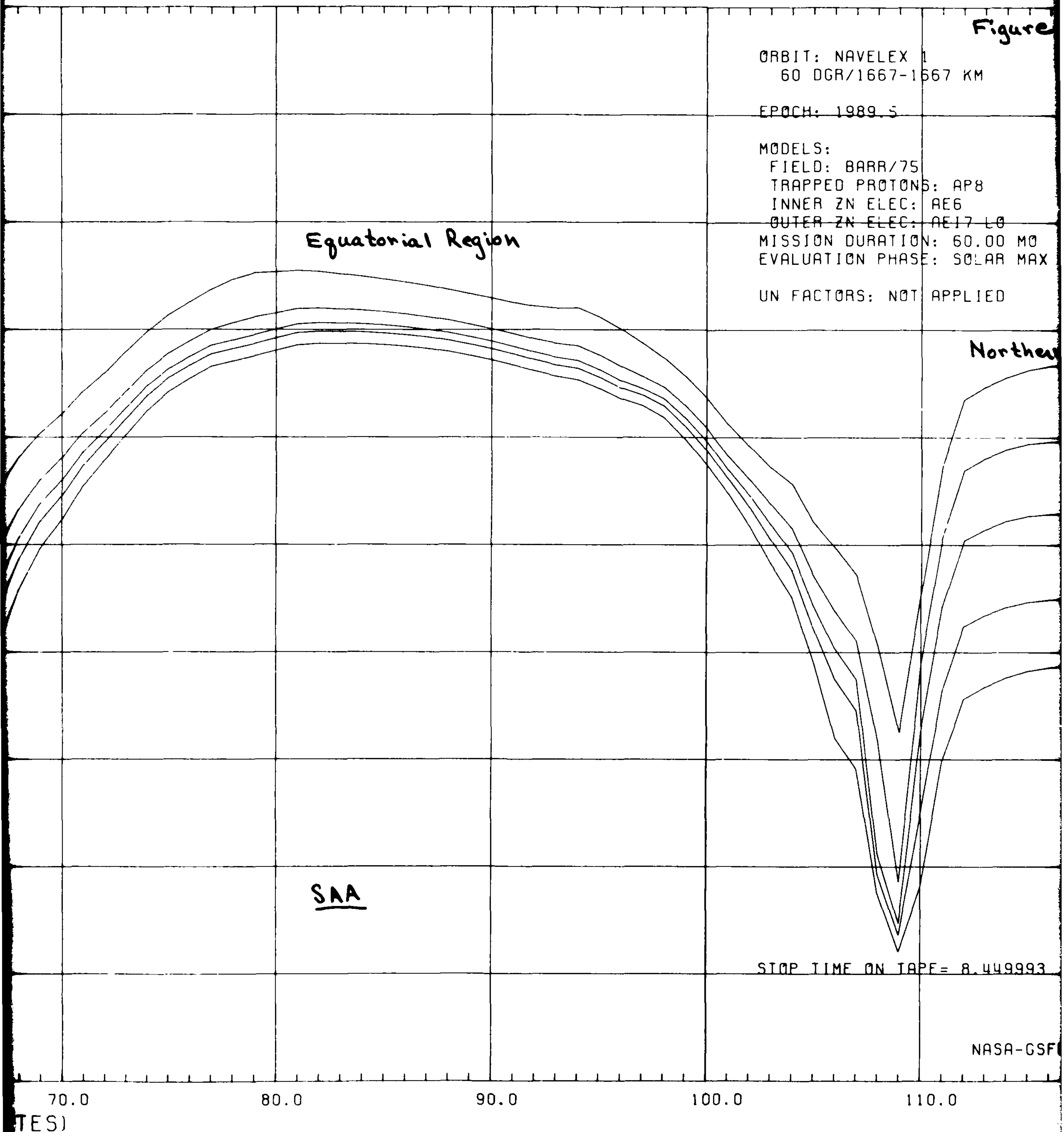


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial Region
SAA
START TIME ON TAPE= 6.483323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40



DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB
Southern Horn
40.0
50.0
60.0
70.0
RELATIVE ORBIT TIME (MINUTES)

E ALUMINUM SLAB SHIELDS



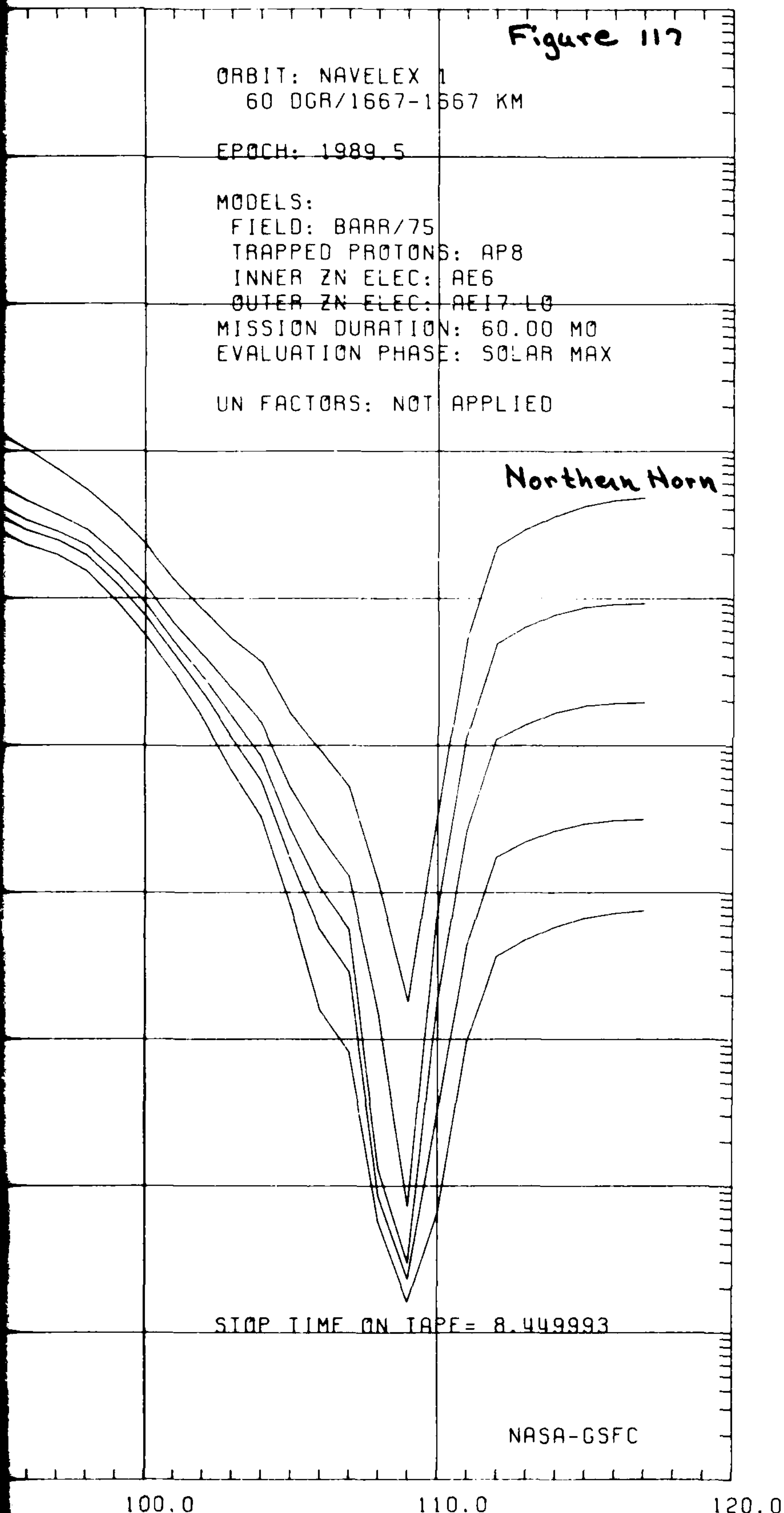
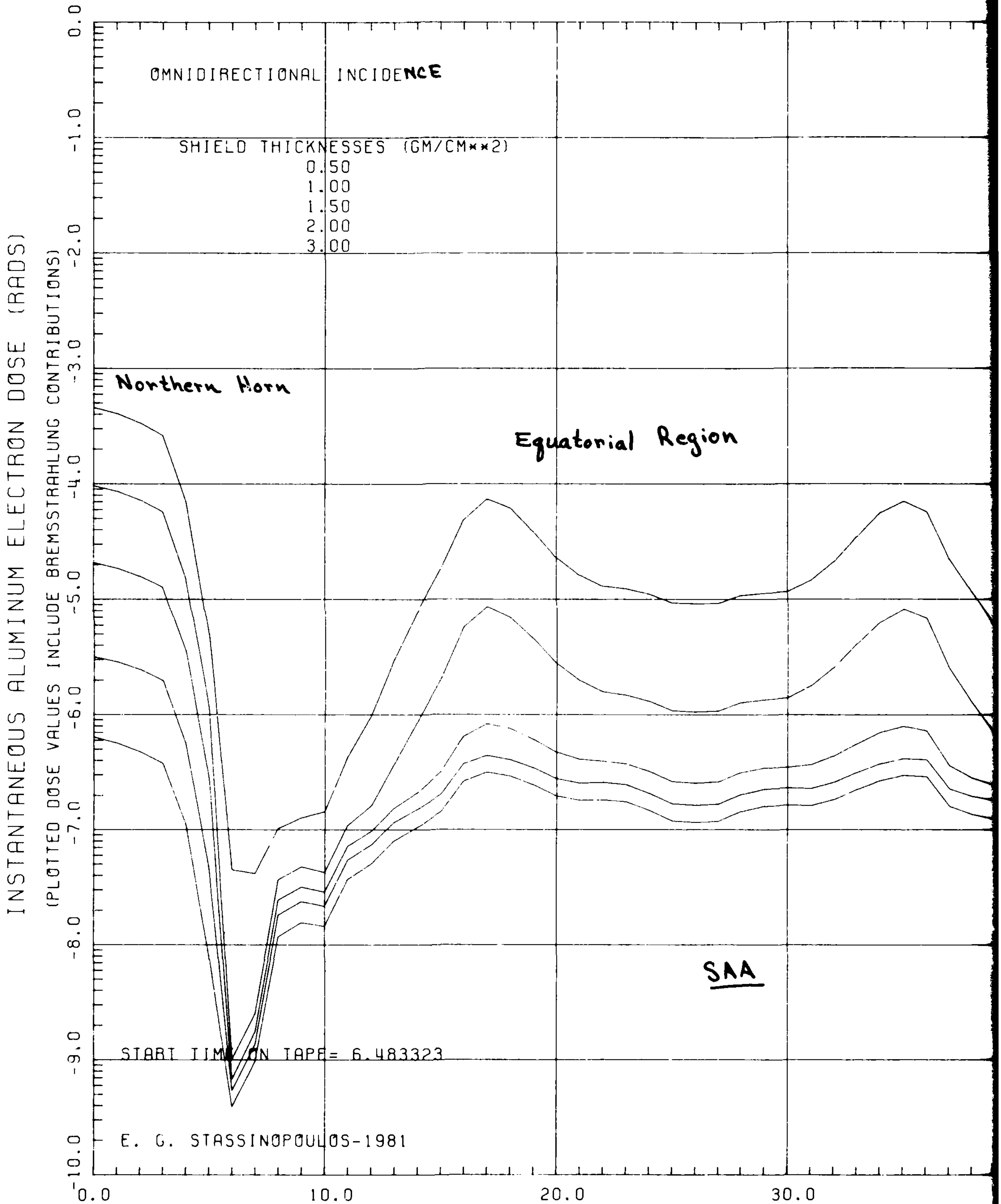
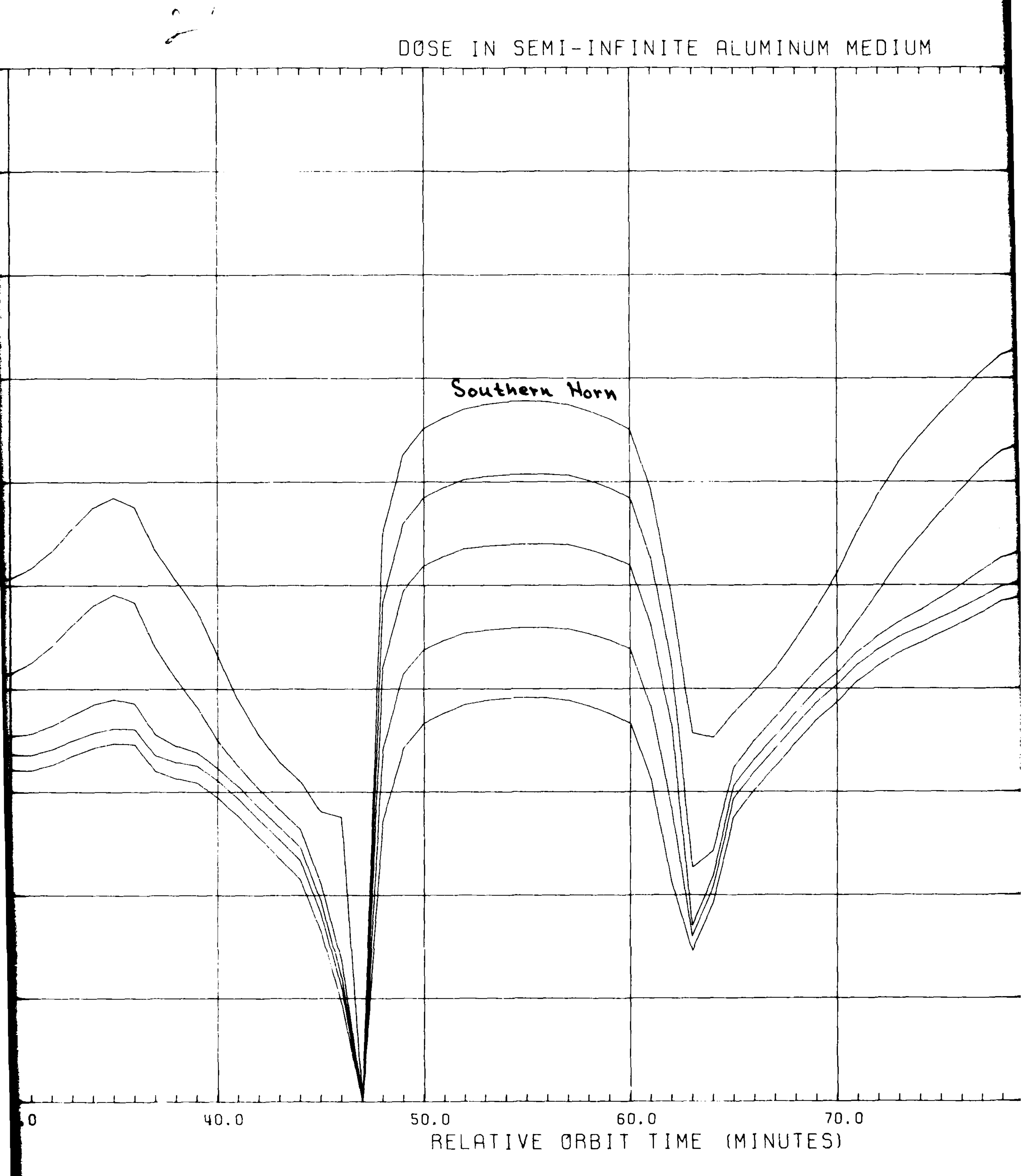
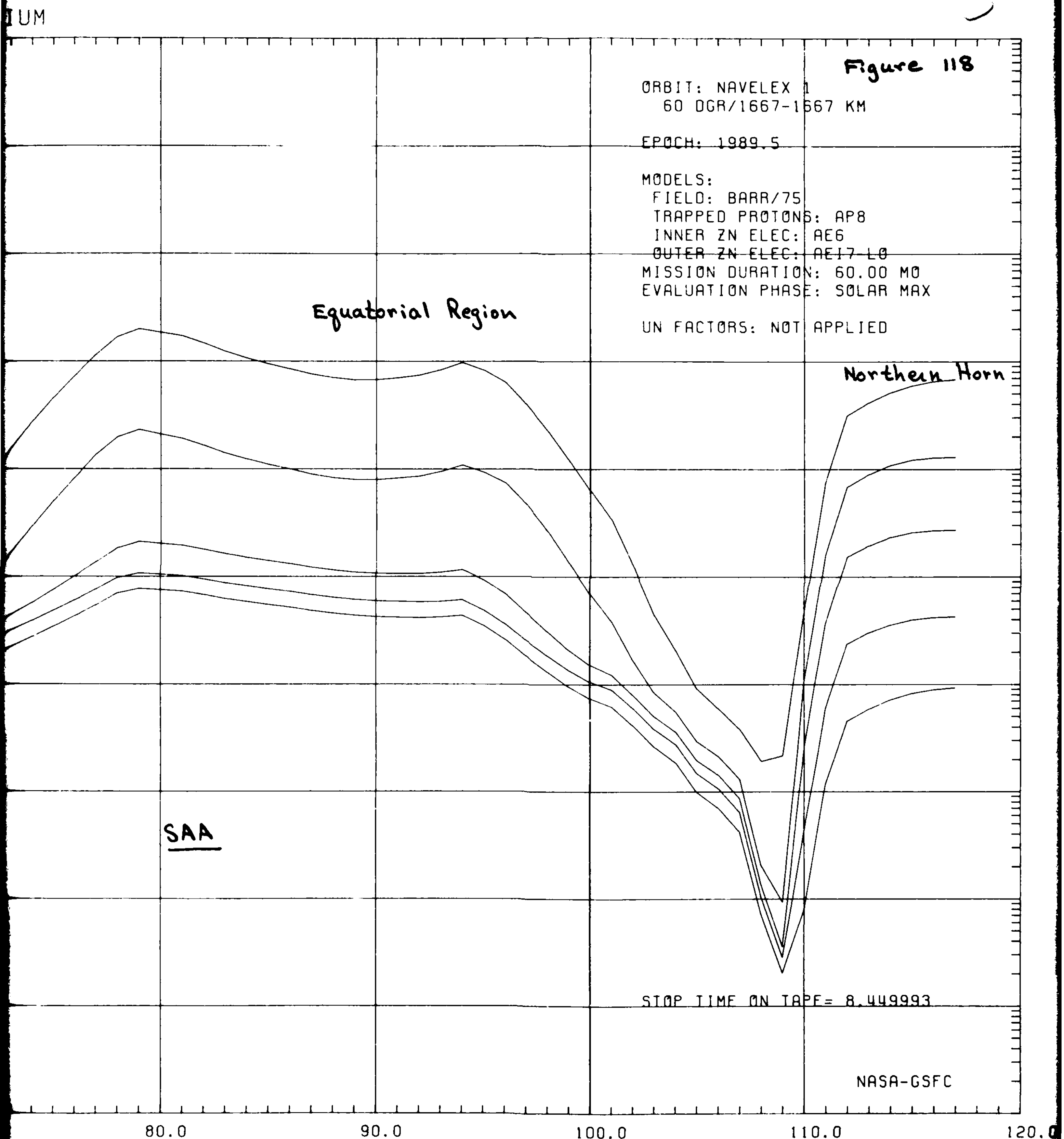


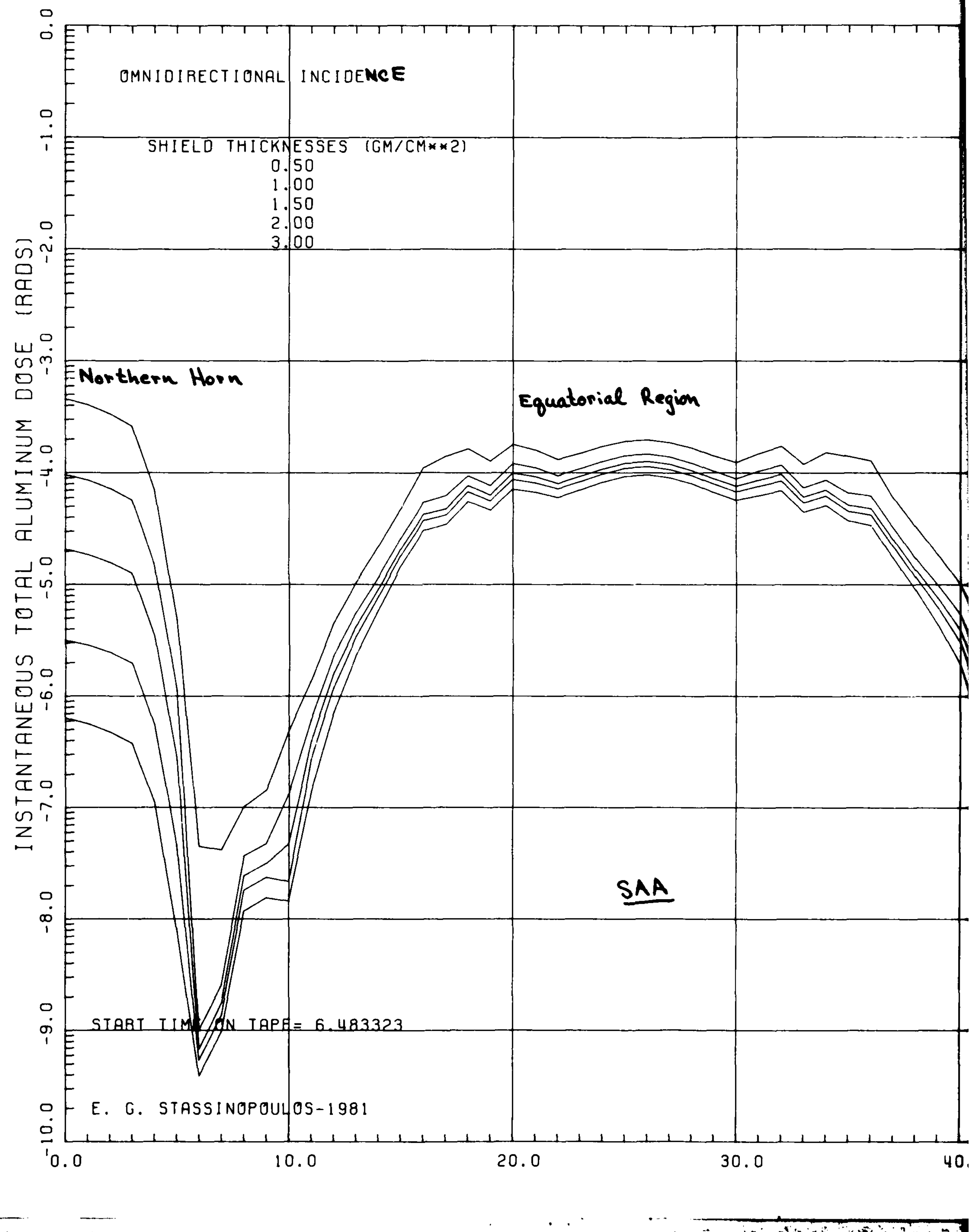
Figure 117
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 8.449993
NASA-GSFC
100.0
110.0
120.0


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial Region
SAA
START TIME ON TAPE= 6.483323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0


DØSE IN SEMI-INFINITE ALUMINUM MEDIUM
Southern Horn
.0
40.0
50.0
60.0
70.0
RELATIVE ØRBIT TIME (MINUTES)

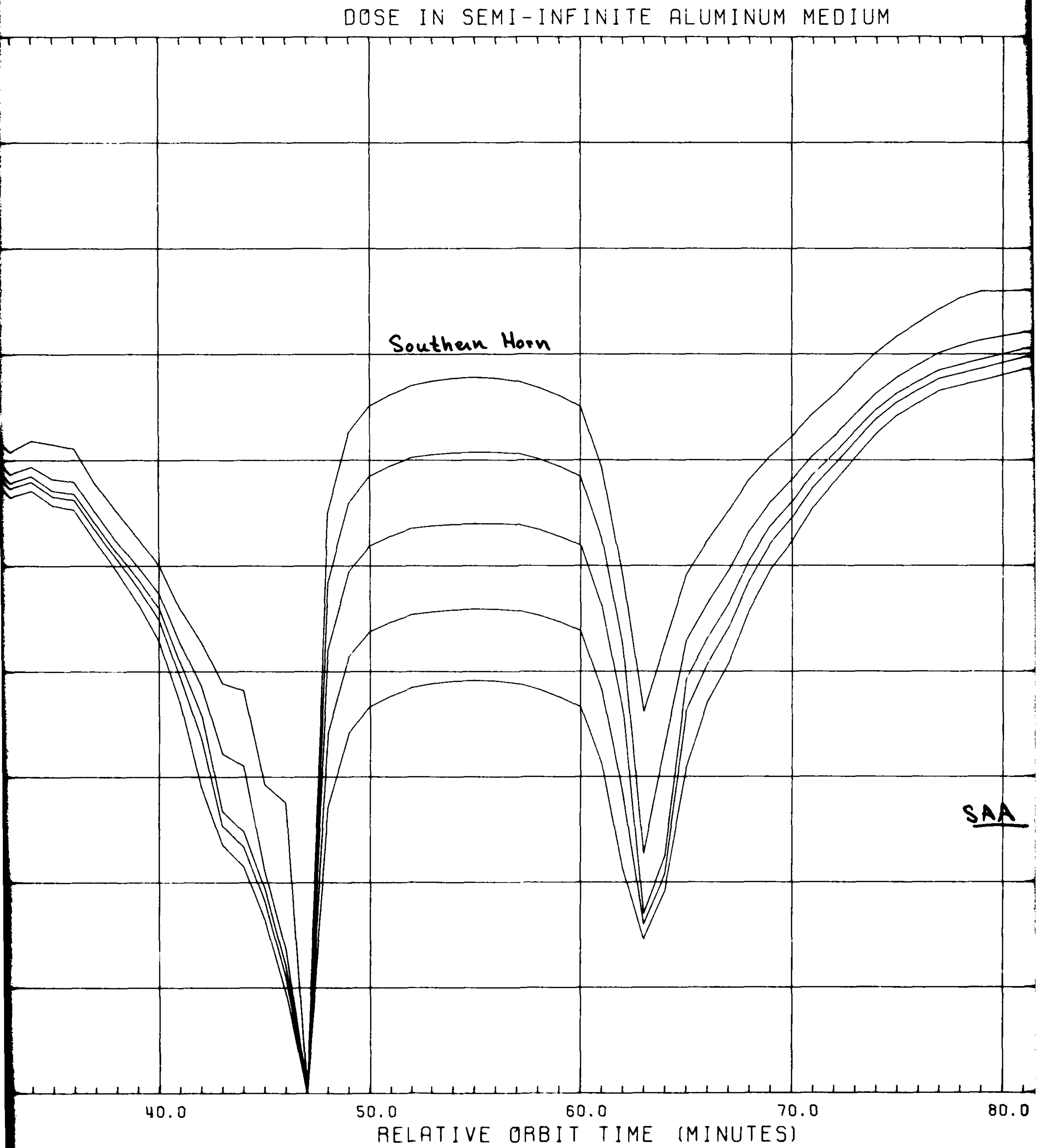
3


IUM
Figure 118
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Equatorial Region
Northern Horn
SAA
STOP TIME ON TAPE= 8.449993
NASA-GSFC
80.0
90.0
100.0
110.0
120.0

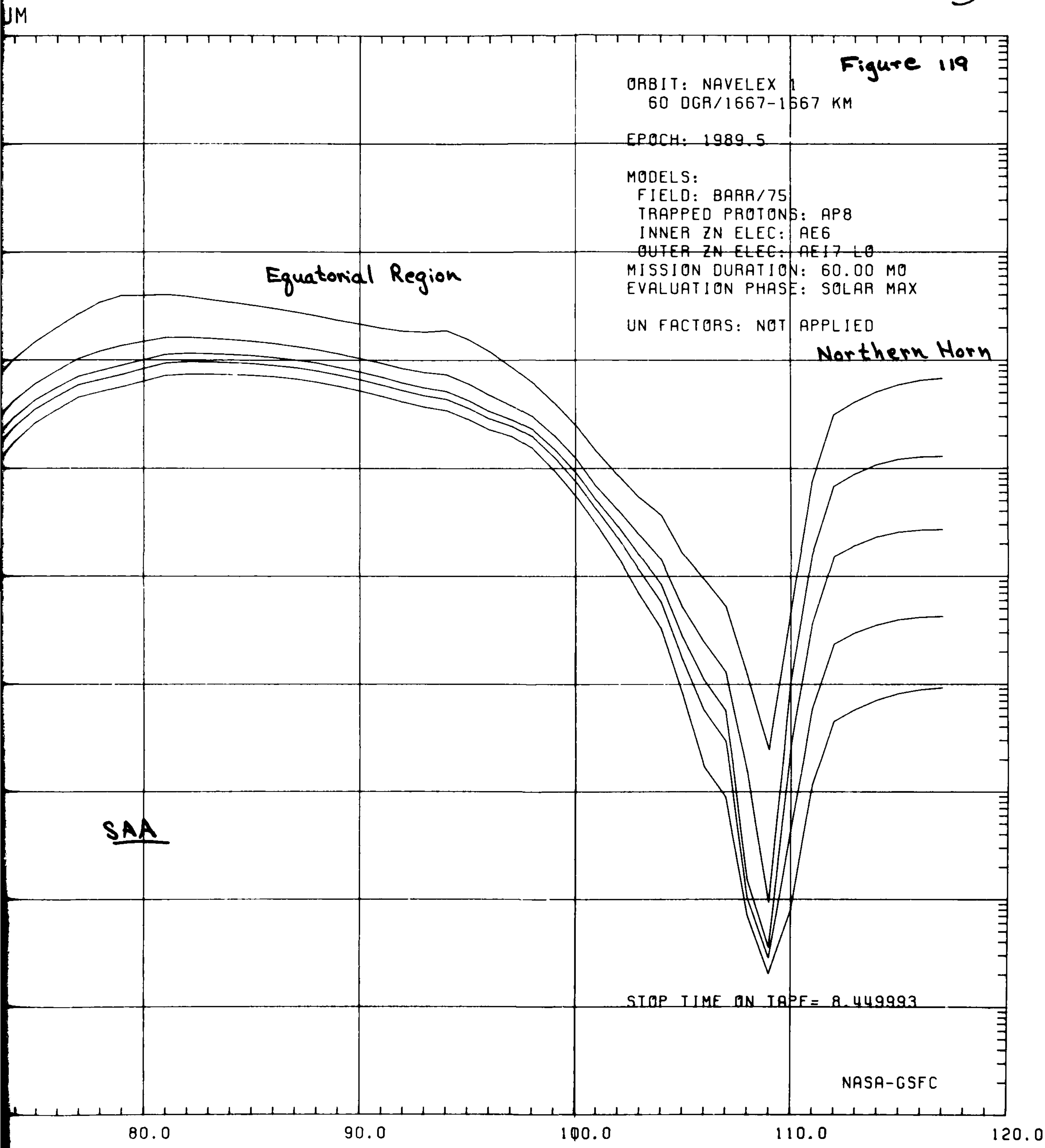


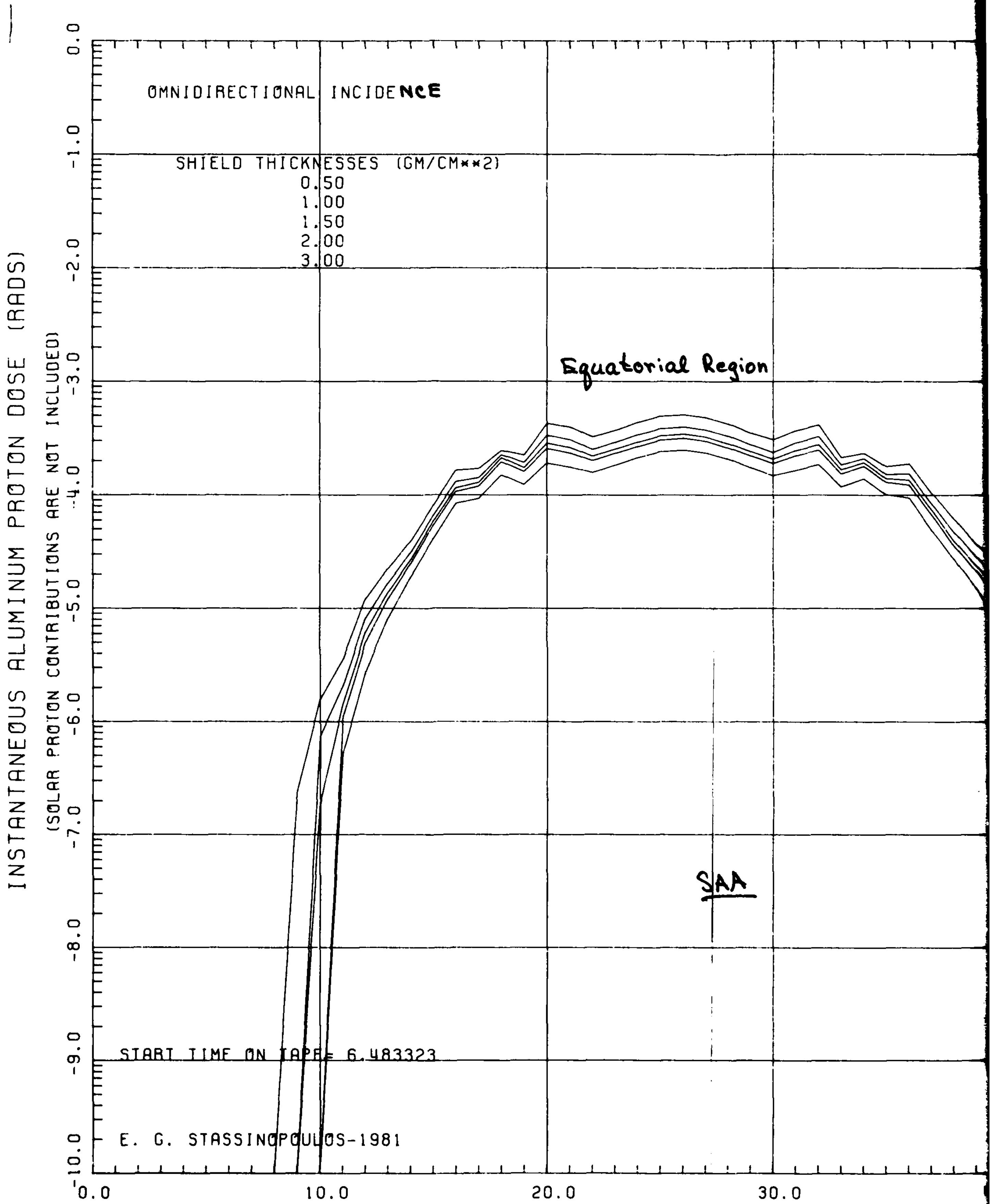
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial Region
SAA
START TIME ON TAPE= 6.483323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40.

2


DOSE IN SEMI-INFINITE ALUMINUM MEDIUM
Southern Horn
SAA
40.0
50.0
60.0
70.0
80.0
RELATIVE ORBIT TIME (MINUTES)

3

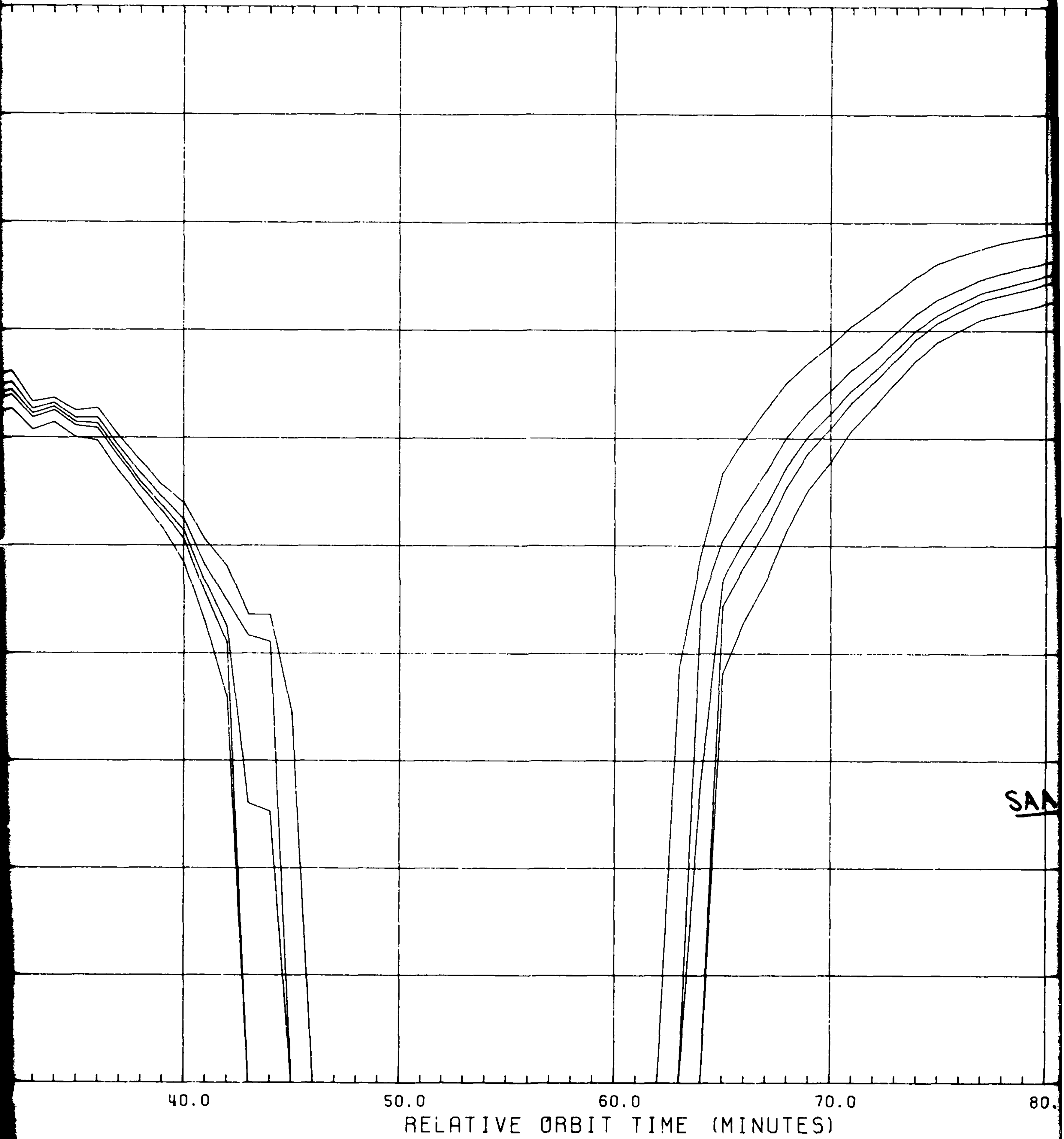

UM
Figure 119
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Equatorial Region
Northern Horn
SAA
STOP TIME ON TAPE= 8.449993
NASA-GSFC
80.0
90.0
100.0
110.0
120.0

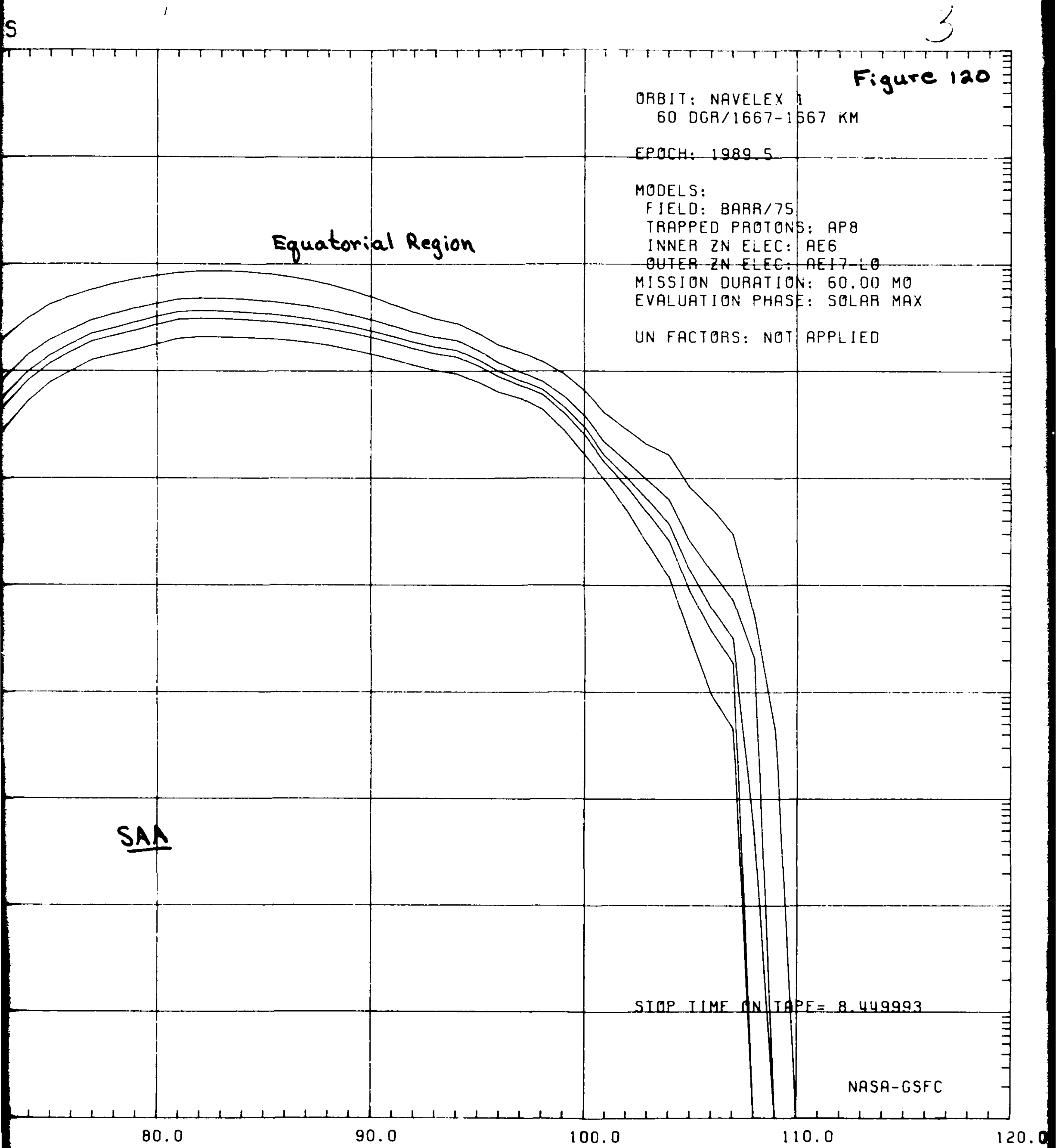


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Region
SAA
START TIME ON TAPE= 6.483323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0

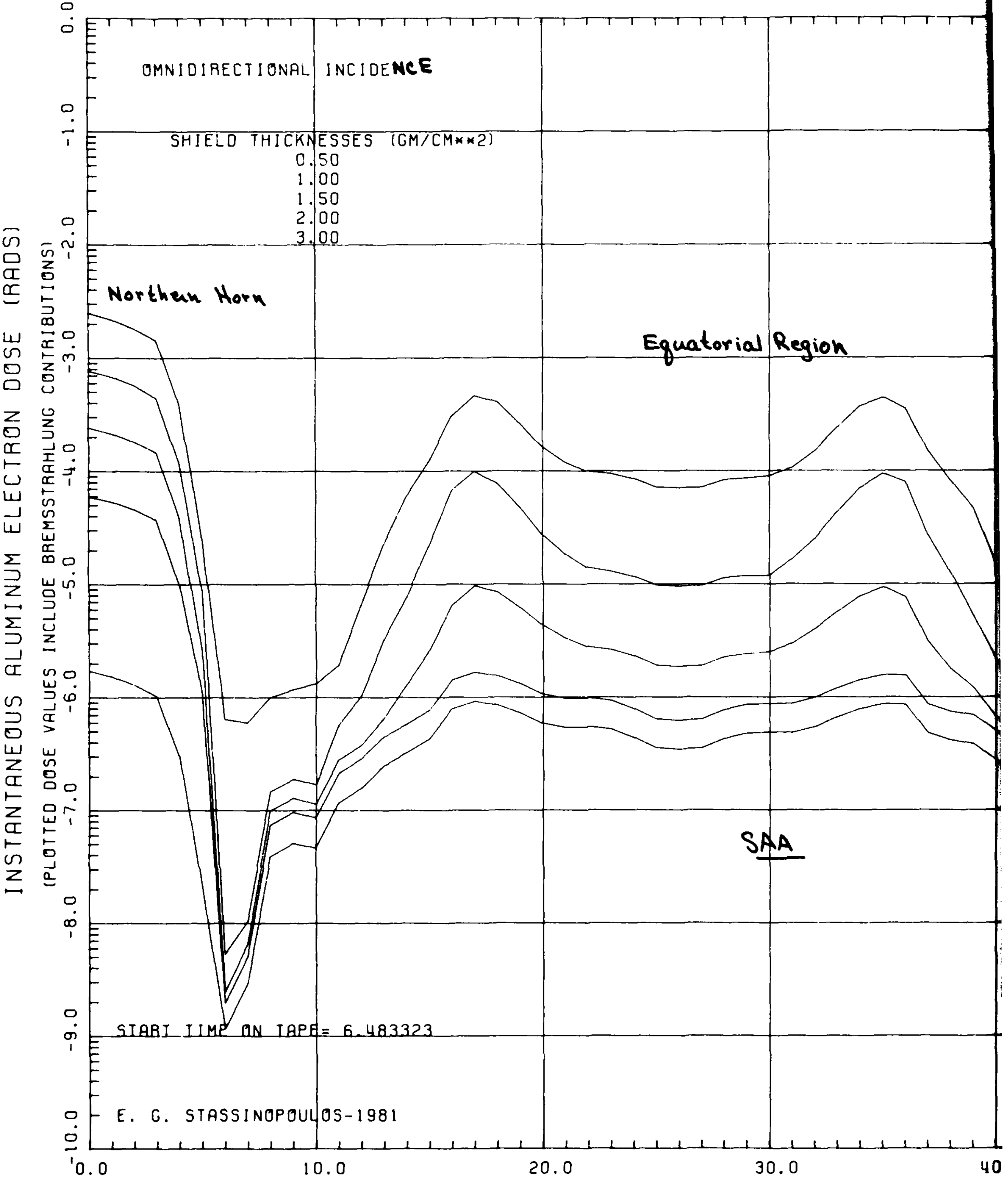
2

DOSE AT CENTER OF ALUMINUM SPHERES

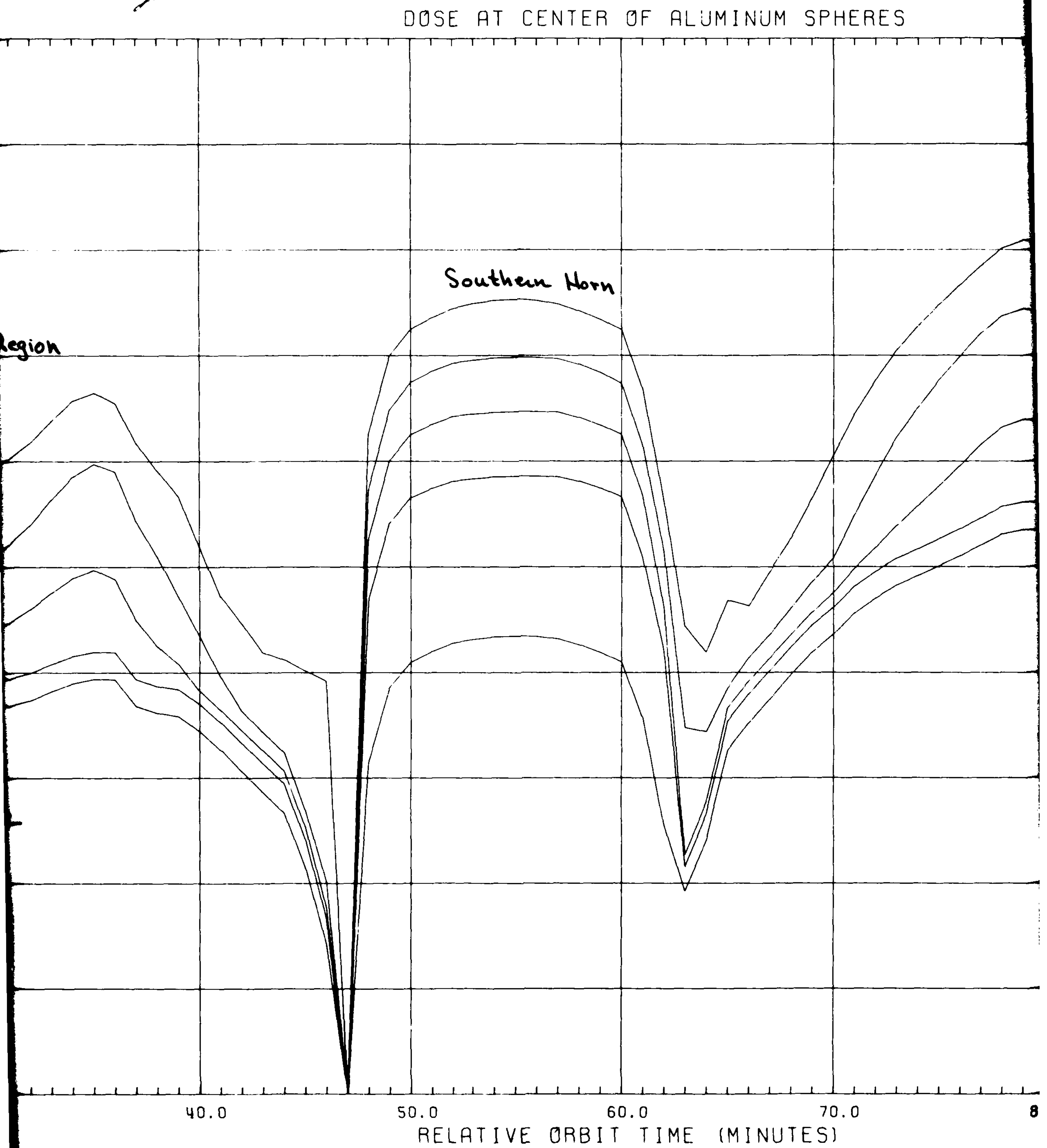




S
3
Figure 120
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-L0
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Equatorial Region
SAA
STOP TIME ON TAPE= 8.449993
NASA-GSFC
80.0
90.0
100.0
110.0
120.0



OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial Region
SAA
START TIME ON TAPE= 6.483323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40


DOSE AT CENTER OF ALUMINUM SPHERES
Southern Horn
Region
40.0
50.0
60.0
70.0
8
RELATIVE ORBIT TIME (MINUTES)

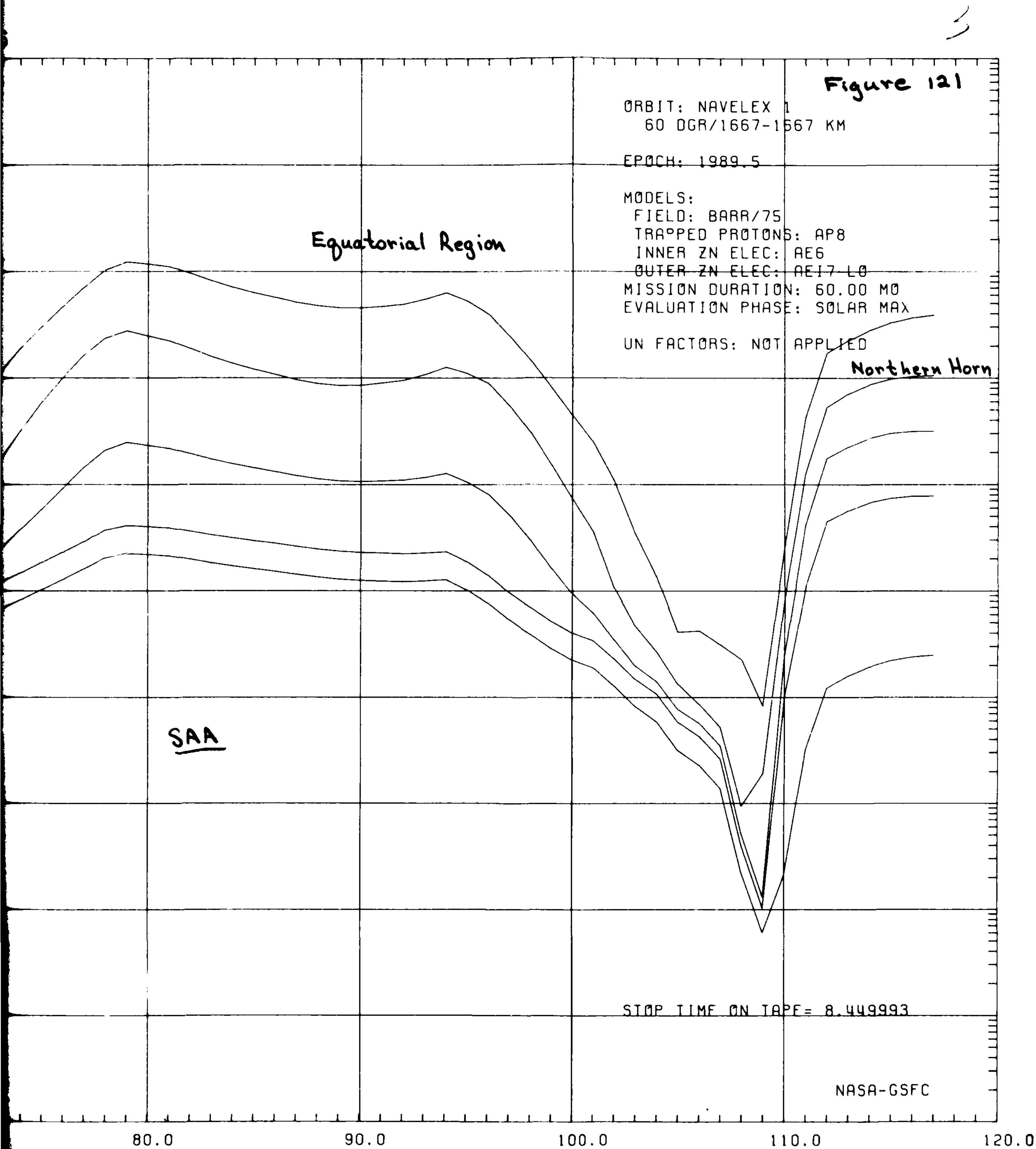
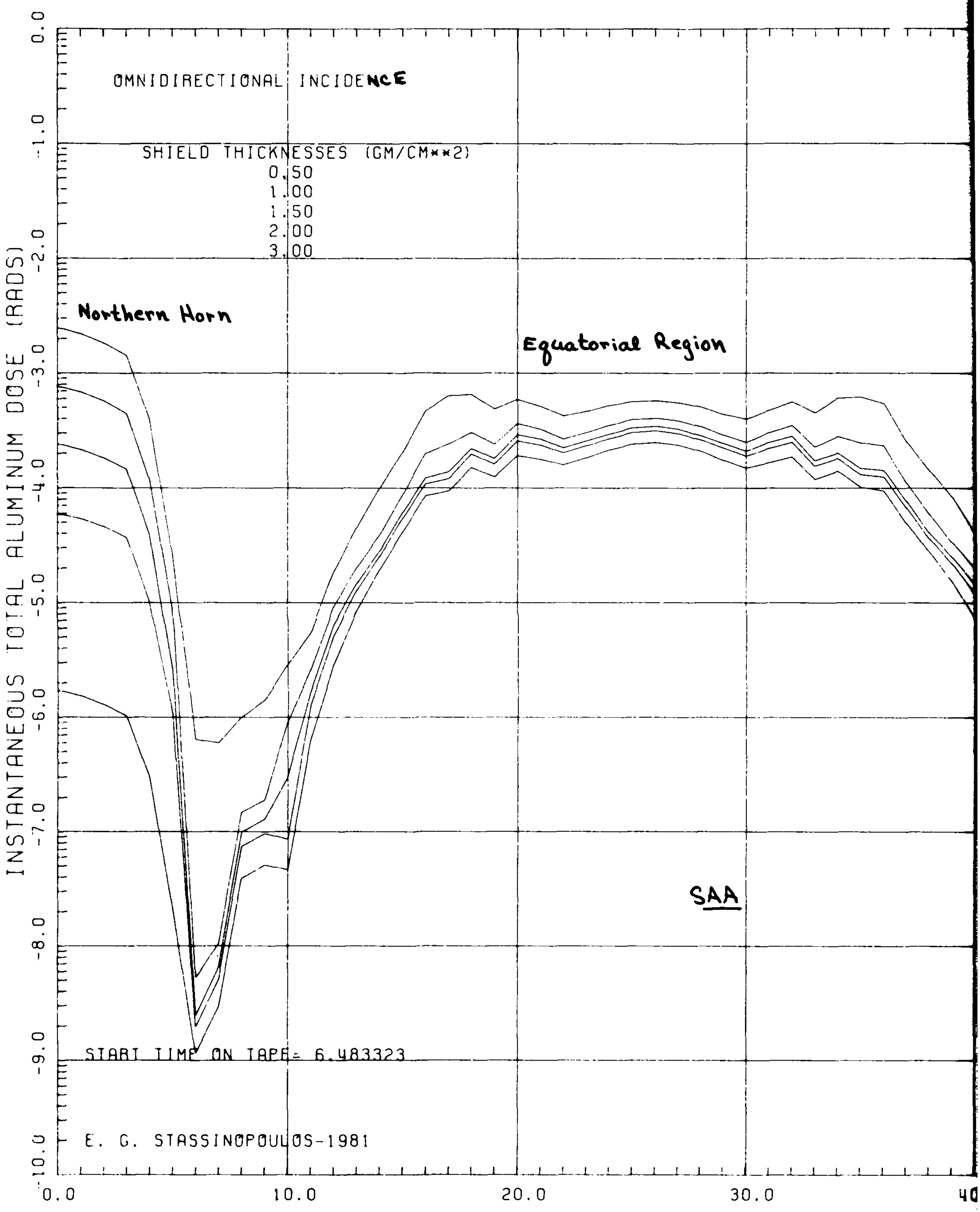
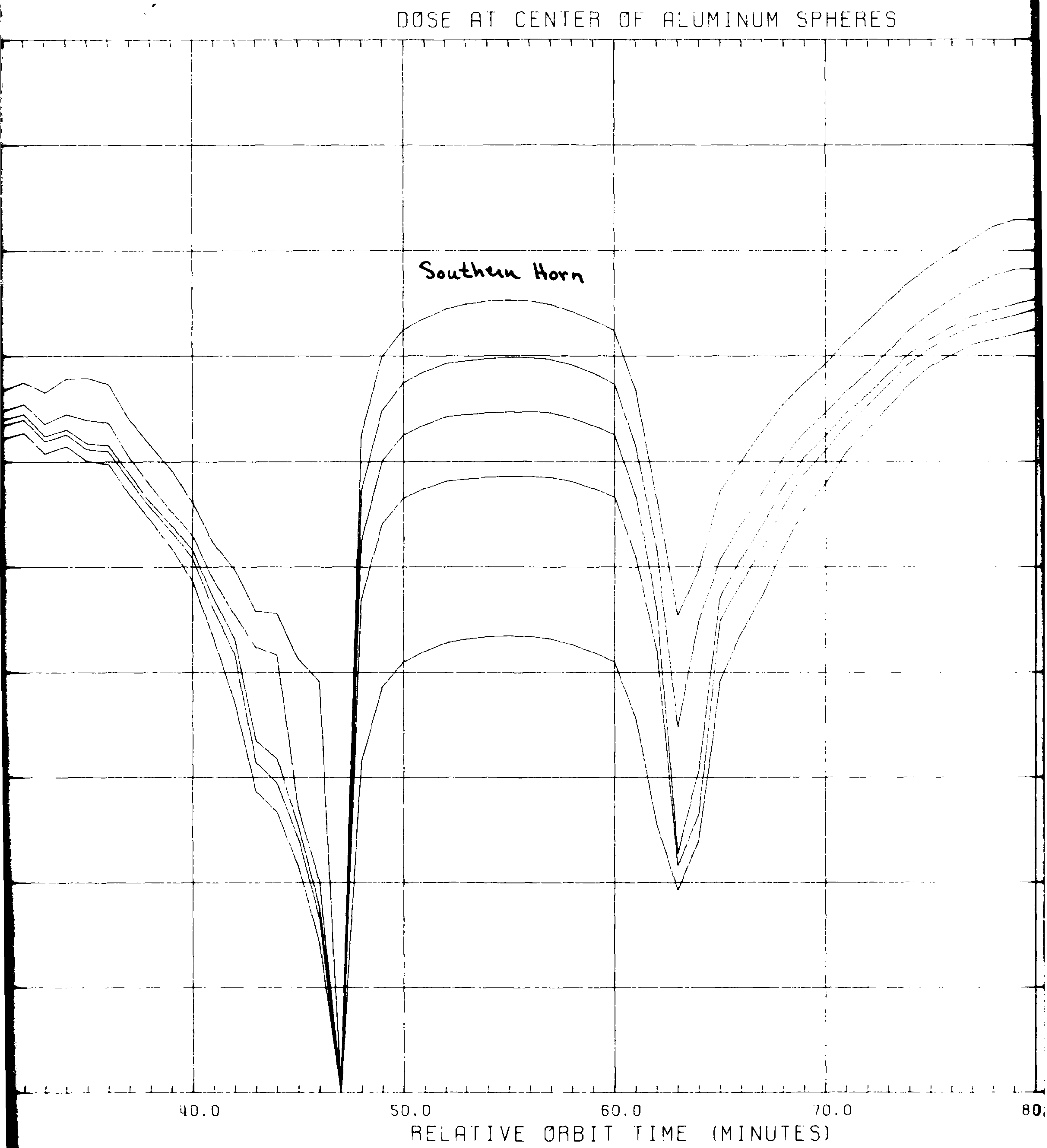
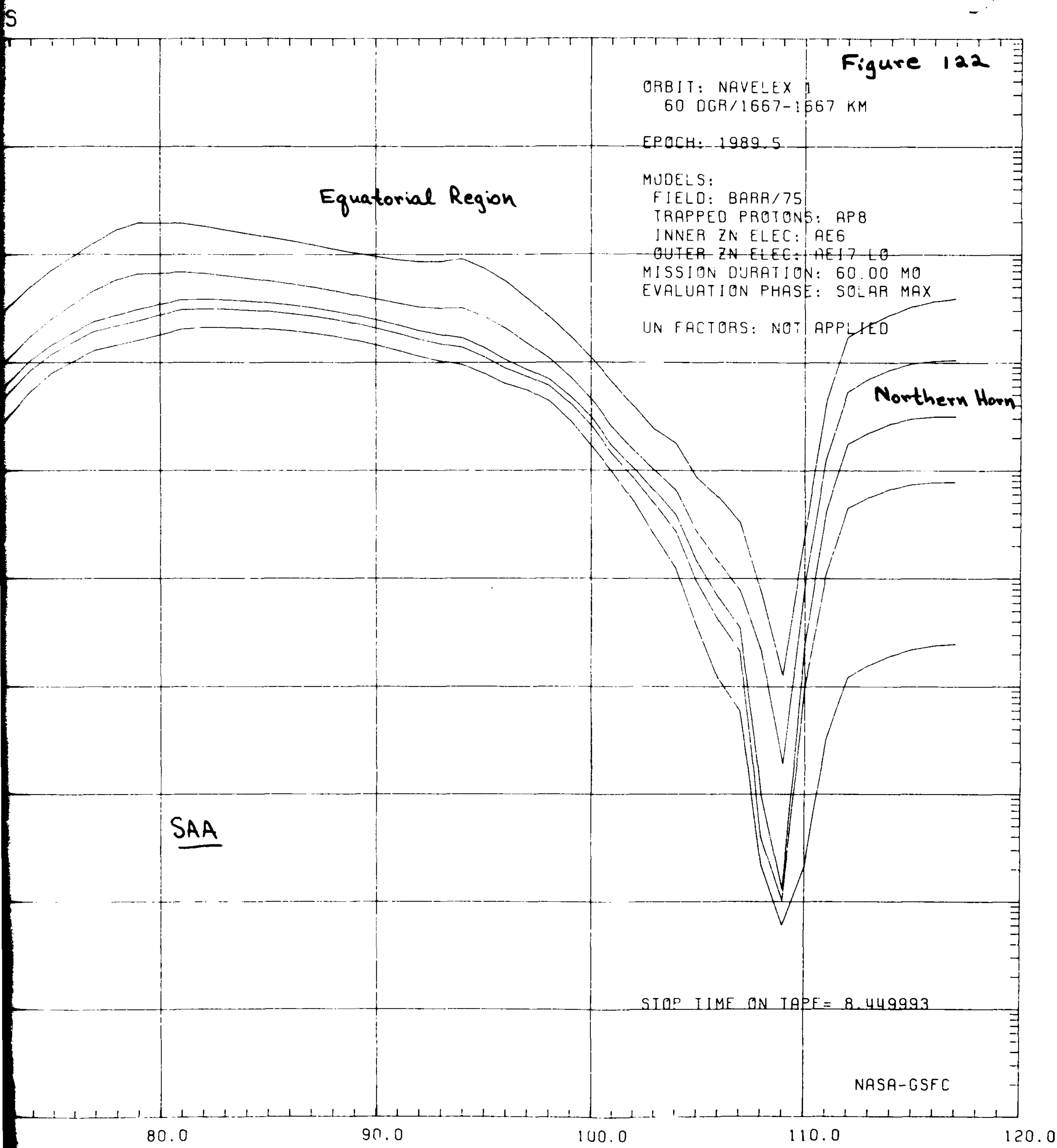


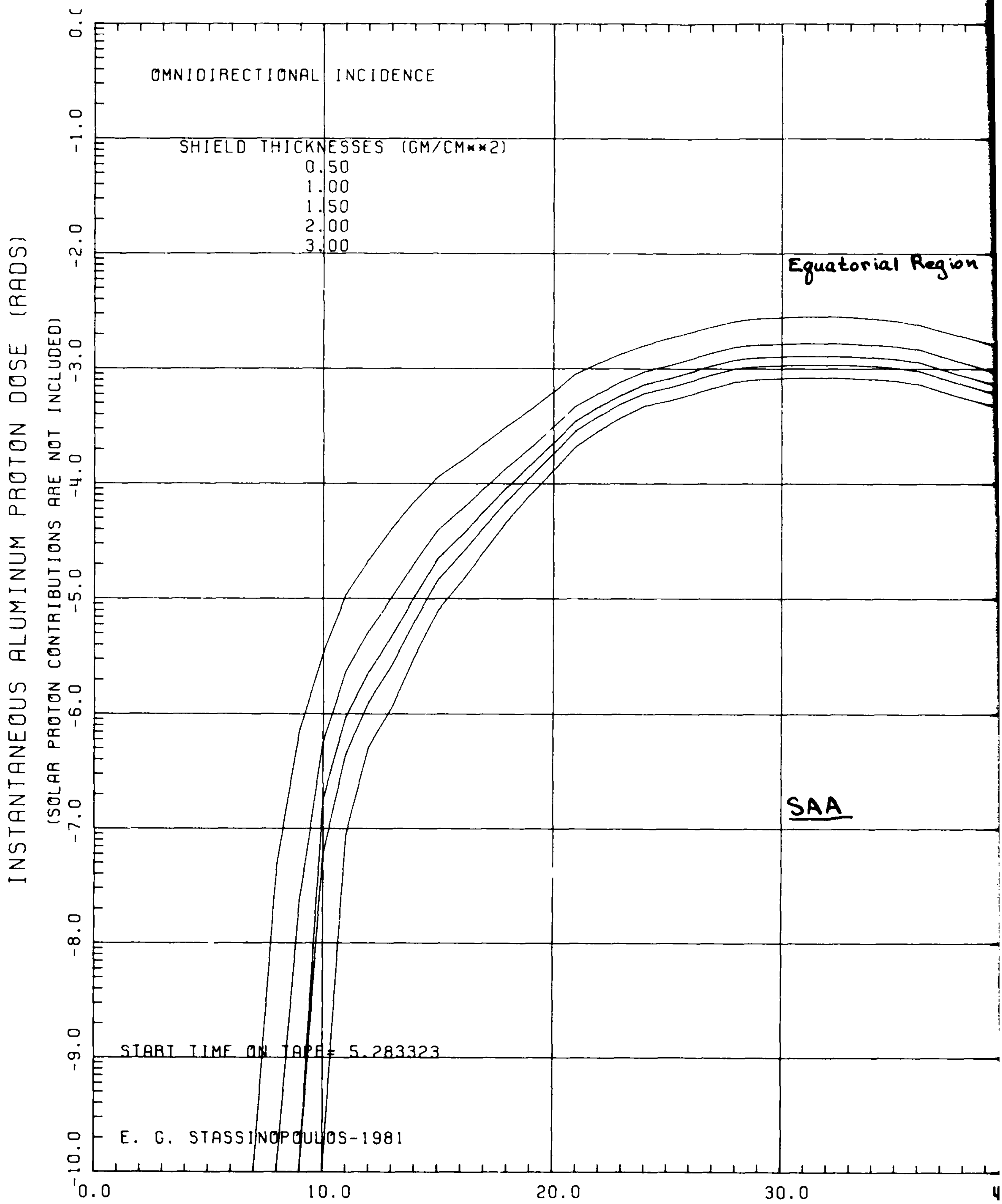
Figure 121
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Equatorial Region
Northern Horn
SAA
STOP TIME ON TAPE= 8.449993
NASA-GSFC
80.0
90.0
100.0
110.0
120.0

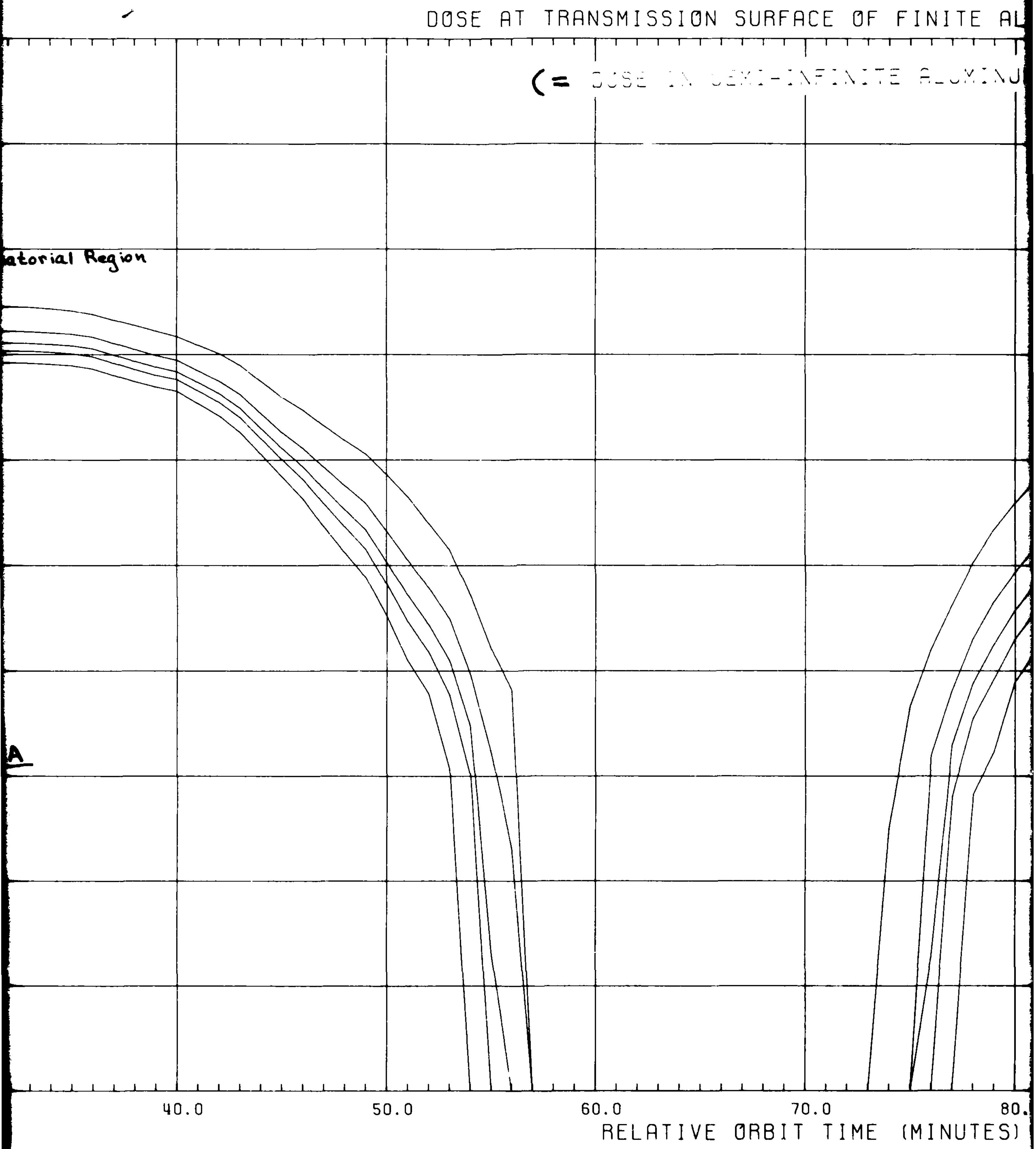


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial Region
SAA
START TIME ON TAPE= 6.483323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40


DOSE AT CENTER OF ALUMINUM SPHERES
Southern Horn
40.0
50.0
60.0
70.0
80.
RELATIVE ORBIT TIME (MINUTES)


S
Figure 122
ORBIT: NAVELEX 1
60 DGR/1667-1667 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Equatorial Region
Northern Horn
SAA
STOP TIME ON TAPE= 8.449993
NASA-GSFC
80.0
90.0
100.0
110.0
120.0

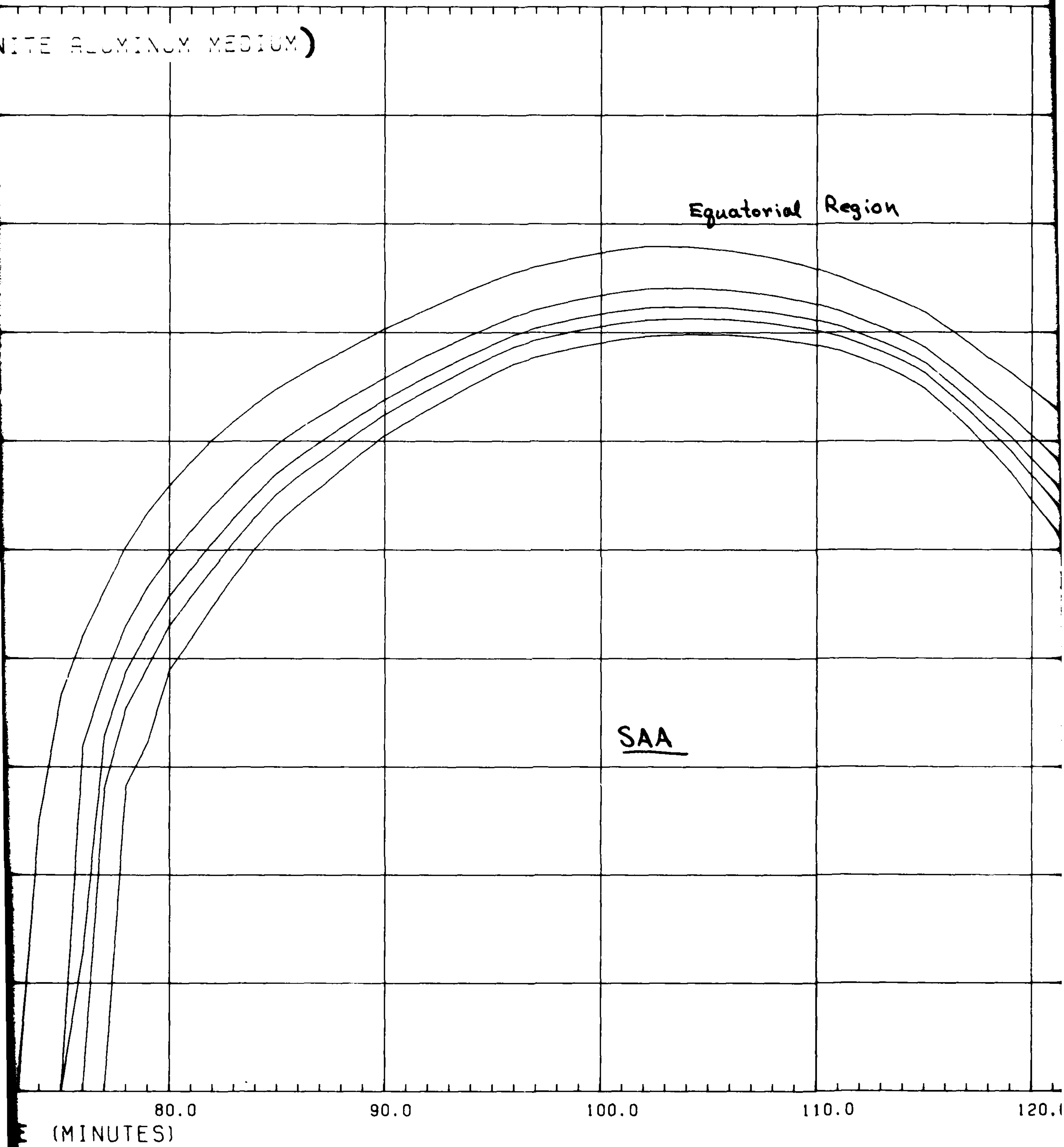

OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Region
SAA
START TIME ON TAPE= 5.283323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0



DOSE AT TRANSMISSION SURFACE OF FINITE AL
(= DOSE IN SEMI-INFINITE ALUMINU
atorial Region
A
40.0
50.0
60.0
70.0
80.
RELATIVE ORBIT TIME (MINUTES)

3

OF FINITE ALUMINUM SLAB SHIELDS



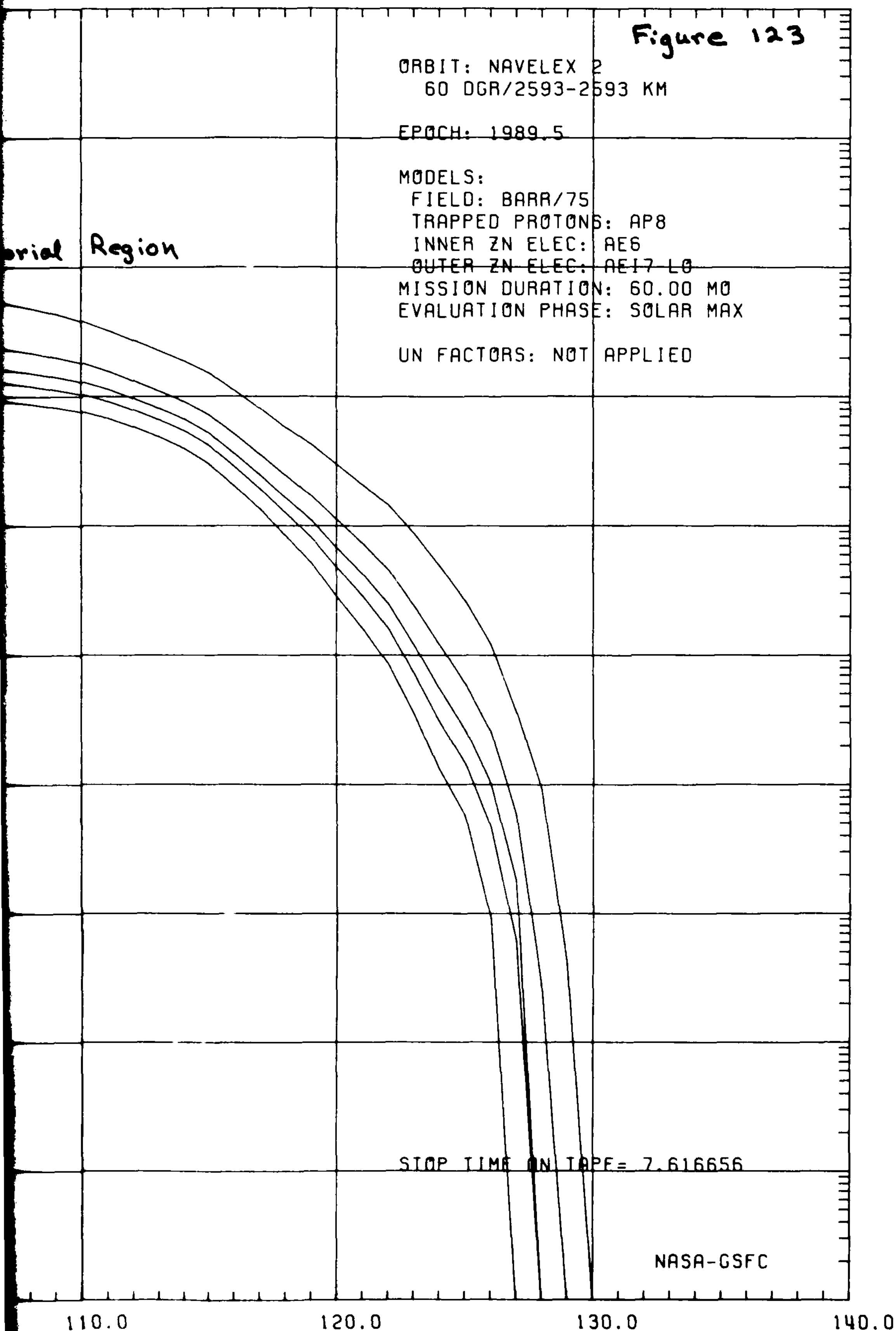
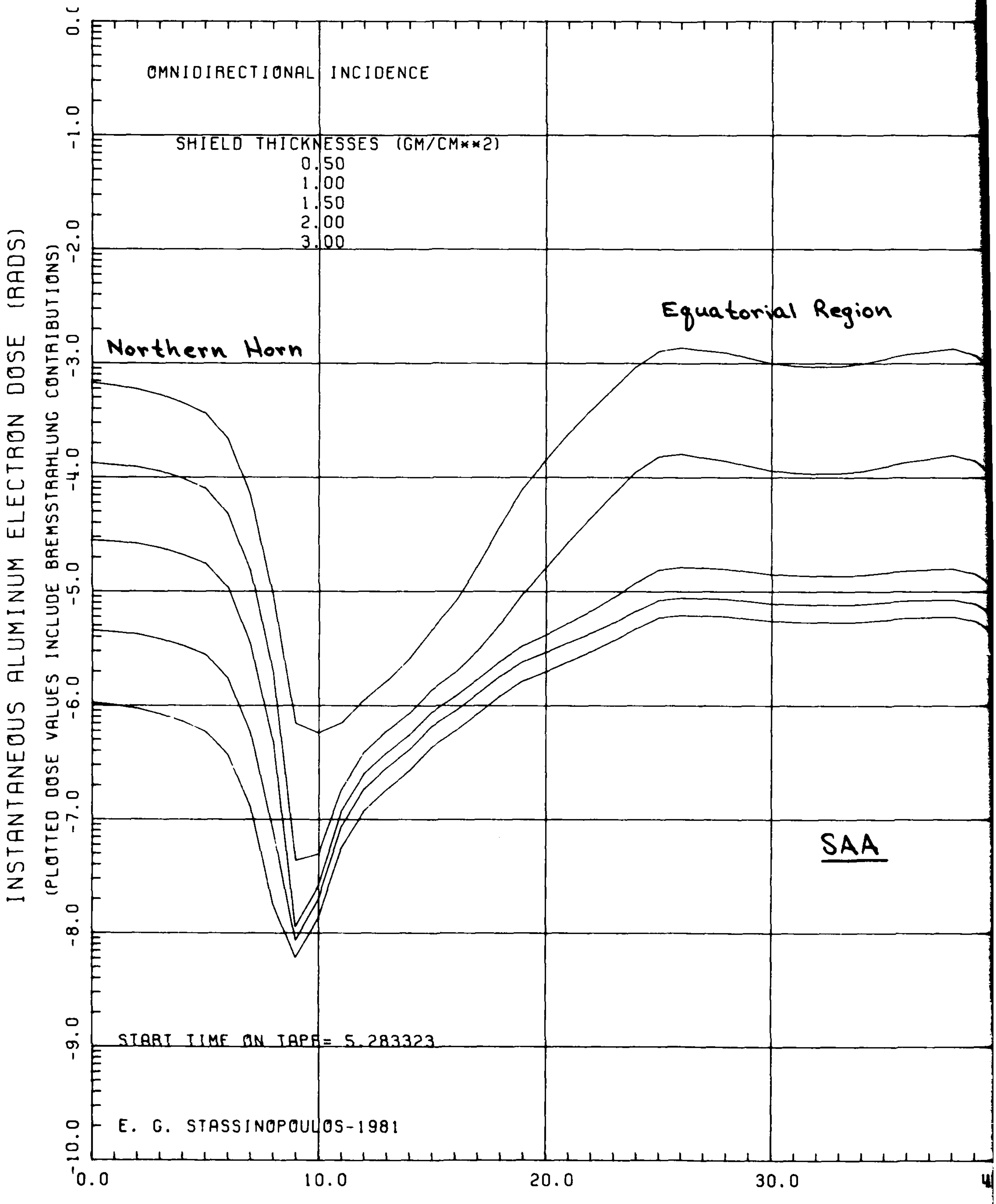
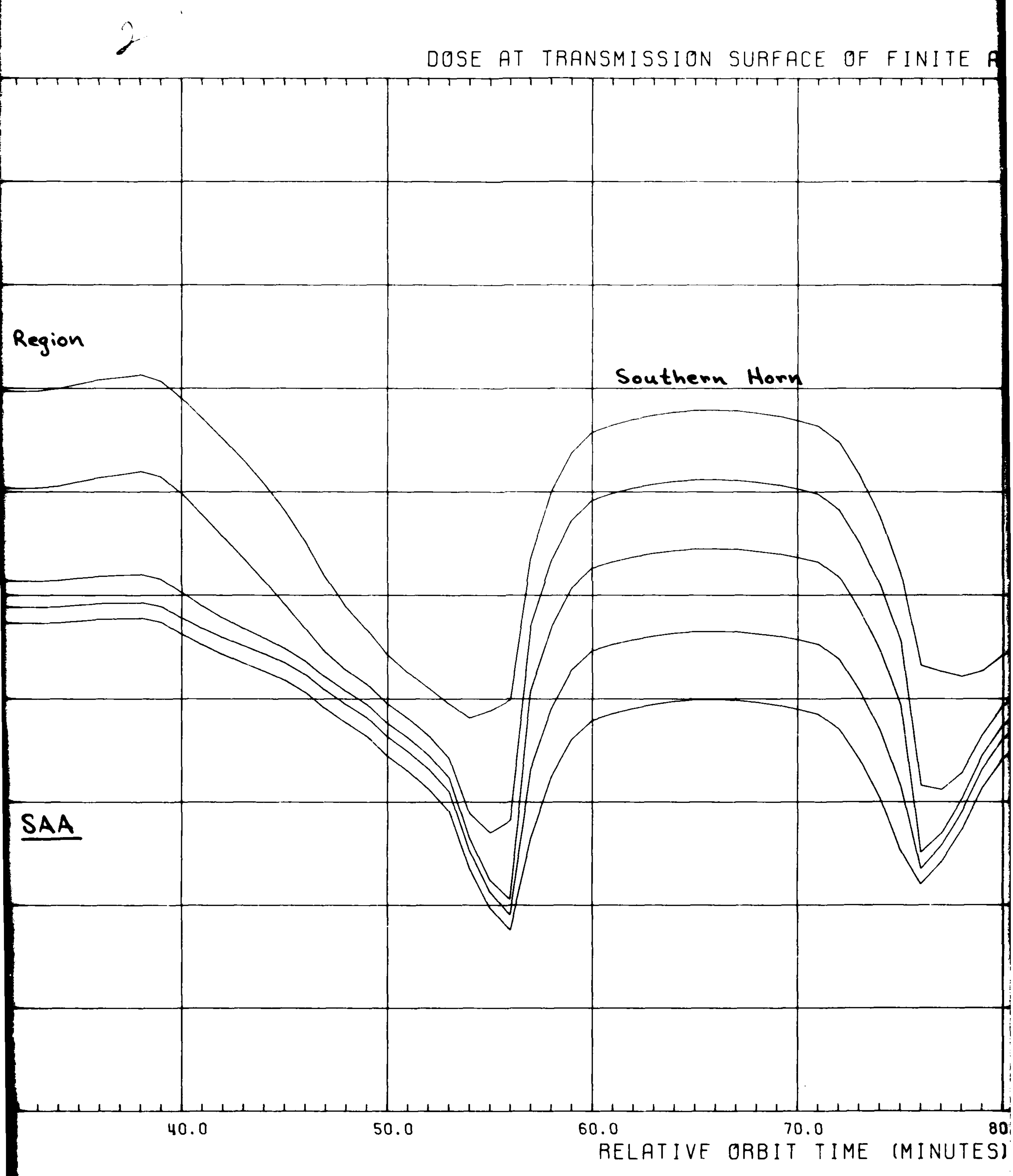


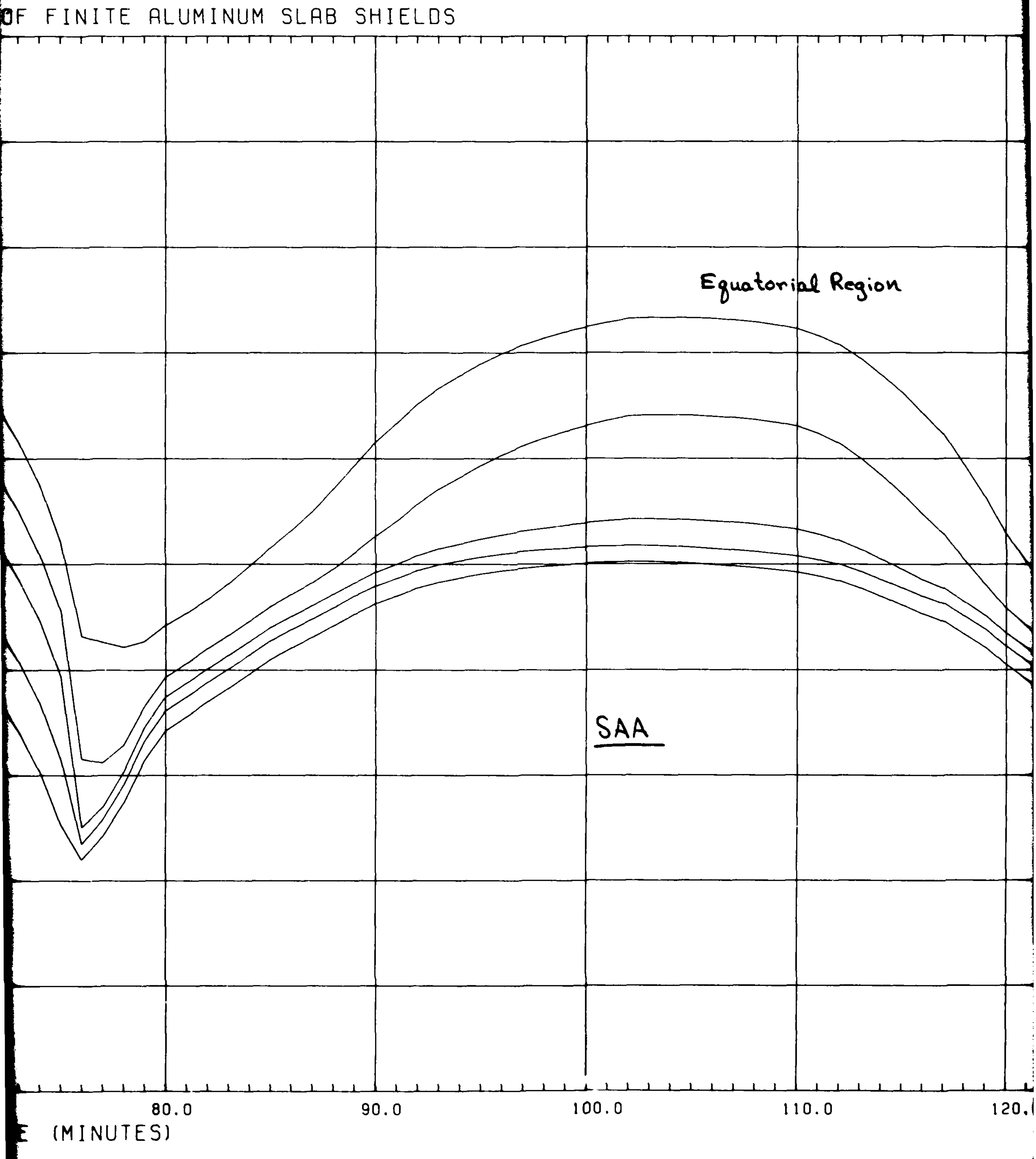
Figure 123
ORBIT: NAVELEX 2
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
orial Region
STOP TIME ON TAPE= 7.616656
NASA-GSFC
110.0
120.0
130.0
140.0



OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial Region
SAA
START TIME ON TAPE= 5.283323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0



2
DOSE AT TRANSMISSION SURFACE OF FINITE A
Region
Southern Horn
SAA
40.0
50.0
60.0
70.0
80
RELATIVE ORBIT TIME (MINUTES)


OF FINITE ALUMINUM SLAB SHIELDS
Equatorial Region
SAA
80.0
90.0
100.0
110.0
120.
E (MINUTES)

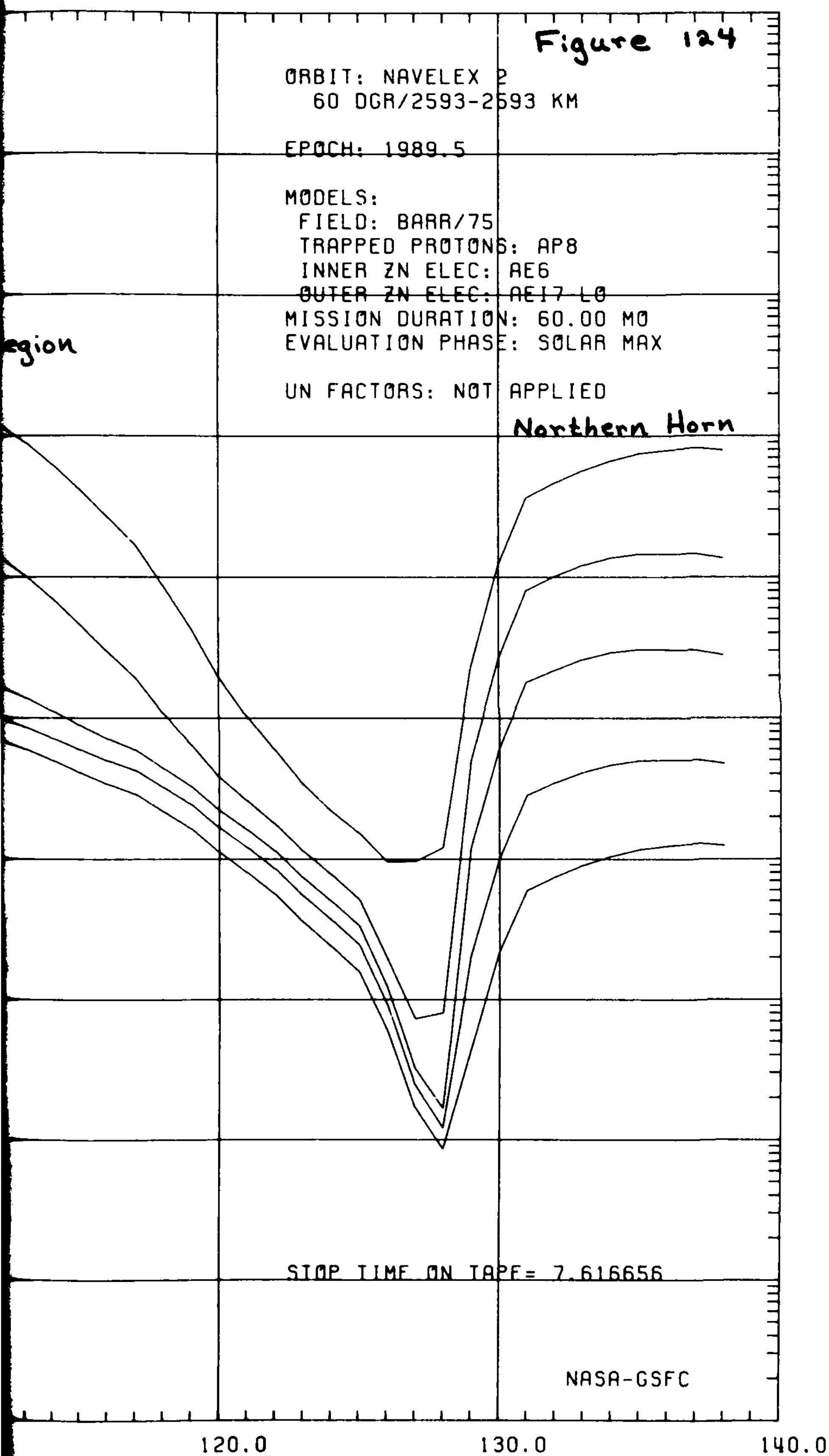
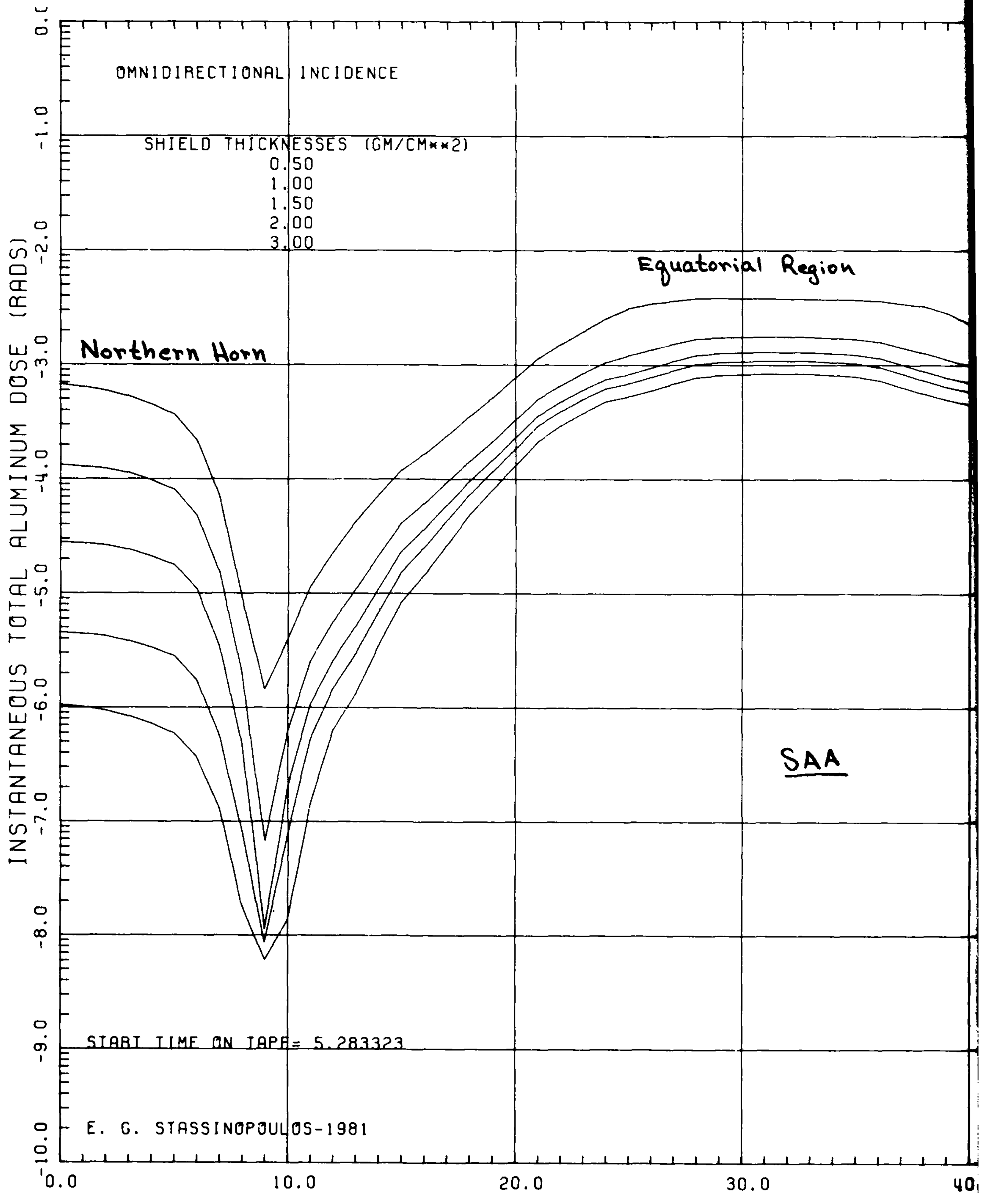
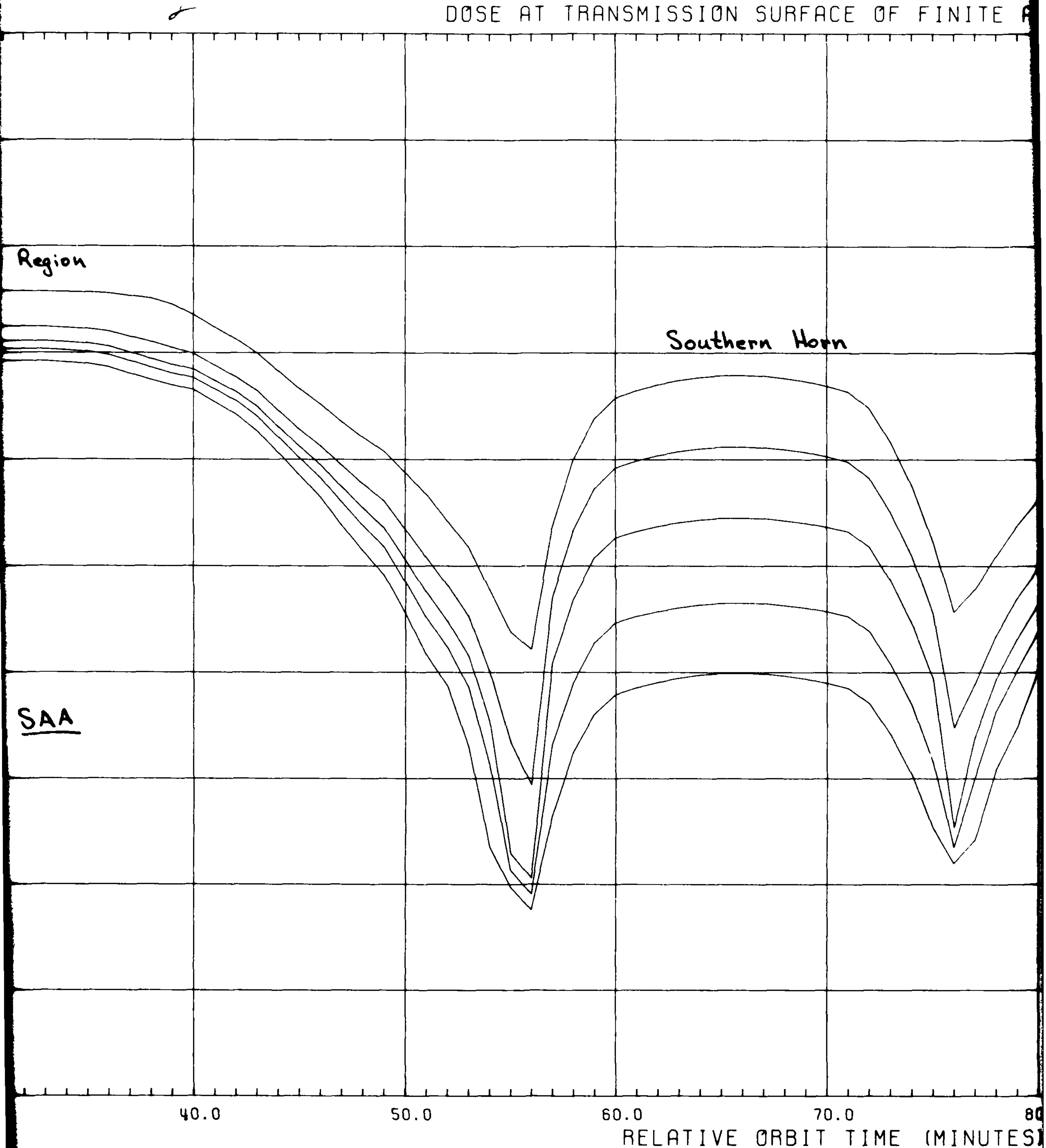
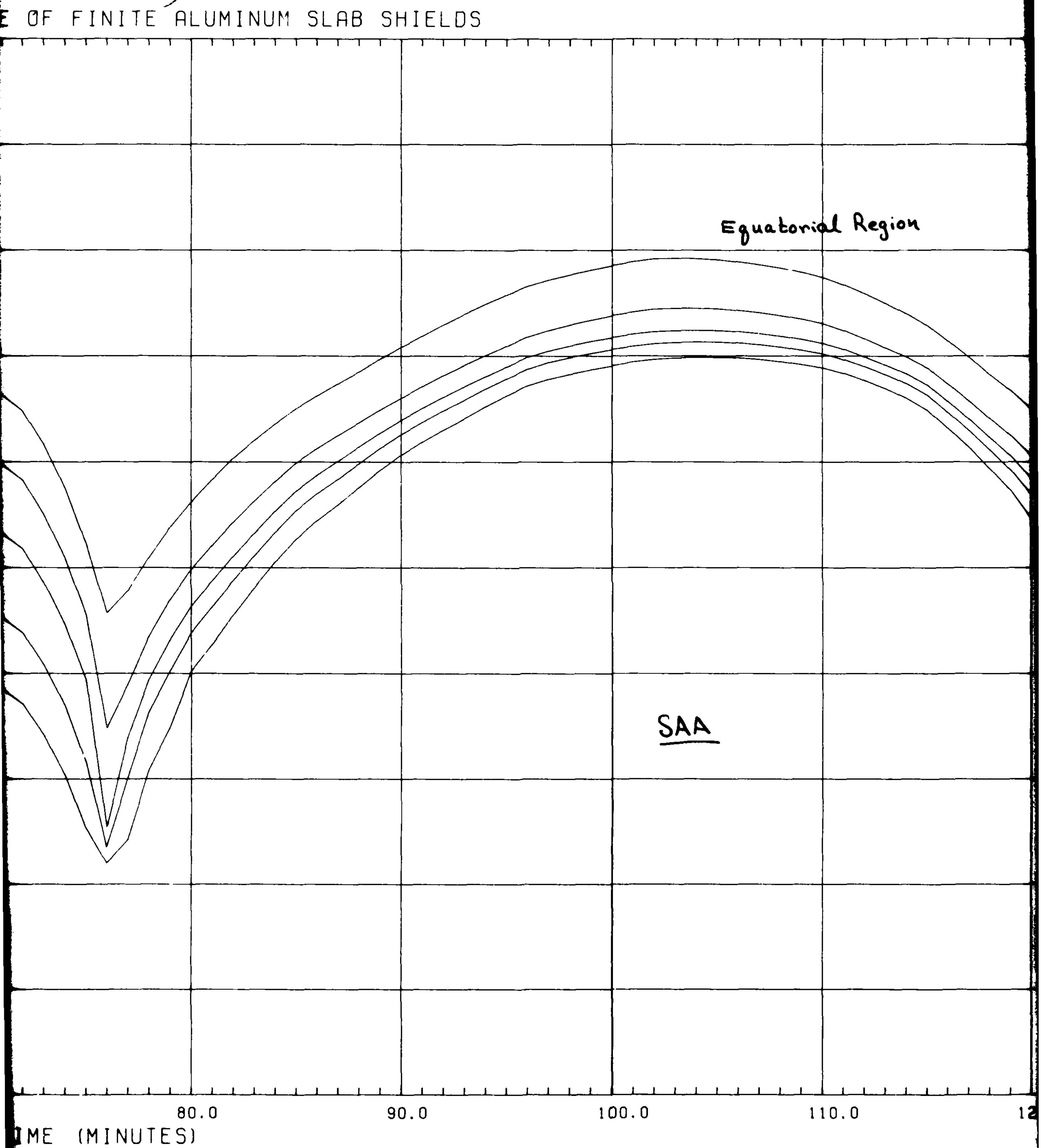


Figure 124
ORBIT: NAVELEX 2
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
egion
STOP TIME ON TAPE= 7.616656
NASA-GSFC
120.0
130.0
140.0


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Region
Northern Horn
SAA
START TIME ON TAPE= 5.283323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40


DOSE AT TRANSMISSION SURFACE OF FINITE A
Region
Southern Horn
SAA
40.0
50.0
60.0
70.0
80
RELATIVE ORBIT TIME (MINUTES)


E OF FINITE ALUMINUM SLAB SHIELDS
Equatorial Region
SAA
80.0
90.0
100.0
110.0
12
IME (MINUTES)

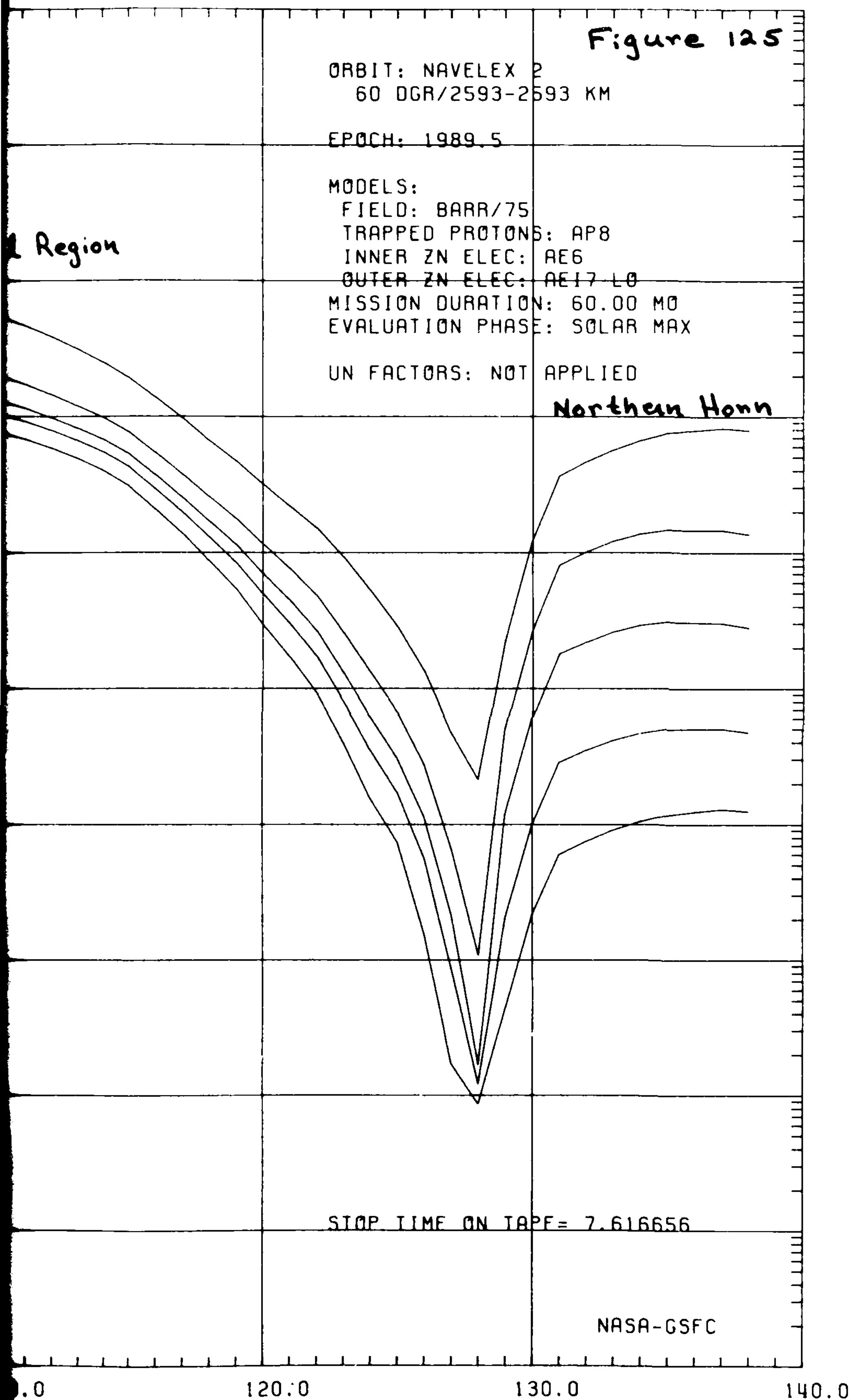
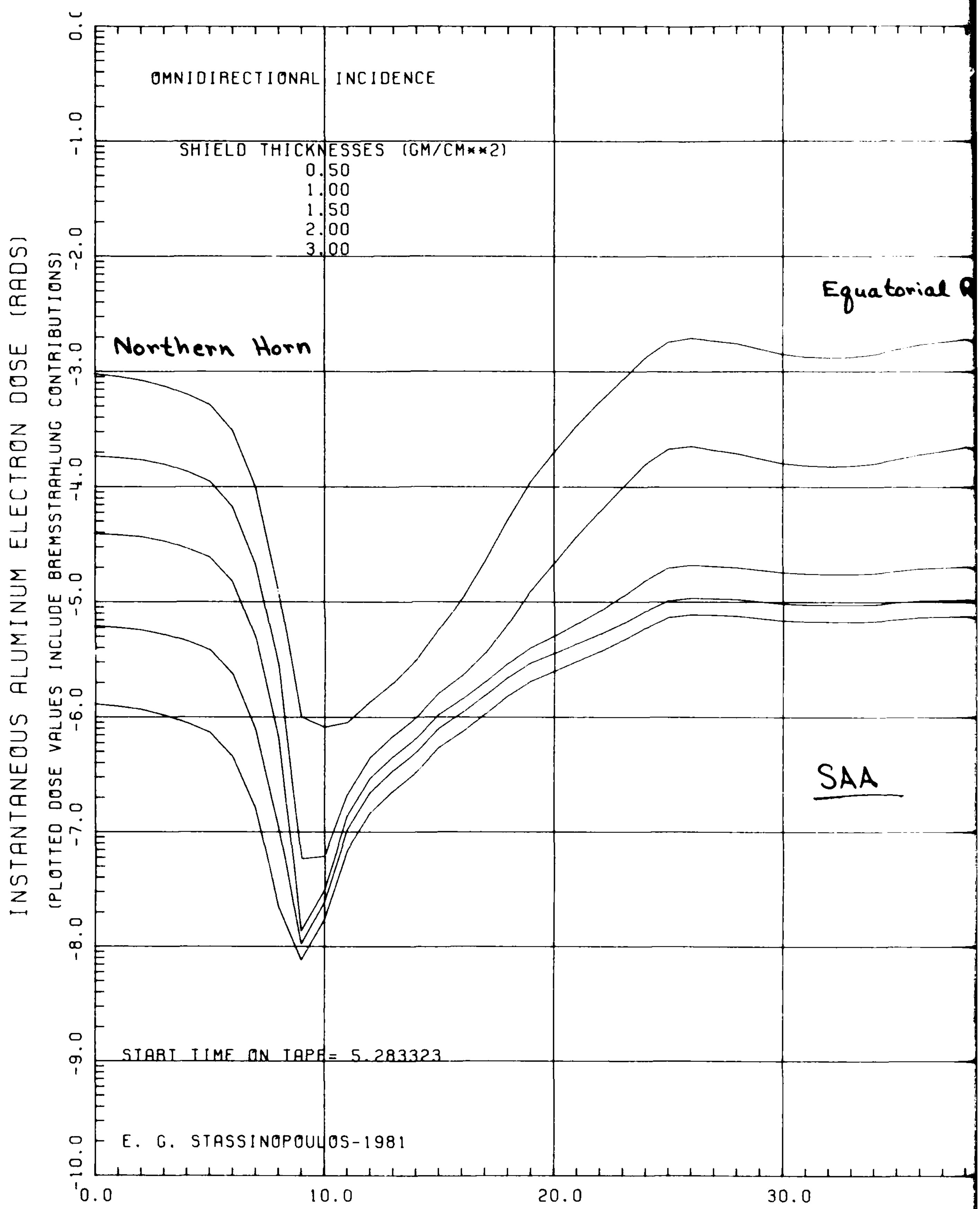
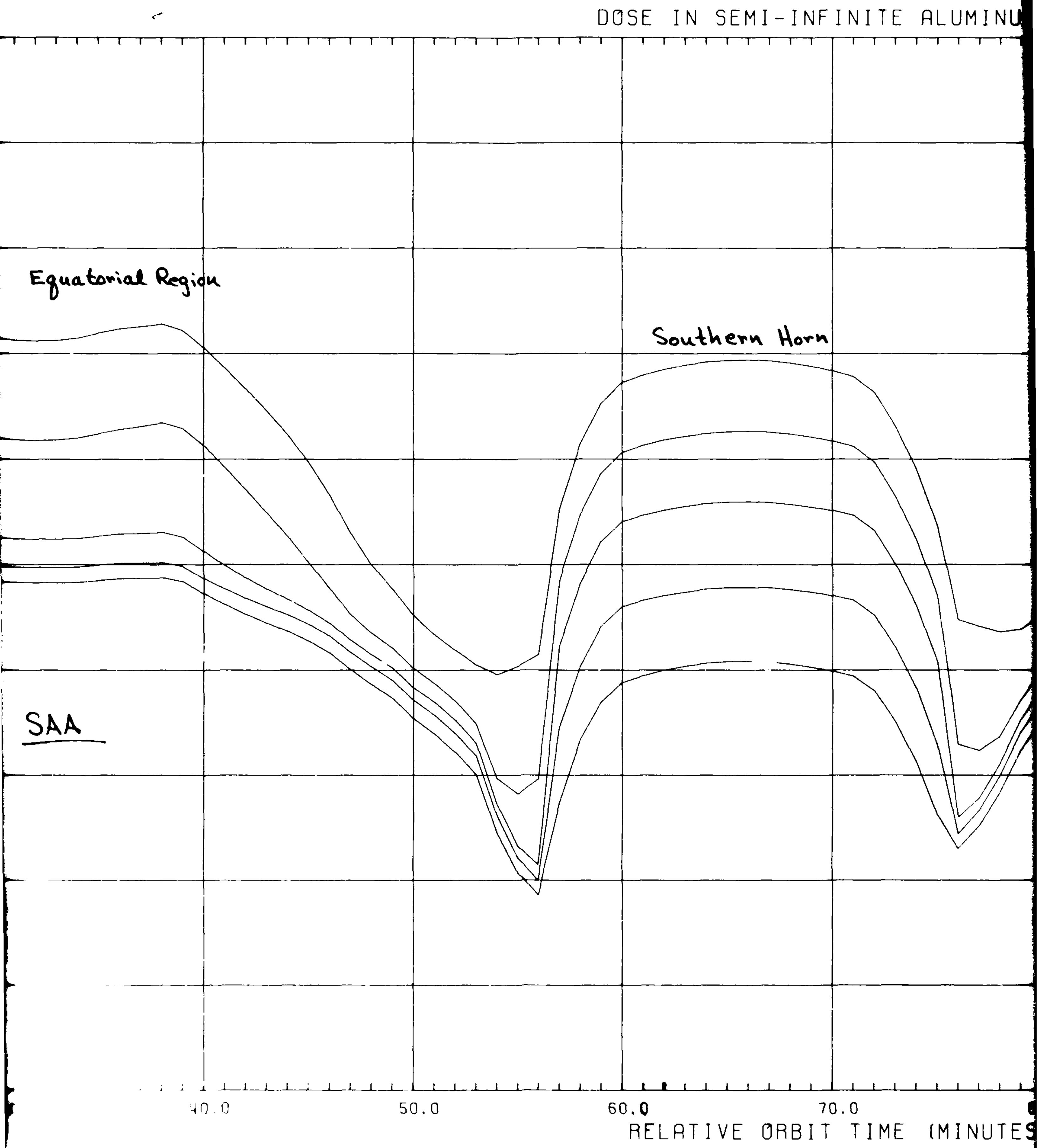


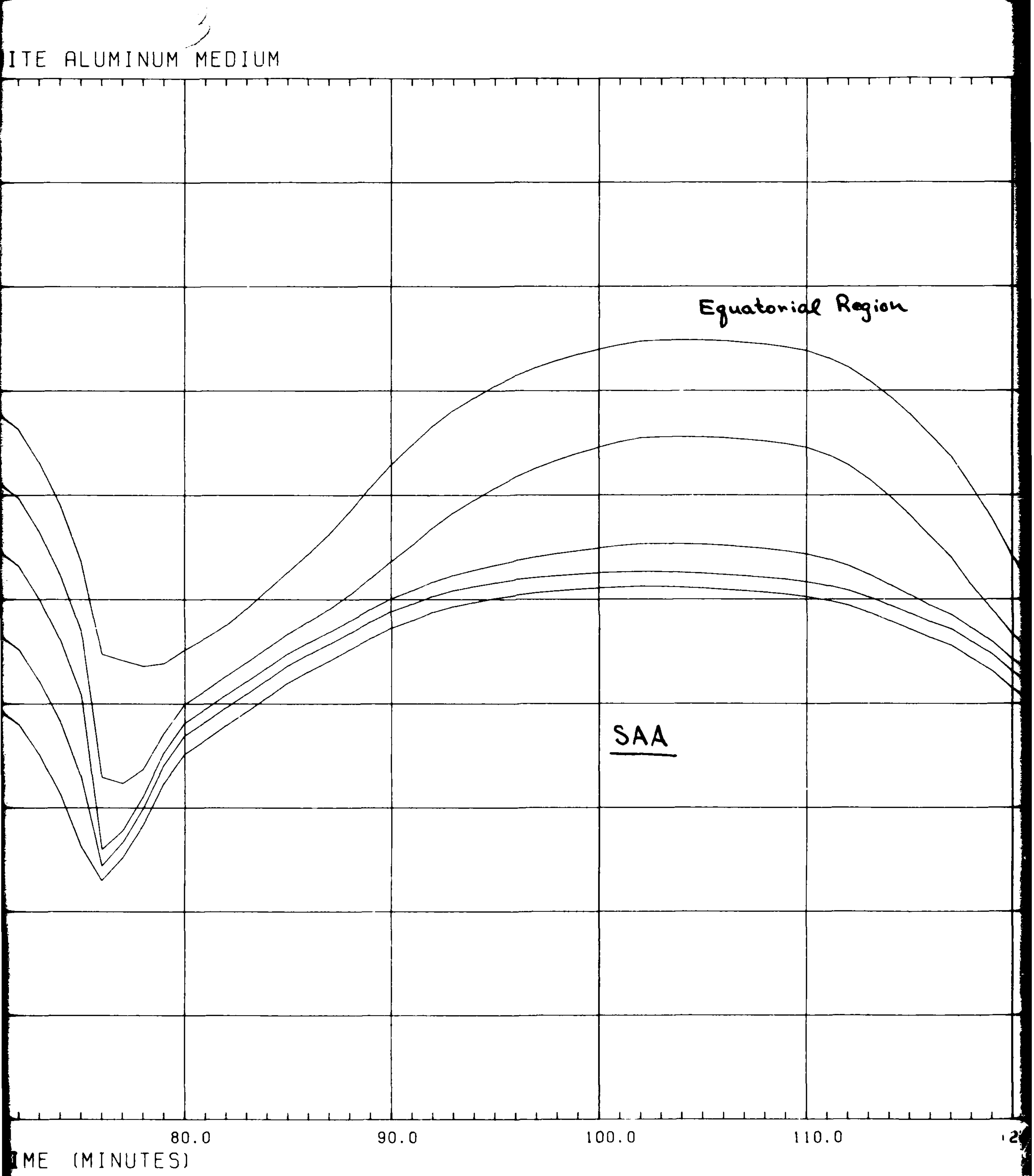
Figure 125
ORBIT: NAVELEX 2
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Region
Northern Horn
STOP TIME ON TAPE= 7.616656
NASA-GSFC
.0
120.0
130.0
140.0



INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial
SAA
START TIME ON TAPE= 5.283323
E. G. STASSINOPOULOS-1981
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0



DOSE IN SEMI-INFINITE ALUMINU
Equatorial Region
Southern Horn
SAA
40.0
50.0
60.0
70.0
RELATIVE ORBIT TIME (MINUTES


ITE ALUMINUM MEDIUM
Equatorial Region
SAA
80.0
90.0
100.0
110.0
IME (MINUTES)

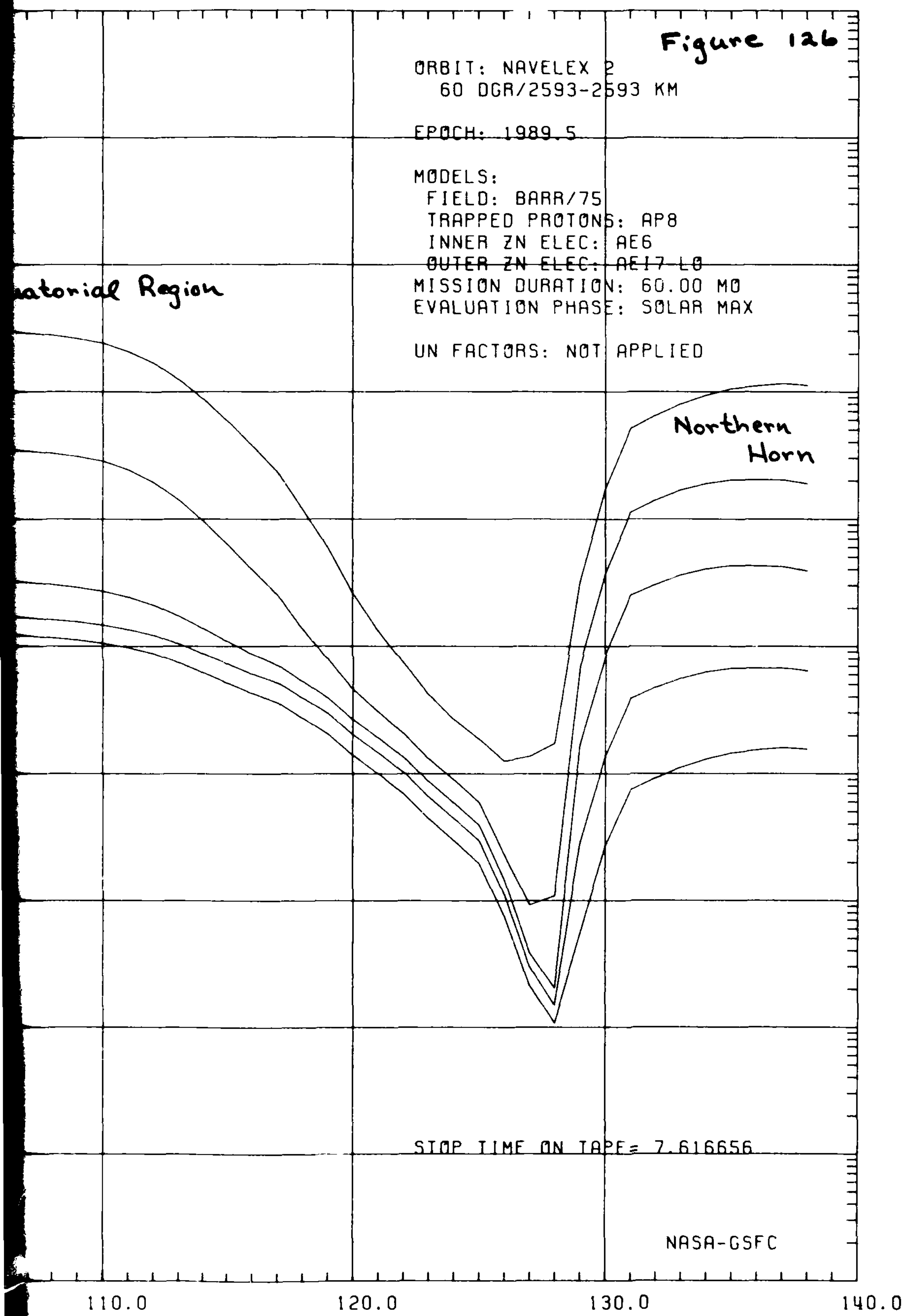
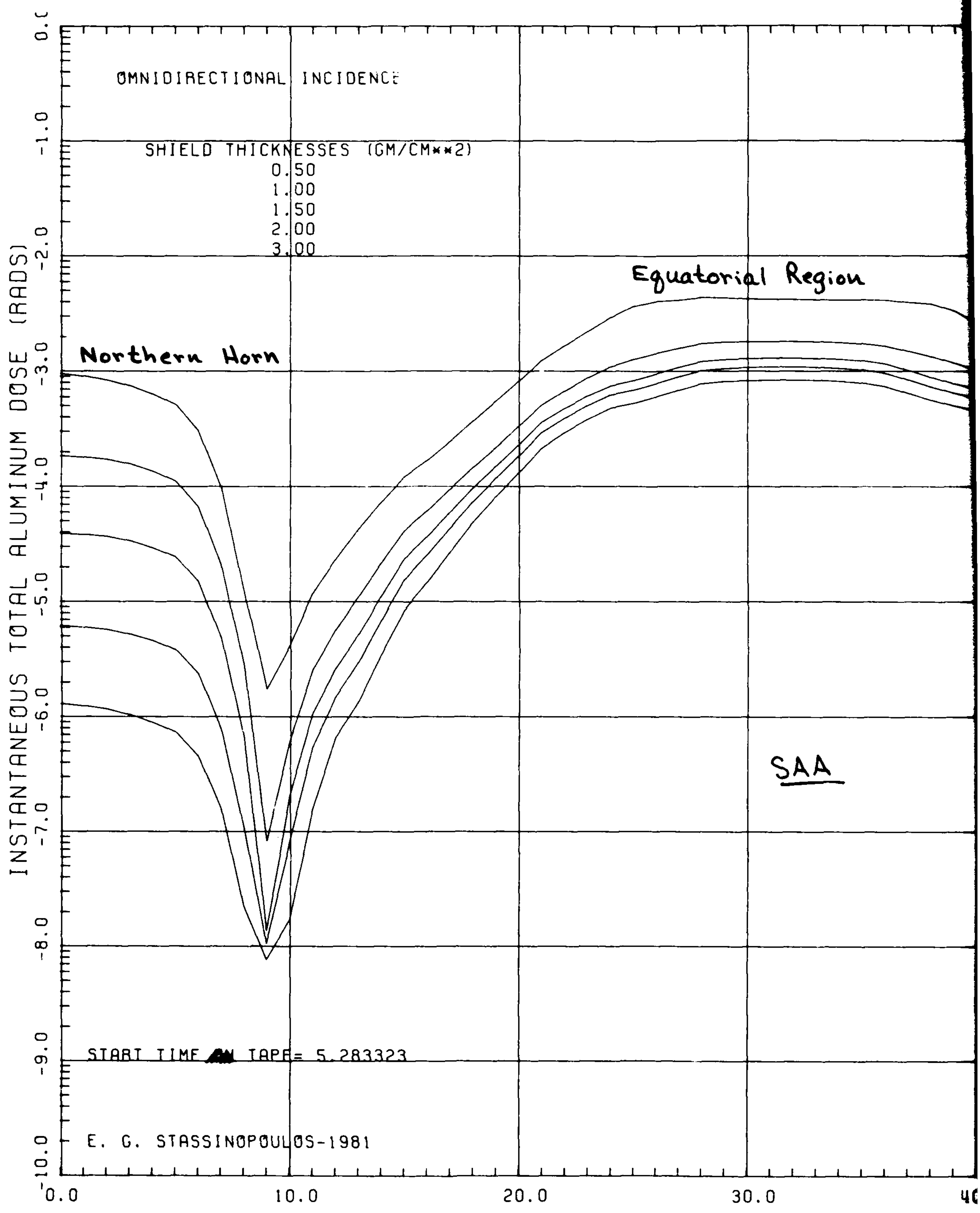
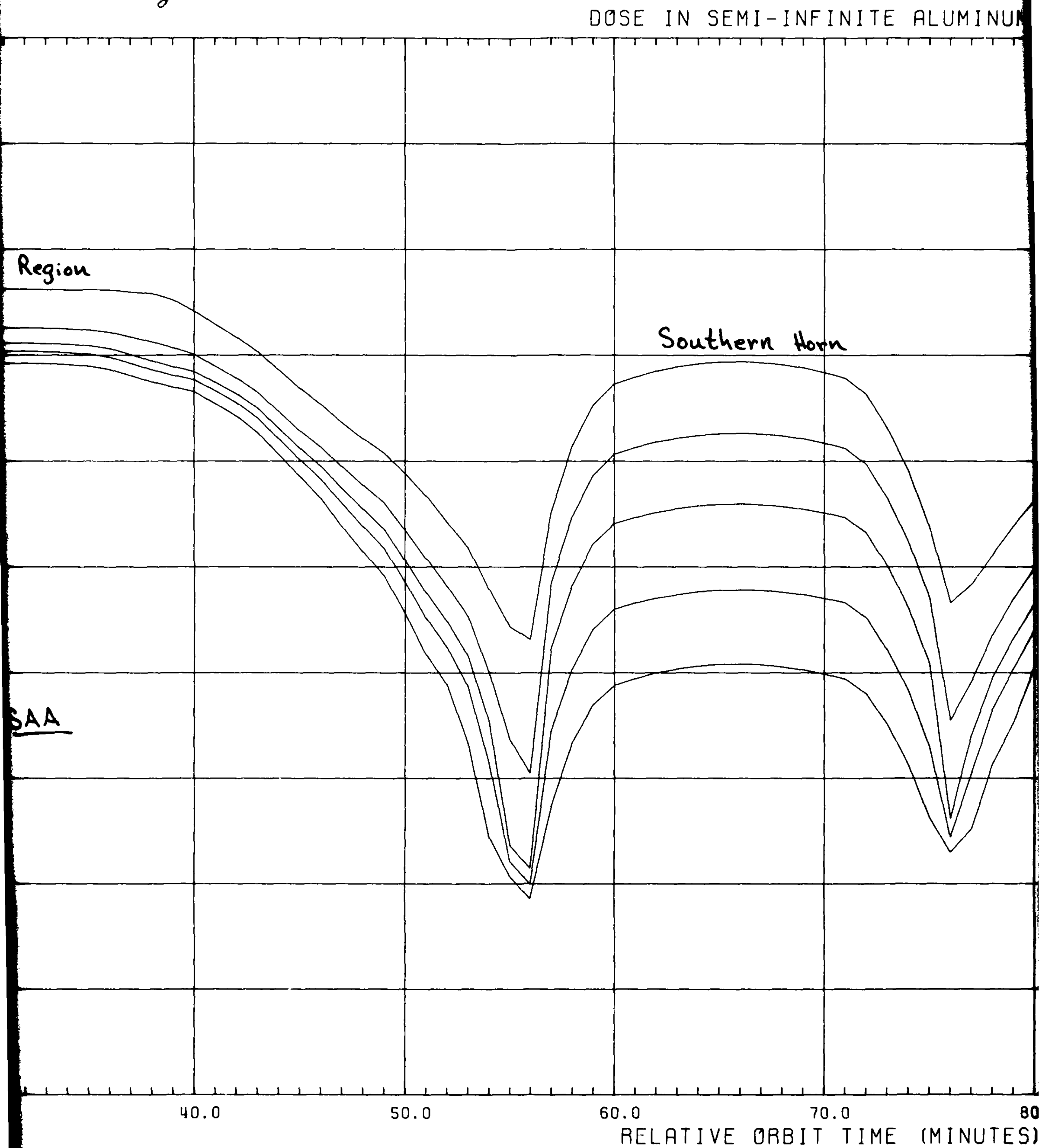


Figure 126
ORBIT: NAVELEX 2
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
atorial Region
Northern Horn
STOP TIME ON TAPE= 7.616656
NASA-GSFC
110.0
120.0
130.0
140.0

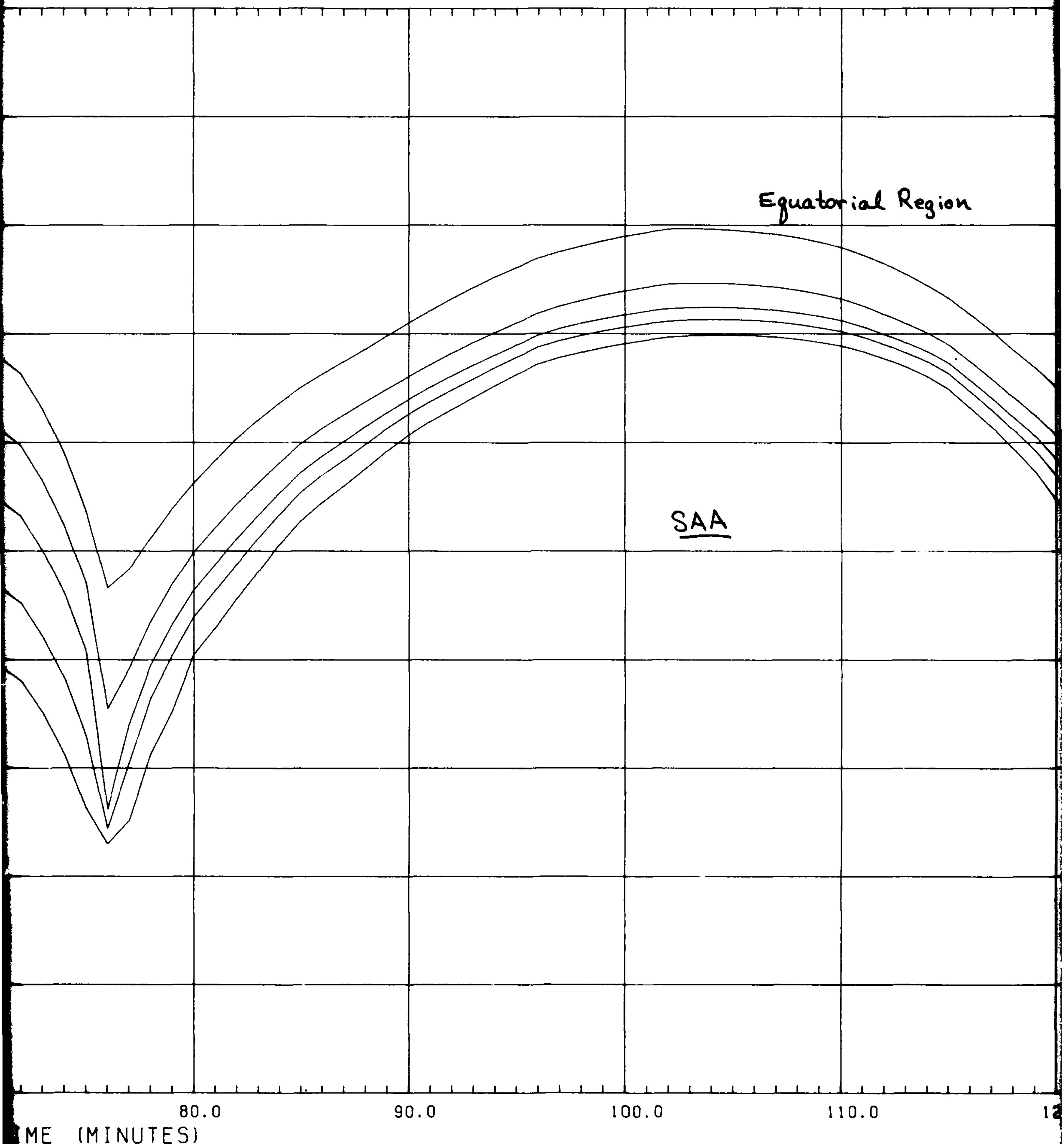


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Region
Northern Horn
SAA
START TIME ON TAPE= 5.283323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0

2'


DOSE IN SEMI-INFINITE ALUMINUM
Region
Southern Horn
SAA
40.0
50.0
60.0
70.0
80
RELATIVE ORBIT TIME (MINUTES)

ITE ALUMINUM MEDIUM



4

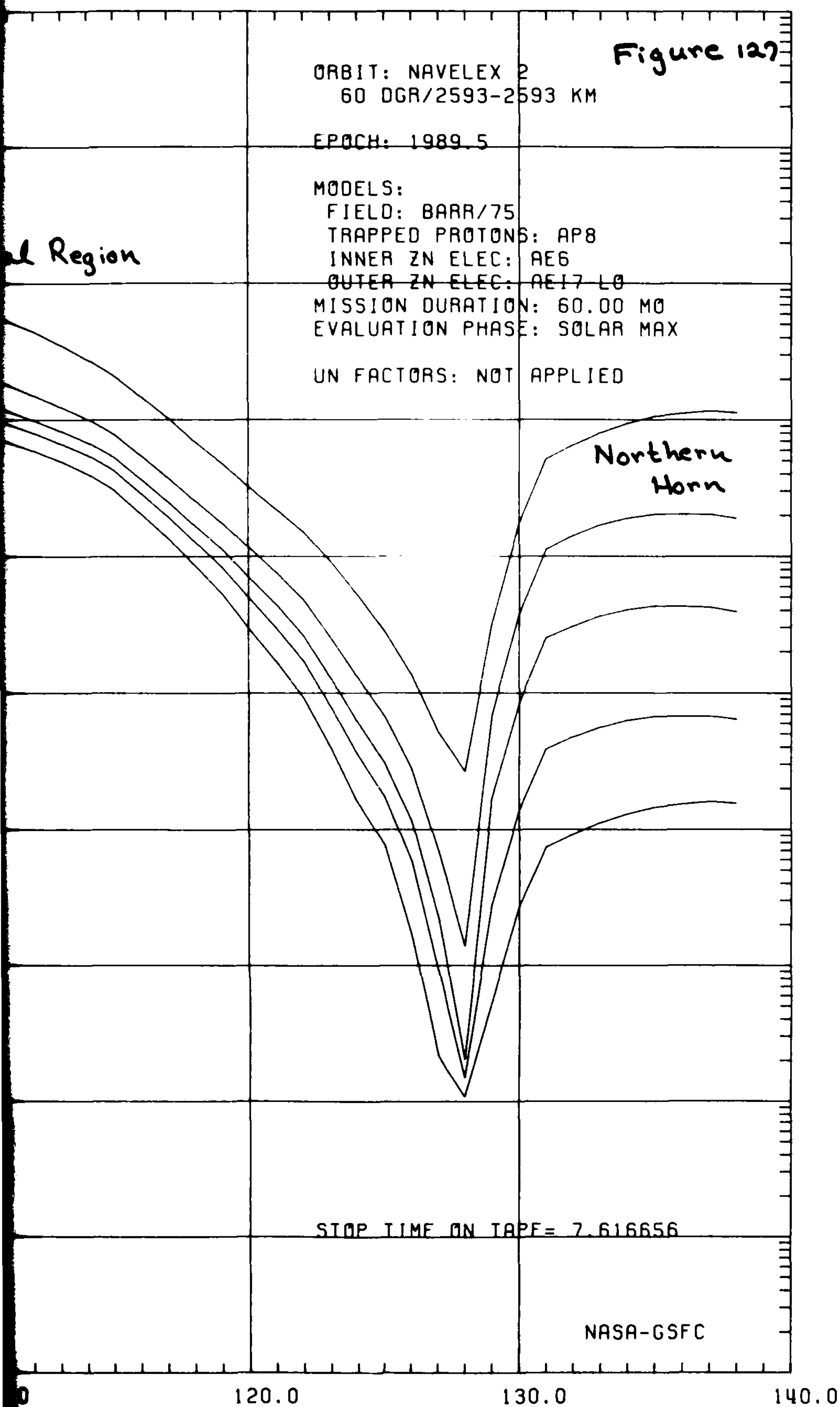
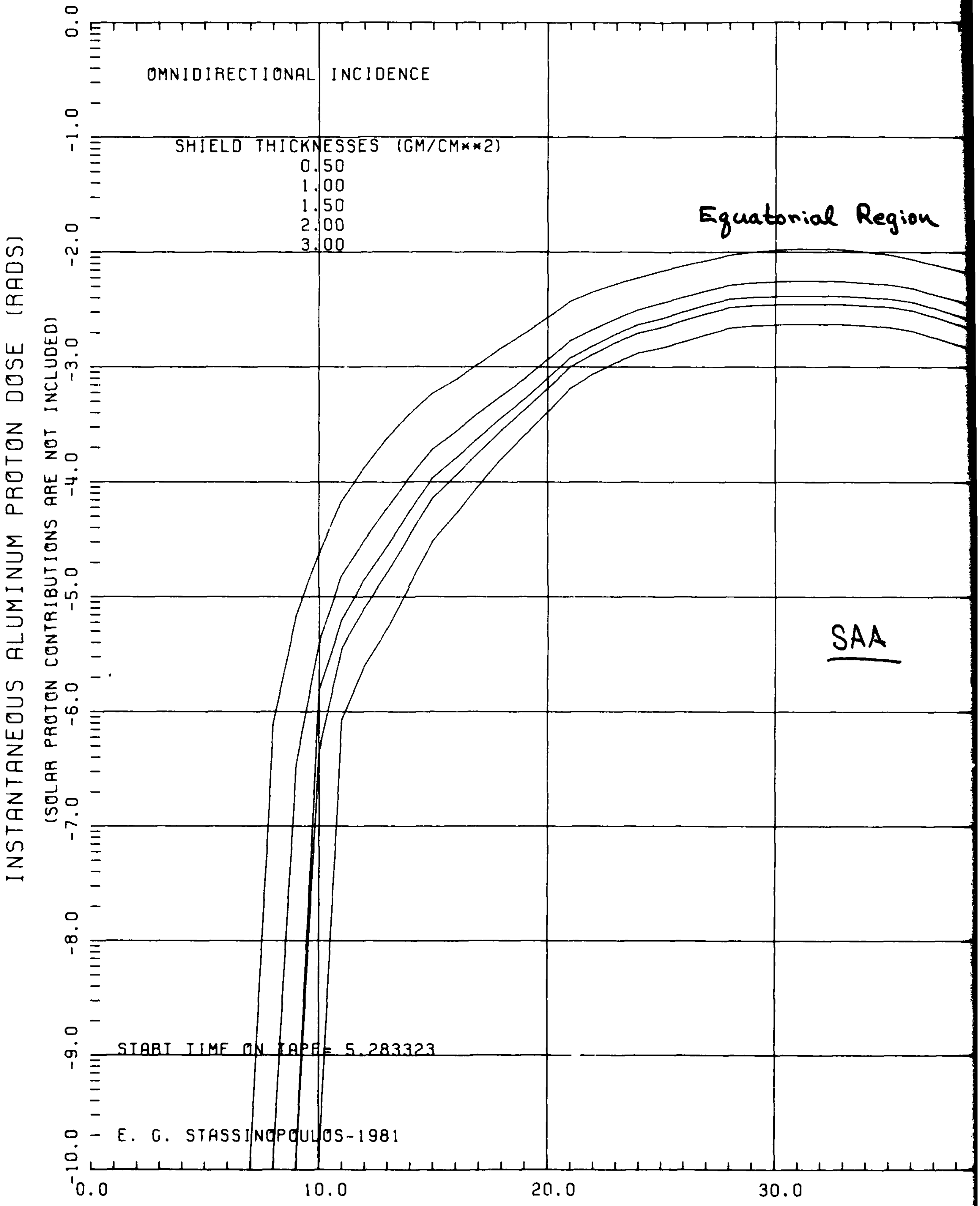
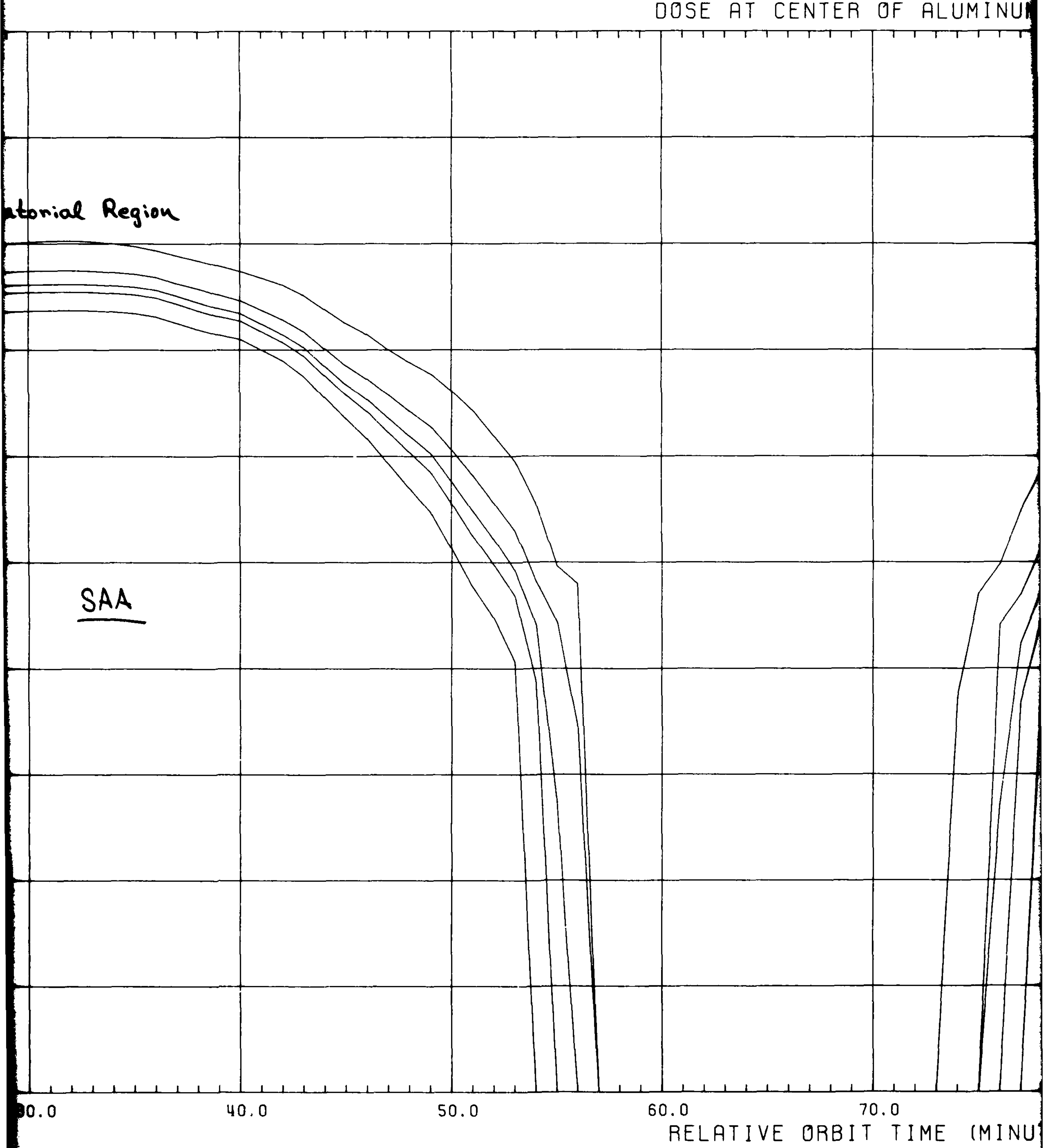
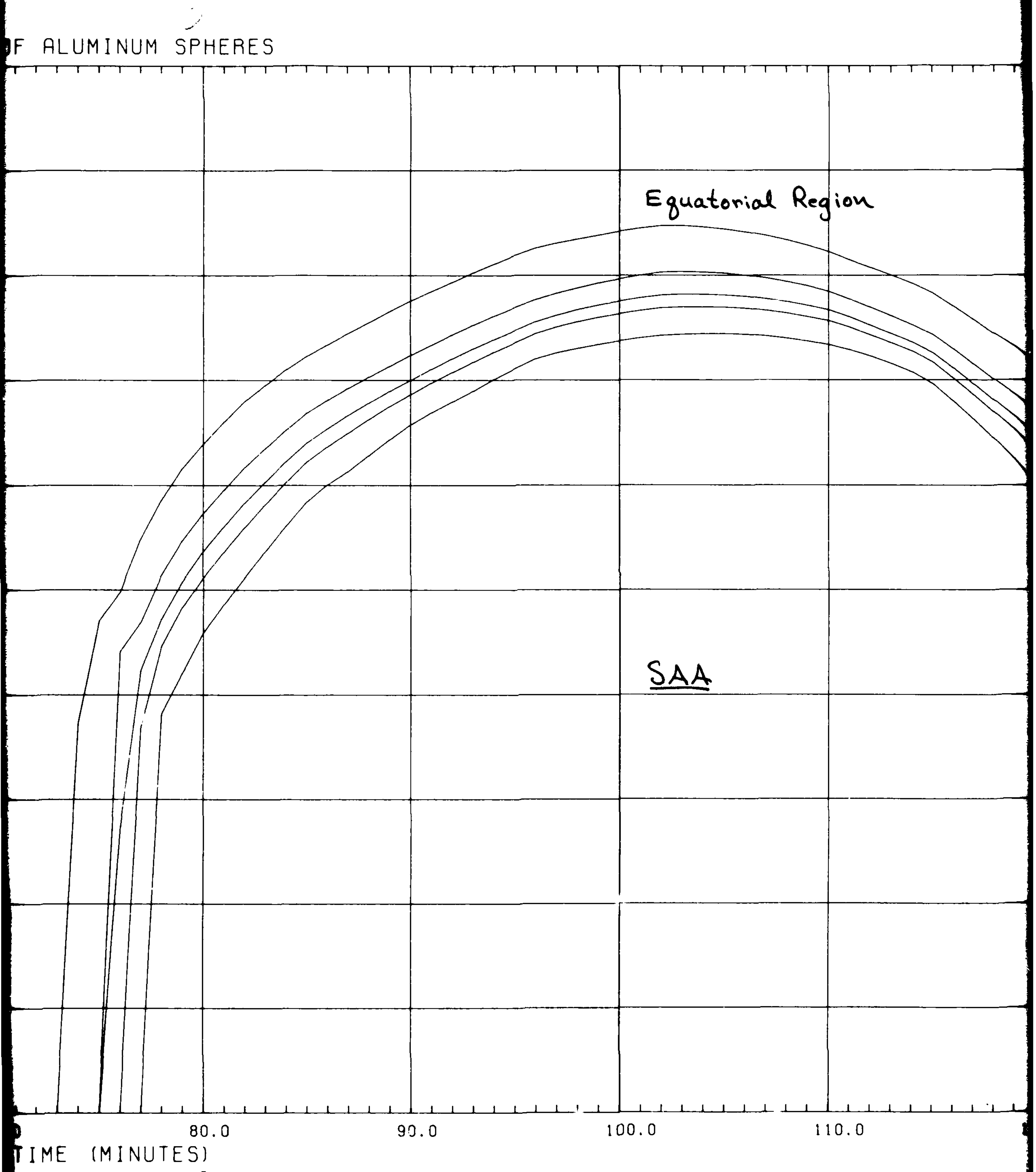


Figure 127
ORBIT: NAVELEX 2
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
al Region
Northern Horn
STOP TIME ON TAPE= 7.616656
NASA-GSFC
120.0
130.0
140.0



OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Region
SAA
START TIME ON TAPE= 5.283323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0


DOSE AT CENTER OF ALUMINUM
atorial Region
SAA
30.0
40.0
50.0
60.0
70.0
RELATIVE ORBIT TIME (MINU



OF ALUMINUM SPHERES
Equatorial Region
SAA
80.0
90.0
100.0
110.0
TIME (MINUTES)

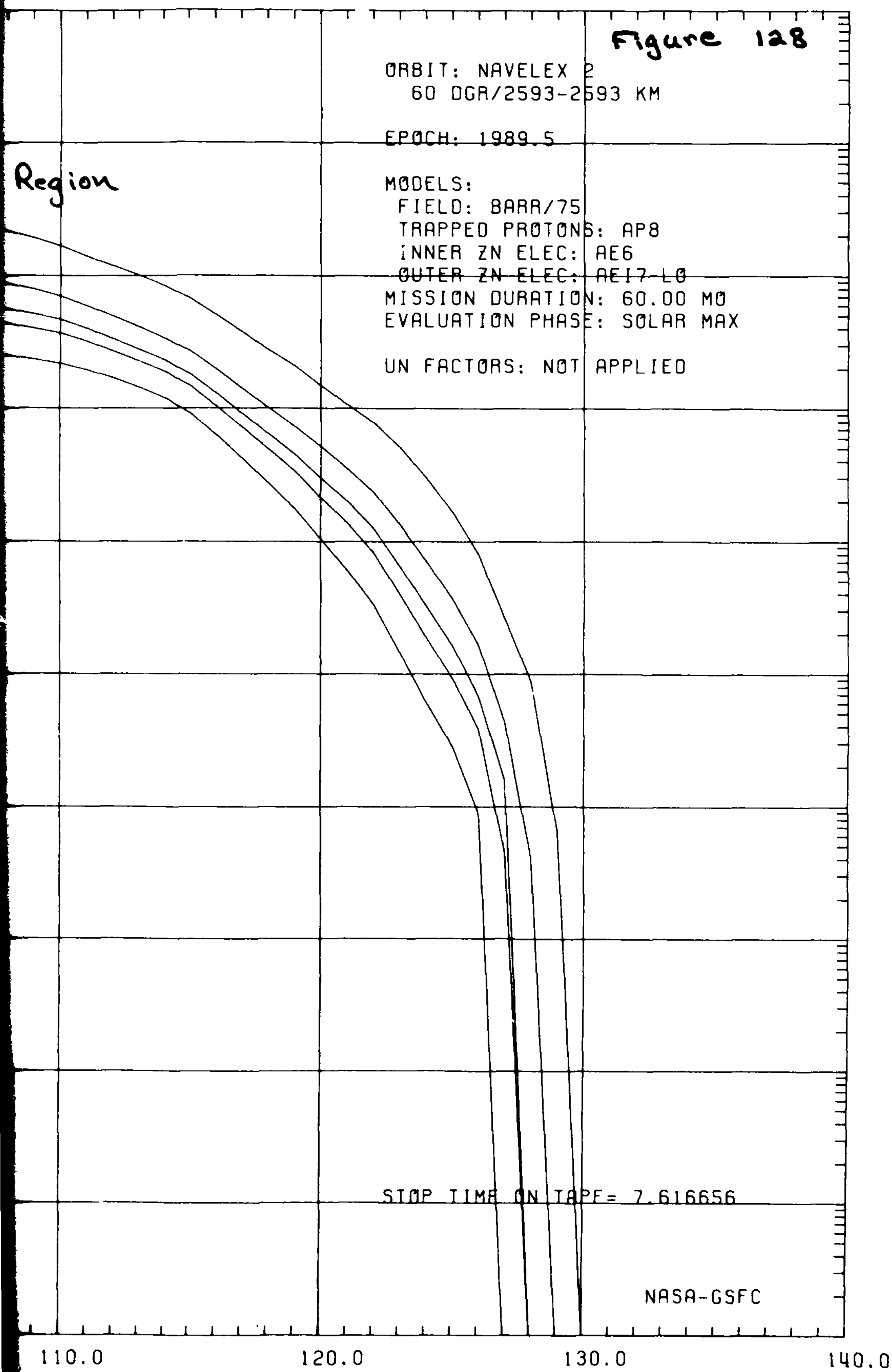
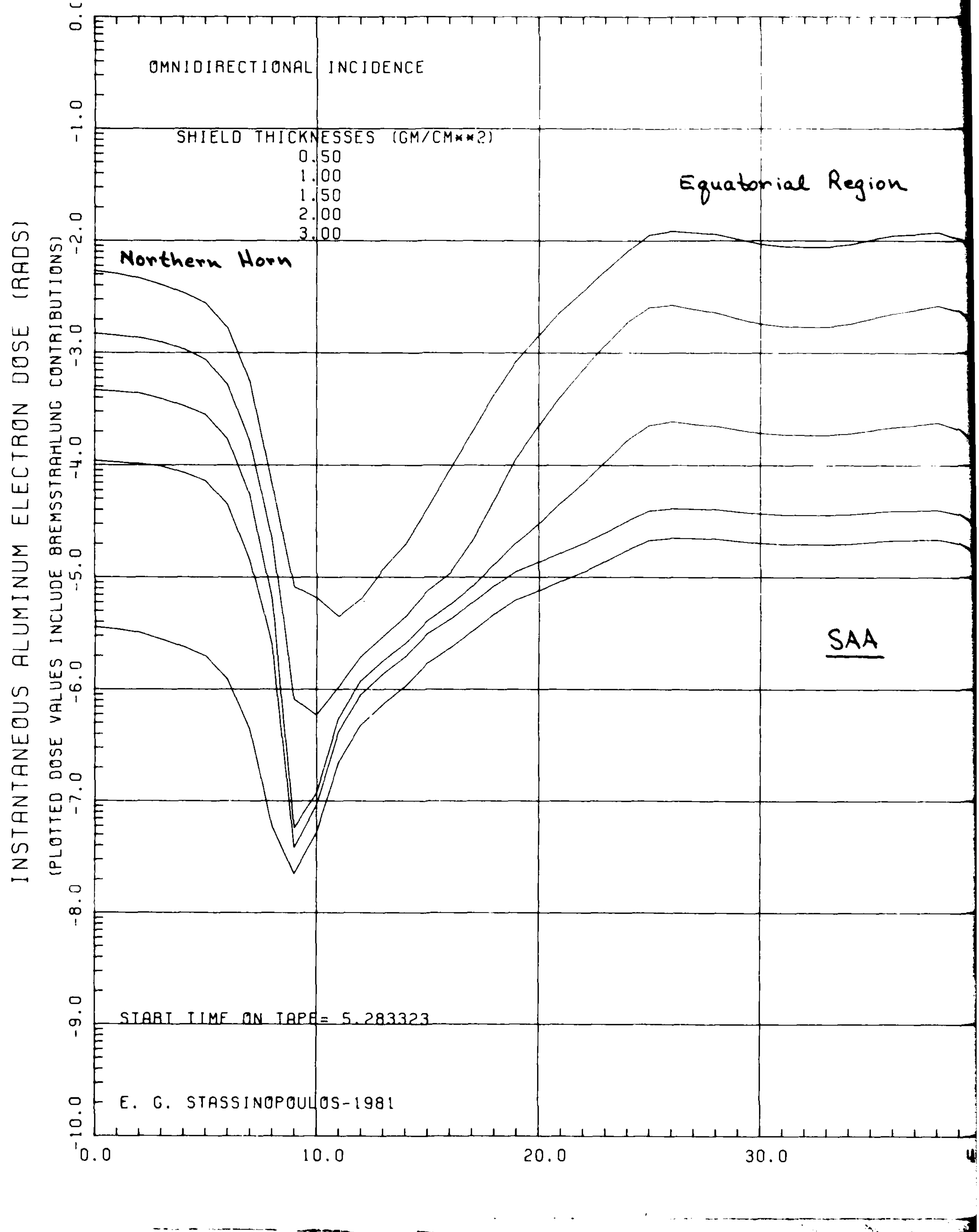
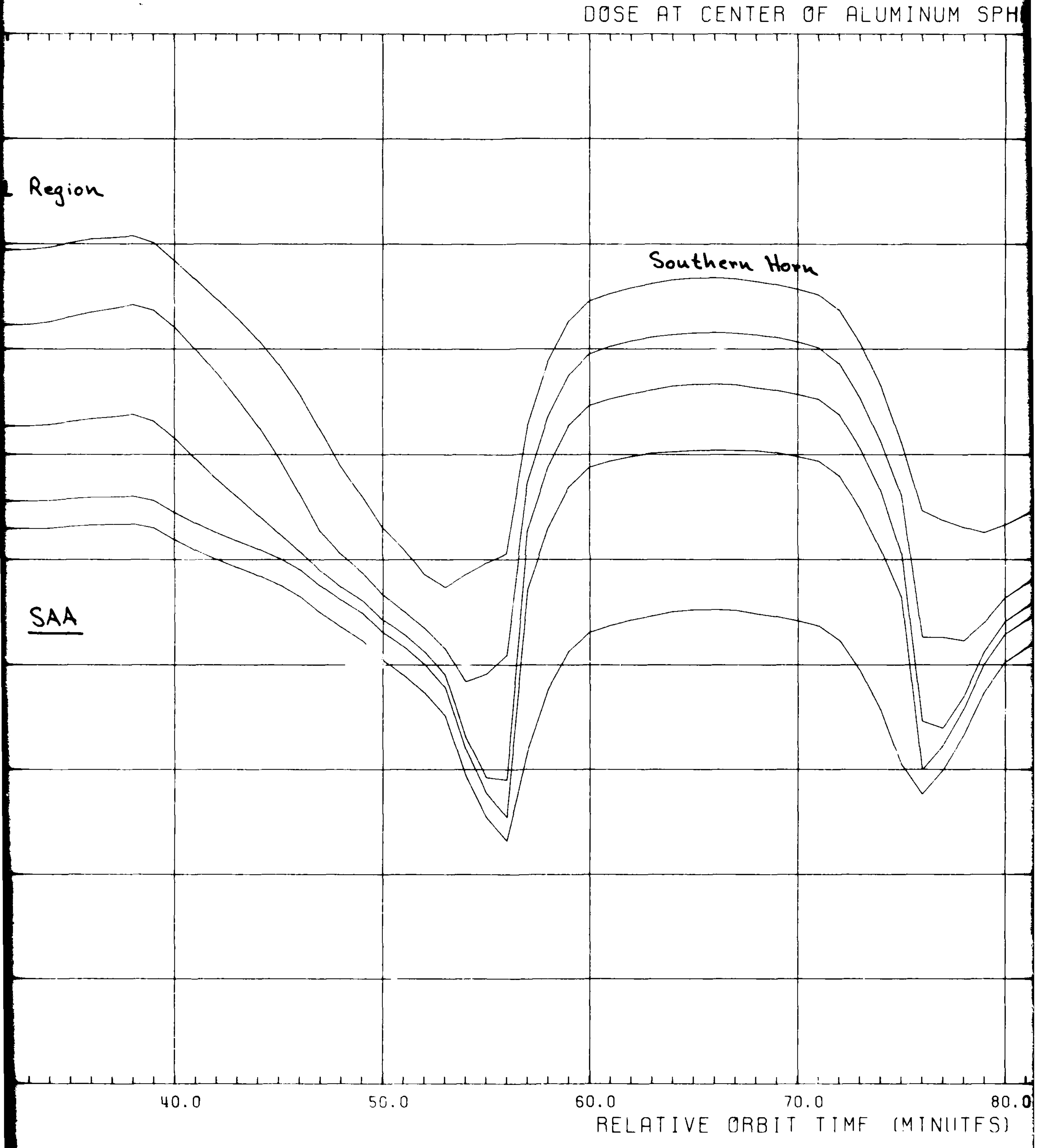
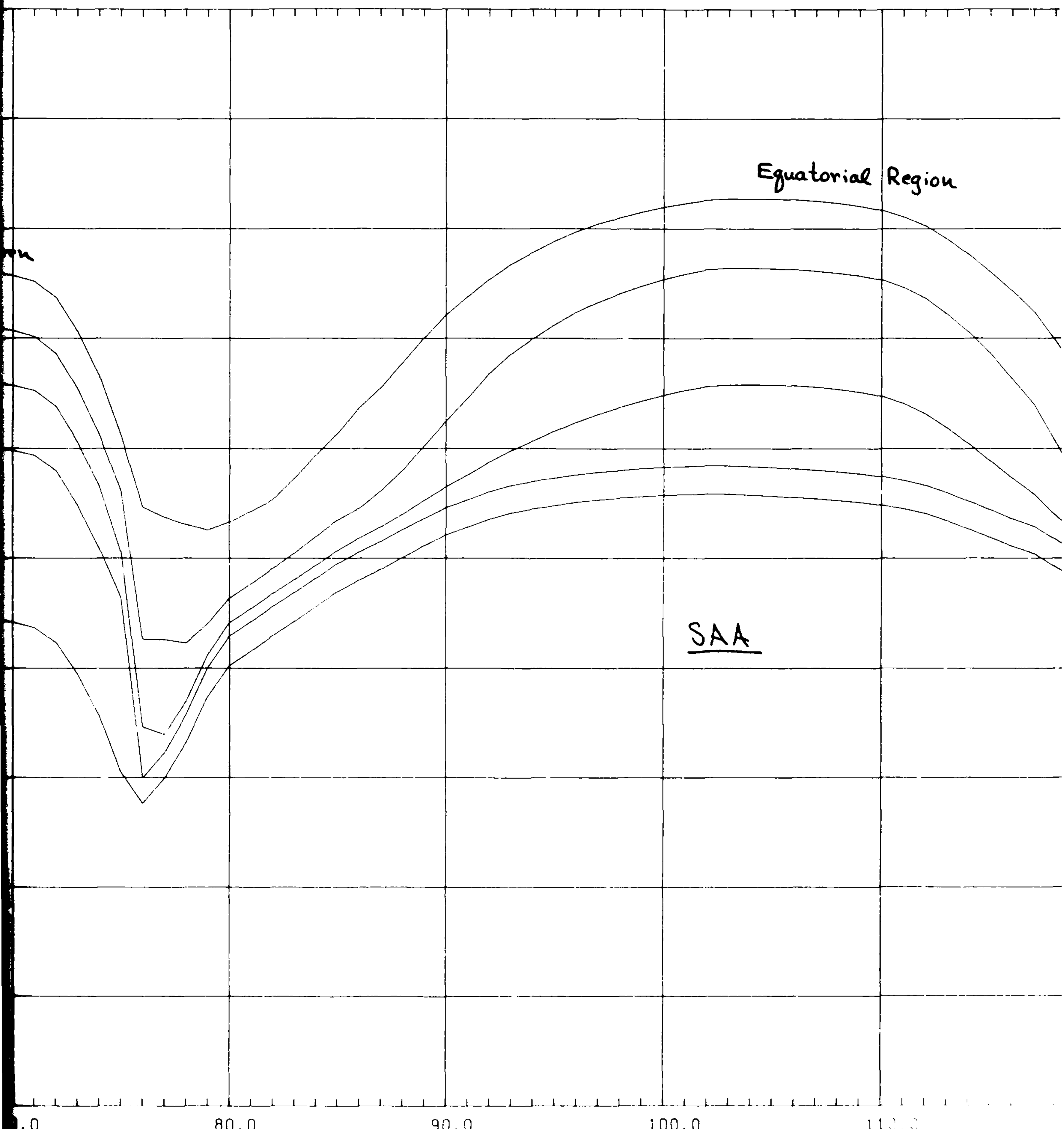


Figure 128
Region
ORBIT: NAVELEX 2
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 7.616656
NASA-GSFC
110.0
120.0
130.0
140.0


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Region
Northern Horn
SAA
START TIME ON TAPE= 5.283323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0


DOSE AT CENTER OF ALUMINUM SPH
Region
Southern Horn
SAA
40.0
50.0
60.0
70.0
80.0
RELATIVE ORBIT TIME (MINUTES)

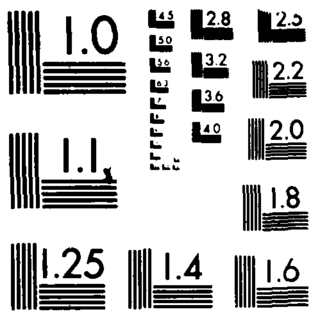
OF ALUMINUM SPHERES



AD-A141 849 ORBITAL RADIATION STUDY FOR INCLINED CIRCULAR TRAJECTORIES(U) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION GREENBELT MD GO.. E G STASSINOPOULOS

4/5

UNCLASSIFIED NOV 81 NASA-GSFC-X-601-81-28 F/G 22/3 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

4

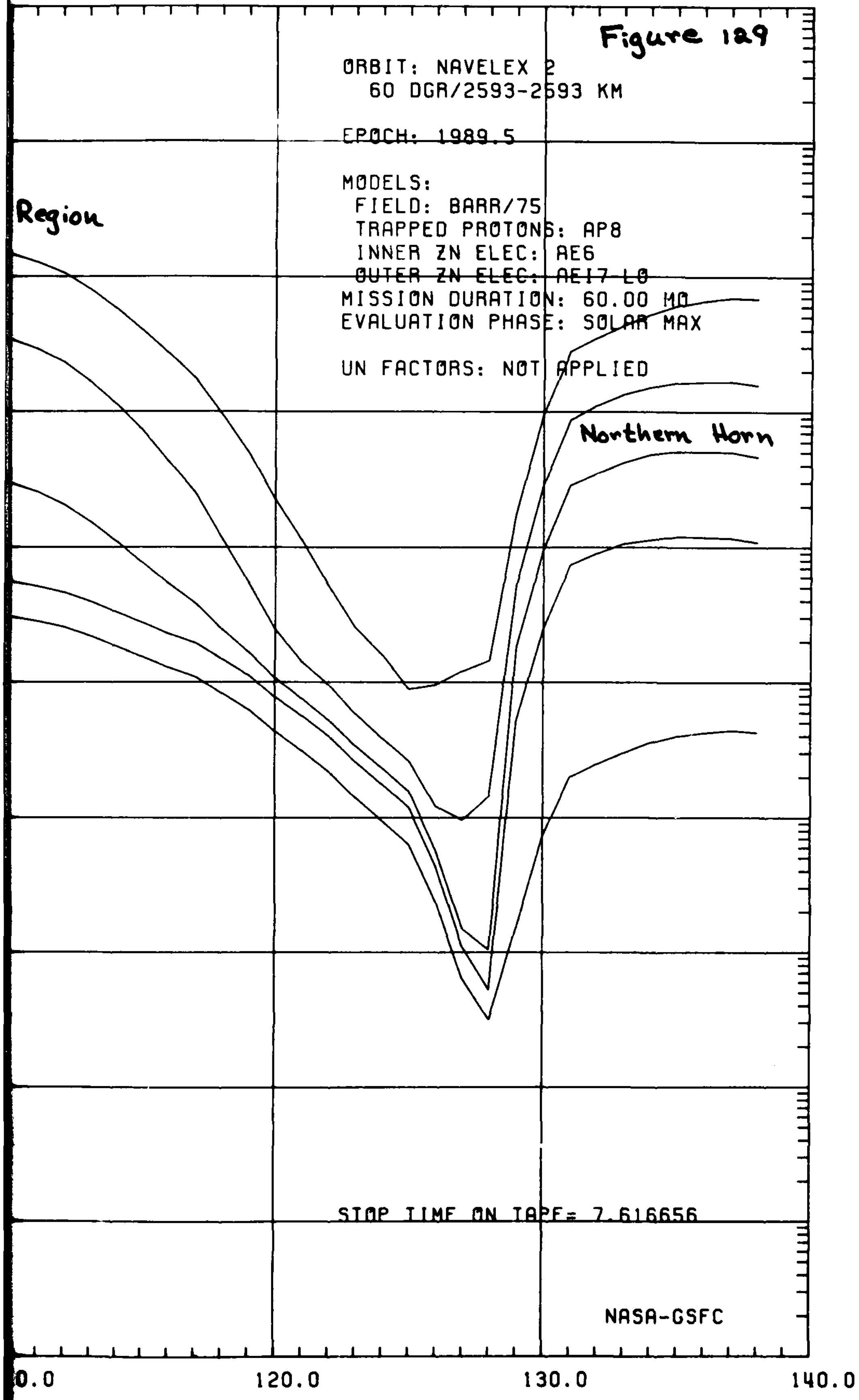
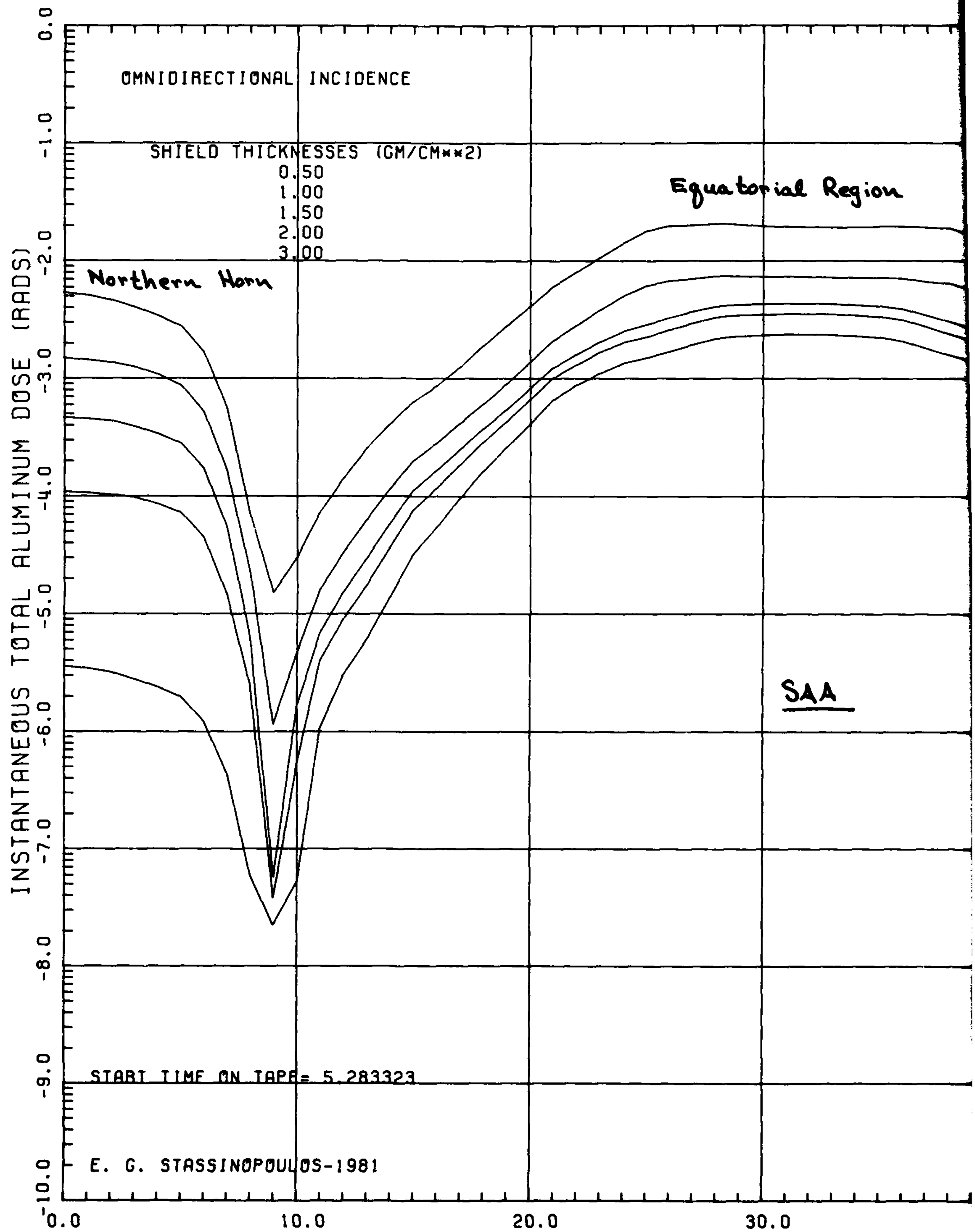
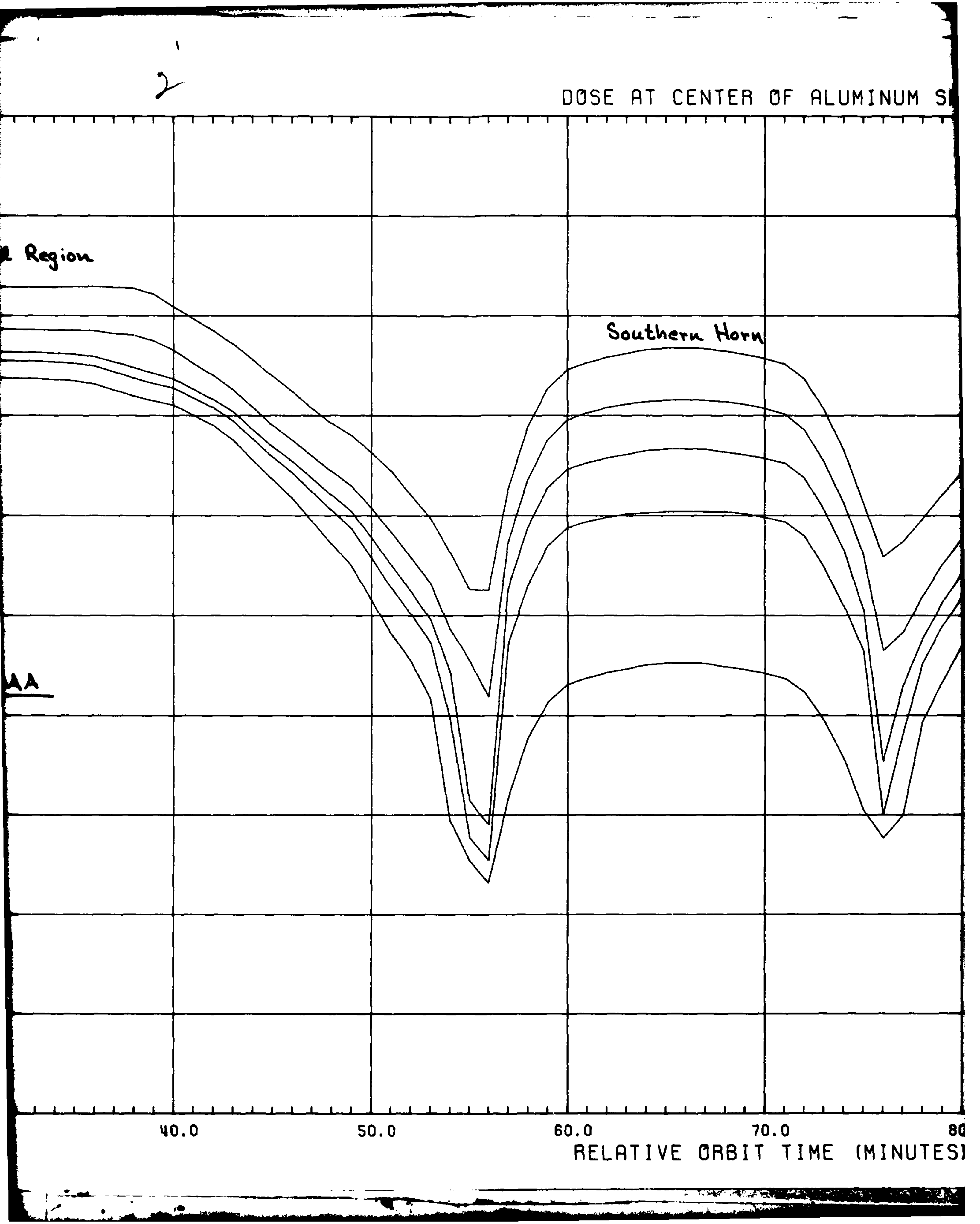


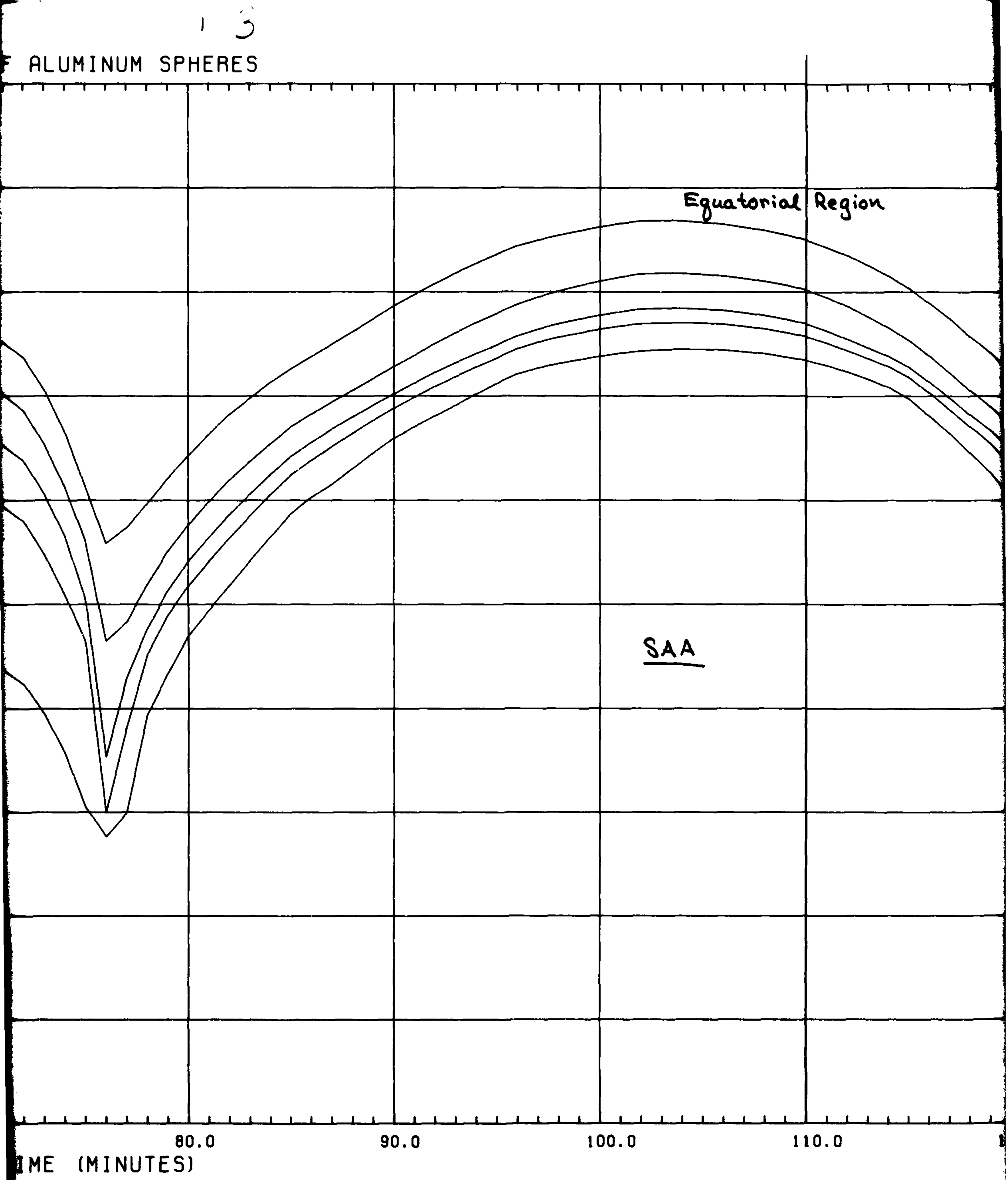
Figure 129
ORBIT: NAVELEX 2
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Region
Northern Horn
STOP TIME ON TAPE= 7.616656
NASA-GSFC
0.0
120.0
130.0
140.0



OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial Region
SAA
START TIME ON TAPE= 5.283323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0



2
DOSE AT CENTER OF ALUMINUM S
Region
Southern Horn
AA
40.0
50.0
60.0
70.0
80
RELATIVE ORBIT TIME (MINUTES)



1 3
F ALUMINUM SPHERES
Equatorial Region
SAA
80.0
90.0
100.0
110.0
IME (MINUTES)

4

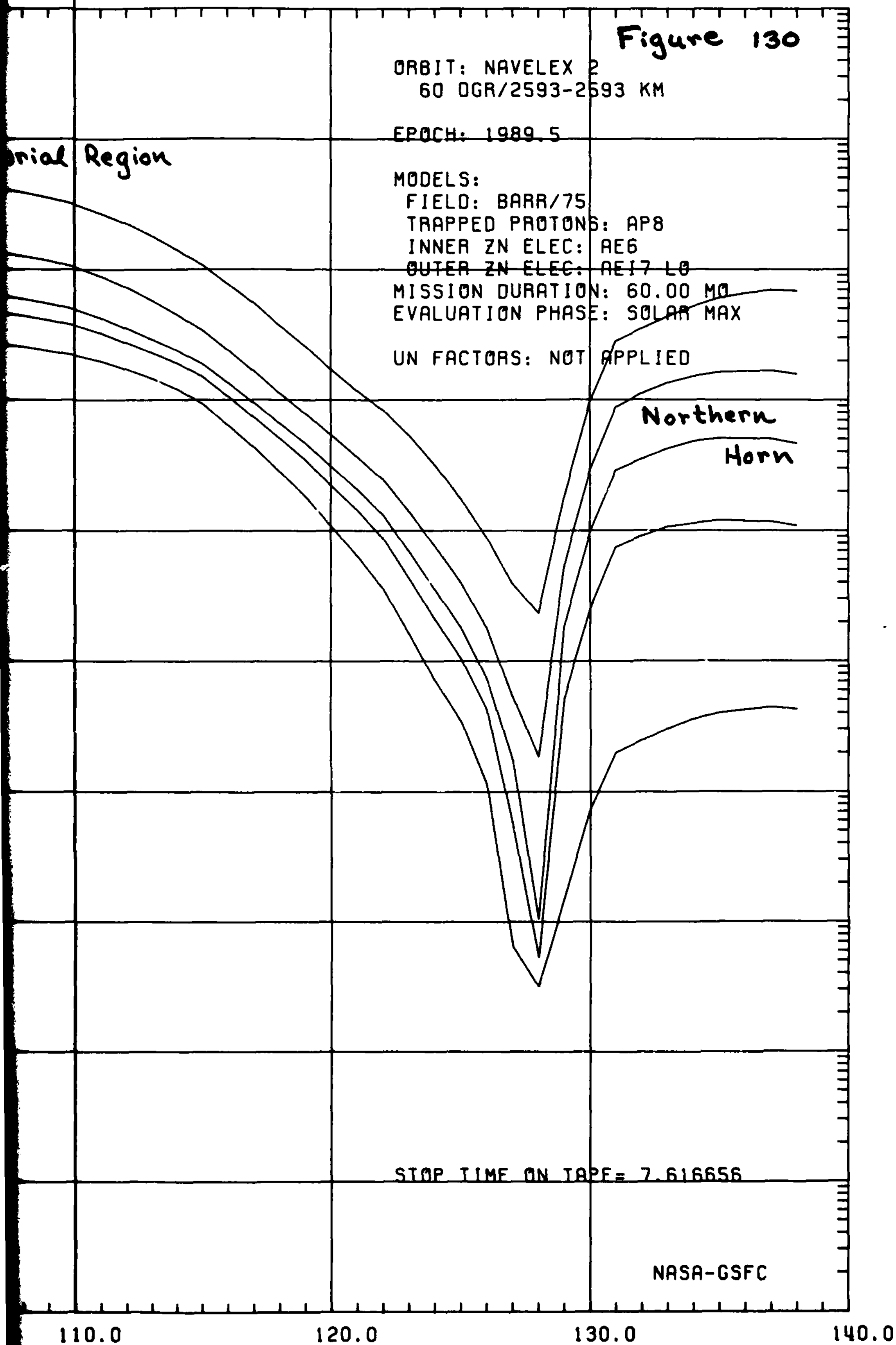
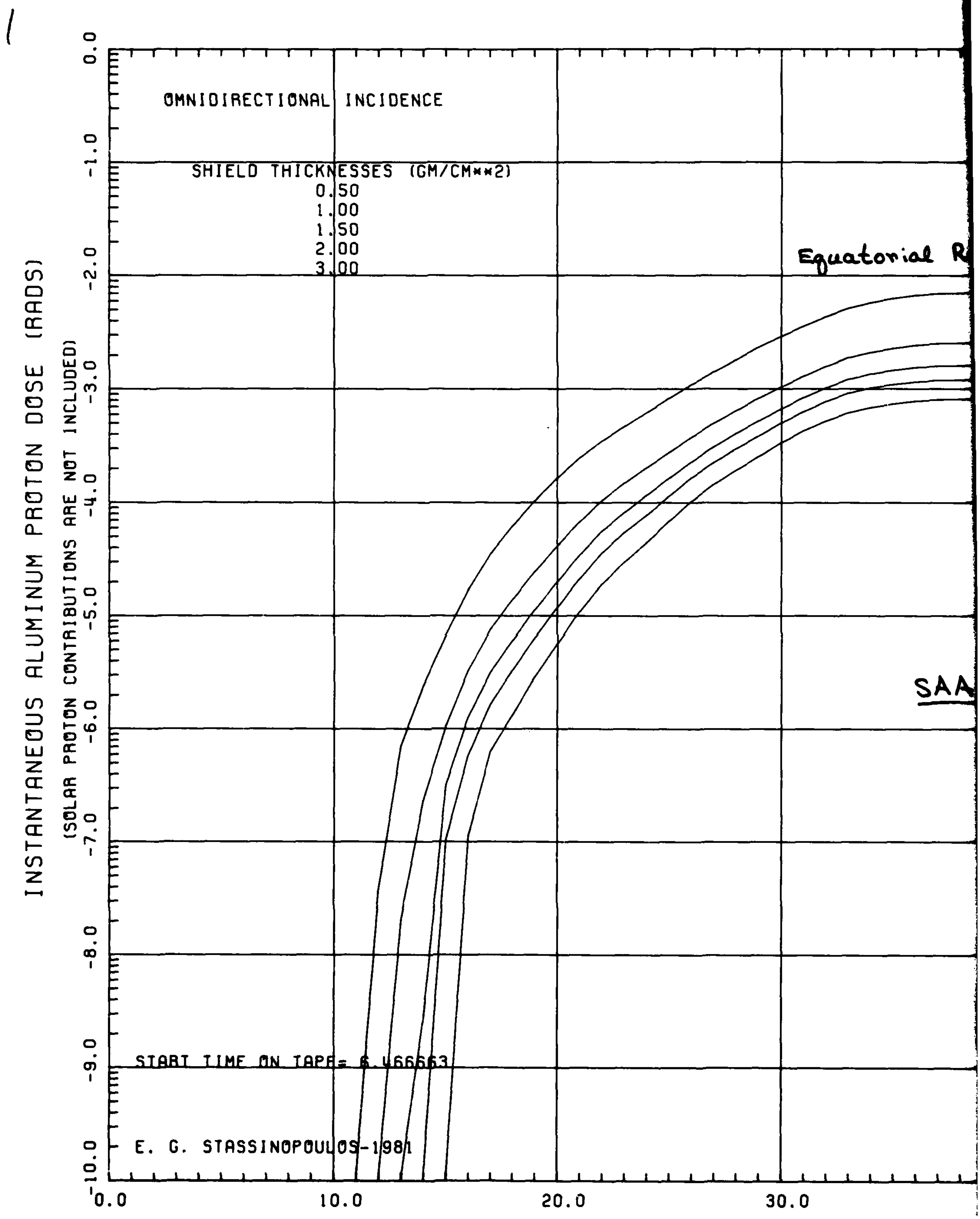
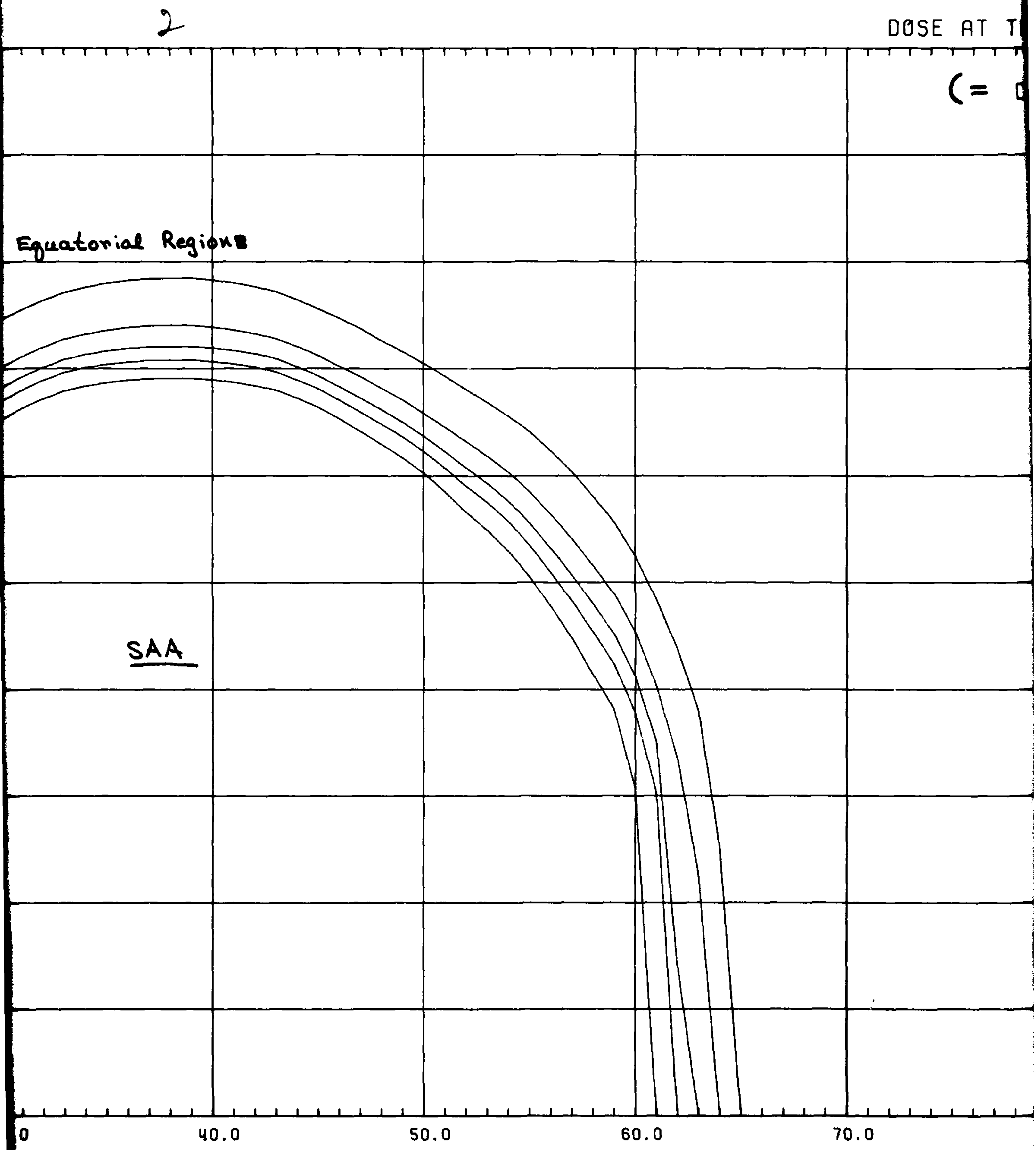


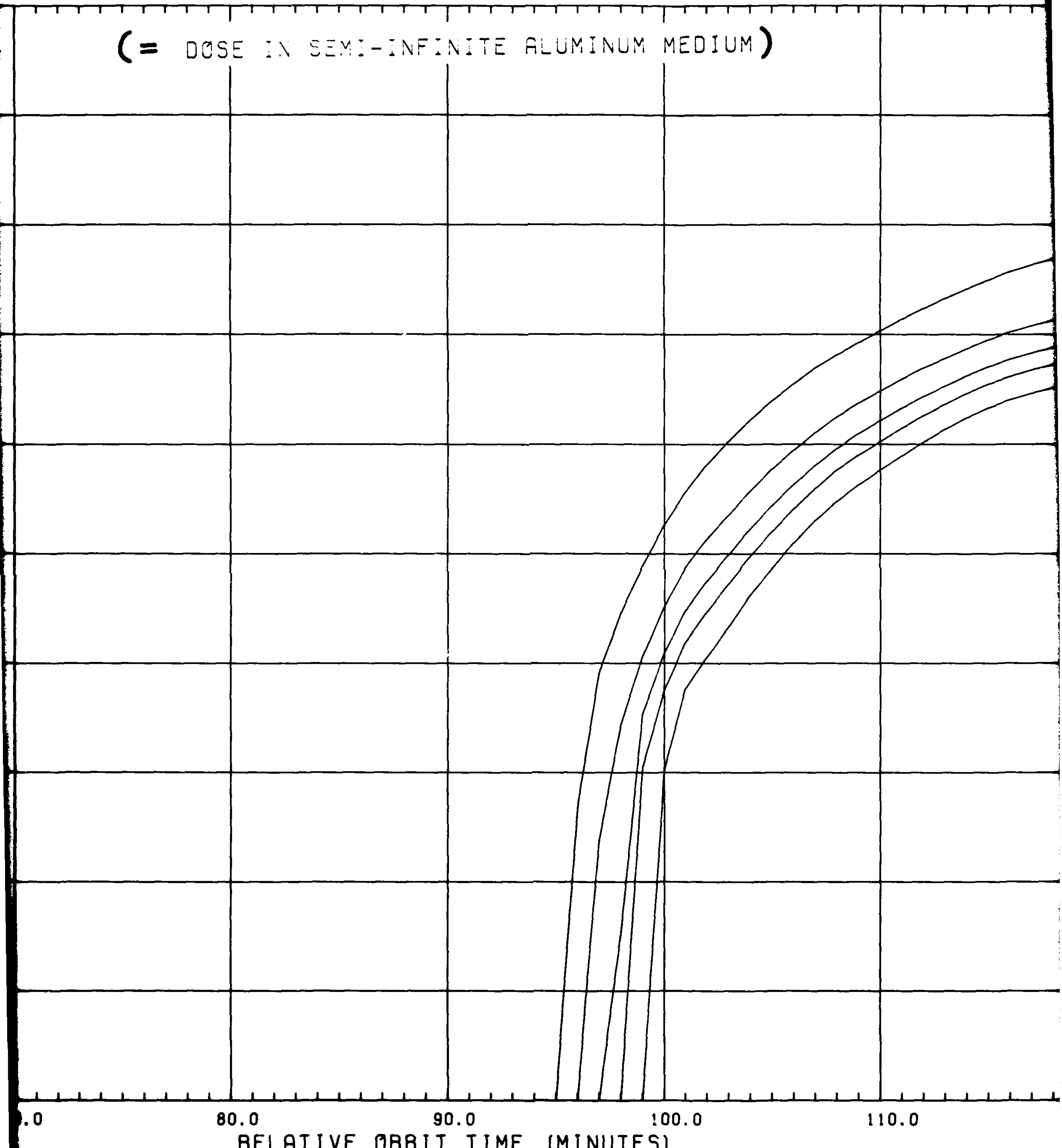
Figure 130
ORBIT: NAVELEX 2
60 DGR/2593-2593 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
rial Region
Northern Horn
STOP TIME ON TAPE= 7.616656
NASA-GSFC
110.0
120.0
130.0
140.0

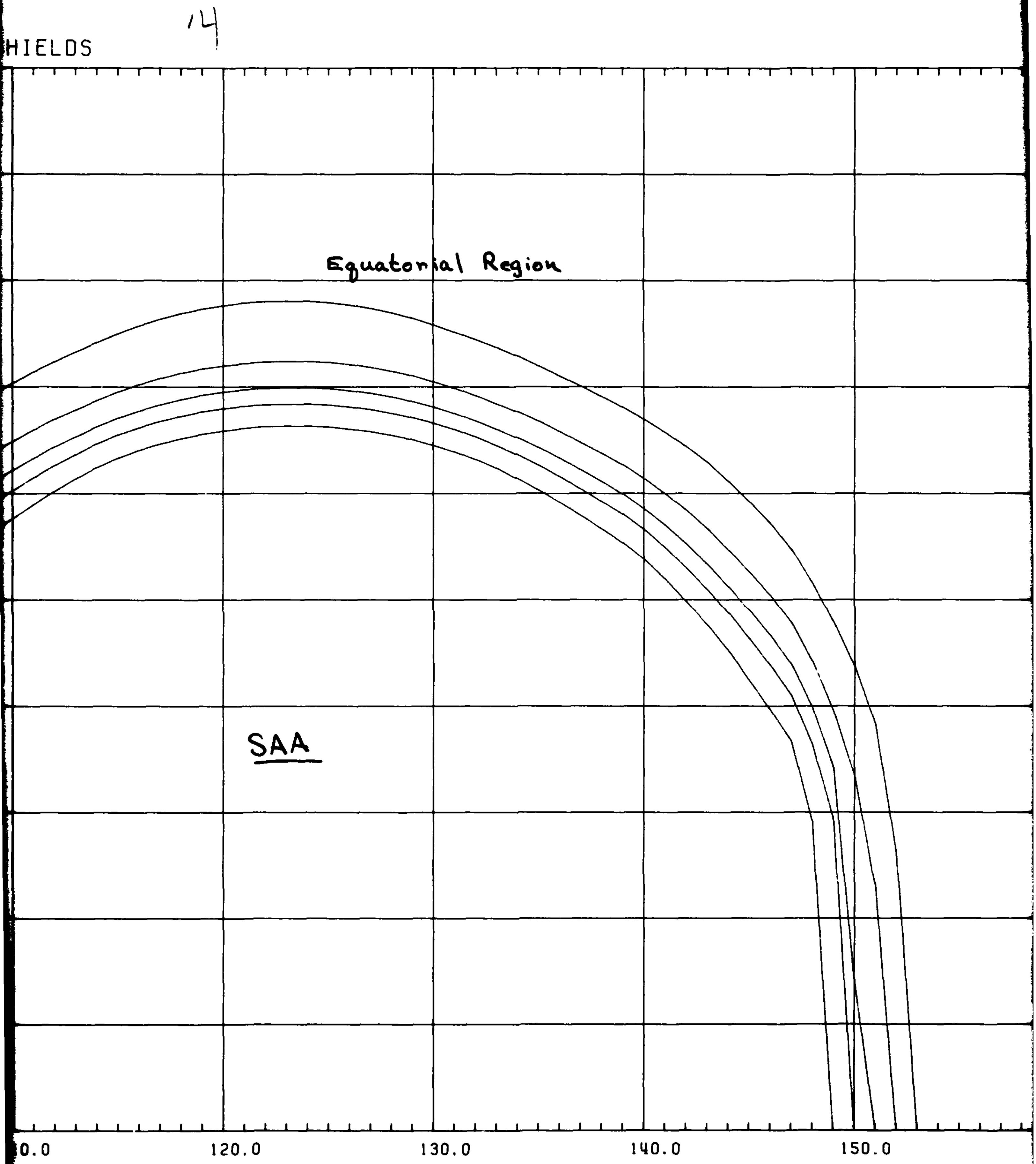

OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial R
SAA
START TIME ON TAPE= 6.466663
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0


2
DOSE AT T
(=
Equatorial Regions
SAA
0
40.0
50.0
60.0
70.0

13

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS

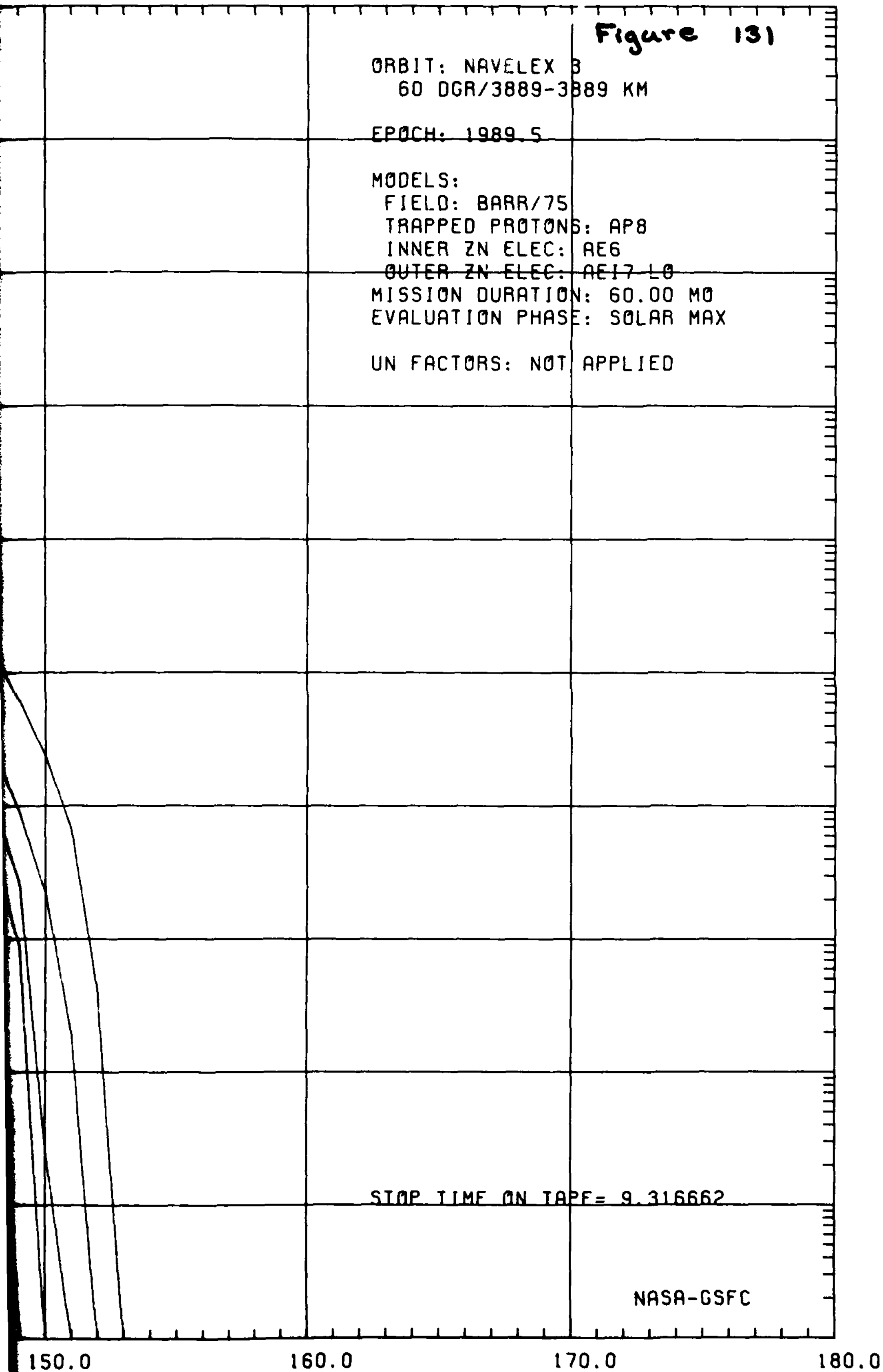


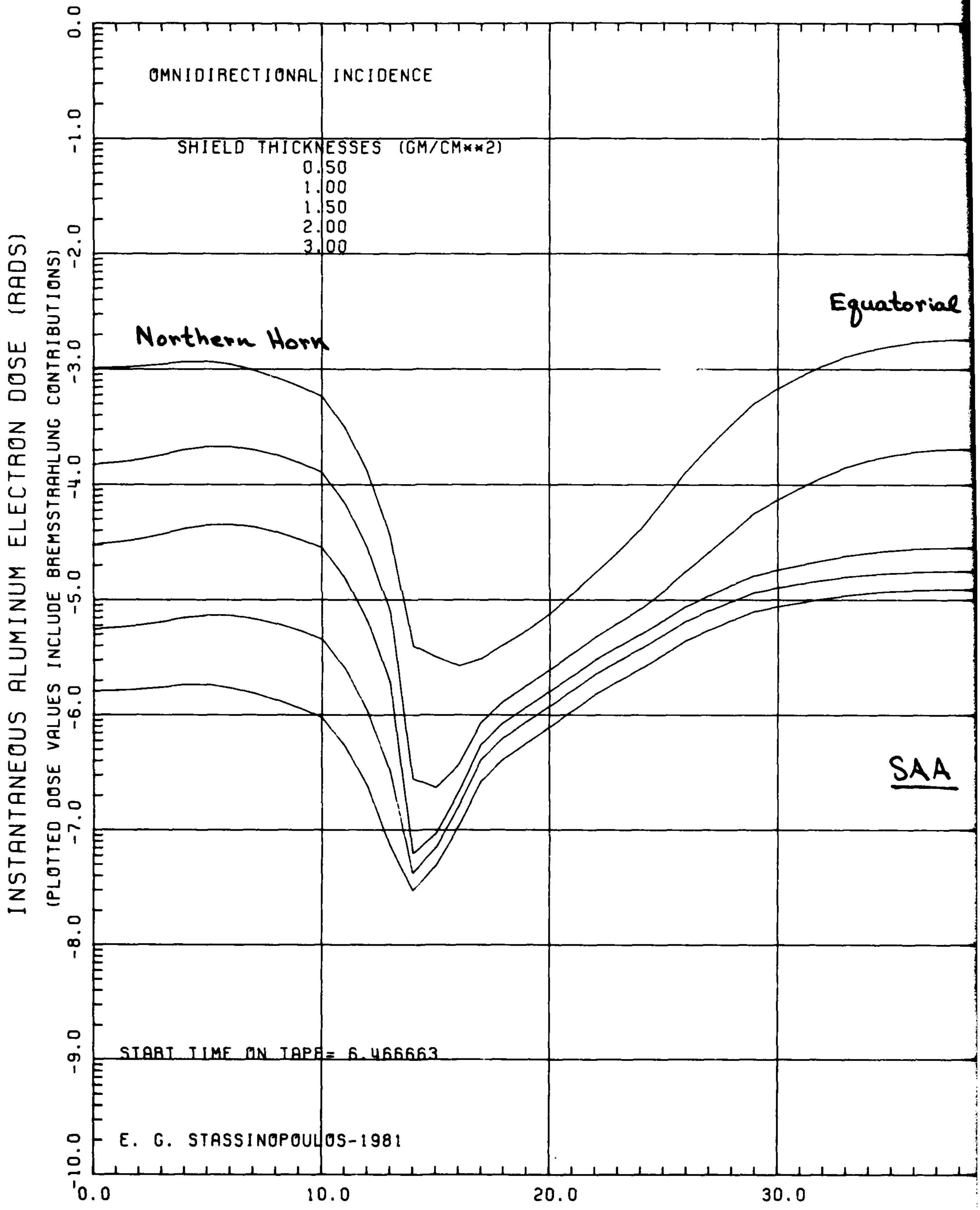


HIELDS
14
Equatorial Region
SAA
0.0
120.0
130.0
140.0
150.0

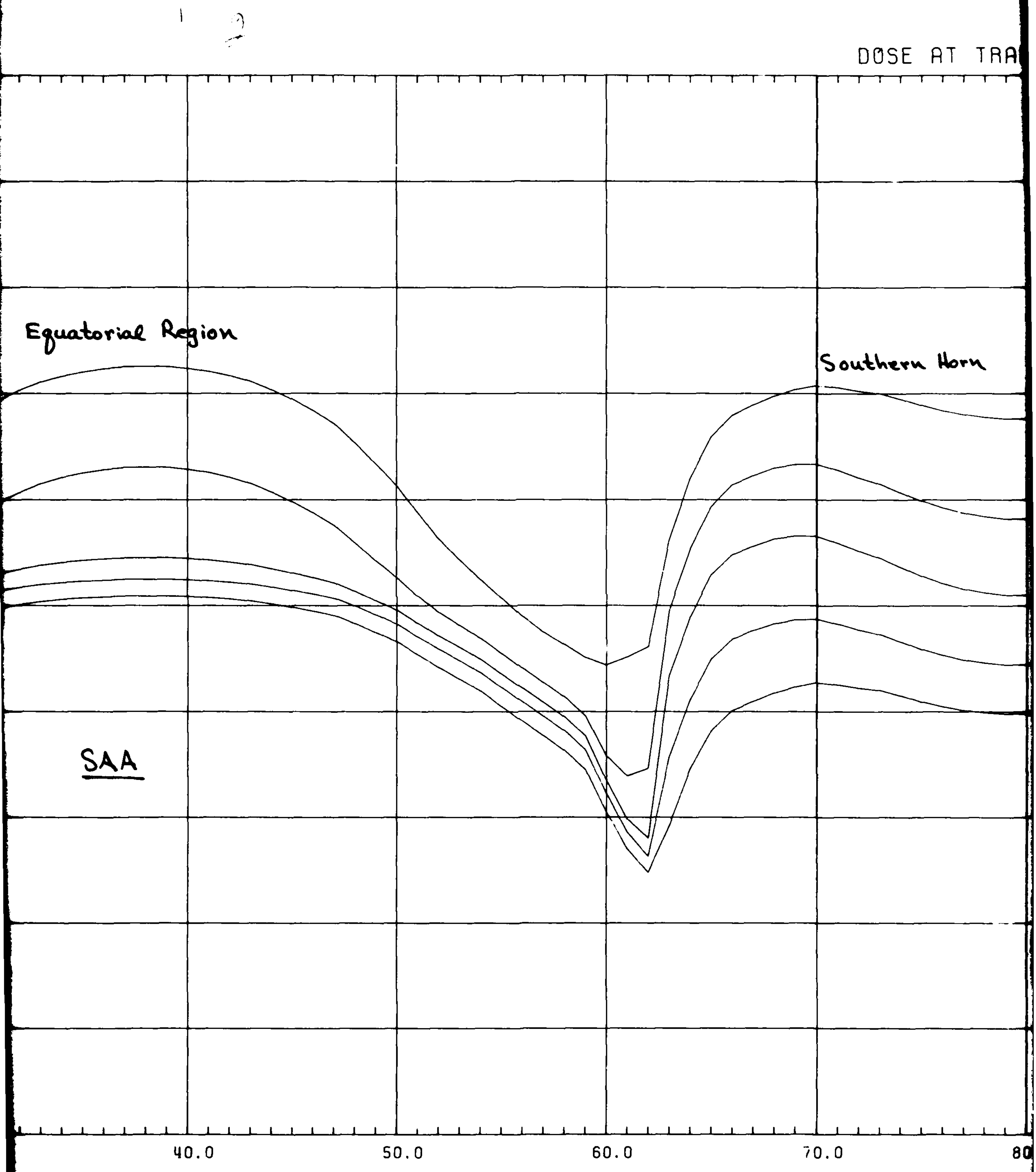
5

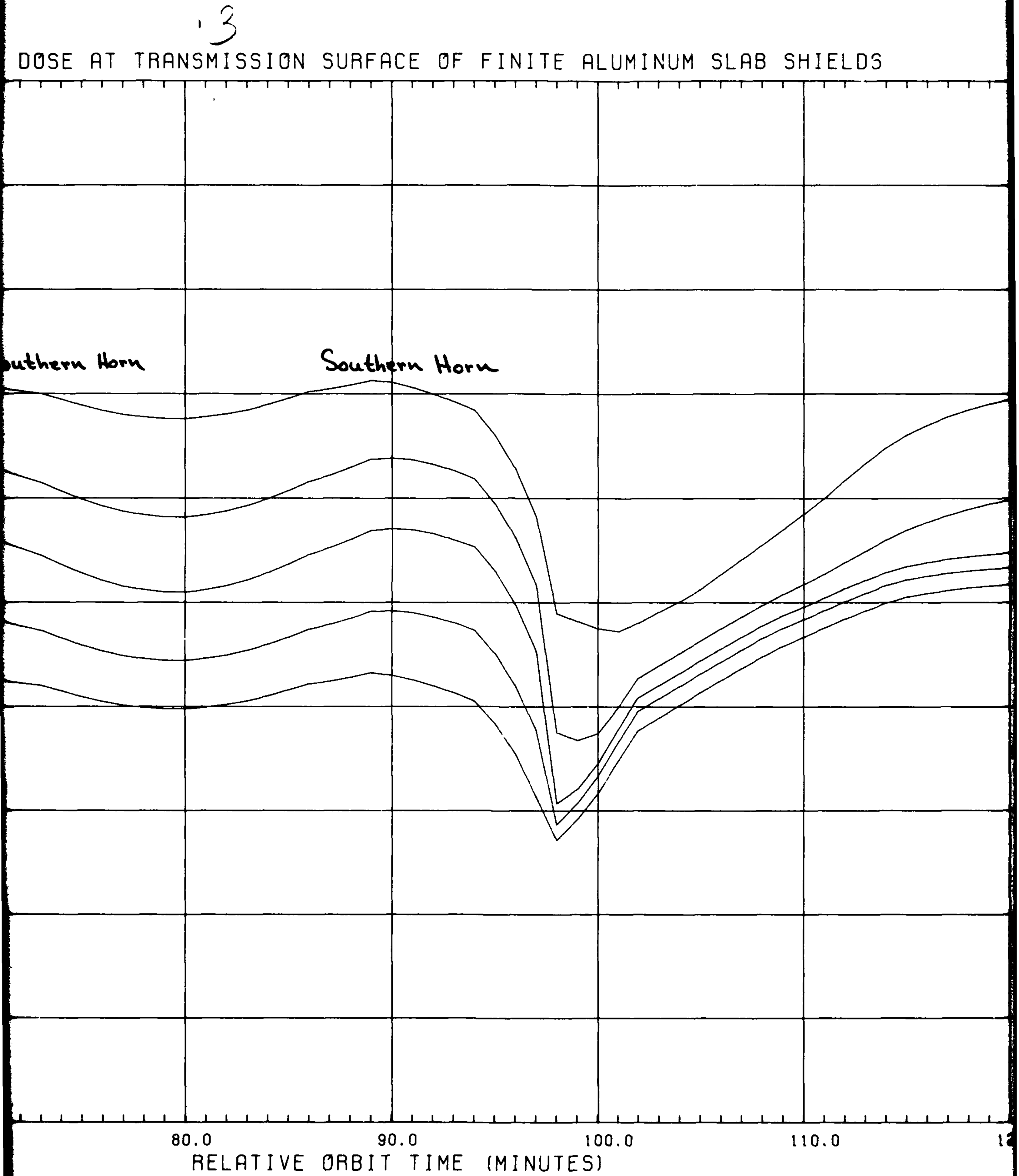
Figure 131


ORBIT: NAVELEX 3
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 9.316662
NASA-GSFC
150.0
160.0
170.0
180.0

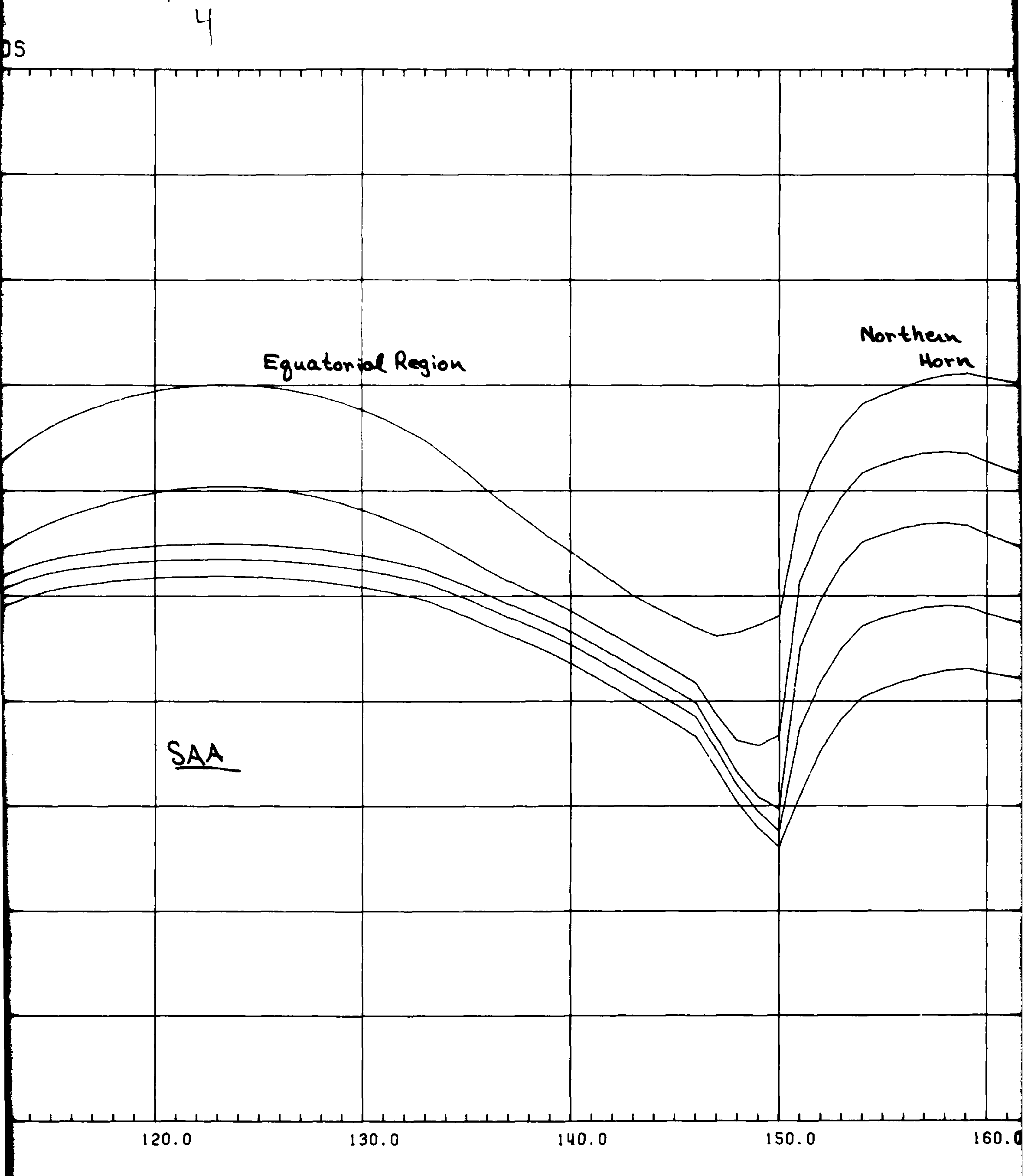


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial
SAA
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
START TIME ON TAPE= 6.466663
E. G. STASSINOPOULOS-1981
0.0
10.0
20.0
30.0


DOSE AT TRA
Equatorial Region
Southern Horn
SAA
40.0
50.0
60.0
70.0
80

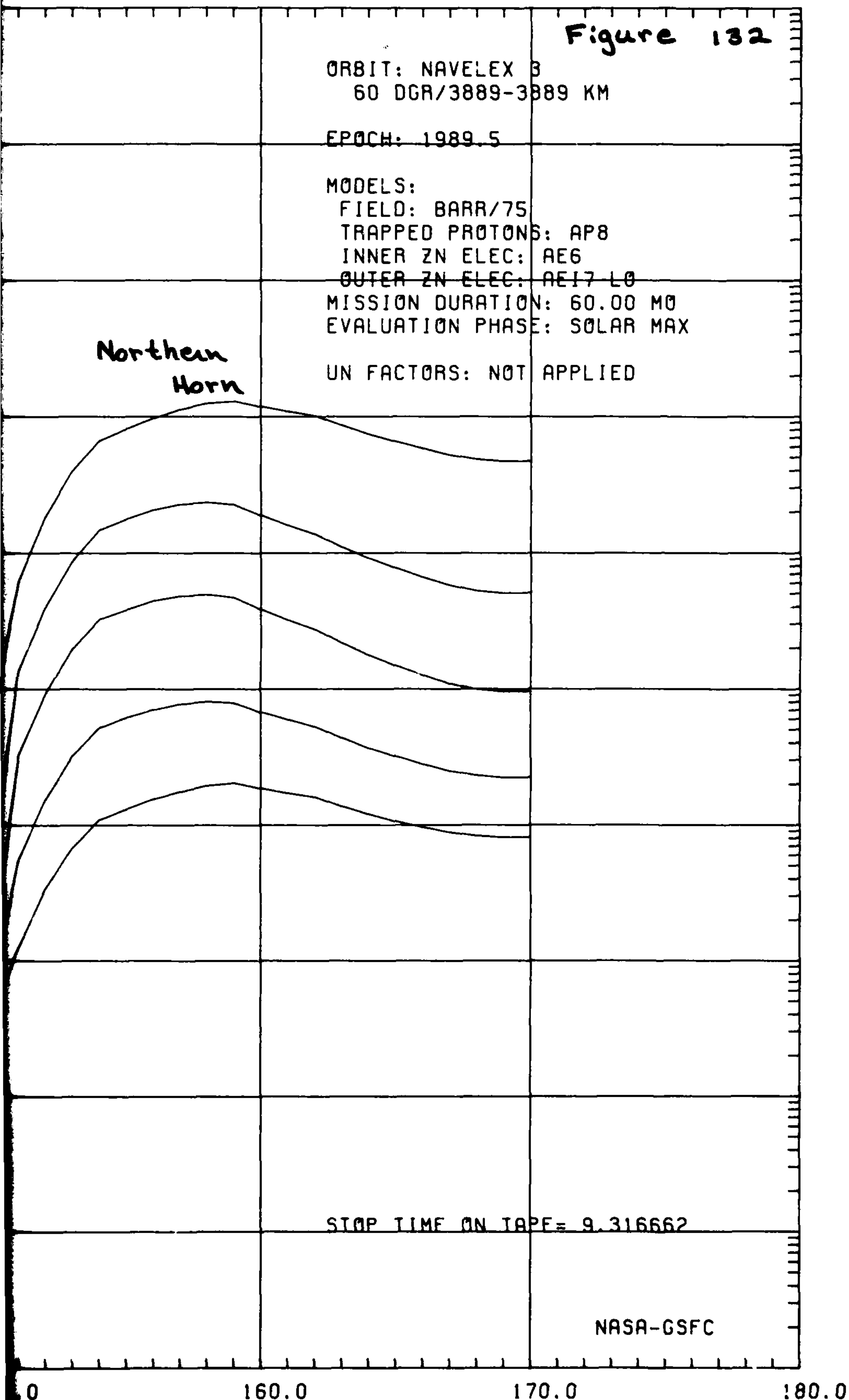


3
DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS
uthern Horn
Southern Horn
80.0
90.0
100.0
110.0
RELATIVE ORBIT TIME (MINUTES)

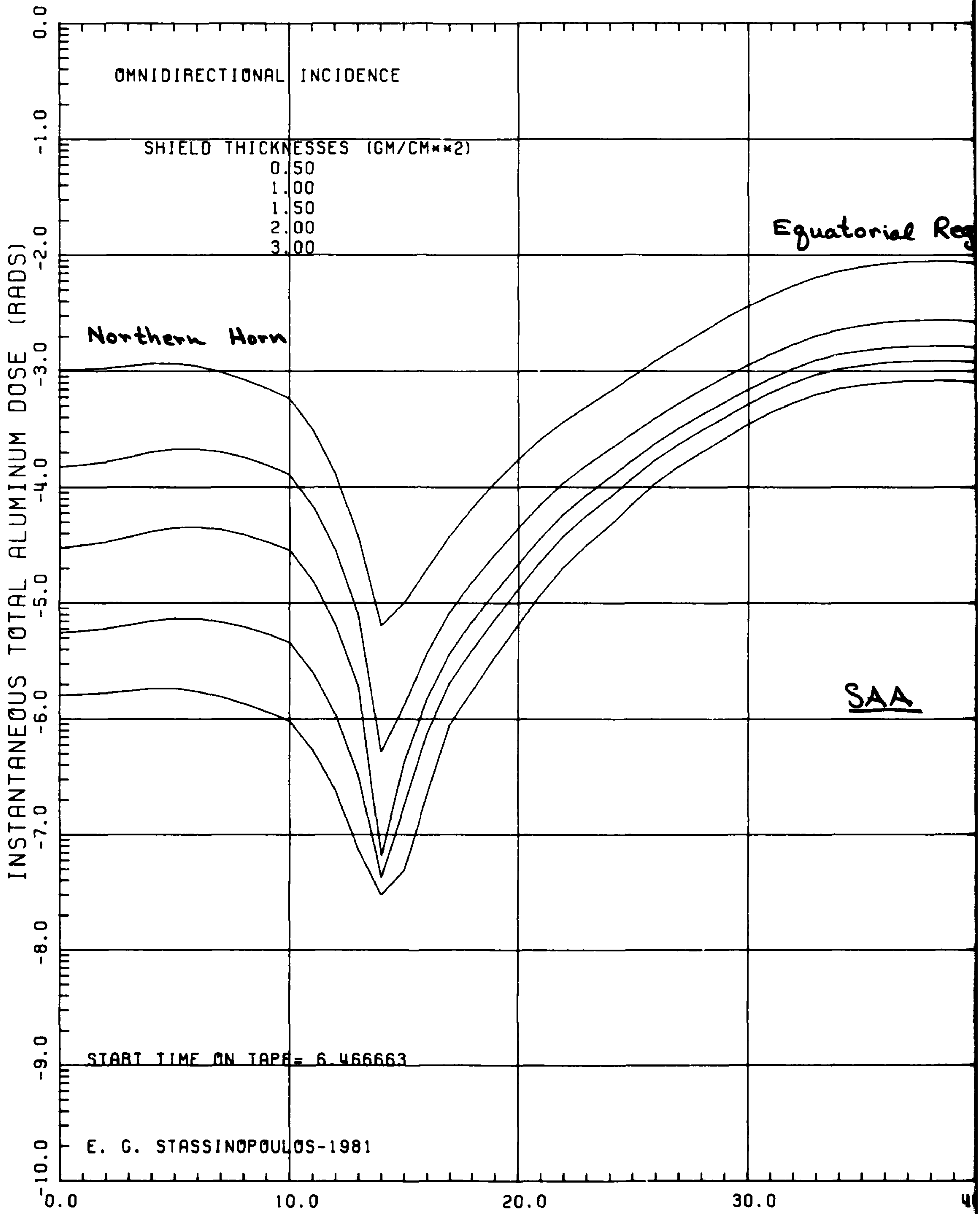

4
DS
Equatorial Region
Northern Horn
SAA
120.0
130.0
140.0
150.0
160.0

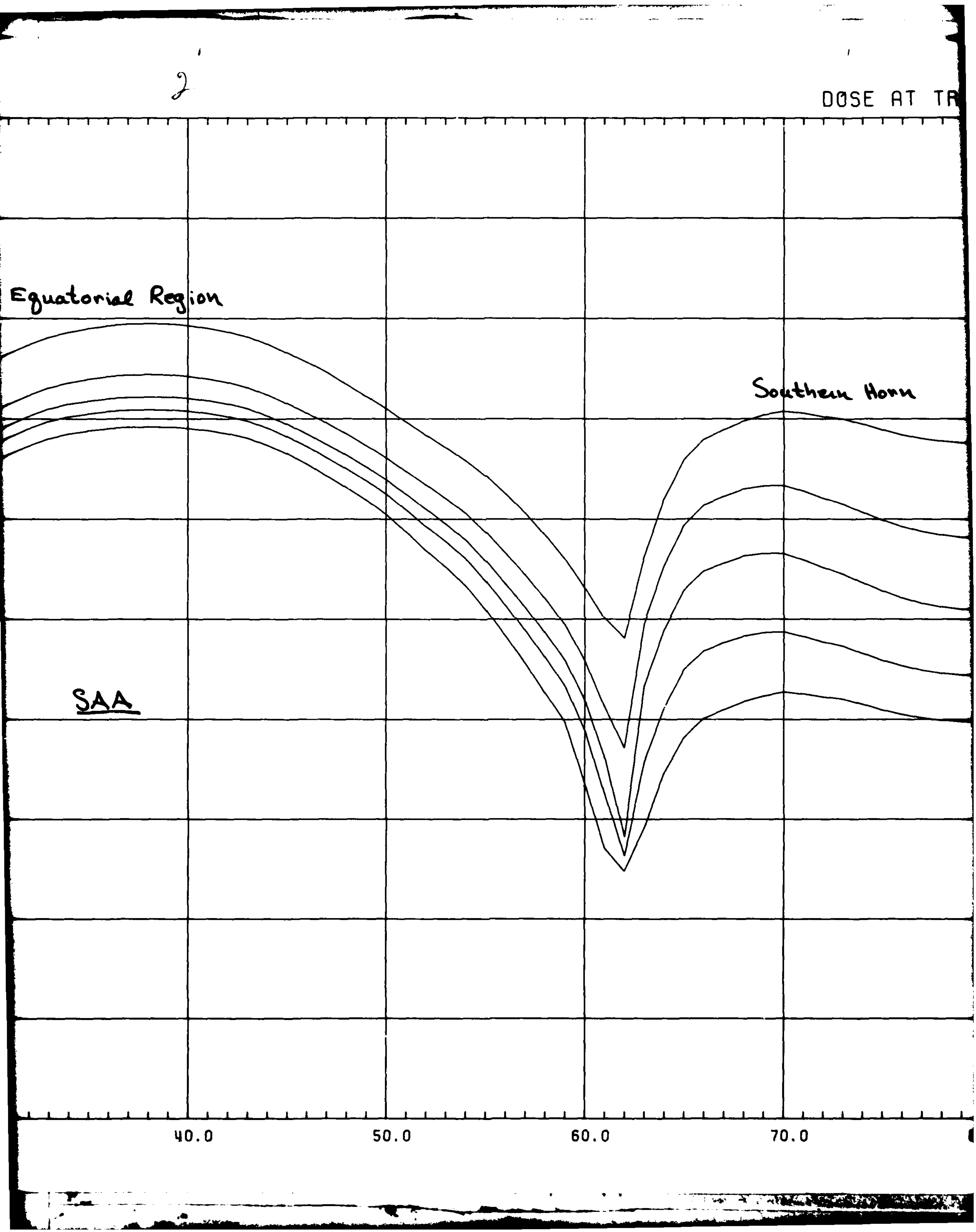
5

Figure 132



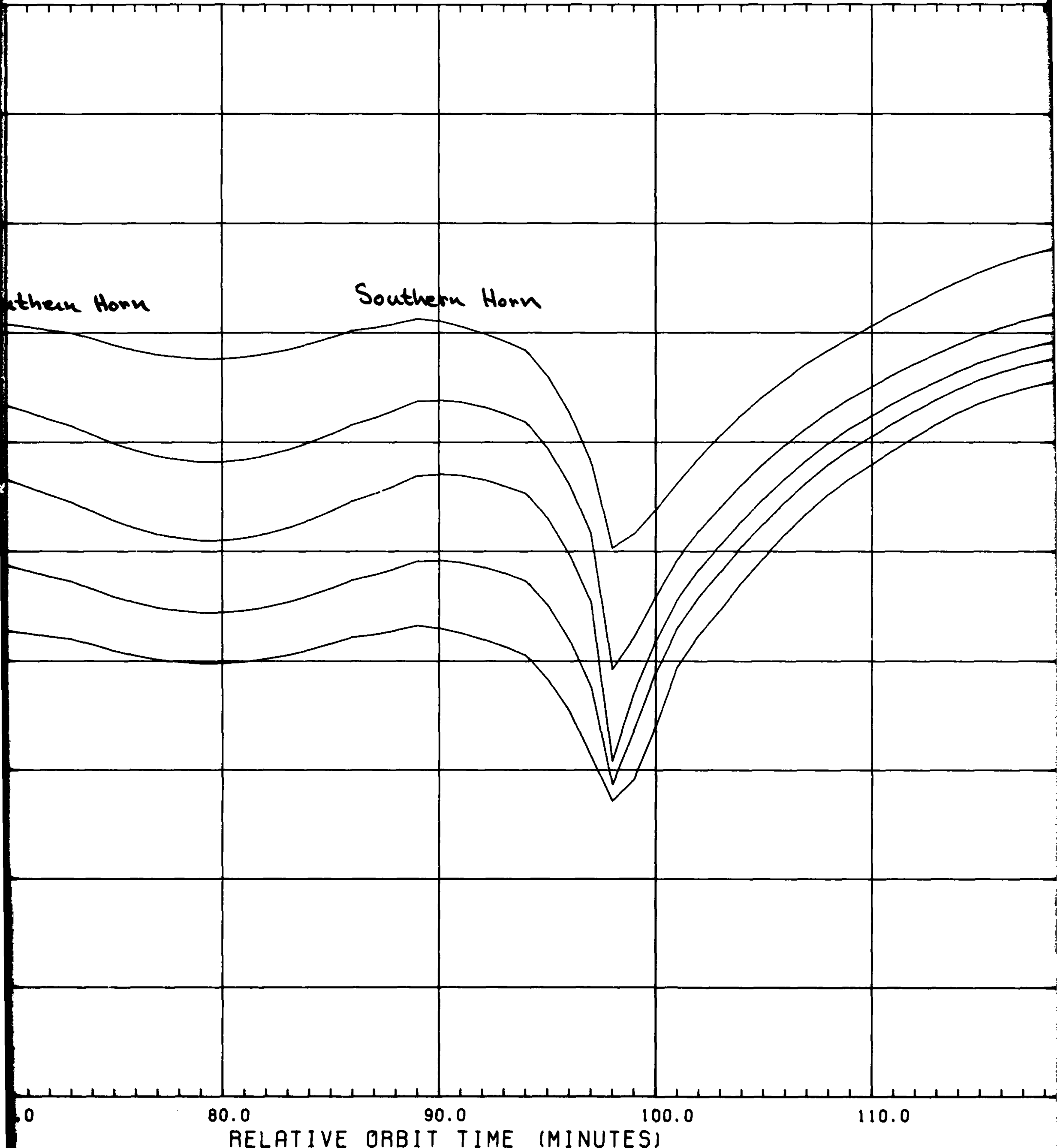
ORBIT: NAVELEX 3
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 9.316662
NASA-GSFC
0
160.0
170.0
180.0


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Reg
Northern Horn
SAA
START TIME ON TAPE= 6.466663
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0


2
DOSE AT TR
Equatorial Region
Southern Horn
SAA
40.0
50.0
60.0
70.0

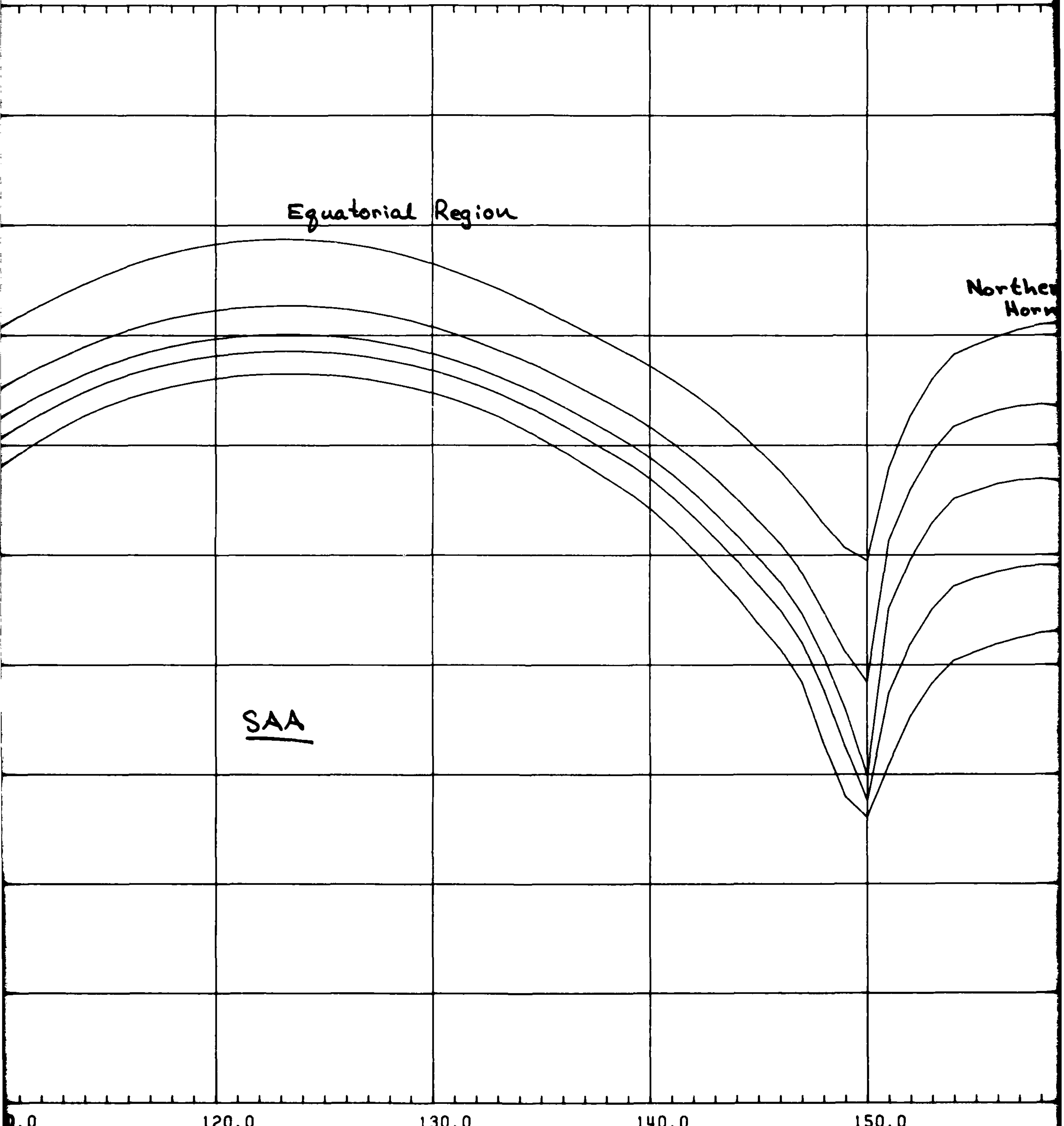
13

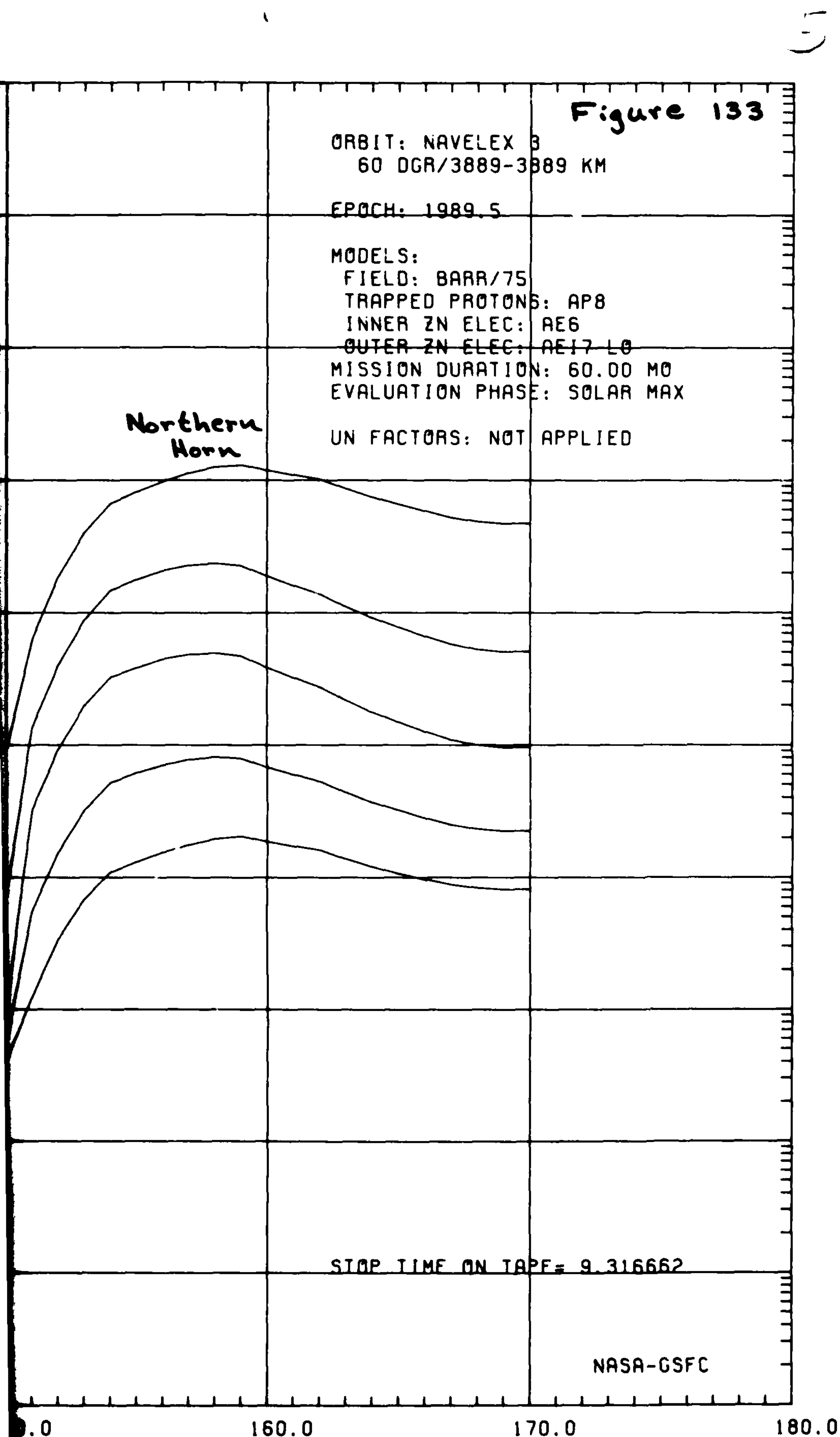
DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM SLAB SHIELDS

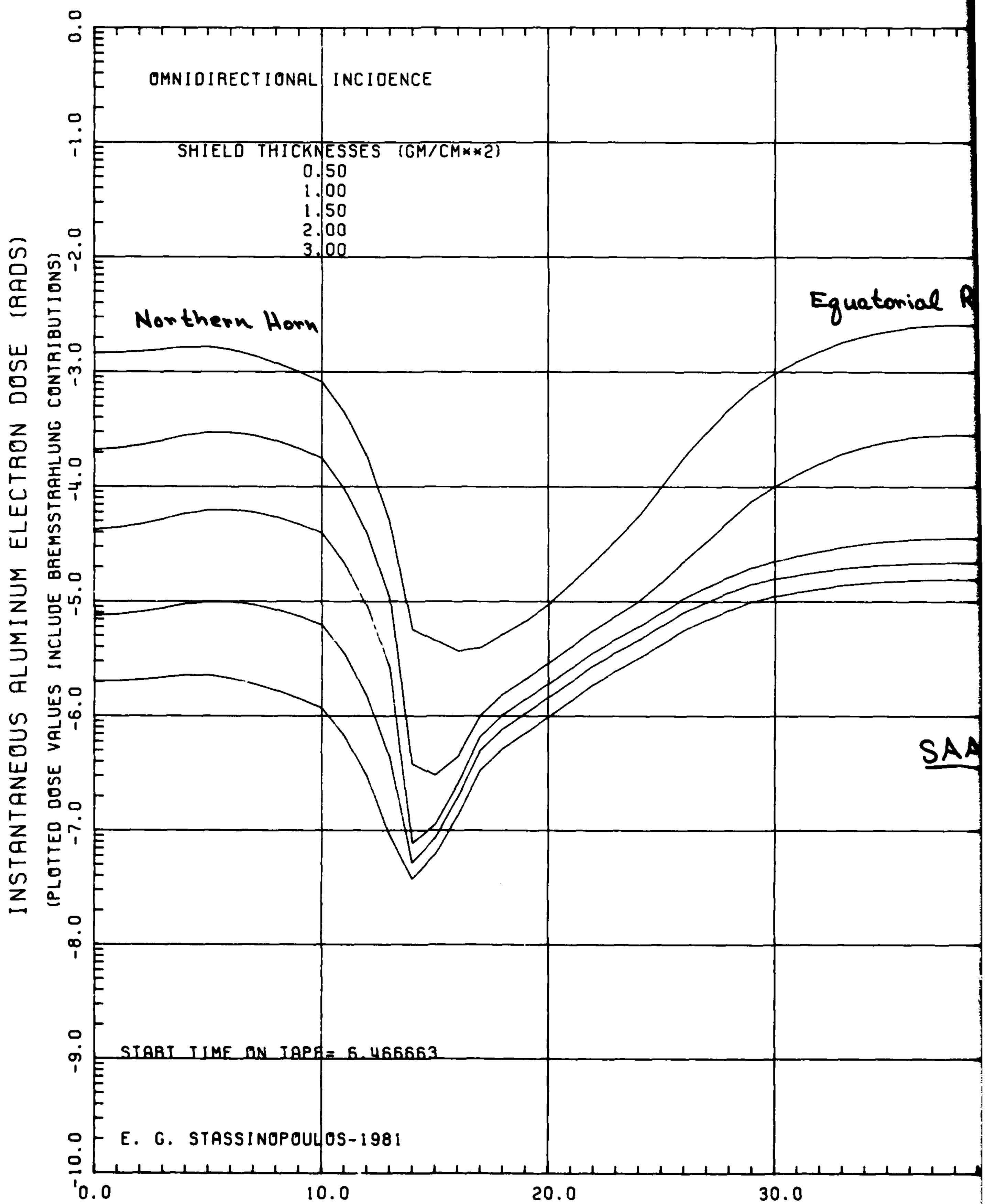


4

IELDS

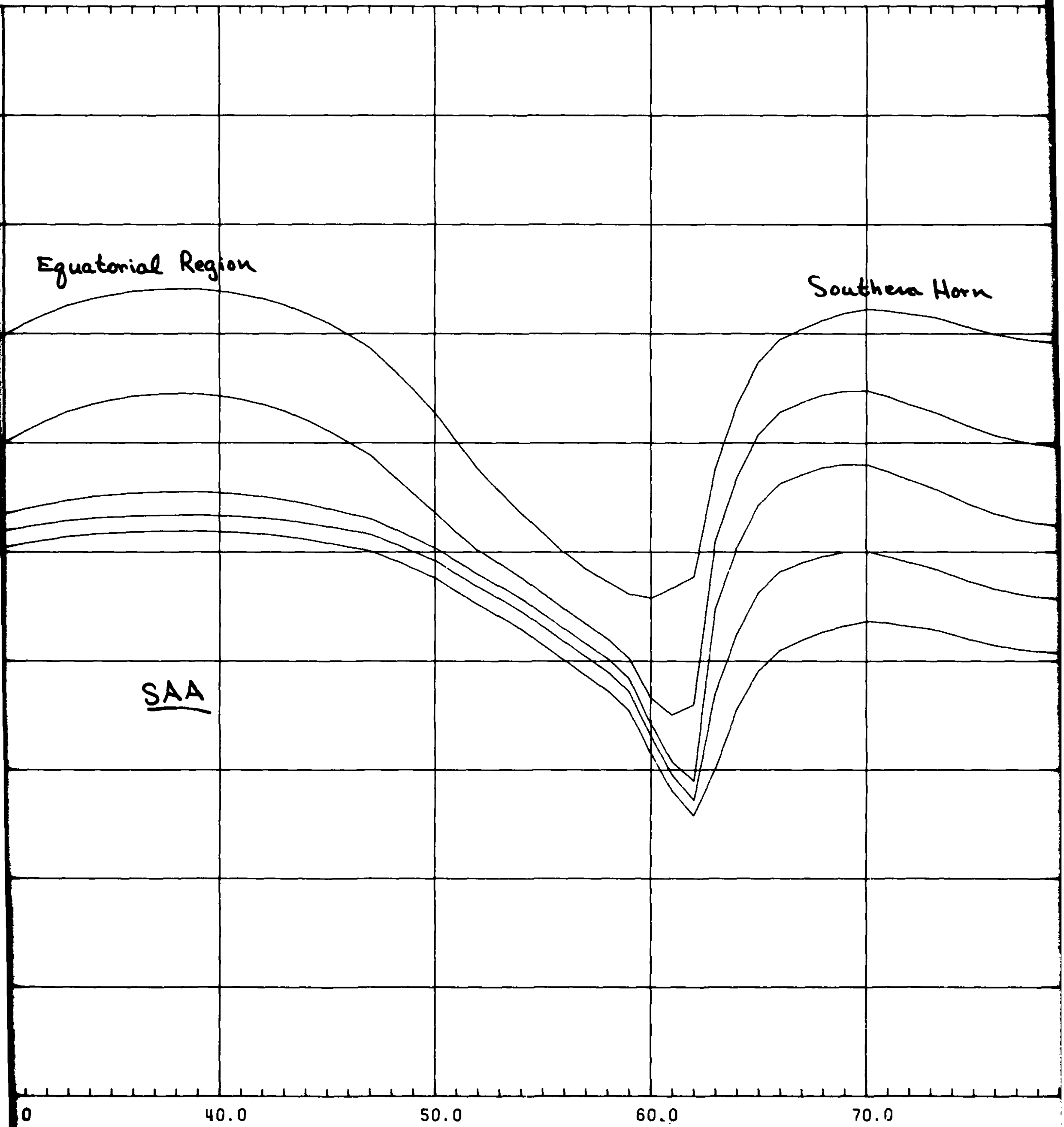



5
Figure 133
ORBIT: NAVELEX 3
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 9.316662
NASA-GSFC
160.0
170.0
180.0

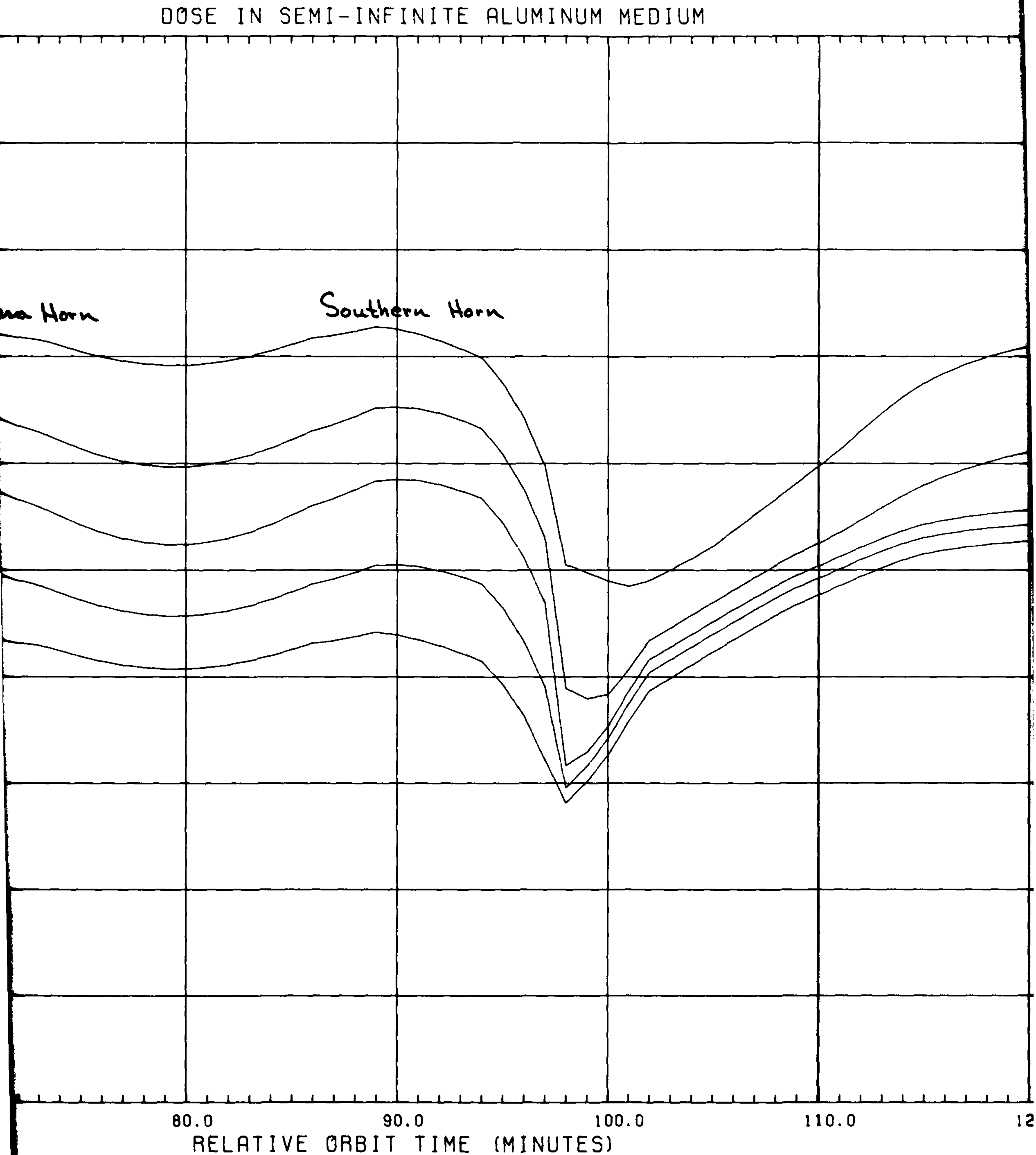


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial R
SAA
START TIME ON TAPE= 6.466663
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0

2'

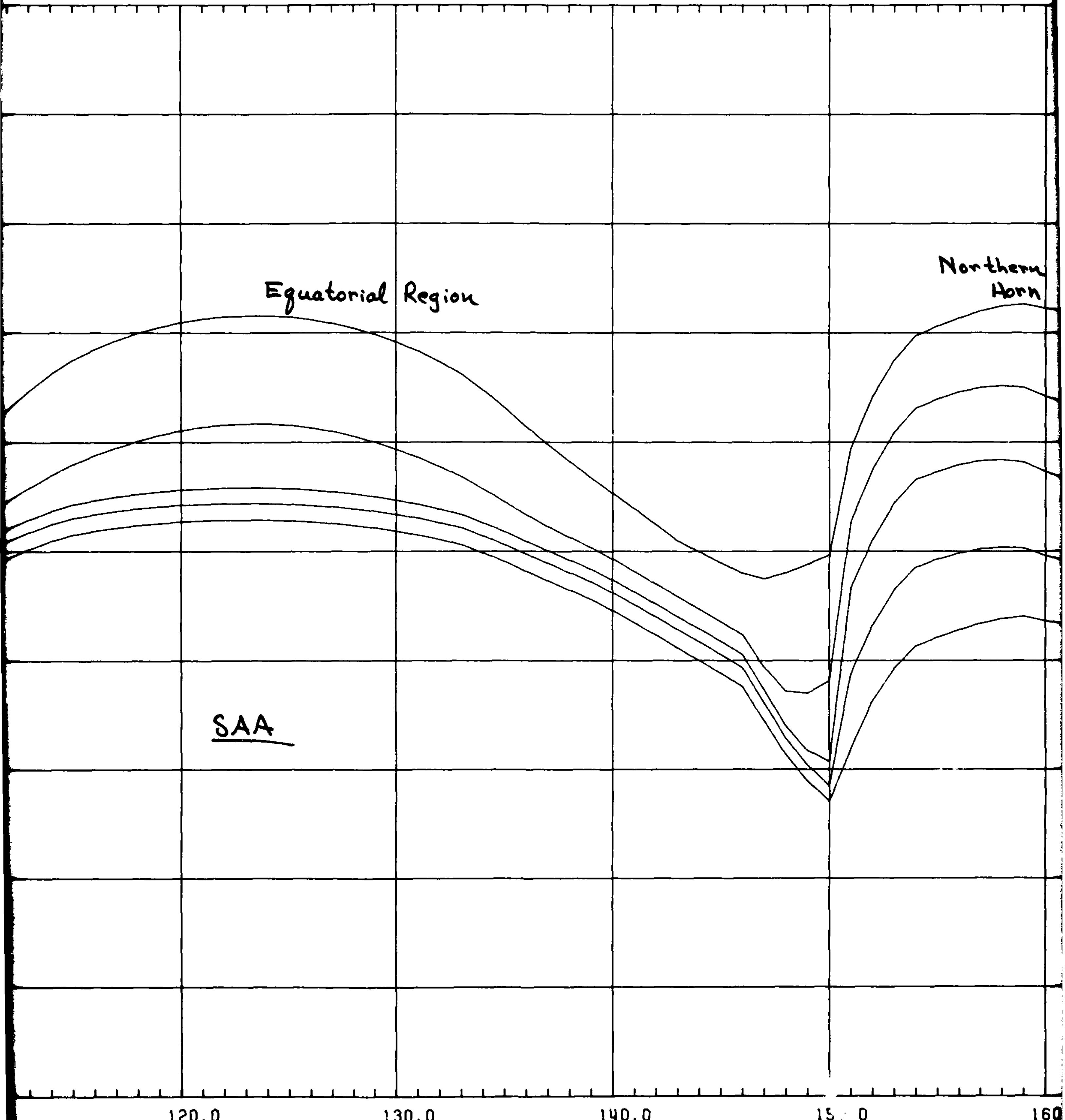


3



DOSE IN SEMI-INFINITE ALUMINUM MEDIUM
...na Horn
Southern Horn
80.0
90.0
100.0
110.0
12
RELATIVE ORBIT TIME (MINUTES)

14



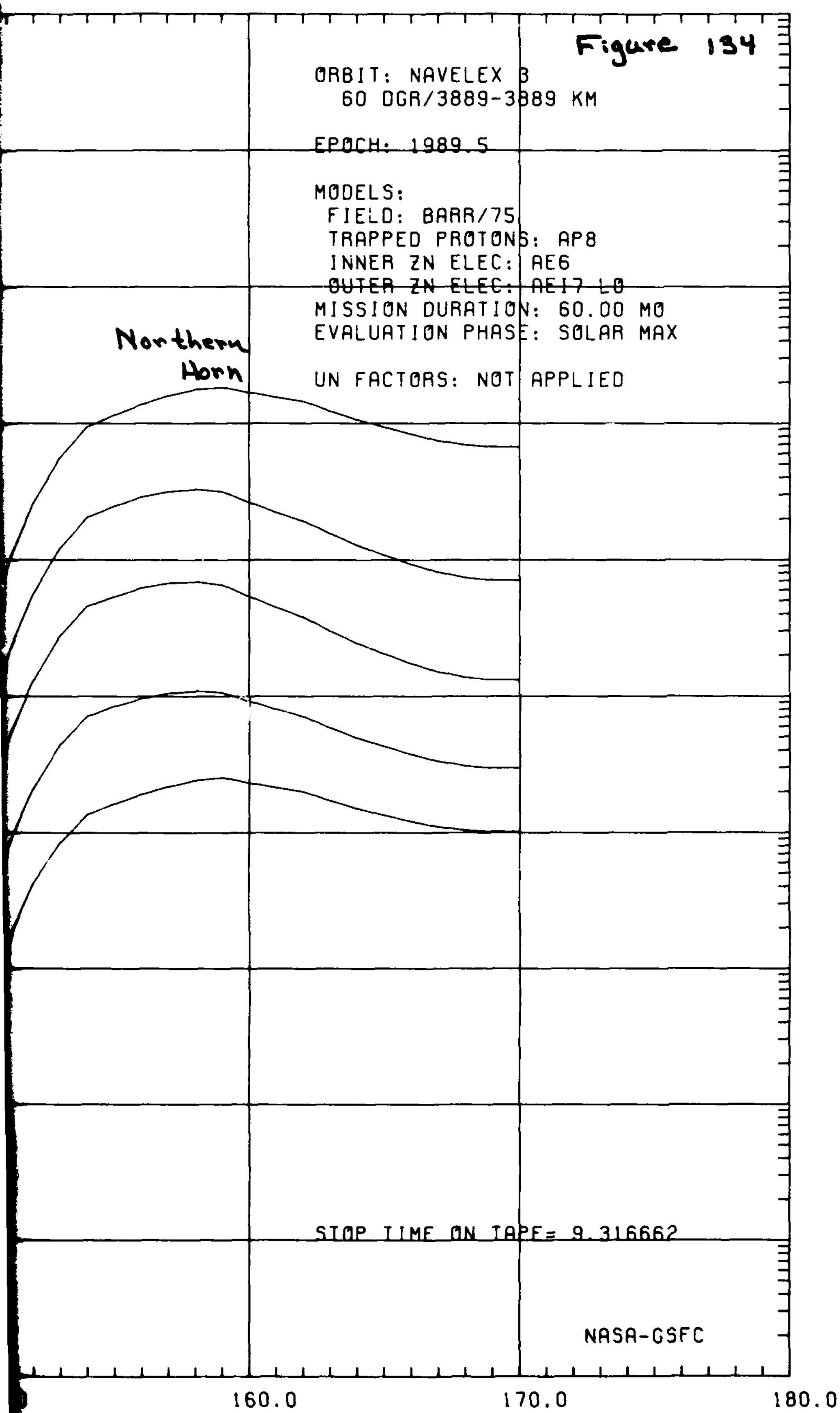
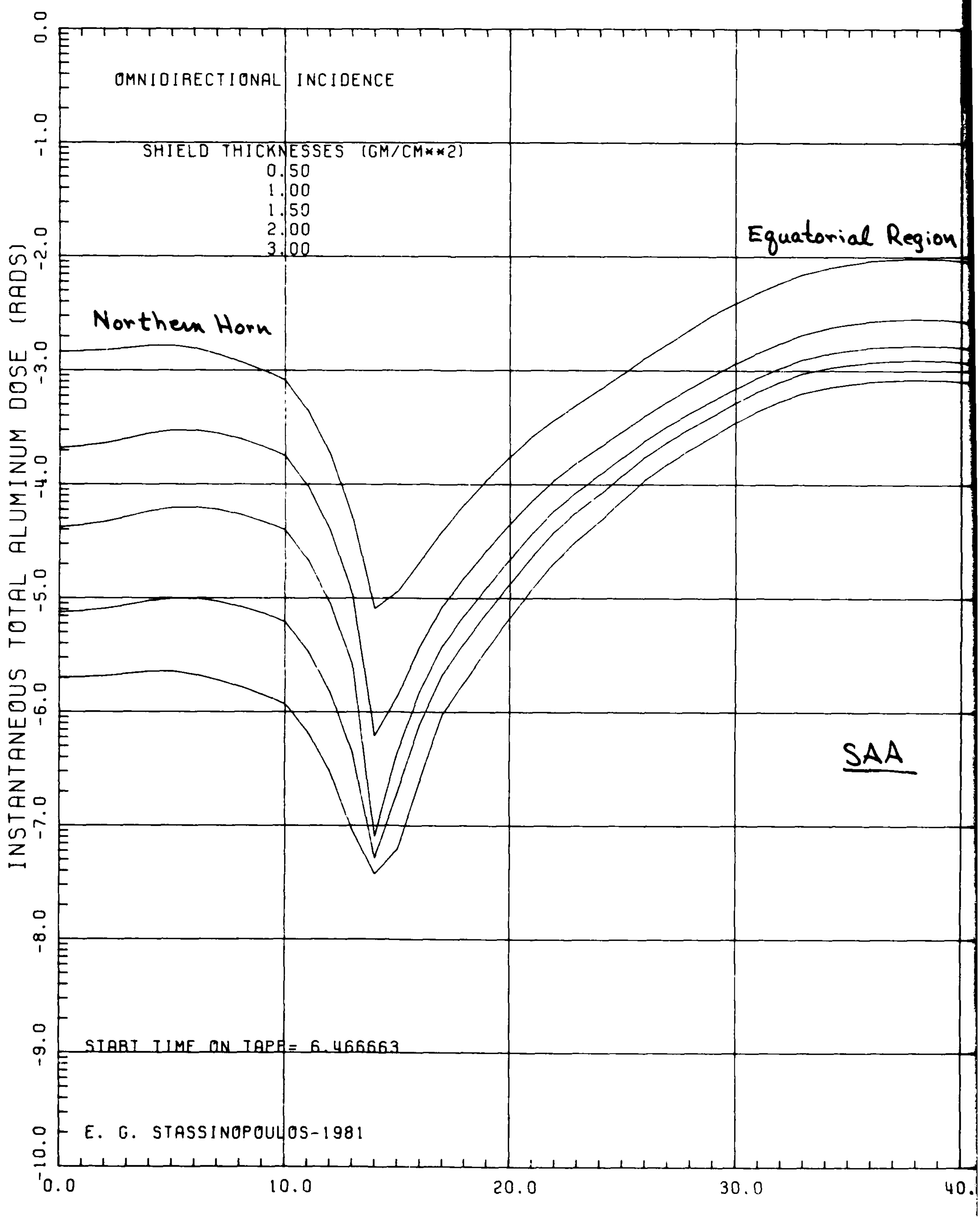
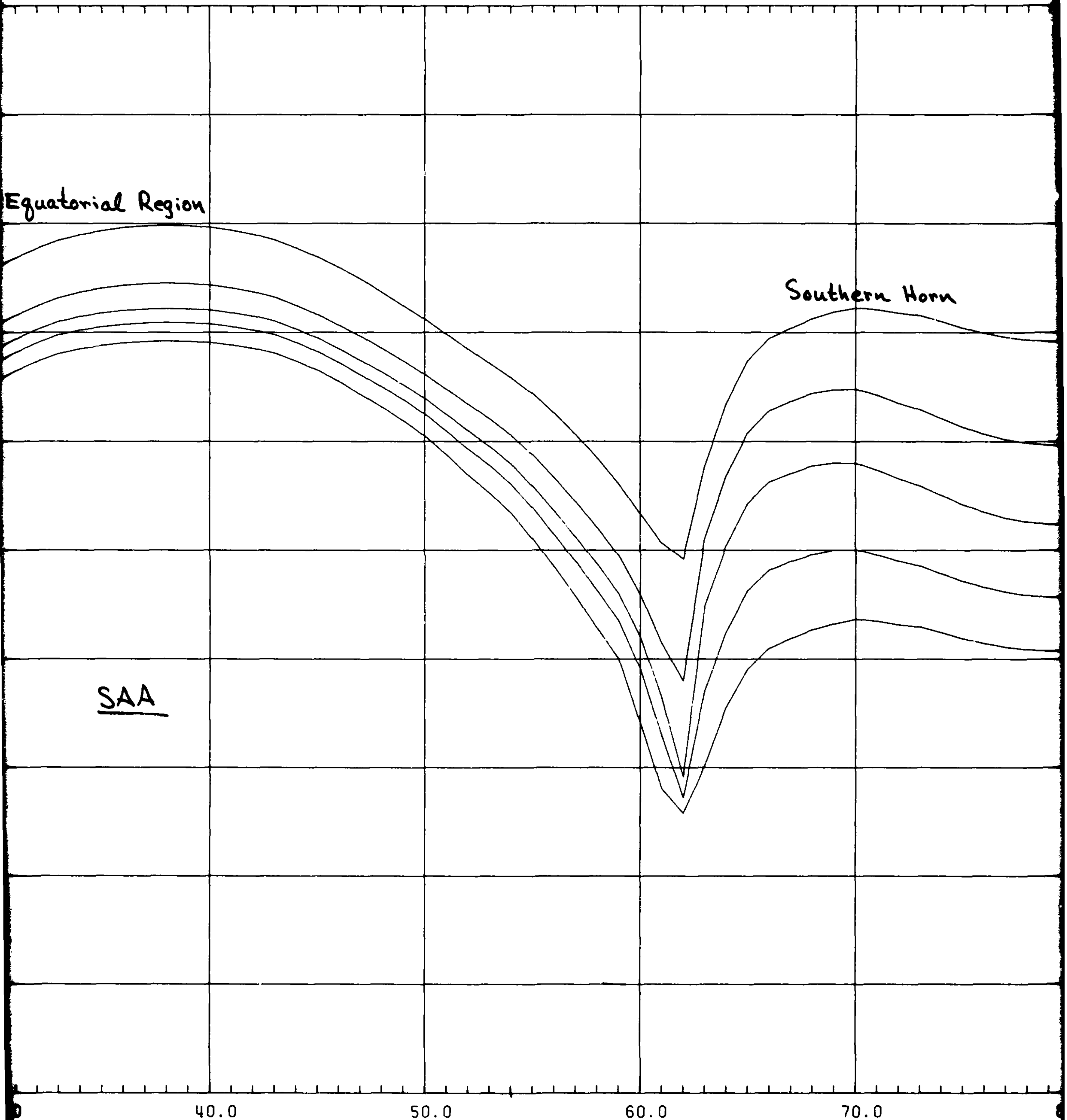
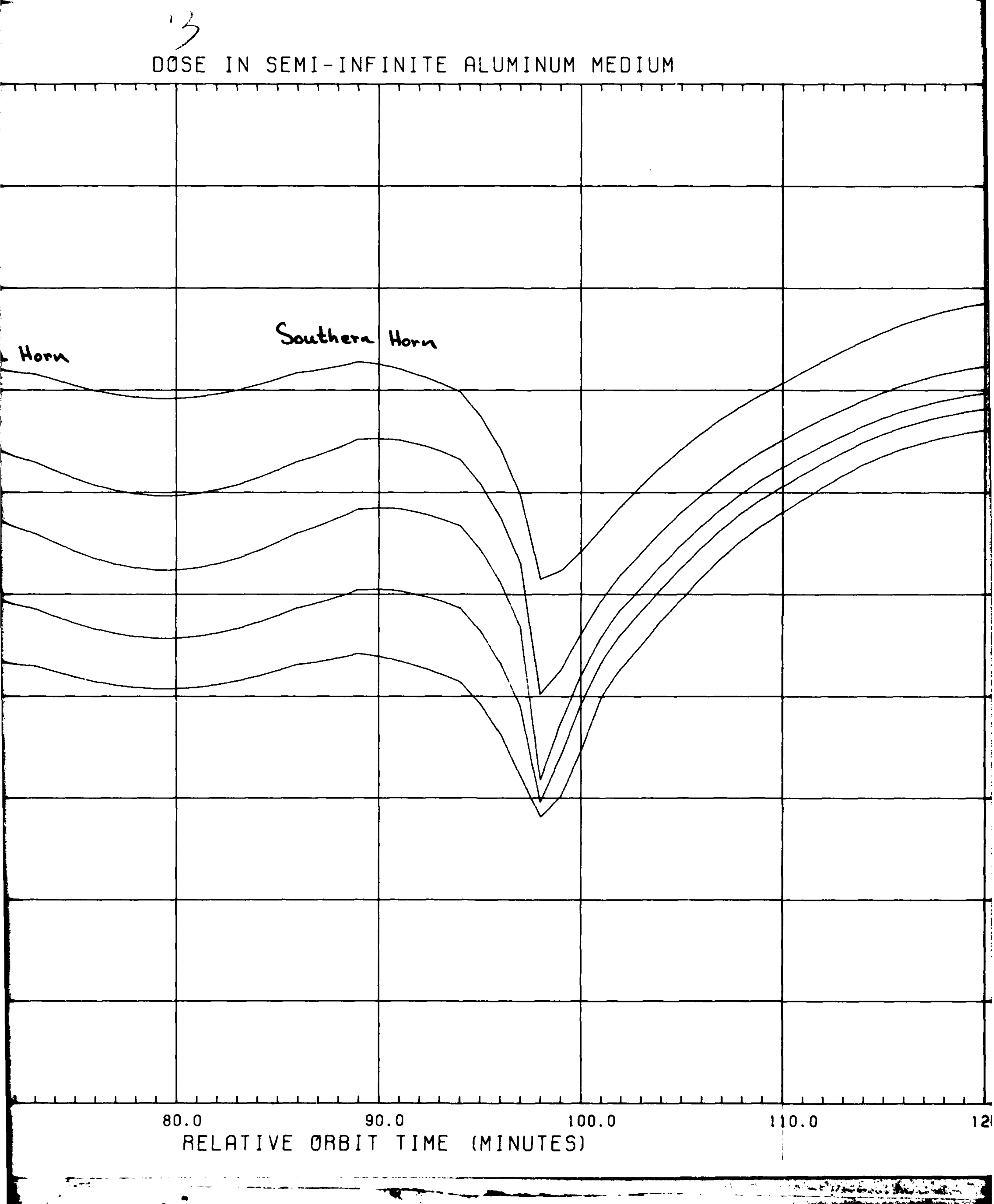


Figure 134
ORBIT: NAVELEX 3
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 9.316662
NASA-GSFC
160.0
170.0
180.0

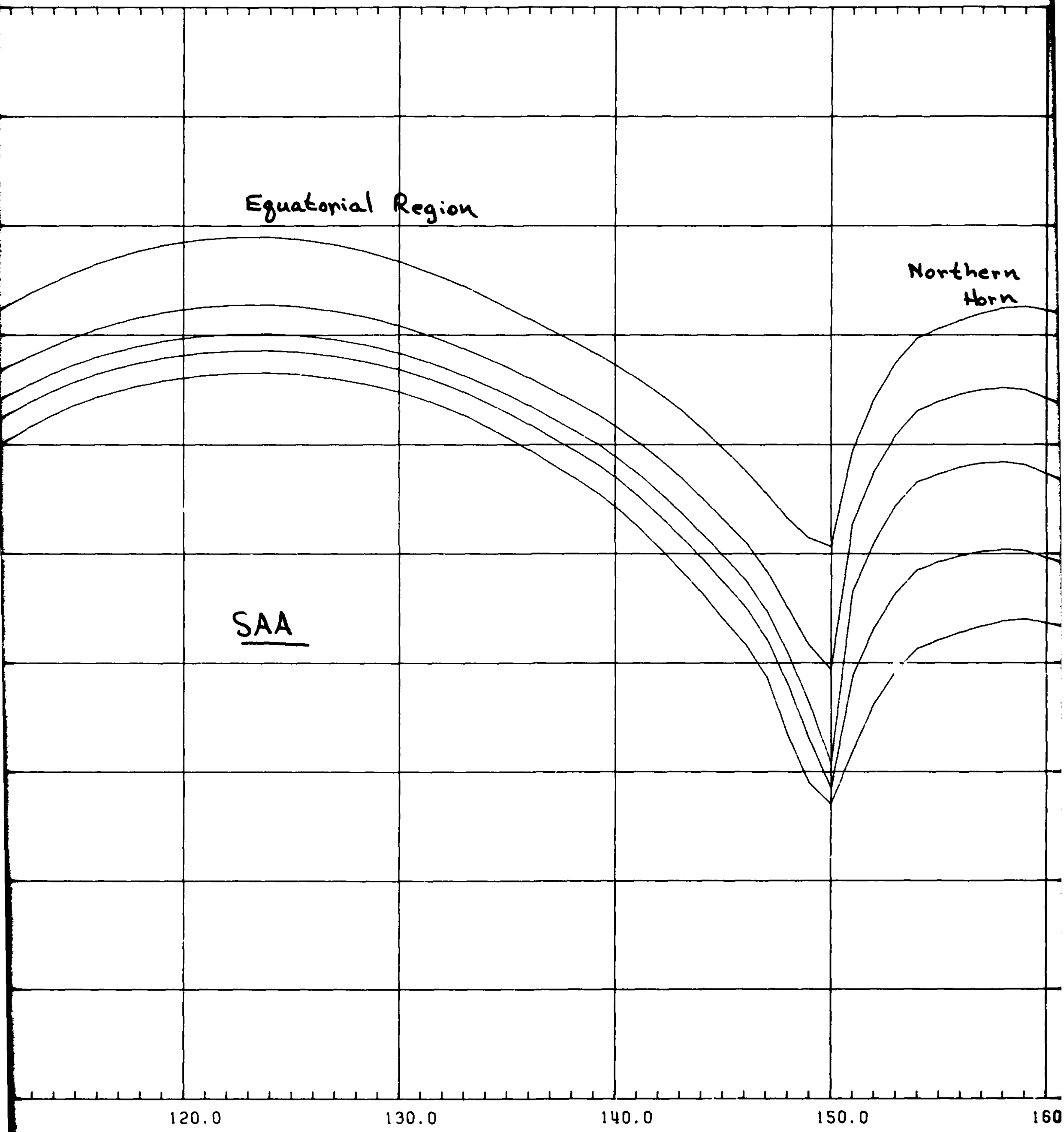

OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Region
Northern Horn
SAA
START TIME ON TAPE= 6.466663
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40.



Equatorial Region
Southern Horn
SAA
40.0
50.0
60.0
70.0

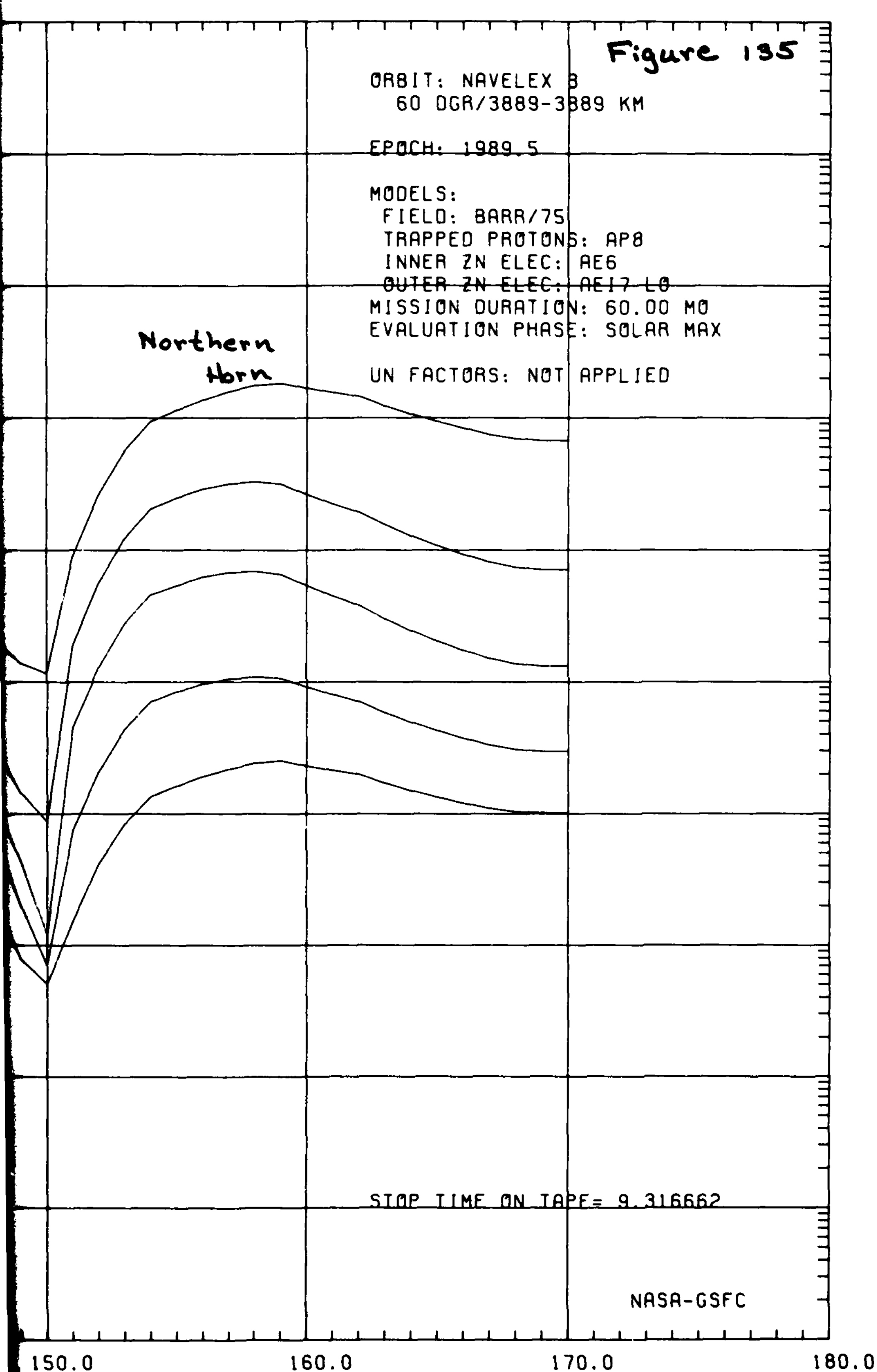


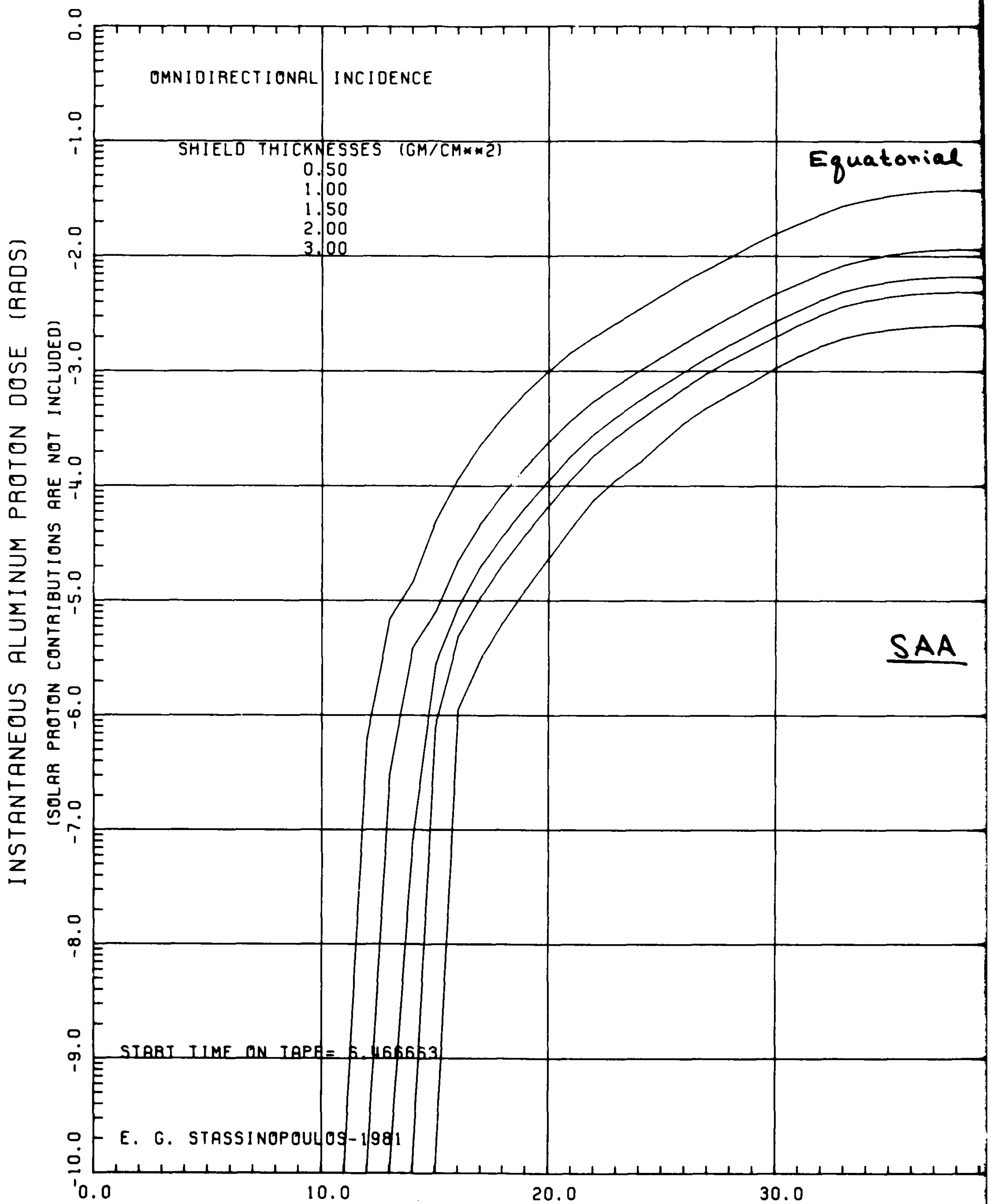
3
DOSE IN SEMI-INFINITE ALUMINUM MEDIUM
Horn
Southern Horn
80.0
90.0
100.0
110.0
12
RELATIVE ORBIT TIME (MINUTES)

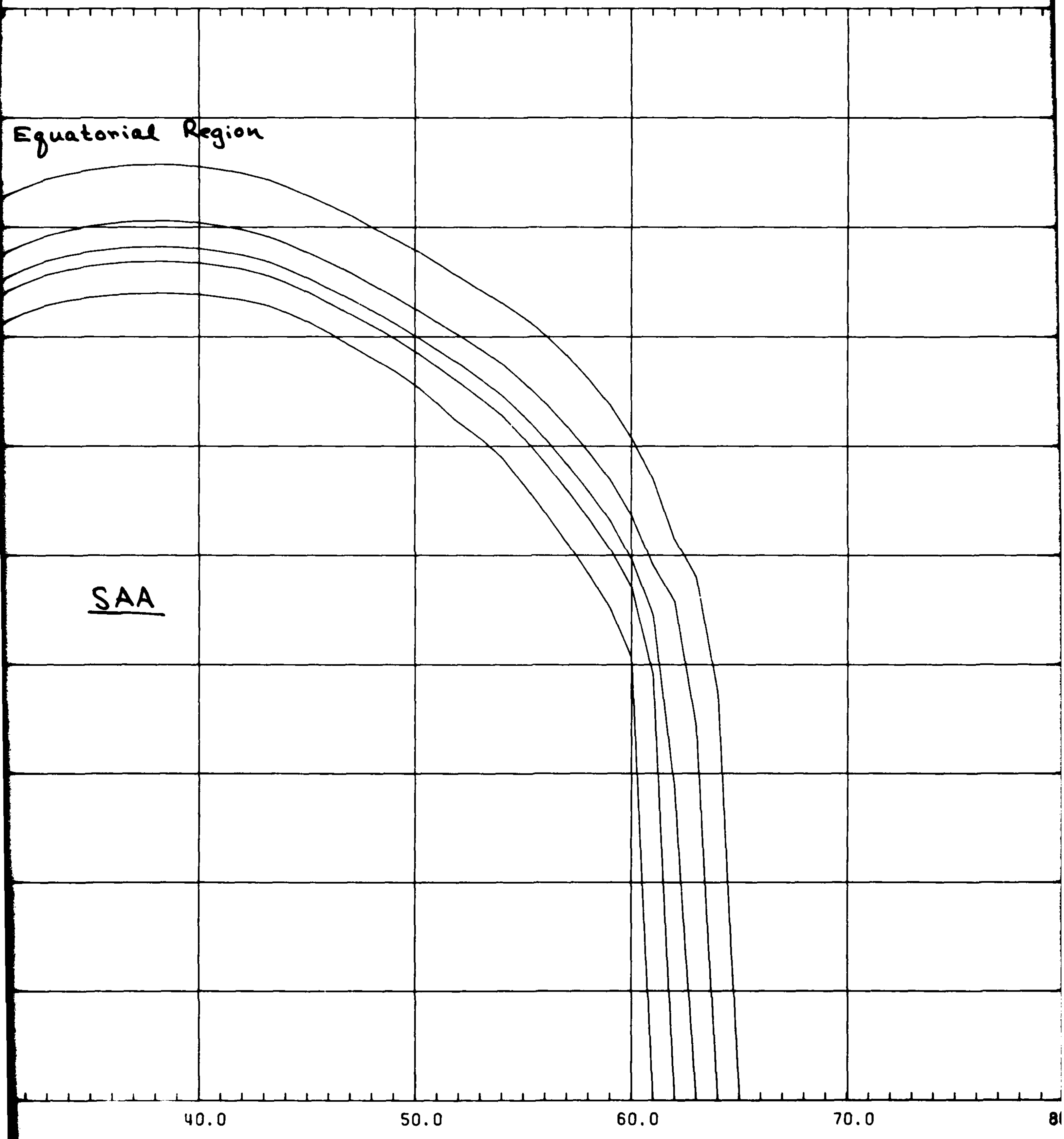

Equatorial Region
Northern Horn
SAA
120.0
130.0
140.0
150.0
160

5

Figure 135


ORBIT: NAVELEX 8
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 9.316662
NASA-GSFC
150.0
160.0
170.0
180.0

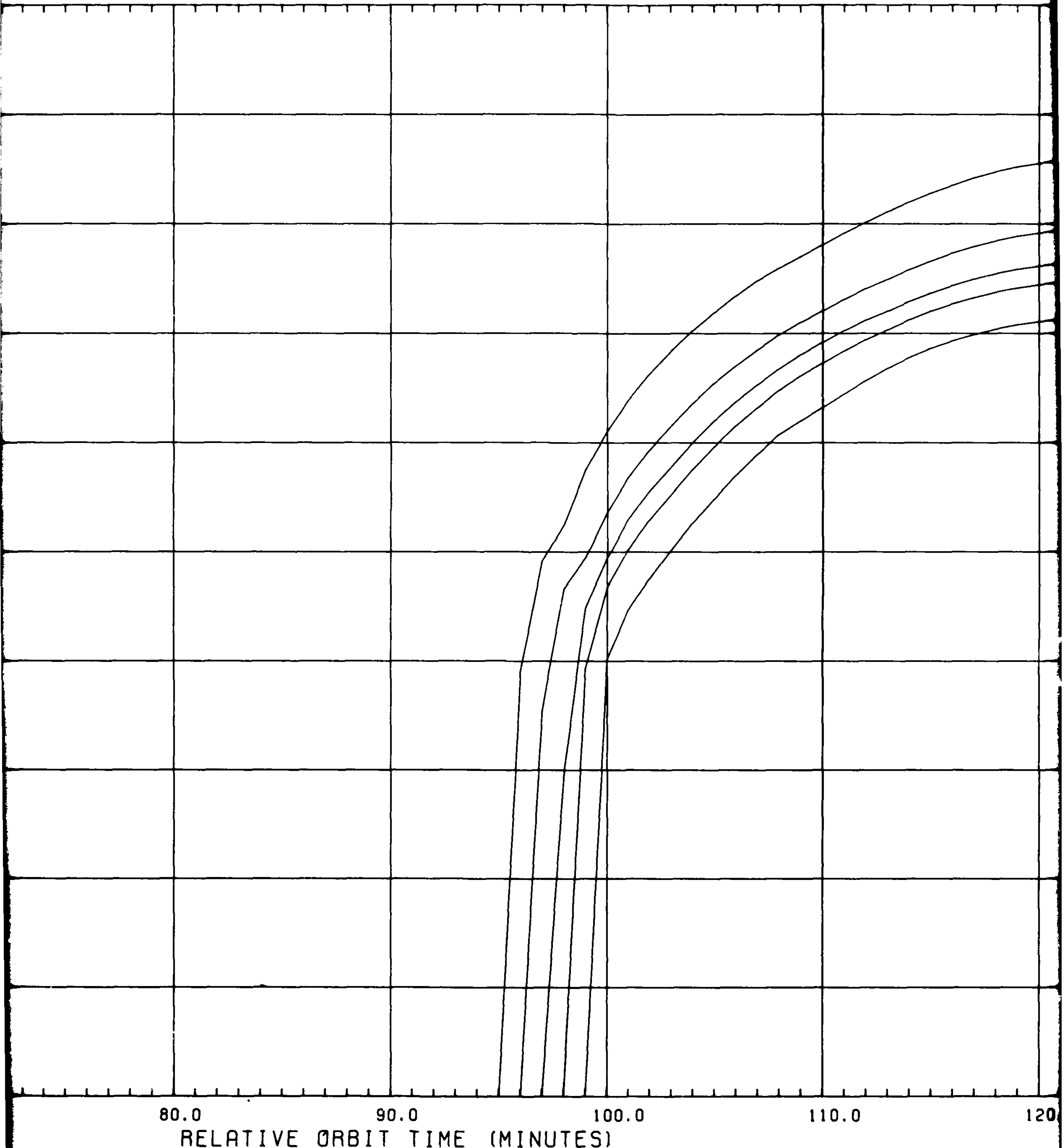

OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial
SAA
START TIME ON TAPE= 5.466663
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0



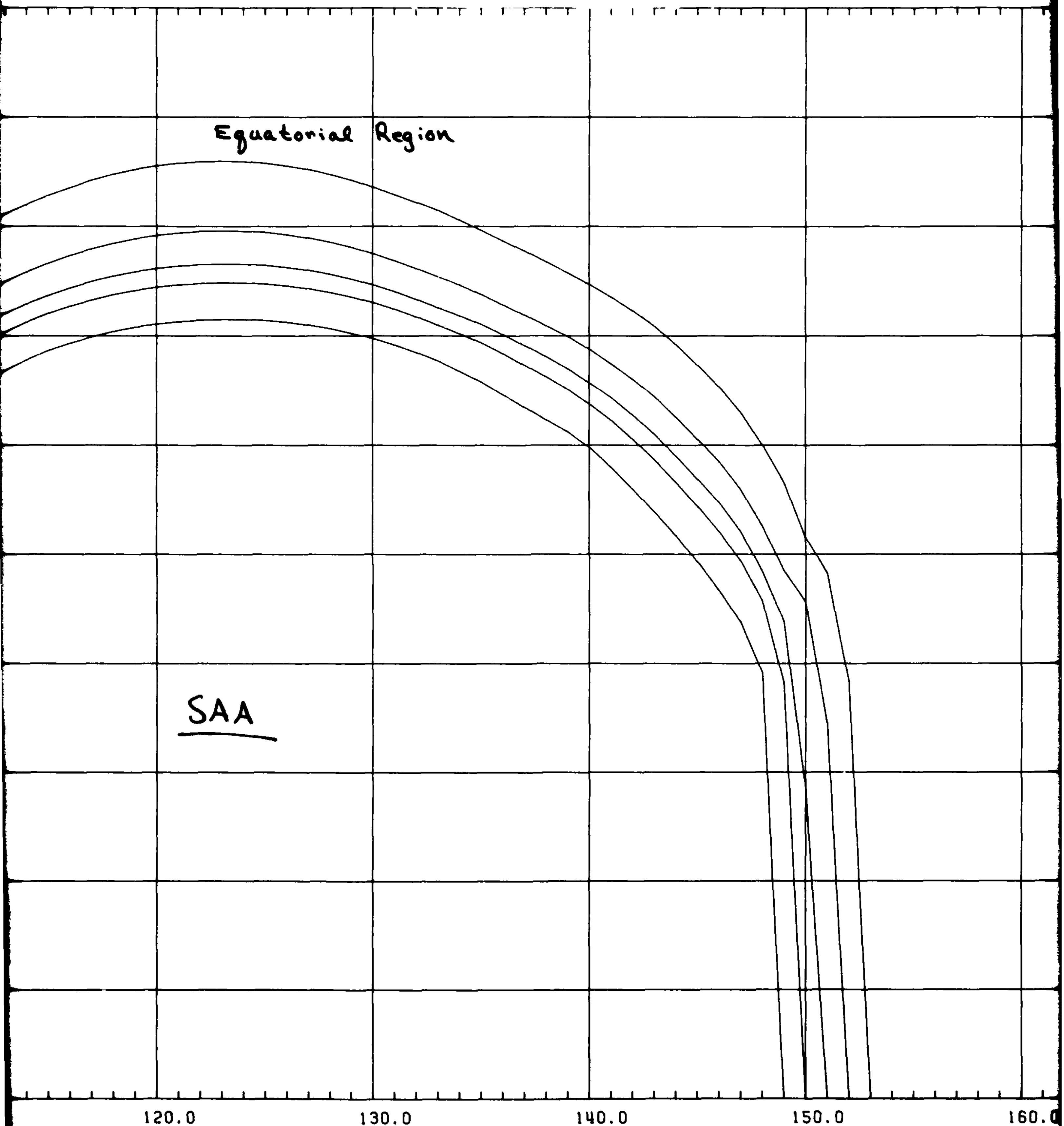
Equatorial Region
SAA
40.0
50.0
60.0
70.0

3

DOSE AT CENTER OF ALUMINUM SPHERES



4



5

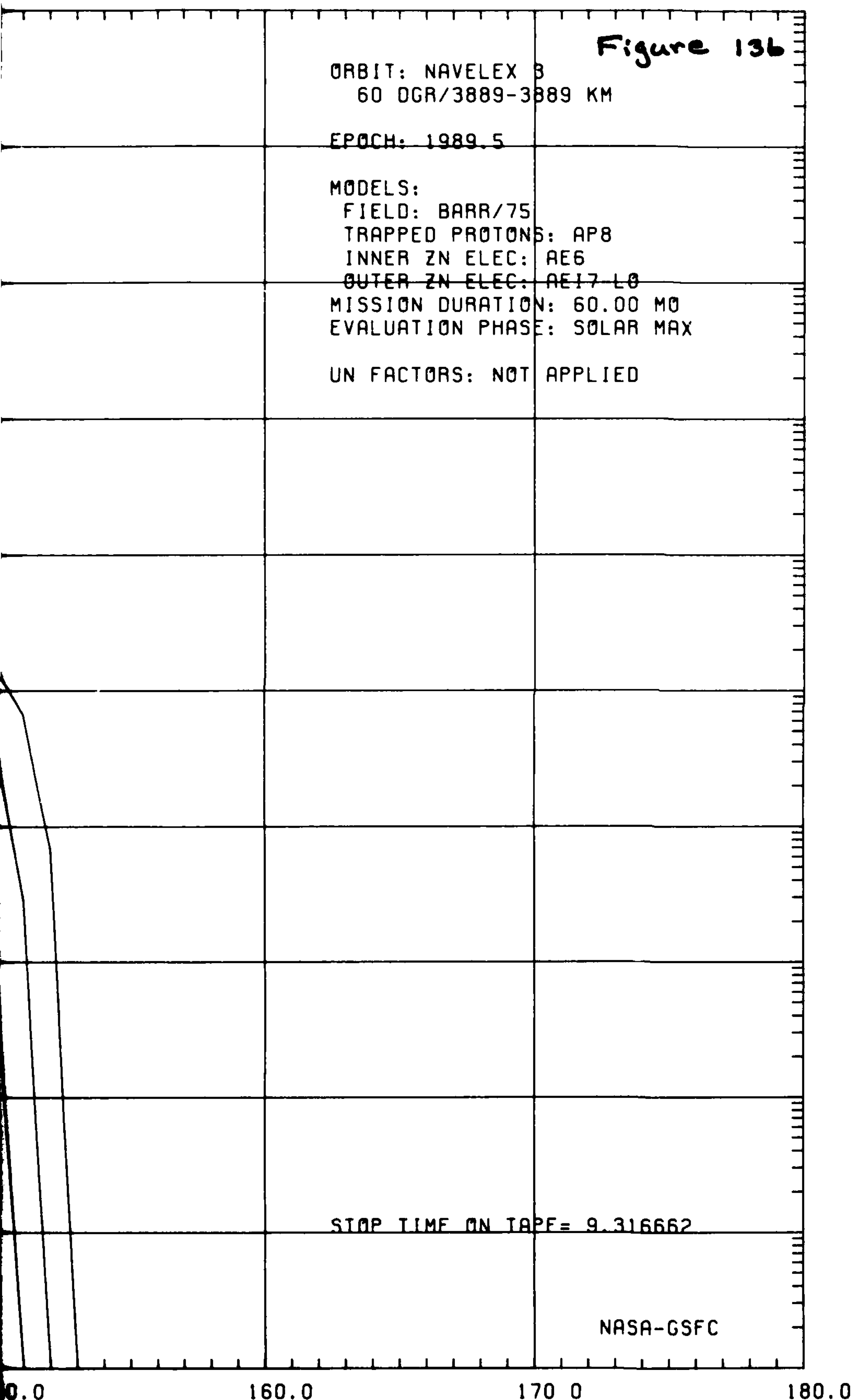
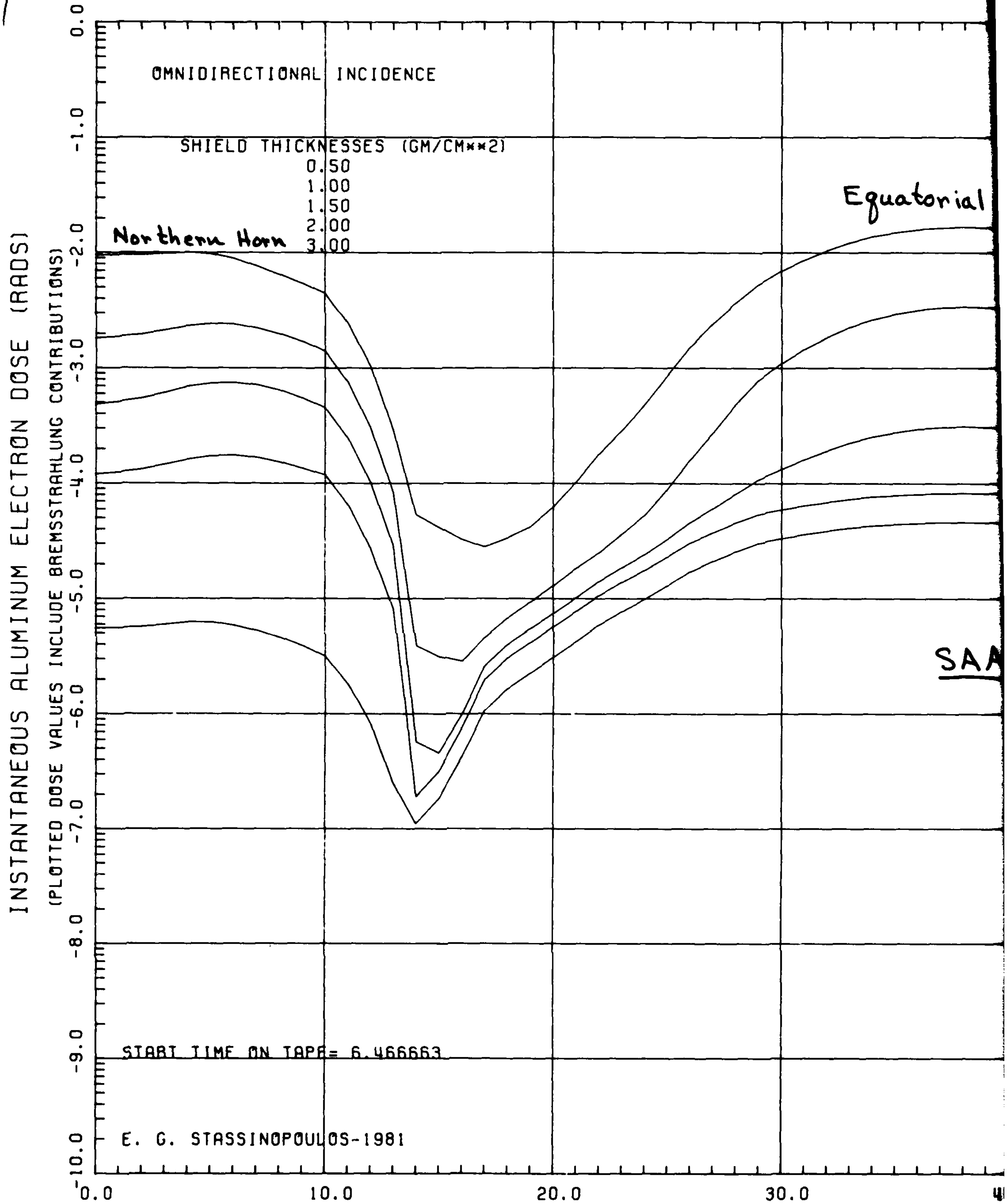
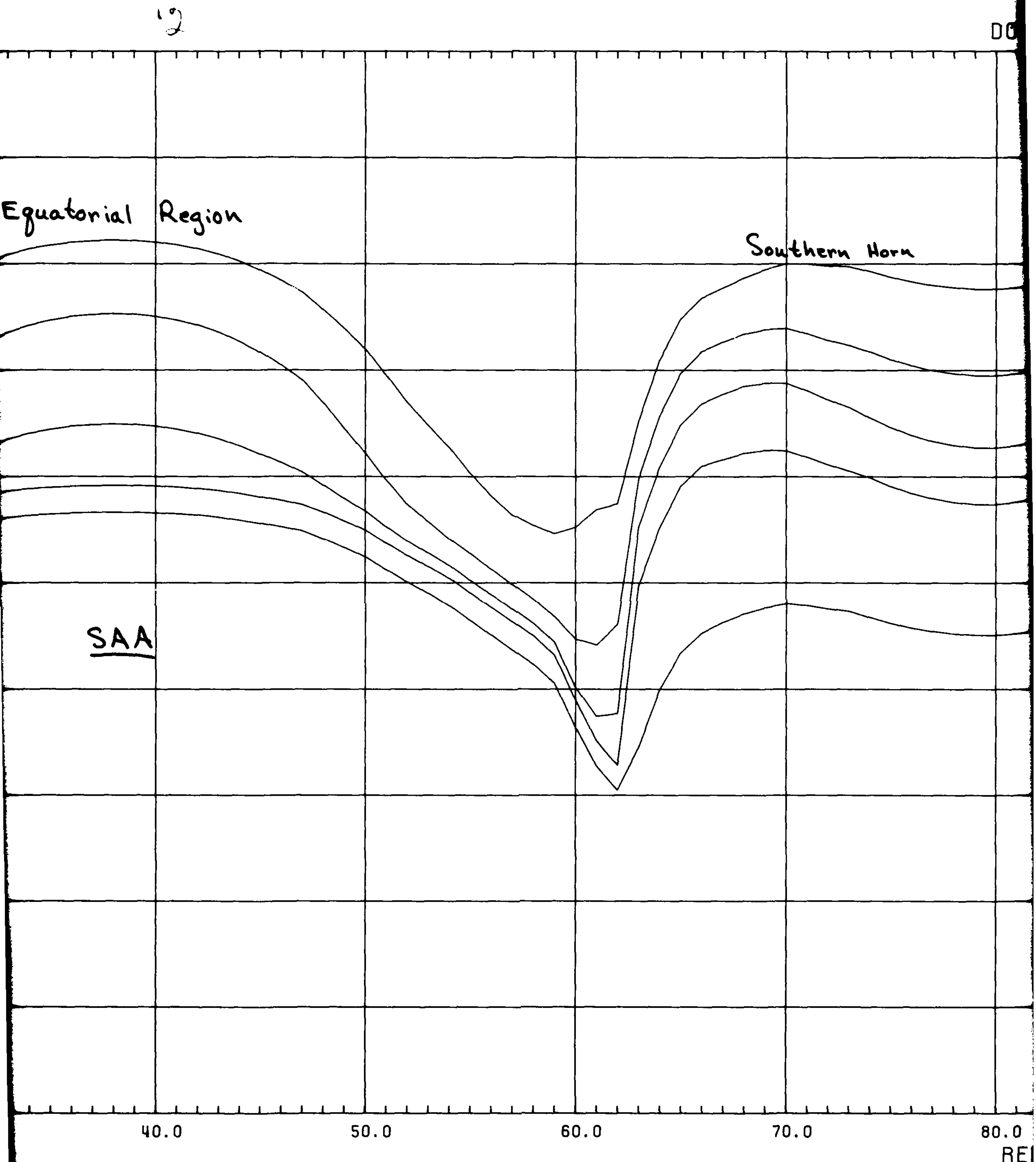


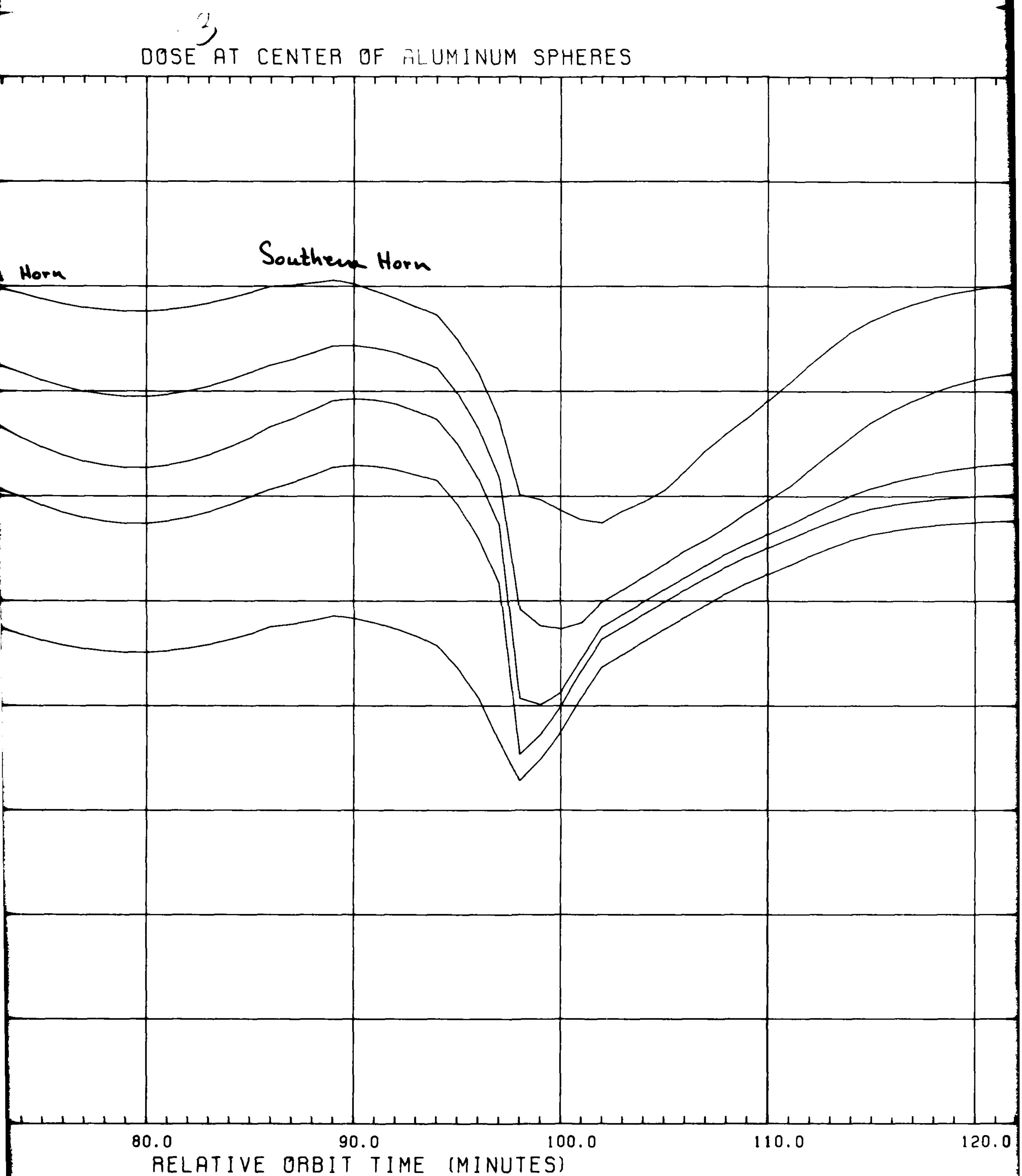
Figure 13b
ORBIT: NAVELEX 3
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 9.316662
NASA-GSFC
0.0
160.0
170 0
180.0



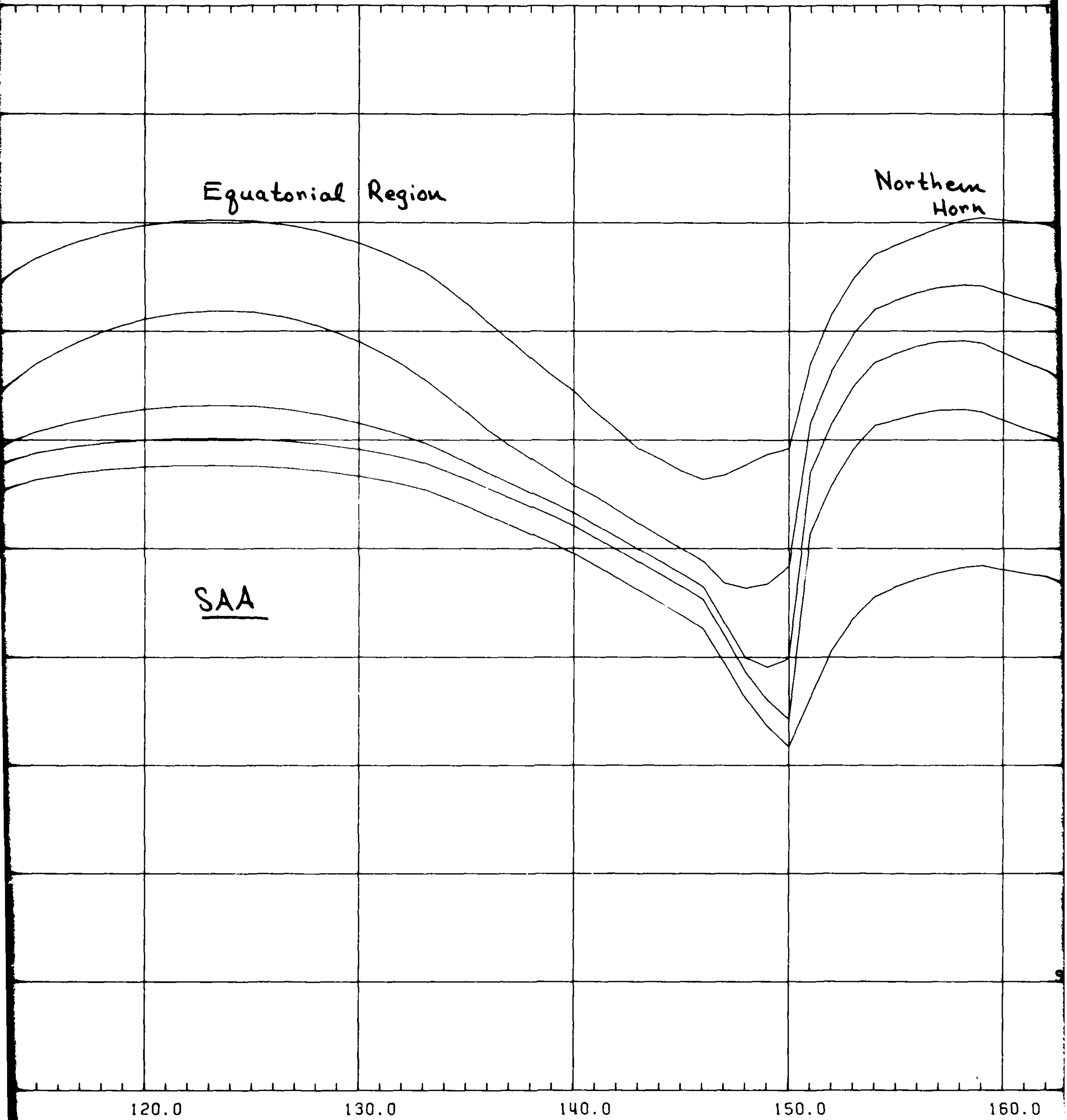
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Equatorial
SAA
START TIME ON TAPE= 6.466663
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0



DO
Equatorial Region
Southern Horn
SAA
40.0
50.0
60.0
70.0
80.0
RE



3
DOSE AT CENTER OF ALUMINUM SPHERES
Horn
Southern Horn
80.0
90.0
100.0
110.0
120.0
RELATIVE ORBIT TIME (MINUTES)


Equatorial Region
Northern Horn
SAA
120.0
130.0
140.0
150.0
160.0

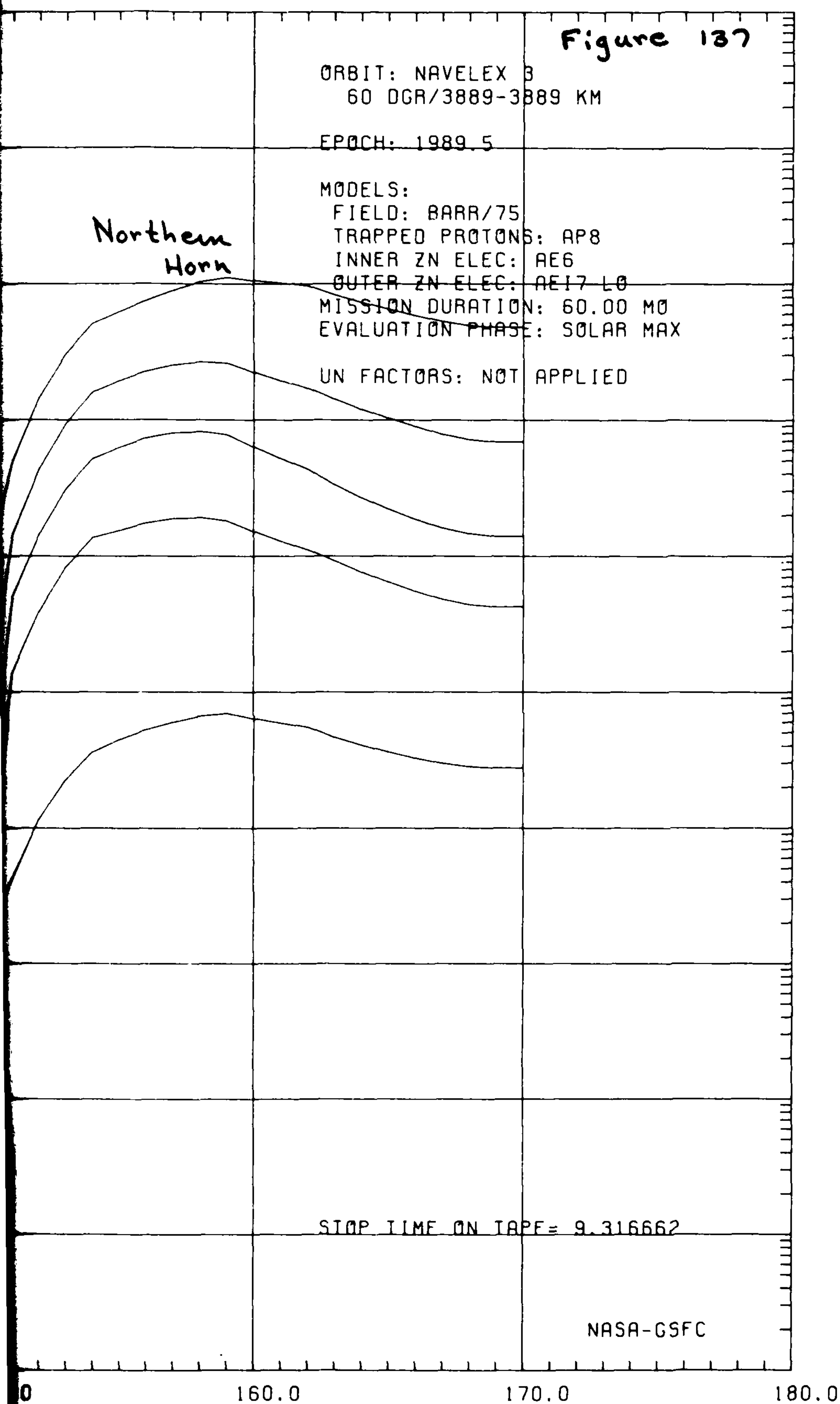
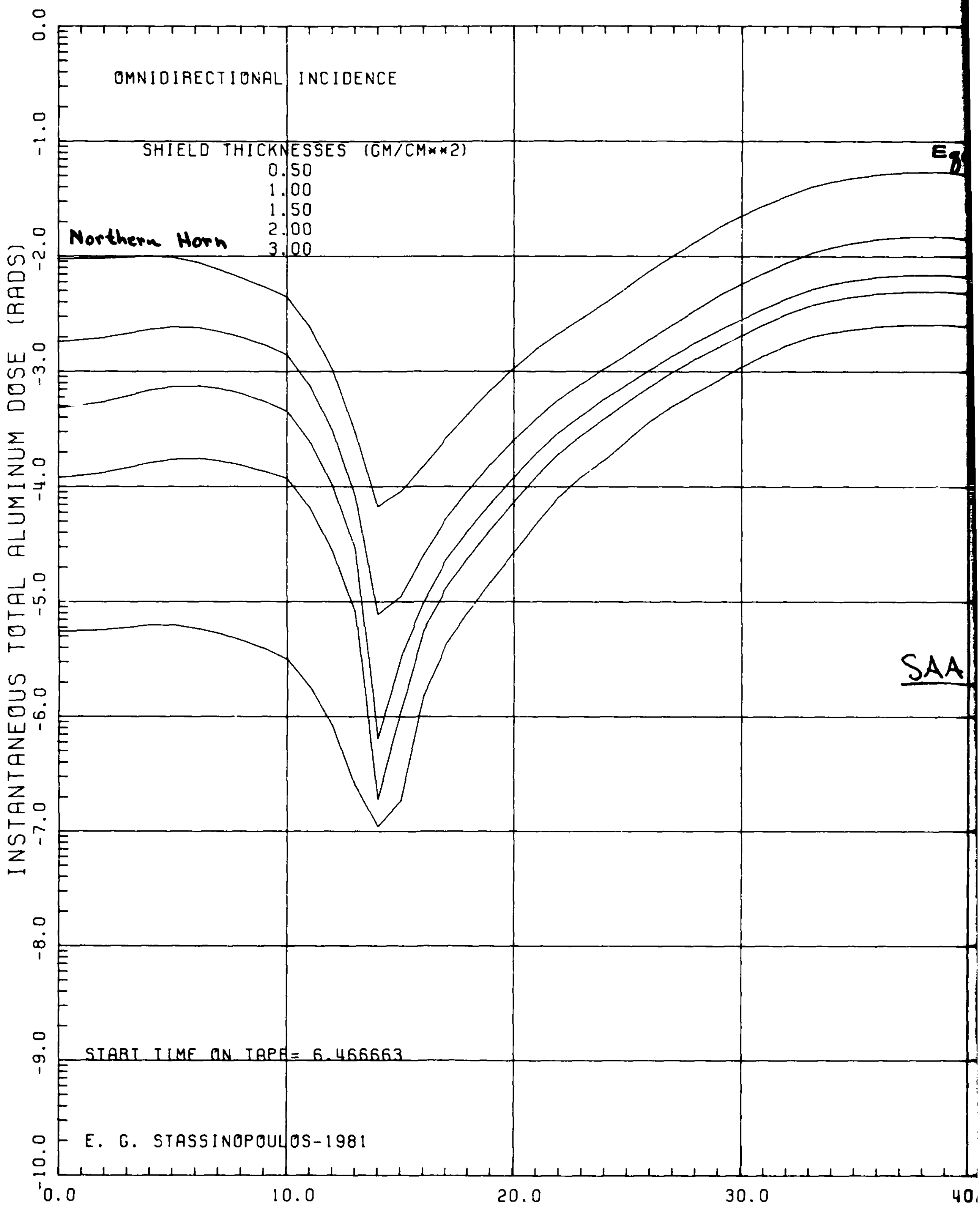
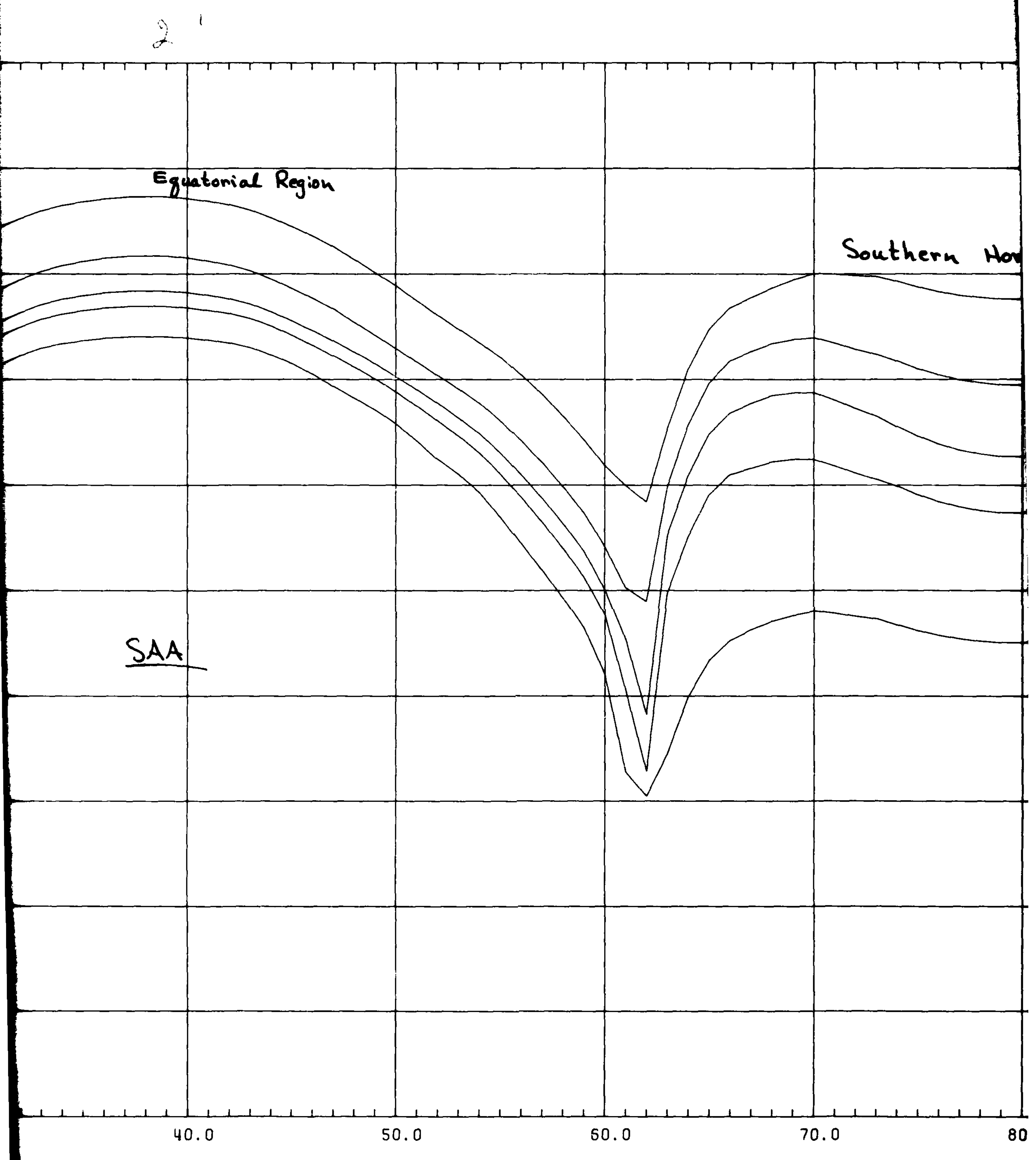
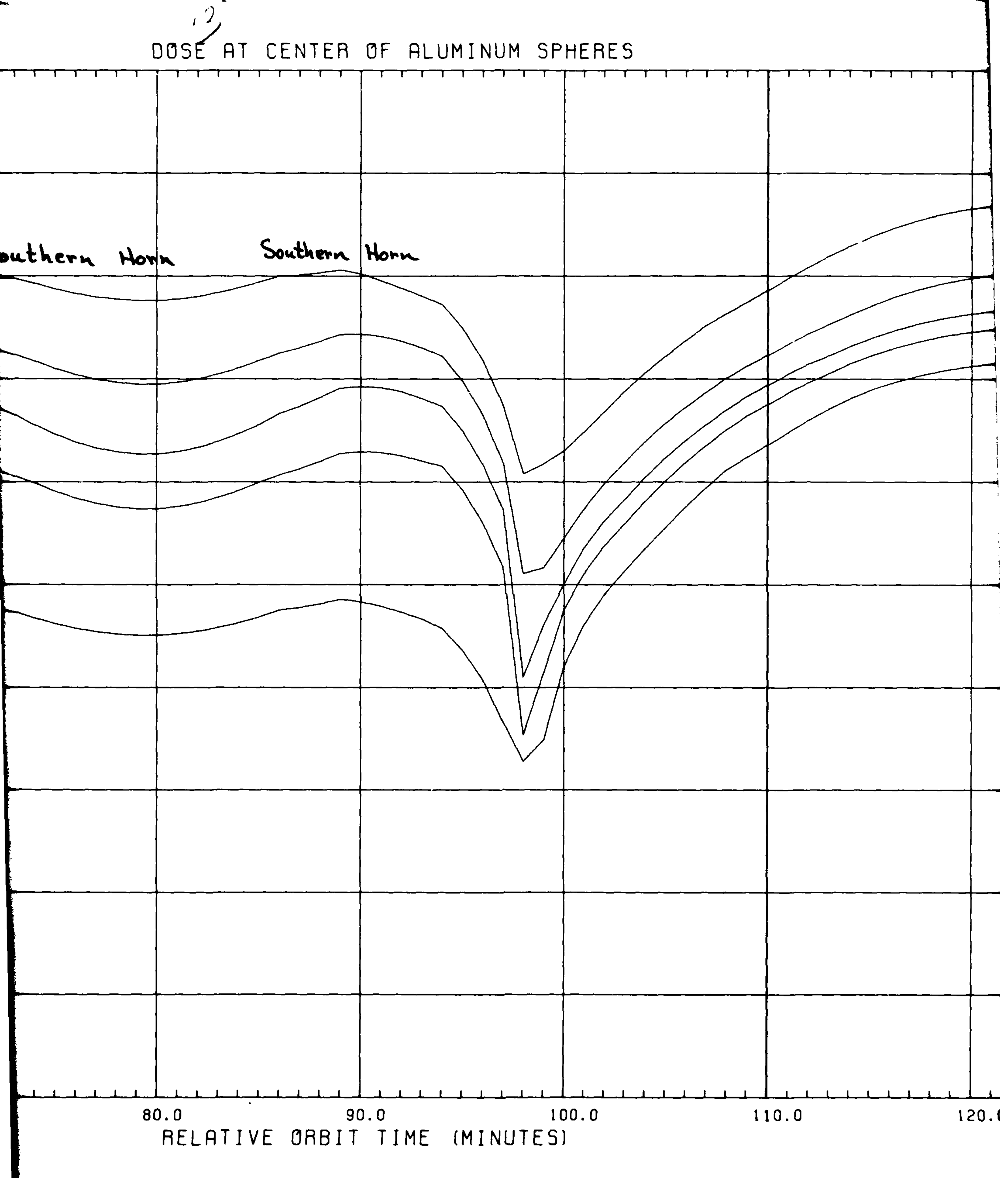


Figure 137
ORBIT: NAVELEX 3
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 9.316662
NASA-GSFC
160.0
170.0
180.0

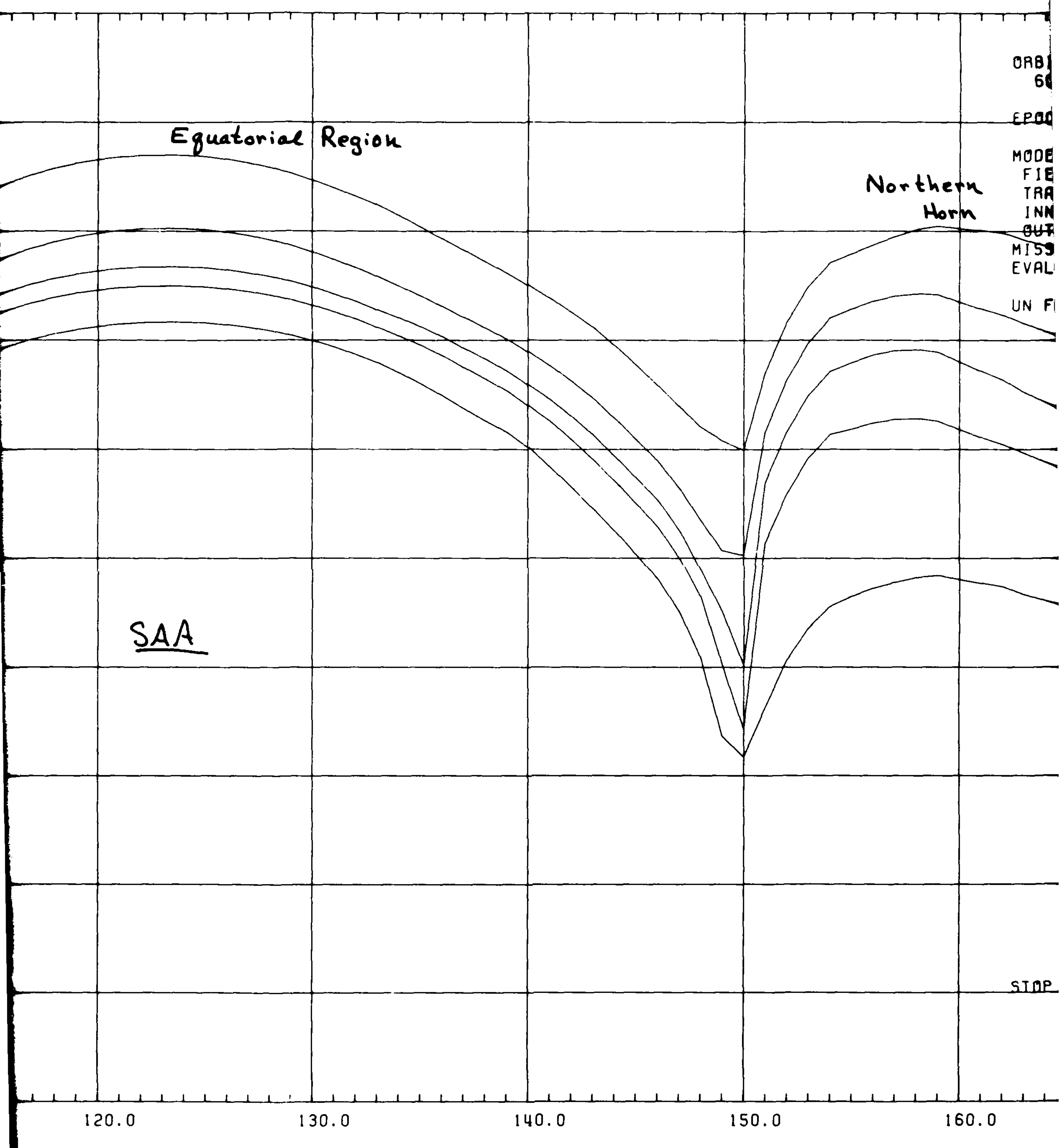

OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
SAA
START TIME ON TAPE= 6.466663
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0



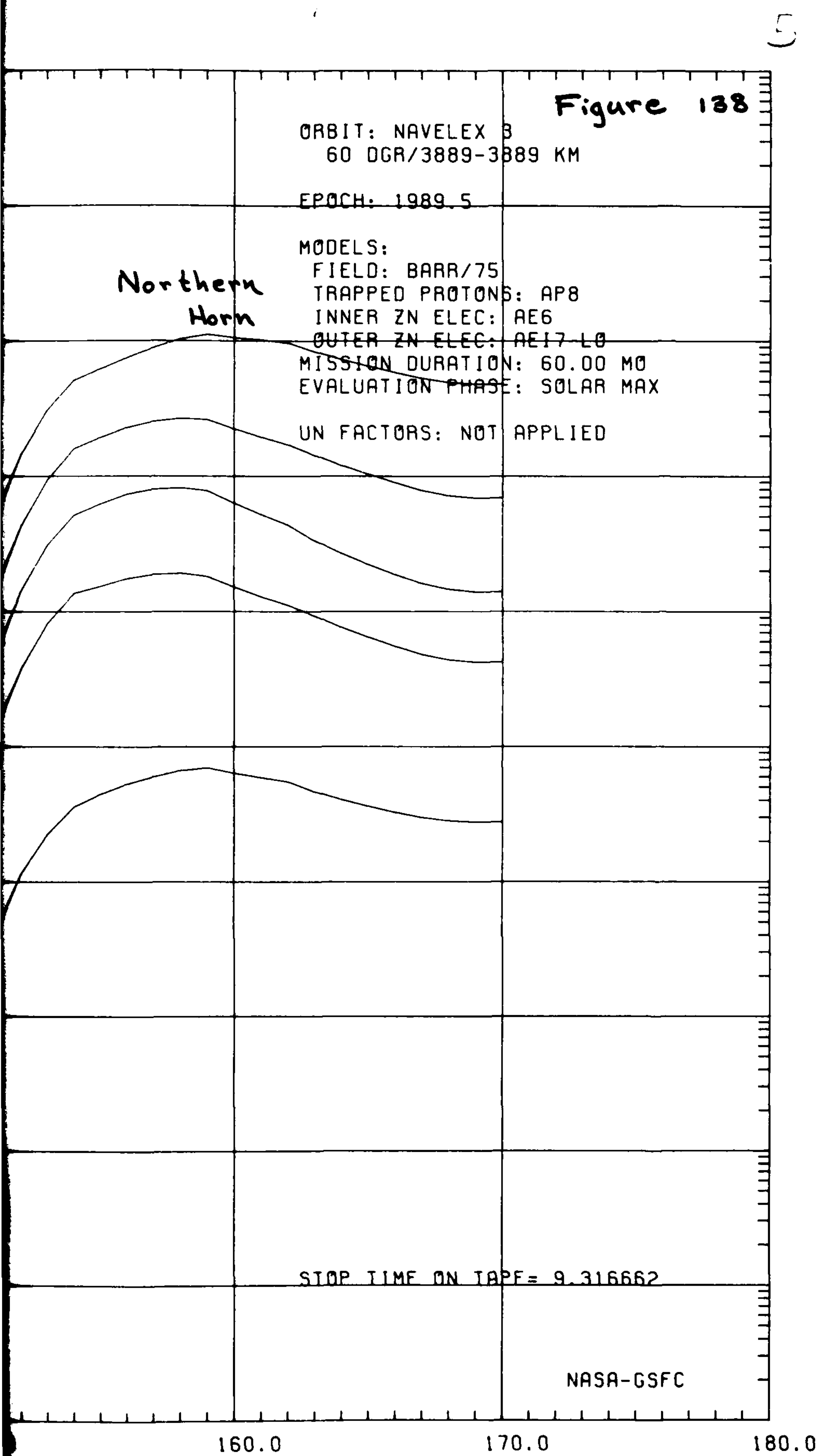
2
Equatorial Region
Southern Hor
SAA
40.0
50.0
60.0
70.0
80

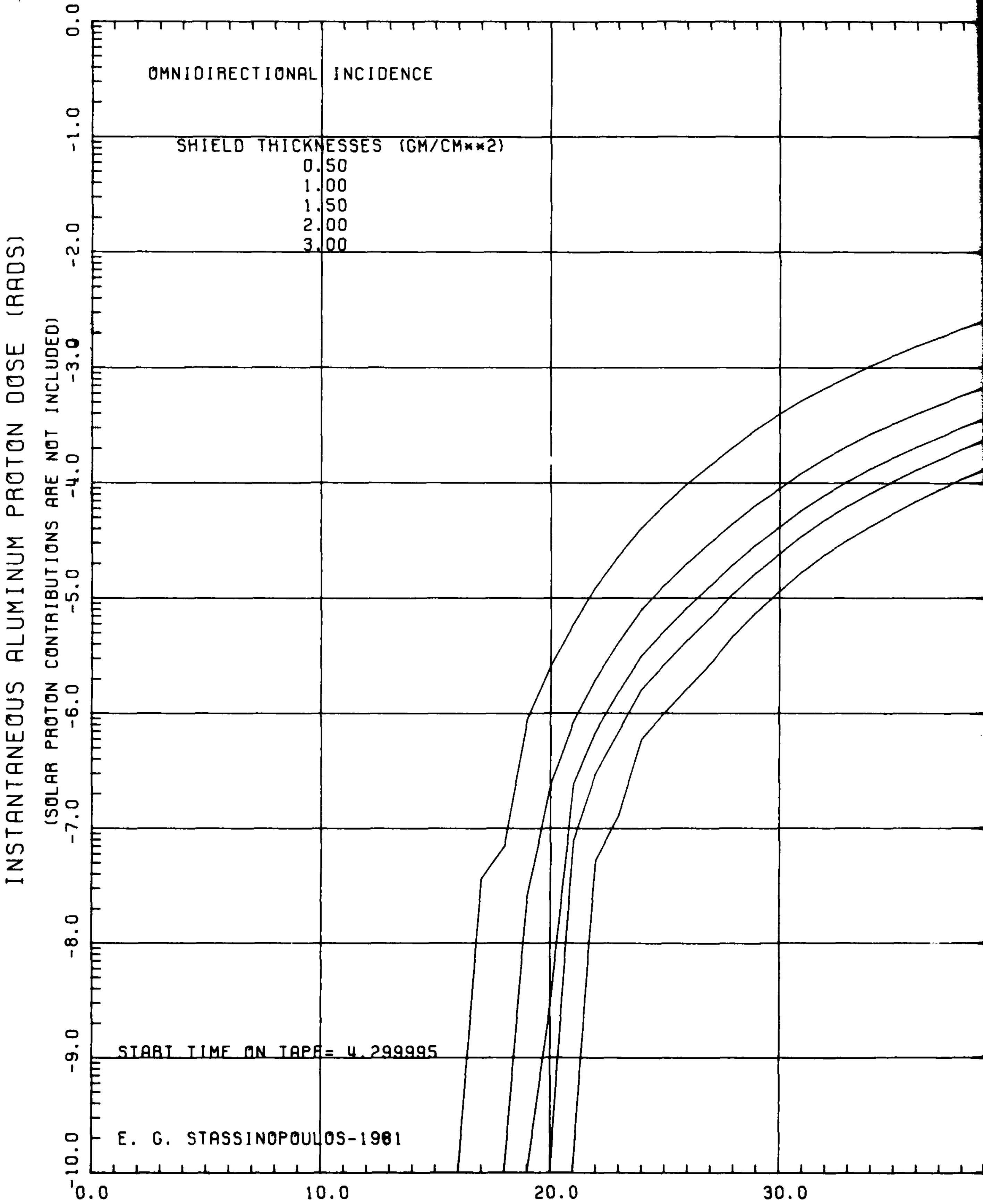


12
DOSE AT CENTER OF ALUMINUM SPHERES
outhern Horn
Southern Horn
80.0
90.0
100.0
110.0
120.
RELATIVE ORBIT TIME (MINUTES)

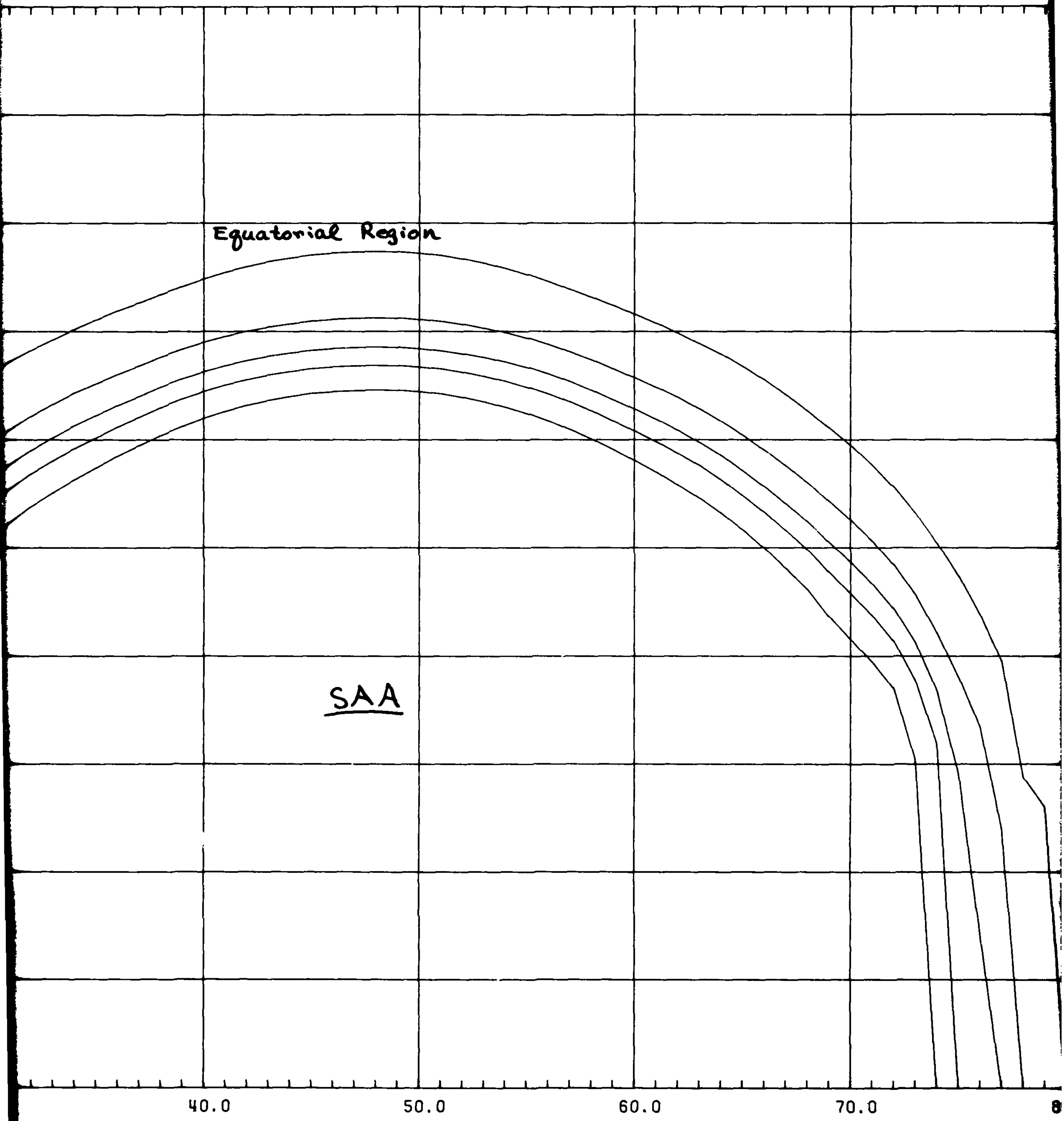


Equatorial Region
Northern Horn
SAA
120.0
130.0
140.0
150.0
160.0

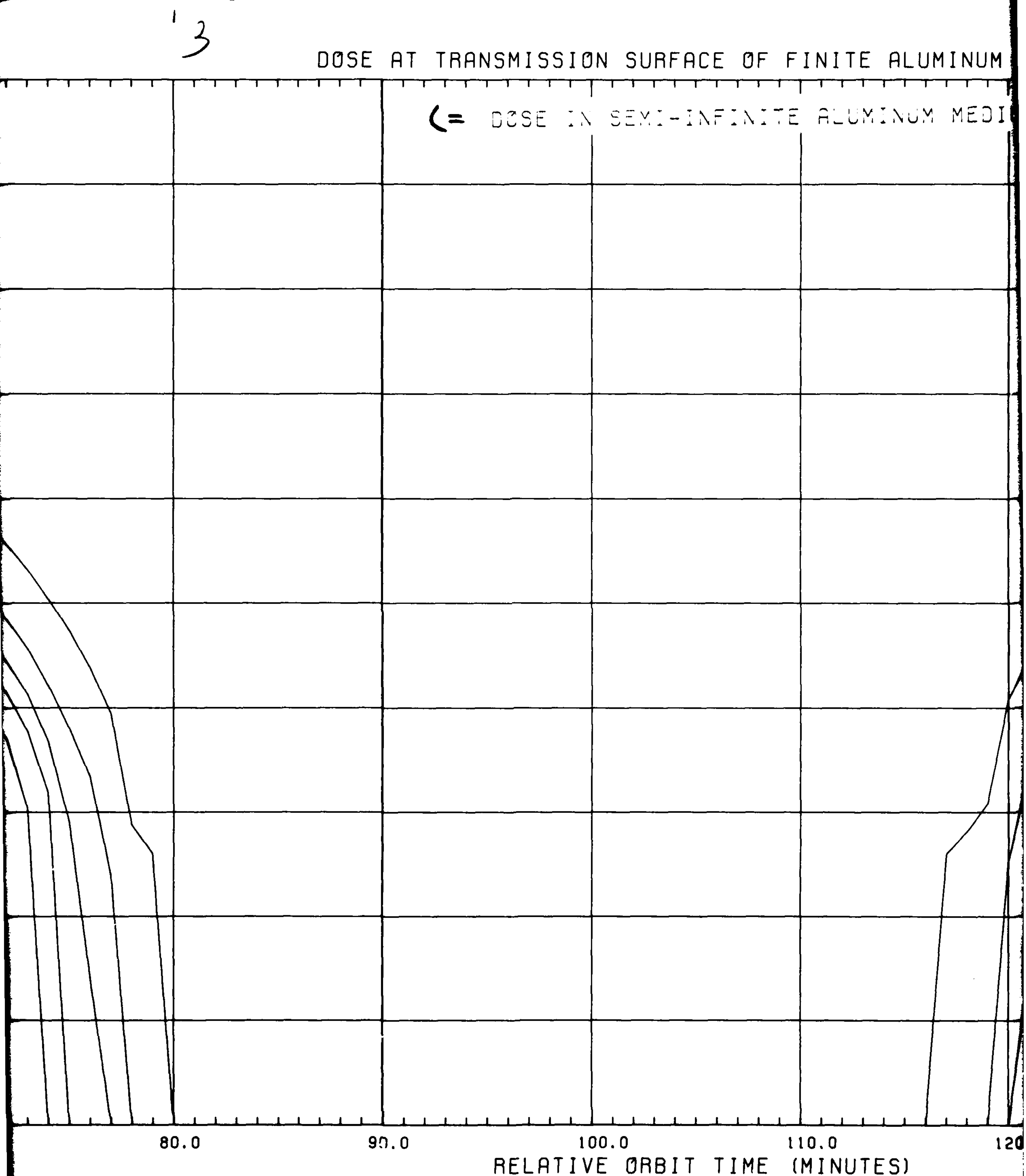

5
Figure 138
ORBIT: NAVELEX 3
60 DGR/3889-3889 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 9.316662
NASA-GSFC
160.0
170.0
180.0



INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
START TIME ON TAPE= 4.299995
E. G. STASSINOPOULOS-1981
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0

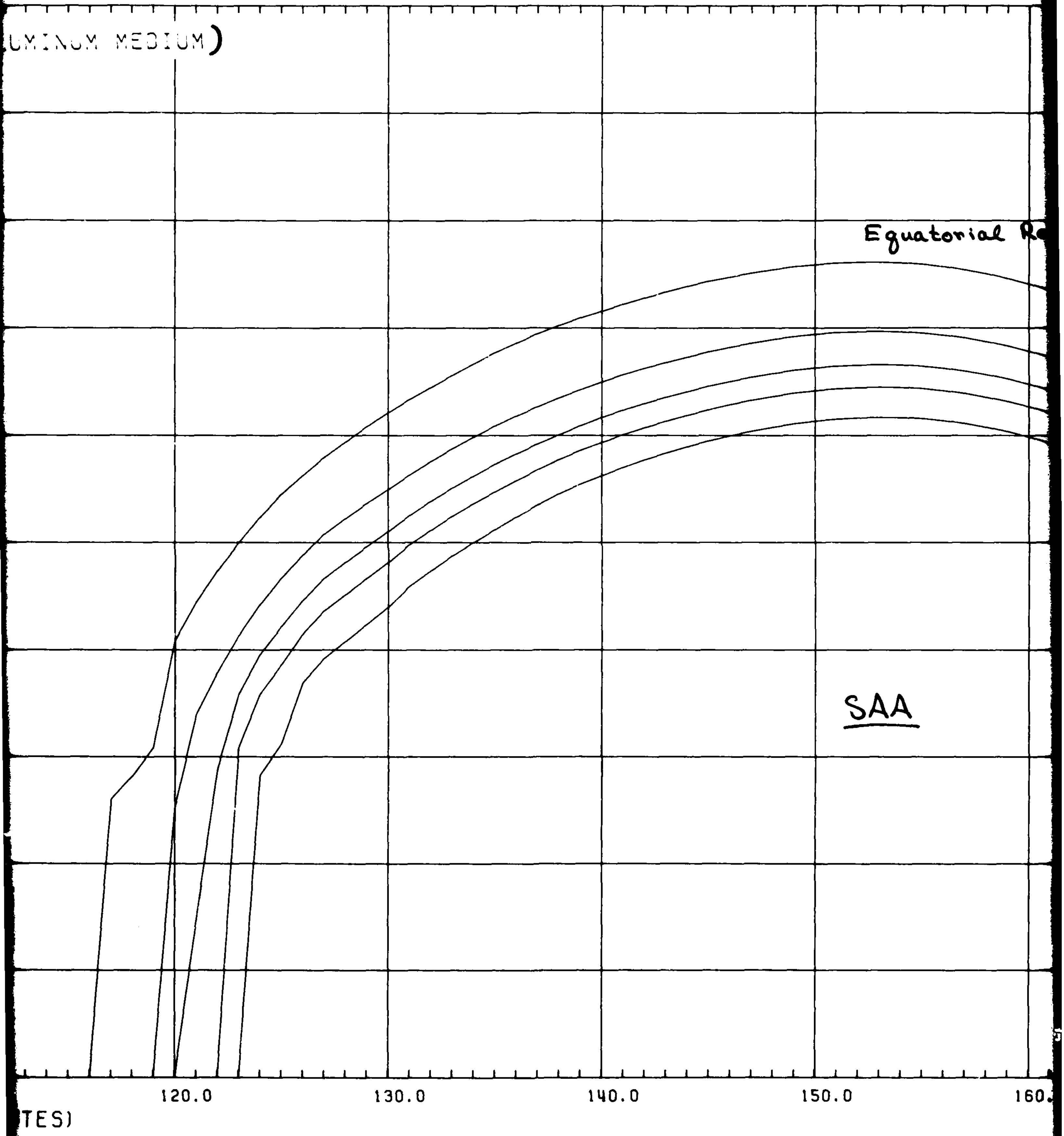


Equatorial Region
SAA
40.0
50.0
60.0
70.0

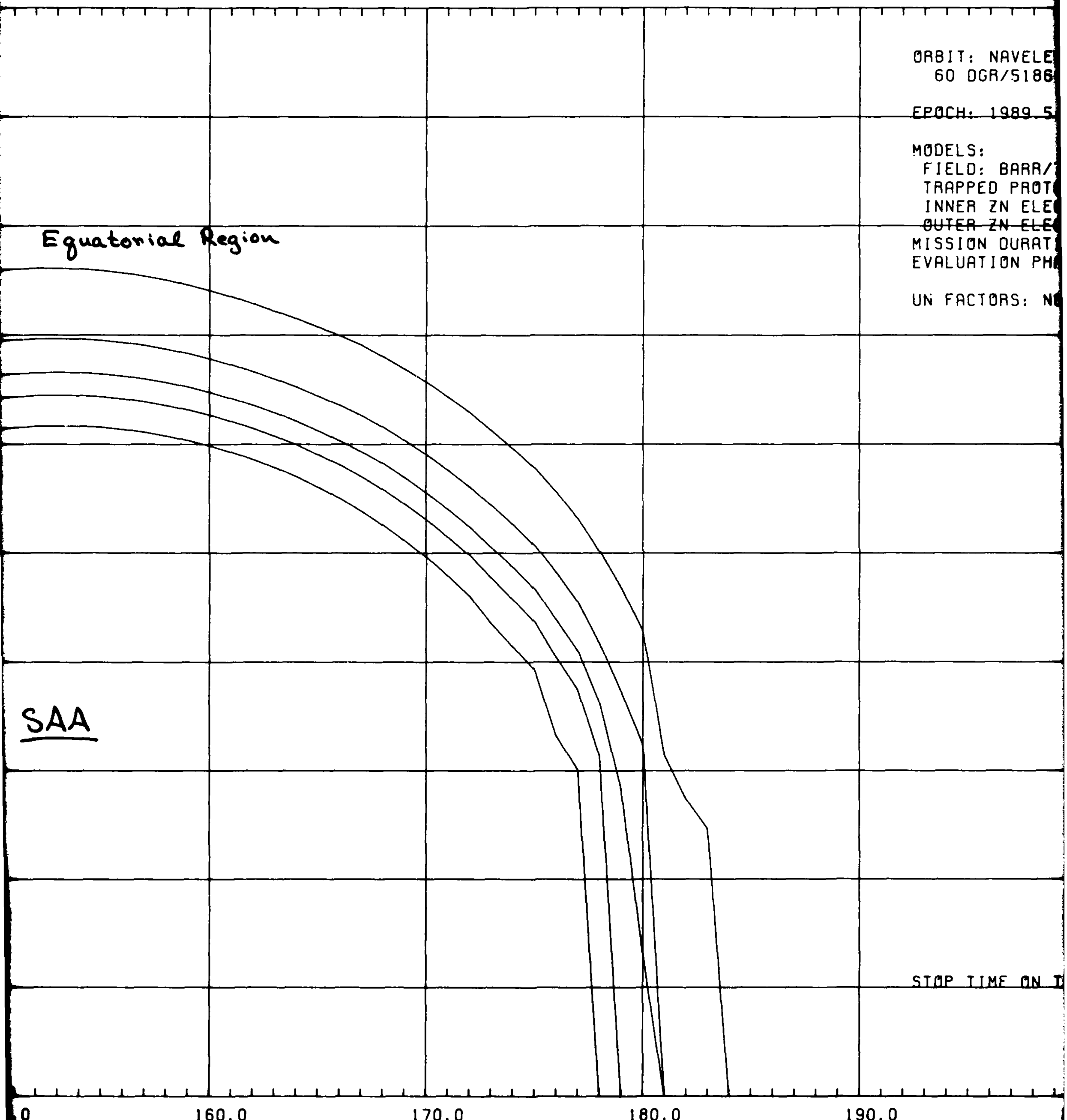

'3
DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINUM
(= DOSE IN SEMI-INFINITE ALUMINUM MEDI
80.0
90.0
100.0
110.0
120
RELATIVE ORBIT TIME (MINUTES)

4

TE ALUMINUM SLAB SHIELDS



5



ORBIT: NAVELE
60 DGR/5186
EPOCH: 1989.5
MODELS:
FIELD: BARR/
TRAPPED PROT
INNER ZN ELE
OUTER ZN ELE
MISSION DURAT
EVALUATION PH
UN FACTORS: N
STOP TIME ON T
Equatorial Region
SAA
160.0
170.0
180.0
190.0

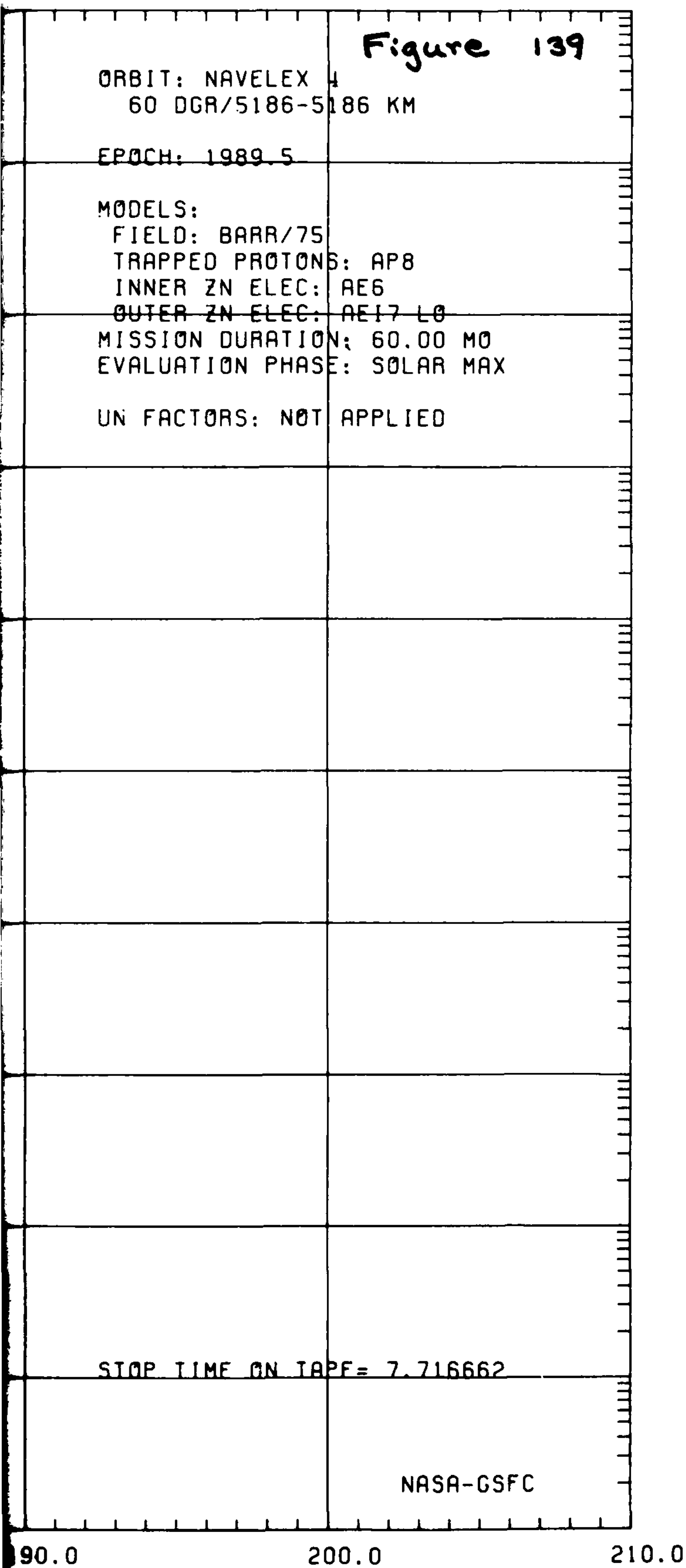
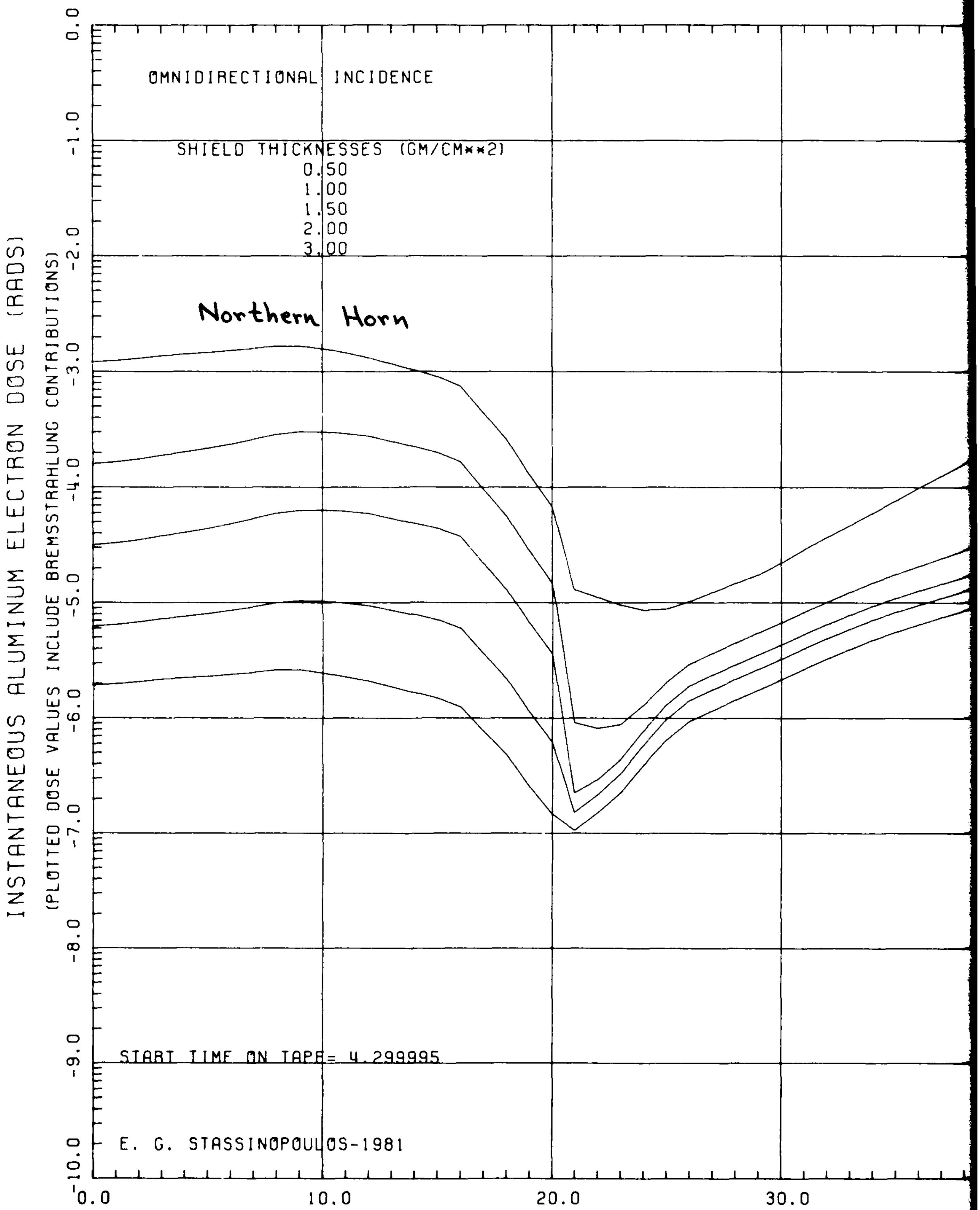
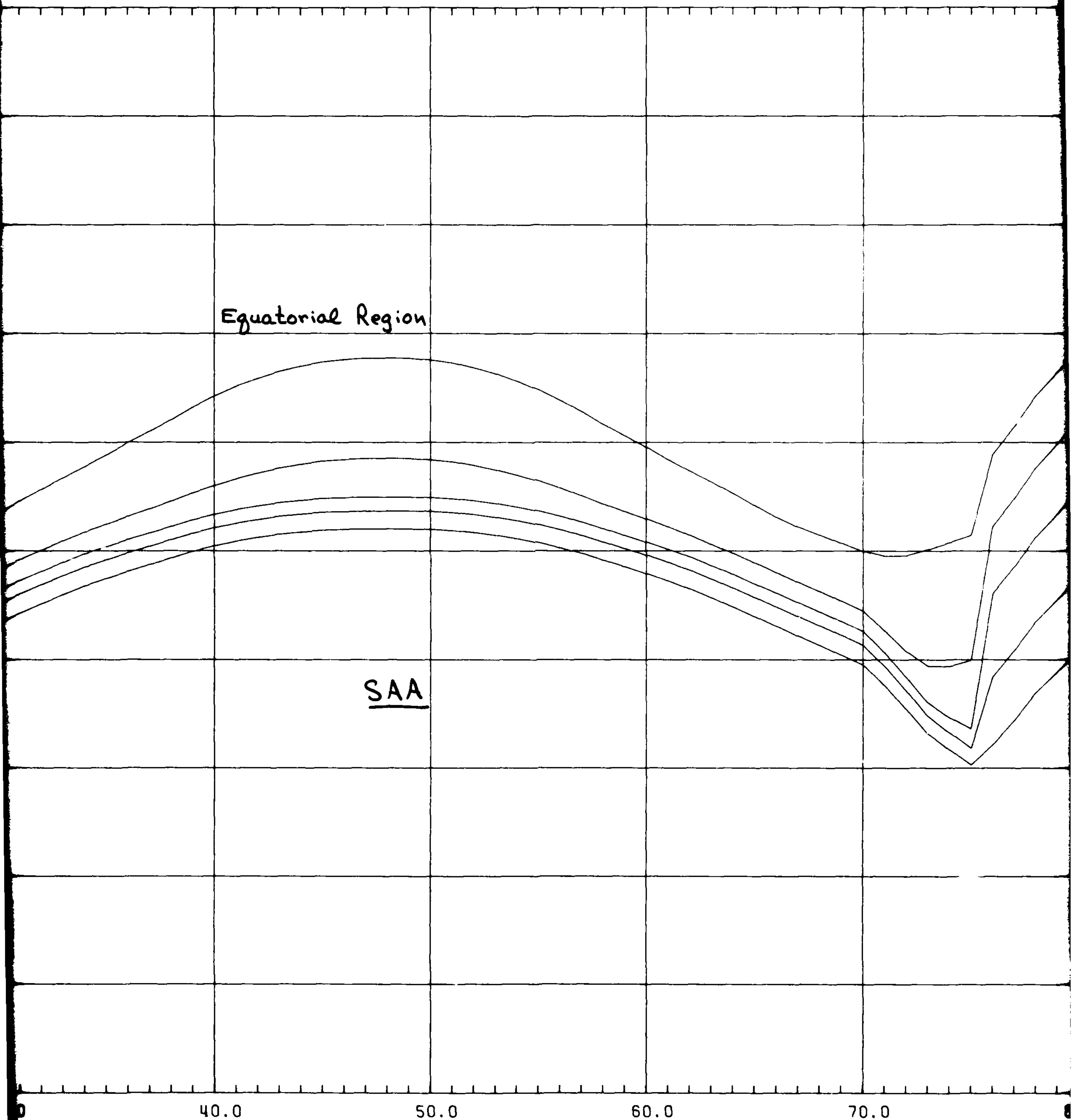

ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 7.716662
NASA-GSFC
190.0
200.0
210.0

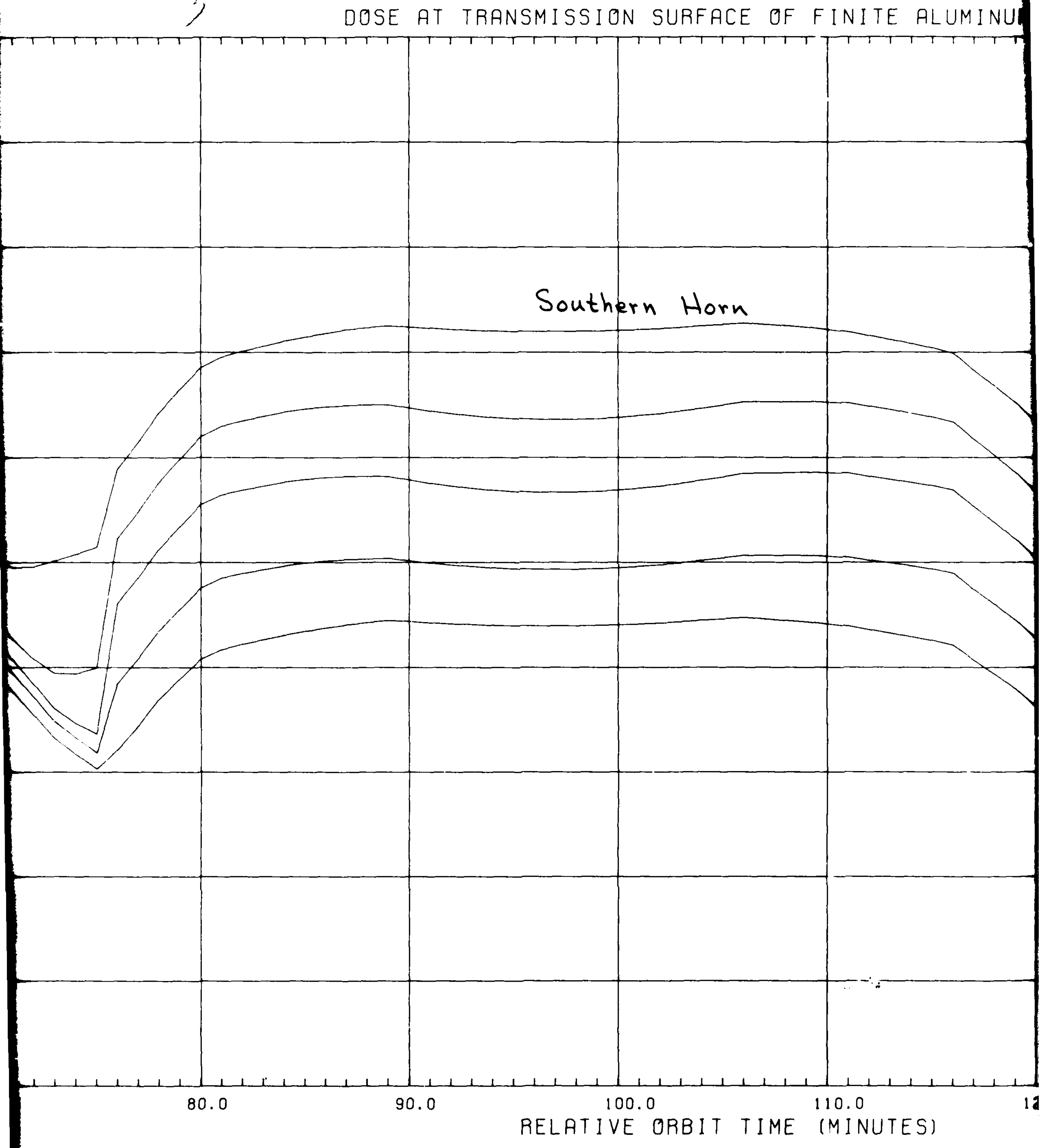
Figure 139



OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
START TIME ON TAPE= 4.299995
E. G. STASSINOPOULOS-1981

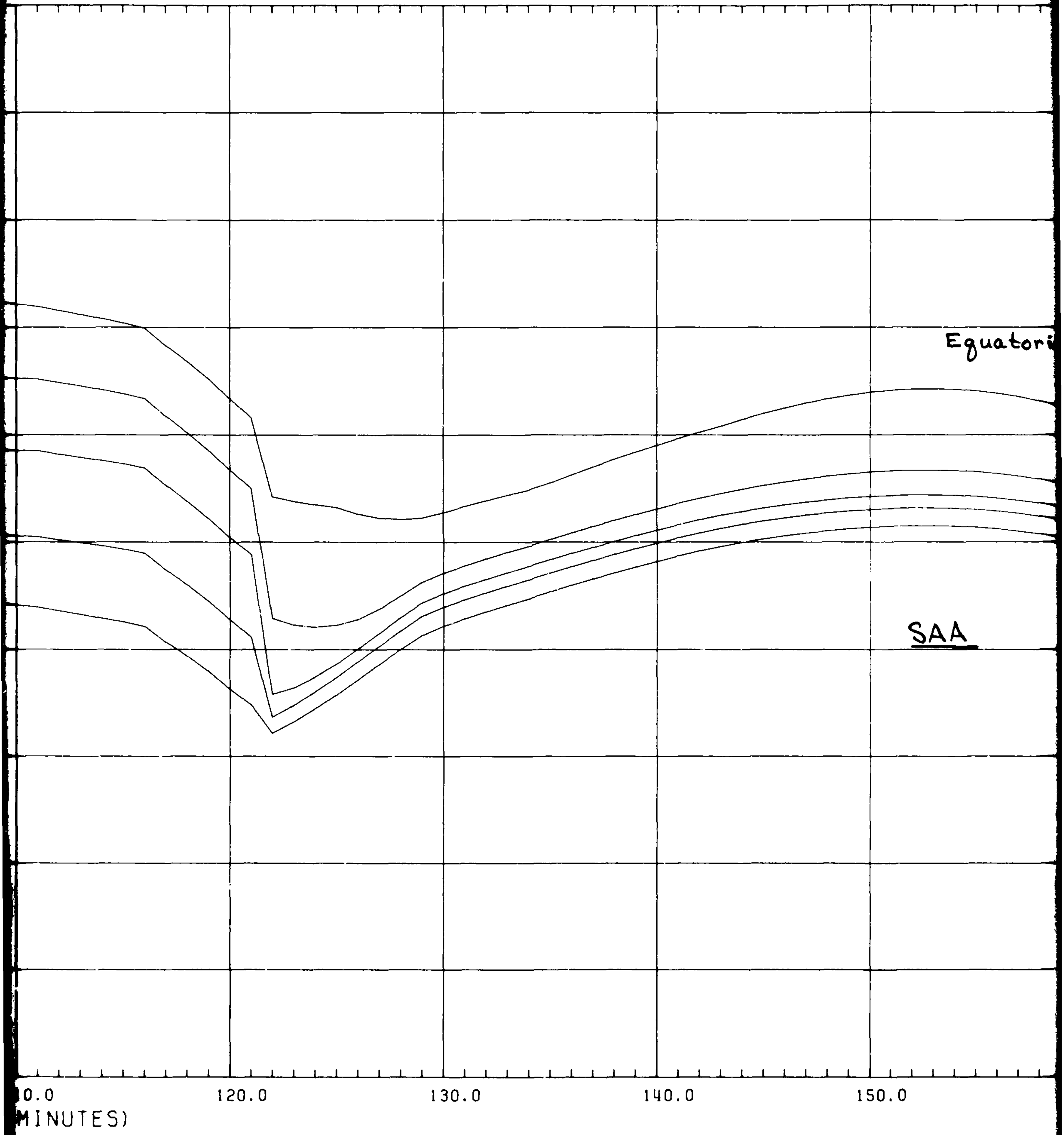


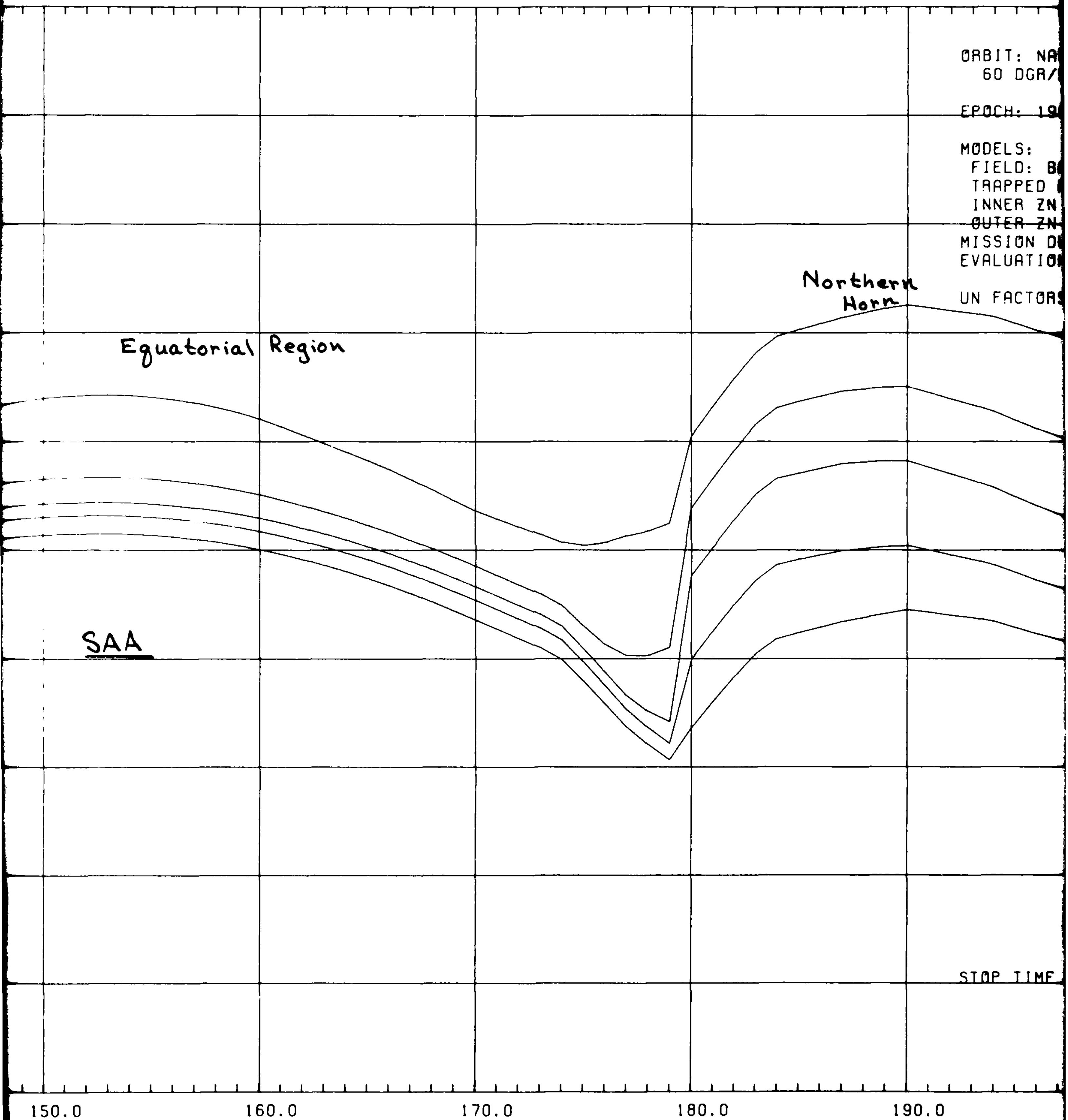
Equatorial Region
SAA
40.0
50.0
60.0
70.0


DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINU
Southern Horn
80.0
90.0
100.0
110.0
RELATIVE ORBIT TIME (MINUTES)

4

FINITE ALUMINUM SLAB SHIELDS





ORBIT: NA
60 DGR/
EPOCH: 19
MODELS:
FIELD: B
TRAPPED
INNER ZN
OUTER ZN
MISSION D
EVALUATIO
UN FACTORS
STOP TIME
Northern Horn
Equatorial Region
SAA
150.0
160.0
170.0
180.0
190.0

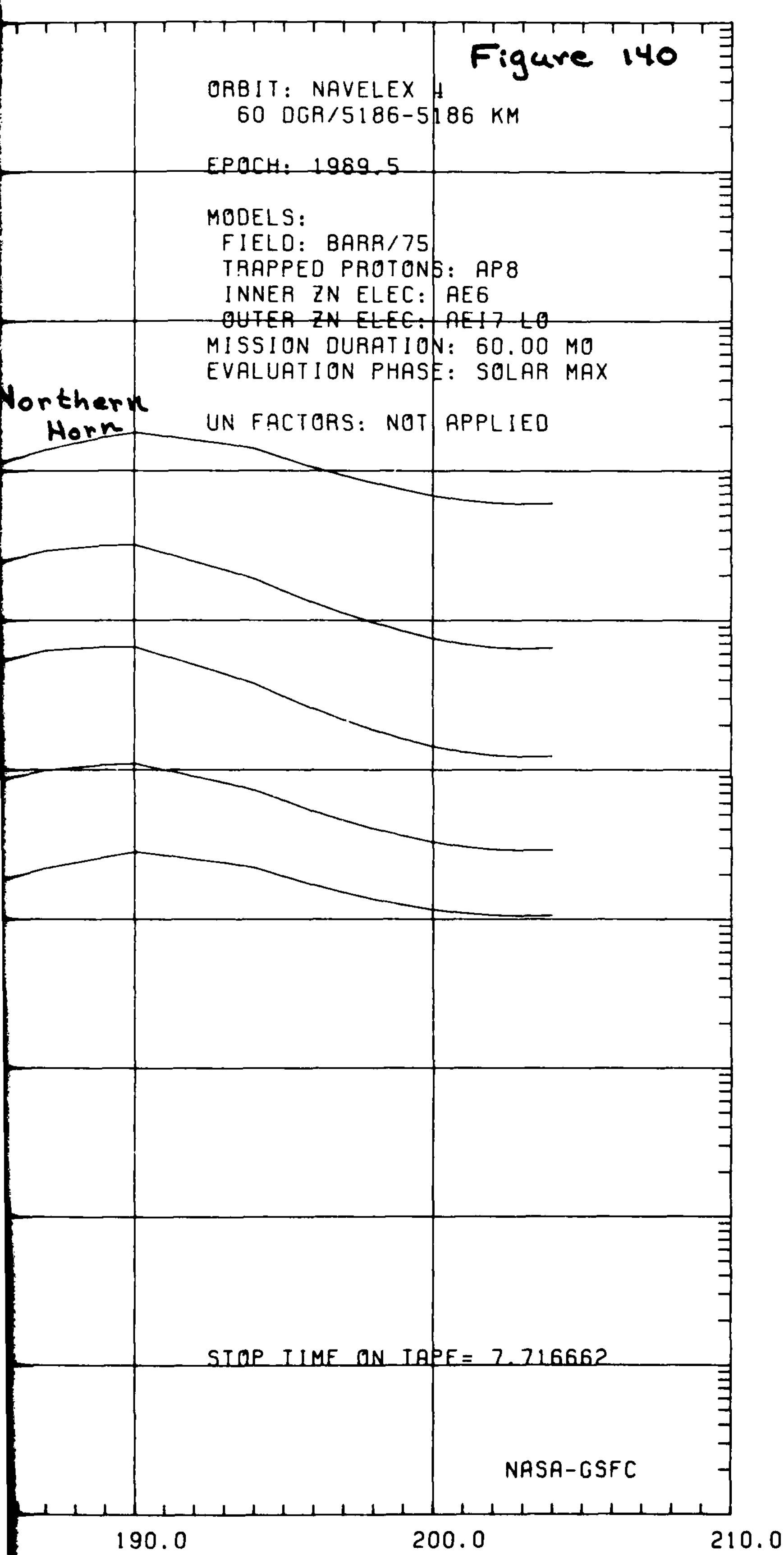
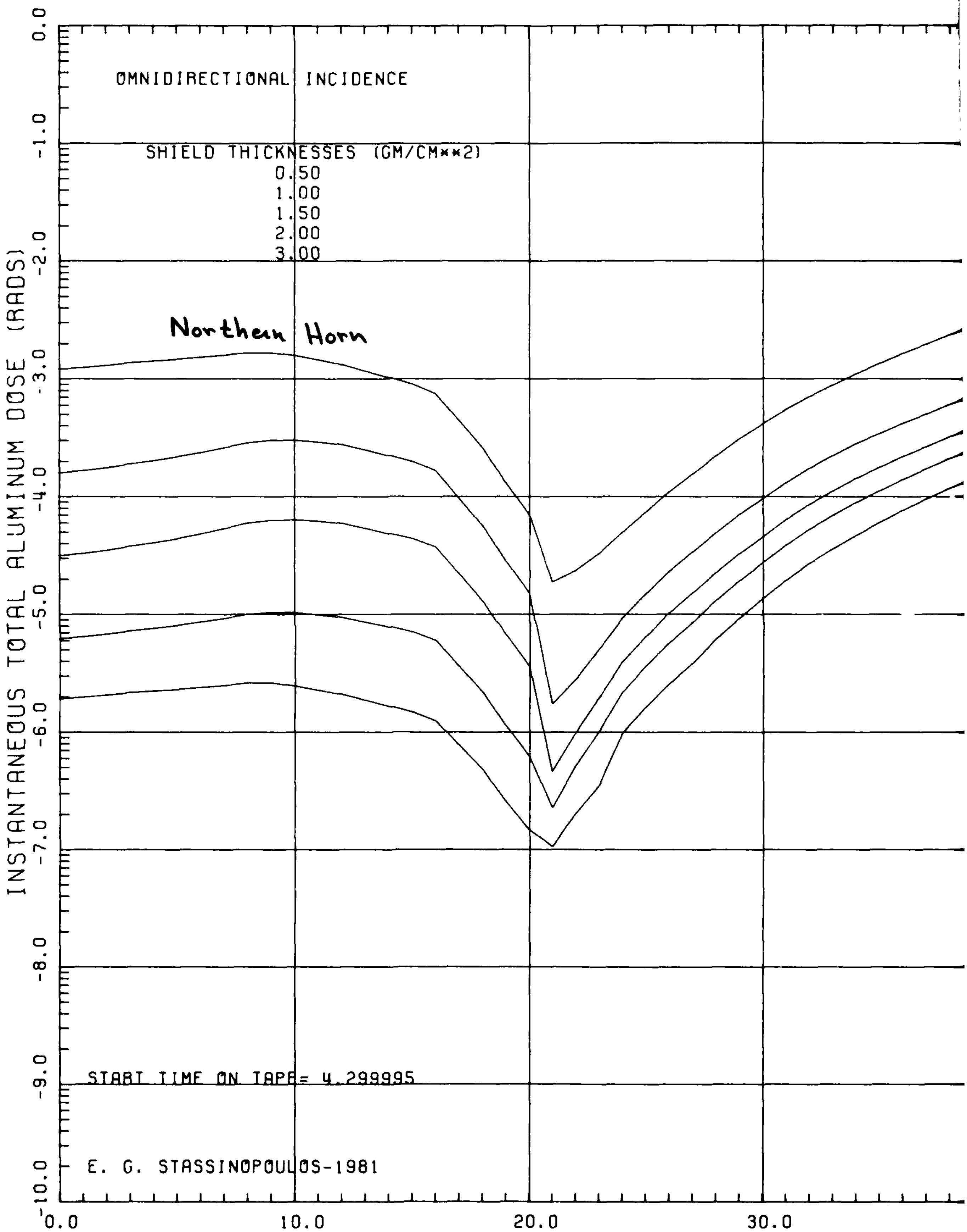
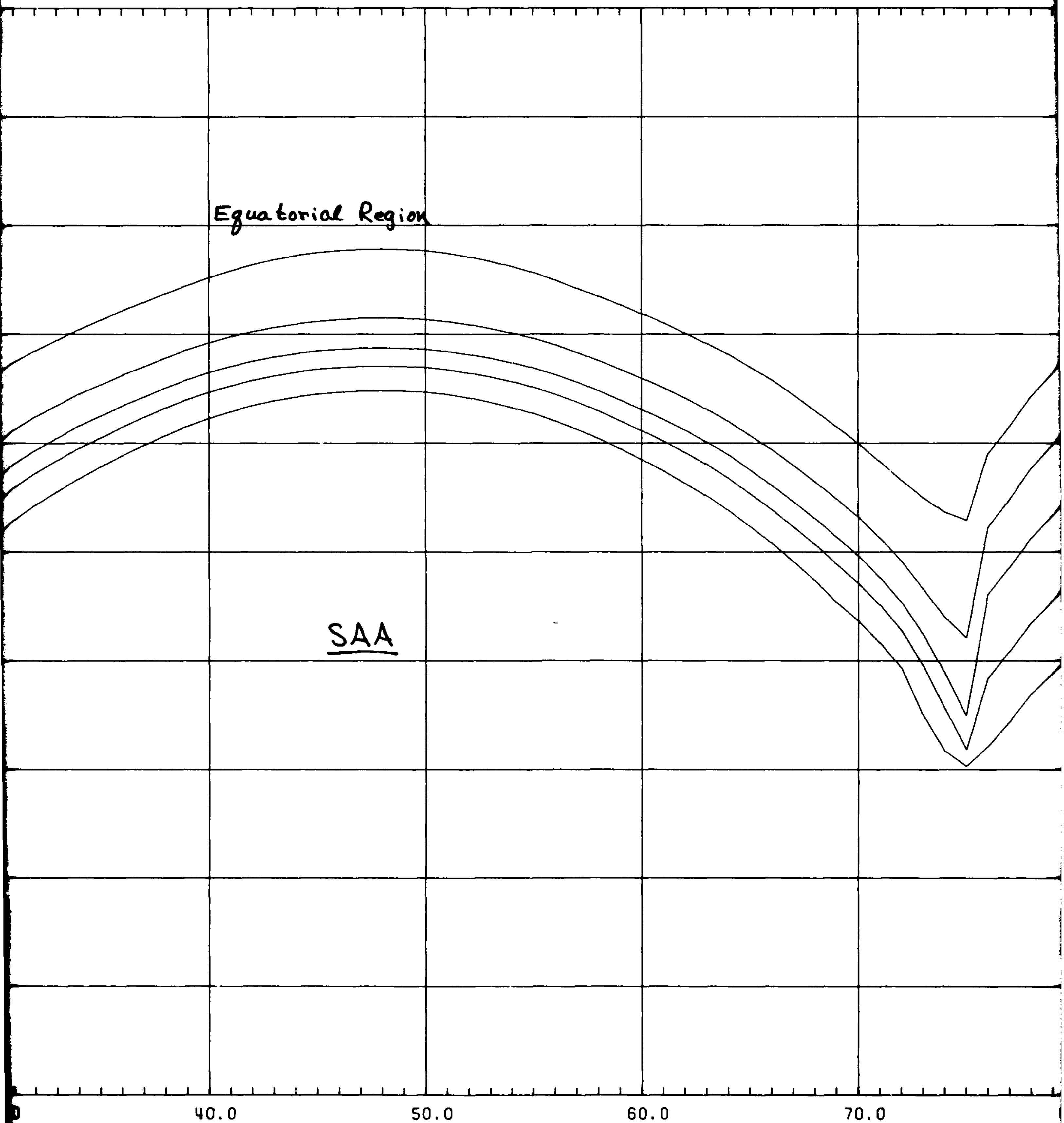


Figure 140
ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 7.716662
NASA-GSFC
190.0
200.0
210.0

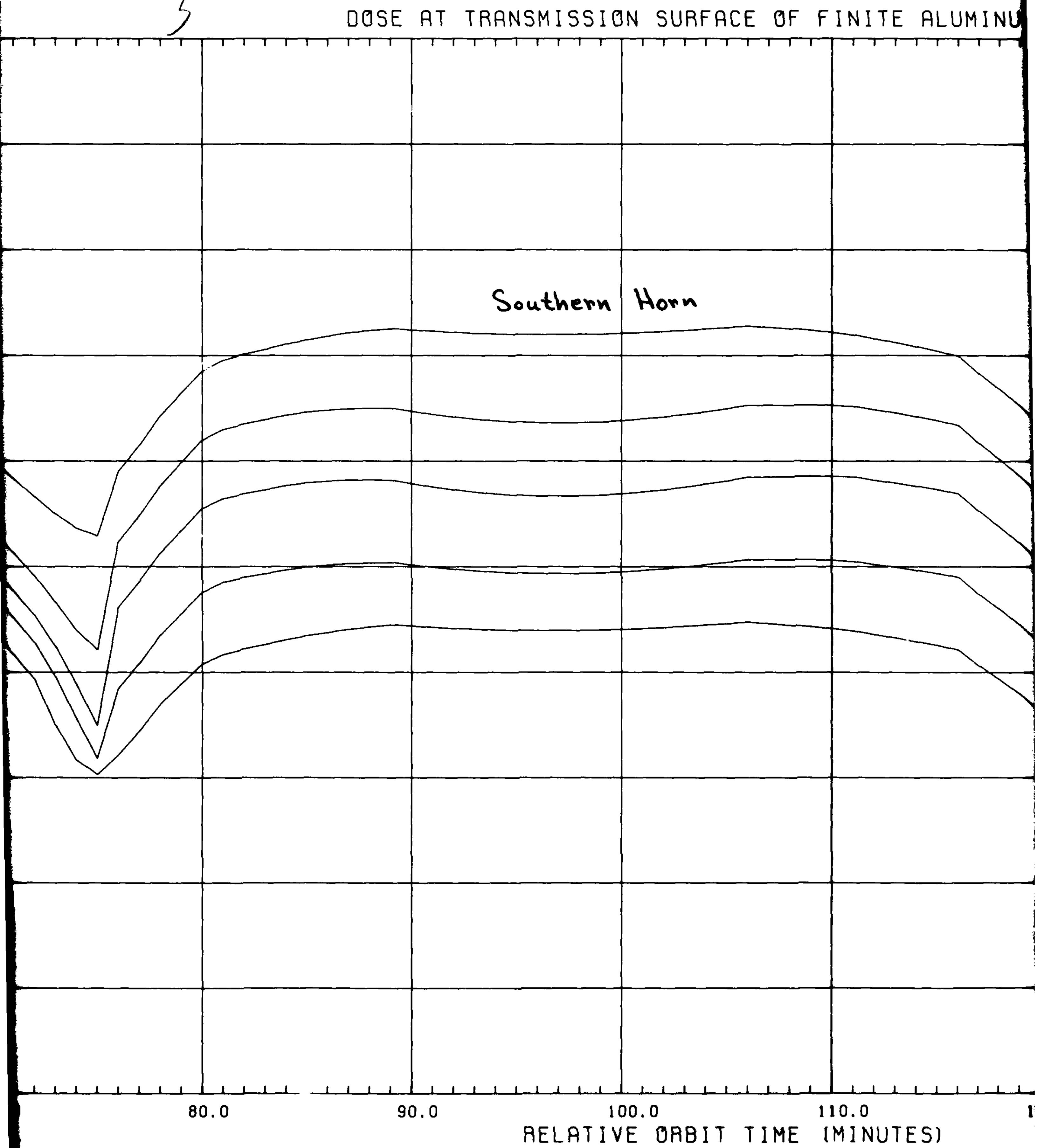


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
START TIME ON TAPE= 4.299995
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0



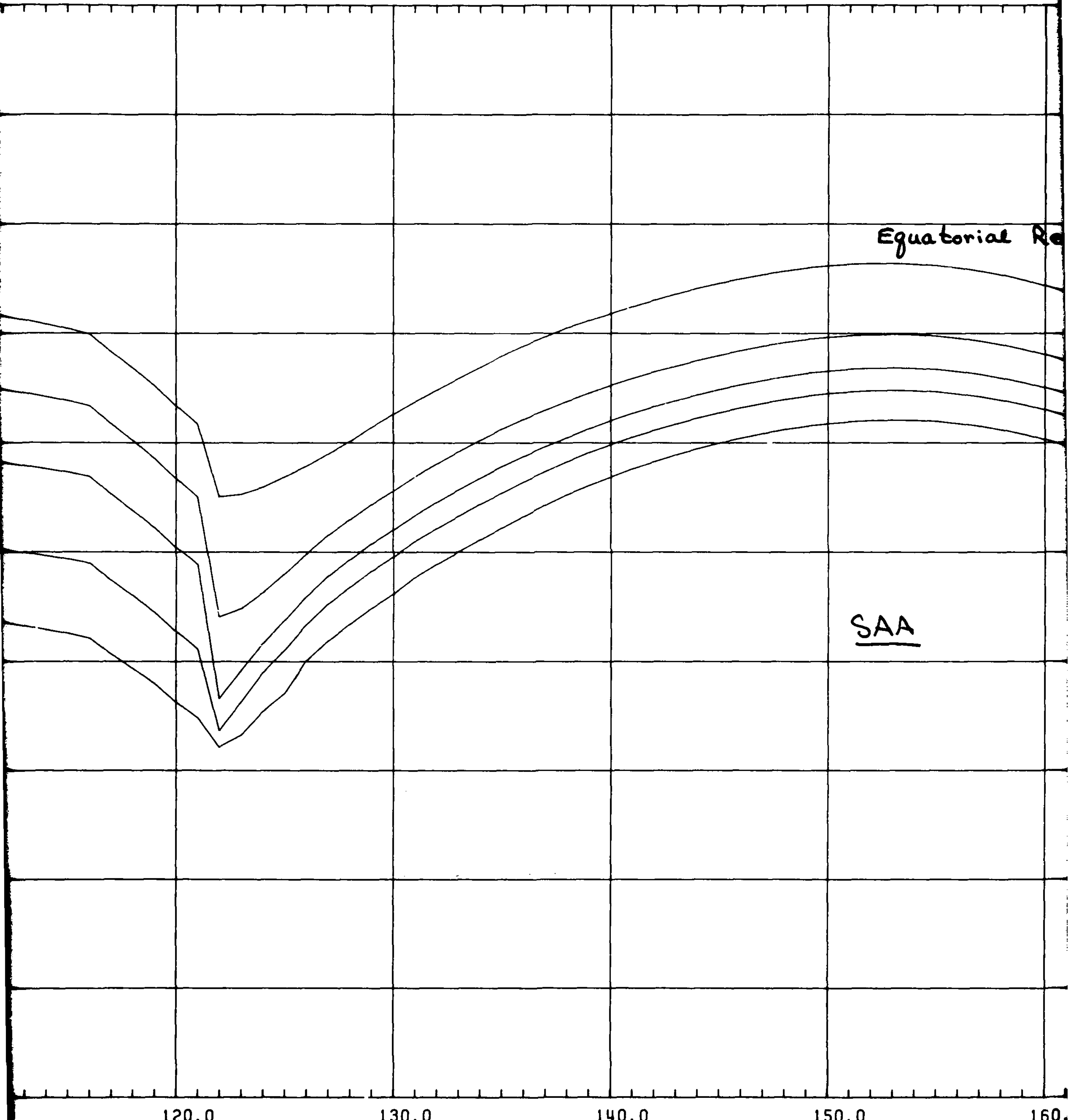
Equatorial Region
SAA
40.0
50.0
60.0
70.0

3'

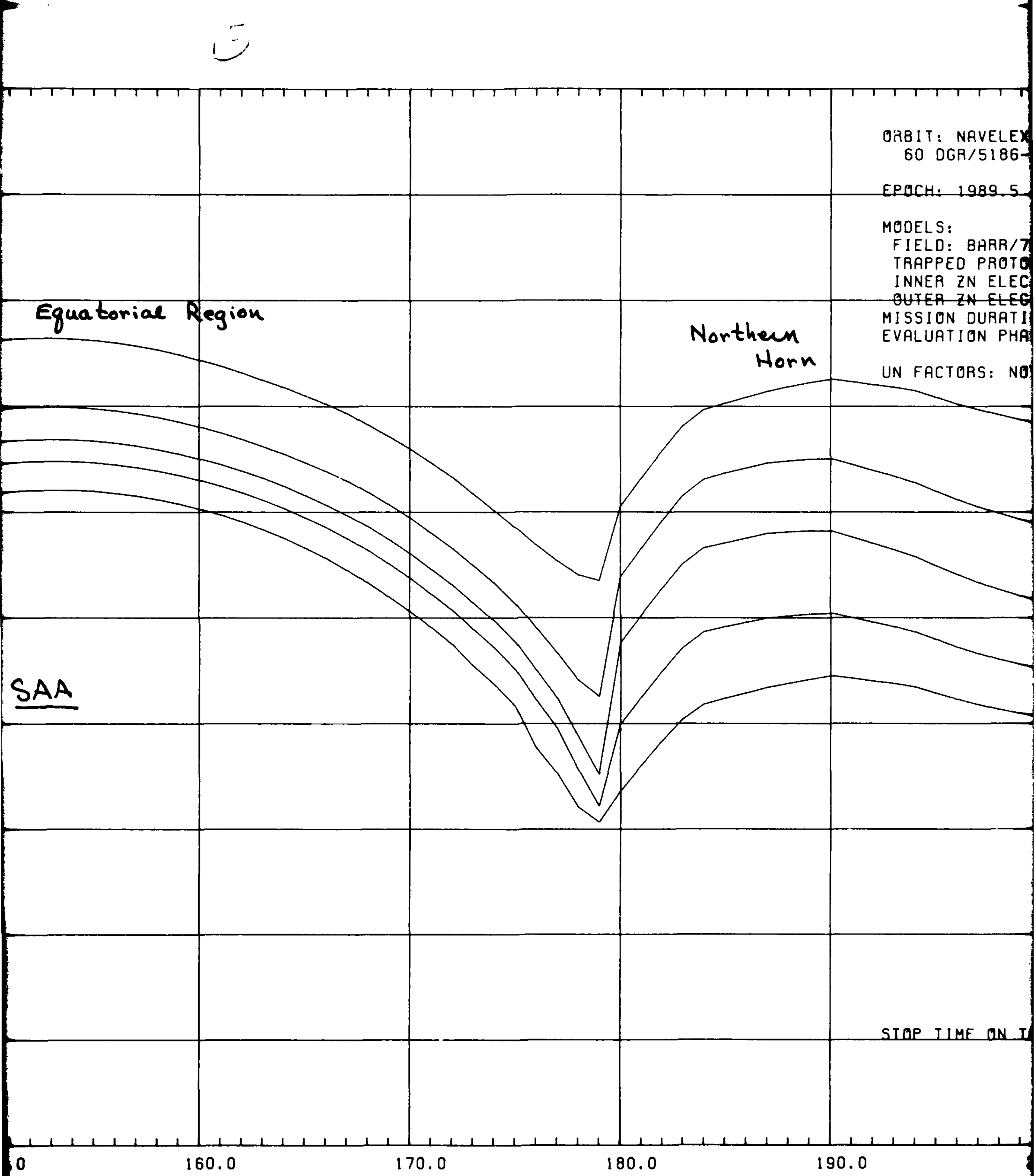

DOSE AT TRANSMISSION SURFACE OF FINITE ALUMINU
Southern Horn
80.0
90.0
100.0
110.0
RELATIVE ORBIT TIME (MINUTES)

' 4

TE ALUMINUM SLAB SHIELDS



TES)



5
ORBIT: NAVELEX
60 DGR/5186-
EPOCH: 1989.5
MODELS:
FIELD: BARR/7
TRAPPED PROTO
INNER ZN ELEC
OUTER ZN ELEC
MISSION DURATI
EVALUATION PHA
UN FACTORS: NO
STOP TIME ON T
Equatorial Region
Northern Horn
SAA
160.0
170.0
180.0
190.0

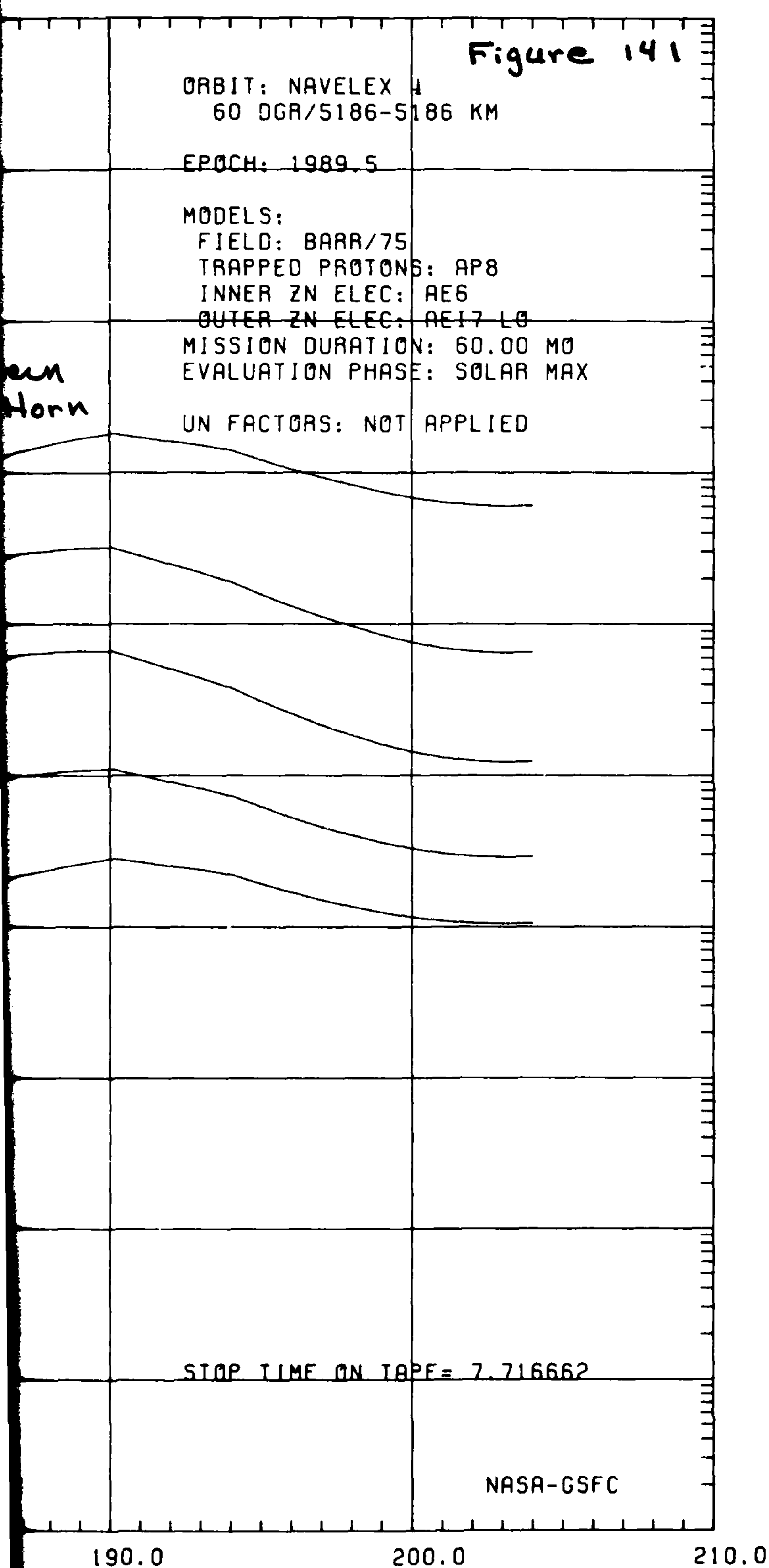
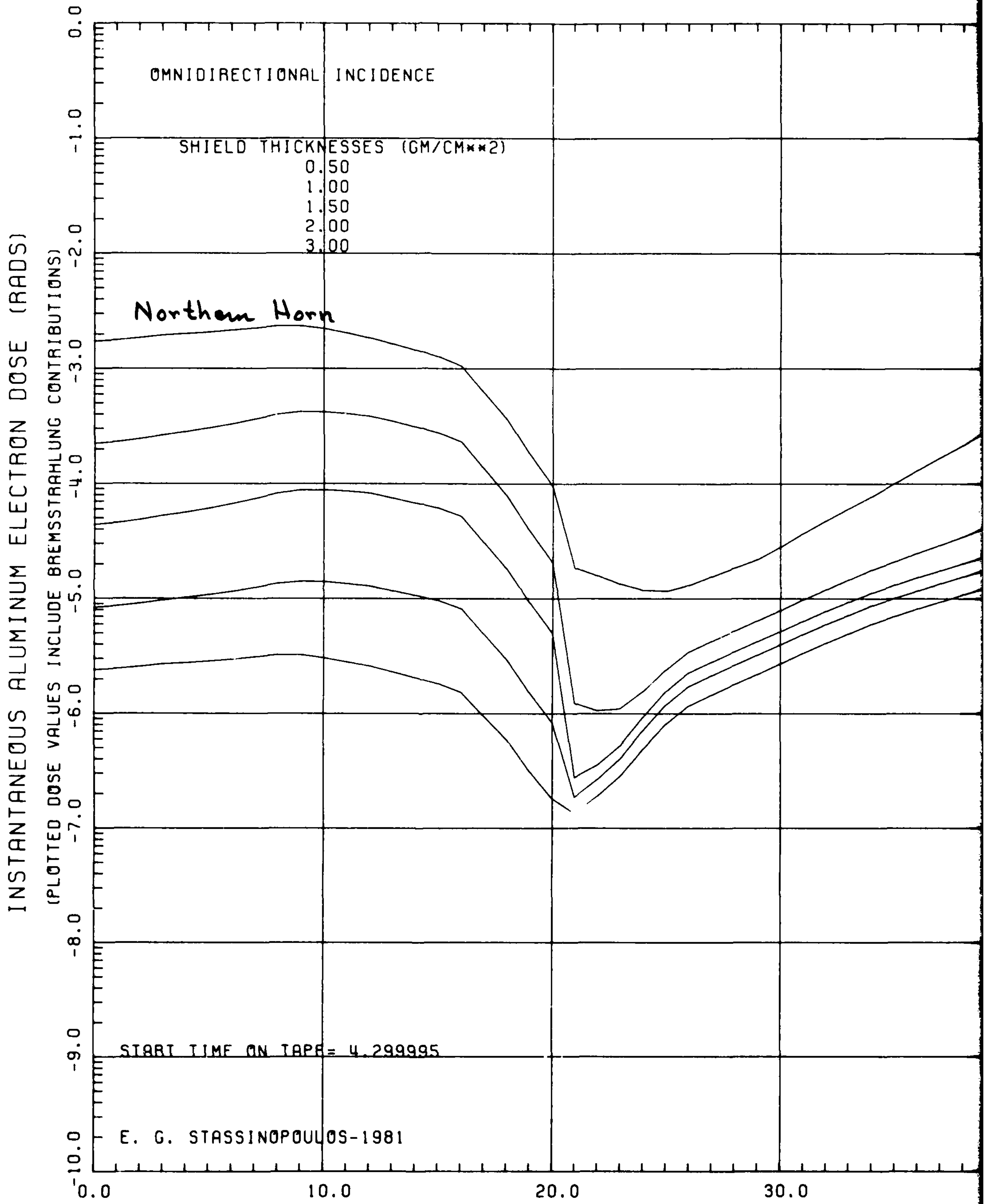
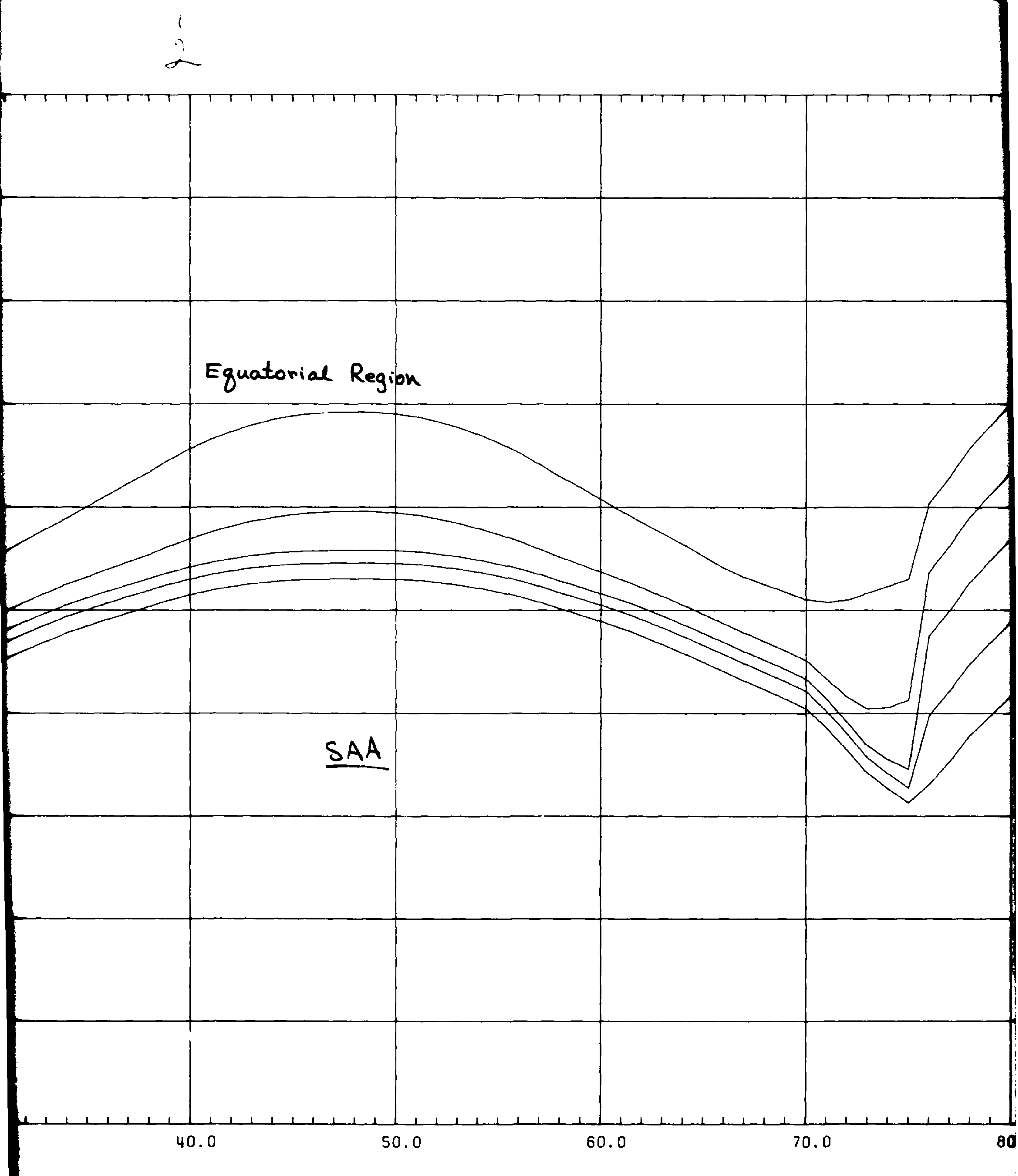


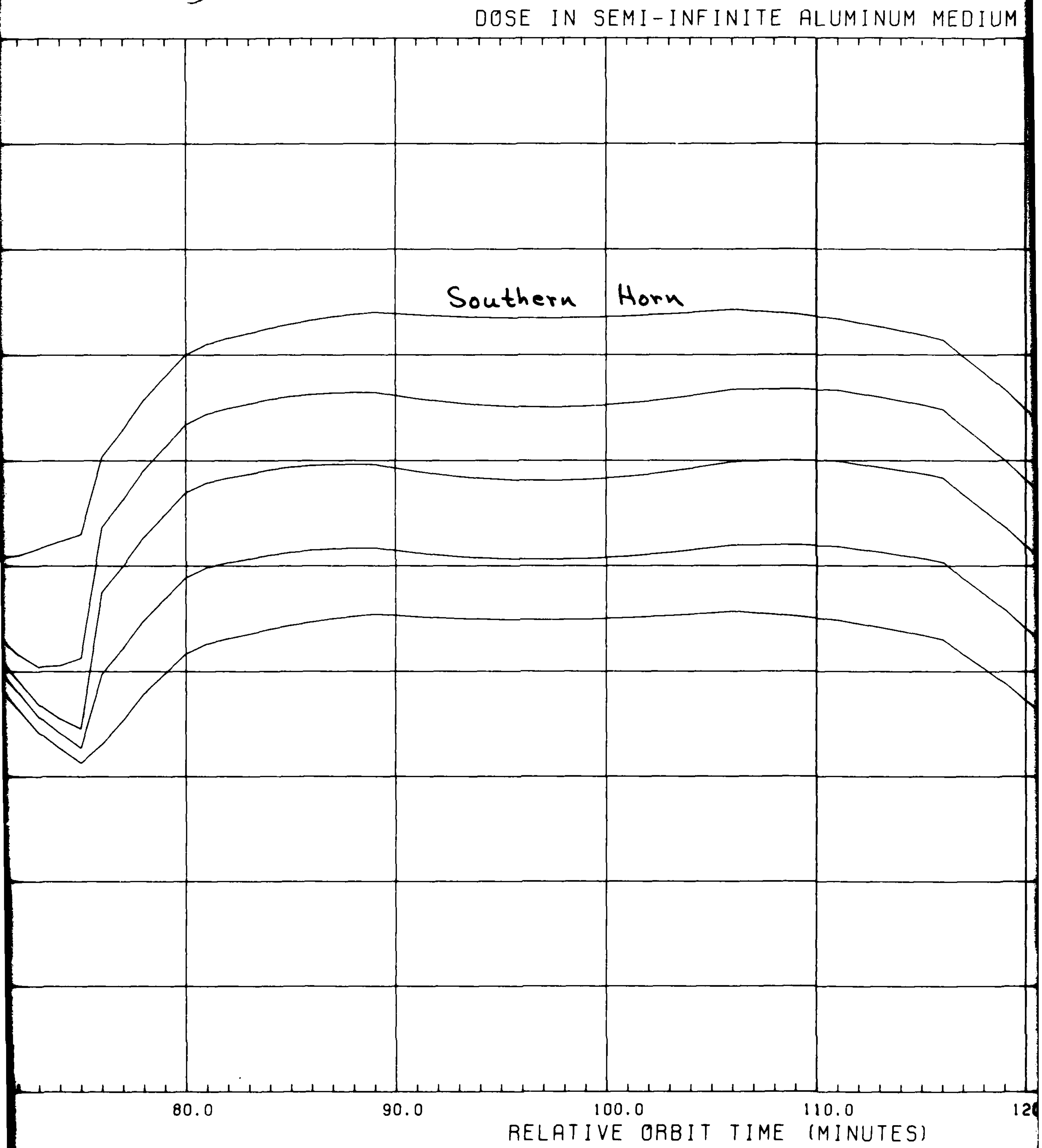
Figure 141
ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Horn
STOP TIME ON TAPE= 7.716662
NASA-GSFC
190.0
200.0
210.0



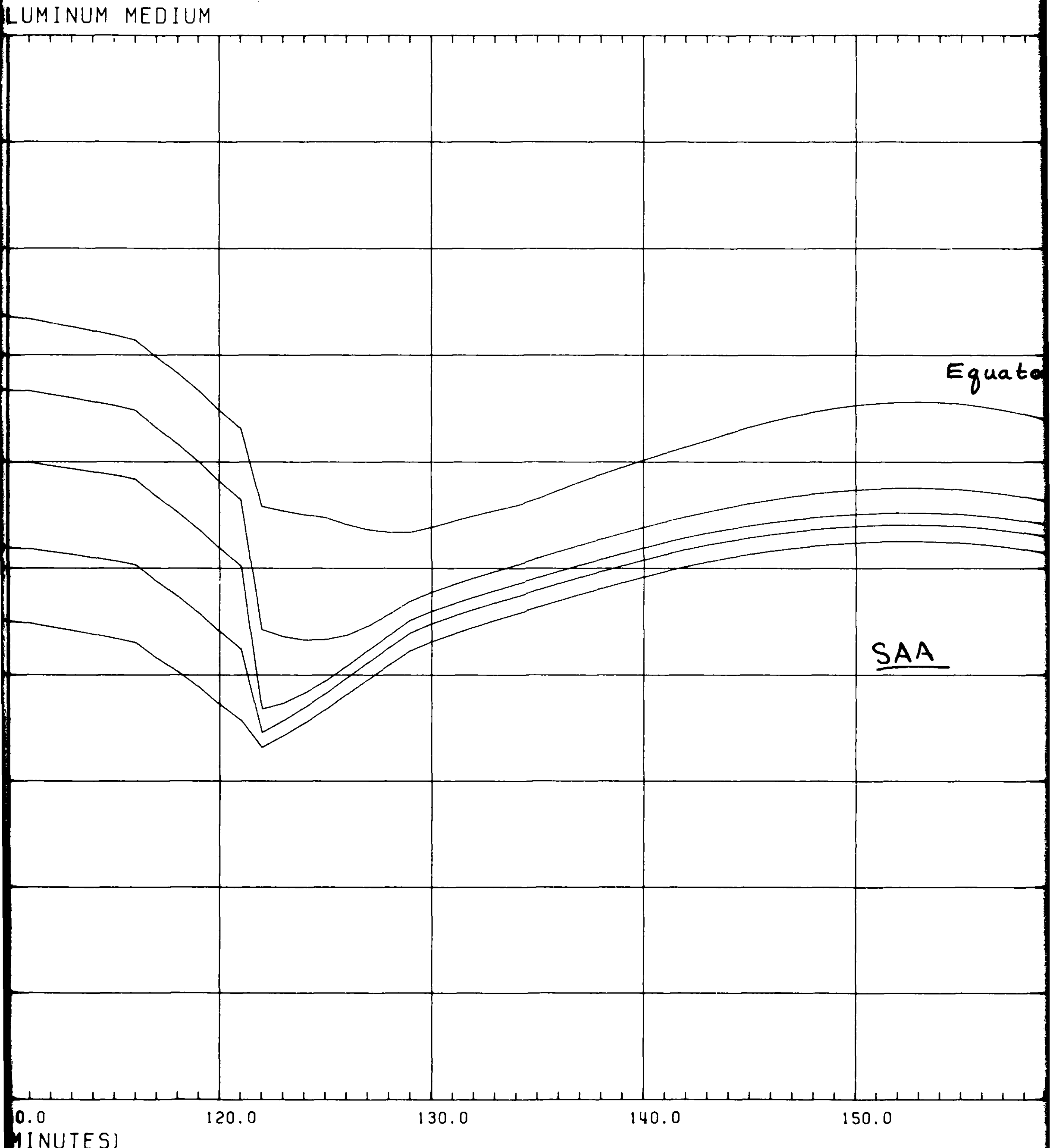
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
START TIME ON TAPE= 4.299995
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0



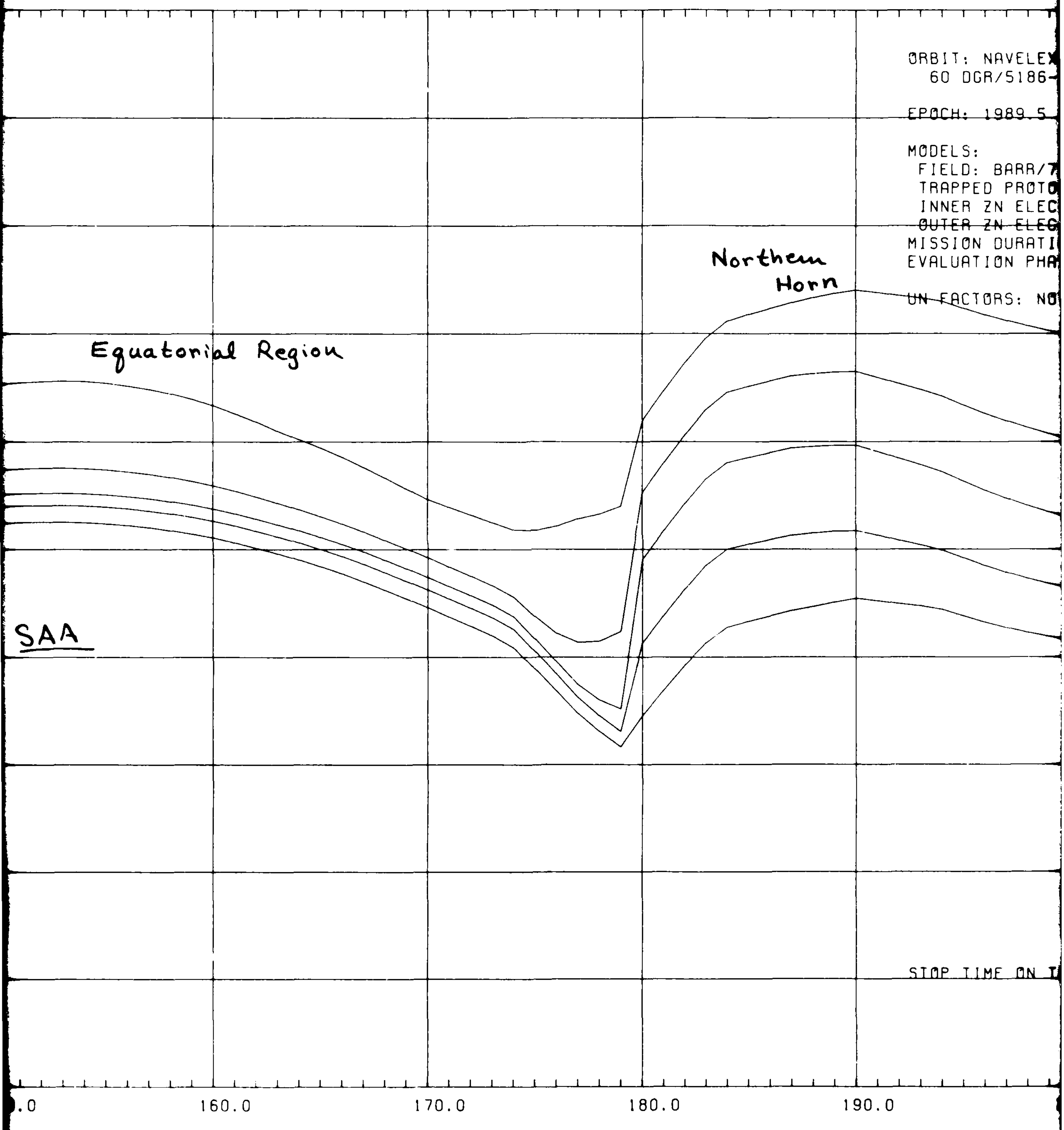
Equatorial Region
SAA
40.0
50.0
60.0
70.0
80



DOSE IN SEMI-INFINITE ALUMINUM MEDIUM
Southern Horn
80.0
90.0
100.0
110.0
RELATIVE ORBIT TIME (MINUTES)



LUMINUM MEDIUM
Equato
SAA
0.0
120.0
130.0
140.0
150.0
MINUTES)


ORBIT: NAVELEX
60 DGR/5186-
EPOCH: 1989.5
MODELS:
FIELD: BARR/7
TRAPPED PROTO
INNER ZN ELEC
OUTER ZN ELEC
MISSION DURATI
EVALUATION PHA
UN FACTORS: NO
STOP TIME ON I
Northern Horn
Equatorial Region
SAA
.0
160.0
170.0
180.0
190.0

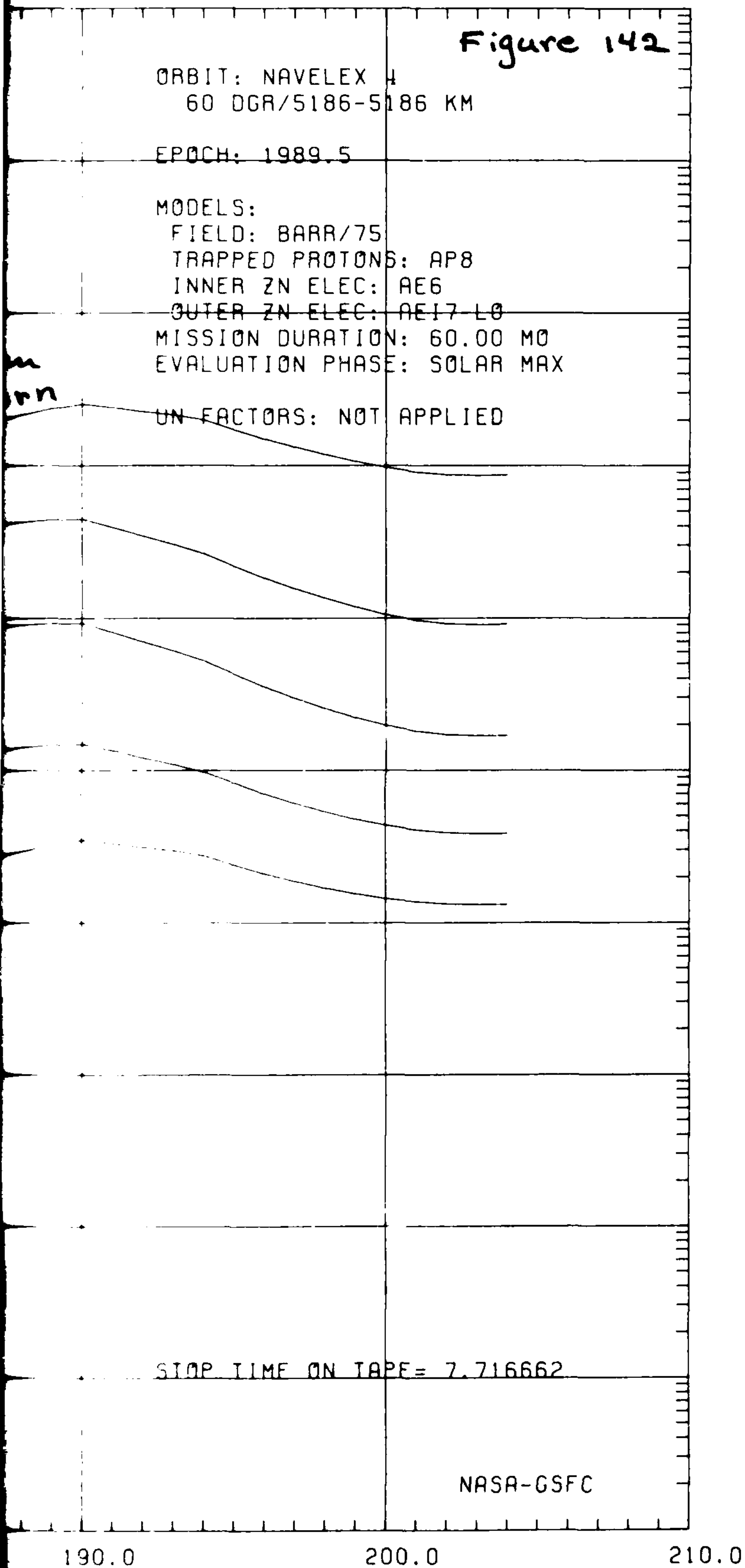
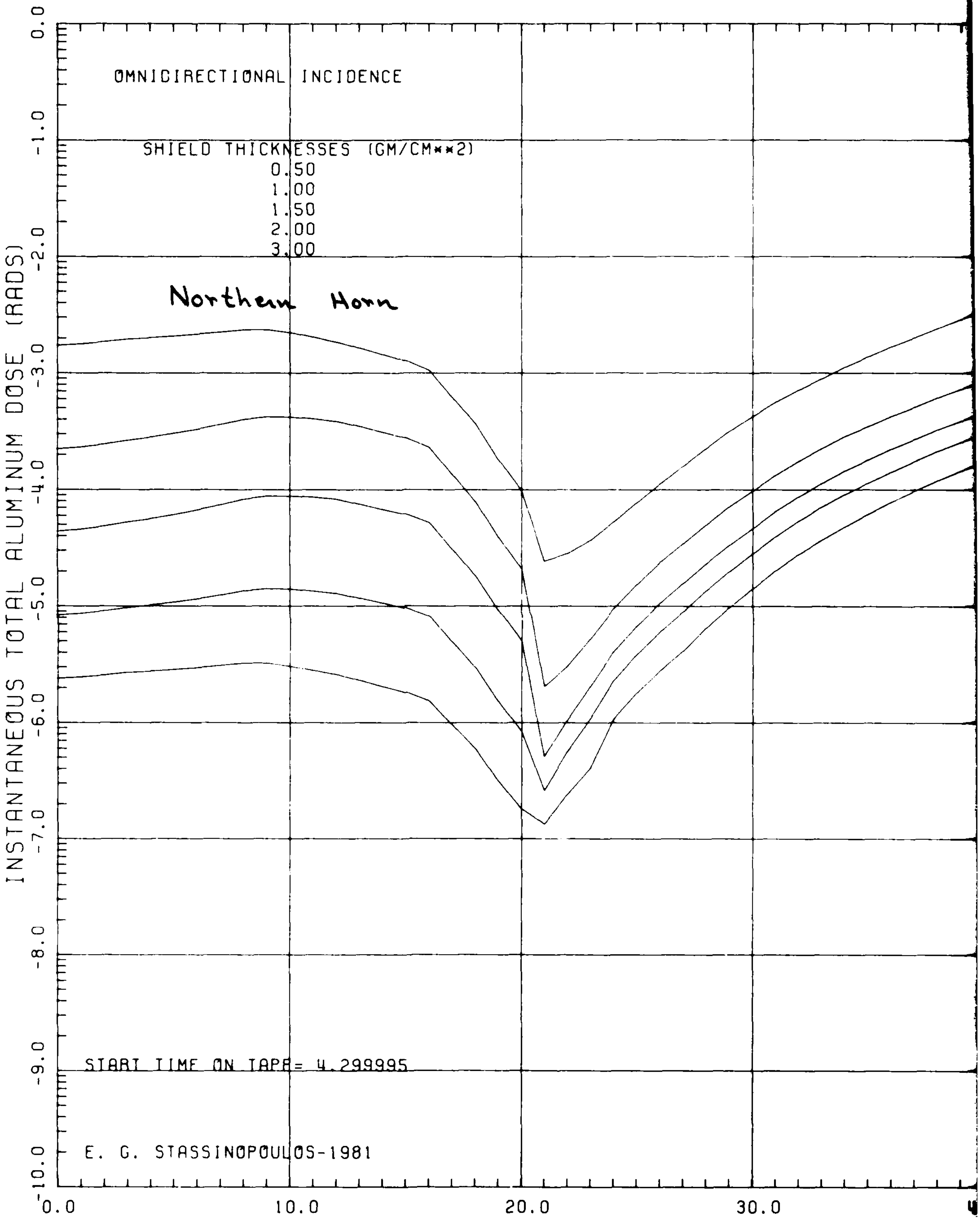
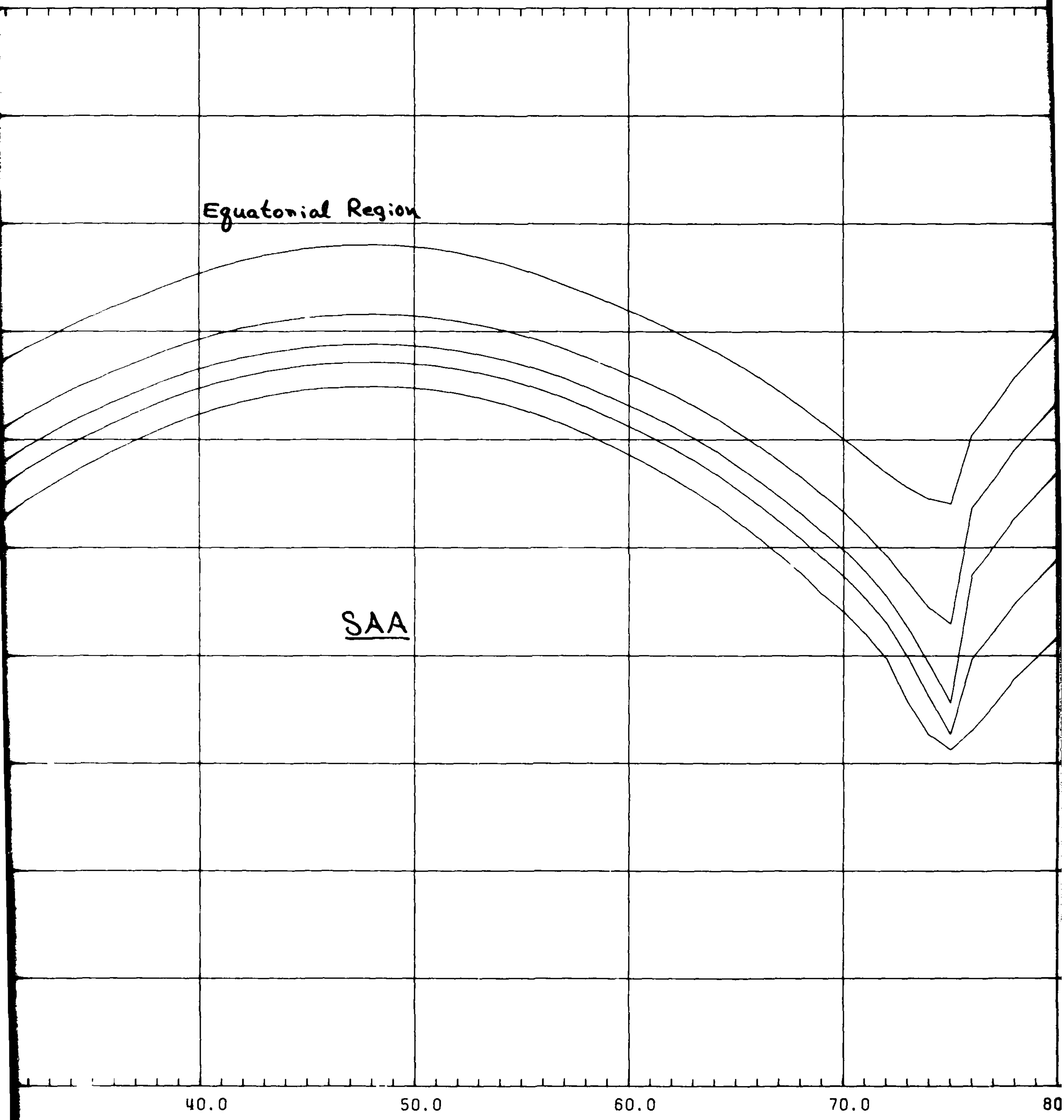


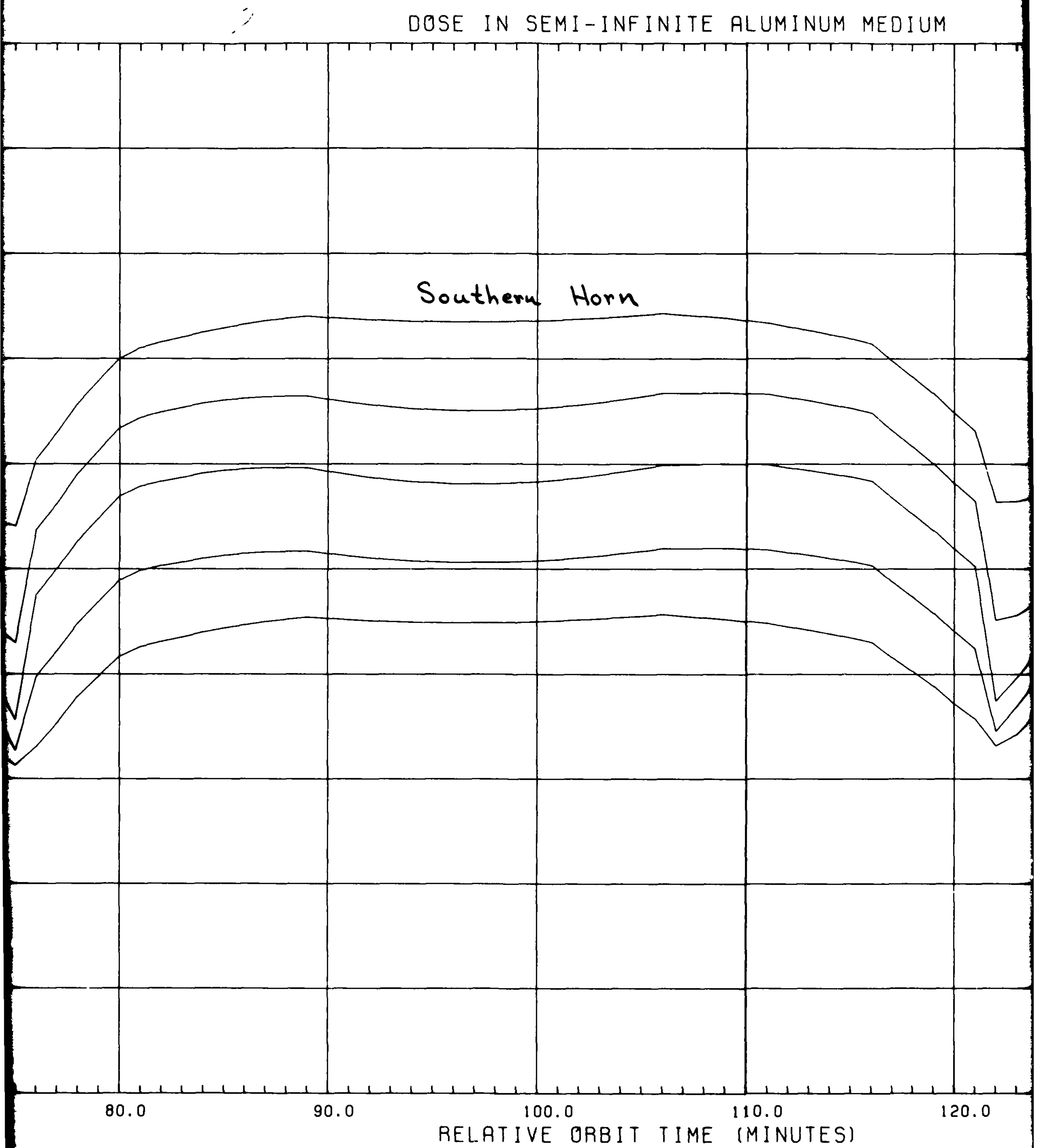
Figure 142
ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 7.716662
NASA-GSFC
190.0
200.0
210.0

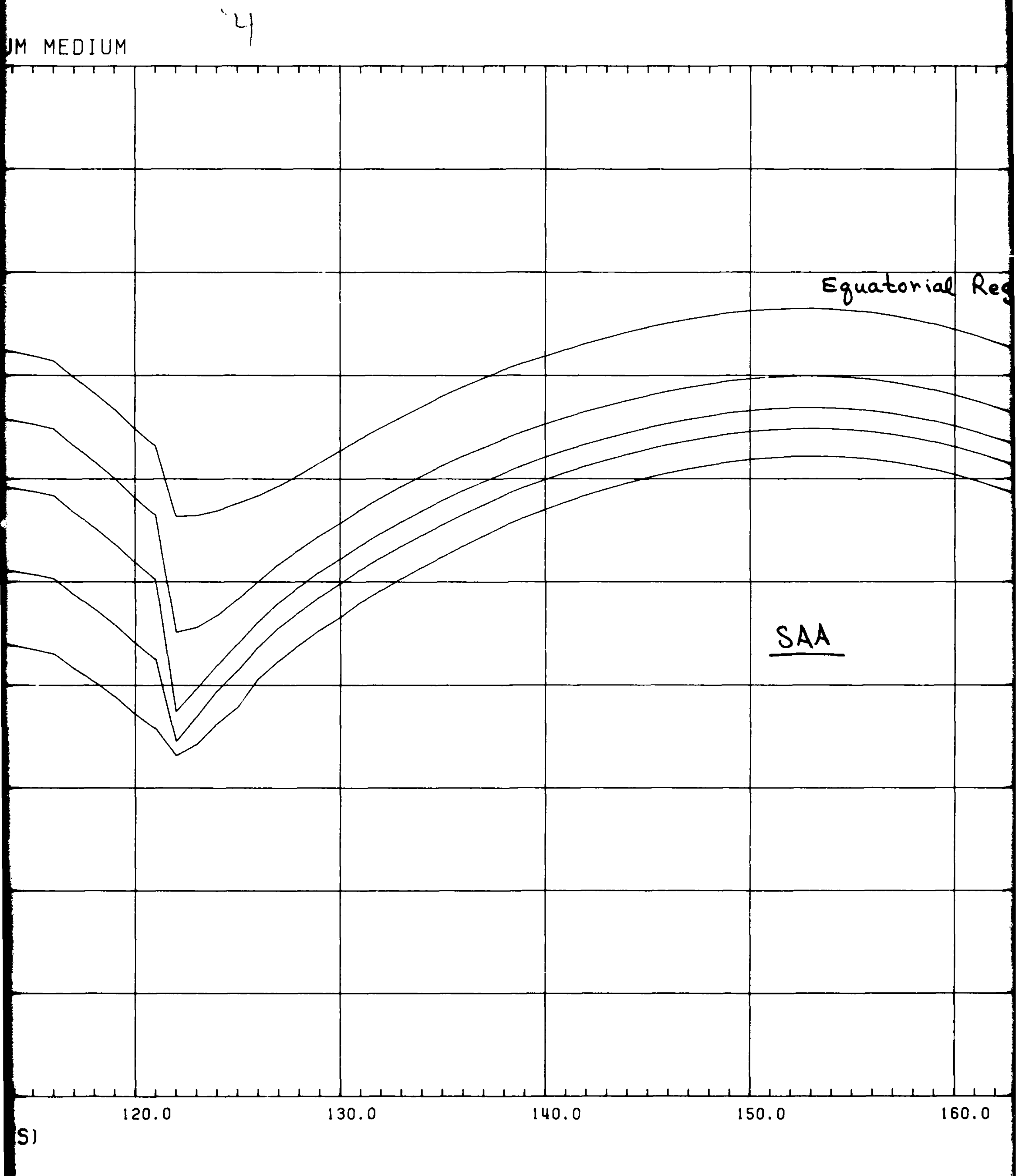


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
START TIME ON TAPE= 4.299995
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0



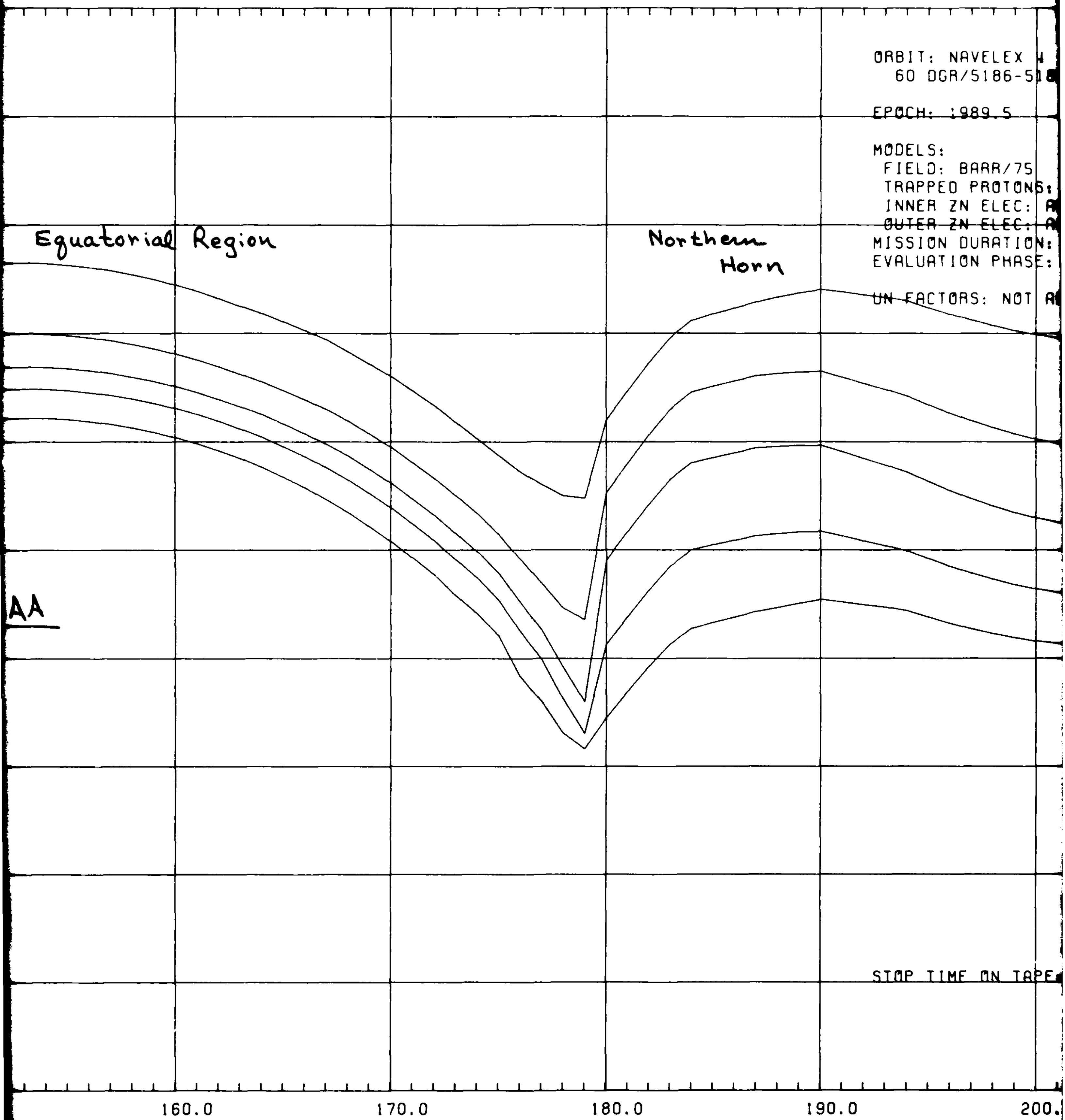
Equatorial Region
SAA
40.0
50.0
60.0
70.0
80


DOSE IN SEMI-INFINITE ALUMINUM MEDIUM
Southern Horn
80.0
90.0
100.0
110.0
120.0
RELATIVE ORBIT TIME (MINUTES)



UM MEDIUM
4
Equatorial Reg
SAA
120.0
130.0
140.0
150.0
160.0
S)

5.



ORBIT: NAVELEX
60 DGR/5186-51
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS:
INNER ZN ELEC:
OUTER ZN ELEC:
MISSION DURATION:
EVALUATION PHASE:
UN FACTORS: NOT
STOP TIME ON TAPE
Equatorial Region
Northern Horn
AA
160.0
170.0
180.0
190.0
200.

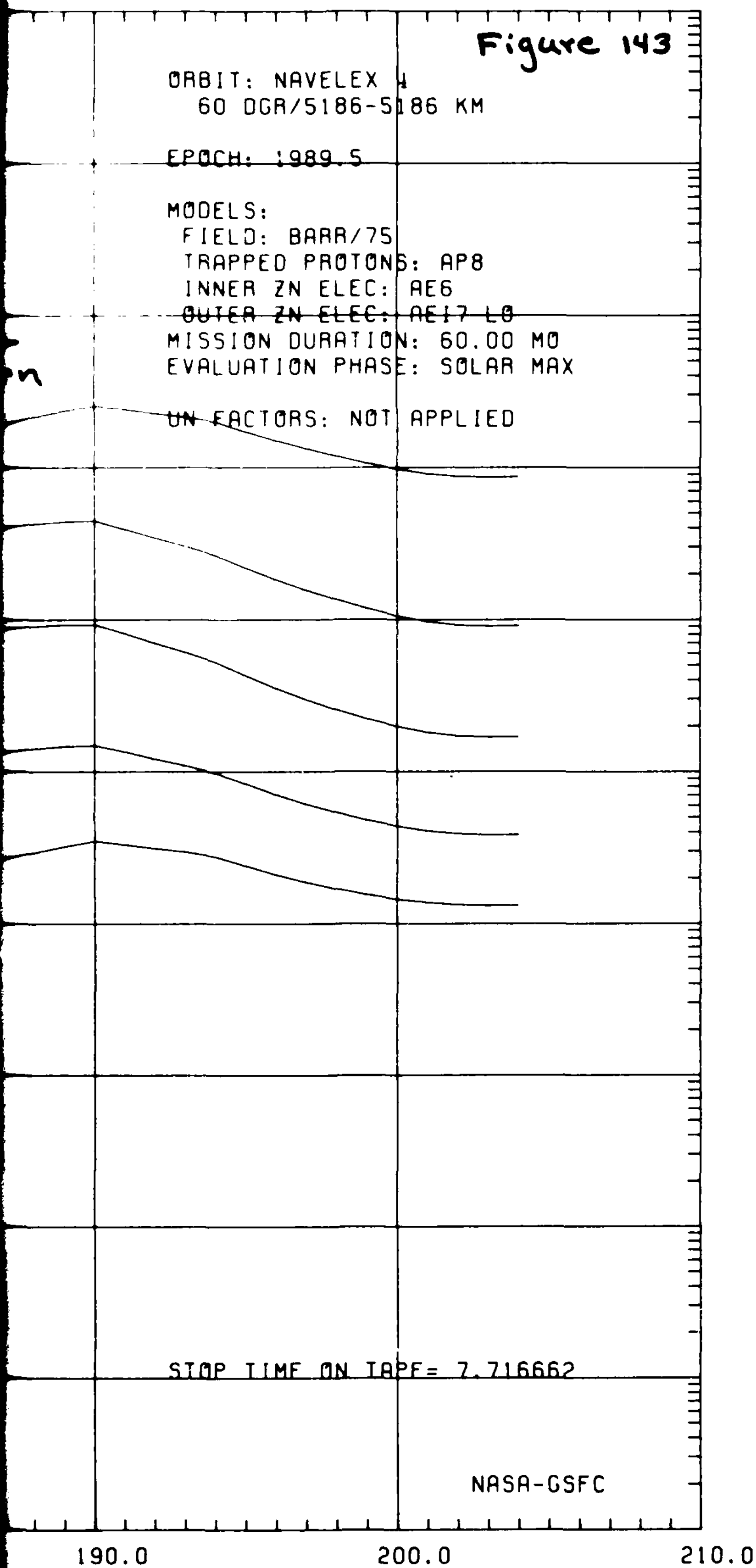
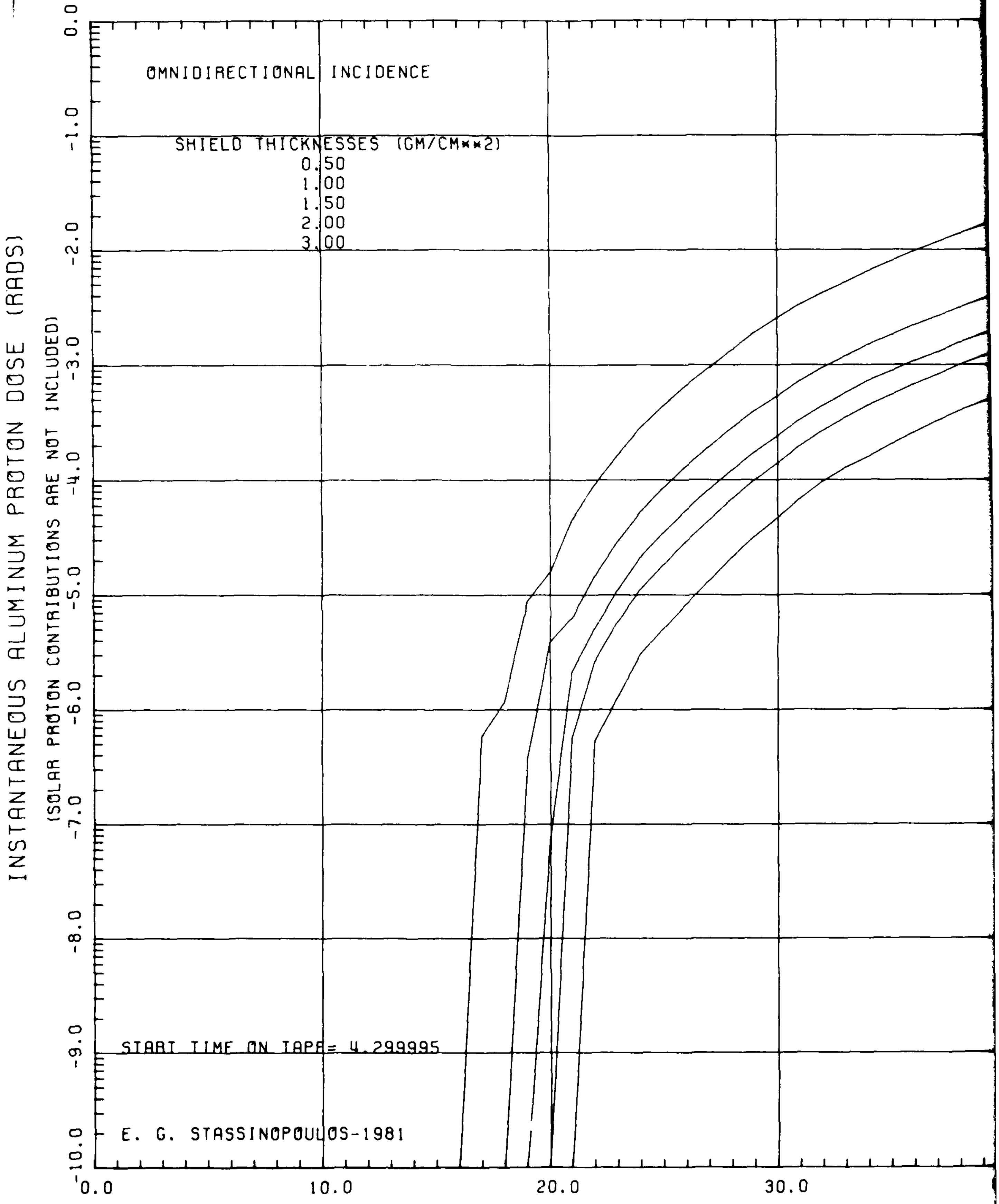
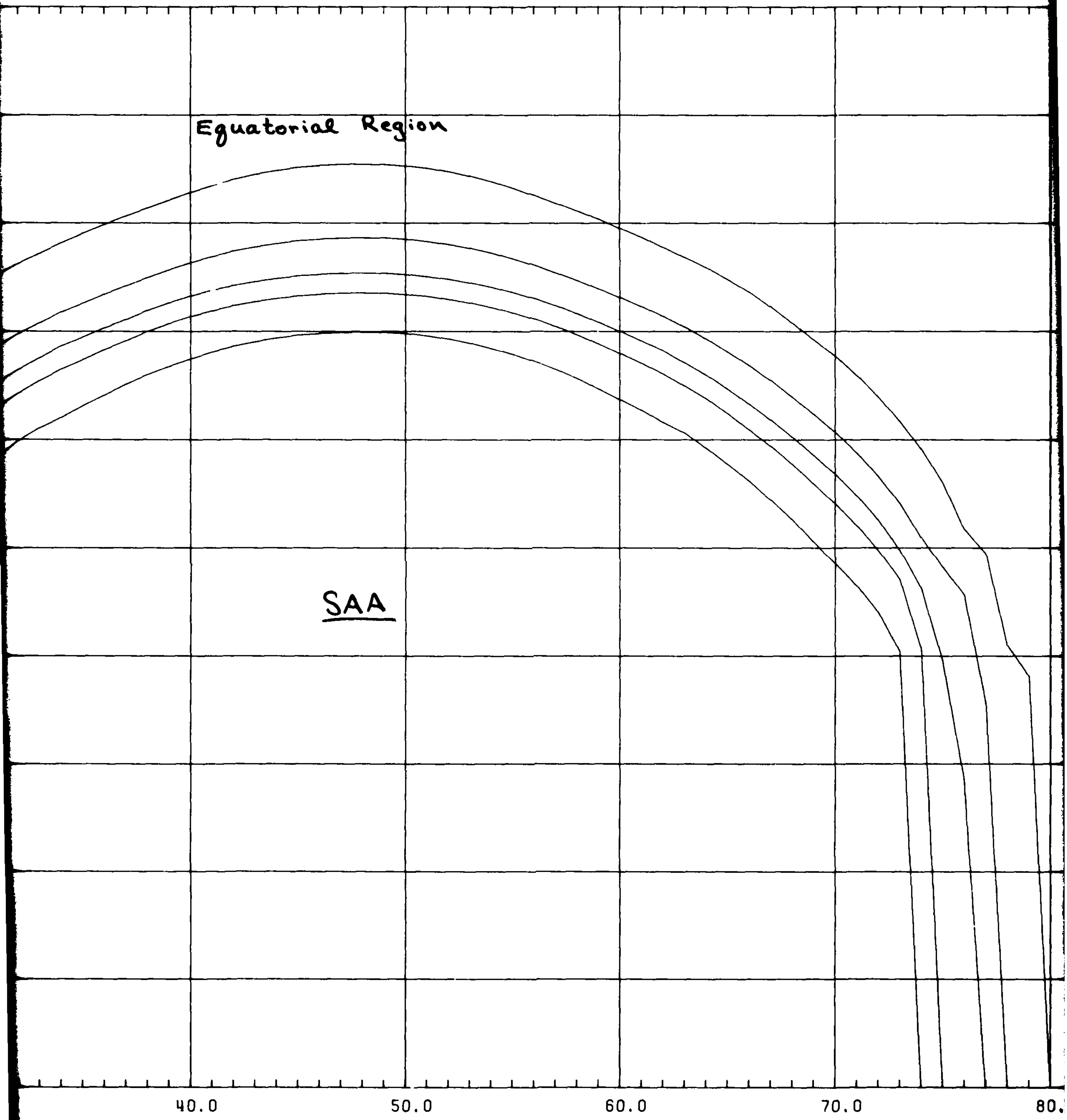
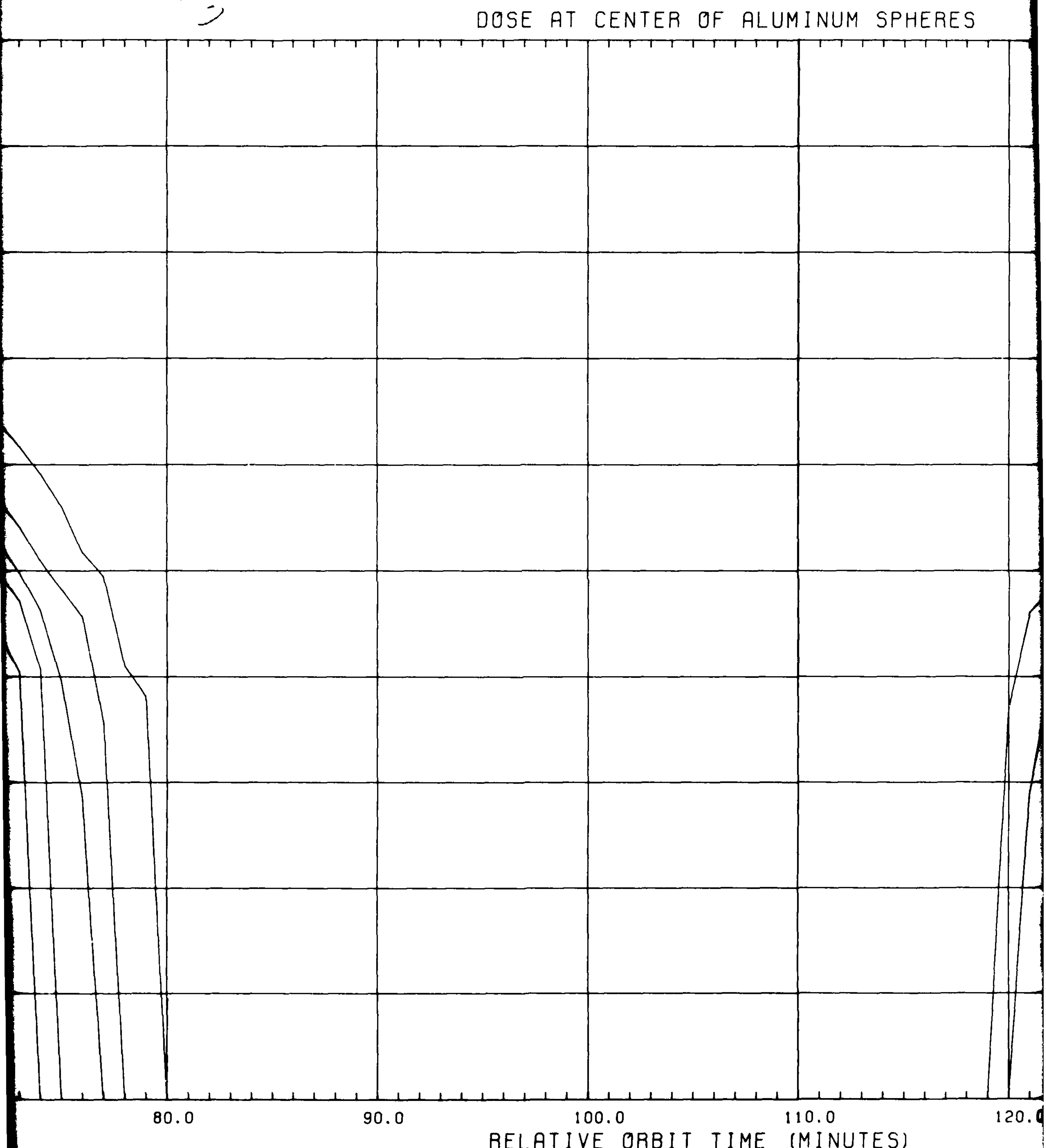


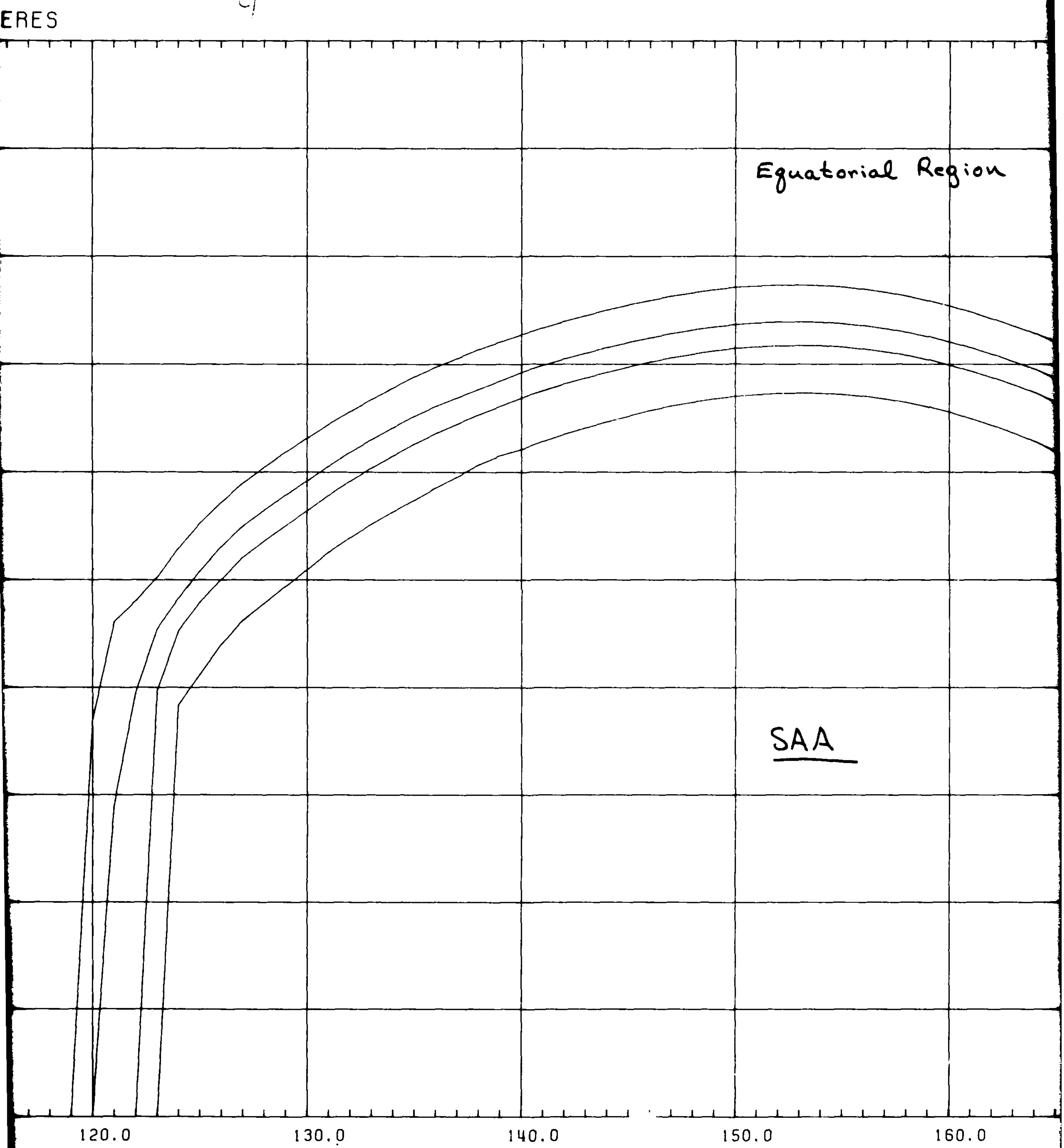
Figure 143
ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 7.716662
NASA-GSFC
190.0
200.0
210.0



OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
START TIME ON TAPE= 4.299995
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0


Equatorial Region
SAA
40.0
50.0
60.0
70.0
80.


DOSE AT CENTER OF ALUMINUM SPHERES
80.0
90.0
100.0
110.0
120.0
RELATIVE ORBIT TIME (MINUTES)


ERES
Equatorial Region
SAA
120.0
130.0
140.0
150.0
160.0

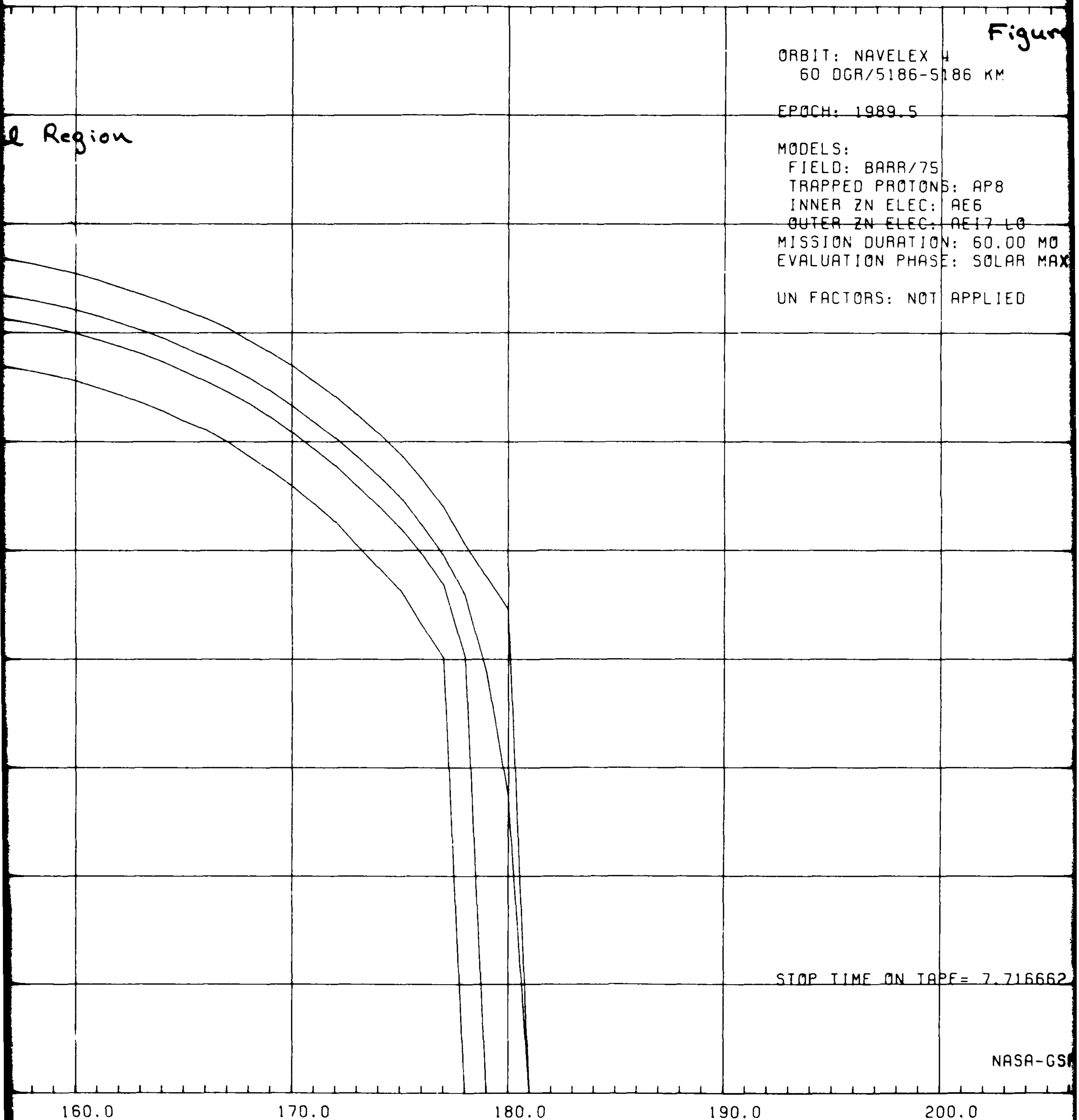
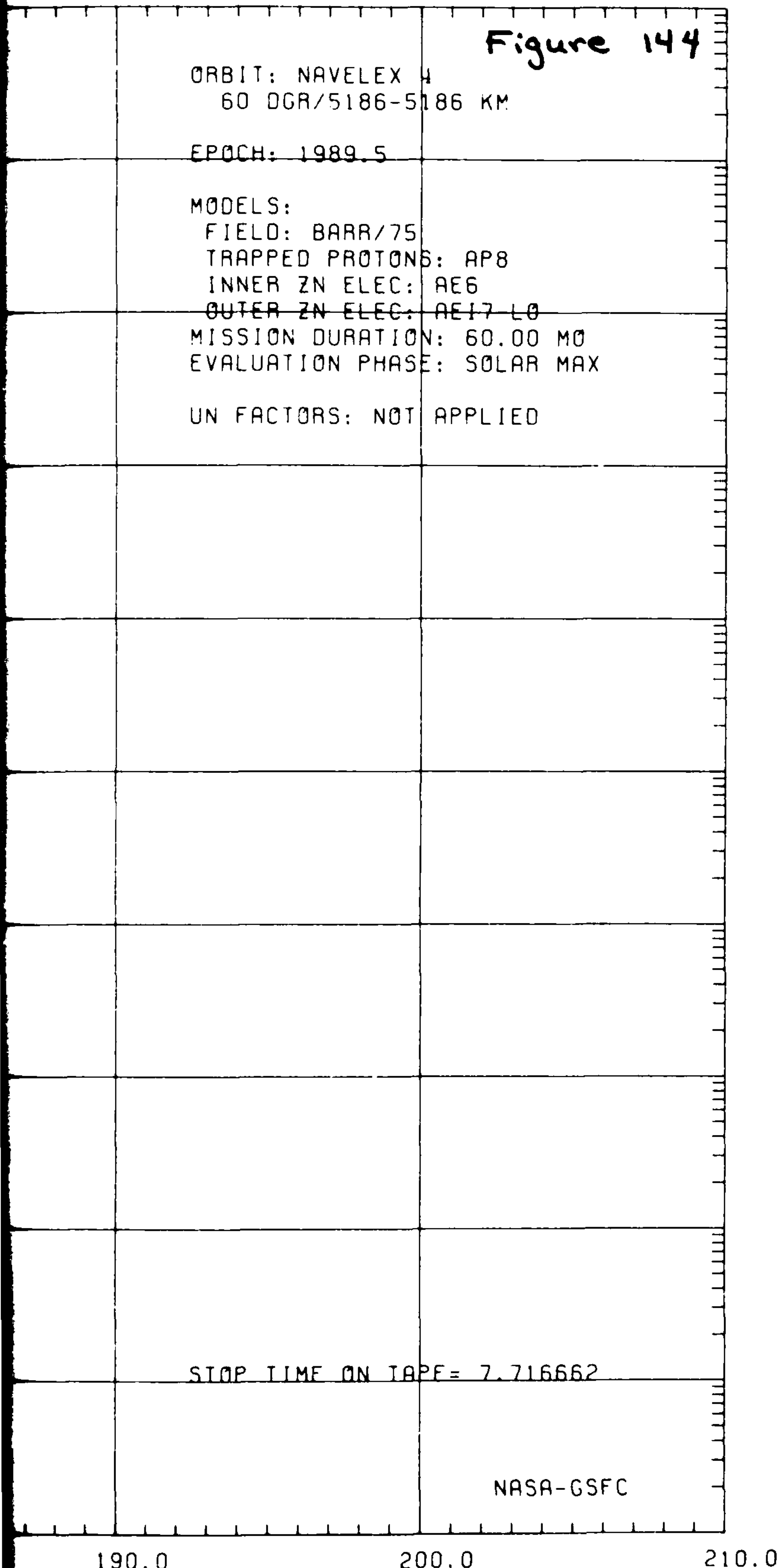
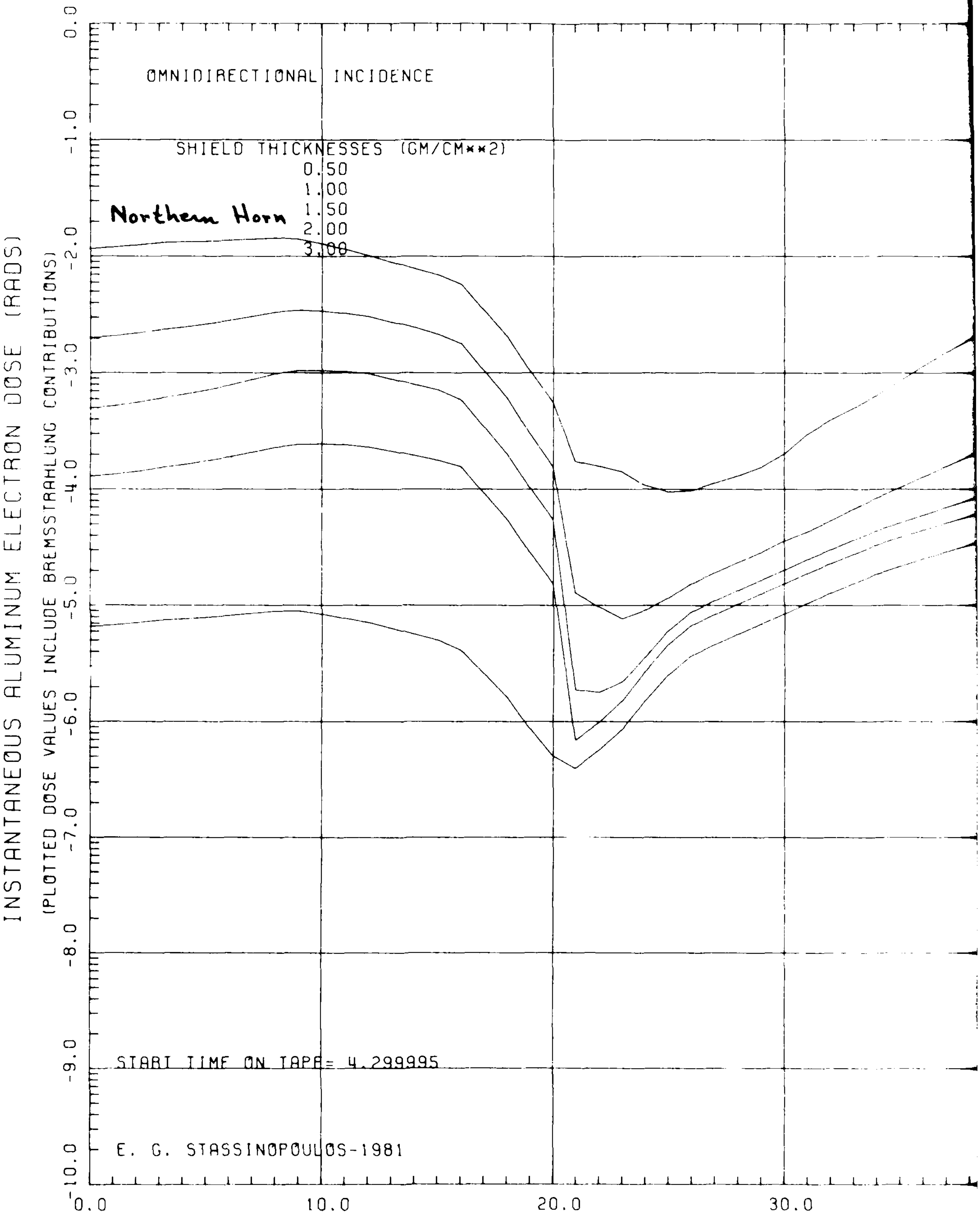

Figur
l Region
ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 7.716662
NASA-GS
160.0
170.0
180.0
190.0
200.0

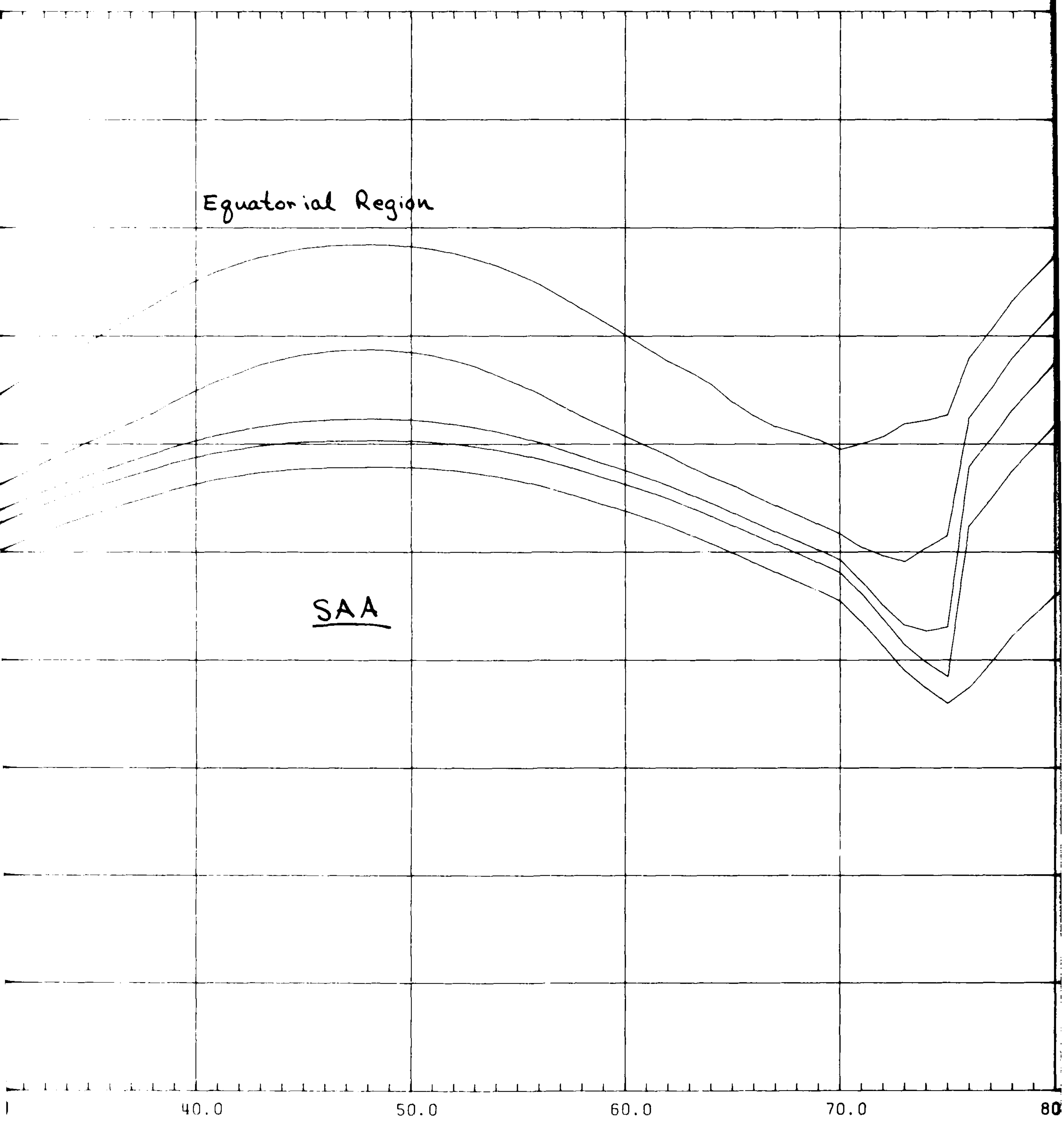
Figure 144



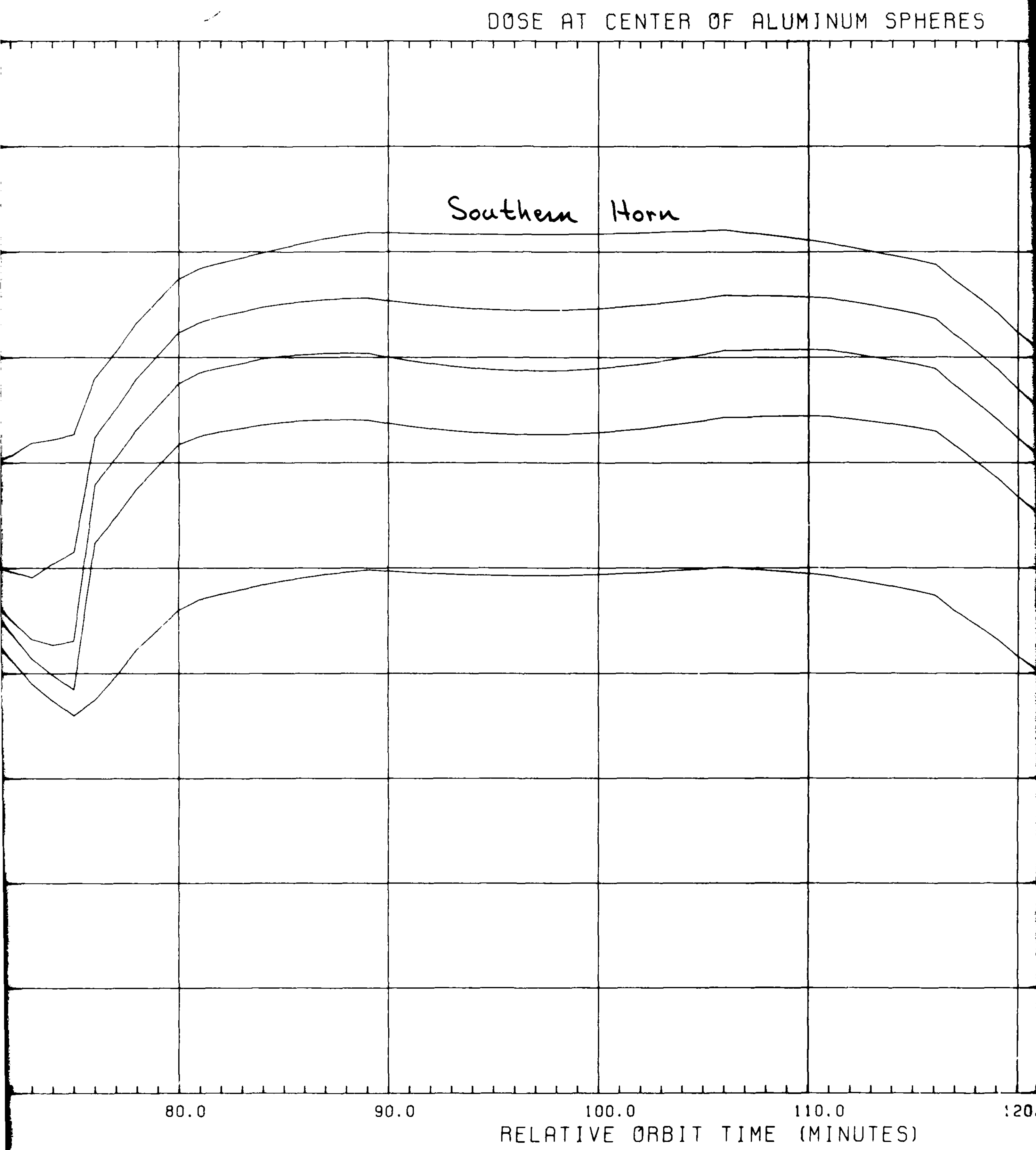
ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 7.716662
NASA-GSFC
190.0
200.0
210.0

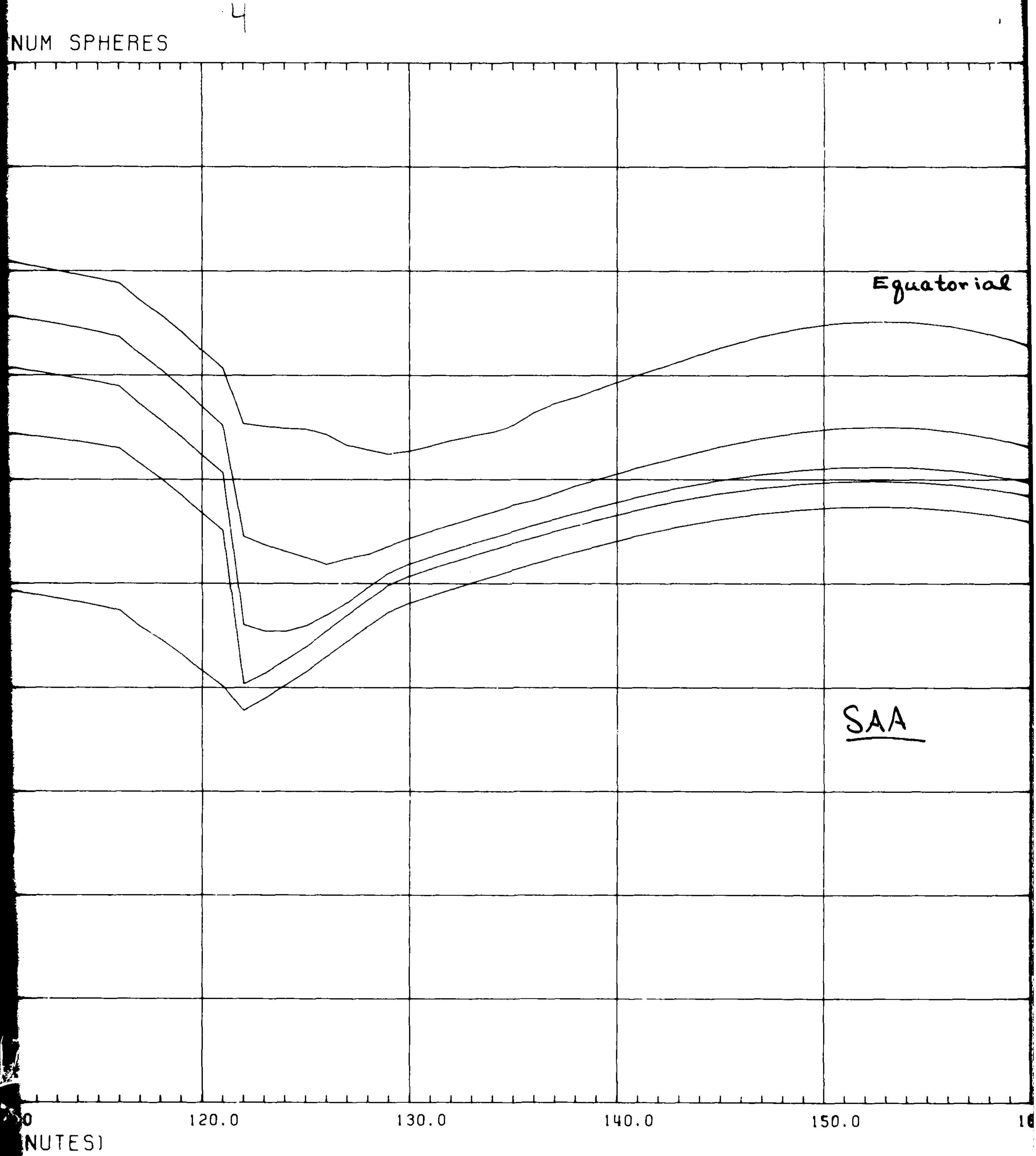


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
START TIME ON TAPE= 4.299995
E. G. STASSINOPOULOS-1981
0.0
10.0
20.0
30.0

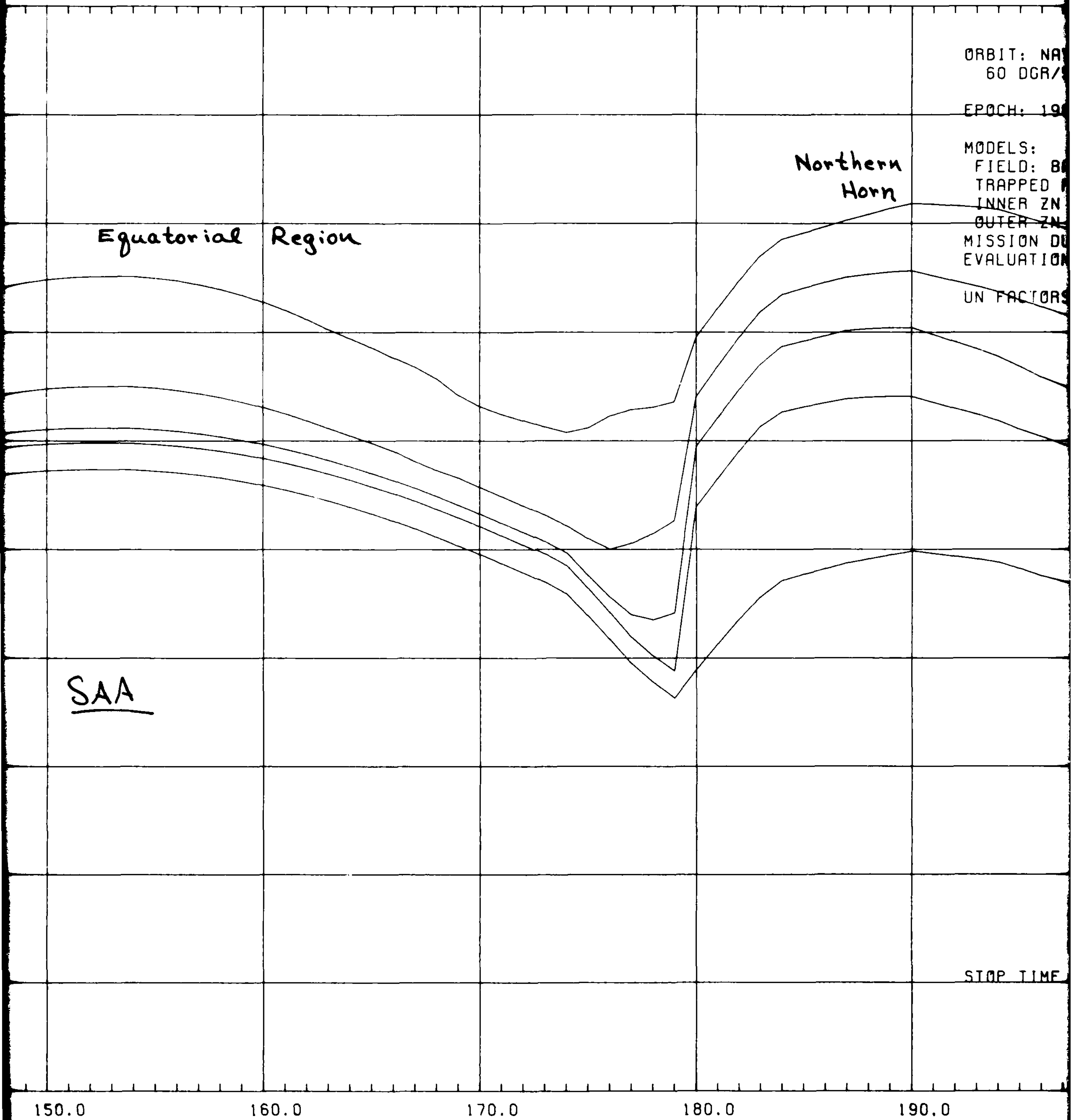


Equatorial Region
SAA
40.0
50.0
60.0
70.0
80


DOSE AT CENTER OF ALUMINUM SPHERES
Southern Horn
80.0
90.0
100.0
110.0
120
RELATIVE ORBIT TIME (MINUTES)



4
NUM SPHERES
Equatorial
SAA
120.0
130.0
140.0
150.0
NUTES)


ORBIT: NA
60 DGR/
EPOCH: 19
MODELS:
FIELD: B
TRAPPED
INNER ZN
OUTER ZN
MISSION D
EVALUATIO
UN FACTOR
STOP TIME
Northern Horn
Equatorial Region
SAA
150.0
160.0
170.0
180.0
190.0

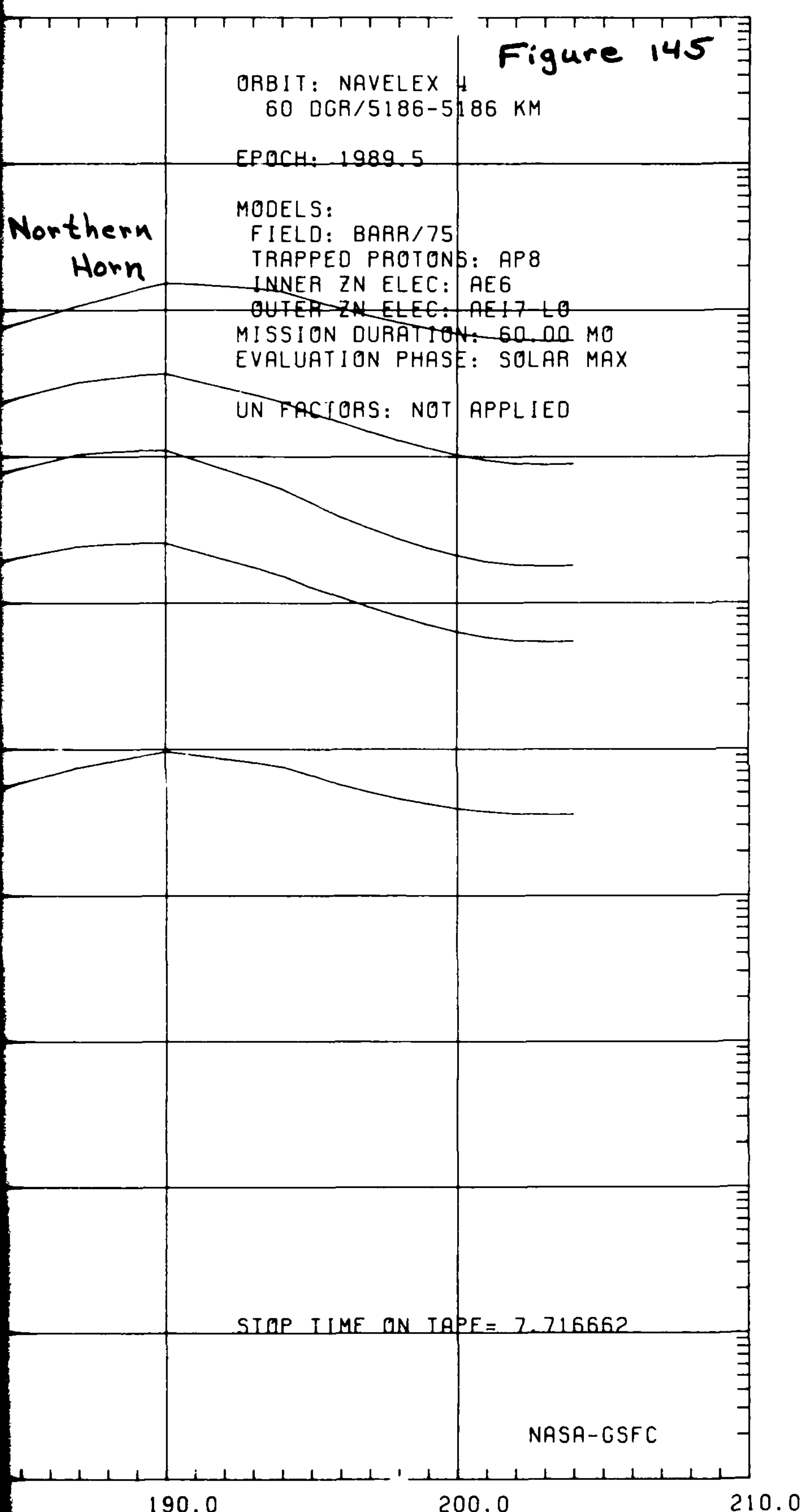
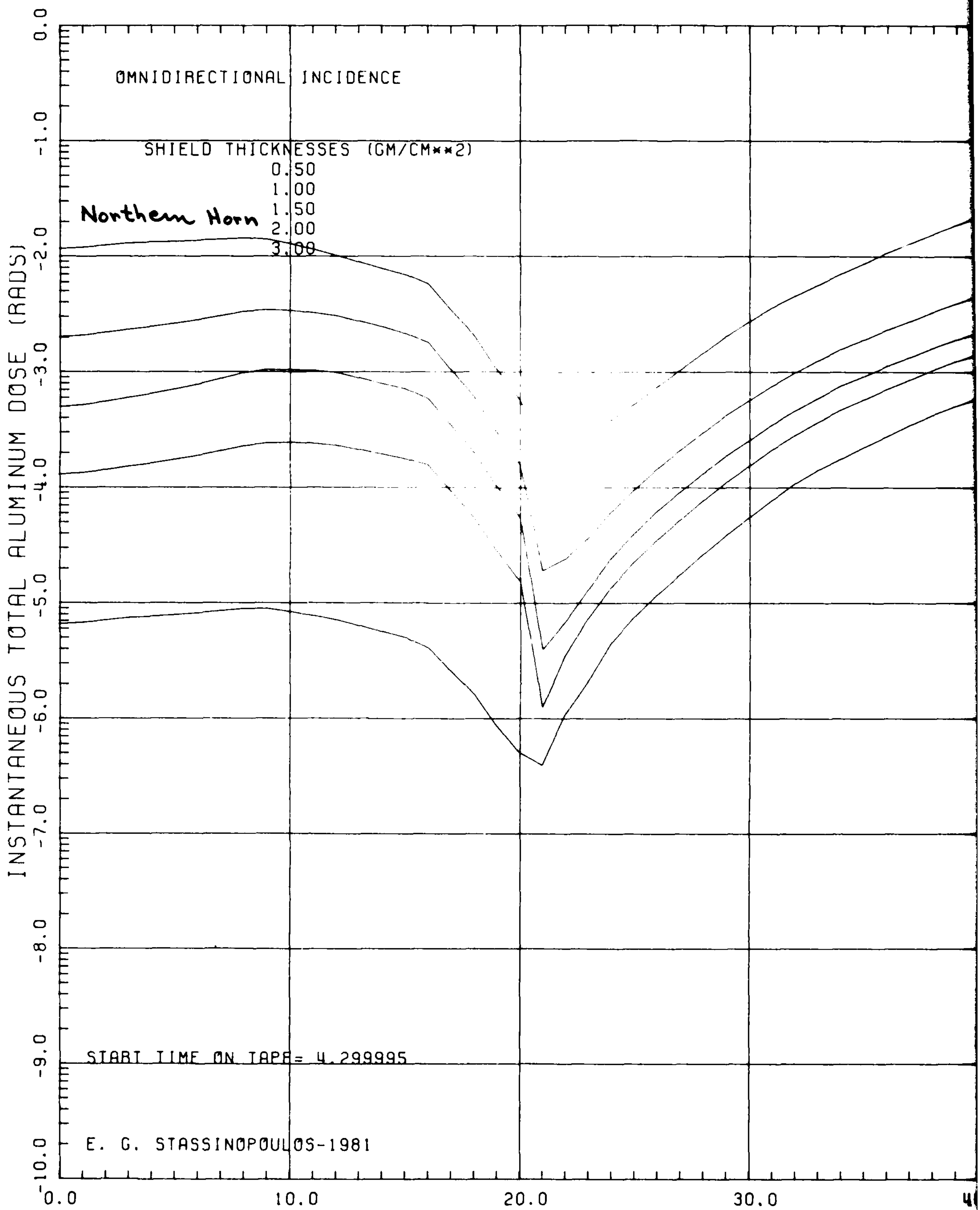
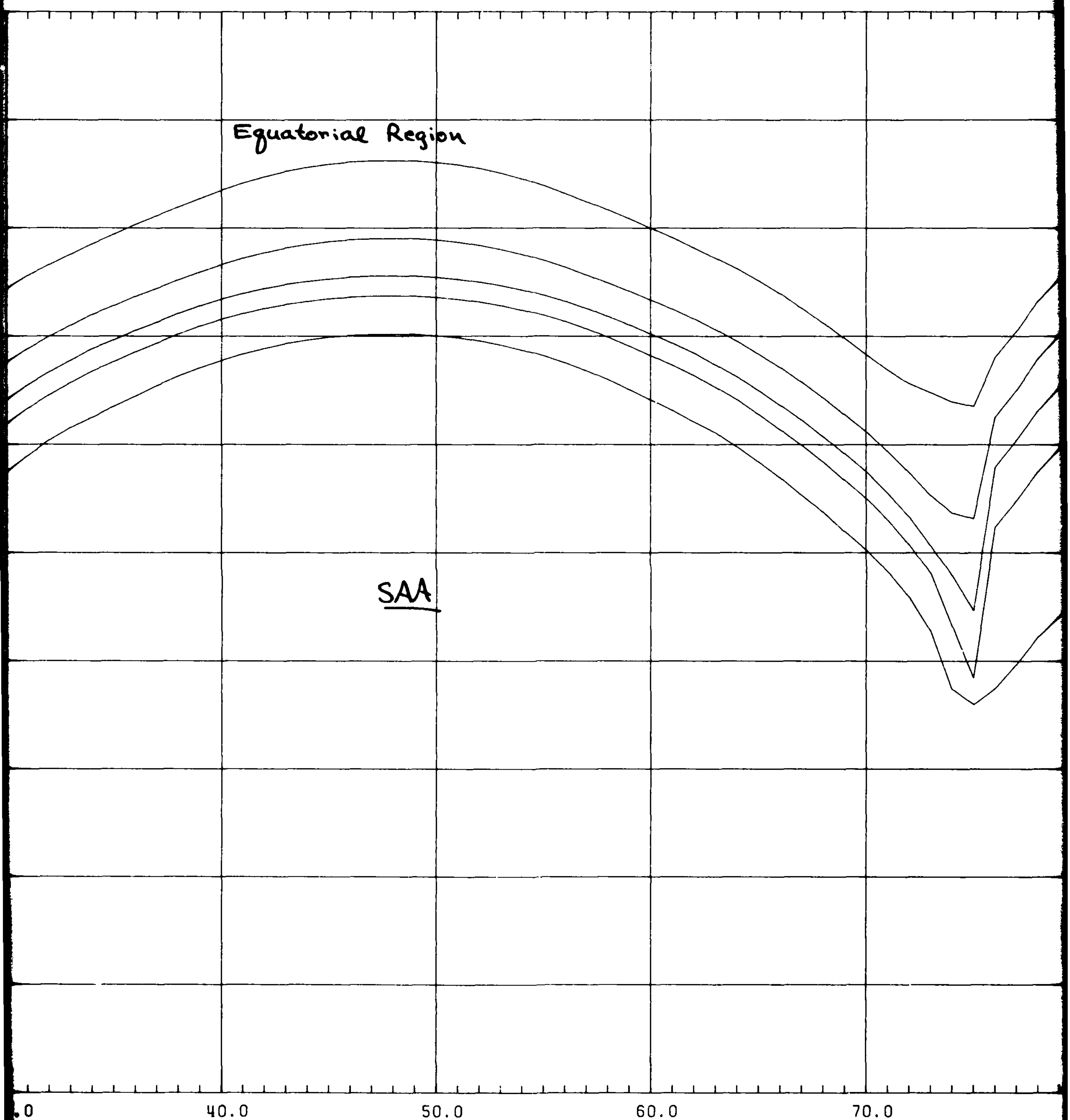
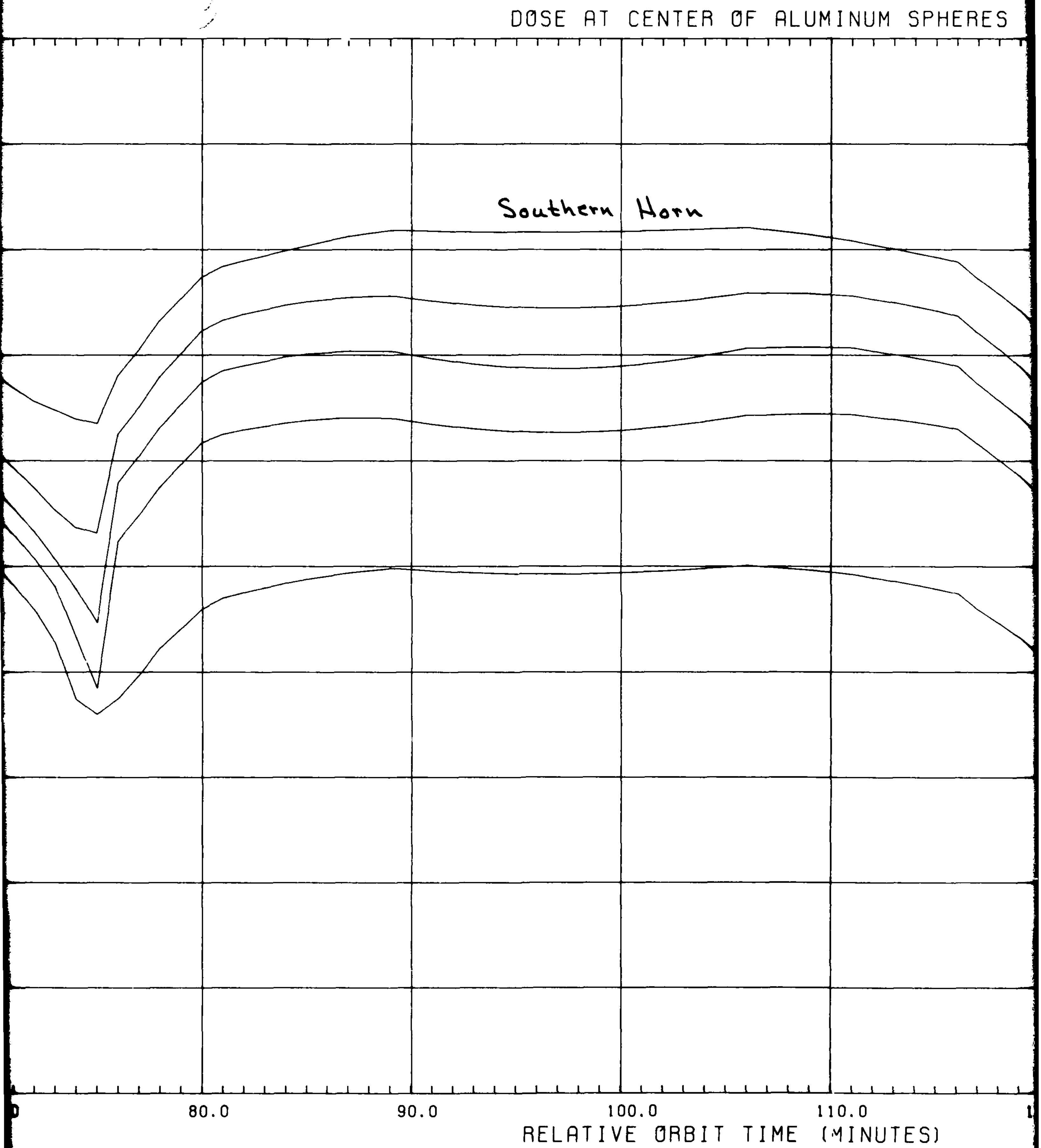


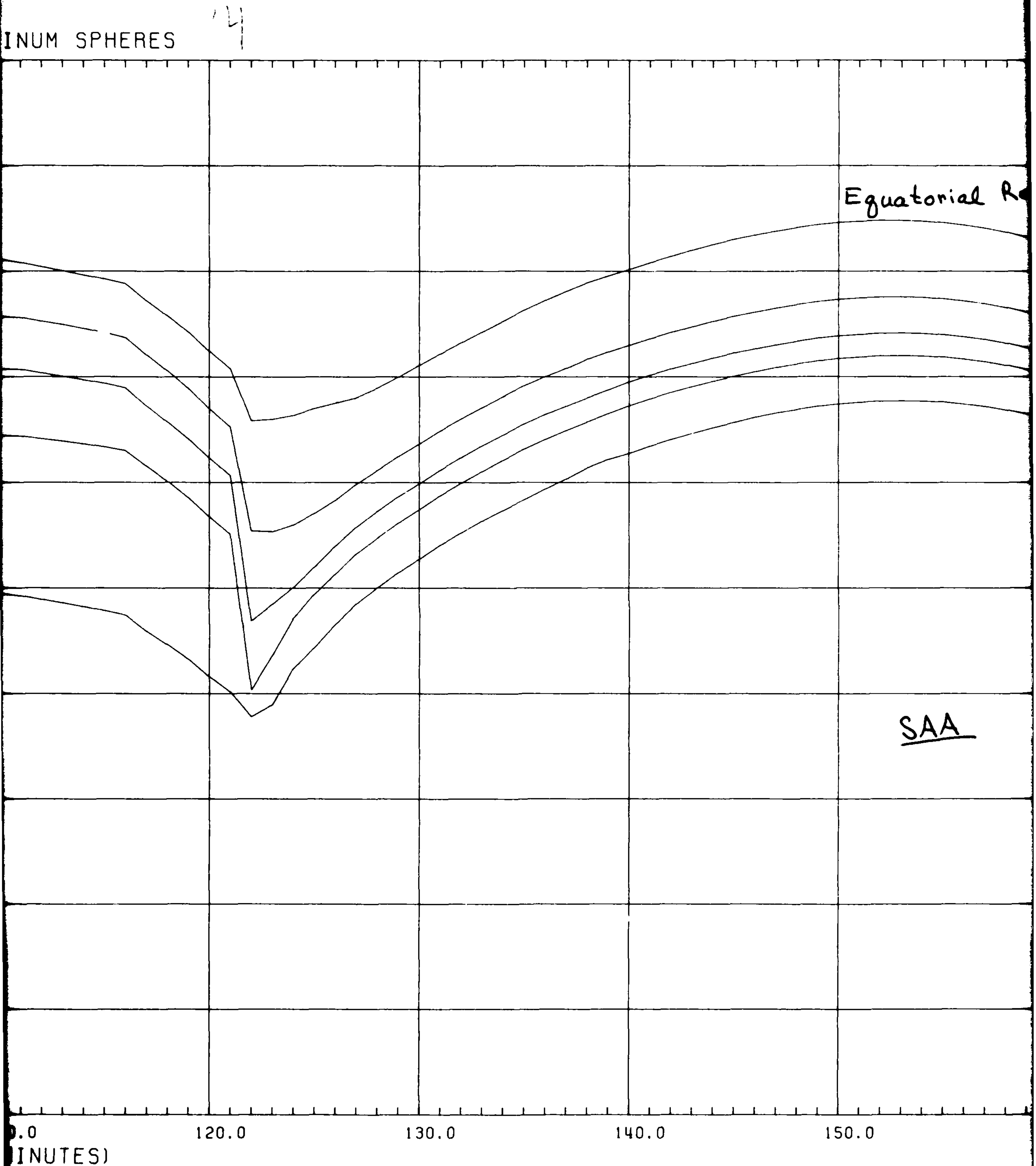
Figure 145
ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 7.716662
NASA-GSFC
190.0
200.0
210.0



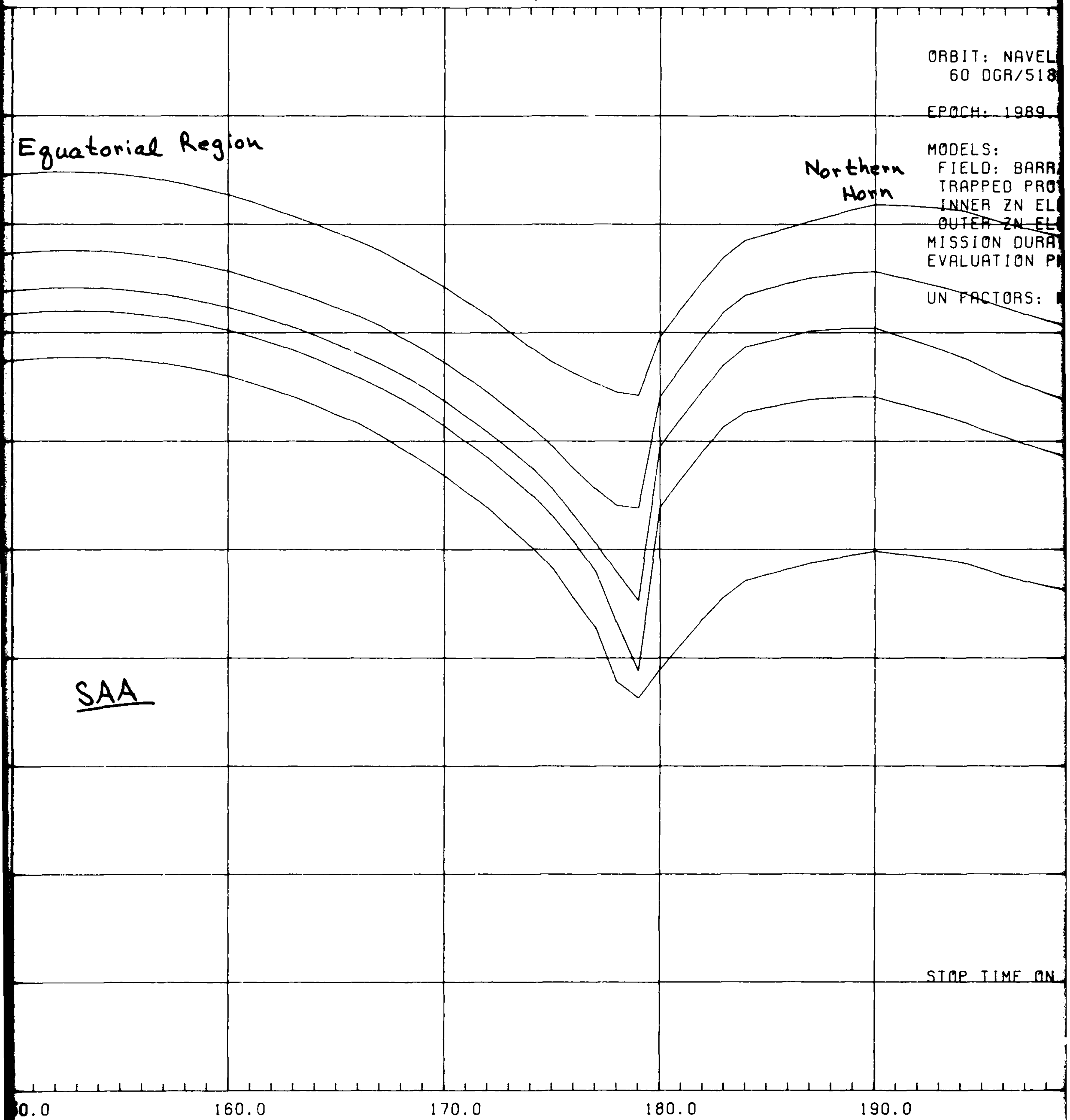
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
START TIME ON TAPE= 4.299995
E. G. STASSINOPOULOS-1981
0.0
10.0
20.0
30.0


Equatorial Region
SAA
.0
40.0
50.0
60.0
70.0


DOSE AT CENTER OF ALUMINUM SPHERES
Southern Horn
80.0
90.0
100.0
110.0
RELATIVE ORBIT TIME (MINUTES)



INUM SPHERES
Equatorial R
SAA
.0
120.0
130.0
140.0
150.0
INUTES)


ORBIT: NAVEL
60 DGR/518
EPOCH: 1989.
MODELS:
FIELD: BARR
TRAPPED PRO
INNER ZN EL
OUTER ZN EL
MISSION DURA
EVALUATION P
UN FACTORS:
STOP TIME ON
Equatorial Region
Northern Horn
SAA
0.0
160.0
170.0
180.0
190.0

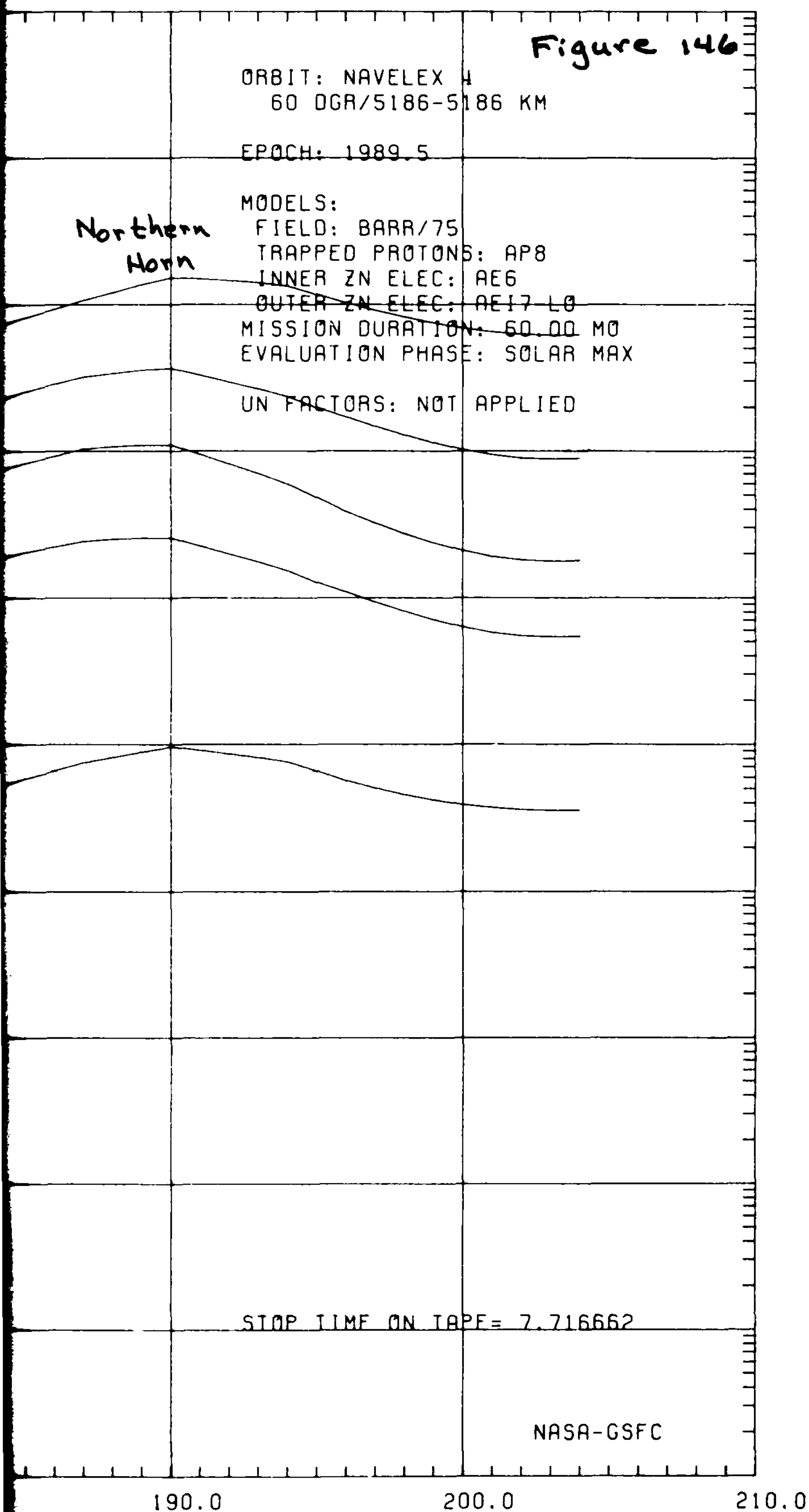
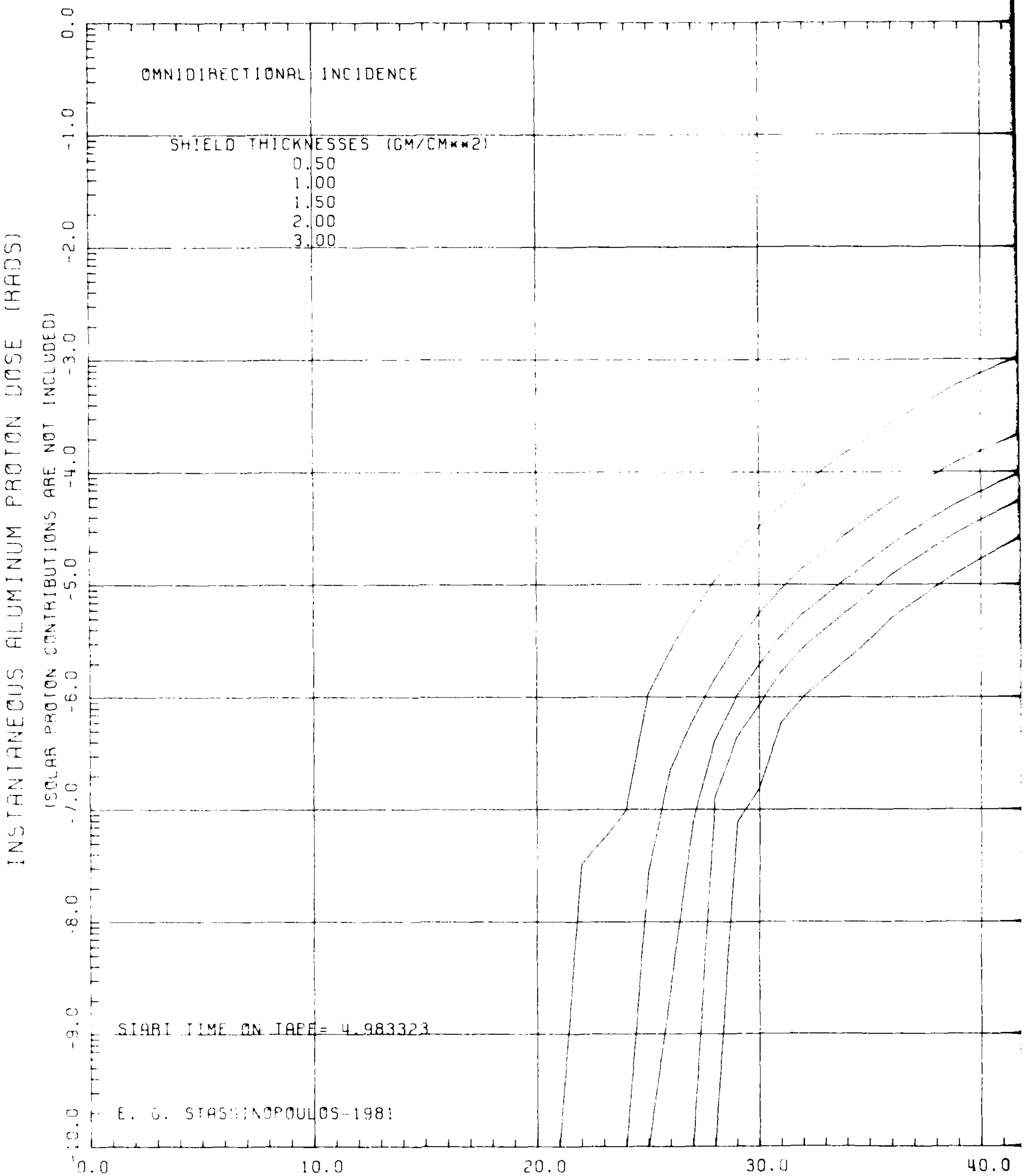
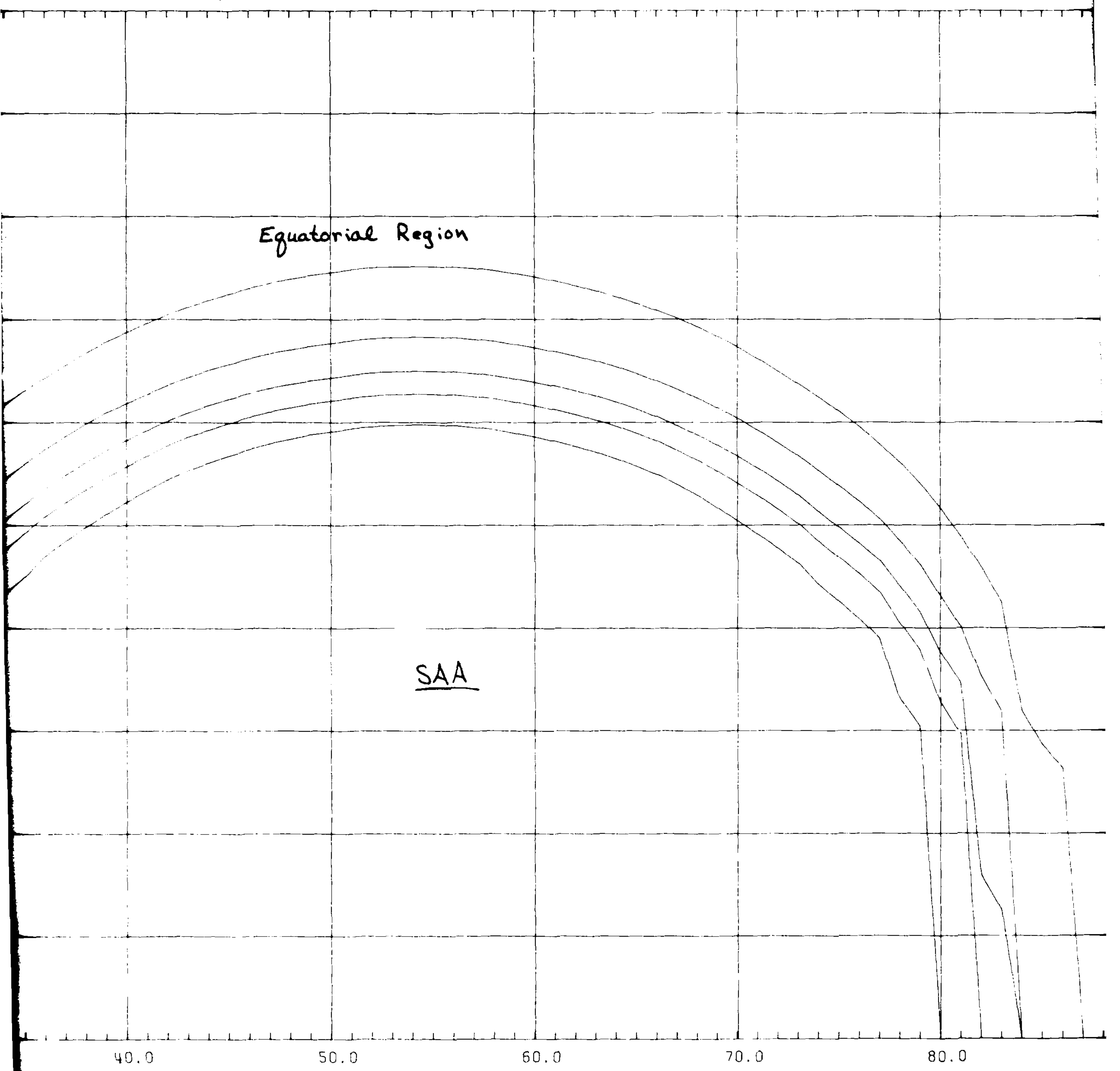


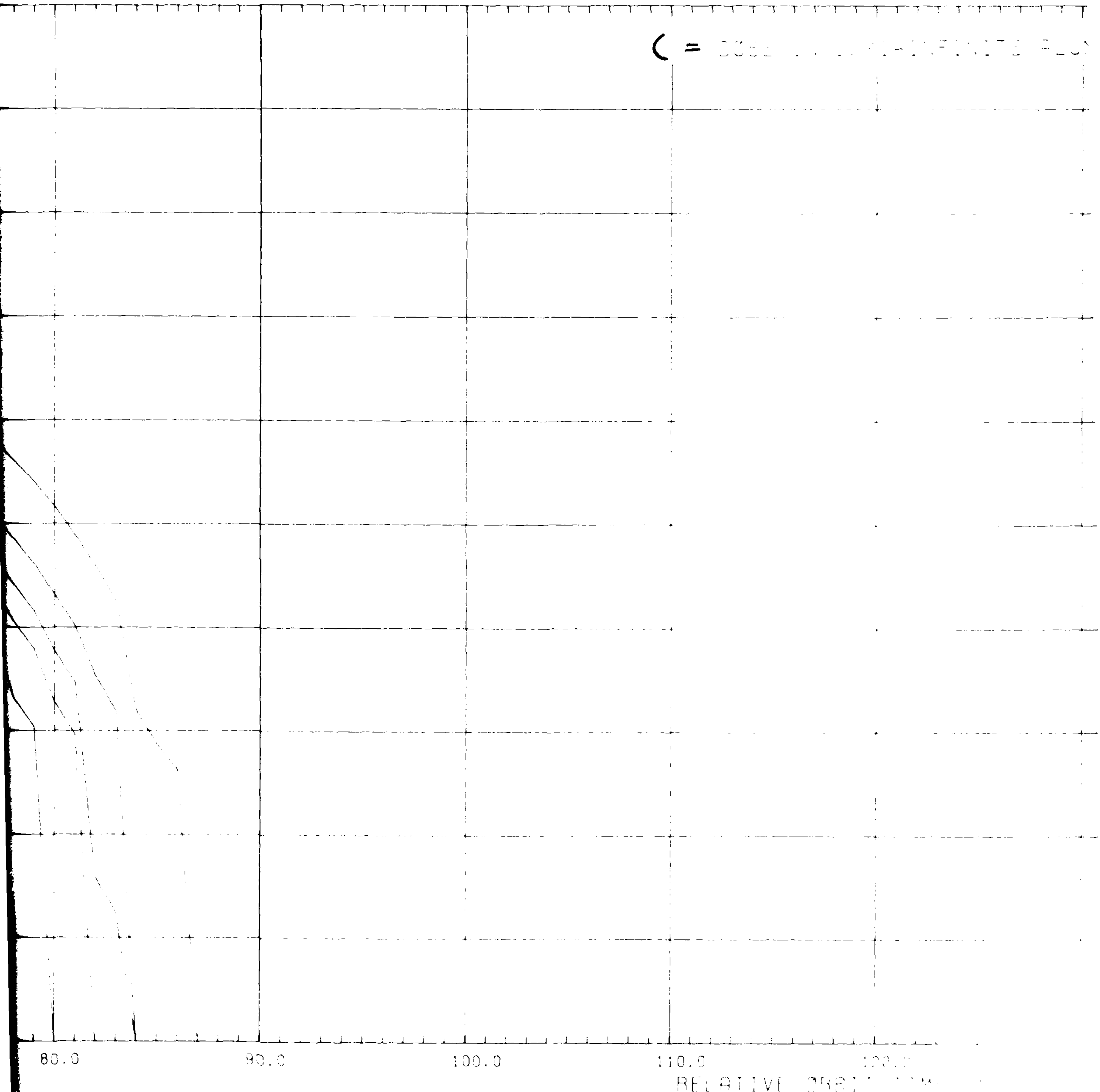
Figure 146
ORBIT: NAVELEX 4
60 DGR/5186-5186 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 7.716662
NASA-GSFC
190.0
200.0
210.0


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
START TIME ON TAPE= 4.983323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40.0



Equatorial Region
SAA
40.0
50.0
60.0
70.0
80.0

DOSE AT TRANSMISSION SURFACE OF FINITE AL



AD-A141 849 ORBITAL RADIATION STUDY FOR INCLINED CIRCULAR TRAJECTORIES(U) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION GREENBELT MD GO.. E G STASSINOPOULOS

5/5

UNCLASSIFIED NOV 81 NASA-GSFC-X-601-81-28 F/G 22/3 NL

END

DATE FILMED

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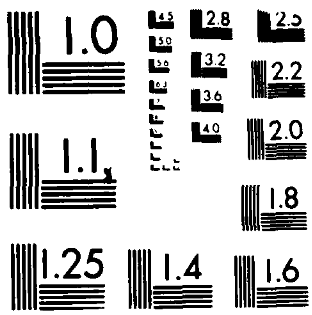
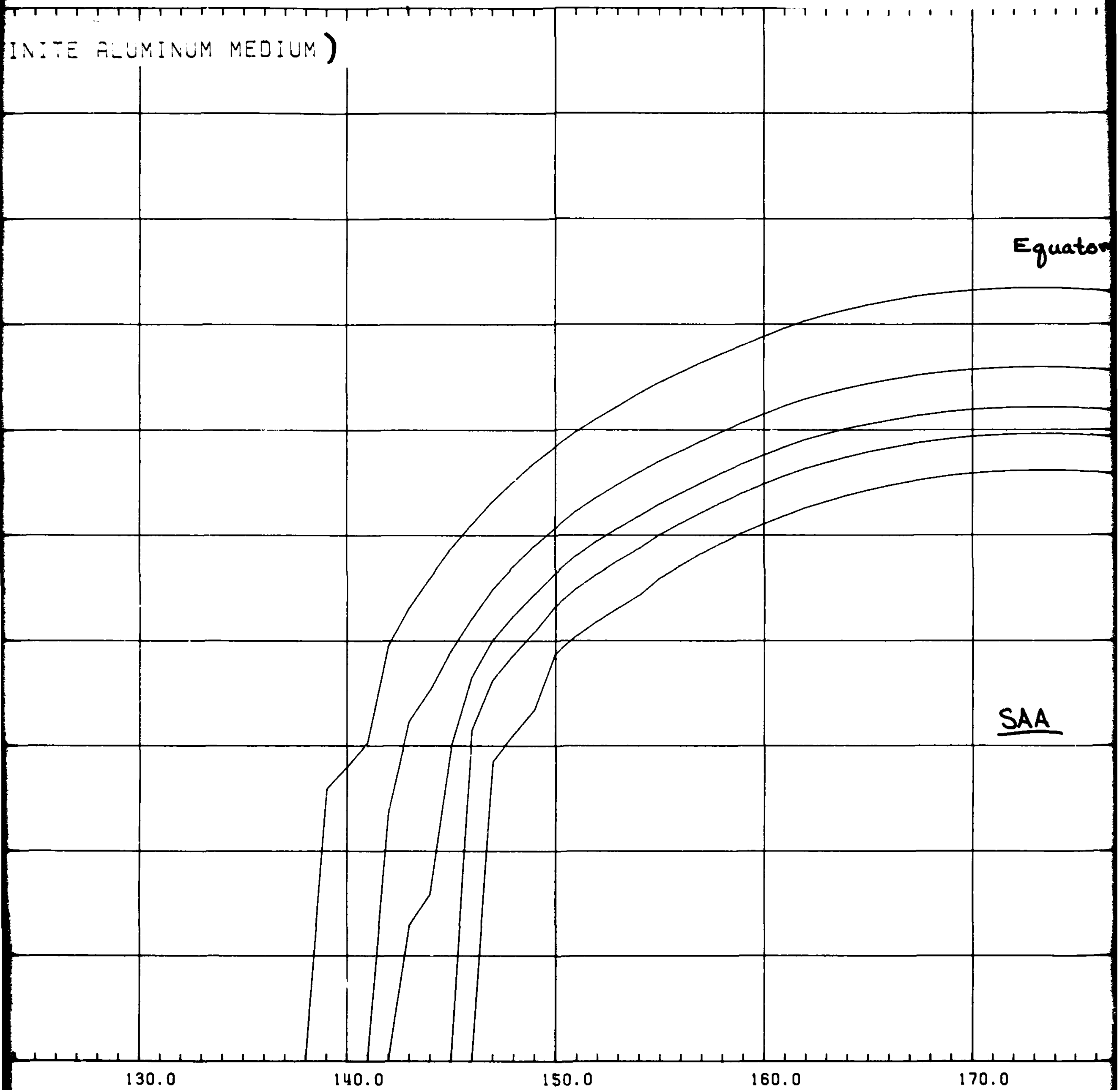


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

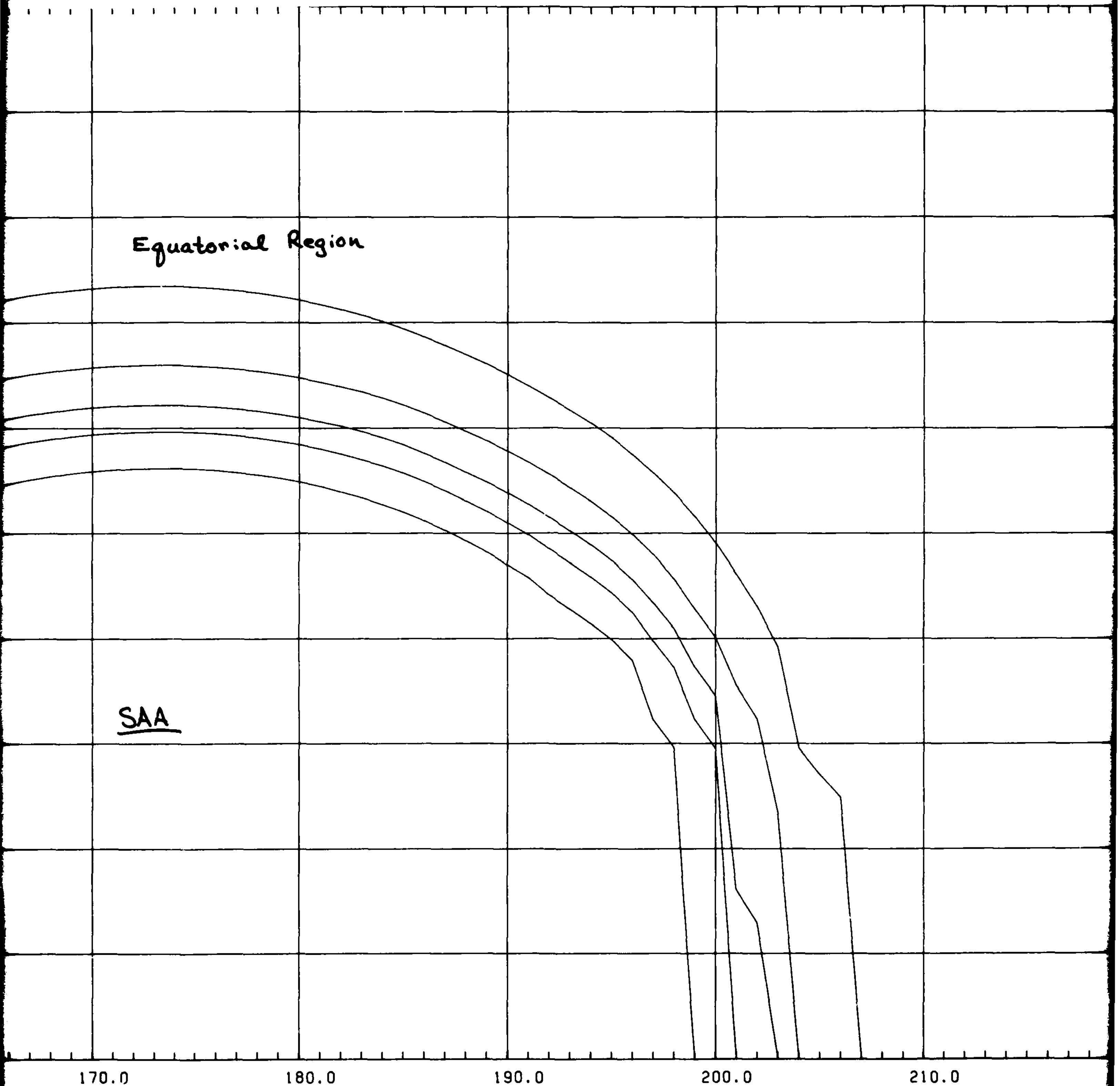
FINITE ALUMINUM SLAB SHIELDS

INITE ALUMINUM MEDIUM)



(MINUTES)

1
5



6

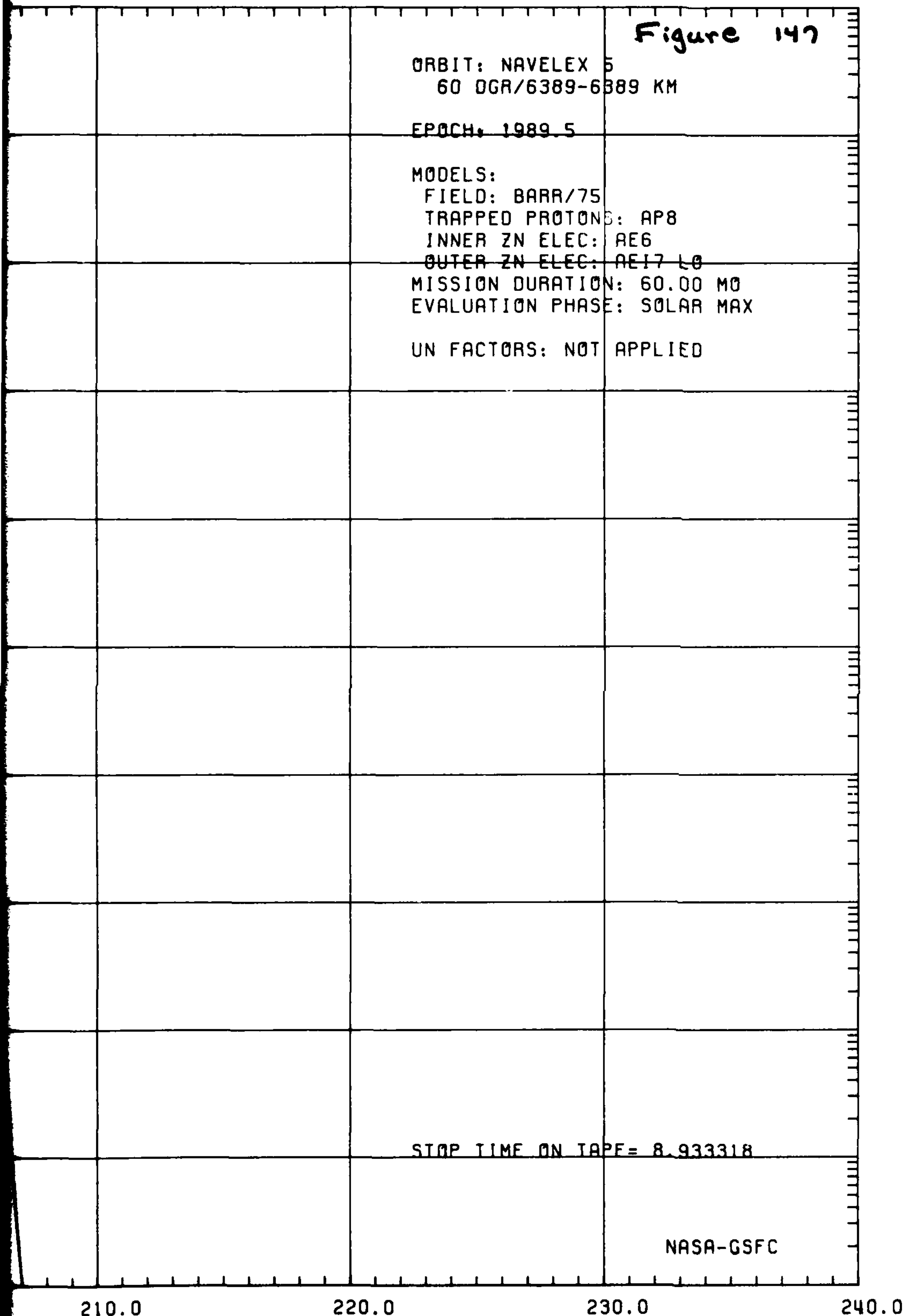
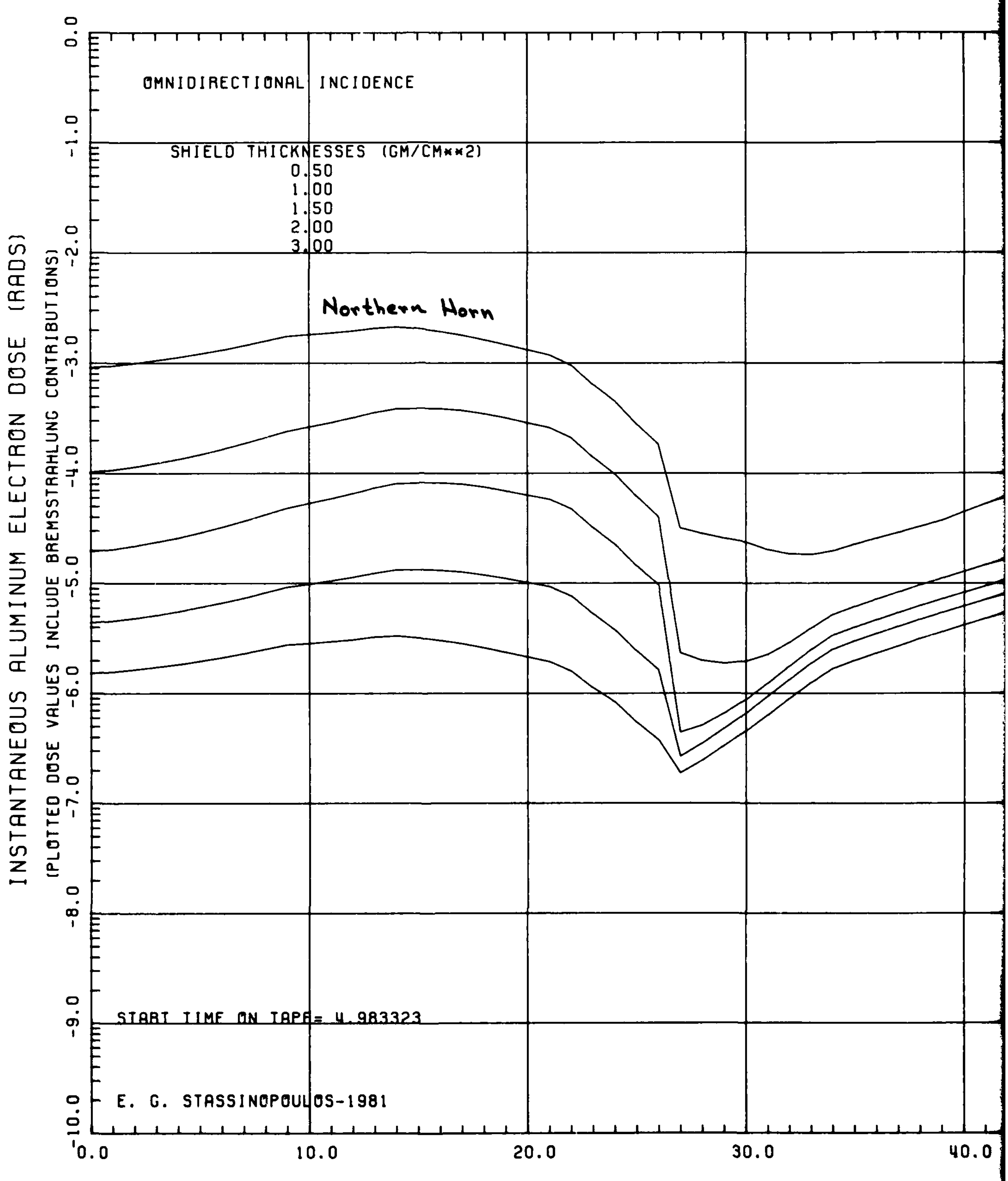
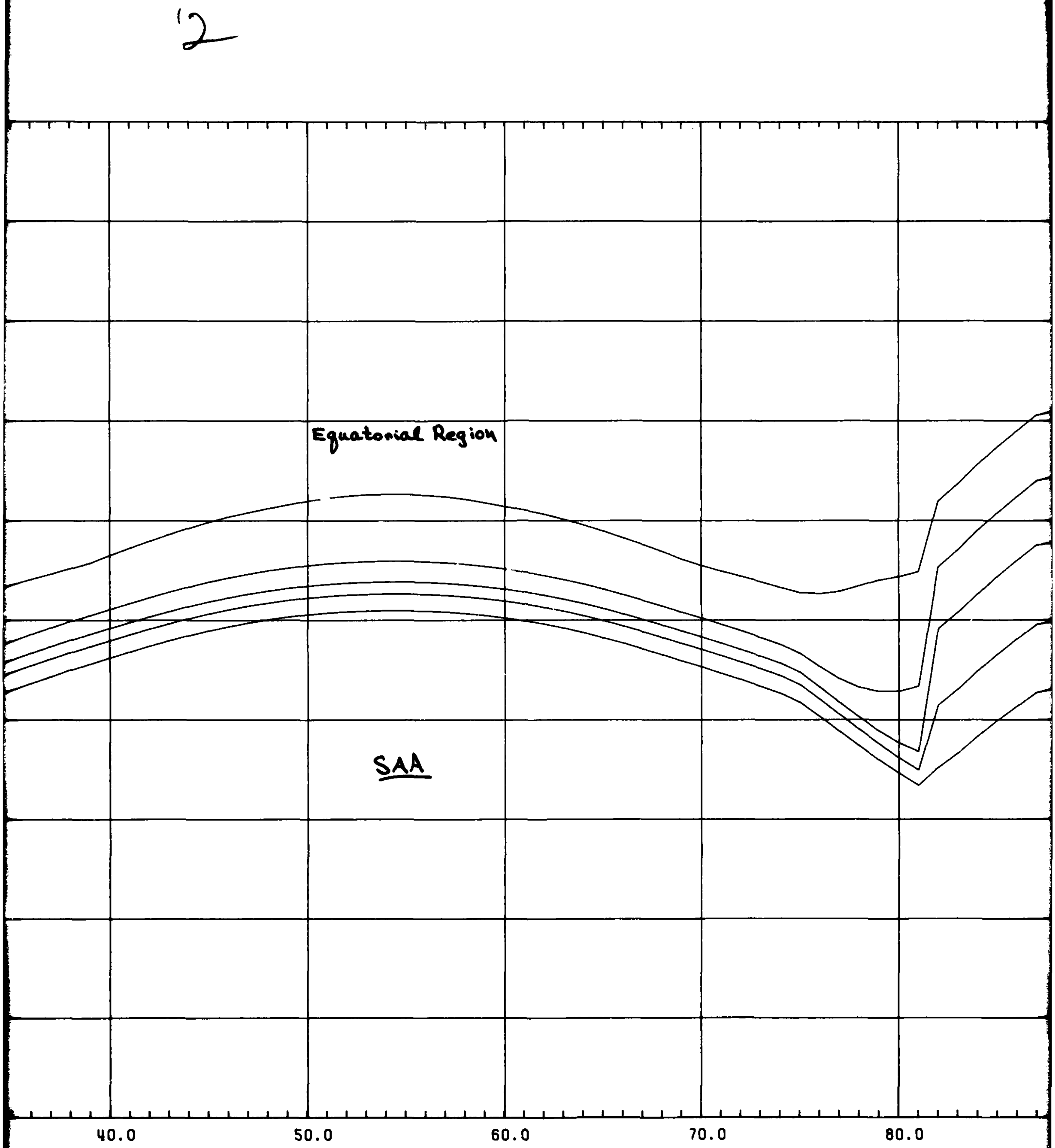


Figure 147
ORBIT: NAVELEX 5
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 8.933318
NASA-GSFC
210.0
220.0
230.0
240.0

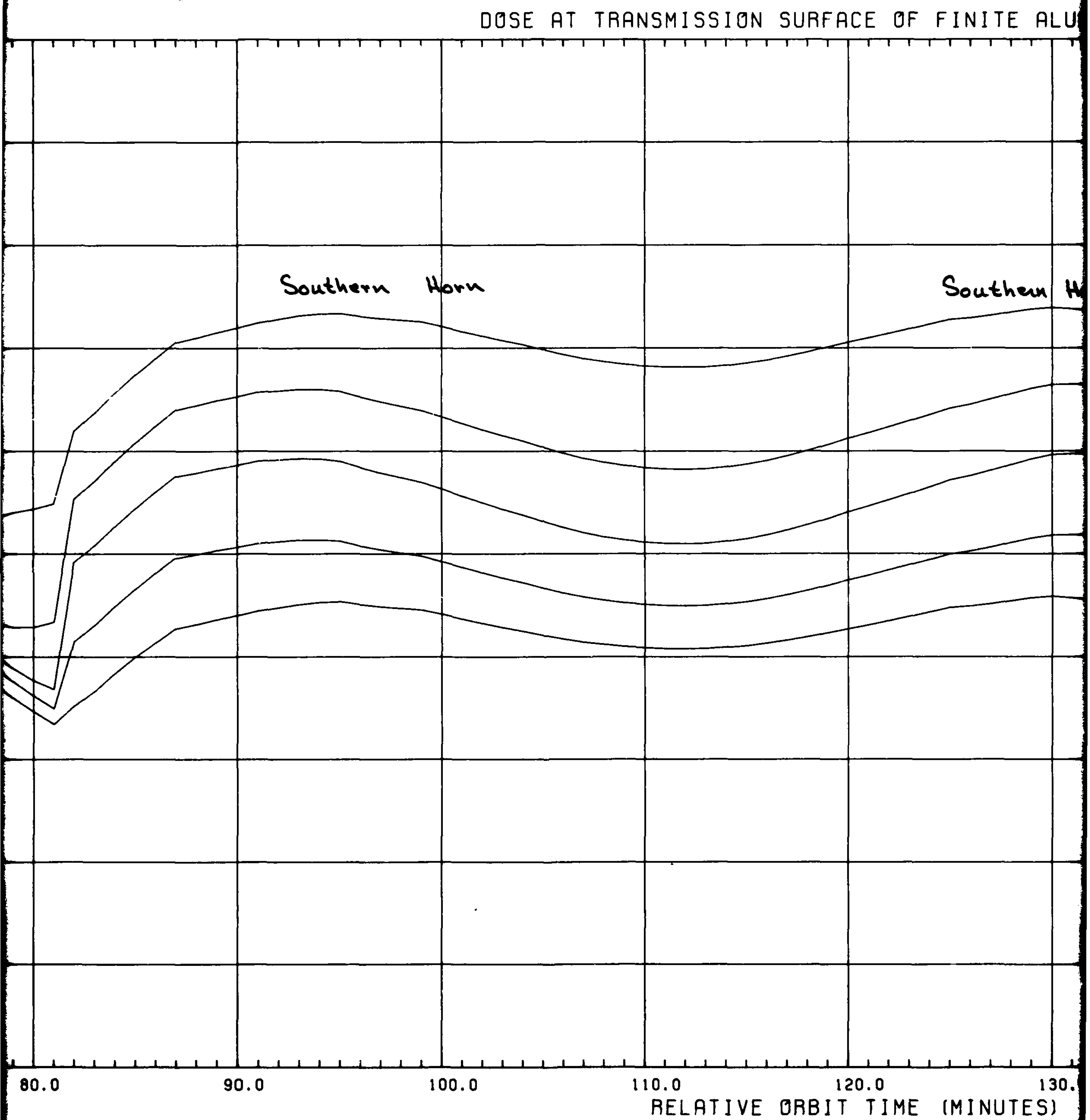


INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
START TIME ON TAPE= 4.983323
E. G. STASSINOPOULOS-1981
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40.0



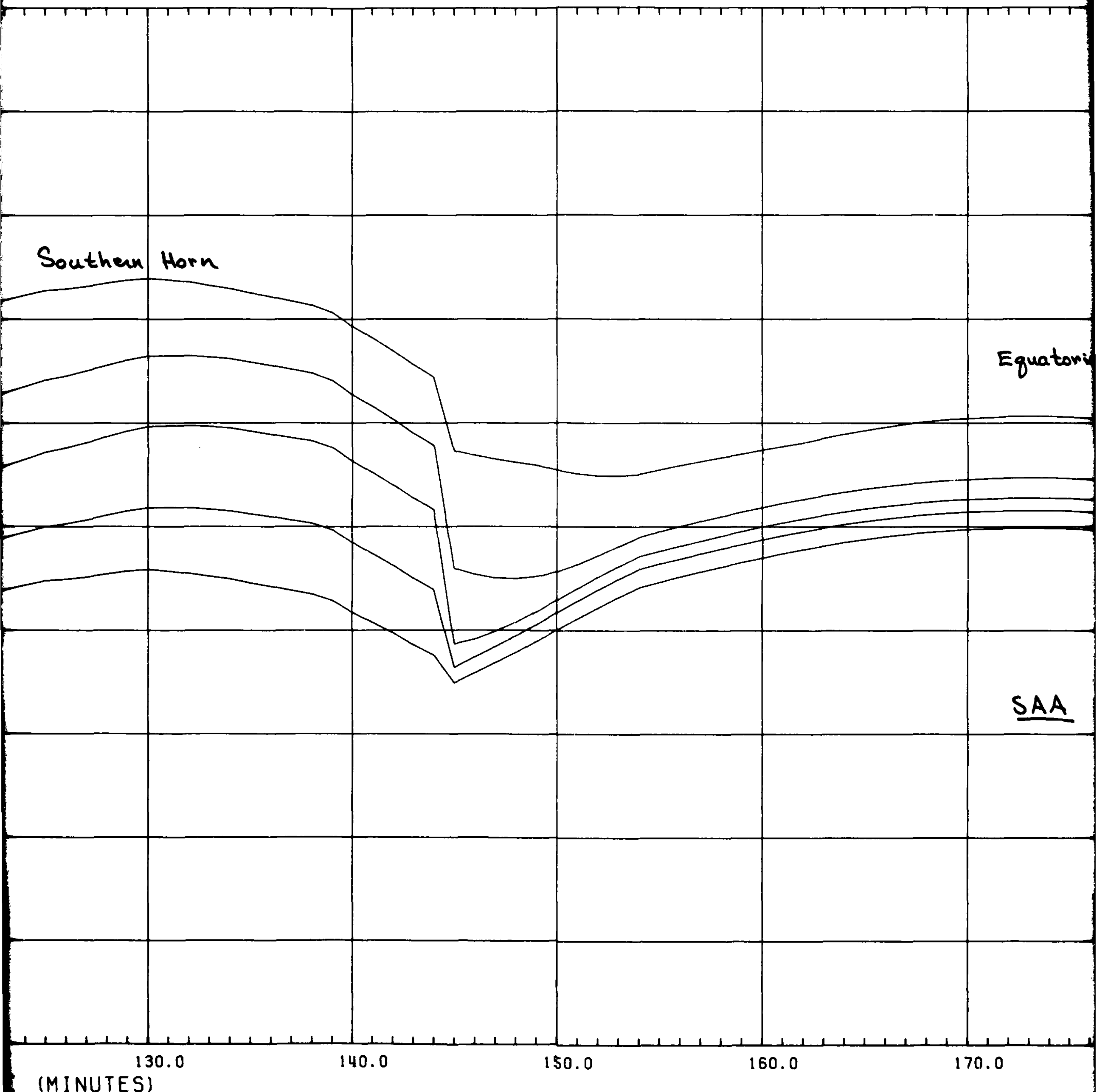
'2
Equatorial Region
SAA
40.0
50.0
60.0
70.0
80.0

3

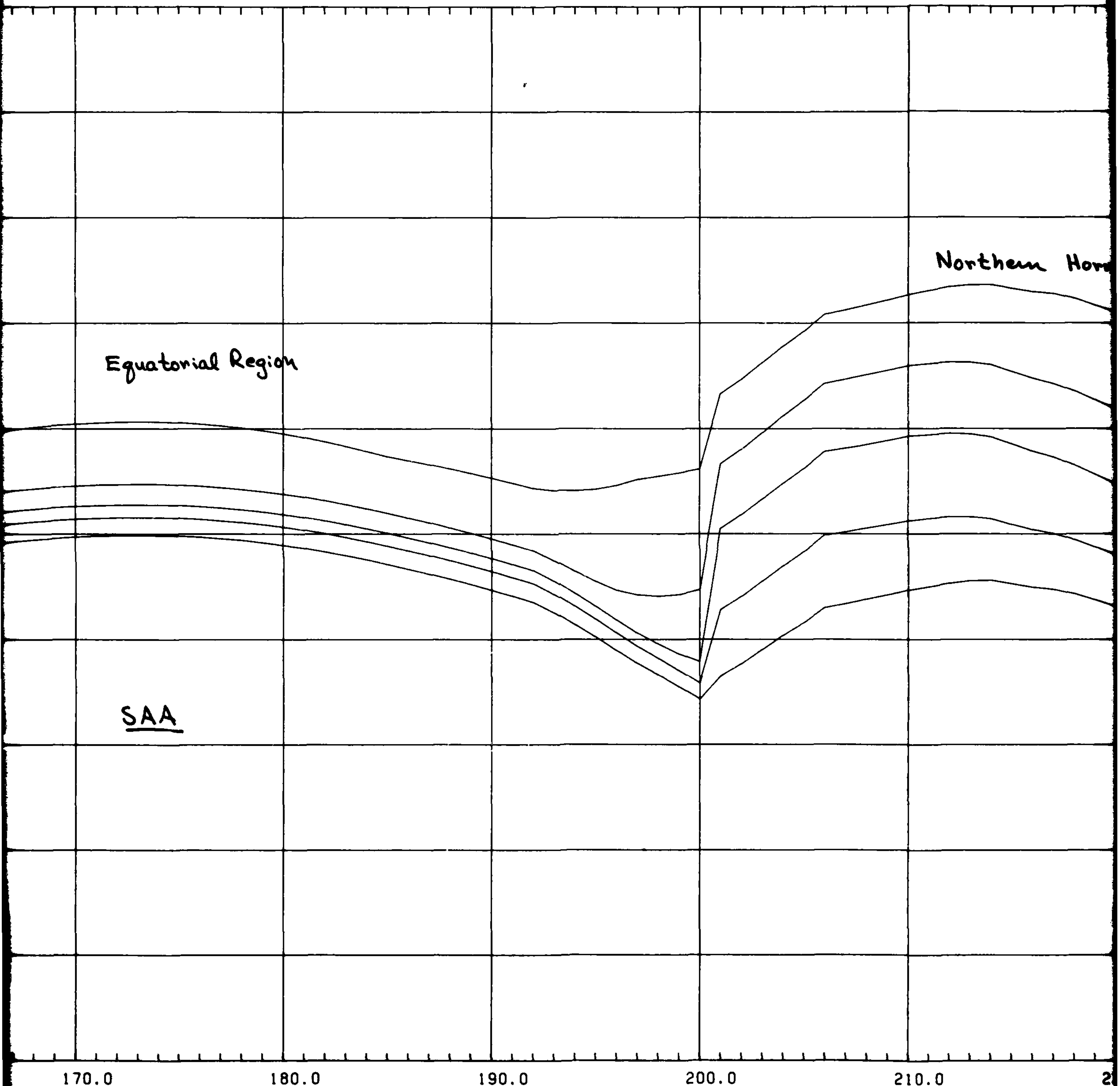

DOSE AT TRANSMISSION SURFACE OF FINITE ALU
Southern Horn
Southern H
80.0
90.0
100.0
110.0
120.0
130.
RELATIVE ORBIT TIME (MINUTES)

'4

F FINITE ALUMINUM SLAB SHIELDS



'5



Northern Horn
Equatorial Region
SAA
170.0
180.0
190.0
200.0
210.0

6

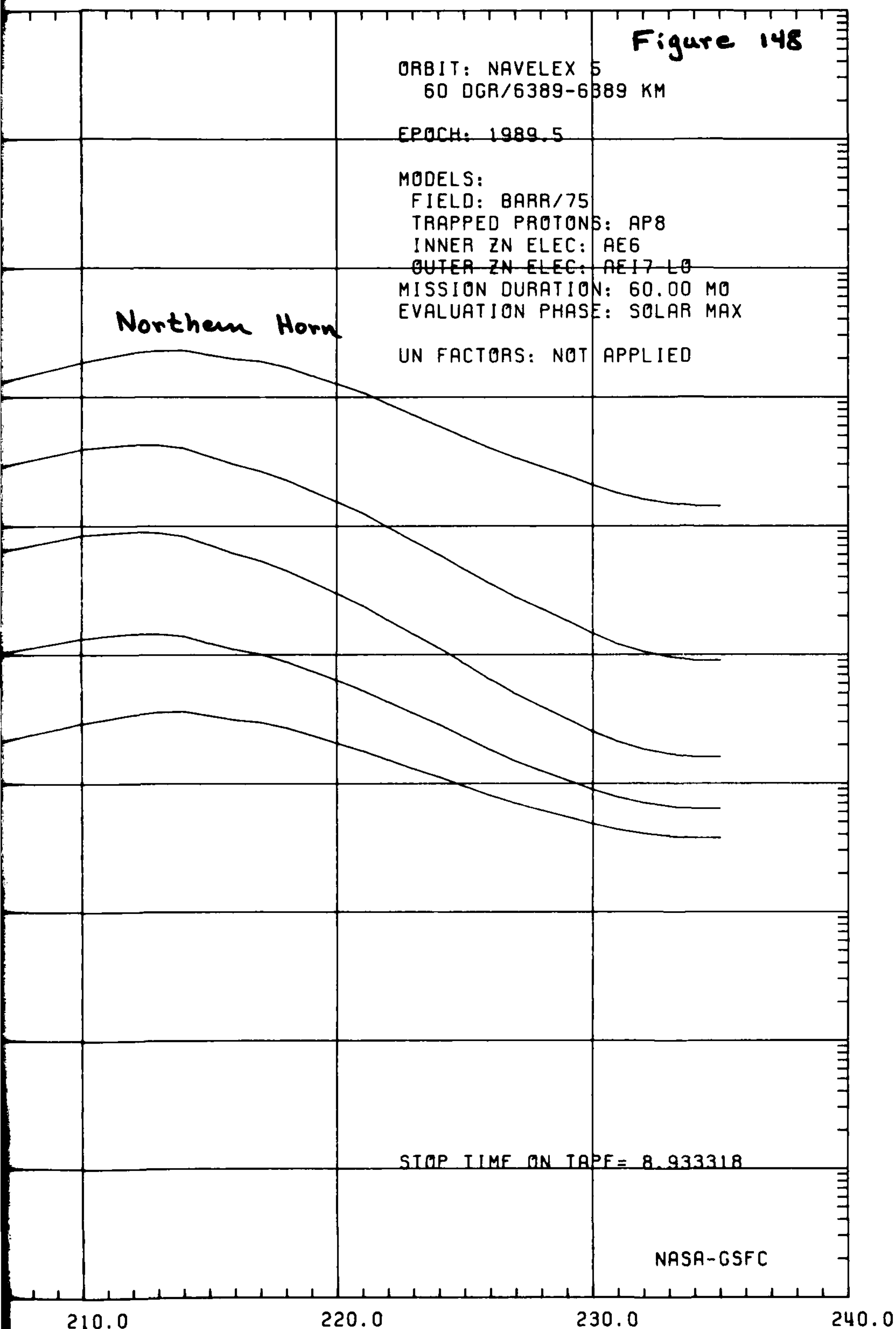
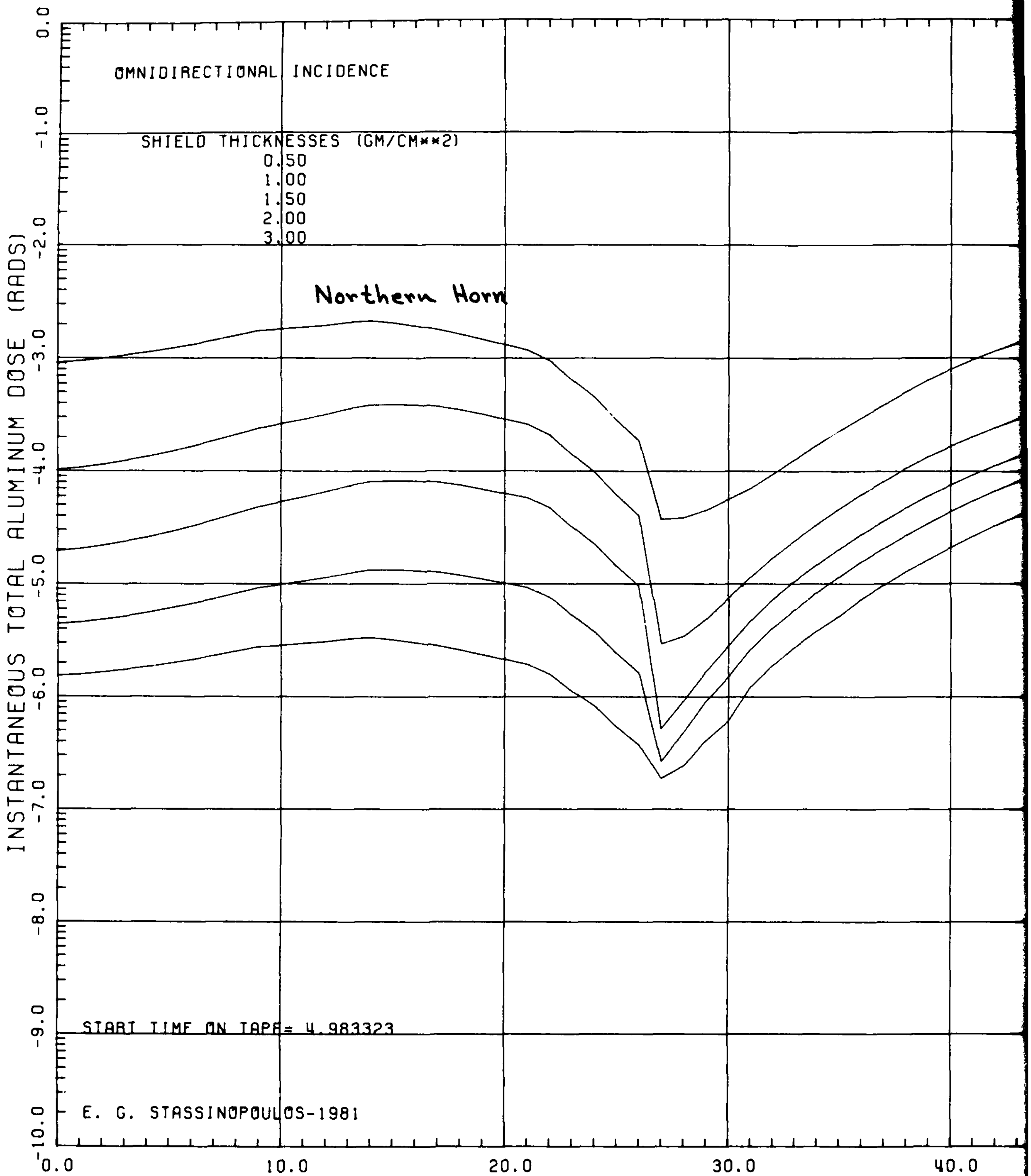
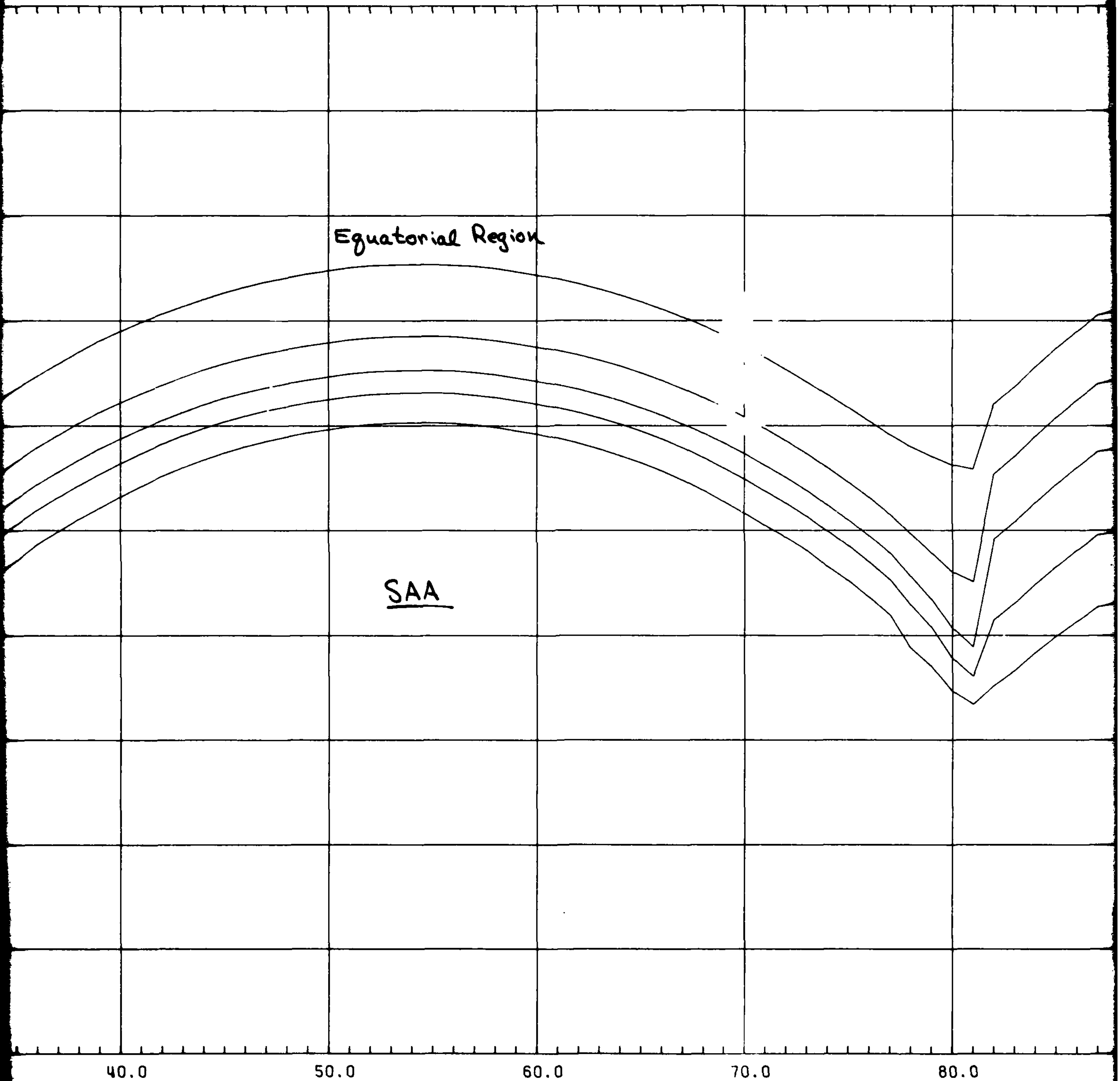
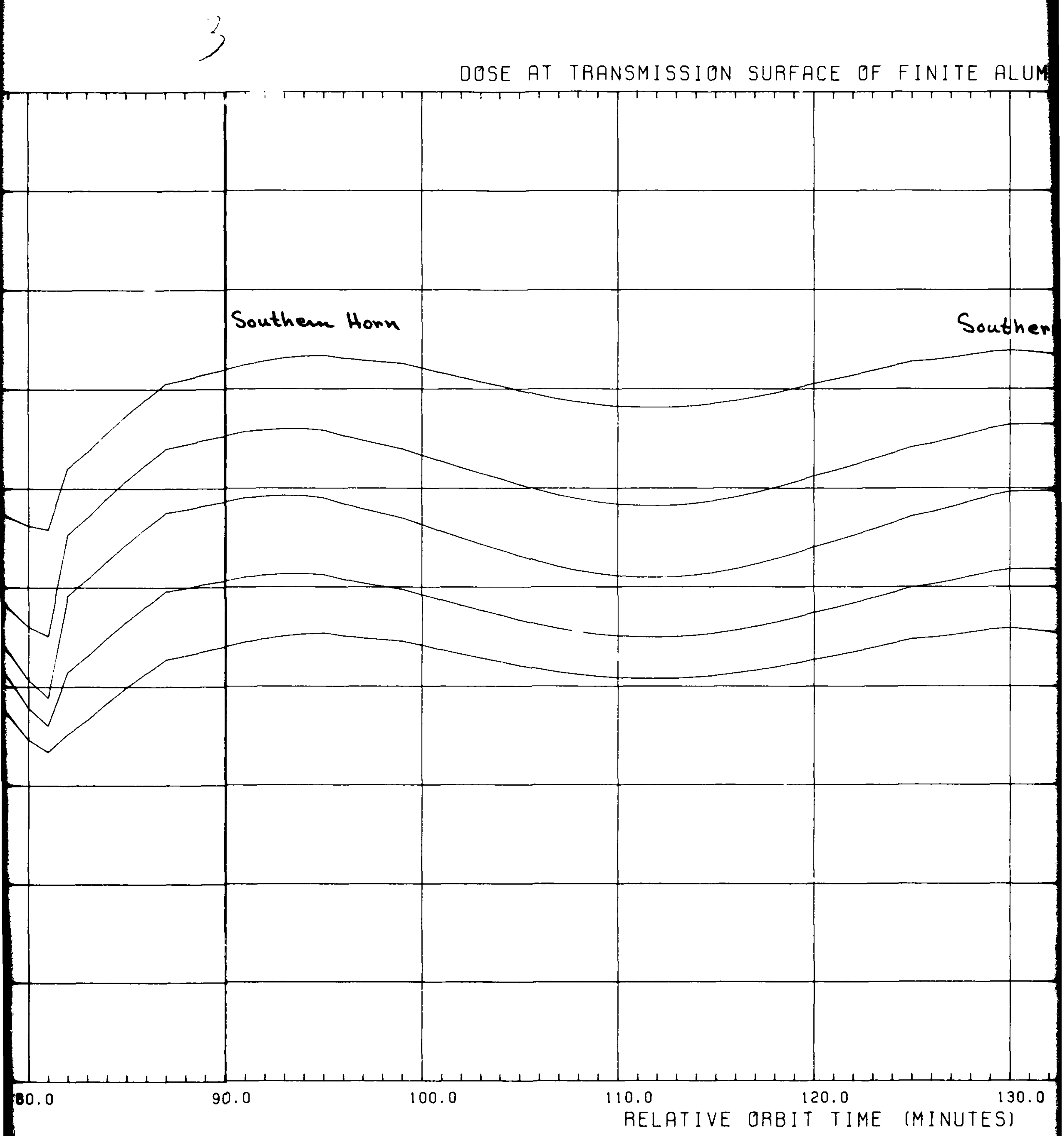


Figure 148
ORBIT: NAVELEX 5
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 8.933318
NASA-GSFC
210.0
220.0
230.0
240.0


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
START TIME ON TAPE= 4.983323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40.0

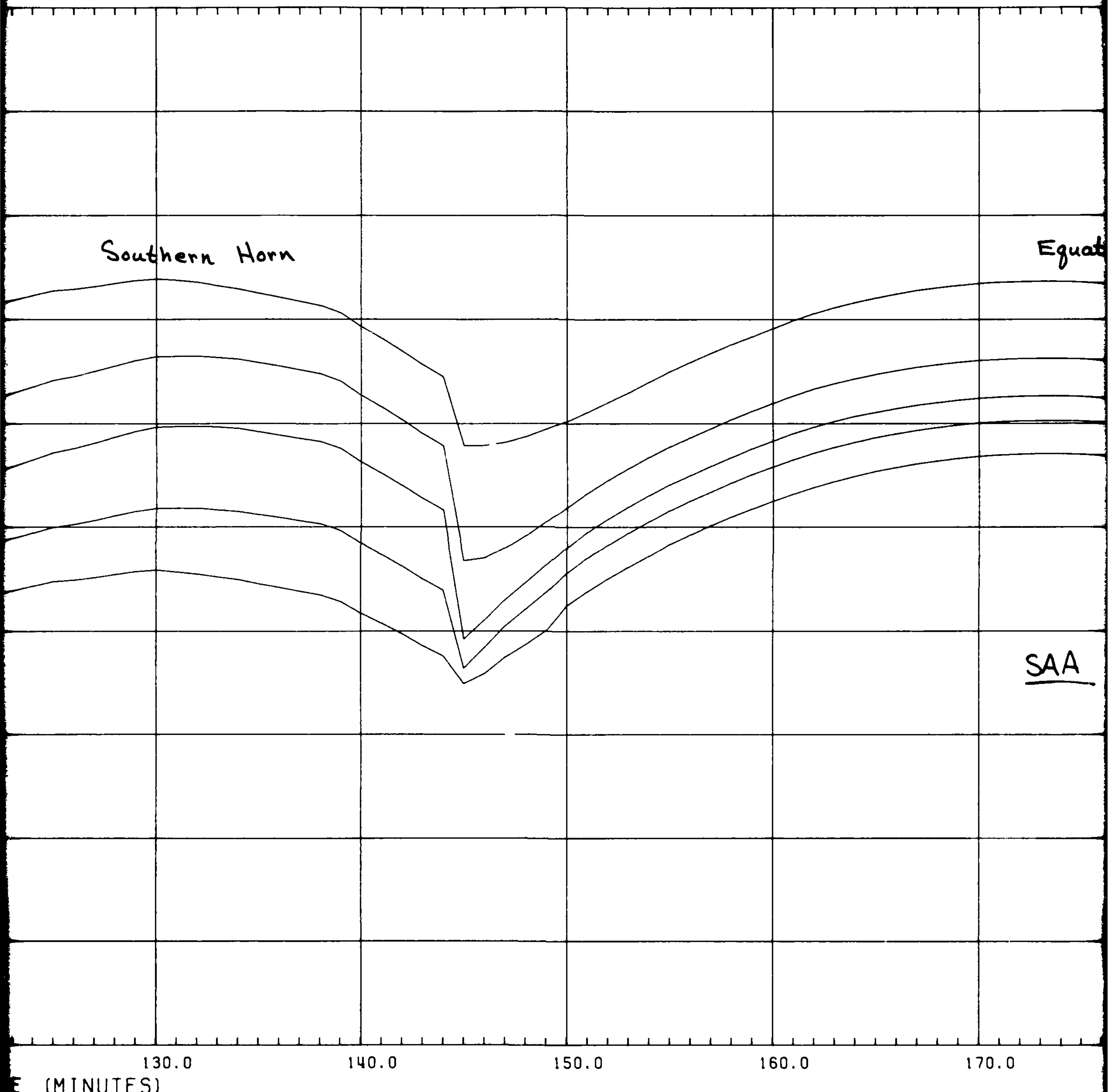
'2



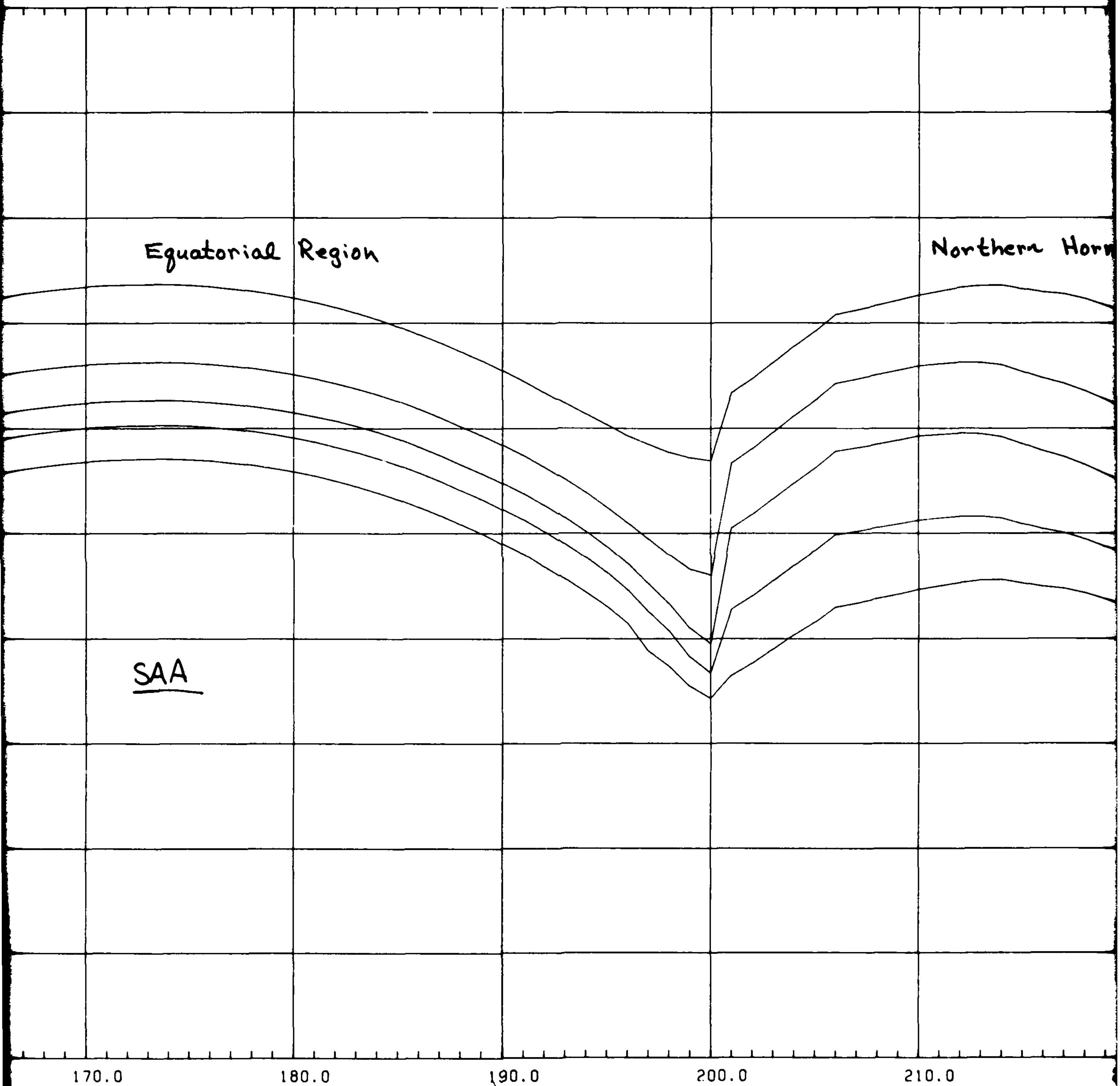

3
DOSE AT TRANSMISSION SURFACE OF FINITE ALUM
Southern Horn
Souther
80.0
90.0
100.0
110.0
120.0
130.0
RELATIVE ORBIT TIME (MINUTES)

'4

F FINITE ALUMINUM SLAB SHIELDS



5



Equatorial Region
Northern Horn
SAA
170.0
180.0
190.0
200.0
210.0

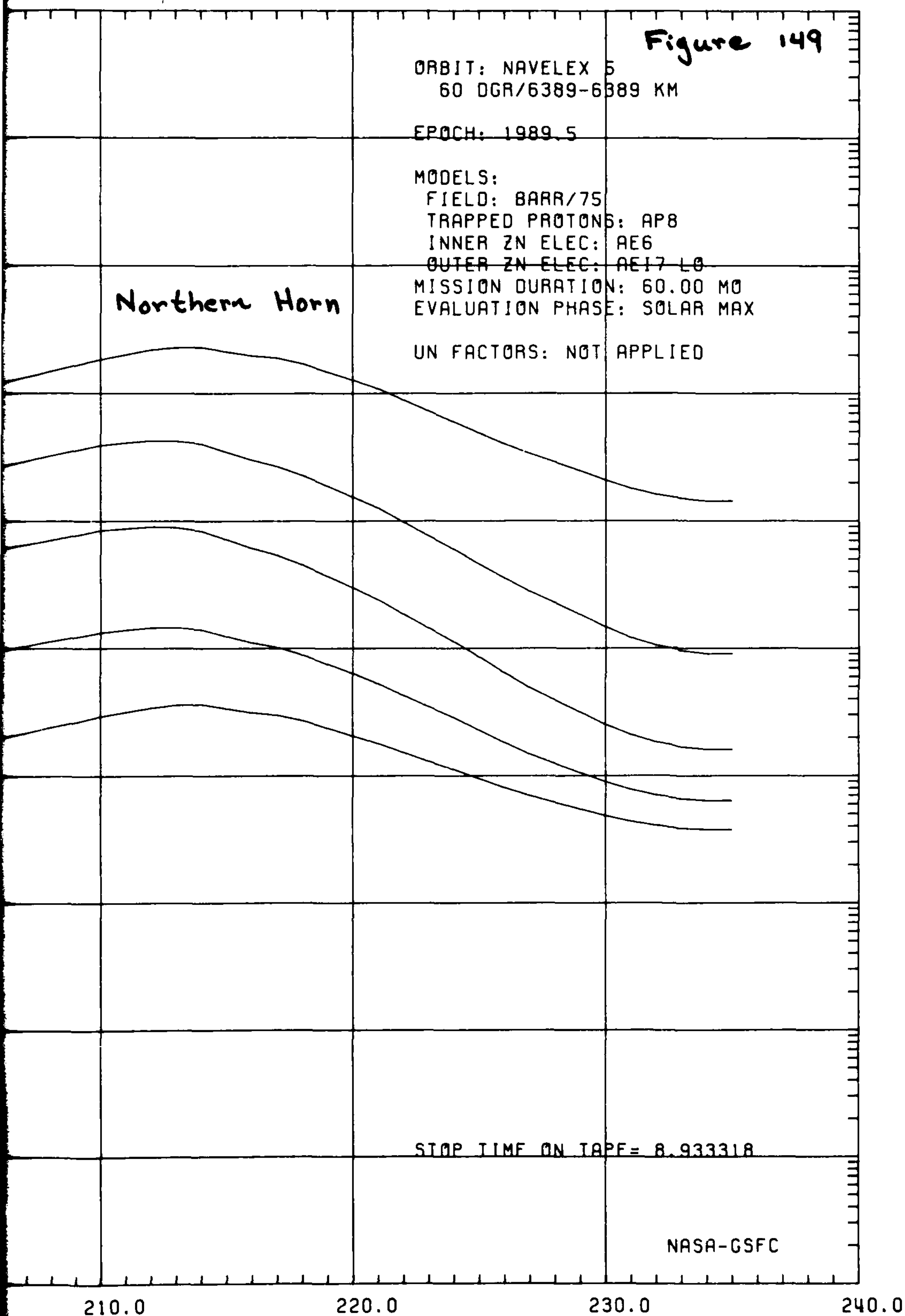
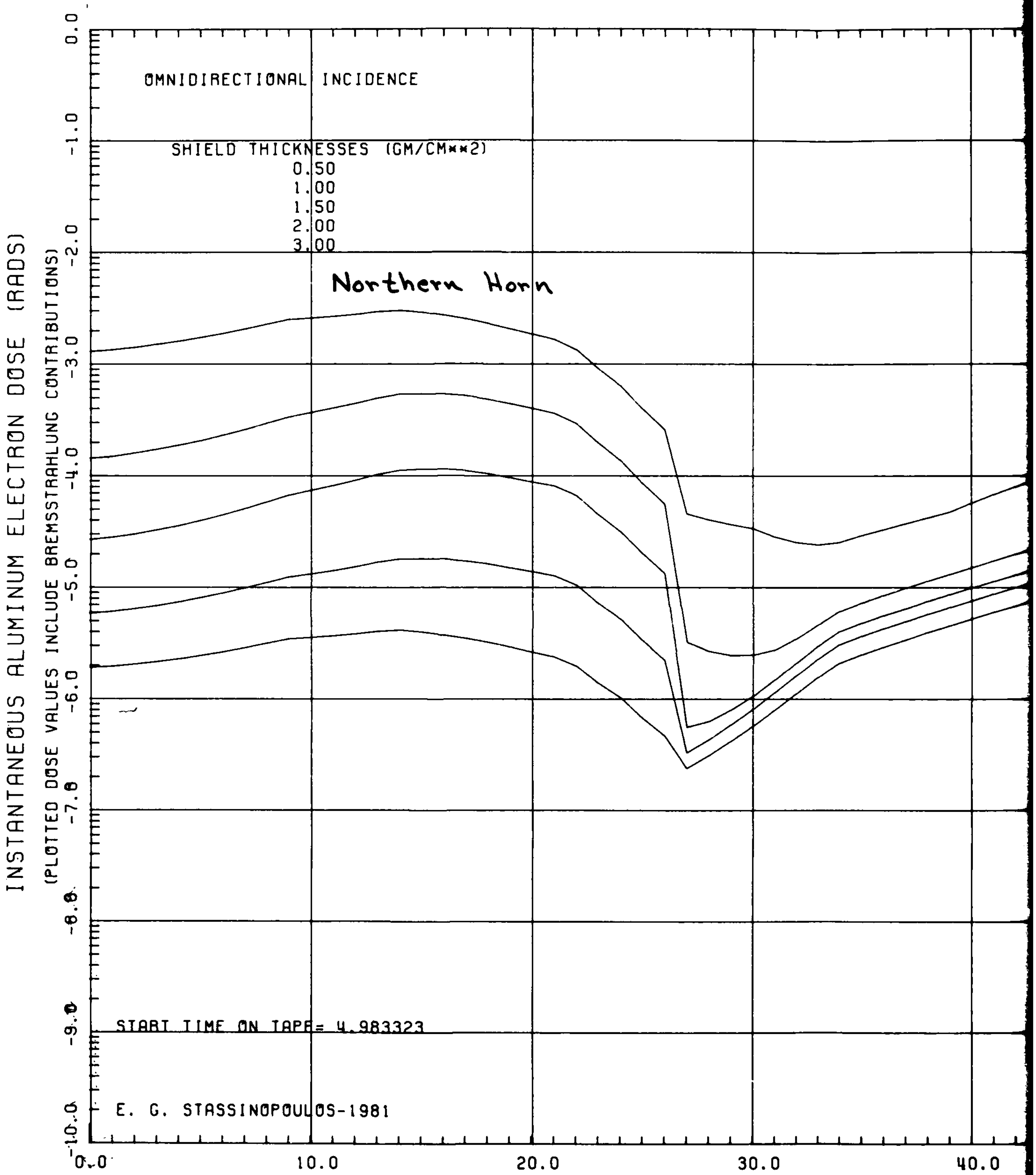
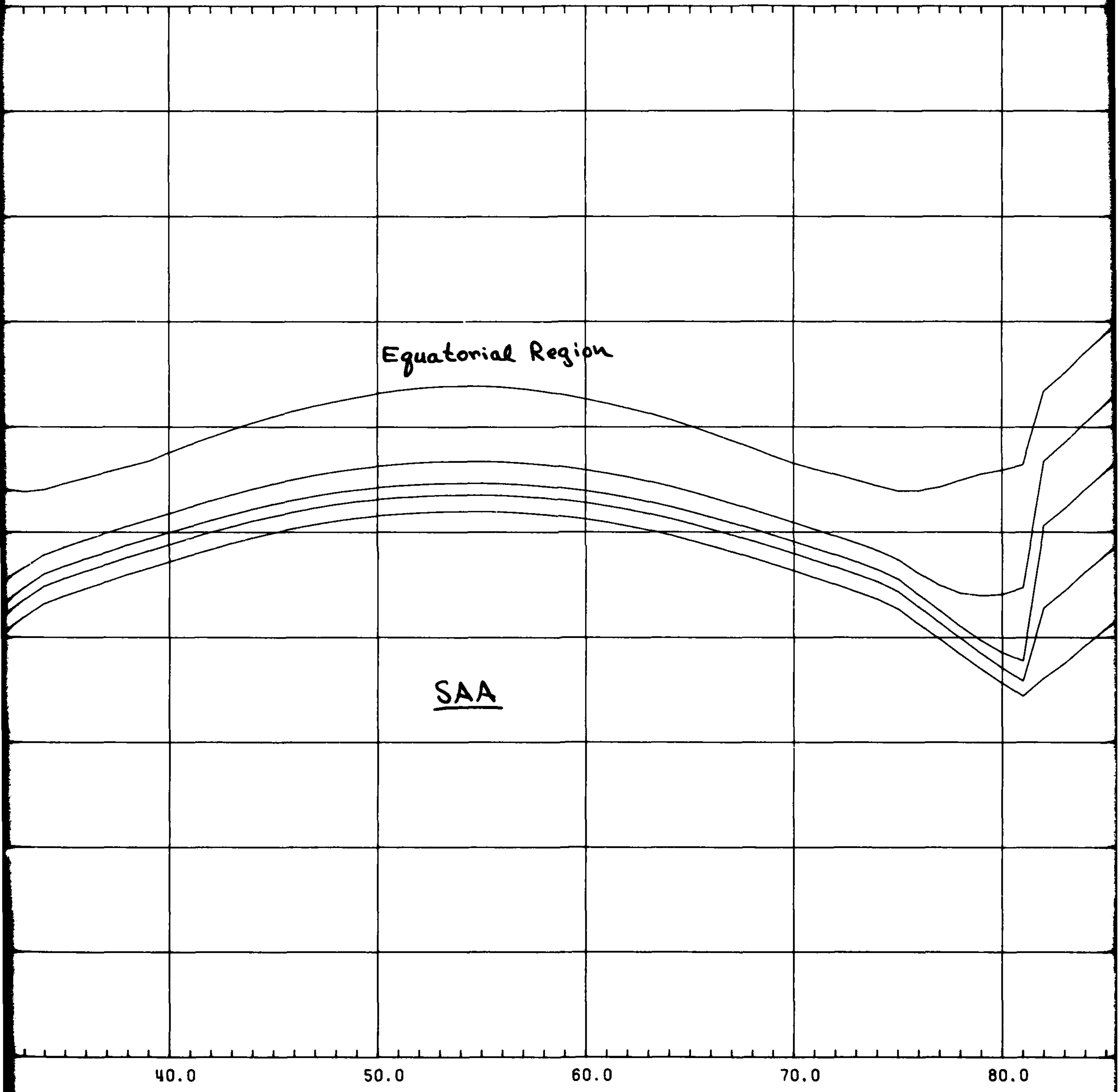


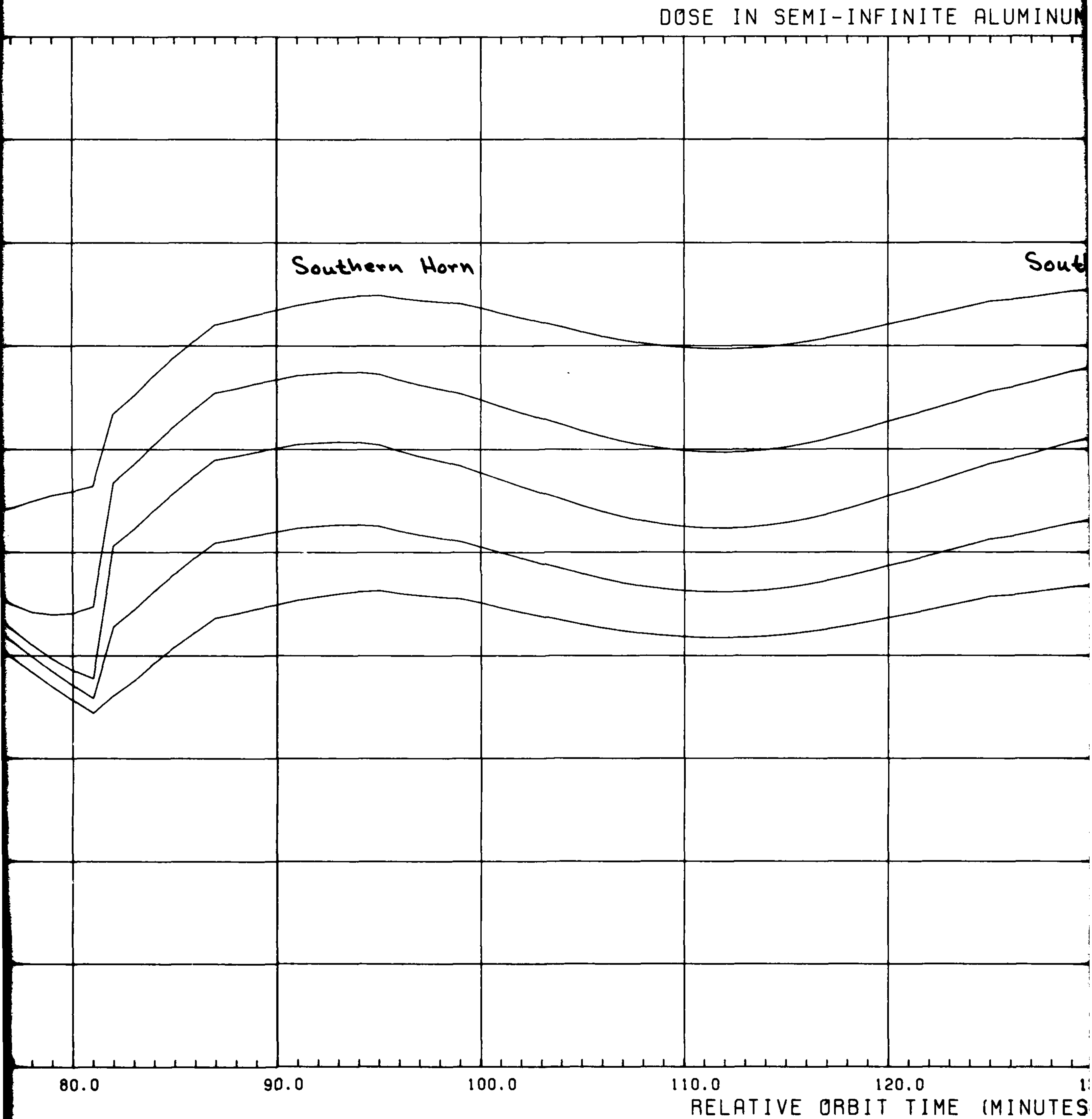
Figure 149
ORBIT: NAVELEX 5
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 8.933318
NASA-GSFC
210.0
220.0
230.0
240.0


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
START TIME ON TAPE= 4.983323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
10.0
20.0
30.0
40.0

2

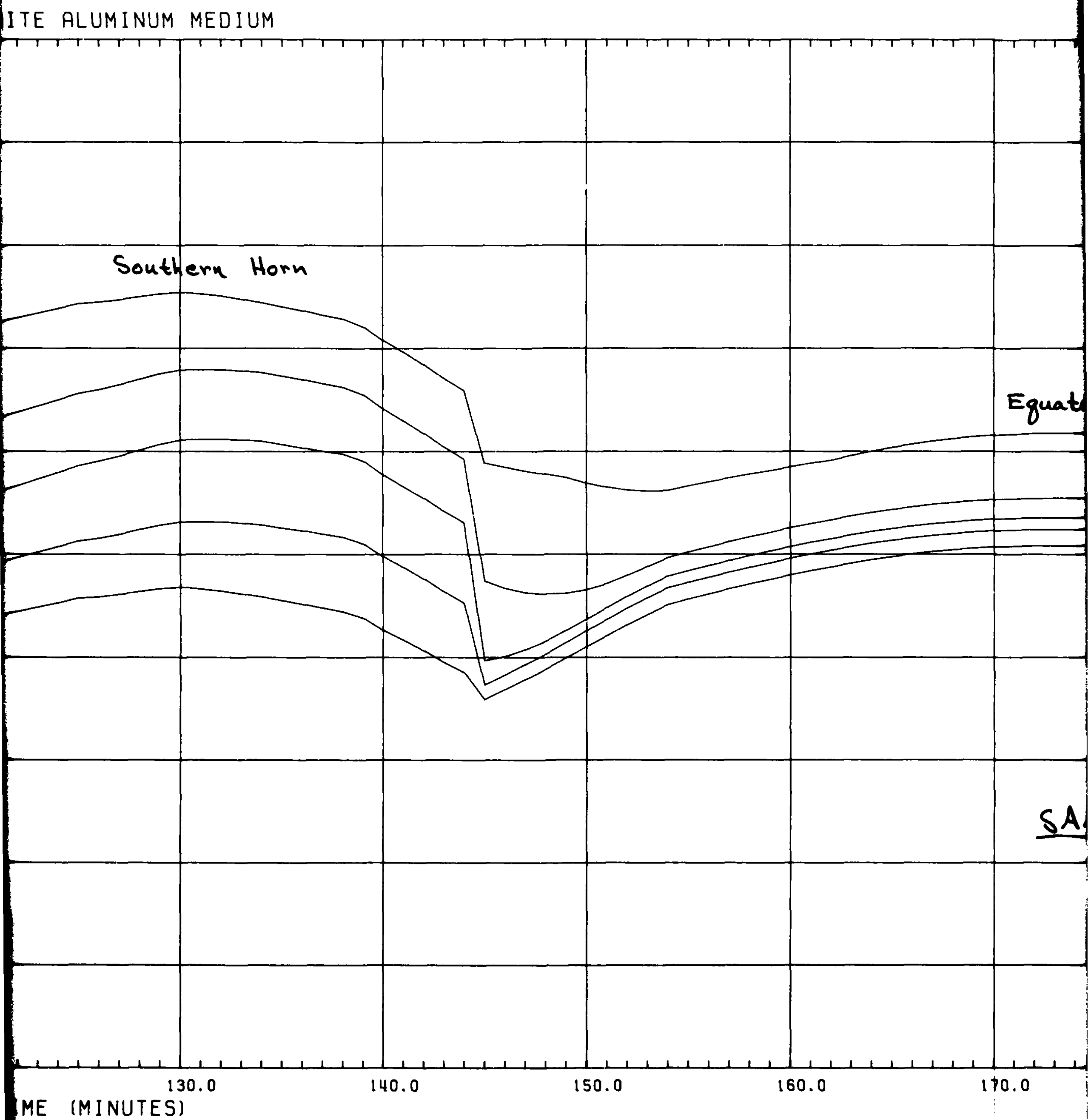


3

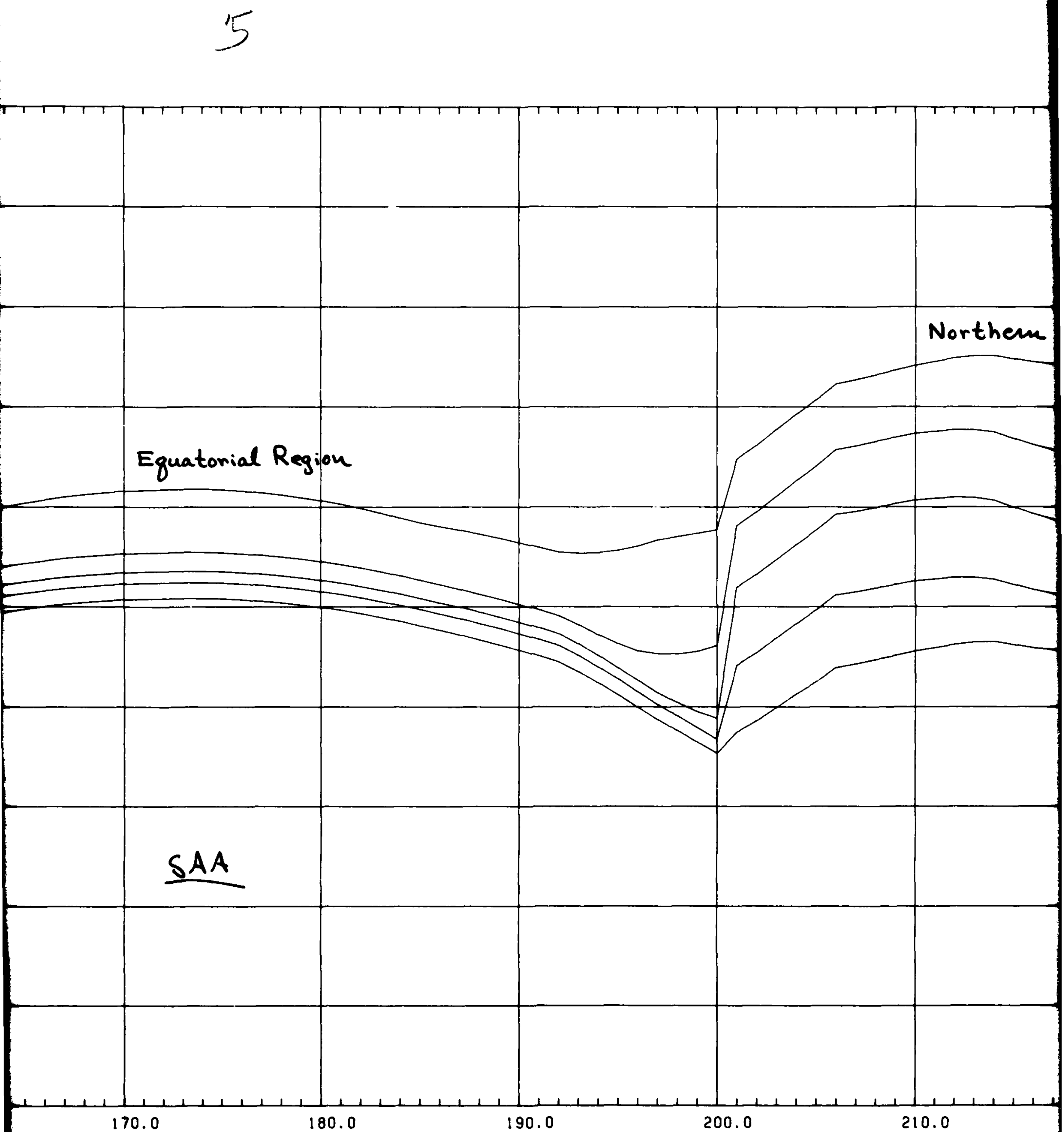


DOSE IN SEMI-INFINITE ALUMINUM
Southern Horn
Sout
80.0
90.0
100.0
110.0
120.0
RELATIVE ORBIT TIME (MINUTES

4



ITE ALUMINUM MEDIUM
Southern Horn
Equat
SA
130.0
140.0
150.0
160.0
170.0
ME (MINUTES)


5
Northern
Equatorial Region
SAA
170.0
180.0
190.0
200.0
210.0

6

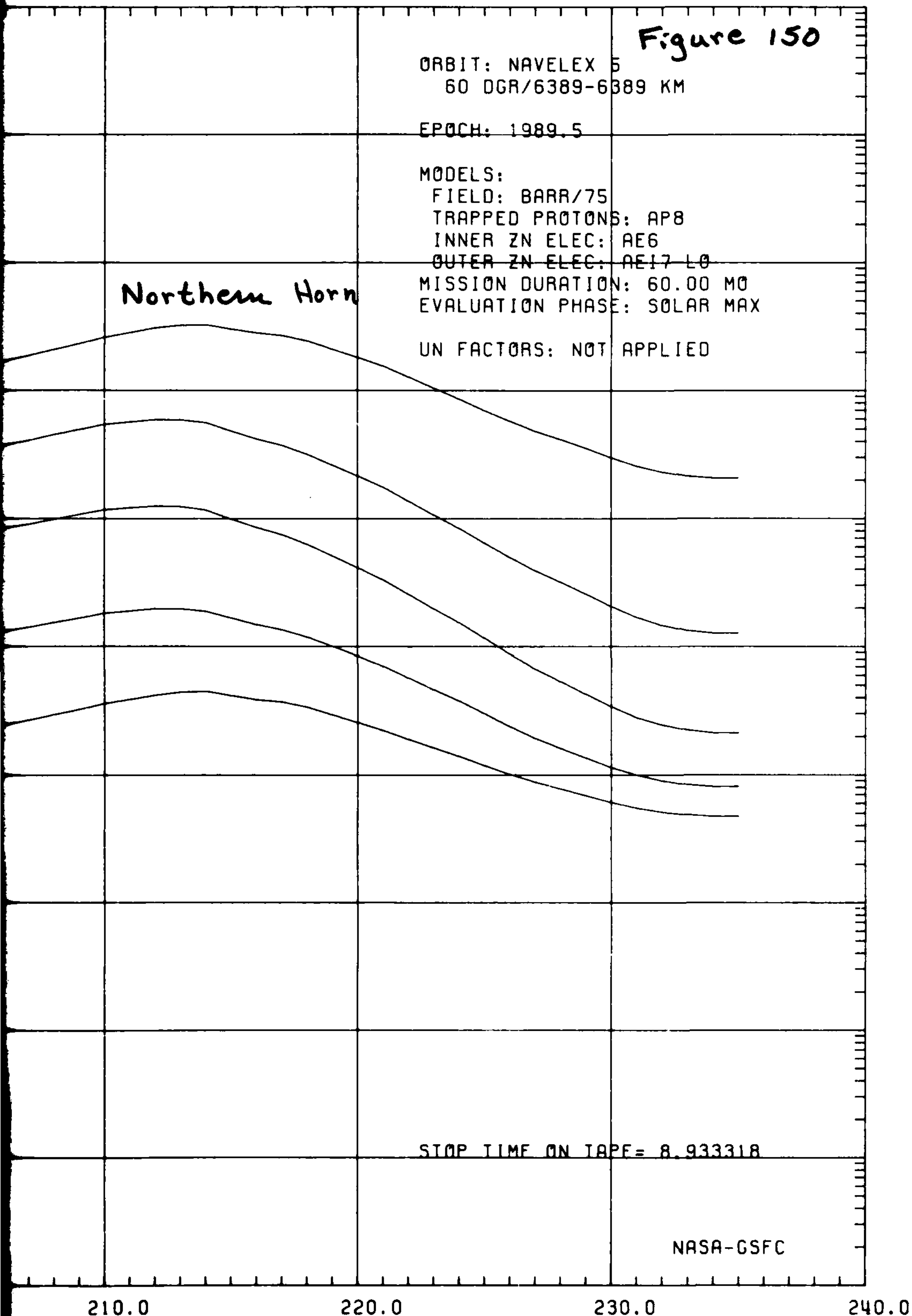
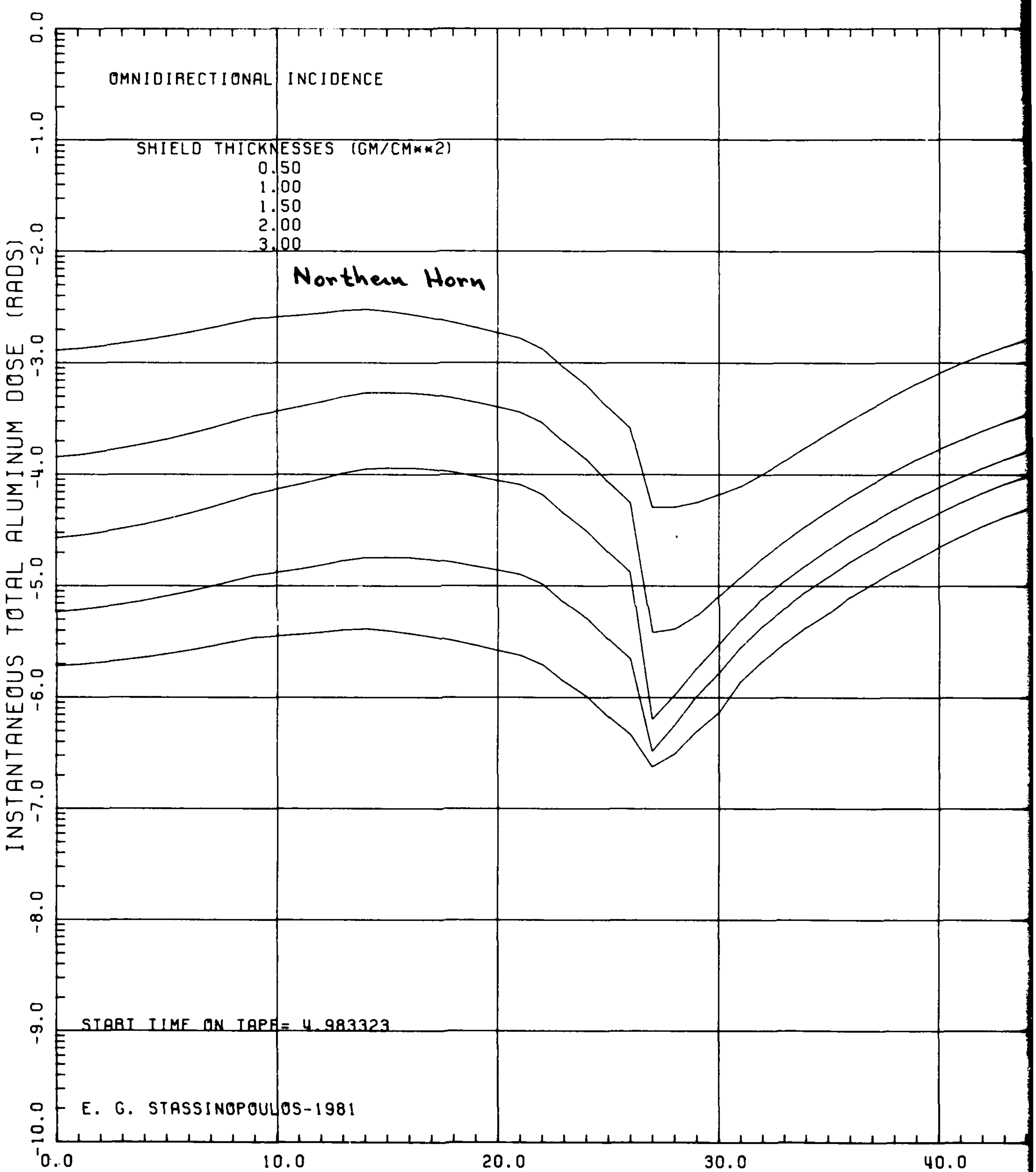
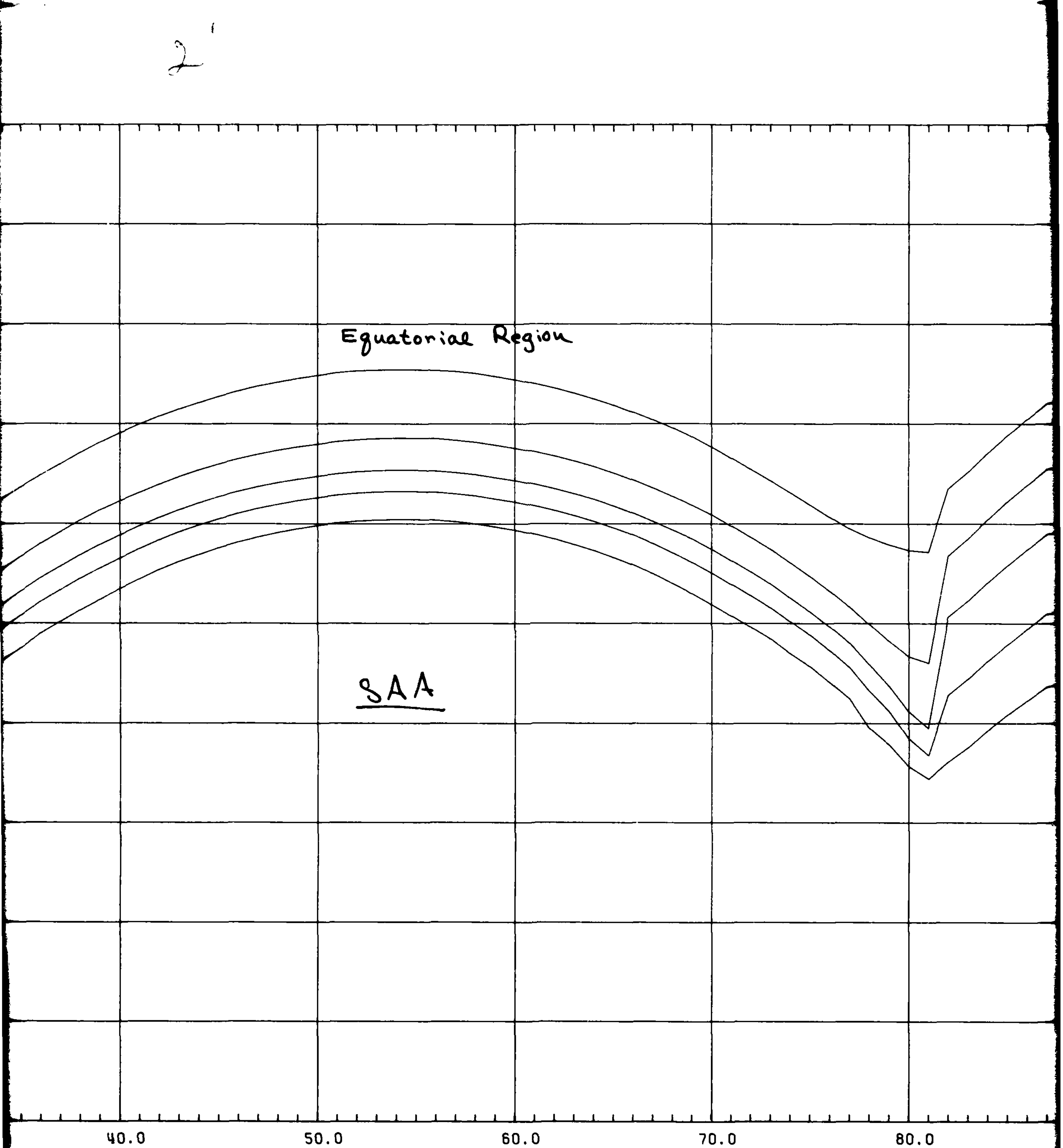
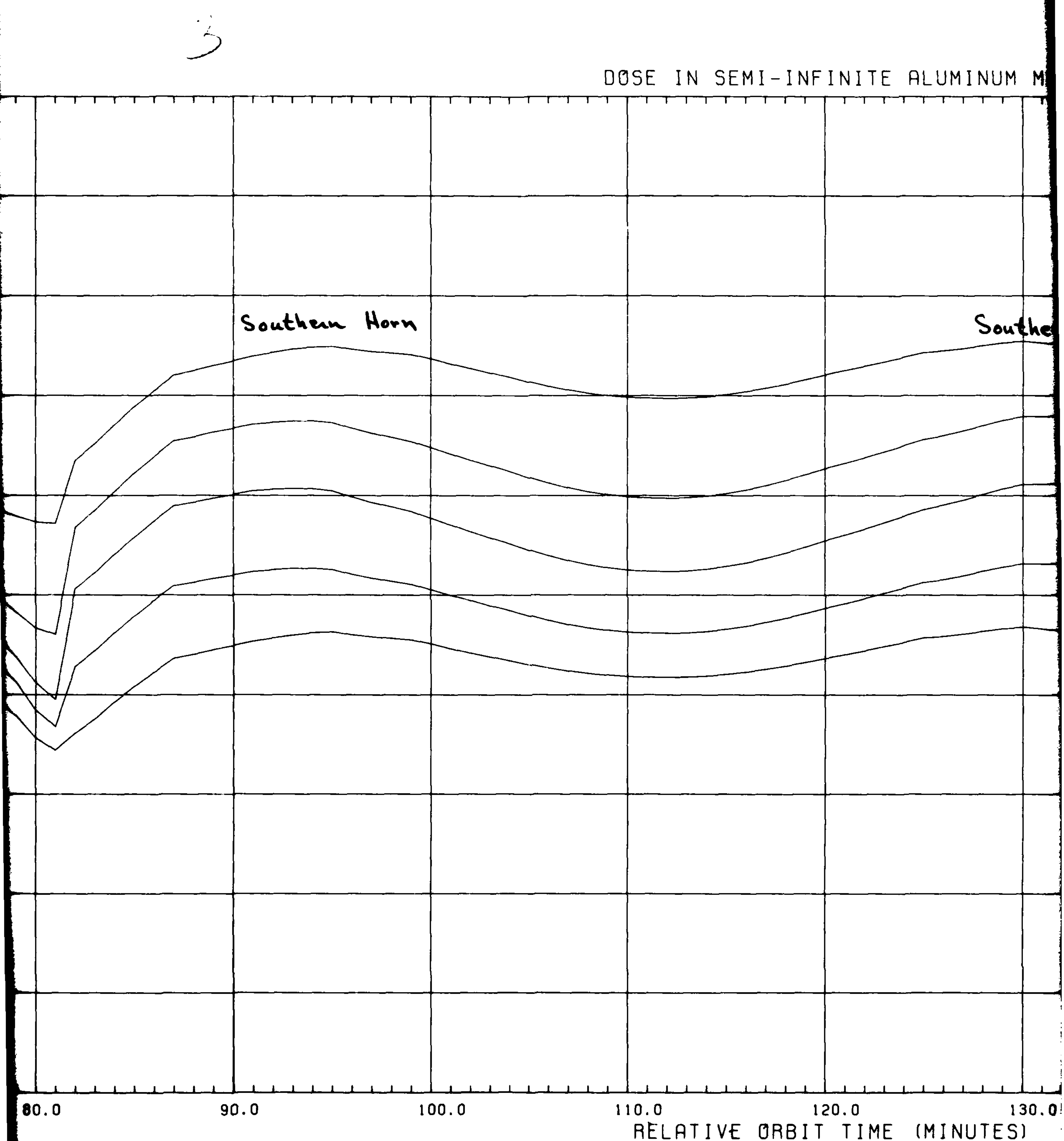


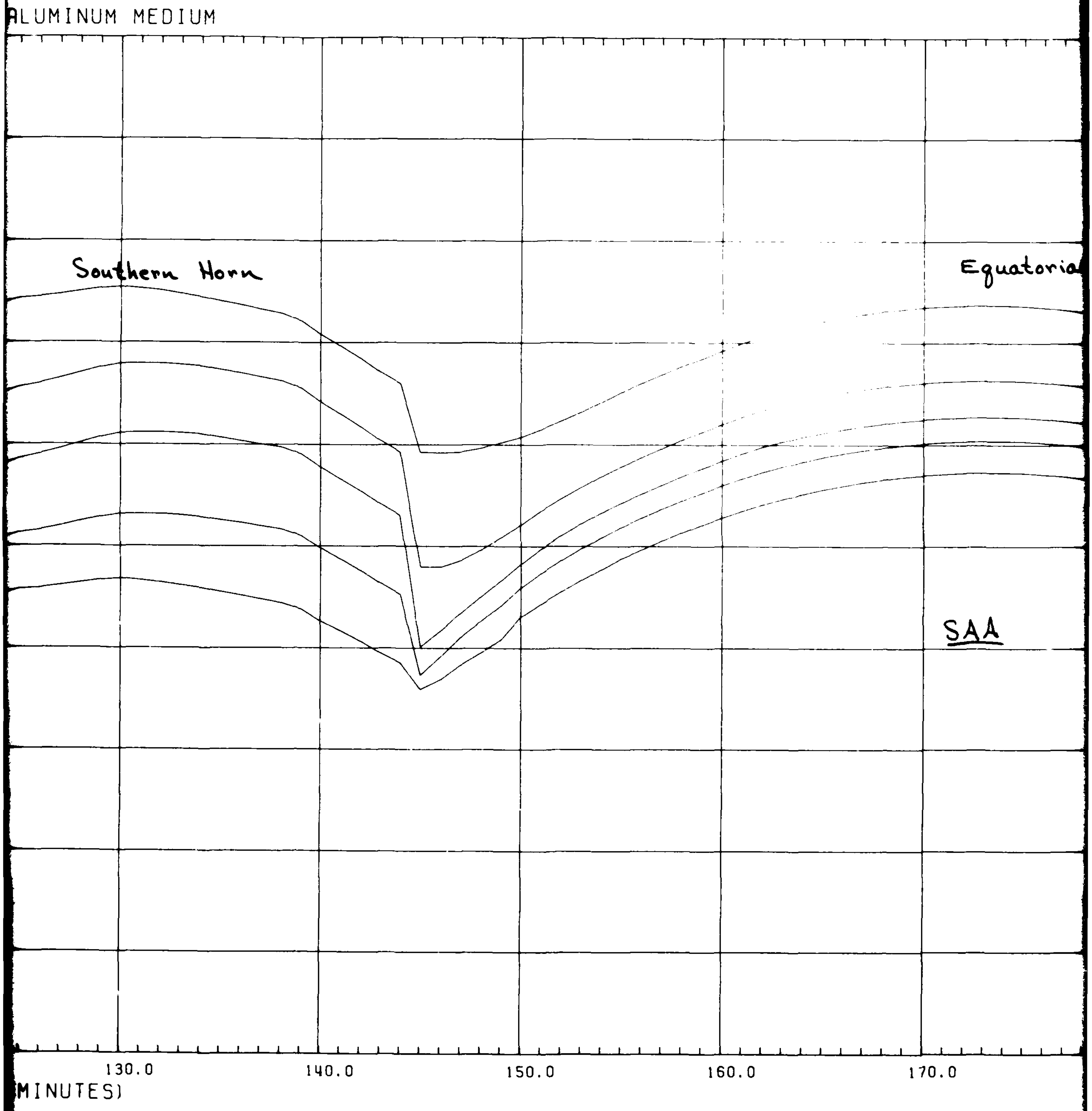
Figure 150
ORBIT: NAVELEX 5
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 8.933318
NASA-GSFC
210.0
220.0
230.0
240.0


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40.0
START TIME ON TAPE= 4.983323
E. G. STASSINOPOULOS-1981

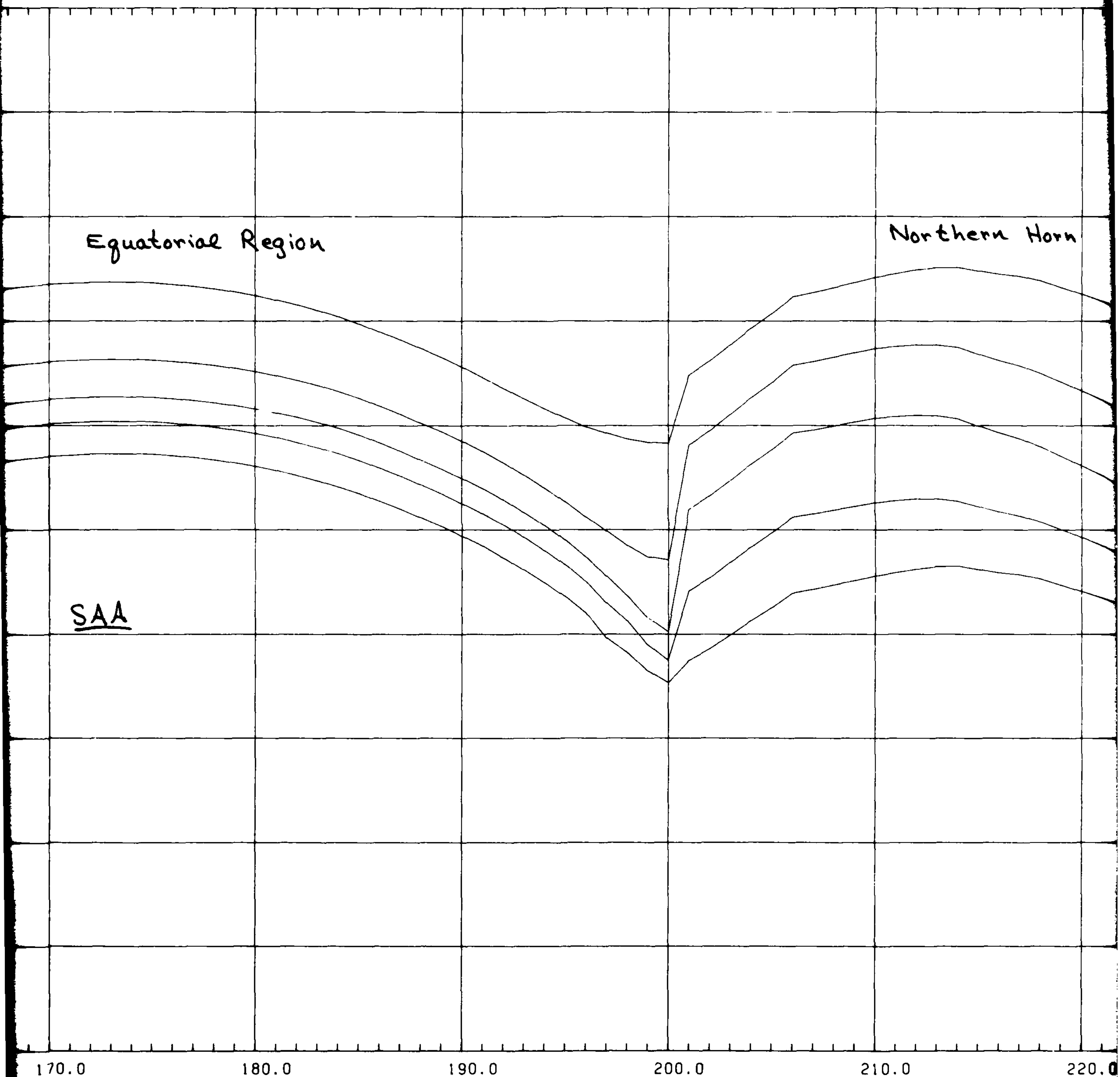

2
Equatorial Region
SAA
40.0
50.0
60.0
70.0
80.0


3
DOSE IN SEMI-INFINITE ALUMINUM M
Southern Horn
Southe
80.0
90.0
100.0
110.0
120.0
130.0
RELATIVE ORBIT TIME (MINUTES)

4



ALUMINUM MEDIUM
Southern Horn
Equatoria
SAA
130.0
140.0
150.0
160.0
170.0
MINUTES)


Equatorial Region
Northern Horn
SAA
170.0
180.0
190.0
200.0
210.0
220.0

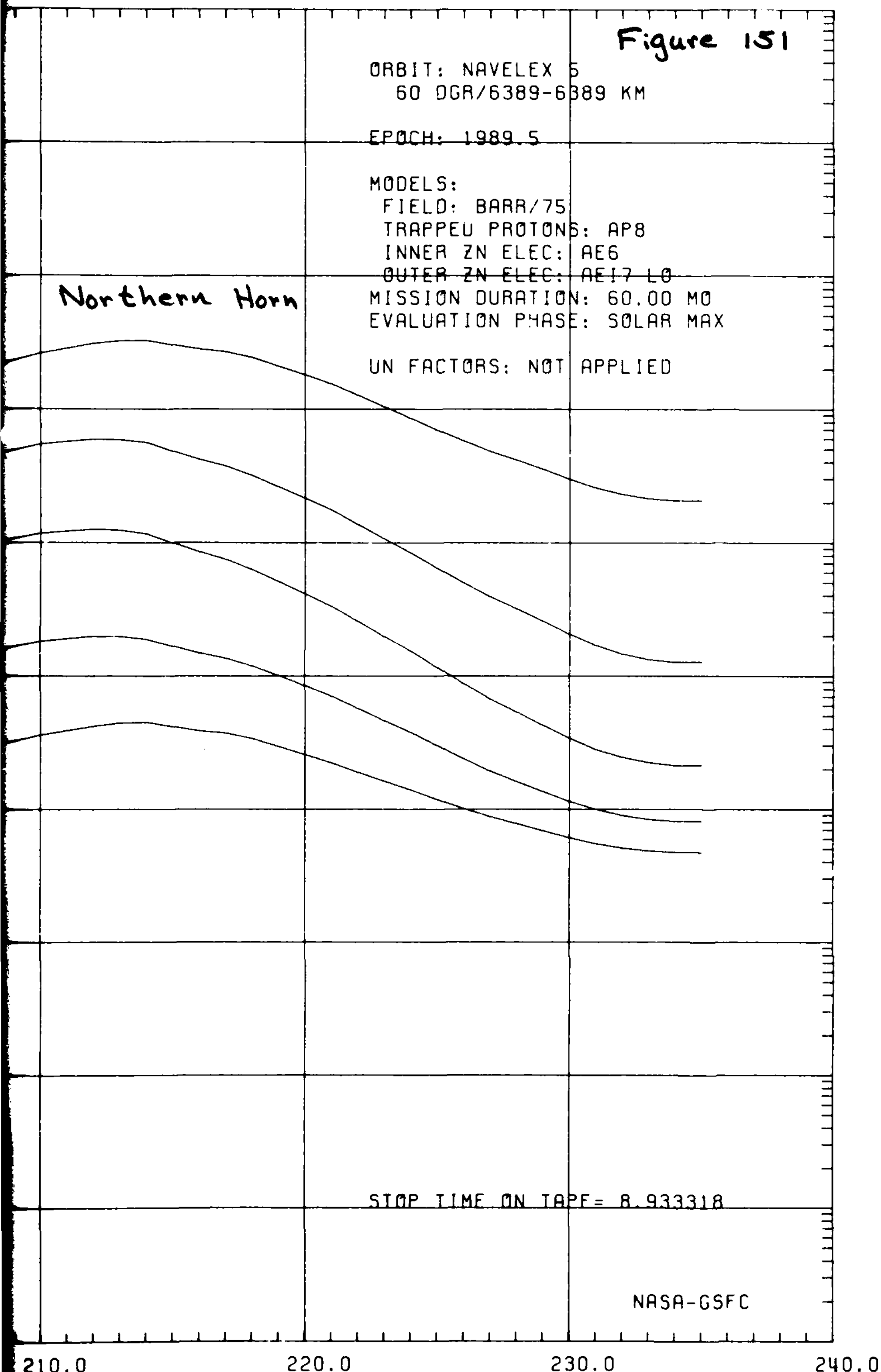
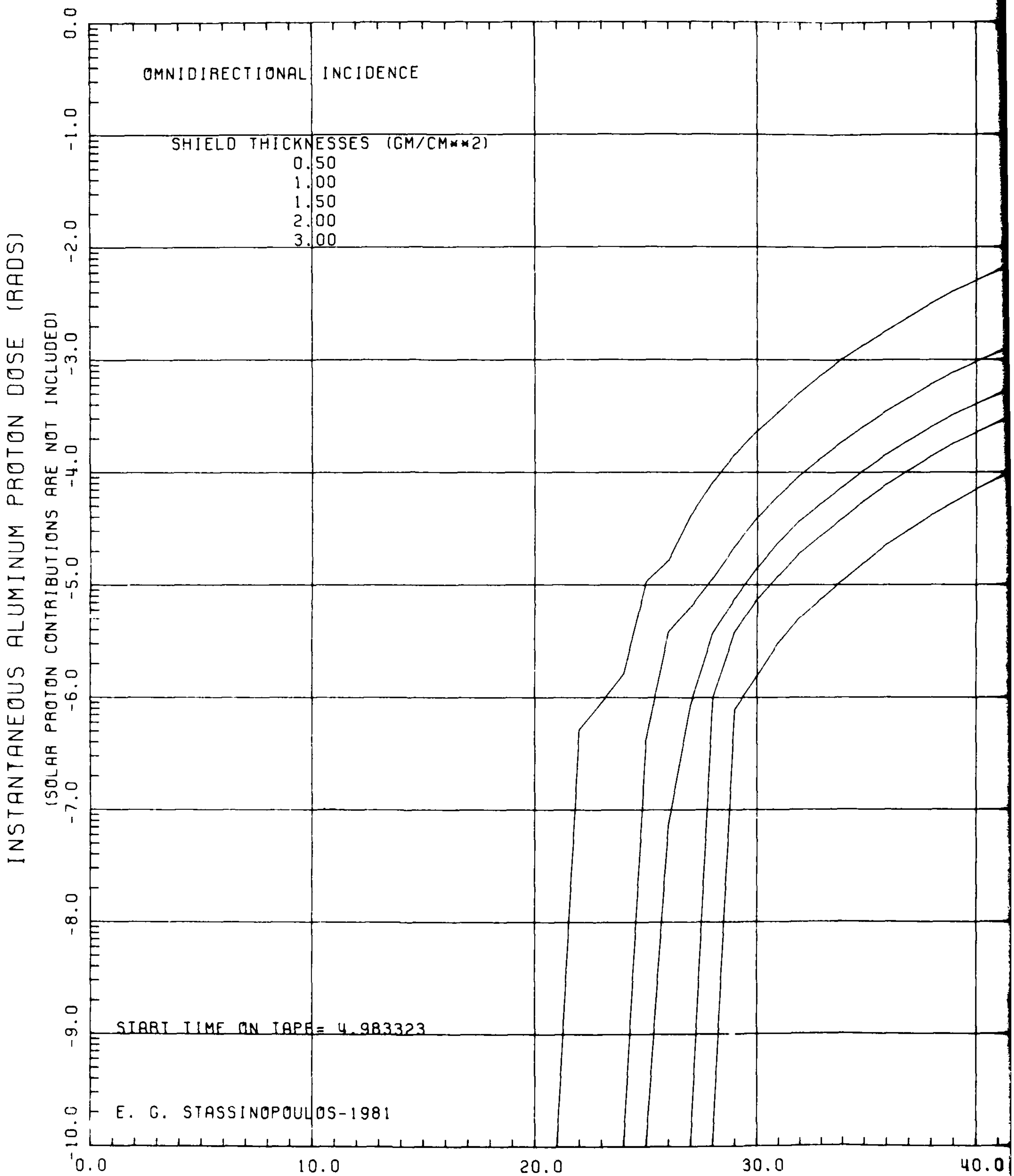
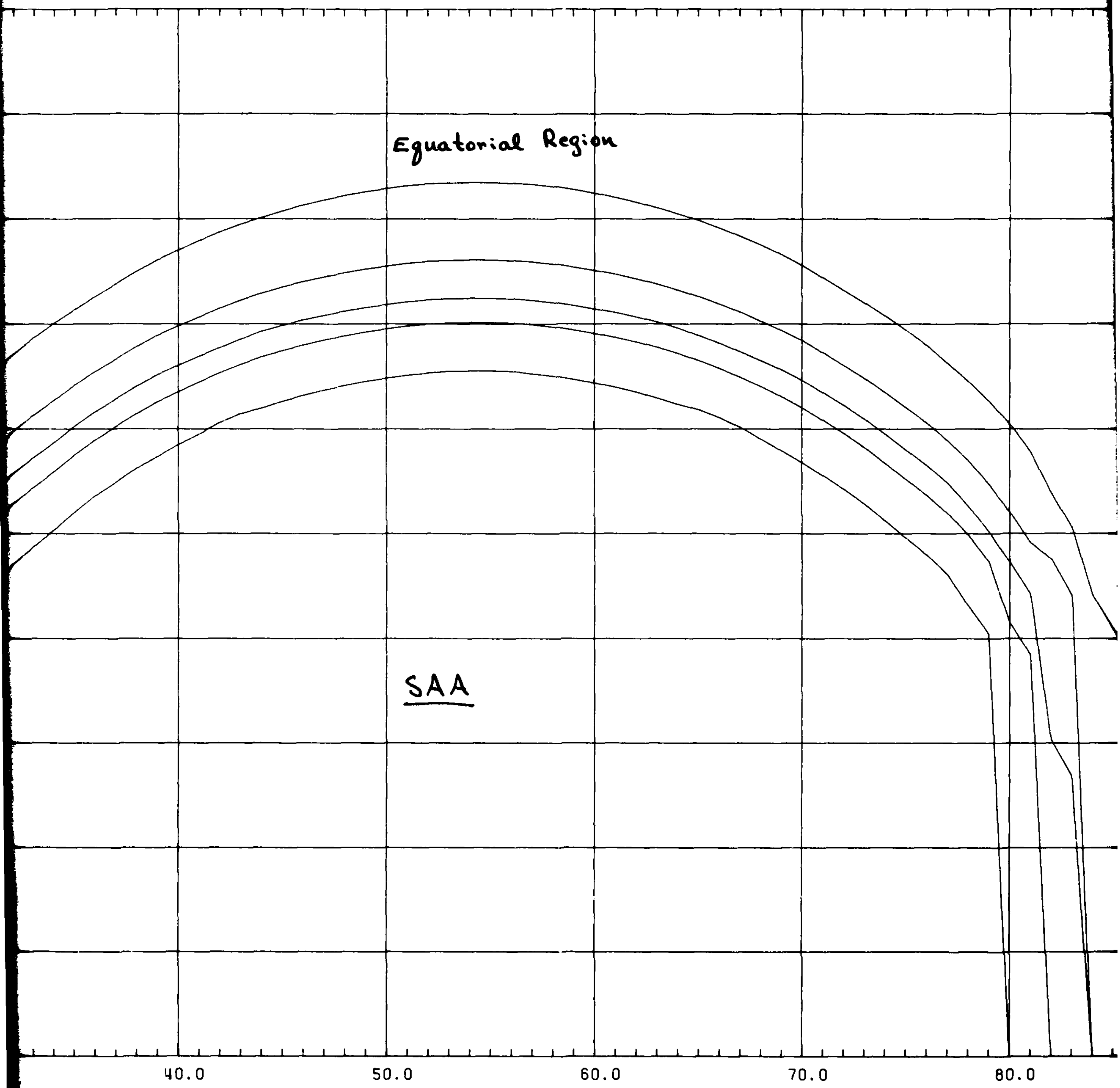


Figure 151
ORBIT: NAVELEX 5
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPEU PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7 LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 8.933318
NASA-GSFC
210.0
220.0
230.0
240.0

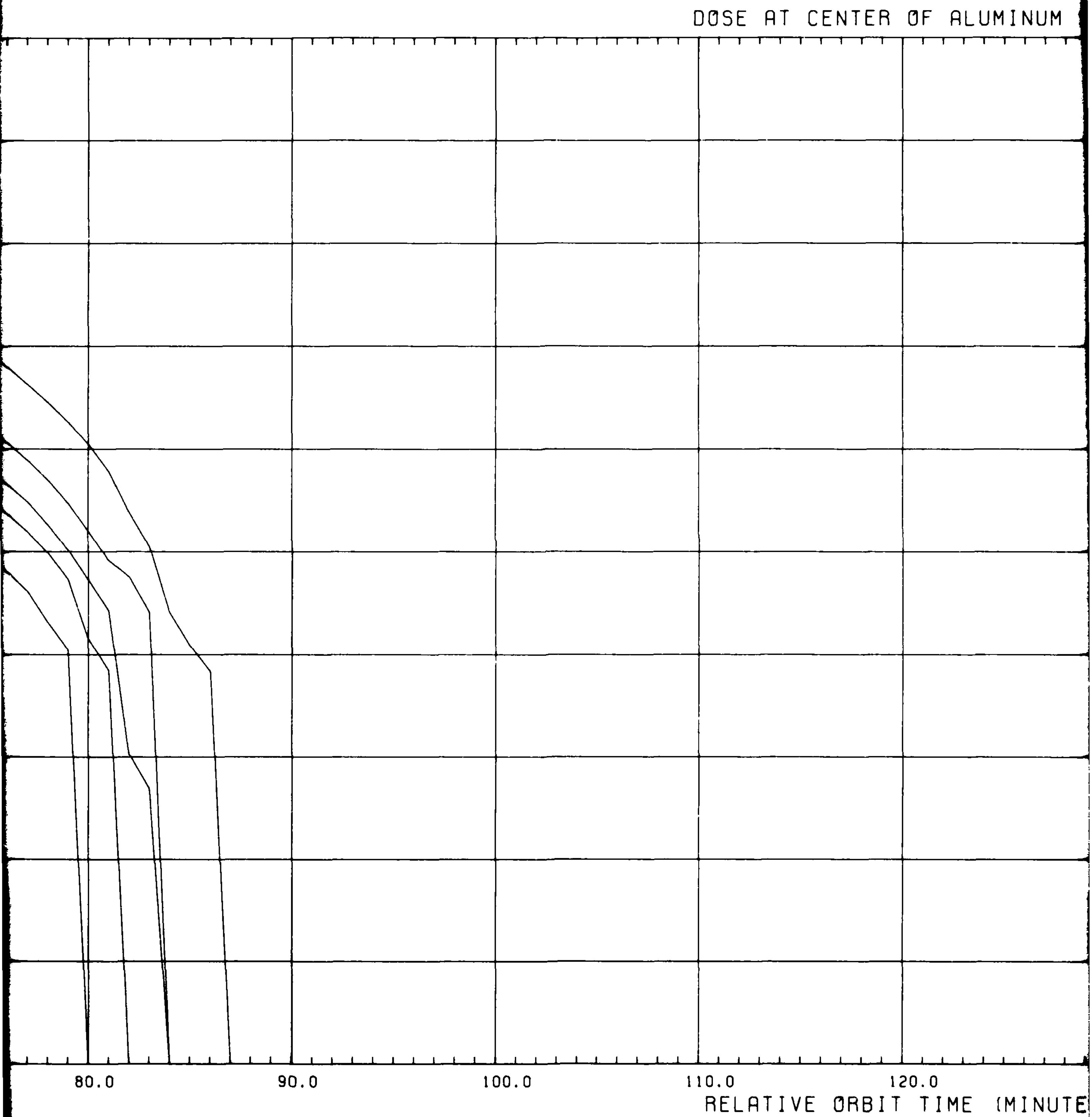


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
START TIME ON TAPE= 4.983323
E. G. STASSINOPOULOS-1981
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40.0

2

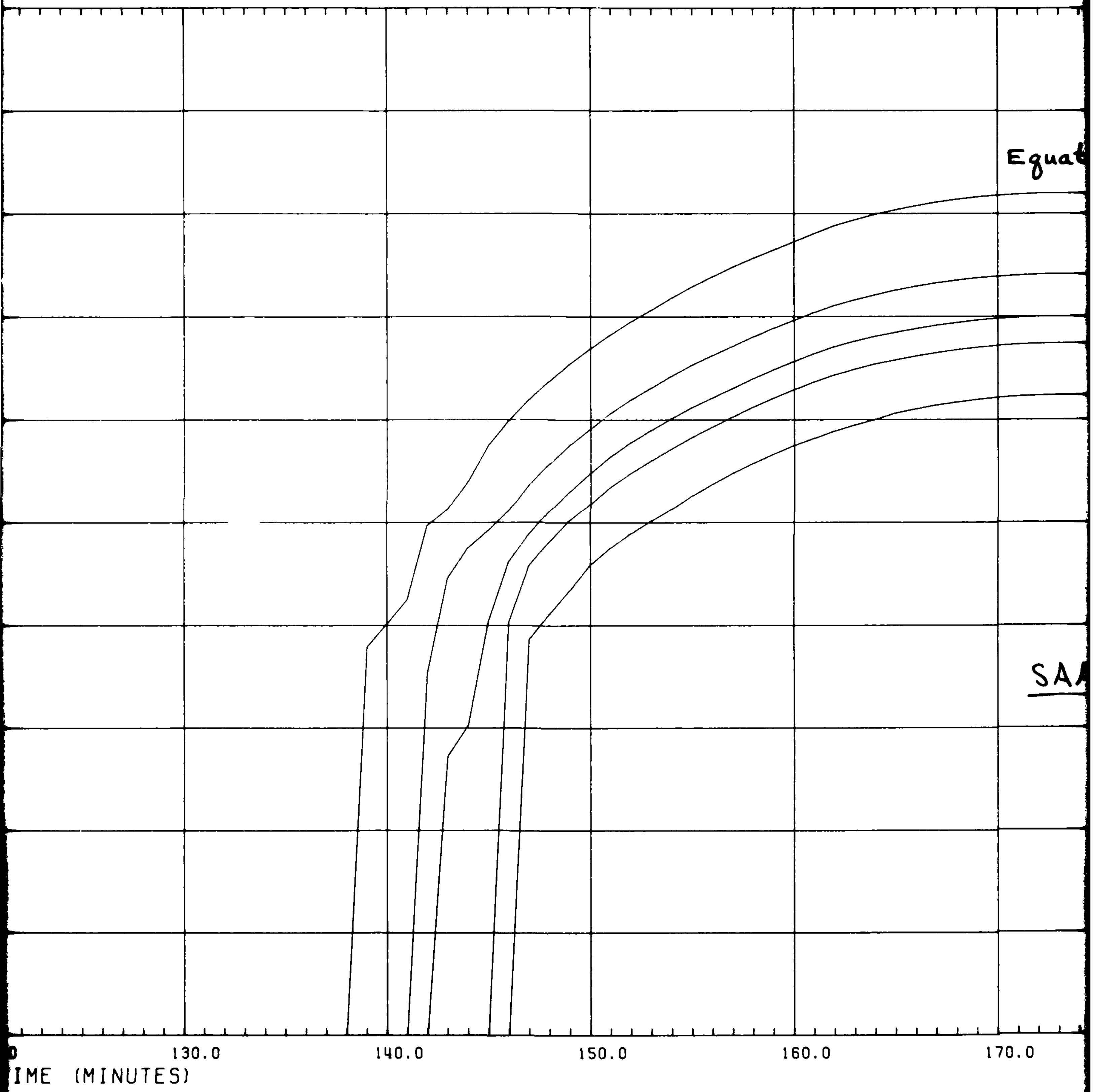


3'

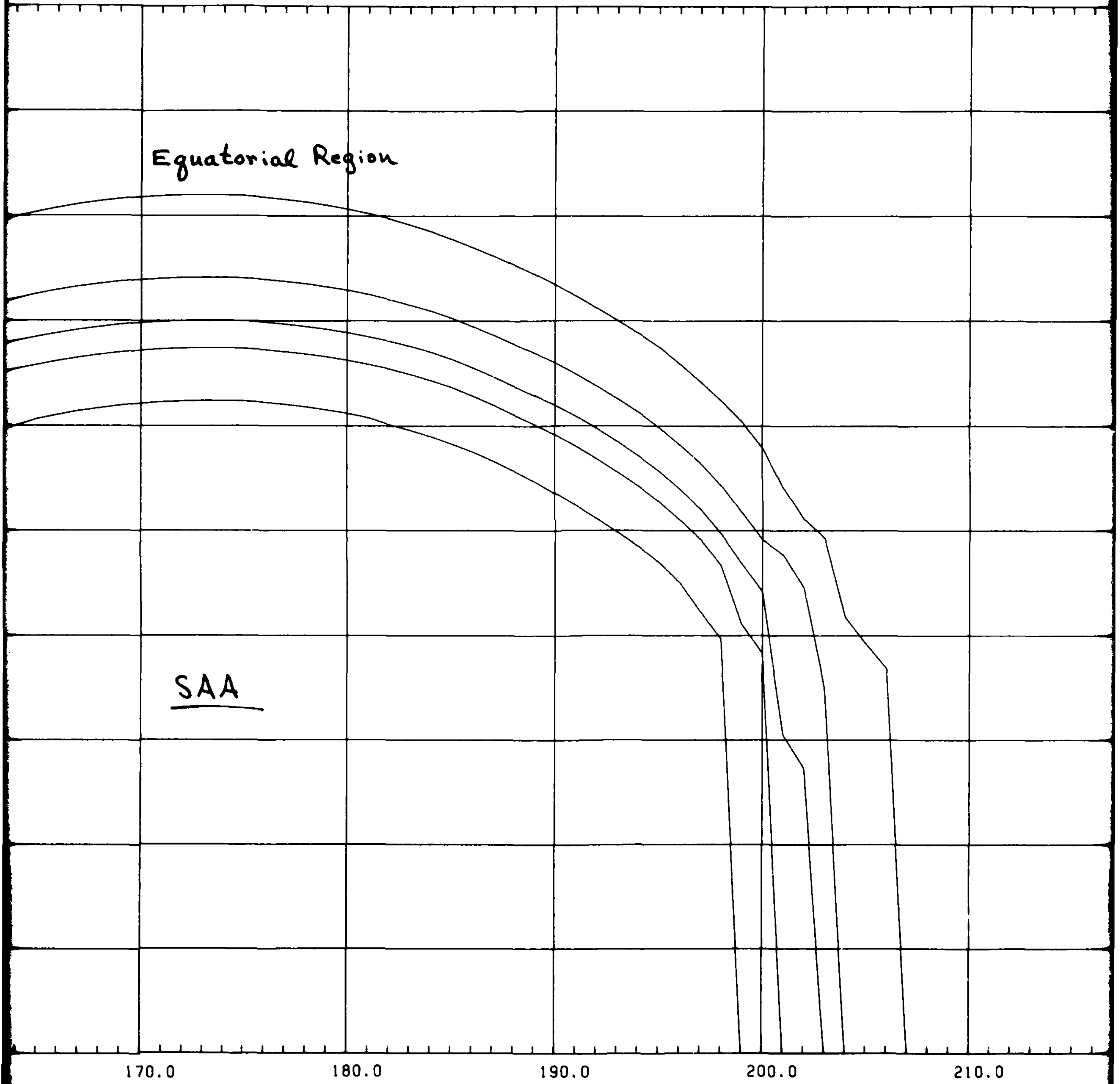

DOSE AT CENTER OF ALUMINUM
80.0
90.0
100.0
110.0
120.0
RELATIVE ORBIT TIME (MINUTE

4

ALUMINUM SPHERES

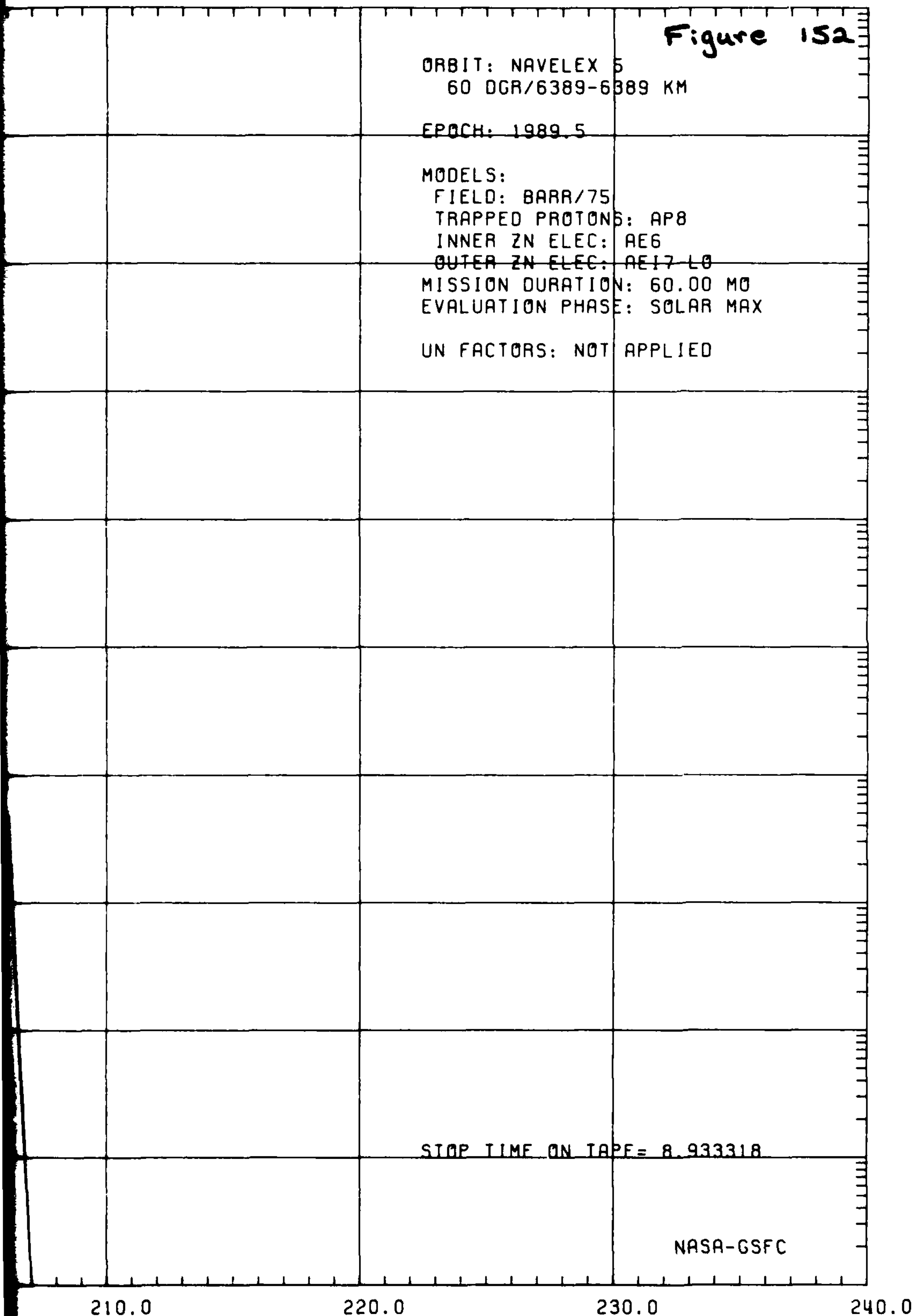


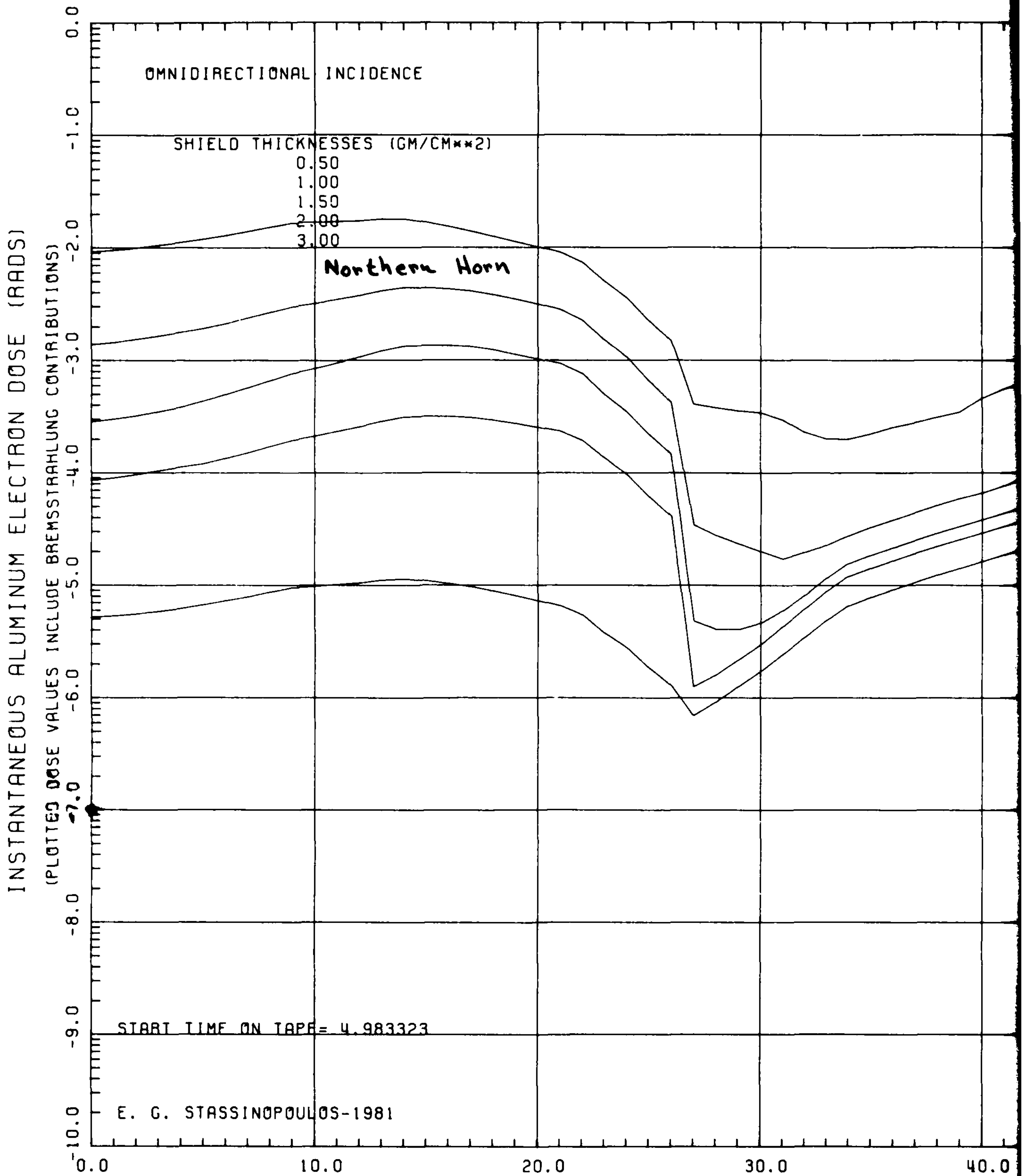
5



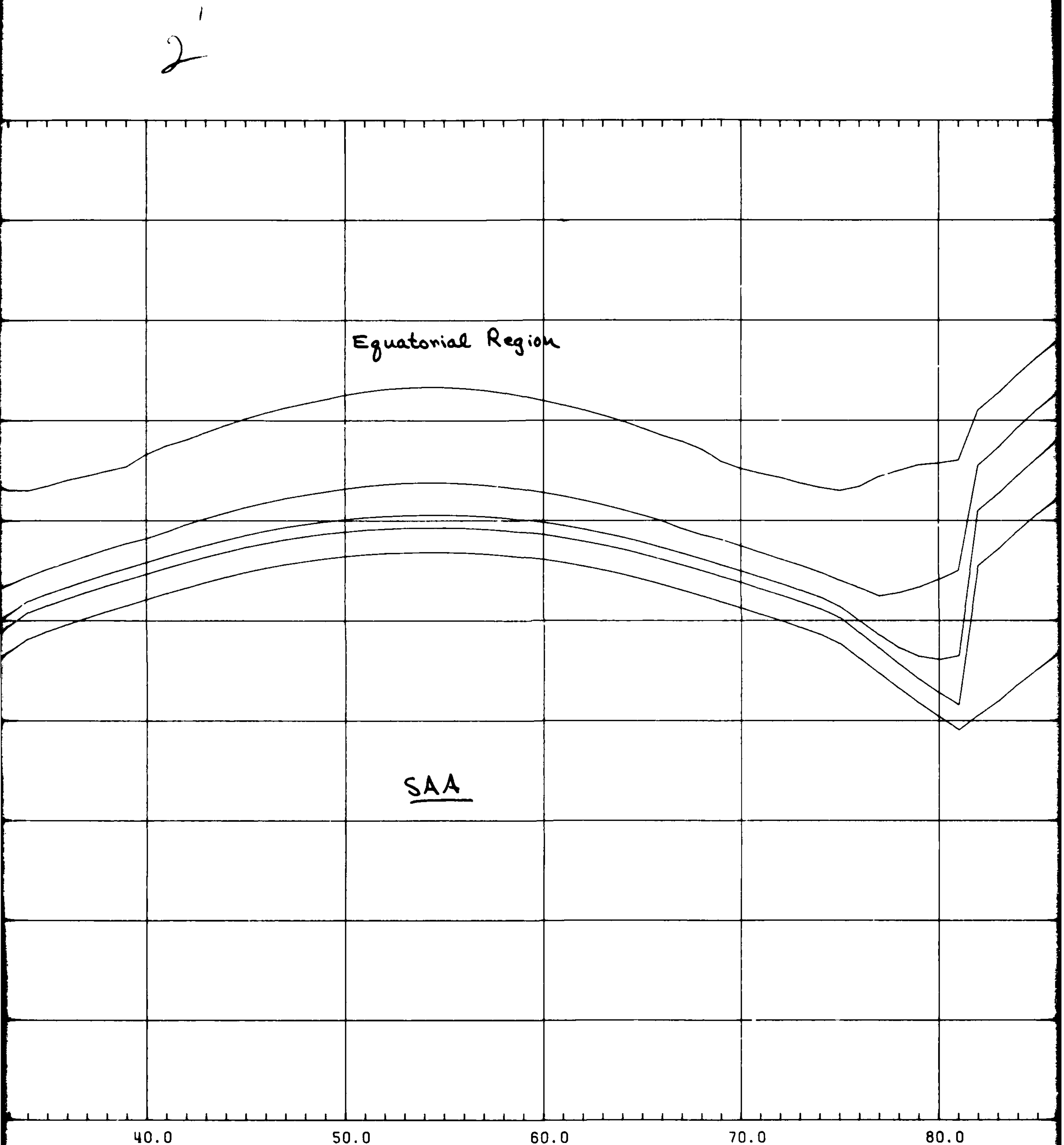
6

Figure 152

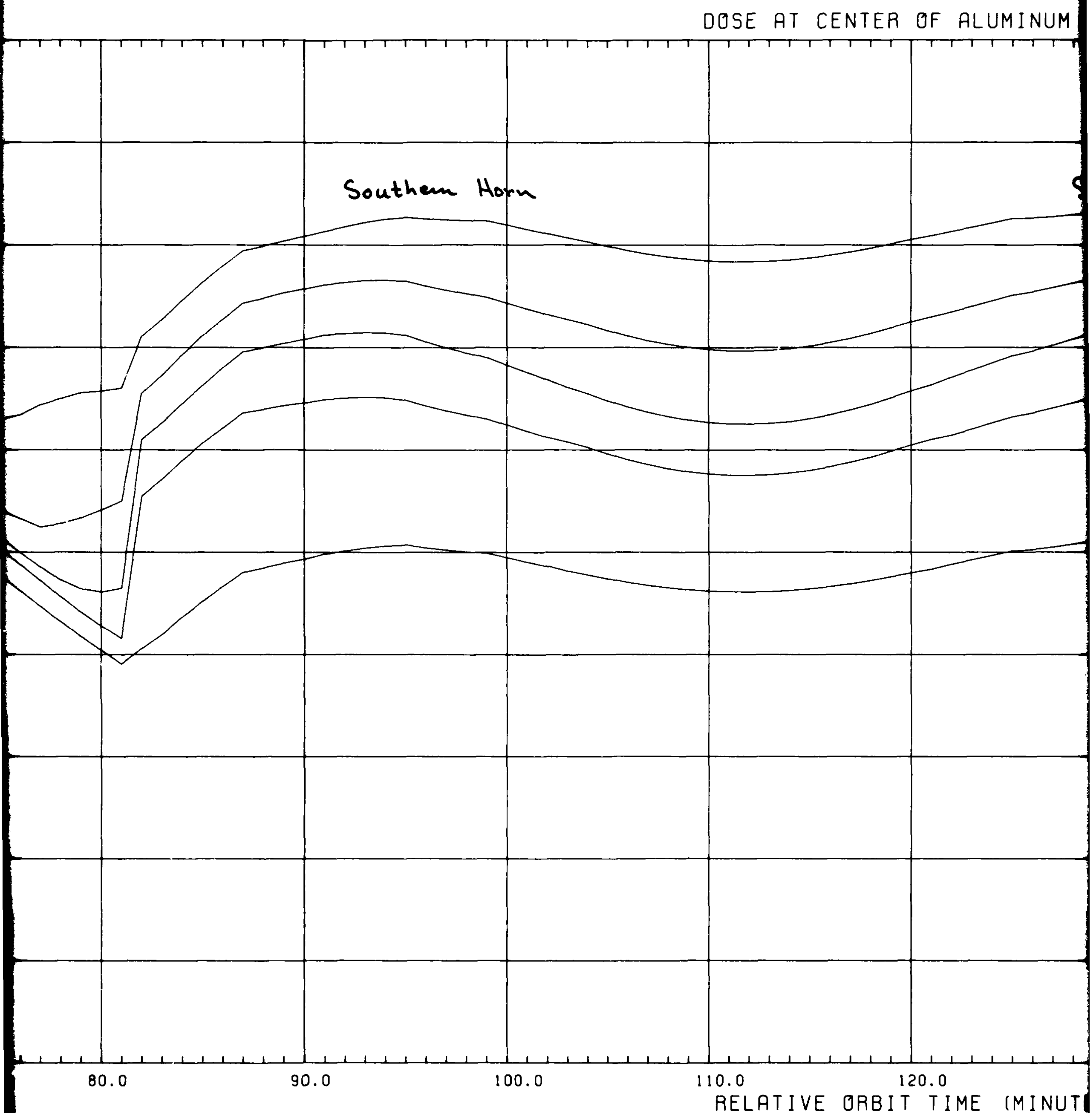

ORBIT: NAVELEX 5
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
STOP TIME ON TAPE= 8.933318
NASA-GSFC
210.0
220.0
230.0
240.0



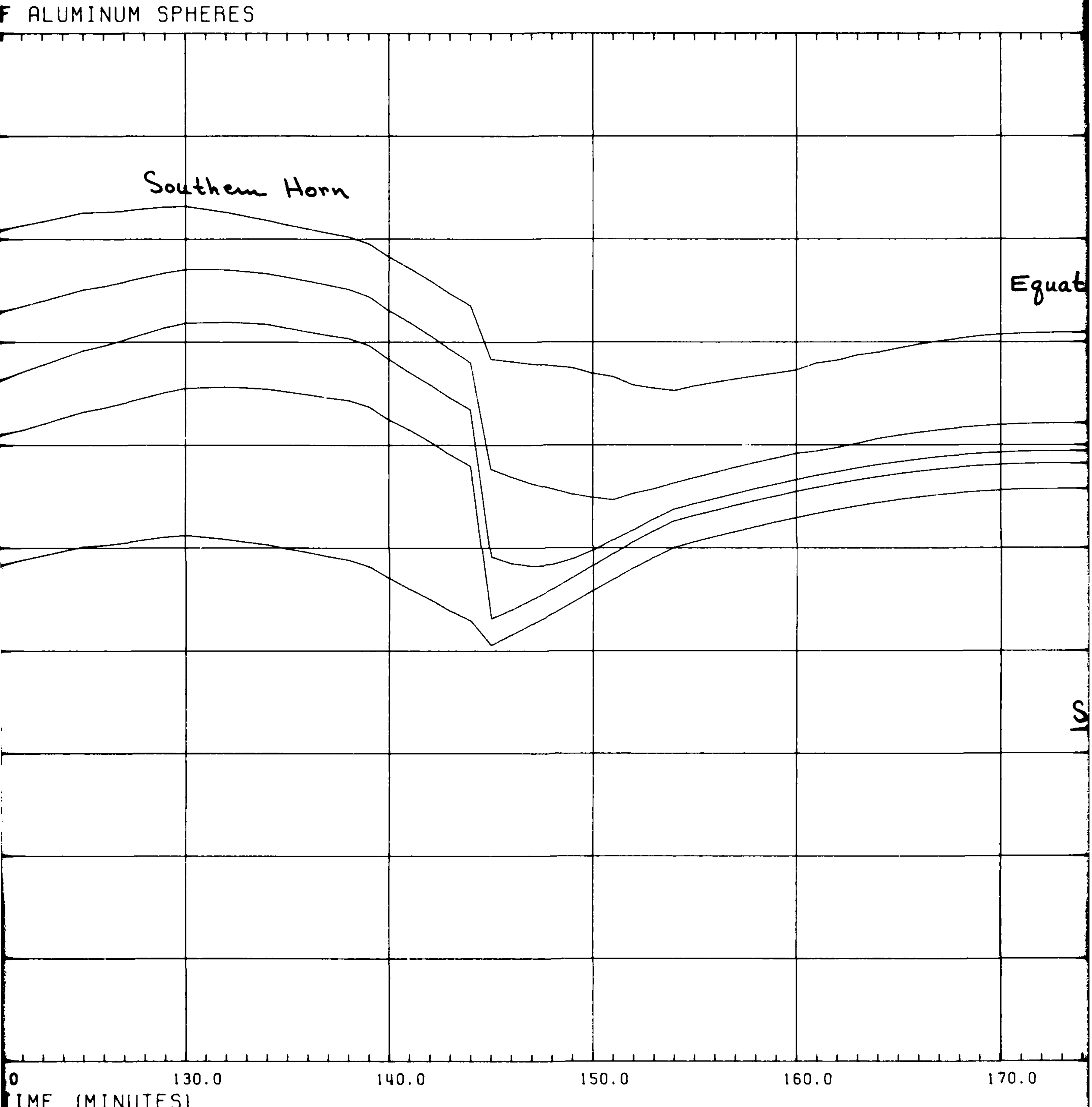
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
START TIME ON TAPE= 4.983323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40.0

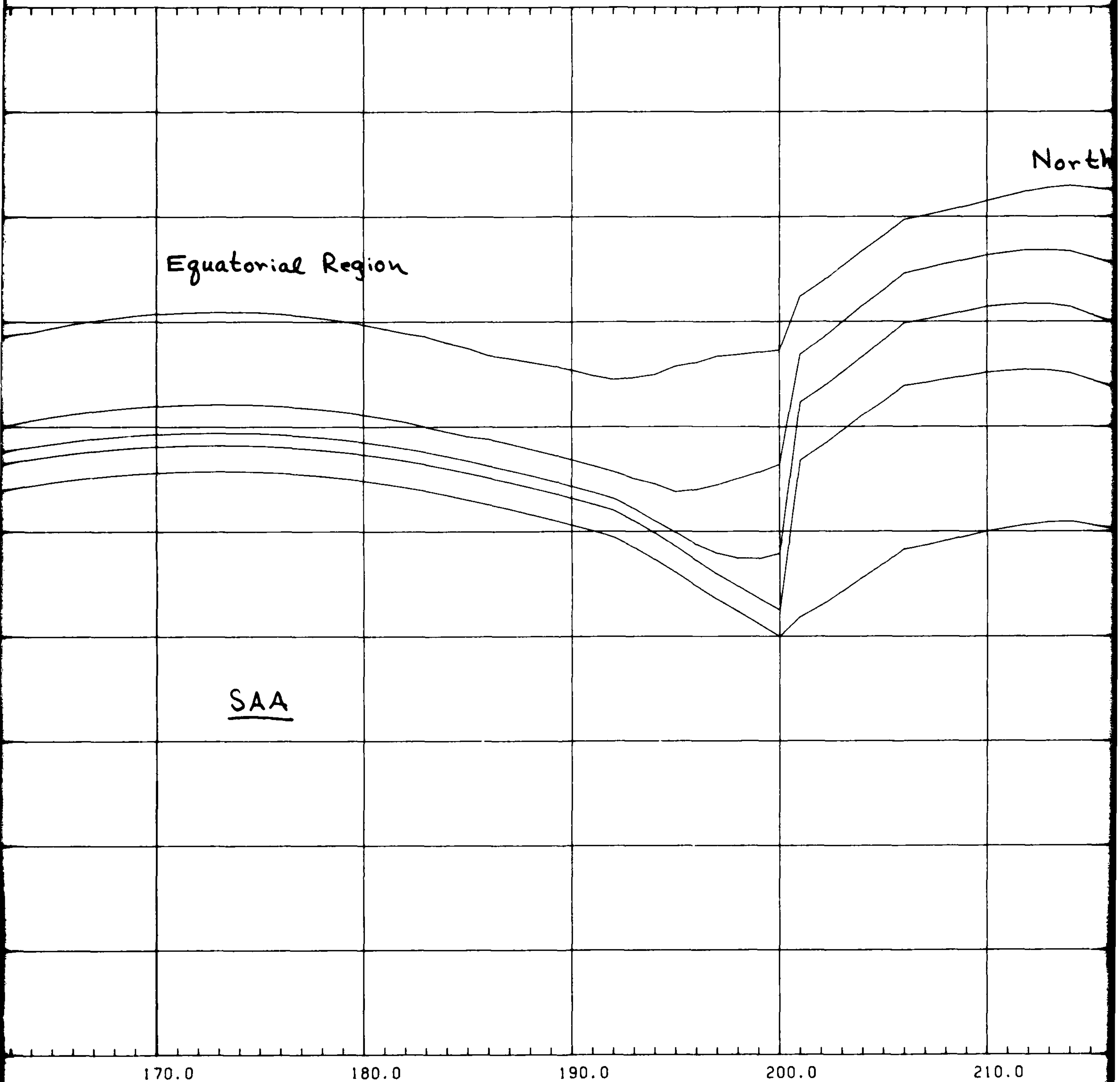

2
Equatorial Region
SAA
40.0
50.0
60.0
70.0
80.0

3'


DOSE AT CENTER OF ALUMINUM
Southern Horn
80.0
90.0
100.0
110.0
120.0
RELATIVE ORBIT TIME (MINUT

'4


F ALUMINUM SPHERES
Southern Horn
Equat
S
0
130.0
140.0
150.0
160.0
170.0
IME (MINUTES)



North
Equatorial Region
SAA
170.0
180.0
190.0
200.0
210.0

6

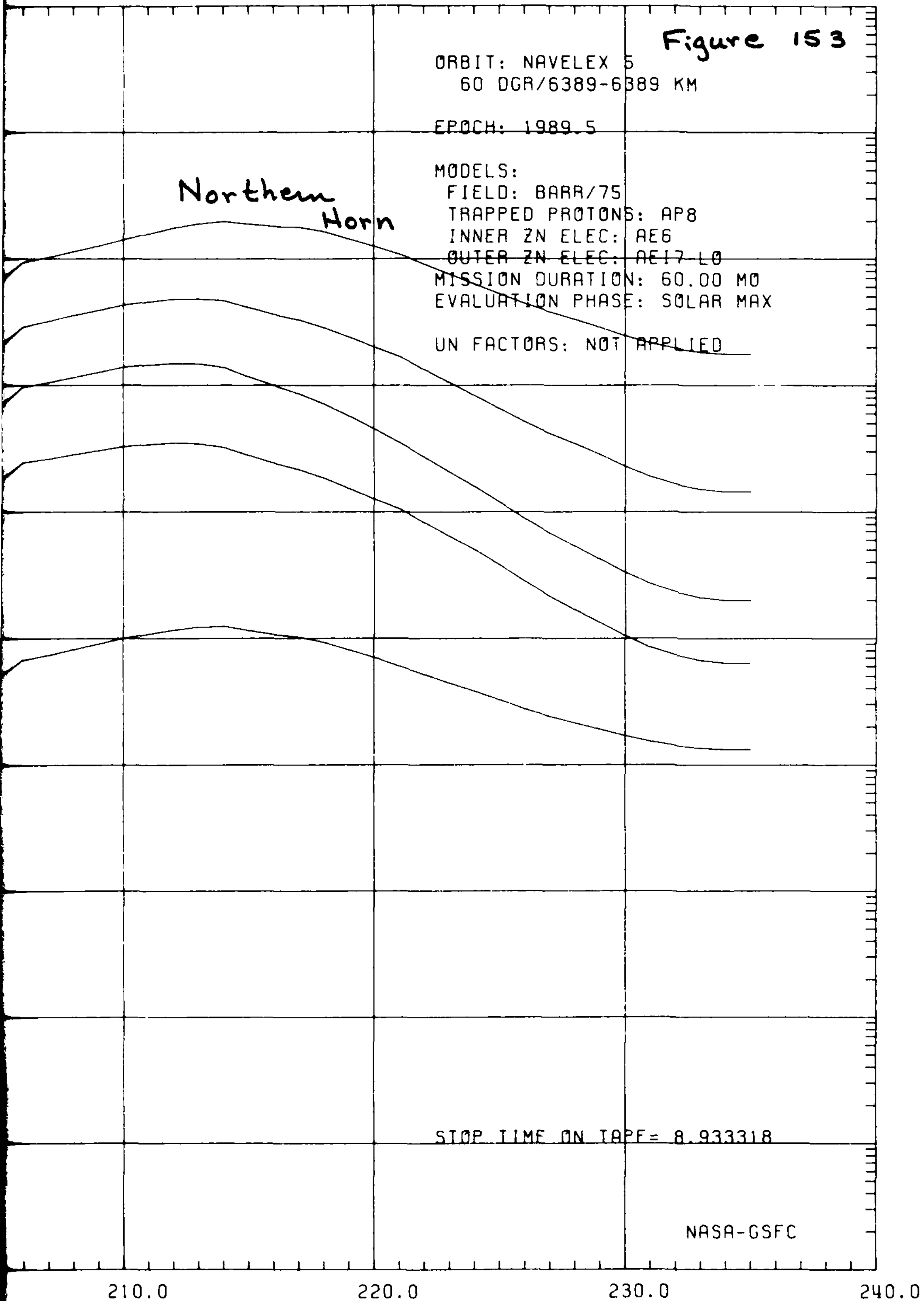
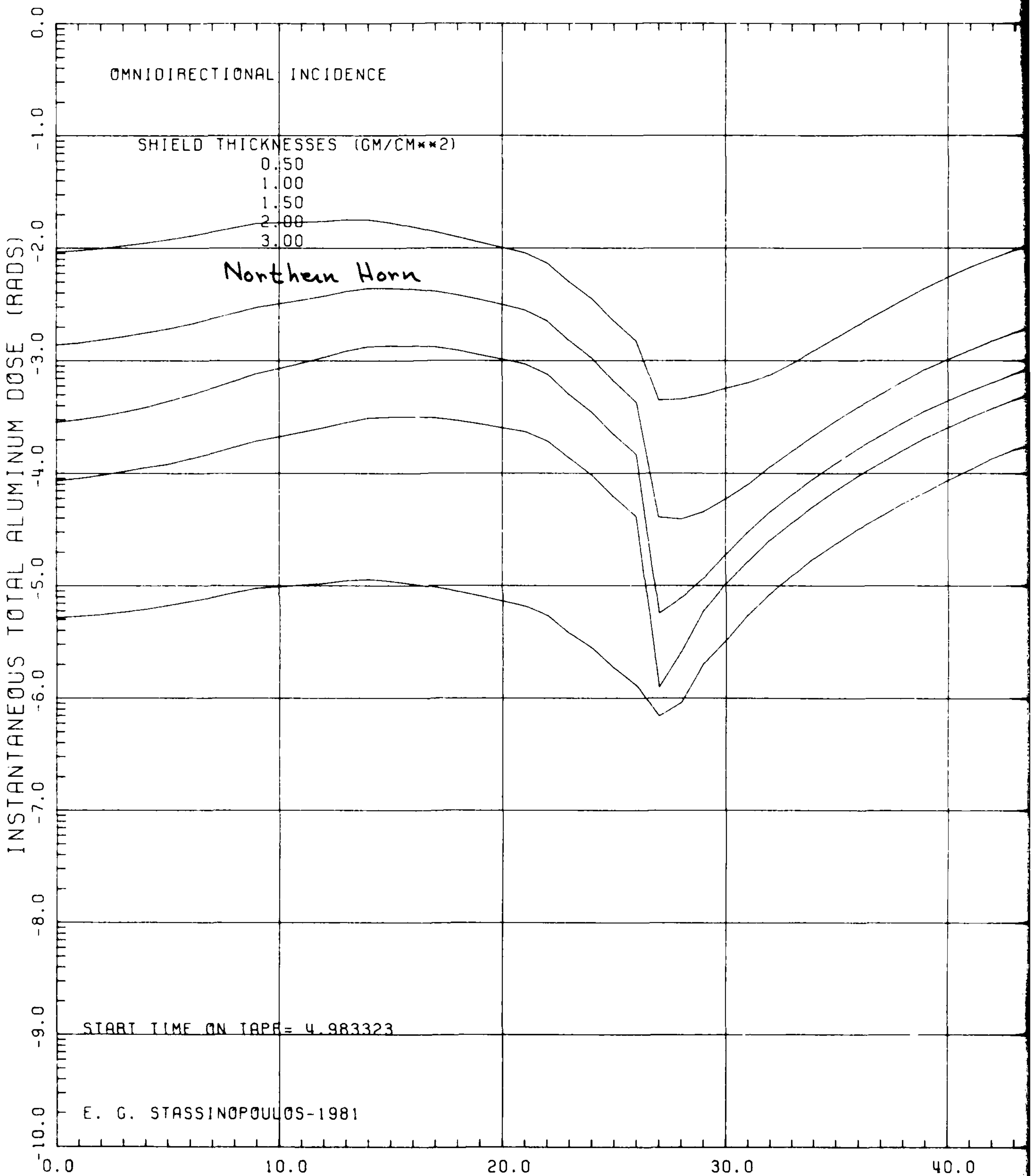
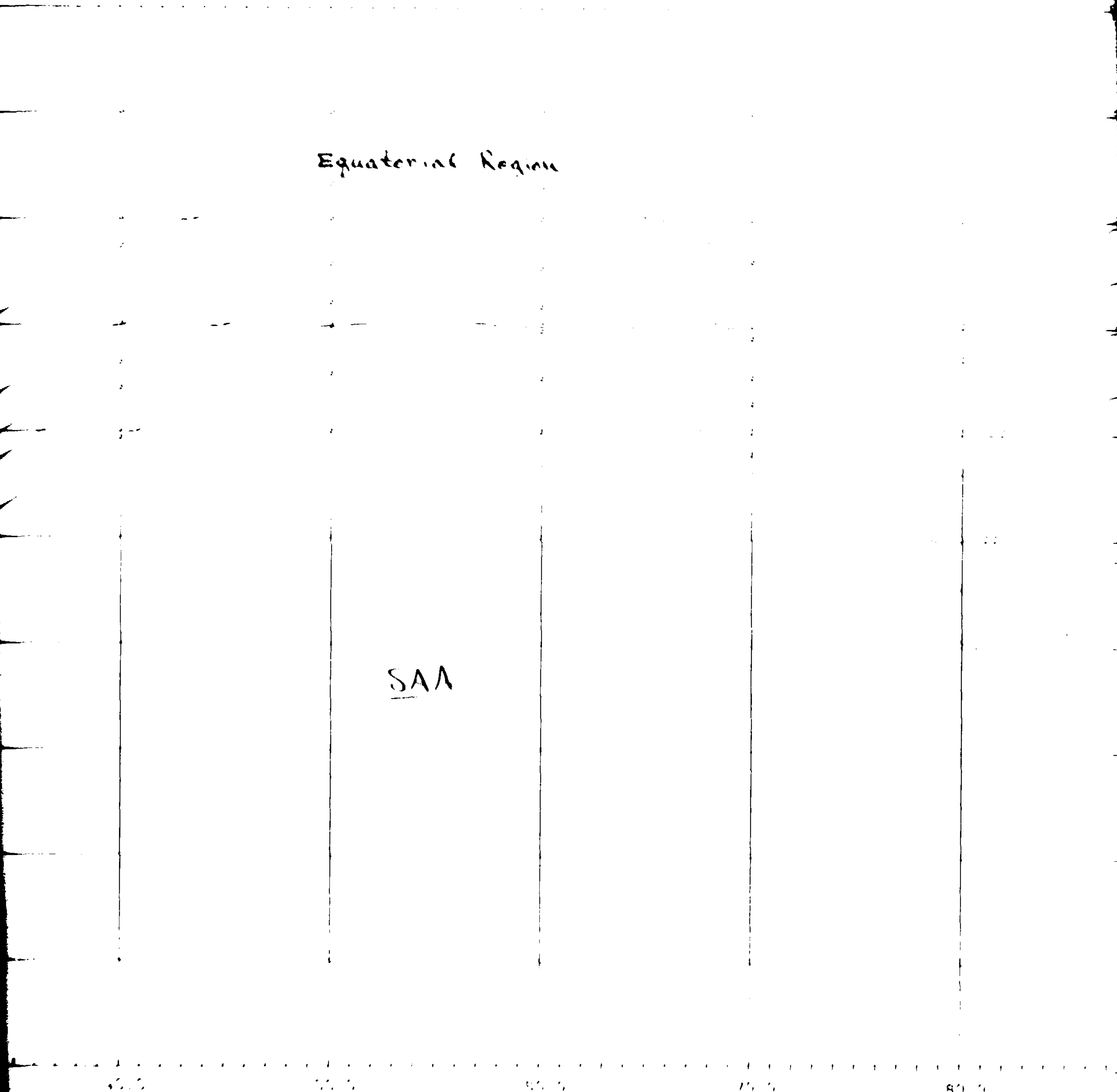
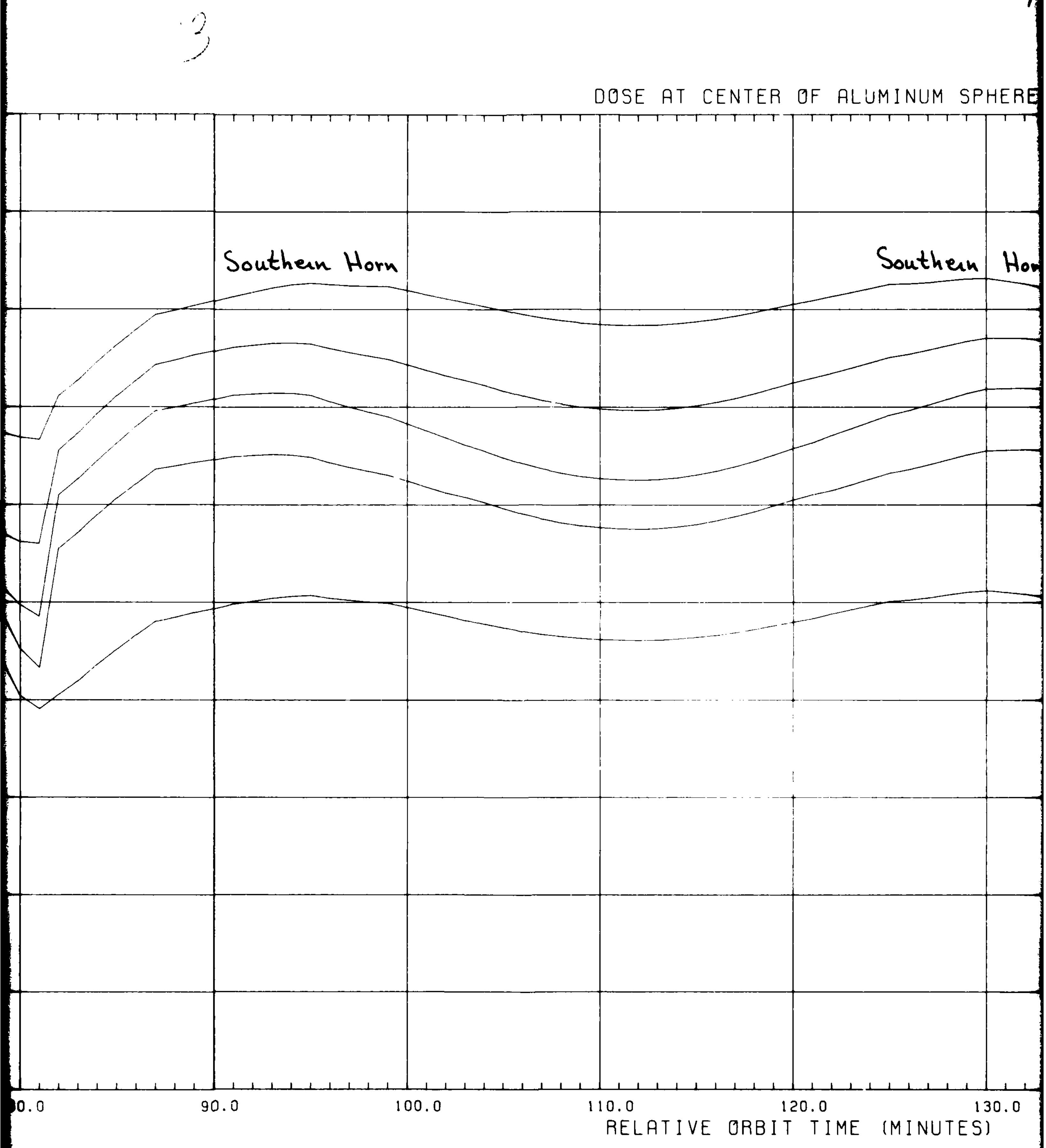


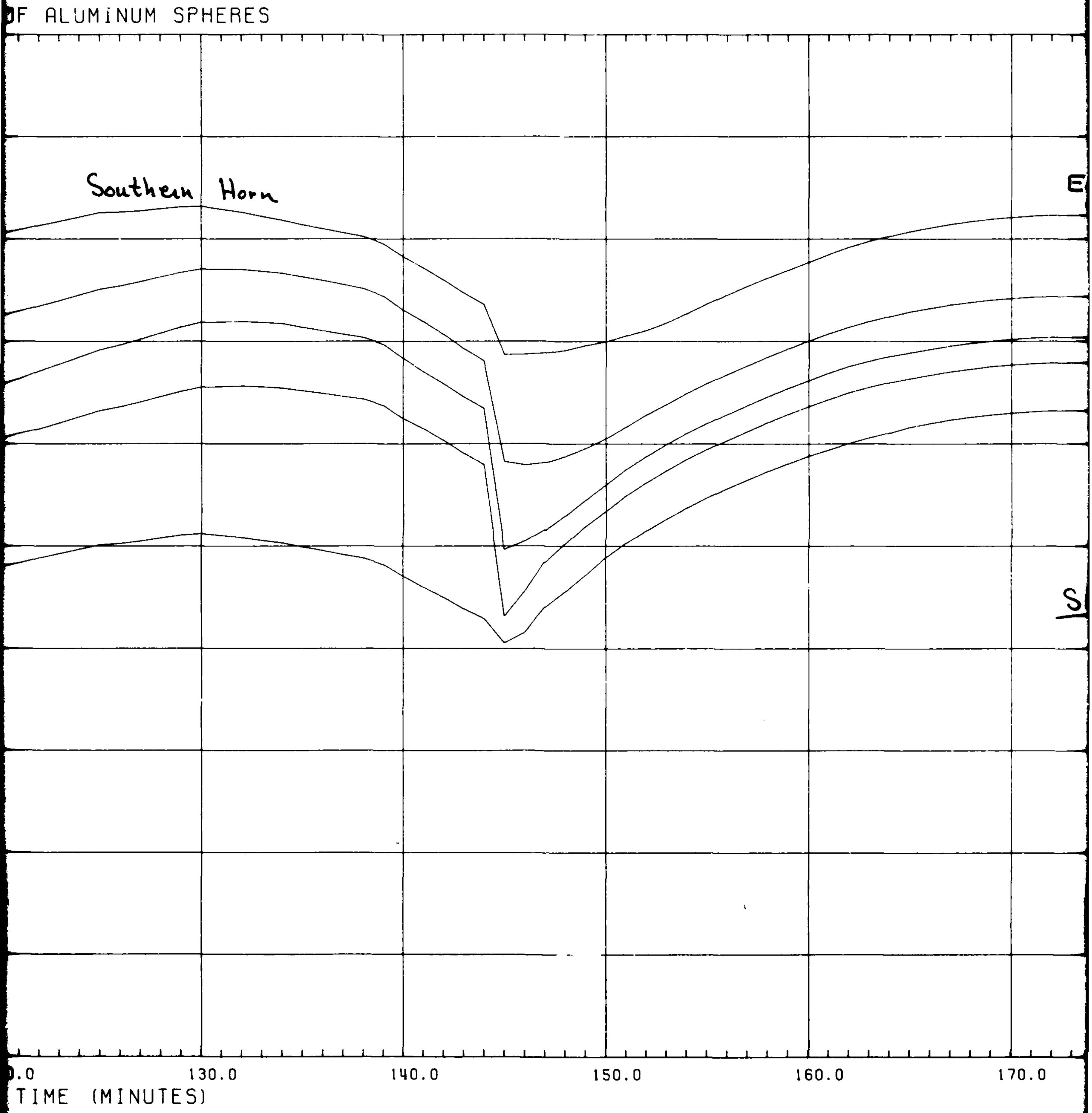
Figure 153
ORBIT: NAVELEX 5
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 8.933318
NASA-GSFC
210.0
220.0
230.0
240.0


OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
START TIME ON TAPE= 4.983323
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
10.0
20.0
30.0
40.0


Equaterial Region
SAA

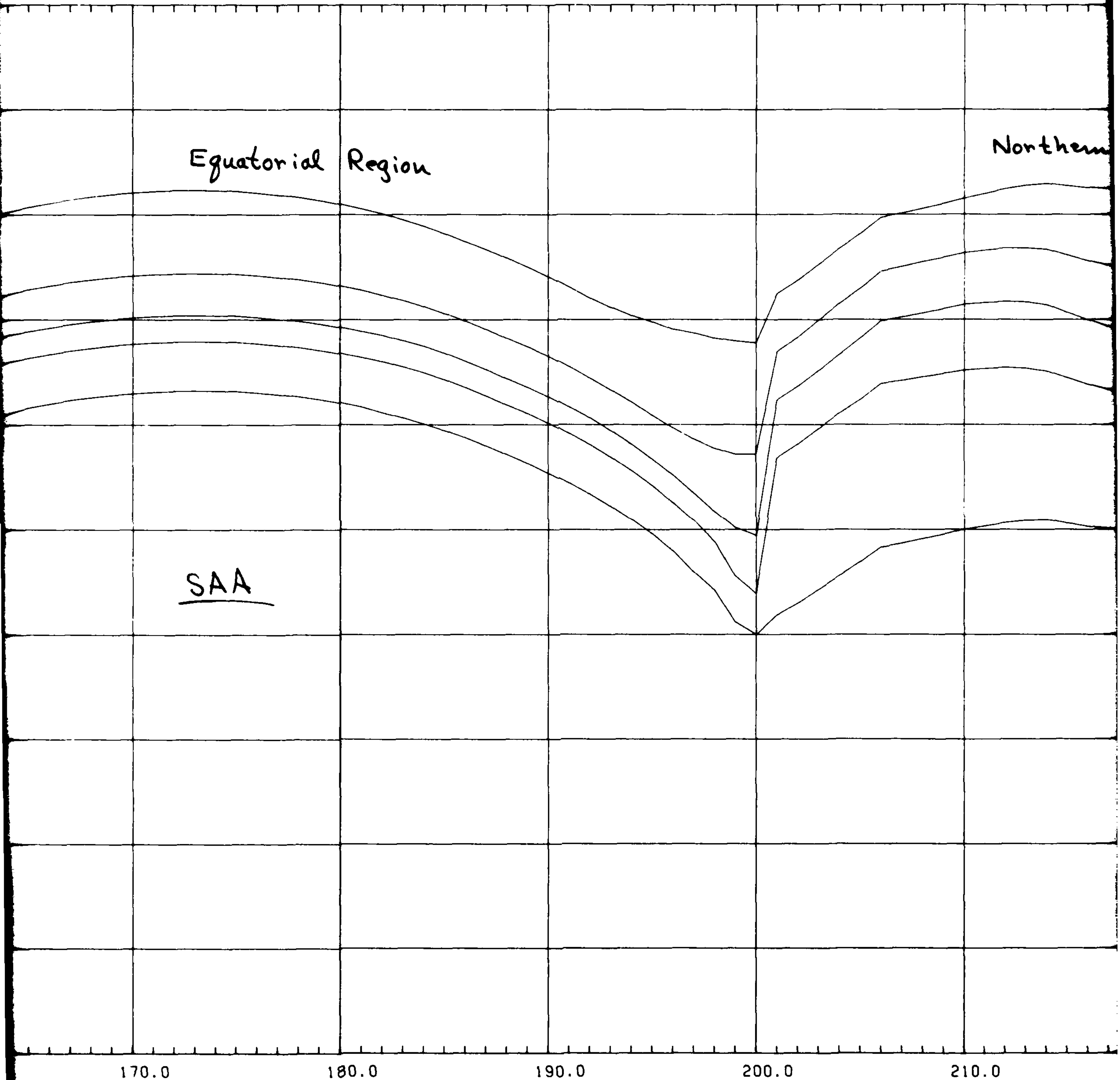

3
DOSE AT CENTER OF ALUMINUM SPHERE
Southern Horn
Southern Hor
0.0
90.0
100.0
110.0
120.0
130.0
RELATIVE ORBIT TIME (MINUTES)

4'



OF ALUMINUM SPHERES
Southern Horn
E
S
.0
130.0
140.0
150.0
160.0
170.0
TIME (MINUTES)

5



6

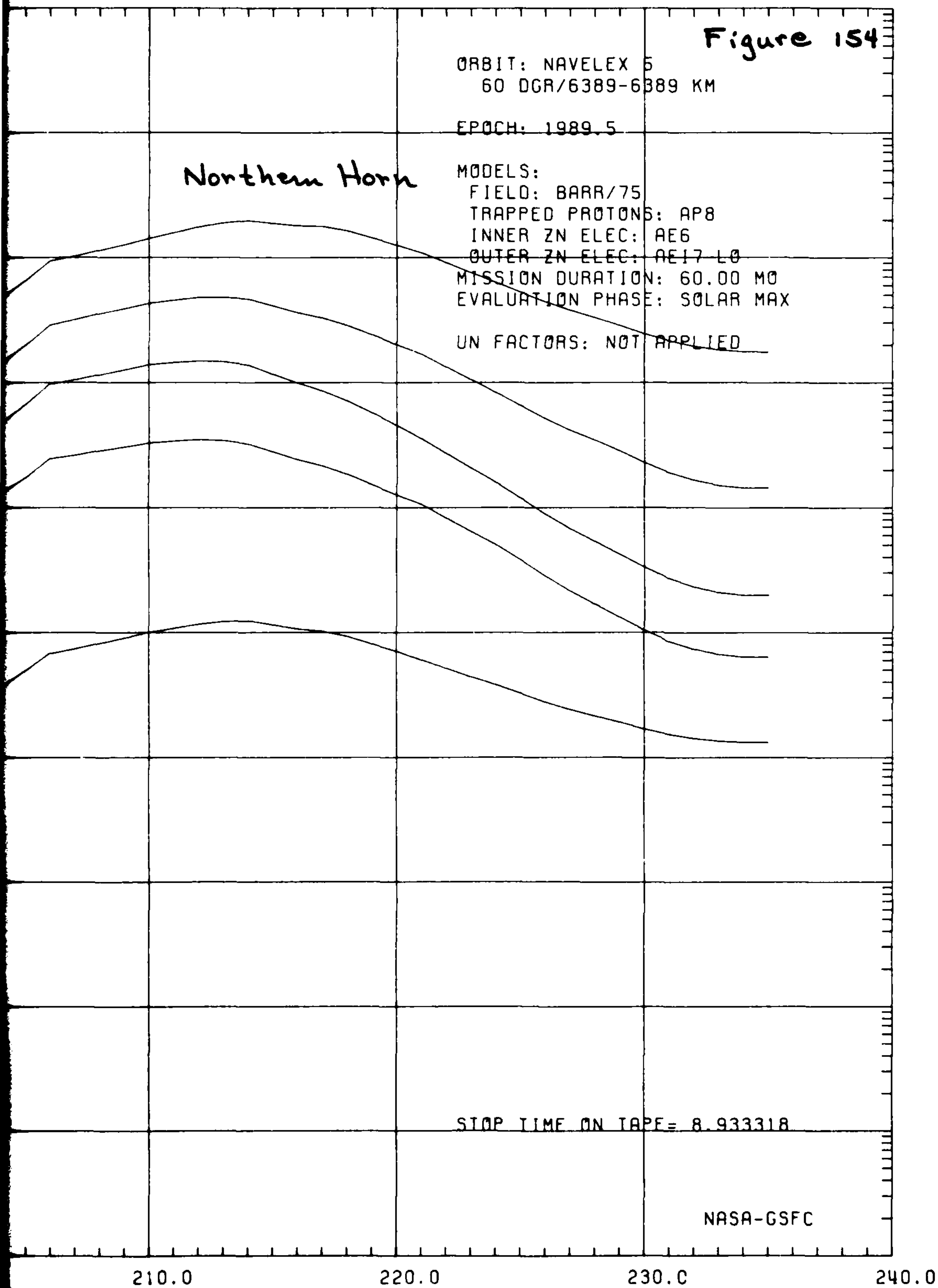
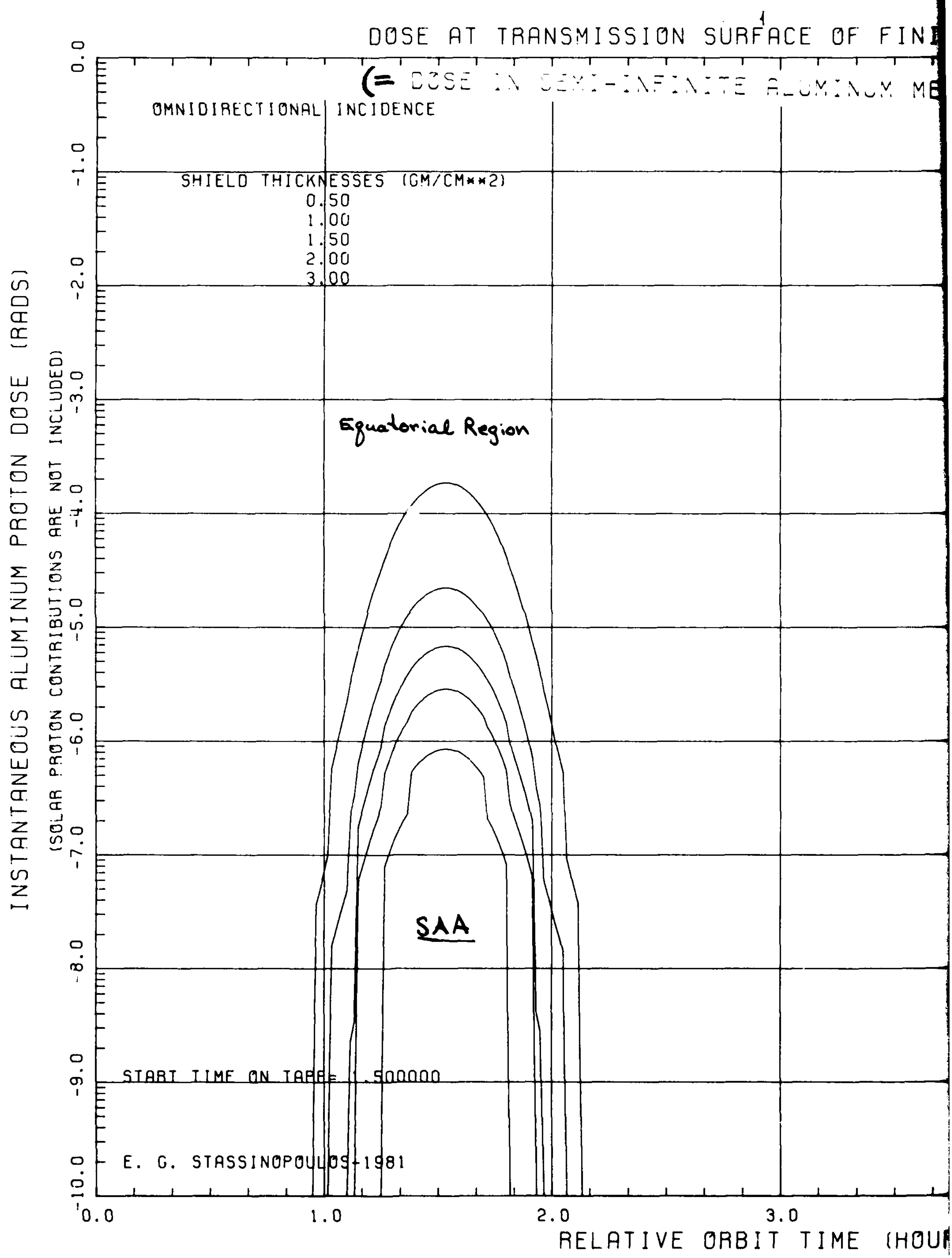
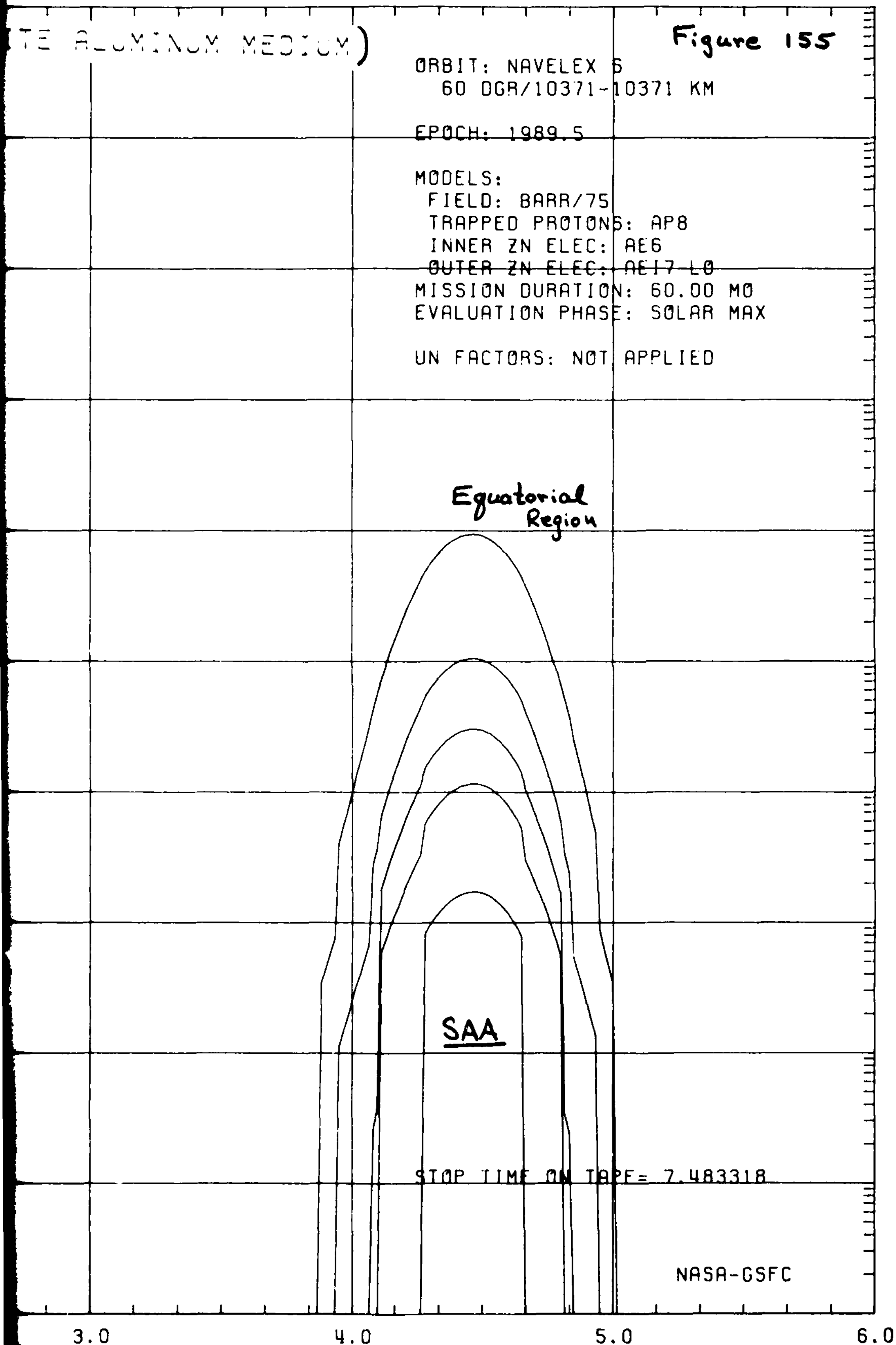

ORBIT: NAVELEX 5
60 DGR/6389-6389 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Northern Horn
STOP TIME ON TAPE= 8.933318
NASA-GSFC
210.0
220.0
230.0
240.0

Figure 154

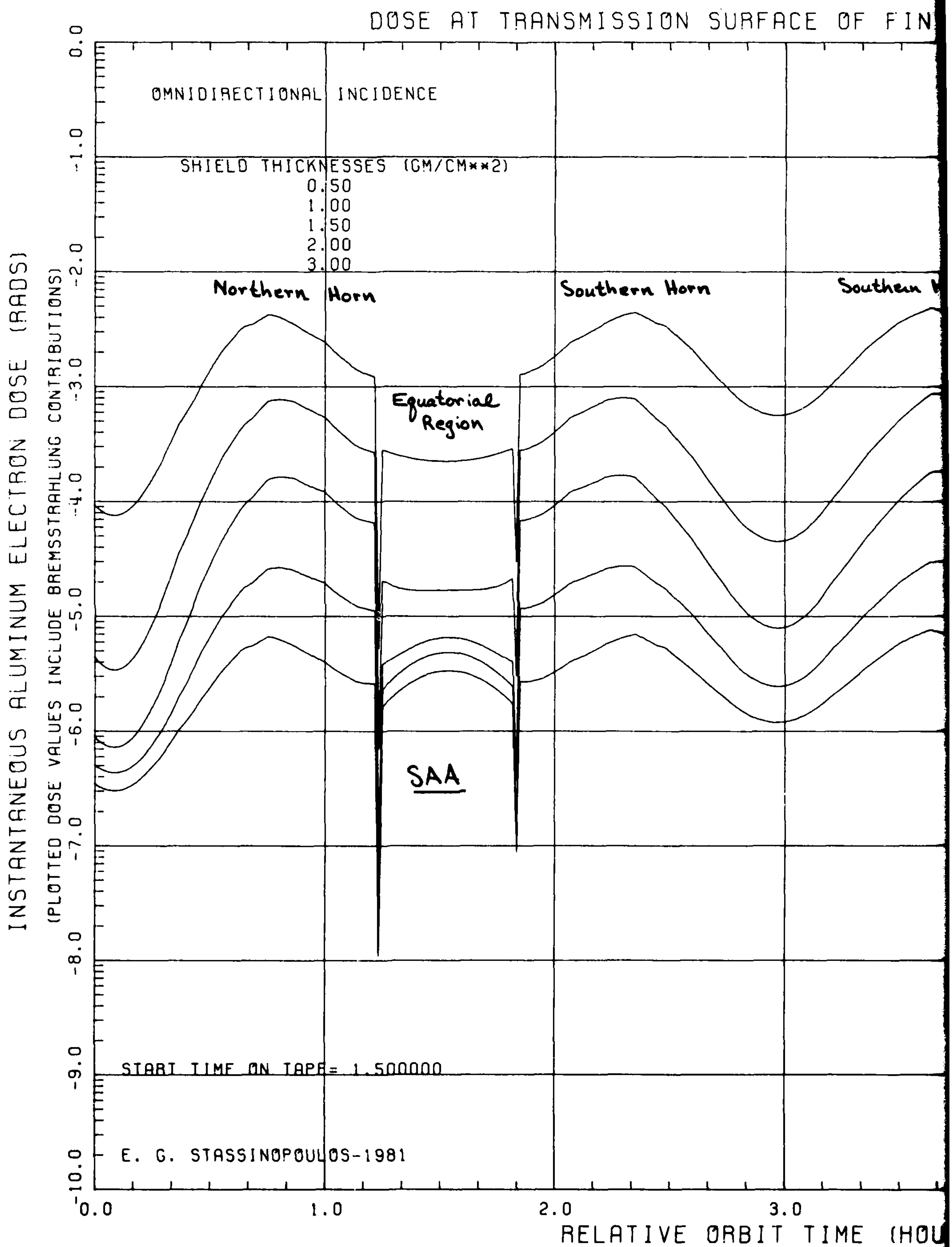


DOSE AT TRANSMISSION SURFACE OF FINI
(= DOSE IN SEMI-INFINITE ALUMINUM ME
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Region
SAA
START TIME ON TAPE= 1.500000
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
1.0
2.0
3.0
RELATIVE ORBIT TIME (HOUR

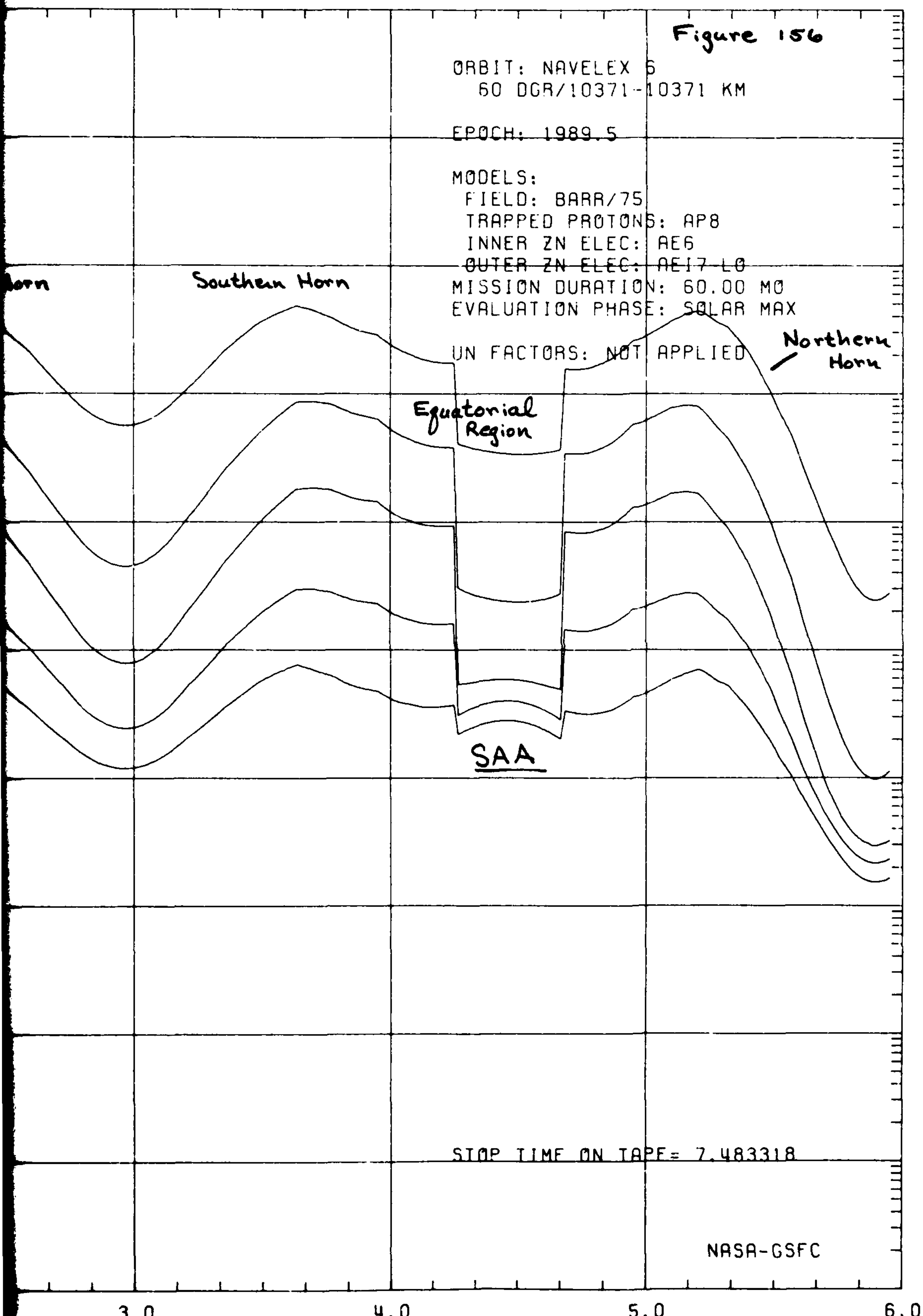
SURFACE OF FINITE ALUMINUM SLAB SHIELDS



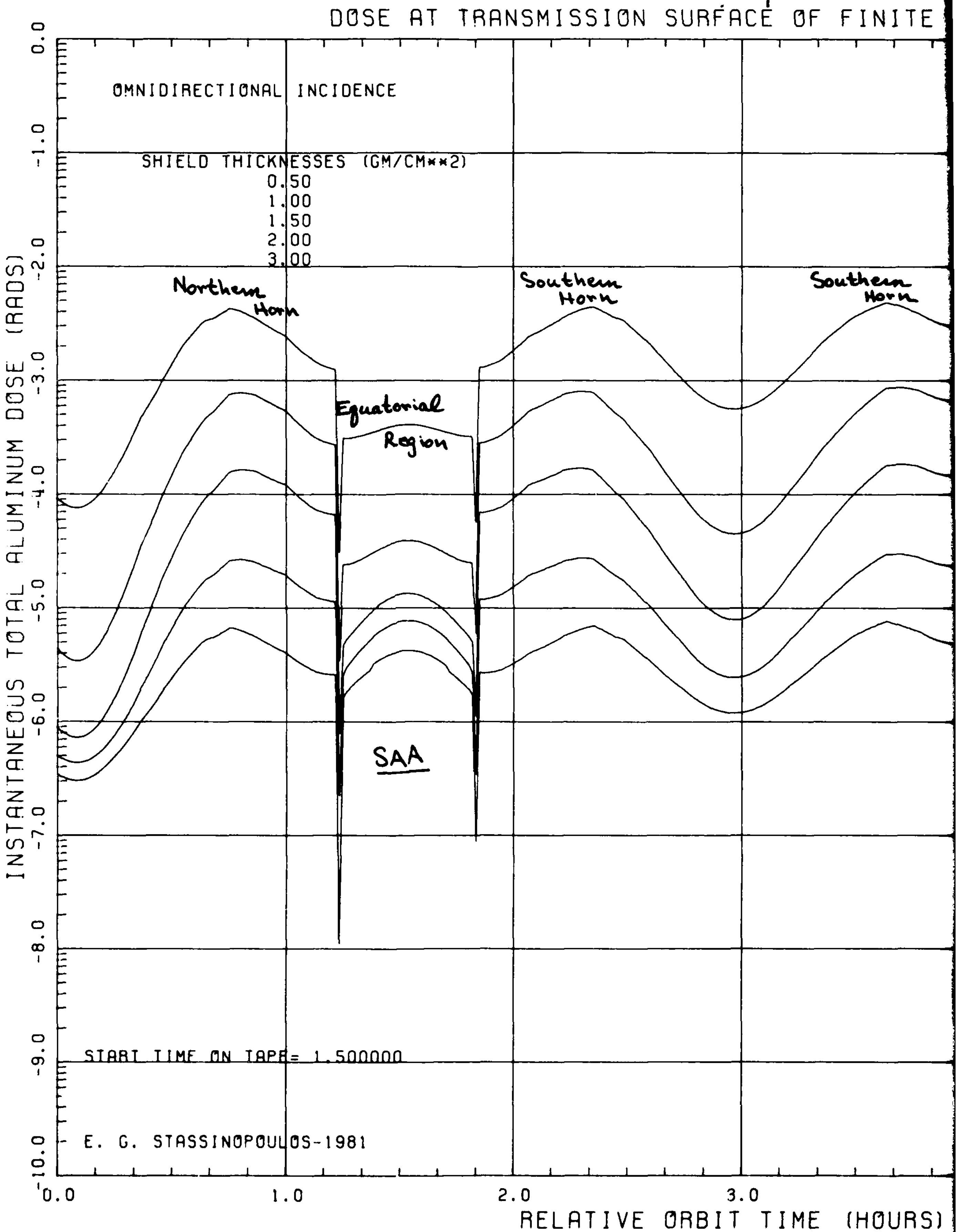
RBIT TIME (HOURS)


DOSE AT TRANSMISSION SURFACE OF FIN
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Southern Horn
Southern H
Equatorial Region
SAA
START TIME ON TAPE= 1.500000
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
1.0
2.0
3.0
RELATIVE ORBIT TIME (HOU

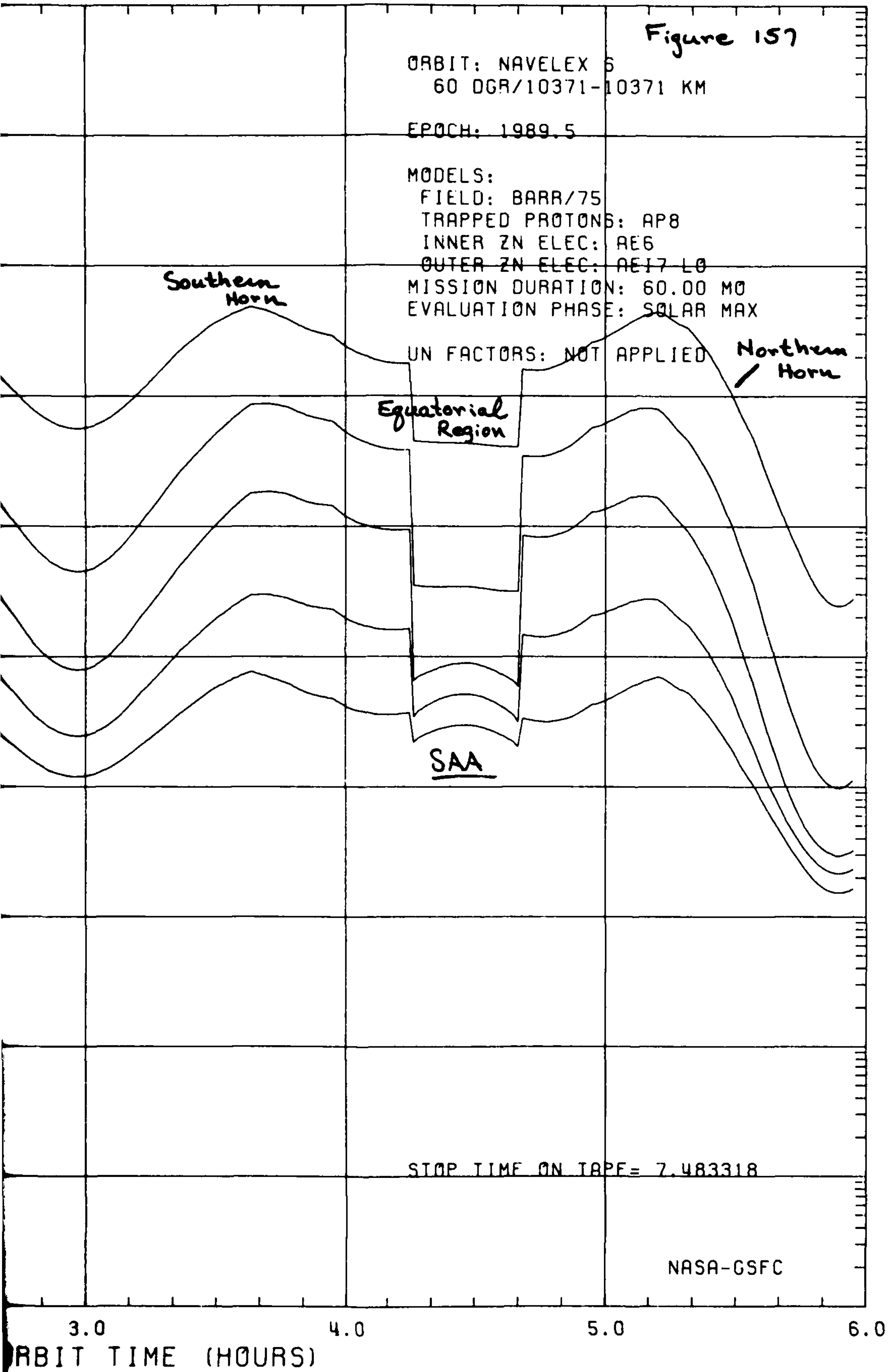
N SURFACE OF FINITE ALUMINUM SLAB SHIELDS

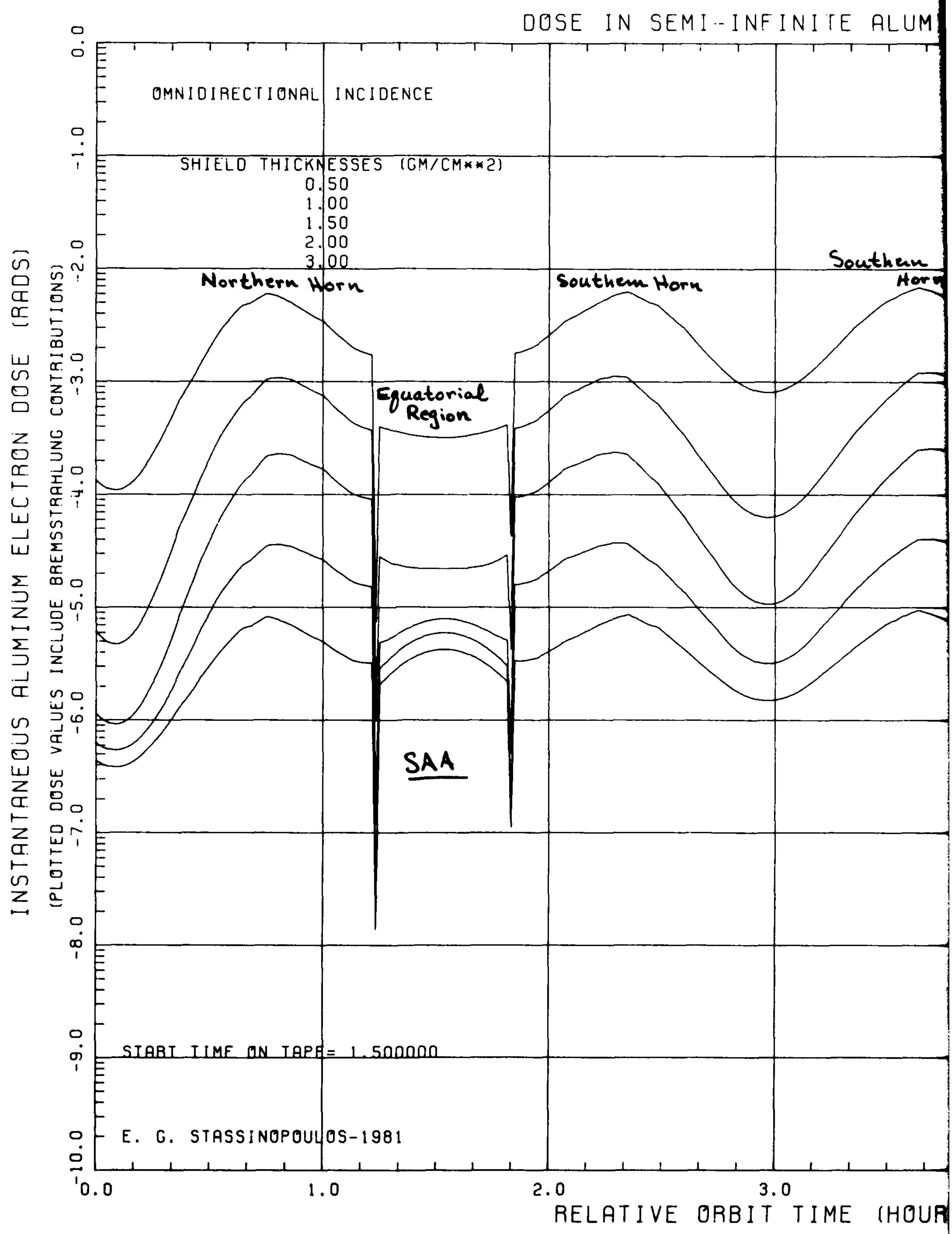


ORBIT TIME (HOURS)


DOSE AT TRANSMISSION SURFACE OF FINITE
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Southern Horn
Southern Horn
Equatorial Region
SAA
START TIME ON TAPE= 1.500000
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
1.0
2.0
3.0
RELATIVE ORBIT TIME (HOURS)

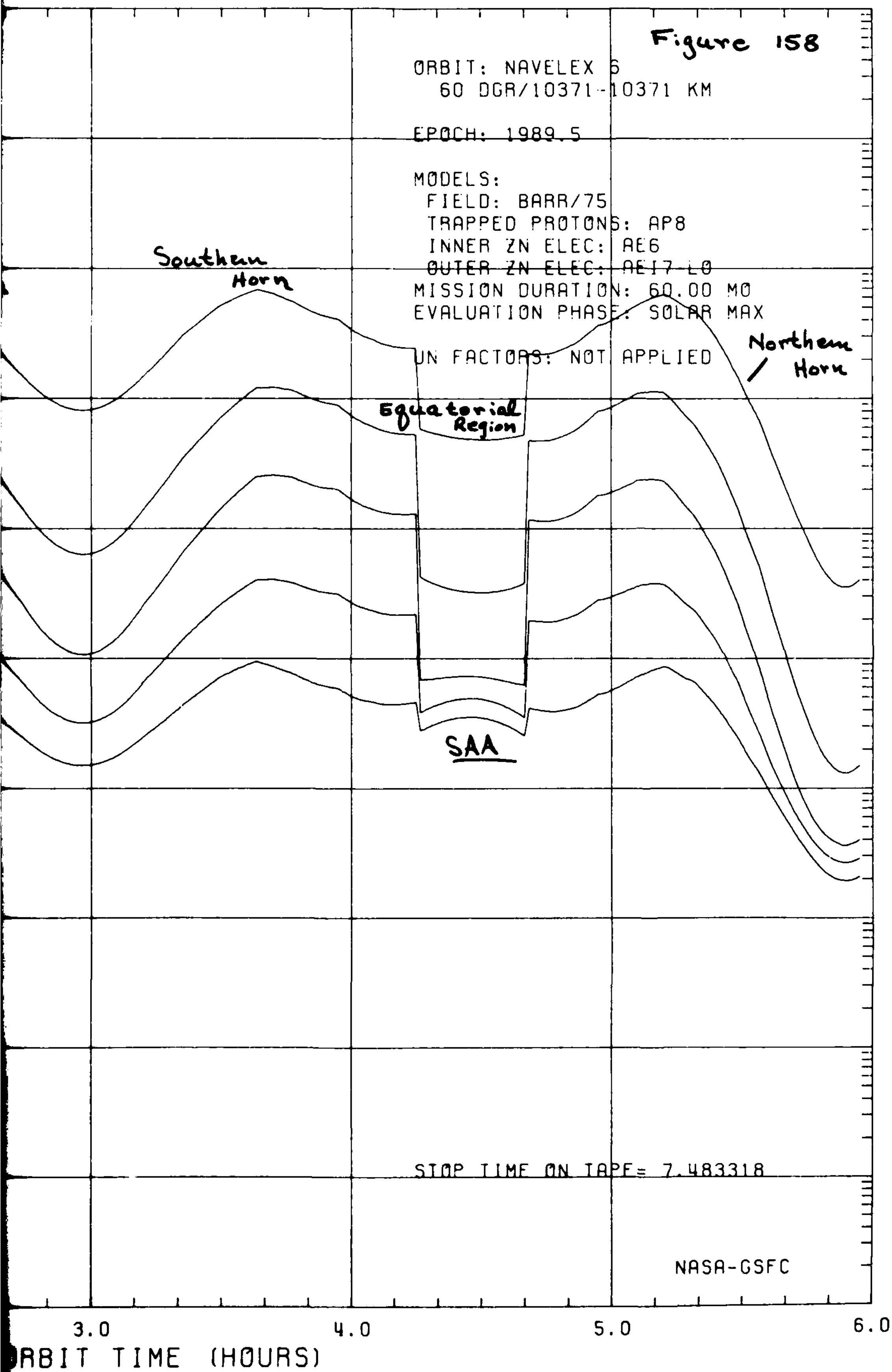
SURFACE OF FINITE ALUMINUM SLAB SHIELDS

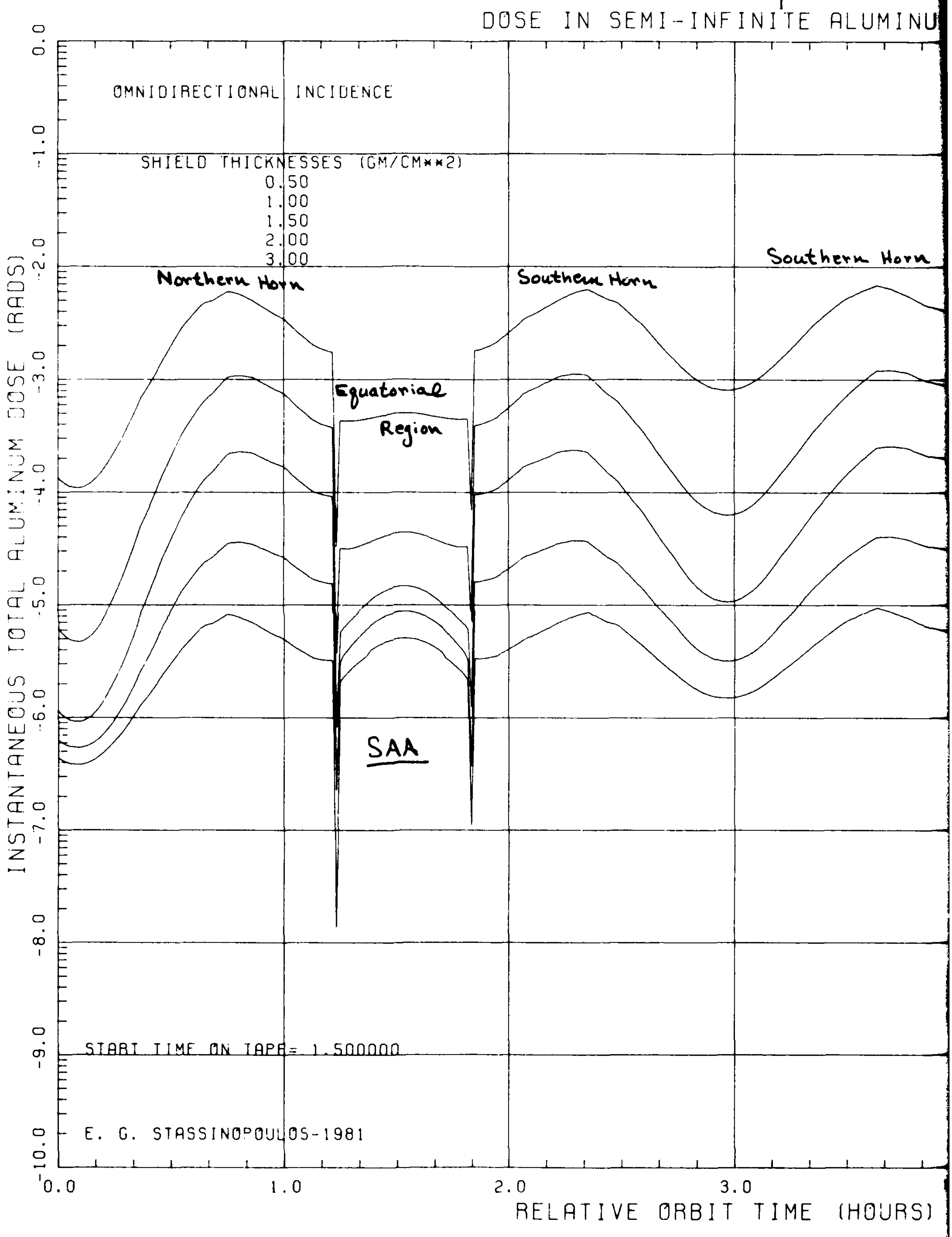




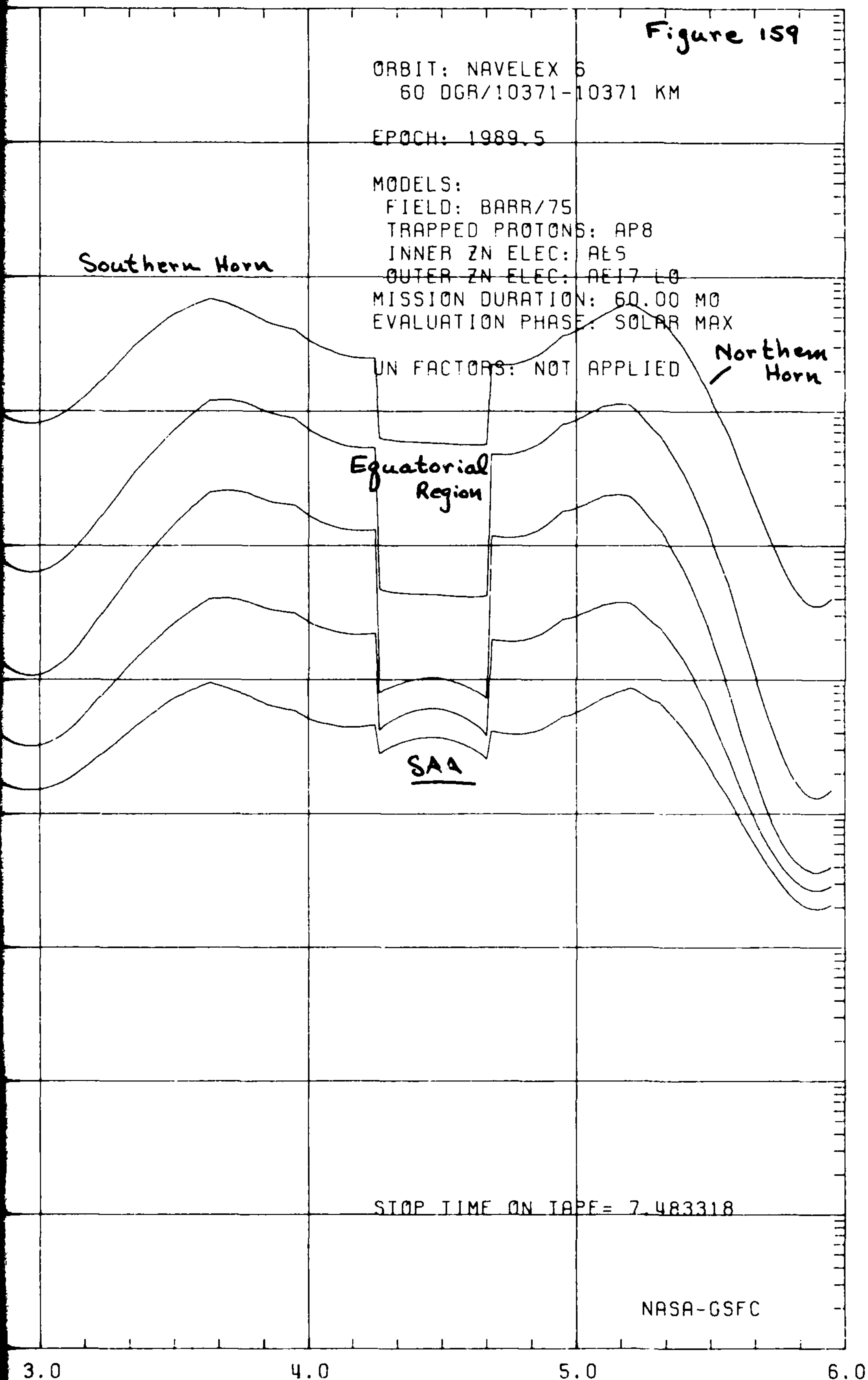
DOSE IN SEMI-INFINITE ALUM
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Southern Horn
Southern Horn
Equatorial Region
SAA
START TIME ON TAPE= 1.500000
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
1.0
2.0
3.0
RELATIVE ORBIT TIME (HOUR

I--INFINITE ALUMINUM MEDIUM

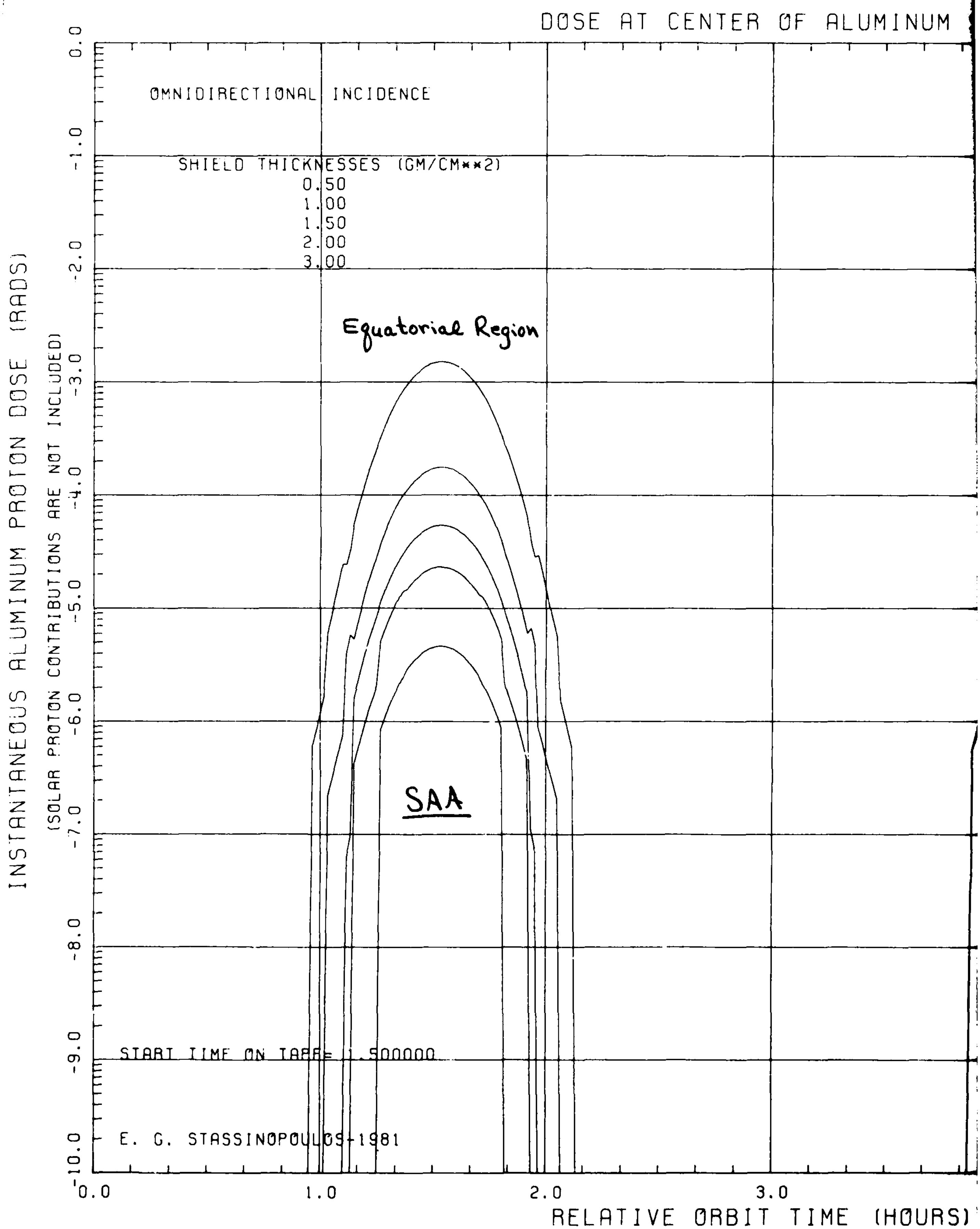


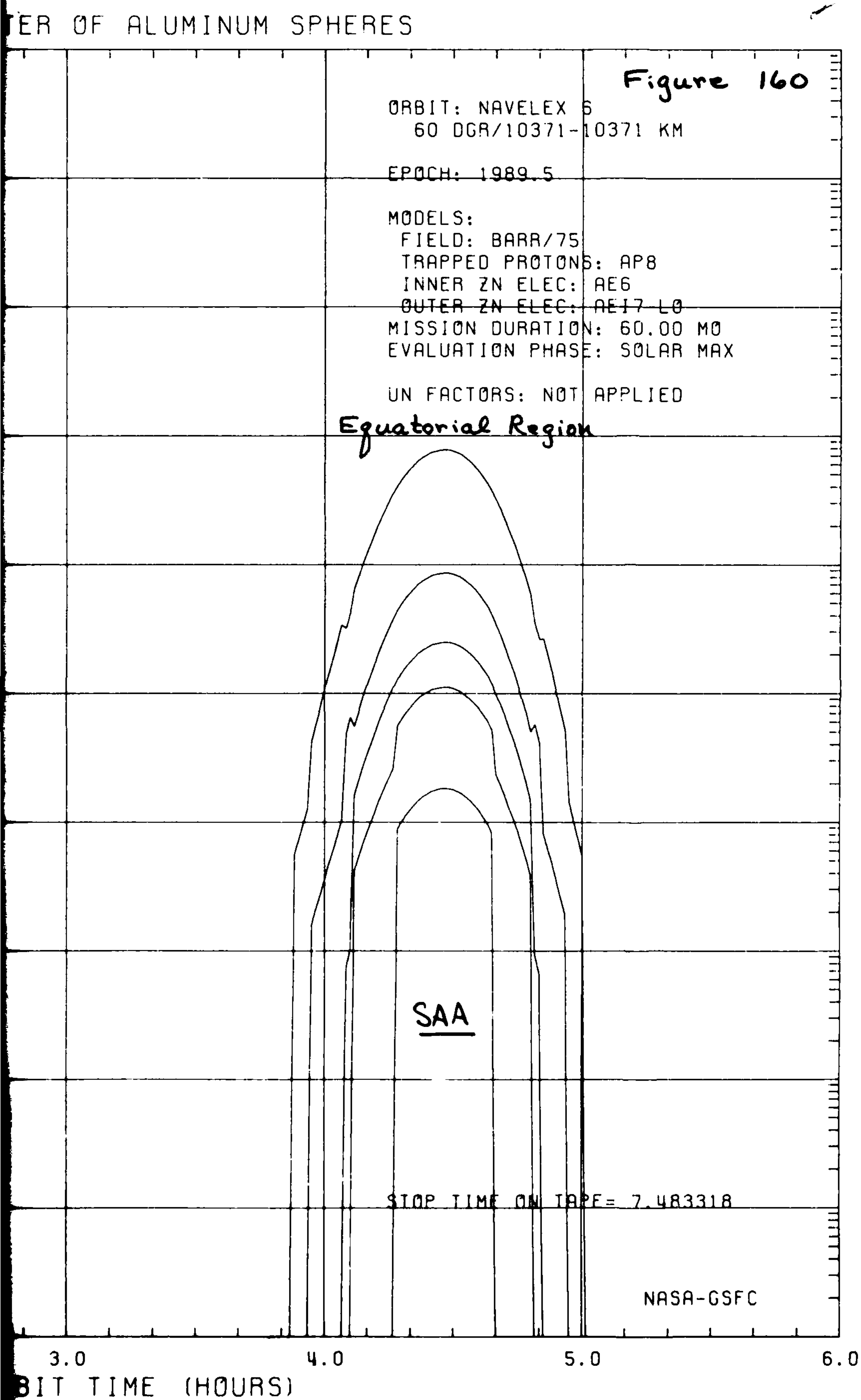

DOSE IN SEMI-INFINITE ALUMINU
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Southern Horn
Southern Horn
Equatorial Region
SAA
START TIME ON TAPE= 1.500000
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
1.0
2.0
3.0
RELATIVE ORBIT TIME (HOURS)

NFINITE ALUMINUM MEDIUM

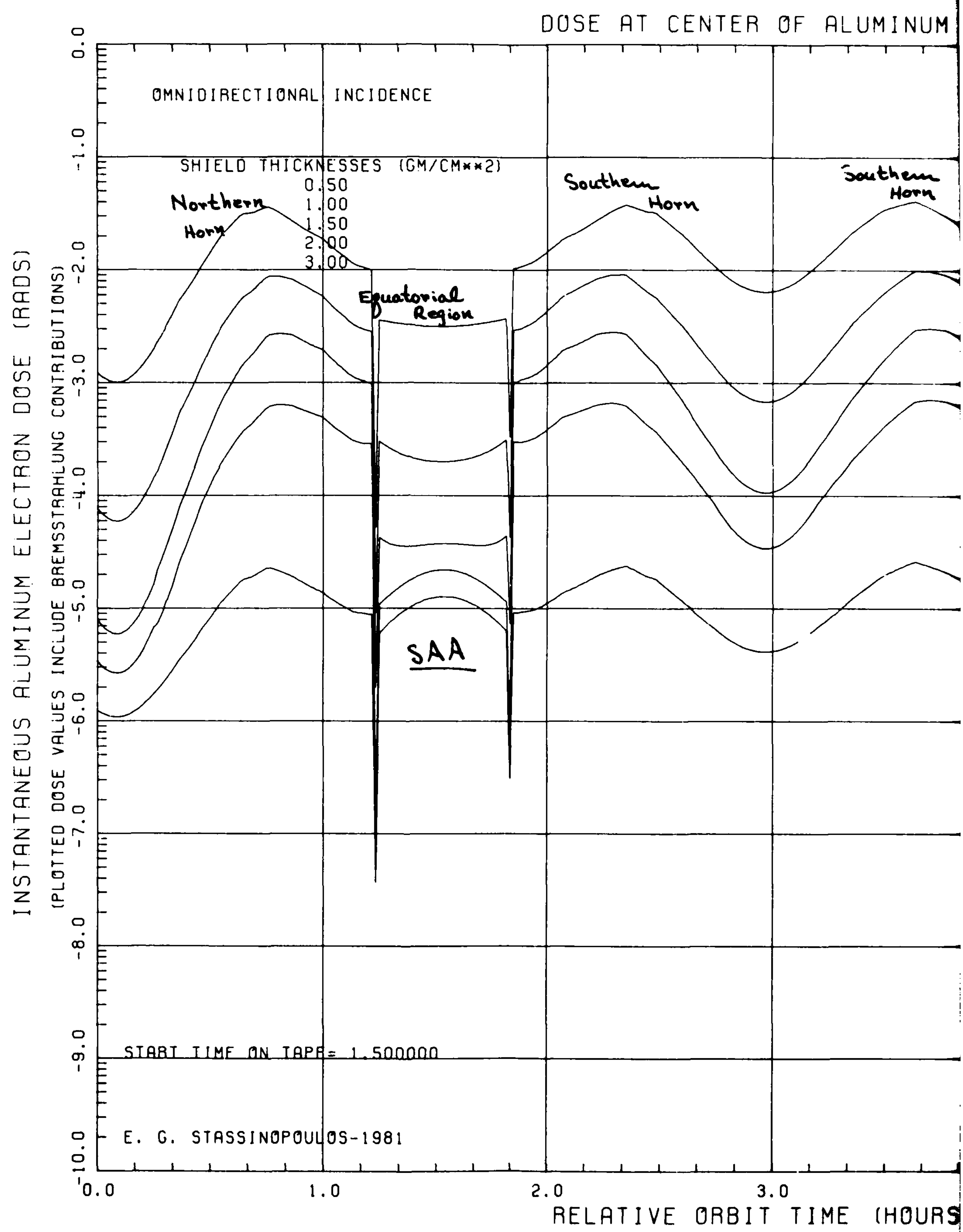


IT TIME (HOURS)


DOSE AT CENTER OF ALUMINUM
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Equatorial Region
SAA
START TIME ON TAPE= 1.500000
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM PROTON DOSE (RADS)
(SOLAR PROTON CONTRIBUTIONS ARE NOT INCLUDED)
RELATIVE ORBIT TIME (HOURS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
1.0
2.0
3.0

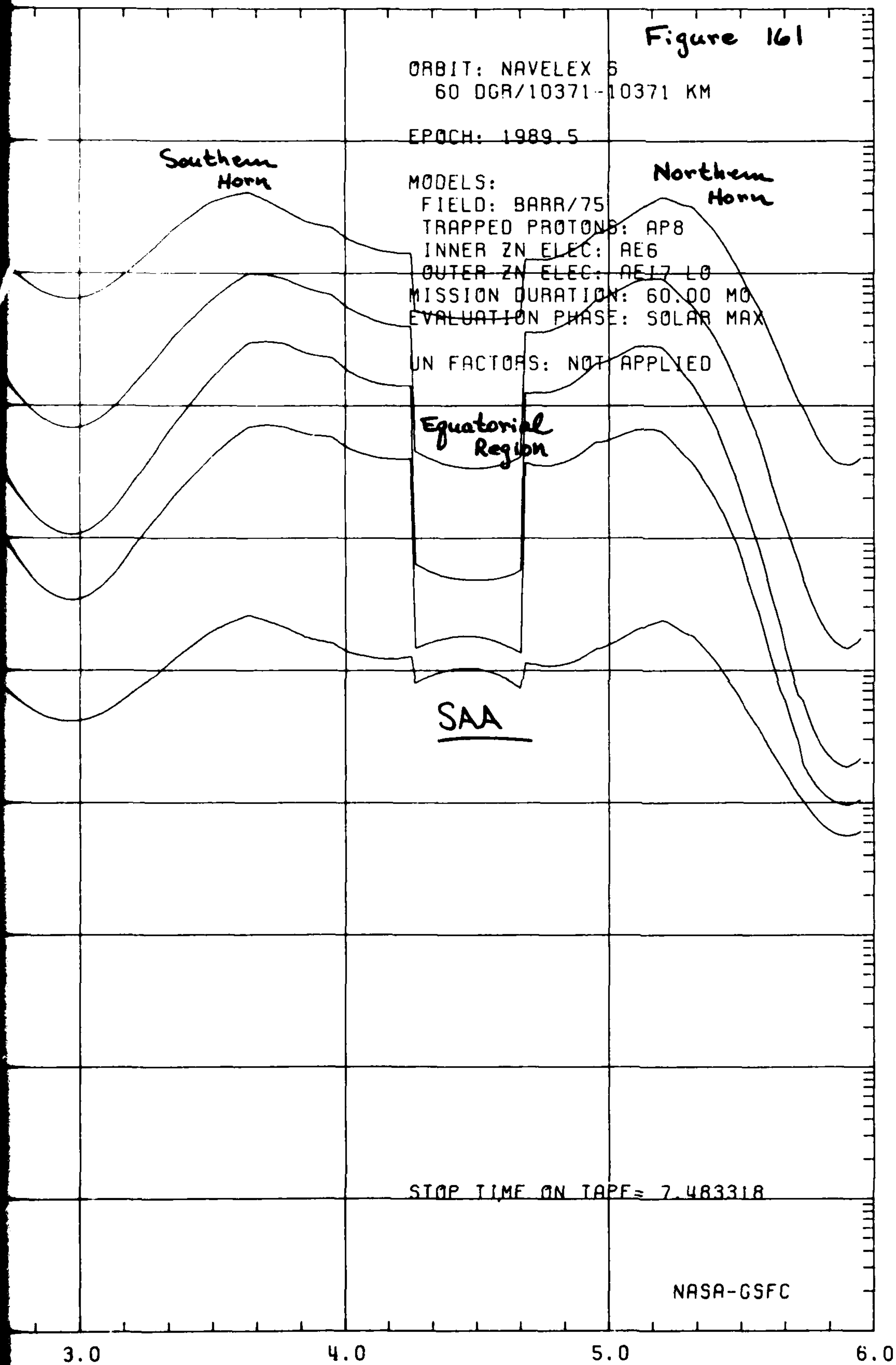


ER OF ALUMINUM SPHERES
Figure 160
ORBIT: NAVELEX 6
60 DGR/10371-10371 KM
EPOCH: 1989.5
MODELS:
FIELD: BARR/75
TRAPPED PROTONS: AP8
INNER ZN ELEC: AE6
OUTER ZN ELEC: AEI7-LO
MISSION DURATION: 60.00 MO
EVALUATION PHASE: SOLAR MAX
UN FACTORS: NOT APPLIED
Equatorial Region
SAA
STOP TIME ON TAPE= 7.483318
NASA-GSFC
3.0
4.0
5.0
6.0
BIT TIME (HOURS)

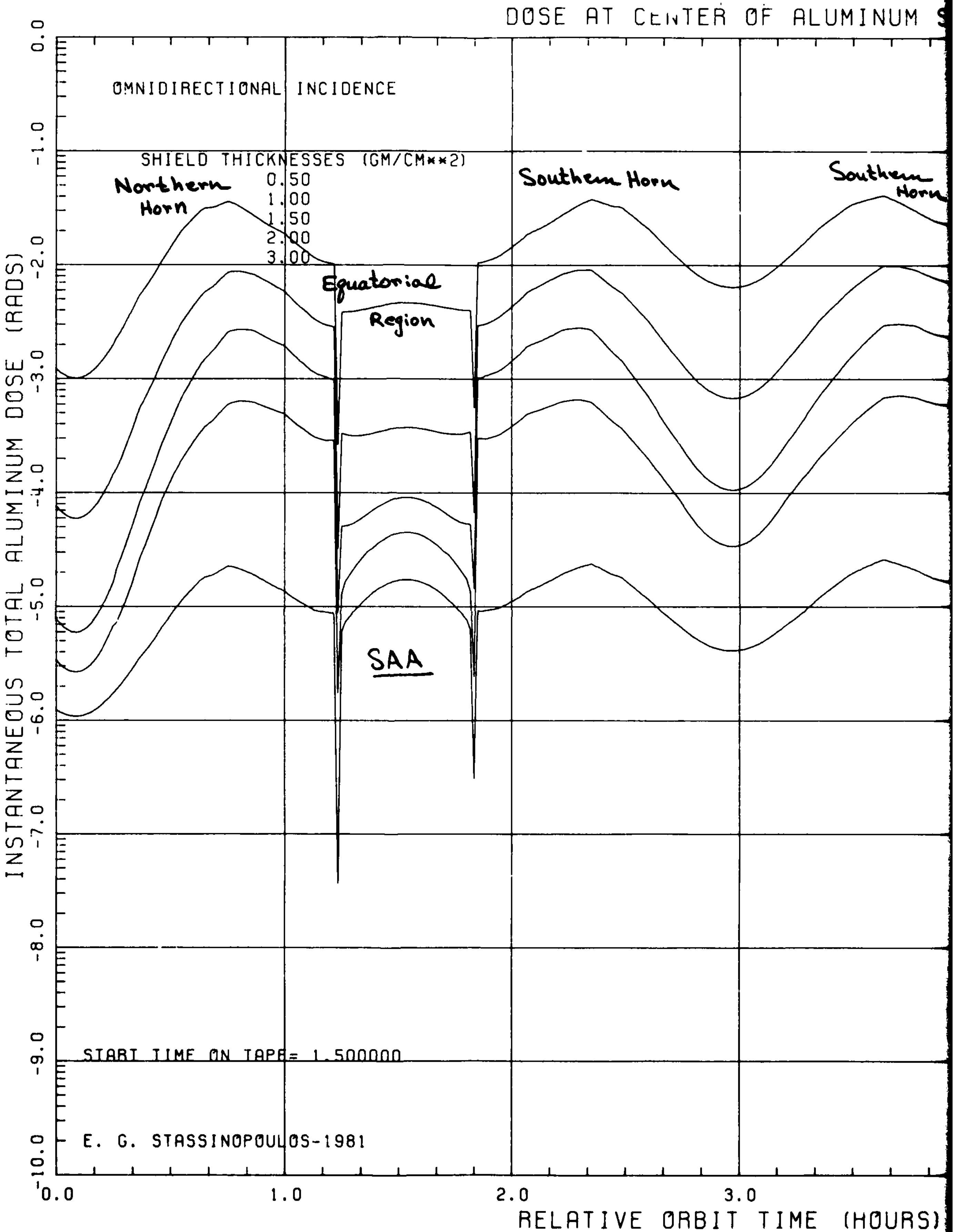


DOSE AT CENTER OF ALUMINUM
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Southern Horn
Southern Horn
Equatorial Region
SAA
START TIME ON TAPE= 1.500000
E. G. STASSINOPOULOS-1981
INSTANTANEOUS ALUMINUM ELECTRON DOSE (RADS)
(PLOTTED DOSE VALUES INCLUDE BREMSSTRAHLUNG CONTRIBUTIONS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
1.0
2.0
3.0
RELATIVE ORBIT TIME (HOURS

TER OF ALUMINUM SPHERES

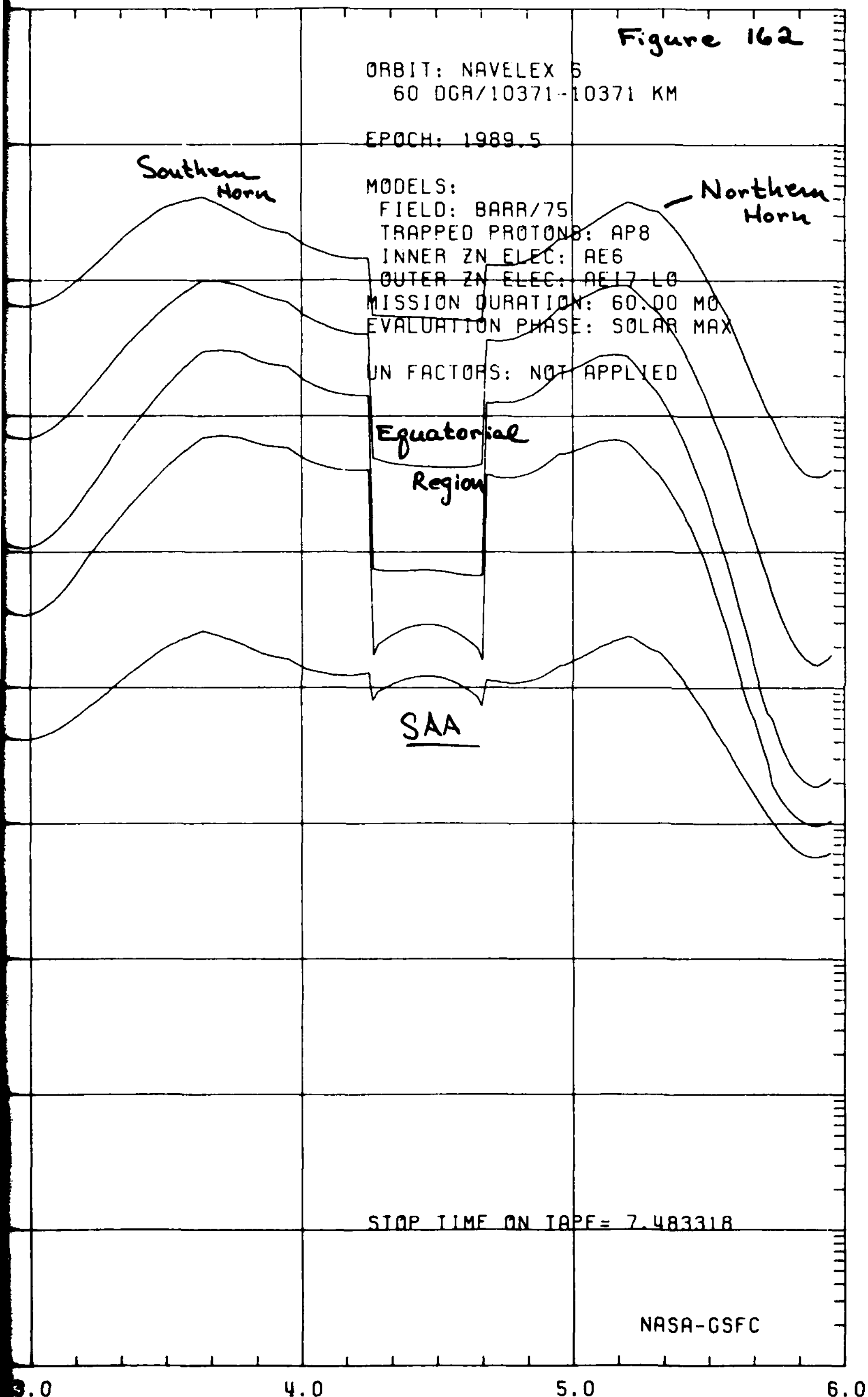


RBIT TIME (HOURS)



DOSE AT CENTER OF ALUMINUM S
OMNIDIRECTIONAL INCIDENCE
SHIELD THICKNESSES (GM/CM**2)
0.50
1.00
1.50
2.00
3.00
Northern Horn
Southern Horn
Southern Horn
Equatorial Region
SAA
START TIME ON TAPE= 1.500000
E. G. STASSINOPOULOS-1981
INSTANTANEOUS TOTAL ALUMINUM DOSE (RADS)
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0.0
1.0
2.0
3.0
RELATIVE ORBIT TIME (HOURS)

OF ALUMINUM SPHERES



T TIME (HOURS)

DAT

FILM

7—