Special Technical Report 12 - Addendum

SUBJECT INDEX FOR SURVEY OF LITERATURE PERTAINING TO THE EQUATORIAL IONOSPHERE AND TROPICAL COMMUNICATION

By: G. H. HAGN  K. A. POSEY  H. W. PARKER

Prepared for:
U.S. ARMY ELECTRONICS COMMAND
FORT MONMOUTH, NEW JERSEY

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SUBJECT INDEX FOR SURVEY OF LITERATURE PERTAINING TO THE EQUATORIAL IONOSPHERE AND TROPICAL COMMUNICATION.

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U.S. ARMY ELECTRONICS COMMAND
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This addendum is a subject index for Special Technical Report 12 on this contract, DA 36-039-AMC-00040(E), "Survey of Literature Pertaining to the Equatorial Ionosphere and Tropical Communication." The greatest numbers of subjects have to do with equatorial aeronomy, but topics under geomagnetism, jungle radio propagation, radio noise, and special equipment and antennas related to studies in the fields cited are included. The literature search involved documents published over a period of about 40 years, ending with 1964, with the greater weight being placed on work published in the latter years.
This report is a subject index to "Survey of Literature Pertaining to the Equatorial Ionosphere and Tropical Communication," Special Technical Report 12, on Contract DA 36-039-AMC-00040(E). The literature survey in that report is organized alphabetically by the first author's last name and includes a list of the authors represented. While this organization is convenient for those already familiar with the literature of low-latitude aeronomy, the approach is less useful for other readers. The authors think a subject index enhances the value of any literature survey. This index is organized alphabetically by subject. The listings under each subject give the first author's last name and the year of publication. The user is advised to check Special Technical Report 12 for all articles by an author for the year of interest, since no distinction has been made when more than one article appears for any given author in a year.
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Noon F2 layer ionization and magnetic dip (Bhur 1957, 1959)
Diurnal, in maximum electron density over Kodikanal (Bhargava 1962)
In the behavior of equatorial F2 layer (Croom 1959)
South Atlantic magnetic, detail maps of (Dudziak 1963)
Geomagnetic distortion in F2 region (Hasegawa 1954)
South Atlantic magnetic: East-west asymmetry in the flux of mirroring geomagnetically trapped protons (Jeckman 1962)
Interpretation of, by ionospheric drift (Hiroto 1959)
Equatorial sunset effect (Hume 1959)
Geomagnetic, and possible interpretation (Lepschinsky 1955)
Geomagnetic, and F2 region (Lyon 1962)
Variations of noon values of $f_{\text{F2}}$ with magnetic latitude (Lyon 1963)
Pitch-angle distribution of the photoelectrons and origin of the geomagnetic anomaly in the equatorial F2 layer (Mariani 1964)
Geomagnetic, of F2 region (Martyn 1955)
Latitude dependence of $f_{\text{F2}}$ over the range 20° N to 69° S (Ose 1959)
Geomagnetic, during sunspot maximum (Rco, C.S.I., 1962)
Diurnal development of anomalous equatorial belt in F2 region (Rastogi 1959)
Equatorial, F-region electron densities and height variations (Somayajulu 1963)
Seasonal, in F region (Wright, J. W., 1962, 1963)
ANTENNA (see also EQUIPMENT)

Rotating spaced loops (Bowman 1960)
Antenna design for tropical broadcasting (CCIR 1963)
Scale-model measurements of sloping wire antenna (Cory 1963)
Measured impedance of tactical antenna (Cory 1964)
For broadcasting in tropics (Dickinson 1956)
Antenna engineering handbook (Jasik 1961)
Experiments with an aerial system for suppressing the ground wave (Khastgir 1940)
Linear communication antennas (Laitinen 1957)
HF skywave transmission over short or moderate distances using half- wave horizontal or sloping antennas (NDRC 1944)
Radiation from antennas in the 2-to-30-Mc/s band (Signal Corps RPA 1958)
Highly directional array for observing field-aligned irregularities (Thomas 1960)
Curves of ground proximity loss for Dipole (Vogler 1963)

ATLANTIC OCEAN

Ionospheric observations over (Bukin 1961)
Detail maps of South Atlantic anomaly (Dudziak 1963)
South magnetic anomaly studied by satellite (Heckman 1962)

ATMOSPHERIC NOISE (see also COSMIC RADIO NOISE; THUNDERSTORM; LIGHTNING)

Measurement of, in southwest Pacific area (Bateman 1944)
Amplitude and phase spectrum of (Bhattacharya 1963)
Attenuation characteristics of (Bhattacharya 1964)
Over tropical land mass (CCIR 1963)
Level of, for tropical broadcasting (CCIR 1963)
Measurement of, interference to broadcasting (Chandrashekhar Aiya 1954)
In 3-Mc/s band at Poona (Chandrashekhar Aiya 1955)
Conversion data for, interference measurements (Chandrashekhar Aiya 1958)
And interference to short-wave broadcasting (Chandrashekhar Aiya 1958)
ATMOSPHERIC NOISE (Continued)

And interference to medium-wave broadcasting (Chandrashekhar Aiya 1958)
Average power of, impulsive (Chandrashekhar Aiya 1959)
And interference in standard broadcast band at Poona (Chandrashekhar Aiya 1959)
Measurement and description of (Chandrashekhar Aiya 1959)
At Poona, in 2.5–to–20.0-Mc/s band (Chandrashekhar Aiya 1959)
And HF noise radiators in lightning ground flashes (Chandrashekhar Aiya 1960)
Structure of (Chandrashekhar Aiya 1962)
For the period 1 December 1957 to 28 February 1958 (Chrichlow 1958)
For the period June 1 to November 30, 1957 (Chrichlow 1958)
Special report on (Chrichlow 1960)
Solar-flare effects on, at 2.5 and 5.0 Mc/s (Herman 1961)
Reception of, at HF (Horner 1953)
Revised radio noise data (Kelley 1960)
Studies in, using warbler method (Kastger 1940, 1942)
An attempt to observe whistlers near the equator (Koster 1955)
Short-term time characteristics of, impulsive (Lakshminarayana 1962)
Level of, in the longest wave region, and its diurnal and annual variations (Lauter 1958)
And interference to 5 Mc/s broadcast band at Poona (Phadke 1955)
Wave forms of, at Madras (Rajam 1936)
Study of, at VLF at Delhi (Sachdev 1958)
Measurement of, during nuclear explosions (Saha 1964)
Short-term amplitude probability distribution of, impulsive (Satyam 1962)
Long-term amplitude probability distribution of (Satyam 1962)
Hourly variation of, seasonal (Satyam 1962)

AURORA

Fading correlation bandwidth and short-term frequency stability on HF transauroral path (Auterman 1962)
Similarity of auroral echoes to equatorial echoes (Bowles 1960)
AURORA (Continued)

Auroral echoes related to echoes from equatorial field-aligned ionization (Bowles 1963)
Magnetohydrodynamics (Ferraro 1955)
From geomagnetically trapped radiation (Kegn 1961)
And world-wide magnetic distributions (Rostad 1935)
Rare tropical aurora observed at Apia (Utlaut 1959)
High auroral arcs and night-time electrojets (Vestine 1960)
Fading and attenuation of HF radio waves over long paths crossing auroral and equatorial zones (Yeh 1960)
BACKSCATTER (see also BIBLIOGRAPHIES; ECHOES)

And transequatorial propagation (American Radio Relay League 1959)
Suggested by work at Banaras (Banerjee, S. S., 1952)
Of radio waves from equatorial F region (Clemesha 1963)
Characteristics of, observed at a frequency of 21.6 Mc/s (Dueño 1958)
Peculiarities and seasonal variations of, transequatorial (Dueño 1960)
Interpretation of some sweep-frequency (Dueño 1963)
Incoherent; effect of Faraday rotation on (Mi'lan 1961)
Possible use for exospheric sounding (Obayashi 1959)
Theory of spread F. based on aspect-sensitive echoes (Renau 1960)
Effect of magnetic field in (Salpeter 1961)
Transequatorial, observed at Brisbane (Thomas 1961)
Lunar control of abnormal transequatorial propagation observed
by using (Thomas 1962)
Sounder, instrumentation for observation of field-aligned F-region
irregularities and transequatorial radio propagation (Thomas 1962)
Anomalous transequatorial propagation observed by using (Thomas 1962)
Observations of transequatorial, from Brisbane (Thomas 1962)
Final report on transequatorial propagation by using (Thomas 1962)
Failure to produce exospheric propagation by using (Thomas 1962)
Reveals anomalous transequatorial propagation (Villard 1957)
Studies of transequatorial propagation by using (Villard 1957)

BAGUIO, PHILIPPINES

Bifurcation of F region at (Marasigan 1958)
Geomagnetic sunspot influences on spread F at (Marasigan 1960)

BALBOA, CANAL ZONE, PANAMA

Stratospheric upper air studies at (Belmont 1962)
BANGALORE, INDIA

Spring thunderstorms over (Chandrashekhar Alya 1963)

BANARAS, INDIA

Observations of 31 meter signals from Delhi at (Banerjee, S.S., 1951)
Scattering observed at (Banerjee, S. S., 1953)
Horizontal gradients between $f_o F2$ at Delhi and (Banerjee, S. S., 1954)

BANGUI, AFRICA

Ionospheric soundings during eclipse of 25 February 1952 at (Lejay 1956)

BENGAL, INDIA (see also DACCA)

Estimation of height of Heavyside layers in (Rakshit 1931)

BIBLIOGRAPHIES (see also SYMPOSIA)

USSR publications for 1958-60 (AID 1961)
Phenomena in the upper atmosphere: Review of Soviet literature (AID 1963)
Plasma physics and magnetohydrodynamics (Auckland 1962)
Ionospheric height at Allahabad, Tech. Phys. USSR 3 (Bansal 1936)
Ionospheric drifts (Briggs 1962)
Equatorial electrojet (Casaverde 1961)
Backscatter literature survey 1928-1960 (Hagn 1961)
Backscatter literature survey 1960-1963 (Hagn 1964)
The ionosphere 1925-1960 (Manning 1962)
Ionospheric propagation of radio waves 1923-1960 (Nupen 1960)
Atmospheric aspects of radio astronomy 1900-1961 (Nupen 1963)
Theoretical studies of propagation of electromagnetic waves (NYU 1951)
Direction finding and related ionospheric propagation topics 1955-1961 (Remmler 1962)

Literature pertaining to radio studies of meteors and meteor trails (Vincent 1960)

Literature pertaining to VLF and ELF propagation (Whitson 1962)

**BIFURCATION** (see also SOLAR ECLIPSE)

Of F region (Appleton 1946, 1947)

Of presunrise F layer at Calcutta (Bandyopadhyay 1959)

In F region at Baguio (Marasigan 1958)

**BRISBANE, QUEENSLAND**

High multiple reflection from F2 at (Baird 1954)

Nighttime spread F over (Bowman 1960)

Observation of reflections from field-aligned ionization at (Dearden 1961, 1962)

Micropulsation studies at (Mainstone 1963)

Observations of field-aligned irregularities at (Matthew 1961, 1962)

Further results of observations of field-aligned irregularities at (Matthew 1962)

Characteristics of $E_{ss}$ and $E_{sc}$ at (McNicol 1951)

Study of spread F ionospheric echoes at (McNicol 1956, 1957)

Micropulsation studies at (McNicol 1963)

Motion in nighttime $E_s$ region at (Thomas 1955, 1956)

Sporadic $E_{ss}$ and $E_{sc}$ at (Thomas 1956)

Transsequatorial backscatter observed at (Thomas 1961)

Observations of transsequatorial propagation from (Thomas 1962)

Lack of exospheric propagation of backscatter signals at (Thomas 1962)

Final report on investigations of field-aligned irregularities and transsequatorial propagation observed at (Thomas 1962)

**BROADCASTING**

On medium wave in tropical and equatorial latitudes (Barghausen 1964)

Sunset fading effects on broadcast circuits (Bennington 1960)

Propagation curves for VHF/UHF in Africa (CCIR 1963)

Sound broadcasting TV (CCIR 1963)
Atmospherics in broadcast reception at Calcutta (Chakravarti 1939)


Atmospheric noise interference in 3-Mc/s band at Poona (Chandrashekhar, A., 1955)

Atmospheric noise interference to short wave (Chandrashekhar, A., 1958)

Atmospheric noise interference to medium wave (Chandrashekhar, A., 1958)

Noise in standard band at Poona (Chandrashekhar, A., 1959)

Vertical radiation and tropical broadcasting (Dickenson 1956)

Tropical Receiver design (Lemmon 1941)

Propagation of MF radio waves in the ionosphere (Wartyn 1935)

Analysis of Skywave intensity of All India Radio (Mitra, S.N., 1955)

Note on ionospheric conditions that may affect tropical broadcasting (Osborne 1952)

Atmospheric noise interference in 5-Mc/s band at Poona (Phadke 1955)

A peculiar type of rapid fading in All India Radio reception (Rao, N.S., 1949)

Polarization of down-coming waves from standard MF stations in India (Satyanarayana 1952)

Studies in fading of medium-wave broadcast signals, India (Tantry 1951)
CALCUTTA, INDIA

Early morning E2 layer at (Bandyopadhyay 1959)
F-layer of the ionosphere over (Bandyopadhyay 1960)
Effect of eclipse on ionosphere over (Baral 1944)
Studies on the ionosphere at (Baral 1948)
Abnormalities in the F region of the ionosphere at (Baral 1948)
Ionosphere over (Baral 1950)
Observations of pulses transmitted from Delhi at (Baral 1952)
Lunar tide in E2 region over (Baral 1956)
Ionosphere at (Bhar 1939)
Effect of magnetic field in oblique propagation at (Chatterjee 1952)
Ionospheric absorption at (Chatterjee 1952)
Nature and origin of sporadic E over (Chatterjee 1953)
E-layer critical frequency at, contaminated with E$_s$ (Chatterjee 1954)
Gyrofrequency in ionosphere over (Datta, S., 1959)
Observations during solar eclipse 1958 at (Datta, S., 1959)
Studies of spread F, double F and forked F at (Datta, R. N., 1960)
Determination of F-region collision frequency over (Ghosh, M., 1956)
Early morning variation of ionization and true height of F region over (Ghosh, S. P., 1940)
Intensity variations of the downcommg wireless waves from the ionosphere at (Khastgir 1940)
Solar tides in ionosphere over (Mitra, A. P., 1950, 1951)
Measurement of ionospheric true heights at, during the polar year 1932-33 (Rakshit 1934)
E2 layer observed at (Saha, A. K., 1955)

CANTON, PHOENIX ISLANDS

Stratospheric upper-air studies at (Belmont 1962)

COHERENT SCATTER

From thin, field-aligned irregularities associated with equatorial spread F as a cause of flutter fading (Calvert 1962)
Associated with topside spread F (Calvert 1963)
COLLISION FREQUENCY (see ELECTRON COLLISION FREQUENCY)

CONDUCTIVITY (IONOSPHERE), (see also ELECTROJET)

Along magnetic equator (Akasofu 1963)
- Of ionosphere (Baker 1952)
- Electric currents in ionosphere (Baker 1953 I, II)
- Effect of transverse magnetic field on (Banerjee, S.S., 1939)
- In dynamo region during daylight as a cause of equatorial E (Bhargava 1961)
- Equatorial electroject and (Casaverde 1961)
- Of D region (Cowling 1948)
- Of ionosphere (Cowling 1963)
- Influence of Hall current on (Hirono, 1950 I, II)
- Magnetic variations in equatorial regions and (Hirono 1952, 1953)
- And geomagnetic variations (Lucas 1953)
- Daily variations of, in upper atmosphere as deduced from geomagnetism (Maeda, H., 1955)
- Solar flare type variation in geomagnetic field and (Nagata 1950, 1952)

CONTINUOUS WAVE (see also DOPPLER TECHNIQUE)

Study of short-term variations of instantaneous frequencies using (Chan 1962)
- Short wave transmissions using, as affected by spread F (Krishnamurthy 1963)
- Method of studying variation of critical frequency of E region using (Rao, B. R., 1954)
- New Method for studying ionospheric drift using (Rao, B. R., 1958)
- Fading of, as a means of spread F study (Rao, M.S.V. G., 1960)
- Effects of equatorial spread F irregularities on (Rao, M.S.V. G., 1961)
- Investigation of traveling disturbances at Waltair using (Somayajulu 1953)
COSMIC RADIO NOISE

Study of solar flares with, on 25 Mc/s at Ahmedabad (Bhonsle 1958, 1960)

Magnetic storms and, at Ahmedabad (Bhonsle 1960)

Abnormal ionospheric behaviour inferred from study of, at 30 Mc/s in India (Krishnamurthi 1958)

Measurement of ionospheric absorption using, at 18.3-Mc/s (Mitra, A.P. 1953)

Absorption of, on 25 Mc/s during solar flare 23 Feb. 1956 at Ahmedabad (Ramanathan 1961)

Absorption at 25 Mc/s, effect of electron-ion collisions in the F region on, at Ahmedabad (Ramanathan 1961)

Change in, associated with magnetic storms (Ramanathan 1961)

Absorption measurements of, during nuclear explosions (Saha 1964)

Sudden decrease in, cosmic-ray intensity, at Huancayo and Uppsala (Sandstrom 1958)

Absorption of, and F scatter on 25 Mc/s at Ahmedabad (Shirke 1962)

CRITICAL FREQUENCIES (see also $f_0$, $V$; VERTICAL INCIDENCE)

Horizontal gradients over India deduced from (Banerjee, S.S., 1954)

Geographical distribution of harmonics of annual variation in, F2-layer at noon (Bazzard 1961)

And magnetic parameters of the day before (Bergh 1961)

Lunar variation in, F2, at Singapore (Osborne, B.W., 1952)

Of normal E layer, measurement at night (Piggott 1955)

Geomagnetic influence on, over F1 and F2 regions (Rastogi 1959)

Enhancement of lunar tide in noon value of, over magnetic equator (Rastogi 1961, 1962)

Enhancement of, after nuclear detonations (Saha 1964)

Of E layer at Huancayo (Wells 1934)
DACCA, BENGAL, INDIA

Ionospheric height measurements at, by method of signal fading  
(Sen Gupta 1936)

DAKAR, SENEGAL

F-region stratification at Dakar (Delobeau 1952)
Lunar tides in F2 layer at (Delobeau 1955)
Absorption at (Delobeau 1956)
Magnetic field in F2 layer at (Suchy)

DELHI, INDIA

Fading of short-wave signals from (Bannerjee, S. S., 1946, 1948)
Horizontal gradient of ionization at (Bannerjee, S. S., 1954)
Pulses transmitted from, observed at Calcutta (Baral 1952)
Ionospheric F2 layer during sunspot minimum at (Kotadia 1956)
Self-gyrointeraction measured at (Mitra, S. N., 1955)
Magneto-ionic triple splitting over (Mitra, S. N., 1955)
Measurements of ionospheric absorption at (Mitra, S. N., 1957)
Horizontal drift in ionosphere over (Mitra, S. N., 1960)
Ionospheric absorption over (Rao, B.V.T., 1958)
Solar tidal effects in F2 region over (Rao, C.S.R., 1957)
Ionospheric absorption at (Rao, M.K., 1962)
Study of atmospheric radio noise at 27 and 100 kc/s at (Sachdev 1958)
Effects of nuclear detonations observed at (Saha, A. K., 1963, 1964)
Fading at (Singh 1958, 1959, 1960)
F-region gyrofrequency from h'-f records (Singh, R. N., 1962)
Ionogram analysis at (Singh 1963)
Oblique incidence pulse observations near MUF at (Somayajulu 1952)

DIFFUSION

Behavior of a Chapman layer in the night F2 region under the influence of gravity, diffusion, and attachment (Duncan 1958)
Convective, in the equatorial F region (Dungey 1956)
DIFFUSION (Continued)

Of electrons near magnetic equator (Ferraro 1960)
Horizontal, into an eclipsed equatorial F region (Gliddon 1962)
Effect of, on equilibrium electron density distribution in F region
near magnetic equator (Goldberg 1962, '63)
General, in symposium on dynamic ionosphere (Johnson, M. H., 1950)
Geomagnetic control of, in the F2 region (Kendal 1962)
Horizontal, and the geomagnetic anomaly (Lyon 1962)
Of ionization in a dipole field (Lyon 1963)
Discussion of (Martyn 1950)
Theory of height and ionization density changes at the maximum of a
Chapman-like region, taking account of (Martyn 1955)
Discussed in symposium (McNish 1950)
In equatorial F layer (Rishbeth 1962, 1963)
Vertical, and distribution of ionization about magnetic equator
(Ross 1963)
Effects of vertical, near magnetic equator (Schmerling 1960)
Horizontal, evidence on F-region ionization diffusion along magnetic
lines of force in equatorial latitudes (Somayajulu 1964)

DIRECTION FINDING

Using rotating spaced loops (Bowman 1960)
Studying tilts by (Bramley 1955)
Bibliography on (Remmler 1962)

DISTURBANCE DAILY VARIATION

In Ghana (Hutton 1962, 1963)
Latitudinal effect on, in F2 layer (Kamiyama 1956)
Of earth currents at Kakioka (Kazuo 1954)
On the magnetic equator, lower daily variations in F2 region
(Maeda, H., 1955, 1959)
F2 layer index of, for IGY (Piggott 1960)
In Central Africa, storm time variations of f0F2 (Rastogi 1961)
In F2 region at auroral latitudes (Sato 1957)
DIVERSITY

Space diversity and reception of fading signals (Bannerjee, S.S., 1946, 1948)

DOPPLER TECHNIQUE

Study of radio propagation characteristics of the equatorial ionosphere using (Barghausen 1963)
At VHF to observe drift (Bowles 1960)
For study of equatorial flutter fading (Calvert 1962)
And equatorial spread F (Calvert 1962)
Equatorial spread F motions observed by (Calvert 1963)
A study of F2-layer effects using (Davies 1962)
Measurements of ionospheric drifts using (Davies 1962)
For studying solar flare effects (Davies 1962)
Over Wallops Island (Jackson 1961)
Electron content from satellite by (Ross 1960, 1961, 1962)

D REGION (D LAYER)

On the lunar semidiurnal variation of (Bossolasco 1960)
Echoes at D-region heights (Ellyett 1947)
Echoes observed (Gnanalingam, 1955)
Ionospheric cross-modulation in, at the geomagnetic equator (Klemperer 1963)
Twenty-seven-day variations in absorption in, over Singapore and Slough (Lange-Hesse 1953)
Structure of, and probable origin (Lepechinsky 1955)

DRIFTS, IONOSPHERIC

Velocity over Calcutta (Baral 1956)
Measurements at Kjello (Becken 1960)
F2 disturbances during magnetic storms analyzed in terms of vertical drifts (Bhargava 1959)
Velocity determined by MUF (Bibl 1963)
Of $E_s$ (Bossolasco 1959)
Equatorial, determined by Doppler technique (Bowles 1960)
Fading due to (Briggs 1950)
Horizontal movements (Briggs 1954)
Survey of (Briggs 1962)
Of equatorial spread F (Calvert 1961)
Velocity of, for equatorial spread F (Calvert 1963)
Measurement of, by means of Doppler shift technique (Davies 1962)
Measurement of, by radio star observations (Dueño 1961)
And semi-diurnal currents in the ionosphere (Fejer 1953)
Seasonal variation of, in E region (Henderson 1962, 1963)
In E region (Hirono 1953)
Vertical, effect of gravity and ionization pressure gradient on, in F2 region (Hirono 1954, 1955)
Wind systems and, deduced from dynamo theory (Hirono 1959)
Latitude variation of midday direction of, in lower ionosphere
(Kazimirovskiy 1983)
Possibility of detecting, from occurrence of spread F (Knecht 1960)
Vertical, at Huancayo (Lewis 1953)
Theoretical study on the geomagnetic distortion in the F2 layer
interpreted by (Maeda, K., 1952, 1955)
New method for estimating loss and drift terms in F region (Mitra, A. P., 1964)
Horizontal, over Delhi (Mitra, S. N., 1960)
Horizontal motions of ionization in equatorial F region (Osborne, B. W., 1955)
Equatorial, and the electrojet (Osborne, D. G., 1963)
in equatorial F2 region (Purslow, B. W., 1958)
Horizontal, lunar daily variation of, at Waltair (Ramana 1962)
In E, F2 regions at Waltair (Rao, A. S., 1963, 1964)
And on ionospheric wind measurements (Rao, B. R., 1954, 1956)
Effect of enhanced solar activity on, in F2 region at Waltair (Rao, B. R., 1958)
Horizontal, in F2 region at equatorial latitudes (Rao, B. R., 1958)
A new continuous wave method of studying (Rao, B. R., 1958)
DRIFTS, IONOSPHERIC (Continued)

Study of horizontal, in F1 and F2 regions at Waltair (Rao, B. R., 1959)
Effect of magnetic activity on, in F2 region (Rao, B. R., 1959)
A new type of ionospheric drift recorder (Rao, B. R., 1961)
Variation of, at Waltair (Rao, E. B., 1961)
Simultaneous study of (Rao, E. B., 1961)
In the ionosphere in relation to fading (Rao, E. B., 1961)
Effect of vertical drift on nocturnal ionization of lower ionosphere (Rao, M. N., 1959)
Study of horizontal, in E region at Waltair (Rao, R. R., 1960, 1961)
Height gradient of horizontal drifts in E region at Waltair (Rao, R. R., 1961)
F2 disturbances in auroral latitudes ascribed to (Sato 1957)
Horizontal, comparison at different latitudes (Shimazaki 1960)
Spread F and vertical movement of F layer (Singleton 1962)
In F2 layer related to electrojet (Skinner 1957)
Horizontal, measurements in ionosphere near equator (Skinner 1958)
Measurements of, in the equatorial region (Skinner 1963)
Vertical, at Talara and Huancayo (Somayajulu 1963)
Observation and analysis of (Yerg 1956)

DYNAMO THEORY

E-layer conductivity and (Baker 1952, 1953)
And Ionosphere conductivity (Cowling 1948, 1963)
Some comments on (Dougherty 1963)
Electrostatic fields in the ionosphere at non-poier geomagnetic latitudes (Farley 1960)
Differential equations of, solved (Fejer 1953)
Theory of diurnal magnetic variations in equatorial regions and conductivity of the ionosphere E region (Hirono 1950, 1952, 1953)
Wind systems and drift motions in the ionosphere deduced from (Hirono 1959)
Related to S current system (Matsushita 1954)
DYNAMO THEORY (Continued)

Solar-flare-type variation in geomagnetic field and integrated electro-conductivity of ionosphere (Nagata 1950, 1952)

Sudden commencement of magnetic storms and (Obayashi 1957)

Disturbances in F2 region associated with geomagnetic storms at auroral latitudes (Sato 1957)

Disturbances in F2 region associated with geomagnetic storms at mid-latitudes (Sato 1957)

Theory of electrostatic fields in the ionosphere at equatorial latitudes (Spreiter 1961)

Of diurnal variation of Earth's magnetic field (Wells 1934)
EARTH CURRENTS

And micropulsations at the equator (Hutton 1960)
Diurnal variation of, at the equator (Hutton 1961, 1962)
S variation of, near magnetic equator (Hutton 1963)
Lunar diurnal variations in, at Huancayo and Tucson (Rooney 1938)

ECHOES

Recording ionospheric (Bajpai, R. R., 1936)
From stratified region above equatorial electrojet (Balsley 1964)
Examination of, for Delhi-Calcutta path (Baral 1952)
From field-aligned ionization (Bowles 1960)
At D-region heights (Ellyett 1947)
From D region (Gnanalingam 1955)
Left-handed, from an equivalent height of E + F (Khastgir 1960)
Multiple, in Bengal (Mitra, S. K., 1933)
Spread, study of (Renau 1959)

ECLIPSE (see also SOLAR ECLIPSE)

Effect of, on ionosphere over Calcutta (Baral 1944)
Photochemical rates in the equatorial F2 region from, of 1958
(Van Zandt 1960)
Effects in F2 layer (Wells 1946)

E LAYER (see E REGION; E1 LAYER; E2 LAYER; SPORADIC E)

E1 LAYER

Origin of (Bhar 1936)
Over Calcutta (Bhar 1939)
At low latitudes (Ben' Kova 1963)
E2 LAYER

Morning, at Calcutta (Bandyopadhyay 1955)
Intermediate layers between E and F1 over Ahmedabad (Rastogi 1954)
Two types of development of, at Ahmedabad (Rastogi 1965)
Observed at Calcutta (Saha, A. K., 1955)

ELECTROJET, EQUATORIAL (see also ELECTROJET, POLAR; SPORADIC E)

Enhancement of, during polar magnetic substorms (Akasofu 1963)
Width of (Alexander 1957)
High conductivity along equator (Ashour 1964)
Anomalously large magnetic variations near equator (Baker 1952, 1953)
Echoes above (Balsley 1964)
Effect of $E_s$ on (Baral 1952)
Related to $E_s$ (Bhargava 1961)
Fading of VHF, $E_s$, and sporadic E (Bowles 1960)
As cause of field-aligned irregularities (Bowles 1963)
Introduction to geomagnetism (Casaverde 1961)
As detected from the abnormal electric distribution above Hyancayo (Chapman 1951)
Association of plane-wave electron density irregularities with (Cooney 1963)
Magneto hydrodynamics (Ferraro 1955)
In Peru (Forbush 1961)
Recent magnetic observations in the Philippines (Glover 1963)
Diurnal variation of earth currents at the equator (Hutton 1961, 1962)
Equatorial enhancement of sudden commencement of geomagnetic storms due to (Jacobs 1963)
Suggestion as to origin of (Knapp 1959)
Theory of field-aligned ionization in (Knox 1964)
Equatorial sporadic E layer and (Kotadia 1962)
In the central Pacific (Mason 1963)
Magnetic activity and (Mryan 1963)
Measurements of magnetic field of (Ogbuehi 1963)
Experimental study and model of (Onwumechilli 1959)
ELECTROJET, EQUATORIAL (Continued)

Relation between H and Z variations near (Onwumechilli 1960)
Anomaly in magnetic declination at Ibadan related to
(Onwumechilli 1960)
in Ghana (Osborne, D. G., 1962)
Position and movement of over Ghana (Osborne, D. G., 1962)
Equatorial drift and (Osborne, D. G., 1963)
Daily variation in strength of (Osborne, D. G., 1963)
Effect of, on seasonal variation of sporadic E (Rao, M. M., 1963)
Nocturnal and seasonal variations of spread F in relation to
(Rao, M. S. V. G., 1961)
Longitudinal variation in (Rastogi 1962)
Lunar tidal variations in (Rastogi 1963)
Effect on sporadic E and F2 layers (Skinner 1957)
Theory of, at equatorial latitudes (Spreiter 1961)
Reflected by solar flare effects (Veldkamp 1954)
Theory of equatorial sporadic E and (Whitehead 1963)
Effects of magnetic disturbances on (Wright, R. W., 1962)
Ionospheric electrostatic fields and (Znuda 1960)

ELECTROJET, POLAR (see also ELECTROJET, EQUATORIAL)

The electrojets (Chapman 1952)
Theory of (Fejer 1963)
Geomagnetic field distortion by a solar stream as a mechanism
for production of (Kern 1961, 1962)
Observations relating to distance scale for motion of electrojet-
electron precipitation regions in auroral zone (Marsh 1963)
Ionospheric disturbances associated with a severe magnetic storm
and (Obayashi 1958)
Theory of, at polar and mid-geomagnetic latitudes (Spreiter 1961)
Note on direction of high auroral arcs (Vestine 1960)
ELECTRON COLLISION FREQUENCY

Technique to determine (Briggs 1951)
In ionosphere (Cook 1961)
At E peak over Dakar (Delobeau 1956)
And the interaction of pulsed radio waves in the ionosphere (Fejer 1955)
Determination of, in the F-region over Calcutta (Ghosh, M., 1956)
An experimental method of measuring, for F region (Hargreaves 1963)
Measurements of, in E region (Schlapp 1959)
An attempt to measure, in F region (Schlapp 1960)
Effect of collisions on ionospheric propagation (Titheridge 1961)

ELECTRON DENSITY

Total, and anomalies (Altman 1963)
Equatorial, in F2 layer (Appleton 1954)
In the F layer of the ionosphere (Bandyopadhyay 1960)
Near Delhi and Calcutta (Banerjee 1946)
Cause and effect in the F2 region (Bannon 1946)
Effect of meteoric shower on (Bhar 1937)
From Faraday fading (Blackband 1960)
Studies of the electron content of the equatorial ionosphere (Blume 1961, 1982)
Equatorial profiles to 5000 km (Bowles 1962)
Over the magnetic equator (Bowles 1962)
Diurnal variation of F2 layer, at equatorial stations (Eyfrig 1950)
The effect of diffusion on, in the F region (Goldberg 1963)
Distribution near the magnetic equator (Goldberg 1962)
Geomagnetic control of, in F region of ionosphere (Goldberg 1963)
Effect of diffusion on, in F region near magnetic equator (Goldberg 1963)
Analysis of, at Leopoldville-Binza (Herrinck 1960)
Mean temporal variations of, at a fixed height in the F region (Hirsh 1962)
F2-layer, and solar corpuscular activity (Lal 1963)
Determination of the available frequency range considering (Lied 1947)
ELECTRON DENSITY (Continued)

Distribution of electrons in the night-time ionosphere (Long 1962)
In F2 layer, world-wide distribution of (Mariani 1959)
Direct measurement of, in a satellite up to one earth radius
(McInerney 1964)
F-region, from circuit measurements (Nisbet 1960)
Practical determination of electron content below N_max
(Osborne, B. W., 1952)
Electron content of F2 layer above Singapore (Osborne, B. W., 1953)
Distribution in ionosphere over Trivandrum (Rao, C. S. R., 1961)
Studies of the geomagnetic anomaly during sunspot minimum
(Rao, C. S. R., 1962)
Total electronic content in F2 layer over Madras, 1959
(Rao, C. S. R., 1962)
Distribution of ionization about magnetic equator (Ross 1963)
Diurnal and annual variation of equatorial electron content
(Ross 1963)
At Washington, D.C., Panama, Talara, and Huancayo (Schmerling 1958,
1959, 1960)
In E layer over Bengal (Sen Gupta 1936)
Total electron content of F region over Ahmedabad (Sheriff 1956)
Profiles, comparison for low and high solar activity, in Ahmedabad
(Shirke 1963)
Spread F and F layer (Singleton 1962)
Some features of F-region density and height variation in equatorial
region (Somayajulu 1963)
Ionization below nighttime F layer (Titheridge 1959)
Ionization of Kennelly-Heaviside layer at Allahabad (Toshniwal 1935,
1936)
Analysis of vertical sounding to determine profiles (Wright, J. W.,
On variation of, in middle latitude F2 layer (Yonezawa 1955)

EMISSION (see AIRGLOW)

EQUATORIAL ANOMALY (see ANOMALIES)
EQUATORIAL IONOSPHERE (see also TRANSEQUATORIAL)

Anomalous belt in F2 (Appleton 1954)
Anomalies in F2 layer (Appleton 1960)
Geomagnetic nature of F2-layer longitude effect (Bailey 1948)
Propagation experiment (Barghausen 1962)
HF propagation characteristics in equatorial latitudes (Barghausen 1963, 1964)
Magnetic field (Ben 'Kova 1962)
E layer (Ben 'Kova 1963)
Ionospheric effects (Bennington 1960)
Airglow observations near (Blackwell 1960)
Satellite observations of (Blumle 1961, 1962)
NBS VHF scatter research (Bowles 1957)
Differs from mid-latitudes (Bakin 1961)
Special problems in using HF reflections from (CCIR 1963)
Equatorial spread F (Lyon 1958, 1960, 1961)
F2 region during sunspot maximum (Lyon 1963)
The equatorial F region (Norton 1961)
A waveguide interpretation of spread F in (Pitteway 1961)
Trough found in theoretical form of F layer, near magnetic equator (Rishbeth 1963)
Research engineering and support for tropical communication (Vincent 1963)
Equatorial spread F (Wright, R. W., 1959)

EQUATORIAL E_s (see SPORADIC E)

EQUATORIAL TROUGH (see ANOMALIES)
EQUIPMENT (see also ANTENNAS)

Polarimeter: for LF echoes (Benner 1950)
Sweep-frequency instruments for studying irregularities (Briggs 1951)
Low-power ionosonde (Rusch 1963)
Rotating aerial backscatter sounder (Clemensha 1962)
A panoramic ionospheric recorder for study of ionospheric traveling disturbances (Heisler 1955)
Tropical receiver design (Lemmon 1941)
A modified Hammerlund Super-Pro communication receiver for pulse measurements of the ionosphere (Mitr, S. N., 1951)
Peak amplitude recorder for investigation of fading (Mazumdar 1954)
Design and development of simple ionospheric sounding equipment (Marty 1956)
A new type of ionospheric drift recorder (Rao, B. R., 1961)
The vector-field proton magnetometer for IGY satellite ground stations (Shapiro 1956)
Instrumentation for observation of field-aligned F-region irregularities and transsequatorial radio propagation (Thomas 1962)
Tests of HF transceivers for use in a tropical forest (Vincent 1963)
Detection of rapidly moving ionospheric clouds (Wells 1946)

E REGION (see also E1 LAYER; E2 LAYER; Sq CURRENT; SPORADIC E)

Sq current systems and (Appleton 1955)
Studies of (Appleton 1961)
At low latitudes (Ben 'Kova 1963)
Abnormal ionization of (Berkner 1937)
Geomagnetic distortion of (Beynon 1959)
Variation of height of F2 peak due to nighttime E layer (Bonnet 1954)
Field-aligned irregularities in (Bowles 1963)
Solar control of, at high latitudes (Chatterjee 1954)
Transient fine structure of (Dissinger 1959)
Influence of solar eclipse 25 February 1952 on, in equatorial Africa (Estrabrod 1953)
Seasonal and latitude variations of drifts in (Henderson 1962, 1963)
Magnetic variations in equatorial regions and conductivity of (Hirono 1952, 1953)
E REGION (Continued)

Reflection and transmission in (Khaistgir 1960)
Measurement of normal critical frequencies at night (Piggott 1955)
A continuous-wave method of studying critical frequency variation of (Rao, B. R., 1954)
World-wide study of horizontal drift and anisotropy of irregularities in (Rao, G. L. N., 1963)
Horizontal drifts in, at Waltair (Rao, R. R., 1960, 1961a)
Height gradient of horizontal drift in, over Waltair (Rao, R. R., 1961b)
Study of noon critical frequencies of (Rastogi 1957, 1958)
Intermediate layers between E and F1 over Ahmedabad (Rastogi 1954)
Measurements of collision frequency in (Schlapp 1959)
Effect of Sq current system on (Shimazaki 1959)
Critical frequency observations at Huancayo (Wells 1934)

Es (see SPORADIC E)

EXOSPHERE

Symposium on (Hines 1960)
Propagation experiments in, at Brisbane (Thomas 1962)
A possibility of long-distance HF propagation along field-aligned ionizations in (Obayashi 1959)

EXTRAORDINARY RAY

Use of, in analysis of ionospheric records, to study region between E and F (Titheridge 1959)
FADING (see also FLUTTER FADING)

Correlation between frequency-selective fading and multipath (Ames 1963)
Correlation bandwidth, for transauroral path (Auterman 1962)
Of radio waves reflected from ionosphere at oblique incidence (Awe 1961)
Of radio waves weakly scattered at 90 km vertical incidence (Awe 1961)
Slow fading of echo at 150 km near equator (Balsley 1964)
Space diversity and (Bannerjee, S. S., 1946, 1948)
Periodic or rhythmic (Bannerjee, S. S., 1948)
Equatorial ionospheric effects (Bennington 1960)
Rate of VHF fading, equatorial electrojet and $E_s$ (Bowles 1960)
Analysis of observations on spaced receivers (Briggs 1950)
Allowances for, in tropical broadcasting (CCIR 1963)
Statistical analysis of, for a single downcoming wave (Das Gupta, P., 1960)
Of ionospheric signals (Flood 1954)
Correlation analysis of vertically reflected radio waves (Fooks 1961)
HF Non-reciprocity and polarization fading (Jull 1962)
Of 108-Mc/s wave from satellite observed at equatorial station (Kent 1961)
Of downcoming wireless waves from the ionosphere (Khastgir 1940)
Random motions of ionosphere irregularities and (Mitra, S. N., 1957)
Random, horizontal drifts in relation to (Rao, E. B., 1961)
Long-period fading in medium radio signals at Waltair (Rao, M. S., 1955)
Investigation of magneto-ionic fading in oblique incidence wave transmissions (Rao, M. S., 1958)
Of CW signals, as a means of spread-F study (Rao, M.S.V., 1960)
Rapid, peculiar type of, in radio reception (Rao, N.S.S., 1949)
Defraction from ionosphere and (Ratcliffe 1948)
Historical survey of, at MF and HF (Salaman 1962)
Ionospheric height measurements in eastern Bengal by method of (Sen Gupta 1936)
Rates of fading of reflected pulses, vertically incident at Ahmedabad (Sethuraman 1958)
FADING (Continued)

On long-distance oblique-incidence pulse circuit on 20.1 Mc/s (Silberstein 1958)
Periodic, particular type of (Singh, B. N., 1958)
Rhythmic, of short-wave radio signals (Singh, B. N., 1959)
Variation of rate of, with frequency (Singh, B. N., 1960)
Effect of radio "fade-out" on F2 layer (Suryanarayana 1962)
Rapid frequency analysis of fading radio signals (Watts 1960)
New type of, on transequatorial circuits (Yeh 1958)
Attenuation of HF waves propagated over long paths crossing auroral, temperate, and equatorial zones (Yeh 1960)

FARADAY EFFECT (see also SATELLITE)

Data used to infer scale height (Bauer 1960)
Determination of electron content (Blackband 1960)
On satellite radio transmissions (Blumle 1961)
From satellite observations of the equatorial ionosphere (Blumle 1962)
And its applications (Daniels 1959)
Near the transverse region of the ionosphere (Dulk 1963)
Effect of, on incoherent backscatter (Millman 1961)
Second-order Faraday rotation formulas (Yeh 1960)

FIELD-ALIGNED IRREGULARITIES (see also IRREGULARITIES; SPORADIC E)

Radio echoes from near magnetic equator (Bowles 1960)
Identified with acoustic plasma waves (Bowles 1963)
Equatorial spread F and (Calvert 1961)
Doppler studies of (Calvert 1962)
Evidence for, between 400 and 1000 km (Calvert 1963)
Observed on topside sounder (Calvert 1963)
Geometry of radio reflections from (Dearden 1961)
Echoes from, observed at Brisbane (Dearden 1962)
Anisotropic, near the magnetic equator (Egan 1960)
Plasma instability resulting in (Farley 1963)
In the Es region (Goodwin 1962, 1963)
FIELD-ALIGNED IRREGULARITIES (Continued)

Radio echoes from, at magnetic equator (Ireland 1962)
Survey of observations of, from Brisbane (Matthew 1961)
Further results of observations of, from Brisbane (Matthew 1962)
Radar observations of, during magnetically disturbed days (Matthew 1962)
Field-aligned irregularities (Ratcliffe 1963)
Scintillation of satellite transmissions and (Singleton 1961)
Irregularities, final report (Thomas 1962)
Instrumentation for observation of (Thomas 1962)

FIELD STRENGTH

Calculation for tropical broadcasting (CCIR 1963)
Measurements over path Tripoli-Accra (Davies 1962)
Calculation of, at HF (Laitinen 1950)
Analysis of sky-wave field intensity (Mitra, S. N., 1955)
Calculation of median sky-wave intensity in tropical regions (Piggott 1959)
Related to atmospheric humidity (Rao, N.S.S., 1950)
Measurements of, during solar eclipses at Ahmedabad (Rastogi 1955, 1956)
Longwave, effects from distant nuclear detonation (Saha 1964)

F LAYER (see also F1 LAYER; F2 REGION)

Relation to anomaly in total content (Altman 1963)
A study of (Bajpai 1938)
Further studies of, at Allahabad (Bajpai 1939)
Decay of ionization below, at night (Bandyopadhyay 1961)
Observations of spread echoes from (Bhargava, B. N., 1958)
Scattering of radio waves by (Booker 1938)
Phenomena of, at Tsumeb, South West Africa (Dleminger 1960)
Convective diffusion in, equatorial (Dungey 1956)
Gyrofrequency in, over Hobart, Tasmania (Ellis 1957)
Theories of (Fejer 1963)
F LAYER (Continued)

Early-morning variation of ionization of true height of (Ghosh, S. P., 1940)

Effect of diffusion on equilibrium electron-density distribution in, near the magnetic equator (Goldberg 1962, 1963)

Method of estimating collision frequencies in (Hargreaves 1963)

Mean temporal variations of electron density at fixed height in (Hirsh 1962)

Height of nighttime irregularities in, at equator (Kent 1961)

Equatorial study of irregularities in (Kent 1963)

The size of moving irregularities in (Khastgir 1960)

Solar effects in (Knecht 1962)

Effect of magnetic activity and F-region height change on equatorial spread F (Krishnamurthy 1963)

Bifurcation in, at Baguio (Marasigan 1958)

Lunar tidal variations in, near magnetic equator (Martyn 1947)

Latitude effect of oxygen red line of night air glow and its relation with (Nakamura 1961)

Electron density in, from rocket measurements (Nisbet 1960)

Horizontal movements of ionization in, equatorial (Osborne, B. W., 1955)

Studies of, equatorial (Rao, B. C. N., 1962)

Traveling disturbances in (Rao, E. B., 1961)

Correlation of spread-F activity with (Rao, M. S. V. G., 1960)

Rates of production and loss of electrons in (Ratcliffe 1956)

Theory of (Ratcliffe 1963)

Diffusion in, equatorial (Rishbeth 1963)

An attempt to measure collision frequency in (Schlapp 1960)

Total electron content of, over Ahmedabad (Sheriff 1956)

Scatter in, and cosmic radio noise on 25 Mc/s at Ahmedabad (Shirke 1962)

Magnetic field of, from h'f records (Singh, R. N., 1962)

Spread F and parameters of (Singleton 1962)

Multiple stratifications of, at Ibadan (Skinner 1954)

Evidence on horizontal diffusion along magnetic lines of force in, equatorial (Somayajulu 1964)

Ionization below, at night (Titheridge 1959)
F LAYER (Continued)

Seasonal anomaly of (Wright, J. W., 1963)

F1 LAYER

Small (5%) diurnal variation of \( f_o \)F1 and virtual height of, at Huancayo (Berknner 1934)
Solar control of, at high latitudes (Chatterjee 1954)
Stratification of, at Dakar, French West Africa (Delobeau 1952)
Effect of geomagnetism on (Eyfrig 1955)
Global characteristics of separation between F1 and F2 layers (Ghosh, M. 1953)
Study of horizontal drifts in F1 and F2 regions at Waltair (Rao, B. R., 1959)
Diurnal variations of (Rao, E. B., 1961)
Intermediate layers between E and F1 over Ahmedabad (Rastogi 1954)
Geomagnetic influences on, at different stages of solar activity (Rastogi 1959)
Effect of Sq current system on (Shimazaki 1959)

F 1.5 LAYER (see also ECLIPSE)

At Dakar, and motion of sun (Delobeau 1952, 1955)
Eclipse effect on F region in equatorial Africa (Estrabaud 1952)
Discussion on the 1.5 layer of the ionosphere (Kotadin 1957, 1963)
Comparison of results of ionospheric soundings in equatorial Africa (Lejay 1956)
Eclipse effect in the F2 layer (Wells 1946)

F2 LAYER (see F2 REGION)

FUJITTER FADING (see also FADING; SPRE:D F)

Rise of F layer at sunset (Appleton 1960)
Equatorial ionosphere propagation experiment (Barthansen 1962)
Study of radio propagation characteristics in equatorial ionosphere (Barthansen 1963)
FLUTTER FADING (Continued)

HF propagation characteristics in equatorial latitudes (Barghausen 1963)

HF propagation via equatorial ionosphere (Barghausen 1964)

Equatorial ionospheric effects: post-sunset fading on long-distance radio circuits (Bennington 1960)

Variations in fading over UK/Singapore and UK/Johannesburg broadcast circuits (Bennington 1960)

Caused by equatorial spread F (Calvert 1962)

Equatorial sunset effect (Humby 1959)

Measurements on sunset fading effect (Koster 1963)

Time of onset of spread F in relation to post-sunset HF variations (Krishnamurthy 1963)

Connection with spread echoes, magnetic storms, and the radiation belt (Lal 1960)

Ionospheric conditions that may affect tropical broadcasting services after sunset (Osborne, B. W., 1952)

Post-sunset rise of fF2 and dependence on post-sunset rise of H'F (Rao, B. C. N., 1963)

Equatorial spread F, in relation to post-sunset changes in magnetic activity (Rao, M. S. V. G., 1961)

Peculiar type of rapid fading (Rao, N. S. S., 1949)

Observation at VHF (Southworth 1960)

Equatorial flutter-fading observations (Stiltner 1963)

Relation to equatorial spread F (Wright, R. W., 1959)

F2 REGION

Diurnal variations in (Allen 1953)

Studies of (Appleton 1950)

Morphology of ionospheric storms in (Appleton 1952)

Anomalous equatorial belt in (Appleton 1954)

Anomalies in F2 layer of (Appleton 1960)

Geomagnetic nature of (Briley 1949)

High multiple radio reflections from (Baird 1954)

Recording ionospheric echoes from (Bajpai 1936)
A study of diurnal variation of critical frequencies of (Bajpai 1938)
Studies of, at Allahabad (Bajpai 1939)
Electron distribution in (Bandyopadhyay 1960)
Cause and effect in (Bannon 1946)
Abnormalities in (Baral 1948)
Lunar tidal variations in (Baral 1956)
Twenty-seven-day variations in, at Huancayo (Bartels 1950)
IGY observations in, Far East (Batemen 1959)
Variation in the critical frequency of (Bazzard 1961)
Drift measurements in, at Kjell (Becken 1960)
And ionospheric critical frequencies (Bergh 1961)
And time lag between magnetic and ionospheric change (Bergh 1962)
And ionosphere investigation (Berkner 1934)
Ionization in, and magnetic dip (Bhar 1957)
A study of noon ionization in (Bhar 1959)
Annual wave in (Bhargava, B. N., 1959)
Distortion of, in the equatorial ionosphere (Bhargava, B. N., 1962)
Fluctuation of ionization in (Bibl 1963)
Peculiarity in, at Lwiro (Bonnett 1954)
Lunar semidiurnal variations of (Bossolasco 1960)
Variations in ionospheric characteristics of (Briggs 1958)
Lunar variations of (Brown, R. A., 1956)
Studies of height oscillations in (Burkard 1950)
Electron annihilation in (Burkard 1950)
Studies of ionospheric tidal effect in (Burkard 1951)
Comments on geomagnetic effect in (Burkard 1954)
Instability of, equatorial F-layer after sunset (Calvert 1963)
Geomagnetic time variations (Chakrabarty 1946)
Vertical transport of electrons in (Chandra 1960)
Ionization distribution in (Chatterjee 1954)
Regularities in (Chatterjee 1954)
Backscattering of radio waves from, equatorial (Clemesha 1963)
Anomalies in behavior of (Croom 1959)
Ionospheric observations during April 19, 1958 eclipse (Datta, S., 1959)
Study of, with Doppler technique (Davies 1962)
The equatorial (Duncan 1960)
Effects of 25 February 1952, solar eclipse on, in equatorial Africa (Estrabaud 1952)
Diurnal variation of electron density of, at equatorial stations (Eyfrig 1950)
On height of (Eyfrig 1952, 1956)
Equator of (Eyfrig 1962)
Effect of magnetic declination on (Eyfrig 1963)
Lunar stratification of, at Huancayo (Gautier 1951)
Determination of collision frequency in (Ghosh, M., 1956)
Theoretical world curves of maximum ionization of (Gliddon 1961)
Mathematical model of (Gliddon 1962)
On ionization of (Goodall 1937)
The solar cycle and (Goodall 1939)
Geomagnetic distortion in, its nature and origin (Hasegawa 1954)
Interpretation of F2 critical frequency measurements of (Heisler 1961)
Analysis of electron density of, at Leopoldville-Binza (Herrinck 1960)
Symposium on (Hines 1960)
Geomagnetic distortion of, on the magnetic equator (Hirono 1954)
Effect of gravity and ionization pressure gradient in the vertical drift in (Hirono 1955)
Characteristics of, on the magnetic equator (Hirono 1955)
Geomagnetic distortion of, on the magnetic equator (Hirono 1955)
The latitudinal effect on the disturbance daily variation in (Kamiyama 1956)
During sunspot minimum over Ahmedabad, Delhi, and Tiruchirapalli (Kotadia 1956)
Lunar tidal variations of midday critical frequencies of, in low latitudes (Kotadia 1962)
Magnetic storm of 11 February 1958 and associated changes in, at low latitude (Kotadia 1962)
F2 REGION (Continued)

During eclipse, at Huancayo (Ledi 1946)
Vertical movement of, at Huancayo (Lewis 1953)
Ionization of, and geomagnetic latitude (Liang 1947)
Horizontal diffusion and the geomagnetic anomaly in (Lyon 1962)
Equatorial anomaly in, during sunspot maximum (Lyon 1963)
Disturbance, daily variation and the lunar daily variation in, on magnetic equator (Maeda, H., 1955)
Geomagnetic distortion of, on magnetic equator (Maeda, H., 1959)
Variation of, associated with geomagnetic variation (Maeda, K., 1952)
Theoretical study on the geomagnetic distortion in (Maeda, K., 1955)
Geomagnetic distortion in (Maeda, K., 1955)
Geomagnetic anomalies of, and their interpretation (Martyn 1955)
A survey of some problems concerning (Martyn 1962)
Variations of, associated with geomagnetic disturbances at the equatorial zone (Matsushita 1955)
Graphical representation of longitudinal effect in (Minnis 1952)
Geographical distribution of ionization in (Minnis 1960)
Geomagnetic control of (Mitra, S. K., 1946)
Ionospheric behavior in F2 region in Singapore (Osborne, B. W., 1951, 1955)
Lunar variation of \( f_{O} \) in, at Singapore (Osborne, B. W., 1952)
Practical determination of electron content below \( N_{\text{max}} \) in (Osborne, B. W., 1952)
Electron content of, above Singapore (Osborne, B. W., 1953)
Daily index of F2-layer disturbance during IGY (Piggott 1960)
A wave-guide interpretation of, for spread F on equatorial ionograms (Pitteway 1961)
Ionospheric drift in, near magnetic equator (Purslow 1958)
Horizontal drifts in, at Waltair (Rao, A. S., 1963)
Effects of enhanced solar activity on drifts in, at Waltair (Rao, B. R., 1958)
Horizontal ionospheric drifts in, at equatorial latitudes (Rao, B. R., 1958)
Solar tidal effects in, over Delhi (Rao, C.S.R., 1957)
Total electron content in, over Madras 1959 (Rao, C.S.R., 1961)
F2 REGION (Continued)

Study of geomagnetic anomaly in, during sunspot maximum (Rao, C.S.R., 1962)

World-wide study of horizontal drift in (Rao, G.L.N., 1964)

Geomagnetic influences on, at different states of solar activity (Rastogi 1956)

Type of development of, at Ahmedabad (Rastogi 1956)

Asymmetry between hemispheres in (Rastogi 1960)

A synoptic study of, in Asian zone (Rastogi 1960)

Some effects of geomagnetic activity on (Rastogi 1961)

Lunar tide in, near equator (Rastogi 1961)

Effect of geomagnetic activity on, over central Africa (Rastogi 1962)

Longitudinal effect in, equatorial (Rastogi 1963)

Seasonal variations of lunar tidal effects in, over India (Rastogi 1963)

Some regularities in (Ratcliffe 1951)

Properties of (Roberts 1963)

Geomagnetic distortion of, at equatorial latitudes (Sarma 1956)

Disturbances in, associated with geomagnetic storm (Sato 1956)

Dynamical structure of, as deduced from world-wide daily variations (Shimazaki 1959)

Irregularities in, at Ibadan (Skinner 1954)

Some geomagnetic effects in, equatorial (Skinner 1955)

Effect of equatorial electrojet on (Skinner 1957)

Magnetic field in, at Dakar (Suchy 1956)

"Fade-out" [sic., Suggest "blackout" (ed.)] of (Suryanarayana 1962)

Photochemical rates in, equatorial, from 1958 eclipse (Van Andt 1960)

Eclipse effects in (Wells 1946)

New theory of formation of (Yonezawa 1956)

Behavior of, during severe magnetic storms (Yonezawa 1963)

Time and distance correlation study of ionosonde data (Zacharisen 1963)
FOCUSING (see also HORIZON FOCUSING)

Horizon (Thomas 1962)
Of radio waves, by E_s clouds (Umlauft 1960)

\( f_{\text{F2}} \) (see also VERTICAL INCIDENCE)

Near-relationship to sunspot number (Alien 1946)
Regional anomalies in (Aono 1953)
Latitude dependence of, over the range 20° north to 69° south
obtained by ship-borne ionospheric sounder (Ose 1959)
In quiet-day vertical cross sections of the ionosphere along 75° W
geographic meridian (Wright, J. W., 1959)
GENERAL IONOSPHERE

Early determination of ionospheric height (Jansal 1936)
Ionosphere research (Beagley 1952)
True ionospheric height (Becker 1959)
Tropical upper air studies (Belmont 1962)
Characteristics of the upper region (Berkner 1936)
Amplitude and phase spectrum (Bhattacharya 1963)
Total reflection of electromagnetic waves (Bose 1938)
Terrestrial Radio Waves (Bremmer 1949)
Electron density over Atlantic Ocean (Bukin 1961)
Electrical conductivity (Cowling 1963)
Ionospheric data (CSIR 1962, 1963)
Anomalous amplitude of seasonal effects in the equatorial ionosphere (Delobbeau 1964)
Radar methods of study (Evans 1962)
Discussion about special ionosphere characteristics: \( MUF (3000) \)
\( f_{\text{F2}} \) related to solar activity (Eyrig 1937)
Pressure and temperature equalization at 200 kilometers (Johnson 1960)
Short-wave communication (Lied 1947)
Distribution of electrons at night (Long 1962)
Ionospheric data (NBS 1955)
Ionosphere at Allahabad (Pant 1936)
Soft corpuscular radiation at 320 kilometers near magnetic equator (Savenko 1962)
Rate of electron production in ionosphere (Seaton 1947)
Physics of fully ionized gases (Spitzer 1956)
A method of solving integral equations for the vertical propagation of time-harmonic plane waves in anisotropic vertically inhomogeneous nonmagnetic media (Tumlinson 1958)
Model (Woodward 1948)
Ionospheric data: Woomera, Australia (WRE 1963)

GEOMAGNETISM

Solar and lunar diurnal variation of (Chapman 1919)
Influence of earth conductivity on (Chapman 1922)
GEOMAGNETISM (Continued)

Geomagnetism (Chernosky 1961)
Effect on F1 layer (Eyfrig 1955)
Daily variations of the electrical conductivity of the upper atmosphere as deduced from the daily variations of (Maeda, H., 1955)
Activity and spread F (Rao, C. V. S., 1962)
Control of ionosphere-geomagnetic influences on F1 and F2 regions (Rastogi 1956)
Effects of, activity on F2 region over Leopoldville (Rastogi 1961)
Effect of, on F2 region over Central Africa (Rastogi 1961)
Effects in equatorial F2 region (Skinner 1955)

GEOMAGNETIC ANOMALY (see ANOMALIES)

GEOMAGNETIC CONTROL OF IONOSPHERE (see also FIELD-ALIGND IRREGULARITIES: LUNAR TIDE)

Control of F2-layer ionization (Appleton 1947, 1950)
Ionospheric storms and the F2-layer anomaly (Appleton 1953)
Anomalous equatorial belt in F2 layer (Appleton 1954)
Regularities and irregularities and (Appleton 1956)
Equatorial anomalies in the F2 (Appleton 1960)
Geomagnetic nature of F2 longitude effect (Bailey 1948)
Abnormalities in F region at Calcutta (Baral 1948)
Ionospheric critical frequencies and magnetic parameters of preceding day (Bergh 1961)
Distortion of E region (Beynon 1959)
Noon F2 ionization and geomagnetic coordinates (Bhar 1959)
Influence of disturbed conditions and increased solar activity (Bhargava 1962)
Control on F2 layer (Burkard 1954)
Control of equatorial F2 layer (Chakrabarty 1946)
Anomalies in behavior of F2 layer (Croom 1959)
Control of the F1 layer (Eyfrig 1955)
Effect on the F2 region (Eyfrig 1963)
Distortion of the F2 region near the magnetic equator (Hirono 1954)
GEOMAGNETIC CONTROL OF IONOSPHERE (Continued)

Control of diffusion in the F2 region (Kendall 1962)
The relationship between $f_{o}F2$ and magnetic phenomena (King 1962)
Relationships between magnetic and ionospheric variations (King 1963)
F2 ionization and geomagnetic latitudes (Liang 1947)
Of high-altitude nuclear explosions (McNish 1959)
Control of F2 region (Mitra, S. K., 1946)
Control of F2 region at equatorial latitudes (Sarma 1956)
Transequatorial backscatter observation of magnetic effects (Thomas 1961)

GEOMAGNETIC DISTURBANCES (see also SUDDEN COMMENCEMENT)

Ionospheric variation associated with (Matsushita 1953)
Ionospheric F2 variations associated with, at the equatorial zone (Matsushita 1955)
And interrelations among upper-atmosphere disturbance phenomena over polar regions (Oguti 1960)
Abnormal variation of earth’s field (Rastogi 1961)

GEOMAGNETIC EQUATOR

Variation of horizontal force near (Alexander 1957)
Variation of noon F2 equivalent heights relative to (Appleton 1947)
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Seasonal anomaly in total electron content—summer decrease (Altman 1963)

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KODAIKANAL, INDIA

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Polar ionospheric disturbances associated with (Obayashi 1958)

World-wide occurrence probability of spread F during (Shimazaki 1960)

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Absorption of HF radio waves under conditions where the QT approximation is valid (Hagn 1963)

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Fading effect, some measurements of (Koster 1963)

On the cooling of the upper atmosphere after (Lowan 1955)

Rise of \( f_o \) F2 after (Rao, B.C.N., 1963)
SUNSPOT CYCLE

Linear relation between \( f_0F2 \) and sunspot numbers of (Allen 1946)
Relation between \( F2 \) criticals, virtual heights, and (Allen 1953)
Equatorial trough variation and (Appleton 1960)
Relationship to magnetic variation (Bartels 1939)
Geomagnetic data and (Bartels 1946)
Relationship between magnetic activity and \( F \)-layer critical frequency and (Berg 1961, 1962)
Lack of correlation of non-seasonal component of noon \( f_0F2 \) with (Berkner 1938)
Widening of anomalous equatorial belt during maximum of (Bhargava 1961)
Fluctuation of \( F2 \) ionization and (Bibi 1963)
Inverse variation of spread \( F \) with (Bowman 1960)
Observations of spread \( F \) over (Briggs 1964)
Ionospheric \( F2 \) layer of Ahmedabad, Delhi, and Tiruchirapalli during minimum of (Kotadia 1956)
\( F \)-region anomaly in the African, American, and East Asian equatorial sectors during maximum of (Lyon 1963)
Influences on spread \( F \) at Baguio (Marsigian 1960)
Study of geomagnetic anomaly during maximum of (Rao, C.S.R., 1962)

SUPER-REFRACTION (see also REFRACTION)

Atmospheric and anomalous propagation of radio waves off the coast of Natal (Phillips, W. E., 1951)

SYMPOSIA (see also BIBLIOGRAPHY)

Proc. Israel 5th Annual Conference on Aviation and Astronautics (Altman 1963)
International symposium on equatorial aeronomy-introduction (Cohen 1963), (agenda on page 227)
Report of committee to promote observations of daily variation of horizontal magnetic force between and near the equators (Egedal 1951)
Exosphere and upper \( F \) region (Hines 1960)
Dynamic characteristics of ionosphere (Johnson, M. H., 1950, Martyn 1950, McNish 1950)
SYMPOSIA (Continued)

Conference on ionospheric physics (Pennsylvania State College 1950)
International symposium on equatorial aeronomy (Smith, R. K., 1962)
International symposium on fluid mechanics in the ionosphere (1959),
   (agenda on page 228)
TALARA, PERU

Anomaly in total electron content over (Altman 1963)
Electron density at, during solar maximum (Schmerling 1958, 1959, 1960, 1961)
Electron density and true-height variations at, during IGY quiet days (Somayajulu 1963)

TAMANRASSET, ALGERIA

Airglow studies at (Barbier 1959, 1961)

THUNDERSTORM (see also ATMOSPHERIC NOISE; LIGHTNING)

Relationship to $E_s$ not supported (Berkner 1937)
Relationship to $E_s$ apparent (Bhar 1959)
Days of, on land mass of India (Chandrashekhar Aiya 1954)
Noise power radiated by, tropical (Chandrashekhar Aiya 1955)
Tropical, as noise radiators (Chandrashekhar Aiya 1955)
Noise from, in standard broadcast band (Chandrashekhar Aiya 1956)
HF noise from, in tropics (Chandrashekhar Aiya 1960)
In Spring, over Bangalore (Chandrashekhar Aiya 1963)

TILT (see also HORIZONTAL GRADIENTS)

Polarimeter for study of (Benner 1950)
Comparative directional measurements of (Bramley 1955)
Equatorial (Somayajulu 1963)
Observed with backscatter on transequatorial paths (Thomas 1962)
Anomalous transequatorial propagation caused by--ionospheric height and frequency plots (Thomas 1962)
Revealed by anomalous transequatorial ionosphere (Villard 1957)
Effective, of the ionosphere at places 1000 kilometers apart (Whale 1955, 1956)
Resulting codes of HF propagation and (Teh 1960)

TIRUPATI, INDIA

Studies on sporadic E at (Venkateswarlu 1961)

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TIRUCHIRAPALLI, INDIA

Ionospheric F2 layer during sunspot minimum (Kotadia 1956)

TOPSIDE SOUNDING

Studies of spread F using (Calvert 1963)
Of the ionosphere (Knecht 1962)
Low-latitude field-aligned ionization observed by, Alouette satellite (Lockwood 1963)
Propagation along field-aligned sheets of ionization observed by, Alouette (Muldrew 1963)

TOWNSVILLE, AUSTRALIA

Anomalous transequatorial VHF propagation recorded at (Carman 1963)

TRANSEQUTORIAL

Virginia to Ghana on 17.5 Mc/s (Agy 1962)
Prediction of MUF over paths (Allcock 1956)
Study of scatter mode (ARRL 1959)
Anomalous VHF propagation (Carman 1963)
Reception of VLF (Chilton 1964)
Propagation of VHF signals (Cracknell 1959, 1960)
Enhanced propagation following geomagnetic storms (Ferrell 1951)
Study of propagation phenomena (HRB-Singer, Inc. 1961)
Scatter, scintillation, and spread F (Koster 1960)
Nighttime scatter at 50 Mc/s (Southworth 1960)
Backscatter observations of magnetically controlled ionization at Brisbane (Thomas 1961)
Propagation, general effects (see Thomas 1961 through 1964)
Instrumentation for observation for field-aligned F-region irregularities (Thomas 1962)
Ray tracing and mode analysis (Thomas 1962)
Observations of propagation from Brisbane (Thomas 1962)
Lunar control of abnormal propagation (Thomas 1962)
Anomalous propagation, cross and auto correlation effects associated with, at 16 Mc/s (Thomas 1962)
TRANSEQUATORIAL (Continued)

Field-aligned irregularities (Thomas 1962)
Studies of propagation by scatter sounding method (Villard 1957)
New evidence of anomalous propagation (Villard 1957)
F-layer propagation study (Washburn 1963)
New type of fading observed on HF paths (Yeh 1958)

TRANSMISSION LOSS, IONOSPHERIC

On 8500-km path between Sterling, Va. and Accra, Ghana (Agy 1962)
Penetration of thin ionospheric layers (Deb 1940)

TRAVELLING DISTURBANCE

Fluctuation of F2 ionization and (Bibl 1963)
Variations of instantaneous frequency observations of large scale TD, related to geomagnetic sudden impulses (Chan 1962)
In ionosphere (Munro 1950, 1956, 1957)
In F over Waltair (Rao, E. B., 1961)
Investigation of, by CW (Somayajulu 1953)
Detection of rapidly moving ionospheric clouds (Wells 1946)

TRIPOLI, LIBYA

HF path between Accra, Ghana and (Barghausen 1964)
Equatorial flutter fading between Accra, Ghana, and (Calvert 1962)

TRIVANDRUM, INDIA

Electron density in ionosphere over (Rao, C.S.R., 1961)
Geomagnetic activity and spread F at (Rao, C.V.S., 1962)

TROPICAL COMMUNICATION (see also JUNGLE RADIO COMMUNICATION)

Calculation of median sky-wave field strength in tropics (Piggott 1959)
Improved intercontinental communications (Rodam 1944)
TROPICAL COMMUNICATION (Continued)

Research engineering and support for tropical communications
(Vincent 1963)

TRUE HEIGHT (see also VIRTUAL HEIGHT)

New calculation methods (Becker 1959)
Early morning variation of F region over Calcutta (Ghosh, S. P.,
1940)
Effect of magnetic activity and F-region height change on equatorial
spread F (Krishnamurthy 1963)
Equatorial spread F and F layer height (Lyon 1960)
Estimation of heaveside layers in Bengal (Rakshit 1931)
Measurements of ionospheric heights at Calcutta (Rakshit 1934)
Coefficients for rapid reduction of h^f-records to N(h) profiles
without computer aids (Schmerling 1959)
Some results of IGY survey (Schmerling 1961)
By method of signal fading (Sen Gupta 1936)
Spread F and F-layer height (Singleton 1962)
Calculation of real and virtual heights (Titheridge 1959)
Ionospheric height measurement at Allahabad (Toshnival 1944)

TSUMEB, SOUTHWEST AFRICA

F-layer phenomena at (Dieminger 1960)
Reflecting properties of ionosphere between 350 and 1500 kc/s at
(Elling 1960)
Sporadic E at (Umlauft 1960)
Air-to-ground propagation in band nine (Kirby 1963)
VELOCITY

Curves for radio wave propagation (Bajpai 1937)
Group velocities and group heights from magnetoionic theory (Shinn 1952)

VERTICAL INCIDENCE (see also CRITICAL FREQUENCIES, \( f_{0} \)F2)

Ionospheric critical frequencies and magnetic parameters (Bergh 1961)
Ionospheric observations over Atlantic Ocean (Bukin 1961)
Studies on ionospheric tidal effect on critical frequencies at Huancayo (Burkard 1951)
Penetration of thin ionospheric layers at (Deb 1940)
Solar eclipse 25 February 1952 in equatorial Africa--effects on E region (Estrabaud 1953)
Correlation analysis of fading of radio waves reflected at (Fooks 1961)
Observations of occurrence and movement of sporadic-E ionization (Harwood 1961)
Relationship between \( f_{0} \)F2 and magnetic phenomena (King 1962)

VHF PROPAGATION

NBS scatter research program (Bowles 1957)
Transmissions across the magnetic equator (Bowles 1960)
Anomalous transequatorial (Carman 1963)
Propagation curves for broadcasting in Africa (CCIR 1963)
Scatter (Cohen 1963)
Radio-wave attenuation through jungle and woods for (Krevsky 1963)
SID effect on VHF scatter associated with solar outburst 29 July 1958 (Obayashi 1960)
Sporadic E observed on oblique-incidence circuits (Smith 1958)
Nighttime equatorial scatter on 50- and 144-Mc/s--radio amateur VHF transequatorial scatter observations during IGY (Southworth 1960)
VHF transequatorial propagation via F layer (Washburn 1963)

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VIRTUAL HEIGHT (see also TRUE HEIGHT)

Variation of noon values (Appleton 1950)
Rapid increase of, for F layer after sunset (Appleton 1960)
Calculation of (Titheridge 1959)
Analysis of nighttime $h'(t)$ records (Titheridge 1961)
New method for analysis of ionospheric $h'(t)$ records (Titheridge 1961)
Measurements in Bengal (Sen Gupta 1936)

VLF PROPAGATION

Measurements for the Radux-Omega navigation system (Casselman 1959)
Transequatorial reception of (Chilton 1964)
Mode theory of, in presence of transverse magnetic field (Crombie 1960)
Reflection from a sharply bounded ionosphere for propagation perpendicular to the magnetic meridian (Crombie 1961)
Nonreciprocity along magnetic equator (Crombie 1963)
Attempt to observe whistlers near magnetic equator (Koster 1955)
Sunrise and sunset effects on (Rieker 1963)
Summary of literature pertaining to (Whitson 1962)
WALTAIR, INDIA

Polarization of $E_s$ echoes at (Abhirama Reddy 1962)

Structure of $E_s$ at, as deduced from polarization observations (Abhirama Reddy 1963)

$Z$ echo at (Abhirama Reddy 1963)

Theoretical wave polarization at vertical incidence (Abhirama Reddy 1963)

Nocturnal and seasonal variations of spread $F$ at (Krishnamurthy 1963)

Absorption on 5.65 Mc/s at (Ramana 1961)

Horizontal drifts in F2 region at (Rao, A. S., 1963)

Horizontal drifts in E region at (Rao, A. S., 1964)

Investigations of ionospheric wind by spaced receiver method at (Rao, B. R., 1956)

Diurnal variation of absorption at (Rao, B. R., 1958)

Effect of enhanced solar activity on F2 region drifts at (Rao, B. R., 1958)

Effect of magnetic activity on drifts over F2 regions at (Rao, B. R., 1959)

Study of horizontal drifts in F1 and F2 regions at (Rao, B. R., 1959)

F1 region drifts at (Rao, E. B., 1961)

Study of drifts at (Rao, E. B., 1961)

The F region over (Rao, E. B., 1961)

Long-period fading in medium radio signals at (Rao, M. S., 1955)

Influence of weather conditions on field strengths received at, by a long-distance short wave transmission (Rao, N. S. S., 1950)

Horizontal drifts in E region at (Rao, R. R., 1960)

Height gradient of horizontal drift in E region over (Rao, R. R., 1961)

Investigation of traveling disturbance by CW at (Somayajulu 1953)
WASHINGTON, D.C.

Anomaly in total electron content—summer decrease (Altman 1963)
Non-seasonal changes of F2-region ion density at (Berkner 1938)
Frequency of occurrence of $F_s$ over (Chadwick 1962)

WATHEROO, AUSTRALIA

Small differences in monthly mean $f_f$ at (Bannon 1946)
Characteristics of upper ionosphere at (Berkner 1936)
Abnormal ionization of E region at (Berkner 1937)
Non-seasonal change of $f_F$ region at (Berkner 1938)
Ionospheric changes (Berkner 1940)
Systematic ionospheric changes (Berkner 1940)

WEATHER

At Macao, correlated with ionospheric height (Gherzi 1952)
The influence of weather conditions on long distance short wave transmission (Rao, N. S. S., 1950)

WINDS

Tropical upper air studies (Belmont 1962)
Some phenomena of the upper atmosphere (Chapman 1951)
In the dynamo mechanism for the magnetic diurnal variation (Forbush 1950)
Interpretation of, as drifts in F2 region (Martyn 1955)
Stratospheric, and 26 or 27-month periodicity in equatorial geomagnetic field (Stacey 1962)
Ionospheric current systems caused by, non-periodic (Van Sabben 1962)
Z ECHO (see also SPLITTING, POLARIZATION)

At Waltair (Abhirama Reddy 1963)
Attributed to partial reflection of ordinary echo
(Satyanarayana 1959)