IHY-AFRICA/SCINDA 2009
7 – 12 June 2009
Livingstone, Zambia

Workshop Report

IHY-Africa/SCINDA 2009

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Three workshops were conducted. 2006 in Cape Verde funded by EAORD, 2007 Ethiopia and 2009 in Zambia. The last two were sponsored by several organization including US-Air Force

14. ABSTRACT
NC A&T State University, in collaboration with US Air Force Research Laboratory Addis Ababa University and Bahir Dar University and the Instituto Nacional De Meteorologica E. Geofisica will organize the 2nd International SCINDA Workshop in Addis Ababa Ethiopia, during the period of November 11- 16, 2007. The workshop is sponsored by a grant obtained from the European Office for Aerospace Research and Development (EOARD) and United States Air Force. Scientists from Ethiopia, Nigeria, Ivory Coast, Cameroon, Cape Verde, Kenya, Mozambique, South Africa and USA will participate in the workshop. The overall goals of the workshop are to establish space science expertise and develop a network of space weather observations across Africa.

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June 7th to June 12th 2009
Livingstone, Zambia

Hosted by:

University of Zambia, Zambia

in collaboration with

Hermanus Magnetic Observatory, South Africa

North-West University, South Africa

Air Force Research Laboratory, USA

Sponsors:

National Aeronautics and Space Administration (NASA), Greenbelt, Maryland, USA

Air Force Research Laboratory (AFRL), Hanscom Air Force Base, Massachusetts, USA

The National Research Foundation (NRF), Pretoria, South Africa

European Office of Aerospace Research and Development (EOARD), London, UK

National Science Foundation (NSF), Arlington, Virginia, USA

International Center for Theoretical Physics (ICTP), Trieste, Italy

Climate and Weather of the Sun-Earth System (CAWSES)/International Committee on Solar-Terrestrial Physics (SCOSTEP)

International Union of Radio Science (URSI) Commission G and H, Belgium

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MTN Mobile Solutions, Pretoria, South Africa

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Hermanus Magnetic Observatory (HMO), Hermanus, South Africa

Rhodes University, Grahamstown, South Africa

University of Zambia (UNZ), Lusaka, Zambia

The National Science and Technology Council (NSTC),, Lusaka, Zambia

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Introduction

As a continuation of the very successful International Heliophysical Year (IHY)-Africa 2007 workshop, which was held in Addis Ababa, Ethiopia in November 2007, the IHY-Africa 2009 workshop was organized in Livingstone, Zambia during the period 7 – 12 June 2009. The purpose of the workshop was to facilitate scientific interaction between space science instrument donors and host institutes and promote space science in Africa, with a strong focus on education and public outreach. Additional aims of the workshop were to converge African and other international scientists under one roof, facilitate the deployment of new observational infrastructure to study space weather, spark interest in space science education and research, and encourage the next generation of African scientists to become interested in the space sciences. The workshop was also the ideal forum to review and document the ongoing instrument deployment and data retrieval progress during the IHY period. This workshop also marked the end of the IHY period and the beginning of the International Space Weather Initiative (ISWI) which will take over the IHY work.

The workshop was aimed at scientists and students from African countries, and those international scientists interested in working together with African scientists, who are involved in all aspects of Space Physics, and included four main science sessions, two major poster sessions and four discussion forums.

The workshop was held in conjunction with the Scintillation Network Decision Aid (SCINDA) 2009 meeting and sessions of particular interest to SCINDA were held on the first two days of the meeting.

Attendees and Logistics

The workshop was organized through three committees, the International Advisory Committee, the International Organising and Programme Committee, and the Local Organising Committee (LOC). A list of the members of these committees appears in Appendix A.

A total of 116 delegates attended the workshop in Zambia. Of these delegates, 79 represented 19 different African countries and 37 travelled from 8 different countries outside of Africa. The list of countries represented at the workshop is given in Appendix B, and a complete list of delegates can be found in Appendix C. What is worth mentioning here is that 24 of the delegates were postgraduate students and 10 were undergraduate students from the University of Zambia.

Due to the generous sponsorship that the workshop received, 74 African delegates and 13 rest of world delegates were sponsored either partially or in full. Travel arrangements were made for the selected sponsored African scientists using a travel agency in South Africa who made all the flight arrangements for the sponsored delegates. The same travel agency also assisted when changes were needed to flights during the workshop. The travel arrangements for the sponsored US scientists were made in the US through UCLA, and were coordinated by Dr Endawoke Yizengaw. Travel arrangements for the Zambian based participants were coordinated by UNZA staff.

The workshop was held in the New Fairmount Hotel (NFH) in Livingstone. Of the 116 delegates, 110 were accommodated in the NFH with 6 choosing to make their own arrangements. The LOC coordinated all the accommodation arrangements with the NFH, who also arranged all the meals and tea breaks.

The opening ceremony was held on the afternoon of Monday 8 June 2009, and included presentations in the conference hall followed by a sunset cruise on the Zambezi River. The opening ceremony was chaired by Prof Roger Smith, Director of Geophysical Institute of University of Alaska and was attended by the Dean of the School of Natural Sciences of the University of Zambia, Dr Samuel Banda, the Vice Chancellor of the University of Zambia, Prof Stephen Simukanga, and the Honourable

Zambian Minister of Science and Technology, Honourable Gabriel Namulambe. Presentations were made by Dr Joseph Davila, the International Heliophysical Year Secretariat as well as a few representatives from the sponsors. The three Zambian guests of honour also made presentations which were motivating for science in Zambia and illustrated the Zambian government's commitment to science and technology and their appreciation for the presence of the IHY-Africa/SCINDA 2009 workshop in Livingstone.

Scientific Programme

The first one and a half days (Sunday and Monday morning) were dedicated to the SCINDA workshop presentations. Monday afternoon was dedicated to the opening ceremony. The scientific programme of the workshop included four main Heliophysics science sessions, as follows with convener names:

- Total Electron Content - Tim Fuller-Rowell and Christine Amory-Mauzaudier
- Irregularities and scintillations – Lee-Anne McKinnell and Keith Groves
- Sun-Heliosphere connection – Marius Potgieter
- Magnetosphere-Ionosphere coupling - Endawoke Yizengaw and Vafi Doumouya

These four science sessions included 40 invited oral presentations with the main focus on space science over the African region.

In addition there were 2 poster sessions which were convened by Pierre Cilliers and chaired by postgraduate students. A total of 46 posters were presented with 23 in each session. The two poster sessions were divided according to the same main science sessions mentioned above with the one exception that a poster session with a general theme was included so that poster abstracts that did not fit into one of the main sessions could also be included.

Included in the program were four one hour open discussion forums, as follows with convener names:

- Infrastructure and Communications in Africa – Victor Chukwuma and Daniel Moeketsi
- Science Education and Outreach – Carolyn Sumners and Patricia Reiff
- Instruments and Databases – Christine Amory-Mazaudier and Justin Mabie
- Establishment of African Geophysical Society – Babatunde Rabiu and Baylie Damtie.

The full workshop programme appears in Appendix D.

Outreach

The IHY-Africa/SCINDA 2009 workshop had a large outreach and public awareness component. On the Saturday prior to the workshop a NASA Geophysical Information for Teachers (GIFT) workshop was held at the New Fairmount Hotel in Livingstone, Zambia. The workshop was entitled "Sun-Earth Relationships and the International Heliophysical Year" and was attended by 22 local school teachers. Several teaching aid materials were given to those teachers who participated in the GIFT workshop and these will help them in their teaching and learning processes within their classroom. The workshop program and organizing committees are listed in Appendix E.

In addition one of the local high schools, Hillcrest National Technical High School, brought approximately 30 learners to each poster session evening. These learners were introduced to the international scientists who spent time with them, and they had access to a portable planetarium which was installed in the venue throughout the week especially for the workshop. The planetarium, from Rice University, was brought by the GIFT workshop organizers for a GIFT workshop demonstration. At the end of the

workshop the planetarium was donated to the University of Zambia, which makes Zambia the second country, next to Ethiopia, in Africa that has a portable scientific planetarium dome. Several of the scientists and students attending the workshop also visited Hillcrest during the week to give presentations and talk to the learners.

Conclusion

The workshop was successful in meeting the aim of bringing together African Space Scientists and providing a forum in which they could meet and make contacts with international colleagues in the field (Figures 1 and 2 below are examples). A number of collaborations have been established as a result of the workshop, and a number of students were exposed to the Space Science field and to successful African scientists in the field. The problems of database access and infrastructure requirements were also discussed, and scientists with instrumentation had access to expertise with whom they could discuss problems. Meetings like these form a very valuable part of scientific research and should be encouraged and supported.

This workshop would not have been possible without the support of the sponsors who are listed at the front of this report, and would not have been successful without the support and hard work of the Zambian and South African organizing team.

Figure 1: Prof Nat Gopalswarmy (left) from NASA in the USA in discussions with Jean Uwamahoro, a young Rwandian student.

Figure 2: Mpho Tshisaphungo, a South African student, and Daniel Okoh, a Nigerian student, with Prof Sandro Radicello (center) from ICTP in Italy.

APPENDIX A

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Congo DR
Czech Republic
Egypt
Ethiopia
France
Germany
Ghana
Italy
Ivory Coast
Japan
Kenya
Liberia
Malawi
Mozambique
Niger
Nigeria
Portugal
Rwanda
South Africa
Uganda
UK
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Zambia
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APPENDIX C

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APPENDIX D

IHY-Africa/SCINDA 2009
PROGRAM

SUNDAY Morning *(June 7, 2009)*

08:00-09:00	**Registration**	All IHY-Africa/SCINDA 2009 Workshop participants

SCINDA 2009 (Scintillation Network Decision Aid) Workshop

SCINDA Workshop

Chair: Keith Groves

09:00-10:30	Keith Groves	Welcome & Introductions
		SCINDA Update–status, new sites
10:30-11:00	**Tea Break**	
11:00-11:30	Charlie Carrano	Remote sensing the ionosphere using GPS-SCINDA
11:30-12:00	Isseyas Mengistu & Benjamin Heruska	Interactive Tutorial: Installation and operation of a GPS-SCINDA system
12:00-12:30	Instrumentation Discussion	
12:30-13:45	**Lunch Break**	

SUNDAY Afternoon

SCINDA-2009 Workshop *(continued)*

Chair: Ron Caton

13:45-14:45	Ron Caton & Justin Mabie	An overview of SCINDA-based products and the SCINDA-IHY website
14:45-15:05	Babatunde Rabiu	Variation of TEC and Ionospheric Scintillation over a Terrestrial Point in Nigeria
15:05-15:25	Paul Baki	Installation of SCINDA-GPS receiver and pre-luminary results from the Nairobi station
15:25-15:45	Larry Amaeshi	Near real-time ionospheric total electron content and scintillation index measurements at the equatorial station of Akoka, Lagos, by means of GPS satellites' signals
15:45-16:15	**Tea Break**	
16:15-16:35	Jacob Adeniyi	Preliminary TEC data over Ilorin an equatorial station
16:35-16:55	Bonaventure Okere	Atmospheric delay and delay corrections at Nsukka, Nigeria
16:55-17:15	Discussion	

MONDAY Morning *(June 8, 2009)*

SCINDA-2009 Workshop *(continued)*

Chair: Gizaw Mengistu Tsidu

09:00-09:10	Keith Groves	Vision for SCINDA Collaboration
09:10-10:10	Collaboration Discussion	
10:10-10:30	Yihenew Dagne / Baylie Damtie	MATLAB-based software for analyzing and visualizing raw data from SCINDA GPS receiving systems
10:30-11:00	**Tea Break**	

11:00-11:20	Rui Fernandes	Optimizing the use of GPS CORS installations in Africa
11:20-11:35	Abebe Kebede	Analysis of TIDs using SCINDA GPS TEC data
11:35-11:50	Pierre Cilliers	Ionospheric scintillation monitoring in the Antarctic and South Atlantic using signals from GPS satellites: Update
11:50-12:30	Keith Groves	SCINDA Status & Future Plans
12:30-13:45	**Lunch Break**	

MONDAY Afternoon

The International Heliophysical Year (IHY) Africa Workshop

Official Opening Ceremony

Chair: Roger Smith

13:45-13:55	Roger Smith	Introductions
13:55-14:05	Joseph Davila	Welcome from The International Heliophysical Year Secretariat
14:05-14:55	Sponsors & Representative Organizations	
15:55-15:00	Dean of University of Zambia, Dr. Samuel Banda	Welcome from the Dean
15:00-15:05	Vice Chancellor of the University of Zambia, Prof. Stephen Simukanga	Welcome from the Vice Chancellor
15:05-15:15	The Honourable Minister of Science & Technology, Zambia, Honourable Gabriel Namulambe	Opening Address

15:15-15:30	Assemble at buses for transport to Zambezi River
15:30-20:00	**Welcoming Reception & Sunset River Cruise**

TUESDAY Morning *(June 9, 2009)*

The International Heliophysical Year (IHY) Overview

Chair: Patricia Doherty

08:30-08:50	Joseph Davila	International Space Weather Initiative
08:50-09:10	Roger Smith	Heliophysical Processes
09:10-09:30	Gizaw Mengistu Tsidu	Report on IHY-Africa 2007 Workshop, Addis Ababa, Ethiopia

Science Session: Magnetosphere-Ionosphere Coupling and Electrodynamics

Chair: Endawoke Yizengaw

09:30-10:15	Mark Moldwin	Inner Magnetosphere-Ionosphere Coupling Tutorial
10:15-10:35	Anthea Coster	Magnetospheric-Ionospheric Coupling: A ground-based experimental perspective
10:35-11:05	**Tea Break**	
11:05-11:25	Yosuke Yamazaki	MAGDAS Project at SERC for Space Weather during IHY/ISWI
11:25-11:45	Peter Sutcliffe	Pi2 pulsations: Ionosphere/ground signatures of dynamic processes in the magnetotail
11:45-12:05	Charlie Carrano	Separating the Ionospheric and Plasmaspheric Contributions to GPS Measurements of Total Electron Content

12:05-12:25	Vafi Doumouya	Seasonal effects in the equatorial electrojet longitudinal variations
12:25-12:30	Discussion	
12:30-13:45	**Lunch Break**	

TUESDAY Afternoon

Science Session: Magnetosphere-Ionosphere Coupling and Electrodynamics *(continued)*

Chair: Vafi Doumouya

13:45-14:05	Keith Groves	The equatorial ionosphere during solar minimum–C/NOFS observations of deep plasma depletions at sunrise and wide decreases in density in the Atlantic anomaly region
14:05-14:25	Endawoke Yizengaw	AMBER magnetometer array and the equatorial electrodynamics
14:25-14:45	Tim Fuller-Rowell	Impact of the lower atmosphere on low latitude electrodynamics
14:45-15:05	Yi-Jiun Su	Assimilative Modeling of Equatorial Plasma Depletions Observed by C/NOFS
15:05-15:45	Discussion	
15:45-16:15	**Tea Break**	

Open Forum I: Infrastructure & Communications in Africa

Chairs: Victor Chukwuma & Daniel Moeketsi

16:15-16:30	Daniel Moeketsi	Centre for High Performance Computing in South Africa: Opportunities for African research collaboration

16:30-16:45	Les Cottrell	African internet performance: How bad is it; what can be done?
16:45-17:00	Victor Chukwuma	Digital Divide, eGY-Africa, and the way forward
17:00-17:15	African Infrastructure Open Discussion	

TUESDAY Evening

17:30-19:00 **Poster Session I**

Magnetosphere-Ionosphere Coupling and Electrodynamics
Sun-Heliosphere Connection
Open Forums II & IV
General Posters I

Convener: Pierre Cilliers
Chairs: Jean Uwamahoro & Mpho Tshisaphungo

***WEDNESDAY Morning** (June 10, 2009)*

Science Session: Sun-Heliosphere Connection

Convener: Marius Potgieter

Chair: Marius Potgieter

08:30-09:05	Nat Gopalswamy	Solar Activity – A Tutorial
09:05-09:10	Discussion	
09:10-09:45	John Richardson	The Solar Wind Magnetic Field
09:45-09:50	Discussion	
09:50-10:25	Stefan Ferreira	Cosmic ray transport and acceleration in a realistic heliosphere
10:25-10:30	Discussion	
10:30-11:00	**Tea Break**	

Chair: Stefan Ferreira

11:00-11:30	Horst Fichtner	Acceleration of charged particles in the heliosphere
11:30-11:35	Discussion	
11:35-12:05	Marius Potgieter	Cosmic rays as probes of the dynamic heliosphere
12:05-12:10	Discussion	
12:10-12:30	Du Toit Strauss	The modeling of anomalous cosmic ray oxygen
12:30-13:45	**Lunch Break**	

WEDNESDAY Afternoon

13:45-16:00	**Excursion to Victoria Falls**

WEDNESDAY Evening

17:40	Buses leave for David Livingstone Lodge
18:00-21:00	**Workshop Dinner at David Livingstone Safari Lodge**

***THURSDAY Morning** (June 11, 2009)*

Science Session: Ionospheric Irregularities and Scintillations
Chair: Lee-Anne McKinnell

08:30-09:15	Keith Groves Tutorial	Ionospheric Scintillation: Models, Measurements, and Impacts

09:15-09:35	Elijah Oyeyemi	On the empirical model for F_2 peak height of the ionosphere
09:35-09:55	Chigomezyo Ngwira	A comparative study of ionospheric irregularities over Southern Africa
09:55-10:15	Pierre Cilliers	Comparison of ionospheric scintillation indices from co-located GPS and GISTM receivers in the Antarctic and South Atlantic
10:15-10:30	Discussion	
10:30-11:00	**Tea Break**	

Science Session: Sun-Heliosphere Connection *(continued)*
Chair: Horst Fichtner

11:00-11:20	Etienne Vos	On the charge-sign dependence of cosmic rays in the heliosphere: A journey from Voyager 1 & 2 to Ulysses and PAMELA
11:20-11:40	Donald Ngobeni	Implications of a latitude dependent solar wind speed on cosmic rays in the heliosheath
11:40-12:00	Rex Manuel	Time dependent cosmic ray modulation in the heliosphere
12:00-12:20	Klaus Scherer	Heliophysics, Space Climate, and the Earth
12:20-12:30	Discussion	
12:30-13:45	**Lunch Break**	

THURSDAY Afternoon

Science Session: Ionospheric Irregularities and Scintillations
(continued) Chair: Keith Groves

13:45-14:05	Jonathan Makela	Signatures of ionospheric irregularities in optical and radio observations

14:05-14:25	Dieter Bilitza	Representation of Irregularities in the International Reference Ionosphere
14:25-14:45	Yannick Béniguel	Ionosphere equatorial scintillations recorded during the PRIS scintillation measurement campaign
14:45-15:05	Ron Caton	Observations of ionospheric irregularity development with ALTAIR
15:05-15:25	Dalia Burešová	Manifestation of strong geomagnetic storms in the ionosphere: Observations and modeling
15:25-15:45	Christine Amory-Mazaudier	Sun Earth's Studies / Ionosphere: Results obtained by the International Research Group in Geophysics Europe Africa Asia from 2002 to 2008
15:45-16:15	**Tea Break**	

Open Forum II: Science Education & Outreach
Chairs: Carolyn Sumners & Patricia Reiff

16:15-16:30	Patricia Doherty & Sandro Radicella	An International Partnership for Sustainable Development in Navigation Science and Technology in Africa
16:30-16:45	Susan Murabana Oduori	Hands-on Universe Africa
16:45-17:15	Education & Outreach Discussion	

THURSDAY Evening

17:30-19:00	**Poster Session II** **Ionospheric Irregularities and Scintillations and SCINDA** **Total Electron Content** **Open Forums I & III** **General Posters II** *Convener: Pierre Cilliers* *Chairs: Courage Mudzingwa and Daniel Okoh*

***FRIDAY Morning** (June 12, 2009)*

Science Session: Total Electron Content

Chair: Tim Fuller-Rowell

08:30-09:15	Ludger Scherliess–Tutorial	The morphology, dynamics, and variability of low- and mid-latitude total electron content
09:15-09:35	John Bosco Habarulema	Progress towards predictions of TEC derived from GPS over Southern Africa
09:35-09:55	Niangoran Mene	Progress towards predictions of TEC derived from GPS over Southern Africa
09:55-10:15	Anthea Coster	Monitoring the Global TEC with ground and space-based GPS
10:15-10:25	Discussion	
10:25-10:55	**Tea Break**	
10:55-11:15	Frédéric Ouattara	West Africa ionosphere case studies by using GPS receivers involved in IHY project: First results

11:15-11:35	Ayman Mahrous	First results of CIDR measurements over Egypt
11:35-11:55	Olivier Obrou	First results of TEC variation from SCINDA GPS receiver in Abidjan
11:55-12:15	Lee-Anne McKinnell	GPS TEC and Ionosonde TEC over Grahamstown, South Africa: First Comparisons
12:15-12:30	Discussion	
12:30-13:45	**Lunch Break**	

FRIDAY Afternoon

Science Session: Total Electron Content *(continued)*

Chair: Christine Amory-Mazaudier

13:45-14:05	Sandro Radicella	TEC Modeling
14:05-14:25	Patricia Doherty	The Low-latitude Ionospheric Sensor Network: The Initial Campaigns and Implications for an African Network
14:25-14:45	Discussion	

Open Forum III: Instruments & Data Bases

Chair: Christine Amory-Mazaudier & Justin Mabie

14:45-15:05	Christine Amory-Mazaudier	Instrument Summaries
15:05-15:15	Andrew Collier	Monitoring the Lower Ionosphere using AWESOME and UltraMSK
15:15-15:45	Justin Mabie	GPS Database for Africa
15:45-16:15	**Tea Break**	

Open Forum IV: Establishment of African Geophysical Society (AGS) *Chairs: Babatunde Rabiu & Baylie Damtie*		
16:15-16:35	Babatunde Rabiu	Introducing the African Geospace Society
16:35-17:15	Panel Discussion	

17:15-18:00	**Wrap-up Discussion & Official Closing** *Chair: Endawoke Yizengaw*

APPENDIX E

Related Workshop

GIFT Workshop

NASA Geophysical Information for Teachers
"Sun-Earth Relationships and the International Heliophysical Year"
June 6, 2009, Livingstone, Zambia

Deborah Scherrer, Stanford University, California, USA
Mark Moldwin, University of California at Los Angeles, USA
Endawoke Yizengaw, University of California at Los Angeles, USA
Patricia Reiff, Rice Space Institute, Houston, Texas, USA
Carolyn Sumners, Houston Museum of Natural Science, Texas, USA
Cristina Rabello-Soares, Stanford University, California, USA

Local Organizing Committee

Vincent Mweene; University of Zambia, Lusaka, Zambia
Vimbi V. Mateke, Linda High School, Livingstone, Zambia
Nchimunya Mwiinga, University of Zambia, Lusaka, Zambia
Leonard Nkhata, Hillcrest High School, Livingstone, Zambia

Schedule	Activity	Facilitator
07:15 to 07:50	Arrival and registration of participants	Mwiinga/Yizengaw
07:50	Arrival of PEO and SESO	Mateke
08:00 to 08:15	Introductions	Yizengaw and Mateke
08:15 to 08:20	Speech by SESO	Mateke
08:20 to 08:30	Speech by PEO and Opening Ceremony	Mateke
08:30 to 08:35	Vote of thanks	Scherrer
08:35	Departure of PEO	Mateke & SESO
08:35 to 09:35	Earth – Sun relationships Overview, Q & A	Moldwin / Yizengaw
09:35 to 10:20	Space Weather Observing - Spectroscopy	Scherrer
10:20 to 10:40	**Break**	**Timekeeper**
10:40 to 12:20	Spectroscopy II and SolarScapes	Moldwin / Scherrer
12:20 to 13:20	**LUNCH**	**Timekeeper**
13:20 to 14:50	Space weather magnetism activities	Moldwin
14:50 to 15:20	Break and Solar Viewing & UV beads	Moldwin /Scherrer
15:20 to 16:50	Planetarium Show & Activities	Reiff/Sumners
16:50 to 17:10	Discussion and Evaluation	All
17:10 to 17:20	Presentation of Certificates of Attendance	SESO/ Yizengaw /Scherrer
17:20 to 17: 25	Vote of thanks	Hamanyati
17:25 to 17:30	Closing remarks	Yizengaw, SESO and Mateke
17:30	**End of the GIFT workshop**	**All**

APPENDIX F

Open Forum III: Instruments & Data Bases

Chair: Christine Amory-Mazaudier & Justin Mabie

During IHY different arrays of scientific instruments were deployed or were operating over Africa: SCINDA, CIDR, AWESOME, SID, RENOIR, AMBER, CALLISTO, MAGDAS, and AGREES /GPS (still pending)
Different arrays were operating before the IHY: INTERMAGNET, AMMA, IGS etc...
During the forum, there was a round table and all the providers of data agreed to share the data. Some data of existing arrays are already on the web.
Here is the summary concerning the GPS and magnetometers network

Four arrays of magnetometers
MAGDAS -> deployed / ~ 12 magnetometers -> contact Dr Yumoto
AMBER -> deployed / 4 magnetometers -> contact Dr Kassie
INTERMAGNET -> permanent network/ 9 magnetometers -> free on the web
IPGP -> permanent network 3 magnetometers -> free on the web

Four arrays of GPS
SCINDA -> deployed / ~ 8 GPS -> contact Dr K. Groves
AMMA -> existing for a project on monsoon / ~6 GPS -> contact Dr O. Bock
IGS -> permanent network /~20 GPS -> free on the web
AGREES -> still pending network

Concerning the GPS data it is very important to develop the GPS data base for Africa in the frame of the SPIDR data base as it is easier to have all the data together in the same format (RINEX°) than to contact each provider separately.

APPENDIX G

Open Forum I: Infrastructure & Communications in Africa

Chairs: Victor Chukwuma & Daniel Moeketsi

1) The forum was chaired by Victor U. CHUKWUMA (Nigeria) and Daniel MOEKETSI (South Africa)
2) Three papers were presented by
    a) Daniel Moeketsi- "Centre for High Performance Computing in South African Research Collaborations"
    b) Les Cottrell – "African Internet Performance: How bad is it; what can be done"
    c) Victor Chukwuma - "Digital Divide, eGY-Africa, and the way forward''

3) African Infrastructure Open Discussion Segment of the forum generated series of suggestions on the way forward, the resolutions and suggestions are as follows:
    a) Transformation of eGY to an NGO as special purpose vehicle strongly supported
    b) Collaboration with existing Networks provider in each countries towards bridging the gap
    c) Vafi Doumonya (Ivory Coast) emphasized the importance of highlighting each countries individual problems, finding possible way forward taking into cognizance that internet policy varies from country to country
    d) Francois Lefeuvre (URSI, PRESIDENT, FRANCE) emphasized the importance of contacting the URSI regional offices and making use of his office towards the regional office(s) on their involvement towards solving the communication problem confronting African Scientist
    e) Sandro Radicella (ICTP) highlighted
        1) Capacity building for the use and management of the systems
        2) Power Supply
        3) Possible involvements of ICTP in capacity building
    f) Christine Amory-Mazaudier (FRANCE) emphasized

1) Replicating what was done in Latin America which Boubakar has adequate information, and as such should be involved.
2) She emphasized working with ICT community in individual country on required applications comparing it to what has been done in South Africa

g) Sandro Radicella retreated the importance of making representation at the forthcoming General Assembly of African Union on ICT problem in Africa through the United Nation resources of Science and Technical of African Union(AU) Commission
h) Appointments and involvements of Ambassadors in each country towards bridging the digital divide was emphasized
i) Justin Mabie (NOAA-USA) highlighted the importance of improving diplomatic ties with advanced countries making reference to USA whose representative is a participant at the on-going workshop
j) James Chibueze (Nigeria-JAPAN) emphasized Private Sector Participation
k) Lekove (Liberia) mentioned the importance of contacting decision makers in each country

The open discussion segment was concluded with an agreement to send the resolutions to individual for review and contributions.