IHY Space Weather Science & Education Workshop,

Addis Ababa, 12-16 November 2007

REPORT on eGY-Africa

Summary

An initiative called eGY-Africa is being undertaken as an Electronic Geophysical Year (eGY) activity to advocate better cyber-infrastructure (Internet access) for Universities and other research, education, and training institutions in Africa. The IHY workshop was used to (i) raise awareness of eGY and eGY-Africa, (ii) present the results of the initial survey of Internet capability and usage in each country, (iii) expand the community of participants and organisers of eGY-Africa, (iv) develop the business/work plan and future events, and (v) pass an IHY-Africa resolution recommending action to improve cyber-infrastructure for science in Africa.

The IHY Workshop

IHY's effort in Africa structured around the deployment of small instruments in African countries. This is undertaken both as a space science research effort and as a means of strengthening space science activities, education and outreach, and training in Africa.

The IHY workshop was held in the Ghion Hotel, Addis Ababa, Ethiopia from 12-16 November 2007 [http://kuiper.colorado.edu/IHY-Africa]. It was preceded by the 2nd Africa SCINDA (The Scintillation Network Decision Aid) Workshop on Sunday 11 November [http://sirius-c.ncat.edu/IHY-SCINDA2007/]. A description of the Workshop is in the appended Second Announcement.

The workshop attracted strong participation by African scientists - 63 scientists from 19 African countries - plus 40 scientists from overseas. The high level of participation, the enthusiasm and commitment by the African scientists, and the quality of the presentations made the workshop an outstanding success.

The Workshop was arranged under IHY through cooperation and collaboration with several other international and African national programs, including CAWSES, eGY, AMMA, and AFREF. The Workshop was hosted by

- Department of Physics, Universities of Addis Ababa
- Department of Physics, Universities of Bahir Dar, Ethiopia
- Ethiopian Physical Society,

and funded by NASA, NSF, EOARD, ICTP, AFOSR, ONR, AFRL, CAWSES, and COSPAR.

Aim of the IHY Workshop

The main aim of the Workshop was to facilitate scientific interaction and promote space science and education in Africa. The space science community is currently exploring ways to increase the observational infrastructure in the African sector, and to encourage scientists in Africa to become involved in the science objectives, and to host instrumentation at their institutions. The new observational infrastructure facilitates the study of space weather, sparks interest in space science education and research, and encourages the next generation to become interested in the space sciences. The workshop provided an ideal opportunity to develop strong interactions with scientists in Africa.

Sessions

- Ionospheric irregularities and scintillations
- Total Electron Content and GPS
- Electrodynamics/magnetometers/plasmasphere
- Infrastructure and Communications in Africa
  - GRID infrastructure for Africa (Monique Petitdidier)
  - Quantizing the Digital Divide from an Internet Point of View: Special Reference to Africa and the IHY (Les Cottrell)

- "Africa GPS database (Francine Coloma)
- "eGY - An Opportunity to improve Access to Earth and Space Science Data (C.Barton)
- New satellite and other ground-based observations
- Panel discussion: How to support of space science and education in Africa?
- Panel discussion: eGY-Africa: How to promote Cyber-infrastructure for Science in Africa?

The Electronic Geophysical Year, 2007-2008 (eGY)

(Abstract of the presentation by C.Barton, D.Baker, and W.K. Peterson)
eGY provides a cooperative international framework for developing the sharing of data and information about our planet and geospace. eGY adopts and extends the ideals of the International Geophysical Year fifty years ago, when the foundations of a global geoscience "information commons" were created. The need for information and understanding about the Earth has become yet more acute, our ability to collect data has mushroomed, and modern information and communications technologies are at our disposal. Several Earth and space science initiatives for collecting, preserving, and providing open access to data are already underway in response to these drivers. For example, the Global Earth Observing System of Systems (GEOSS). Scientists and decision makers from rich and poor countries alike can benefit from open access to data and information, but only within the limitations of their cyber-infrastructure. eGY is an opportunity to take steps to improve the cyber-infrastructure available to scientists and educators in Africa.

eGY-Africa

eGY-Africa is an eGY (www.egy.org) activity to use advocacy to secure better cyber-infrastructure (Internet access) for Universities and other research, education, and training institutions in Africa. The eGY program was invited to participate in the Workshop. We used the opportunity to promote eGY, to test support for eGY-Africa, to secure participation, and to plan the next steps for eGY-Africa.

The first formal eGY-Africa planning meeting took place during the IUGG General Assembly in Perigia, Italy in July 2007. This was, therefore, the second planning meeting and the first such meeting involving a large community of Africa scientists.

Inspirational goal of eGY-Africa

The central goal is to make African communities wealthier, safer, and more sustainable through full participation in the information revolution. Participation in the information revolution is conditional on the existence of a cyber-infrastructure to connect people and machines to the world community and the vast resources of information and services that exist. This is particularly important for scientists and technologists who have the responsibility of producing and using information and knowledge to inform decision-makers and deliver societal benefits. Modern ICT (Information & Communications Technology) is marketed as a quickly implemented and low-cost way for poor communities to share on equal terms with rich ones the benefits of the information revolution. In practice, the digital divide is growing and denying poor countries access to those very benefits. The situation is particularly acute in Universities, where internet services are commonly poorer than in those provided (at high cost) through the private sector.

eGY-Africa activities at the Workshop

- Presentation on eGY, including eGY-Africa, by C. Barton
- Discussion meeting about eGY-Africa (see Appendix)
- Presentation of the preliminary results of the survey of capability by Les Cottrell and Monique Petitdidier.
- Two planning discussions about eGY-Africa.
- A resolution in support of better cyber-infrastructure and internet connectivity was proposed to the Workshop.
- Visit to the UN ECA headquarters in Addis Ababa to discuss eGY, eGY-Africa, and to find out more about high level policy on cyber-infrastructure.

OUTCOMES

eGY-Africa was welcomed enthusiastically. The initiative clearly is targeting an issue that is of great concern to African scientists. Many new participants were identified who are willing to play an active role in eGY-Africa. The discussion meeting was attended by everyone at the Workshop and resulted in many good suggestions that have been used to revised the operating plan for eGY-Africa, improve the survey questionnaire, and expand the calendar of events (listed in the Plan).

- A Cyber-infrastructure resolution was adopted by the IHY Workshop (see Appendix).
- The main steps to be taken next were identified as
    - o Produce eGY-Africa documentation, website, and news services to keep everyone informed.
    - o Proceed with the survey
    - o Start to grow "eGY-Africa" groups in each country to provide a national focus for the Internet issue, to help meet national needs, and to link to developments in the rest of Africa and elsewhere. When possible, such groups should centre around existing networks of people. Hold a discussion meetings in each country in 2008.
    - o Host a a pan-African workshop on cyber-infrastructure and Internet connectivity to be held in a francophone country sometime in 2009. A sub-committee of persons was established to start planning: Mohamed Gaye (Senegal), Larry Amaeshi (Nigeria), Vafi Doumbia (Ivory Coast), Cesar M'bane (Cameroon), Cesar M'bane (Cameroon), Olivier Obrou (Ivory Coast), Frederic Ouattara (Burkina Faso), with support from members of the eGY-Africa organizing group.
    - o Engage with high level bodies and the private sector concerned with cyber-infrastructure in Africa: the Economic Commission for Africa, the African Union, NEPAD, ICSU's Regional Office for Africa, CODATA, and so forth.

eGY-Africa Organisers

Abebe Kebede, Alem Mebrahtu, Larry Amaeshi, and Mohamed Gaye agreed to join the organising team. Alem Mebrahtu was appointed as the Secretary for eGY-Africa. The group now comprises:

Abebe Kebede	North Carolina A&T Univ., USA . Also Ethiopia	abkebede@gmail.com,
Alem Mebrahtu (Secretary)	Mekelle Univ., P.O.Box 3044, Mekelle, Ethiopia	alemmeb@yahoo.com,
Charles Barton (Chair)	Australian National University, Canberra (eGY)	Charles.barton@anu.edu.au,
Colin Reeves	Earthworks, Delft, The Netherlands	reeves.earth@planet.nl,
Gilbert Rochon	Purdue University, USA	rochon@purdue.edu,
Jean Pierre Tchouankoue	University of Yaounde, Cameroun	tchouankoue@yahoo.com,
Larry Amaeshi	University of Lagos, Nigeria	larryamma@yahoo.co.uk ,
Les Cottrell	Stanford Linear Accel. USA	cottrell@slac.stanford.edu,
Mohamed Gaye	L'Université Cheikh Anta DIOP de Dakar, Sene	mmgaye@ucad.sn,
Monique Petitdidier	CETP/CNRS, France	monique.petitdidier@cetp.ipsl.fr
Victor Chukwuma (co-chair)	Olabisi Olabanjo Univ., Ago Lwoye, Nigeria	victorchukwuma@yahoo.com,

Discussion Meeting: "How to promote Cyber-infrastructure for Science in Africa"

The discussion meeting that was held on Monday evening, 12th November. The panel members were: Charles Barton (Moderator), Monique Petitdidier, Abebe Kibede, Les Cottrell, Victor Chukwuma, and Tim Fuller-Rowell. The aim of the discussion was to inform people and seek opinions about the proposed *eGY-Africa* initiative, to develop the draft plan, and to identify people willing to participate.

The discussion was introduced by short presentations by the panel members:
    Victor Chukwuma: The inspirational goal
    Charles Barton: Introduction to eGY-Africa: the cyber-infrastructure problem
    Abebe Kibede   Network in Africa

Monique Petitdidier Grid infrastructure for Africa
Les Cottrell: An Internet view
Tim Fuller-Rowell Interested in participating?

This was followed by a presentation about the preliminary survey and its results by Monique Petitdidier (see summary below).

The discussion focused around questions posed in the questionnaire: the present status of facilities in different countries, planned facilities, benefits, problems, steps we can take as a community of scientists with a job to do, personal experiences and case histories. It also covered, in less detail, planning, funding, collaboration and participation. Notes taken during the discussion meeting by Barbara Thompson are attached as a separate document.

The International Heliophysical Year Space Science Workshop recommendation on Cyber-infrastructure"
The Workshop approved a resolution with the above title.

Preamble
The International Heliophysical Year Space Science Workshop, held in Addis Ababa, 12-16th November 2007, brought into sharp focus the outstanding scientific and technical abilities of African scientists as resourceful researchers, strongly committed to education and training. African scientists offer a huge reservoir of talent and enthusiasm.
Modern information & communications technologies offer a low-cost way for all communities, regardless of wealth and level of industrialisation, to share on equal terms the benefits of the information revolution. Internet infrastructure has profound effects on educational and research outcomes, and fuels economic success. Affordable access to the Internet is clearly essential for sustaining viable University and high school sectors.
The workshop highlighted the single largest barrier that prevents African countries from benefiting from their indigenous scientific talent and resources – poor access to the Internet. Overcoming this barrier will also ensure continued regeneration and expansion of talent in a manner that is achievable in no other way.

Resolution

We, the 63 African scientists, representing 19 African countries participating in the International Heliophysical Year Workshop in Addis Ababa, 12-16 November 2007,

RECOGNISE that modern information and communications technologies have revolutionised the conduct of research, education, and training in science and technology, as well as elsewhere, by providing rapid and effective means to
- communicate among people,
- participate in international, regional, and national scientific and educational efforts,
- discover, access, and share data and information,
- utilize available computational services, including data processing, visualization, and analysis,
- benefit from the vast world-wide research and teaching resources and publications that exist, and
- transmit observational data from remote stations,

NOTE that the capabilities listed above deliver economic and social benefits to communities that have an efficient cyber-infrastructure and good Internet connectivity,

REGRET that the digital divide is growing and denying most African communities those very benefits, and that the situation is particularly acute in research, education, and training institutions, where Internet services are often poor, or even non-existent,

RECOMMEND that high priority be given to improving the cyber-infrastructure for universities, colleges, and other national science and technology institutions in Africa as a cost–effective and essential means of achieving national Millennium Development Goals.

Ghion Hotel, Addis Ababa,

Survey of Internet capability

The purpose of the survey is to establish what cyber/Internet facilities exist, what is planned, what is needed and why, what problems are encountered, and what can we do to improve the situation. The approach is bottom-up – i.e., get the information from the people who need such services to do their job. The rationale behind this survey activity is that we need to be well informed in any advocacy role, there are benefits from being aware of the situation in communities outside our own (institutional, national, and international), and we are better able to determine where to direct effort.

The main findings from the preliminary survey are:
- A typical leading university with tens of thousands of students has a couple Mbps or less.
- In some cases it is DSL at 128kbps or even dial up at 56kbps (c.f. typical US or European University with >= 1Gbps)
- Often only faculty are allowed to use the Internet.
- Only in 7 countries (Egypt, Cameroun, S. Africa, Burkina Faso, Mozambique, Ethiopia) are all universities connected.
- For other countries, 5% to 50% of universities have Internet access.
- Only S. Africa (TENET), Burkina Faso (RENER), and Egypt (Internet Village IV) have a dedicated National Research and Education network (NREN).
- Four countries have Internet connectivity in capital only (Ivory Coast, Niger, Congo DR, Congo Rep).
- South Africa has access almost anywhere people can afford it.
- Most people want more bandwidth and reduced costs. Suggestions to increase competition, remove monopolies, open markets to international companies. Reliable power is often cited as a problem.

[LES and MONIQUE to complete]

Visit to the UN Economic Commission for Africa:

Charlie and Alem to complete

Further information

A copy of the revised operating plan, lists of participants, suggested activities for participants, and other working documents about eGY-Africa can be downloaded from:
http://groups.google.com/group/egyafrica
This Google Group website is used for working documents that are actively being updated.
General documentation about eGY-Africa can be accessed through the main eGY website:
www.egy.org
The African Scientific Network website (http://sirius-c.ncat.edu/asn/index.html) is being developed by Abebe Kibede to provide access to information for individual countries about people, activities, and cyber-facilities. It will also be used as a portal to cyber-infrastructure developments relating to Africa and case histories.
[ABEBE to approve/complete]

The following documents (in Microsoft Word) supplement this report. They can be downloaded from: http://groups.google.com/group/egyafrica.
- IHY Workshop 2nd Announcement – announcement and description of the Workshop
- IHY Workshop schedule – the agenda for the Workshop
- Discussion Notes_BT – notes on the eGY-Africa Discussion meeting
- Questionnaire_071213 – current version of the survey questionnaire
- eGY-Africa Plan 071228 – current version of the business plan for eGY-Africa

Conclusion
The IHY-Africa Workshop was a significant event in the development of space science research, education, training, and outreach in Africa. Its remarkable success can be attributed to the effectiveness of the IHY instrument deployment program and to the financial support received that permitted so many African scientists to attend. The workshop provided the opportunity to transform the eGY-Africa concept into a practical program with the ability to grow and make a contribution to securing better internet facilities for science and education.

Report prepared by the group of eGY-Africa Organisers and Barbara Thompson
27 December 2007
Address comments to the eGY-Africa Secretary or Chair.

APPENDIX. Acronyms

AFOSR	CHECK	
AFREF	CHECK	
AFRL	CHECK	
AMMA	CHECK	
CAWSES	Climate and Weather of the Sun-Earth System	www.ngdc.noaa.gov/stp/SCOSTEP/scostep.html
CODATA	ICSU's Committee on Data for Science & Technology	http://www.codata.org/
COSPAR	ICSU Committee for Space Research	www.cosparhq.org
eGY	The Electronic Geophysical Year, 2007-2008	www.egy.org
EOARD	CHECK	
ICTP	International Centre for Theoretical Physics, Italy	http://www.ictp.it/
IHY	The International Heliophysical Year	http://ihy2007.org/
NASA	National Aeronautical and Space Administration (USA)	
NEPAD	New Partnership for Africa's Development	http://www.nepad.org/
NSF	National Science Foundation (USA)	
ONR	Office of Naval Research (USA)	
SCINDA	The Scintillation Network Decision Aid	