

## UNESCO-AEON WORKSHOP “Earth Science Education Initiative for Africa”

26-27 November 2009  
AEON – *Africa Earth Observatory Network*  
University of Cape Town

### Report

#### Introduction

The aim of this UNESCO workshop, as summarised in the initial document, is to prepare an *“assessment of the existing capacities and actual needs in earth science education, research and industry, within existing faculties, geological surveys, laboratories and applied schools”* in order build, during a final workshop at UNESCO Headquarters in Paris, an appropriate strategy towards *“development of the next generation of earth scientists in Africa who are equipped with the necessary tools, networks and perspectives to apply sound science to solving and benefiting from the challenges and opportunities of sustainable development”*.

The workshop was hosted by AEON (African Earth Observatory Network) and attended by 25 participants from Botswana, Lesotho, Namibia, Malawi, Mauritius, South Africa, Swaziland, Tanzania, and Zambia. Two participants from Nigeria and from UNESCO Paris joined the workshop (list of participants attached). The opening address was made by Professor Jo Beall, Deputy Vice Chancellor of the University of Cape Town and the sessions were chaired by Professor Maarten de Wit, Director of AEON.

#### Programme

a) Introductory presentations on:

- UNESCO Earth Science Initiative for Africa (Sarah Gaines),
- International Geoscience Programme (IGCP) in Africa (Felix Toteu),
- Input from the former Earth Science Specialist, UNESCO Nairobi Office (Thomas Schlueter),
- Input from ICSU (International Council for Science) Regional Office (Enow Achuo),
- Input from Industry, case of TOTAL Nigeria (Thierry Rosaz),
- Regional Earth Science Education Overview (Maarten de Wit).

Followed by

- b) Assessment of capacity country by country
- c) Examples of Outreach and Training Initiatives in the region:
  - AEGOS, African-European Georesources Observation System (Cindy Peterson),
  - EarthWISE (Marian Tredoux),
  - Africa Array (Ray Durrheim),
  - IGEO, International Geoscience Educators Organisation (Ian McKay),
  - Africa Alive Corridors (Maarten de Wit and Felix Toteu),
  - Input from YES, Young Earth Scientist (Elyvin Nkhonjera),
  - Geo-train initiative (Christoffel Fourie).

### **Assessment of current status of geoscience education in the region**

Different presentations and the *Tour de Table* have highlighted the following main problems facing Earth Science Education and Research in the region:

- Absence of or very young/small Earth Science Departments in some universities (e.g., Mauritius, Namibia, Botswana, Swaziland, Malawi);
- Limited capacity (staff and equipment needed for practicals) to cope with the growing number of students, compounded by brain drain of academic staffs;
- Geoscience Education has little status compared to other basic science disciplines (physics, biology, chemistry and mathematics). At schools, the earth is viewed only from geography perspective and the term geology seems difficult to embed in primary education;
- Difficulty to attract good students in geosciences;
- Poor background in physics, chemistry and mathematics of entry-level students;
- Current tertiary programmes do not seem to produce graduates suitable for the industry, one of the reasons being the absence of engineering stream in geoscience training; as shown during the workshop, some companies in oil industry have set up their own facilities to cope with this situation;
- Poor visibility of geosciences among the public and decision makers;
- Poor coverage of the region (and Africa as a whole) in terms of analytical facilities;
- Insufficient interaction between researchers at regional and continental level.

## **Discussions**

For an in depth discussion, participants were split into four break-out groups:

*Group 1: Making Geosciences Attractive*

*Group 2: Training Pipeline*

*Group 3: Interaction between Academia, Government and Industry*

*Group 4: Sharing resources*

The groups recognised:

- That the 21<sup>st</sup> century Earth Science Education must transcend the conventional view of geological sciences, and that the teaching of Earth Sciences needs to be multidisciplinary in its approach;
- That Earth Sciences Education must be introduced at the early stage of school through practical and innovative methods;
- That some of the problems facing Geoscience Education and Research may be solved through an efficient network (regional and continental) of geoscientists; such network will enhance the involvement of Africans in international research projects, (e.g., IGCP);
- The need of more visibility and advocacy for geosciences and outreach to show "earth science at work" in communities;
- That Earth Science Education in Africa should also focus on developing earth-related indigenous knowledge;
- The need for staff/researcher/technician exchange (some funding could be sourced from ANSTI, AAU);
- The need to improve the analytical infrastructure in the region, with the understanding that South Africa is exceptionally endowed with more than basic facilities;
- The need of a dedicated website for teaching material and outreach;
- The need of involving Young Earth Scientists (YES) congress in outreach activities, including role modeling and mentoring to younger generations;
- The need of using African/regional examples in geoscience courses where possible; in this regards, the continent is endowed with huge potential Geological Heritage sites with high pedagogic and outreach value;
- The need for emphasis on fundamental skills such as geological mapping and fieldwork;
- The need of broadening postgraduate skills through exchange programme and international visits;
- The need for joint research projects, with PhD and MSc students;

- The need for more interactions between universities, industry and parastatal organisations to foster awareness of geoscience career opportunities among students;
- The important role of university-based outreach initiatives, NGOs, local organisations such as national geoscience societies, IGCP and IYPE/IUGS national committees in promoting geosciences at grassroots level.

Participants believe that the UNESCO Earth Science Education Initiative for Africa would gain from a progressive adaptation of curricula to bring geosciences at the same level as the other major science disciplines, and that the introduction of Geoscience Engineering Stream in tertiary education would better equip graduates for jobs in industry.

## **Recommendations**

Taking into account the presentations, the *Tour de Table*, the break-out groups reports and the concluding remarks, the participants to the UNESCO Earth Science Education workshop of southern Africa agreed on, and

1. *Recommend* the promotion of multidisciplinary approach in geosciences through Earth System and Stewardship Science to increase the potential of the young generation of African geoscientists in coping with the global challenges of the 21<sup>st</sup> century;
2. *Recommend* that a continental network of earth scientists be established as a legacy of the Earth Science Initiative for Africa workshop, with the strong mandate of breaking the isolation of African researchers, stimulating collaborative and cross-disciplinary research, and promoting the African leadership in Earth System Science;
3. *Recommend* setting up of regional centres of excellence in appropriate locations and based on the uniqueness of the type of training field and/or services they would provide including teaching material, database management, analytical facility, water resources, geothermal energy, geo-medicine, etc;
4. *Recommend* that UNESCO endorses and lobbies for the creation of an African Geoscience Analytical Fund, possibly managed through an institution like ICSU-ROA, to facilitate access to analytical equipments hosted in Africa-based centres of excellence;

5. *Recommend* the reinforcement of existing structures of lecturer/researcher/technician exchange (including from the African diaspora) to support young/small earth science departments;

6. *Recommend* that UNESCO endorses and lobbies for a compulsory Geoscience Education at schools, with content adjusted to local environment. This will help closing the gap between primary/secondary and tertiary education;

7. *Recommend* strong outreach activities in Africa through actions designed to raise the public profile of geoscience and make it more attractive to the youth. Such actions could be conducted by IYPE/IUGS National committees, university-based outreach initiatives and Young Earth Scientists Congress with support from geological societies and the Organisation of African Geological Surveys; and

8. *Recommend* that African geoscientists work towards the identification and promotion of Geological Heritage as an important pedagogic and outreach tool.