Report of the NUFFIC sponsored Refresher course on:

Use of low cost earth observation data in environmental and climate monitoring applications: taking further the African Union – AMESD initiative.

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This refresher course was conducted at the Geographic Information Systems and Remote Sensing Research and Training Centre (CGIS-NUR), Butare, Rwanda, from 5-16 October 2009. CGIS-NUR serves as a national and regional training and research outreach centre of excellence in the field of geographic information systems and remote sensing to promote a spatially literate society by serving as a recognised, multi-disciplinary training and research centre in GIS and RS technologies and applications through which it addresses issues of local, national and regional importance such as societal and economic transformation and sustainable development.

Despite a large number of applications for the refresher course (over 170), 28 participants were finally selected. Next to the NUFFIC sponsorship also funds could be utilized from the ITC Capacity Building fund. The origin of the selected African participants was: 1 from Chad, 5 from Ethiopia, 1 from Ghana, 4 from Kenya, 1 from Sudan, 1 from Tanzania, 3 from Uganda, 3 from Zambia, 1 from Zimbabwe and the other 8 participants were from Rwanda, mainly from CGIS and various NUR faculties.

Figure 1: The participants after the opening session (under the GEONETCast receiving antenna), the inset shows the opening by the Director CGIS and the Vice Rector of NUR of the new lecture room, equipped with 30 computers and connected to the local area network, allowing access to the data and images disseminated by GEONETCast, used during the refresher course.

The course was designed for mid career professionals who are active in the field of land and water resources management, governmental staff dealing with meteorology, environment and water related affairs and lecturers and researchers of relevant departments from African academic institutions.

The objectives of the refresher course were:

- To provide an update in recent developments supporting environmental, water resources analysis and management, meteorological and climatological monitoring in the African Region and more specifically the contributions of GEONETCast and AMESD;
- To build on the existing capacity to use remote sensing and GIS in relation to environmental and water resource management issues and linkage to *in-situ* observations;
- To build capacity in meteorological, environmental and water resource related data extraction, data preparation and data exchange using Geo(IT) tools, like the GEONETCast toolbox, developed as a plug-in under ILWIS3.6Open, use of scripting and batch routines for multi-temporal image processing and presentation of results using Web Mapping Services;
- To apply images and products provided through the GEONETCast environmental data dissemination system, utilizing the ground receiving system established at CGIS-NUR in 2006 and develop an own application related to environmental and water resources monitoring.

The course started with an overview of the various international initiatives that are currently implemented or proposed for the near future in sub-Sahara Africa. Then further information was provided on GEONETCast, the system infrastructure, including an on-site demonstration, the images and data-products disseminated and subsequently the capabilities of the GEONETCast toolbox developed under ILWIS 3.6 Open were shown. These lectures were followed by various practical assignments were the participants acquainted themselves further with the various sources of near real-time information provided. On Saturday an excursion was conducted to the Nyungwe National Park and further to the border of Rwanda-Congo at the southern most portion of Lake Kivu. During this excursion also a climatological tower, with various measurement devices was visited and the data recorded by the logger was transferred to a laptop for further assessment of the *in-situ* data later on.

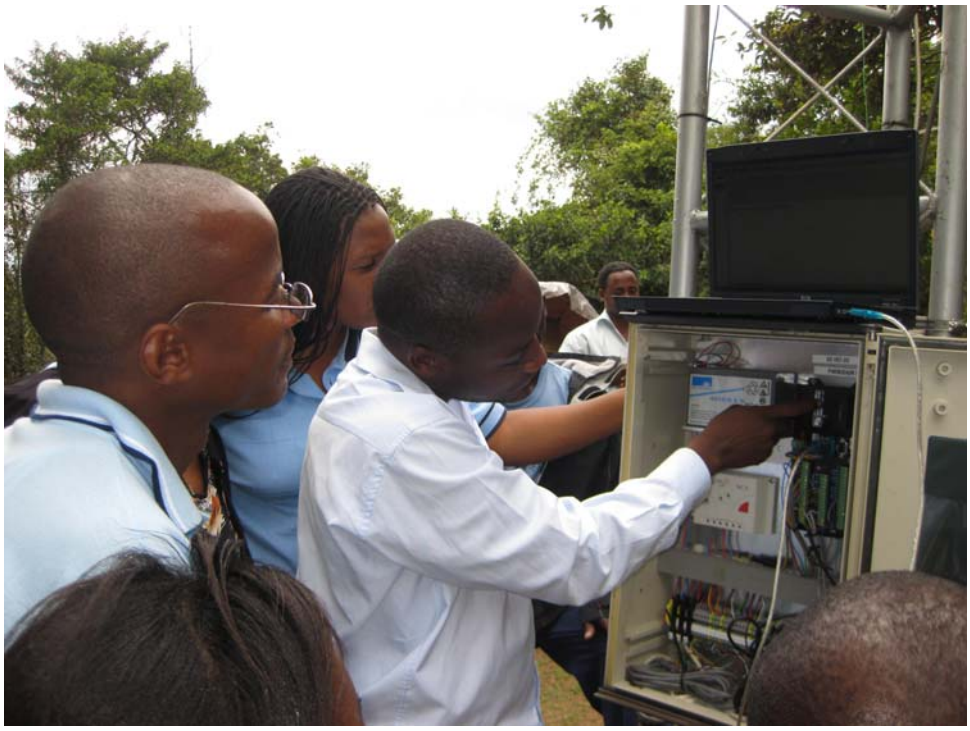

Figure 2: Reading out the logger of the climatological tower installed at the Nyungwe National Park Headquarter.

During the first two days of the second week a guided set of exercises was followed using images recorded by the SEVIRI instrument onboard of Meteosat 9 in order to understand the characteristics of measurements covering different ranges of the electromagnetic spectrum, access the archive and import single event or time series of data and apply different, or a combination of, spectral channels for environmental, meteorological, water resource, disaster and climatology related applications. During the remainder of the course participants had to develop their own applications using the various images and data-products that are received by the CGIS-NUR GEONETCast ground receiving station. Over 15 different applications were finally presented, covering a wide range of environmental, water resource and climatological related subjects. Through development of the applications the participants demonstrated the ability to use the data, perform the analysis and present the results in the form of maps, time-series animations and even as a Web Mapping Service for informed (and timely) decision making.

The course was closed and the certificates of attendance were handed over by Minister S. Kamanzi, from the Rwandan Ministry of Natural Resources. There was also a closing remark by Mrs. Bernot Ullerö from NUFFIC Capacity Building and Scholarships Directorate, the Netherlands. Participants expressed their satisfaction by what had been achieved during this refresher course and a number of participants will try to set-up their own GEONETCast ground receiving facilities for the purpose of their work in the future.

Figure 3: Minister S. Kamanzi, Rwandan Minister of Natural Resources, together with the course participants during the closing ceremony.

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