GEO plenary side event
DSWG and DMP TF
12 November 2014
– 14h00 – 17h30

Mrs NOASILALAONOMENJANAHARY A. Lucie
GEO- DSWG Member
National Focal Point AfriGEOSS - Madagascar
PLAN

- AfriGEOSS in General (Background, Vision, Goals, Objectifs and Perspectives)
- AfriGEOSS perspectives in Indian Ocean
- AfriGEOSS Perspectives in Madagascar
HISTORY OF AfriGEOSS
The outcome of the Rio+20 Conference, building on action from the Millennium Development Goals, reaffirmed Sustainable Development as the primary objective of the Global Agenda post-2015. Sustainable development must be pursued through an integrated approach addressing each of its three components – Economic, Social and Environmental.
• The Conference confirmed the importance of Earth observation data and information for policymaking, and recognized the relevance and ongoing efforts in developing global environmental observing systems, and the need to support developing countries in their efforts to collect and use environmental data was also reinforced.
ABOUT AfriGEOSS

• The Afri GEOSS is GEO in Africa;

• The AfriGEOSS, initiative in GEO IX plenary session in Brazil – Foz d’Igassu, developed within the GEO framework, will strengthen the link between the current GEO activities with existing capabilities and initiatives in Africa and will provide the necessary framework for countries and organizations to access and leverage on-going bilateral and multilateral EO-based initiatives across Africa, thereby creating synergies and minimizing duplication for the benefit of the entire continent.
This coordination initiative has been recognized essential to enhance Africa's capacity for producing, managing and using Earth observations, thus also enabling the Region's participation in, and contribution to, the Global Earth Observation System of Systems (GEOSS)
VISION OF THE AfriGEOSS

• The AfriGEOSS vision is a continent where decisions on policy and implementation programs, involving the production, management and use of Earth observation, are taken with the involvement of all stakeholders, through a coordination framework enabling the linkage country-region-continent that AfriGEOSS wants to build.

• This is expected to be realized, in the medium-long term, by strengthening and enlarging the role of the existing national, regional and continental institutions
GOALS OF AfriGEOSS

• AfriGEOSS aims to provide the necessary framework for African countries and organizations as well as international partners to access and leverage on-going local and international bilateral and multilateral EO-based initiatives across Africa, thereby creating synergies and minimizing duplication for the benefit of the continent.
8 OBJECTIVES OF AfriGEOSS:

• To achieve the above, a set of overall objectives has been defined for AfriGEOSS:
• Coordinate and bring together relevant stakeholders, institutions and agencies across Africa that are involved in GEO and other Earth observation activities;
• Provide a platform for countries to participate in GEO and to contribute to GEOSS;
• Assist in knowledge sharing and global collaboration;
• Identify challenges, gaps and opportunities for African contributions to GEO and GEOSS;

• Leverage existing capacities and planned assets and resources; and

• Develop an appropriate strategy and participatory model for achieving the above goals.

• Develop a strategy of Communication of the Earth Observation data in Africa
OFFICIAL LAUNCH OF AfriGEOSS

• During the AfricaGIS 2013/GSDI14, held in Addis Abeba, AfriGEOSS was launched on 5 November 2013.

• AfriGEOSS is an initiative by the intergovernmental Group on Earth Observations (GEO) aimed at building infrastructural capacities in Africa to benefit from geospatial data for sustainable development.

• GEO states: "The intergovernmental Group on Earth Observations (GEO) is playing a key role by supporting the Environmental component of the Sustainable Development agenda at the global level, and also at the regional level through a dedicated initiative, focused on Africa – AfriGEOSS.

• AfriGEOSS is designed to support the continent’s efforts to bridge the digital divide and build a knowledge-based economy, by enhancing Africa’s capabilities for producing, managing and using Earth Observation data and information."
SPEECH ABOUT THE OFFICIAL LAUNCH OF AFRIGEOSS
PROMOTION OF THE GEO X PLENARY SESSION AND MINISTER SUMMIT OF GEO IN GENEVA 15-16 JANUARY 2014
COUNTRIES MEMBERS OF AfriGEOSS

Algeria  
Burkina Faso  
Cameroon  
Central African Republic  
Congo  
Cote d'Ivoire  
Egypt  
Ethiopia  
Gabon  
Ghana  
Guinea-Bissau  
Guinea, Republic of  
Madagascar  
Mali  
Mauritius  
Morocco  
Niger  
Nigeria  
Senegal  
South Africa  
Sudan  
Tunisia  
Uganda

Source: http://www.earthobservations.org/members.php
• African Association of Remote Sensing of the Environment (AARSE),
• African Center of Meteorological Application for Development (ACMAD),
• Environmental Information System (EIS-Africa),
• UN Economic Commission for Africa (UNECA),
PERSPECTIVES
Implementation of the 5 Activities Areas in the country member of AfriGEOSS
1. User Needs and Applications:

- **Agriculture**: GEO Global Agricultural Monitoring (GEOGLAM) in Africa
- **Biodiversity**: GlobWetland Africa
- **Climate**: Global Framework for Climate Services in Africa
- **Ecosystems**: Global Forest Observations Initiative in Africa Working Group on Land Cover for Africa
- **Disasters**: Disasters Initiatives in Africa
- **Meteo**: The Monitoring for Environment and Security in Africa
- **Energy**: Towards a Bioenergy Atlas for Africa (BAFA)
- **Water**: The TIGER initiative
  - GEOSS African water Cycle Coordination Initiative (AfWCCI)
2. Data and Infrastructure

- GEOSS Portal
- Afromaison Africa Broker
- AGEOS Catalogue
- RCMRD Data Portal
- SANSA
- SERVIR /Africa Geodata Portal
- UNECA GEO Info
- GEOCAB Portal
3. Human Capital Development
4. Ressource Contributors Coordination
5. Communication and Outreach
PERSPECTIVES IN IOC
IN THE INDIAN OCEAN

Comoros
Mayotte
Madagascar
Seychelles
Mauritius
Reunion

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat
The IOC aims to achieve political and economic co-operation, sustainable development in a global context, co-operation in the field of agriculture, maritime fishing, and the conservation of resources and ecosystems, and strengthening of the regional cultural identity, through cooperation in cultural, scientific, technical, educational and judicial fields.
SEAS-OI Station (Survey of Environment Assisted by Satellite in the Indian Ocean)

- COVERAGE: Indian Ocean Region, part of East Africa;
- Received data: SPOT5, RADARSAT;
- SENTINEL ??

Up to now, data from SEAS-OI are freely available for public institutions.
In Madagascar, a network of spatial data endusers ensures good transmission of scientific and technical informations. AMESD receiving stations are implemented in Toliara (South West) and in Antananarivo. A receiving station implemented in Reunion island can provide free optical and radar data for all national institutions in the IOC Region and east africa coast.
Pôles de compétences et chantiers géographiques
Satellite Antenna offered by AMESD

Following
- the temperature,
- the sea level
- Fisher Boat in the IOC
- Concentrations of chlorophylls

Identifying the Potential Fishing Zone
PROJECT MASE IN IOC

• The MAritime Security (MASE) project is implemented by the IOC for Eastern and Southern Africa and Indian Ocean region. (ESA-OI),
• The MASE have mobilized against piracy and maritime security.
• This regional mobilization helped countries in the region to contribute in the fight against piracy.;
• This resulted in a regional strategy ESA-OI fight against piracy. Beyond regional responses, each country now seeks to empower the fight against maritime piracy.
Zone very high risk of piracy
Zone risk piracy
Piracy in Indian Ocean from 2005 to 2010

Due to the effective cost of the use of MPA (Air Maritime Patrol), the lack of dedicated Air assets and the limited capacity of drones (first generation), the contribution of Satelite was decisive in the fight against Piracy. But Satelites can have a dual use. Technical capabilities can be applied both for Piracy Survey and Natural Ressources management. This is why Madagascar try to develop a global approach in order to optimize his own use of Satelite support as a National level, with an extensive approach in terms of collaboration at the Regional and international level.
The Malagasy solution and proposal is the implementation of an Regional Information Center.
PROJECT MASE

• This mobilization has also convinced the European Union as the main partner of the IOC,
• To support both national and regional levels. IOC in collaboration with other regional organizations of the ESA-OI, COMESA and the EAC have developed a project to support maritime safety (MASE Start-up) of which the officer is the IOC to implement the actions most urgent and prepare the region for the implementation of the regional strategy against piracy.
THE GREAT POWER COMPETITION IN THE INDIAN OCEAN
THE PROJECT MESA in IOC Monitoring Environment and Security for Africa

• Monitoring Environment and Security for Africa has following the project AMESD in the IOC Region.

• The MESA thema in the IOC is: « Marine and Coastal Management in the South West Indian Ocean Région »..

• The countries covered by MESA: Seychelles, Madagascar, Mauritius, Comoros, Reunion, Kenya, Mozambique and Tanzania
OBJECTIF GLOBAL DU PROJECT MESA

• To increase the decision-making and planning capacity of institutions mandated for marine and coastal management in IOC member states and in neighboring countries of the Mozambique Canal, by enhancing access to and exploitation of relevant Earth Observation applications.
OBJECTIVE SPECIFIC OF THE PROJECT MESA

• To increase the decision making and planning capacity of institutions mandated for marine and coastal management in IOC member states and in neighbouring countries of the Mozambique Canal,

• by enhancing access to and exploitation of relevant Earth Observation (EO) application.

• To provide an improvement and sustained access to Earth Observation (EO) data and information to stakeholders of IOC states and neighbouring countries of Mozambique channel
THE GEOSS - SOCIETAL AREA BENEFIT IN MADAGASCAR

1. Biodiversity
2. Oceans
3. Ecosystems, Fire
4. Meteorology
5. Health
6. Disasters
IOGA

- IOGA: Institut Observatoire Geophysique of Antananarivo. The University based in the capital and offers academic training in Geophysique. Another academic on remote sensing and natural risks is proposed jointly by University of Antananarivo and University of Réunion.
BIODIVERSITY

- The Global Biodiversity Information Facility (GBIF) France work in Madagascar to develop the MADABIF – (Madagascar Biodiversity Information Facility) with the REBIOMA- REseau des BIOdiversity in Madagascar or Biodiversity in Madagascar Network. [http://www.rebioma.net/](http://www.rebioma.net/) . The Portal of the REBIOMA is in [http://data.rebioma.net/](http://data.rebioma.net/)
• **The SANSA** – South Africa National Satellite Agency has a great satellite station to cover the Mozambic Chanel and Madagascar and the South, South Est and South West of Africa.
Land Cover of Madagascar

- Land Cover Map from FAO Data Base;
Sustainable management of national forest resources needs complete, reliable and up-to-date forest data. The assessment of the change in Madagascar’s natural forest cover, from 2005 to 2010, gave the following main results and highlights:

- Natural forest cover in 2010 was estimated at 9,220,040 ha.
- Approximately 36,000 hectares of natural forest were lost each year in Madagascar, between 2005 and 2010. The annual deforestation rate for the period 2005-2010 is estimated at 0.4%. This represents a decline from previous periods because the rate was 0.8% between 1990 and 2000 and 0.5% between 2000 and 2005.
• Highest regional rates of deforestation were found in western dry forests with a loss rate of
• 0.9% and 0.8% per year for this period, respectively, for Boeny and Atsimo Andrefana regions.
• In terms of area deforested, Atsimo Andrefana and Menabe regions are the most affected:
• almost 66,000 ha and 26,000 ha between the two dates; half of the lost area correspond to
• these two regions.
• Spiny forests and dry forests are more vulnerable than moist forests as well as low altitude
• forests compared to high altitude forests.
• So, Madagascar remains in the category of countries with high rates of deforestation.
## Available data

### Forest carbon database

<table>
<thead>
<tr>
<th>Inventories</th>
<th>Year</th>
<th>Plot numbers</th>
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<tbody>
<tr>
<td>IEFN-0 (DGF)</td>
<td>1995/96</td>
<td>795</td>
</tr>
<tr>
<td>JariAia (DGF/USAID)</td>
<td>2006/07</td>
<td>550</td>
</tr>
<tr>
<td>FORECA Ivohibe (GTZ)</td>
<td>2008</td>
<td>439</td>
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<tr>
<td>FORECA Tapia (ESSA)</td>
<td>2008</td>
<td>385</td>
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<td>Makira (WCS)</td>
<td>2010</td>
<td>131</td>
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<tr>
<td>Forêts sèches (CI)</td>
<td>2011</td>
<td>130</td>
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<td>CAZ/COFAR (CI)</td>
<td>2008/09</td>
<td>117</td>
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<td>PHCF (GoodPlanet/WWF)</td>
<td>2010</td>
<td>92</td>
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<td>Honko (BlueVenture)</td>
<td>2012</td>
<td>78</td>
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<td>Itasy (ONE/DGF)</td>
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<td>70</td>
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<td>Kirindy (ONE/DGF)</td>
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<td>15</td>
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<tr>
<td>PK32 (WWF/CIRAD)</td>
<td>2012</td>
<td>14</td>
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<td><strong>Total</strong></td>
<td></td>
<td><strong>2816</strong></td>
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Tracks ... The model

Random Forest model with explanatory variables:

- Altitude (SRTM)
- MODIS
  - EVI 2000 - 2010
  - VCF 2000 – 2010
- WorldClim
  - Mean Temperature
  - Seasonality temperature
  - Precipitation

The valuation of LiDAR data is in progress.
MAP OF FOREST BIOMAS

Map of forest biomass

- **Best available model**
  Values after cross-validation (10x)

<table>
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<tr>
<th>Model</th>
<th>R²</th>
<th>RMSE</th>
<th>Bias</th>
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<tr>
<td>IEFN</td>
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<td>50.2</td>
<td>106.8</td>
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<td>RF</td>
<td>0.72</td>
<td>38.5</td>
<td>83.5</td>
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<td>Baccini</td>
<td>0.38</td>
<td>54.8</td>
<td>149.7</td>
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<tr>
<td>Saatchi</td>
<td>0.34</td>
<td>59.0</td>
<td>216.2</td>
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</tbody>
</table>

- **Map with 250m resolution, dated 2010** (prediction based on the VCF / ITS 2010)
- **Lack of calibration for non-forest areas**
- **Scientific article writing ongoing**
COMBINATION WITH 2010 CARBON MAP

**Combination with 2010 Carbon map**

- Emissions from 2000 – 2030 * deforestation

<table>
<thead>
<tr>
<th>Year</th>
<th>Stocks tC</th>
<th>Emissions tC/year</th>
<th>Emissions tCO₂/year</th>
<th>Emissions tCO₂ cum.</th>
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<td>2010</td>
<td>835'284'606</td>
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<td>2015</td>
<td>812'505'525</td>
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<td>-16'704'659</td>
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<td>788'877'065</td>
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<td>2025</td>
<td>765'818'143</td>
<td>-4'611'784</td>
<td>-16'909'876</td>
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<tr>
<td>2030</td>
<td>743'446'039</td>
<td>-4'474'421</td>
<td>-16'406'209</td>
<td>-336'741'409</td>
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</table>

Annual emissions of ~ 17 MtCO₂
## DATA FOREST 2000 – 2010 IN 22 REGIONS OF MADAGASCAR

<table>
<thead>
<tr>
<th>Region</th>
<th>Forest 2000 (ha)</th>
<th>Carbon 2000 (tC)</th>
<th>Forest 2010 (ha)</th>
<th>Carbon 2010 (tC)</th>
<th>Deforestation (ha/yr)</th>
<th>Emissions (tC/yr)</th>
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<td>1,125,690</td>
<td>196,522,540</td>
<td>1,115,574</td>
<td>187,746,470</td>
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<td>168,792</td>
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<td>ATSIMO</td>
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<td>9,220,040</td>
<td>985,516,151</td>
<td>-71,971</td>
<td>-5,859,495</td>
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</table>
THANK YOU FOR YOUR ATTENTION