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FINAL PUBLISHABLE ACTIVITY REPORT

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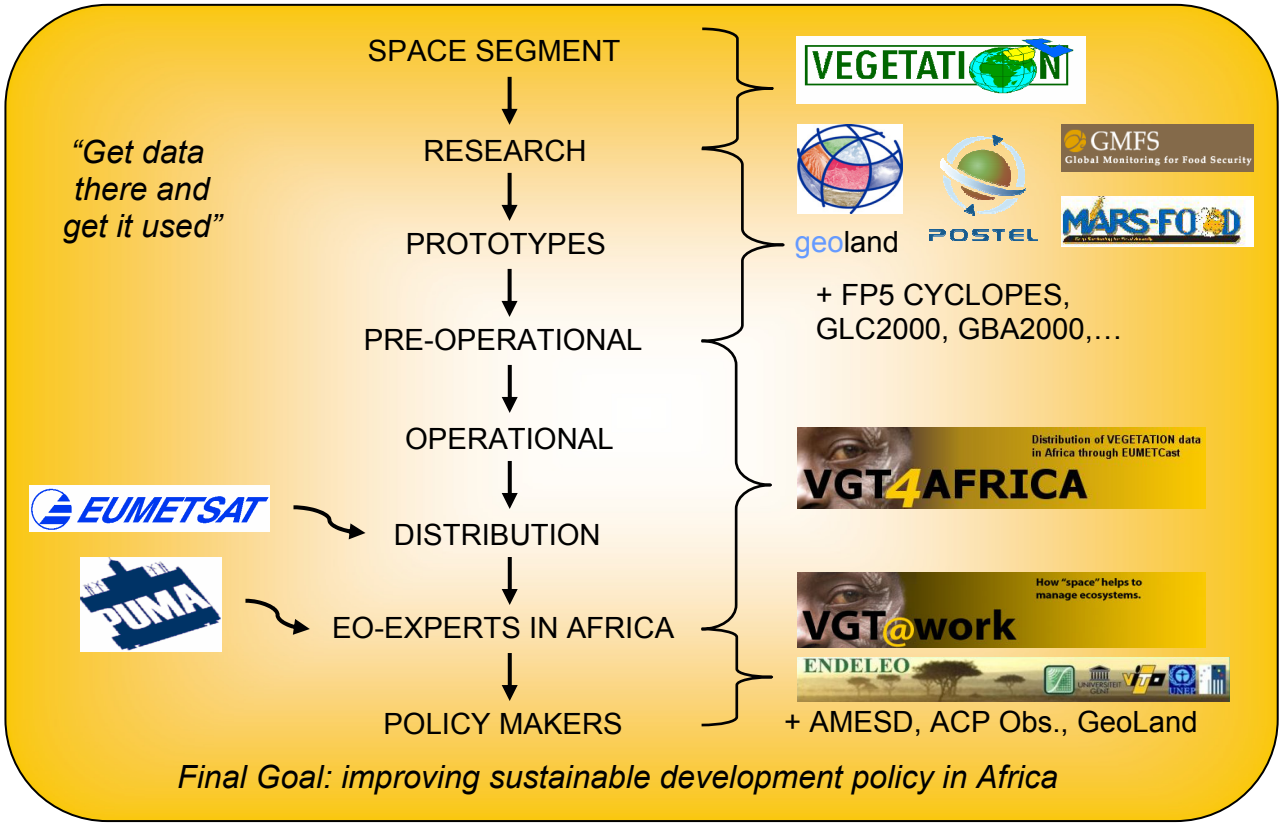
The operational production, distribution and the effective use of environmental, remote sensing and Earth Observation data is of enormous benefit to the African people and sustainable development. How the VGT4Africa partners, VITO, JRC-IES and MEDIAS-France, accomplished this for data derived from the VEGETATION instruments on board the SPOT satellites, is described in this report.

Distribution of SPOT-VEGETATION data in Africa through EUMETCast



Introduction

The European Commission intends to promote the involvement of the developing countries in the **Global Monitoring for Environment and Security** (GMES) initiative, by ensuring their access to Earth Observation data, especially from satellite measurement networks. The VGT4AFRICA project responds to this EC intention and provides to Earth Observation experts in African countries VEGETATION derived data and products. The local EO-experts can extract valuable information from this data which helps their local policy makers in their decision making processes.

Objectives

In the framework of GMES and in complement to the PUMA and AMESD projects, the VGT4AFRICA project aspires to set up and maintain **an operational capacity for production** as well as **timely and free delivery** of VEGETATION data from the SPOT satellites and high-level derived products **to all African countries.** The African user community includes all national meteorological services of Africa as well as regional institutions responsible for environmental monitoring.

This data should be used to support sustainable development policies in Africa.

The main objectives of the VGT4AFRICA project are to enable the African Experts to work with the delivered environmental information. This objective can be split up in a technical and the human one.

The "Technical objective" is **to give easy and free access** to low resolution Earth Observation data products to African users in **all African countries** via the EUMETCast telecommunications system provided by EUMETSAT;

The "Human objective" is to aid the African Earth Observation experts in receiving the data and **to train them** in working with the products.

In other words, we could say that we want to "*get it there and get it used*"!

This service is an important step to help African authorities and institutions in fulfilling their environmental monitoring and reporting obligations and in improving the management of their natural resources. The African users can achieve this by developing their own **operational environmental monitoring services** based on the exploitation of the products delivered through the above-mentioned system. For long-term sustainability, the VGT4AFRICA project is part of a larger strategy to which many projects contribute, as indicated in the figure above.

2005: product catalogue and first disseminations

In the first year of the project, the project partners first assembled a **catalogue of possible products** was assembled, which was presented to a committee of 11 African users from 10 different national and regional environmental institutions, at the first users meeting in Ispra, Italy in early June 2005.

From this catalogue, shown in the table below, the user committee selected the products that they were most interested in, resulting in the definition of the project's **product portfolio** (indicated in dark green).

For the production and delivery of the selected Earth Observation data products, a dedicated processing system was also set up at VITO, Belgium.

Using this system, 2 of the selected products, **NDVI** (Normalized Difference Vegetation Index) and **NDWI** (Normalized Difference Water Index), were operationally produced and delivered to the African users via the **EUMETCast** satellite broadcasting system from EUMETSAT, at the foreseen 10-day interval.

To monitor the delivery of the products, VITO also set up it's own EUMETCast receiving station.

As a fall-back scenario for the EUMETCast dissemination system, users were given the possibility to download products freely from the **project website**, accessible at http://www.vgt4africa.org and setup and maintained by VITO.

To help the African users in converting the data to the format they require and in clipping the geographical region of interest, VITO developed the **VGTExtract tool** and provides it as freeware on the website. The setup of a user **help desk**, the creation of documentation and training material and the organization by JRC-IES of the **first training session** in the Agrhymet regional centre in Niamey, Niger provided further support for users.

Product class	*Variable*	*Product name*	*Ancillary data*	*Developer*	*Code Provider*	***PRIOR***	***Time freq***
Vegetation	Leaf Area Index	LAI	None	Medias	Medias	**2**	**10D**
	Fraction vegetation cover	fCover method 1	None	Medias	Medias	**1**	**10D**
		fCover method 2	None	JRC	VITO	**2**	**10D**
	Fraction of Absorbed PAR	FAPAR	None	Medias	Medias	**2**	**10D**
	Phenology	Phenology	None	JRC	JRC	**1**	**10D-M**
	Productivity	Net Primary Productivity	Solar irradiance, air temperature	VITO	VITO	**2**	**D-M**
		Net Ecosystem Productivity		VITO	VITO	**2**	**SEASON/YEAR**
		Dry Matter Productivity		VITO	VITO	**1**	**10D-M**
		Vegetation Productivity Indicator	None	VITO	VITO	**2**	**10D**
Radiation	Surface Albedo	Albedo	None	Medias	Medias	**1**	**10D**
Fire	Burnt area	Burnt area	None	JRC	VITO / JRC	**1**	**10D-M**
	Drought indicator	NDWI	None	VITO	VITO	**1**	**10D**
Water	Water Bodies	Water Bodies	Lake & Wetland database	JRC	VITO / JRC	**1**	**10D**

Catalogue of potential products and the selected product portfolio (dark green) Vegetation Productivity Indicator was additionally implemented.

2006: important shift to user support

In 2006, further product developments have led to the **operational production** of 5 out of the 10 selected products: **NDVI**, **NDWI**, Dry Matter Productivity (**DMP**), Vegetation Productivity Indicator (**VPI**) and Small Water Bodies (**SWB**), partly thanks to cooperation with other projects such as the Food Security component of the Monitoring Agriculture with Remote Sensing (MARS) project and the Global Monitoring for Food Security (GMFS) project. Because the processing chains for **Phenology** and Leaf Area Index (**LAI**) products have also been delivered to VITO for integration. Operational production for those products was expected to start in early 2007 as well.

In addition, the **metadata of the products** was significantly **enhanced** and now follows the international ISO 19139 standard, which may allow the data to be incorporated into web services that follow the Open Geospatial Consortium's (OGC) standards and may also make the data compliant with the INSPIRE directive. Pursuing this compliance is however still ongoing, as the standards are rapidly evolving.

In October 2006, the VGT4AFRICA partners also presented the project and it's data at the **7th EUMETSAT User Forum** in Maputo, Mozambique. At this forum, **2 DVDs** with software and documentation in French and English, including an overall **user manual** that covers all aspects of VGT4AFRICA, were provided to the forum attendants as well. In addition, JRC-IES collected a list of e-mail contacts for the EUMETCast stations in Africa, which allowed for a direct communication to promote the reception of VGT4AFRICA data.

JRC-IES also organized 2 additional training sessions: one in Gaborone, Botswana in July and one in Maputo, Mozambique in October, immediately following the user forum mentioned above.

In 2006, the number of website users and the number of EUMETCast

receiving stations that are known to actively receive VGT4AFRICA data, have significantly increased. Four out of the 6 organizations with active reception, Agrhymet, INAM, ARC and BMS further distribute the data among their regional and national partner organizations.

2007: growth in product usage

An overview of the EUMETCast stations and their status at the end of the project, as known to the VGT4AFRICA partners, is provided in the table below. As can be seen, the 5 additional EUMETCast stations actively receiving the VGT4Africa data **nearly double the total number of receivers** in comparison to the end of 2006. Quite a few receivers are in preparation as well.

Largely thanks to the dissemination of DMP, VPI and SWB data since the end of 2006, the availability of Phenology data since mid 2007 and the promotion of the data in various training and outreach activities, the **usage of the VGT4Africa data** enjoyed another big **increase** in 2007. The data were not only used in the 4 regional training workshops foreseen in this project and organized by partner JRC. The 4th and final regional training session, hosted by the IGAD region's Climate Predication and Application Center (ICPAC), was held in September 2007. But the provided products were even used in training sessions organized by third parties, such as the International Institute for Geo-Information Science and Earth Observation (ITC).

The **number of product**s successfully **downloaded** from the project website **increased five-fold**, from 2000 (end of 2006) to around 12000, representing a total volume of over 200 GigaBytes.

The number of registered web site users doubled w.r.t. 2006 as well, resulting in **over 100 users** at the end of 2007, spread over more than 20 different countries.

The user community contains a **wide variety of users**, from PhD students over research institutes, universities to **regional center**s (spanning an economic or development region of multiple countries) and even **international organizations** like United Nations Food & Agricultural Organization (FAO) and World Food Programme (WFP).

The VGT4Africa data disseminations can thus be seen as a way to reunite multiple research communities, across projects and research themes, at continental scale.

The integration of the LAI, fCover and Albedo products required more effort than expected. The Phenology products, although ready in mid 2007, needed to be revised because of a technical constraint preventing their EUMETCast dissemination.

However, through **relentless efforts of the partners** - even partly at their own expense in early 2008 - **nearly all** foreseen **products** were **operationally produced and delivered** to users in early 2008. Only Burnt Area's final integration tests were postponed until Geoland-2, that is expected to start around mid 2008. This includes an additional 10th product, VPI, that was added to the portfolio in 2006.

A **final user workshop** was organized at VITO in November, with 10 different users from all corners in Africa. At this workshop, the partners gathered user feedback, which is important for the further continuation and strategy of this work.

A lot of effort also went into the **continuity of VGT4Africa**'s efforts, for instance through a number of follow-on or related activities like FP7 Geoland, FP7 DevCoCast, VGT@Work, ACP Observatory and African Union Commission's AMESD initiative.

Organization	Country / region	Station status at end of 2007
Agrhymet regional center	CILSS region (9 countries in western Africa)	Active since 2005
Agricultural Research Council, Institute for Soil, Climate and Water (ARC-ISCW)	South-Africa	Active since 2005
Botswana Met. Office & Southern African Development Community (SADC)	Botswana, SADC region (14 countries in southern Africa)	Active since 2006
University KwaZulu Natal (UKZN)	South-Africa	Active since 2006
National Meteorological Institute (INAM)	Mozambique	Active since 2006
National Meteorological Service	Sudan	Active since 2006
Geographic Information Systems and Remote Sensing Regional Outreach Center of the National University of Rwanda (CGIS-NUR)	Rwanda	Active
National Meteorology Directorate	Ivory Coast	Active
Kenya Meteorology Department (KMD)	Kenya	Active
National Meteorological Agency	Ethiopia	Active
Zambia Meteorology Department, Remote Sensing Unit	Zambia	Active
ASECNA	Senegal	In preparation
National Meteorological Service	Swaziland	In preparation
National Meteorological Office	Congo-Brazzaville	In preparation
National Meteorological Office	Mauritania	In preparation
Water Resources Department	The Gambia	In preparation
Institute for Arid Regions (IRA)	Tunisia	In preparation
National agency for meteorology and satellite tele-detection (METTELSAT)	Dem. Rep. of Congo	In preparation

Overview of VGT4AFRICA reception via EUMETCast at the end of 2007

Outlook

A number of activities carry on where VGT4Africa leaves off. Examples include the VGT@Work project, started in 2007, that will focus on further training of African Earth Observation specialists in the CILSS and SADC regions in the use of VGT4AFRICA data. It will help them improve their specific applications, thus further bridging the gap between the African EO experts, targeted by VGT4AFRICA, and the policy makers.

Other initiatives such as the FP7 Geoland and FP7 DevCoCast will continue and improve the data production and dissemination and extend this system to Developing Countries in Asia and South America. To accomplish this, the GEONETCast system will be used. GEONETCast is currently one of the most operational components of the Global Earth Observation System of Systems (GEOSS).

The African Union's African Monitoring of the Environment for Sustainable Development (AMESD) initiative will for instance maintain the existing EUMETCast receivers in Africa and install several more.

The ACP Observatory will focus more on the thematic interpretation of the provided data.

Impact of the project

The project was well received in the Earth Observation community that focuses on global land applications, for instance at multiple EC and ESA workshops and forums.

Many people, both on the European and on the African side, which include not only Earth Observation specialists, but also policy makers, have already shown interest in the project, particularly in how we approach the end users in Africa. The new approach using satellite telecommunications, combined with operational, reliable data provision, were key success factors.

The cooperation in the consortium, with EUMETSAT, the VEGETATION programme and the African users, but also with related projects, happens in a very constructive atmosphere, which pave the way for further collaboration.

VGT4Africa at a glance

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