

# geoland Overview 2005

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## General Progress

The geoland Global Observatories could benefit from substantial additional implementation opportunities, some of them including additional funding already last year (e.g. FP6 SSAs VGT4AFR and HALO, EC & Chinese Food Monitoring system roll-out funding, ESA's DUE project GlobCover, JRC's Global Daily Burnt Area project, PUMA access to infrastructure).

The Global Observatories have initiated a meeting to pave the way towards a "Global Land Monitoring" service.

The year 2005 saw two major steps forward for the Regional Observatories:

- Implementation funding through ESA's GSE Stage 2 project "Land Information Services",
- the programmatic definition and implementation road-map for a "Fast Track Service Land Monitoring" (EC COM). The DG ENTR Implementation Group just had its first meeting on Monday this week.

Currently, EEA and its MS are discussing an improved European land monitoring update to be implemented as a GMES "Fast Track Service Precursor".

A self-governed and project-overarching "GMES Land User Platform" has been initiated by the GSE Land project in close coordination with geoland. It will be organised and led by ETC-TE (see ESA/PB-EO(2006)9).

The geoland consortium has established excellent working links with parallel and follow-up GMES activities, including the Sentinel definition and the IP Sustainability [called "Boss4GMES"] (and many more, e.g. ESA Heterogeneous Mission Access).

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To ensure a consistent message and information flow from the consolidation phase into implementation and further R&D activities, the consortium currently evaluates to establish a "geoland platform" to allow programmatic coordination across the participating stakeholder groups and projects.

### **Operational Scenario**

The operational scenario team has focussed on three major GMES objectives in 2005:

- the development of implementation scenarios both for the regional and global applications, resulting -inter alia- in inputs to the FTS European Land Monitoring, and a Global Land Monitoring strategy paper to be discussed at a meeting "Towards a Global Land Monitoring fast track service" end of February.
- the definition of sensor requirements including key inputs on behalf of the "land cover & vegetation" community into the Sentinel-2 programmatic definition and the on-going study (... list documents OS, Sentinel-2, DLR Study).
- The definition of sensor requirements for a post-Vegetation mission.
- verification of existing sensor capacities meeting short and mid-term user requirements - essential for GMES implementation and operations before 2010.

Further activities included

- geoland requirements on multi-mission EO data access (ESA HMA study), and
- an assessment of the geoland service maturity to identify gaps in technology to be closed by follow-up activities (Research, Development, Industrialisation/Operationalisation), and elements mature for short-term or mid-term implementation.

Sentinel-2 seems to evolve into a powerful tool serving the high-resolution land monitoring requirements. The idea to attach the medium-resolution land monitoring requirements to an Ocean-minded Sentinel-3 seems to deserve further thinking - it may look attractive from a sensor-type of view - the GEOLAND partners consider that in such event instrument and system specification should fully include the specific requirements of land monitoring applications..

The technical implementation assessment leads to the preliminary conclusion that FP7 DG RTD funding may be appropriate to cover additional R&D required; operationalisation funding to upgrade performance and to go from prototypes to fully integrated systems is still open - Contributions from ESA, Eumetsat Member States and EC sector policies are potential sources. Fast Track Service implementation seems to be secured for the European Land Monitoring core services, while the downstream applications turning land cover into meaningful user information is largely open. The same applies to the Global Observatories mature elements for a "Global Land Monitoring" service.

### **Core Service Land Cover**

The Core Service definition was accepted as intermediate step towards a higher level information service reflecting policy needs by ESA for GSE Land, and by EEA / DG ENTR to prepare the Terms of Reference for a "European Fast Track Service Land Monitoring".

Activities focussed on:

- Verification of thematic service definition by key European user organisations,

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- Validation of eligible production methods,
- Evaluation and benchmarking of scale-independent change detection approaches,
- Review of Mediterranean objects definition, and demonstration of applicability for Med. conditions with Spanish, Italian, and Greek user organisations.

The analysis of interoperability with national land cover mapping programmes started in Q4/2005 following the apparent need for such a discussion after the DG ENTR Fast Track Service Land Monitoring Workshop.

A sub-set of classes has been selected to propose a Fast Track Service Precursor (FTSP) outline to successfully initiate a MS debate leading to a modified approach for the up-coming European land monitoring update. A close working relationship with the Implementation Group land has been established.

### **Observatory Nature Protection**

Starting from a quite fragmented ground with a broad portfolio ranging from local site-monitoring applications towards regional / European monitoring of habitats and biodiversity, the service portfolio has matured:

- A general site monitoring service applicable for all Europe has been proposed. Successful consolidation within the observatory provided, it has been accepted by ESA for a European-wide implementation on a larger number of sites as an optional GSE Land project extension.
- To support the large variety of national / local nature monitoring and site management needs, the strategy has been changed away from “custom-made services” towards “key information parameters” as input to individually defined local services.

### **Observatory Water & Soil**

#### Water

The validated Water Quality portfolio has been accepted for roll-out in Sweden, Czech, Poland, Germany, Belgium, Luxemburg, France, and Spain through GSE Land. The irrigation service was successfully validated and will see another three years of service continuity for the Adour-Garonne basin (until 2008) through GSE Land; additional Spanish catchments will be addressed.

Consolidation of a new diffuse pollution service for pesticides leakage has been started. The OWS-W service portfolio in total will be further developed during 2006, with training for the national and regional users in autumn 2006.

#### Soil

Having identified the fact that European-scale and national-scale soil erosion models provide non-consistent results, even working on similar input data, the observatory has been focussed on identifying the reasons. One key driver seem to be model sensitivity towards seasonal vegetation coverage variation.

Model assimilation to prove and demonstrate sensitivity is being prepared for Italian and Greek sites.

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### **Observatory Spatial Planning**

The validated land consumption assessment and impact portfolio (OSP-F-1) on sub-national level has been accepted for roll-out through GSE Land in the following 10 European countries: Austria, Belgium, France, Germany, Liechtenstein, Luxembourg, Netherlands, Spain, Switzerland, United Kingdom. Further to implementation in the a.m. test-sites tool operationalisation has been funded in GSE Land.

The scenario tool (OSP-F-2) has been validated in 2006 and offered as a potential extension to GSE Land.

The European portfolio relying on CORINE data has been tested in the European test site (approx. 400.000 sqkm) and has in parts been rolled out to all EU nations covered by CLC 90 and 2000 via INTEREG funds.

Regarding LC/LU data OSP has tested and successfully validated core service data for usage of OSP-F-1. Via the ESA funded "Innovator Project CARTO-CHANGE" a linkage between geoland CLC+, CLC and Globcover type LC/LU data will be established.

### **Core Service Bio-Physical Parametres**

Many discussions and meetings between the Core Service Bio-physical Parameters (CSP) and Global Observatories Tasks Managers have lead to a common document presenting their vision of what could be a future operational "Global Land Monitoring" GMES Core Service. This Strategic Plan explains the notion of "Core Service" and "Downstream services", details their links with the current CSP and Global Observatories, and proposes a list of products that could be included in the Core Service portfolio. In parallel, Medias-France, IM and VITO have produced a draft MoU (Memorandum of Understanding) presenting the distribution of responsibilities of main activities (research, processing line engineering development, production) of the future operational Core Service.

At the end of the second year of the geoland project, all CSP products, except Downwelling Shortwave Radiation, are available, at least for limited time periods. The whole time series should be delivered in the next weeks and months. Beside the processing line implementation and the production of large amount of data, the CSP partners have concentrated their efforts on two topics : 1. the validation activities and the improvement of algorithms; 2. the delivery of final products.

Important efforts have been made to improve the CSP pages in the geoland web site. In a first step, a process has been set up to allow the registered users (members of Global Observatories) to get the products on line. Then, after the requests from external potential users, CSP partners have decided to disseminate the products to the whole scientific community, outside the geoland world, without any restrictions. For that, a Data Policy document has been written. Now, an automatic process with identification and registration is under implementation, and should be operational in March 2006. Such facility seems essential for promoting the CSP products by providing them to a user community as large as possible.

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### **Observatory Natural Carbon & Water Fluxes**

Successfully validated model fit for “operationalisation” and mid-term operations are ORCHIDEE, ISBA-A-gs and C-TESEL (CEA/CNRS, Météo-France, ECMWF, respectively). It is expected that the modelling system will be able to reach the pre-operational level before the end of the project for all the ONC products (ECMWF, CEA/CNRS).

A prototype 2D assimilation system was implemented over SW France, using the ISBA-A-gs model. A simple sequential assimilation system was applied at a global scale with ORCHIDEE. On the other hand, although rapid progress was made within geoland, the data assimilation system will need to be consolidated in the framework of post-geoland activities (through FP7) in order to reach the pre-operational level.

### **Observatory Food Security and Crop Monitoring**

geoland supports the development of a Global Crop Monitoring Service in the context of the GMES Land Monitoring Service by developing components that could be applied in any Crop Production monitoring system, notably the MARS system, the GMFS project and a future system for China

The basic assumption is that operational MARS system is the forerunner of the GMES Crop Monitoring Service, and will continue to cooperate with FAO which has the international primary mandate for monitoring agricultural production and food security. The system is the major reference for the Observatory Food Security and Crop Monitoring (OFM), as it is open to upgrades and implementation of new approaches, and transferable to new areas of interest.

The move of Geoland-OFM to China is in response to the interest of the government of China to strengthen and modernize its existing system for collecting statistical data which is now based largely on agricultural ground surveys. The incompatibility of the various data sources on agricultural land cover calls for the use of remote sensing as providing objective truth.

### **Observatory Global Land Cover and Forest Change**

A number of products developed up to pre-operational level by OLF have been accepted by the African User Community to become standard monitoring products delivered operationally in Africa through EUMETCAST to the PUMA receiving stations. The action of transferring OLF results into operational processing and distribution system is covered by the VGT4Africa SSA. The EDF-funded AMESD project expected to start by end 2006 will take benefit of these data.

After reviewing of its design by users a workable prototype of a multi-criteria analysis tool for land cover change identification was developed. It is meant to be used by local users getting pre-processed data as described before.

OLF also contributed to the design of the environment component of the Africa Observatory for Sustainable Development under development (FP7) by JRC in partnership with EC DG's in charge of international cooperation (DG DEV, DG AIDCO, DG RELEX and DG ENV).