

LAND COVER AND CHANGE

Newsletter of the GOFC-GOLD Land Cover Project Office

NOVEMBER 2006

NUMBER 12

EARSSEL WORKSHOP ON LAND USE AND LAND COVER HARMONIZATION

From 28-30 September the European Association of Remote Sensing Laboratories (EARSSEL) together with the Center for Remote Sensing of Land Surfaces at Bonn University organized the **2nd Workshop of the EARSSEL Special Interest Group on Land Use & Land Cover**. Under the title "Applications and Developments" it brought together more than 120 participants from universities, public institutions and companies from Europe. Aim of the workshop was to form a platform for scientific exchange and discussion on current methodological issues in mapping and monitoring land use and land cover from space as well as their application in e. g. large scale mapping, land degradation and urban land cover.

The GOFC-GOLD Land Cover Project office organized a Special Session on Land cover harmonization and held a Tutorial on the UN Land Cover Classification System (LCCS) during the workshop. Summary and outcomes are presented in this newsletter.

Newsletter content

FRA 2010 Global Remote Sensing Assessment	1
Side Event at Climate Change Conference	4
LCCS Tutorial & Land Cover Harmonization Session	5
GSE Forest Monitoring	6
Products of POSTEL	7
Calendar	8

PLANNING A GLOBAL REMOTE SENSING ASSESSMENT FOR FAO'S FRA 2010

EXPERT MEETING DISCUSSES METHODOLOGICAL FRAMEWORK AND A GLOBAL PARTNERSHIP WITH GOFC-GOLD CONTRIBUTION

Background

The Food and Agricultural Organizations of the United Nations (FAO) is producing estimates of the world's forests since the 1940's. The results of the most recent global Forest Resource Assessments (FRA) of 2005 have been documented and published (www.fao.org/forestry/fra2005). It reports on more than 40 variables related to forests and evaluates progress towards sustainable forest management worldwide. The assessment includes 229 countries and territories, and provides forest consistent estimates for 1990, 2000 and 2005. Most of the FRA information is provided by individual country reports that have been synthesized to derive global forest estimates (Figure 1).

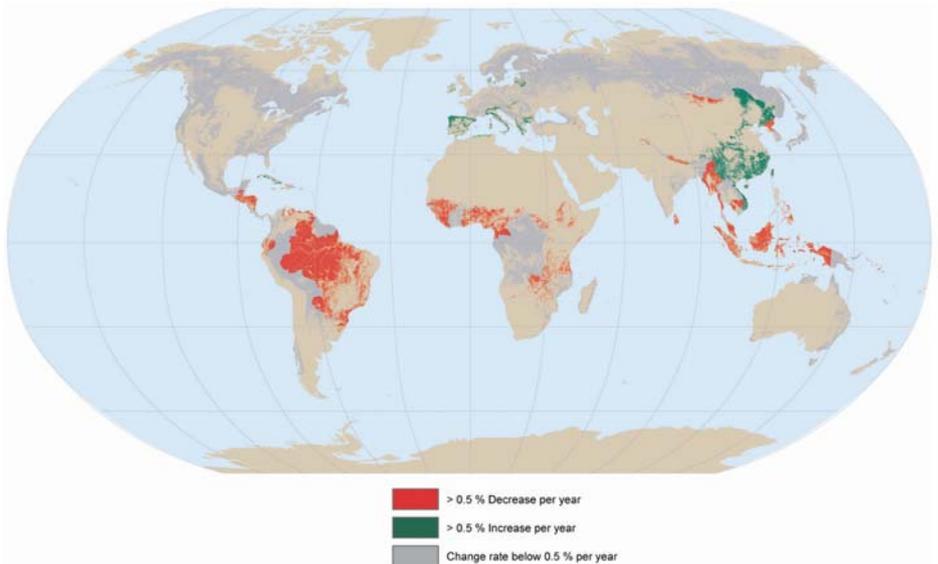


Figure 1: One result of FRA2005: Countries with large net changes in forest area 2000–2005, Source FAO (www.fao.org/forestry/fra2005)

FRA 2010 plans

The next FRA reporting is anticipated for the year 2010. The framework for this upcoming assessment has been outlined in an expert consultation in June 2006 based on an evaluation of FRA 2005 (Meeting report: <http://www.fao.org/forestry/kotka-5>). FRA

2010 will highlight legal, policy, and institutional information in addition to the variables acquired for FRA 2005. The requirements posed by the 2010 targets of the UN Convention on Biological Diversity and reporting obligations of the UN Framework Convention on Climate Change will be receive particular emphasis.

In addition, the expert meeting emphasized enhanced collaboration with other forest-related reporting processes and organizations and to assess the need for and potential scope of a remote sensing component to complement the information provided in national reports. The remote sensing component should provide additional information on the spatial distribution of forests and on forest and land cover and land-use change dynamics at the biome, regional and global level.

Remote Sensing Assessment

Satellite remote sensing has been applied in previous FRA's (i.e. for the year 2000) and is used by number of countries for deriving their national estimates.

As advocated in this year's expert consultation, the growing need for more detailed information on the dynamics of forest area changes led to the plan to complement the FRA 2010 country reporting with a global remote sensing survey. Although being a consistent global effort, the survey evolves with close links to national monitoring systems and should increase national mapping and forest inventory capacities. The independent assessment intends to better inform about the spatial distribution of forests at global and regional levels (area change statistics), and to quantify land use change (deforestation, fragmentation and forest degradation) consistent over time and space. Such information help to better identify causal mechanisms of deforestation, biodiversity and ecosystem assessments, and thus support thematic studies associated with FRA and related research and modeling efforts.

The FRA 2010 remote sensing survey attempts to monitor forests for the time period 1975 to 1990 to 2000 to 2005. The observations will build upon existing Landsat data archives. Additional satellite data are needed for existing Landsat data gaps (i.e. from clouds and seasonality requirements). A supplementary project for a Radar data assessment in permanently cloudy areas is described in this Newsletter (FRA-SAR project). The Landsat-resolution satellite assessments will be use a systematic global sample of lat/lon grid intersections (Figure 2). The current plan estimates about 9.000 sample locations globally. The implementation will be closely linked with the European TREES-3 project coordinated by the Joint Research Center. The high resolution sampling approach will integrated with moderate resolution global observations (MODIS vegetation continuous fields on percent tree canopy cover) from 2000-2005. Such data provide full global coverage, annual estimates of tree canopy cover at 250 m spatial resolution and indicate likely hotspots of deforestation and allow for identification of major degradation corridors.

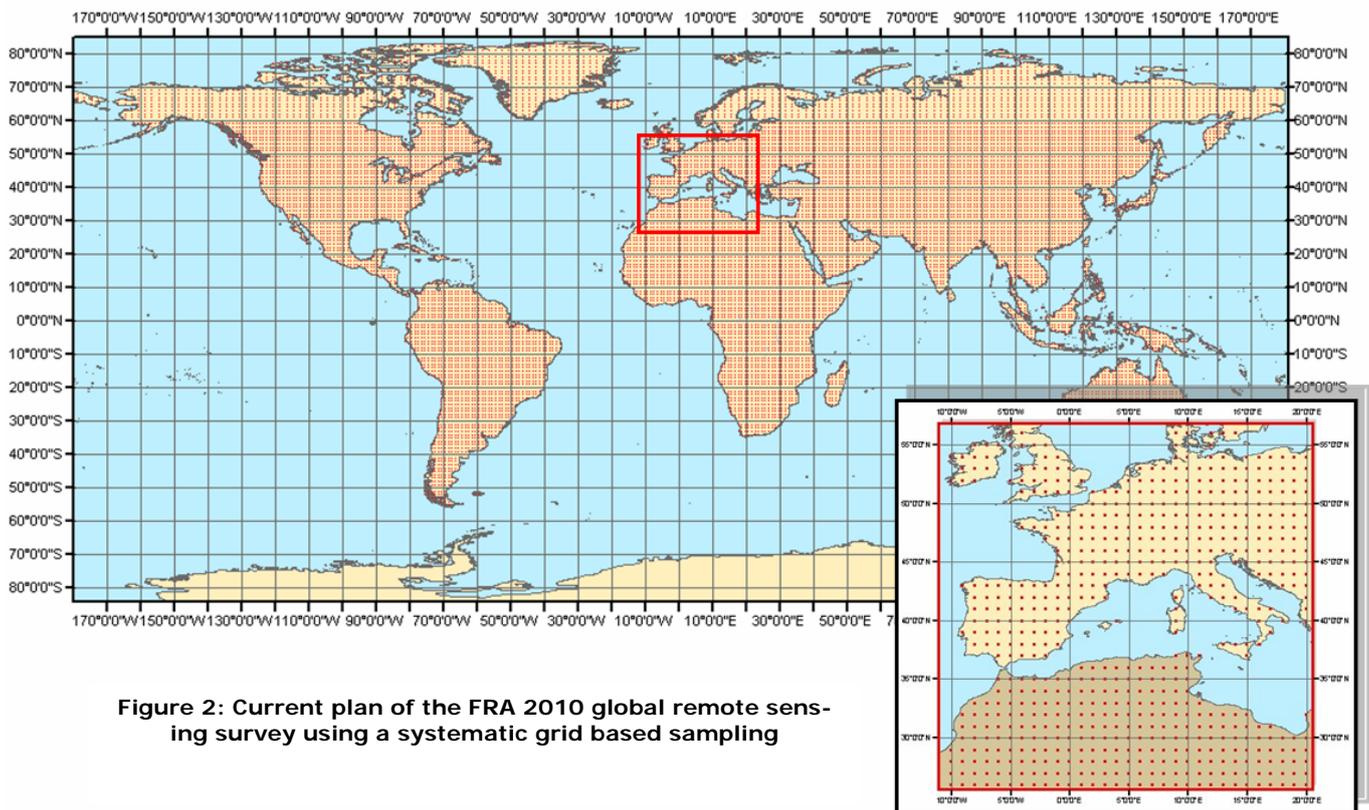


Figure 2: Current plan of the FRA 2010 global remote sensing survey using a systematic grid based sampling

Expert meeting in Oct. 2006

A first positive feedback on the survey plan from the land remote sensing community was provided during the global vegetation monitoring workshop in Missoula, in August 2006 (www.ntsg.umt.edu/VEGMTG/). The conclusions of the land cover breakout group can be found in a summary report presentation: http://www.ntsg.umt.edu/VEGMTG/thursday/1030_Landcover_report.ppt. To further review and refine the approach, NASA provided funding to the Heinz Center to organize an FAO-UNEP technical meeting on the methodology and implementation aspects of the planned FAO FRA 2010 remote sensing survey. The meeting took place at the H. John Heinz III Center for Science, Economics, and the Environment, Washington, DC. It was attended by 24 forest and land cover/land use mapping and monitoring experts (Figure 3).

The objectives of this meeting were to assist FAO and UNEP in further refining the methodology for the planned FRA 2010 Remote Sensing Survey by (i) informing meeting participants on the current status of the plans and (ii) collecting specific methodology feedback and suggestions from participants, e.g. sampling design, available input data, preprocessing options, classification system and legends. In addition, the intention was to evolve an operational global partnership chaired by FAO and UNEP for the implementation of the survey. The general conclusion of the meeting was the endorsement of the general approach and methodology proposed for the planned FRA 2010 Remote Sensing Survey. There was willingness of the participants to assist in its implementation and the group of experts present at the meeting can continue to play an advisory role without the need of a formal partnership agreement.



Figure 3: FAO-UNEP technical meeting on the methodology and implementation aspects of the planned FAO FRA 2010 remote sensing survey at Heinz Center, Washington DC on 18/19. Oct. 2006.

GOF-C-GOLD contribution

GOF-C-GOLD has been invited to the FRA 2010 remote sensing partnership and actively participated in the expert meeting. Given the plan of activities, GOF-C-GOLD has offered to contribute as established international platform on global forest and land cover observations in a number of specific aspects of the survey. Through its close connection to space agencies, GOF-C-GOLD will help in making remote sensing data available for the survey. This includes the access to archives of non-Landsat data to fill data gaps, the timely delivery of the Landsat mid-decadal dataset and the provision of Landsat-type image data in the near future. GOF-C-GOLD will advise and help the consensus building on the remote sensing data interpretation methods and the development and harmonization of legends based on LCCS. GOF-C-GOLD made a proposal to provide the accuracy assessment for FRA 2010. The land cover implementation team has already committed to pursuing a global land cover validation effort. The FRA 2010 process could directly benefit from related GOF-C-GOLD and CEOS Cal/Val experiences and, vice versa, the information provided by FRA 2010 could be directly incorporated in the GOF-C-GOLD global validation activities. In addition, GOF-C-GOLD offered its existing networks of regional expert and capacity building efforts, the monitoring activities of fire implementation team, and the advocacy role in the context of GEO and contributing projects such as FRA-SAR.

Link to GEO

An adjacent meeting on 20th October 2006 at the Heinz Center discussed the potential contribution of GEO to the FRA 2010 process. Organizations leading the related work plan task (AG-06-04), the evolving GEO community of practice for forest observations and a representative from the GEO secretariat informed about their activities. The participants jointly revised the work plan for the related tasks and pointed at avenues where GEO help and input is needed with the most urgent objective for accessing to high-resolution satellite datasets and coordinated acquisition strategies.

REDUCING EMISSIONS FROM DEFORESTATION IN DEVELOPING COUNTRIES

JOINT ESA & GOFC-GOLD SIDE EVENT AT THE UNFCCC CLIMATE CHANGE CONFERENCE 2006 IN NAIROBI



Deforestation accounts for approximately 20 % of the global anthropogenic carbon dioxide emissions. The majority of these deforestation activities are occurring in developing countries (~15 million ha/yr). Preventing forests from being cleared could stop these emissions. Therefore, international negotiations are currently underway within the UNFCCC to build incentives for developing countries to reduce or avoid emissions from deforestation and forest degradation (REDD) and have been discussed at this years UNFCCC Climate Change Conference, held from 7-17th November in Nairobi, Kenya.

Addressing this topic, the European Space Agency (ESA) and the GOFC-GOLD Working group on REDD organized a side event during the conference on "Reducing mission from deforestation in developing countries". The aim was to inform about the technical capabilities for monitoring deforestation and reduced carbon emissions by remote sensing techniques and about current national pilot projects. Frédéric Achard from the GOFC-GOLD Land Cover Implementation Team discussed the considerations and presented the GOFC-GOLD technical document that has been recently published as input to the SBSTA (Newsletter 11). Olivier Arino (ESA) informed about ESA activity and the GMES initiative. Furthermore case studies from Bolivia and Cameroon were presented by Gisela Ulloa (Bolivia), Bernard Schlamadinger (Johanneum Research) and Thomas Häusler (GAF AG). More

ESA and GOFC-GOLD side event at UNFCCC COP 12 and COP/MOP 2 in Nairobi

Thursday 9 November 2006
11:15-12:45 in African Blackwood Tree room

Reducing emissions from deforestation in developing countries: can it be measured?

AGENDA

- REDD: Considerations for Monitoring and Measuring
Frédéric Achard, JRC & GOFC-GOLD Land Cover Characteristics and Changes Implementation Team
- Satellite data availability and GMES
Olivier Arino, ESA
- ESA GMES Forest Monitoring services
Thomas Häusler, GAF and Antonio Lumicid, Ministry for the Environment, Land and Sea of Italy
- Combining policy analysis with remote sensing data to test REDD policy mechanisms
Bernard Schlamadinger and Tracy Johns, Joanneum Research
- REDD in Bolivia: Building wall to wall emission projections based on national experiences
Gisela Ulloa, Coordinator National Clean Development Office/Lead negotiator in REDD, Bolivia

The side event will be chaired by Mark Doherty, ESA

than 100 conference participants attended the side event.

In 2007, GOFC-GOLD will organize a following workshop to further discuss the topic and to develop implementation guidelines towards a detailed technical protocol for measuring and monitoring.

Further information as well

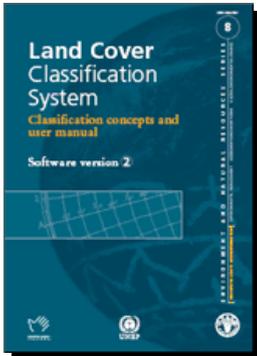
as the presentations can be found on the UNFCCC website:
http://regserver.unfccc.int/seors/reports/events_list.html.



Impressions from the ESA/GOFC-GOLD side event at the UNFCCC Climate Change Conference 2006

TOWARD HARMONIZING GLOBAL AND REGIONAL LAND COVER MAPS

GOFC-GOLD SPECIAL SESSION & LCCS TUTORIAL DURING THE EARSEL WORKSHOP (OCTOBER, IN BONN)



A main activity of the GOFC-GOLD Land Cover Implementation Team is participation in the Harmonization & Validation Initiative that aims to establish international standards for land cover characterization and to produce reliable accepted methods for land cover map accuracy assessment.

In response to the need for consistent information about land cover and land cover change, several global and regional datasets have been derived in the last years. But their development was driven by different national or international initiatives, so that the applied mapping standards reflect the varied interests, requirements and methodologies of the originating programs. As a consequence, compatibility and comparability between these different maps are limited and hinders their use to serve a large number of applications. Addressing this topic, the GOFC-GOLD Land Cover Project Office organized a **Special Session on Land Cover Harmonization** during the this year's workshop of the EARSEL Special Interest Group on Land Use & Land Cover, prefaced by a **Tutorial on the UN Land Cover Classification System (LCCS)**.

component for harmonization and validation of global and regional land cover datasets as it provides the appropriate framework for land cover legend generation and as exploratory tool for comparing and contrasting classification schemes.

The tutorial was prepared and organized by Martin Herold (GOFC-GOLD) and Antonio di Gregorio (FAO) and gave a brief introduction to LCCS as land cover language and legend translator and discussed the needs and concept for land cover harmonization and standardized mapping. The presentation included an overview on the process and the results of translating the CORINE land cover/use legend into LCCS.

In the following session current mapping projects and programs in Europe were presented. Ana Souza (European Environmental Agency, EEA) and Steffen Kuntz (Infoterra) presented the GMES Fast Track Service for Land. Pierre Defourny (University Louvain) informed about the GLOBCOVER initiative (see GOFC-GOLD Newsletter 6). The National Geographic Institute of Spain presented the SIOSE project, addressing the issue of an effective land cover and land use information infrastructure using a classifier concept similar to LCCS.

Related documents and information on the Tutorial and LCCS are available on the GOFC-GOLD Website:

http://www.gofc-gold.uni-jena.de/sites/lccs_earsel06.php



Impressions of the 2nd Workshop of the EARSEL SIG of Land use & Land cover, October 2006, in Bonn (photos: EARSEL)

LCCS is classification system developed by FAO and UNEP. It is a reference system for land cover able to combine a high level of flexibility (ability to describe land cover features all over the world at any scale or level of detail) with an absolute level of standardization of the class definition between different users. It allows a dynamic creation of classes by a combining land cover diagnostic attributes so called classifiers. In that way LCCS is an essential



SERVICE PORTFOLIO TO SUPPORT SUSTAINABLE FOREST MANAGEMENT

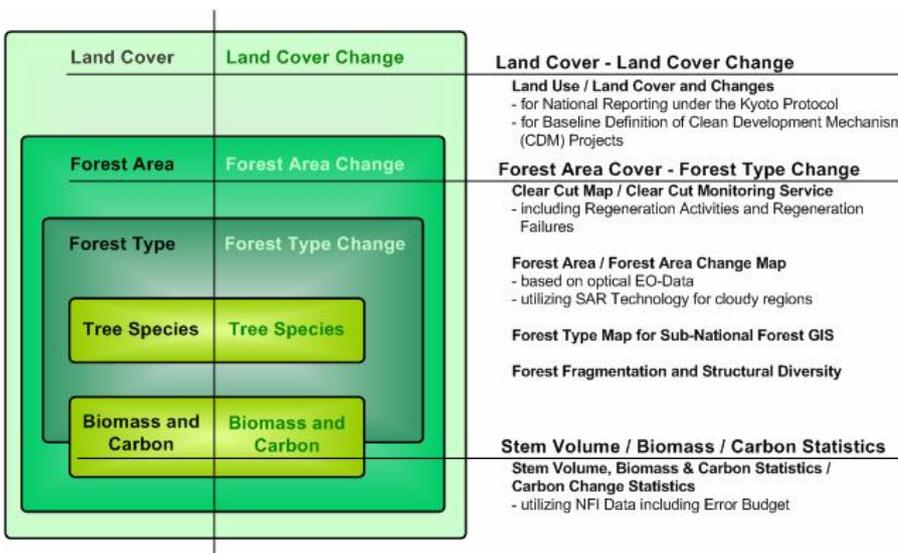
THE GMES SERVICE ELEMENT (GSE) FOR FOREST MONITORING



Environmental policies and a sustainable management of ecosystem resources need reliable and actual information about the status of the environmental systems to plan future developments and actions and to monitor their effectiveness. To strengthen the use of Earth Observation

in this field, the European Union has launched together with the European Space Agency (ESA) the joint initiative: Global Monitoring of Environment and Security (GMES) that aims to develop a global monitoring capability for policy makers and other end users based on remote sensing (<http://www.gmes.info/>).

An integral component of GMES focusing on forest ecosystems is the **GMES Service Element (GSE) for Forest Monitoring**, initiated in 2002. It seeks to provide a service portfolio for standardized spatially referenced, quality products and services around forest monitoring e.g. forest and land use maps, biomass, and carbon accounting (see Fig. 3) on different spatial scales. These products are accessible and transparent to users and address the policy related demands for securing the ecological functions in the forestry and land use sector, i.e. UNFCCC, Kyoto Protocol and the UN Convention on Biological Diversity.

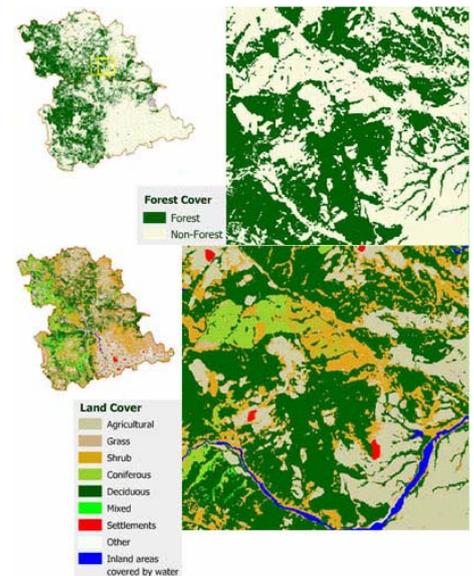


Products provided by the GSE Forest Monitoring Service

The Forest Service is a network of various partners, including the service providers (agencies working in the field of remote sensing), user organisations (policymakers and national institutes) and the research community from 16 countries. The lead is accomplished by the GAF AG Germany.

In the first phase, which was successfully finished in 2005, key concepts, products and services were developed in different test sites and applied by the users. Currently the second stage is ongoing until 2008, with the objectives to demonstrate progress towards long-term sustainability and to deliver services and benefits to users on larger scales. It is intended to establish a durable, open and dis-

tributed GMES Service Provision Network as well as standards and working practices for GMES Services. The provided services will be scaled up to pan-European Scale. On the national level, support to national UNFCCC and Kyoto Protocol Reporting obligations in LULUCF sector is addressed, as well as forest information up-date and the detection of natural and human induced forest disturbances. Local scale activities focus on the support to management and reporting obligations of LULUCF projects.



Product examples, forest & land cover maps for a test site in Greece

An important goal is the co-ordination with related GSE's and other EO-Land Services programmes in Europe and internationally. This co-ordination is required to avoid duplication of services and products, catering to the same user-segments (policies) and to improve the cost-effectiveness by developing synergies in shared infrastructure, data etc.

For further information:
<http://www.gmes-forest.info/>

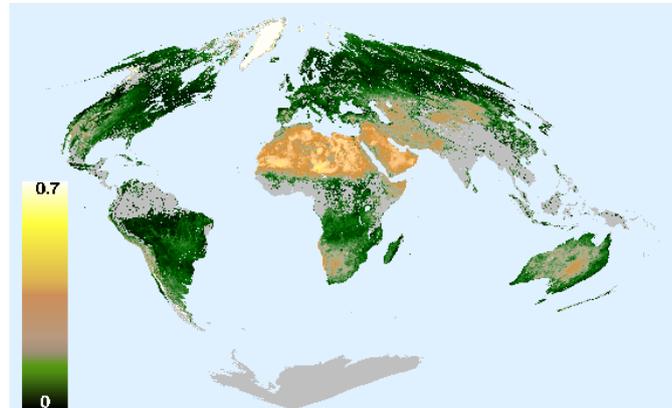
DERIVATION OF BIOPHYSICAL PARAMETERS FROM SATELLITES IMAGES

UPDATED POSTEL WEBSITE PROVIDES VARIOUS PRODUCTS



To develop the knowledge in climate and environmental science and to understand the underlying processes a wide range of variables characterizing ecosystem conditions are needed. These "biogeophysical variables" describe e. g. vegetation cover, burnt areas, soil moisture content, albedo or the surface temperature and are used as input for modeling environmental processes and to produce monitoring indicators like water quality, drought, desertification, deforestation/ reforestation, which are important for decision makers and in environmental policy. The service **POSTEL (Pôle d'observation des surfaces continentales par télédétection)** addresses this need. It aims to derive soil and vegetation variables by using Earth Observation satellite data for regional and global scales.

POSTEL is a French initiative, supported by several national public institutions e. g. Météo-France, the National Space Agency (CNES) and the National Centre for Scientific Research (CNRS). It is a network of Expertise Centers, the Service Centre and various cooperating research laboratories, data processing centers and companies. The Expertise Centers are research groups of national institutes. Their task is to develop the concepts for the biogeophysical products and the appropriate algorithms and the product validation, while the POSTEL Service Centre, located at MEDIAS France, is responsible for the design of the operational processing lines, the production and dis-



Product example: Directional albedo, 670nm, July 15, 2005 (derived from POLDER-3/ Parosol)

tribution, as well as of the interface with the user community. The product portfolio encompasses parameters concerning vegetation and soils, the radiation and the watercycles (see fig.). They are derived from optical or micro-wave sensors measurements acquired over many years. After registering on the POSTEL webpage, these products are available for download.

The POSTEL network is engaged in several projects covering different application fields. Ongoing Research & Development projects focus on the derivation of biogeophysical variables and their validation. Other projects like GEOLAND, GlobCover or VGT4AFRIKA aim to prepare the onset of monitoring services for GMES, e. g. POSTEL conducts the leadership of the GEOLAND Biogeophysical Parameter Core Service (CSP) and provides the CSP products to the users. A third group of projects is connected to space science, wherein POSTEL is responsible for the processing, the production and the distribution of scientific satellite sensors of CNES. Actual examples are parameters derived from the POLDER sensor, e. g. NDVI, albedo and the Bidirectional Reflectance Distribution Function (BRDF) that is for the first time available world wide.

Product	Parameter	Space Coverage	Time Coverage	Space Resolution	Time Resolution
Vegetation	LAI	Continent to Global	1998 - present	1 km to 25 km	1 day to 1 month
	Fcover				
	FAPAR				
	NDVI				
	Burnt Area				
	Surface Reflectance				
Radiation	Land Cover	Global	2005	300 m	
	BRDF	Continent To Global	1998 - 2005	1 km to 50 km	½ hour to 10 days
	Surface Albedo				
	Downwelling Shortwave radiation				
Downwelling Longwave Radiation					
Water	Land Surface Temperature				
	Precipitation	Continent To Global	1992 - 2005	1 km to 1°	1 day to 10 days
	Soil Moisture				
	Evapotranspiration				
	Water Bodies				
Water Level					

POSTEL Products (available on: <http://postel.mediasfrance.org/>)

UPCOMING LAND COVER EVENTS

EVENTS / CONFERENCES / WORKSHOPS

November 2006

ESSP Global Environmental Change Open Science Conference

Venue: Beijing, China

Date: 9-12 November

Info: http://www.essp.org/ESSP2006/Information_index.html

GOFC-GOLD will co-organize a special session: Towards a Global Observation System of Biodiversity and Land Cover Changes: Solutions for Sustainable Development

Regional GOFC-GOLD Workshop for NERIN: Detection and Validation of Land cover Change

Venue: Moscow, Russia

Date: 13-17 November

GEO III Plenary Meeting & User Interface Committee (UIC) meeting

Venue: Bonn, Germany

Date: 28-29 November

Info: <http://www.earthobservations.org/meetings/meetings.html>

December 2006

2nd GOFC/GOLD Workshop on Geostationary Fire Monitoring and Applications

Venue: Darmstadt, Germany

Date: 4-6 December

Info: <http://gofc-fire.umd.edu/implementation/events/meetings/index.asp>

Workshop on Harmonization of Forest and Land Cover Classification using LCCS for Asia Pacific Region

Venue: Dehradun, India

Date: 4-8 December

Info: <http://www.fao.org/gtos/meetLCCS5.html>

2007

2nd Space & Society Conference "Space Options for the 21st century"

Venue: Noordwijk, The Netherlands

Date: 27 February – 1 March

Info: <http://www.congrex.nl/06a12/>

GlobCarbon User Consultation Meeting

Venue: ESRIN, Frascati, Italy

Date: 29 March

Info: GlobCarbon Website <http://dup.esrin.esa.it/projects/summary43.asp>

ESA Envisat Symposium

Venue: Montreux, Switzerland

Date: 23–27 April

Info: <http://www.envisat07.org/>

At the Envisat Symposium, a special Convention Session will focus on the support of Earth Observation to UNFCCC, UNCCD, CBD, the World Heritage and the Ramsar Convention.

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The Newsletter is distributed free of charge to all members listed in the ESA Land Cover Project Office database. To update your information, to subscribe or to be removed from our database, please contact us or visit the newsletter website:

<http://www.gofc-gold.uni-ena.de/sites/letter.html>

If you have any suggestions or recommendations for future contributions in this Newsletter please feel free to contact us.

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