

LAND COVER OBSERVATIONS TO SUPPORT THE UNFCCC

REPORT ON THE PROGRESS FOR LAND COVER OBSERVATIONS AS ESSENTIAL CLIMATIC VARIABLE

The Implementation Plan of the Global Climate Observing System for Climate (GCOS) is the most advanced Earth Observation framework for a UN convention. The plan emphasizes the need for operational observations for thirteen Essential Climatic Variables (ECV) in the terrestrial domain; among them land cover and fire. The Global Terrestrial Observing System (GTOS) with its panel GOFC-GOLD act as an international agent to:

1. undertake coordination and planning for systematic land cover and fire related climate observations, as identified in the GCOS IP,
2. produce plans for the Parties contributions to the global observing system for climate,
3. report (through the sponsors of GTOS) to the Parties concerning progress, and provide guidance on additional actions they need to take to address any identified problems.

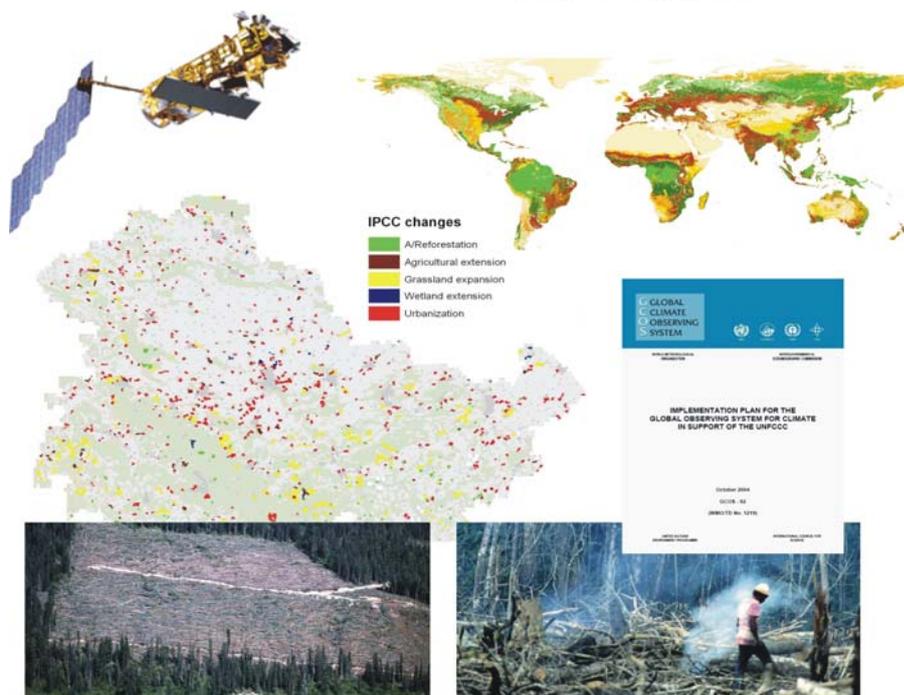
In preparation of the UNFCCC Conference of the Parties eleventh session (COP11) in Montreal (December 2005), GTOS with GOFC-GOLD has contributed a report on the progress for land cover and fire observations. The report has been prepared in response to a request from the sponsors of the Global Terrestrial Observing System (GTOS) for inputs on a Progress

Report to be submitted to the UNFCCC and discussed at COP 11. For land cover observations, the GCOS IP specifies six action items. The GOFC-GOLD response is presented in the box shown on the next page. Overall, GOFC-GOLD's activities aim towards an operational terrestrial observation system with the key issues being the continuity and consistency in observations within an integrated framework, combining *in situ* measurements with fine and coarse resolution satellite data. These efforts go along with standardizing land

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cover characterization and validation, and end to end international coordination.



Progress on actions for land cover observations in response to UNFCCC

Progress is reported below on all of the Land Cover actions (T22-T27) in the GCOS IP. The actions are linked and built upon each other, e.g. the development of a standard land cover classification system (action T22) is to be parallelized with evolving common validation protocols (action T23). The availability of standards for land characterization (action T22) and validation (action T23), and the continuity of fine resolution observations (T24) are essential for implementing the other actions T25-27.

Action T22: Establish international standards and specifications for the production of land-cover characterization maps. Under the lead of FAO/UNEP, the UN Land Cover Classification Systems (LCCS) has been developed, taken as proposal to ISO TC211, and tested in national and international mapping initiatives; most prominently in the context of GLCN. GOFC-GOLD has adopted LCCS as most suitable and accepted international land cover characterization framework. The involved partners have provided strategies and resources (e.g. LCCS-software and documentation), and fostered capacity building and awareness raising for a consensus-oriented, international initiative to evolve and implement LCCS and jointly agree on a common set of land cover classifiers. GOFC-GOLD has contributed legend translations and harmonization case studies of existing land cover datasets as well as assistance for ongoing land mapping projects.

Action T23: Produce reliable accepted methods for land-cover map accuracy assessment. The CEOS/WGCV, working with GOFC-GOLD, has established standard validation protocols for land cover datasets. The related report document is in its final stages of review and will be made available by the end of 2005. The protocol emerged from an international consensus and specifies a set of core analysis requirements that should be routinely adopted as a baseline for reporting map accuracy. Such issues include required test data sampling approaches, standardized reference data acquisition, and accuracy reporting requirements to ensure transparent, robust, and independent accuracy assessments.

Action T24: Commit to continuous 10-30m resolution optical satellite systems with data acquisition strategies at least equivalent to the Landsat 7 mission for land cover. GOFC-GOLD has identified fine-scale (Landsat-type) satellite data as essential component of an integrated and operational terrestrial observation strategy (GOFC-GOLD report 4). An acquisition gap for fine-scale land observations will severely damage evolved global data acquisition frameworks that provide continuous observations for land mapping, monitoring, and validation purposes. GOFC-GOLD has emphasized the importance of Landsat-type data continuity in many circumstances and started to develop coordination among national space agencies for cooperative gap filling. Given the status quo, there is an obvious data gap coming for the second half of the 2000/10 decade. This situation is unacceptable to GOFC-GOLD as it undermines many key goals and initiatives.

Action T25: Develop an *in situ* reference network and apply CEOS WGCV validation protocols for land cover. GOFC-GOLD and CEOS/WGCV have developed such a framework for operational global land cover validation. This framework builds upon evolving standards in land mapping and validation. The key is a new global set of land cover sites that provides statistically robust, consistent, harmonized, updated, and accessible reference information. The political framework, the organizations for international cooperation, and the methodological resources to support an operational land cover validation framework exist or are being developed.

Action T26: Generate annual products documenting global land-cover characteristics at resolutions between 250m and 1km, according to internationally-agreed standards and accompanied by statistical descriptions of the maps' accuracy. GOFC-GOLD has contributed an integrated observation strategy for a concerted international activity to coordinate coarse resolution satellite observations (GOFC-GOLD report 3). Coordinated observations are the key for operational terrestrial monitoring given the suite of satellite observations available on this scale. Progress has been made towards standardized development and update of land cover maps, and gain experiences on current challenges in coarse scale land cover mapping. Land cover products with 1 km spatial resolution are currently being refined and updated with more detailed land cover datasets. Most prominently, the ESA/JRC-GLOBCOVER products will provide a global land cover observations for the year 2005 with about 300 m spatial resolution using ENVISAT MERIS data. It is intended that GLOBCOVER and the products produced by the MODIS land cover team will increase our understanding of global land cover change.

Action T27: Generate maps documenting global land cover at resolutions between 10m and 30m every 5 years, according to internationally-agreed standards and accompanied by statistical descriptions of the maps' accuracy. The implementation of this action is least advanced, however, there is a suite of ongoing regional studies of land cover change in hot spot areas of climate-induced or anthropogenic changes in land cover (e.g. forest degradation). Furthermore, the GLCN (in partnership with GOFC-GOLD) is developing strategies and gaining experience on how global scale fine-resolution land cover observations may be best implemented. Despite such progress, there will be no single global land cover map (10-30 m) that meets the requirements of the international community in the foreseeable future. If continuity of fine-scale satellite observations is provided, such land cover information could be available by the end of the decade if a focussed effort was implemented.

NEW MEMBERS JOIN THE GOF-C-GOLD LAND COVER IMPLEMENTATION TEAM

The GOF-C-GOLD Land Cover Implementation Team welcomes three new members. Mike Wulder, Sergey Bartalev, and Frédéric Achard will complete the Implementation Team with their comprehensive expertise in tropical and boreal ecosystem monitoring and research in different fields of remote sensing techniques, and terrestrial observations. The following section briefly introduces each new member.

Mike Wulder

Mike Wulder is a Research Scientist with the Canadian Forest Service, and leads a land cover mapping project for the forested area of Canada. His research focuses on: 1) studies of optical and LIDAR remote sensing (laser altimetry), GIS, spatial statistics and change detection, and 2) estimates of forest inventory and structural parameters. His current projects include Landsat-7 ETM+ Land Cover of the Forested Area of Canada (Earth Observation for Sustainable Development of Forests (EOSD)), Mountain Pine Beetle Detection and Mapping, Polygon decomposition (fusion

of GIS and remotely sensed data), and Forest Attribute Estimation. Mike Wulder received the Ph.D. in Geography (focused on remote sensing) from the University of Waterloo, in 1998.

You can contact Mike Wulder at: mwulder@nrcan.gc.ca.

Sergey A. Bartalev

Sergey Bartalev is head of the Boreal Ecosystems Monitoring Laboratory at the Russian Academy of Sciences' Space Research Institute. His research primarily focus on development of satellite remote sensing methods to improve understanding of scale, spatial-temporal pattern and main driving forces for land cover and vegetation dynamics throughout the Earth's boreal region. As co-investigator for GLC2000 project at JRC he has developed the Northern Eurasia land cover map. He is awarded by European Commission's Marie-Curie International Research Fellowship to conduct his research at the Friedrich-Schiller-University Jena during 2005-2006. Sergey Bartalev received the PhD in remote sensing from the Moscow University of Geodesy and Cartography, in 1991.

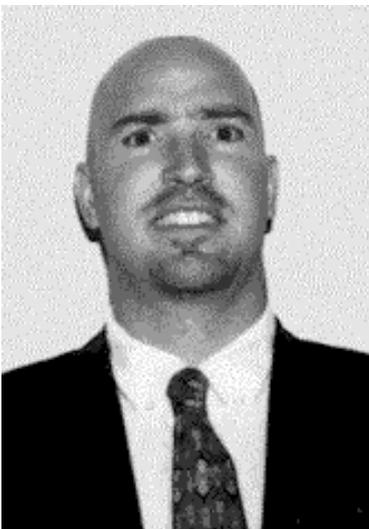
You can contact Sergey Bartalev at:

bartalev@d902.iki.rssi.ru

Frédéric Achard

Frédéric Achard is a research scientist with the Joint Research Centre (JRC), Ispra, Italy, where he started a research activity over Southeast Asia in the framework of the Tropical Ecosystem Environment observations by Space project (TREES). He coordinated the second phase of the TREES project and initiated in 1999 activities of forest cover monitoring in boreal Eurasia. His current research interests include the development of Earth observation techniques for global and regional forest monitoring, and the assessment of the implications of forest cover changes in the Tropics and boreal Eurasia on the global carbon budget. Frédéric received his Ph.D. degree in tropical ecology and remote sensing from Toulouse University, France, in 1989. You can contact Frédéric Achard at:

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EVOLVING BEST PRACTICES FOR VALIDATING VEGETATION CONTINUOUS FIELDS PRODUCTS

GOFC-GOLD/CEOS WORKSHOP IN BROOKINGS, SD, OCTOBER 2005

Background and Scope

Operational land cover observations require commonly accepted validation protocols so that users can understand the limitations of products and so that producers can improve them. Land cover is typically characterized by a classificatory scheme, which assigns each pixel to one of a number of classes. An alternative approach is to characterize each pixel in terms of the proportion occupied by a particular class such as the percentage tree cover, creating so-called vegetation continuous fields (VCF) products. For the evolving suite of VCF products there is only limited accuracy information, and neither are there an integrated sampling framework or field measurement protocol to implement a thorough product validation on regional and global scales.

On 27th and 28th October, a workshop was held at South Dakota State University's in the Geographic Information Science Center of Excellence in Brookings, South Dakota, to discuss and develop concepts for validating VCF data sets. This meeting was a continuation of the joint activities of the CEOS Working Group for Calibration and Validation (WGCV) and GOFC-GOLD to evolve standards for land characterization and validation. This has already resulted in a document describing best practices for validating conventional classifications of global land cover data sets (Strahler et al., in print). Similarly, the overall objective of the VCF validation meeting was to present and discuss approaches to validate continuous vegetation cover estimates and



Participants of the Vegetation Continuous Fields validation workshop in front of the Geographic Information Science Center of Excellence in Brookings, South Dakota State University

develop consensus from the science community, producers and users of VCF products on the most suitable approaches for their validation and for confidence-building so that such data will have much wider use. The workshop was attended by 22 experts representing a variety of universities, agencies, and user organizations from different parts of the world (e.g. CEOS, GOFC-GOLD, USGS, JRC, INPE, USFS, USDA, etc.). The following sections provide an overview of the workshop discussions and outcomes.

New VCF products

The suite of MODIS VCF products will be extended within the next year. The current single-date 500 m product of tree, herbaceous, and bare cover will be improved to a global 250 m multi-year data set including a larger variety of thematic layers. They include trees, woody shrubs, herbaceous, bare, agriculture, water, as well as, leaf longevity and leaf type. Developing a validation frame-

work for all these upcoming products including change characteristics seems essential; however, the workshop's technical discussions were largely focused on the assessing single-date tree cover datasets.

Validation objectives

There is more than one reason for validating VCF layers. Robust accuracy assessment is important for the production of maps and to support good science. Many international environmental protocols and agreements require that map products are independently evaluated and can potentially be challenged. User communities often request validation statements but also require interoperability with any data and analysis system in place. Thus, inter-comparisons with existing data in the form of *in situ* or map products) may also be considered in the accuracy assessment processes to build

user confidence in new earth observation products.

Validation techniques

The validation approaches for continuous fields data are somewhat different than for conventional land cover classifications. The sampling design has to consider the continuous heterogeneity of the land surface and the different reference data acquisitions and analyses; accuracy reporting will be based on measures like correlation and root mean square error instead of the classical error matrix. *In-situ* observations require quantitative measures of cover density from representative reference sample areas or transects. Such information needs to be scaled for comparison with big pixels of moderate resolution global map products such as those from MODIS. Different intermediate resolution remotely sensed data may be used for this purpose, e.g. 1-5 m resolution data allow tree crown identifications or Landsat-type data provide fine-resolution fractional cover estimates where there are closed canopies and the landscape is not heavily fragmented. Timing and the spatial support domain of reference data are key considerations since VCF conventionally represents vegetation at peak conditions as sub-pixel estimates. A suite of available datasets was identified, which may be useful for VCF verification and harmonization purposes. Prominent examples for

tree cover are forest inventories, existing *in situ* datasets and networks (i.e. BIGFOOT, VALERI, GTOS-TEMS, LTER, GLC2000 and MODIS sites), and several other available global and regional land cover map products. However, existing data sets rarely provide reference information thorough enough that they can directly used to validate VCF measurements. Specific cross-walking procedures may need to be developed. Most likely the comparisons will provide qualitative indicators of performance useful for regional-scale confidence building rather than quantitative validation assessment.

Implementation framework

The implementation of a global operational validation requires a joint international initiative. GOF-C-GOLD and the CEOS WGCV have outlined such a framework for global land cover datasets. It describes the processes for the establishment and operation of such a framework and defines roles and responsibilities to involve key actors for best use of resources and experiences. This initiative is a response to the GCOS Implementation Plan of the UNFCCC. The VCF validation efforts are expected to join and profit from this ongoing initiative ultimately providing robust, comparative, and updated accuracy assessment for all key global land cover datasets. Until then, studies are encouraged that support better understanding of VCF product

accuracy both as quantitative and confidence building validation and verification exercises.

Codifying best practices

The participants of the workshop agreed to summarize the consensus on approaches to VCF validation in a "best practices" document. This effort will follow the model of the "Recommendations for Evaluation and Accuracy Assessment of Global Land Cover Maps" developed by CEOS WGCV and GOF-C-GOLD (Strahler et al., in print). An outline of the corresponding VCF document was prepared during the workshop and will be developed within the next months based on the workshop findings. This document for validating discrete land cover data sets will draw upon other completed validation efforts notably the aforementioned document produced by CEOS WGCV and GOF-C-GOLDVCF validation is just starting and is expected to benefit from validation of related variables depicted in similar ways such as LAI and from other related ongoing studies.

Overall, the workshop provided a successful start in this arena. Not all questions raised at the workshop may have been answered properly, but a road map was developed to move forward. At least one additional workshop will be needed.

Reference:

Strahler, A., Boschetti, L., Foody, G. M., Fiedl, M. A., Hansen, M. C., Herold, M., Mayaux, P., Morisette, J. T., Stehman, S. V., Woodcock, C. (in press). *Global Land Cover Validation: Recommendations for Evaluation and Accuracy Assessment Of Global Land Cover Maps, Report of Committee of Earth Observation Satellites (CEOS) - Working Group on Calibration and Validation(WGCV)*.



Discussion to evolve best practices for validation of VCF products.

PROGRESS AND CHALLENGES IN LAND COVER OBSERVATIONS IN NORTHERN EURASIA

GOFC-GOLD WORKSHOP IN ST. PETERSBURG, JUNE 2005

Scope of the workshop

The Regional GOFC-GOLD Workshop "Observations of Land Cover and Needs of Research Projects in Northern Eurasia" was held June 18-19, 2005 in St. Petersburg, Russia as a pre-symposium workshop at the 31st International Symposium on Remote Sensing of Environment "Global Monitoring for Sustainability and Security". Due to the sheer size of Northern Eurasia region, remotely sensed satellite data are critically important for better understanding of interactions of ecosystems, atmosphere, and human dynamics in Northern Eurasia. The potential of the available remotely sensed data has not been fully used to date, in large part because of the difficulty in locating and accessing in-situ data sets and integrating them with remotely sensed data. The workshop brought together 84 participants representing 16 different countries and made an important step in the development of the GOFC-GOLD regional network in Northern Eurasia.

The workshop informed participants of regional data sets and observational networks generated by new and recent projects that were funded by NASA, European Union, Russia, Kazakhstan, Mongolia, and Japan. A special session examined availability and limitations of social science data for Earth Science research in Northern Eurasia. Included in the workshop was also a capacity-building session focusing on FAO Land Cover Classification System (LCCS-2). Two panel discussions evaluated the availability of observational data in Northern Eurasia for studies of land cover at regional and at global scale.

Progress in Land Cover Observation in Northern Eurasia

Workshop participants acknowledged that over the last few years significant progress was made in meeting the data needs of research projects in the region; in particular:

- **Availability and use of remotely sensed data** in studies of land cover increased dramatically. It is important however for NERIN community to continue advocating for maintaining the availability of data, both remotely sensed and *in-situ*.
- **Data sharing and collaborative research** gained greater acceptance and growing support in the NERIN community.
- The importance of **product validation, harmonization, and cross-comparison** is widely recognized, but the effort in this direction is clearly insufficient

- There is a growing understanding of the **need for "common language" in land cover classifications**; LCCS is a fundamental basis of harmonized land cover mapping.
- The method development for extracting thematic land-cover information from the remotely sensed data is approaching the level that allows initiating the **transition from research projects to a system of operational monitoring** of land cover that would meet



Figure: Participants of the NERIN workshop in St. Petersburg and Workshop organizer Olga Krankina (top right)

an array of societal needs, including support for international conventions.

- The important role humans play in land-cover dynamics is widely recognized, however quantitative understanding of this role remains a challenge. Availability and quality of social science data is a cause for concern and methods for **combining the remotely sensed and social science data** need to be developed further so that robust projection of future changes in land cover can be made.

NELDA for NERIN

NERIN network is positioned to move beyond the information exchange and assessment of data availability towards developing a system for continuous land-cover monitoring that would meet the needs of users in the region and the global change science community. Active network projects

are needed to build the basis for operational land-cover monitoring. The on-going fire-validation project works on comparing and validating the moderate resolution active fire and burned area products with high resolution remotely sensed and *in-situ* data. The planned parallel activity for GOF-C-GOLD Land Cover Theme is the Northern Eurasia Land Dynamics Analysis (NELDA) project. NELDA is designed to develop tools, methods, data, and collaborations needed to better characterize land-cover dynamics across the Northern Eurasia region. Building on recent and ongoing projects, NELDA will link together the interested research teams, establish a set of test sites for land cover analysis in the region, use these sites to validate global and regional land cover and land-cover change products, develop new methods for continental mapping of vegetation disturbance, assess the continental-scale patterns of



vegetation recovery following different types of disturbance, evaluate the utility of available products to meet the regional and local needs, and define the requirements for new land cover products. Ultimately, the project results will inform the development of operational land cover monitoring across the region.

In summary, the workshop provided a thorough review of available observations of land cover in Northern Eurasia, identified several important issues that need to be addressed for improved understanding and characterization of land-cover and its change, and discussed NELDA project that would serve as a next important next step in the development of NERIN. The workshop was made possible by the support of NASA-LCLUC Program, START, Canadian Forest Service (GOF-C-GOLD Project Office), FAO, and the Russian Academy of Sciences.

Dr. Olga Krankina
Olga.Krankina@oregonstate.edu.
GOF-C-GOLD land cover team member

More information:
 NERIN: <http://www.fao.org/gtos/gofc-gold/net-NERIN.html>

Workshop information:
<http://enviromis.scert.ru/en/resources/petersburg-2005>
<ftp://ftp.fsl.orst.edu/pub/krankina/NERIN%202005%20workshop%20at%2031%20ISRSE/>

The following considerations for planning the future development of NERIN emerged from the workshop:

1. **Planning for long term** is critically important because the task of monitoring land-cover change is long-term by definition; the transformation of research projects into services for users and integration of research into services – is another long-term task.
2. Better **understanding of user needs** is necessary for prioritizing network activities and framing future research.
3. Acceptance and use of data products for the region is the ultimate measure of network success and a major obstacle is the lack of **statistically valid independent validation of land-cover products**. Developing a “living” database of accuracy assessment sites can help address this persistent problem.
4. Improved **understanding of coupled human dynamics and environmental change** is essential for meeting the needs of decision support structures and communities. NERIN should facilitate the development an effective dialogue among scientists and interdisciplinary studies across physical and social science domains.
5. Critical **near-term funding priorities** include support for network projects, synthesis of results and coordination among ongoing projects, organization of workshops, and training/capacity building.

MERIS AND (A)ATSR USER WORKSHOP

ESRIN, SEPTEMBER 2005

Background

The joint MERIS and (A)ATSR workshop was held at ESRIN, Frascati, Italy from 26-30 September 2005.

The workshop was organised by ESA to provide scientists and data users with the opportunity to present first-hand and up-to-date results from their on-going research activities including discussions on scientific applications, data quality, development of new algorithms and data products. Of specific interest was the synergistic use of the data from these instruments for operational applications, primarily in the marine environment and the coastal zones, but also for applications over land and the atmosphere.

The workshop focused on themes covering the MERIS and (A)ATSR mission objectives and data exploitation.

Objectives and scope of workshop

Workshop was held to:

- Provide a forum for ESA

Following **special sessions** with focus on land were organised:

- Remote Sensing of Land Surfaces
- Land Products
- Land Cover Mapping (see below)
- Land Biophysical Products
- (A)ATSR Land Surface Temperature

Land Cover Mapping Session

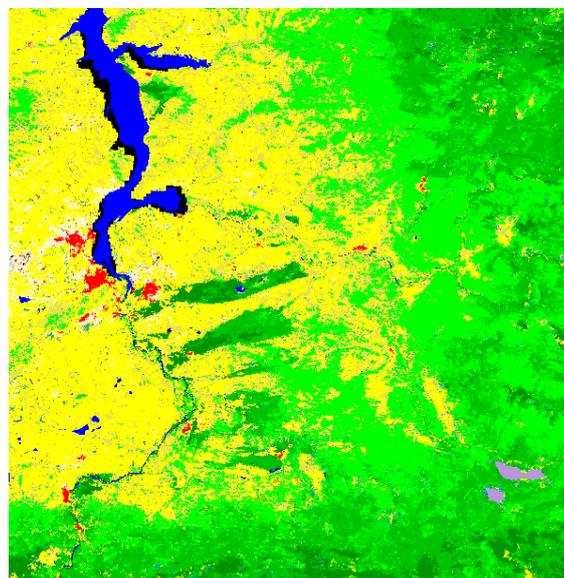
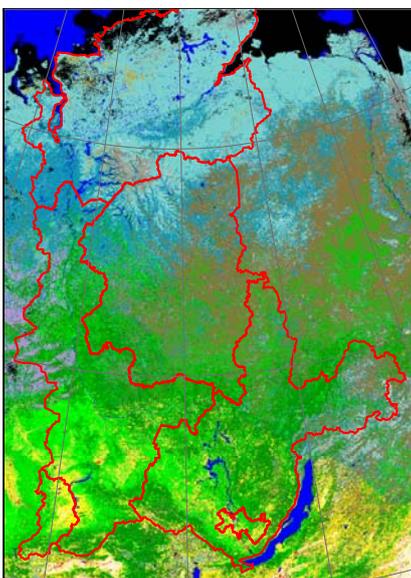
- A new **global landcover** product with 300 m resolution is being de-veloped.
- Use of **MGVI for vegetation** and water dynamics identification.
- Linear spectral unmixing techniques used to extract **sub-pixel land-cover information** from MERIS full resolution imagery.
- Use of **vegetation index from MERIS and coherence from ASAR** for urban/non urban land-use mapping

Principal Investigators to present results of AO and Category 1 projects,

- Inform MERIS and (A)ATSR data users about instrument performance and product quality,
- Present the evolution of the Envisat services for MERIS and (A)ATSR data,
- Cover various aspects of the data analysis and interpretation,
- Initiate and encourage close collaboration be-

tween MERIS and (A)ATSR user groups,

- Demonstrate the scientific capabilities of the MERIS and (A)ATSR measurements and how they compare with other sensor data,
- Assess the usefulness of available data analysis tools, and to
- Formulate recommendations for algorithm development and product upgrade.



Further workshop information:

http://envisat.esa.int/workshops/meris_aatsr2005/

Legend

- Unclassified
- Water
- Barren Ground
- Urban
- Croplands
- Cropland/Forest Complex
- Evergreen Needleleaf
- Deciduous Broadleaf
- Needleleaf/Broadleaf Forest
- Mixed Forest
- Broadleaf/Needleleaf Forest
- Deciduous Needleleaf Forest
- Humid Grassland
- Wetland
- Steppe
- Tundra Lichen-Moss
- Tundra Heath



Figure: MERIS land cover map of the entire region of the Siberia-II project (left) and over an agricultural area (180 x 182km) in the South of the region (right).

EPIDEMIO

EARTH OBSERVATION IN EPIDEMIOLOGY

Microscopes are not the only tools available to study disease. The ESA funded EPIDEMIO will employ satellites to predict and help combat epidemic outbreaks, as well as join the hunt for the origin of the deadly Ebola virus

Objectives

There is a growing international awareness about the importance of the epidemiology of diseases and it is recognized that improved up-to date information of the environment, in which infectious diseases occur, will help epidemiologists to study, understand and predict threats to human health. Within the scope of the project "Epidemio" satellites will join this field as data source of epidemics. The scope of this project is to demonstrate and use the potential of Earth Observation for a new service which supplies

new types of environmental information for epidemiology.

Implementation

1. Provision of user requirements by a group of epidemiologists for their work to be supplied by the project (see products).
2. User have agreed to devote resources to assist ESA in achieving the objectives of the project by:
 - Assisting definition of a service and support the clarification of the User Requirements
 - Delivering suitable ground data for the study sites and any available ancillary data needed to implement and validate the required products.
 - Assisting assessment of the service.

Products

Information requirements for EPIDEMIO include:

- Urban maps,
- Digital Elevation maps,
- maps of water bodies,
- rush vegetation maps,
- land cover maps (see box),
- historical cartography,
- wind blown dust maps, and
- Surface temperature maps.

The project started 2004 and is implemented by a European industrial consortium led by Jenaoptronik.

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Product UR-5: Medium resolution land cover map

General Overview / Task

- Timely production of land cover maps at scale 1:500.000, ground resolution 300m
- based on MERIS

Test Site

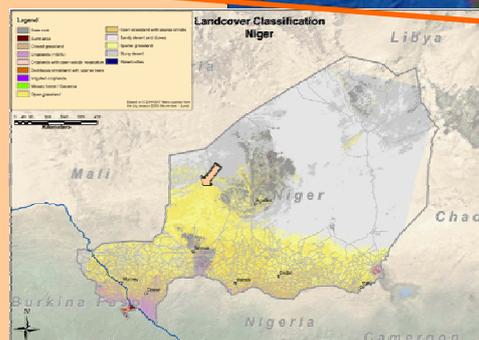
- Niger
- Mali / Niger / Burkina Faso
- Ethiopia
- Madagascar

Prototype products

- Medium resolution land cover map of all test sites

Final Map Legend

- FAO LCCS legend adapted to the Different user needs, 10-15 classes

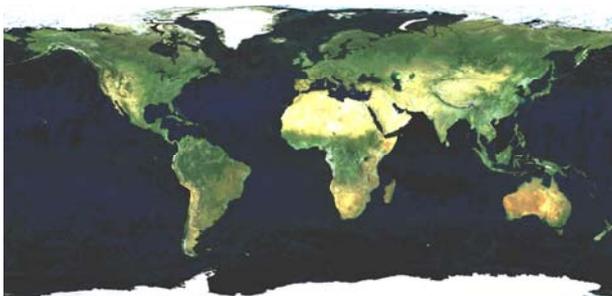


TOWARDS OPERATIONAL GLOBAL AND REGIONAL LAND OBSERVATIONS

ANNOUNCEMENT FOR A SPECIAL GOFC-GOLD SESSION AT THE ISPRS COMMISSION VII MID-TERM SYMPOSIUM, MAY 2006

Background

Reliable observations of the terrestrial environment are of crucial importance to understanding climate change and its impacts, to sustainable development, natural resources management, and understanding of ecosystems and biogeochemical cycling. There is a strong push from international conventions, treaties, and implementation guidelines (UNCED, Kyoto Protocol, GEOSS, GMES, GCOS, GTOS) for sustained, harmonized, and validated land observation products. Despite such importance, it is to be recognized that satellite based land observations are not operational. Major reasons for this limitation are lack of flexibility of product definitions for a suite of applications, insufficient knowledge on available products and data access, missing standards for land mapping, as well as, insufficient validation information. Hence, fostering discussions, and developments of thorough land product definitions and suitable environmental indicators, implementation of internationally agreed standards in land characterization and validation strategies, and data dissemination are essential to overcome current



The global MERIS mosaic for May, July, Oct and Nov 2004 (1km resolution, MERIS spectral bands 2, 3, 5, 7 (Source: ESA).

limitations and fulfil the requirements posed by the international community.

ISPRS Commission VII Symposium at ITC

8-11 May 2006, the ISPRS Commission VII Mid-term Symposium "Remote Sensing: From Pixels to Processes" will be held in Enschede, The Netherlands. The event will bring together researcher, professionals, managers and decision makers to discuss the issues and latest trends and developments in remote sensing methodology. All eight working groups of the commission will organise special sessions during the symposium.

Recent developments and current regional and global land mapping activities will be presented and discussed in a Special Session jointly organised by:

- ISPRS, Intercommission Working Group VII/IV, and
- GOFC-GOLD Land Cover Project Office, Jena

The **ISPRS ICWG VII/IV** focuses on the monitoring of global environmental changes such as land use and land cover, the derivation of global data and database establishment and the development of methodologies, models and sustainability indicators for prediction of ecosystem changes. The ISPRS ICWG VII/IV is chaired by Christiane Schmullius.

Call for papers

Objective of this special session is bringing together key actors in the field to communicate and discuss issues and develop-

ments in regional and global land cover mapping (see box).

Invitation and information for contributors

We would like to invite presentations on the following themes:

- Land cover/use as key variable in environmental change
- Programmes and initiatives in land mapping
- Derivation of land cover/use data on regional and global scales
- Implementation of land cover product harmonisation and validation
- Mapping and monitoring of land change processes
- Applications and user requirements for coarse-scale land mapping products
- Challenges and directions for future land cover mapping activities

For contributions please send an abstract to Christiane Schmullius (C.Schmullius@uni-jena.de) by **15 December 2005**. Authors are requested to adhere to the ISPRS guidelines for authors (see www.isprs.org).

More information:

ISPRS: <http://www.isprs.org>

ISPRS ICWG VII/IV:

<http://www.isprs.org/technical/commissions/wg7.html#icwg4/7>

Symposium information and programme:

www.itc.nl/isprsc7/symposium2006



UPCOMING LAND COVER EVENTS

EVENTS / CONFERENCES / WORKSHOPS

November 2005

5th International Symposium on Forest Fire Protection

Venue: National Research Institute of Fire and Disaster, Mitaka, Tokyo, Japan

Date: 30 November to 02 December

Info: http://www.fri.go.jp/symposium/5th/index_e.html

United Nations Climate Change Conference (COP 11 and COP/MOP 1)

Venue: Palais des Congrès de Montréal, Canada

Date: 28 November to 9 December

Info: http://unfccc.int/meetings/cop_11/items/3394.php

December 2005

REDLATIF Workshop

Venue: Mexico

Date: 1-2 December

Info: <http://mob.conae.gov.ar/redlatif/actividades.html>

GMES Conference "Integration of the New EU Member Countries into the GMES Programme"

Venue: GMES Information Centre Poland

Date: 12-14 December

Info: <http://www.gmes.info/events.0.html>

February 2006

3D Remote Sensing in Forestry

Venue: University of Natural Resources and Applied Life Sciences, Vienna, Austria

Date: 14-15 February

Info: <http://www.asprs.org/Pecora16/>

May 2006

ISPRS Commission VII Mid-term Symposium "Remote Sensing: From Pixels to Processes"

Venue: ITC, Enschede, The Netherlands

Date: 8-11 May

Info: <http://www.itc.nl/isprsc7/symposium2006>

June 2006

2nd International Conference on Land cover /Land use study using Remote Sensing and Geographic Information System

Venue: Ulaanbaatar, Mongolia

Date: 8-9 June

Info: For further information contact Dr. Renchin Tsolmon (tsolmon@num.edu.mn)

NEWSLETTER AND REPORTS

Newsletter

GLCN News bulletin:

<http://www.glcn.org/news/downs/pub/res/GLCN-Newsletter-1-final.pdf>

GLOBCOVER newsletter 2:

http://dup.esrin.esa.it/files/project/131-176-149-30_200592114240.pdf

IGBP Newsletter 62:

http://www.igbp.kva.se/uploads/NL_62.pdf

IHPD Newsletter 03/05:

http://www.ihdp.uni-bonn.de/html/publications/update/pdf-files/IHDPUpdateLUCC3_05.pdf

GSDI Association Newsletter 10/05:

http://www.gsdi.org/newsletters/SDI-Africa_v4n10.pdf

GMES E-News:

For subscription see www.gmes.info or send an email to info@gmes.info

Reports

LCCS2 User Manual:

http://dwms.fao.org/lccs/index_en.asp

JRC Report «Feasibility study on the use of medium resolution satellite data for the detection of forest cover change caused by clear cutting of coniferous forests in the northwest of Russia»:

http://ies.jrc.cec.eu.int/fileadmin/Documentation/Reports/Global_Vegetation_Monitoring/EUR/EUR_21579.pdf

LUCC report series:

<http://www.geo.ucl.ac.be/LUCC/lucc.html>

GCOS Implementation Plan:

[http://www.wmo.ch/web/gcos/Implementation_Plan_\(GCOS\).pdf](http://www.wmo.ch/web/gcos/Implementation_Plan_(GCOS).pdf)

THE ESA GOF-C-GOLD LAND COVER PROJECT OFFICE NEWSLETTER:

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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