

# LAND COVER AND CHANGE

Newsletter of the GOFC-GOLD Land Cover Project Office

AUGUST 2006

NUMBER 11

## RELEASE OF KEY DOCUMENTS

This newsletter presents three recently published documents on activities where GOFC-GOLD was working on or contributing to:

- The GOFC-GOLD Working Group on Tropical Deforestation released a technical document on: **“Reducing Greenhouse Gas Emissions from Deforestation in Developing Countries”** in response to the UNFCCC 11<sup>th</sup> Conference of the Parties (COP).
- The CEOS Working Group on Calibration and Validation presents its findings on: **“Global Land Cover Validation: Recommendations for Evaluation and Accuracy Assessment of Global Land Cover Maps”**.
- The **Global Terrestrial Observing System (GTOS) published its Biennial Report**, summarizing recent developments of GTOS and its panels over the last two years.

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## PROPOSING AN EAST ASIA REGIONAL NETWORK

### WORKSHOP IN MONGOLIA OUTLINES PLAN OF GOFC-GOLD REGIONAL ACTIVITY

Organized by the GTOS/GOFC-GOLD and the National University of Mongolia, an international workshop on “Forest and Land Cover Observations in Asia and Northern Eurasia” was held on 9<sup>th</sup> June 2006 in Ulaanbaatar, Mongolia. This meeting was preceded last year by a one day meeting in Beijing on the initiation of an East Asian Regional Network following the 3<sup>rd</sup> meeting of the Scientific and Technical Board in Beijing on the 21<sup>st</sup> March 2005 (Brady and Larsson, 2005). The meeting involved GOFC-GOLD engagement in regional networks for Northern Eurasia (NERIN) and Asia in building capacities and foster international GOFC-GOLD implementation.

The workshop was open for all participants of the 2<sup>nd</sup> International Conference on Land cover/Land use study using Remote Sensing and Geographic Information System in Mongolia held on the 8<sup>th</sup> June and other representatives who wished to attend. Overall, nearly 100 participants from Mongolia, Japan, China, South Korea, Thailand, Taiwan, Russia, Uzbekistan, Germany, USA, Netherlands, and Great Britain participated in the GOFC-GOLD workshop.



Fig. 1 View on Ulaanbaatar, located on the Tuul Gol River

The workshop discussed:

- the status of land cover observations in the region,
- how to advance the inventory of observational data on land cover including access and dissemination of earth observation datasets,
- issues of harmonization and validation,
- how to improve cooperation and sharing of information among observational data resources and networks.



**Fig. 2: Participants at the GOFC-GOLD Regional Workshop in Mongolia**

Besides a number of presentations, two break-out groups were formed; the first on observations and the second on data and information systems. The key question for the first group was: "What are the key problems associated with observations, which can be improved by regional cooperation in East Asia?" and for the second "What are the key problems associated with data and information systems, which can be improved by regional cooperation in East Asia?"

The breakout groups concluded that international networking is key to improve assimilation and dissemination of data within the region. There should be a regional responsibility for data set inventories, possibly coordinated by an East Asia network office.

Selected participants of the workshop will prepare a report of the meeting. The report will be circulated to all those attending this workshop, the workshop held last year in Beijing and other interested parties. Assuming that there is a positive consensus then the GOFC-GOLD Executive Committee will with regional guidance set up an organizing committee for a meeting of the first GOFC-GOLD East Asia Regional Network. The proposed meeting will have the following goals:

- Formal inauguration of the GOFC-GOLD East Asia Regional Network
- Agreement on governance

- Workshop on one key priority area identified at the Ulaanbaatar Workshop. Provisionally this is proposed to be a Validation Meeting on Best Practices and the creation of a shared land cover validation data base for East Asia.
- A provisional East Asia Regional Network Web site will be hosted by Keio University.

GOFC-GOLD would like to thank and acknowledge the local organizer of this workshop, notably: Prof. Dr. Renchin Tsolmon and Narangerel Zagdaa from the National University of Mongolia and The Mongolian Ministry of Nature and Environment.



**Fig. 3: Organizer Renchin Tsolmon with John Townshend and Olga Krankina of GOFC-GOLD**

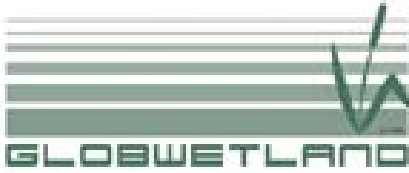
Reference:

M.A. Brady and M. Larsen (2005): [Report of the 3rd Meeting of the GOFC-GOLD Scientific and Technical Board](#), Beijing, China, 19-22 April 2005, GOFC-GOLD Report 21, pp. 18-21.



# MONITORING WETLANDS FROM SPACE

## ESA AND THE RAMSAR CONVENTION ORGANISE GLOBWETLAND SYMPOSIUM



On **19-20 October 2006** an international symposium on the application of Earth observation (EO) technologies for the assessment and monitoring of wetlands will be held in Frascati, Italy, organized by the European Space Agency (ESA) and the RAMSAR convention secretariat.

Wetlands play a vital role in storing and purifying water for human use, recharge natural aquifers, retain nutrients in floodplains, help control flooding and regulate local climate. They are also places of remarkable biological diversity: freshwater wetlands alone are home to 40 % of the world's species and 12 % of global animal species. Nevertheless, wetlands are under threat. Half the world's wetlands are estimated to have been lost during the past century, converted into agricultural or urban areas, or drained to help combat water-linked diseases such as malaria.



The Ramsar Convention provides the framework for international co-operation for the conservation of wetlands. It requires its parties to designate wetlands of international importance for inclusion in a list of so-called "Ramsar sites" and to wisely manage the wetlands in their

territories. Performing efficient inventories of these Ramsar sites and providing an efficient monitoring of their ecological health represent some of the main provisions of the Ramsar Convention, as well as fostering best practice in local wetland management. Currently, more than 1596 wetlands have been designated, covering a total area of 135 million hectares.



In the last few decades EO data with increasing capabilities in terms of spatial, temporal and spectral resolution, have become more accessible to a larger community of users, allowing efficient and reliable monitoring of the environment at different scales. Such information provides fundamental support to the Conventions Contracting Parties. The ESA GlobWetland ([www.globwetland.org](http://www.globwetland.org)) project aimed to demonstrate the capabilities of satellite imagery in providing detailed wide-area views of individual wetlands across 50 sites in 21 countries.

The Objective of the Globwetland Symposium is to bring together and strengthen the link between the different actors involved in the implementation of the Ramsar convention and the EO scientific and industrial community. It aims to define the current state of the art on the use of EO for wetlands management and draft a coordinated plan for future research, scientific and policy-relevant activities (see box).

More Information on the conference program and registration can be found on: <http://www.congrex.nl/O6A11/>



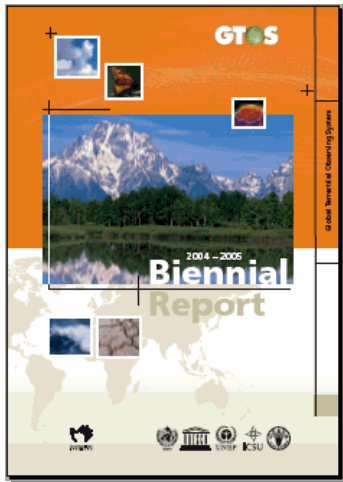
### Objectives of the GlobWetland Symposium, 19-20 October in Frascati, Italy:

- Review the main targets of the Ramsar Convention, where Earth Observation may contribute
- Review the achievements of the GlobWetland and other related projects from:
  - The technical view point (What EO can do)
  - The user perspective (How wetland managers can integrate and use EO-derived information into management plans)
- Review the latest developments and processes in research concerning the use of EO for the inventorying, monitoring and assessment of wetlands
- Identify the key scientific technical and policy-relevant challengers for the future

# GTOS Biennial Report 2004-2005

## GTOS PRESENTS WORKING PROGRESS

The Global Terrestrial Observing System (GTOS) released its actual Biennial Report of the period 2004-2005 which summarizes the working progress of the individual GTOS panels, activities and networks (fig. 4).

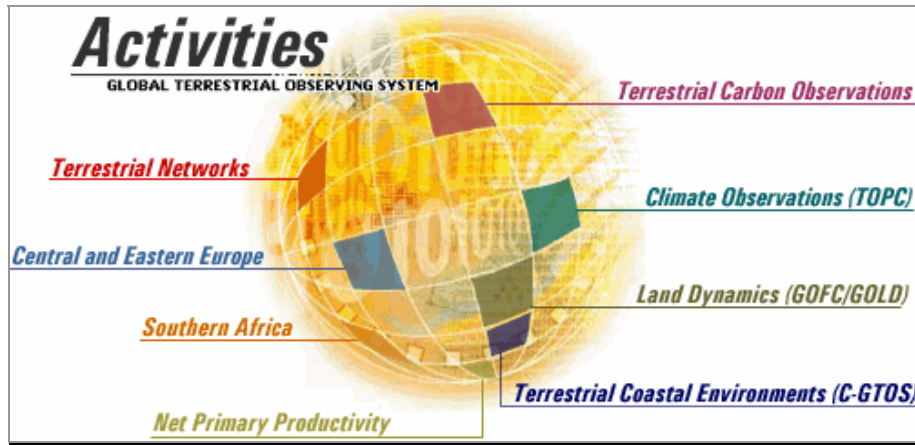


"The 2004-2005 biennium was a particularly busy period for GTOS and the international observations community as a whole. The increase in number and intensity of natural disasters, as well as the rise in reporting on the evidence and effects of climate change on local, regional and global systems, are cause for concern, motivating policy-makers to intensify national and international efforts to understand, prevent and adapt to climate change." states John Latham, the Programme Director of GTOS in the preface.



*In addressing issues on climate change, biodiversity loss and land degradation, GTOS takes into account the work of the Biodiversity Related Conventions and the Rio Conventions, and the linkages among them.*

Throughout 2005, GTOS has strengthened its linkages with international conventions. Providing scientific information to the various subsidiary bodies of these conventions has become a guiding strategic initiative for GTOS. The **Terrestrial Observing Panel for Climate (TOPC)** is supporting the development of the adequacy reports and the Implementation Plan for the Global Observing System for Climate (GCOS) for UNFCCC. The **GTOS Secretariat** has also been active in support of the convention, in particular for issues related to terrestrial climatic variables.



**Fig. 4 GTOS Activities**

The Global Observation of Forest and Land Cover Dynamics (**GOFC-GOLD**) has revised its strategy, and has made significant progress in its land cover activities and its fire mapping and monitoring products. **NASA and FAO** will assist in placing these products into an operational context, developing a global fire monitoring system.

The **Terrestrial Carbon Observations** Network (TCO) has made rapid progress in forming a new team, strategy and obtaining funding to implement activities, including the new CarboAfrica project which will improve the understanding of sources, sinks and fluxes of carbon in Africa.

The **GTOS Coastal initiative** has finalized its implementation plan, begun the execution of the identified priority products, and has now been endorsed to become a full GTOS Panel.

The report is available for download and free ordering on the GTOS web page: <http://www.fao.org/gtos/gtospub/pub40.html>

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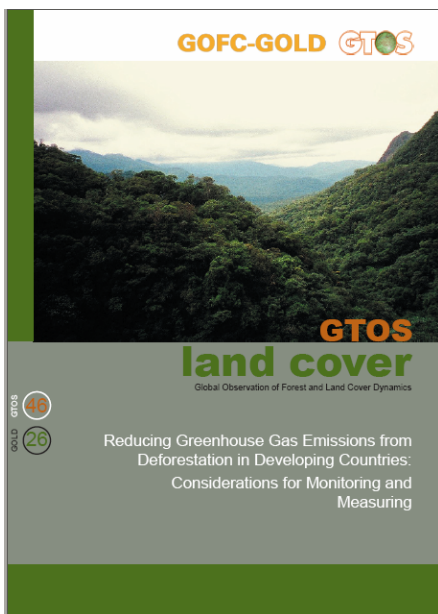


# REDUCING GREENHOUSE GAS EMISSIONS FROM DEFORESTATION IN DEVELOPING COUNTRIES

GTOS/GOFC-GOLD PUBLISHES TECHNICAL DOCUMENT AT:

[HTTP://WWW.GOFC-GOLD.UNI-JENA.DE/DOCUMENTS/DEFOREST/GTOS-GOFC-TROPICAL-DEF-FINAL.PDF](http://www.gofc-gold.uni-jena.de/documents/deforest/gtos-gofc-tropical-def-final.pdf)

Official international discussions were initiated at the UNFCCC 11<sup>th</sup> Conference of Parties (COP) in December 2005 on issues relating to reducing emissions from deforestation in developing countries. The COP requested the Subsidiary Body for Scientific and Technological Advice (SBSTA) to consider the relevant scientific, technical, and methodological issues and report at SBSTA's 27<sup>th</sup> session in December 2007. In this context, GOFC-GOLD has established a special working group on this issue and organised a related workshop, held in Jena, in March 2006. The outcomes are now presented in the technical document:



**“Reducing Greenhouse Gas Emissions from Deforestation in developing Countries: Considerations for Monitoring and Measuring”.**

The objective is to assess the technical capabilities for this specific monitoring task as input

to the SBSTA. The report raises the considerations that need to be addressed in further development of more detailed guidelines and protocols.

### **Forest Cover**

Analysis of remotely sensed data from aircraft and satellite is the only practical approach to measure changes in forest area at national and international scales and since the early 1990s, this can be done from space with confidence. For the analysis of these data various methods are available and appropriate. The choice depends on national capabilities, deforestation patterns. More critical than the application of standard methods across all countries is the quantification of the accuracy of the result and ensuring that consistent methods are applied at different time intervals is more critical.

### **Carbon stocks**

For many developing countries the estimation of carbon stocks of forests undergoing

deforestation and the subsequent carbon dynamic are uncertain. Default data and guidelines exist already in the IPCC Good Practice Guidance Report and in the upcoming revised IPCC methods for national inventories of GHGs. New technologies and approaches are developing for monitoring changes in carbon stocks using a combination of satellite and airborne imagery that potentially reduce these uncertainties.

### **National systems**

Key constraints in implementing national systems for monitoring changes in forest cover are cost and access to high resolution data. International coordination is needed to ensure repeated coverage of the world's forests and access to quality data at a reasonable cost. Reliable and up-to-date data sources on the national distribution of carbon stocks in forests and changes in stocks under local practices of clearing and degradation is also needed.

### **Recommended actions by the GOFC-GOLD Working Group for the improvement of monitoring and measurement systems of reduced GHG emissions from deforestation:**

- Need for dedicated pilot projects and experiences establishing a deforestation monitoring system at sub-national to national scale
- Compilation of existing satellite imagery for its quality (cloud free for example) and its suitability for developing accurate base periods for major countries in all three tropical regions
- Assess national capacities and capabilities for analyzing data on land cover change and carbon stocks and start to improve them
- Support developing countries to build historical deforestation data bases
- Continue to build forest inventory-type databases linking forest area/density change to changes in carbon stocks

# ACCURACY ASSESSMENT OF GLOBAL LAND COVER PRODUCTS

## WORKING GROUP ON CALIBRATION & VALIDATION RELEASED TECHNICAL DOCUMENT

The Committee on Earth Observation Satellites (CEOS) is an international forum for the coordination of Earth observation satellite programs and for interaction of these programs with users of satellite data worldwide (<http://www.ceos.org>). To ensure long-term confidence in the accuracy and quality of Earth observation data and products, the CEOS established the Working Group on Calibration and Validation (WGCV) as a forum for calibration and validation information exchange, coordination, and cooperative activities. The Working Group on Global Land Cover Validation, a topical group within the Land Product Validation (LPV) subgroup of WGCV now presents its findings in a technical document. The purpose of this report is to identify useful and desirable methods and approaches to the validation of global land cover maps.

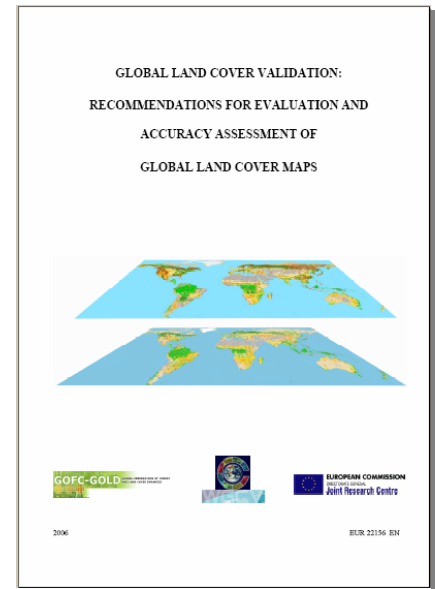
### Highlights

Global land cover maps at coarse resolution pose unique challenges for accuracy assessment, including the high frequency of mixed pixels, difficulty in precise geolocation of map products and reference materials, and in the difficulties associated with acquiring and interpreting fine-resolution reference imagery.

Accuracy assessment is an expensive, yet essential, component of the land cover mapping process. Maps without associated accuracy data remain untested hypotheses. Statistically valid estimates of map accuracy and their publication are essential to validation of land cover products and their ultimate acceptance and use.

A set of core analysis methods exists for accuracy assessment that should be routinely adopted as a baseline for reporting map accuracy. These include employing probability sampling and consistent estimators within the design-based inference framework to generate estimates of the overall accuracy of the map as well as per-class accuracies and the variances of these estimates. Confusion matrices, user's and producer's accuracies should be published with the accuracy assessment, and the data used to derive these estimates should be archived and made accessible to the scientific community. There is considerable room for building upon these core methods to pursue additional dimensions of map accuracy that can improve the validation of land cover products. These are not limited to, but include:

- (1) Validation during and after map production;
- (2) Use of confidence-based quality assessment methods for assessing spatial uncertainty;
- (3) Addition of fuzzy accuracy methods;
- (4) Appropriate use of systematic qualitative and descriptive methods; and
- (5) Appropriate extensions of single-date approaches to land cover change validation.



Available at:

<http://landval.gsfc.nasa.gov/pdf/GlobalLandCoverValidation.pdf>

A coordinated international effort and comprehensive consensus building are essential for implement the validation requirements within an operational framework. The general approach is to combine experience and resources from different participating agencies involved in global earth observations since previous efforts have suffered from a lack of funding and limited available resources. It seems foolish and wasteful to have each land cover mapping project conduct its own expensive, yet still likely inadequate, accuracy assessment. Instead, the objective is to develop a "universal validation dataset" – a new set of land cover reference sites that provides statistically robust, consistent, harmonized, updated, and accessible reference information.

## UPCOMING LAND COVER EVENTS

### EVENTS / CONFERENCES / WORKSHOPS

#### August 2006

##### Global Vegetation Workshop 2006

**Venue:** Missoula, USA

**Date:** 8-10 August

**Info:** <http://www.ntsug.umt.edu/VEGMTG/>

##### UNFCCC Workshop on Reducing Emissions from Deforestation in Developing Countries

**Venue:** Rome, Italy

**Date:** 30 August-1 September

**Info:** [http://unfccc.int/methods\\_and\\_science/lulucf/items/3745.php](http://unfccc.int/methods_and_science/lulucf/items/3745.php)

#### September 2006

##### GEO User Interface Committee (UIC) Meeting

**Venue:** Ottawa, Canada

**Date:** 5-7 September

**Info:** [http://www.cgeo-gcot.gc.ca/geo-1/calendar/geo-i\\_e.htm](http://www.cgeo-gcot.gc.ca/geo-1/calendar/geo-i_e.htm)

##### 2<sup>nd</sup> Workshop of the EARSeL Special Interest Group on Land Use

**Venue:** Universitätsclub Bonn, Germany

**Date:** 28-30 September

**Info:** <http://www.zfl.uni-bonn.de/earsel/earsel.html> (Submission of abstracts by 15 May 2006)

During this meeting GOFC-GOLD will organize a tutorial on evolving standards in land characterization.

#### October 2006

##### 2<sup>nd</sup> Göttingen GIS&RS Days "Global Change Issues in Developing and Emerging Countries"

**Venue:** Göttingen, Germany

**Date:** 4-6 October

**Info:** <http://www.ggrs.uni-goettingen.de/>

##### FAO FRA 2010 Remote Sensing Expert Meeting

**Venue:** Washington, DC

**Date:** 18-19 October

**Info:** <http://www.fao.org/forestry/site/fra/en>

##### ESA & Ramsar GLOBWETLAND Symposium – Looking on wetlands from space

**Venue:** Frascati, Rome, Italy

**Date:** 19-20 October

**Info:** <http://www.congrex.nl/06A11/>

#### November 2006

##### 1<sup>st</sup> National GEOSS Conference

**Venue:** Bonn, Germany

**Date:** 2-3 November

**Info:** [http://www.d-geo.de/index\\_en.htm](http://www.d-geo.de/index_en.htm)

**November 2006****12<sup>th</sup> Conference of the Parties to the UNFCCC & 2<sup>nd</sup> Meeting of the Parties to the Kyoto Protocol****Venue:** Nairobi, Kenya**Date:** 6-17 November**Info:** <http://unfccc.int/>**ESSP Global Environmental Change Open Science Conference****Venue:** Beijing, China**Date:** 9-12 November**Info:** [http://www.essp.org/ESSP2006/Information\\_index.html](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

**GEO III Plenary Meeting & User Interface Committee (UIC) event****Venue:** Geneva, Switzerland**Date:** 28-29 November**Info:** <http://www.earthobservations.org/meetings/meetings.html>**December 2006****2<sup>nd</sup> 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>**Newsletter archives of related projects****GLOBCOVER Newsletter:** <http://dup.esrin.esa.it/projects/summary68.asp>**GLCN Newsletter** (Global Land Cover Network): <http://www.glcnet.org/news/>**The ESA GOFc 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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