

# LAND COVER AND CHANGE

Newsletter of the GOFC-GOLD Land Cover Project Office

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## REPORT FROM THE GOFC-GOLD SYMPOSIUM ON FOREST AND LAND COVER OBSERVATIONS HELD 21-25<sup>TH</sup> MARCH 2006 IN JENA

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The ESA GOFC-GOLD Project Office organized and hosted an international Symposium on Land and Forest cover observations. This workshop was held 21<sup>st</sup>-25<sup>th</sup> March in Jena and provided the frame for four independent workshops reflecting the different GOFC-GOLD activities. Overall, 87 participants from 27 nations attended this symposium, where members of the GOFC-GOLD land cover implementation team (LC-IT) came together with representatives from several national and

international organizations and space agencies, as well as representatives of the scientific community and companies. This newsletter contains a brief summary of the outcomes of these individual events. A central event has been the GOFC-GOLD LC-IT Meeting from 23<sup>rd</sup> to 24<sup>th</sup> march at the Dornburg Castle near Jena. This meeting followed the recent land cover IT workshops in Toulouse (2001) and Jena (2004), and the GOFC-GOLD Scientific and Technical Board meeting in



Figure 1: Participants on the GOFC-GOLD Symposium on "Forest and Land Cover Observation" in front of the Dornburg Castle near Jena

Beijing (2005). The purpose was to report the progress of GOFC-GOLD and to discuss activities considering the objectives posed by the international community and GOFC-GOLD Scientific and Technical Board and the action items defined in the previous LC-IT meeting in Jena. The workshop agenda focused on the following topics:

- Requirements from the international community including GEO(SS), GCOS IP/UNFCCC and other conventions, and Integrated Global Observations for Land (IGOL)
- Observation data continuity and access,
- Evolving standards in land characterization and validation,
- Participation in ongoing and future programs for land cover characteristics and change assessment,
- GOFC-GOLD regional networks and capacity building,
- User involvement and confidence building.

During the first day the contribution of GOFC-GOLD to international initiatives and the activities of the LC-IT members were presented. Prominent efforts include those of the Group on Observation (GEO), UN conventions in particular the United Framework Convention on Climate Change (UNFCCC) and the related implementation plan of the Global Climate Observing system (GCOS), and the development of the IGOS-P theme for Integrated Global Observations for Land (IGOL). During the second day three breakout group discussions reviewed tasks and actions given to GOFC-GOLD and developed strategies for new products and activities in the field of:

- Harmonization & validation
- Pending actions & tasks
- External collaborations.

|         | Tuesday, March 21st  |   | Wednesday, March 22nd  |   | Thursday, March 23rd                                     | Friday, March 24th                                       | Saturday, March 25th               |
|---------|--|---|--|---|--|--|------------------------------------|
| Day     | Workshop on Monitoring Tropical Deforestation for Compensated Reductions (Day 1) | Workshop on Monitoring Boreal Forest Ecosystems and Carbon accounting (Day 1) | Workshop on Monitoring Tropical Deforestation for Compensated Reductions (Day 2) | Workshop on Monitoring Boreal Forest Ecosystems and Carbon accounting (Day 2) | GOFC-GOLD Land Cover Implementation Team Meeting (Day 1) | GOFC-GOLD Land Cover Implementation Team Meeting (Day 2) | GOFC-GOLD Regional Network Meeting |
| Evening | Dinner in the University Botanical Garden  |   | Dinner at SCALA on top of Jena-tower   |   | Castle Conference Dinner                                 | Dinner   | Adjourn                            |

Fig. 2: Overview and different workshops of the GOFC-GOLD Symposium

The GEO process can directly benefit from GOFC-GOLD activities. Building upon ongoing efforts, the GOFC-GOLD Land Cover IT will lead and contribute to several GEO tasks outlined in the 2006 work plan.

Future activities include the GLOBCOVER project as GEO case for international cooperation on global land cover mapping, develop consensus on specifications for fine-resolution land change datasets. The evolving a GEO community of practice for forest observations develops in partnership with the FAO Forest Resource Assessment 2010 including an Earth Observation for a consistent global forest and fire assessment.

GOFC-GOLD plays a key role for the development of IGOL. The IGOL report will be completed soon and addresses strategies for integrated land observations. The requirements again raise the issue of continuity and consistency of observations in both the spatial, temporal and thematic domain. In particular the current data gap and lack of coordinated fine-resolution satellite and in-situ data observations pose major challenges for implementing IGOL.

The Land Cover-IT has reported contributions to the GCOS implementation to the UNFCCC

for evolving standards in land cover characterization and validation. GOFC-GOLD has taken ownership for three land cover product specifications currently developed as Appendix to the GCOS IP.

As direct input for ongoing UNFCCC policy discussions, the land cover implementation working group on "Monitoring deforestation for reducing emissions from deforestation" has developed consensus on the technical protocols for implementing such an observing system in developing countries. Several European programs and projects for forest and land cover observations are currently ongoing or evolving in the context of GMES. This workshop has provided a clear incentive to link the European and global activities for the benefit coordinated and efficient land monitoring. Key components of coordinated efforts will be the joint work on implementation GEO tasks (i.e. between EEA and GOFC-GOLD) and networking mechanisms within to Europe building upon GOFC-GOLD experiences.

The land cover office in Jena would like to thank the sponsors, the organizing committee and all supporters who have helped to make the symposium such a success. All detailed outcomes will be reported in the GOFC-GOLD and GTOS report series.

## NEW GOF-C-GOLD CO-CHAIR

During the workshop in Jena, GOF-C-GOLD welcomed **Philippe Mayaux** as new co-chair. He took over the position from Alan Belward from the European Joint research Center. Philippe Mayaux has been an active member of the Land Cover Implementation for many years. He has agreed to take responsibility as co-chair with particular focus on linking with GCOS activities and the regional network coordination.

Philippe Mayaux is a research scientist with the Joint Research Centre (JRC), Ispra, Italy, where he works in the Global Environmental Monitoring Unit (GEM). He currently coordinates different activities of the African

observatory related to forest ecosystems and biodiversity. He coordinates the PASTIS project, which aims to build up an environmental database of projects, documents and spatial data of recent EU funded projects in Africa. Philippe's research interests include vegetation mapping and monitoring of African ecosystems, the implications of land cover changes on biodiversity evolution and the transfer of technical results into policy. He received his Ph.D. degree in Agriculture Science and Biology Engineering from the Catholique University Louvain, Belgium. You can contact Philippe Mayaux at: [philippe.mayaux-@jrc.it](mailto:philippe.mayaux-@jrc.it)



## WORKSHOP OF GOF-C-GOLD REGIONAL NETWORKS PARTICIPANTS OF ALL NETWORKS DISCUSS FUTURE EFFORTS

The Revised Strategic Plan underlines the importance of Regional Networks (RN) in the implementation of GOF-C-GOLD. They offer the possibility for regional scientists, data providers and users to communicate their information requirements and improve the access to observation and their use. At the 3<sup>rd</sup> Scientific and Technical Board meeting in April 2005 the regional networks breakout group prepared a list of key issues and recommended actions. The Regional Network Meeting addressed these issues and recommended actions. During the one-day meeting, presentations addressed the following issues:

- GOF-C-GOLD minimum requirements for RNs – preparation of ToRs
- Calibration/validation test site network
- RN guidance/contribution to national carbon reporting post 2012 (in reference to the recent UNFCCC COP 11

meeting)

- RNs role in implementation of GEOSS and other international conventions
- Linking network activities to national priorities and requirements
- Network sustainability and capacity building strategies

Different regional networks informed about their activities and plans for the future including. The regional networks jointly asked Olga Krankina to continue her successful work as regional network representative to the GOF-C-GOLD Excom. She will work hand in hand with the new GOF-C-GOLD co-chair Philippe Mayaux.

The discussions highlighted a number of important issues. GOF-C-GOLD should enhance the visibility of the networks, i.e. through improved web presence, meetings and proper reporting mechanisms (network implementation plan). Regional

data access remains a key issue and regional and national projects should be identified that contribute to GOF-C-GOLD progress.

Curtis Woodcock of the Land Cover IT highlighted the role of the regional networks in the upcoming global land cover validation activities. The networks could provide local expertise to judge the accuracy and efficiency of existing maps. Global mapping efforts should produce more detailed or tuned products better suited for use within regional and national circumstances. Thus, the networks should be more involved in the production of land cover datasets and explore their use for national resource management. Such a task would fit very well into planned engagement in GEO.

The availability of resources and capacities are essential to foster such activities and the workshop highlighted avenues to seek and provide such support in the future.

# DEVELOPMENT OF TECHNICAL GUIDELINES FOR MONITORING TROPICAL DEFORESTATION FOR COMPENSATED REDUCTIONS

## OUTCOMES OF THE WORKSHOP - 21-22 MARCH IN JENA

During the first two days of the symposium experts in the field of tropical deforestation, earth observation and UNFCCC implementation came together in the GOF-C-GOLD Workshop on "Monitoring tropical deforestation for compensated reductions". GOF-C-GOLD has established an ad hoc working group on this issue in fall 2005. The role/goal of this GOF-C-GOLD working group is to provide technical guidance on current and future capabilities for monitoring deforestation within the context of the UNFCCC present discussions.

Regular communications have resulted in an outline for terms of reference and specific activities to develop and demonstrate internationally agreed and accepted technical protocols for space-based monitoring of deforestation for compensated reductions.

Besides GOF-C-GOLD team members, the related workshop in Jena brought together an international group of more than 30 recognized scientists and experts in the field of earth observation and tropical forest cover. Taking note of the recent UNFCCC decision related to the reduction of emissions from deforestation in developing countries, the overall goal of this workshop was to develop a consensus and concerted response of the earth observation community on the technical feasibility of space-based monitoring of deforestation and reduced carbon emissions in a transparent, timely and cost-effective manner.

### Objectives of the GOF-C-GOLD working group

- Finalize the terms of reference of the ad hoc working group coordinated by GOF-C-GOLD
- Provide feedback and discussions on activities in progress:
  - Define needs and requirements on what is suggested or intended by the UNFCCC and related activities
  - Assess standard practices for monitoring tropical deforestation (nationally, internationally) with particular focus on the role of Earth Observation
- Outline future activities towards a complete draft technical document with particular focus on consensus and development guidelines for best practices
- Identify key requirements/current limitations in implementing monitoring in tropical countries

The workshop included one day of presentations and one day of breakout group discussions. The presentations were organized in different sessions to emphasize the different workshop objectives. After a first session giving an overview and background information on tropical deforestation, the participants discussed the needs and requirements to understand what exists, is suggested and required by UNFCCC, the Kyoto protocol, and IPCC good practice guidance.

Topic of a third session has been the assessment of current practices in monitoring deforestation and carbon stock changes using remote sensing. In a number of presentations these practices were summarized, including presentations of key national monitoring systems from Brazil, India, Peru, Indonesia. There are, however, prominent examples of effective space-based forest monitoring systems, as the examples from Brazil and India shown. Brazil's digital PRODES program distributes

spatially-explicit estimates of annual deforestation throughout the Brazilian Amazon, based on Landsat imagery (Figure 2). In India, the Forest Service of India integrated digital and visual image interpretations with in-situ assessments of growing stock, biomass and carbon to achieve a countrywide forest assessment.

In summary, comprehensive experiences on methods and techniques for monitoring tropical deforestation from Earth observation exist already at project level within the framework of the CDM, at national level for some countries and at regional or global level from international organizations (FAO) or research institutes. Satellite observations have proven to provide consistent, transparent, and cost-effective measurements of forest cover and change in high spatial and temporal detail over large geographic areas, in particular for tropical regions. Thus, an operational deforestation monitoring system for developing countries should consider

satellite observations to be effective. Large deforestation areas, which reflect the majority of carbon emissions from forest change are most easily detected using current observation capabilities. Detection of forest degradation and small deforestation patches require more specific and regionally tuned approaches. Considering existing satellite databases and assuming continuity for future satellite mission, forest changes can be monitored for assessing and comparing historical and future rates of deforestation. Current satellite observations do not allow for direct operational estimation of changes in carbon stocks at a national scale. A combination with ground-based or detailed remote surveys is anticipated to estimate net carbon emissions from satellite-observed changes in forest area; such approach is already proposed by the IPCC 2003 good practice guidance.

Based on the consensus achieved, the international community present at the workshop has agreed to start developing technical guidelines and protocols for monitoring emissions from deforestation in

developing countries. Specific aspects of such a monitoring framework have been discussed in designated breakout groups including 'best' practices and outlines on:

- Monitoring deforestation
- Monitoring forest degradation and regeneration
- Estimating biomass/forest types in relation to carbon emissions
- Historical deforestation and projections
- Verification
- Structure of 'best' practices report and input to SBSTA workshop

The agreement reached during the workshop was communicated to accredited observers of the UNFCCC, in particular GTOS, to be considered for the submissions to the SBSTA due 31. March 2006. Three of the March 31st submission of accredited observers to the UNFCCC specifically referred to the outcomes of the GOFC-GOLD workshop including the ones from GTOS, Environmental Defense and the Climate Action Network. Of the eighteen submissions by parties, six country submissions and the one

from the EU more or less support the use of Earth Observation.

A first draft of the technical development will be drafted for the upcoming SBSTA meeting in Bonn in May 2006. GOFC-GOLD will give a presentation on earth observation capabilities during a Environmental Defense side event at the May 2006 SBSTA. More importantly, the technical document will be reviewed, finalized and presented at the specific SBSTA workshop on this issue in late summer 2006.

Despite the earth observation potentials, further developments of capacities are needed for establishing operational deforestation monitoring systems at country level in developing countries and for ensuring long-term satellite observation continuity and appropriate data dissemination mechanisms.

Results of the workshop will be documented in a GOFC-GOLD report. There is specific GOFC-GOLD website on this issue:

[www.gofc-gold.uni-jena.de/sites/deforest.html](http://www.gofc-gold.uni-jena.de/sites/deforest.html)

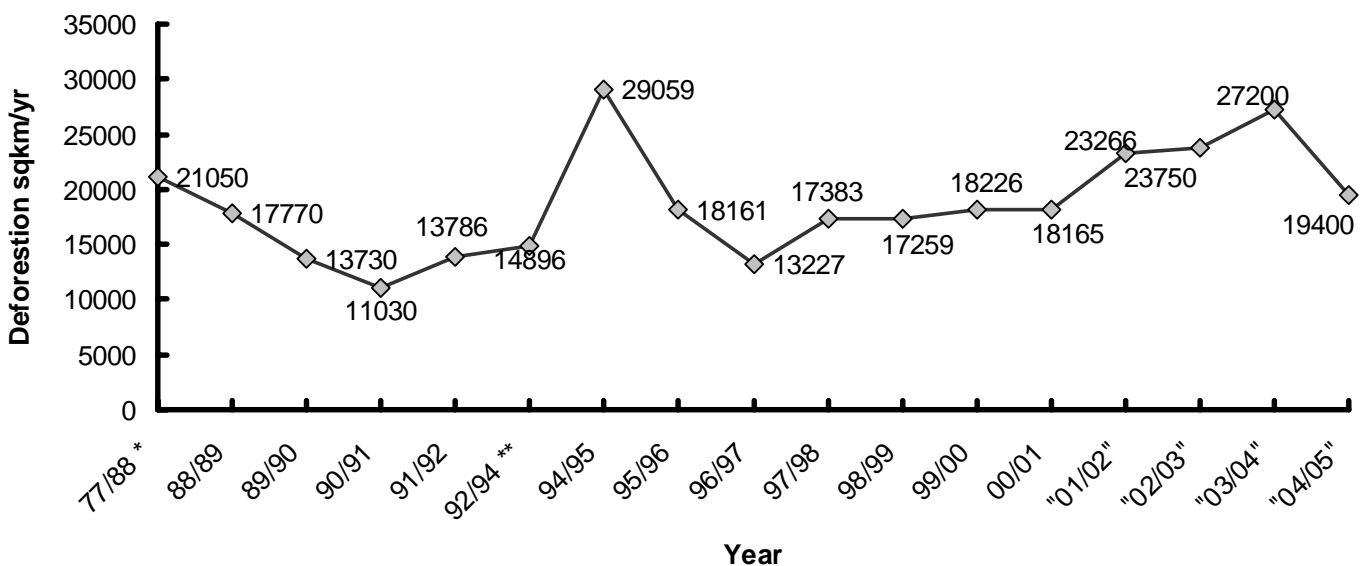
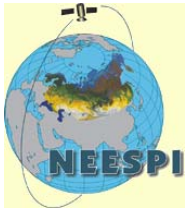


Figure 2: Annual deforestation rates estimated for the Brazilian Amazon derived from space-based observations (Source: INPE, 2006). The total gross deforestation for this period: 681.343 sqkm. (Note: \* decade mean; \*\* bi-annual mean)

# FOCUS RESEARCH CENTER ON LAND COVER STUDIES IN NORTH-EURASIA

## UNIVERSITY OF JENA PARTICIPATES IN NEESPI



The Northern Eurasia Earth Science Partnership Initiative is an international network that aims to establish an interdisciplinary research program in northern Eurasia. It focuses on the vast territory between the 15 E Longitude and the Pacific Ocean and between the 40 N Latitude and the Arctic Ocean, encompassing a wide range of different ecosystem types, i.e. boreal forests, peat-bog and forest tundra, forest steppes, agriculture, lakes and coastal zones (fig. 3) (NEESPI, <http://www.neespi.org>).

This part of the globe is undergoing significant changes, in particular changes associated with a rapidly warming climate and with important changes in governmental structures since the early 1990s and their associated influences on land use and the environment. How this carbon-rich, cold region component of the Earth system functions as a regional entity and interacts with and feeds back to

the greater Global system is to a large extent unknown. Thus, the capability to predict future changes that may be expected to occur within this region and the consequences of those changes with any acceptable accuracy is currently uncertain.



**Fig. 3 Land cover map of the NEESPI study area (Source: Joint Research Center)**

Out of this need for more integrated studies in this specific region and a greater cooperation between the scientists from the US, Europe and Russia the idea emerged to initiate NEESPI. During several workshops in 2003 and 2004 the NEESPI Science Plan has been discussed and finalized. The central research question is: How do Northern Eurasia's terrestrial ecosystems dynamics interact with and alter the biosphere, atmosphere, and hydrosphere of the Earth? The anticipated outcome is the ability to measure, monitor, and model the processes that will provide accurate future projections of climatic and environmental changes in this region.

Important parts of the research strategy are the application of remote sensing and modelling tools.

Actually, 52 funded projects are coordinated by NEESPI, through several Focus Research Center (FRC), each with a specific thematic or regional expertise. Since 2005 FRC for water system studies, aerosol chemistry, land use, biogeochemistry or the Arctic Region were established. The Department of Earth Observation of the University of Jena acts as the NEESPI Focus Research Center for Land Cover and coordinates a number of projects with direct reference to NEESPI (see box).

### Projects of the Earth Observation Department at the University of Jena contributing to NEESPI progress

- ESA Forest Dragon project
- GMES - Russia: Global Monitoring for Environment and Security
- GOFC-GOLD Land Cover Implementation Team Project Office
- GSE - Forest Monitoring in Russia
- IRIS - Irkutsk Regional Information System for Environmental Protection
- SIB-ESS-C – Siberian Earth System Science Cluster
- SIBERIA-II Multi-Sensor Concepts for Greenhouse Gas Accounting of Northern Eurasia
- SIBERIA: SAR Imaging for Boreal Ecology and Radar Interferometry Application

## UPCOMING LAND COVER EVENTS

### EVENTS / CONFERENCES / WORKSHOPS

#### 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>

GOFC-GOLD will organize and host a special session during this event.

#### **Reducing Emissions from Deforestation in Developing Countries**

**Venue:** Bad Blumau, Austria

**Date:** 10-12 May

**Info:** <http://www.joanneum.at/REDD/>

#### **GI 2006-SYMPOSIUM - GeoINSPIRE'd EU-X-border-GI&SDI in Europe of Regions**

**Venue:** Dresden, Germany

**Date:** 11-12 May

#### **26<sup>th</sup> EARSeL Symposium 'New Developments & Challenges in Remote Sensing', Workshop on Geohazards**

**Venue:** Warsaw, Poland

**Date:** 29 May- 02 June

**Info:** <http://www.earsel.org/>

#### June 2006

#### **2<sup>nd</sup> 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](mailto:tsolmon@num.edu.mn))

For this conference, GTOS and GOFC-GOLD will organize a capacity building event on evolving standards in land characterization.

#### July 2006

#### **2006 IEEE International Geoscience and Remote Sensing Symposium**

**Venue:** Colorado, USA

**Date:** 31 July – 04 August

**Info:** <http://www.igarss06.org/>

GOFC-GOLD will be represented with a booth

### EVENTS / CONFERENCES / WORKSHOPS

#### August 2006

#### **Global Vegetation Workshop 2006**

**Venue:** Missoula, Montana, USA

**Date:** 8-10 August

**Info:** <http://www.ntsg.umn.edu/VEGMTG/>

**September 2006****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/>**ESA & Ramsar GLOBWETLAND Symposium – Looking on wetlands from space****Venue:** Frascati, Rome, Italy**Date:** 19-20 October**Info:** <http://www.congrex.nl/06A11/globwetland.pdf>**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:** 6-11 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

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<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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