

LAND COVER AND CHANGE

Newsletter of the GOFC-GOLD Land Cover Project Office

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NUMBER 19

GOFC-GOLD LAUNCHES BIOMASS WORKING GROUP

SUMMARY OF THE RECENT MEETING IN MISSOULA

The GOFC-GOLD project office in Canada and the GOFC-GOLD land cover project office in Germany organized the first biomass working group meeting on June 15th adjacent to the Global Vegetation Workshop at the University of Montana in Missoula.

NEW VERSION OF THE REDD SOURCEBOOK

In July 2009 the GOFC-GOLD REDD working group released the new REDD sourcebook, which is a consensus perspective from the global community of earth observation and carbon experts on methodological issues relating to quantifying the green house gas (GHG) impacts from deforestation and forest degradation in developing countries. There are over 800 registered users (Fig.2). The Sourcebook is available for download on the Land Cover Project Office homepage, and has been presented in a dedicated side event read more on page 4.

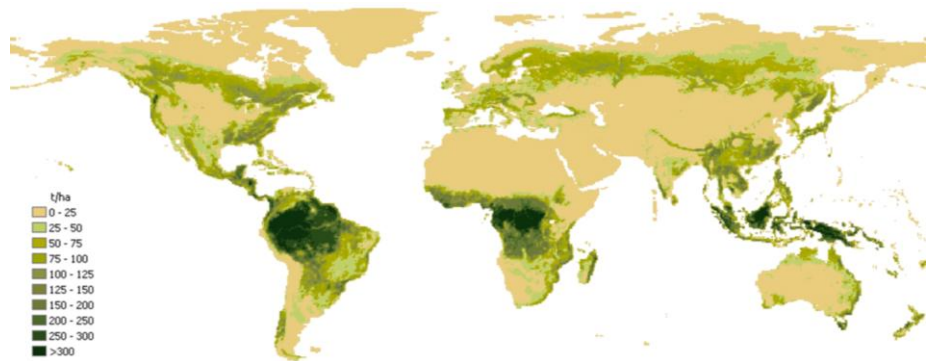


Fig. 1: Global distribution of aboveground biomass

Twenty-five participants attended the meeting to discuss the status and progress of global and regional biomass monitoring using remote sensing as the primary data source. The activities leading to the establishment of the working group have been driven by the strong advocacy of biomass and carbon in key international political processes and the subsequent need for an international coordination and a communication platform to enhance biomass monitoring using a combination of remote sensing and in situ observations.

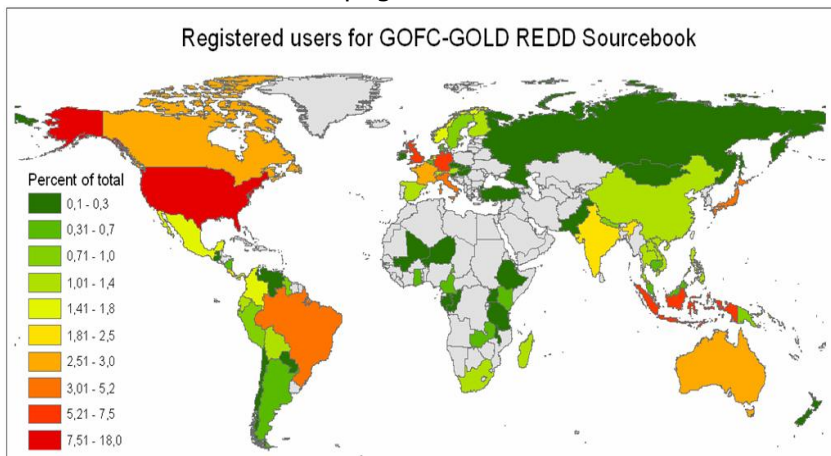


Fig. 2: Distribution of users for the GOFC-GOLD REDD Sourcebook (Total: 830 users)

At the beginning of the workshop, the participants noted the importance of vegetation biomass as a crucial ecological variable for understanding the status, condition, and potential future changes to the climate system. Vegetation biomass is a large global store of carbon. Changes in the amount of vegetation biomass have been identified as having an effect on the CO₂ content of the global atmosphere. Forest utilization and management activities, through harvesting, deforestation (conversion to non-forest land use), or reforestation affect and add complexity to the nature of the flow of carbon between forests and the atmosphere.

In this context, the meeting addressed a number of objectives to: convene and officially inaugurate the GOFC-GOLD biomass WG and specify working procedures, membership, and objectives; to provide an assessment of user needs for monitoring biomass and implications for developing a global monitoring framework; to discuss progress for observing biomass as ECV (incl. calibration and validation issues); and to plan for next steps and actions. Participation was comprised of internationally recognized scientists and experts in the field of earth observation and biomass estimation. Participants included GOFC-GOLD land cover implementation members, representatives of Universities, National Forest Services, technical experts from environment research labs, as well as a few representatives from space agencies. The workshop included ½ day of presentations and ½ day of discussions. During the morning session, participants reported on biomass monitoring user requirements, international initiatives and the progress of various research and implementation team activities. During the afternoon session, the scope, objectives and action items for the working group and its next steps were discussed. The presentations are available at the GOFC-GOLD homepage at http://www.gofc-gold.uni-jena.de/sites/biomass_presentations.php, (also see Table 1 on next page). Based on the discussions and presentations there was strong motivation for initiating this working group. An initial objective is to compile a team of leading international experts in biomass monitoring willing to engage and cooperate; including relevant (GTOS) panels representing key communities. The emphasis of the group will be on the remote sensing contribution to forest aboveground biomass monitoring. The focus is on working towards truly global observations and monitoring in a consistent and transparent manner. The activities will build upon the

existing political mandate (UNFCCC, GEO) and the established GOFC-GOLD framework. Operational and large-area biomass monitoring has to employ different technologies working on different scales, biomass ranges and regions. Current experience exists on national and regional levels. There needs to be discussions towards an integrated global biomass observation strategy that is built upon the assessment of current gaps, which include: user needs versus status of observations; the synthesis of technological progress to specify near-operational components; specify roles, level maturity, and contributions of different technologies; involving a set of contributory and demonstration project; and is working using calibration and validation procedures. The proposal of a working group for biomass received sufficient support from the participants, and will move to address a number of key issues to move the area of biomass monitoring into more operational mode:

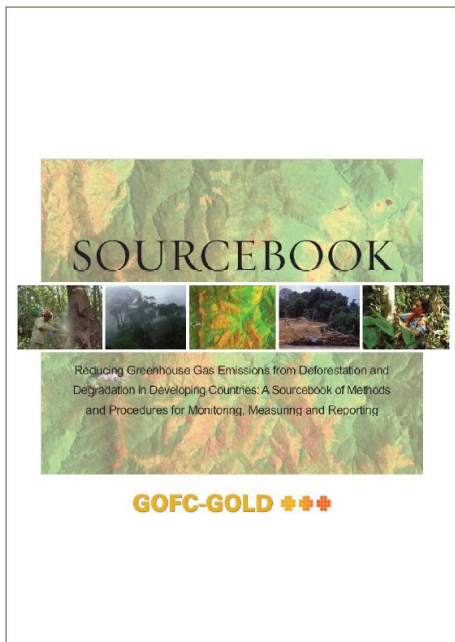
- Need for international coordination and a communication platform to enhance biomass monitoring using a combination of remote sensing and *in situ* observations for biomass estimation;
- Bridging the needs and requirements articulated by the international user community, with remote sensing observation progress developed in the research domain, and refined towards the specification of suitable products intended for operational implementation;
- Support and integrate evolving international projects and programmes to improve the global monitoring of biomass as an Essential Climate Variable (ECV);
- Investigate and communicate opportunities for the harmonization of the different methodologies for data collection, analysis, and validation;
- Foster the cooperation and exchange of data and information among different communities and agencies involved in biomass and carbon assessments; and
- Integrate activities with a number of other relevant ECV observation products, in particular of land cover and fire.

The success of this effort is strongly dependent on the contributions from a wide variety of professional and highly motivated scientists. The Biomass working group we like to invite interested scientist and experts to engage in this effort led by Prof. C. Schmallius (c.schmallius@uni-jena.de).

Tab. 1: Summary of Biomass Working Group presentations

<p>1ST GOFC-GOLD AD HOC BIOMASS WORKING GROUP SESSION 1: INTERNATIONAL INITIATIVES AND NEEDS</p>
<p>Opening and welcome (Brady, Schnullius)</p> <ul style="list-style-type: none"> • Introducing Workshop objectives • Summarizing ESA's Changing Earth Program SP-1304 future goals • Listing GEO Forest Carbon Tracking short-term objectives
<p>Identifying Critical Earth Observations: User Needs for Monitoring Biomass (Brady)</p> <ul style="list-style-type: none"> • Introducing related Working Groups and recent drivers • Summarized functions of GOFC-GOLD focusing Terrestrial ECV's • Outlook on possible GOFC-GOLD Biomass contributions
<p>Terrestrial Carbon Monitoring (Running)</p> <ul style="list-style-type: none"> • Discussed combination of satellite data and ground data • Showed U.S. examples of spatial variations in water balance and LAI caused by disturbances • Concluded that disturbances can be observed (e.g. MODIS Disturbance Index) <p>Scoping for GOFC-GOLD biomass working group (Herold)</p> <ul style="list-style-type: none"> • Introduced drivers for the purpose of the biomass working group • Demonstrated a GOFC-GOLD biomass strategy
<p>SESSION 2: TECHNOLOGIES, CAPABILITIES & EXPERIENCES</p>
<p>Biomass from Lidar (Wulder)</p> <ul style="list-style-type: none"> • Summarized the usage of LiDAR for Biomass acquisition • Screened examples of LiDAR test carried out on national and international levels <p>RADAR for Biomass Mapping (Kelldorfer)</p> <ul style="list-style-type: none"> • Presented the status of biomass mapping using RADAR • Introduced current and future space born missions • Focused ALOS/Palsar as a highly recommended biomass monitoring satellite
<p>Biomass: In situ methods (Schaaf/Strahler)</p> <ul style="list-style-type: none"> • Introduced biomass insitu measurement and modeling methods • Screened results of measuring biomass using the Echidna Validation Instrument (EVI) • EVI has the capability of reconstructing a 3D model of forests
<p>Boreal-Northern Eurasia (Christiane Schnullius)</p> <ul style="list-style-type: none"> • Reported progress on operational pan-boreal and savannah forest biomass monitoring • In the FOREST DRAGON program a R² of 0.59 between steam volume acquired by InSAR vs Ground data was achieved. • Presentation of the 1st ESA BIOMASAR classification example
<p>Creating a National Forest Biomass Map of Canada (Hall)</p> <ul style="list-style-type: none"> • Done a Biomass Map of Canada using Satellite Data and Models • Used Landsat frames and models to estimate tree properties and biomass • Future map will include LiDAR and RADAR data
<p>Synergy for large area biomass monitoring (Baccini)</p> <ul style="list-style-type: none"> • Presented a method for national scale biomass mapping using satellite data and field data • Pointed how large scale biomass mapping could be carried out • Synergistic effects of Optical and Radar data should be emphasized
<p>Aboveground Forest Biomass (Powell)</p> <ul style="list-style-type: none"> • objected to quantify live aboveground forest biomass dynamics • Introduced biomass measuring and modeling approaches • Landsat archives are valuable for temporal information

GOFC-GOLD WORKING GROUP PRESENTS NEW REDD SOURCEBOOK VERSION



The REDD sourcebook provides a consensus perspective from the global community of earth observation and carbon experts on methodological issues relating to quantifying the green house gas (GHG) impacts of implementing activities to reduce emissions from deforestation and degradation in developing countries (REDD). The UNFCCC negotiations and related country submissions on REDD in 2005-2007 have advocated that methodologies and tools become available for estimating emissions from deforestation with an acceptable level of certainty. Based on the current status of negotiations and UNFCCC approved methodologies, this sourcebook aims to provide additional explanation, clarification, and methodologies to support REDD early actions and readiness mechanisms for building national REDD monitoring systems. It emphasizes the role of satellite remote sensing as an important

tool for monitoring changes in forest cover, and provides clarification on applying the IPCC Guidelines for reporting changes in forest carbon stocks at the national level. The sourcebook is the outcome of an ad-hoc REDD working group of –Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD, www.fao.org/gtos/gofc-gold/), a technical panel of the Global Terrestrial Observing System (GTOS). The working group has been active since the initiation of the UNFCCC REDD process in 2005, has organized REDD expert workshops, and has contributed to related UNFCCC/SBSTA side events and GTOS submissions. GOFC-GOLD provides an independent expert platform for international cooperation and communication to formulate scientific consensus and provide technical input to the discussions and for implementation activities. A number of international experts in remote sensing and carbon measurement and accounting have contributed to the development of this sourcebook. With political discussions and negotiations ongoing, the current document provides the starting point for defining an appropriate monitoring framework considering current technical capabilities to measure gross carbon emission from changes in forest cover by deforestation and degradation on the national level. This sourcebook is a living document and further methods and technical details can be specified and added with evolving political negotiations and decisions. Respective communities are invited to provide comments and feedback to evolve a more detailed and refined technical-guidelines document in the future. The REDD Sourcebook can be downloaded on the GOFC-GOLD Homepage.

<http://www.gofc-gold.uni-jena.de/redd/>

GOFC-GOLD SBSTA 30 SIDE EVENT

On June 3rd a side event on the topic of “GOFC-GOLD REDD sourcebook: review and recommendations for improving national monitoring capacities” was held. The side event outlined GOFC-GOLD recommendations for collecting key data and developing national forest carbon monitoring based on an updated version of the REDD sourcebook.

Contributing Authors to the updated Sourcebook version:

Frédéric Achard, Gregory P. Asner, Luigi Boschetti, Barbara Braatz, Michael Brady, Sandra Brown, Emilio Chiuvienco, Ivan Csiszar, Ruth De Fries, Michael Falkowski, Sandro Federici, Scott Goetz, Giacomo Grassi, Nancy Harris, Martin Herold, Yasumasa Hirata, Hans Joosten, Chris Justice, Josef Kellndorfer, Stephen Kull, Werner Kurz, Eric Lambin, Danilo Mollicone, Suvi Monni, Erik Næsset, Ross Nelson, Devendra Pandey, Tim Pearson, Gary Richards, David Shoch, Florian Siegert, Margaret Skutsch, Carlos Souza, Allan Spessa, Patrick Van Laake, Michael Wulder

GOF-C-GOLD REPORTS ON PROGRESS FOR GCOS IMPLEMENTATION PLAN TASKS ON LAND COVER

GOF-C-GOLD has recently submitted comments on the Progress Report on the Implementation of the Global Climate Observing System for Climate Support of the UNFCCC 2004-2008. Reports for the land cover tasks are listed:

- (1) Good Progress on Action [T22; Establishing international standards and specifications for the production of land-cover characterization maps](#): GOF-C-GOLD has contributed legend translations and harmonization case studies of existing land cover datasets, as well as assistance for ongoing land mapping projects.
- (2) Good Progress on Action [T23; Produce reliable accepted methods for land-cover map accuracy assessment](#): CEOS WGCV and GOF-C-GOLD established robust standard validation protocols and best practices for accuracy assessment of land cover maps. To harmonize the reporting of national and sub-national accuracy the FAO GLCN developed specific harmonization software. The protocols have been used partly for the validation for ESA's GlobCover2.
- (3) Moderate-Low Progress on 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](#): GEO will foster the international coordination of existing satellites for the upcoming data gap around 2010. Support needs to be strengthened. A Landsat

Data Continuity Mission has been approved starting in 2012. The free access for alternate satellites (e.g. CBERS, AWIFS) for large areas is still lacking. Data distribution and acquisition needs improved coordination.

- (4) Low Progress on Action [T25; Develop an in situ reference network and apply CEOS WGCV validation protocols for land cover](#): Because of the limited progress reached to date, GOF-C-GOLD and CEOS/WGCV have developed a framework for an in situ reference network for operational global land cover validation. The political framework and organizations for international cooperation, and the methodologies to support an operational land cover validation framework exist, or are being developed. The FAO Forest Resource Assessment 2010 establishes a sample system at one degree latitude and longitude intersections. Furthermore the FAO is providing support to national forest monitoring assessments based on systematic field sampling, combined with remote sensing wall-to-wall or sample based mapping.
- (5) Moderate Progress on 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](#): Several data sets do exist which differ in their validation status and their classification schemes. For instance, the LCCS compatible MODIS land cover products are annually available for 2000-2007.
- (6) Low Progress on 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](#): moderate resolution global product has been achieved. GlobCover is the first detailed coarse-resolution (300 m) land cover map at global level, generated by ESA in partnership with FAO, UNEP, GOF-C-GOLD and others. It is not yet clear what methodology will be put in place under the UNFCCC in connection with the proposed implementation of Reducing Emissions from Deforestation and forest Degradation in developing countries (REDD). Relevant space agencies under CEOS have agreed to supply, on a regular basis, the high-resolution data necessary for the generation of fine-resolution land cover maps to support such a methodology. There is however, a suite of ongoing regional studies of land cover change in hotspot areas of climate-induced or anthropogenic changes in land cover. Namely the FAO Forest resource assessment 2010, DLR's FRA-SAR activities, GOF-C-GOLD's GEO task DA-07-02. Despite those efforts there will be no scientifically feasible 10-30m global land cover product available for the international community in the near future.

SUMMARY OF THE CEOS LAND PRODUCT VALIDATION SUBGROUP MEETING IN MISSOULA

About 20 participants attended the CEOS WGCV LPV meeting held on June 15th in Missoula (Montana), which was attached to the 4th Global Vegetation Monitoring workshop:

(1) Introduction: The Land Product Validation Subgroup aims to coordinate validation activities of global high level products. Since 2000 significant progress has been made for some products. The LPV subgroup organized a short meeting to evaluate the status of current validation activities and provided a strategy for the coming years. The reinforcement of the role of several land satellite derived products named ECVs (Essential Climate Variables) for monitoring, understanding and managing when possible and desired the Earth system has also provided a strong focus on the validation activities. About 20 participants attended the meeting held. This article reports the main outputs of this meeting.

(2) Role of the LPV group: LPV aims to foster and coordinate the validation activities for land products at the international level. It has initially focused on land cover, fire in collaboration with GOF-C-GOLD (Global Observation of Forest Cover and Land Cover Dynamics) as well as albedo, LAI and fAPAR products. The LPV sub-group chair and vice-chair are nominated for a 3-year duration and until recently, LPV members consisted of a group of practitioners who actively contributed to the development and implementation of validation procedures. The more formal role of LPV sub-group envisioned for the validation of Land ECVs propelled the adoption of a new and recently implemented structure. The LPV is subdivided into six focus groups. Three major tasks are carried out by the LPV. The first task is the development of protocols for the validation of satellite-derived products and defining guidelines and for reporting results. The second task is the coordination and Implementation of global validation activities. The final task is to provide the interface between the community, CEOS and other international structures.

(3) CEOS land product validation stage hierarchy: A hierarchical approach to classify land product validation stages was adopted by CEOS through consensus of the LPV community in 2003. As displayed in the box there are three

main validation stages to define the ECV status of representation.

STAGE 1:

Product accuracy is assessed from a small (typically < 30) set of locations and time periods by comparison with reference in situ and / or higher resolution airborne or satellite data. Spatial and temporal consistency of the product and consistency with similar products has been evaluated over selected locations and time periods.

STAGE 2:

Product accuracy is estimated over a significant set of locations and time periods by comparison with reference in situ and / or higher resolution airborne or satellite data.

Spatial and temporal consistency of the product and consistency with similar products has been evaluated over globally representative locations and time periods. Results are published in peer-reviewed literature.

STAGE 3:

Uncertainties in the product and its associated structure are well-quantified from comparison with reference in situ and higher resolution airborne and satellite data. Uncertainties are characterized in a statistically robust way over multiple locations and time periods representing global conditions.

Spatial and temporal consistency of the product and consistency with similar products have been evaluated over globally representative locations and periods.

Results are published in peer-reviewed literature.

STAGE 4:

Validation results for stage 3 are systematically and operationally updated by independent actors for comparative assessment of existing products, when new products are released and as the

FIRST FULL REPORTS ON THE ASSESSMENT OF STANDARDS FOR ESSENTIAL CLIMATE VARIABLES PUBLISHED FOR SBSTA 30

For the 30th session of the Subsidiary Body of Science and Technical advise (SBSTA) to the UNFCCC, the first set of full reports assessing the status ECV observations has been released. The ECV process should help to overcome the heterogeneity in the characteristics of global land cover datasets the international community lead by GLCN, GTOS/GOFC-GOLD and CEOS WGCV has been fostering harmonization and more standardized land cover monitoring. Product comparisons and initial comparative validation exercises have been performed. For observing land cover as an ECV, several areas require attention: coordinated observations, integrated and standardized mapping, and independent quality assessment. Any ECV monitoring efforts have to ensure saliency and legitimacy in addition to technical credibility. An international coordination mechanism among key actors worldwide (users, producers, science, regional/national experts) is essential to ensure that land cover products are accepted internationally and by the UNFCCC.

The use of coordinate observations for ECV monitoring is crucial to ensure optimal data reliability and appropriate accuracy. Mapping and Monitoring needs to become integrated and standardized. There is a need for both maps (static and updated) and dynamic monitoring products at different spatial and temporal scales (Table 2?). These outputs require different sets of observations and monitoring approaches. The development and derivation of the mapping products need consistency in land cover characterization to be interoperable as part of an integrated global observing system. The broad areas and topics requiring international consensus are outlined in this document. There is also a need to ensure synergy with other ECV observation products (i.e. Fire, biophysical parameters, Snow Cover) that are directly related to land cover characteristics.

<i>Name</i>	<i>Spatial resolution</i>	<i>Frequency of product update</i>	<i>Maturity</i>
Mapping of land cover			
Land cover maps	250m - 1 km	annual	pre-operational
Fine-scale land cover and land use maps	10-30 m	3-5 years	pre-operational (for land cover)
Global land cover reference sample database	In-situ/1 m	1-5 years	pre-operational (CEOS, GOFC-GOLD)
Monitoring of dynamics and change			
Global land cover dynamics and disturbances	250m - 1 km	intra-annual/ long-time series	pre-operational (for several processes)
Fine-scale land cover and land use change	10-30 m	1-5 years	pre-operational (for land cover)
Monitoring areas of 'Rapid change'	1-30 m	1-2 years or less	pre-operational (for some change processes)

Table 2: Characteristics of land cover mapping and monitoring products useful for observing land cover as an ECV

Suitable global estimates techniques will be used to quantify product accuracy through an independent quality assessment. The international community should provide a mechanism to meet the requirements for assessing products that are generated by incorporating evolving technologies. The basis for such efforts consist of sustained global network of calibration and validation sites, international agreement and standards and approaches for land cover characterization and validation, and an internal coordination mechanism, currently lead by GOFC-GOLD and the Land Validation sub-group of the CEOS WGCV.

SUMMARY OF RECENT GOF-C-GOLD REPORTS 37-43 RELEASED MARCH - AUGUST

This contribution lists and summarizes recent GOF-C-GOLD Reports provided for GTOS. The Reports are at <http://www.fao.org/gtos/gofc-gold/series.html> available for download.

GOF-C-GOLD No.37 Report: From November 4 - 7, 2008 the first GEO Forest Monitoring Symposium was held in Foz de Iguaçu Brazil. The Symposium was convened with the goals of linking existing and planned forest observation systems around the world, identifying new systems where gaps currently exist, and improving access to, and use of, in situ, aerial and satellite Earth observations. It was concluded that several existing products clearly demonstrate the ability of Earth observations to improve global forest monitoring. Especially biomass characterization and estimation should be improved using LiDAR, RADAR and thermal capabilities. Furthermore, the Symposium supported by the Land Surface Imaging Virtual Constellation under development by the CEOS.

Reports 38 to 42 present the outcomes of the 3rd GOF-C-GOLD land cover meeting in Oct. 2008

GOF-C-GOLD No.38 Report: As part of 3rd GOF-C-GOLD Land Cover Symposium described in the previous newsletter, the Report of the GOF-C-GOLD/CEOS Workshop on Land Cover Change Accuracy Assessment has been released in June. The workshop aimed to provide a best practices document. Six priorities have been defined for future collaboration: (1) Continue cooperation between GOF-C-GOLD and CEOS WGCV (2) Use and make available existing global reference databases (3) Define fine scale land cover change standards for accuracy assessment, definitions and procedures (4) Plan an operational validation component of global land cover monitoring (5) Usage of "application specific weighting" for user specified accuracy reporting (6) Continue to communicate and contribute to political and policy level activities, including the UNFCCC/SBSTA and GEO.

GOF-C-GOLD No 39 Report: Since its introduction to the UNFCCC in 2005, the REDD issue has become one of the main topics in the negotiations for an international Post-Kyoto Climate Agreement. The Workshop on Monitoring Tropical Deforestation and Degradation (REDD) was mainly designated to contribute to the living document of the REDD Sourcebook.

GOF-C-GOLD No 40 Report: The Land Cover Implementation Team Meeting resulted in a detailed action plan for the GOF-C-GOLD land cover team. The details on the workshop presentations, breakout groups, and the action plan are available in the report.

GOF-C-GOLD No 41 Report: The Workshop on Boreal and Temperate Forest Monitoring was intended to bring together a group of experts and data users to consider wide-area forest monitoring from a number of different perspectives. The speakers at the workshop illustrated how different data sources and processing options are appropriate to meet different information needs. Future, recent and operational approaches were presented. Appropriate remote sensing information for land cover should be extracted from Optical-, RADAR- and LiDAR-Systems.

GOF-C-GOLD No 42 Report: During the 5th Meeting of the GOF-C-GOLD Regional Networks the established networks were briefly reviewed including: NERIN, WARN, SEARRIN, OSFAC, SAFNet, Miombo, RedLatif. Emerging options for Regional Networks were discussed including the GOF-C-GOLD Regional Network Data Initiative, FRA 2010 and the Global Fire Assessment 2010. The second session was a Business Meeting that reviewed and discussed GOF-C-GOLD policies and collaborative plans for networks. A Regional Network Workshop should be held every two years.

GOF-C-GOLD No 43 Report: This report includes details and results for translating and evaluating land cover legends using the UN Land Cover Classification System (LCCS) for the Anderson Classification System, the CORINE, IGBP and UMD land cover legend. The translations were developed through cooperation between the Land Cover Topic Centre (LCTC) of the UN GLCN and the GTOS/GOF-C-GOLD LC-IT Project office. As major element the LCCS is used to harmonize existing and future legends.

AN ASSESSMENT OF NATIONAL FOREST MONITORING CAPABILITIES IN TROPICAL NON-ANNEX I COUNTRIES

Commissioned by the Princes of Wales Rainforest Project and the Government of Norway, the GOCF-GOLD land cover project office has prepared a report that assesses national forest monitoring capabilities in tropical non-annex I countries.

The objective of the study was to specify and scope the near-term capacity-development activities, for 99 tropical non-Annex I countries, that would be required to implement an accurate forest area change and carbon stock monitoring system. The assessment of current monitoring capabilities emphasized that the majority of countries have limitations in their ability to provide a complete and accurate estimation of greenhouse gas (GHG) emissions and forest loss. Only 3 out of the 99 countries currently have the capacities considered to be very good for both forest area change monitoring and for forest inventories. The major shortcomings in the current monitoring capacities can be summarized according to the relevant reporting principles of the Intergovernmental Panel on Climate Change (IPCC) in their Good Practice Guidelines (GPG):

- **Consistency:** Estimations previously provided by many countries are based either on single-date measurement or on integrating heterogeneous data sources, rather than using a systematic and consistent measurement and monitoring approach;
- **Transparency:** Expert opinions, independent assessments or model estimations are commonly used as information sources to produce forest carbon data; this could potentially lead to a lack of transparency;
- **Comparability:** Common methodologies and guidance must be used to produce comparable results. Few countries have experience in using the IPCC GPG as a common approach to estimation and monitoring;
- **Completeness:** The lack of suitable data for measuring and monitoring forest area change and changes in carbon stocks in many non-Annex 1 countries is evident. Carbon stock data for above ground and below ground carbon are often based on estimations or

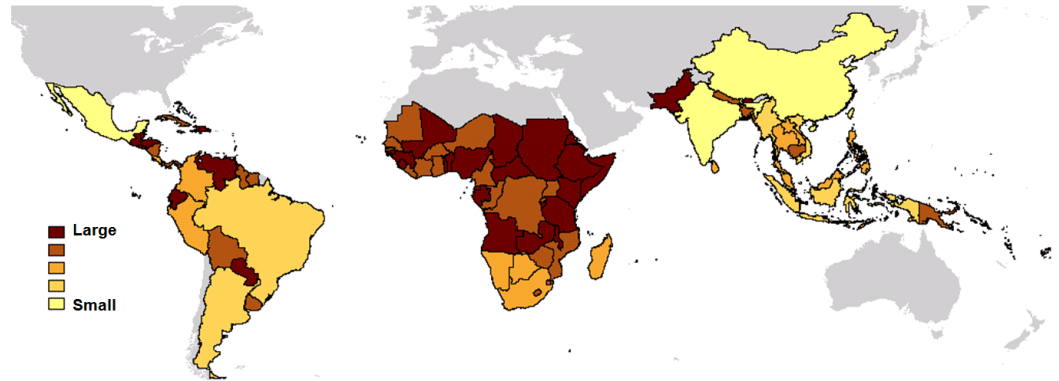


Figure: Spatial distribution of the capacity gap for different countries analyzed.

conversions using IPCC default data and very few countries are able to provide information on all five carbon pools or estimates from biomass burning.

- **Accuracy:** There is limited information on sources of error and uncertainty levels of the estimates provided by countries, and approaches to analyze, reduce, and deal with these in international reporting

A capacity gap for each country was defined as the difference between what is required and what currently exists for countries to measure and verify the success of REDD implementation actions using the IPCC GPG. As a synthesis of this study, the figure below indicates the current distribution where the largest capacity gaps exist for countries:

- that have limited experience in estimation and reporting of national GHG inventories, in application of the IPCC GPG;
- with low existing capabilities to continuously measure forest area changes and changes in forest carbon stocks as part of a national forest monitoring system;
- that face particular challenges for REDD implementation that may not be relevant for all countries,
- where the availability of useful data sources for REDD monitoring is constrained due to lack of receiving stations, persistent cloud cover, seasonality issues, topography or inadequate data access infrastructure.

The full report is available under:

http://princes.3cdn.net/8453c17981d0ae3cc8_q0m6vsqxd.pdf

PROGRESS ON ESA'S GLOBAL & REGIONAL LAND COVER ACTIVITIES



ESA Announces Climate Change Information Day

The ESA will hold an information day on the ESA Climate Change Initiative (CCI) on Monday the 5th October of 2009 at ESA ESRIN in Frascati Italy. At this event the overall objectives and the implementation plan of the ESA CCI will be presented. ESA plans, in the last quarter of this year the release of a competitive tender for proposals in order to perform the detailed requirements, definitions, algorithms, developments and prototypes for a first set of eleven Essential Climate Variables (ECV). For this purpose more than 20 MEuro has been earmarked. The content, schedule and requirements for these first CCI projects will be presented and discussed. ESA staff will be available to answer questions and there will be Opportunities for the attendees to meet and discuss together. This event is expected to be of interest for scientific research groups who intend to participate in or use the results of this program. This includes Earth observation research teams, industrial partners, as well as climate research and modeling groups who wish to make use for the results (global data products) of this program. The meeting will start at 08:30 and will end approximately at 16:00. If you wish to attend use the registration form which is provided online:

https://participants.congrex.com/scripts/jmevent/Registration.asp?Client_Id=%27CXNL%27&Project_Id=%2709M42%27&Form_Id=1&Form_Number=2&Stand_Id=0&A=&Language_Code=&template_id=

Please contact Mark Doherty for further details or questions: mark.doherty@esa.int

Progress on Globcorine

The 1st Progress Meeting of the Globcorine project took place in ESRIN on the 29th of June 2009. Globcorine is part of the Data User Element (DUE) Programm and aims to demonstrate an automatic service that can generate in a consistent way a land cover / land use map and a land change indicator, based on a CLC- compatible legend.

Globcorine is based on the Globcover Software system but it concentrates on the pan European area (including the Mediterranean basin and European Russia), although the system could be potentially extendable globally. Its main data source is the Envisat MERIS fine resolution (300m) mode data acquired between end 2004 and mid 2006.

On November the 17th a final presentation will be performed. Further details on the Globcorine Issue can be found on:

<http://dup.esrin.esa.it/projects/summaryp114.asp>

Contact Oliver Arino for further details: Oliver.Arino@esa.int



Globcover Update

The Globcover Global land cover product is now available since more than 10 months. With more than 6000 registered users and more than 8000 downloads the Globcover community keeps constantly growing. The GLOBCOVER processing system has arrived at ESA ESRIN and will start the new production phase to continuously process MERIS data into land cover data on global scales. Priority will be given to the 2009 yearly global mosaic.

The last update on Globcover was performed in May 2009. Future proceedings will involve a deeper concern about users. The Globcover users corner. Introduction of the corner is a unique chance for users to meet and giving them the opportunity to talk about their work and how Globcover contributed to it.

ESA is committed to continue to engage in global land cover mapping and monitoring efforts building upon the GLOBCOVER experiences and moving them into more operational mode.



UPCOMING LAND COVER EVENTS

EVENTS / CONFERENCES / WORKSHOPS

October

ESA Climate Change Initiative Information Day

Venue: Frascati, Italy

Date: 5th October 2009

Info: https://participants.congex.com/scripts/jmevent/Registration.asp?Client_Id=%27CXNL%27&Project_Id=%2709M42%27&Form_Id=1&Form_Number=2&Stand_Id=0&A=&Language_Code=&template_id=

Info: XIII World Forestry Congress 2009

Venue: Buenos Aires, Argentina

Date: 18-23 October 2009

Info: <http://www.wfc2009.org/en/index.asp>

GEO Forest Carbon Tracking task co-leads meeting

Venue: London, UK

Date: 19-22 October 2009

Info: <http://geo-fct.org/events.html>

SADC, regional fire management meeting

Info : <http://afis.meraka.org.za/safnet/meetings.php>

Asia Pacific Forest Monitoring Network meeting

Venue : Wuhan, China

Date : 26-28 October 2009

Info : http://www.fao.org/gtos/gofc-gold/2009_e.html

November

International GEO Workshop on Synthetic Aperture Radar (SAR) to Support Agricultural Monitoring

Venue: Kananaskis, Canada

Date: 2-4 November 2009

Info: <http://www.cgeo.gc.ca/events-evenements/sar-ros/index-eng.asp>

GTOS Steering Committee Meeting

Venue: Paris, France

Date: End of 2009

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

GOFC-GOLD Science and Technical Board Meeting

Venue: Washington DC, USA

Date: November 2009

Info: Adjacent to GEO plenary

GEO Plenary

Venue: Washington DC, USA

Date: 17-18 November 2009

Info: <http://earthobservations.org/meetings/geo6.html>

Group on Earth Observation VI Plenary Session

Venue: Washington DC, USA

Date: 17-18 November 2009

GEO – IGOS P Symposium**Venue:** Washington DC, USA**Date:** 19 November 2009**Info:** http://earthobservations.org/meetings/20091119_geo_igos_symposium_abstract.pdf**December****Fifteen session and Conference of the Parties of the UNFCCC (COP-15)****Venue:** Copenhagen, Denmark**Date:** 7-18 December 2009**Info:** <http://www.cop15.dk/en/>**January 2010****Regional CARBON REED meeting (OSFAC)****Venue:** TBA**Date:** January 2010**Info:** <http://osfac.umd.edu/>**OSFAC Regional Network Workshop****Venue:** Kinshasa, Kongo**Date:** January 2010**Info:** <http://osfac.umd.edu/>

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 G OFC 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-jena.de/sites/letter.php>

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

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