

Newsletter N° 22 | June 4

# LAND COVER AND CHANGE

## Newsletter of the GOFC-GOLD Land Cover Project Office

### Sentinel-2 as a tool for Land Cover and Forest monitoring

The European Space Agency organized the first Sentinel-2 Preparatory Symposium at ESA-ESRIN, Frascati, Italy on April 23-27. The main objectives of the Symposium were the presentation of the mission, bridge the gap between Science and Services, and provide fora to ESA PI's and scientists. The symposium focused on the following themes: agriculture, forestry, land cover, cartography, and other applications. Read



more on the outcomes of the S-2 Preparatory Symposium on page 2.

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## GOFC-GOLD Land Cover IT meeting at ESA ESRIN, Frascati

The GOFC-GOLD Land Cover (LC) Project Office (PO) organized a side-meeting to the Sentinel-2 Preparatory Symposium in Frascati, on 22-27 April, 2012. The purpose of this meeting was to present, address and discuss the GOFC-GOLD LC Implementation Team progress in various areas and activities to define a future action plan. The specific objectives of the workshop were:

1. discuss the GOFC-GOLD role and contribution to GEO FCT / GFOI tasks and the one on global land cover
2. make progress on issues, and agree on actions to further joint efforts for monitoring LC as Essential Climate Variable (ECV)
3. discuss on global LC validation activities, report on progress of validation data production, online database etc.
4. discuss on good practices for land cover change accuracy assessment

5. update for the REDD+ Sourcebook
6. report on Biomass WG activities.

The workshop objectives were built on previous meetings of similar type and the related outcomes. See Newsletter No 21 for more information.

The decision to strengthen the role of the GOFC-GOLD LC-IT in the design of the LC ECV has been decided. The LC-IT will participate also to the establishment of an in-



Fig. 1. Satellite dish at ESA ESRIN site

dependent LC validation database which is part of the Land Cover Climate Change Initiative (CCI) led by the European Space Agency (ESA). Progress on the validation database jointly developed by Boston University and the LC-IT has been reported. We mentioned the opportunity to use the GOFC-GOLD Regional Network meetings to benefit from the local expertise to facilitate the interpretation of some problematic sample plots.

Decision to keep the REDD Sourcebook as a guideline document and not make it evolve as a technical manual has been confirmed. However authors will be contacted to make a review of each section to identify what content should be updated.

Regarding the Group on Earth Observation (GEO) Forest Carbon Tracking (FCT) and the Global Forest Obser-

vation Initiative (GFOI), the LC-IT is involved in the current development of the guidance document on LC and LC change. The LC-IT also expressed his interest in helping the Food and Agriculture Organization (FAO) that is engaged in the redaction of country-specific technical manuals built upon the REDD Sourcebook, for capacity development.

The Project Office proposed to organize the next GOFC LC-IT meeting on April 15-19, 2013 on the campus of Wageningen University, Netherlands. More detailed information will be provided in the upcoming Newsletters.

## GOFC-GOLD LC Office at SEERIN meeting in Sofia

The South Eastern Europe Regional Information Network (SEERIN) Formulation Workshop was organized on April 17, in Sofia, Bulgaria. Persons from Bulgaria, Czech Republic, Germany, Macedonia, Poland, Romania, Slovakia, Switzerland, The Netherlands, Turkey, Ukraine and the United States of America attended this workshop. The GOFC-GOLD LC-IT PO presented to the audience the expertise that can be provided for LC global and regional mapping projects, and key international bodies and harmonization initiatives being developed for large-scale LC mapping. Each University and Research Institute attending the workshop presented their current research projects and areas of expertise. Participants were encouraged to meet again and submit research proposals focusing

on LC and LC change mapping. European sources of financing were discussed. Decision the rename the RN as South Central European Regional Information Network (SCERIN) was decided. More information on the outcomes of the workshop and upcoming meetings will be available soon on the webpage of the now-called SCERIN.



Fig. 2. Participants of the SEERIN workshop

## Sentinel-2 as a tool for Land Cover and Forest monitoring

The Sentinel-2 (S-2) Preparatory Symposium organized on April 23-27 in Frascati, Italy was attended by about 350 persons. A total of 72 oral presentations were made and 110 posters were presented (oral presentations are available on the symposium website).

The symposium was an opportunity to demonstrate how forestry applications will be greatly enhanced by S-2; both for existing applications (classification, LC change, biomass, fire, ...), and new ones (phenology, time series analysis). Key observational benefits were pointed out such as temporal, spectral and spatial improvements. Expected benefits of improved revisiting capacity (5 days with 2 satellites) are: cloud contamination reduction, utilization of phenological stage, improved time series analysis to improve consistency, accuracy, timeliness and thematic detail. Expected benefits of improved spectral information content are: species identification, damage, and biomass estimation. A few key R&D activities will be re-



quired prior to the start of the mission, in terms of mass data management, pre-processing automation, automatic accuracy assessment of S-2 data products, and automatic processing of S-2 time series. New retrieval techniques will have to be developed for time series and change analysis.

Regarding Land Cover applications in general, the participants insisted on data policy. A free access to data result in an increase of data usage, promote geographical spread of use,

in developing countries notably, and increase the number and nature of applications. Needs for a single portal to access the collection of S-2 data, availability of ready-to-use data, and user-friendly tools to process large volumes of data (composite options, tile to mosaic, cloud / shadow masking) were stressed. Interoperability between Landsat and S-2 data, via a linkage between the archives, was expressed for time series analysis. Furthermore tools to permit spatial and temporal inte-

gration of both data types are expected to increase temporal revisit. Inter-sensor calibration (between S-2 and other sensors) was identified as important for leveraging multi-sensor collection archives. Promotion of the development and access to calibration / validation data was discussed and the role of the Joint Research Centre and GOFC-GOLD was pointed out. A lot of the speakers have welcomed the red edge bands as well

as the SWIR bands for several applications where most of the new exploitation development is needed. Finally, participants agreed the true value of the S-2 mission will be realized with the launch of the second S-2 satellite that will enable a 5-day revisiting period eventually.

Session summaries can be found on the website of the S-2 Preparatory Symposium.



## Project for a Centralized and Flexible Validation Database for Global Land Cover Map Products from GOFC-GOLD LC-IT

Accuracy assessment of Global Land Cover (GLC) map products is an important part of the mapping procedure. The need for a validation database enabling satisfying thematic accuracy assessment of GLC products has not been fulfilled yet. Heterogeneity of available validation databases concerns an extensive suite of characteristics such as the sampling design (sample scheme, sample size, minimum mapping unit) and response design

(source of information (ground truth, photo interpretation), data acquisition date, level of detail of classes (forest versus coniferous/deciduous)). The GOFC-GOLD LC-IT proposes a framework to 1) select the most appropriate databases among the existing ones based on internal quality and merging-capacity criteria, 2) set harmonization rules to ensure a coherent and flexible usage of a unified validation database, 3) establish the new database and make it available

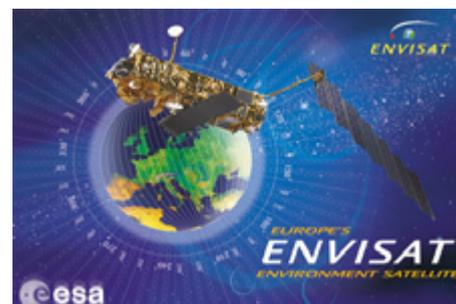
online to the GLC mapping community.

As part of the project, the GOFC-GOLD LC Office is starting a close collaboration with the Université Catholique de Louvain to make an external verification of the validation samples of the Land Cover CCI. We will provide information on the upcoming developments in the next Newsletters.

## ENVISAT MERIS Mission

The contact with the Envisat satellite was lost on April 8 after ten years in orbit. Efforts in attempting to regain control of the satellite have been unsuccessful so far. As chances of recovering Envisat

are extremely low, ESA declared the end of the mission for Envisat on May 9. However, additional attempts to re-establish contact keep being done. For more detailed information, see [this page](#).



## ORFEO: an Open Source Image Processing Toolbox

ORFEO Toolbox (OTB) [1] is an open-source image processing library. This French Space Agency (CNES) [2] initiative, in partnership with CS [3], has been capitalizing technical know-how since 2006. Today, the OTB provides its users a wide set of algorithms and functionalities specifically targeting remote sensing data exploitation. Furthermore, the OTB library al-

ready includes a diversified collection of useful tools in a land cover analysis context. Among these high-end resources, segmentation algorithms such as Mean Shift, classification methods like Support Vector Machines (SVM) or spectral rule-based classifier along with a whole Object-Based Image Analysis (OBIA) framework are available. They also benefit from the extensive set of feature gathering radiometric indexes,

invariant descriptors and textures.

The kalideos program[4] is currently relying on OTB capabilities to develop an automatic land cover map production chain from SPOT images. Another asset of OTB is to provide these high-end resources through multiple interfaces. One of them is an integration within the open-source GIS Quantum GIS[5] as plug-ins

based on the SEXTANTE project providing the user an intuitive and efficient way to build processing chains.

**For more information:**

1. OTB website - <http://orfeo-toolbox.org/>
2. CNES website - <http://www.cnes.fr/>
3. CS website - <http://www.c-s.fr/>
4. Kalideos website - <http://kalideos.cnes.fr/>
5. QGIS website - <http://www.qgis.org/>

or email your questions to:  
[otb-users@googlegroups.com](mailto:otb-users@googlegroups.com)

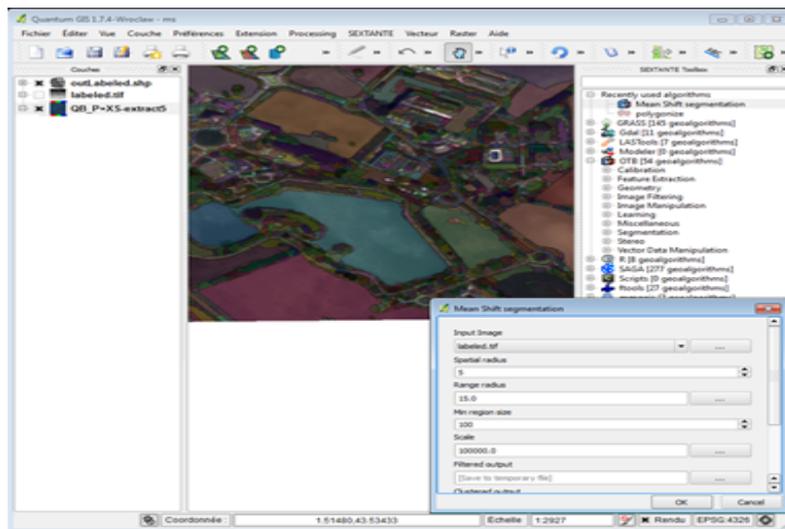


Fig. 3. OTB Mean Shift application from within QGIS

## Survey for Land Change Modeling Committee of National Academy of Sciences

The U.S. National Academy of Sciences, through its National Research Council (NRC), is assessing the future research requirements for spatially explicit land-change models and needs your input (committee details below). An important topic concerns the need for land use and land cover data to enable

land change modelling. To those involved with Land Change models we kindly ask that you complete a short, five question, on-line questionnaire: <http://dels-registration.nas.edu/s3/LCM>. This is a small survey, going only to a select group of individuals, so your response will be valuable to the committee. Please complete the questionnaire by June 15th if possible.



## Calendar of upcoming events for 2012 / 2013

Event	Date	Venue	Contact
Data Initiative and advanced training	30 April-25 May	Sioux Falls / Boston, USA	Thomas Loveland, Curtis Woodcock
UNFCC SBSTA session	14-25 May	Bonn, Germany	TBD
Miombo workshop	TBA Spring	Maputo, Mozambique	Olga Krankina
Volga workshop	17-22 June	Yoshkar-Ola, Russia	Olga Krankina
Workshop on Baikal (Capacity building for young scientists)	1-9 July	TBD	Garik Gutman
39th COSPAR Scientific Assembly	14-22 July	Mysore, India	<a href="http://www.cospar-assembly.org/">http://www.cospar-assembly.org/</a>

Table 1 (continued): Upcoming events

Event	Date	Venue	Contact
Biomass Working Group session at IGARSS	23-27 July	Munich, Germany	Christiane Schmullius
32nd International Geographical Congress	26-30 August	Cologne, Germany	<a href="https://igc2012.org/">https://igc2012.org/</a>
SEARRIN workshop	Summer/ Fall	Bangkok, Thailand	Chris Justice, Olga Krankina
CARIN workshop	Fall	Tashkent, Uzbekistan	Olga Krankina
ForestSAT 2012	11-14 September	Corvallis, USA	<a href="http://www.forestsat2012.com/">http://www.forestsat2012.com/</a>
Silvilaser Conference	16-19 September	Vancouver, Canada	<a href="http://silvilaser2012.com/">http://silvilaser2012.com/</a>
GlobBiomass User Consultation meeting <i>Jointly with</i> LandCover-CCI progress meeting	8-12 October	Jena, Germany	Christiane Schmullius
LCLUC Science Team meeting with South Asia RN meeting	6-12 October	TBD, India	Chris Justice
3rd MERIS/(A)ATSR & OLCI/SLSTR Preparatory Workshop	15-19 October	Frascati (Rome) Italy	<a href="http://www.sen3symposium.org/">http://www.sen3symposium.org/</a>
Regional Agriculture production and land use monitoring workshop with RedLaTIF meeting	Fall	TBD	Chris Justice
Conference on User Requirements of Remote Sensing of Forest Fires in the Boreal Zone	/	TBD	Johann Goldammer
Fire Implementation Team meeting	Late 2012/ Early 2013	TBD, U.S.A	Krishna P. Vadrevu
GOFC-GOLD LC-IT meeting	April 2013	Wageningen, Netherlands	Brice Mora
Trans-Atlantic training on LCLUC-related topics	June 2013	Prague, Czech Republic	Garik Gutman

Table 1: Upcoming events

## Acknowledgements

The GOFC-GOLD LC PO wishes to thank the Organization Committee of the Sentinel-2 Preparatory Symposium for providing information on the outcomes of the event, and the ESA Media Relation Office who provided information on the ENVISAT mission. We thank people from C-S for providing information on the ORFEO ToolBox (OTB).

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.gofcgold.wur.nl/sites/letter.php>

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



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