

G L O B C O V E R

POST PROCESSING KICK-OFF AND PROJECT DEVELOPMENT FOR A NEW GLOBAL LAND COVER PRODUCT

The GLOBCOVER post processor Kick-Off Meeting was held on 13 April 2005 at ESA/ESRIN. The objective of the meeting was to discuss progress of this project, which started in April 2004 with the Globcover User Requirements, and to in-

map for the year 2005, using as main source of data the fine resolution (300 m) mode data from MERIS sensor onboard Envisat (Figure 1). The product is intended to update and complement existing comparable global products like GLC 2000.

mode and on full swath with an average of 150 min acquisition time per day (Figure 2). All data will be used as input for developing the GLOBCOVER products. ESA is also updating its own MERIS FRS processor. The new ver-

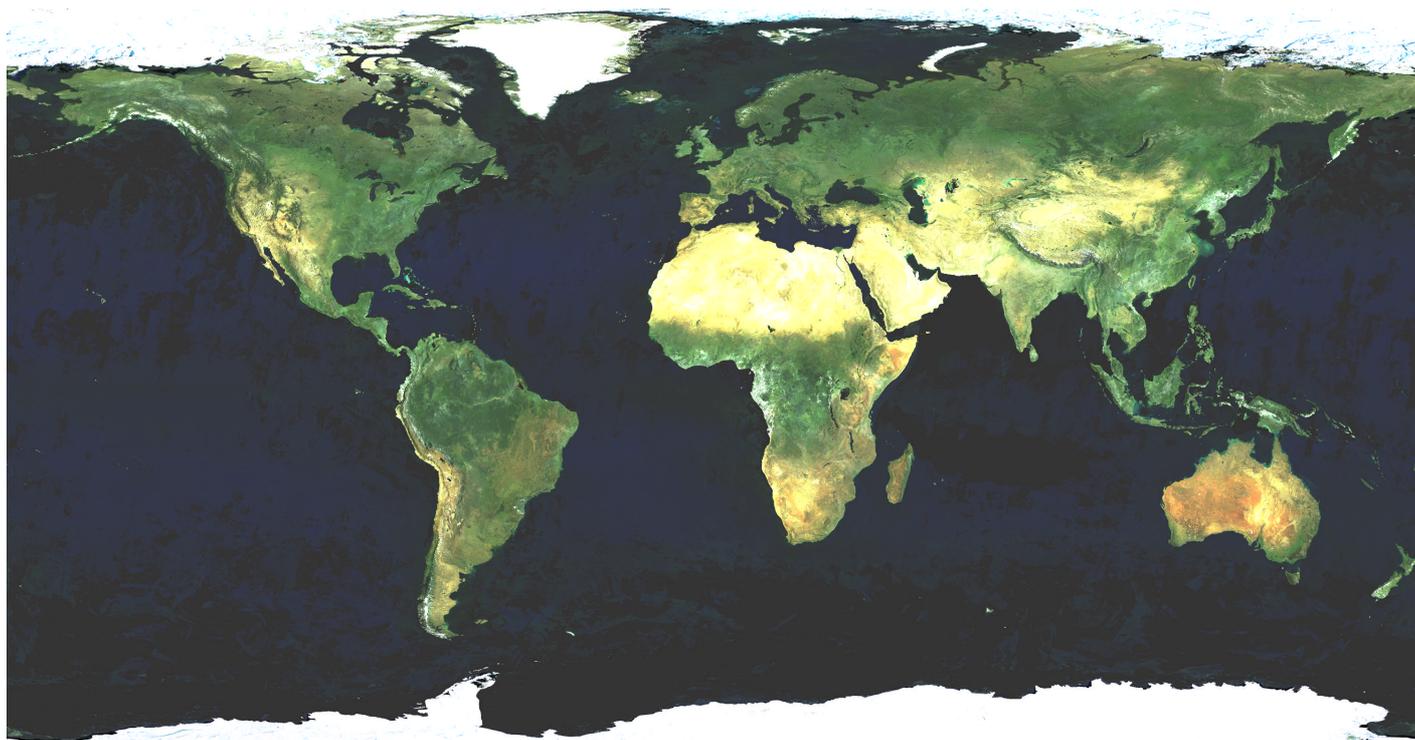


Figure 1: The global MERIS mosaic for May, July, October and November 2004 (1km resolution). The colour composite has been obtained by merging MERIS spectral bands 2, 3, 5, 7 (Source: ESA).

roduce the Medias France consortium with its implementation plan for the development of the GLOBCOVER V1 product. The workshop was attended by representatives of ESA, the Medias France consortium, GOFC-GOLD, JRC, IGBP and EEA. The objective of GLOBCOVER is to produce a global land-cover

GLOBCOVER progress

Since 01st of December 2004, the Envisat MERIS instrument is acquiring on his Full Resolution

version 5.0 is planned to be available in July 2005. The first monthly MERIS mosaics are expected in January

Newsletter content:

GLOBCOVER	1	Global user community	5
Geoland	4	Upcoming land cover events	7

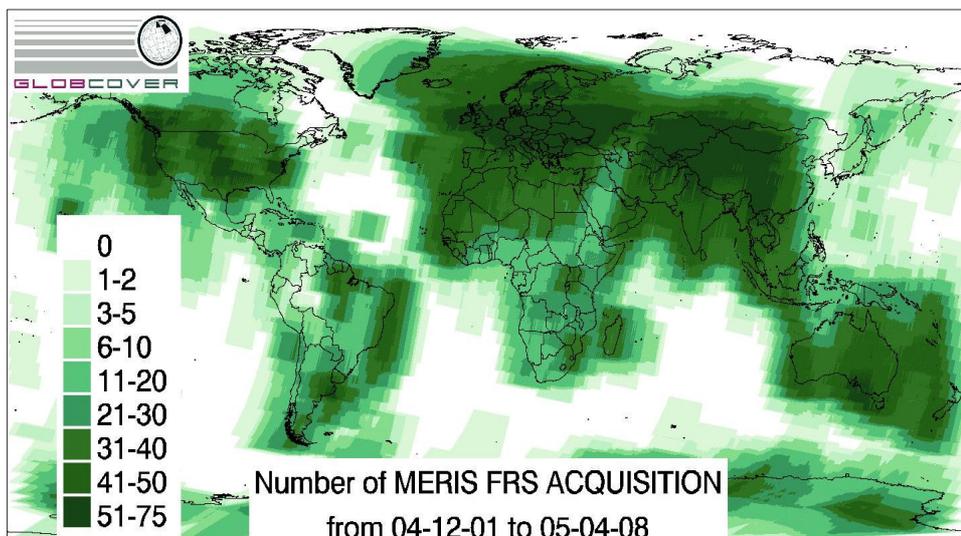


Figure 2: MERIS full resolution acquisition density since 1st of December 2004.
(Source: ESA)

2006. The global products are intended to be available in January 2007 (V1 product) and in January 2008 (V2 product). The validation of the GLOBCOVER product is planned to be finished by September 2008. The GLOBCOVER project is a continuation of ESA (Data User Element-DUE) commitment to improved global and regional land cover observations for a variety of applications (Table 1). Main users of the GLOBCOVER products are FAO and UNEP.

The Medias France consortium

A consortium leading by Medias France has been retained to produce the GLOBCOVER V1 product. Medias France is a public, nonprofit corporation headquartered in Toulouse. It supports research projects on regional and global environment for sustainable development particularly on the Mediterranean Basin and subtropical Africa. Further partners in the consortium are UCL-Geomatics (B), Brockmann Consult (G), Synoptics (N), Spacebel (B), Noveltis (F) and Magellium (F). The consortium implements the MERIS data pre-processing (Brockmann Consult), system

development and demonstration (Medias France), management and promotion (Medias France), and land cover classification and validation. Detailed information on Medias France can be found at: <http://medias.obs-mip.fr>.

Land cover classification

The classification component project will be coordinated by the Geomatics group of the University Catholique de Louvain that was already been involved in the GLC2000 regional mapping process. Key idea of the analysis is to combine the high spatial consistency of classes delineation obtained from multispectral composites with the great land cover discrimination provided by temporal profile analysis. The classification process will focus regionally-tuned approaches (including involving regional experts) using the FAO Land Cover Classification System (LCCS).

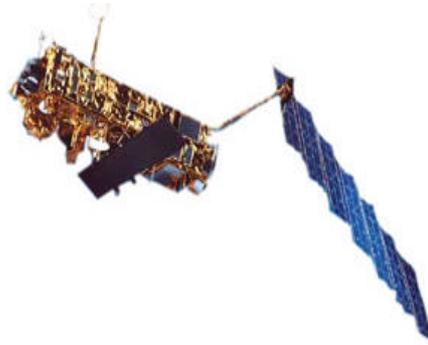
The GLOBCOVER V1 product will be provided in January 2007. The GLOBCOVER V2 map will be based on the V1 product and will be developed by European Joint Research Center (JRC).

Table 1: ESA DUE/DUP land cover and land use projects.

AQUIFER – AQUIFER Management Service Prime Company: GAF AG (Germany) http://www2.gaf.de/Aquifer/
BEGo – Gorilla Natural Habitat Monitoring Service Prime Company: SYNOPTICS (Netherlands) http://www.gorillamap.org
DesertWatch – Desertification Monitoring Service Prime Company: ACS (Italy) http://dup.esrin.esa.it/desertwatch/
EPIDEMIO – Earth Observation in Epidemiology Prime Company: DJO (Germany) http://www.epidemie.info/
GLOBCARBON – Global Land Products for Carbon Model Assimilation Prime Company: VITO (Belgium)
GLOBCOVER – Global Land Cover in 2005 using MERIS data Prime Company: Medias France (France)
GLOBWETLAND – Development and demonstration of a standardised information service based on EO technology to support the implementation of the RAMSAR Convention Prime Company: ATLANTIS (Canada) http://www.globwetland.org
KYOTO INVENTORY – Services for the Kyoto Protocol Verification Prime Company: INTECS HRT (Italy) http://kyoto-inv.pisa.intecs.it/

GLOBCOVER and CORINE

Considerations of European Environmental Agency (EEA), JRC and ESA are currently underway to develop an additional path of GLOBCOVER products to link these land observations to the European CORINE program. This process would improve the flexibility and relevance of global land cover data to local and regional applications and would provide a test case for the integration of land cover information across scales for Europe. Linking GLOBCOVER and CORINE seems challenging since mapping and cartographic standards are different. Currently, this link is approach as an addition to the proposed GLOBCOVER project. GOFC-GOLD is currently investigating the compatibility of the CORINE legend to current global products and LCCS-based legends.



Despite obvious inconsistencies, GOFC-GOLD recognizes the willingness of both agencies (EEA and ESA) to approach such a task. Specific of the integration framework, e.g. on the level of the data or the mapping products, remain to be defined.

LC classification based upon MERIS FRS data

Preliminary land cover classification results based upon MERIS full resolution data were derived within the EU-project Siberia-II.

Figure 3 shows classification results from GLC2000, Modis and Meris data for an agricultural and forestal area along the Yenisey in Siberia. The GLC2000 legend was applied in all three datasets. The increase of spatial resolution allows a finer feature of the landscape to be identified and therefore a significant increase in the thematic detail of the product.

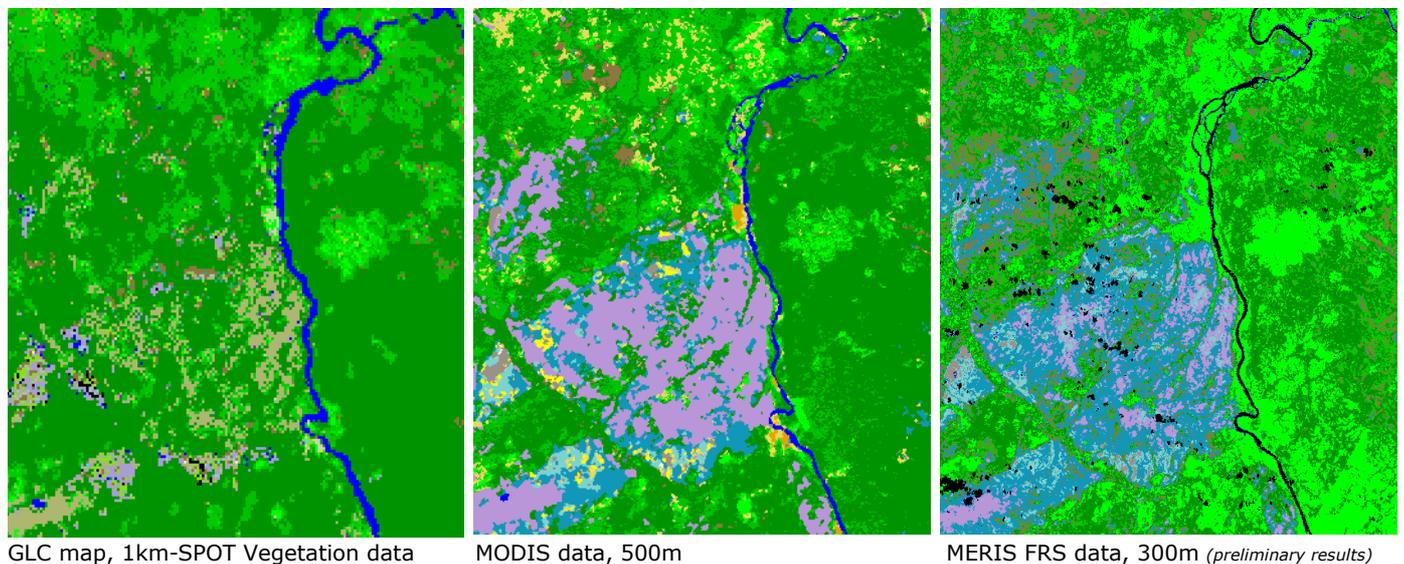
For further information about GLOBCOVER and the ESA DUE/DUP:

<http://www.esa.int/DUE>

or contact Dr. Olivier Arino:

olivier.arino@esa.int.

Land Cover products for a selected part of the Siberia II region



GLC2000 legend

<p>Forest</p> <ul style="list-style-type: none"> Tree Cover, broadleaved evergreen Tree Cover, broadleaved deciduous, closed Tree Cover, broadleaved deciduous, open Tree Cover, needle-leaved evergreen Tree Cover, needle-leaved deciduous Tree Cover, mixed leaf type Mosaic: Tree cover / Other natural vegetation Tree Cover, burnt <p>Snow and Ice</p> <ul style="list-style-type: none"> Snow and Ice 	<p>Agriculture</p> <ul style="list-style-type: none"> Cultivated and managed areas Mosaic: Cropland / Tree cover / Other natural vegetation Mosaic: Cropland / Shrub or Grass Cover <p>Deserts</p> <ul style="list-style-type: none"> Bare, sandy Bare, gravel Bare, rocky <p>Other</p> <ul style="list-style-type: none"> Water bodies No data 	<p>Wetlands</p> <ul style="list-style-type: none"> Tree Cover, regularly flooded, fresh and brackish water Tree cover, regularly flooded, saline water Regularly flooded Shrub and/or Herbaceous cover <p>Grasslands and Shrublands</p> <ul style="list-style-type: none"> Shrub Cover, closed-open, evergreen Shrub Cover, closed-open, deciduous Herbaceous Cover, closed-open Sparse Herbaceous or sparse Shrub cover <p>Urban</p> <ul style="list-style-type: none"> Artificial surfaces
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Figure 3: Land cover classification for a forest-agricultural area in Siberia based upon SPOT Vegetation, MODIS and MERIS data and applying the LCCS-compatible GLC2000 legend (preliminary results).

G E O L A N D

A GMES PROJECT ON LAND COVER AND VEGETATION



Geoland is a Framework Program 6 Integrated Project financed by the European Commission (EC), which aims to build up a European capacity for Global Monitoring of Environment and Security (GMES) in the field of land applications.

Why Geoland?

The ambition of the Geoland consortium is to develop and demonstrate a range of reliable, affordable and cost efficient European geo-information services, supporting the implementation of European directives and their national implementation, as well as European and International policies. Thus, the GMES initiative is considered a unique opportunity to integrate existing technology with innovative and scientifically sound elements into sustainable services.

Geoland particularly addresses environmentally policies and conventions:

- Natura 2000

- Convention on Biological Diversity
- Habitats and Bird Directive
- Ramsar Convention
- Water Framework Directive, Thematic Strategy for Soil Protection
- UN Framework Convention on Climate Change (Kyoto Protocol)
- United Nations Forum on Forest
- European Spatial Observatory Network (ESPO)
- European Spatial Development Perspective (ESDP)

Structure of Geoland

The project is structured into three regional and three global observatories, each of them supported by a core service providing basic geo-information inputs. An Operational Scenario is being established to define the geo-information infrastructure and satellite technology requirements to achieve a fully operational service. Within eight sub-projects, the 56 Geoland partners develop products and services, utilizing

available Earth Observation resources in combination with in-situ measurements, and integrating them with existing models into pre-operational geo-information services. These will support international, European, national and regional authorities and institutions in fulfilling their increasing monitoring and reporting obligations - and help them to better manage natural resources.

Geoland medium resolution change detection workshop at JRC, Ispra, 27-28 April 2005

The workshop was held to review the state of the art in the field of change detection with specific attention to Medium Resolution Earth Observation data and to establish and agree on a roadmap towards an annual monitoring service for change detection and trends analysis based on these data. Decided key actions for the near future of Geoland are to prepare concrete specifications from generic user requirements and to closer link Geoland technical activities with ESA/GLOBCOVER and EEA to avoid duplication of activities, e.g. through joint technical meetings. Recommendations from Geoland to ESA shall be given to get the tools for correcting data as well as pre-processed data provided as soon as possible. Furthermore, an illustrated list of examples shall give an idea of what is feasible and what is not. All these decided actions are currently assessed in a feasibility study.

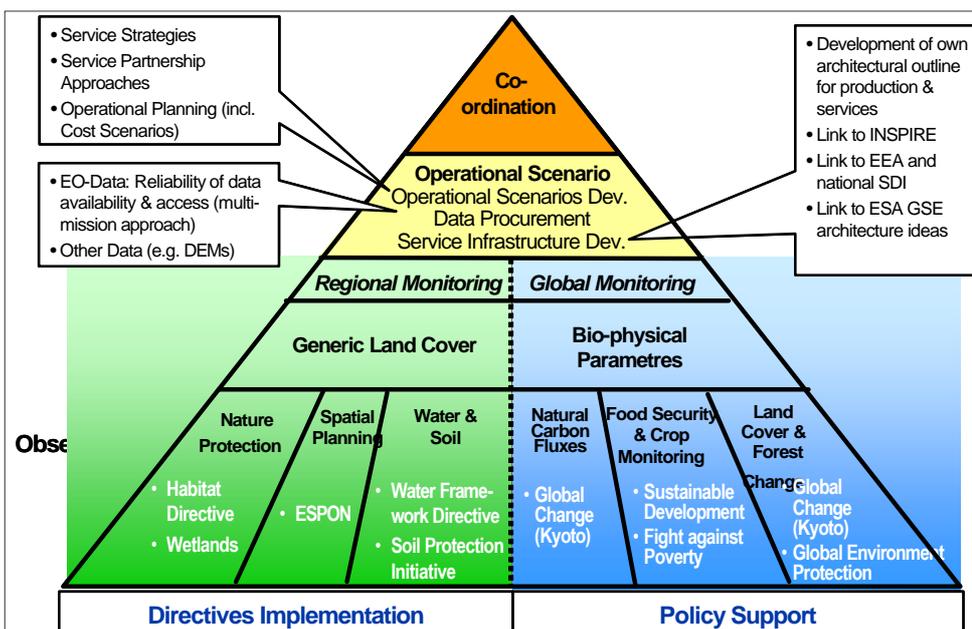


Figure 4: The framework of Geoland project

For more information:
<http://www.gmes-geoland.info>

A GLOBAL USER COMMUNITY FOR GLOBAL DATASETS?

SUMMARY OF THE RESULTS OF A QUANTITATIVE ANALYSIS OF THE USERS OF GLOBAL ENVIRONMENTAL DATASETS

UNEP/GRID Arendal, Norway

- o 4 January 2000 to 18 June 2001
- o 671 users
- o 19% of all users from Norway
- o 20% were for global applications
- o 35% of all users from academic institutions
- o 38% used data for mapping applications

UNEP/GRID Geneva, Switzerland

- o 10 August 1998 to 7 July 2001
- o 2011 users
- o 29% of all users from the United States
- o Of those that provided a research site, 28% were global
- o 48% of all users from academic institutions
- o Of those that provided an application, 25% were for media, press, or education

Global Land Cover Database (GLCC, USGS, USA)

- o 12 January 1999 to 17 December 2001
- o 1108 users
- o 40% of all users from the United States
- o 32% were for global applications
- o 39% of all users from academic institutions
- o 18% of applications were for land use/land cover studies

Global Map 1.0 (GSI, Japan)

- o 28 November 2000 to 28 July 2003
- o 3603 users
- o 73% of all users from Japan
- o 57% of all downloads were of local (Japan) data
- o 42% of all users were from personal (i.e., aol.com, yahoo.com) accounts
- o 37% downloaded the data to use as a reference map

Global Map 0 (GSI, Japan)

- o 28 November 2000 to 28 July 2003
- o 1158 users
- o 58% of all users from Japan
- o 26% of all downloads were of local (Japan) data
- o 35% of all users were from personal (i.e., aol.com, yahoo.com) accounts
- o 42% downloaded the data to use as a reference map

Global Map (Geoscience, Australia)

- o 1 September 2001 to 30 August 2002
- o 3511 users
- o 81% of all users from Australia
- o 100% of the downloads were of local (Australia) data
- o 55% of all users were from personal (i.e., aol.com, yahoo.com) accounts
- o 33% downloaded the data to use as a reference map

Online distribution of global databases usually includes a feedback system that requires users to enter their information before accessing the actual datasets. Karen Kline, the Assistant Secretary General of the International Steering Committee for Global Mapping, has provided an assessment of the global community of users for environmental databases through analyzing such feedback system data.

The Approach

The user information collected by several global data set providers was analyzed to define the user community, as well as to identify any issues that may be of particular interest to the data providers. These data providers are: UNEP/GRID Arendal/Norway, UNEP/GRID Geneva/Switzerland, the Global Land Cover Characteristics data from the USGS EROS Data Center/USA, Global Map Version 0 and Global Map Version 1.0 from GSI/Japan, and Australia Global Map Version 1.0 from Geoscience Australia. The user information was gathered, and then each user entry was coded based upon the data set they downloaded, where the user is located, where their research is, what domain they are in (i.e., academic, commercial, government), and the type of research application (based upon Hadley et al., 2000).

Findings

With the exception of UNEP/GRID Geneva, the host country has the most users for each of the various data sets, despite the fact that data covering other parts of the world are also available at the same sites



(see text box to the left). This would indicate that despite the availability of the data, and easy access provided over the Internet, that extensive communication of the existence of these data sets is limited to the host country.

There is a clear digital divide between the more developed countries and the less developed countries. More developed countries, particularly those in North America and Western Europe, as well as Japan and Australia repeatedly appear on the lists of users for each of the data sets.

Figure 5 shows the percentage of the user population that each country has (the darker colors indicate a higher percentage) for all the data sets combined. Africa clearly has many countries in which there are no users at all. This could be because of a lack of computing and communication infrastructure to allow for the search, identification of, and downloading of these data sets. Or the fact that all of these data providers' websites

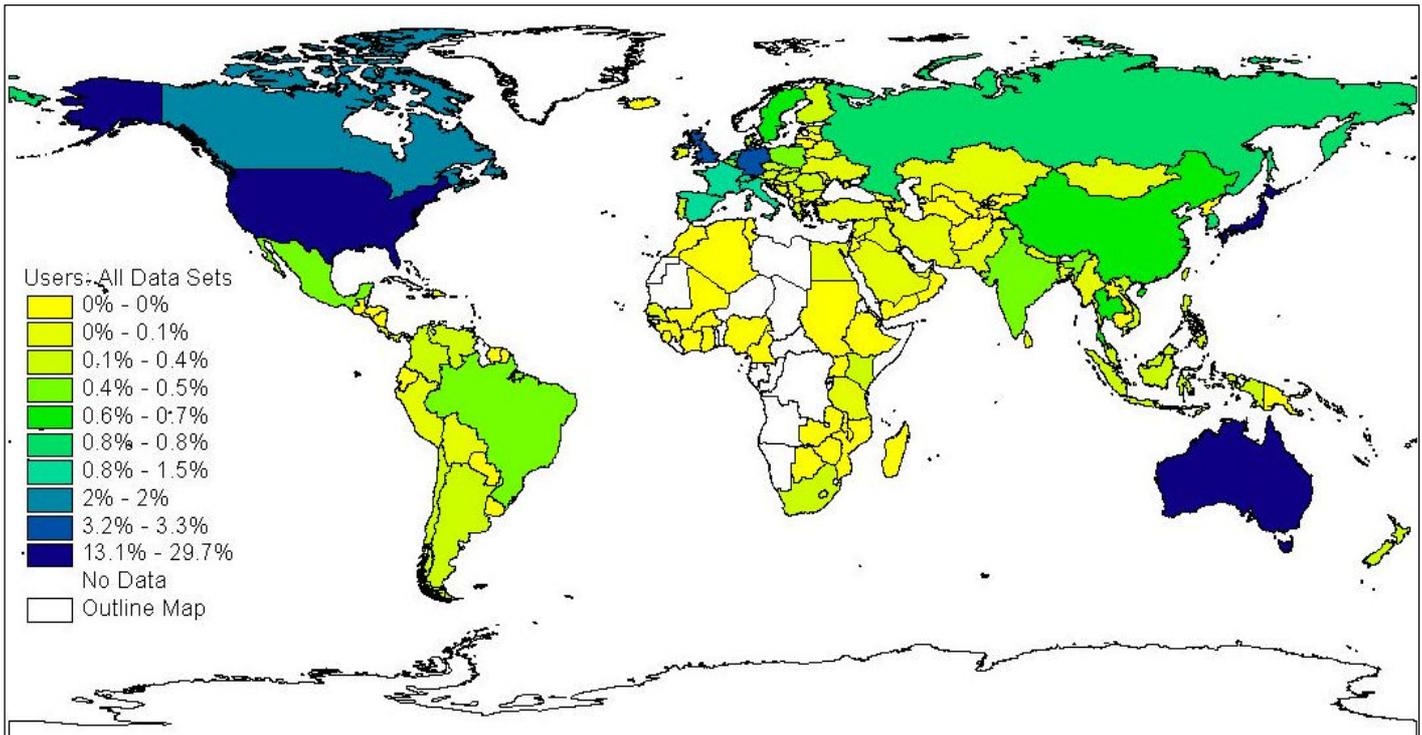


Figure 5: Distribution of global environmental database users of six different datasets served by UNEP/GRID Ardenal-Norway, UNEP/GRID Geneva-Switzerland, the Global Land Cover Characteristics data from the USGS EROS Data Center-USA, Global Map Version 0 and Global Map Version 1.0 from GSI-Japan, and Australia Global Map Version 1.0 from Geoscience Australia.

are in English, which could make it extremely difficult for French-speaking people in African nations, for example, to read and identify those data sets that might be of use.

Many of the users of the UNEP/GRID and GLCC data come from academic environments while the Global Map user community is mostly identified as personal users. In this case, UNEP/GRID and the GLCC data providers have made a concerted effort to communicate the existence of their data holdings, particularly within the academic community, including academic, peer-reviewed journals, see (Loveland et al., 2000) for an example.

Global Map providers, however, have not yet communicated the existence of the Global Map data product in the academic forum. On the other hand, though, extensive communication between the ISCGM Secre-

tariat and the Japanese media has occurred, with a corresponding increase in the number of users after each news article.

In summary, this assessment shows that the user community for global datasets is diverse. However, regional disparities are obvious and highlight some of the difficulties and challenges in providing a better match between the data products, their availability and accessibility, and the end user community. Ideally, to increase the community, the targeted users must be first clearly identified. Then the appropriate methods to communicate with the potential users must be defined, and effectively utilized.

On the other hand, many applications and user communities might not be obvious or reached in an appropriate way. Capacity building and awareness raising efforts on the value and access

of such databases is still necessary. The establishment of stable computing and communicating infrastructures throughout the world will help this process.

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 Secretariat of the International
 Steering Committee for Global
 Mapping (ISCGM)
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References:

Hadley, B. C., J. E. Estes and J. Scepán (2000). *European and Asian Satellite Remote Sensing Applications: A Literature Review and Analysis*. Santa Barbara, University of California: 172p.

Loveland, T. R., B. C. Reed, J. F. Brown, D. O. Ohlen, Z. Zhu, L. Yang and J. W. Merchant (2000). "Development of a global land cover characteristics database and IGBP DISCover from 1 km AVHRR data." *International Journal of Remote Sensing* 21(6/7): 1303-1330.

UPCOMING LAND COVER EVENTS

EVENTS / CONFERENCES / WORKSHOPS

May 2005

International Conference Multifunctionality of Landscapes - Analysis, Evaluation, and Decision Support

Venue: Justus-Liebig-University Giessen, Germany

Date: 18-19 May

Contact: Martin Bach (Martin.Bach@agrار.uni-giessen.de) <http://www.sfb299.de/conference/>

June 2005

Northern Eurasia Regional Information Network (NERIN) Meeting

Venue: St. Petersburg, Russia

Date: 17 - 18 June

Contact: Olga Krankina (olga.krankina@oregonstate.edu)

This meeting will be held prior to the 31st International Symposium on Remote Sensing of Environment (<http://www.niersc.spb.ru/isrse/index.shtml>)

September 2005

International Workshop on European Union Expansion: Land Use Change and Environmental Effects in Rural Areas

Venue : Université de Luxembourg

Date: 5 -7 September

Contact: Laurence A. Lewis (llewis@clarku.edu) <http://www.clarku.edu/offices/Leir/europeanunionconf.htm>

October 2005

LUC - 6th Open Meeting of the Human Dimensions of Global Environmental Change Research Community

Venue: University of Bonn, Germany

Date: 9-13 October

Contact: <http://openmeeting.homelinux.org/>

THE ESA GOFC GOLD LAND COVER PROJECT OFFICE NEWSLETTER:

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<http://www.qofc-gold.uni-jena.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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