

SOUTHEAST ASIAN REGIONAL RESEARCH AND INFORMATION NETWORK (SEARRIN)

Challenges for Earth Observation in Tsunami Disaster Relief

The Southeast Asian Regional Research and Information Network (SEARRIN) is an active component of the GOFC-GOLD regional networks. It is dedicated to Earth Observation in a global context and represents a link between national agencies and user groups and the global user/producer community. The on-going collaboration involves a diverse group of institutions from academia, government, non-government organizations, and the private sector. It is a rare example of cooperative research and analysis in ASEAN, where governments might not ordinarily engage such action beyond their national mandates.

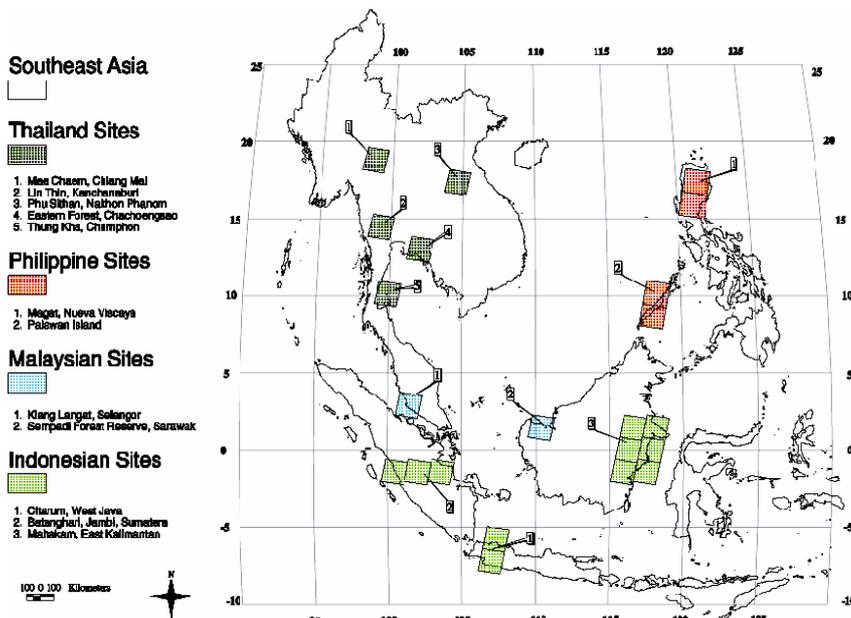


Figure 1: Study sites of the SEARRIN regional network
 (Source: J. Samek, D. Skole, Michigan State University/GOFC-GOLD Land Cover Team).

SEARRIN is active in different areas in South Eastern Asia (Fig. 1). In the context of GOFC-GOLD the network has primarily focused on mapping on forest areas, and deforestation and associated processes.

With the occurrence of a major earthquake off the coast of Sumatra, Indonesia on December 26, 2004 and the related Tsunami impacts on coastal area, SEARRIN became an important link to make Earth Observation data more relevant to national and regional disaster relief agencies. The immediate need for regional impact maps based on earth observation data was addressed through cooperation between the GOFC-GOLD land cover team (Dave Skole and J. Samek) and SEARRIN. The regional network in Indonesia represent a number of institutions primarily BPPT (Indonesian Agency Forest Assessment and Application of Technology), LAPAN (National Institute of Aeronautics and Space of Indonesia), and BTIC (Biotrop Training and Information Centre). BPPT is

lead agency for the GOFC-GOLD/SEARRIN team in Indonesia.

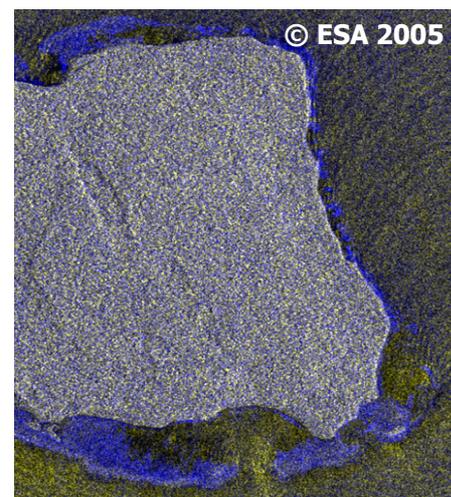


Figure 2: Envisat ASAR - multitemporal composite image highlights coastal destruction (in blue) on North Sentinel Island, part of the Andaman Islands in the Bay of Bengal.

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Answer urgent data requests

After the earthquake/tsunami, SEARRIN colleagues at BPPT contacted the GOFC-GOLD team at the Global Change and Earth Observations of Michigan State University requesting assistance in acquiring Landsat data over the Tsunami impacted areas of Sumatra. Landsat scenes from Dec. 29, 2004 for Aceh Province, Sumatra were acquired from partners at the USGS/EROS Data Center. BPPT further requested to provide processed images on-line detailing the large area impacts of the Tsunami for their use in supporting national relief efforts. At the time of the request, they were only seeing high-resolution images of select areas and little knowledge of the complete impact which systems like Landsat are able to provide.

Between the Dec 29th and 30th the Landsat ETM datasets have been processed to regional scale impact maps. The impact maps along with an assessment report and the datasets were made available online to the Indonesian partners on 30th December 2004 (Fig. 3). The SEARRIN GOFC-GOLD regional acted as distributor the circulated the materials to national and regional agencies and so directly supported the relief efforts.



**Aceh Province
Sumatra, Indonesia**

A model for cooperation

This example shows that established links between data, data products, and users are able to address urgent information request and support disaster relief. Exemplary, GOFC-GOLD provides capacity in management support for local and regional services through the regional networks.

Basically, technologies and scientific understanding exists. With a good model for international cooperation and communication, the Earth Observation community can do more to prevent and better respond to such disasters in the future. Resources and priorities need to be placed on developing the necessary tools and protocols to take advantage of existing technologies and assets.

International initiatives

New international Earth Observation initiatives, i.e. led through the Group of Earth Observations (GEO) work hard to make earth observations assets available to all countries. Goal of GEO is a global system of systems (GEOSS) for improved coordination of observations of the Earth. The third Earth Observation Summit, scheduled for 16 February 2005 and hosted by the European Commission (EC) in Brussels, will adopt the 10 year plan and authorise its implementation. The primary European contribution to



10 km

Figure 3: TSUNAMI impact map from Landsat ETM imagery acquired 29th December 2004; affected areas in red (Source: J. Samek, D. Skole, Michigan State University/GOFC-GOLD Land Cover Team).

GEOSS is the Global Monitoring for Environment and Security (GMES) initiative. Jointly led by the EC and ESA, this initiative will bring together the capacity of Europe to collect and manage data and information.

Recently, the Kyoto World Conference on Disaster Reduction in January 2005 has specifically promoted to use of in situ and space-based earth observations, space technologies, and remote sensing.

WWW-INFO:

- SEARRIN network:
<http://www.eoc.ukm.my/searrin/>
- Global Change and Earth Observations of Michigan State University Tsunami mapping information:
<http://www.globalchange.msu.edu/trf/c/tsunami2004/>
- Group of Earth Observation (GEO):
<http://earthobservations.org/>
- Kyoto world conference on Disaster Reduction:
<http://www.unisdr.org/wcdr/>
- ESA - tsunami impact mapping:
http://earth.esa.int/ew/planning/pl_in_donesiath-dec04.htm

ESA GOF-C-GOLD LAND COVER OFFICE 2004

First Year annual progress report

With the establishment of a GOF-C-GOLD Land Cover Project Office (LC-PO) at the Friedrich Schiller University Jena, Germany in February 2004, the European Space Agency has taken responsibility to participate and contribute to the international cooperation and communication to coordinate and improve global observations of land. The Land Cover Project Office (PO) helps to strengthen the GOF-C-GOLD framework, to coordinate, promote and fulfil the GOF-C-GOLD Land Cover implementation plan, and to support the European Space Agency and related projects and services. In conjunction with the extensive ENVISAT data acquisitions and several regional and global mapping activities (e.g. GLOBCOVER), ESA has strengthened his position in coordination of land observations and extended their activities for an improved match between data products and user needs. The achievements of 2004 have been summarized in an annual progress report submitted to ESA. The report is available on the GOF-C-GOLD LC-PO webpage:

http://www.gofc-gold.uni-jena.de/documents/reports/gofc_po_apr2004.pdf

In 2005 the LC-PO will continue to work on the implementation of the GOF-C-GOLD objectives. Main issue for 2005 is the active harmonization and exploration of synergies between existing global and regional land cover products. All activities will be in accordance and in cooperation with ongoing international developments on the strategic level including GEO(SS), GMES, IGOS-P/IGOL, the GTOS activities, the GCOS implementation plan, and the UN Global Land Cover Network and related user requirements.

Progress and achievements in 2004:

- **Establishment of Land Cover Project Office (LC-PO)**
 - Installation of LC-PO at Friedrich Schiller University Jena
 - Inauguration meeting with press event
 - Dissemination of LC-PO-installation to international programmes and bodies
- **State of the art in global land cover assessment**
 - Collect and summarize published materials
 - Develop documentation on land cover algorithms, change routines, data and data products, in situ facilities etc.
- **Strategies for land cover harmonization and dataset interoperability**
 - Review of previous land cover harmonization approaches
 - Translation and comparison of several land cover legends using the FAO Land Cover Classification System, i.e. IGBP, USGS, CORINE, MODIS Land Cover and Continuous Fields Products and others
 - Development of strategic documents for harmonization of existing land cover datasets and guidelines for standardized development of land cover legends for future mapping activities
 - Assist ESA to harmonize development of the GLOBCOVER products
- **Global land cover validation strategy**
 - Strong cooperation with CEOS Cal-Val group on development of validation standards
 - Participation in validation activities (GLC2000, GLOBCOVER)
 - Outline implementation plan for an operational validation strategy to assess the accuracy of existing and future global land cover products and foster their interoperability and synergy
- **Prototype studies on harmonization and validation**
 - Evaluation and test beds for harmonization / validation strategies
 - Case studies on land cover comparisons are being carried out in Thuringia, Eastern Europe, Siberia, Mongolia
- **GOF-C-GOLD science meetings and capacity building**
 - Organization and hosting of the GOF-C-GOLD land cover science team meeting in Jena, March 2004
 - Organization and co-hosting of the GOF-C-GOLD workshop on harmonization of land cover datasets at FAO in Rome
 - Organization of several small harmonization and LCCS-capacity building events
- **Participation in key events to foster international cooperation**
 - Contacts /communications with GOF-C-GOLD regional networks
 - Participation in meetings and workshops on: GLOBCOVER meetings, GTOS, IGOS-IGOL, GLC2000 validation, UN Global Land Cover Network (GLCN), GEOLAND, German Aerospace Center (DLR)
 - Participation in scientific conferences: ENVISAT Symposium, Lucc symposia
- **Documentation, publication, and outreach:**
 - 25 deliverables submitted to ESA
 - Establishment of webpage and regular updates
 - Development and distribution of four GOF-C-GOLD newsletters
 - Several reports on PO-organized meetings (Jena and Rome)
 - Press releases
 - Assistance and review of key documents: GTOS-Coastal implementation plan, GLOBCARBON product validation plan, CEOS Cal-Val 'best practice' document on validation of global land cover datasets, Integrated Global Observations of Land (IGOL) documents etc.

UPCOMING: 3RD SCIENCE AND TECHNICAL BOARD MEETING, 19-22 APRIL 2005, BEIJING CHINA

Background

The panel for Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD) represents a coordinated international effort working toward the common goal of developing and implementing a suite of securely-funded, ongoing observational programmes. Using an appropriate combination of space borne and near-earth data, these programmes provide timely and consistent information about forests and land cover dynamics worldwide. GOFC-GOLD is a Panel of the Global Terrestrial Observing System (GTOS), sponsored by FAO, UNESCO, WMO, ICSU and UNEP. The GOFC-GOLD Project Office is hosted by Canada. Other contributing agencies include NASA, ESA, START and JRC.

The STB role

The Scientific and Technical Board (STB) is one element of the organizational structure created to implement the GOFC-

GOLD programmes. The STB is comprised of scientists and technical experts both from within and outside of the panel. With overall guidance from the Global Terrestrial Observing System (GTOS), the STB reviews annually the progress, problems and plans for the year in review. The review also includes the plan of activities for the forthcoming year, the budget necessary to carry out the proposed activities, and suggested sources of funding. The STB also communicates with the IGOS Partnership to ensure that GOFC-GOLD is responsive to the needs of CEOS members and other IGOS Partners.

The STB meeting

In cooperation with the Chinese Ministry of Science and Technology, the STB will hold its third meeting from 19-22 April 2005 at Beijing. Participants will include: external board members, panel executive and IT chairs; regional representatives from six net-

works; East Asia regional representatives; symposium participants and resource personnel.

In addition to annual business affairs, the third meeting includes two special events: a) 5-year review and revision of the GOFC-GOLD Strategy document (1999), and b) initiation of a new GOFC-GOLD regional network for East Asia. The STB meeting will be accompanied by a half-day symposium on with presentations by members of GOFC-GOLD and Chinese scientists on land cover change assessment.

Expected outcomes

The expected outcomes of the meeting include: a GOFC-GOLD strategy document to guide activities from 2005-2010; commitments for ongoing and new funding; a new East Asia GOFC-GOLD regional network; and a symposium proceedings report.

Organization

The STB meeting is organized by GOFC-GOLD chair John Townshend and the GOFC-GOLD Project Office: Michael Brady and Murugi Larson. For additional information on GOFC-GOLD and the STB meeting please refer to:

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Edmonton, Alberta
Canada T6H 3S5
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Fax: (1-780) 435-7359

Email : GOFC-GOLD@nrca.gc.ca

<http://www.fao.org/gtos/gofc-old/index.html>

STB meeting objectives:

Overall, the meeting will have the following complementary objectives:

1. Assess current progress in the work of GOFC-GOLD (1/2 day).
2. Present and review a new GOFC-GOLD strategy document for 2005-2010 (1 day).
3. Outline priorities for the implementation teams and regional networks (1/2 day).
4. Discuss possibilities of setting up a new East Asia Regional Network (1 day).
5. Hold scientific symposium on the topic of Land Cover Change to which a high level audience from China will be invited (1/2 day).

OBSERVATIONS OF LAND COVER AND NEEDS OF RESEARCH PROJECTS IN NORTHERN EURASIA

NERIN Regional Network and GOFC-GOLD Workshop

Role of Regional Networks

The GOFC-GOLD regional networks provide a forum for users and researchers operating in (or with an interest in) a common geographic area, and represent a link between national agencies and user groups and the global user/producer community. They provide a mechanism for sharing of resources and expertise, and perform an essential cross-cutting role in the implementation and integration of GOFC-GOLD's thematic components.

Northern Eurasia Network

Northern Eurasia is a major source of uncertainty in many global-scale estimates, including the estimates of land-cover, wild fire, carbon stores, and flux. Because the region is believed to play a critical role in global change it is important to understand it better and the research interest in the region is high. The region possesses significant data

resources, research expertise, and infrastructure for collecting observational data, but the access to these can be a challenge.

The primary goal of GOFC-GOLD Northern Eurasia Regional Information Network (NERIN) is to promote and coordinate the production and provision of Earth System observations for a wide range of user communities in Northern Eurasia and to the global Earth Science community.

Implementation activities

Following a series of workshops convened in Russia in 2000-04, NERIN has emerged as an informal network of scientists and other professionals, institutions, observational networks, and projects within the thematic scope of GOFC-GOLD program, NERIN is currently assembling information about the content, quality, condition, and other characteristics of data sets available to support new

research in Northern Eurasia. This effort is designed to determine data availability and identify collaborators for future research projects. Searchable metadata for 77 datasets are freely available and new contributions are encouraged.

WWW-INFO:

NERIN regional network:

<http://www.fao.org/gtos/gofc-gold/net-NERIN.html>

NERIN Metadata Database:

<http://www.data.forestry.oregonstate.edu/MDEDIT/index.aspx>

NEESPI:

<http://neespi.gsfc.nasa.gov>

ISPRS Conference, St. Petersburg:

<http://www.niersc.spb.ru/isrse>

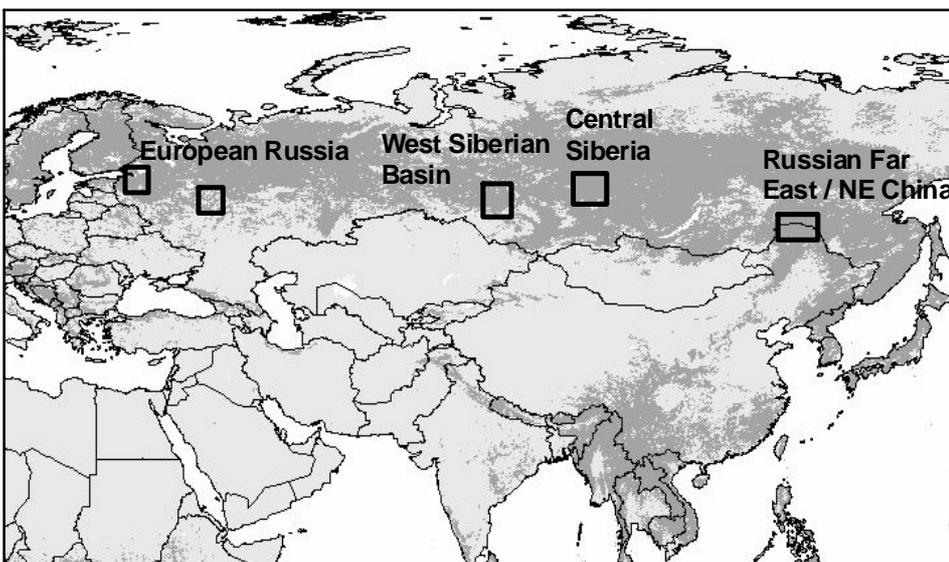


Figure 3: NELDA study regions and phase-1 sites. Dark gray shading indicates extent of forest and woodland cover (DeFries et al., 1998).

NERIN includes two related thematic components: fire and land cover. The network currently maintains an active fire-monitoring project and the land cover network project is being planned. Northern Eurasia Landcover Dynamics Analysis (NELDA) is expected to develop as a large-scale land cover change project with multiple validation sites distributed across the region (Figure 3). The project will study the various types of land cover and land use change that are significant in different parts of Northern Eurasia, validate moderate and coarse resolution land cover and land cover change products for the region, and set up a network of permanent validation sites as a basis

for other studies of land-cover within the scope of GOF-C-GOLD, and other interested programs such as the Northern Eurasia Earth Science Partnership Initiative (NEESPI;). Plans for NELDA will be reviewed at the next NERIN workshop

Workshop in June 2005

NERIN and Land Cover Implementation Team offer a 2-day workshop to introduce new large-scale research projects in the region and the FAO Land Cover Classification System (LCCS-2). The workshop is entitled:

"OBSERVATIONS OF LAND COVER AND NEEDS OF RESEARCH PROJECTS IN NORTHERN EURASIA"

and will be held June 18 - 19, 2005 as Pre-symposium work-

shop at the 31st International Symposium on Remote Sensing of Environment":

"GLOBAL MONITORING FOR SUSTAINABILITY AND SECURITY"

The workshop will discuss land cover harmonization and validation, share information among project teams on observational data resources and networks, and advance the inventory of observational data on land cover. The project leaders will outline their objectives, data requirements, and plans for data acquisition. The workshop will aim to cover the observational data that were not covered at the Feb. 2004 workshop in St. Petersburg expanding the scope of NERIN geographically (beyond the boreal forest) and thematically (socio-economic data). For information

and details on NERIN and the upcoming works please contact:

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A NEW GEOGRAPHIC INFORMATION SCIENCE CENTER OF EXCELLENCE (GIScCE)

Recently, a new research collaboration between South Dakota State University (SDSU) and the USGS EROS Data Center (EDC) has been established that should be of interest to the earth observation and global change research community. The program is called the Geographic Information Science Center of Excellence (GIScCE) and has as its focus the science of earth observation and monitoring. EDC is the world's largest repository of remotely sensed data sets and a renowned center of applied earth science studies. The GIScCE is a research partnership of SDSU faculty and EDC scientists which employs the capabilities of geographic information science (GISc), namely remote sensing, geographic information systems,

digital mapping, and geostatistics, to document and understand the changing earth. To achieve this, an interdisciplinary center of study is required, one which utilizes engineering principles to efficiently and accurately process earth observation data, geographic principles to create meaningful thematic depictions of land cover and land use change, and applications which focus on the resultant effects of change on the geosphere, biosphere and hydrosphere. Through the combined resources of many disciplines, the GIScCE seeks to investigate important questions regarding the dynamic earth system. SDSU has established several professor research positions, with limited teaching responsibilities, as the core center staff.

Co-directors of GIScCE are Dr. Matthew Hansen and Dr. Tom Loveland. Both have been involved in global land observations and previous GOF-C-GOLD activities. In 2005, GIScCE will host a GOF-C-GOLD workshop on "Continuous fields land product validation". More information on this workshop will be available soon.

For more information on the GIScCE see the following web-page:

http://www3.sdstate.edu/University_research/GIScCenterofExcellence/

or contact Dr. M. Hansen:

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UPCOMING LAND COVER EVENTS

EVENTS / CONFERENCES / WORKSHOPS

February 2005

GOFC-GOLD Fire Mapping and Monitoring Implementation Team Meeting

Venue: Montréal, Canada

Date: 7 - 9 February, 2005

Contact: Ivan Csiszar, http://www.fao.org/gtos/gofc-gold/docs/meetings-2005/FireIT_2005_announcement.pdf

The meeting will be co-hosted by the Canadian Space Agency, which will provide the venue at their headquarters.

International Conference on Land-Cover and Land-Use Processes in the NEAR Region

Venue: Harbin, China

Date: 2 - 5 February, 2005

Contact: http://lcluc.gsfc.nasa.gov/products/pdfs/Events/2_05_harbin_china.pdf

The aim of the conference is to advance the GOFC-GOLD and NEESPI sciences in Land-Cover and Land-Use Change Processes in the North East Asia Region (NEAR).

March 2005

5th International Symposium on Remote Sensing of Urban Areas (URS 2005) in conjunction with 3rd Joint Workshop on Remote Sensing and Data Fusion over Urban Areas (URBAN 2005)

Venue: Tempe, Arizona (USA),

Date: March 14-16, 2005

Contact: <http://ces.asu.edu/urs/>

There will be a special session jointly organized by GOFC-GOLD on 'Global observations of urban areas' (<http://ces.asu.edu/urs/special.htm>)

June 2005

Northern Eurasia Regional Information Network (NERIN) Meeting

Venue: St. Petersburg, Russia

Date: 17 - 18 June, 2005

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

This meeting will be held prior to the 31st ISPRS symposium (<http://www.niersc.spb.ru/isrse/index.shtml>)

October 2005

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

Venue: University of Bonn, Germany

Date: 9-13 October 2005

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

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