

2<sup>nd</sup> GEO Forest Monitoring Symposium  
July 1-3, 2009 Chiang-Rai, Thailand

**Program** (issue 19 June 2009)

Sponsors: Geo-Informatics and Space Technology Development Agency (GISTDA, Thailand)  
Australian Department of Climate Change  
Norway  
GEO Secretariat

Venue: Phu Chaisai Mountain Resort & Spa, Chiang Rai, Thailand

Dates: 1 -3 July 2009

Information and Registration: <http://conference.gistda.or.th/2ndgeoforest/>

### Introduction

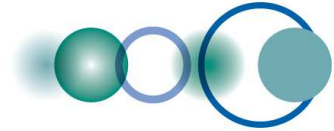
The 2nd Symposium will build on the conclusions and recommendations of the 1st. Its main objective will be to make substantial progress on the implementation of a “GEOSS Forest Monitoring System” capable of meeting operational needs of the full range of Users dealing with forest and forest related issues.

### Background

The Global Earth Observation System of Systems (GEOSS) is a complex system of sensors, communication devices, storage systems, computational and other devices used to observe the Earth and to gather the data needed for a better understanding of the Earth’s processes. In addition, GEOSS includes models and processes to create information from the observational data. The 2003 Earth Observations Summit established the objective “to monitor continuously the state of the Earth, to increase understanding of dynamic Earth processes, to enhance prediction of the Earth system, and to further implement our international environmental treaty obligations”.

GEOSS aims to achieve comprehensive, coordinated and sustained observations of the Earth system, to improve monitoring of the state of the Earth, increase understanding of Earth processes, and enhance prediction of the behavior of the Earth system.

The GEOSS Implementation Plan states that GEOSS will provide the overall conceptual and organizational framework for integrated global Earth observations to meet user needs. GEOSS will be a “system of systems” consisting of existing and future Earth observation systems, supplementing but not supplanting their own mandates and governance arrangements. It will provide the institutional mechanisms for ensuring the necessary level of coordination, for strengthening and supplementing existing Earth observation systems, and for reinforcing and supporting component systems in carrying out their mandates.



The emphasis of GEOSS is on societal benefits, initially in nine key areas. Sound management of the Earth system, in both its natural and human aspects, requires information that is timely, of known quality, long-term, and global. Interpretation and use of Earth observations requires information on drivers and consequences of change, including geo-referenced socio-economic data and indicators. The nine societal benefit areas (SBA) addressed in the implementation plan are:

- Disasters: Reducing loss of life and property from natural and human-induced disasters
- Health: Understanding environmental factors affecting human health and well-being
- Energy: Improving management of energy resources
- Climate: Understanding, assessing, predicting, mitigating, and adapting to climate variability and change
- Water: Improving water resource management through better understanding of the water cycle
- Weather: Improving weather information, forecasting and warning
- Ecosystems: Improving the management and protection of terrestrial, coastal and marine resources
- Agriculture: Supporting sustainable agriculture and combating deforestation and desertification
- Biodiversity: Understanding, monitoring and conserving biodiversity

Forest ecosystems are amongst the Earth's greatest natural resources and are linked to all nine SBAs. The current lack of globally consistent map products for forests, however, is significantly limiting efforts to understand trends in the world's forests. Filling this gap and advancing our knowledge of the status of and trends in the world's forest resources and their long-term ability to support multiple societal benefit areas will require the coordinated development of Earth observation systems.

### The GEO Work Plan

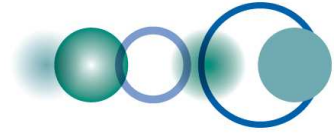
The 2009-2011 Work Plan of the Group on Earth Observations (GEO) takes the GEOSS 10-year Implementation Plan up to and beyond its midway point, increasingly focusing on putting the components of GEOSS into place. This will enable connections to be realized between diverse observing, processing, data-assimilation, modelling and information-dissemination systems. The new work plan also enhances the role of users and Communities of Practice for GEO. The work plan includes a number of subtasks associated with forest observations, the most recent of which addresses forest carbon tracking.

### Activities of the GEO Forests Community of Practice

The Forests Community of Practice (FCoP) is completing the 10-12 tasks related to forest observations in the 10-year plan towards a Global Earth Observing Systems of Systems (GEOSS). The tasks address forest-related observations in the general areas of: a) biodiversity, invasive species, forest ecology and protected areas; b) forest and land cover dynamics, including effects of fire and agriculture, and c) forest biomass and carbon tracking.

The goals of the FCoP are to link existing and planned forest observation systems around the world, identify new systems where gaps currently exist, and improve access to, and use of, in situ, aerial and satellite Earth observations.

To ensure steady task progress, the FCoP engages in regular events to consolidate the GEOSS approach for a systematic and integrated forest monitoring system of systems. These events



ensure coordination, facilitate and promote data sharing, inter-operability, and foster the development of sustained operational systems based on these capabilities.

The 1st GEO Forest Monitoring Symposium was held from 4-7 November 2008 at Foz do Iguaçu, Brazil and locally hosted by the INPE. The goals of the first symposium were necessarily broad and included: 1) promoting communication and collaboration among various communities working on different forest related themes, particularly in Latin America, and to strengthen the focus on forest observation world-wide; 2) providing a forum where GEO task teams and key Institutions worldwide can further their programmes of work as they relate to forest observation; and 3) helping participants achieve a greater understanding of the current status of, and requirements for, critical forest characterization and monitoring, including carbon and biomass, biodiversity, fire, water, fragmentation and degradation, and stress and damage.

### Symposium Theme

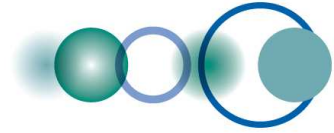
The major theme of the 2nd Forest Monitoring Symposium is From Research to Operations. It will provide a forum for discussions related to interoperability and consistency in satellite data supplies, and, importantly, the need to consolidate the methods appropriate for multi-sensor processing, which can satisfy global, wall-to-wall operational forest change monitoring, for use in national and regional level forest monitoring programs. The workshop will briefly describe the GEO forest observation-related tasks, including the new GEO forest carbon tracking task, as well as the GEO forest community of practice, which is addressing user engagement in the GEOSS.

### Objectives

Discuss and consolidate the approach and the operational features of a GEOSS Forest Monitoring System of Systems (products, interoperability, and scalability), how National Forest activities contribute to it and how it will serve the different User Communities. It will also provide a key opportunity for GEO outreach in the South East Asia Region

To meet these objectives, this Symposium will describe GEO forest observation tasks and review progress of the carbon tracking task within the broader context of GEOSS and the GEOSS forest efforts. It will:

1. Review existing and planned GEO efforts in forest monitoring, carbon observation, associated modelling and use of these tools for timely provision of observations required for their routine use world-wide. Are the tasks adequate to provide the observational data, tools and products needed as input for broad-scale forest carbon tracking? Are there further opportunities for coordination? Specific objectives are to:
  - Review implementation status of recommendations and outcomes of first symposium and workshop. Revise and recommit as necessary.
  - Introduce the GEOSS and foster engagement of countries in East and Southeast Asia.
  - Enhance coordination of GEO forest tasks to support new forest carbon tracking task.
2. Seek to consolidate processing approaches for national and regional scale annual forest-change monitoring. A key question to be addressed is whether such approaches can fulfill the operational needs of international environmental agreements and assessments? Specific objectives are to:
  - Identify operational national and regional forest-related observation systems in Asia and encourage their registration to GEOSS to enhance interoperability.
  - Identify observational data access issues and constraints



3. Consolidate national demonstrators and associated validation sites from around the globe where such approaches will be tested and verified against in-situ forest inventory and carbon estimates. Specific objectives are to:
  - Meet face-to-face with representatives of national demonstrators.
  - Identify observational data access issues and constraints; Procurement and discussion of data sets.

### Intended audience

The intended audience of the second symposium includes, among others: GEO forest task teams; prospective GEO member countries in Asia and elsewhere; national forest monitoring specialists; scientists with an interest in forest carbon tracking; forest EO data providers; and international organizations supporting forest monitoring (data, funding, science, etc.).

### Program Structure

The Symposium is structured in three main sessions, the first providing, through the presentation of several national and regional examples of Forest Monitoring activities a good understanding of system functionalities and performances needed to support a variety of users, the second discussing the architecture of the system, its main features, its products and services, mainly through discussions within three concurrent Breakout Groups, the third defining its main components, reviewing them from a User perspective and discussing development approach options, ensuring coordination and compatibility with other on-going GEOSS developments and other initiatives of global relevance.

### Breakout Groups

The program includes also, as in the first Symposium, three Breakout Groups, addressing specific themes and communities, active and working on different applications requiring Forest monitoring. They are

1. Biodiversity, Invasive Species, Forest Ecology, Protected Areas
2. Forest Inventory, Biomass and Carbon
3. Forest and Land Cover Dynamics

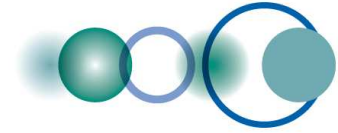
Each group is requested to assess the suitability of the GEOSS Forest Monitoring System in addressing operational needs in the respective areas. Each Group will start the discussion from the conclusions and recommendations from the first Symposium.

The work of each group will be therefore focused in the review the performances and characteristics of the GEOSS Forest Monitoring System and will be documented into a report that will be published after the Symposium.

Each group coordinator will present a summary of findings and recommendations to the Plenary.

Reports and presentations to Plenary should clearly identify, from the point of view of each User Community, existing gaps and proposed improvements in the GEOSS Forest Monitoring System main components, such as:

- Satellite observations
- In situ/aerial observations and measurement
- Linking observations (satellite + in situ) with models



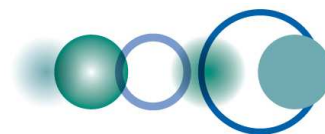
- Information products
- Technical standards and interoperability
- Access to data and products

The work of each Group will be introduced by few presentations, setting the scene in terms of (i) summary user requirements, (ii) associated monitoring system performances and (iii) results and recommendations from the first Symposium.

Participants will be asked to indicate the preferred Breakout Group at registration.

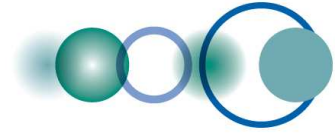
Coordinators of the Breakout Groups are the following

1	Biodiversity, Invasive Species, Forest Ecology, Protected Areas	D. Muchoney <a href="mailto:dmuchoney@geosec.org">dmuchoney@geosec.org</a> K.D. Singh <a href="mailto:karndeo_singh@hotmail.com">karndeo_singh@hotmail.com</a>
2	Forest Inventory, Biomass and Carbon	A. Held <a href="mailto:Alex.Held@csiro.au">Alex.Held@csiro.au</a> C. Silapathong <a href="mailto:chaow@gistda.or.th">chaow@gistda.or.th</a>
3	Forest and Land Cover Dynamics	D. de Morisson Valeriano <a href="mailto:dalton@ltid.inpe.br">dalton@ltid.inpe.br</a> T. Hame <a href="mailto:Tuomas.Hame@vtt.fi">Tuomas.Hame@vtt.fi</a>



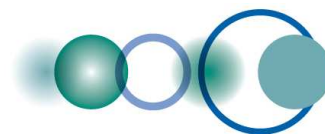
## Program Outline

	am	pm
DAY 1	<p><b>Welcome addresses</b></p> <p><b>Session 1</b> Introduction/Keynote speeches</p> <p><b>Session 2</b>- 1<sup>st</sup> Symposium Summary and recommendations (including progress and follow-on)</p> <p><b>Session 3</b> - GEO Workplan and Forest</p> <ul style="list-style-type: none"> <li>- GEO Forest CoP</li> <li>- forest related tasks overview (*)</li> </ul>	<p><b>Session 4</b></p> <p>National Forest Monitoring and Regional Networks</p>
DAY 2	<p><b>Session 5</b> - GEOSS Forest Monitoring system outline</p> <p><b>Session 6</b> Plenary – Introduction to the Breakout Groups</p> <p><b>Session 7</b> - Breakout Groups</p> <ol style="list-style-type: none"> <li>1. Biodiversity, Invasive Species, Forest Ecology, Protected Areas</li> <li>2. Forest Inventory, Biomass and Carbon</li> <li>3. Forest and Land Cover Dynamics</li> </ol>	<p><b>Session 7</b></p> <ul style="list-style-type: none"> <li>- Breakout Groups (continue)</li> <li>- Breakout Groups Reports to Plenary + discussion</li> </ul> <p><b>Round table 1</b> “Data distribution and Data sharing -</p>
DAY 3	<p><b>Session 8</b>- GEOSS Forest Monitoring system components</p> <ul style="list-style-type: none"> <li>- Satellite observations</li> <li>- In situ/aerial observations and measurements</li> <li>- Linking observations (satellite + in situ) with models</li> <li>- Information products</li> <li>- Technical standards and interoperability</li> <li>- Access to data and products</li> </ul>	<p><b>Round table 2</b> “User review and recommendations”</p> <p><b>Round table 3</b> “Scenario(s) for implementation and Capacity Building”</p> <p><b>Session 9</b> – Concluding Session</p> <ul style="list-style-type: none"> <li>- Symposium Summary</li> <li>- Concluding Remarks</li> </ul>



(\*) GEO Workplan Forest related tasks

Overarching task	Subtask #	Title
Cross-Cutting Products and Services	US-09-03b	Forest Mapping and change Monitoring
Global Data Sets	DA-09-03a	Global Land Cover
Interoperable Systems for GEOSS	AR-09-02a	Virtual Constellations (LSI)
Warning Systems for Disasters	DI-09-03b	Implementation of a fire warning system at global level
Advocating for Sustained Observing Systems	AR-09-03a	Global terrestrial Observations
Developing a Biodiversity Observation Network	BI-07-01a	GEO Biodiversity Observation Network (GEO BON)
Developing a Biodiversity Observation Network	BI-07-01b	Invasive Species Monitoring System
Developing a Biodiversity Observation Network	BI-07-01c	Capturing Historical and New Biodiversity Data
Ecosystem Observation and Monitoring Network	EC-09-01a	Ecosystem Classification and Mapping
Ecosystem Observation and Monitoring Network	EC-09-01d	Protected areas assessment and monitoring
User Engagement	US-09-01b	Communities of Practice and Partnership Development
Global Carbon Observation and Analysis System	CL-09-03b	Forest carbon tracking



## DETAILED PROGRAM

**Wednesday, 1<sup>ST</sup> July**

**08.30–09.00            Check-in and Registration**

**09.00 – 09.15            Welcome address**

Surachai Linthong, Vice Chiang Rai Province Governor

**09.15 – 10.30            Session 1    Introduction/Keynote speeches**

Dr. Darasri Dowreang, CEOS Chair, “CEOS Agencies in Support of GEO Forest Carbon Tracking”

Prof. Jose Achache, GEO Secretariat Director

Alexander Held, CSIRO-Australia, “National Forest Measurement, Reporting and Verification, and linkages to UNFCCC Process”

Giovanni Rum, GEO Secretariat, “2nd Symposium objectives”

**10.30 – 11.00            Session 2    1<sup>st</sup> Symposium Summary and recommendations**

G. Rum 1st Symposium Report presentation

**11.00 – 11.30            Coffee Break**

**11.30 – 12.30            Session 3    GEO Forest activities**

Chair: C. Silapathong

J. Fan, GEO Forests Community of Practice and Partnership Development, US-09-01b

Overview and progress of GEO Work Plan tasks -

1. K.D. Singh / D. Muchoney, Biodiversity, Invasive Species, Forest Ecology, Protected Areas Ecosystem Observation and Monitoring Network

BI-07-01a            GEO Biodiversity Observation Network (GEO BON)

BI-07-01b            Invasive Species Monitoring System

BI-07-01c            Capturing Historical and New Biodiversity Data

EC-09-01a            Ecosystem Classification and Mapping

EC-09-01d            Protected areas assessment and monitoring

2. A. Held/C. Silapathong, Forest Inventory, Biomass and Carbon, Global Carbon Observation and Analysis System

CL-09-03b            Forest carbon tracking

3. T. Hame / D. de Morisson Valeriano, Forest and Land Cover Dynamics, Cross-Cutting Products and Services

US-09-03b            Forest Mapping and change Monitoring

Global Data Sets

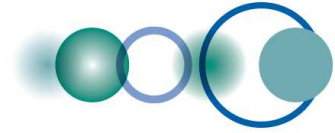
DA-09-03a            Global Land Cover

Interoperable Systems for GEOSS

AR-09-02a            Virtual Constellations (LSI)

Warning Systems for Disasters

DI-09-03b            Implementation of a fire warning system at global level



Advocating for Sustained Observing Systems  
AR-09-03a Global terrestrial Observations

**12.30 – 13.30 Lunch Break**

**13.30 – 15.30 Session 4 - National Forest Monitoring and Regional Networks**

The session is intended to provide an overview on what is in place in different Countries in order to better identify what requirements the GEO Forest Monitoring Systems should address, what gaps it should close, what interface with end users it should put in place.

To ensure a rather homogeneous content of each presentation, we are asking each speaker to include in the presentation information related to:

- Infrastructure that is used (satellites, ground networks, etc.)
- Main forest information products currently used
- Users involved (National and local level) and how forest information is used in their internal procedures
- Current plans for modification/improvements
- Critical gaps and new requirements to be addressed (observations, type of required information products, access to information ... etc)

Chair: Toumas Hame

Australia, S. Reddy  
China, G. Li  
Indonesia, Wardoyo  
Japan, Y. Hirata  
Pakistan, M. Iqbal  
Thailand, A. Ratanasuwan  
Uzbekistan, A. Akhadov

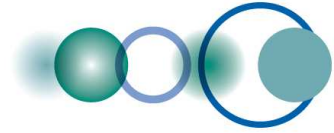
**15.30 – 16.00 Coffee Break**

**16.00 – 18.00 Session 4 - National Forest Monitoring and Regional Networks (continue)**

Brazil, M. Alvarenga  
Ghana, F. Mensah  
Mexico, F. Paz Pellat  
Tanzania, G. Otieno  
USA, L. Heath  
National Forest Monitoring and Assessments (NFMA) and SE Asian regional networks, M. Otsuka-FAO Regional Office

**18.00 Adjourn**

**19.00 – 20.30 Reception hosted by GISTDA**

**Thursday, 2nd July****09.00 – 10.00            Session 5 Plenary** - GEOSS Forest Monitoring system outlinePresentation - GEO Secretariat  
Discussion**10.00 – 10.30            Session 6 Plenary** – Introduction to the Breakout GroupsG. Rum, Breakout Group Charter  
General discussion and Group assignment**10.30 – 11.00            Coffee Break****11.00 – 12.30            Session 7** - Breakout Groups session

Breakout Groups

1. Biodiversity, Invasive Species, Forest Ecology, Protected Areas (Chair: K.D. Singh / D. Muchoney)
2. Forest Inventory, Biomass and Carbon (Chair: A. Held/C. Silapathong)
3. Forest and Land Cover Dynamics (Chair: T. Hame / D. de Morisson Valeriano)

**12.30 – 13.30            Lunch Break****13:30 – 15:30            Session 7** - Breakout Groups session (continued)**15:30 – 16:00            Coffee Break****16.00 – 16.30            Session 7** – Breakout Groups - Reports to Plenary

Chair: GEO Secretariat

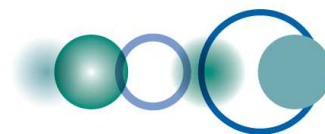
1. Biodiversity, Invasive Species, Forest Ecology, Protected Areas (Chair: D. Muchoney/K.D. Singh)
2. Forest Inventory, Biomass and Carbon (Chair: A. Held/C: Silapathong)
3. Forest and Land Cover Dynamics (Chair: T. Hame / D. de Morisson Valeriano)

**16.30 – 18.00            Round table 1** Data distribution and Data sharing

- Progress on GEOSS data sharing principles implementation, M. Onoda, GEO Secretariat
- The Landsat example, D. Dye, USGS
- Data sharing issues in SE Asia K. Linpakom, GISTDA / S. Reddy, Dept of Climate Change Australia
- Google initiatives on Forests, A. Luers Google.org

Discussion, recommendations and way forward

**19.00 – 20.30            Reception hosted by GEO Secretariat**



## Friday, 3rd July

### 09.00 – 11.00      **Session 8** - GEOSS Forest Monitoring system components

Chair: GEO SEC

- Satellite observations
  - Systematic and coordinated satellite observation plan – F.M. Seifert, ESA/CEOS
  - The LSI constellation – D. Dye, USGS
  - The JRC TREES-3 project and the FRA 2010 Approach to Remote Sensing Survey, HJ. Stibig, JRC
  - Forest monitoring system by combining wall-to-wall imagery and a sample of VHR imagery, T. Häme, VTT, Finland
- In situ/aerial observations and measurement
  - GEO Forest and Carbon task: activities at the validation sites, O. Nesije
- Linking observations (satellite + in situ) with models
  - Preliminary report on forest carbon mapping by utilizing PALSAR and ecosystem model, A. Ito, NIES, Japan
  - Regional to global remote sensing observations of tropical forests and detection of change: towards an operational forest monitoring system for GEO - Milne, A.K., Lucas, R.M. and Mitchell, A.L., Australia

### 11.00 – 11.30      **Coffee Break**

### 11.30 – 13.00      **Session 8**    Continue

- Information products
  - Radar mapping results for Indonesia and Guyana of the Wageningen team – N. Wielaard, The Netherlands
- Technical standards and interoperability
  - The GEO Forest and Carbon task approach – A. Held
- Access to data and products
  - Introduction of prototypes to demonstrate and disseminate forest carbon tracking - O.Ochiai , JAXA
  - Data / Information requirement for Forest Monitoring by S. Ongsomwang, Thailand
- Discussion

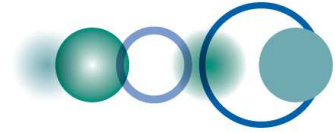
### 13.00 – 14.00      **Lunch Break**

### 14:00 – 15:00      **Round table 2**      ‘User review and recommendations’

- User perspective, M. Obersteiner, GEO Secretariat
- Updated GEOSS Forest Monitoring system, G. Rum GEO Secretariat

*Outline update based on the findings of breakout groups’ reports*

General discussion and recommendations



**15:00 – 16:30**            **Round table 3** “Implementation Scenario(s) and Capacity Building”

- Norwegian international actions on forest monitoring - O. Nesije
- Collaborations/regional networks and technical capacity-building in China and Indonesia- A. Held, CSIRO, Australia
- NGO's/Foundations views, K. D. Singh
  
- Discussion

**16:30 – 17:00**            **Coffee Break**

**17:00 – 18:00**            **Session 9** – Closing Session

Chair : J. Achache

Symposium summary, G. Rum GEO Secretariat

*GEOSS Forest Monitoring system Implementation (Architecture, Options, Main actors, Resources, Planning)*

Discussion

Concluding remarks and way forward by the Chair