

# **GEOSS Workshop XXXVIII – Evolution of Oceans Observing Systems – Building an Infrastructure for Science**

Washington State Convention and Trade Center  
Seattle, Washington  
Sunday, September 19<sup>th</sup>, 2010 from 08:30 to 18:00

To be held in conjunction with Oceans 2010 MTS/IEEE Seattle

Co-organizers

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The Global Earth Observation System of Systems (GEOSS) is a complex “system of systems,” including sensors, communication systems, spatio-temporal data infrastructures and other components essential for observing the Earth on all relevant scales and disseminating this information to users for a host of important societal benefits. The proposed GEOSS workshop XXXVIII on “Evolution of Oceans Observing Systems – Building an Infrastructure for Science” will focus specifically on the interoperability of individual ocean observatory initiatives in different nations and on different continents. Common challenges in regard to scientific and technical goals have to be identified and steps for a better coordination of the individual activities have to be made. Ideas of how to organize this endeavor will be discussed like building a Community of Practice for ocean observatory systems.

## **Workshop Theme**

The theme of the workshop follows the need to understand the capabilities of the major ocean observing systems to be used within the GEOSS era, and specifically new and existing cabled observing systems and their ability to address the data and information needs for science. This workshop is organized by the IEEE Committee on Earth Observations (ICEO) as part of an ongoing international series of GEOSS workshops that focus on data, science, and user themes pertinent to GEOSS.

## **Workshop Objectives**

The IEEE GEOSS workshops focus on development of observing systems for Earth science and the system-of-systems engineering communities that form a core intellectual resource for integrating complex systems. The emphasis on ocean observation systems in this workshop serves to direct attendees’ attention toward key ocean observational challenges and opportunities within the context of both US and global monitoring. The unique format and scope of this GEOSS workshop serves to ensure that a broad range of data users, scientists, and engineers contribute to the discussions on Earth system models and the use of environmental data.

After bringing the audience up to date on the GEOSS, the discussion will focus on answering a series of questions associated with Ocean data collection, evaluation and decision support systems, including: 1) What Ocean Observing Systems are available today and what tools and methods are best suited for integrating these systems, 2) What ocean observation methods and infrastructure are immediately needed and what gaps are there in observations, and 3) What key scientific reference data sets are available and what sets still need to be developed.

The benefits of this workshop are thus available globally, both in direct publications and in the impact that this workshop will have on the identification and implementation of GEO tasks. The

activity also serves to connect the engineering community more closely with the Earth science modeling and Earth data user communities, thus enhancing an important three-way partnership necessary to see the maximum benefits from Earth observations.

In the NSF sponsored GEOSS workshop in 2009 on Ocean Observing systems, the participants agreed to create an international Ocean Community of Practice to stimulate international information exchange and collaboration. It is anticipated that the proposed 2010 GEOSS workshop will be the focal point for nucleating of the Community of Practice.

### **Workshop Details**

This one day workshop will be co-located with. It will be held at the Washington State Convention and Trade Center, in Seattle, Washington, USA, on Sunday, September 19th 2010 from 8:30 to 18:00. The workshop will offer an agenda of key invited speakers noted for their expertise in ocean observing systems. Ample time will be allocated to breakout sessions within which small groups will exchange views and provide proposed approaches to question posed to fulfill workshop objectives. A summary of the break-out group discussions will be presented to the reconvened audience. Workshop presentations and break-out sessions summaries will be collected as part of the workshop proceedings and made available on the IEEE Committee on Earth Observation (ICEO) website at [www.ieee-earth.org](http://www.ieee-earth.org).

Sponsors of the workshop will include NSF, the IEEE Oceans Engineering Society, and the IEEE Committee on Earth Observation.

### **GEOSS Background**

The Global Earth Observation System of Systems (GEOSS) is envisioned to cover all aspects of Earth observations and in this way introduce a new capability for monitoring and providing data on environmental processes. GEOSS is a complex “system of systems,” including sensors, communication systems, spatio-temporal data infrastructures and other components essential for observing the Earth on all relevant scales and disseminating this information to users for a host of important societal benefits. In addition, GEOSS includes models and data fusion processes to create usable information that is essential for decision making 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 goals are to achieve comprehensive, coordinated and sustained observations of the Earth system, in order 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 10-year Implementation Plan states that GEOSS will provide the overall conceptual and organizational framework for integrated global Earth observations to meet user needs. GEOSS is a system of systems consisting of existing and future Earth observation systems, supplementing but not supplanting their own mandates and governance arrangements. It provides 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, sustained, 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 areas addressed in the GEOSS 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 desertification
- Biodiversity: Understanding, monitoring and conserving biodiversity

Although all of the above societal benefit areas (SBAs) of the Implementation Plan are important for GEOSS, this workshop will focus specifically on the need to understand the capabilities of major Oceans Observing Systems to be used within the GEOSS time frame.