

## GEO-X Plenary & Geneva Ministerial Summit

Integrating Observations to Sustain our Planet

15–17 January 2014, Geneva, Switzerland

# GEOSS: An Information Service for Cold Regions

Conclusion and Recommendations from GEO Cold Regions Side Event  
Geneva, Switzerland, January, 2014

The Group on Earth Observations (GEO) is mandated to build a Global Earth Observation System of Systems (GEOSS). GEO coordinates global joint efforts for Earth observations (space-based, airborne-based, and *in situ*) and information services to provide societal benefits over a vast **Cold Regions** area including the North Pole, South Pole, Himalaya-Third Pole and Mountain areas.

### Vision and Importance:

- ✧ More than one hundred countries around the world have cryospheric elements (various forms of frozen water). These elements are a main source of fresh water, which need long-term monitoring and modelling, especially mass balance measurement. For example, the GEOSS Water Strategy identified Snow Water Equivalent as being very important for water resources management, particularly at mid- and high latitudes.
- ✧ Cold Regions are the most ecologically and environmentally sensitive areas, and changes to these areas comprehensively affect the dynamic Earth system, impacting many aspects of society in all parts of the world. “What happens in the Poles doesn’t stay in the Poles.” For example, black carbon from the atmosphere is retained in the cryosphere and influences the energy balance, with resulting impacts on snow and ice melt, as well as on the climate.
- ✧ A global, comprehensive Cold Regions Information Service will strengthen synergies among the activities of the Environmental, Climate and Cryospheric communities across poles and mountain Cold Regions. In particular, it will support the efforts of scientists, experts and decision makers to ensure the sustainability of these environmentally stressed areas in an increasingly complex political and economic context.
- ✧ With its strong link to user communities, GEO is developing a user-driven approach to Cold Regions that will complement the current science-driven effort.

### Observations and Information Service Progress to Date:

- ✧ The cryosphere component is the main element of the Cold Regions. The World Meteorological Organization’s (WMO) Global Cryosphere Watch (GCW) aims to provide observations and information products on sea and freshwater ice, snow, glaciers, permafrost, ice caps, ice sheets, ice shelves, etc. The WMO’s Solid Precipitation Intercomparison Experiment (SPICE) contributes to the improvement of automatic, *in situ* measurements of solid precipitation amounts and snow on the ground (snow depth), including the linkages between them.
- ✧ With the vision of realizing pan-Arctic and global value-added services and providing societal benefits, the Sustaining Arctic Observing Networks (SAON) is being implemented to connect the Arctic

science, observing and data management activities and interests of the Arctic and non-Arctic countries, as well as integrate with global observing systems. SAON advocates the principles of free and open access to high quality data, and also promotes full and open data policies and standards proposed by the International Arctic Science Committee (IASC), which are important for Cold Regions information services.

- ✧ The circumpolar observations information activities, such as: the Svalbard Integrated Arctic Earth Observing System (SIOS); the Circumpolar Biodiversity Monitoring Program (CBMP) under the Arctic Council's Conservation of Arctic Flora and Fauna (CAFF); and the Arctic Council's Arctic Monitoring and Assessment Programme (AMAP), will provide access to Arctic observations which include, land cover, ecosystems, atmosphere, cryosphere and biodiversity data sets.
- ✧ Satellite observations are an effective means to explore and monitor the Earth's poles and remote high mountain Cold Regions, like the Himalaya-Third Pole and Alpine mountains. The extensive number of (near-) polar orbiting satellites provides timely and regular Earth observation data for polar areas, feeding operational monitoring and scientific research, e.g., the regional comparative study. ESA-NASA collaborations on the Greenland and Antarctica ice sheet mass balance intercomparison is an excellent example of using these data resources to improve scientific knowledge; however, the potential is far from fully exploited.

#### **Observations and Information Service Recommendations:**

- ✧ Polar and mountain Cold Regions need sustainable observations and operational environmental monitoring and prediction services addressing cryospheric, ecosystem, and biodiversity elements.
- ✧ It is necessary to engage both the space and *in situ* communities, and promote the integration of space and *in situ* observations, in the Cold Regions.
- ✧ An initiative on Arctic land monitoring could be a part of the Copernicus Global Land Service (i.e., use of the Sentinel-2 satellite for land monitoring will contribute significantly to the management, protection and development of the Arctic region) and a contribution to GEO's Cold Regions activities.
- ✧ Flexible and sustained funding support for Cold Regions observations and information services is needed.

#### **GEOSS Information Service for Cold Regions:**

- ✧ **An Information Service for Cold Regions (or GEO Cold Regions)**, exploiting the GEOSS information system, is needed to provide easy access to observations and environmental information products by users across the globe. This initiative should also collaborate with related projects and programs, such as SAON, SIOS, CAFF, Pan-Eurasian Experiment (PEEX), International Network for Terrestrial Research and Monitoring in the Arctic (INTERACT), World Glacier Monitoring Service (WGMS), WMO SPICE, GCW Portal and Polar Space Task Group (PSTG).
- ✧ The GEO Cold Regions may offer a global interface for existing programs, allowing them to reach communities outside their own membership domains and create synergies among different activities/programs.
- ✧ Developing a GEO Cold Regions Community Portal to GEOSS should be considered. The portal would expand the outreach of, and maximize synergies among, thematically wide GEO activities and thematically deep participant activities, thereby exploiting their complementary roles.

## Appendix: Agenda

### **GEOSS: An Information Service for Cold Regions**

#### **Programme**

Room 13, Level 2, CICG, Geneva, Switzerland

Monday, 13 January 2014, 16:30-18:30

- 16:30**      **Welcome and Introduction (5')**
- Barbara Ryan**, Director, GEO Secretariat
- 16:35**      **Importance of Cold Region Observations (25')**
- David Grimes**, GEO Principal, Canada  
**Michael Zemp**, Director, World Glacier Monitoring Service (WGMS)
- 17:00**      **Observations and Information Services Progress (40')**
- Wenjian Zhang**, Director, Observing and Information Systems Department (OBS), WMO  
**Jan Ren éLarsen**, SAON Secretariat and on behalf of the Arctic Council (AC)  
**Stephen Briggs**, Head of the Earth Observation Programme Planning & Coordination Service, ESA  
**Michael Freilich**, Director, Earth Science Division, NASA, USA  
**Yves-Alain Roulet**, Head of Measurement Technology, Federal Office of Meteorology and Climatology MeteoSwiss, WMO SPICE IOC Member
- 17:40**      **Demonstration of GEOSS Portal (10')**
- Guido Colangeli**, ESA
- 17:50**      **Discussion (30')**
- All participants
- 18:20**      **Wrap up (10')**
- Dag Anders Moldestad**, NSC, Norway
- 18:30**      **Adjourn**

**Chaired by:**

**Barbara Ryan**, Director, GEO Secretariat

**GEO Secretariat Support:**

Yubao Qiu

Espen Volden

