

**A GEO Initiative for an Assessment Report on Earth Observations (AREO)***A proposal of the Science and Technology Committee (STC)**Draft Version (14.05.2010)***Recommendation**

That the GEO Ministerial Summit (Beijing, 2010) commits GEO to preparing a comprehensive report on the world's capacity to determine the state of the global environment from earth observation.

The GEO Executive Committee is requested to endorse this recommendation.

**Proposal**

It is proposed that the GEO Ministerial Summit establishes an intergovernmental panel on earth observations (IPEO) in the frame of GEO to organize a comprehensive assessment of the global observational capacity for determining the status and trends of the global environment against agreed information needs.

The mandate of the IPEO is to prepare an Assessment Report (AR) that evaluates the extent to which the earth observation capacities available today are adequate to support high priority, globally relevant, policy and management decisions. The AR should be based on published material and specific input from GEO Members. It should consider ground- and sea-based instrumentation as well as air- and space-borne systems, available information products and their suitability for addressing the challenges of decision-making and management in the nine GEO Societal Benefit Areas. The panel should draw on input from ongoing activities both inside and outside of GEO.

The IPEO should moderate broad international agreement on the AR through a comprehensive review process involving broad scientific, technological and end-user communities.

The AR should be completed by the time of the GEO Plenary meeting in 2013. Intermediate milestones may be

- the agreement on the process (mid 2011),
- an agreed structure (GEO Plenary 2011),
- a complete draft after review by selected groups of reviewers representing GEO Members and Participating Organization (GEO Plenary 2012).

Upon the completion of its task, the IPEO would be dissolved.

The GEO Secretariat should be tasked to organize the IPEO and provide secretarial support to it. The STC could serve to advise on and oversee the process for GEO.

For the IPEO to succeed it is of paramount importance that the proposed commitment to be made by the GEO Ministerial Summit includes a specific commitment for adequate, additional and dedicated resources to be made available by GEO Members. These resources should be specified in the Ministers' commitment and should include, at a minimum

- two full-time staff at the GEO Secretariat dedicated to organizing and supporting IPEO
- 1 Mio € over three years to support expert involvement, travel, public relations activities of IPEO
- a national focal point to coordinate participation in the IPEO at national level

### **Motivation**

Earth observations are fundamental for informed decisions of the global community, national governments, and many other decision makers. At many levels, decision makers face increasingly complex choices ultimately impacting the sustainability of our civilization. Earth observations are critical for the scientific understanding of the Earth system, the assessment of the impact of human activities on this system, and the monitoring of the processes that cause global change. A deep understanding of these changes is a prerequisite to enable the evolution of a sustainable global economy. Increasingly, the anthropogenic impact on the Earth system is likely to lead to the emergence of unexpected environmental changes. A comprehensive observing system is needed in order to detect unexpected trends and phenomena in a timely manner.

The complexity of the Earth system with its multiple physical, chemical, and biological interactions between solid Earth, oceans, atmosphere, land surface, biosphere, and, not least, anthroposphere, turns the designing of a comprehensive Earth observation system into a formidable, multi-faceted challenge. Identifying the key variables that need to be observed requires an iterative process, which needs to be informed by increasingly more comprehensive observations. Likewise, quantifying the temporal and spatial resolution and the latency of the observations that are needed to capture the fingerprints of the relevant Earth system processes in a timely manner requires an iterative processes based on a combination of increasingly more complex models and more comprehensive observations. Finally, designing, implementing and operating the observation infrastructure together with the necessary processing, modelling, and interpretation that leads to useful products, services, and information again is an inherently iterative undertaking informed by the former two processes.

Currently, these iterative processes are mostly carried out within individual scientific disciplines. Assessments of the state of Earth observation systems and the adequacy of the information available on the state of and trends in the Earth systems most often take a view focused on a specific discipline or societal area. Examples are the Integrated Global Observing Strategy Partnership (IGOS-P) Theme reports or the assessments carried out by the Global Climate Observing System (GCOS) for the Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC). Many individual science or monitoring plans, most often on national or regional levels, also address the required observation systems, and these plans are normally narrowly focused on specific scientific fields.

No comprehensive assessment of our ability for Earth observation is available. The World Summit on Sustainable Development (WSSD) in 2002 emphasized the importance of comprehensive Earth observations. With GEO, for the first time, the global community has created an organization well posed to arrange such an assessment. The foundation for identifying needs, gaps, redundancies, and priorities could be built in a first overall assessment of the state of our capacity for observing the state of our global environment. Importantly, ongoing activities within GEO would contribute substantially to this initiative, e.g. the work of Task US-09-01a (“User Engagement: Identifying Synergies between Societal Benefit Areas”) or the scientific review of the GEO Work Plan undertaken under Task ST-09-01.