GROUP ON EARTH OBSERVATIONS

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GEO 2009-2011 WORK PLAN

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WORK PLAN MANAGEMENT

The 2009-2011 GEO Work Plan provides the agreed framework for implementing the GEOSS 10-Year Implementation Plan (2005-2015). It is a living document that will be updated annually. In 2009, this update will be particularly important since it will take full account of the ongoing work on revising the GEOSS Targets and defining a GEOSS Performance Monitoring and Evaluation Framework.

I THE NEW WORK PLAN

The 2009-2011 Work Plan takes the GEOSS 10-Year Implementation Plan up to and beyond its mid-way point. While the first phase of GEOSS development, from 2005 to 2008, focused on building the GEO community and engaging countries and organizations, the next phase will increasingly focus on actually putting the components of GEOSS into place. As GEOSS takes shape over the next several years, connections will be realized between diverse observing, processing, data-assimilation, modeling, and information-dissemination systems. This will make it possible to obtain a dramatically increased range of data sets, products and services on the key aspects of the Earth system.

The 2009-2011 Work Plan was prepared according to a set of written guidelines reflecting the conclusions of the GEO-IV Plenary and Cape Town Ministerial Summit about how the Work Plan should evolve (see Annex I). It incorporates the proposals and comments (technical and official) received from the GEO community during the period April to October 2008. It also takes into account the recommendations made by the GEO Committees and the Committee Co-Chair Coordination (C4) in September 2008.

The 2009-2011 Work Plan differs from its 2007-2009 predecessor in three main ways: (i) it groups the Tasks into two thematic parts; (ii) it consolidates GEO activities developed in the first years of GEOSS implementation under a smaller number of overarching Tasks; and (iii) it enhances the role of users and Communities of Practice – taking full account of the IGOS transition into GEO. The latter marks the start of a reinvigorated effort to ensure that users are engaged with GEO, actively involved in implementing the Work Plan, and starting to realize the benefits of GEOSS through improved decision-making. In addition, the Work Plan proposes the present Work Plan Management section, including a description of the role of GEO Committees and the procedures for Task management.

(i) A Two-part Structure

The Work Plan has been organized into two major parts to provide a clear overview of GEO activities. Part 1, “A Transverse GEOSS”, features the fundamental, cross-cutting components of GEOSS, such as the GEOSS Common Infrastructure. Part 2, “The Nine GEOSS Societal Benefit Areas”, describes the services and end-to-end systems that will support decision-making in each of the Societal Benefit Areas (SBAs). These two parts are intimately linked and fully complementary; they can be seen as representing the two faces of the GEOSS coin.

(ii) A Smaller Number of Overarching Tasks

The Work Plan consists of a set of *Tasks* (and *sub-tasks*), each implemented by a *Task team* composed of *Co-Leads* (GEO Members and Organizations), a *Point of Contact* (representing one of the Co-Leads) and *contributors* (further Members and Organizations).

Overarching Tasks, Sub-tasks and Coordination

The 2009-2011 Work Plan seeks to emphasize the added value that GEO brings to Earth observation. It links together related Tasks from the 2007-2009 Work Plan that share a strategic objective – while at the same time ensuring the continuity of these individual efforts. As a result, the Work Plan contains just 42 strategic overarching Tasks, compared with 73 Tasks in the previous 2007-2009 Plan (details

of how the 2007-2009 Tasks have transitioned into the new 2009-2011 Work Plan may be found in Annex II).

To facilitate implementation, many of these overarching Tasks are divided into sub-tasks. This is because activities within a single overarching Task may be either too advanced or too different in nature to be implemented by a single Task team. In such cases, Task teams are created at the sub-task level and not at the Task level.

Such an approach requires efficient coordination between the various sub-tasks and this will be provided by the four GEO Committees. Committees will encourage Task teams to interact with one another and will make recommendations as appropriate – ensuring that overarching Tasks move forward in a coherent manner. In this way, the overarching Tasks will promote synergies and cross-fertilization amongst their underlying sub-tasks and contribute to a more focused GEOSS implementation (see also Section II on the "Evolving Role of GEO Committees").

Distribution of Tasks: The Cross-Cutting Nature of GEOSS

GEOSS is inherently cross-cutting, as are the individual Tasks in the Work Plan. Each Task typically involves two or more transverse areas (Architecture, Data Management, Capacity Building, Science & Technology, User Engagement), Societal Benefit Areas (Disasters, Health, Energy, Climate, Water, Weather, Ecosystems, Agriculture, Biodiversity) or system types (such as observing, modeling, information). Therefore, the placement of a Task in any particular section of the Work Plan is to some extent arbitrary.

For example, although many Tasks in the Work Plan strongly involve capacity building, not all of these Tasks are listed under Section 1.3 on Capacity Building. Instead, they feature in Part 2 under "The Nine GEOSS Societal Benefit Areas" – see, for example, HE-09-03 (End to End Projects for Health), EN-07-03 (Energy Policy Planning), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), WA-06-07 (Capacity Building for Water Resource Management), WA-08-01 (Integrated Products for Water Resources Management and Research), WE-09-01 (Capacity Building for High-Impact Weather Prediction), EC-09-01 (Ecosystem Observation and Monitoring Network), EC-09-02 (Ecosystem Vulnerability to Global Change), AG-07-03 (Global Agricultural Monitoring), and BI-09-01 (GEO BON).

In the Work Plan Part 2, the cross-cutting dimension of Tasks is made more explicit in two main ways (note that in Part 1, Tasks are transverse and by definition relevant to all SBAs): First, *"Spider-web" diagrams* make it possible to visualize the relevance of each Task to all nine societal benefit areas. This is done by grading the relevance to each SBA from a minimum of 0 to a maximum of 5. As Work Plan implementation proceeds, this grading will be regularly reviewed by Task teams and Committees. Second, a non-exhaustive list highlights *"Key related Tasks in other SBAs"* at the end of each Task description.

(iii) An Enhanced User-driven Approach

The 2009-2011 Work Plan reflects the inputs and engagement of the GEO Communities of Practice as well as the former IGOS themes, which transitioned into GEO in 2008 (for a complete list of Communities of Practice, see Appendix A). The GEO Communities of Practice are a priority mechanism for engaging users and building partnerships; they provide Leads and participants for many Task teams, offer strategic insights and fresh ideas, and promote dialogue between the users and providers of Earth observations. The important contributions that Communities of Practice make to the Work Plan implementation are highlighted throughout the document (see cross-references in Part 2).

Taken together, these changes to the Work Plan approach should make the vision of a cross-cutting and user-driven GEOSS clearer for all contributors and participants. By making the linkages between Tasks and components explicit, this more focused approach seeks to bring the 10-Year GEOSS Implementation Plan for 2005-2015 closer to realization.

II EVOLVING ROLE OF GEO COMMITTEES

With the growing maturity of GEOSS and the launch of 2009-2011Work Plan, the importance of the four GEO Committees is set to increase. The Committees and their individual members will need to maintain the momentum of their existing efforts while tackling new challenges. While working within their existing terms of reference, the Committees will take additional measures to ensure that GEOSS progresses to the next level and that this progress is recognized by Ministers at the next GEO Summit.

(i) Guiding the Work Plan

As described in the GEO Rules of Procedure, the four GEO Committees "provide high-level review, advice, recommendations, and support in the ongoing development and implementation of the GEOSS 10-Year Implementation Plan". The Committees also actively promote the implementation of GEOSS activities as described in GEO Work Plans. In particular:

* *The Architecture and Data Committee* supports "the Group on Earth Observations (GEO) in all architecture and data management aspects of the design, coordination, and implementation of the Global Earth Observation System of Systems (GEOSS) for comprehensive, coordinated, and sustained Earth observations."

Consistently in the present Work Plan, the ADC will oversee the Tasks dedicated to building a transverse GEOSS Common Infrastructure, organizing data management and implementing the GEOSS Data Sharing Principles. These are described in Sections 1.1 and 1.2.

* *The Capacity Building Committee* supports "the GEO in strengthening the capability of all countries, in particular developing countries, to use Earth observation data and products in a sustainable manner and to contribute observations and systems to GEOSS. The GEO capacity building strategy will follow the World Summit on Sustainable Development (WSSD) concept of a global partnership between those whose capacity needs development and those who are able to assist in the process, recognizing that activities have intertwined social, environmental, and economic impacts".

The CBC, therefore, will help to define and review the five Tasks dedicated to building capacity for a transverse GEOSS (see Section 1.3). CBC members should also review the capacity-building components in all other Tasks (which are described in a dedicated capacity-building "box" in each Task Sheet) in order to promote synergies, reduce duplication and address gaps.

* *The Science and Technology Committee* engages "the scientific and technological communities in the development, implementation and use of a sustained GEOSS in order to ensure that GEO has access to sound scientific and technological advice".

Accordingly, the STC will support the implementation of the Work Plan Science and Technology Tasks (Section 1.4). It will ensure that all Tasks reflect the most up-to-date scientific and technological understanding of Earth systems and Earth observation tools. This responsibility includes developing, reviewing and periodically updating the GEOSS Science and Technology Roadmap. The Roadmap describes the major scientific and technological gaps that need to be addressed so that GEOSS can achieve its full potential. STC members will also interact with the GEO Communities of Practice and other expert fora.

* *The User Interface Committee* engages "users in the nine societal benefit areas in the development, implementation, and use of a sustained GEOSS that provides the data and information required by user groups on national, regional and global scales. The User Interface Committee has a specific goal to address cross-cutting issues by coordinating user communities of practice, ensuring continuity and avoiding duplication".

The UIC should then support the implementation of the User Engagement Tasks (Section 1.5). It will also take the lead in assessing the needs, requirements, and priorities of the end-users of Earth

observations and ensuring that user needs are reflected in the Work Plan Tasks. GEO recognizes that user groups need to be engaged actively in the design and construction of GEOSS so that GEOSS will deliver what they truly need. In conjunction with other Committees, the UIC will support the application of Earth observations to decision-making and to the realization of societal benefits. The UIC will also develop methods and processes to engage a broad range of users in GEOSS.

In addition to the above responsibilities, the four GEO Committees jointly help to coordinate the various sub-tasks of each overarching Task by encouraging Task teams to interact with one another and by making recommendations as appropriate. Whereas the ADC primarily focuses on the transverse Tasks, the CBC, STC and UIC have more cross-cutting mandates; they too address transverse Tasks, but each one, based on its particular mandate, also identifies and guides a number of Tasks from the nine societal benefit areas in Part 2 of the Work Plan. To re-enforce coordination within and across overarching Tasks, a joint session of the four GEO Committees may be organized on an annual basis, possibly at the time of the GEO Plenary.

To carry out their work, Committees interact with Task Leads and review Task Sheets and progress reports issued periodically by the Secretariat. They recommend corrective actions when needed. Each Committee also plays an important role in helping to identify Leads and contributors for all Work Plan Tasks. They then provide expertise, ideas, contacts, recommendations and practical support to the Task teams.

(ii) GCI and Data Sharing: the Two Cornerstones of the 2009-2011 Work Plan

If the 2009-2011 Work Plan is to succeed in securing the foundations of GEOSS, the four Committees need to make an essential contribution to advancing two GEOSS cornerstones: the GEOSS Common Infrastructure (GCI) and the implementation of GEOSS Data Sharing Principles. The ADC plays a key role in guiding the construction of these two cornerstones, while other Committees provide additional insight from their particular perspectives.

The *GEOSS Common Infrastructure (GCI)* consists of web-based portal(s); clearinghouses for searching data, information and services; and registries containing information about GEOSS components and associated standards and best practices. Its implementation will require specific contributions from each Committee. The CBC will contribute to the GCI by ensuring the proper development of the capacity-building components of the GEO Portal. In parallel, the STC will ensure that the GCI reflects the best scientific knowledge and technology available. The UIC will ensure that the GCI is providing the data sets, products and tools that users need.

During the first year of the Work Plan, the Committees will contribute via the GCI Initial Operating Capacity (IOC) Task Force. The IOC phase was launched in June 2008 and will continue for one year. Based on the experience of the IOC, the Common Infrastructure will evolve to become fully operational. The success of GEOSS over the long-term will be measured by the quality, number and diversity of datasets, services and components that can be accessed through the Common Infrastructure. Consequently, it is vital that each Task team that is developing an operational component registers this component with the GCI. Teams must also ensure that components incorporate the GEOSS interoperability standards and comply with the GEO data sharing principles.

Meanwhile the GEO Principals and the Committees will continue to explore ways and means for sustaining the operations of GEOSS, the Common Infrastructure and the various components. This could include efforts to mobilize resources and contributions from both donors and the private sector.

Developing and implementing the *GEO Data Sharing Principles* should also be a key priority for all Committees during the first two years of this Work Plan's implementation. The aim is to build consensus amongst GEO Members and Participating Organizations for adopting the Principles at the GEO-VII Plenary and Ministerial Summit in 2010.

(iii) Engaging the GEO Community

In addition to the responsibilities described above, the CBC, STC and UIC contribute to Work Plan implementation by engaging the users and producers of Earth observations and reaching out to resource providers and other interested groups. In particular:

The Capacity Building Committee will ensure

A Coordinated and Effective Approach to Capacity Building – CBC members ensure that the GEO community maintains a coordinated and effective approach to capacity building throughout this Work Plan. They support the analysis of national strategies for capacity-building and proactively seek to ensure that they are coordinated and mutually supportive. The ultimate aim is to ensure that all countries have the capacity to use Earth observation data and products and to contribute observations and systems to GEOSS.

Resource Mobilization – The CBC helps to mobilize resources to foster the use and understanding of Earth observations, as described in the GEO Capacity Building Strategy (available on the GEO website). Committee members individually and collectively identify priorities and resource needs for addressing human, institutional and infrastructural capacity in Earth observation. They then seek to identify and engage donors and other providers of resources.

The Science and Technology Committee will work towards

Catalyzing Research and Development (R&D) Funding for GEOSS – Committee members work with national governments and international organizations and encourage them to integrate the science and technology needs of GEOSS into their national, regional and international R&D programmes. They develop proposals and guidelines to assist R&D agencies to respond to GEO's needs, and they dialogue with key decision-makers and funding entities. They also identify programmes relevant to GEO's scientific and technological priorities and encourage them to collaborate with one another.

Engaging the Research Community in GEO – STC members support the research needs of GEOSS by reaching out to the world's diverse scientific and technological communities and making GEOSS more visible and attractive to them. To achieve this, they may organize a GEO presence at major symposia and other meetings, for example through plenary presentations or side events. They may contact universities and laboratories to involve them in GEOSS activities, form links with major scientific research enterprises in each Societal Benefit Area, and actively encourage relevant scientists and technical experts to contribute to GEOSS in a truly participatory way. The STC has already produced a document describing how GEOSS can benefit the research community ("The Role of Science and Technology in GEOSS" is available on the GEO website).

The User Interface Committee will focus on

Engaging Communities of Practice – Communities of Practice (CoPs are listed in Appendix A) are contributing in essential ways to the GEO Work Plan and to identifying user needs. Some CoPs, however, still need to be introduced to and engaged by GEO, while others need to be better integrated into the Work Plan. The UIC – as well as other GEO Committees – interacts with the Communities of Practice in order to engage them in GEO Tasks and to identify the needs of the well-organized user groups that the CoPs represent.

Identifying Synergies between Societal Benefit Areas – The UIC identifies cross-cutting issues and data sets that could strengthen synergies between Societal Benefit Areas. It develops and maintains processes for identifying critical Earth observation needs common to more than one SBA by interacting with scientific and technical experts.

(iv) Coordination and Planning

While allocating differing responsibilities to each of the four Committees is a practical necessity, it is also essential that their work remains fully coordinated. The Committee Co-Chair Coordination (C4) takes responsibility for ensuring that the Co-Chairs of the various Committees share information and ideas on a regular basis. It may decide, as appropriate, to convene a joint session of the four GEO Committees on an annual basis, preferably as part of the GEO Plenary.

In addition, the work of the Committees is kept in synch by the master schedule adopted at GEO Plenary meetings. Under the current master schedule, each Committee meets twice a year within two general time slots. The exact dates are chosen in a manner that best supports the yearly Work Plan process and feeds into the meetings of the Executive Committee and GEO Plenary. In order to foster interaction and information exchange, the meetings will be co-located when possible. In addition to these two meetings, Committees may choose to organize a third meeting at the time and location of the annual Plenary meeting.

III TASK MANAGEMENT

The 2009-2011 GEO Work Plan contains 42 overarching Tasks. Each Task or sub-task is implemented by a "Task team" with its own "Lead" or "Co-Leads", "Point of Contact" and set of "contributors".

(i) Getting Engaged

The process starts with an informal "signing in" procedure through which representatives of GEO Members or Participating Organizations volunteer to lead or contribute to a Task or sub-task (this is typically done through an email addressed to the GEO Secretariat at secretariat@geosec.org). As work on the Task proceeds, additional Leads and contributors may join, thus ensuring wider participation. For Tasks focused on user needs, the Task Leads and contributors are encouraged to work with a related Community of Practice. Specific activities within each Task may be further refined with the agreement of the Leads and contributors.

(ii) Leading a Task (or sub-task)

When a Member or Participating Organization agrees to lead a GEO Task, it takes responsibility for ensuring, on a best-effort basis, that Task milestones are reached and deliverables are met. Ideally, more than one Member or Participating Organization should agree to co-lead a Task and share the work of implementation (the order in which Co-Leads are listed in the Work Plan is alphabetical, with countries coming first and organizations second). In some cases, a Committee may invite an external organization to co-lead, or contribute to, a Task. Commitments to lead or contribute to GEO Tasks are entered into voluntarily in the spirit of advancing GEOSS under the terms of the GEOSS 10-Year Implementation Plan.

Although *Task Leads* and contributors are always entities (countries or organizations), the actual leadership comes from individuals who take up responsibility for the Task. Each individual should clarify and confirm that his or her country or organization agrees to lead or contribute to a GEO Task, and that he or she is the responsible party. In addition, Leads and contributors may invite other experts (either internal or external to their government or organization) to participate in the Task in their individual capacity as invited experts.

Task Leads organize the work of their Task in cooperation with other Task Leads and contributors and take steps to ensure that the work is carried out. They coordinate internally within their country or organization so that the appropriate competencies of all of its relevant agencies, divisions, or units are brought into the Task as necessary. They also provide any financial and in-kind resources necessary for implementing the Task, drawing on sources internal to their agency, institution or organization. Throughout Task implementation, Task Leads encourage other organizations and entities to participate on a best effort basis as contributing organizations in the Task, particularly from developing countries whenever possible.

For each Task, an individual volunteer must be identified from among the Task Leads to serve as the Task *Point of Contact*. The Point of Contact provides a single point of communication for all those involved in the Task and serves as a liaison with Committees and the Secretariat. In addition the Point of Contact is responsible for reporting on progress to the GEO community by updating the detailed "Task Sheet" (see below).

Throughout this process, the GEO Secretariat regularly communicates with Task Leads and Points of Contact to facilitate and support their work. Supporting the work of the Committees, it helps coordinate efforts across Tasks and sub-tasks and, where necessary, assists the Points of Contact to communicate with the Committees.

(iii) Contributing to a Task (or sub-task)

Contributors support the implementation of a Task through selected activities and projects indirectly providing financial or in-kind resources. This contribution is coordinated with the Task Leads. Contributors also assist in recruiting additional contributing organizations to the Task, particularly within their own country, region, or discipline, and provide other support to the Task Leads where possible. They further provide advice and information to the Task Leads on user requirements and best practices and endeavor to engage user communities.

(iv) Informing and Reporting – Task Sheets

All information pertaining to a Task or sub-task is compiled into a document referred to as the *Task Sheet*. The Task Sheet contains information on achievements to date, contributors to the Task (contact details), and the work to be performed. Whereas Task Sheets already exist for the 2007-2009 Work Plan (available at http://www.earthobservations.org/geoss_imp.shtml), new ones will be developed for the present Work Plan. They will be completed in line with recent progress on GEOSS performance indicators, thus providing a much improved platform for monitoring and reporting progress on Task implementation. The new Task Sheets will also be easily accessed through hyperlinks to the on-line version of the present document (to be available in early 2009).

Reporting on the progress being made by the Task teams occurs in two steps. First, the Points of Contact ensure that they are fully informed of all developments and progress concerning the Task (or sub-task) and act as a single point of reporting for the entire team. Second, the Point of Contact updates the Task Sheet to reflect progress according to the agreed calendar.

Based on the Task Sheet updates, the Secretariat produces periodic Work Plan progress reports. These are presented to the Executive Committee several times a year, and an annual report is presented to the GEO Plenary. Work Plan progress reports are also circulated to Committees and Communities of Practice, as appropriate.

(v) Updating the Work Plan – Targets

The Secretariat typically prepares an annual update of the 2009-2011 Work Plan based on consultations with Task Leads and inputs from Committees. (Committees may propose updates and revisions to the Work Plan; see Section II.) This update is submitted to the GEO community for review and then to the GEO Plenary for review and acceptance.

In 2009, a special update process will take full account of the GEOSS Target revision and the definition of a GEOSS Performance Monitoring and Evaluation Framework. This will include a systematic linking of Tasks and Targets and hence an overall evaluation of the Work Plan's relevance to GEOSS implementation. This may require all of the parties involved to meet in a single forum, probably in early 2009.

GEO 2009-2011 WORK PLAN

1 A TRANSVERSE GEOSS

1.1 ARCHITECTURE

In this Section, Task implementation and sub-task cross-coordination within a Task are under the guidance of the Architecture and Data Committee

AR-09-01: GEOSS Common Infrastructure (GCI)

Address the core architectural principles in GEOSS as a function of user needs. Provide useful guidelines and tools to GEO Members and Participating Organizations in the establishment and operation of GEOSS.

a) Enabling Deployment of a GEOSS Architecture (former AR-07-01)

This sub-task is led by EC (EuroGEOSS), USA (FGDC) and IEEE

Facilitate and support the deployment and operation of the GCI, including the incorporation of contributed components and services consistent with the GEOSS architecture; the GCI consists of GEO web portal(s) providing user access to information and services related to the nine societal benefit areas, clearinghouse(s) for searching data, information and services, and registries containing information about GEOSS components and associated standards and best practices. Define and solicit support for a contributed-systems (e.g. components, services) facilitator function. Expand the existing GEO process for interoperability arrangements including the Standards and Interoperability Forum (SIF) and regional teams, and consensus on linkages of GEOSS components and Spatial Data Infrastructure (SDI). With support from the User Interface Committee, develop user-driven system-of-systems engineering activities to ensure that the GEOSS reference and functional architecture is appropriately designed.

Define and deploy core GEOSS registry infrastructure for GEO Members and Participating Organizations to: (i) commit component systems; (ii) register related resources with GEOSS; and (iii) provide consultation to the contributed-systems facilitator. The registries in the GCI will be components and services registries, standards and special arrangement registries, best practices registry, requirements registry, and others as needed to support the core operations requirements of GEOSS. Address integration and user issues emerging from the initial operating capability of the GCI. Document the GEOSS convergence and interoperability supporting the high-level strategic and tactical guidelines of GEOSS implementation. Update and maintain the Strategic and Tactical Guidance Documents to reflect current practices and implementation of the GEOSS Architecture.

b) GEOSS Architecture Implementation Pilot (former AR-07-02)

This sub-task is led by USA (FGDC) and OGC

Develop and pilot new process and infrastructure components for the GCI and the broader GEOSS architecture through continuation of existing efforts and new activities solicited through Architecture Implementation Pilot (AIP) calls for participation and other means. Facilitate continuation of the Interoperability Process Pilot Project (IP3) as a means of coordinating cross-disciplinary interoperability studies and pilots. Coordinate societal benefit area support by the IP3 Pilots. As appropriate, incorporate GEOSS contributed infrastructure components into pilot implementations of

the GEOSS Architecture in coordination with Task AR-09-01a. Develop a capacity building registry infrastructure to include relevant information on existing Earth observation capacity building efforts and resources (the Capacity Building Committee will supply the content for this registry). Provide phased delivery of components to operations under sub-task AR-09-01a: with each phase consisting of: architecture refinement based on user interactions; component interoperability testing; and SBA-focused demonstrations.

c) GEOSS Best Practices Registry (former DA-06-09)

This sub-task is led by Japan (University of Tokyo) and IEEE

Support the operation and upgrade of the GEOSS Best Practices Registry. The registry should be capable of including best practices in observation, modelling and analyses, ontologies, capacity building, cost-benefit sharing mechanisms, and other relevant GEO best practices (e.g. data sharing, cooperative data acquisition, joint development, joint flight, collaborative sciences) and other relevant GEO best practices. This sub-task will work in coordination with the four GEO Committees and Members & Participating Organizations, who will provide the content for the registry.

d) Ontology and Taxonomy Development

This sub-task is led by Japan (University of Tokyo), ESA and IEEE

As part of the Best Practices Registry, create an Ontology and Taxonomy section to get an overview of available ontologies and taxonomies. Compare and analyze ontologies and taxonomies such as to avoid unnecessary overlaps and conflicts. As appropriate, develop ontologies and taxonomies stored in the Best Practices Registry into standards. Assist in the deployment of a reference able ontology for Earth observation to link the User Requirements Registry with the Components and Services Registry. Assess how to use the ontology and taxonomy section of the best practices registry for discovery composition and access in the frame of the GEOSS architecture.

AR-09-02: Interoperable Systems for GEOSS

Address the various interoperability aspects of contributing systems, including observing, modelling and information systems.

a) Virtual Constellations (former DA-07-03)

This sub-task is led by CEOS and GTOS (GOFC-GOLD)

Advocate rapid development of the “CEOS Constellations Concept”. Observations from a virtual constellation would provide better temporal, spatial, and spectral resolution and related data management and dissemination. A series of virtual constellations are in definition by space agencies, in consultation with user communities within the CEOS framework, each addressing key GEOSS observation gaps in the process. Prototype Constellations address:

- Precipitation, which aims to strengthen international cooperation on space-based observations of precipitation, including realisation of the GPM mission and providing guidance to new;
- Land Surface Imaging, designed to ensure the relevant synergy with High Resolution Multispectral Imager Continuity;
- Ocean Surface Topography, designed to ensure continuity of Sea Level measurement in accordance with GCOS requirements;
- Atmospheric Chemistry, which will address many of the needs for atmospheric observations of the climate community;

- Ocean Colour Radiometry which will provide scientific data products related to marine ecosystems and ocean biogeochemistry for near-surface global ocean and coastal waters (pending on final approval by CEOS Members);
- Ocean Surface Vector Winds to collect observations of ocean surface vector winds over the global ice-free ocean that will be used for operational analyses and forecasts, as well as retrospective research (pending on final approval by CEOS Members)

Other cases, for instance constellations of SAR systems or micro-satellites for a range of Earth observation applications, will be considered along the line.

b) WIS (former AR-07-04)

This sub-task is led by WMO

Upgrade and demonstrate the WMO Information System (WIS) as one operational exemplar of the GEOSS architecture implementation process providing improvements for multiple societal benefit areas. Extend and further improve the existing WMO Global Telecommunications System (GTS) services to ensure time and operational-critical exchange of weather, water, climate and hydro-meteorological disaster data, warnings and products in response to identified user requirements. Implement procedures and mechanisms to provide to all national and international programmes and user communities data discovery and access services, including metadata compliant with relevant international standards. Improve connectivity and access to environmental information among WMO's Member Countries, and interoperability through registration in the relevant GEOSS registers – to facilitate timely decision making and exploitation of WMO's rich information base.

c) Sensor Web Enablement for In-Situ Observing Network Facilitation (former DA-07-04)

This sub-task is led by South Africa (CSIR)

Foster the development of space-borne, air-borne, sea-based and ground-based sensing networks (advances in communication technology and ground-based in-situ technologies have made it feasible to consider webs of sensors on all types of platforms with rapid access to observations; this technology is referred to as Sensor Webs and Sensor Networks). Develop scenarios or use cases that demonstrate the value of Sensor Webs to the GEOSS societal benefit areas e.g. Disasters, Health, Biodiversity, Ecosystems and Water. Evaluate the applicable standards, and coordinate with AR-09-01.

d) Model Web Development

This sub-task is led by IEEE

Develop a dynamic modelling infrastructure (Model Web) to serve researchers, managers, policy makers and the general public. This will be composed of loosely coupled models that interact via web services, and are independently developed, managed, and operated. Such an approach has many advantages over tightly coupled, closed, integrated systems, which require strong central control, lack flexibility, and provide limited access to products.

AR-06-11: Radio Frequency Protection

This Task is led by WMO

Recognizing the fundamental importance of radio-frequencies necessary for all GEOSS components, in particular in-situ, ground- and space-based observations, as well as the increasing economical and political pressure on corresponding parts of the spectrum, undertake appropriate coordinated advocacy activities in association with Member countries, including representations to the International Telecommunication Union (ITU) and other bodies in charge of frequency management. This also includes a support to GEO Members in influencing their national and regional frequency management

bodies. In particular, the case of passive bands, essential for Earth observations, will be monitored with the highest care, endeavouring to assess the potential impact of interference on Earth observation applications and final products. In this respect, it is also important to link with Scientific Committee on Frequency Allocations for Radio Astronomy and Space Science (IUCAF).

CB-06-04: Dissemination and Distribution Networks

Develop and foster synergies between diverse communication networks established to distribute and disseminate GEOSS data, information and products.

a) GEONETCast

This sub-task is led by China (CMA), EC (DevCoCast), USA (NOAA), EUMETSAT and WMO

Establish GEONETCast as a distribution system for GEOSS related data, information and products using communication satellites and low cost, self contained, stand alone, off-the-shelf reception stations. GEONETCast is particularly useful in distributing operational or project data where a large number of users can benefit and where Internet access has low bandwidth or is non-existent. GEONETCast has been established on a demonstration basis, and will evolve to a fully operational global system with cross-cutting data serving all GEOSS Societal Benefit Areas. EUMETCast and GEONETCast America will, within their bandwidth capabilities, redistribute FENGYUNGCast data and products to all interested users in Europe and America. Similarly, FENGYUNCast will, within its bandwidth capabilities, redistribute EUMETCast and GEONETCast America data and products to all interested users in Asia. This will ensure that data is exchanged among all GEONETCast regional hubs.

b) GEONET

This sub-task is led by ESA

Establish GEONET as a global communication network of interconnected networks by which GEOSS related information, data and products can be circulated and distributed in response to users and providers needs. GEONET is based on the sharing of national, regional and global telecommunications networks and will serve all GEOSS Societal Benefit Areas. GEONET comprises User Access, Data Exchange and Dissemination services. GEONET will be based on communication network typologies, satellite and terrestrial, considered most suitable to meet the service requirements, providing access points for users and data providers at identified locations. Within the task, an inventory of the available networks for access, exchange and dissemination as candidates for GEONET will be performed, the draft architecture of GEONET will be defined and a demonstrator based on the available networks will be set-up as a first step towards a full operational system.

1.2 DATA MANAGEMENT

In this Section, Task implementation and sub-task cross-coordination within a Task are under the guidance of the Architecture and Data Committee

DA-06-01: GEOSS Data Sharing Principles

This Task is led by ICSU (CODATA)

Identify steps required to further the practical application of the agreed GEOSS Data Sharing Principles: (1) There will be full and open exchange of data, metadata, and products shared within GEOSS, recognizing relevant international instruments and national policies and legislation; (2) All shared data, metadata, and products will be made available with minimum time delay and at minimum cost; (3) All shared data, metadata, and products being free of charge or no more than cost of reproduction will be encouraged for research and education.

Define near-term milestones needed to come to consensus on *Implementation Guidelines for the GEOSS Data Sharing Principles* and move expeditiously towards the development of working data sharing policies and procedures for GEOSS. This requires an iterative process, whereby initial experience with data sharing policies and procedures provide important lessons. Throughout this process, ensure data access for capacity building and work in close connection with DA-09-02a (GEOSS Quality Assurance Strategy).

DA-09-01: Data Management

This Task involves the (i) planning, development, implementation, and administration of systems for the acquisition, storage, and retrieval of data, and the (ii) maintenance and updating of data & information (including access and confidentiality, conformity and quality, and content). Also included is the timely and economical acquisition of data; and management of data assets after receipt.

a) GEOSS Quality Assurance Strategy (former DA-06-02)

This sub-task is led by CEOS and IEEE

Develop a GEO data quality assurance strategy, beginning with space-based observations and evaluating expansion to in-situ observations, taking account of existing work in this area.

b) Data, Metadata and Products Harmonisation (former DA-06-04)

This sub-task is led by USA (USGS) and CEOS

Facilitate the development, availability and harmonization of data, metadata, and products commonly required across diverse societal benefit areas, including base maps, land-cover data sets, and common socio-economic data.

DA-09-02: Data Integration and Analysis

Coordinate data management approaches from input to processing, archiving, and dissemination. Enable users to (i) utilize large volumes of data from heterogeneous data sources in cooperation with existing data centers and (ii) more effectively define an action, perform the action at a desired time, monitor the execution status, and view the results.

a) Data Integration and Analysis Systems (former DA-07-06)

This sub-task is led by Japan (University of Tokyo)

Coordinate data management approaches that encompass a broad perspective of the observation data life-cycle – from input to processing, archiving, and dissemination, including reprocessing, analysis and visualization of large volumes and diverse type of data.

b) Ensemble-Technique Forecasting Demonstrations (former DA-06-03)

This sub-task is led by UK (Met Office)

Facilitate the development of demonstration projects promoting the use of ensemble-based techniques in disciplines other than weather forecasting.

c) Global Geodetic Reference Frames (former AR-07-03)

This sub-task is led by IAG

Ensure the availability of accurate, homogenous, long-term, stable, global geodetic reference frames as a mandatory framework and the metrological basis for Earth observation. Identify steps towards such consistent high-accuracy global geodetic reference frames for Earth observation and the observing systems contributing to GEOSS.

d) Atmospheric Model Evaluation Network

This sub-task is led by USA (EPA)

Demonstrate the use of web services to compare global and regional atmospheric models (including atmospheric chemistry/air quality models). Apply to a variety of Earth observations from distributed archives using standardized approaches to evaluate and improve model performance. Draw upon and contribute to the work of the Task Force on Hemispheric Transport of Air Pollution under the Convention on Long-range Transboundary Air Pollution, the IGAC-SPARC Atmospheric Chemistry and Climate Initiative, AeroCOM, and the Air Model Evaluation International Initiative.

DA-09-03: Global Data Sets

Provide a suite of global datasets based on improved and validated data sources. Initiate regular analysis and reporting. Facilitate interoperability among data sets.

a) Global Land Cover (former DA-07-02)

This sub-task is led by USA (USGS) and GTOS (GOFC-GOLD)

Provide a suite of global land cover datasets, initially based on improved and validated moderate resolution land cover maps and eventually including land-cover change at high resolution. This activity will benefit directly from the establishment of the Land Surface Imaging virtual constellation (see AR-09-02a).

b) Global Meteorological and Environmental Data

This sub-task is led by China (CMA)

Implement the Chinese Meteorological Satellite Program for global weather and environmental monitoring. This Program will (i) provide users worldwide with low-resolution multiple-source observation data; (ii) develop integrated multi-source satellite retrieval products shared with users; and (iii) enhance capabilities to acquire and apply Chinese meteorological satellite data and products.

c) Digital Geological Map Data

This sub-task is led by the UK (BGS)

Make web-accessible the best available geological map data worldwide. Build upon the OneGeology project to (i) create global dynamic digital geological map data and (ii) make existing geological map data accessible in whatever digital format is available in each country. The target scale is 1:1 million but the project will be pragmatic and accept a range of scales and the best available data. Ninety four countries and a dozen international scientific organizations contribute to the OneGeology Project.

d) Global DEM (former DA-07-01)

This sub-task is led by Japan (University of Tokyo) and CEOS

Facilitate interoperability among Digital Elevation Model (DEM) data sets with the goal of producing a global, coordinated and integrated DEM. This DEM database should be embedded into a consistent, high accuracy, and long term stable geodetic reference frame for Earth observation.

1.3 CAPACITY BUILDING

In this Section, Task implementation and sub-task cross-coordination within a Task are under the guidance of the Capacity Building Committee

CB-09-01: Resource (or Seville Roadmap) Mobilization

This Task is led by Spain (AEMET)

Implement the Seville Roadmap on Resource Mobilization[1]. The road map aims to mobilize resources for building the capacity of the three key contributors to Earth observations: individuals, institutions and infrastructure. It also works to strengthen links between the user and donor communities.

CB-09-02: Building Individual Capacity in Earth Observations

Identify education and training opportunities across GEOSS societal benefit areas. Develop synergies, encourage cross-fertilization and address common challenges.

a) Recognition of Cross Border Education and Training in Earth Observation (former CB-08-01)

This sub-task is led by Netherlands (ITC)

Bring together providers of (international and cross-border) capacity building, experts in recognition (credential valuation and accreditation) and governance (quality assurance) of higher education qualifications, and professionals from the Earth-observation and geographical-information sectors, to exchange knowledge and propose potential solutions on the issues of recognition and exchange of cross-border and international education & training products for Earth observation.

b) Summer Institute on Climate Information for Public Health

This sub-task is led by USA (IRI)

Develop a sustainable “Summer Institute on Climate Information for Public Health” building on the efforts of the International Research Institute for Climate and Society (IRI), the Center for International Earth Science Information Network (CIESIN) and the Mailman School of Public Health. The Summer Institute will offer public health decision-makers and their partners the opportunity to learn practical methods for integrating climate knowledge and information into health decision-making processes through expert lectures, special seminars, focused discussions and practical exercises.

c) UN-SPIDER/GEO Summer Schools on Space-based Solutions for Disaster Management and Emergency Response

This sub-task is led by UNOOSA

Build upon the outcome of GEO 2007-2009 Task CB-07-02 (Knowledge Sharing for Improved Disaster Management and Emergency Response) to establish and support regional training and capacity building programmes related to disaster management and emergency response.

[1] Document available at http://www.earthobservations.org/ag_cbc.shtml

d) CBERS/GEO Capacity Building Network

This sub-task is led by Brazil (INPE)

Develop and implement a training program for the African end-users of the CBERS images. The programme will foster (i) the use of freeware and open-source geo-processing software (e.g. SPRING and TerraView), and (ii) the development of remote-sensing applications using CBERS images. Initial focus will be on users in Lusophone African countries.

e) Earth Observation Game for Youth

This sub-task is led by IEEE

Initiate an international contest to create a game that emphasizes the impact of Earth observation on societal conditions. Develop an outcome to work with students and young people through their recreational interest to participate in game playing. The winners will support introduction of the game on a global basis, both into schools and through community organizations.

f) GLOBE/GEO Climate Education Project

This sub-task is led by USA (UCAR)

Develop a student research campaign to foster the use of Earth observation and better prepare the future work force in dealing with changes in the global environment – through collaboration between the GEO community and the worldwide community of educators, students, and partners of the GLOBE (Global Learning and Observations to Benefit the Environment) Program. The GLOBE/GEO Student Climate Research Campaign (SCRC) will complete its planning in 2009 and implement the school-based pilot project in 2010. The latter will serve as a model for potential (future) GLOBE/GEO education-research campaigns on topics such as Water, Health, Biodiversity and Energy.

g) GEONETCast Training

This Task is led by China (CMA), EC (DevCoCast), USA (NOAA), EUMETSAT and WMO

Enhance GEONETcast capacity building and user engagement activities, particularly in developing countries. In particular, develop the GEONETCast Training Channel that will focus on (i) training end-users to use products for specific purposes and to disseminate data via GEONETCast; (ii) linking GEONETCast products and product navigator (inside portal) with specific training material; (iii) transmitting training materials via GEONETCast to local trainers; and (iv) disseminating training materials on GEOSS-related environmental data.

CB-09-03: Building Institutional Capacity to Use Earth Observations

Coordinate, strengthen and sustain existing capacity building networks within Earth observation communities. As appropriate facilitate the construction of new networks.

a) Building National and Regional Capacity (former CB-07-01d)

This sub-task is led by UNEP

Build national capacity in developing countries by enabling human, technical and institutional capacity for coordinating, accessing, using and sharing environmental data, information and services. Develop and implement a participatory model for environmental networking, observing/monitoring, and data/information sharing at the national level. The model will be based on existing national mechanisms. It will include key institutions (data providers and information disseminators), integrating regional and global tools and mechanisms for environmental data and observing systems. In addition, improve in-country coordination among national statistical organisations, remote sensing agencies, environment, forests, wildlife and water related ministries for providing improved access to national environmental data.

b) Establishing Regional Capacity Building Networks

This sub-task is led by Netherlands (ITC)

Organize and reinforce international capacity building and training opportunity networks in Earth observation sciences & geo-information provision. These GEO training opportunity networks (e.g. GEOTOPS) will include virtual and e-learning based mode of knowledge transfer. A typical operational capacity building network in a world region will include key institutions in data provision (e.g. space agencies, a GEONETCast member or data provider) and academic (research-oriented capacity development) and professional higher-education institutions and regional centers. Capacity building services delivered by those institutions will be embedded in national higher-education systems (accredited, e.g. in European Union area), and internationally recognized by professionals and/or other bodies. GEO will have a coordination role using e.g. its web portal capacity building services and GEONETCast system.

c) Building Capacity for Non-technical Decision-makers in the Use and Impact of Earth Observation

This sub-task is led by IEEE

Maintain a GEOSS-focused web-based magazine for the general public and non-technical managers & decision-makers to complement existing capacity building efforts in GEO. Update the magazine(s) on a routine basis to inform and provide an understanding of the impacts of Earth observations on societal conditions and the benefits of global observation. Expand on existing GEOSS-focused web-pages to incorporate more material from developing countries. Enable access to the magazine(s) through the GEOPortal (AR-09-01a).

d) Building Capacity for Operational Oceanography

This sub-task is led by Denmark (DMI)

Facilitate ocean data sharing and use by stimulating a global cooperation on operational oceanography, especially in developing countries. In the first stage, establish a global operational oceanography network connecting advanced operational forecasting centres in developed countries and quasi-operational centres in e.g. Asia, Africa and Latin America. In the second stage, establish regional cooperation projects (between advanced and less-developed operational centres). The first cooperation example will be based on EU project YEOS, a cooperation among China, EU and Korea.

CB-09-04: Capacity Building Needs and Gap Assessment

Engage the user community in identifying their capacity building needs for accessing, using and producing Earth observations for societal benefit. Develop an operational capacity building presence within the GEOSS Common Infrastructure (Task AR-09-01).

a) Identifying Best Practices, Gaps and Needs (former CB-07-01b)

This sub-task is led by the Netherlands (ITC)

Through the engagement of user and expert networks, build registry and database content for the existing components, services and best practices registries of Task AR-09-01. This content will include current and planned capacity building activities, best practices, and identified gaps and needs. Moreover this will include, as needed, observation, modelling and implementation best practices. Best practice examples will for instance relate to open-content courses, e-learning material, and downloadable data & products that support the use of GEOSS and capacity building. Develop and disseminate, for each societal benefit area, specific capacity building outreach material reflecting best practices. Enable access to the above through the GEOPortal (AR-09-01a) and GEOSS Best Practices Registry (AR-09-01c).

b) Capacity Building Performance Indicators (former CB-07-01c)

This sub-task is led by Germany (BGR), Spain (INM) and IOC

Develop reliable and widely accepted qualitative and quantitative metrics for measuring (i) the efficacy of Earth observation capacity building programs and (ii) the implementation of GEO capacity building strategy. The development of these metrics will require the engagement of the entire GEO community to ensure buy-in.

c) User Oriented Workshops for GEOSS Outreach and Feedback

This sub-task is led by Netherlands (ITC) and IEEE

Organize a series of workshops to demonstrate the GEOSS Common Infrastructure to users in all societal benefit areas. Continue series of global and regional workshops to provide avenues for user inputs into the GEOSS requirements and feedback on the operational aspects of GEOSS; approximately five workshops per year will be organized which should support outreach on GEOSS capabilities. In addition, organize capacity building workshops to expose regional and local stakeholders to best practices in capacity building and to the benefits of the GEONETCast data dissemination system – in combination with open source web-based applications and service deliveries, for the various societal benefit areas, and GEOSS observation networks.

CB-09-05: Infrastructure Development and Technology Transfer for Information Access

Identify hardware, software and other technology required to access, use and develop Earth observation data, information and products for decision making. Promote technology transfer (in its very broadest sense), and advance infrastructure and information sharing.

a) Open Source Software (former CB-07-01e)

This sub-task is led by Brazil (INPE)

Encourage the development of open-source solutions across and along the Earth observation value chain – by building upon existing efforts and drawing upon networks of Open Source Software (OSS) developers. As a starting point, use the TerraView and Terralib platform to encourage the development of OSS for end-users dealing with integrated Earth observation and GIS data. Related activities will include: (1) Provide new versions of the SPRING image processing software and GIS software for use with CBERS images, TerraView and Terralib; (2) Develop TerraView and TerraLib training material, courses, tutorials and documentation for both programmers and end-users (available in English), and develop specialized training material for e-learning; and (3) Translate into French interfaces of TerraLib, TerraView and SPRING, and tutorials and manuals of TerraLib, TerraView and SPRING.

b) CBERS

This sub-task is led by Brazil (INPE) and CEOS

Establish and upgrade the capacity of ground stations with a footprint in Africa to receive, process, store and distribute CBERS (China-Brazil Earth Resources Satellite) imagery. Data will be distributed free of charge to all interested African countries within the footprint of the respective ground stations. Two ground stations have initially been selected: Maspalomas, operated by INTA (Spain), and Hartebeeshoek, operated by CSIR (South Africa). Other possibilities, still requiring negotiation, include: Matera in Italy and Malindi in Kenya, both operated by ASI (Italy), and Aswan, operated by NARSS (Egypt).

c) SERVIR Expansion

This sub-task is led by USA (NASA, USAID)

Establish SERVIR regional hubs in geographic regions other than Panama (where it was originally established to serve the Meso-American region) – starting with eastern Africa. Develop additional SERVIR tools that can provide (i) early warnings of thunderstorms, flash floods, and vector-borne diseases; (ii) climate prediction mapping; and (iii) air quality monitoring. SERVIR is a system that integrates satellite and other geospatial data for improved scientific knowledge and decision-making by managers, researchers, students, and the general public. The SERVIR system is web-based and makes available previously inaccessible Earth observation data and online decision-support tools to interpret, map and visualize (3D) this data. It is used to monitor weather, forest fires, and ecological changes, as well as to respond to severe events such as red tides, tropical storms, and flooding.

d) Geo-resources Services for Africa

This sub-task is led by EC (AEGOS)

Build upon the AEGOS project to design a pan-African infrastructure of interoperable data and user-oriented services to strengthen the sustainable use of geo-resources in Africa. Safeguard, share, valorise the knowledge and data archived in African and European geological surveys. Support geoscientific communities and institutional decision-makers in the design and implementation of sustainable development public policies.

1.4 SCIENCE AND TECHNOLOGY

In this Section, Task implementation is under the guidance of the Science and Technology Committee

ST-09-01: Catalyzing Research and Development (R&D) Funding for GEOSS

This Task is led by EC (DG-RTD) and IIASA *(to be confirmed)*

Encourage national governments and international organizations to address GEOSS Science and Technology needs in their R&D programmes. As stated in "The Role of Science and Technology in GEOSS"[2], it should be a priority for GEO Members and Participating Organizations to involve research institutions and funding agencies in GEOSS implementation. To this end, GEO Members and Participating Organizations will be encouraged to: (i) plan and conduct R&D activities in support of GEOSS implementation; (ii) Contribute relevant R&D activities (planned or ongoing) to GEOSS implementation; (iii) Identify and earmark funding sources for those activities; and (iv) promote GEOSS throughout the process.

Related activities will include: Develop proposals and guidelines to assist R&D agencies in addressing GEO needs. Engage a dialogue with decision makers and funding agencies. Identify programmes relevant to GEOSS Science and Technology needs and encourage them to collaborate with one another.

ST-09-02: Promoting Awareness and Benefits of GEO in the Science and Technology Community

This Task is led by EC (DG-RTD), COSPAR and IIASA *(to be confirmed)*

Engage the research community in GEOSS to achieve breakthroughs in the understanding of the Earth's changing environment and global integrated Earth system. The nine interdependent GEOSS societal benefit areas require an inter-disciplinary scientific approach cutting across observations, research, knowledge and information. The scientific community should collaborate within GEO to address interactions between the components of the global integrated Earth system, and connect natural and socioeconomic sciences.

A strong GEO engagement from the Science and Technology community would contribute to: (i) Connect disciplines to address the complex issues of the global integrated Earth system; (ii) Improve interoperability between global observing systems, modeling systems, and information systems; (iii) Facilitate data sharing, data archiving, data dissemination, and reanalysis; (iv) Optimize recording of observations, assimilation of data into models, and generation of data products to improve understanding of the global integrated Earth system for prediction of environmental phenomena; (v) Enhance value of global observations from individual observing systems through their integration in the societal benefit areas; and (vi) Harmonize well-calibrated, high-accuracy, stable, sustained in-situ and satellite observations of the same variable recorded by different sensors and different agencies.

Related activities will include: Form links with major scientific research enterprises in each societal benefit area. Actively encourage relevant scientists and technical experts to contribute to GEOSS in a truly participatory way. Reach out to the world's diverse scientific and technological communities and make GEOSS more visible and attractive to them. Contact universities and laboratories to involve them in GEOSS activities. Organize a GEO presence at major symposia and other meetings, for example through plenary presentations or side events.

[2] Document available at http://www.earthobservations.org/ag_stc.shtml

1.5 USER ENGAGEMENT

In this Section, Task implementation and sub-task cross-coordination within a Task are under the guidance of the User Interface Committee

US-09-01: User Engagement

Involve users in reviewing and assessing requirements for Earth Observation data, products and services. Create an appropriate mechanism for coordinating user requirements across societal benefit areas. Foster partnerships among and within societal benefit areas, making use of user communities where they exist and catalyzing the formation of new ones where they do not.

a) Identifying Synergies between Societal Benefit Areas

This sub-task is led by USA (EPA, NASA)

Develop a GEO process for identifying critical Earth observation needs common to many GEOSS societal benefit areas, involving scientific and technical experts, taking account of socio-economic factors and building on the results of existing systems' requirements development processes.

b) Communities of Practice and Partnership Development

This sub-task is led by USA (EPA) and IAG

Develop GEO Communities of Practice to identify and refine user needs, in particular for cross-cutting areas – building upon GEO's initial experience of Communities of Practice, information provided by national, regional and project-level surveys, and the extensive work of the Integrated Global Observing Strategy Partnership (IGOS-P), now transitioned into GEO. The following Communities of Practice have been recognized by the User Interface Committee: Air Quality and Health, Coastal Zone, Energy, Forest, Geohazards, Global Agriculture Monitoring, and Water and Health.

US-09-02: Socio-Economic Indicators

Develop socio-economic data and products. Support the development of methods, models and tools required to produce GEOSS-relevant socio-economic indicators.

a) Socio-Economic Benefits of GEO and GEOSS

This sub-task is led by IIASA

Build upon the GEOBENE project (Global Earth Observation - Benefit Estimation: Now, Next and Emerging) to assess Earth observation benefits and GEOSS added-value (including cooperation and data sharing). Define test-cases and develop methodologies and analytical tools in each of the nine GEOSS societal benefit areas. In particular develop integrated models that will also serve as effective decision-making tools to evaluate impacts and benefits of multiple scenarios across societal benefit areas. Such models will be also used in the framework of the European project EuroGEOSS – to assess the GEOSS added value to multi-disciplinary interoperability and modelling.

b) Socio-economic and Demographic Global Data

This sub-task is led by UNECA

Develop global spatially-enabled socio-economic databases with an initial focus on Africa. Support the development of tools and methods for building, visualizing, and analyzing socioeconomic indicators for informed decisionmaking, policy formulation, and operational strategies for development.

c) Global Road and Human Settlements Mapping on GEO Grid

This sub-task is led by Japan (AIST) and ICSU

Develop a global road and human settlements map on GEO Grid. Related activities will include: (i) System development of GEO Grid towards sharing, developing and distributing data; (ii) Research & development for producing relevant data using satellite images; and (iii) Collection, maintenance, and evaluation of relevant remote sensing and GIS data.

US-09-03: Cross-Cutting Products and Services

Foster the development and use of Earth observation products and services across the societal benefit areas of GEOSS, especially in developing countries.

a) Development of Global Map for GEOSS Societal Benefit Areas (former DA-06-05)

This sub-task is led by Japan (GSI) and ISCGM

Foster the use of Global Map in societal benefit areas such as Disasters, Health, Agriculture, Biodiversity and Water. Identify the needs for basic geographic data and reflect these needs in new specifications. Global Map datasets provide a full and consistent coverage of land on the Earth – at 1 km resolution. They are composed of the following thematic layers: elevation, vegetation, land-cover, land-use, transportation drainage systems, boundaries and population centers.

b) Forest Mapping and Change Monitoring (former AG-06-04)

This sub-task is led by USA (NASA, USDA Forest Service, USGS), GTOS (GOFC-GOLD) and FAO, and supported by the Forest Community of Practice

Integrate international efforts on assessment and monitoring of forests and forest changes using a combination of ground and satellite information and internationally agreed standards. Make relevant synergies with CL-09-03b (Forest Carbon Tracking) and DI-09-03b (Implementation of a Fire Warning System at Global Level).

c) Bio-geophysical, Soil & Land Surface Data

This sub-task is led by EC (e-SOTER), USA (NASA) and WCRP

Coordinate the collection, processing and distribution of bio-geophysical and land surface parameter data (e.g. Leaf Area Index (LAI), Vegetation Index (VI), Fraction Photosynthetically Available Radiation (FPAR) and Net Primary Productivity (NPP)). Deliver this data as a service to the global modelling communities; there is a heritage of this type of effort (ISLSCP 1 and 2).

Support the development a Global Soil Information System (GLOSIS) building upon the work of the International Soil Reference and Information Centre (ISRIC). Incorporate the various existing regional initiatives into a coherent system for soil data – to support implementation of major multilateral environmental agreements (e.g. UNFCCC, UNCCD and CBD) and provide harmonized & policy-relevant information to users at the regional and national level. As the European contribution to GLOSIS, e-SOTER will deliver a web-based regional pilot platform with data, methodology, and applications, using remote sensing to validate, augment and extend existing data.

d) Global Phenology Data

This sub-task is led by USA (NPN, University of Wisconsin)

Coordinate the collection of in-situ phenology observations and expand existing observing networks. Identify and generate satellite-derived phenological/temporal metrics and test models for describing the phenological characteristics of natural and modified ecosystems. Changes in vegetation phenology impact biodiversity, net primary productivity, species distribution, albedo, biomass and ultimately the global climate.

2 THE 9 GEOSS SOCIETAL BENEFIT AREAS

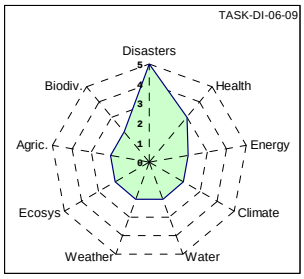
2.1 DISASTERS

Reducing loss of life and property from natural and human-induced disasters

Disaster-induced losses can be reduced through observations relating to hazards such as: wildland fires, volcanic eruptions, earthquakes, tsunamis, subsidence, landslides, avalanches, ice, floods, extreme weather, and pollution events. GEOSS implementation will bring a more timely dissemination of information through better coordinated systems for monitoring, predicting, risk assessment, early warning, mitigating, and responding to hazards at local, national, regional, and global levels.

GEOSS 10-Year Implementation Plan, Section 4.1.1

DI-06-09: Use of Satellites for Risk Management



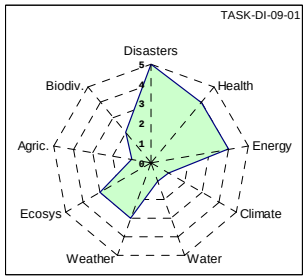
This Task is led by Canada (CSA), China (CARSA, NSMC), CEOS and UNOOSA, and supported by the Geohazards Community of Practice

Define and facilitate implementation of satellite constellations for risk management from a multi-hazard perspective. Develop dedicated software tools (based on AR-09-02a output) – to be used, in the short term, to analyze the coverage for critical observations and, in the medium-long term, to implement the user interface for products ordering/retrieval and data integration/re-processing.

Deliverables will include: (i) Constellation requirement definition and performance assessment, through the full involvement of users and the participation of "champions" from the Geohazards Community of Practice; (ii) Actions towards the Board of the International Charter and relevant CEOS members, to identify possible strengthening of Charter mechanisms and options for widening its scope; and (iii) Cross-cutting use of satellites for health risk management and emergency response.

Key related Tasks in other SBAs include: HE-09-01 (Information Systems for Health), HE-09-02 (Monitoring and Prediction Systems for Health), WA-06-02 (Droughts, Floods and Water Resource Management), WA-06-07 (Capacity Building for Water Resource Management)

DI-09-01: Systematic Monitoring for Geohazards Risk Assessment



Define and implement a unified and integrated approach to geohazards risk assessment. Build upon synergies and integrate data from global in-situ seismographic networks and remote sensing. Coordinate multi-level efforts and implement decision-support tools to facilitate and support data access for selected "Supersites" locations.

a) Vulnerability Mapping and Risk Assessment (former DI-06-03 and DI-06-07)

This sub-task is led by China (CENC), France (BRGM), Italy (EUCENTRE), UNOSAT and WMO, and supported by the Geohazards Community of Practice

Facilitate access to the remote-sensing & in-situ data required to perform systematic geohazards vulnerability mapping and risk assessment. Related activities will include: (i) Retrieval, integration

and systematic access to remote sensing & in-situ data in selected regional areas exposed to geological threats ("Supersites"); the initial objective will be to dramatically enhance access to SAR data and integration of InSAR & GPS data; and (ii) Development, testing and application of global seismic vulnerability mapping to "Supersites" areas.

b) Seismographic Networks Improvement and Coordination (former DI-06-02)

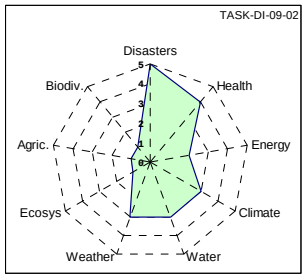
This sub-task is led by China (CENC), EC (EMSO, EuroSITES), USA (USGS), FDSN and ISC, and supported by the Geohazards Community of Practice

Improve the capabilities of global seismographic networks such as GSN, FDSN (including regional and global components), GNSS networks and new ocean bottom networks such as VENUS, NEPTUNE and ESONET. Facilitate sharing of data and event products among GEO members. Expand and coordinate efforts to provide access, using GEOSS interoperability methods, to real time and archived seismological data and products. Develop a portal that will interlink distributed seismological data centers and provide seamless access to other GEOSS components.

Broaden the scope of this activity to identify and build upon synergies across in-situ observing network types (e.g. seismological, GNSS, hydrological). Synergies could range from the use of the same best practices and operational approach, to the use of a common part of the infrastructure for collection and dissemination, and co-location of in-situ instruments.

Key related Tasks in other SBAs include: EC-09-02 (Ecosystem Vulnerability to Global Change)

DI-09-02: Multi-Risk Management and Regional Applications



Define and implement an integrated approach to all phases of disaster management. Develop a framework for regional disaster management applications.

a) Implementation of a Multi-Risk Management Approach (former DI-06-08)

This sub-task is led by France (BRGM) and WMO, and supported by the Geohazards Community of Practice

Define and implement an integrated and comprehensive approach to systematically address all risk and disaster phases, including risk assessment and mapping. Support ISDR in the implementation of the Hyogo Framework for action and promote the development of a Disasters Community of Practice (CoP) that would provide guidance for activities and initiatives in the Disasters societal benefit area (the Disasters CoP would include and embrace existing hazard-thematic CoPs such as the Geohazards CoP).

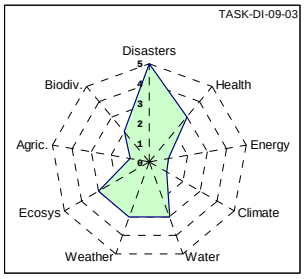
b) Regional End-to-End Disaster Management Applications (former DI-07-01)

This sub-task is led by France (BRGM), and supported by the Geohazards and Water Cycle Community of Practice

Implement regional and cross-cutting end-to-end projects. Potential areas of application will include: Famine and drought early warnings for Africa (to be coordinated with AG-07-03); multi-risk (natural hazards and epidemics) decision-support tools for Latin-Central America and Asia; and risk management for floods.

Key related Tasks in other SBAs include: HE-09-01 (Information Systems for Health), HE-09-03 (End to End Projects for Health), EN-07-02 (Energy Environmental Impact Monitoring), WA-06-02 (Droughts, Floods and Water Resource Management), WA-06-07 (Capacity Building for Water Resource Management), WA-08-01 (Integrated Products for Water Resource Management and Research), EC-09-02 (Ecosystem Vulnerability to Global Change), AG-07-03 (Global Agricultural Monitoring)

DI-09-03: Warning Systems for Disasters



Support the development, improvement and coordination of early warning systems for natural disasters.

a) Tsunami Early Warning System of Systems (former DI-06-04)

This sub-task is led by IOC and UNOSAT, and supported by the Geohazards and Coastal Zone Communities of Practice

Support the establishment and continuation of a multi-hazard fully-operational global tsunami early warning and mitigation system of systems. Promote full and open exchange of publicly-funded, unclassified data relevant to tsunami warning/mitigation systems and enhancement/development of mechanisms for real-time data sharing, including seismic and sea level (deep ocean and tide gauge) data. Contribute to the operationalization of comprehensive observing networks (in-situ sea level, seismic stations and remote monitoring) and data management systems (including integration of the global ocean observing system (GOOS), international seismic networks, and related global telecommunication systems). Define and promote standards/protocols for operating observing systems, and managing data exchange/transmission for multiple observing systems relevant to tsunami detection, early warning and mitigation.

b) Implementation of a Fire Warning System at Global Level (former DI-06-13)

This sub-task is led by Canada (CFS), Portugal (INOV) and GTOS (GOFC-GOLD), and supported by the Geohazards and Forest Communities of Practice

Develop a globally-coordinated warning system for fire, including improved prediction capabilities, analysis tools and response support through sensors, information products and risk assessment models. Related activities will include: (i) Review of existing warning systems; (ii) Assessment to enhance current fire early warning systems; (iii) Development of mechanisms for the implementation of an operational global early warning system. Activities will be coordinated with the ISDR initiative on "Wildland Fire Monitoring Network" and the GFMC (Global Fire Monitoring Center). They will also build upon the European Forest Fire Information System (EFFIS) – providing fire danger forecasts and analyses of forest fire damages for the pan-European area.

Key related Tasks in other SBAs include: HE-09-02 (Monitoring and Prediction Systems for Health), WE-06-03 (TIGGE), WE-09-01 (Capacity Building for High-Impact Weather Prediction), CL-09-03 (Global Carbon Observation and Analysis System), EC-09-01 (Ecosystem Observation and Monitoring Network), EC-09-02 (Ecosystem Vulnerability to Global Change), AG-07-03 (Global Agricultural Monitoring), BI-07-01 (GEO BON)

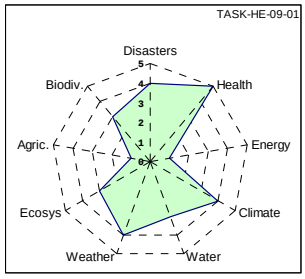
2.2 HEALTH

Understanding environmental factors affecting human health and well-being

Health issues with Earth-observation needs include: airborne, marine, and water pollution; stratospheric ozone depletion; persistent organic pollutants; nutrition; and monitoring weather-related disease vectors. GEOSS will improve the flow of appropriate environmental data and health statistics to the health community, promoting a focus on prevention and contributing to continued improvements in human health worldwide.

GEOSS 10-Year Implementation Plan, Section 4.1.2

HE-09-01: Information Systems for Health

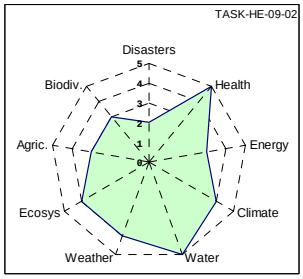


This Task is led by France (CNES), IEEE and WHO

Improve in-situ environmental and health data collection for the utilization and validation of remotely-sensed data. Explore how GEOSS will support the collection & distribution of information and meet the diverse needs of the health community. Develop a global public health information network database to improve health decision-making at the international, regional, country and district levels. As a priority, connect WHO's Open Health information tool and other health and environmental information systems to the GEO Portal and GEOSS Common Infrastructure (GCI).

Key related Tasks in other SBAs include: DI-06-09 (Use of Satellites for Risk Management), HE-09-02 (Monitoring and Prediction Systems for Health), HE-09-03 (End to End Projects for Health), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), WA-06-02 (Droughts, Floods and Water Resource Management), WE-06-03 (TIGGE), WE-09-01 (Capacity Building for High-Impact Weather Prediction)

HE-09-02: Monitoring and Prediction Systems for Health



Support the development of operational health-related applications. Connect established and emerging cross-cutting observing systems to monitoring and prediction systems for health. Include and gradually consolidate contributions from different, not yet coordinated systems. This Task will feed into HE-09-01 and HE-09-03.

a) Aerosol Impacts on Health and Environment: Research, Monitoring and Prediction (former HE-07-03)

This sub-task is led by WMO, and supported by the Air Quality & Health and Atmospheric Chemistry (former IGACO) Communities of Practice

Facilitate research and development activities that lead to the delivery of new services related to monitoring of the atmospheric cycles of various aerosols and their improved forecast in operational numerical models of the atmosphere. Reduce risks due to aerosol influences on health and public safety and assess aerosol effects on marine and terrestrial ecosystems. Support international initiatives such as the Sand and Dust Storm Warning, Advisory and Alert System (SDS-WAS) in developing dust storm warning system and assessments. Review current developments in the modeling and observation of bioaerosol transport/deposition and in the present understanding of impacts of the atmospheric deposition of dust (iron, phosphorus) to the ecosystem with the goal of extending the societal benefits of improved prediction of dust and aerosol.

b) Air Quality Observations, Forecasting and Public Information

This sub-task is led by USA (EPA), and supported by the Air Quality & Health and Atmospheric Chemistry (former IGACO) Communities of Practice

Provide near real-time air quality observations and forecasts for the purposes of air quality and public health management, research and public information. Assimilate Earth observations data into weather models and provide reliable 2-3 day forecasts of air quality. Harmonize standards for sharing air quality observations, forecasts, and related indices and maps for public information so authorities can intervene to reduce human health responses to diseases. Relate statistically the frequency and severity of air quality episodes with health outcomes & records to better understand the transmission pathways of human respiratory diseases. Related activities will include: Protocol Monitoring for the GMES Service Element: Atmosphere (PROMOTE); Ozone Web; PREV'AIR; and AIRNow International

c) Global Monitoring Plan for Persistent Organic Pollutants (POPs)

This sub-task is led by UNEP, and supported by the Air Quality & Health and Atmospheric Chemistry (former IGACO) Communities of Practice

Develop and implement a global monitoring plan for tracking changing levels of POPs in the natural environment and in human beings (among other benefits, this monitoring will enable the Stockholm Convention on Persistent Organic Pollutants to evaluate the effectiveness of international efforts to reduce releases of POPs). Interlink existing and emerging systems for monitoring air, water, ice caps and human health. Identify, fill in gaps and address a number of technical and financial barriers. Priorities for 2009 include producing 5 regional monitoring reports that will summarize monitoring data for the Convention's 12 POPs in ambient air & human milk or blood for the period 1998-2008.

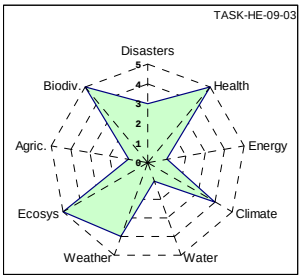
d) Global Monitoring Plan for Atmospheric Mercury

This sub-task is led by USA (EPA), and supported by the Air Quality & Health, Atmospheric Chemistry (former IGACO), Biodiversity and Forest Communities of Practice

Develop a global monitoring network for mercury by harmonizing standard operating procedures for monitoring mercury and its compounds in air, atmospheric deposition, water, soil, sediments, vegetation and biota. The sharing of data from this network, allowing access to comparable and long-term data from a wide array of locations, will help understand temporal and spatial patterns of mercury transport and deposition to, and evasion from, terrestrial and aquatic ecosystems. The data produced will support the validation of regional and global atmospheric mercury models for use in evaluations of different policy options for reducing mercury pollution impacts on human health and ecosystems. Build upon the contributions of, among others, the UNEP Mercury Programme, the Hemispheric Transport of Air Pollutants Task Force (TF HTAP), and the European Monitoring and Evaluation Program (EMEP). Moreover build upon the US MercNet initiative and international monitoring and modelling efforts led by Italy, Japan and South Africa.

Key related Tasks in other SBAs include: HE-09-03 (End to End Projects for Health), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), WA-06-07 (Capacity Building for Water Resource Management), WE-06-03 (TIGGE), WE-09-01 (Capacity Building for High-Impact Weather Prediction)

HE-09-03: End to End Projects for Health



Develop and implement end-to-end health-environment projects to advance the application of observation, monitoring and forecasting systems to health decision-making processes. Initiate efforts to establish a global health-climate Community of Practice in response to the 61st World Health Assembly's resolution on 'climate change and health' to promote effective engagement of the health sector in all related sectors – at national and global levels in order to reduce the projected health risks from climate change.

a) Implementation of a Meningitis Decision-Support Tool (former HE-06-03)

This sub-task is led by Switzerland (HCF), USA (IRI), WHO and WMO, and supported by the Air Quality & Health and Atmospheric Chemistry (former IGACO) Communities of Practice

Support the Meningitis Environmental Risk Information Technologies project (MERIT) which aims to extend current capabilities to more effectively combine environmental information with knowledge of epidemic meningococcal meningitis. MERIT implementation will have an immediate impact on public health decision-making and outcomes in Africa through increasing the effectiveness of prevention and response control strategies, and ongoing surveillance of meningitis epidemics. Priorities include the implementation of an operational decision-support tool for testing the 2009 meningitis epidemic season in Africa.

b) Implementation of a Malaria Early Warning System

This sub-task is led by CEOS

Initiate a globally coordinated warning system for malaria. Foster the utilization of satellite and in-situ data for monitoring environmental conditions conducive to the spread of malaria and support the development of user training for this technology. Priorities include: (i) Develop country specific techniques to use satellite data for early malaria detection and monitoring; (ii) Provide training to developing countries on satellite-based techniques used to identify mosquito habitat that stimulates the spread of malaria; and (iii) Improve techniques by obtaining in-situ malaria data and feedback about the accuracy and effectiveness of the satellite data, analyses and services.

c) Ecosystems, Biodiversity and Health: Decision-Support Tools and Research

This sub-task is led by USA (EPA) and supported by the Air Quality & Health, Atmospheric Chemistry (former IGACO), Biodiversity and Forest Communities of Practice

Implement research activities that foster the application of tools (e.g. indicators, models) to informed decision-making and help reduce the emergence & spread of infectious diseases. Through an interdisciplinary team approach (which also includes end-users such as decision-makers), characterize the dynamics and mechanisms underlying the relationship between social stressors, changes in biodiversity, and disease transmission to humans. This sub-task is unique in its interdisciplinary "Community of Practice" approach, and in encouraging the coordination of Earth observations with field data to study this relationship.

Key related Tasks in other SBAs include: HE-09-01 (Information Systems for Health), HE-09-02 (Monitoring and Prediction Systems for Health), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), WA-06-02 (Droughts, Floods and Water Resource Management), WE-06-03 (TIGGE), WE-09-01 (Capacity Building for High-Impact Weather Prediction), EC-09-01 (Ecosystem Observation and Monitoring Network), BI-07-01 (GEO BON)

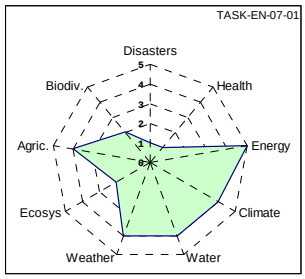
2.3 ENERGY

Improving management of energy resources

GEOSS outcomes in the energy area will support: environmentally responsible and equitable energy management; better matching of energy supply and demand; reduction of risks to energy infrastructure; more accurate inventories of greenhouse gases and pollutants; and a better understanding of renewable energy potential.

GEOSS 10-Year Implementation Plan, Section 4.1.3

EN-07-01: Management of Energy Sources



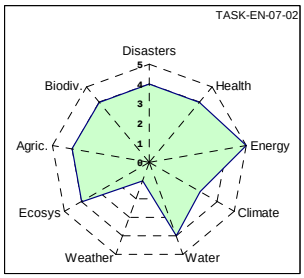
This Task is led by Germany (DLR), CEOS and IEEE, and is supported by the Energy Community of Practice

Support the development of Earth observation products and services for the resource assessment, monitoring and forecasting of fluctuating energy sources (e.g. hydro, solar, wind, ocean). Consider end-to-end systems including generation, transmission, distribution, and integrated operations (e.g. efficient integration of energy sources into the electricity grid, and electricity grid management).

Related activities will include: Promote collaboration between users and providers of Earth observation applications to foster the development of innovative Earth observation services in support of energy management. Expand the use of Earth observations in the development, operation and management of energy production systems. Assess the utility of Earth system models to inform energy sector decision-making on the future availability of resources in a changing climate.

Key related Tasks in other SBAs include: EN-07-03 (Energy Policy Planning), WA-06-02 (Droughts, Floods and Water Resource Management), WA-08-01 (Integrated Products for Water Resource Management and Research), WE-06-03 (TIGGE)

EN-07-02: Energy Environmental Impact Monitoring



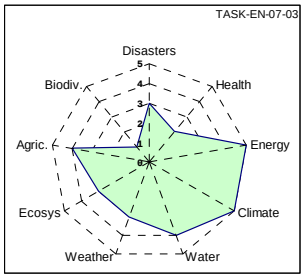
This Task is led by EC (EnerGEO), and is supported by the Energy Community of Practice

Promote the development of Earth observation systems for the monitoring and prediction of environmental impact from energy resource exploration, extraction, transportation and/or exploitation. Build upon the contribution of the European project EnerGEO (Earth observation for monitoring and assessment of the environmental impact of energy use).

Related activities will include: Promote and develop the use of Earth observation data for impact monitoring. Support the development of modelling systems helping to quantify and anticipate changes e.g. to freshwater, biodiversity, ecosystems, atmospheric and oceanic composition, and ground elevation. Make relevant synergies with Task DA-09-05 (Global Carbon Observation and Analysis System) and carbon sequestration & greenhouse gas monitoring activities.

Key related Tasks in other SBAs include: HE-09-02 (Monitoring and Prediction Systems for Health), EN-07-03 (Energy Policy Planning), CL-09-03 (Global Carbon Observation and Analysis System), WA-06-07 (Capacity Building for Water Resource Management), WA-08-01 (Integrated Products for Water Resource Management and Research), EC-09-02 (Ecosystem Vulnerability to Global Change), BI-07-01 (GEO BON)

EN-07-03: Energy Policy Planning



This Task is led by France (ENSMP), and is supported by the Energy Community of Practice

Encourage the use of Earth observations for informed energy-policy planning in developing and developed countries.

Related activities will include: Enhance availability of data and products required to better assess countries' potential for energy production. Encourage training of decision-makers at all relevant levels for interpreting relevant data and products. Encourage the use of Earth science models to support energy scenario assessments.

Key related Tasks in other SBAs include: EN-07-01 (Management of Energy Sources), EN-07-02 (Energy Environmental Impact Monitoring), WA-06-02 (Droughts, Floods and Water Resource Management), WA-06-07 (Capacity Building for Water Resource Management)

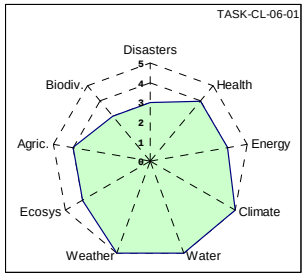
2.4 CLIMATE

Understanding, assessing, predicting, mitigating, and adapting to climate variability and change

The climate has impacts in each of the other eight societal benefit areas. Coping with climate change and variability demands good scientific understanding based on sufficient and reliable observations. GEOSS outcomes will enhance the capacity to model, mitigate, and adapt to climate change and variability. Better understanding of the climate and its impacts on the Earth system, including its human and economic aspects, will contribute to improved climate prediction and facilitate sustainable development while avoiding dangerous perturbations to the climate system.

GEOSS 10-Year Implementation Plan, Section 4.1.4

CL-06-01: A Climate Record for Assessing Variability and Change



Extend and improve the quality of the past climate record through advanced data reanalysis and reconstruction in the atmosphere, ocean, land and sea ice domains. Generate high-quality temporally-homogeneous estimates of the past climate to support analyses of climate variability and change.

a) Sustained Reprocessing and Reanalysis of Climate Data

This sub-task is led by CEOS and GCOS

Ensure the development of international mechanisms to coordinate and maintain sustained climate data reprocessing and reanalysis efforts. With regard to the reprocessing of historical datasets (to obtain consistent long-time series of satellite records), make relevant synergies with CL-09-02a.

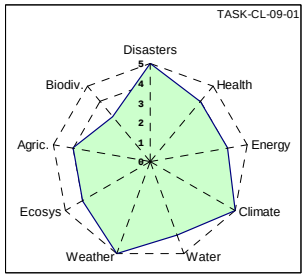
b) Extending the Record of Climate Variability at Global Scale

This sub-task is led by IGBP (PAGES)

Support and coordinate activities towards a global coverage of high-resolution, well-dated reconstructions of past climate parameters (e.g. temperature, precipitation, pressure) in the ocean and on land to better understand past modes of climate variability. Focus on the last 2000 years and the extension of instrumental records. Encourage activities that promote proxy calibration, quantitative data-model comparisons, and better understanding of interdecadal and longer climate change at global and regional scales.

Key related Tasks in other SBAs include: CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), CL-09-02 (Sustained Observing Systems), WA-06-02 (Droughts, Floods and Water Resource Management), WE-06-03 (TIGGE), EC-09-02 (Ecosystem Vulnerability to Global Change)

CL-09-01: Environmental Information for Decision-making, Risk Management and Adaptation



Support the integration of climate and environmental risk management into adaptation processes. Coordinate and drive the development of tailored climate products and services. Encourage the use of this information by policy and decision makers (at all levels), and initiate user-oriented activities to do both increase the demand, and foster the supply, of climate and environmental services for development.

a) Towards Enhanced Climate, Weather, Water and Environmental Prediction (former CL-07-01)

This sub-task is led by Australia (BOM), WMO, WCRP and IGBP

Strengthen the ability worldwide to deliver new and improved climate, weather, water and environmental services. Key research activities relate to: (i) Seamless weather, climate and Earth system prediction; (ii) Multi-scale organization of tropical convection and interaction with the global circulation; (iii) Data assimilation for coupled models as a prediction and validation tool for weather and climate research; and (iv) Information to assess risks, and benefits of climate/weather predictions, for society and the global economy. This sub-task includes the continuation of former Task WE-07-01 (Data Assimilation and Modelling for Operational Use).

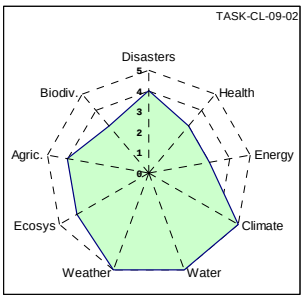
b) Climate Information for Decision-making, Risk Management and Adaptation

This sub-task is led by GCOS and WCRP

Promote the resourcing and implementation of the Climate for Development in Africa Programme (ClimDev Africa). The programme is to improve the availability, exchange and use of climate information & services at national, local and regional levels – in support of economic growth and achievement of the Millennium Development Goals. African partners include the African Union, the UN Economic Commission for Africa, the African Development Bank, and the African National Meteorological and Hydrological Services. In addition, implement the programme "Climate Observations and Regional Modelling in support of climate risk management and sustainable development." This programme is to assist the developing and least developed countries of Eastern Africa to undertake and appropriately use climate projections in adaptation planning.

Key related Tasks in other SBAs include: DI-09-03 (Warning Systems for Disasters), HE-09-03 (End to End Projects for Health), CL-09-02 (Sustained Observing Systems), WA-06-02 (Droughts, Floods and Water Resource Management), WA-06-07 (Capacity Building for Water Resource Management), WA-08-01 (Integrated Products for Water Resource Management and Research), WE-06-03 (TIGGE), WE-09-01 (Capacity Building for High-Impact Weather Prediction), EC-09-02 (Ecosystem Vulnerability to Global Change), BI-07-01 (GEO BON)

CL-09-02: Sustained Observing Systems



Establish actions for the maintenance and expansion of observing systems for climate and weather, including terrestrial, oceanic, air-borne and space-based. Promote stable, reliable and long-term operations of climate and weather observing networks. In particular, accelerate the implementation of the Global Climate Observing System (GCOS) in line with the "Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC".

a) Key Climate Data from Satellite Systems (former CL-06-02)

This sub-task is led by USA (NASA, NOAA), CEOS, GCOS and WMO

Establish actions securing the provision of key data for climate studies and forecasting from satellite systems.

b) Key Terrestrial Observations for Climate (former CL-06-03)

This sub-task is led by GTOS

Develop intergovernmental mechanisms for coordinating terrestrial observations needed for climate studies and forecasting. Develop a framework for the preparation of guidance materials, standards, and reporting guidelines for terrestrial (including land-coast interface) observing systems for climate and

associated data, metadata, and products to expand the comprehensiveness of current networks and facilitate exchange of data.

c) Legacy of the International Polar Year 2007-08 (former CL-06-05)

This sub-task is led by WCRP, and is supported by the Cryosphere Community of Practice

Coordinate with the International Polar Year (IPY) to enhance the utilization of Earth observations in all appropriate realms (including, but not limited to, sea and land ice, permafrost, coastal erosion, physical and chemical polar ocean changes, marine and terrestrial ecosystem change, biodiversity monitoring and impacts of increased resource exploitation and marine transport). Ensure an appropriate legacy for IPY projects and advocate for the continuation of relevant efforts beyond the duration of the IPY.

d) Global Ocean Observation System (former CL-06-06)

This sub-task is led by GOOS, IEEE and POGO, and is supported by the Coastal Zone Community of Practice

Enhance and improve the coordination of coastal/open-ocean observations and modelling initiatives, in support of a global ocean observation system.

Related activities will include: Improve the global coverage and data accuracy of the coastal/open ocean observing systems as well as the management and archiving of the resulting data and information. Contribute to the implementation of global coastal and open ocean observing networks using the mechanism of GOOS and Regional Alliances. In particular sustain and extend the network of Argo buoys and encourage the establishment of a Program Office to ensure the ongoing implementation of this global array of profiling floats in the ocean. Building on existing capabilities, develop a global coordinated information and data system for deep-ocean monitoring to better understand the dynamics of the ocean processes throughout the ocean water column.

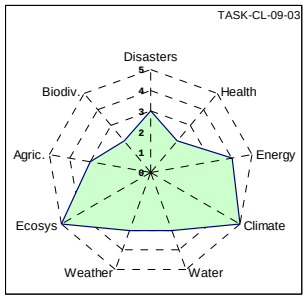
e) Global Observing System (GOS) (former WE-06-01 and WE-06-02)

This sub-task is led by WMO

Achieve a complete and stable Global Observing System (GOS). The surface-based component should include in-situ, airborne, land and possibly ocean measurements; high priority should be given to a stable, and as much as possible automated, fully functional World Weather Watch Upper Air Network and the further development of the Aircraft Meteorological Data Relay (AMDAR) programme. The space-based component should include operational geostationary and polar components building upon WMO efforts to (i) increase spatial and temporal resolution for geostationary imagers and sounders, and (ii) provide a broader availability of polar Doppler wind profiles for initial operational testing.

Key related Tasks in other SBAs include: CL-06-01 (A Climate Record for Assessing Variability and Change), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), WA-06-02 (Droughts, Floods and Water Resource Management), WA-08-01 (Integrated Products for Water Resource Management and Research), WE-06-03 (TIGGE), WE-09-01 (Capacity Building for High-Impact Weather Prediction), EC-09-01 (Ecosystem Observation and Monitoring Network)

CL-09-03: Global Carbon Observation and Analysis System



Implement a global carbon observation and analysis system addressing the three components of the carbon cycle (atmosphere, land and ocean). Develop robust tools and methodologies for high-precision CO_2 measurements and carbon storage evaluation.

a) Integrated Global Carbon Observation (IGCO) (former EC-06-01)

This sub-task is led by EC (COCOS) and USA (NOAA, USGS), and supported by the Carbon Cycle Community of Practice (former IGCO)

Support the development of a global integrated global carbon observation system, including improved global networks of in-situ CO_2 observations, absorption of CO_2 by the oceans and resulting acidification caused.

b) Forest Carbon Tracking

This sub-task is led by Australia (CSIRO), Japan (JAXA), Norway (NSC), CEOS, FAO and GTOS (GOFC-GOLD), and supported by the Carbon Cycle (former IGCO) and Forest Communities of Practice

Coordinate the definition, development and validation of robust tools and methodologies for the evaluation of carbon storage in forests, considering also impacts of forest fires. Build upon GEO efforts in forest monitoring, carbon observation and modelling to foster the use of these tools – coordinating the timely provision of observations required for their operational use. Promote and facilitate the development of reference, coherent and validated databases.

Preliminary activities will include: (i) Coordination of tools and methodologies assessment; (ii) Coordination of observations (securing continuity); (iii) Coordination of reference datasets production; (iv) Improvement of access to observations, datasets, tools and expertise; (v) Pilot initiatives to demonstrate capabilities; and (vi) Capacity building.

c) Global Monitoring of Greenhouse Gases from Space

This subtask is led by Japan (JAXA), USA (NASA), CEOS and ESA, and supported by the Carbon Cycle (former IGCO) and Forest Communities of Practice

Foster the use of space-based greenhouse gas (GHG) observations and consolidate data requirements for the next-generation GHG monitoring missions. Establish an international group in close cooperation with the CEOS Atmospheric Composition constellation and the Carbon Cycle Community of Practice, to initially generate and implement plans for the end-to-end utilization of space-based GHG data, particularly those of GOSAT and OCO to be launched in early 2009.

Key related Tasks in other SBAs include: DI-09-03 (Warning Systems for Disasters), EN-07-02 (Energy Environmental Impact Monitoring), EN-07-03 (Energy Policy Planning), EC-09-01 (Ecosystem Observation and Monitoring Network), EC-09-02 (Ecosystem Vulnerability to Global Change)

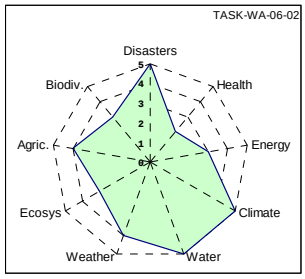
2.5 WATER

Improving water-resource management through better understanding of the water cycle

Water-related issues addressed by GEOSS will include: precipitation; soil moisture; streamflow; lake and reservoir levels; snow cover; glaciers and ice; evaporation and transpiration; groundwater; and water quality and water use. GEOSS implementation will improve integrated water-resource management by bringing together observations, prediction, and decision-support systems and by creating better linkages to climate and other data. In situ networks and the automation of data collection will be consolidated, and the capacity to collect and use hydrological observations will be built where it is lacking.

GEOSS 10-Year Implementation Plan, Section 4.1.5

WA-06-02: Droughts, Floods and Water Resource Management



Address decision-making challenges related to the management of hydro-meteorological extremes and the sustainable use of water.

a) Forecasting and Early Warning Systems for Droughts and Floods

This sub-task is led by USA (NOAA), and supported by the Water Cycle Community of Practice (former IGWCO)

Improve forecasting methods for extreme events (floods, droughts) used by hydrological services throughout the world – to help bridge the gap between research and user communities. Expand upon regional initiatives such as the (i) North American Drought Monitor (NADM) to establish a Global Drought Early Warning System (GDEWS), (ii) the European Flood Alert System EFAS to produce twice-daily 10-day early flood warnings for Europe, and (iii) GMES/Kopernikus project GEOLAND.

b) Impacts from Drought

This sub-task is led by Canada (University of Manitoba), EC (CEOP-AEGIS), USA (NOAA) and WCRP, and supported by the Water Cycle Community of Practice (former IGWCO)

Track and analyze impacts from drought (including feedbacks such as soil drying) to provide a tangible and practical demonstration of the value of integrated water cycle observations. Develop a full and operational data cycle of environmental information from "producer-to-consumer"/"source to sink," and explore the application of data products to Water and Agriculture.

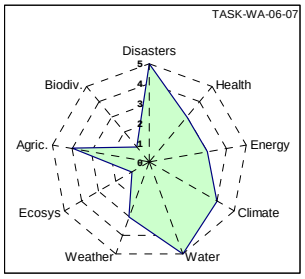
c) Mountain Water Resources

This sub-task is led by EC (ACQWA), and supported by the Water Cycle Community of Practice (former IGWCO)

Analyze the future of water resources in vulnerable mountain regions in the context of climate change and increasing extreme events. Build upon the European project ACQWA (Assessing Climatic change and impacts on the Quantity and quality of WAter) to deliver among others, technical papers on downscaling techniques for hydrological modeling and water policy recommendations for decision-makers.

Key related Tasks in other SBAs include: DI-06-09 (Use of Satellites for Risk Management), DI-09-02 (Multi-Risk Management and Regional Applications), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), WA-06-07 (Capacity Building for Water Resource Management), WA-08-01 (Integrated Products for Water Resource Management and Research), WE-06-03 (TIGGE), WE-09-01 (Capacity Building for High-Impact Weather Prediction), AG-07-03 (Global Agricultural Monitoring)

WA-06-07: Capacity Building for Water Resource Management



Initiate capacity building programs in support of water management, to show the value of, and develop tools for, Earth observation data.

a) Latin America

This sub-task is led by Argentina (CONAE) and USA (NASA), supported by the Water Cycle Community of Practice (former IGWCO)

Develop a proposal along the lines of the CEOS/UNESCO TIGER programme focused on the use of Earth observation data for water resources management (surface waters, groundwater). This to help: (i) Identify data and general support from space agencies; (ii) Identify a coordinating agency to organize calls for proposals and securing reviews and monitoring of the proposals; (iii) Identify further funding sources; and (iv) Issue a call for proposals to the research and development community. The program will be initiated in Latin America and then be extended to Asia and Africa. Linkages with existing GEO efforts will be made.

b) Africa

This sub-task is led by USA (NASA) and CEOS, and supported by the Water Cycle Community of Practice (former IGWCO)

In the scope of Phase 2 of the TIGER initiative (focusing on the use of space technology for water resource management in Africa), assist African countries to overcome problems faced in the collection, analysis and dissemination of water-related geo-information. Exploit the advantages of Earth Observation (EO) technology to build the basis for an independent African capacity and set up sustainable water observation systems. In addition, build and extend the Central American “SERVIR” (visualization and monitoring using Earth science data) for hydrologic applications (e.g. flood warning) to East Africa and possibly other parts of the world. Other important projects include the hydrologic data integration and assimilation systems of the ‘Land Information System’ (LIS).

c) Asia

This sub-task is led by Japan (JAXA, University of Tokyo), and supported by the Water Cycle Community of Practice (former IGWCO)

Build upon the Asian Water Cycle Initiative (AWCI) to develop competencies among water management practitioners, researchers, and administrators (AWCI addresses climate change monitoring in Asia through the integration of in-situ and satellite/remote sensing). In addition, build upon Sentinel Asia to develop disaster management-support systems in the Asia-Pacific region and building capacity for utilization of satellite images.

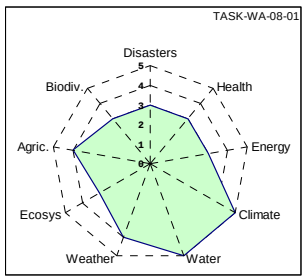
d) Global Water Quality Monitoring (former WA-07-01)

This sub-task is led by USA (State of Wisconsin), and supported by the Water Cycle Community of Practice (former IGWCO)

Initiate projects to develop operational observation and monitoring systems of water quality, integrating in-situ water quality monitoring methods for terrestrial sources & the coastal ocean with remote-sensed operational systems of global-scale freshwater quality. Ensure that resulting information systems are compatible and interoperable as part of the system of systems. Make relevant synergies with HE-07-02 and develop models that relate water quality databases to exposure and health effects data; and identify mechanisms for alerting public health professionals on hazardous conditions identified by the monitoring of these parameters.

Key related Tasks in other SBAs include: HE-09-02 (Monitoring and Prediction Systems for Health), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), WA-06-02 (Droughts, Floods and Water Resource Management), WA-08-01 (Integrated Products for Water Resource Management and Research)

WA-08-01: Integrated Products for Water Resource Management and Research



Improvements and expansion of in-situ networks, combined with new satellite missions (in addition to existing space-borne Earth observing systems) and emerging assimilation and prediction capabilities, are opening the door to a new era in global water-cycle management.

a) Soil Moisture

This sub-task is led by ESA and WCRP, and supported by the Water Cycle Community of Practice (former IGWCO)

Establish a global soil moisture network suitable for the development of multi-purpose soil moisture products. Apply in-situ based products to the calibration and validation of remotely-sensed observations. Such a global network is still to be established and is as such a high priority. Make relevant synergies with Task US-09-03 (Cross-cutting Products and Services).

b) Runoff

This sub-task is led by Japan (University of Tokyo) and Switzerland (University of Geneva), and supported by the Water Cycle Community of Practice (former IGWCO)

Integrate, in a phased approach, dedicated river gauging networks of existing hydrological stations into a global runoff observation network. The main output of the HARON project (Hydrological Applications and Run-Off Network) will be strengthened in-situ and satellite monitoring networks of estuaries, rivers, lakes, reservoirs, and groundwater levels.

c) Groundwater

This sub-task is led by Netherlands (IGRAC), and supported by the Water Cycle Community of Practice (former IGWCO)

Establish a Global Groundwater Monitoring Network (GGMN) for a periodic assessment of global groundwater resources, using information from existing national, regional and global networks – in order to represent changes in groundwater resources at scales relevant to regional and global resouce assessment.

d) Precipitation

This sub-task is led by CGMS, and supported by the Water Cycle Community of Practice (former IGWCO)

Under the guidance of CGMS/International Precipitation Working Group (IPWG), promote and advance the development and validation of multi-sensor satellite-based precipitation estimates, including snowfall. Inputs from the Precipitation Virtual Constellation (AR-09-02a) will supplement these efforts.

e) Water Cycle Data Integration

This sub-task is led by EC (CEOP-AEGIS) and WCRP (GEWEX), and supported by the Water Cycle Community of Practice (former IGWCO)

Upcoming satellite launches and plans for new missions provide new global data sets that will supplement the in-situ networks for many water cycle variables. The Coordinated Energy and water cycle Observations Project (CEOP) under the WCRP Global Energy and Water-cycle Experiment (GEWEX) is tailoring and developing tools to access the various data collections and undertake data integration work over the Internet.

f) Pilot Projects for Improved Water Discovery and Quality Assessments

This sub-task is led by IEEE, and supported by the Water Cycle Community of Practice (former IGWCO)

Conduct pilot projects in cooperation with local and national governments and other organizations to provide water where it is needed, but not now available. These projects will be focused on developing countries and realizeable in the field within one year. They will be sustainable, resusable, repeatable, and scalable.

Key related Tasks in other SBAs include: CL-06-01 (A Climate Record for Assessing Variability and Change), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), CL-09-02 (Sustained Observing Systems), WA-06-02 (Droughts, Floods and Water Resource Management), WA-06-07 (Capacity Building for Water Resource Management), WE-06-03 (TIGGE), EC-09-01 (Ecosystem Observation and Monitoring Network), AG-07-03 (Global Agricultural Monitoring)

2.6 WEATHER

Improving weather information, forecasting and warning

The weather observations encompassed by GEOSS are based on the requirements for timely short- and medium-term forecasts. GEOSS can help fill critical gaps in the observation of, for example, wind and humidity profiles, precipitation, and data collection over ocean areas; extend the use of dynamic sampling methods globally; improve the initialization of forecasts; and increase the capacity in developing countries to deliver essential observations and use forecast products. Every country will have the severe-weather-event information needed to mitigate loss of life and reduce property damage. Access to weather data for the other societal benefit areas will be facilitated.

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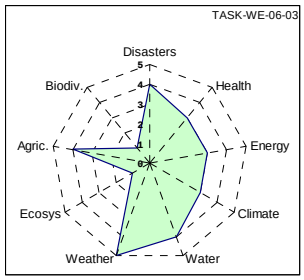
WE-06-03: TIGGE and the Development of a Global Interactive Forecast System for Weather



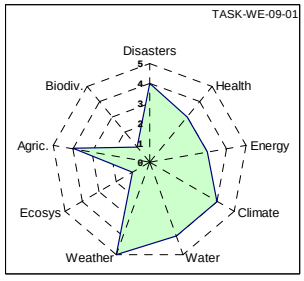
This Task is led by WMO

Complete THORPEX Interactive Global Grand Ensemble (TIGGE) Phase 1 and commence TIGGE Phase 2. TIGGE is a global operational multi-model ensemble prediction system incorporating easily accessible databases. Development of TIGGE will be an important contribution to a number of Tasks related to risk management, early warning systems, major hazards and associated impacts. Related activities will include: Foster real-time data exchange, construct common web interfaces, design an improved archiving strategy, and develop a common toolbox to assist the development of user-driven products such as probabilistic tropical-cyclone warning services and extreme-precipitation forecasting; the latter will form the early products of a Global Interactive Forecasting System (GIFS) to internationally coordinate advance warnings and forecasts for high- impact weather events.

Key related Tasks in other SBAs include: DI-09-03 (Warning Systems for Disasters), HE-09-01 (Information Systems for Health), HE-09-02 (Monitoring and Prediction Systems for Health), HE-09-03 (End to End Projects for Health), EN-07-01 (Management of Energy Sources), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), CL-09-02 (Sustained Observing Systems), WA-06-02 (Droughts, Floods and Water Resource Management), WE-09-01 (Capacity Building for High-Impact Weather Prediction), AG-07-03 (Global Agricultural Monitoring)

WE-09-01: Capacity Building for High-Impact Weather Prediction

Develop capability for numerical weather prediction in developing countries. Focus on high-impact weather events (including, but not limited to, extremes) and foster rapid progress through enhanced infrastructure and training.



a) Infrastructure for Numerical Weather Prediction

This sub-task is led by Korea (KMA)

Develop improved system-infrastructures for the operation of numerical weather prediction in developing countries – building upon relevant WMO programmes. Identify gaps & needs and facilitate technical cooperative activities for the exchange of hardware, software, technologies, and expertise. In addition, co-organize a series of regional capacity building workshops with major numerical weather prediction centers to assist developing countries in their utilization of currently available forecasts.

b) Socio-economic Benefits in Africa from Improved Predictions of High-Impact Weather

This sub-task is led by WMO

Improve the prediction of high-impact weather and help reduce vulnerability to climate variability and change in Africa through the WWRP-THORPEX Africa initiative. The latter is designed to do both accelerate predictive skill and realize the related benefits for African society and the economy through a set of priority demonstration projects.

Key related Tasks in other SBAs include: CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), CL-09-02 (Sustained Observing Systems for Climate), WA-06-02 (Droughts, Floods and Water Resource Management), WA-06-07 (Capacity Building for Water Resource Management), WE-06-03 (TIGGE)

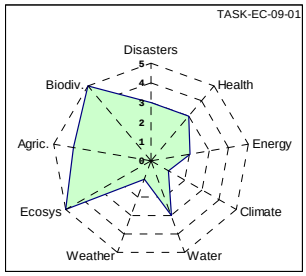
2.7 ECOSYSTEMS

Improving the management and protection of terrestrial, coastal and marine resources

Observations are needed on the area, condition, and natural-resource stock levels of ecosystems such as forests, rangelands, and oceans. GEOSS implementation will seek to ensure that methodologies and observations are available on a global basis to detect and predict changes in ecosystem condition and to define resource potentials and limits. Ecosystem observations will be better harmonized and shared, spatial and topical gaps will be filled, and in situ data will be better integrated with space-based observations. Continuity of observations for monitoring wild fisheries, the carbon and nitrogen cycles, canopy properties, ocean colour, and temperature will be set in place.

GEOSS 10-Year Implementation Plan, Section 4.1.7

EC-09-01: Ecosystem Observation and Monitoring Network (GEO EcoNet)



Coordinate and improve the observation, characterization and monitoring of terrestrial (forest, urban agriculture, woodlands, grasslands, and deserts), freshwater, ice and oceans ecosystems – especially in terms of acquisition and use of satellite/aerial/in-situ observation. Develop a global integrated sampling frame in coordination with the GEOSS Geodesy activities.

a) Ecosystem Classification and Mapping (former EC-06-02)

This sub-task is led by Paraguay (Guyra Paraguay) and USA (USGS), and supported by the Forest and Global Agricultural Monitoring Communities of Practice

Continue the work of the Ecosystems Classification Task Force, covering terrestrial, freshwater, and ocean ecosystems – to create a globally agreed, robust, and viable global classification scheme for ecosystems. Establish links to existing databases, such as the Ocean Bio-geographic Information System. In parallel with the classification effort, develop, review and initiate a mapping approach to spatially delineate the classified ecosystems.

b) Ecosystem Status and Trends

This sub-task is led by USA (USGS), and supported by the Forest and Global Agricultural Monitoring Communities of Practice

Coordinate the continuing characterization and monitoring of ecosystems status and trends. Using the GEO Ecosystem map as a framework, extract geospatial data on key indicators of all ecosystems' status, health and functioning (key indicators include time series of land cover change, climate variables, population, transportation, water and fragmentation). Major sources will include: (i) The Encyclopedia of Life – an ecosystem of websites that makes key information about all life on Earth accessible to anyone, anywhere in the world; and (ii) The Encyclopedia of Earth – a new electronic reference about the Earth, its natural environments, and their interaction with society. The Encyclopedia is a free, fully searchable collection of articles.

c) Regional Networks for Ecosystems (former EC-06-07)

This sub-task is led by GTOS and POGO, and supported by the Forest and Global Agricultural Monitoring Communities of Practice

Build upon the successful extension of the regional-scale ANTARES project (South America) to the global-scale ChloroGIN project – under POGO and IOCCG. Further develop existing initiatives (e.g. IOC-sponsored regional networks; GOFC-GOLD regional networks and ILTER for terrestrial domains).

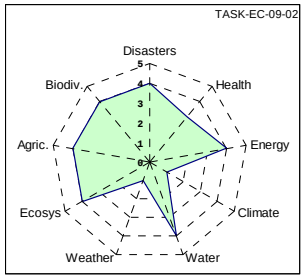
d) Protected Areas Assessment and Monitoring (GEO PAAM)

This sub-task is led by EC (JRC), USA (NASA, Nature Conservancy, NPCA, USGS), IUCN, UNEP (WCMC) and UNESCO, and supported by the Forest and Global Agricultural Monitoring Communities of Practice

Apply Earth observation to the characterization, mapping and monitoring of global protected areas consisting of UNESCO World Heritage sites & Biosphere Reserves; RAMSAR Wetlands, natural areas; and sites of cultural, geological and archaeological significance. Use Earth observation and other geospatial data to support the delineation and update of protected areas boundaries. Improve dissemination of Earth observation data to protected area planners and managers.

Key related Tasks in other SBAs include: HE-09-03 (End to End Projects for Health), EN-07-02 (Energy Environmental Impact Monitoring), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), CL-09-02 (Sustained Observing Systems), CL-09-03 (Global Carbon Observation and Analysis System), AG-07-03 (Global Agricultural Monitoring), BI-07-01 (GEO BON)

EC-09-02: Ecosystem Vulnerability to Global Change



Identify and assess the risks posed by global change and human development to the environment, society and regional economies. Support the development of adaptation strategies to reduce these risks and mitigate impacts at local, regional and global levels.

a) Impact of Tourism on Environmental and Socio-Economic Activities

This sub-task is led by Greece (MKFES)

Map potential impacts of global change on key sectors of Eastern Mediterranean's economy and society. Potential impacts include: (i) changes in agricultural production, fisheries and water supplies; (ii) Sea-level rise and its impact on tourism, manufacturing, land use, and urban areas; (iii) Impact on employment and other economic variables; and (iv) Intra-regional and extra-regional migration. Based on this mapping, identify potential measures for mitigating impacts. The tourism-intensive Eastern Mediterranean region features an extensive shoreline, thousand of islands, highly sensitive agricultural lands and an unstable economy. As a result, small environmental changes can negatively affect the region's social and economic conditions.

b) Impact of Transport Infrastructure Development

This sub-task is led by UNECA

Identify, map and assess environmental risks to support the development of transport infrastructure in Africa, strengthening the continent effort in regional integration, economic development and poverty alleviation. In particular produce a comprehensive geo-spatial database, with appropriate applications, to support the preparation of an integrated, all-modes transport infrastructure master plan for Africa.

c) Vulnerability of Sea Basins

This sub-task is led by EC (EnviroGRIDS)

Develop a collaborative management system to store, analyze, visualize and disseminate crucial information on past, present and future states of European seas – to assess their sustainability and vulnerability. Build upon the European project EnviroGRIDS (gridded management system for environmental sustainability and vulnerability) to develop a Black Sea basin observation and assessment system. Make relevant synergies with AR-09-01 (GCI). EnviroGRIDS will rely on ultra-modern technology using the largest gridded computing infrastructure in the world.

c) Vulnerability of Mountain Regions

This sub-task is led by EC (ACQWA), Italy (Ev-K2-CNR) and WCRP, and supported by the Water Cycle Community of Practice (former IGWCO)

Implement a high elevation climate and environment monitoring network, starting with the existing SHARE: Stations at High Altitude for Research on the Environment network. Provide high-quality, reliable, long-term climatic and environmental data for the scientific community and decision-makers for the assessment of climate change and its impacts, especially in terms of vital human and economic resources from mountain areas already adversely affected by global change (e.g. water, energy, food, forest products, tourism).

Key related Tasks in other SBAs include: EN-07-02 (Energy Environmental Impact Monitoring), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), WA-06-02 (Droughts, Floods and Water Resource Management), EC-09-01 (Ecosystem Observation and Monitoring Network), AG-06-02 (Data Utilization in Fisheries and Aquaculture), AG-07-03 (Global Agricultural Monitoring), BI-07-01 (GEO BON)

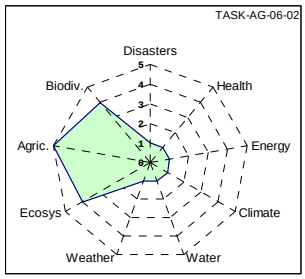
2.8 AGRICULTURE

Supporting sustainable agriculture and combating desertification

Issues addressed by GEOSS will include: crop production; livestock, aquaculture and fishery statistics; food security and drought projections; nutrient balances; farming systems; land use and land-cover change; and changes in the extent and severity of land degradation and desertification. GEOSS implementation will address the continuity of critical data, such as high-resolution observation data from satellites. A truly global mapping and information service, integrating spatially explicit socio-economic data with agricultural, forest, and aquaculture data will be feasible, with applications in poverty and food monitoring, international planning, and sustainable development.

GEOSS 10-Year Implementation Plan, Section 4.1.8

AG-06-02: Data Utilization in Fisheries and Aquaculture

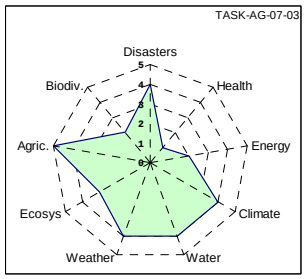


This Task is led by Canada (BIO), Spain (IEO) and POGO, and supported by the Coastal Zone Community of Practice

Identify opportunities for the enhanced utilization of Earth observations in fisheries and aquaculture. Consult with experts from fisheries, aquaculture, coastal zone management and Earth observation communities at regional and international levels. Support the implementation of the SAFARI project and IOCCG monograph. Make relevant synergies with AR-09-02a and the proposed Virtual Constellation on Ocean Colour Radiometry that will provide products related to marine ecosystems and ocean biogeochemistry for near-surface global ocean and coastal waters.

Key related Tasks in other SBAs include: EN-07-02 (Energy Environmental Impact Monitoring), EN-07-03 (Energy Policy Planning), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), CL-09-02 (Sustained Observing Systems), EC-09-01 (Ecosystem Observation and Monitoring Network), EC-09-02 (Ecosystem Vulnerability to Global Change), BI-07-01 (GEO BON)

AG-07-03: Global Agricultural Monitoring



Support sustainable agriculture management and improve food security through the increased use of Earth observation data. Enhance current global capabilities in the areas of agriculture monitoring, famine early warning, food-supply prediction and agriculture risk assessment. Build the capacity necessary to utilize Earth observation information, especially within the developing world.

a) Global Agricultural Monitoring System (former AG-07-03)

This sub-task is led by EC (JRC), USA (University of Maryland), and supported by the Global Agricultural Monitoring Community of Practice

Develop and improve a global operational agricultural monitoring system – enhancing current capabilities in the areas of monitoring, famine early warning and food security. Related activities will include: (i) Global mapping and monitoring of changes in distribution of cropland area and associated cropping systems; (ii) Global monitoring of agricultural production leading to accurate and timely reporting of national agricultural statistics, accurate forecasting of shortfalls in crop production, and reduction of risk & increased productivity at a range of scales; (iii) Development of early warning systems for famine, enabling timely mobilization of international response in food aid.

b) Agricultural Risk Management (former AG-07-02)

This sub-task is led by WMO, and supported by the Global Agricultural Monitoring Community of Practice

Develop and improve analytical tools and methods for agriculture risk assessment, particularly for crop failure. Establish common standards and formats. Facilitate the implementation of pilot-projects linking Earth system models to end-user application models (such as crop-yield models) to improve food-supply prediction.

c) Expanding Earth Observation Applications in Agriculture and Promoting Capacity Building in Developing Countries (former AG-06-07)

This sub-task is led by China (IRSA), Korea (KMA) and Uganda (DPRTRP), and supported by the Global Agricultural Monitoring Community of Practice

Develop training modules and expand the use of Earth observations for agricultural purposes in Africa, Asia, Latin America, Central and Eastern Europe, and Small Island States. Training modules will be underpinned by practical exercises using multi-source satellite data.

Key related Tasks in other SBAs include: DI-09-02 (Multi-Risk Management and Regional Applications), DI-09-03 (Warning Systems for Disasters), EN-07-02 (Energy Environmental Impact Monitoring), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), CL-09-03 (Global Carbon Observation and Analysis System), WA-06-02 (Droughts, Floods and Water Resource Management), WA-06-07 (Capacity Building for Water Resource Management), WA-08-01 (Integrated Products for Water Resource Management and Research), WE-06-03 (TIGGE), WE-09-01 (Capacity Building for High-Impact Weather Prediction), EC-09-01 (Ecosystem Observation and Monitoring Network), EC-09-02 (Ecosystem Vulnerability to Global Change)

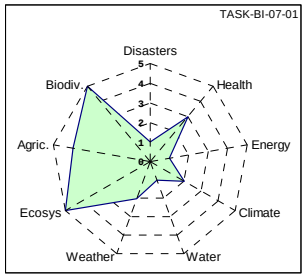
2.9 BIODIVERSITY

Understanding, monitoring and conserving biodiversity

Issues in this area include the condition and extent of ecosystems, distribution and status of species, and genetic diversity in key populations. Implementing GEOSS will unify many disparate biodiversity-observing systems and create a platform to integrate biodiversity data with other types of information. Taxonomic and spatial gaps will be filled, and the pace of information collection and dissemination will be increased.

GEOSS 10-Year Implementation Plan, Section 4.1.9

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



Coordinate and improve biodiversity (animals, plants, genes, etc) observation, assessment and conservation – especially in terms of acquisition and use of satellite, aerial and in-situ observation. Develop a global observation network to facilitate coordination among information users and providers. Improve the quality and quantity of observation and advocate for a better understanding of trends and conservation.

a) Biodiversity Observation Network (GEO BON)

This sub-task is led by EC (EBONE), USA (NASA) and DIVERSITAS International, and supported by the Biodiversity Community of Practice

Implement the GEO Biodiversity Observation Network that was launched in April 2008. The network targets are spatially and topically prioritized, based on analysis of existing information and identification of unique or highly diverse ecosystems e.g. those supporting migratory, endemic or globally threatened species, and those whose biodiversity is of socio-economic importance, and which can support the 2010 CBD target.

Specific objectives include: (i) Develop a strategy for assessing biodiversity at both the species and ecosystems level; (ii) Facilitate the establishment of monitoring systems that enable frequent, repeated, globally coordinated assessment of trends and distributions of species and ecosystems of special conservation merit; and (iii) Facilitate consensus on data collection protocols and the coordination of the development of interoperability among monitoring programs. The marine biodiversity component will be made as strong as possible to animate mutually-beneficial dialogue between terrestrial and marine components.

b) Invasive Species Monitoring System (former BI-07-02)

This sub-task is led by USA (NASA, USGS), and supported by the Biodiversity Community of Practice

Characterize, monitor and predict changes in the distribution of invasive species. Characterize the current requirements and capacity for invasive species monitoring, identify gaps, and develop strategies for implementing cross-search functionality among existing online invasive species information systems from around the globe. Invasive alien species (IAS) threaten biodiversity and exert a tremendous cost on society for IAS prevention and eradication. They endanger natural ecosystem functioning and seriously impact biodiversity and agricultural production. The Task will be coordinated by members of the Global Invasive Species Information Network (GISIN).

c) Capturing Historical and New Biodiversity Data (former BI-06-03)

This sub-task is led by GBIF, and supported by the Biodiversity Community of Practice

Develop a strategic plan for the capture and mobilisation of various types of "fit-for-use" historical and new biodiversity data through multi-cultural, heterogenous and distributed data custodians. Develop criteria for Data Rescue Centres. Develop strategies for industrialisation of capture, digitisation and mobilisation of primary biodiversity data. Develop strategies for mobilisation of biodiversity data generated through "ad-hoc" and "non-primary" projects. Promote uptake of Global Biodiversity Resources Discovery System (GBRDS). Review and develop primary biodiversity data capture standards. Implement the strategic plan for capturing historical biodiversity data from natural history collections and the research community.

Key related Tasks in other SBAs include: DI-09-03 (Warning Systems for Disasters), HE-09-03 (End to End Projects for Health), EN-07-02 (Energy Environmental Impact Monitoring), CL-09-01 (Environmental Information for Decision-making, Risk Management and Adaptation), CL-09-02 (Sustained Observing Systems), EC-09-01 (Ecosystem Observation and Monitoring Network), EC-09-02 (Ecosystem Vulnerability to Global Change), AG-06-02 (Data Utilization in Fisheries and Aquaculture)

APPENDIX A: GEO COMMUNITIES OF PRACTICE

DEFINITION

A Community of Practice (CoP) is a user-led community of stakeholders, from providers to the final beneficiaries of Earth observation data and information, with a common interest in specific aspects of societal benefits to be realized by GEOSS implementation.

OBJECTIVES

Each CoP will have slightly different objectives, however common objectives will include:

a. Identify, gather, and seek agreement on their particular user community requirements;
b. Provide a forum for cooperation of activities where GEOSS adds value to existing initiatives, to identify linkages and opportunities for collaborative strategic and technical projects and to coordinate the delivery of some GEOSS targets to enable the realization of societal benefits.
c. Report on progress and provide updates to the User Interface Committee, GEO and other stakeholder communities as appropriate;
d. Advise the User Interface Committee, other CoPs and GEO on matters relating to their particular area of interest or societal benefit, and on cross-cutting issues of interest to the CoP.
e. Provide an informal point of contact for members or other jurisdictions on the specific benefit or interest area that affect more than one organization;

PARTICIPANTS

Each Community of Practice should include representatives from GEO Members, Participating Organizations and any other stakeholders that have similar interests, goals, and or objectives - working closely together to create a forum for efficient and effective intelligence and advice to be provided to GEO for the successful implementation of GEOSS. Both developing and developed countries will be represented.

Air Quality and Health

Participants:
Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Switzerland, UK, USA, CEOS, EEA, ESA, ECMWF, ICSU, ISPRS, WMO
Contact:
Gary Foley (foley.gary@epa.gov)

Atmospheric Chemistry (former IGOS Atmospheric Chemistry theme – IGACO)

Under development

Biodiversity

Participants:
Australia, Botswana, Brazil, Canada, Columbia, Denmark, Estonia, France, Germany, Ghana, Hungary, India, Iran, Israel, Italy, Japan, Mexico, Namibia, Netherlands, Nicaragua, Niger, Nigeria, Norway, Panama, Philippines, Portugal, South Africa, Switzerland, Thailand, Tunisia, UK, Ukraine, Uruguay, USA, ASEAN Centre for Biodiversity, BioNET-INTERNATIONAL, BirdLife International, Conservation International, DIVERSITAS, ESRI, GBIF, Guyra Paraguay, IUCN, LIFEWATCH, The Nature Conservancy, UNEP, UNESCO
Contact:
Woody Turner (woody.turner@nasa.gov), Anne Larigauderie (anne@diversitas-international.org)

Carbon Cycle (former IGOS Carbon theme – IGCO)

Under development

Coastal Zone (reflecting former IGOS Coastal theme)

Participants:
Algeria, EC, Egypt, Germany, Greece, Italy, Israel, Spain, Sweden, USA, IOC
Contact:
Michael Bruno (Michael.Bruno@stevens.edu), Paul DiGiacomo (Paul.DiGiacomo@noaa.gov), Hans-Peter Plag (hpplag@unr.edu)

Cryosphere (former IGOS Cryosphere theme)

Under development
Contact:
Jeff Key (jeff.key@noaa.gov)

Energy

Participants:
Australia, Belgium, Canada, China, Denmark, EC, Egypt, France, Germany, India, Italy, Korea, Netherlands, Russia, Switzerland, Thailand, USA, European Wind Energy Association, ESA, GOOS, International Energy Agency, IEEE
Contact:
Ellsworth LeDrew (ells@watleo.uwaterloo.ca), Thierry Ranchin (thierry.ranchin@ensmp.fr), Marion Schroedter-Homscheidt, (marion.schroedter-homscheidt@dlr.de)

Forest

Participants:
Australia, Brazil, Canada, China, EC, Finland, France, Germany, Italy, Japan, Korea, Niger, Norway, Portugal, Russia, South Africa, Thailand, USA, CEOS, EEA, ESA, EUMETSAT, FAO, GOFC-GOLD, GTOS, ISCGM
Contact:
Michael Brady (MBrady@NRCan.gc.ca)

Geohazards (former IGOS Geohazards theme)

Participants:
France, Italy, Japan, UK, USA, ESA, GGOS, UNESCO
Contact:
Gonéri Le Cozannet (g.lecozannet@brgm.fr)

Global Agricultural Monitoring (former IGOS Land sub-theme)

Participants:
Argentina, Australia, Austria, Belgium, Brazil, China, EC, ESA, FAO, France, India, Italy, Netherlands, South Africa, USA, CGIAR, WMO
Contact:
Chris Justice (justice@hermes.geog.umd.edu), Jai Singh Parihar (Parihar_jaisingh@yahoo.com)

Water Cycle (former IGOS Water Cycle Theme – IGWCO)

Participants:
Argentina, Australia, Canada, China, Finland, France, Germany, Japan, Netherlands, Panama, Portugal, Switzerland, UK, USA, UNESCO, WMO
Contact:
Rick Lawford (lawford@umbc.edu)

APPENDIX B: ACRONYMS

ACQWA	Assessing Climatic change and impacts on the Quantity and quality of Water
AEGIS	Asian-monsoon systEm with Ground satellite Image data and numerical Simulations
AEGOS	African-European Georesources Observation System
AEMET	Spanish Meteorological Agency
AeroCOM	Aerosol Comparisons between Observations and Models
AG	Agriculture
AIP	Architecture Implementation Pilot
AIRNow	A cross-agency Web site on Air Quality News
AIST	National Institute of Advanced Industrial Science and Technology
AMDAR	Aircraft Meteorological Data Relay
ANTARES	A Network for the Enhancement of the Education and Scientific Research
APEC	Asia-Pacific Economic Cooperation
APFM	Associated Programme on Flood Management
AR	Architecture
ASEAN	Association of Southeast Asian Nations
ASI	Italian Space Agency
AVHRR	Advanced Very High Resolution Radiometer
AWCI	Asian Water Cycle Initiative
BGR	German Geological Survey
BGS	British Geological Survey
BI	Biodiversity
BIO	Biotechnology Industry Organization
BioNET-Itnl	Global Network for Taxonomy
BirdLife-Itnl	Global Partnership of conservation organizations
BOM	Australian Bureau of Meteorology
BRGM	French Geological and Mining Research Bureau
CARSA	China Association for Remote Sensing Application
CB	Capacity Building
CBD	Convention on Biological Diversity
CBERS	China-Brazil Earth Resources Satellite
CENC	China-Europe GNSS Technology Training and Cooperation Center
CEOP	Coordinated Energy and Water Cycle Observations Project
CEOS	Committee on Earth Observation Satellites
CFS	Canadian Forest Service
CGIAR	Consultative Group on International Agricultural Research
CGMS	Coordination Group for Meteorological Satellites
ChloroGIN	Chlorophyll Ocean Globally Integrated Network
CIESIN	Center for International Earth Science Information Network
CL	Climate

ClimDev Africa	Climate for Development in Africa
CMA	Chinese Meteorological Administration
CNES	French Space Agency
COCOS	Coordination of Carbon Observing Systems
CODATA	ICSU Interdisciplinary Scientific Committee on Data for Science and Technology
CONAE	Argentinean National Commission of Space Activities
Conservation Intl	Organization applying solutions to protect Air, Water and Resources
CoP	Community of Practice
CSA	Canadian Standards Association
CSIR	Council for Scientific and Industrial Research, South Africa
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DA	Data Management
DEM	Digital Elevation Model
DevCoCast	Provides processed land and ocean satellite data and value-added products in Developing Countries
DG-RTD	EC Directorate-General for Research and Technological Development
DI	Disasters
DIVERSITAS	An international programme of biodiversity science
DLR	German Aerospace Center
DMI	Danish Meteorological Institute
DPRTRP	Disaster Preparedness and Refugees Transition and Recovery Programme for North and Eastern Uganda
EBONE	European Biodiversity Observation Network
EC	Ecosystems
EC	European Commission
ECMWF	European Centre for Medium-range Weather Forecasts
EcoNet	Ecosystem Observation and Monitoring Network
EEA	European Environmental Agency
EFAS	European Flood Alert System
EFFIS	European Forest Fire Information System
EMEP	European Monitoring and Evaluation Program
EMSO	European Multidisciplinary Seas Observation
EN	Energy
EnerGEO	EO for monitoring and assessment of the environmental impact of energy use
ENSMP	Mines National College of Paris
EnviroGRIDS	Gridded management system for environmental sustainability and vulnerability
EO	Earth Observations
EPA	United States Environmental Protection Agency
ESA	European Space Agency
ESONET	European Seas Observatory Network
e-SOTER	Web-based Regional Pilot Platform with data, methodology, and applications, using remote sensing to validate, augment and extend existing data
ESRI	Environmental Systems Research Institute

EUMETCast	EUMETSAT Broadcast System for Environmental Data
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EuroSITES	European Ocean Observatory Network
Ev-K2-CNR	High Altitude Scientific and Technological Research
FAO	Food and Agriculture Organization
FAPAR	Fraction of Absorbed Photosynthetically Active Radiation
FDSN	International Federation of Digital Seismograph Networks
FENGYUNCast	CMA contribution to GEONETCast; utilises the AsiaSat 4 satellite beam to broadcast data and products to a user community in the Asia Pacific region
FGDC	Federal Geographic Data Committee
FP7	European Union 7th Framework Programme
FPAR	Fraction Photosynthetically Available Radiation
GAW	Global Atmosphere Watch
GBIF	Global Biodiversity Information Facility
GBRDS	Global Biodiversity Resources Discovery System
GCI	GEOSS Common Infrastructure
GCOS	Global Climate Observing System
GDEWS	Global Drought Early Warming Systems
GEO	Group on Earth Observations
GEOBENE	Global Earth Observation Benefit Estimation: Now, Next and Emerging
GEO BON	Group on Earth Observations Biodiversity Observation Network
GEONETCast	Near real time, global network of satellite-based data dissemination systems designed to distribute space-based, air-borne and in situ data, metadata and products to low-cost receiving stations maintained by users
GEO PAAM	Group on Earth Observations Protected Areas Assessment and Monitoring
GEOSS	Global Earth Observation System of Systems
GEOTOPS	GEO Training Opportunity Networks
GEWEX	Global Energy and Water Cycle Experiment
GFMC	Global Fire Monitoring Center
GGMN	Global Groundwater Monitoring Network
GHG	Greenhouse Gas
GIFS	Global Interactive Forecast System
GIS	Geographical Information System
GISIN	Global Invasive Species Information Network
GLOBE	Global Learning and Observations to Benefit the Environment
GLOSIS	Global Soil Information System
GMES	Global Monitoring for Environment and Security
GNSS	Global Navigation Satellite System
GOFC-GOLD	Global Observation of Forest and Land Cover Dynamics
GOOS	Global Ocean Observing System
GOS	Global Observing System
GOSAT	Greenhouse gases Observing SATellite
GPM	Global Precipitation Measurement

GPS	Global Positioning System
GSI	Geological Survey Institute
GSN	Global Seismographic Network
GTOS	Global Terrestrial Observing System
GTS	Global Telecommunications System
Guyra Paraguay	Non governmental organization that promote and coordinate progress towards the conservation and sustainable use of biodiversity
HARON	Hydrological Applications and Run-Off Network
HCF	Health and Climate Foundation
HE	Health
HTAP	Hemispheric Transport of Air Pollutants
IAG	International Association of Geodesy
IAS	Invasive Alien Species
ICSU	International Council for Science
IEEE	Institute of Electrical and Electronics Engineers
IEO	Spanish Institute of Oceanography
IGACO	International Global Atmospheric Chemistry Observations
IGAC-SPARC	International Global Atmospheric Chemistry - Stratospheric Processes And their Role in Climate
IGBP	International Geosphere-Biosphere Programme
IGCO	Integrated Global Carbon Observation
IGOS	Integrated Global Observing Strategy
IGOS-P	Integrated Global Observing Strategy Partnership
IGRAC	International Groundwater Resources Assessment Centre
IGWCO	Integrated Global Water Cycle Observations (former IGOS Water Theme)
IIASA	International Institute for Applied Systems Analysis
ILTER	International Long Term Ecological Research network
INM	Spanish National Meteorological Institute
INOV	Portuguese Innovative Company on Electronics and Telecommunications
INPE	Brazilian National Institute for Space Research
InSAR	Interferometric Synthetic Aperture Radar
INTA	Instituto Nacional de Técnica Aeroespacial, Spain
IOC	Intergovernmental Oceanographic Commission
IOCCG	International Ocean Colour Coordinating Group
IP3	GEOSS Interoperability Process Pilot Projects
IPWG	International Precipitation Working Group
IPY	International Polar Year
IRI	International Research Institute for Climate and Society
IRSA	Institute of Remote Sensing Applications
ISC	International Seismological Centre
ISCGM	International Steering Committee for Global Mapping
ISDR	International Strategy for Disaster Reduction
ISLSCP	International Satellite Land-Surface Climatology Project

ISPRS	International Society for Photogrammetry and Remote Sensing
ISRIC	International Soil Reference and Information Centre
ISSG	IUCN/SSC Invasive Species Specialist Group
ITC	International Institute for Geo-Information Science and Earth Observation
ITC	International Training Centre
ITU	International Telecommunication Union
IUCAF	Scientific Committee on Frequency Allocations for Radio Astronomy and Space Science
IUCN	International Union for the Conservation of Nature and Natural Resources (World Conservation Union)
IUGG	International Union of Geodesy and Geophysics
JAXA	Japan AerospaceExploration Agency
JRC	Joint Research Center of the European Commission
KMA	Korea Meteorological Administration
LAI	Leaf Area Index
LAM	Limited Area Model
LIFEWATCH	e-Science and Technology Infrastructure for Biodiversity Data and Observatories
LIS	Land Information System
MercNet	Web access information straight from Mercury's system
MERIS	Medium Resolution Imaging Spectrometer
MERIT	Meningitis Environmental Risk Information Technologies
MKFES	Mariolopoulos-Kanaginis Foundation of Environmental Sciences
MODIS	Moderate Resolution Imaging Spectroradiometer
NADM	North American Drought Monitor
NARSS	National Authority for Remote Sensing and Space Sciences, Egypt
NASA	National Aeronautics and Space Administration
NBII	National Biological Information Infrastructure
NEPTUNE	The North-east Pacific Time-series Undersea Network Experiments
NMHS	National Meteorological and Hydrological Service
NOOA	National Oceanic and Atmospheric Administration
NPCA	National Parks Conservation Association
NPN	US National Phenology Network
NPP	Net Primary Productivity
NSC	Norwegian Space Centre
NSMC	China National Satellite Meteorological Center
NWP	Numerical Weather Prediction
OCO	Orbiting Carbon Observatory
OGC	Open Geospatial Consortium
OS	Open Source
OSS	Open Source Software
PAAM	Protected Areas Assessment and Monitoring
PAGES	Past Global Changes
POGO	Partnership for Observation of the Global Ocean

POPs	Persistent Organic Pollutants
PREV'AIR	Air Quality Forecasts and Observations in France and Europe
PROMOTE	PROtocol MOniTOring (for the GMES Service Element: Atmosphere)
R&D	Research and Development
RAMSAR	Convention on Wetlands
SAFARI	Societal Applications in Fisheries & Aquaculture using Remotely-Sensed Imagery
SAR	Synthetic Aperture Radar
SBA	Societal Benefit Area
SCRC	Student Climate Research Campaign
SDI	Spatial Data Infrastructure
SDS	Sand and Dust Storm
SERVIR	Regional Visualization and Monitoring System
SIF	Standards and Interoperability Forum
SPOT	Système Probatoire d'Observation Terrestre
SPOT-VGT	SPOT Vegetation
SPRING	Freeware and Open-Source Geo-Processing Software
SSC	Species Survival Commission
SST	Sea Surface Temperature
TerraLib	Open source GIS software library
TerraView	GIS application built on the TerraLib GIS library
TF	Task Force
THORPEX	The Observing-system Research and Predictability Experiment
TIGER	ESA-launched initiative focusing on the use of space technology for water resource management in Africa
TIGGE	THORPEX Interactive Global Grand Ensemble
TNO	Netherlands Organization for Applied Scientific Research
UCAR	University Corporation for Atmospheric Research
UK	United Kingdom
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNOOSA	United Nations Office for Outer Space Affairs
UNOSAT	United Nations Operational Satellite Applications Programme
US	User Engagement
USA	United States of America
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VENUS	Victoria Experimental Network Under the Sea

VI	Vegetation Index
WA	Water
WAS	Warning, Advisory and Alert System
WCRP	World Climate Research Programme
WCMC	UNEP World Conservation Monitoring Centre
WE	Weather
WHO	World Health Organization
WIS	WMO Information System
WMO	World Meteorological Organization
WWRP	World Weather Research Programme