GEO 2012-2015 WORK PLAN

Version 1

Submitted for Official Review

(please send comments to secretariat@geosec.org by 31 August 2011)

27 June 2011

Foreword

This document presents Version 1 of the 2012-2015 Work Plan. It incorporates the technical comments received from the GEO community during the period March-May 2011 and draws from the recommendations made over the 2011 Work Plan Symposium (4-6 May). Consistent with these inputs, Version 1 proposes a number of changes to Version 0, which was circulated to the whole GEO community on 9 March. These changes may be summarized as follows:

(i) The title of part 3 was changed from "Information Services" to "Information for Societal Benefits"

(ii) The nine Societal Benefit Areas were re-introduced under part 3 (note that Tasks addressing three Strategic Targets (or more) were presented as transverse Tasks, outside the nine Societal Benefit Areas; see Tasks SB-01 to SB-04)

(iii) Four Tasks were created:
   a. "Infrastructure" Task IN-05 on "GEOSS Design and Interoperability"
   b. "Institutions and Development" Task ID-03 on "Science and Technology in GEOSS"
   c. "Institutions and Development" Task ID-04 on "Building a User-Driven GEOSS"
   d. "Health" Task HE-02 on "Tracking Pollutants"

(iv) Two Tasks were removed:
   a. "Institutions and Development" Task on "Building Communities and Increasing Awareness" (incorporated into Task ID-04 on "Building a User-Driven GEOSS")
   b. "Institutions and Development" Task on "Ensuring GEOSS Sustainability" (an issue that is currently under the mandate of the GEO Executive Committee)

(v) The Task on "Gap Analysis" was moved from the "Infrastructure" part to the "Institutions and Development" part

(vi) The Task template was expanded to provide more details on implementation. The titles of the "Definition" and "Deliverables" sections were changed to "Related GEOSS Strategic Targets" and "Components" respectively. In addition, the following 4 sections were added (see p.9):
   a. "Description" (main objectives)
   b. "Leads" (GEO Members and Participating Organizations willing to take responsibility on a best-effort basis; note that Points of Contact will be identified over the next few months)
   c. "Priority Actions" (practical actions or outputs)
   d. "Resources Available for Implementation" (e.g. major funded projects or activities, human resources)

(vii) All Task titles and contents were revised and expanded based on the input and comments received from the GEO community (including coordinated input from Communities of Practice and Committees)

(viii) A new proposal for improved Work Plan management was developed (see Introduction)

For reference, the log of technical comments received during the period March-May 2011 is available at ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V1/. Outcomes of the 2011 Work Plan Symposium are available at ftp://ftp.earthobservations.org/TEMP/2011_WorkPlanSymposium/.

As of 27 June, Version 1 is submitted for official review until 31 August 2011. Based on this official review, Version 2 of the 2012-2015 Work Plan will be prepared and submitted to the GEO-VIII Plenary which will be held in Istanbul, Turkey, on 16-17 November 2011.

Introduction

THE NEW WORK PLAN

The draft 2012-2015 Work Plan reflects the conclusions of the GEO-VII Plenary, Beijing Declaration, and GEOSS Mid-Term Evaluation. It differs from the current 2009-2011 Work Plan in four main ways: (i) it derives directly from the GEOSS Strategic Targets; (ii) it groups Tasks into three thematic parts (rather than two as before); (iii) it features a streamlined number of Tasks; and (iv) it proposes an improved Work Plan management structure.

(i) A Target-Driven Approach

When GEO developed the 2009-2011 Work Plan three years ago, it adopted an activity-driven approach to structuring its work. This involved identifying existing activities and organizing them into Overarching Tasks. As the conclusion of the 10-Year Implementation Plan comes into view, the focus needs to shift to ensuring that the 2015 Strategic Targets are fully addressed. This can best be achieved through a target-driven approach that looks forward to what an operational GEOSS should look like.

The 2012-2015 Work Plan has therefore been designed to meet the objectives described in the "demonstrated by" bullet points of the Strategic Targets document (see "Related GEOSS Strategic Targets" section under each Task). As a result, the titles of the 26 Tasks presented in the new Work Plan correspond to high-level outcomes identified as being necessary to meet the Targets.

A set of one or more "Components" has also been defined for completing each Task and thus addressing the Strategic Targets. These Components define priority actions and identify voluntary contributions available for implementation. They are based on the inputs of the GEO community and build directly on ongoing 2009-2011 sub-tasks and new proposals (see, under each Task, the "Related 2009-2011 Work Plan Tasks" and "New Proposals" sections).

The foregoing explanation is intended to assist the GEO community in understanding the transition from the previous Work Plan to the new one. Once the new Work Plan is in place, it will offer a simpler and more easy-to-understand structure than exists at present. This should facilitate the completion of the GEOSS 10-Year Implementation Plan and the engagement of additional contributors to, and users of, GEOSS.

(ii) A Three-part Structure

The Work Plan has been organized into three major parts to match the key objectives outlined by the GEO-VII Plenary and to provide a clear overview of GEO activities. Part 1 on "Infrastructure" features the physical cross-cutting components of an operational and sustainable GEOSS, including interoperable observing, modelling and dissemination systems. Part 2 on "Institutions and Development" describes "GEO at work" and the community's efforts to ensure that GEOSS is sustainable, relevant and widely used; it focuses on reinforcing data sharing, resource mobilization, capacity development, user engagement and science and technology integration. Part 3 on "Information for Societal Benefits" focuses on the information, tools and end-to-end systems that should be available through GEOSS to support decision-making across the nine Societal Benefit Areas.

(iii) A Streamlined Number of Tasks

Consistent with the target-driven approach described above, as well as comments received from the GEO community, the 2012-2015 Work Plan proposes a streamlined number of Tasks. Each of the 26 Tasks (as compared with 44 in the current Plan) is to be implemented through a limited number of Components, each supported by Leads (GEO Members and Organizations), one Point of Contact (representing one of the Leads) and contributors (further Members and Organizations). Note that individuals representing Task Leads would receive from the GEO Secretariat a non-binding letter acknowledging their role and confirming that they are officially recognized by GEO.

With the new Work Plan, Points of Contact would regularly report on progress to the GEO community through interactive web pages. These web pages (maintained through the Work Plan Information Management System) would represent improved versions of the present Task Sheets and reflect the new structure of the Work Plan as follows: Infrastructure, Institutions and Development (encompassing Capacity Building, Science & Technology, and User Engagement), and Tools and Information.

Within each of these three categories, reporting would follow the logic model used by the Monitoring and Evaluation Working Group (outputs-activities-resources). It would address milestones, deadlines, issues and gaps, and identify information relevant to decision making. Such a model would make it easy to see the linkages within and across Tasks. It would also ensure a consolidated database that would not require duplication of information (information entered under one Task would not have to be repeated by another Task: it would simply be pointed to).

Task Sheets would be updated at least twice a year and serve as a basis for reporting on Work Plan implementation progress to the GEO Plenary and Executive Committee. Reporting would also rely on a Work Plan Symposium bringing together the whole Work Plan community and providing opportunities to assess progress, foster partnerships and cross-fertilization, and identify gaps and required actions.

(iv) Improved Work Plan Management

As emphasized by the GEO community (see technical comments received on Version 0 and Work Plan Symposium outcomes):

- Any future management approach for the GEO Work Plan should maximize the likelihood of GEO achieving the Strategic Targets by monitoring progress towards these Targets and enabling effective coordination and cross-fertilization of activities
- Each Work Plan part (“Infrastructure”, “Institutions and Development”, and “Information for Societal Benefits”) has specificities that should be acknowledged and properly addressed. Hence, a board or a group created under any of these parts should be allowed to define its own mandate (terms of reference), membership, and nature and frequency of interactions
- Any new management approach should remain simple and avoid creating sub-groups and/or multiple layers of coordination. Moreover, it should build on the achievements of the four GEO Committees and seek to improve the current Committee structure (rather than create new bodies from scratch)

Hence, the following management approach is recommended: One Implementation Board for the “Infrastructure” part; four Implementation Groups for the “Institutions and Development” part; and one Implementation Board for the “Information for Societal Benefits” part.

Groups would differ from Boards to the extent that they would be more open and focus on a single Task (and a single Strategic Target) rather than on a set of Tasks (and Targets). Coordination between Boards and Groups would be (at minimum) ensured through cross-representation on the Boards/Groups as well as the organization of the annual Work Plan Symposium.

"Infrastructure" Implementation Board (IB)

This Board would be given the mandate to (i) monitor progress towards the Architecture and Data Management Strategic Targets; (ii) advise on the implementation of the Infrastructure Tasks; and (iii) actively coordinate activities within and across Infrastructure Tasks, while also establishing cross-cutting links to the "Institutions and Development" and "Information for Societal Benefits" parts of the Work Plan. Any issue of a non-technical nature (e.g. delivery on the commitments of Members and Participating Organizations, resources) would be brought to the attention of the Board for further action and guidance.

The membership of the Infrastructure Implementation Board would be composed of (i) a sample of current Architecture and Data Committee co-chairs (to ensure global coverage e.g. Africa, Americas, Asia, Europe); (ii) representatives from the other Implementation Board and the Implementation Groups (see below); (iii) one or two members of the GEO Secretariat; and (iv) a few additional members, as appropriate, to fill gaps in representation (e.g. regarding in-situ data, space data, modeling, information and communications technology).

The Infrastructure Board would thus have about 10-15 members. The Leads responsible (on a best-effort basis) for the implementation of the Infrastructure Tasks would not be members of the Implementation Board. Current members of the Architecture and Data Committee that would not serve on the Board could become Leads (or contributors) of Infrastructure Tasks – thereby continuing their work in realizing the operational implementation of the GEOSS architecture and data management.

The Implementation Board would have regular interactions with the Task Leads of the Infrastructure Tasks and (virtually) meet as often as required. The Board would also report on progress towards Strategic Targets to the GEO Plenary and Executive Committee – and thus directly support the monitoring and evaluation of GEOSS (in collaboration with the Monitoring and Evaluation Working Group).

"Institutions and Development" Implementation Groups

Four Implementation Groups would oversee the "Institutions and Development" Tasks: one on "Data Sharing" (Task ID-01), one on "Capacity Building" (Task ID-02), one on Science and Technology (Task ID-03), and one on User Engagement (Task ID-04). One Implementation Group could also potentially be created on "Gap Analysis" (pending a GEO Plenary decision and the willingness of Members and Organizations to take the lead of Task ID-06). Task ID-05 on "Catalyzing Resources for GEOSS Implementation" would be jointly overseen by the "Capacity Building" and "Science and Technology" Groups.

Each Group would be given both a general mandate (common to all Groups) and a specific mandate (defined by each Group). The general mandate would consist of (i) monitoring progress towards the related Strategic Target; (ii) supporting related Task implementation; and (iii) actively coordinating relevant activities within and across the related Task. The specific mandate (and nature/frequency of interactions) would be up to each Group to define according to the needs and requirements of the work at hand, building upon existing roadmaps and plans.

The membership of the Implementation Groups would be open, albeit with the following requirement: Each member of the Group would be officially nominated by a GEO Member or Participating Organization and be allocated sufficient resources to contribute to the Group (and related Task implementation) activities.

Moreover, the membership of each Implementation Group would include: (i) the Leads of the related Task; (ii) representatives from the other Implementation Groups (as appropriate); (iii) representatives from the "Infrastructure" and "Societal Benefits" Implementation Boards (see below); (iii) one or two members of the GEO Secretariat; and (iv) additional members, as appropriate, to fill gaps in representation (e.g. regarding funding institutions).

Hence the current Capacity Building, Science and Technology, and User Interface Committees would migrate to become Implementation Groups tied more directly to Work Plan implementation. The current Data Sharing task force and Data Sharing task team would be brought together under the Data Sharing Implementation Group.

In order to ensure coordination and information sharing between the different Implementation Groups (and to reinforce the roles of individual representatives on the respective Groups), a coordination forum would be put in place (very much in the spirit of the current Committee Co-Chair Coordination, C4). This forum would have regular virtual meetings, and also organize (and harmonize) reporting on progress towards Strategic Targets to the GEO Plenary and Executive Committee – and thus directly support the monitoring and evaluation of GEOSS (in collaboration with the Monitoring and Evaluation Working Group).

"Societal Benefits" Implementation Board (SB)

The "Societal Benefits" Board would be given the mandate to (i) monitor progress towards the Strategic Targets of the nine Societal Benefit Areas; and (ii) actively coordinate activities across "Societal Benefits" Tasks, also establishing cross-cutting links to the "Infrastructure" and "Institutions and Development" parts of the Work Plan; and (iii) providing advice on Task implementation, as appropriate.

The membership of the "Societal Benefits" Implementation Board would be composed of (i) one representative per "Societal Benefits" Task (to be identified by Task Leads); (ii) one representative per Community of Practice (if not already covered); (iii) representatives from the other Implementation Board and Groups; (iv) members of the GEO Secretariat; (v) a few additional members, as appropriate, to fill gaps in representation. The "Societal Benefits" Board would thus have about 20-25 members.

The Implementation Board would (virtually) meet as often as required. It would report on progress towards Strategic Targets to the GEO Plenary and Executive Committee – and thus directly support the monitoring and evaluation of GEOSS (in cooperation with the Monitoring and Evaluation Working Group).

This work would compliment that of the Communities of Practice, which would continue to make an essential contribution to Work Plan implementation at the Task level by: coordinating activities within Tasks, providing a forum for contributor interactions, engaging users, fostering partnerships, and promoting a dialogue between the users and providers of GEOSS data and information.

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TEMPLATE

APPLIED TO EACH TASK

XX-XX [Task title reflecting high-level outcomes of one (or more) Strategic Target(s)]

Related GEOSS Strategic Targets *(referred to as "Definition" in Version 0)*

[This section identifies the main Strategic Targets addressed by the Task. It features the most relevant "demonstrated by" bullet points identified in the Strategic Targets document (*see GEO-VI Document 12 Rev1 at http://www.earthobservations.org/documents.shtml)*]

Description (NEW)

[This section sets out the main objectives of the Task, consistent with the Strategic Targets above]

For each Component *(referred to as "Deliverables" in Version 0),*

> ***Component*** [Building block required to meet the Task objectives]
>
> ***Leads (NEW)***
> [GEO Members and/or Participating Organizations taking responsibility for ensuring, on a best-effort basis, that the Component is implemented. The proposed list is tentative, and to be refined over the next few months. Points of Contact are also to be identified over the next few months]
>
> ***Priority Actions (NEW)***
> [Practical actions and outputs supporting the Component implementation – defined and implemented by Leads and contributors. This section includes references to ongoing initiatives]

To Be Implemented in Connection with (NEW)

[This section provides a (non-exhaustive) list of Tasks whose underpinning activities should be connected to those of the present Task. It sheds light on cross-Task relationship and inter-dependence]

Related 2009-2011 Work Plan Tasks

[This section provides a (non-exhaustive) list of 2009-2011 sub-tasks that are directly related to the present Task and in the process of being collectively reorganized under this Task. Ongoing 2009-2011 sub-tasks represent fundamental resources for the new Work Plan development and future implementation]

For details of ongoing 2009-2011 sub-tasks,
see http://www.grouponearthobservations.org/cdb/geoss_imp.php

New Proposals from the GEO Community

[This section mentions new proposals (submitted by the GEO community during Dec 2010 – May 2011) that are in the process of being included in the 2012-2015 Work Plan]

For details of new proposals, see
ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/ and
ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V1/

Resources Available for Implementation (NEW)

[This sections attempts to give an indication of the main resources available for Task implementation. It aims to include major funded projects and activities, direct financial contributions and in-kind support (human resources). This section is under development and at this stage highly tentative and preliminary. It will be refined and improved over the next few months]

GEO 2012-2015 WORK PLAN

1 INFRASTRUCTURE

IN-01 Earth Observing Systems

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Architecture: Coordinated planning and sustained operation of national, regional and global observing and information systems within an interoperability framework. Continual improvement in observations and information available to users through the transition of research outcomes and systems into operational use, and through an optimal mix of space-based, airborne and in-situ observing platforms. Increased efficiency in the operation of observational systems through convergence among global, regional and national facilities.

Weather: Identification and addressing of critical gaps in observational networks that reflect, in particular, the needs of developing countries, the need for continuity in space-based and in-situ observations, and the potential benefits of an interactive observing system to support user needs.

Water: An operationalized and sustained global network of in-situ observation sites.

Description

Promote and coordinate surface- and space-based observing systems to provide long-term continuous observations of all components of the Earth System (atmosphere, ocean, terrestrial, ice, solid earth). Ensure that the Earth and its physical processes are monitored globally across spatial and temporal scales. Identify critical gaps in existing observational networks with particular focus on: the needs of developing countries, the need for continuity of observations, the need for increased advocacy of in-situ networks, and the potential benefits of enhanced observing systems. Individual Earth observing systems operated by national, regional and international entities are integral to GEOSS. Collectively they can be seen as a global means to observe the Earth's atmosphere, oceanic and terrestrial domains.

Components

C1 Development, Maintenance and Coordination of Surface-based Observing Networks (in-situ and airborne)

Leads (tentative)

Austria (Technical Institute of Vienna), Germany (BFG, DWD), Spain (AEMET), Switzerland (WGMS), USA (NASA, NOAA), FDSN, UNEP, WMO

Priority Actions

- Support the collection, analysis and archiving of water-cycle in-situ measurements (rain-gauge, river-gauge, soil moisture, and groundwater). Operate a global network of in-situ stations on the state and trends of global inland water quality. Collect standardized observations on glacier fluctuations (changes with time in mass, volume, area) and develop glacier inventories (distribution of surface-ice in space; see also WA-01)
- Advocate rapid development of a global High Frequency Radar network to measure coastal surface currents (see also SB-01)
- Operate and maintain a global network of tower sites to measure the exchanges of carbon dioxide, water vapor, and energy between terrestrial ecosystem and atmosphere (FLUXNET; see also CL-02)

- Improve the global and regional coordination of seismographic networks (see also DI-01)
- Support the development of an African ceilometer network. Implement a basic demonstration in northern Africa (5 stations: Tenerife, Cairo, Tamanrasset, Niamey, Dakar) for: (i) characterizing the Saharan air layer thickness/top; and (ii) verifying dust models and satellite-derived products

C2 Development and Coordination of Space-based Observing Systems

Leads (tentative)

Brazil (INPE), China (CRESDA), CEOS

Priority Actions

- Advocate rapid development of the "CEOS Constellations Concept". Observations from Virtual Constellations provide higher temporal, spatial, and spectral resolution, as well as improved data management and dissemination. Virtual constellations are under development in seven areas: Precipitation, Atmospheric Chemistry, Land Surface Imaging, Ocean Surface Topography, Ocean Colour Radiometry, Ocean Surface Vector Winds, and Sea-Surface Temperature
- 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
- Promote the AfricaGeoSat-1 project (for a dedicated African geostationary imaging space system) to the regional agencies and key role players across Africa. Coordinate and finalize the technical specifications of the space system by consolidating requirements (e.g. for capacity building). Identify synergies with existing and planned systems, and link AfricaGeoSat-1 unique applications with ongoing activities (e.g. forest, agriculture and water management)
- Establish actions securing the provision of Essential Climate Variables (ECVs) data from satellite systems (see also SB-02, CL-01)

C3 Advocacy and Coordination across Surface- and Space-based Observing Systems

Leads (tentative)

USA (NOAA), GCOS, GOOS, GTOS, IAG, WMO

Priority Actions

- Promote stable, reliable and long-term operations of Earth observing networks within the framework of national policies and international obligations. Demonstrate that global observing systems do not only serve research but also underpin products and services across all Societal Benefit Areas
- Develop intergovernmental mechanisms for coordinating terrestrial observations needed for climate studies and forecasting (GTOS; see also SB-02)
- Achieve a complete and stable Global Observing System (GOS)
- Enhance the coordination of coastal/open-ocean observations and modelling initiatives in support of a global ocean observation system (GOOS; see SB-01)
- Improve the networking among existing observing systems and sites to create pan-Arctic observing networks (SAON; see WA-01)
- Promote geodetic reference frames and the monitoring of global change signals (e.g. in gravity field or Earth rotation). The "International Terrestrial Reference Frame" and "International Celestial Reference Frame" provide foundations for most Earth observations (GGOS)

- Document user requirements. Document the Earth observing systems' ability to produce an agreed core set of essential environmental, geological, and socio-economic variables

C4 Radio-Frequency Protection

Leads (tentative)

WMO (CBS)

Priority Actions

- Advocate protection for all parts of the radio frequency spectrum needed to measure, collect and disseminate Earth observation data. Monitor with the highest care the case of passive bands, assessing the potential impact of interference on Earth observation applications and final products
- Encourage GEO Members to liaise with national representatives in radio-communication fora – to ensure sustained political support for radio-frequency protection
- Undertake coordinated activities with representatives from the International Telecommunication Union (ITU). Link with the Scientific Committee on Frequency Allocations for Radio Astronomy and Space Science (IUCAF)

To Be Implemented in Connection with

IN-02 (Earth Data Sets), IN-03 (GEOSS Common Infrastructure), IN-04 (GEOSS Communication Networks), IN-05 (GEOSS Design and Interoperability), ID-01 (Data Sharing), ID-03 (Science And Technology in GEOSS), ID-04 (Building a User-Driven GEOSS), ID-06 (Gap Analysis), All "Societal Benefits" Tasks

Related 2009-2011 Work Plan Tasks (non exhaustive)

AR-06-11: Radio Frequency Protection
AR-09-02a) Virtual Constellations
AR-09-03a) Global Terrestrial Observations (GTOS)
AR-09-03b) Legacy of the International Polar Year 2007-08
AR-09-03c) Global Ocean Observation System (GOOS)
AR-09-03d) Global Observing System (GOS)
AR-09-03e) Global Geodetic Observing System (GGOS)
DA-09-02c) Global Geodetic Reference Frames
CB-09-05b) CBERS

New Proposals from the GEO Community

- Africa-GeoSat1 (Egypt, Netherlands, Nigeria, South Africa, AARSE, RCMRD, UNECA)
- Sustaining Arctic Observing Networks (USA, USGEO)
- Global High Frequency Radar Network (USA, USGEO)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

Section under development

IN-02 Earth Data Sets

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Data Management: Increased use of observations through advances in all aspects of life-cycle data management, integration, and data recovery and conversion. Removal of important data management deficiencies. Enhanced information extraction from historical, current and future source data.

Science and Technology: Increased accessibility of global sets of scientific data necessary for improved Earth System modelling in the different GEOSS Societal Benefit Areas.

Description

Foster advances in life-cycle data management, including processing, inter-calibration and validation, quality assurance, harmonization, archiving, integration, assimilation, modelling, long-term preservation, digitization, and visualization. Work to link regional systems and national data infrastructures into global systems to create new information sources within GEOSS. Promote the application of GEOSS interoperability principles to Earth data sets so that data are easily accessible and readily integrated to meet users' needs. Support the development and harmonization of global data, metadata, and products commonly required across Societal Benefit Areas.

Components

C1 Advances in Life-cycle Data Management

Leads (tentative)

Japan (University of Tokyo), Spain (AEMET), CEOS (NOAA, USGS), ESA

Priority Actions

- Improve and coordinate data management approaches that encompass a broad perspective of the observation data life-cycle – from processing to modelling and visualization. Identify and implement recommendations for best practices of Earth observation data and information life-cycle management. Build upon the Data Integration and Analysis System (DIAS) to assess and document Earth datasets in cooperation with operational- and research- data centers
- Develop a GEO strategy for data quality assurance, building upon ongoing initiatives such as the CEOS Quality Assurance for Earth Observation (QA4EO). Start with space-based observations and gradually expand into in-situ observations. Support related calibration and validation (cal/val) activities.
- Develop a GEO strategy for the long-term preservation of Earth observation data, building upon existing long-term data preservation guidelines. Support campaigns for the digitization of observation databases. Promote the use of free software for observation database management

C2 Development of Regional/Global Information and Cross-cutting Datasets (including socio-economic information)

Leads (tentative)

EC (OneGeology Europe), Japan (AIST, ISCGM, JAXA), Netherlands (ISRIC), UK (BGS), CEOS (UKSA, UNOOSA, USGS), IAG

Priority Actions

- Provide a suite of global datasets based on improved and validated data sources. Facilitate interoperability among data sets using the GEOSS architecture

- Produce a global, coordinated and integrated Digital Elevation Model (DEM), facilitating interoperability among existing Digital Elevation Model (DEM) data sets
- Ensure the availability of accurate, homogeneous, long-term, stable, global geodetic reference frames as a mandatory framework and the metrological basis for Earth observation
- Improve Global Map and foster its use across Societal Benefit Areas. Global Map datasets provide a full and consistent coverage of land on the Earth – at 1 km resolution
- Develop a global digital geological map of the world. Make existing geological map data web-accessible. Use OneGeology to transfer know-how to the developing world
- Support the development of a global soil information system incorporating data from global, regional and national soil data projects
- Develop a global road and human settlements map on GEO Grid. Collect, maintain, and evaluate relevant remote sensing and GIS data. Develop systems on GEO Grid towards sharing, developing and distributing data

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-03 (GEOSS Common Infrastructure), ID-01 (Data Sharing), ID-04 (Building a User-Driven GEOSS), SB-02 (Global Land Cover), HE-01 (Health Decision Making), WA-01 (Integrated Water Information), AG-01 (Global Agricultural Monitoring)

Related 2009-2011 Work Plan Tasks (non exhaustive)

DA-09-01a) GEOSS Quality Assurance Strategy
DA-09-01b) Data, Metadata and Products Harmonisation
DA-09-01c) Long Term Preservation of Earth Observation Data
DA-09-02a) Data Integration and Analysis Systems
DA-09-03c) Digital Geological Map Data
DA-09-03d) Global DEM
DA-09-03e) Global Soil Data
DA-09-03f) Global Road and Human Settlements Mapping on GEO Grid
US-09-02b) Socio-economic and Demographic Global Data
US-09-03a) Development of Global Map for GEOSS Societal Benefit Areas
US-09-03d) Global Phenology Data
EC-09-02a) Impact of Tourism on Environmental and Socio-Economic Activities

New Proposals from the GEO Community

None at this stage

Resources Available for Implementation (tentative and preliminary)

Section under development

IN-03 GEOSS Common Infrastructure

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Architecture: Deployment, population, and enablement of sustained operations and maintenance of a user-friendly and user-accessible GEOSS Common Infrastructure, including the core components and functions that link the various resources of GEOSS. The GCI will (i) consist of web-based portals, clearinghouses for searching data, information and services, registries and other capabilities supporting access to GEOSS Components, standards, and best practices.

Data Management: Open, reliable, timely, consistent, and free access to a core set of essential environmental observations and information products, supported by adequate metadata, by users across all GEOSS Societal Benefit Areas in accordance with GEOSS Data Sharing Principles.

Description

Facilitate and support the sustained operation, maintenance and enhancement of a user-friendly and user-accessible GEOSS Common Infrastructure (GCI) – allowing users to search and access GEOSS resources (e.g. datasets and services). While ensuring routine operations, aim at improving the GCI by both, (i) defining a GCI architecture evolution strategy, and (ii) implementing enhancements. Maintain the GCI as the architectural framework essential to implementing the GEOSS Data Sharing Principles. Support the integration of new GCI components and provide the resources needed for the discovery of, and access to, a core set of data and information across all Societal Benefit Areas. Continuously engage with GCI core service operators, data and service providers, and user communities.

Components

C1 Evolution and Enhancement of the GEOSS Common Infrastructure (GCI)

Leads (tentative)

Brazil (INPE), EC (EuroGEOSS, GENESI), Italy (ASI), Japan (University of Tokyo), USA (USGS), ESA and IEEE

Priority Actions

- Define and maintain a GCI Architecture Evolution Strategy based on a gap analysis of the current GCI. This includes a definition of the GCI requirements baseline and a specification of the interfaces between GCI components and external components
- Enhance GCI components on the basis of (i) the GCI Architecture Evolution Strategy and (ii) coordinated input from multiple sources (e.g. data sharing community, users and providers of GEOSS information, usability testing). Proceed with enhancements having assessed feasibility and the need, urgency, and resources needed for implementation. Conduct tests to prepare for a transfer to operations
- Consider “real-time distributed search” and “documentation of GCI interfaces” as possible enhancements. Develop data discovery and data integration capabilities using GEOSS Earth observation vocabulary
- Conduct usability testing sessions and organize demonstrations of the GCI capabilities on the occasion of major events (e.g. GEO Plenary) – to collect feedback from users and suggestions for enhancements

C2 Operations and Maintenance of GCI Components

Leads (tentative)
USA (USGS), ESA, FAO, IEEE

Priority Actions

- Manage routine operations through (i) proper monitoring, maintenance and administration of GCI software and hardware platforms, (ii) ad-hoc problem solving, and (iii) implementation and administration of a database gathering information on GCI problems and possible enhancements
- Maintain the GCI as the architectural framework essential to implementing the Data Sharing Principles. Keep procedures for registering and maintaining metadata simple, or partially automated. Enable users to easily discover GEOSS resources and to search for data or services that (i) fit a particular application or Societal Benefit Area(s); and/or (ii) comply with full and open exchange. Users should also be able to understand usage requirements and restrictions indicated by the data providers
- Support the integration of new GCI components such as the GEOSS Data Collection of Open Resources for Everyone (GEOSS Data-CORE – a distributed pool of documented datasets contributed by the GEO community on the basis of full and open access). Identify resources needed for the discovery of, and access to, the Data-CORE. Call to the GEO community to identify operational products/data catalogs and repositories that should, as an outcome, become available through the GCI

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-02 (Earth Data Sets), IN-04 (GEOSS Communication Networks), IN-05 (GEOSS Design and Interoperability), ID-01 (Data Sharing), ID-04 (Building a User-Driven GEOSS), All “Societal Benefits” Tasks

Related 2009-2011 Work Plan Tasks (non exhaustive)

AR-09-01a) Enabling Deployment of a GEOSS Architecture
AR-09-01b) GEOSS Architecture Implementation Pilot
AR-09-01c) GEOSS Best Practices Registry
AR-09-01d) Ontology and Taxonomy Development

New Proposals from the GEO Community

Operations, Maintenance and Enhancement of the GEOSS Common Infrastructure Components (ESA)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

- Contracts (through 2015) of GCI component providers for operations and maintenance
- European FP7 projects: EuroGEOSS, GENESI (ongoing); GEOWOW (to commence in September 2011 for a duration of 3 years)

Section under development

IN-04 GEOSS Communication Networks

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Data Management: Open, reliable, timely, consistent, and free access to a core set of essential environmental observations and information products, supported by adequate metadata, by users across all GEOSS Societal Benefit Areas in accordance with GEOSS Data Sharing Principles.

Capacity Building: Increased use of Earth observation in policy and decision making. Enhanced participation of developing countries in GEO and GEOSS.

Description

Enhance timely and reliable access to, and delivery of, Earth observation and information products from all Societal Benefit Areas. In particular, address access issues in developing countries. This involves the collection of satellite and in-situ data, the transfer of data and products between agencies responsible for observations and products, and the dissemination of data and products to users. The related technology includes the Internet, wireless communication (fixed and mobile) networks (e.g. satellite, cellular, WiFi, WIMAX), broadband land connections and satellite-based direct-broadcast systems independent from ground-based telecommunications infrastructures.

Components

C1 Worldwide Communication Network of Networks

Leads (tentative)

South Africa (CSIR), CEOS, ESA, IEEE, IIASA, WMO

Priority Actions

- Establish and expand a worldwide communication network of interconnected networks based on satellite, fixed land-based and mobile/wireless communication, and data dissemination systems. Provide capabilities such as user access, data exchange and dissemination services in response to users' and providers' needs
- Establish a demonstrator that will include data collection and access in under-served regions (e.g. through mobile phone networks, satellite networks and dedicated applications)
- Develop a global network of satellite direct-broadcast stations (DB) with the ability to share and distribute data in near real-time
- Build upon the WMO Information System (WIS). Ensure operational exchange of weather, water, climate and hydro-meteorological disaster data and warnings
- Build upon ongoing initiatives such as GEONET, GEOMOBILENET, and Data Democracy. Explore possible connections with the emerging European Data Relay Satellite (EDRS) system, and European GMES (Global Monitoring for Environment and Security) Sentinels

C2 GEONETCast

Leads (tentative)

China (CMA), USA (NOAA), EUMETSAT

Priority Actions

- Further develop GEONETCast – a distribution system for GEOSS information using communication satellites and low cost, off-the-shelf reception stations. Turn GEONETCast

into a fully operational global system disseminating data and products across all Societal Benefit Areas

- Expand the GEONETCast broadcast footprint over the Pacific region. Pacific Island states have noted the low availability of environmental information in the region – mainly due to poor internet access and communications infrastructure
- Build capacity for using GEONETcast information, particularly in developing countries. Develop GEONETCast Training Channels to (i) train end-users; and (ii) transmit training materials to local trainers

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-03 (GEOSS Common Infrastructure), ID-01 (Data Sharing), ID-02 (Institutional and Individual Capacity)

Related 2009-2011 Work Plan Tasks (non exhaustive)

AR-09-02b) WMO Information System
AR-09-04a) GEONETCast
AR-09-04b) GEONET
CB-09-02g) GEONETCast Training
CB-09-05e) Data Democracy
US-09-02a) Socio-Economic Benefits of GEO and GEOSS (Geo-Wiki)

New Proposals from the GEO Community

Global Network of Satellite Direct-Broadcast Stations for Real-Time Products (South Africa)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

GEONETCast is fully funded by the entities operating the system: China (CMA), USA (NOAA), and EUMETSAT

Section under development

IN-05 GEOSS Design and Interoperability

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Deployment, population, and enablement of sustained operations and maintenance of a user-friendly and user-accessible GEOSS Common Infrastructure (GCI), including the core components and functions that link the various resources of GEOSS.

Description

Manage the evolutionary technical architecture (design) of GEOSS and contributed Earth observation data and service resources. Enable a sustainable GEOSS – supporting the development of the GEOSS Common Infrastructure (GCI) and GEOSS communication networks for the access to, and use of, Earth observations and related services.

Components

C1 Technical Design of GEOSS and Contributed Resources

Leads (tentative)

Brazil (INPE), China (CMA), EC (JRC), Japan (University of Tokyo), USA (NOAA, USGS), CEOS, IEEE, OGC, WMO

Priority Actions

- Develop a GEOSS technical architecture document that describes the components of GEOSS, including registries, interoperability arrangements, information types, predictive models and dynamic modeling infrastructures (model webs), sensor webs, software/applications, and data, system interfaces, and services
- Perform periodic gap analyses on GEOSS architecture and identify corrective measures, building upon new technologies and R&D
- Execute and document Architecture Implementation Pilots (AIPs) and related research activities. Recommend improvements to the GEOSS architecture on the basis of AIPs' outcomes
- Annually review and/or revise the GEOSS Tactical and Strategic Guidance documents (or new tutorial documents) – to reflect changes in the architecture and operations of GEOSS
- Manage the Standards and Interoperability Registry in concert with the Standards and Interoperability Forum (SIF)

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-02 (Earth Data Sets), IN-03 (GEOSS Common Infrastructure), IN-04 (GEOSS Communication Networks), ID-04 (Building a User-driven GEOSS)

Related 2009-2011 Work Plan Tasks (non exhaustive)

AR-09-01a) Enabling Deployment of a GEOSS Architecture
AR-09-01b) GEOSS Architecture Implementation Pilot
AR-09-02c) Sensor Web Enablement for In-Situ Observing Network Facilitation
AR-09-02d) Model Web Development
DA-09-02a) Data Integration and Analysis Systems

New Proposals from the GEO Community

None at this stage

Resources Available for Implementation (tentative and preliminary)

Section under development

2 INSTITUTIONS AND DEVELOPMENT

ID-01 Advancing GEOSS Data Sharing Principles

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Data Management: Open, reliable, timely, consistent, and free access to a core set of essential environmental observations and information products, supported by adequate metadata, by users across all GEOSS Societal Benefit Areas in accordance with GEOSS Data Sharing Principles i.e. (i) full and open exchange of data, metadata and products shared within GEOSS, recognizing relevant international instruments and national policies and legislation; (ii) all shared data, metadata and products being made available with minimum time delay and at minimum cost; and (iii) all shared data, metadata and products being provided free of charge or no more than the cost of reproduction will be encouraged for research and education.

Description

Support and advance the Declaration of the Group on Earth Observations Ministerial Summit in Beijing, China (5 November 2010), which committed to: (i) Maximize the number of documented datasets made available on the basis of full and open access; (ii) Create the GEOSS Data Collection of Open Resources for Everyone (GEOSS Data CORE), a distributed pool of documented datasets with full, open and unrestricted access at no more than the cost of reproduction and distribution; and (iii) Develop flexible national and international policy frameworks to ensure that a more open data environment is implemented.

Components

C1 Advancing GEOSS Data Sharing Principles

Leads (tentative)

To be determined (GEO Members and/or Participating Organizations taking responsibility on a best-effort basis. GEO body associated with data sharing to support coordination and communication across GEO)

Priority Actions

- Develop continuously the GEOSS Data-CORE: Maximize the number of datasets made available on the basis of full and open access. Data providers should register their observation and information resources through the GEOSS Common Infrastructure (GCI) directly or via community catalogues. Detailed metadata should also be registered, with no costs or restrictions attached to its use, to facilitate data and service discovery, assessment, and integration for decision support
- Monitor the use and impact of resources made available with full and open access: Develop metrics to assess the impact and progress of data sharing and, where possible, implement such metrics into the GCI. Metrics should include clear performance indicators and milestones towards progress. Users who benefit from full and open access would be asked to document the use and impact of the data, metadata and products received
- Establish national coordinating mechanisms to promote and monitor engagement with the implementation of the GEOSS Data Sharing Principles: Establish a process within countries to identify and reduce institutional, legal and technical barriers to full and open exchange of data, metadata and products. Encourage governmental data providers to make their datasets available on the basis of full and open exchange. Governments should also seek to implement and promote the

Implementation Guidelines as best practices at the national and institutional levels. This process should enable feedback to be provided to the GEO

- Maintain the GEOSS Common Infrastructure as the architectural framework essential to implementing the Data Sharing Principles (see IN-03)

To Be Implemented in Connection with

IN-03 (GEOSS Common Infrastructure), IN-04 (GEOSS Communications Networks), IN-05 (GEOSS Design and Interoperability); these Tasks cover the technical aspects of data sharing, for example, the implementation of a "search and discovery capability" for the GEOSS Data-CORE. ID-04 (Building a User Driven GEOSS), All "Societal Benefits" Tasks

Related 2009-2011 Work Plan Tasks (non exhaustive)

DA-06-01: GEOSS Data Sharing Principles
CB-09-05e) Data Democracy

New Proposals from the GEO Community

None at this stage

Resources Available for Implementation (tentative and preliminary)

In 2012 and beyond: To be determined

In 2011 (for information): In-kind contributions from GEO Members and Participating Organizations represented on the Data Sharing Task Force, namely: Brazil (INPE), Cameroon (Ministère de l'Environnement), Canada (Carleton University), Canada (CSA), China (CMA), Czech Republic (Hydrometeorological Institute), European Commission (DG-RTD, JRC), France (IGN, Météo France), India (ISRO), Italy (ISPRA), Japan (JAXA, RESTEC), Netherlands (KNMI), Norway (University of Bergen), Slovenia (Environmental Agency), UK (Environment Research Funders' Forum), USA (NASA, NOAA, USGS), COSPAR, EEA, GSDI, IEEE, ICIMOD, ICSU, IISL, OGC, UNEP, and UNOOSA

Section under development

ID-02 Developing Institutional and Individual Capacity

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Capacity Building: Networking activities that specifically build individual, institutional and infrastructure capacity. Increased use of Earth observation in policy and decision making. Enhanced participation of developing countries in GEO and GEOSS.

Description

Enhance coordination of national and international capacity-building efforts to produce and use Earth observation and information. Increase the demand for day-to-day Earth observation and information across Societal Benefit Areas. 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 cross-border education and training across Societal Benefit Areas showing the short- and long-term benefits of Earth observation. Develop synergies, encourage cross-fertilization and address common challenges.

Components

C1 Institutional Development

Leads (tentative)

Chile (UDEC), China (CRESDA), Denmark (DMI), EC (FP7), France (BRGM), Germany (DLR, GKSS), Korea (KORDI), Netherlands (ITC), Norway (NERSC), South Africa (DST, Umvoto), Switzerland (University of Geneva), USA (USAID), UNEP

Priority Actions

- Establish regional capacity-building networks: Organize and reinforce international networks (incl. training opportunity networks) for the use and provision of Earth observations. Improve coordination of these networks through the GEO Portal and GEONETCast. Capacity building networks typically include key institutions in data provision (e.g. space agencies) and academic higher-education institutions. Training opportunity networks typically rely on virtual and e-learning knowledge transfer
- Create conditions for expanding GEO capacity building activities and improving their effectiveness across Societal Benefit Areas: Build upon ongoing projects such as the GEO Network for Capacity Building (GEONetCab), the GEO capacity building initiative in Central Asia (SEOCA), ACQWA, enviroGRIDS, AFROMAISON; and existing networks such as AFRIMET, the Latin American Network of Climate Change Offices (RIOCC); and the Regional Gateway for Technology Transfer and Climate Change Action in Latin America and the Caribbean (REGATTA)

C2 Individual Development

Leads (tentative)

Brazil (INPE), China (CMA), Netherlands (ITC), South Africa (DST, Umvoto), USA (NOAA, USAID), CEOS (CSIR, INPE), EUMETSAT, UNOOSA, WMO

Priority Actions

- Coordinate capacity building components across Societal Benefit Areas: Organize summer schools or training workshops within and/or across Societal Benefit Areas (and related areas), e.g. Climate,

Health, Disaster, Energy, Forest Monitoring. Build upon ongoing activities such as the CLIVER program for Latin America

- Foster recognition of cross-border education: Bring together (i) providers of international (and cross-border) capacity building; (ii) experts in recognition (credential valuation and accreditation) and governance (quality assurance) of higher-education qualifications; and (iii) professionals from the Earth observation and information sectors – to exchange knowledge and propose solutions to the issues of recognition and exchange of cross-border/international education
- Develop open-source software and open systems: Encourage the development of open-source solutions across and along the Earth observation value chain – building upon existing efforts and drawing upon networks of Open Source Software (OSS) developers
- Develop adequate dissemination schemes that reflect the reality of limited bandwidth in developing countries. Build upon the Data Democracy initiative and support CBERS, GEONetCast and SERVIR training

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-04 (GEOSS Communications Networks), ID-01 (Data Sharing), ID-04 (Building a User-driven GEOSS), ID-05 (Resources for GEOSS Implementation), ID-06 (Gap Analysis), All "Societal Benefits" Tasks

Related 2009-2011 Work Plan Tasks (non exhaustive)

CB-09-02a) Recognition of Cross Border Education and Training in Earth Observation
CB-09-02b) Summer Institute on Climate Information for Public Health
CB-09-02c) UN-SPIDER/GEO Summer Schools on Space-based Solutions for Disaster Management
CB-09-02f) GLOBE/GEO Climate Education Project
CB-09-03a) Building National and Regional Capacity
CB-09-03b) Establishing Regional Capacity Building Networks
CB-09-04a) Identifying Best Practices, Gaps and Needs
CB-09-04b) Capacity Building Performance Indicators
CB-09-05e) Data Democracy
EC-09-02c) Vulnerability of Sea Basins (enviroGRIDS)

New Proposals from the GEO Community

- European FP7 project AFROMAISON: Africa at meso-scale: Adaptive and integrated tools and strategies on natural resources management (Switzerland, EC)
- AFRIMET activities: MARINEMET (West Africa Marine Meteorology Project), METAGRI (West Africa Agriculture Meteorology Project), EMERMET (Countries Emerging from Conflict and Natural Disasters Project), MANAGEMET (Management), HEALTHMET (Strengthening capabilities to create links between meteorological, climatological and health services) (Spain)
- Regional Gateway for Technology Transfer and Climate Change Action in Latin America and the Caribbean (REGATTA) (Spain, UNEP)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V1/

Resources Available for Implementation (tentative and preliminary)

- European FP7 projects: AFROMAISON (started in March 2011 for a duration of 3 years, 3MEUR), GEO-Net-CaB, SEOCA
- REGATTA project and fellowships (over 300) for courses in meteorology, co-funded by Spain
- Activities funded by Brazil (INPE) for the development of free open source geotechnologies (including interfaces in several languages, tutorials, training courses and materials)

Section under development

ID-03 Science and Technology in GEOSS

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Science and Technology: Improved and new instrumentation and observation system design for in-situ, airborne, and space-based observation, benefiting from advances in science and technology. Increased accessibility of global sets of scientific data necessary for improved Earth System modelling in the different GEO Societal Benefit Areas. Increased accessibility of data and improved coordination and maintenance of observational systems through GEOSS are realized by the research community.

Description

Ensure full engagement of relevant science and technology communities such that GEOSS advances through integration of innovations in Earth observation science and technology, also enabling the research community to fully benefit from GEOSS accomplishments. Promote research and development (R&D) in key areas of Earth sciences to facilitate improvements to Earth observation and information systems, and support the transition of systems and techniques from research to operations. Engage with a wide range of Science and Technology (S&T) communities including individual scientists and their institutions, both public and private.

Components

C1 Engaging the Science and Technology (S&T) Community in GEOSS Implementation

Leads (tentative)

EC (EGIDA), USA (NASA), IEEE

Priority Actions

- Engage the Science and Technology community in the development of GEOSS: Develop a framework for the transition of relevant research infrastructures to sustained operation. Encourage the incorporation of new technology in observing systems. Assess the requirements for continuity and long-term monitoring of essential data. Support state-of-the-art technology in the GEOSS Common Infrastructure (GCI) and observation infrastructures. Promote registration within the GCI of key scientific data sets
- Develop incentives for Science and Technology communities: Devise a GEOSS Data Citation Standard, GEO Label, and portfolio of compelling examples illustrating the contribution of Science and Technology to GEOSS
- Establish links to major Science and Technology organizations and research institutions: Establish an interactive directory of major professional S&T organizations. Inform organizations about GEO and GEOSS, establish a dialog and foster cooperation between GEO and major university networks
- Promote GEOSS in Science and Technology communities: Organize special sessions on GEOSS at major S&T meetings. Implement a web-based interactive tool for the planning and documentation of GEO/GEOSS related presentations. Compile a slide library for S&T focused presentations

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-04 (GEOSS Communication Networks), ID-02 (Developing Institutional and Individual Capacity), ID-04 (Building a User-Driven GEOSS), ID-05 (Catalyzing Resources for GEOSS Implementation), ID-06 (Gap Analysis), All “Societal Benefits” Tasks

Related 2009-2011 Work Plan Tasks (non exhaustive)

CB-09-04a) Identifying Best Practices, Gaps and Needs
ST-09-01: Catalyzing Research and Development (R&D) Resources for GEOSS
ST-09-02: Promoting Awareness and Benefits of GEO in the Science and Technology Community
US-09-01a) Identifying Synergies between Societal Benefit Areas

New Proposals from the GEO Community

None at this stage

Resources Available for Implementation (tentative and preliminary)

European FP7 project EGIDA (1 MEUR, 2010 – 12)

Section under development

ID-04 Building a User-Driven GEOSS

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

User Engagement: Establishment of an agreed core set of essential environmental, geophysical, geological, and socio-economic variables needed to provide data, metadata and products in support of all GEOSS Societal Benefit Areas. Involvement of users in: reviewing and assessing requirements for Earth observation data, products and services; creating appropriate mechanisms for coordinating user requirements; utilizing data/information delivery systems; and capturing user feedback on an ongoing basis across Societal Benefit Areas. Increased use of geo-spatial data in all Societal Benefit Areas and in particular in developing countries [*also supported by GEOSS Mid-Term Evaluation, Recommendation 6*].

Description

Advance user-oriented perspectives and needs in GEOSS development and enable the development of Communities of Practice. Collect and integrate user-oriented feedbacks on products, tools, data access and delivery. Foster and promote applications of Earth observation and information to decision making. Support the sustained use of these applications by end-users, which can demonstrate value, encourage broader use, and build demand for Earth observations. Show the benefits of GEO and GEOSS to policy makers, scientific and technological communities, and the public.

Components

C1 GEOSS-Wide Activities for a User-Driven GEOSS

Leads (tentative)

France (MINES ParisTech), USA (EPA, NASA)

Priority Actions

- Support user communities through GEO Communities of Practice: Encourage the development, identification, or incorporation of various communities into the GEOSS framework – to enhance the functionality and usability of GEOSS. Mentor the GEO Communities of Practice
- Identify user needs and requirements: Characterize user needs for Earth observations, information and user-oriented tools. Ensure GEO engages a broad range of user types, and assist users in utilizing GEOSS and providing feedback. Focus on Earth observations priorities, user-type analysis, visualization and analysis tool needs, and user-oriented handbooks
- Foster GEOSS applications and societal benefits: Broker connections between experts and users. Identify best practices in applications, and enable GEO efforts to document societal benefits
- Develop GEOSS Professorships: Create GEOSS industrial professorships to demonstrate the benefits of using Earth observation/information within Societal Benefit Areas. Professorships would include research, training and diffusion activities and be granted by companies and/or organizations

C2 Outreach and Awareness Raising

Leads (tentative)

IEEE, would supported by the User Engagement Implementation Group

Priority Actions

- Show the benefits of Earth observation and information through the identification and dissemination of success stories in language that can be understood by all, specifically decision- and policy-makers
- Maintain a GEOSS-focused web-based magazine for the general public, non-technical managers and decision-makers. Expand on existing web-pages to incorporate more material from developing countries
- Organize user-oriented workshops for GEOSS outreach and feedback. Provide avenues for user inputs into GEOSS requirements and feedback on the operational aspects of GEOSS

To Be Implemented in Connection with

All Work Plan Tasks

Related 2009-2011 Work Plan Tasks (non exhaustive)

CB-10-01a) Earth Observation Game for Youth
CB-10-01b) Building Capacity for Non-technical Decision-makers in the Use and Impact of EO
CB-10-01c) User Oriented Workshops for GEOSS Outreach and Feedback
CB-10-01d) Atlases of our Changing Environment
US-09-01a) Identifying Synergies between Societal Benefit Areas
US-09-01b) Communities of Practice and Partnership Development

New Proposals from the GEO Community

None at this stage

Resources Available for Implementation (tentative and preliminary)

Section under development

ID-05 Catalyzing Resources for GEOSS Implementation

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Capacity Building: Leveraging resources for Earth observation capacity building efforts. Ensuring the engagement and committed involvement of resource providers in the GEO capacity building process.

Science and Technology: Improved and new instrumentation and observation system design for in-situ, airborne, and space-based observation, benefiting from advances in science and technology. Increased accessibility of global sets of scientific data necessary for improved Earth System modelling in the different GEOSS Societal Benefit Areas.

Description

Mobilize resources for GEOSS in the areas of capacity building (individual, institutional, infrastructure) and research and development (R&D). Work to strengthen links between users and donor communities, involving resource providers such as national and international programmes. Encourage national governments and international organizations to integrate GEOSS science and technology needs in their R&D programmes. Ensure wide circulation of information on funding-opportunities within the GEO community.

Components

C1 Resource Mobilization for Capacity Building (Individual, Institutional and Infrastructure)

Leads (tentative)

EC (GEONETCab), Netherlands (ITC), South Africa (Umvoto), Spain (AEMET), USA (NASA)

Priority Actions

- Identify opportunities in existing programmes and mechanisms for resourcing capacity building activities
- Build on the GEONETCab project to ensure active brokering between resource providers and GEOSS needs
- Communicate GEOSS agenda to funding agencies and resource providers. Identify windows of opportunity (e.g. conferences, workshops) for interacting with groups of donors
- Promote “Earth Observations in Decision Support Projects”. Support the various phases of project development: Proposal Solicitation, Project Brokering, Donor Coordination, Applications, Showcases, Tracking, and Outreach
- Produce specific examples of resources leveraged across a range of user types and Societal Benefit Areas

C2 Resource Mobilization for Research and Development

Leads (tentative)

EC (EGIDA), Norway (NSA), UK (BGS, NERC), USA (NASA), ESA

Priority Actions

- Establish a dialog between GEO and funding agencies for the research and development needed to fully develop GEOSS and exploit the benefits of GEOSS
- Develop means to (i) communicate GEOSS Science & Technology needs; (ii) match research projects with available funding programs; and (iii) support effective transition from research to operations

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), ID-01 (Data Sharing), ID-02 (Institutional and Individual Capacity), ID-03 (Science and Technology in GEOSS)

Related 2009-2011 Work Plan Tasks (non exhaustive)

CB-09-01: Resource (or Seville Roadmap) Mobilization
CB-09-04a) Identifying Best Practices, Gaps and Needs
ST-09-01: Catalyzing Research and Development (R&D) Resources for GEOSS
US-09-01a) Identifying Synergies between Societal Benefit Areas

New Proposals from the GEO Community

Earth Observations for Decision Support Projects, based on the User Interface and Capacity Building Committees Call for Proposals Process (USA, USGEO)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

European FP7 project EGIDA (1 MEUR, 2010 – 12)

Section under development

ID-06 Gap Analysis

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Architecture: Comprehensive gap analysis and gap filling, integrated across all Societal Benefit Areas, including issues pertaining to operational redundancy and succession planning (especially with respect to space missions) for systems and products.

Weather: Identification and addressing of critical gaps in observational networks that reflect, in particular, the needs of developing countries, the need for continuity in space-based and in-situ observations, and the potential benefits of an interactive observing system to support user needs [*also supported by GEOSS Mid-Term Evaluation, Recommendation 7*].

Description

Within GEOSS, elucidate practical methods for filling critical gaps in, inter alia, observation specifications and parameters, geographical areas, and observation and information accessibility. Identify opportunities and measures to minimize gaps in data, metadata, and products. Set and address priorities for filling gaps.

Components

C1 Gap Analysis

Leads (tentative)

To be determined

Priority Actions

- Perform an observational gap analysis: Devise a structured process for observational gap analysis covering observation specifications and parameters, geographical areas, and observation and information, using both “top-down” and “bottom-up” approaches. Make use of external input using non-GEO-engaged experts from Member countries available
- Perform a domain/SBA-focused gap analysis comprehensive in scope and integrated across all Societal Benefit Areas: Identify opportunities and measures to minimize gaps in data, metadata, and products. Address the needs of developing countries and the need for observations continuity
- Identify, and build upon, gap analysis activities in individual Societal Benefit Areas: Enable efficient reporting of these activities under the present framework. Connect these activities to develop a synthesis and reduce duplication
- Perform a periodic meta-analysis: Provide a consolidated view of priority needs, gaps, opportunities in synchronization with the triennial Ministerial meetings

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), ID-03 (Science and Technology in GEOSS), ID-04 (Building a User-Driven GEOSS), ID-05 (Catalyzing Resources for GEOSS Implementation), CL-01 (Climate Information), BI-01 (Global Biodiversity Observation)

Related 2009-2011 Work Plan Tasks (non exhaustive)

CB-09-04a) Identifying Best Practices, Gaps and Needs
ST-09-01: Catalyzing Research and Development (R&D) Resources for GEOSS
CL-09-02a) Key Observations for Climate
CL-09-02b) Key Climate Data from Satellite Systems

New Proposals from the GEO Community

- Development of a GEOSS Gap Analysis Strategy (Science & Technology Committee and Monitoring & Evaluation Working Group)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

To be determined

3 INFORMATION FOR SOCIETAL BENEFITS

SB-01 Oceans and Society: Blue Planet

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Climate: Improved scientific understanding, modelling and prediction of climate. Accessibility of all the observational data needed for climate monitoring and services in support of adaptation to climate variability and change. Availability of all Essential Climate Variables needed by the WCRP, the IPCC and the UNFCCC.

Ecosystems: Increased operational monitoring of major marine and coastal ecosystems on an annual basis including properties such as extent, water temperature, salinity, pH and pCO2, phytoplankton species composition and productivity and marine resource stocks, based on remote sensing and sampled in-situ observations using internationally agreed standards.

Agriculture: Improved collaboration and coordination on the use and applications of Earth observations for fisheries and aquaculture.

Biodiversity: Increased routine collection of long term in-situ and remotely sensed biodiversity observations. Increased information sharing on biodiversity conservation and sustainable use of biodiversity resources. Increased availability of biodiversity information necessary to respond to and support related topics (ecosystems, health, climate, etc).

Description

Provide sustained ocean observations and information to underpin the development, and assess the efficacy, of global-change adaptation measures (such as those related to vulnerability and impacts of sea-level rise). Improve the global coverage and data accuracy of coastal and open-ocean observing systems (remote-sensing and in-situ). Coordinate and promote the gathering, processing, and analysis of ocean observations. Establish a global ocean information system by making observations and information, generated on a routine basis, available through the GEOSS Common Infrastructure. Develop a global operational ocean forecasting network. Provide advanced training in ocean observations, especially for developing countries. Raise awareness of biodiversity issues in the ocean.

Components

C1 Global Ocean Information Coordination and Access

Leads (tentative)

EC (JRC), Germany (Bremen University), CEOS, GOOS, IOC, POGO

Priority Actions

- Promote the implementation of the Global Ocean Observing System (GOOS), a scientifically designed international system for gathering, processing, and analyzing ocean observations, and distributing data products. Support the development of global coastal and open-ocean observing networks using Regional Alliances. Support and provide access to GOOS products which describe the state of the ocean globally at regular intervals
- Establish a Global Ocean Information System (GOIS), building on existing capabilities and forging close links between data providers (in situ and satellite-based) which already have effective monitoring, forecasting, and other information tools available, and potential users
- Ensure the availability of Essential Climate Variables ocean datasets. Coordinate with CEOS climate activity plans to optimize marine elements

- Develop vulnerability and integrated management of coastal zones in order to inventory, protect, and monitor coastal lands in the context of climate change and associated risk. Form links with disaster management activities (see DI-01)
- Provide advanced training in ocean observations and services, especially for personnel from developing countries and economies in transition, through a series of fellowship schemes, pilot projects (e.g. MARINEMET) and a Centre of Excellence

C2 Operational Systems for Monitoring of Marine and Coastal Ecosystems

Leads (tentative)

Canada (Dalhousie University), UK (PML), USA (WHOI)

Priority Actions

- Support the implementation of OceanSITES, a worldwide system of deepwater time-series stations, featuring capabilities such as surface moorings (observing air-sea interactions), and subsurface moorings (that can carry instrumentation down to the sea floor). OceanSITES complement satellite imagery and Argo float data by adding dimensions of time and depth
- Advocate rapid development of a global high frequency radar network to measure coastal surface currents. High frequency radar is recognized as a cost-effective solution to augment in-situ measurements and provide increased spatial and temporal resolution
- Promote the Chlorophyll Global Integrated Network (ChloroGIN) project which coordinates in-situ measurement of chlorophyll and related bio-optical properties of the ocean, in combination with satellite derived estimates of the same. ChloroGIN is a network of regional networks
- Promote the International Ocean Colour Coordinating Group (IOCCG) and application of remotely-sensed ocean-colour data through coordination, training, liaison between providers and users, advocacy and provision of expert advice
- Develop and expand global plankton biodiversity monitoring, building upon 80 years of phytoplankton and zooplankton biodiversity data obtained in the North Atlantic by means of the Continuous Plankton Recorder (CPR) survey. Global perspective will be achieved through international partnerships (see also BI-01)
- Fully engage with the four ocean-related CEOS Virtual Constellations: Ocean Surface Vector Wind, Ocean Surface Topography, Ocean Colour Radiometry, and Sea Surface Temperature (see also IN-01)

C3 A Global Operational Ocean Forecasting Network

Leads (tentative)

Denmark (DMI), UK (MetOffice), POGO

Priority Actions

- Establish a global operational oceanography network, connecting advanced operational forecasting centres in developed countries and quasi-operational centers in Asia, Africa and Latin America. Establish regional cooperation projects between advanced and less-developed operational centers
- Support the development of the GODAE (Global Ocean Data Assimilation Experiment) international ocean-forecasting project. Extend multi-model ensemble forecasting techniques to operational short-range ocean forecasting

C4 Applications of Earth Observations and Information to Sustainable Fishery and Aquaculture Management

Leads (tentative)

Canada (CSA, Dalhousie University), UK (PML), FAO

Priority Actions

- Facilitate the application of rapidly-evolving satellite technology to fish harvesting and fish health assessment. Support the development of the Societal Applications in Fisheries and Aquaculture using Remotely-Sensed Imagery (SAFARI) Project. SAFARI aims to accelerate the assimilation of Earth observation into fisheries research and ecosystem-based fisheries management on a global scale, through international coordination and outreach
- Design and implement a suite of ecological indicators with a view to detecting changes in ocean ecosystems (e.g. due to climate change, overfishing). Design and implement indicators responsive to seasonal and interannual changes in ocean ecosystems (see also EC-01)

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-03 (GEOSS Common Infrastructure), IN-04 (GEOSS Communication Networks), ID-01 (Data Sharing), ID-02 (Institutional and Individual Capacity), ID-04 (Building a User-driven GEOSS), DI-01 (Disaster Reduction), CL-01 (Climate Information), CL-02 (Global Carbon Observation), EC-01 (Global Ecosystem Monitoring), BI-01 (Global Biodiversity Observation)

Related 2009-2011 Work Plan Tasks (non exhaustive)

AR-09-03c) Global Ocean Observation System
DA-09-02b) Ensemble-Technique Forecasting Demonstrations
CB-09-03d) Building Capacity for Operational Oceanography
EC-09-01c) Regional Networks for Ecosystems
AG-06-02: Data Utilization in Fisheries and Aquaculture

New Proposals from the GEO Community

- Blue Planet: Ocean and Society (POGO)
- Global Ocean Information System (Germany, Bremen University)
- Extension of Ensemble Forecasting Techniques to Operational Ocean Forecasting Systems (UK)
- Vulnerability and Integrated Management of Coastal Zone (South Africa)
- Global High Frequency Radar Network (USA, USGEO)
- West Africa Marine Meteorology Project, MARINEMET (Spain)

For details, see *ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/* or *ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V1/*

Resources Available for Implementation (tentative and preliminary)

- European FP7 project GEO-WOW (Ocean Component, 2011-2014); GMES marine projects
- IOC regular annual budget support for GOOS
- Multilateral Member States implementation of GOOS
- USA (NOAA) annual funding for climate module of GOOS
- Open Ocean Module of the Global Environmental Facility - Transboundary Water Assessment Program (GEF-TWAP) (2012-2015)

Section under development

SB-02 Global Land Cover

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Data Management: Preparation of and access to, among Member and Participating Organization communities, global and regional information encompassing cross-cutting data sets such as land-cover and land use information.

Climate: Availability of all Essential Climate Variables needed by the WCRP, the IPCC and the UNFCCC.

Ecosystems: Increased operational monitoring of major ecosystems on land on an annual basis, including properties such as land-cover type.

Agriculture: Improved collaboration and coordination on the use and applications of Earth observations for land-cover mapping.

Description

Provide a suite of global land-cover and land-cover change datasets, based on improved and validated moderate resolution land-cover maps. Develop <50m global land-cover and land-cover change data sets, based on international community consensus and including a robust accuracy assessment. Improve the use of time-series products to characterize the nature and extent of land-cover change and dynamics.

Components

C1 Global Land-cover and Land-cover Change

Leads (tentative)

China (SBSM), EC (JRC), USA (USGS, NASA), FAO, GTOS (GOFC-GOLD)

Priority Actions

- Develop a global moderate-resolution land-cover monitoring system. Produce a global land-cover type (<50m) updated annually, together with annual and bi-decadal maps and statistics, and a robust independent accuracy-assessment led by the international community. Increase the use of time-series land-cover products and validate land-cover datasets such as GLOBCOVER and MODIS
- Enhance access to historical land-cover relevant imagery and global high-resolution coverage obtained through international acquisitions coordination. Support retrospective processing of historical satellite data archives for land-cover mapping and change analyses. Continue to provide access to available imagery for follow-up efforts and retrospective analysis building for instance upon GLOBCOVER and MODIS land-cover.
- Build international consensus and generate products driven by requirements for land-cover as an Essential Climate Variable. Ensure the joint operations of new satellites for land-cover monitoring, in particular the GMES Sentinels and the Landsat data continuity mission

To Be Implemented in Connection With

IN-01 (Earth Observing Systems), IN-02 (Earth Data Sets), ID-01 (Data Sharing), SB-03 (Global Forest Observation), SB-04 (Impact Assessment), EN-01 (Energy and Geo-Resources Management), CL-01 (Climate Information), CL-02 (Global Carbon Observation), AG-01 (Global Agricultural Monitoring), EC-01 (Global Ecosystem Monitoring)

Related 2009-2011 Work Plan Tasks (non exhaustive)

DA-09-03a) Global Land Cover
US-09-02a) Socio-Economic Benefits of GEO and GEOSS (Geo-Wiki)

New Proposals from the GEO Community

- Global Land Cover (USA)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

- US financial resources for the development of global land-cover products (~$1 million/year from USGS expected)
- ESA GLOBCOVER and land-cover climate change initiative (1.8 MEUR for 3 years) to respond to Essential Climate Variable requirements and provide land-cover products to the climate user community
- GOFC-GOLD global land-cover validation and harmonization initiative funded through support by ESA, NASA, and Canada (Canadian Forest Service, Canadian Space Agency)
- FAO support for validation activities and provision of software, standards and training (e.g. validation against existing FAO land-cover datasets; utilization with free access of any FAO software for segmentation and labeling; integration of ADG (Advanced Database Gateway) within the GEO Portal)

Section under development

SB-03 Global Forest Observation

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Climate: Development and facilitation of a comprehensive (atmosphere, ocean, land) global carbon observation and analysis system in support of monitoring based decision-making and related environmental treaty obligations.

Agriculture: Increased use of Earth observing capabilities and supporting applications systems to produce timely, objective, reliable, and transparent forest statistics and information at the national and regional level. Improved collaboration and coordination on the use and applications of Earth observations for forestry.

Ecosystems: Development of tools for decision making in support of the assessment, protection and sustainable management of ecosystems. Increased operational monitoring of major ecosystems on land on an annual basis, including properties such as (…) biomass and carbon estimates of vegetation and soils based on remote sensing and sampled in-situ observations using internationally agreed standards.

Description

Support the worldwide development of national forest information systems for improved forest management and ecosystem & biodiversity monitoring. Focus initially on REDD+ Measurement, Reporting and Verification (MRV), gradually connecting forest information systems to the global carbon observation and analysis capabilities (see CL-02). Coordinate satellite data acquisition over the global forest (with CEOS agencies and commercial providers) and define methodological guidelines for the key components of the MRV process (e.g. in-situ measurements and standards, satellite data processing, forest information product development, validation and accuracy metrics, models for carbon change assessment). Ensure comprehensive coverage and continuity of data, and facilitate countries' access to data, tools and methodologies. Continue Forest Carbon Tracking (FCT) demonstration activities and ensure continuous update of the technical basis for monitoring. Support the long-term observational needs of the UNFCCC and engage with other key users such as the IPCC.

Components

C1 Forest Carbon Tracking Activities to Demonstrate Observational and Methodological Guidelines

Leads

Australia (CSIRO), Canada (CFS), EC (FP7), Japan (JAXA), Norway (NSC), USA (USGS), CEOS (ESA), FAO

Priority Actions

- Through National Demonstrators activities, develop methods and protocols for data collection, processing and integration. Develop methods for forest carbon tracking. As of June 2011, National Demonstrators include Australia (Tasmania), Brazil, Cameroon, Colombia, Democratic Republic of Congo, Guyana, Indonesia (Borneo and Sumatra), Mexico, Nepal, Peru, and Tanzania
- Promote coordinated research and development needed for continuous improvement

C2 Definition, Implementation and Operations of the Global Forest Observation Initiative (GFOI) in Support of National Forest Information Systems

Leads (tentative)

Australia (CSIRO), Japan (JAXA), Norway (NSC), USA (USGS), CEOS, FAO

Priority Actions

- Ensure sustained availability of satellite and ground observations in support of national forest information systems. Develop a long-term data acquisition strategy and a 5-year plan for space data coverage and continuity in support of global forest observation requirements. Set up a framework for engaging data providers (CEOS agencies and commercial providers). Coordinate and provide regular and routine observations that are essential for effective reporting. Support the collection of, and access to, in-situ data
- Support countries in their use of observations in national forest information systems – respecting national choices of data and tools. Consolidate, review and issue a set of GEO guidelines/best practices on consistent and comparable methods for individually developed national systems. Work with countries to identify best implementation approaches. Develop tailored national capacity building plans to help governments implement national forest information systems

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), SB-02 (Land-Cover), SB-04 (Impact Assessment), EN-01 (Energy and Geo-Resources Management), CL-02 (Global Carbon Observation), EC-01 (Global Ecosystem Monitoring), AG-01 (Global Agricultural Monitoring), BI-01 (Global Biodiversity Observation)

Related 2009-2011 Work Plan Tasks (non exhaustive)

CL-09-03b) Forest Carbon Tracking
EC-09-01e) Forest Mapping and Change Monitoring

New Proposals from the GEO Community

Global Forest Observation Initiative (GFOI) (Australia, Brazil, China, Norway, Tanzania, USA, ESA/CEOS, GOFC-GOLD, FAO, World Bank)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

- CEOS space agencies' missions and related data acquisition
- European FP7 projects RECOVER, REDDAF, REDD-FLAME, REDDINESS, GEOCARBON, and AGRICAB
- US SilvaCarbon program
- In-kind and financial contributions from Australia, Brazil, Canada, EC, France, Japan, Netherlands, Norway, USA, CEOS, FAO
- Engineering and managerial resources needed to define, develop and deliver forest services to countries will be identified in the Global Forest Observation Initiative (GFOI) Implementation Plan

Section under development

SB-04 Impact Assessment of Human Activities

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Energy: Significant increase in use of Earth observations by all sectors (biomass, fossils, geothermal, hydropower, nuclear, ocean, solar and wind) for improved environmental, economic and societal impact assessments of energy exploration, extraction, conversion, transportation and consumption.

Description

Foster the use of Earth observation and information for environmental, economic and societal impact assessment. Develop datasets, tools and services for impact monitoring and prediction across Societal Benefit Areas. In particular, develop a set of tools to process and analyze datasets, either separately or in combination, including geophysical models. Identify data requirements for impact monitoring and promote related in-situ as well as remotely-sensed observations.

Components

C1 Tools and Information for Impact Assessment and Energy Policy Planning

Leads (tentative)

EC (EnerGEO), France (MINES ParisTech), Germany (DLR), Netherlands (TNO)

Priority Actions

- Develop a modelling platform that will enable planners and governments to forecast and monitor the environmental impact of changes in the energy mix
- Integrate Earth observation data with state-of-the-art modelling tools to calculate socio-economic impacts and environmental costs

C2 Impact Monitoring System for Geo-Resource Exploration and Exploitation

Leads (tentative)

EC (ImpactMIN, EO-MINERS), France (BRGM), UK (BGS)

Priority Actions

- Develop new tools for impact monitoring of mining operations using Earth observations
- Integrate information from in-situ, airborne and satellite observation (through data assimilation and models) to provide impact diagnostics

C3 Operational Carbon Capture and Sequestration (CCS) Monitoring System

Leads (tentative)

Netherlands (TNO), Norway (NSC), UK (BGS, SciSys)

Priority Actions

- Develop, and foster the use of, Earth observation products and services for the monitoring of CO2 storage sites
- Build upon ongoing projects such as “EO services for CO2 capture and storage facilities” (SciSys, UK) and ”CO2 capture and storage for the energy industry using high-resolution SAR” (InfoTerra Gmbh, Germany). Expand as appropriate to other projects and related sites (e.g. In Salah, Algeria; Weyburn, Canada)

- Perform a gap analysis that will form the basis for the establishment of an operational Earth observation system for CCS site monitoring
- Explore several methods for monitoring CCS sites, including surface deformation, hyperspectral and gravimetry methods

To Be Implemented in Connection with

ID-04 (Building a User-driven GEOSS), HE-01 (Tools and Information for Health Decision-Making), EN-01 (Energy and Geo-Resources Management), HE-02 (Tracking Pollutants), CL-01 (Climate Information), CL-02 (Global Carbon Observation and Analysis System)

Related 2009-2011 Work Plan Tasks (non exhaustive)

EN-07-02a) Environmental Impact of Energy Production (EnerGEO)
EN-07-02b) Towards an Operational Carbon Capture and Sequestration (CCS) Monitoring System
EN-07-03: Energy Policy Planning
EC-09-02b) Impact of Transport Infrastructure Development

New Proposals from the GEO Community

Two European FP7 projects (UK, EC, EuroGeoSurveys): (i) ImpactMIN – a toolset for the environmental impact monitoring of mining operations using Earth Observations; and (ii) EO-MINERS – to monitor mineral resources exploration and mining from concept to closure

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

European FP7 projects: EnerGEO (funded until 2013, overall funding 7MEUR), ImpactMIN, EO-MINERS

Section under development

DISASTERS

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

DI-01 Informing Risk Management and Disaster Reduction

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Disasters: Improved use of observations and related information to inform policies, decisions and actions associated with disaster preparedness and mitigation. More effective access to observations and related information to facilitate warning, response and recovery to disasters. Increased communication and coordination between national, regional and global communities in support of disaster risk reduction, including clarification of roles and responsibilities and improved resources management. Improved national response to natural and man-made disasters through delivery of space-based data, resulting from strengthened International Charter on "Space and Major Disasters". Support to the successful implementation of the Hyogo Framework for Action 2005-2015.

Description

Improve disaster risk management and reduction by providing timely information relevant to the full disaster management cycle (mitigation, preparedness, warning, response and recovery). Adopt a multi-hazard end-to-end approach to ensure that relevant Earth observations and information effectively reach decision-makers and the public. Focus on four main areas: (1) Provide support to operational systems; (2) Enable and inform risk and vulnerability analyses; (3) Conduct regional end-to-end pilots with a focus on building institutional relationships; and (4) Conduct gap analyses in order to identify missing data, system gaps, and capacity gaps (in coordination with ID-06).

Components

C1 Disaster Management Systems

Leads (tentative)

EC (GMES), South Africa (CSIR), USA (NASA), CEOS, ESA, UNITAR, UNOOSA

Priority Actions

- Improve access to information provided through key disaster management mechanisms such as the International Charter on Space and Major Disasters, Sentinel Asia, GMES Emergency Management Services, and SERVIR
- Make information related to environmental risk and vulnerability easily accessible to a wide range of decision-makers through a centralized platform. Build upon the South African Atlas that comprises an electronic spatial database system, a repository of global change-related information, and human capacity development
- Enhance the use of satellite data for disaster management, based on lessons-learned and experience from countries and organizations
- Integrate baseline geographic information and reference maps with real-time data from satellite or in-situ platforms into online Graphical User Interface and Decision Support System tools
- Review global and regional disaster risk management systems. Perform a gap analysis considering data, metadata, systems, and capacity (building upon existing analyses)

C2 Geohazards Monitoring, Alert, and Risk Assessment

Leads (tentative)

EC (OneGeology), Italy (EUCentre), South Africa (DST), USA (University of Miami, USGS), EPOS, ESA, FDSN

Priority Actions

- Apply a fully integrated approach to geohazards monitoring, based on collaboration among existing networks and international initiatives, using new instrumentation such as in-situ sensors, and aggregating space (RADAR, optical imagery) and ground-based (subsurface) observations. Develop open comprehensive natural-hazards datasets, initially focusing on selected targets (e.g. Supersites)
- Support the establishment of Supersites and Natural Laboratories. Provide an e-infrastructure allowing easy data access (space & in-situ), access to a wide range of tools, and a platform for on-line collaboration. Develop a consolidated Supersites Strategic Plan (covering space, ground, infrastructure meta-data, processing and data dissemination)
- Enhance global earthquake monitoring, alert, and damage assessment. Improve the global and regional coordination of seismographic networks. Enable rapid data access to waveform data for early warning, rapid shaking assessment and rapid damage assessment
- Support global earthquake risk assessment. Improve global standards and establish regional programs for hazard and risk assessment in a global framework. Support the implementation of the Global Earthquake Model initiative (GEM)
- Develop large-area vulnerability modeling and mapping using novel algorithms and methodologies based on SAR and optical satellite data

C3 Tsunami Early Warning and Hazard Assessment

Leads (tentative)

EC (DG-ECHO, JRC), Germany (DLR), IOC

Priority Actions

- Support tsunami early warning. Establish an inventory of relevant systems such as the German Indonesian Tsunami Early Warning System (GITEWS) and the European Tsunami Alerting Device (TAD)
- Promote real-time data sharing in particular seismic and sea-level (deep-ocean and tide-gauge data). Standardize procedures, terminology, communication and evacuation practices. Optimize tsunami evacuation plans through the use of damage scenarios and traffic flow models
- Support tsunami hazards assessment. Enable and develop a global tsunami hazard map through provision of bathymetry and topography data

C4 Global Wildland Fire Information System

Leads (tentative)

Canada (CFS), EC (JRC), Germany (GFMC), South Africa (CSIR), USA (NOAA, USDA), GTOS (GOFC-GOLD)

Priority Actions

- Support the establishment of an operational Global Wildland Fire Early Warning System (GWFEWS). Assess and realize the potential contributions of existing regional systems e.g. EFFIS

(European Forest Fire Information System), CFFDRS (Canadian Forest Fire Danger Rating System), and AFIS (Africa Fire Information System)

- Improve fire management cooperation and regional coordination with local systems. Produce common global fire danger metrics. Conduct regional inter-calibration of Fire Danger Indices (FDIs) within GWFEWS
- Support and promote the use of satellite data for wildfire risk assessment (near real-time, rapid refresh hot-spot detection) and damage assessment (burn scar mapping)
- Develop longer-term predictions of fire-danger based on advanced numerical weather models (in coordination with WE-01)
- Expand fire-danger rating systems to countries that do not have the financial nor institutional capacity to develop their own system

C5 Regional End-to-End Pilots

Leads (tentative)

Canada (CSA), USA (NASA, USAID), CEOS

Priority Actions

- Implement regional and cross-cutting end-to-end projects. Develop natural-risk decision-support tools and applications supporting the full cycle of disaster management, especially for developing countries. Support the implementation of the GEO Caribbean Satellite Disaster Pilots and Sensor Web applications in Namibia (and the Caribbean).
- Identify locations of tandem centers of excellence in developed and developing regions and initiate the formation of centers

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-03 (GEOSS Common Infrastructure), ID-01 (Data Sharing), ID-02 (Institutional and Individual Capacity), ID-04 (Building a User-driven GEOSS), ID-06 (Gap Analysis), SB-01 (Oceans and Society), HE-01 (Health Decision Making), WA-01 (Integrated Water Information), WE-01 (High-Impact Weather Prediction)

Related 2009-2011 Work Plan Tasks (non exhaustive)

CB-09-05c) SERVIR Expansion
DI-06-09 Use of Satellites for Risk Management
DI-09-01a) Vulnerability Mapping and Risk Assessment
DI-09-01b) Seismographic Networks Improvement and Coordination
DI-09-01c) Supersites and Natural Laboratories
DI-09-02a) Implementation of a Multi-Risk Management Approach
DI-09-02b) Regional End-to-End Disaster Management Applications
DI-09-03a) Tsunami Early Warning System of Systems
DI-09-03b) Implementation of a Wildland Fire Warning System at Global Level
EC-09-02e) Risk and Vulnerability Atlas

New Proposals from the GEO Community

- Development of a South African Geological Hazard Observation System (South Africa)
- Earthquake Damage Assessment from Radar Data (Italy, EUCENTRE)
- Earthmapper International Constellation for Global Disaster Monitoring and Early Warning (UK)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/ or ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V1/

Resources Available for Implementation (tentative and preliminary)

- ESA-funded review for improving access to the International Charter Space and Major Disasters in Africa
- In-kind contributions in support of the Supersites initiative from ESA, UNAVCO, USA (University of Miami), and several space agencies
- Regional/national wildfire systems funded by Canada (CFS), EC (JRC), Germany GFMC and South Africa (CSIR), also supporting the implementation of the GWFEWS
- Caribbean Satellite Disaster Pilot and Namibia Flood project co-funded by Canada (CSA), USA (NASA), CEOS and other partners

Section under development

HEALTH

Understanding environmental factors affecting human health and well-being

HE-01 Tools and Information for Health Decision-Making

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Health: Access to improved environmental information and tools to support the global community of human health and environment experts. Increased use of environmental information and tools to support decision making in epidemics and/or disease management and planning for well-being. Applying outcomes from other Societal Benefit Areas to improve health and well-being.

Description

Develop tools and information systems for the environment and human health. Advance the integration of Earth observations and forecasts into health decision-making processes. Establish linkages with other Societal Benefit Areas such as Ecosystems, Biodiversity, Climate and Disasters (e.g. in connection with floods, earthquakes, cyclones, and tsunami events). Engage with health users and decision-makers to identify the needs. Carry out capacity building and a plan for promotion and sustainable use of Earth observation information by the health user-community. Build upon the work of the Health and Environment Community of Practice.

Components (*note: Diseases may have other transmission pathways than those indicated below*)

C1 Air-borne Diseases, Air Quality and Aeroallergens

Leads (tentative)

EC (EO2HEAVEN), Spain (AEMET), USA (EPA, HCF, NASA), WMO

Priority Actions

- Meningitis: Support the integration of research activities with public health needs to (i) reduce the burden of meningitis in Africa, (ii) provide access to quality climate information, (iii) identify risk assessment criteria, and (iv) map the distribution of meningitis and population at highest risk
- Influenza: Assess current activities, needs, and priorities in the use of Earth observations for the surveillance and prediction of seasonal influenza and early detection of pandemic influenza. Expand the availability, use, and application of environmental and influenza monitoring data
- Aerosols: Facilitate research and development activities for services related to monitoring of the atmospheric cycles of aerosols and their improved forecast in operational numerical models. Reduce risk due to aerosols for health and public safety and assess aerosol effects on marine and terrestrial ecosystems. Support initiatives such as the Sand and Dust Storm Warning and Assessment System (SDS-WAS)
- Air Quality: Provide near-real-time air quality observations and forecasts for health management, research and public information. Improve Earth observation data assimilation schemes. Implement a system that reduces adverse respiratory and cardiovascular outcomes among residents exposed to ambient pollution. Build upon a number of projects: EO2HEAVEN, AIRNow International, and Real Time Data Dissemination for Air Quality
- Aero-allergens: Identify and expand tools, networks and databases providing information on aeroallergens for health decision-making. Support emerging Earth observation systems and models to improve forecasts and alerts/early-warning. In particular, improve links with phenology monitoring

C2 Water-borne Diseases, Water Quality and Risk

Leads (tentative)

EC (EO2HEAVEN), France (CNES), USA (EPA, NOAA), WHO

Priority Actions

- Implement a global initiative for cholera early warning. Produce risk prediction tools to better manage cholera risk in key countries. Examine the relationship between environmental factors (e.g. climatic) and cholera outbreaks in sub-Saharan Africa and South Asia
- Identify and map environmental factors affecting the distribution and re-emergence of leptospirosis. Address the various factors controlling leptospirosis (e.g. rodent populations, water and sanitation, environmental conditions) and provide recommendations for outbreak response and research
- Build and sustain an international cross-disciplinary community that integrates environmental, health and social information to understand, predict, and reduce freshwater and marine disease risk. Determine the impact of extreme events, and climate variability and change, on the vulnerability of water sanitation systems globally, and related burden of water-borne disease
- Assess coastal and inland aquatic system health and human health impact from vibrios, contaminants, and harmful algal blooms. Improve real-time data dissemination for coastal beach water quality (see also SB-01 and WA-01)

C3 Vector-borne Diseases

Leads (tentative)

Brazil (FIOCRUS, UFPR), France (CNES), India (ICMR)

Priority Actions

- Link Earth observation and public-health communities to build user-driven tools for vector-borne disease monitoring. Tools would integrate climate conditions as advanced information for disease preparedness and control
- Foster the use of satellite and in-situ data for monitoring environmental conditions conducive to the spread of vector-borne and zoonotic diseases. Identify initially district-level study areas in India, Africa, Europe and the Americas for dengue, malaria, Rift Valley fever, and Lyme disease respectively
- Develop distribution maps of vector-borne diseases. Collect retrospective monthly/weekly data. Collect meteorological satellite data and examine the relationship with disease incidence. Study the feasibility of developing advanced systems for use by health authorities

C4 A Holistic Approach to Health: Transmission Dynamics, Urban Health Forecasting, Linkages and New Technologies

Leads (tentative)

EC (JRC), USA (EPA)

Priority Actions

- Implement the health-meteorology forecasting service “Healthy City – Intelligent City”. Develop an early warning system in Shanghai focusing on Chronic Obstructive Pulmonary Disease (COPD), cardiovascular disease and children’s asthma. Map risks to understand not only physical and clinical factors, but also social determinants (see also EC-01)

- Through an interdisciplinary approach, characterize the dynamics and mechanisms underlying the relationship between social stressors, changes in biodiversity, and disease transmission to humans (e.g. for Lyme disease, West Nile Virus)
- Establish linkages between disasters (e.g. floods, earthquakes, tsunami, cyclones) and areas prone to vector and waterborne diseases. Assess health consequences of intensive agricultural land-use

To Be Implemented in Connection with

IN-02 (Earth Data Sets), ID-02 (Institutional and Individual Capacity), ID-04 (Building a User-driven GEOSS), SB-01 (Oceans and Society), SB-02 (Global Land Cover), DI-01 (Disaster Risk Reduction), CL-01 (Climate Information), WA-01 (Integrated Water Information), EC-01 (Global Ecosystem Monitoring), AG-01 (Global Agricultural Monitoring), BI-01 (Global Biodiversity Observation)

Related 2009-2011 Work Plan Tasks (non exhaustive)

US-09-02a) Global Phenology Data
HE-09-01: Information Systems for Health
HE-09-02a) Aerosol Impacts on Health and Environment: Research, Monitoring and Prediction
HE-09-02b) Air Quality Observations, Forecasting and Public Information
HE-09-02e) Surveillance and Prediction of Seasonal Influenza
HE-09-03a) Implementation of a Meningitis Decision-Support Tool
HE-09-03b) Predicting and Reducing Incidence of Vector-Borne and Zoonotic Diseases
HE-09-03c) Ecosystems, Biodiversity and Health: Decision-Support Tools and Research
HE-09-03d) Reducing Health Risk from Water-borne Diseases
WA-08-01g) Global Water Quality Monitoring

New Proposals from the GEO Community

Real Time Dissemination of Coastal Air Quality and Beach Water Quality Information through a Global Geospatial System (USA, USGEO)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

- European FP7 project EO2HEAVEN (funded until 2015, overall funding 7MEUR)
- Funds and in-kind contributions (including human resources, data and information) from Brazil (FIOCRUS, UFPR), (France (CNES), Japan (NIES), South Africa (CSIR, DST), USA (EPA, NASA, NOAA), WMO (SDS-WAS)
- WHO project on Global Information Management System on Environment and Health (GIMS); to be confirmed

Section under development

HE-02 Tracking Pollutants

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Health: Access to improved environmental information and tools to support the global community of human health and environment experts. Increased use of environmental information and tools to support decision making in epidemics and/or disease management and planning for well-being.

Ecosystems: Increased operational monitoring of major ecosystems on land on an annual basis. Increased operational monitoring of major marine and coastal ecosystems on an annual basis.

Description

Increase the availability of Earth observation and information needed to track pollutants and anticipate changes to the environment. Harmonize standard operating procedures for monitoring pollutants and their compounds in air, atmospheric deposition, water, soil, sediments, vegetation and biota. Understand temporal and spatial patterns of pollutant transport and deposition to, and evasion from, terrestrial and aquatic ecosystems. Support the validation of regional and global atmospheric pollutant models for use in evaluations of different policy options. Evaluate the effectiveness of international efforts to reduce releases of pollutants.

Components

C1 Global Mercury Observation System

Leads (tentative)

EC (GMOS), Germany (HZG), Italy (CNR), Japan (NIES), USA (EPA)

Priority Actions

- Develop standard operating procedures (SOPs) for monitoring mercury and its compounds in air, atmospheric deposition, water, soil, sediments, vegetation and biota
- Conduct ground-based observations to provide spatially-distributed information on mercury concentrations in ambient air and precipitation. Collect quasi real-time observations from over 40 sites worldwide located at different altitudes and latitudes
- Conduct marine observations to provide data on mercury concentrations in biotic and abiotic systems of major oceans (Atlantic, Pacific, Indian) and seas (North, Baltic, Mediterranean Seas)
- Collect globally-distributed tropospheric observations (on regional and intercontinental flights; GMOS and NAAMEX projects). Establish vertical profiles of mercury species across the troposphere and lower stratosphere
- Validate regional and global scale atmospheric mercury models on the basis of the data produced at ground-based sites over oceans and seas, and in the troposphere/stratosphere
- Develop an interoperable system to share information and tools, and download various types of datasets and information (observations, modeling products, reports)

C2 Global Monitoring of Persistent Organic Pollutants, Emerging Contaminants and Global Change Indicators

Leads (tentative)

Germany (VTI, BUND), UNEP (Stockholm Convention Secretariat)

Priority Actions

- Develop and implement a global monitoring plan for tracking changing levels of Persistent Organic Pollutants (POPs) in the natural environment and human beings. Evaluate the effectiveness of international efforts to reduce POP releases. Interlink relevant existing systems for monitoring air, water, ice caps and human health
- Encourage the tracking of nanoparticles, and impact thereof, in soil, water, and atmosphere
- Expand the monitoring of disease-vector plants and animals as health indicators of climate change impacts (see also EC-01)

To Be Implemented in Connection with

HE-01 (Health Decision Making), SB-01 (Ocean and Society), SB-04 (Impact Monitoring), EC-01 (Global Ecosystem Monitoring), BI-01 (Global Biodiversity Observations)

Related 2009-2011 Work Plan Tasks (non exhaustive)

HE-09-02c) Global Monitoring Plan for Persistent Organic Pollutants (POPs)
HE-09-02d) Global Observation System for Atmospheric Mercury

New Proposals from the GEO Community

- Nanoparticles Observing System (Germany, Bund)
- Monitoring of Disease-Vector Plants and Animals (Germany, Bund)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

Global Mercury Observation System

- European FP7 project GMOS (7 MEUR over 2010-2015)
- Italian Polar Research Program, funding period 2010-2012; French Polar Program
- US AMNet Program (supported by e.g. EPA, FWS, NOAA, NPS, USGS)
- CARIBIC funded by Max Planck Society, Helmholtz Association, and Leibniz Association
- NAAMEX (North America Airborne Mercury Experiment) project
- Operations of monitoring sites in/by Japan, Canada, China, Germany

Persistent Organic Pollutants

- Stockholm Convention Secretariat: Financial resources for 2012: US$ 640,000; 2013: US$ 350,000. Human resources: Secretariat staff time; Staff time of the regional organization group members
- Contribution from strategic partners: GAPS, RECETOX, South-East Asia Monitoring Programme, UNEP DTIE/Chemicals Branch, WHO

Section under development

ENERGY

Improving management of energy resources

EN-01 Energy and Geo-Resources Management

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Energy: Significant increase in use of Earth observations by all sectors (biomass, fossils, geothermal, hydropower, nuclear, ocean, solar and wind) for improved: (i) Prediction of potential hazards to the energy infrastructure; (ii) Prediction of the production of intermittent sources of energy; and (iii) Mapping of renewable energy potential. Improved energy management, including balance between energy demand and supply as well as development of alternative energy scenarios. Safe, efficient and affordable development and operation of existing and new energy resources, with emphasis on minimizing environmental and societal impact while moving towards a low-carbon footprint. Advancement of the application of data, systems and tools.

Description

Support the development of Earth observation products and services for energy and geo-resources management. Consider end-to-end energy production systems (including generation, transmission, distribution, and integrated operations) and geo-resource exploitation systems (including exploration, extraction and transportation). Promote collaboration between users and providers of Earth observation and information. Encourage the use of Earth observation and information for informed energy-policy planning in developing and developed countries.

Components

C1 Tools and Information for the Resource Assessment, Monitoring and Forecasting of Energy Sources (including solar, wind, ocean, hydropower, and biomass) and Geological Resources (including mineral and fossil resources, raw material and groundwater)

Leads (tentative)

EC (AEGOS, ENDORSE), France (MINES ParisTech), Germany (DLR), UK (BSG), IRENA

Priority Actions

- Develop prototype products and services required to assess countries' potential for energy production. Foster the use of Earth observation and information in energy-policy planning
- Identify user needs for specific energy data sets (including solar, wind, ocean, hydropower, and biomass, geothermal)
- Enhance data access through improved interoperability. Design an infrastructure of interoperable data and user-oriented services to strengthen the sustainable use of geo-resources
- Promote the use of Earth observations for the mapping of geothermal resources, with a focus on the East African Rift System (EARS). Locate geothermal anomalies using thermal and mineral mapping under different climate conditions (desert, savannah, rain forest)
- Develop a Bio-Energy Atlas for Africa to provide information on the quantity, distribution, usage, and quality of biomass
- Encourage training of decision-makers at all relevant levels for interpreting relevant data and products

To Be Implemented in Connection with

IN-03 (GEOSS Common Infrastructure), SB-02 (Global Land Cover), SB-03 (Global Forest Observation), SB-04 (Impact Monitoring), CL-01 (Climate Information), CL-02 (Global Carbon Observation), WA-01 (Integrated Water Information), WE-01 (High-impact Weather Prediction), AG-01 (Global Agricultural Monitoring)

Related 2009-2011 Work Plan Tasks (non exhaustive)

CB-09-05d) Geo-resources Services for Africa (AEGOS)
EN-07-01: Management of Energy Sources
EN-07-02c) Locating High-Temperature Geothermal Resources
EN-07-03: Energy Policy Planning

New Proposals from the GEO Community

- Bio-Energy Atlas for Africa (South Africa, Brazil, RCMRD)
- Irradiance Energy Atlas for Northern Africa (Spain)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/ or ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V1/

Resources Available for Implementation (tentative and preliminary)

European FP7 projects ENDORSE (ENergy DOwnstReam SErvices - Providing energy components for GMES; 2011-2013); AEGOS legacy

Section under development

CLIMATE

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

CL-01 Climate Information for Adaptation

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Climate: Improved scientific understanding, modelling and prediction of climate. Accessibility of all the observational data needed for climate monitoring and services in support of adaptation to climate variability and change. Availability of all Essential Climate Variables needed by the WCRP, the IPCC and the UNFCCC.

Agriculture: Improved agricultural risk assessment and operational weather/climate forecast systems for early warning and food security.

Description

Produce high-quality temporally-homogeneous estimates of past and current climate to better detect climate variability and change. Accelerate the implementation of the Global Climate Observing System (GCOS) – the climate-observing component of GEOSS. Strengthen the ability worldwide to deliver new and improved climate, weather, water and environmental services. Support the integration of climate products and services into adaptation processes. Encourage the use of this information by policy and decision makers at all levels.

Components

C1 Extension and Improvement of the Climate Record

Leads (tentative)

EC (ERACLIM, MACC-II), Japan (JMA), USA (NOAA), GCOS, ECMWF, IGBP (PAGES), WCRP

Priority Actions

- Support reanalysis and reprocessing efforts in the atmosphere, ocean, land and-sea ice domains
- Facilitate the recovery of historical atmospheric, terrestrial and marine observations
- Compile proxy-based paleoclimate records over the last two millennia for the Arctic and all continents (including adjacent ocean regions)
- Produce regional-scale reconstructions of seasonal variations in temperature, precipitation, and atmospheric pressure fields
- Promote proxy calibration, data-model comparison, and understanding of inter-decadal and longer climate change at global and regional scales

C2 Accelerated Implementation of the Global Climate Observing System

Leads (tentative)

GCOS, CEOS (ESA, NOAA), GOOS, GTOS, WMO (GAW, GOS)

Priority Actions

- Support the implementation of the specific Actions identified in the “Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC” (2010 Update). These will help make available Essential Climate Variables datasets and be conducted across the atmospheric, oceanic, and terrestrial domains essentially over the next five years

- Provide support to the GCOS component systems: the WMO Global Observing System (GOS) and Global Atmosphere Watch (GAW), the IOC-led Global Ocean Observing System (GOOS), the FAO-led Global Terrestrial observing System (GTOS), the global hydrological networks and satellite systems
- Establish actions securing the provision of Essential Climate Variables data from satellite systems
- Support the GCOS programme in its assessment of progress and adequacy, and its development of a new Implementation Plan, including review and refinement of the list of Essential Climate Variables, in the 2014-2015 timeframe

C3 Weather, Climate and Earth-System Prediction Systems

Leads (tentative)

IGBP, WCRP, WMO (WWRP/THORPEX)

Priority Actions

- Foster advances on seamless prediction, sub-seasonal to seasonal prediction, and polar prediction through the implementation of dedicated international research projects
- Improve the representation of organized tropical convection in models and of its interaction with the global circulation. In particular, further support the Year of Tropical Convection (YOTC). Develop diagnostics/metrics for robust simulation of the Madden Julian Oscillation

C4 Easy Access to, and Use of, Climate Information

Leads (tentative)

EC (GMES), Spain (AEMET), USA (NOAA), GCOS, WMO

Priority Actions

- Ensure delivery of the climate information needed for adaptation through the GEO Portal
- Build upon existing “Climate Services” portals such as the US portal “climate.gov”
- Build upon the WMO Global Framework for Climate Services (as it develops)
- Promote the implementation of regional initiatives such as the Climate for Development in Africa Programme (ClimDev Africa)
- Provide training on data series handling and the generation of regional climate change scenarios to enhance the role of National Meteorological Services as climate service providers

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-03 (GEOSS Common Infrastructure), ID-02 (Institutional and Individual Capacity), ID-04 (Building a User-driven GEOSS), SB-01 (Oceans and Society), SB-02 (Global Land Cover), SB-03 (Global Forest Observation), CL-02 (Global Carbon Observation), WA-01 (Integrated Water Information), AG-01 (Global Agricultural Monitoring), BI-01 (Global Biodiversity Observation)

Related 2009-2011 Work Plan Tasks (non exhaustive)

AR-09-03a) Global Terrestrial Observations
AR-09-03c) Global Ocean Observation System
AR-09-03d) Global Observing System (GOS)
CL-06-01a) Sustained Reprocessing and Reanalysis of Climate Data
CL-06-01b) Extending the Record of Climate Variability at Global Scale
CL-09-01a) Towards Enhanced Climate, Weather, Water and Environmental Prediction

CL-09-01b) Climate Information for Decision-making, Risk Management and Adaptation
CL-09-02a) Key Observations for Climate (GCOS)
CL-09-02b) Key Climate Data from Satellite Systems

New Proposals from the GEO Community

- Training on the Generation of Regional Climate Change Scenarios (Spain)
- Regional Gateway for Technology Transfer and Climate Change Action in Latin America and the Caribbean (REGATTA) (Spain)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V1/

Resources Available for Implementation (tentative and preliminary)

- Year of Tropical Convection (YOTC) Programme Office
- Participating Organizations and Universities (research)
- European funding for GMES development and operations

Section under development

CL-02 Global Carbon Observation and Analysis

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Climate: Development and facilitation of a comprehensive (atmosphere, ocean, land) global carbon observation and analysis system in support of monitoring based decision-making and related environmental treaty obligations.

Ecosystems: Increased operational monitoring of major ecosystems on land on an annual basis, including properties such as biomass and carbon estimates of vegetation and soils based on remote sensing and sampled in-situ observations using internationally agreed standards.

Description

Develop a comprehensive (atmosphere, ocean, land) and integrated global carbon observation and analysis system to provide (i) improved estimates of carbon budget at different scales (from global to regional/national); and (ii) reliable information and products for decision makers. Improve global observation networks of CO2, CH4, isotope ratios and exchange fluxes. Develop geo-information tools, databases and models integrating carbon reservoir and flux data. Provide communication points to increase the information flow from providers to users, and disseminate current state-of-the-art information.

Components

C1 Integrated Global Carbon Observation and Analysis System

Leads (tentative)

Australia (CSIRO), EC (GEOCARBON), France (LSCE), Italy (CMCC, University of Tuscia), Japan (AIST, JAXA), Netherlands (University of Amsterdam), Norway (Bergen), UK (University of Sheffield), USA (NASA, NOAA, USDA, USGS), CEOS, GTOS, WMO (GAW)

Priority Actions

- Improve information and products: Provide a coordinated set of harmonized global carbon information (integrating the land, ocean, atmosphere and human dimension). Support decision-makers and relevant international community (providing advice on carbon observations). Create a Carbon portal linked to the GEO Portal
- Improve global observation networks measuring carbon pools and fluxes, considering both CO2 and CH4: Produce a catalogue of current observation systems and datasets. Identify gaps in the current coordination of the global observing systems. Define an optimal observational network design for an operational global carbon observing system
- Improve (resolution and accuracy) carbon budgets at different scales: Provide a coordinated set of harmonized global carbon information based upon existing observations and model integrations
- Develop geo-information tools, databases and models integrating data from different sources: Develop an integrated Carbon Cycle Data Assimilation System (CCDAS) ingesting data from multiple data sources (in situ and satellite observations of atmospheric, terrestrial and ocean domains) at different scale. Maintain and update a geo-referenced database of all available data
- Validate space-based greenhouse-gas (GHG) observations and consolidate data requirements for the next-generation GHG monitoring missions: Routinely provide space-based GHG data and products for CO2 and CH4, e.g. drawn from the GOSAT, SCHIAMACHY and IASI missions. Identify gaps in current and future GHG missions. Design CEOS activities in response to the GEO Carbon Strategy Report

To Be Implemented in Connection with

ID-06 (Gap Analysis), SB-02 (Global Forest Observation; as regards forest carbon tracking), EC-01 (Global Ecosystem Monitoring; as regards the carbon component of ecosystems, biomass, soil carbon), SB-01 (Ocean and Society; as regards pCO2), WA-01 (Integrated Water Information; as regards carbon in lake sediments)

Related 2009-2011 Work Plan Tasks (non exhaustive)

CL-09-03a) Integrated Global Carbon Observation (IGCO)
CL-09-03c) Global Monitoring of Greenhouse Gases from Space

New Proposals from the GEO Community

None at this stage

Resources Available for Implementation (tentative and preliminary)

- European FP7 and GMES projects: GEOCARBON (6.5MEUR for 3 years, starting end 2011), CARBOCHANGE, and MACC-II
- Resources allocated to FLUXNET and other regional flux networks (such as the Asia Flux network observing CO2 fluxes in forests)
- Japanese greenhouse gas observing satellite GOSAT (providing e.g. datasets of CO2 global distribution)

Section under development

WATER

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

WA-01 Integrated Water Information (incl. Floods and Droughts)

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Water: An operationalized and sustained global network of in-situ observation sites. Increased availability of information products and services for monitoring changes in the water cycle, including clouds and precipitation, appropriate for both research and integrated water resource management. Increased availability of data and information, including quantity and quality of both surface and groundwater, to support a water cycle decision making system. Routine, reliable production of "watershed" and human health indicators from satellite data, surface and subsurface data, and data assimilation capabilities.

Ecosystems: Increased knowledge of environmental flow requirements of river baseflow and peak flow, as well as human requirements for irrigation and power plant cooling water and domestic usage.

Description

Develop integrated and sustained information systems to produce the water products and services needed for water, disaster, agriculture, energy and health management. Focus on developing local, regional and global hydrological risk (e.g. floods, droughts) assessment, prediction and management systems for integrated water resource management. Maintain an operational and sustained global network of in-situ observation sites and satellite systems to provide global coverage of priority water-cycle variables. Increase the scope and availability of products and services for monitoring changes in the water cycle (including precipitation, evapo-transpiration, soil moisture, river discharge and storage in lakes and reservoirs, and groundwater storage). Develop information products on the quality of surface and coastal waters for a comprehensive water-cycle decision making system.

Component

C1 Integrated Water-cycle Products and Services

Leads (tentative)

Japan (JAXA, University of Tokyo), USA (NASA, NOAA, USGS), CEOS, WMO

Priority Actions

- Ensure users have access to stable, state-of-the-art, characterized, global precipitation datasets, building upon the Virtual Constellation for Precipitation (see also IN-01)
- Improve global evapo-transpiration products for vegetated land surfaces, and also for lakes and rivers, deserts, urban areas and snow-covered land-areas
- Develop a global soil-moisture product and service for climate and water management applications
- Deliver integrated data sets from the Great Lakes basin providing information on extent of ice cover, surface and groundwater levels, and bacteria conditions at beaches. Develop tools to ensure access and interoperability to serve the needs of theme-based user communities
- Integrate, in a phased approach, dedicated river gauging networks of existing hydrological stations into a global runoff observation network. Make the data available through the GEOSS Common Infrastructure using standardized formats
- Establish a Global Groundwater Monitoring Network (GGMN) for a periodic assessment of global groundwater resources, using information from existing national, regional and global networks

- Develop a GEOSS Water Cycle Integrator (WCI) to provide holistic coordination of water cycle information, including integration of observations, research, modeling, and analysis; cross-SBA applications; management systems; and a sustained educational framework
- Develop End-to-end State-of-the-water-cycle Indicators. Provide an operational global data compendium, organized as a set of electronic maps, and representing a definitive, comprehensive, and up-to-date picture of the state of hydrological systems and affiliated water resources, their accessibility and use by society

C2 Information Systems for Hydro-meteorological Extremes (incl. Floods and Droughts)

Leads (tentative)

Austria (Technical University of Vienna), EC (JRC), USA (NIDIS, NOAA, Princeton University), WMO

Priority Actions

- Establish an integrated framework for predicting, monitoring and responding to hydro-meteorological extremes. Construct a global, multi-model and multi-ensemble flood and drought information platform to assemble existing sources of real-time flood and drought information (forecasts and observations), while providing a common risk-management framework for early warning and risk management
- Establish a global drought observing system to correct errors in precipitation, soil moisture, evapo-transpiration, and terrestrial water-storage change derived from land-surface/hydrological models
- Establish a global drought monitor to link together continental and regional drought monitoring efforts and produce a web-based, real-time, geographic information system. Develop a regional drought impacts monitor to assess drought vulnerability by establishing a water usage and demand baseline
- Establish a global drought information and early warning framework, capitalizing on drought observing, monitoring, and impact systems, to enable early-warning systems to more effectively respond to drought at national/regional levels

C3 Information Service for Cold Regions

Leads (tentative)

Canada (University of Waterloo), USA (NASA, NOAA, NSIDC), WMO

Priority Actions

- Support the development of sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs. Improve the networking among existing observing systems and sites to create pan-Arctic observing networks. Promote the implementation of the SAON project (Sustaining Arctic Observing Networks)
- Support glacier monitoring, building upon the work of GLIMS, GlobGlacier, and the National Snow and Ice Data Center. Collect standardized observations on glacier fluctuations and perform glacier inventories; see also IN-01
- Archive, manage, and provide access to in-situ and remotely-sensed data measuring frozen ground, glaciers, ice sheets, sea ice, and snow. Build a polar data catalogue through integrated observation and modelling data from the broad range of “International Polar Year” research activities
- Establish a Cryosphere Constellation by linking existing and proposed portals of cryospheric information, such as the Polar Data Catalogue, National Snow and Ice Data Centre, and SAON. Link this constellation of portals through GEOSS interoperability standards

C4 Global Water-Quality Products and Services

Leads (tentative)

Australia (CSIRO), Germany (University of Bonn), South Africa (CSIR), USA (EPA, NASA, Wisconsin Department of Natural Resources), UNEP, WHO

Priority Actions

- Develop improved water-quality datasets through algorithm development, atmospheric correction and standardization of data processing and products. Develop a riverine water-quality data assimilation system primarily based on in-situ water-quality data from the GEMS archive and constituent transport models
- Scope water-quality information systems to collate, manage and provide public access to international water-quality datasets. Develop toolsets for analysis and visualization, incorporating both remotely-sensed and in-situ databases. Develop integrative hydrologic/water-quality models focused on sediment and nutrients
- Expand the ChloroGIN project as a fast track end-to-end exercise to include large lakes and evaluate existing lake algorithms (see SB-01)
- Coordinate efforts of the water-quality community, working with other GEO communities (such as Health and Oceans; see HE-01)

C5 Information System Development and Capacity Building

Leads (tentative)

Canada (IISD), Japan (JAXA, University of Tokyo), USA (University of Maryland, USAID), ESA, IEEE, UNESCO

Priority Actions

- Latin and Caribbean Americas: Design a programme for water-resource management to support the development of infrastructure, decision-support-systems, and training/research applied to the use of Earth observation
- Asia: Develop competencies among water management practitioners, researchers, and administrators through demonstration projects in the Asian Water Cycle Initiative. Build upon Sentinel Asia to develop disaster management-support systems and Space Application for Environment (SAFE) in the Asia-Pacific region (see also DI-01)
- Africa: Improve the collection, analysis and dissemination of water-related information. Support the African Water Cycle Coordination Initiative to develop an independent water management capacity and sustainable water observing networks. Build upon the TIGER initiative (space technology for water resource management in Africa) and existing information systems such as SERVIR
- Conduct demonstration projects on the value of Earth observations for water management. Assess and coordinate requirements for Earth observation data, products and services. Capture user feedback on an ongoing basis across the Water area (particularly from developing countries)
- Conduct pilot projects for improved water discovery and quality in cooperation with local, regional, and national groups, to provide water quantity and quality assistance

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-03 (GEOSS Common Infrastructure), ID-02 (Institutional and Individual Capacity), ID-04 (Building a User-Driven GEOSS), SB-01 (Oceans and Society), DI-01 (Disaster Risk Reduction), HE-01 (Health Decision-Making), CL-01 (Climate Information), CL-02

(Global Carbon Observation), WE-01 (High-Impact Weather Prediction), AG-01 (Global Agricultural Monitoring)

Related 2009-2011 Work Plan Tasks (non exhaustive)

AR-09-03b) Legacy of the International Polar Year 2007-08
WA-06-02a) Forecasting for Droughts and Floods
WA-06-02b) Impacts from Drought
WA-06-02d) Prototype Regional Drought Early Warning Test Beds
WA-06-07a) Latin America
WA-06-07b) Africa
WA-06-07c) Asia
WA-06-07d) Pilot Projects for Improved Water Discovery and Quality Assessments
WA-08-01a) Soil Moisture
WA-08-01b) Runoff
WA-08-01c) Groundwater
WA-08-01d) Precipitation
WA-08-01e) Water Cycle Data Integration
WA-08-01g) Global Water Quality Monitoring

New Proposals from the GEO Community

- Global Flash Flood Guidance System (USA, USGEO)
- Sustaining Arctic Observing Networks (USA, USGEO)
- Eco-Hydrologic Sensitivity and Dry-Weather Hazards in a Changing Climate (Italy, Genova Uni)
- WaterML - to improve interoperability and exchange of water data (USA, USGEO)
- Sediment and Biogeochemical Sources, Fluxes and Sinks (Germany, Bonn University)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

- Data, systems and services contributed by the Global Precipitation Climatology Centre, Global Runoff Data Centre, International Groundwater Assessment Centre, International Data Centre on the Hydrology of Lakes and Reservoirs, and World Glacier Monitoring Service
- European FP7 projects GEO-WOW (Water Component), DEWFORA, and GLOWASIS
- CEOS Virtual Constellation for Precipitation
- Resources supporting Japan strengthened strategy for Arctic environment
- Additional in-kind contributions from Austria (Technical University of Vienna), Canada (University of Manitoba), EC (JRC), Japan (JAXA, University of Tokyo), UK (University College of London), USA (Princeton University, USGS), IEEE

Section under development

WEATHER

Improving weather information, forecasting and warning

WE-01 High-Impact Weather Prediction and Information

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Weather: Improvements in the range and quality of services for high-impact weather forecasting due to the design, future development, and operation of global observing, data assimilation, numerical modelling, and user application techniques. More accurate, reliable and relevant weather analyses, forecasts, advisories and warnings of severe and other high-impact hydro-meteorological events enabled by enhanced observational capabilities

Agriculture: Improved agricultural risk assessment and operational weather/climate forecast systems for early warning and food security

Energy: Significant increase in use of Earth observations by all sectors for improved prediction of potential hazards to the energy infrastructure.

Description

Increase the predictability of high-impact weather events worldwide. Enhance collaboration on ensemble prediction, both internationally and among operational centres and academia. Produce user-driven probabilistic products to improve early warnings of high-impact events. Realize the benefits of research developing and evaluating these probabilistic products. Enable the development of an operational Global Interactive Forecast System (GIFS) to coordinate advance warnings and forecasts of high-impact weather events to mitigate loss of life and property. GIFS will be developed through the volunteer contributions of national, regional, and international organizations, requiring significant investment from National Hydro-Meteorological Services and other organizations. Contribute to high priority issues such as disaster early warning, food security, and energy infrastructure safeguard.

Components

C1 Global Multi-Model Prediction System for High-Impact Weather

Leads (tentative)

WMO (WWRP/THORPEX)

Priority Actions

- Further develop TIGGE (THORPEX Interactive Global Grand Ensemble), a user-friendly database of global ensemble weather forecasts. Use web-enabled technology to foster the generation and distribution of products. Develop a future archive strategy, product generation and service provision. Finalize and implement access arrangements
- Implement the Global Interactive Forecast System (GIFS). As an initial step, produce user-driven probabilistic products (based on TIGGE forecasts) such as tropical cyclone tracks, heavy rainfall and strong wind distributions. Build upon the WMO Severe Weather Forecast Demonstration Project (SWFDP) to provide a framework for the evaluation of these prototype products, and to ensure that products address needs of operational forecasters and end-users.

C2 Easy Access to, and Use of, High-impact Weather Information

Leads (tentative)
Korea (KMA), Spain (AEMET), WMO (WWRP/THORPEX), ACMAD

Priority Actions

- Develop a common platform to collect, store and exchange data – not only observations and model outputs but also event documentation, particularly impacts on African society, economy and environment. Support the implementation of THORPEX Africa
- Extend the concept of Virtual Centers for high-impact weather prevention to Central America, building upon the experience of the operational Centre for Eastern South America. Deploy weather watching networks (based on remote sensing) to better detect and forecast high-impact weather
- Facilitate technical cooperative activities for the exchange of weather prediction hardware, software, technologies, and expertise
- Develop training activities for the use of numerical weather prediction, meteorological satellite images and meteorological radar data, as a prerequisite to the implementation of early warning systems

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), IN-03 (GEOSS Common Infrastructure), ID-02 (Institutional and Individual Capacity), ID-04 (Building a User-driven GEOSS), ID-05 (Catalyzing Resources for GEOSS), SB-01 (Oceans and Society), DI-01 (Disaster Risk Reduction), CL-01 (Climate Information), WA-01 (Integrated Water Information) and AG-01 (Global Agricultural Monitoring)

Related 2009-2011 Work Plan Tasks (non exhaustive)

WE-06-03: TIGGE and the Development of a Global Interactive Forecast System for Weather
WE-09-01a) Infrastructure for Numerical Weather Prediction
WE-09-01b) Socio-economic Benefits in Africa from Improved Predictions of High-Impact Weather

New Proposals from the GEO Community

Virtual Centers for High-impact Weather Prevention and Weather Watching Networks (Spain)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V1/

Resources Available for Implementation (tentative and preliminary)

- Weather forecasts, archiving centers, and research from 10 global weather forecasting centers: Australia (BOM), Brazil (CPTEC), Canada (CMC), China (CMA), France (MétéoFrance), Japan (JMA), Korea (KMA), UK (UKMO), USA (NCAR, NCEP) and ECMWF
- European FP7 project GEOWOW (Weather Component; to commence in Sept. 2011)
- THORPEX Africa requires additional resources. Previous initiatives for funding did not succeed

Section under development

ECOSYSTEMS

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

EC-01 Global Ecosystem Monitoring (incl. Urban Monitoring)

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Ecosystems: Implementation of a global standardized ecosystem classification system and map as a basis for worldwide inventory, assessment and monitoring. Implementation of a global, standardized inventory of major ecosystems and the protected areas within them. Increased operational monitoring of major ecosystems on land on an annual basis, including properties such as land cover type; species composition; vegetation structure, height and age; net ecosystem productivity; and biomass and carbon estimates of vegetation and soils based on remote sensing and sampled in-situ observations using internationally agreed standards.

Agriculture: Development of quantitative measurements of global and regional desertification.

Description

Assess the present state and trends of ecosystem conditions and services, as well as the pressures and impacts upon them, for policy-making and natural resource management. Provide a corresponding framework and improve the basic knowledge of temporal and spatial variations of ecosystems. Promote sustained and comprehensive observations to assess ecosystem resilience (i.e. the capacity to resist, and recover from, changes, such as habitat fragmentation and alien species invasion). Improve the coordination of urban observations, monitoring, assessment, and modeling initiatives worldwide to better understand interactions between human settlements and ecosystems. Refine techniques for documenting ecosystem services, and work with established international monitoring communities and networks.

Components

C1 Global Standardized Ecosystem Classification, Map and Inventory (incl. characterizations of ecosystems in protected areas)

Leads (tentative)

USA (USGS), UNEP (WCMC)

Priority Actions

- Develop a standardized robust and practical global ecosystem classification – and map – for terrestrial, freshwater, and marine ecosystems. Focus on scales appropriate for ecosystem management. Integrate global ecosystem products with existing ecosystem maps and databases
- Conclude the Australia GEOSS ecosystem mapping effort, and initiate standardized ecosystem mapping in Indonesia
- 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. Conduct a global gap analysis of ecosystem representation in protected areas (see also ID-06)

C2 Operational Monitoring of Key Ecosystems and Related Services

Leads (tentative)

Austria (ZAMG), Canada (CNR, CSA, Environment Canada), Italy (Ev-K2-CNR), Switzerland (University of Geneva), FAO

Priority Actions

- For key ecosystems (e.g. moist forests, dry forests, Arctic ecosystems, wetlands, drylands, mountains), develop and initiate an operational monitoring program to assess changes in ecosystem extent, condition, structure, function, composition
- Implement a high-elevation climate and environment monitoring network, starting with the existing SHARE: Stations at High Altitude for Research on the Environment network. Build upon the European project ACQWA (Assessing Climatic change and impacts on the Quantity and quality of WAter) to analyze the future of water resources in vulnerable mountain regions
- Produce global phenology data. Coordinate international efforts to collect and develop phenology observations (in-situ and space-based) and modeling products (see also HE-01)
- Identify key partners in selected ecosystems. Develop consensus for monitoring approach. Initiate integration of results
- Develop a conceptual framework program for using Earth observations to monitor the production and delivery of ecosystem goods and services, from ecosystems to consumers as a potential model for global implementation

C3 Global Urban Observation and Analysis

Leads (tentative)

Germany (DLR), USA (Indiana State University), IEEE

Priority Actions

- Improve global coverage and data accuracy of urban observing systems through integrating satellite data of different sources, resolutions, and sensors with in-situ field measurements
- Document requirements for global urban monitoring and assessment in terms of data products and expectations for data validation, archiving, update and sharing
- Develop a global urban observing and research network by using the mechanism of GEO, establishing regional alliances and encouraging the establishment of a Program Office
- Create a global urban morphological database for urban monitoring/assessment and climate modeling to better understand the impacts of global climate change on urban areas
- Conduct urban analyses linking Earth observation products with socio-economic and demographic data, to improve knowledge of urban environments, air quality and carbon emissions, population density, quality of life, and environmental/infectious diseases (see also HE-01)

To Be Implemented in Connection with

IN-06 (Gap Analysis), SB-01 (Oceans and Society), SB-02 (Global Land-Cover), SB-03 (Global Forest Observation), SB-04 (Impact Assessment), HE-01 (Health Decision Making), HE-02 (Tracking Pollutants), CL-02 (Global Carbon Observation), BI-01 (Global Biodiversity Observation)

Related 2009-2011 Work Plan Tasks (non exhaustive)

EC-09-01a) Ecosystem Classification and Mapping
EC-09-01b) Ecosystem Functions and Services
EC-09-01d) Protected Areas Assessment and Monitoring

EC-09-01e) Forest Mapping and Change Monitoring
EC-09-02d) Vulnerability of Mountain Regions

New Proposals from the GEO Community

- Coordination of Urban Observations, Monitoring, Assessment, and Modelling Initiatives Worldwide, in support of a Global Urban Observation System (USA, Indiana State University)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V0/

Resources Available for Implementation (tentative and preliminary)

- International SHARE project - Stations at High Altitude for Research on the Environment
- In kind contributions from Canada (CSA, CNR, Environment Canada), Italy (Ev-K2-CNR), USA (Indiana State University, USGS)

Section under development

AGRICULTURE

Supporting sustainable agriculture and combating desertification

AG-01 Global Agricultural Monitoring and Early Warning

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Agriculture: Increased use of Earth observing capabilities and supporting applications systems to produce timely, objective, reliable, and transparent agricultural and forest statistics and information at the national and regional level. Improved agricultural risk assessment and operational weather/climate forecast systems for early warning and food security. Effective early warning of famine leading to more timely mobilization of an international response in food aid. Expanded monitoring of agricultural land use change, through periodic regional and global assessments. Increased capacity building through targeted workshops and joint multi-institution research teams.

Description

Improve sustainable agriculture management and food security through the increased use of Earth observation and information. Enhance current global capabilities in agricultural monitoring, food-supply prediction and agriculture risk assessment. Develop early-warning systems to enable timely mobilization of international response in food aid. Build capacity and expand the use of Earth observation and information for agricultural monitoring in Africa, Asia, Latin America, Central and Eastern Europe, and Small Island States.

Component

C1 A Global Operational Monitoring System of Systems for Agricultural Production, Famine Early-warning, Food Security and Land-use Change

Leads (tentative)

Canada (Agri-Food), China (CAS), EC (JRC), India (ISRO), USA (University of Maryland, USDA)

Priority Actions

- Undertake Joint Experiments on Crop Assessment and Monitoring (GEO-JECAM). Establish a series of research supersites over a range of cropping systems. Facilitate inter-comparison of retrieved information and methods for crop acreage estimation/monitoring and yield estimation/ forecasting, with the aim of establishing ‘best practices’ for different agricultural systems
- Develop the PAY (Production Area Yield) Database. Encourage countries to contribute monitoring data to a common database for inter-comparison and analysis. Enable query for data on production, commodity (e.g. corn, soy, wheat, rice), year (2005-present), date of forecast, country and agency
- Conduct Coordinated Data Initiatives for Global Agricultural Monitoring (CDIGAM). Define observational requirements, identify gaps in current in-situ observations, and promote satellite data continuity. Encourage full and open access to data (e.g. from Brazil, Canada, China, EU, India, Israel, Japan, Korea, Russia, South, Thailand, USA)
- Implement the GLAMSS Thematic Workshop Series – a series of technical international workshops on techniques and methods, best practices, emerging technologies and model inter-comparisons
- Support AGRIMET, in collaboration with National Meteorological and Hydrological Services, to help rural communities in West Africa make better use of weather and climate information and increase the productivity of their cropping systems

- Launch new activities in relevant areas such as agriculture rangelands, agricultural drought, agriculture and water use, cropping systems analysis, modeling cropping systems response in the context of global change, global crop phenology (see also WA-01)

To Be Implemented in Connection with

IN-01 (Earth Observing Systems), ID-01 (Data Sharing), ID-02 (Institutional and Individual Capacity), ID-06 (Gap Analysis), SB-02 (Global Land Cover), SB-03 (Global Forest Information), CL-01 (Climate Information), WA-01 (Integrated Water Information), WE-01 (High-Impact Weather Prediction), EC-01 (Global Ecosystem Monitoring)

Related 2009-2011 Work Plan Tasks (non exhaustive)

AG-07-03a) Global Agricultural Monitoring System
AG-07-03b) Agricultural Risk Management
AG-07-03c) Expanding Earth Observation Applications in Agriculture and Promoting Capacity Building in Developing Countries

New Proposals from the GEO Community

- Improving Global Crop Monitoring Capacity in the frame of GEO/GEOSS (China)
- West Africa Agriculture Meteorology Project, AGRIMET (Spain)

For details, see ftp://ftp.earthobservations.org/TEMP/2012-2015_WorkPlan_V1/

Resources Available for Implementation (tentative and preliminary)

- National support for the GEO-JECAM pilot sites in Argentina, Brazil, Canada, China, Europe and Mexico. Support for the GEO-JECAM Secretariat from Canada (Agriculture and Agri-food)
- Support from the Agriculture Community of Practice for the Thematic Workshop Series
- Training program initiated by India (ISRO)
- Additional in-kind contributions from China (IRSA), EC (JRC), India (ISRO) and USA (UMD, USDA)

Section under development

BIODIVERSITY

Understanding, monitoring and conserving biodiversity

BI-01 Global Biodiversity Observation (GEO BON)

Related GEOSS Strategic Targets (*from GEO-VI Document 12 Rev1*)

Biodiversity: Increased routine collection of long term in-situ and remotely sensed biodiversity observations. Access through GEOSS to a large panel of biodiversity observations, including satellite, aerial and in-situ. Increased information sharing on biodiversity conservation and sustainable use of biodiversity resources. Implementation of a mechanism that enables users to interact with the development of biodiversity observations systems and request services. Increased availability of biodiversity information necessary to respond to and support related topics (ecosystems, health, climate, etc). Increased information to reduce the cost and support the management of biodiversity issues.

Description

Implement the GEO Biodiversity Observation Network (GEO BON): a global, scientifically-robust framework for observations designed to detect biodiversity change. Coordinate data gathering and delivery of biodiversity information, and build upon existing analyses and systems to identify key areas of data collection and monitoring (e.g. migratory, endemic or globally threatened species). Work in cooperation with the Convention on Biological Diversity (CBD) and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). In particular, (i) facilitate consensus on data collection protocols and interoperability among monitoring programs, (ii) support monitoring systems that enable frequent, repeated, assessment of trends and distributions of species and ecosystems of special conservation merit; and (iii) develop a strategy for assessing biodiversity at the genetic, species and ecosystem level. Animate a mutually-beneficial dialogue between terrestrial and marine components (see SB-01).

Components

C1 Global Biodiversity Observation Network (GEO BON)

Leads (tentative)

Australia (Australian Museum, CSIRO), EC (EBONE), Japan (Kyushu University), Netherlands (NIOZ), Portugal (University of Lisbon), South Africa (CSIR), USA (USGS, Stanford University), UNEP (WCMC)

Priority Actions

- Develop standards for data collection and management of terrestrial, marine and freshwater species, and ecosystems observations: Promote monitoring standards for population counts of birds, mammals, and plants. Promote monitoring standards for marine biodiversity observations. Harmonize ecosystem mapping and monitoring so that data are exchangeable (see EC-01)
- Implement a worldwide network of biodiversity observations for terrestrial, marine and fresh-water ecosystems: Develop a global network of biodiversity observation sites. Identify and fill gaps in data monitoring in regions where major ecosystem changes are happening. Establish an International Freshwater Consortium, covering global freshwater biodiversity observation and analysis. Record changes in marine biodiversity at multiple scales and time periods, from viruses to whales

- Develop reporting mechanisms for biodiversity-relevant topics, starting with terrestrial ecosystems and services, and genes: Promote observations on genetic diversity on crop plants and wild genetic diversity. Implement a new measure of global change for biodiversity in terrestrial and marine ecosystems through model-based integration of in-situ and remote-sensing data. Characterize, monitor and predict changes in the distribution of invasive species. Develop a full global analysis of stability of ecosystem carbon services

To Be Implemented in Connection with

ID-06 (Gap Analysis), SB-01 (Oceans and Society), SB-03 (Global Forest Observation), SB-04 (Impact Assessment), HE-01 (Health Decision Making), CL-01 (Climate Information), EC-01 (Global Ecosystem Monitoring)

Related 2009-2011 Work Plan Tasks (non exhaustive)

EC-09-01b) Ecosystem Functions and Services
EC-09-01d) Protected Areas Assessment and Monitoring
BI-07-01a) Biodiversity Observation Network (GEO BON)
BI-07-01b) Invasive Species Monitoring System
BI-07-01c) Capturing Historical and New Biodiversity Data

New Proposals from the GEO Community

None at this stage

Resources Available for Implementation (tentative and preliminary)

- A wide variety of resources are being utilized, including from Japan (committed during COP-10), and the European Commission
- European FP7 call for extending the EBONE project (European Biodiversity Observation Network) to a global scale within the GEO framework, overall funding 9 MEUR
- GEOBON Working groups are independently seeking funding and many of them are already successful

Section under development

APPENDIX: 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
BFG	German Federal Institute of Hydrology
BNSC	British National Space Centre
BOM	Australian Bureau of Meteorology
BRGM	French Geological and Mining Research Bureau
CARSA	China Association for Remote Sensing Application
CAS	Chinese Academy of Sciences
CAWCR	Centre for Australian Weather and Climate Research
CB	Capacity Building
CBD	Convention on Biological Diversity
CBERS	China-Brazil Earth Resources Satellite
CDC	Centers for Disease Control and Prevention
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
CMACast	CMA contribution to GEONETCast; utilises the AsiaSat 4 satellite beam to broadcast data and products to a user community in the Asia Pacific region
CMCC	Italian Euro-Mediterranean Center for Climate Change
CNES	French Space Agency
CNR-IIA	Italy National Research Council - Institute for Atmospheric Pollution
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
CRESDA	Center for Resource Satellite Data and Applications, China
CSA	Canadian Standards Association
CSIR	Council for Scientific and Industrial Research, South Africa
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSIS	Center for Strategic & International Studies
DA	Data Management
DANTE	Delivery of Advanced Network Technology to Europe
DEADP	Department of Environmental Affairs and Development Planning, South Africa
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
DMN	Morocco Direction de la Météorologie Nationale
DPRTRP	Disaster Preparedness and Refugees Transition and Recovery Programme for North and Eastern Uganda
DST	Department of Science and Technology, South Africa
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 of the United Nations
FAPAR	Fraction of Absorbed Photosynthetically Active Radiation
FDSN	International Federation of Digital Seismograph Networks
FGDC	Federal Geographic Data Committee
FIOCRUZ	Brazilian Oswaldo Cruz Foundation
FP7	European Union 7th Framework Programme
FPAR	Fraction Photosynthetically Available Radiation
FRA	FAO Global Forest Resources Assessments
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 BON	Group on Earth Observations Biodiversity Observation Network
GEO PAAM	Group on Earth Observations Protected Areas Assessment and Monitoring
GEO	Group on Earth Observations
GEOBENE	Global Earth Observation Benefit Estimation: Now, Next and Emerging
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
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
GGOS	Global Geodetic Observing System
GHG	Greenhouse Gas
GIFS	Global Interactive Forecast System
GIS	Geographical Information System
GISIN	Global Invasive Species Information Network
GISS	Geo Information Systems Section, UNECA
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	Geospatial Information Authority of Japan
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
ICMR	Indian Council of Medical Research
ICT	Information and Communication Technology Section, UNECA
IEEE	Institute of Electrical and Electronics Engineers
IEO	Spanish Institute of Oceanography
IES	International Education of Students
IFRC	International Federation of Red Cross and Red Crescent Societies
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
IMTSSA	Institut de Médecine Tropicale du Service de Santé des Armées, France
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
IRD	French Institut de Recherche pour le Développement
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
ISPRA	Italy Institute for Environmental Protection and Research
ISPRS	International Society for Photogrammetry and Remote Sensing
ISRIC	International Soil Reference and Information Centre
ISRO	Indian Space Research Organisation
ISS-CAS	Institute of Soil Science, Chinese Academy of Sciences
ISSG	IUCN/SSC Invasive Species Specialist Group
ISTD	ICT Science and Technology Division, UNECA
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
LSCE	Laboratoire des Sciences du Climat et de l'Environnement, France
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
NRC	National Resource Council Canada
NBII	National Biological Information Infrastructure
NEPTUNE	The North-east Pacific Time-series Undersea Network Experiments
NIDIS	USA National Integrated Drought Information System
NIES	Japan National Institute for Environmental Studies
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
NSIDC	US National Snow and Ice Data Center
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
PAMS	Poverty Analysis and Monitoring Section, UNECA
PML	UK Plymouth Marine Laboratory
POGO	Partnership for Observation of the Global Ocean
POPs	Persistent Organic Pollutants
PREV'AIR	Air Quality Forecasts and Observations in France and Europe
R&D	Research and Development
RAMSAR	Convention on Wetlands
RIHN	Research Institute for Humanity and Nature, Japan
SAC	Space Applications Centre, India
SAFARI	Societal Applications in Fisheries & Aquaculture using Remotely-Sensed Imagery

SAR	Synthetic Aperture Radar
SBA	Societal Benefit Area
SBSM	Chinese State Bureau of Surveying and Mapping
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
SMB	Shanghai Meteorological Bureau, China
SMPHB	Shanghai Municipal Public Health Bureau, China
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
UCL	UK University College London
UFPR	Brazilian Universidade Federal do Paraná
UK	United Kingdom
UN	United Nations
UNAM	Universidad Nacional Autónoma de México
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
UNITAR	United Nations Institute for Training and Research Operational Satellite Applications Programme
UNOOSA	United Nations Office for Outer Space Affairs
UNOSAT	United Nations Operational Satellite Applications Programme
UNSPIDER	United Nations Platform for Space-based Information for Disaster Management and Emergency Response
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
WCMC	UNEP World Conservation Monitoring Centre
WCRP	World Climate Research Programme
WGCV	Working Group on Calibration & Validation, CEOS
WHO	World Health Organization
WHOI	US Woods Hole Oceanographic Institution
WIS	WMO Information System
WMO	World Meteorological Organization
WWRP	World Weather Research Programme
ZAMG	Austria Central Institute for Meteorology and Geodynamics