

2015 Deliverables in Support of the GEOSS

The Committee on Earth Observation Satellites



Introduction

The Committee on Earth Observation Satellites (CEOS) coordinates civil space-based observations of the Earth. Participating agencies strive to enhance international coordination, data exchange and access and to optimise societal benefit. As of December 2013, 55 members and associate members made up of space agencies, national, and international organisations participate in the planning and coordination activities of CEOS.

The establishment of the Group on Earth Observations (GEO) in 2005 as a strong focus for coordination among the Earth observations community provided additional impetus and direction for CEOS - being recognised as the space component of GEO, with responsibility for implementation of the space segment of the Global Earth Observation System of Systems (GEOSS).

CEOS has since aligned much of its resources and capacity in support of GEO's commitments to the international community, supporting a wide range of its activities. 2015 marks the conclusion of the first 10-year implementation plan for the GEOSS, and CEOS and its Agencies wish to affirm the case for continued, indeed expanded support for realisation of the GEOSS.

This paper has been developed by CEOS to communicate the nature and extent of the contribution of CEOS to the GEOSS by 2015, at the conclusion of the GEOSS 10-year Implementation Plan.



Space segment



As an organisation that comprises 31 space agencies and 24 Associate agencies, the Committee on Earth Observation Satellites (CEOS) provides the primary coordination framework related to the planning and provision of satellite Earth observations (EO). CEOS Agency governments fund, build and operate a diverse range of EO satellite missions in support of different spheres of society, including meteorology, climate, and a diverse range of research, operational and commercial activities. CEOS Agencies are operating or planning around 260 satellites with an Earth observation mission over the next 15 years. These satellites will carry more than 760 observing instruments.

In 2015, approximately 90 of these satellites will be in operation, including a series of seven Virtual Constellations defined by CEOS in support of GEO objectives. A CEOS Virtual Constellation is a set of space and ground segment capabilities operating together in a coordinated manner, in effect, a virtual system that overlaps in coverage in order to meet a combined and common set of Earth Observation requirements and increase mutual benefit among space and other environmental agencies in support of cross-cutting GEO Tasks and Targets.

The seven Virtual Constellations (VCs) being implemented for the GEOSS Space Segment are:

Atmospheric Composition: *ensuring the systematic capability to provide essential observations of atmospheric composition from space, including in relation to ozone, greenhouse gases, volcanic ash monitoring and air quality monitoring.*

Land Surface Imaging: *ensuring continuous and global observations of the land surface in support of key GEO programmes such as the Global Forest Observations Initiative (GFOI) and the Global Agricultural Monitoring Initiative (GEOGLAM).*

Ocean Colour Radiometry: *supporting the only measurement capability available that provides synoptic information for the global ocean related to ecological and biogeochemical processes, and a crucial measurement in support of ocean research and multiple applications.*

Ocean Surface Topography: *providing observations central to understanding the dynamics of the oceans, assessing the ocean's role in climate, and sustaining a robust ocean forecast capability.*

Ocean Surface Vector Winds: *fostering the best quality wind data for applications in short, medium, and decadal time scales in the most efficient manner through international collaboration, scientific innovation, and rigour.*

Precipitation: *coordinating the continued advancements of multi-satellite global precipitation missions.*

Sea Surface Temperature: *fostering the best quality sea surface temperature data and their availability for applications across all relevant spatial and temporal scales in the most effective and efficient manner through international collaboration.*

The GEOSS, as it matures, will include many of these observing systems and the diverse products and services that they provide to numerous sectors of society.

Ground Segment & Information Systems



The data and information resulting from the GEOSS Space Segment coordinated by CEOS is accessible through a number of systems:

The CEOS International Directory Network (CEOS IDN: <http://idn.ceos.org>) contains descriptions of more than 15,000 data collections from CEOS agencies that can be discovered from the GEO Portal, and CEOS has committed to its systematic use, update and improvement for registration of all existing and future CEOS agency datasets. Currently more than 9,000 data collections from CEOS agencies are marked as “GEOSS Data Core”, to indicate that these collections are easily accessible with very low impediments to access by general users. By 2015, the IDN will contain descriptions of most of the CEOS agencies’ data collections.

The CEOS WGISS Integrated Catalogue (CWIC: <http://wgiss.ceos.org/cwic>) provides access to many CEOS Agencies’ EO inventory data systems using commonly supported catalogue standards. Currently CWIC provides search and access to over 1,800 data collections, tagged as “GEOSS Data Core”, and over 50 million data granules, providing a major access point to satellite data for GEO users. Additional data collections will continue to be made accessible from CWIC.

The Federated Earth Observation) system (FedEO: <http://fedeo.esa.int/web/guest>) provides access to many European agencies’ EO data.

The CEOS Missions, Instruments & Measurements database (MIM: <http://database.eohandbook.com>) provides information on all CEOS agency EO missions and links to data holdings.

The CEOS Data Policy Portal (<http://www.ceos-datapolicy.org>) is intended to capture the data access policies of CEOS Mission and Instrument combinations in order to promote improved access to data and GEO data sharing principles.

Individual CEOS Agencies will continue to maintain their substantial data systems in support of their national programmes and these will be recognised as major contributions to the GEOSS. In addition, CEOS is undertaking a number of initiatives to optimise the accessibility and benefits of these various systems that will be realised by 2015:

CEOS OpenSearch will provide a common mechanism to search and access much of the CEOS Agencies satellite data by 2015.

An inventory of Essential Climate Variables (ECVs) supported by CEOS agency activities will also be available by 2015. This will be used to conduct a gap analysis of ECVs and recommend mitigation strategies.

CEOS efforts on calibration and validation of member satellites will provide a series of Test Sites for satellite system harmonization and interoperability. Both satellite and in situ data will be collected at these sites.

Products & Services

The information products and services to be delivered by CEOS by 2015 in support of the GEOSS are:

Atmosphere

- multi-sensor volcanic eruption alert service;
- multiple Essential Climate Variable (ECV) products, including ozone, greenhouse gases;
- information services in support of society's needs for carbon-related information – being identified in the Carbon Task Force plan;
- greenhouse gas measurements for end-user applications;
- multi-sensor precipitation products for climate and meteorological applications;
- plans for a geostationary air quality constellation.

Ocean

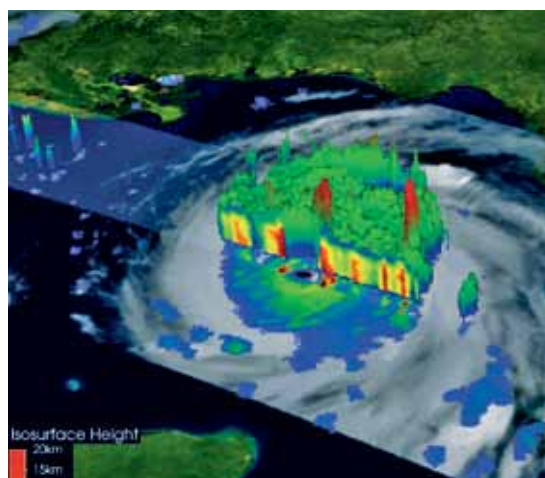
- multiple Essential Climate Variable (ECV) products, including Sea Surface Height, Sea Surface Temperature, Sea Surface Winds, and Ocean Colour;
- a Sea Surface Temperature Climate Data Assessment Framework (CDAF), for evaluating the characteristics of SST datasets for climate purposes;
- a range of products and services on different spatial and temporal scales for operational, industrial, and research uses resulting from the coordination efforts of the four VCs dedicated to observations of the ocean;
- implementation of the INSITU-OCR (supporting an in-situ sensor calibration and data validation network for ocean colour measurements).

Land

- coordinated land surface acquisitions of the world's forested areas in support of GFOI;
- coordinated land surface acquisitions of the crop lands of the world's largest agricultural producer countries in support of GEOGLAM;
- coordinated radar acquisitions for the Asia-RiCE component of GEOGLAM to assist capacity building around rice crop monitoring and food security;

- ongoing input to the monthly food security outlook reports of the Agricultural Market Information System (AMIS) initiated by the G-20;
- new end products and services from the Floods pilot, to better deliver flood related information
- a range of new products from the Seismic Hazards pilot, including maps of active faults at the global scale, and products for rapid earthquake response;
- new products from the Volcanoes pilot, including operational monitoring over large scale eruptions;
- the CEOS Disaster Recovery Observatory will be developed to make available as much geospatial data as possible that may be of use in the immediate aftermath of a major disaster and for a period of a number of years after the event;
- multiple Essential Climate Variable (ECV) products, as identified in the ECV inventory - such as surface albedo and fraction of photosynthetically active radiation.

In addition, CEOS Working Groups dedicated to climate, information systems, calibration & validation, capacity building and disasters will implement a range of outputs and activities in support of GEO tasks.

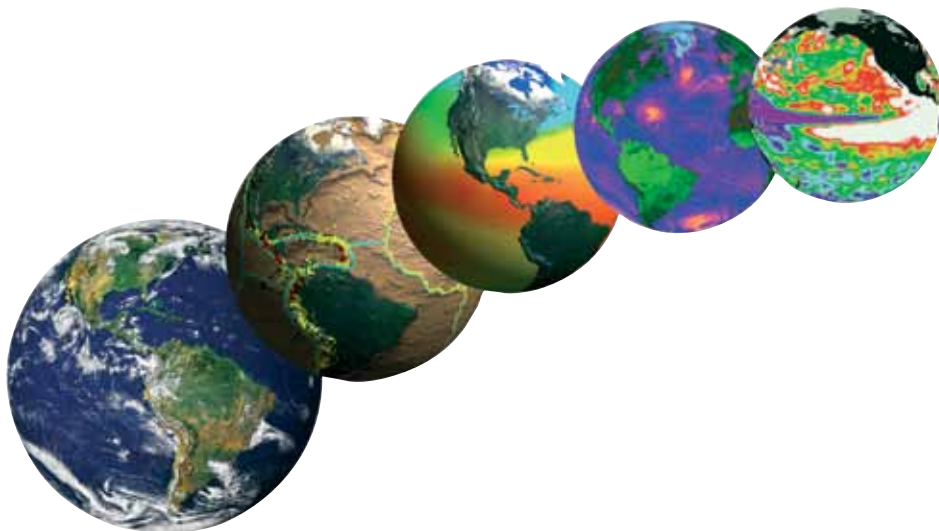


Precipitation radar observation of Hurricane Katrina

Conclusions

This statement of deliverables for the 2015 GEOSS by CEOS highlights the diversity and scale of the activities which space agencies are investing in through the CEOS framework for the benefit of GEO.

The emergence of GEO has provided an effective and important focus for CEOS coordination efforts. The diversity and scale of the CEOS contributions anticipated for 2015 are a testament to the power of the vision of the Global Earth Observation System of Systems and to the support of governments worldwide, through their space agency Members of CEOS, for its realisation.





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