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The global Earth observation system of systems

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Recognizing the growing need for improved Earth observations, 140 governments and leading international organizations have established the Group on Earth Observations, or GEO, to collaborate and implement a Global Earth Observation System of Systems (GEOSS) by the year 2015. Countries and organizations are contributing their respective Earth monitoring systems, from satellites in space and in situ instruments on land, in the oceans and in the atmosphere. They are interlinking these systems so that, together, they provide a more complete picture of Earth's systems dynamics.

GEO is developing common technical standards to pool observations and ensure their cross calibration and validation. It is building a web-based infrastructure to ensure easy access to the wealth of data and services contributed to, or generated by, GEOSS. GEO has been promoting the free and open sharing and dissemination of Earth observation data which has already driven significant changes in data distribution policies of several key Earth observing satellites: Landsat, Cbers and the future Sentinels of GMES. GEO is also reflecting on solutions to transition research systems into operational observing systems and ensure their long-term sustainability. First, the current status of GEOSS implementation and these core activities of GEO will be presented.

Then, examples of global data sets and information systems or services developed through GEOSS will be presented:
- a high-resolution global digital elevation model (DEM) based on Aster data was released by Japan and the USA. In situ measurements are now being used to improve the model as well as the stacking procedure used to develop it;
- the Supersites initiative ensures coordinated access to data and information on natural hazards in geologically active regions. In light of the recent tragedy in Haiti, this project created a dedicated web site regularly updated with maps of seismicity, tectonics, Coulomb stress changes, topography, real and synthetic interferograms, as well as damage maps, data, and space images. See http://supersites.unavco.org/haiti.php;
- the global carbon observation and analysis system combines observations, reanalysis and product development to provide regional information on emission variations. It addresses the three components of the carbon cycle (atmosphere, land, ocean). The project includes the improvement of global networks of atmospheric CO2 observations, air-surface exchange flux networks, surface ocean CO2 and related marine biochemistry observations, as well as space-based measurements combining Sciamachy , Airs and the newly launched Japanese Gosat;
- the Forest Carbon Tracking (FCT) project coordinates the acquisition of observations from multi-spectral and radar (X, C and L-band) satellites, their processing through different models and methodologies and their validation by in situ measurements in 7 selected countries. The aim is to demonstrate the feasibility of a global monitoring and verification system for carbon storage and change in forests. Data and results can be viewed on-line at www.geo-fct.org. This portal allows users to visualize the FCT National Demonstrators, the relevant validation sites and the inventory of the coordinated acquisitions of satellite and in-situ data. Maps and information resulting from the processing of the data will also be posted here when available.