AOGS 2006

The Global Geodetic Observing System (GGOS): A Project of the IAG

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Geodesy is the science of measuring and mapping the geometry, orientation and gravity field of the Earth including the associated variations with time. The Global Geodetic Observing System (GGOS) as the "flagship project" of the International Association of Geodesy (IAG) aims to coordinate and integrate all geodetic observations in order to generate a consistent high quality set of geodetic parameters for monitoring the phenomena and processes within the 'System Earth'. Coordination means bringing together the different geodetic observing techniques, services and analysis methods so as to ensure that the same standards, conventions, models and parameters are used in the reduction of observations and in the data analysis. Integration implies the inclusion of all relevant information for parameter estimation, implying the combination of geometric and gravimetric data, and the common estimation of all the necessary parameters representing the solid Earth, the hydrosphere (including oceans, ice-caps, continental water), and the atmosphere. In fact many of the burning questions related to the water cycle, the climate, global change, and geohazards cannot be solved without sufficient knowledge of mass transports throughout 'System Earth' and the associated dynamics. All these processes affect the three fundamental geodetic quantities, namely the Earth's figure (geometry), its gravity field and its rotation. Thus, GGOS is an unique contribution to Earth observation in its capability to provide detailed information on the dynamics of the solid Earth and its fluid envelop on all relevant spatial and temporal scales. When setting up GGOS as a project, the IAG Executive Committee asked the GGOS Steering Committee to establish a relationship with the Integrated Global Observing Strategy Partnership (IGOS-P). IGOS-P is a component of the Global Earth Observation System of Systems (GEOSS). IGOS-P addresses a number of problems and components of Earth observing systems in the frame of specific Themes. Focusing on the observing system for the mass transports within the Earth system the proposed 'Earth System Dynamics' Theme has the goal to develop the science basis for, and to facilitate, the implementation of GGOS. The Theme will define the role of GGOS, the underlying strategy and its interface to the other components of GEOSS. The interaction of GGOS with the other IGOS-P Themes will facilitate the full exploitation of the geodetic contribution by all other global observing systems. The Theme will ensure that GGOS meets the user requirements both from the IGOS-P Themes and the nine societal benefit areas identified by the Earth Observation Summit II.