

Integrated Global Water Cycle Observations (IGWCO):

The Integrated Global Water Cycle Observations (IGWCO) theme was developed, approved and implemented under the auspices of the IGOS-P and the guidance of the WCRP (GEWEX), the Committee on Earth Observation Satellites (JAXA) and the World Meteorological Organization (WMO). IGWCO was instrumental in developing targets and activities for the Water Cycle component of the 10-year GEOSS Implementation Plan. From this perspective, the IGWCO is active in providing strategies for integrated data products for use in 1) facilitating effective water management and sustainable development of the world's water resources, 2) monitoring and adapting to climate variability and change, 3) initializing numerical weather and water forecast models, and 4) addressing research directed at priority water cycle questions. IGWCO also promotes strategies that facilitate the acquisition, processing, and distribution of data products needed for effective management of the world's water resources.

IGWCO supports the development of integrated data products for a range of water cycle variables. Its **precipitation** efforts have focused on the steps that would be needed to develop global products that utilize the best satellite, in-situ and other remote sensing observations. In collaboration with the International Precipitation Working Group (IPWG) it initiated the Program to Evaluate High Resolution Precipitation Products (PEHRPP) to assess the best way to combine precipitation data from disparate sources such as *in-situ* rain gauge networks, passive microwave sensing, and precipitation radar. Efforts related to **soil moisture** support the GCOS goal of developing and producing on a quasi-operational basis an integrated soil moisture product by optimally combining the best available *in-situ* and remotely sensed data. IGWCO is now attempting to develop a global soil moisture measurement network and is dealing with issues of network design such as measurement protocols, validation issues, network design and metadata. The **runoff** activities have included the establishment of an integrated stream/lake/reservoir database and the production of integrated data products, comprised of *in-situ* and remotely-sensed capacity/flow monitoring in real time. A specific plan known as HARON (Hydrological Applications and Runoff Network) serves as the focal point for these efforts. **Groundwater** efforts are building on the planned Global Groundwater Monitoring System (GGMS) being led by IGRAC. It will use aggregated information from existing networks to provide changes in groundwater at regional scales over the globe. **Water quality** efforts have focused on 1) an assessment of the possible contributions of remote sensing to water quality monitoring, and 2) the incorporation of such observational data into integrated global data products.

IGWCO has also developed a number of cross-cutting activities to foster the convergence of these variable-specific efforts. This is being done in part through the Coordinated Energy and water cycle Observations Project (CEOP) which is demonstrating the value of a fully integrated data system to support research and applications. This data system is distributed and accommodates a diverse range of data types and formats. Other IGWCO activities that facilitate integration include work on indicators and capacity building. Capacity Building is being tailored to regional needs in Asia through the Asian Water Cycle Initiative, in Africa through TIGER and an emerging African Water Cycle Initiative and in Latin America through the water component of the GEOSS in the Americas activity. As the IEEE Pilot Projects are funded they are expected to make a significant contribution to this element of GEO Water Cycle activities and IGWCO objectives.

In 2009, IGWCO was further integrated into GEO by becoming a Community of Practice. This development brings it closer to the Water Cycle Community of Practice activity that has been initiated under GEO in 2006. IGWCO is now working with that group to draw more users into the planning, development and evaluation of new water cycle data products.