H091:
Remote Sensing Applications for Water Resources Management

Submit an Abstract to this Session

Session ID#: 7598

Session Description:

Water resources management can benefit the application of remote sensing and hydrologic models. In addition, remote sensing data products provide valuable information during extreme events, such as the droughts in California and flooding in Southeast Asia. Remote sensing assets, such as the Global Precipitation Measurement (GPM) mission, the Soil Moisture Active-Passive (SMAP) mission, the Landsat satellites, and many other satellites and airborne platforms can be used to support the operational water resources community for management practices and decisions. This session will highlight how satellite, airborne and ground-based sensor networks can be used to measure the quantity or quality of hydrologic resources, and provide information to water managers or water users to improve monitoring and management of water resources. Topics of interest include (1) extreme events such as floods and drought; (2) water supply and snow water resource monitoring; (3) evapotranspiration, soil moisture and agricultural water management; and (4) water quality.

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ESA's Soil Moisture and Ocean Salinity Mission -
Contributing to water resource management

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The Soil Moisture and Ocean Salinity (SMOS) mission, launched in November 2009, is the European Space Agency's (ESA) second Earth Explorer Opportunity mission. The scientific objectives of the SMOS mission directly respond to the need for global observations of soil moisture and ocean salinity, two key variables used in predictive hydrological, oceanographic and atmospheric models. SMOS observations also provide information on the characterisation of ice and snow covered surfaces and the sea ice effect on ocean-atmosphere heat fluxes and dynamics, which affects large-scale processes of the Earth's climate system.

The focus of this paper will be on SMOS's contribution to support water resource management:

- SMOS surface soil moisture provides the input to derive root-zone soil moisture, which in turn provides the input for the **drought index**, an important monitoring prediction tool for plant available water.
- In addition to surface soil moisture, SMOS also provides observations on **vegetation optical depth**. Both parameters aid agricultural applications such as crop growth, yield forecasting and drought monitoring, and provide input for carbon and land surface modelling.
- SMOS data products are used in **data assimilation and forecasting systems**. Over land, assimilating SMOS derived information has shown to have a positive impact on applications such as NWP, stream flow forecasting and the analysis of net ecosystem exchange. Over ocean, both sea surface salinity and severe wind speed have the potential to increase the predictive skill on the seasonal and short- to medium-range forecast range.
- Operational users in particular in Numerical Weather Prediction and operational hydrology have put forward a requirement for **soil moisture data to be available in near-real time (NRT)**. This has been addressed by developing a fast retrieval for a NRT level 2 soil moisture product based on Neural Networks, which will be available by autumn 2015.

This paper will focus on presenting the above applications and used SMOS data products.

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