Geophysical Research Abstracts
Vol. 17, EGU2015-15378-2, 2015
EGU General Assembly 2015

Improving Multi-Sensor Drought Monitoring, Prediction and Recovery Assessment Using Gravimetry Information

Amir Aghakouchak (1) and Mohammad J. Tourian (2)
(1) University of California, Irvine, (2) Institute of Geodesy, University of Stuttgart, Germany

Development of reliable drought monitoring, prediction and recovery assessment tools are fundamental to water resources management. This presentation focuses on how gravimetry information can improve drought assessment. First, we provide an overview of the Global Integrated Drought Monitoring and Prediction System (GIDMaPS) which offers near real-time drought information using remote sensing observations and model simulations. Then, we present a framework for integration of satellite gravimetry information for improving drought prediction and recovery assessment. The input data include satellite-based and model-based precipitation, soil moisture estimates and equivalent water height. Previous studies show that drought assessment based on one single indicator may not be sufficient. For this reason, GIDMaPS provides drought information based on multiple drought indicators including Standardized Precipitation Index (SPI), Standardized Soil Moisture Index (SSI) and the Multivariate Standardized Drought Index (MSDI) which combines SPI and SSI probabilistically. MSDI incorporates the meteorological and agricultural drought conditions and provides composite multi-index drought information for overall characterization of droughts. GIDMaPS includes a seasonal prediction component based on a statistical persistence-based approach. The prediction component of GIDMaPS provides the empirical probability of drought for different severity levels. In this presentation we present a new component in which the drought prediction information based on SPI, SSI and MSDI are conditioned on equivalent water height obtained from the Gravity Recovery and Climate Experiment (GRACE). Using a Bayesian approach, GRACE information is used to evaluate persistence of drought. Finally, the deficit equivalent water height based on GRACE is used for assessing drought recovery. In this presentation, both monitoring and prediction components of GIDMaPS will be discussed, and the results from 2014 California Drought will be presented.

Further Reading:

Hao Z., AghaKouchak A., Nakhjiri N., Farahmand A., 2014, Global Integrated Drought Monitoring and Prediction System, Scientific Data, 1:140001, 1-10, doi: 10.1038/sdata.2014.1.