Geophysical Research Abstracts
Vol. 16, EGU2014-14633, 2014
EGU General Assembly 2014

Objective Drought Classification Using Multiple Land Surface Models

Dennis Lettenmaier (1) and Kingtse Mo (2)

(1) University of Washington, Seattle, WA USA (dennisl@u.washington.edu), (2) NOAA Climate Prediction Center, College Park, MD USA (kingtse.mo@noaa.gov)

The current generation of drought monitors (e.g., the U.S. Drought Monitor) uses physically based indices, such as the standardized precipitation index (SPI), total soil moisture percentiles (SMP) and the standardized runoff index (SRI) to monitor precipitation, soil moisture and runoff deficits respectively. Because long-term observations of soil moisture and to a lesser extent spatially distributed runoff are not generally available, SRI and SMP are more commonly derived from land surface model-derived variables, where the models are forced with observed quantities such as precipitation, surface air temperature and winds. One example of such system is the North American Land Data Assimilation Systems (NLDAS). While monitoring systems based on sources like NLDAS are able to detect droughts, they are challenged by classification of drought into, for instance, the D0 to D4 categories used by the U.S. Drought Monitor (USDM), in part due to uncertainties among multiple drought indicators, models and assimilation systems. We explore here an objective scheme for drawing boundaries between the D0-D4 classes used by the USDM. Our approach is based on multiple SPI, SM and SRI indices, from which we form an ensemble mean index, which we then remap to a uniform distribution by using the climatology of the ensemble (percentile) averages. To assess uncertainties in the classification, we use a concurrence measure to show the extent to which the different indices agree. We describe an approach to drought classification that uses both the mean of the ensembles, and its concurrent measure. The classification scheme gives an idea of drought severity, as well as the representativeness of the ensemble mean index.