

The WCRP Drought Interest Group: Seasonal drought prediction over the United StatesLi-Chuan Chen[†]; Kingtse Mo[†] University of Maryland/National Weather Service, USALeading author: LiChuan.Chen@noaa.gov

Seasonal forecasts of drought indices over the United States are made for the period from 1982 to 2009 based on the NCEP Climate Forecast System Reanalysis and Reforecasts (CFSRR). Three indices: standardized precipitation index (SPI), soil moisture (SM) percentile, and standardized runoff index (SRI), and their potential use for drought prediction are explored. SPI, which measures precipitation deficits, is used to identify meteorological drought. SM percentile, computed based on probability distributions, is used to classify agricultural drought. SRI, similar to SPI and measuring runoff deficits, represents hydrological drought. Before predicting drought indices, monthly-mean precipitation, soil moisture, and runoff forecasts from the CFS global model were bias-corrected and downscaled to regional grids of 50-km resolution based on the probability distribution functions. Generally, prediction skill of all indices is regionally and seasonally dependent. For precipitation forecasts, skill drops quickly after one month. Most skill comes from the El Niño Southern Oscillation (ENSO) events and their impact on drought, which the model is able to capture reasonably well. Forecasts have higher skill in winter and lower skill in summer. The ways to construct ensemble has an impact on the prediction skill, in particularly when the initial conditions are dominant. For the first month, the ensemble with eight youngest members has the best skill. After the first month, the ensemble with 16 members performs superior to other tested ensembles. Overall, both the six-month SPI and SM percentile are skillful out to 3-4 months. For SPI prediction, skill comes from the observations appended to the precipitation forecasts. For predicting SM percentile, it comes from the SM memory and initial conditions.