Characteristics of drought over the United States simulated in the CMIP3 experiment

<u>Kingtse . Mo</u>[†]; Lindsey Long; Jae Schemm [†] Climate Prediction Center, USA Leading author: <u>kingtse.mo@noaa.gov</u>

The Drought Interest Group suggested to perform diagnostocs and model intercomparison studies. The WCRP CMIP3 20th Century experiments and the NCEP model CMIP experiments were examined to diagnose the ability of models to simulate drought and persistent wet spells over the United States. A total of seven models were selected for this study. Over the United States, the frequency of occurrence of the extreme precipitation (P) events indicates that drought and wet spells are more likely to occur and persist over the western interior states. Extreme P events over the Southeast are less persistent. The NCEP T382 CFS model captures the west-east contrast, and both the magnitudes and the pattern of the frequency of occurrence are well simulated. The NCEP T126 CFS and the HadCM3 models exhibit similar patterns to the observed, but the magnitudes are very weak. The other models show that the preferred regions for persistent P anomalies are located over the Southern Plains and the Gulf coast. Some of these errors are related to the model's climatology. Most models are too wet and have larger P variability than observations over the western interior states. ENSO is the dominant forcing in modulating precipitation over the United States. Therefore, a model must capture the impact of ENSO on P in order to capture the west-east contrast of persistent extreme events. For the agricultural droughts defined by the soil moisture anomalies, the NCEP T382 CFS has the most realistic simulation. The NCEP CFS model versions containing the OSU land model do not capture the persistence of soil moisture over the western region.