



## **Great Plains drought in simulations of the twentieth century**

R. McCrary and D. Randall

Dept. of Atmospheric Sciences, Colorado State Univ., Fort Collins, CO 80523, USA

We evaluate the ability of the Coupled Global Climate Models (CGCMs) that participated in the Intergovernmental Panel on Climate Change's (IPCC's) Fourth Assessment Report (AR4) to simulate Great Plains drought with the same frequency and intensity as was observed during the twentieth century. In particular, simulations from three IPCC models are analyzed in this study: the Geophysical Fluid Dynamics Laboratory (GFDL) Coupled Model version 2.0 (CM2.0), the NCAR Community Climate System Model version 3 (CCSM3), and the Hadley Centre Coupled Atmosphere-Ocean General Circulation Model version 3 (HadCM3). The models have some difficulty capturing the seasonally varying climatology of the hydrologic cycle of the Great Plains. All three models do simulate at least one long-term drought period for the Great Plains region during their representations of 20th Century Climate. Multi-year droughts produced by the models exhibit similar magnitudes and spatial scales similar to those observed during the twentieth century. Cool, La Nina-like conditions in the tropical Pacific are associated with long-term drought conditions over the Great Plains in CM 2.0 and HadCM3. There appears to be no systematic relationship between tropical Pacific SST variability and Great Plains drought in CCSM3.