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The Drought Interest Group...The 1998-2002 United States drought and its links to global sea surface temperatures

Andrew Hoell[†]; Mathew Barlow
[†] University of Massachusetts Lowell, USA
Leading author: andrew_hoell@uml.edu

The most intense, widespread and long duration drought since the 1960s affected the United States between 1998 and 2002. The precipitation over the United States was separated into nine regions based upon geographic state outlines, and all regions except those located over the Midwest and Southern Plains experienced consistently severe yearly and seasonal precipitation deficits. Monte Carlo resampling suggests that a drought of this length and breadth is highly unlikely, as drought conditions such as these never occurred in any of the synthetic time series. Seasonally averaged United States precipitation is related to six distinct sea surface temperature (SST) areas over the Indian and Pacific Oceans. Many of these SST areas have statistically significant relationships during their warm and cold extremes with regional United States precipitation. During 1998-2002, SST areas located within the tropical and subtropical Pacific Ocean were consistently in excess of one standard deviation from their means. The SST areas comprise SST anomalies within the Pacific Basin, such as, a strong La Nina, a warm west and central extratropical Pacific and a cool north Pacific when used as predictors in a linear regression model. Seasonal precipitation anomalies over the United States were also reconstructed using the SST areas as predictors in the same linear regression model. The evolution and magnitude of Southwestern and Southeastern United States precipitation departures during 1998-2002 were reconstructed with considerable skill, especially during the cold seasons. However, precipitation reconstruction over the Northwest and central United States during all seasons was poor using any and all SST indices as predictors.