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Decreasing occurrence of great droughts over the conterminous U.S.

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We examine drought variability and trends over the last century (1916-2013) over the conterminous U.S. (CONUS) using observed precipitation (P), temperature (T) and reconstructed total moisture percentiles (TMP) and runoff from four land surface models. We used an integrated drought index (IDI), which we defined as the equally weighted mean of the 3-month standardized runoff index (SRI3) and TMP from four land surface models mapped onto a uniform probability distribution. Using a definition of drought as IDI less than 0.3 for 6 months or longer, we identified 16 drought events that covered more than 50% of the area of the CONUS during our study period. 13 of these events were located at least partially over the Central U.S., which we defined as (30-46oN, 85-110oW). We found that 12 of these large Central U.S. droughts occurred when cold sea surface temperatures (SSTAs) were located in the tropical Pacific with warm SSTAs in the North Atlantic. We also found a predominance of decreasing trends in IDI; droughts occurred less often and events were less severe as time progressed. In particular, only two of the 16 events (2012 and 1988) occurred in the second half of the record.