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Supporting Information for

The challenge of accurately quantifying future megadrought risk in the American Southwest

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Figures S1 to S3

Introduction

The supplementary information contains two additional figures that provided a brief validation of the CESM model.

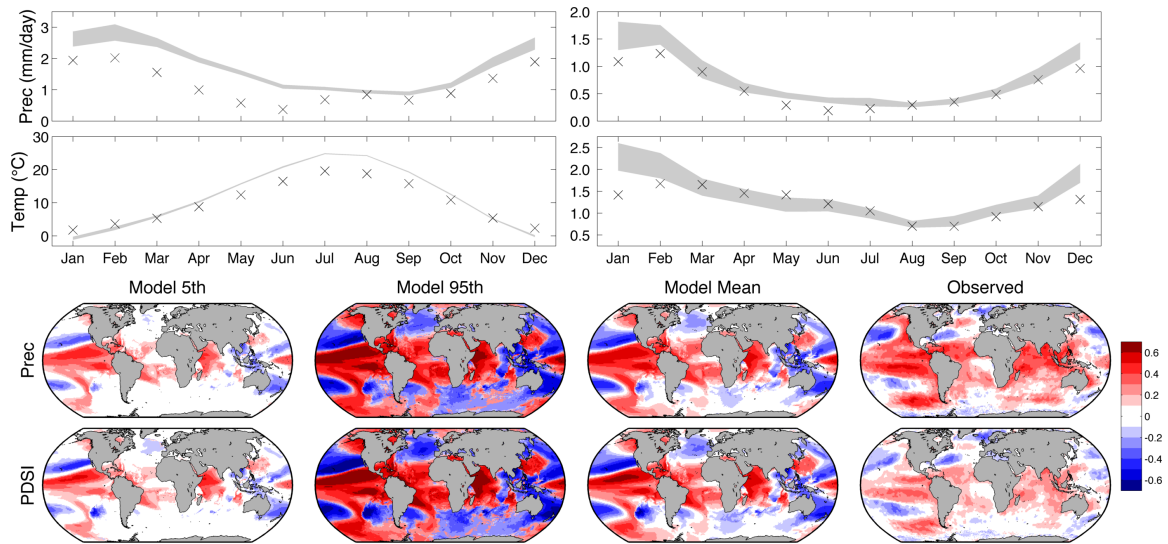


Figure S1. (top left panels) Precipitation climatology from the Global Precipitation Climatology Center [GPCC—*Rudolf et al., 1994*] and temperature climatology from Berkeley Earth [*Muller et al., 2013*] over the ASW as compared to the range in these climatologies across the 30 LENS ensemble members for the common period 1920-2005 C.E. (top right panels) Standard deviation of the precipitation and temperature for each month for the common period 1920-2005 C.E. (bottom panels) Correlation of annually averaged precipitation and JJA PDSI averaged over the ASW with annually averaged global sea surface temperatures (SST) between 1920-2005 C.E. For the observations we use the GPCC precipitation, NADA PDSI [*Cook et al., 2007*] and the Hadley Center Ice and Sea Surface Temperature dataset [*Rayner et al., 2003*]. For the models the correlation patterns are calculated for all 30 LENS ensemble members and 5th and 95th percentile, and mean correlation coefficient at each grid point are plotted.

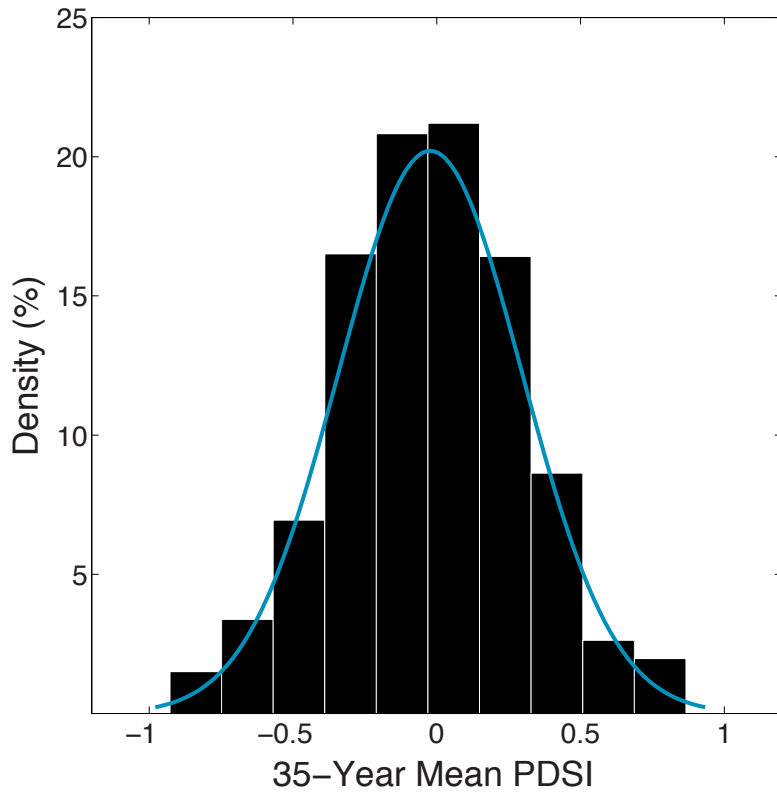


Figure S2. Ten-bin histogram of mean PDSI over the ASW (32°N-41°N; 125°W-105°W) for all 35-year periods from the 1100-year CESM control simulation with a normal distribution fit (blue curve).

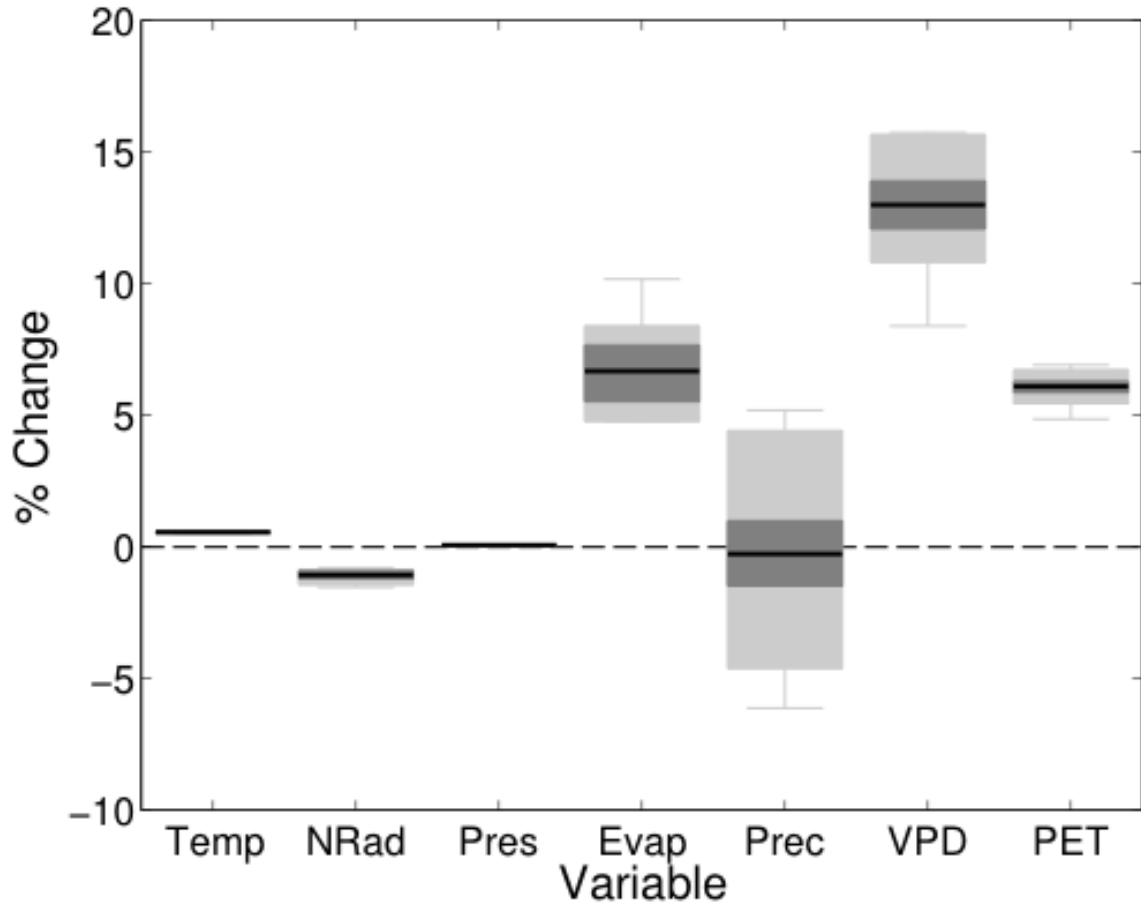


Figure S3. Percent change in temperature, surface net radiation, surface pressure, evaporation, precipitation, vapor pressure deficit and potential evapotranspiration between 2006-2040 C.E. relative to the mean of the pre-industrial control run. The first five variables are model outputs while the last two variables are calculated using the Penman-Monteith function [Penman, 1948; Xu and Singh, 2002]. The dark gray shaded region is the 25th to 75th percentile, the light gray shaded region is the 5th to 95th percentile, the whiskers are the full data range and the black line is the mean of the 30 LENS ensemble members.