Understanding the statistics of extremes

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Is it possible to have extreme events, like those found in the present climate, in the absence of external radiative forcing? The statistics of 2-meter temperature and precipitation, in terms of mean, variance, skewness, and kurtosis are calculated for different sample sizes and compared to observed datasets to determine if the probability distribution functions of the observed climate record are within the sampling errors of the CCSM4 pre-industrial control run. We attempt to understand the specific regions where the observed statistics of temperature and precipitation are not well represented in a pre-industrial climate simulation by comparing the statistics to the 20th century runs and runs with and without radiative forcing. We diagnose whether the differences in PDFs are due to sampling, model errors, or direct (changing CO2) versus indirect (SST) forcing.