Mia Gross

The sensitivity of daily temperature variability and extremes to dataset choice.

Poster Summary (from Abstract of Gross et al. 2018, J. Clim):

Robust conclusions regarding changes in the temperature distribution rely on the accuracy and reliability of the input datasets used. Differences between methodologies and datasets in previous studies add uncertainty when comparing and quantifying findings. Here, the authors investigate the sensitivity of assessing global and regional temperature variability and extremes over 1980–2014 in gridded datasets of daily temperature anomalies. A gridded in situ–based dataset, Hadley Centre Global Historical Climatology Network–Daily (HadGHCND), is compared against several commonly used reanalysis products by assessing both the entire distribution and the tails of the distribution. Empirical probability distribution functions show sensitivity to the input dataset when estimating aspects such as standard deviation and skewness, with the mean showing robust results for most regions, irrespective of dataset choice. Standard deviation is especially sensitive, with larger disagreements between datasets for some regions more than others, such as Africa and the Mediterranean region, and with larger differences in minimum temperatures compared with maximum temperatures. Estimates of extreme parameters also show sensitivity to dataset choice, particularly in the lower tails and for daily minimum temperature anomalies. Comparing changes in the means and the extremes of the temperature distributions, the cold extremes in the lower tails have been warming at a faster rate than the mean of the entire distribution for much of the Northern Hemisphere extratropics, with warm extremes warming at a faster rate than the mean in some subtropical regions. These documented sensitivities call for caution when assessing changes in temperature variability and extremes, as dataset choice can have substantial effects on results.