Geophysical Research Abstracts
Vol. 20, EGU2018-9540, 2018
EGU General Assembly 2018

Changes in hot extremes at different temporal and spatial scales

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In the context of global warming, a great deal of attention has been devoted to quantify and understand future changes in "hot extremes". Regardless of the region and the season considered, studies have generally shown that the intensity and frequency of hot extremes will increase in the future. Changes in hot extremes are not only due to shifts in the mean but can also arise as a widening/shortening or a change in the hot tail of the temperature distribution. Quantifying the specific way in which changes in the various moments are combined can have important implications.

We will present a simple but unambiguous methodology to decompose daily hot extremes in various terms that reflect the contribution from different temporal and spatial scales, ranging from the long-term global mean to the local temperature anomaly of the day of the extreme. The methodology was applied to 30-year temperature records from gridded observed datasets and 33 atmosphere-ocean global climate models from the Coupled Model Intercomparison Project Phase 5. We will show that the decomposition is useful to analyse not only future changes in extremes and its separation according to mean and variability changes but also to disentangle present-climate biases when comparing to observations.