



Connecting climate model projections of global temperature change with the real world

Ed Hawkins and Rowan Sutton

NCAS-Climate, University of Reading, Department of Meteorology, READING, United Kingdom (e.hawkins@reading.ac.uk)

Current state-of-the-art global climate models produce different values for Earth's mean temperature. When comparing simulations with each other and with observations it is standard practice to compare temperature anomalies with respect to a reference period. It is not always appreciated that the choice of reference period can affect conclusions, both about the skill of simulations of past climate, and about the magnitude of expected future changes in climate. We discuss some of the key issues that arise when using anomalies relative to a reference period to generate climate projections and highlight that there is no perfect choice of reference period. When evaluating models against observations, a long reference period should generally be used, but how long depends on the quality of the observations available. The IPCC AR5 choice to use a 1986-2005 reference period for future global temperature projections was reasonable, but a case-by-case approach is needed for different purposes and when assessing projections of different climate variables. Finally, we recommend that any studies that involve the use of a reference period should explicitly examine the robustness of the conclusions to alternative choices.