



SPARC Workshop SHARP2016

The radiative heating response to climate change

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The structure and magnitude of radiative heating rates in the atmosphere can change markedly in response to climate forcings; diagnosing the causes of these changes can aid in understanding parts of the large-scale circulation response to climate change. This study separates the relative drivers of projected changes in longwave and shortwave radiative heating rates over the 21st century into contributions from radiatively active gases, such as carbon dioxide, ozone and water vapour, and from changes in atmospheric and surface temperatures. Results are shown using novel radiative diagnostics applied to timeslice experiments from the UM-UKCA chemistry-climate model; these online estimates are compared to offline radiative transfer calculations. Line-by-line calculations showing spectrally-resolved changes in heating rates due to different gases will also be presented.