

Do Earth System processes affect future changes in monsoon variability?

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Various studies have shown the importance of Earth System feedbacks in the climate system and the necessity of including such feedbacks in climate models used for making climate change projections. The HadGEM2 family of Met Office Unified Model configurations combines model components which facilitate the representation of many different processes within the climate system, including atmosphere, ocean and sea ice, and Earth System components including the terrestrial and oceanic carbon cycle and tropospheric chemistry. We examine the climatology and variability of the Asian summer monsoon in idealised climate change experiments in which a quadrupling of CO₂ is applied as a step change. Two members of the HadGEM2 family are used, with a common physical framework, one of which includes tropospheric chemistry and an interactive terrestrial and oceanic carbon cycle, to investigate whether such components affect the way in which the monsoon changes, and on which temporal and spatial scales such effects are manifest. We also investigate the extent to which model systematic biases may affect the climate change response and its sensitivity to Earth System processes.