Tropical Australia and The Western Pacific Monsoon: General Assessment and Projected Changes

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The Australian monsoon is a fundamental component of Southern Hemisphere summer circulation, and dominates rainfall distributions over northern Australia and adjacent regions. This study examines the ability of the current generation of models (CMIP3) to simulate the Australian monsoon, including basic temperature, pressure, wind and precipitation patterns and variation. The variability of models on a range of timescales is also assessed, including interannual variability. Both daily and monthly fields are analysed to examine the ability of models to depict timescale variability, as well as issues such as monsoon onset and duration, and intensity of rainfall events. A comparison will be made with aspects of monsoon representation by the previous generation of models as well as reanalysis fields. We find that while there are some deficiencies in simulating 20th century monthly climate means (of rainfall in particular) some of the large scale features such as the zonal winds are quite reasonably simulated.

Changes to the Australian monsoon over the coming century could have profound consequences for Northern Australia and adjacent regions, for example affecting rainfall totals, distribution or intensity. Projected changes in the Australian monsoon as depicted by the coupled climate models are examined. Assessing these changes in the Australian monsoon under enhanced greenhouse conditions is problematic, because the signal (if any) seems to be very weak. The ensemble mean model results indicate a possible later retreat of the monsoon, in particular over the North-western part of Australia.