



Future changes in Australian midlatitude cyclones using a regional climate model ensemble

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Midlatitude cyclones cause the majority of strong winds, high seas and coastal flooding along the east coast of Australia, and are also an important contributor to annual rainfall variability and water security. For this reason, there is substantial interest in how the frequency or behaviour of these cyclones may change during the 21st century.

A recent regional downscaling project in southeastern Australia (NARcliM) provides an ensemble of climate model projections at both 50km and 10km resolutions for the 20-year periods 1990-2009 and 2060-2079. This allows us to analyse and assess the projections of midlatitude cyclones in significantly more detail than previous studies. NARcliM is an ensemble of 4 CMIP3 Global Climate Models (GCMs) which have been downscaled using three different configurations of the Weather Research and Forecasting model, with both GCMs and regional downscaling parameters chosen to optimise both model skill and independence of errors during the current climate.

In addition to the ensemble of regional climate projections, we also employ three different cyclone identification and tracking methods which have been recently evaluated in the study region. This provides the most robust assessment to date of future changes in cyclone activity in this region, drawing attention to both areas of consistency and seasons and locations of high inter-model or inter-method uncertainty. The high resolution regional models also allow the first assessment of future changes in the frequency of heavy rainfall and strong winds associated with these systems.