



Climate change in Australasia and South America CORDEX domains using RegCM4

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There is substantial evidence that the sensitive ecosystems of Australia and South America have already experienced negative changes due to anthropogenic climate change. Climate change is further predicated to have consequences in not only environmental sectors such as water management, coral reef health, and forest fire occurrence, but also industries like tourism and agriculture. Under the CORDEX framework, this study uses the RegCM4 model to downscale 3 GCMs over the Australasia and South America domains on a 25km resolution grid: HadGEM2-ES, MPI-M-MPI-ESM-MR, and NCC-NorESM1-M. These GCMs are downscaled for a historical (1970-2005) period which is compared against future simulations (2006-2099) to determine the response of the earth system to climate change in the near- and far-future under RCP2.6 and RCP8.5. Evaluation of the model is accomplished using a downscaled simulation of ERA-Interim over 1979-2015, which shows the REGCM4 modeling system is adequate at reproducing spatial and temporal precipitation and temperature patterns over both domains. Future projections indicate average temperature rises of 1-2°C under the RCP2.6 driving scenario for both domains with 3-5°C and 3-7°C increases under the RCP8.5 scenarios for Australia and South America, respectively. Little climate change signal in precipitation is seen over land under future climate change, excluding strong drying in the oceans directly north of mainland Australia, where many coral reefs reside and over the Amazonian region in South America.