

Evaluation of the Australian Community Climate and Earth System Simulator (ACCESS) for climate simulation with a focus on the Australian region

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In response to ongoing demand for climate projection capability and in recognition of the need of a national approach to climate modelling, a project to develop the "Australian Community Climate and Earth System Simulator" (ACCESS) was commenced in 2006 to develop the next generation of Australian climate and earth system simulation capability. The partners in this project are the CSIRO and the Bureau of Meteorology through the Centre of Australian Weather and Climate Research (CAWCR) and participating Australian Universities, including linkage via the Centre of Excellence for Climate System Science. ACCESS aims to develop prediction/projection capability spanning the range of timescales from weather prediction, through seasonal prediction, to climate change projection on centennial time scales. It aims to support the Bureau of Meteorology in the provision of meteorological services, and the interests of natural resource management and climate impact and adaptation work. It further aims to support the Assessment Reports of the Intergovernmental Panel on Climate Change (IPCC) through the provision of appropriate climate projections. The initial components of ACCESS include those for the atmospheric, oceanic, sea ice and land surface. Components for the carbon and other key biogeochemical cycles, and for atmospheric chemistry are to follow. The atmospheric component is an implementation of the Hadley Centre HadGEM atmospheric model, the ocean component is based on the GFDL MOM4p1 code, the sea ice component is based on the LANL CICE4 code, the land surface model is the Australian community CABLE model. This presentation will present an evaluation of the ACCESS coupled model in terms of climate metrics and its representation of key features relevant to climate mean state and variability both globally and with a focus on the Australian region. The version of the coupled model will be that intended to be used for the provision of model output to the Coupled Model Intercomparison Project phase 5 (CMIP5) for use in the IPCC Fifth Assessment Report. Aspects to be examined include climate mean state characteristics, regional storm tracks, synoptic behaviour, and large-scale modes of variability including El Niño/Southern Oscillation, Indian Ocean variability, and Southern Annular Mode and their impact on Australian climate variability. The evaluation will be based on multicentury 'present-day' and preindustrial control simulations and an historical (1850 - 2005) simulation of the coupled model, and a 1979 - 2005 simulation with the stand-alone atmospheric model. The model performance will be discussed in terms of 'fitness-for-purpose' relative to the performance of previous coupled climate models.