



Modelling drought in south-east Australia using a regional climate model

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The Weather Research and Forecasting (WRF) regional model was run from 2000 through 2009 over south-east Australia. During this period the region entered into and later (partially) recovered from a severe drought. The model used the following physics schemes: WRF Single Moment 5-class microphysics scheme; the Rapid Radiative Transfer Model (RRTM) longwave radiation scheme; the Dudhia shortwave radiation scheme; Monin-Obukhov surface layer similarity; Noah land-surface scheme; the Yonsei University boundary layer scheme and the Kain-Fritsch cumulus physics scheme. The model simulation uses boundary conditions from the NCEP/NCAR reanalysis with an outer 50km resolution nest and an inner 10km resolution nest. Both nests used 30 vertical levels spaced closer together in the planetary boundary layer.

WRF was run in control mode with the default climatological surface albedo and vegetation fraction datasets, as well as with these datasets prescribed using satellite data. Comparison of these simulations demonstrates the importance of capturing the dynamic nature of these fields as the climate moves into (and then out of) a persistent multi-year drought. Both simulations capture the drought reasonably well, emphasizing changes in the large scale circulation as a primary cause. Local land surface feedbacks do however hasten the onset and deepen the severity of the drought.