



Statistical Testing of Dynamically Downscaled Rainfall Data for the East Coast of Australia

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This study performs a validation of statistical properties of downscaled climate data, concentrating on the rainfall which is required for hydrology predictions used in reservoir simulations. The data sets used in this study have been produced by the NARCLiM (NSW/ACT Regional Climate Modelling) project which provides a dynamically downscaled climate dataset for South-East Australia at 10km resolution. NARCLiM has used three configurations of the Weather Research Forecasting Regional Climate Model and four different GCMs (MIROC-medres 3.2, ECHAM5, CCCMA 3.1 and CSIRO mk3.0) from CMIP3 to perform twelve ensembles of simulations for current and future climates. Additionally to the GCM-driven simulations, three control run simulations driven by the NCEP/NCAR reanalysis for the entire period of 1950-2009 has also been performed by the project.

The validation has been performed in the Upper Hunter region of Australia which is a semi-arid to arid region 200 kilometres North-West of Sydney. The analysis used the time series of downscaled rainfall data and ground based measurements for selected Bureau of Meteorology rainfall stations within the study area. The initial testing of the gridded rainfall was focused on the autoregressive characteristics of time series because the reservoir performance depends on long-term average runoffs. A correlation analysis was performed for fortnightly, monthly and annual averaged time resolutions showing a good statistical match between reanalysis and ground truth. The spatial variation of the statistics of gridded rainfall series were calculated and plotted at the catchment scale. The spatial correlation analysis shows a poor agreement between NARCLiM data and ground truth at each time resolution. However, the spatial variability plots show a strong link between the statistics and orography at the catchment scale.