



Post-processing GCM daily rainfall and temperature forecasts for applications in water management and agriculture

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Ensemble time series forecasts of rainfall and temperature up to six months ahead are sought for applications in water management and agricultural production. Raw GCM forecasts are generally not suitable for direct use in hydrological models or agricultural production simulators and must be post-processed first, to ensure they are reliable, as skilful as possible, and have realistic temporal patterns. In this study, we test two post-processing approaches to produce daily forecasts for cropping regions and water supply catchments in Australia.

In the first approach, we apply the calibration, bridging and merging (CBaM) method to produce statistically reliable monthly forecasts based on GCM outputs of rainfall, temperature and sea surface temperatures. We then disaggregate the monthly forecasts to obtain realistic daily time series forecasts that can be used as inputs to crop and hydrological models. In the second approach, we develop a method for directly post-processing daily GCM forecasts using a Bayesian joint probability (BJP) model. We demonstrate and evaluate the two approaches through a case study for the Tully sugar region in north-eastern Australia. The daily post-processed forecasts will benefit applications in streamflow forecasting and crop yield forecasting.