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Atmospheric Modelling for Seasonal Prediction at the CSIR

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Abstract

Three aspects of seasonal forecast modelling when using an atmospheric general circulation model (AGCM) are presented in this paper. The first aspect deals with the verification of simulations created by forcing the AGCM at its lower boundary by observed monthly sea-surface temperature (SST) and sea-ice fields. The AGCM is the conformal-cubic atmospheric model (CCAM) administered by the Council for Scientific and Industrial Research. Since the model is forced with observed rather than predicted values the skill of the CCAM in simulating seasonal-to-interannual climate variability through these so-called AMIP runs is thought to provide an upper boundary of the model's seasonal forecasting capabilities. The second aspect introduces hindcasts (or re-forecasts) made at lead-times which are the result of forcing the CCAM with predicted SST (while the sea-ice remains specified as climatological values) in order to determine how the model can be expected to perform under real-time operational conditions. Both the simulation and the hindcast runs are statistically downscaled from the horizontal resolution of the model (~200 km) to gridded seasonal rainfall and maximum temperatures at about a 50 km resolution. The focus area of the verification work is southern Africa south of 15°S for both deterministic as well as probabilistic simulations and hindcasts for the austral summer season. The third and final aspect describes the current operational forecast setting and provides the CCAM's rainfall and maximum temperature forecasts for the coming 2014/15 summer season over SADC.