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NARCliM regional downscaling project in Australia: Long-term climatological analysis of the control period

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NARCliM (NSW/ACT Regional Climate Modelling project) is a regional climate modeling project for the Australian area. It will provide a comprehensive dynamically downscaled climate dataset for the CORDEX-AustralAsia region at 50km, and South-East Australia at a resolution of 10km. NARCliM data will be used by state governments to design their climate change adaptation plans. It runs an ensemble of WRF simulations using three different physical configurations and four different GCMs for the present and future periods along three different time-windows (1990-2010, 2020-2040 and 2060-2080). We will present the validation of the control period (1950-2009) using the NNRP re-analysis. Simulated climatologies are compared with observed ones from a gridded data-set (AWAP) comparing observed and simulated seasonal climatologies and long-term series based on the climatological sensitivity to different climate indices (representing modes of variability including ENSO, the Indian Ocean Dipole, and the Southern Annular Mode which affect the Australia climate). Results show that the performance of the simulated climate presents a regional (from tropical to desert areas), seasonal and variable (precipitation and minimum/maximum daily temperatures) sensitivity without a clear outperforming physical configuration. Long-term analysis (mostly by means of correlations with the time-series of the indices) shows that increasing spatial resolution has a positive impact on how the model represents the continental climate response to the large scale and improves the results from the data providing the boundary conditions (NNRP) taking the response of the observations as the reference.