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Relating ocean-atmospheric climate indices with Australian river streamflow

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Abstract

The relationship between climate indices with Australian river streamflow (ASF) may provide valuable information for long-lead streamflow forecasting for Australian rivers. The current study examines the correlations between three climate indices (SST, 500 mb meridional wind - U_{500} and 500mb geopotential height- Z_{500}) and 135 unimpaired ASF gauges for 1971-2011 using the singular value decomposition (SVD) method. First, SVD method was applied to check the SST-ASF correlated regions of influence and then extended SST-ASF variabilities were used to determine the correlated regions within Z_{500} and U_{500} fields. Based on the teleconnection, the most correlated region (150°E to 105°W and 35°S to 5°N) was identified and its persistency was checked by lag analysis up to 2 years from seasonal to yearly time-scale. The results displayed positive correlation for the south and south-eastern part of Australia while negative correlation prevails in the north-eastern region (at 95% significance level). The most correlated region was found situated along the South Pacific Convergence Zone (SPCZ) axis which may be considered as a probable climate driver for ASF. The persistency of this region was checked by a separate climate indicator (mean

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