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Precipitation variability over the eastern Bolivian Altiplano

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The precipitation variability and its relationship with climate indices over the Bolivian Altiplano have been studied in the past. However, precipitation variability is affected by local climatic conditions and temporal variation of atmospheric flow. In this paper, an analysis of the variability of the austral summer precipitation and the in[U+FB02]uence of climate indices in the eastern Bolivian Altiplano is developed using principal component analysis, singular value decomposition, and cross wavelet analysis. Results show that precipitation in most of the region is characterized by climate indices, although with varying time frequency and power. The El Niño–Southern Oscillation (ENSO), Pacific Decadal Oscillation (PDO), North Atlantic Oscillation (NAO), and Antarctic Meridional Mode (AMM) variability are analyzed together with the precipitation. The ENSO is shown to exhibit the largest influence on precipitation variability. The physical explanation of this influence is the warm and dry air transported from the Pacific Ocean to the Altiplano during the El Niño events that inhibits the transport of humid air from the Atlantic, with opposite conditions during La Niña events. As a consequence, generally the region presents drier conditions than normal during El Niño events. The study identified the variation of strength of climate forcing for different time periods. The results have a potential use for seasonal precipitation forecasting.