



Interannual variability of South American monsoon circulation

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The South America Monsoon System (SAMS) is responsible for influencing the atmospheric circulation and precipitation over most of tropical South America (SA) during the summer season. Studies for aiming to understand the temporal variability of this system have great value to the scientific community, because the processes that control the monsoon climate are not totally clear. Thus, the main objective of this research is to investigate the possible large-scale climatic factors and the remote interaction mechanisms, which may be associated with summer season interannual variability focusing on identifying the main differences between dry and wet extremes rainy season in the South-eastern Amazon Basin (SAB), Central-West (WC) and Southeast (SE) of Brazil, which are areas influenced by the summer monsoon regime. For such analyzes, Pearson correlations, quantile method and composite analysis were used during the period from 1979 to 2014. The correlation between precipitation anomaly in SAB and the sea surface temperature anomaly (SSTA) and wind at 850hPa and 300hPa indicate El Niño-Southern Oscillation (ENSO) influence. Precipitation anomalies in WC did not show significant correlation with SSTA. However, a pattern similar to ENSO Modoki type was observed in the composite analysis. At 850 hPa, the presence of an anomalous cyclonic (anticyclonic) circulation was observed over the central region of SA during wet (dry) summers seasons. Over SE region of Brazil, a dipole SSTA pattern over the South Atlantic was identified, as well the presence of anomalous circulations with an equivalent barotropic structure over these SSTA areas. This pattern is more evident in case of dry summer on the SE. At 300 hPa, the wave train between 30°S-60°S was observed presenting a feature curvature from 120°W reaching SA, similar to the Pacific-South American pattern (PSA). Analysis of the summer interannual variability indicated the manifestation of wet summers more frequently than dry summers in the SAB during the last decade. On the other hand the SE region experienced rainfall deficit during the last five summer seasons, with the summer of 2013/2014 considered the driest over the last 35 summers studied in this region.