The Paraná River response to the 1982-83 and 1997-98 ENSO events. 2000.

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Abstract

The most severe flooding of the twentieth century in the Argentine section of the Paraná River occurred during the strong El Niño (EN) event of 1983. During the 1997-98 EN episode, discharge anomalies in the Paraná basin, while of the same sign of those of the 1982-83 event, were much smaller. The main differences were observed during January-March and June-July of the following year of the starting date of the event when the 1982-83 discharge anomalies were considerably larger. This study explores this issue as well as the relationship between convection anomalies in the Paraná basin and tropical Pacific and South Atlantic sea surface temperature (SST) anomalies.
The correlation between convection in the Upper and Middle Paraná and Iguazú basins, as measured by outgoing long-wave radiation, and SST in both EN-1+2 and EN-3 regions is statistically significant for most of the period November-July, reaching the maximum value in the three basins during May. However, the analysis of the higher Paraná streamflows during EN events since 1904 indicates that they were decisively influenced by the EN-3 SST anomalies. Therefore, the exceptional discharge of the Paraná River of 1983 is attributed principally to the exceptionally warm SST temperatures in the EN-3 region during April-June 1983.
During January 1983 there was a pattern of SST anomalies in the South Atlantic with warm water to the north of the South Atlantic convergence zone (SACZ), especially west of 20°W, and cold water to the south. This pattern is correlated with convection over the upper and middle Paraná basins, as occurred in 1983. During January 1998, the SST pattern was substantially different from what should be expected to be associated with positive anomalies in the convection field over the middle Paraná basin. This feature could be responsible for the small convection over this basin during January 1998.