

The Years of El Niño, La Niña, and Interactions with the Tropical Indian Ocean

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Abstract

The Indian Ocean zonal dipole is a mode of variability in sea surface temperature that seriously affects the climate of many nations around the Indian Ocean rim, as well as the global climate system. It has been the subject of increasing research, and sometimes of scientific debate concerning its existence/non-existence and dependence/independence on/from the El Niño–Southern Oscillation, since it was first clearly identified in *Nature* in 1999. Much of the debate occurred because people did not agree on what years are the El Niño or La Niña years, not to mention the newly defined years of the positive or negative dipole. A method that identifies when the positive or negative extrema of the El Niño–Southern Oscillation and Indian Ocean dipole occur is proposed, and this method is used to classify each year from 1876 to 1999. The method is statistical in nature, but has a strong basis on the oceanic physical mechanisms that control the variability of the near-equatorial Indo-Pacific basin. Early in the study it was found that some years could not be clearly classified due to strong decadal variation; these years also must be recognized, along with the reason for their ambiguity. The sensitivity of the classification of years is tested by calculating composite maps of the Indo-Pacific sea surface temperature anomaly and the probability of below median Australian rainfall for different categories of the El Niño–Indian Ocean relationship.