



Decadal variations of the Ningaloo Niño

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In early 2011, ocean temperatures along the west coast of Australia were the highest ever recorded. This resulted in the first ever recorded bleaching event in the pristine World Heritage Ningaloo Reef and massive die off of economically important fish species off the west coast. This unprecedented marine heat wave has been termed the Ningaloo Niño, in analogy with other coastal Niños. The 2010-2011 Ningaloo Niño was mostly induced by an unseasonable surge of the Leeuwin Current during one of the strongest La Niñas on record. Both remote wind anomalies in the equatorial western Pacific and local alongshore wind anomalies are important in accelerating the Leeuwin Current during the event. In this talk empirical orthogonal functions and time series analyses are used to compare the 2010-2011 Ningaloo Niño with historical events since 1950s. It is noted that there are significant decadal variations in the relationship between Ningaloo Niño and Pacific ENSO and to a certain extent the Ningaloo Niño occurs independently from Pacific La Niña, and some Ningaloo Niño events actually occur during El Niño. The developments of low sea level pressure anomalies in the southeast Indian Ocean and high surface pressure anomalies on the Australia continent are crucial factors in strengthening the Leeuwin Current in Austral summer and the occurrences of the Ningaloo Niño. A coupled atmosphere-ocean model forced by the equatorial eastern Pacific sea surface temperature anomalies suggests that the recent phase reversal of the Pacific Decadal Oscillation and associated hiatus status of global warming may have increased the likelihood of the occurrences of the Ningaloo Niño in recent years.