

**the 9th International Conference on Southern Hemisphere
Meteorology and Oceanography
(Melbourne, Australia, 9th - 13th February, 2009)**

Low-Frequency Variability of Regional Sea Surface Temperature and Rainfall in the Austral-Indonesian Region

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Abstract

A study of low-frequency variability of regional sea surface temperature (SST) and rainfall in the Austral-Indonesian region on seasonal basis is conducted. This study covers an area of 90°-160°E and 25°S-20°N, which includes Indonesia and Northern Australia. The results show decadal to multidecadal variability from 9 to more than 50 year cycles, with consistently dominant 14 years cycle obtained from the spectral analysis of the principal SST loading. These might be linked to the Pacific inter-Decadal Oscillation (PDO) and the Interdecadal Pacific Oscillation (IPO) phenomenon. The analysis demonstrates correlations of the EOF scores of 9 years filtered SST data and rainfall. The seasonal patterns of these correlations are similar to the rainfall climatology patterns during 1977-2002 periods and are opposite to the climatology of 1947-76 periods particularly for the Indonesian region. Considerable upward trends of the regional SST in different areas in the Austral-Indonesian region are also found, particularly after 1980s. It is possible that climate change might have a major role in contributing to these trends. The increase of mean SST anomalies on low-frequency timescales could lead to more active ocean-atmosphere processes. These might cause an increase of more extreme rainfall events on higher frequency time scales on specific regions.