

Climatology of Tropical Cyclones in the South Pacific Region and Their Relationships to El Niño Events*

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An analysis of a 28-year dataset of tropical cyclones in the South Pacific Region, 135°E–135°W and below 5°S, was carried out to examine the relationship between cyclone paths, origins, occurrences and frequency in relation to the Southern Oscillation (SO).

The geographical map reveals that cyclones generally track southwest from their starting positions, and then change direction and move southeast irrespective of the ENSO cycle.

Cyclone paths during the negative SOI phases are longer than the positive SOI values. Tropical cyclones originate at a mean position of 174°E and 12°S during negative SOI periods, and they originate at a mean position of 171°E and 15°S during positive SOI periods. Cyclone incidences shift eastward and northward during negative phases of the ENSO cycle and vice versa during the positive phases. Latitudinal origins show reasonable linear correlation with the SOI, with a correlation coefficient $r = 0.8$, which the longitudinal positions are poorly correlated with a coefficient of $r = -0.2$.

Tropical cyclones are more severe during negative SOI periods. About 90% of the cyclones occurring during the negative SOI periods exceeded 80 knots, and only 10% had their maximum sustained wind speed of 80 knots or higher during the positive SOI periods. Over 60% of all cyclones occur during negative SOI periods. Hence cyclones are more severe, with higher numbers, during El Niño periods, and weaker with lower numbers during La Niña periods. The monthly cyclone numbers show a single peak in February. All cyclones occur during the months between November to April in the South Pacific region.

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