

Maru, E., K. Ito, and H. Yamada, 2025: Analysis of Tropical Cyclone Rapid Intensification in the Southwest Pacific Region. *J. Meteor. Soc. Japan*, **103**, doi:10.2151/jmsj.2025-010.

**Plain Language Summary:** This study statistically investigates the characteristics of tropical cyclones (TCs) undergoing rapid intensification (RI) in the Southwest Pacific region in the 37 years from 1986 to 2022, comparing with non-rapidly intensifying TCs (NR-TCs). The frequency of RI-TC occurrence shows a slowly increasing trend over the 37-year period. In El Niño years, TCs tend to undergo RI more frequently presumably due to the average genesis to the further north where sea surface temperature and ocean heat content are high.

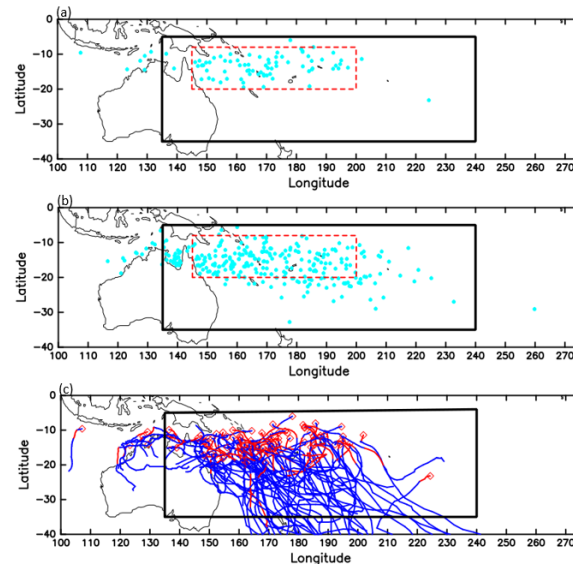


Figure 1. (a) RI-TC genesis locations (cyan dots), inner red dashed box area indicates the region with frequent RIs and (b) NR-TC genesis locations (cyan dots). (c) Tracks (red lines) indicate the period of RI for all 82 RI-TCs detected in this study and blue lines indicate the other period. A red diamond indicates the RI-TC genesis location same as cyan dots in (a). For presentation purpose,  $XX^{\circ}\text{S}$  and  $XX^{\circ}\text{W}$  are respectively represented as  $-XX$  and  $360-XX$  in the longitudinal axis.

- Among the 364 TCs investigated, 82 TCs satisfied the criteria of a maximum wind speed increase of 30 kt or more in a 24-hour period.
- The slow increasing trend in the 37-yr period was not statistically significant. On the other hand, the annual number of all TCs (RI-TCs and NR-TCs) analyzed in this study shows a decreasing trend but also not statistically significant.
- The average number of RI-TCs per year and the average occurrence rate were 2.6 and 24.8% during El Niño years, whereas those were lower in La Niña years (2.0, 21.0%) and neutral years (1.9, 20.2%).