

Fudeyasu, H., R. Yoshida, M. Yamaguchi, H. Eito, C. Muroi, S. Nishimura, K. Bessho, Y. Oikawa, and N. Koide, 2020: Development conditions for tropical storms over the western North Pacific stratified by large-scale flow patterns. *J. Meteor. Soc. Japan*, **98**, 61-72.

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**Plain Language Summary:** This study investigated the characteristics and environmental conditions of tropical cyclones (TCs) over the western North Pacific from 2009 to 2017 that dissipated before reaching tropical storm strength (TDs) under unfavorable environmental conditions; we compared these with TCs that reached tropical storm strength (TSs) in terms of modulations of relevant large-scale flow patterns. The flow patterns were categorized based on five factors: shear line (SL), confluence region (CR), monsoon gyre (GY), easterly waves (EW), and Rossby wave energy dispersion from a preexisting cyclone (PTC). Among 476 cases, 263 TDs were detected using best-track data and early stage Dvorak analysis.

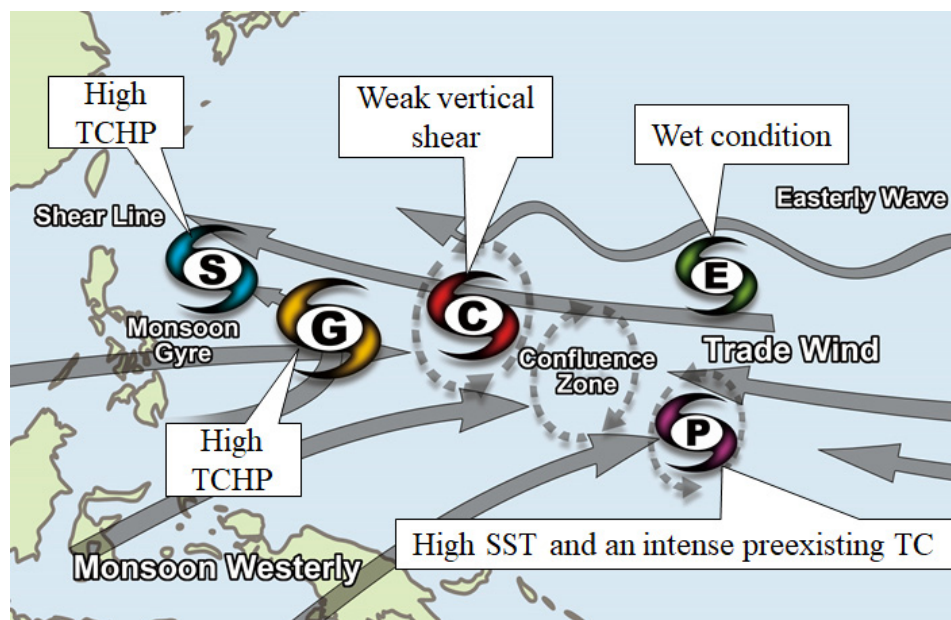


Figure 1. Schematic image of the five flow patterns and conditions prior to a TC's reaching TS strength. The westerly and easterly winds are indicated by arrows, and the TC genesis location (cyclone symbol) of each factor is shown.

- The environments around TDs were less favorable for development than those of TSs, as there were significant differences in atmospheric (oceanic) environmental parameters between TDs and TSs in the factors of CR, EW, and PTC (SL, GY, and PTC).
- The environmental conditions for reaching tropical storm strength using five factors can be summarized as follows: higher tropical cyclone heat potential in the SL and GY, weak vertical shear in the CR, wet conditions in the EW, and higher sea surface temperatures (SST) and an intense preexisting cyclone in the PTC.