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Plain Language Summary: During the autumn rainy season, typhoons located far from Japan sometimes cause significant precipitation in Japan. In this study, we characterized remote precipitation events (PRE cases) in September for 40 years from 1980 to 2019. We also analyzed cases in which remote precipitation did not occur despite approaching typhoons (non-PRE cases), as well as cases in which heavy precipitation was not affected by typhoons (non-typhoon cases). In particular, the comparison of the PRE cases and the non-PRE cases revealed differences regarding the extension of the subtropical high and the location of the jet streak.

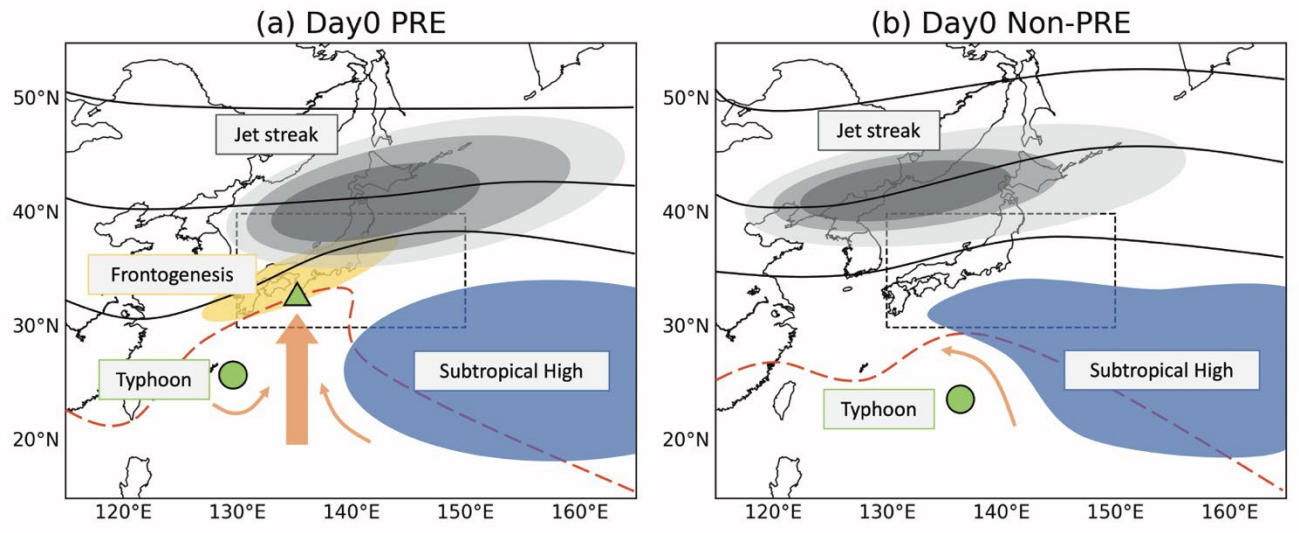

Figure 1. Conceptual models of the environmental field on (a) Day0 PRE cases and (b) Day0 non-PRE cases. The black contour shows the 200 hPa geopotential height. The dashed red contour shows the 850 hPa equivalent potential temperature (340 K). The orange arrow shows the horizontal wind. The rectangle shows the extraction area [130–150°E, 30–40°N]. The green circle shows the median point of typhoons. The green triangle shows the median point of precipitation.

- The subtropical high south of Japan was retreating for the PRE cases during the two days before PRE occurrence, while it was strengthening for the non-PRE cases.
- The jet streak entrance east of the 200 hPa trough was close to the precipitation area for the PRE cases. By contrast, for the non-PRE cases, the 200 hPa jet streak entrance was located to the west compared to the PRE cases.
- The northward water vapor inflow from the middle troposphere was larger in the PRE cases than in the non-typhoon cases.