

## **Seasonal differences in tropical cyclone-induced sea surface cooling in the western North Pacific**

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Tropical cyclone (TC)-induced sea surface temperature (SST) cooling is a critical factor influencing the intensity of TCs within ocean basins and exerting influence on local weather patterns. This study investigates the seasonal differences in TC-induced SST cooling, with a particular focus on summer (June-August) and autumn (September-November) within the western North Pacific for the period 1992–2021. Our analysis reveals that, during autumn, the average maximum TC-induced SST cooling along the TC path is approximately 0.18°C less than that observed during summer, even though the mean TC intensity is 14 knots higher than in summer. This is because in autumn, the average mixed layer depth is ~12 m deeper than in summer and the TC track shifts equatorward, preventing the entrainment of cooler subsurface water to the surface, resulting in less SST cooling in autumn at the same TC intensity. Since, TC-induced SST cooling has negative feedback on TC intensity, these results are crucial in understanding the seasonal differences in TC intensity in this basin.

Keywords: cyclone-induced cooling, western North Pacific, mixed layer depth, seasonal difference

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