
Asymmetric wave distributions of tropical cyclones based on CFOSAT observations

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Résumé

Observations of the China-France oceanography satellite (CFOSAT) are used to investigate the wave distribution's asymmetry during tropical cyclone (TC) from August 2019 to August 2020. The spatial distribution of TC waves is analyzed based on an individual case, six ocean basins, and TCs categories. A study of super typhoon Hagibis shows that the highest significant wave height (SWH) appears on the typhoon track's right side. Further analysis reveals that the highest SWH is located on the right (left) side of TC tracks in the Northern Hemisphere (Southern Hemisphere). In the Western North Pacific, North Atlantic, Eastern North Pacific, and North Indian Ocean, the highest SWH is on the right side of TCs of 251 km, 260 km, 130 km, and 118 km, respectively. In the South Pacific and South Indian Ocean, the highest SWH is on the left side of 70 km and 128 km. According to the TC categories, the largest (smallest) departure happens during the weakest (strongest) TC. The intensifying of TC favors the wave field's growth and reduces the asymmetry of the wave height's distribution. Both the asymmetric wind fields and the land's orographic effects impact the TC wave's distribution. In the Eastern North Pacific, the TC wind is the weakest, but the departure is not the smallest, probably due to the left continent bounding the wave energy's spread.

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