Long-range Radiation and Dissipation of M2 Internal Tides in the Philippine Sea

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Generation and long-range radiation processes of M2 internal tides in the Philippine Sea are revealed by a set of high-resolution numerical simulations. The M2 internal tides are effectively generated at prominent topographical features, including Luzon Strait, Ryukyu Island chains, Bonin ridge and Mariana Arc. The converted baroclinic energy amounts to 47GW with the low-mode components contributing to 33GW, among which 9.5GW was transferred into the deep basin of Philippine Sea. Low mode tidal beams from Luzon Strait radiate into the Western Pacific with a long distance over thousands of kilometers and interfere with internal tides originate from other sources. Strong dissipation occurs both near the sources and in the deep basin. Notably, the integrated remote incident internal tidal dissipation over the deep basin sums up to 6.5GW and exhibit widespread distribution. The modulation effect of Kuroshio on the generation and propagation of internal tides from Luzon Strait and the Ryukyu Island chains is also discussed.

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