

Observed Waves in the refreezing eastern Chukchi Sea during 2018 Mirai Cruise

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The sea ice in the Pacific side of the Arctic Ocean starts to melt in August, retreats the most in September, and advances again in October. In November, in typical years, most of the Chukchi Sea is covered by ice. Waves generated in the open waters is largest in October. During the R/V Mirai (JAMSTEC) expedition in November 2018 (MR18-05C, PI J. Inoue), anomalously warm surface waters delayed freezing of Chukchi Sea providing a unique opportunity to observe ocean waves in the freezing period. A drifting wave buoy, ship-borne wave gauge, and satellite synthetic aperture radar data were analyzed to characterize the waves during that period. The drifting wave buoy was deployed at the edge of the Marginal Ice Zone, gradually migrated to the west, and eventually got trapped in the sea ice. During this period, the largest significant wave height observed by a buoy was 2.6 m. Once trapped in ice, the buoy-detected wave energy significantly reduced from the open water wave height detected by ship-borne wave gauge. The possible generation, decay, and propagation of waves in the ice-covered sea for on-ice and off-ice conditions will be discussed in conjunction with the obtained satellite SAR images.

Keywords: wave-ice interaction, Marginal Ice Zone, Chukchi Sea, R/V Mirai, SAR