
[JJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-OS Ocean Sciences & Ocean Environment

[A-OS18]Physical Oceanography (General)

convener:Eitarou Oka(Atmosphere and Ocean Research Institute, The University of Tokyo), Yoshimi Kawai(Research and Development Center for Global Change, Japan Agency for Marine-Earth Science and Technology), Tomoki Tozuka(東京大学大学院理学系研究科地球惑星科学専攻)

Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

This session invites presentations on a wide variety of topics related to physical oceanography.

[AOS18-P02]Surface Ocean Wave Development under Explosive Cyclone Conditions

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Keywords:Surface Ocean Wave, Explosive Cyclone, Northwestern Pacific

Ocean wave developments under explosive cyclone (EC) conditions are investigated with hindcast simulations of ocean waves in the Northwestern Pacific between 1994 and 2014. Composite analyses of the ocean wave field under EC conditions are conducted in order to obtain an overall depiction of spatio-temporal developments of ocean waves. Because of the rapid development of ECs, ocean waves beneath ECs continue to grow for about half a day after the EC begins to decay. ECs generate two areas with narrow directional spectra: on the cold side of a warm front and on the right-hand-side of the cyclone center, relative to the propagating direction. In comparison, typhoons usually generate just one area with a sharp peak. This research successfully provides a schematic diagram which illustrates the ocean wave development under an EC condition with atmospheric system (Fig. 1). This EC feature is derived from the existence of atmospheric fronts, which produce a complex wind system for the ECs. In one case study, spectral analysis of wave spectra from an EC in January 2013 indicates that the warm front plays a critical role in generating the distinctive ocean wave system in the warm and cold zones along the warm front, both of which have a narrow spectrum in direction and frequency. In contrast, ocean waves on the left-hand-side and in the backward area relative to the propagation direction are composed of swell and wind-wave systems propagating in different directions. Ocean wave disasters under ECs are proved to show dissimilar features from typhoons and should provide substantial information to maritime disaster risk management.