Geophysical Research Abstracts
Vol. 14, EGU2012-3870, 2012
EGU General Assembly 2012

Characteristics of the large-height swell-like waves on the east coast of Korea

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On the east coast of Korean peninsula, unusually high swell-like waves are occasionally observed several times during the winter season. These high swell-like waves are not related to the northwest monsoon that is typical in winter season, but are generated when strong northeasters blow continuously over the East Sea of Korea. In recent years, exceptionally high swell-like waves compared to the past observation record has attacked the east coast of Korean peninsula and caused severe casualties and damages of ships and coastal structures. Taking a few examples, abnormally high swell-waves of Hs =9.69 m were observed near Sokcho harbor on October 2006. More recently on the first day of Year 2011, large-height swell-like waves of Hs = 6.7 m visited at Jukbyeon port.

At the present, the occurrence of such high swell-like waves are not fully predicted and only partially included in the normal weather forecast. Hence, researchers have much interest in improving understanding of the detailed generation mechanism of the high swell-like waves and predicting its occurrence. In this presentation, the characteristics of the high swell-like waves occurred on the first day of 2011 will be reported, with some supplementary results of the other big wave events that occurred previously. The New Year wave was monitored at 12 measuring stations simultaneously along the east coast. By analyzing these wave data with the corresponding meteorological data provided by Korean Meteorological Agency (KMA), major characteristics of these waves were clarified in some detail.

The reason for appearance of the high swell-like waves was found to be due to the long-lasting strong northeasters in the East Sea, which was formed as a result of the low pressure trough in the vicinity of the extra-tropical low pressure system that advances to East Sea from the China inland with decreasing its central pressure. Such a strong low pressure system can be occasionally developed in winter season and may cause severe disaster repeatedly on the coast of Korea. In this respect, it is required to further enhance predictability of the high swell-like waves, based on understanding of the detailed mechanism of the rapid growth of the low pressure system.