Diurnal variations of sea surface temperature around the Korean peninsular

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Sea surface temperature (SST) is a basic parameter for air-sea interactions and numerical weather predictions. In general, daily mean SST data are widely used because of the nature of SST with slow temporal and spatial variability and the lack of high frequency ocean data. However, when (or where) the diurnal variation of SST is dominant, using the daily mean data may have significant limitations, particularly in simulating and explaining weather phenomena varying with short time scale such as torrential rains. The present study investigated the characteristics of diurnal SST variations in the Seas around the Korean peninsula using the ocean buoys from the Korea Meteorological Administration (KMA) and satellite SST data from the Communication, Ocean and Meteorological Satellite (COMS). The diurnal variations were the largest in summer and the smallest in winter. Spatially they are large in the Yellow and South Seas and small in the East Sea. Among all the buoys, Chilbal-do and Geomun-do buoys reveal the largest variation, at which the magnitude reached up to 8℃ in summer, while Donghae, Mara-do, and Ulleung-do buoys show a rather small diurnal variation within 5℃. The magnitudes of diurnal SST variations are mainly related to the variations of solar radiation with high and low peaks in 2-4 PM and 7-9 AM, respectively. In the Yellow Sea and the South Sea, tidal mixing in summer contributed to additional diurnal variations. These overall results suggest that an improved weather prediction in Korea, particularly during summer, requires the consideration of diurnal SST variation.

Key words : Diurnal variation, Sea surface temperature, tidal mixing

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