

Multi Satellite Data Observation for Internal Wave Observation and its Effect to Plankton Distribution in the Lombok Strait and Adjacent Areas

Yessy Arvelyna, Masaki Oshima

Tokyo University of Marine Science and Technology
Department of Marine Information System Engineering
yessy_a@e.kaiyodai.ac.jp

Recently, the internal waves have been proposed as mechanism for cross-shelf transport of planktonic organism and nutrients. Other study suggested the distribution of planktonic organism has experienced the internal wave induced change in concentration, which increase linearly with the wave amplitude and the swimming frequency of plankton observed from temperature-depth measurement and the water sampling of chlorophyll concentration. We investigated the effect of internal wave in the Lombok Strait to chlorophyll distribution in south of Bali Island and the Lombok Strait. For this purpose, ERS 1/2 SAR, ASTER image, SeaWiFS and AVHRR-NOAA images data have been observed during 1996-2004 period. Internal waves have been detected using the application of Discreet Meyer wavelet tranform and spectral reflectance analysis. The results show smoother internal wave feature is retained and the feature's coefficient is enhanced 2-4.59 times compared to sea surface, which provided accuracy in classification over than 80%. The internal wave induced current using Korteweg-de Vries (KdV) equation, we calculated that internal wave propagation speed was 1.2 m/s and internal wave induced current was 0.56 m/s, respectively. The observation results show that the internal waves in the Lombok Strait were propagated to the south and the north of strait and mostly occurred during transitional season and wet season (rainy season) between September to December when the layers are strongly stratified. The preliminary result of this study concludes that the internal waves presumably affect chlorophyll distribution to westward in the coast off Bali Island (from 9.25°-10.25°LS to 8.8°-10.7°LS) and increase surface chlorophyll concentration near coastal area (8.8°-9.25°LS, 114.5°-115°SE).