

Analysis of the river plume dynamics in Osaka Bay: a new estimation of sea surface salinity using ocean color satellite images.

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The riverine, low saline water, river plume, from the rivers into the coastal seas contains a large amount of the terrestrial organic matters to provide the nutrients in the environments of marine ecosystems and fishery grounds. However, the riverine water can often induce the harmful algae bloom such as red tide. Therefore, information of sea surface salinity (SSS) as an index of the low saline water draws increasing attention for not only researchers but also fishers from point of view of water environment conservation in semi-enclosed seas and fishery grounds. In date, not only SST maps but also SSS maps can be derived by satellites owing to development of the observational sensors and platforms. However, the resolutions of the conventional SSS maps are too coarse to estimate the SSS in the coastal seas with the large observational errors. Therefore, the technique to estimate the SSS in the coastal seas using satellites has been unestablished yet. The SSS has been known to highly correlate with the terrigenous, coloring dissolved organic material (CDOM) since the river plume in the coastal seas contains the CDOM discharged from the land. Using this relationship between SSS and CDOM, this study estimate the SSS in the coastal seas based on the CDOM map derived from the hourly products of the satellite observation to analyze the dynamics of riverine plume.

We used the hourly ocean color satellite images with the horizontal resolution of 500 m derived from the COMS/GOCI products to investigate the SSS dynamics in Osaka Bay because a large terrestrial runoff from Yodo River forms the distinguished river plume in the bay. The in-situ observations and water samplings using R/Vs were conducted in the flood seasons during the period from August through November to derive salinity and CDOM data in the sea surface. Further, we corrected the SSS data from regular observations conducted by several research institutes and automated observational stations to establish the estimation method of the SSS map from the CDOM map. The CDOM maps can be derived from the GOCI products. As a sample of the results, we show the dynamics of the river plume in Osaka Bay from a temporal sequence of the SSS maps in July to September, 2015, corresponding to the flood events induced by the typhoon approaches.

Keywords: ocean color satellite images, coloring dissolved organic material, sea surface salinity, river plume