The forefront research for flow and water quality estimations in coastal area using geo-stationary and polar orbital satellites data

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Continuous estimation of the flow velocity and water quality distribution in a wide area at high resolution is extremely important in order to understand the natural phenomena occurring at the interface between the river and the ocean. In recent years,satellite remote sensing is expected as a powerful tool to grasp such phenomena. In this presentation, a case study of flow velocity estimation using the stationary meteorological satellite "Himawari-8" data, which observes sea surface temperature (SST) at 10 minute intervals at first. A strong flow velocity distribution of about 0.5 m/s was detected by applying the image correlation method to continuous SST images in the southern part of the Lombok Straits of Indonesia in the study area. Such a method can measure the flow velocity distribution of wide channel at low cost, so it is particularly effective in waters where there is a remarkable water temperature difference. Meanwhile, the heavy rain in western Japan occurred in July 2018, and a large amount of sediment from the land flowed out to the Seto Inland Sea. As a result, oyster beds for aquaculture were broken or red tide damage caused by a large amount of nutrient salt was occurred. The state of such huge flood were monitored by the polar orbital earth observation satellite such as Landsat-8, Sentinel-2 (10 m to 30 m spatial resolution) and GCOM-C (250 m spatial resolution). The polar orbital satellite has lower observation frequency than geostationary satellite, but there is an advantage that detailed distribution of sediment discharge from river and red tide distribution can be visualized. Combining such stationary / polar orbital satellite data, measured data, numerical model and other technologies will make it possible to monitor coastal environments connecting the open ocean and rivers more quickly and in detail in the future.

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