

## Residence time of river water in the Jakarta Bay

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Jakarta bay faces to capital city of Indonesia, and its width and length are about 30km and 10km, respectively. The Jakarta Bay is shallow with maximum depth of 20m and opens to Java Sea. Massive materials supply through rivers into the bay. Since maintenance rate of sewage system is a few percentages, enormous nutrients, organic matters, and garbage. It is expected that marine environment in the Jakarta Bay has become worse. However, we do not know the environment at the moment because of lack of observed data. We have conducted hydrographic survey since December 2015 to capture current status of marine environment in the Jakarta Bay. It was found from our observation that hypoxia occurred throughout the year. Magnitude of hypoxia was small in rainy season but large in dry and transition seasons. Since tropical region like Jakarta Bay is heated at the sea surface during all seasons, water temperature becomes homogenous in vertical. Therefore, density stratification is controlled by fresh water supply from rivers. Considering this fact, it is expected that stratification develops in rainy season, and hypoxia occurs due to decreasing of vertical flux of oxygen. However, our observation did not show the situation.

In the present study, we develop a three dimensional model to understand seasonal variation in density stratification in the Jakarta Bay and to know residence time of river water in the bay. We developed a model based on POM. The model is driven by tidal forcing, surface wind, and river discharge from 10 rivers, and we reproduced physical field in 2016. Calculated sea surface salinity distributions coincided well with observations except in dry season. Sea surface current shows eastward or northeastward currents in February and May, and westward and northwestward in September and December. From the sea surface current pattern, it is implied that fresh water supplied from Citarum river might flow out to Java Sea immediately. In order to know residence time of river waters, we calculated age of river water using CART theory (Deleersnijder et al., 2001). Age of river water in May was about 15 days and that in September was about 50 days. This result suggests that density stratification in the Jakarta Bay might be controlled by not only total river discharge but also residence time of river water. At the presentation, we will introduce a result of contribution ratio of each river to salinity in the Jakarta Bay

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