

Observation of Generation and Disappearance of Hypoxia in the Western Part of Nanao Bay

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In order to investigate the generation and disappearance of hypoxia in the western part of Nanao Bay located on Noto Peninsula, changes in water temperature, salinity, dissolved oxygen (DO) and current in Nanao Bay were observed from June to October, 2016. The generation and disappearance of hypoxia (DO less than 2mg/L) in the bottom layer (8.5 m depth) was repeated at several days interval. Hypoxia gradually appeared during several days and disappeared in hours. Hypoxia was observed from late June to early October and was the most frequent in August coinciding with high water temperature. In the case of hypoxia observed on June 24, DO did not change significantly in the surface layer (1 m depth) but gradually decreased in the bottom layer from ca. 8 mg/L to ca. 2 mg/L during 3 days. Since salinity stratification was only found around estuary after precipitation on June 23, the salinity cannot be a main factor for hypoxia. Current velocity in the bottom layer was low from June 22 to 24. Therefore, stagnant flow and high water temperature were presumed to be the cause of hypoxia. On June 25 when strong southwestern wind blew in Nanao Bay, eastward flow occurred in the surface layer, whereas a strong westward flow exceeding 20 cm/s occurred in the bottom layer. DO in the bottom layer significantly recovered to ca. 8 mg/L with increasing current velocity. Water temperature in all layers decreased when the current in the bottom layer was strong. These results suggest that the wind-driven current in the surface layer to the leeward side had brought flow in the bottom layer toward the windward side as the compensation flow. As a result, vertical mixing was promoted and oxygen was supplied to the bottom layer.

Keywords: Nanao Bay, Hypoxia, meteorological factor

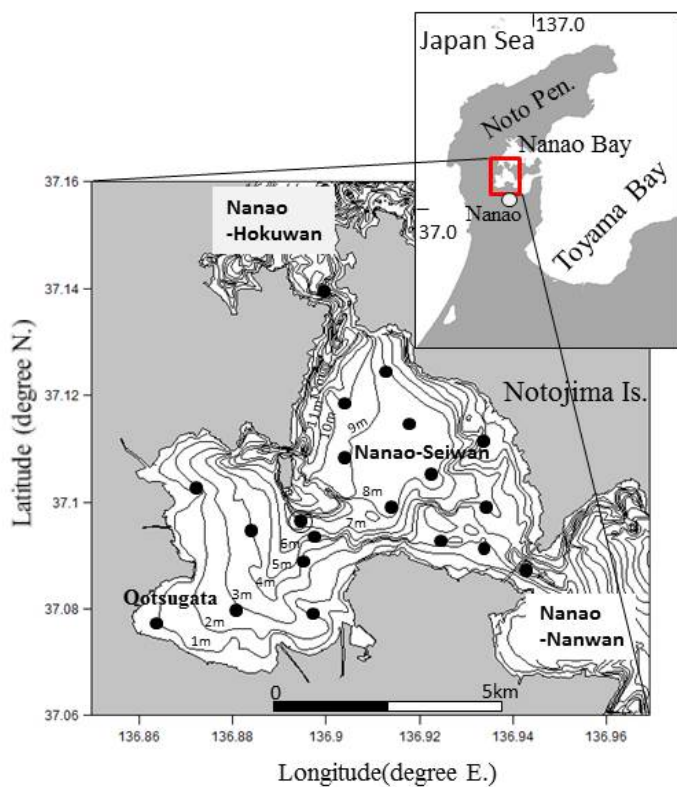


Fig.1. Location of observation stations in Nanao Bay (● indicates the CTD observation stations), ● indicates the temperature, current, and DO continuous mooring observation station).

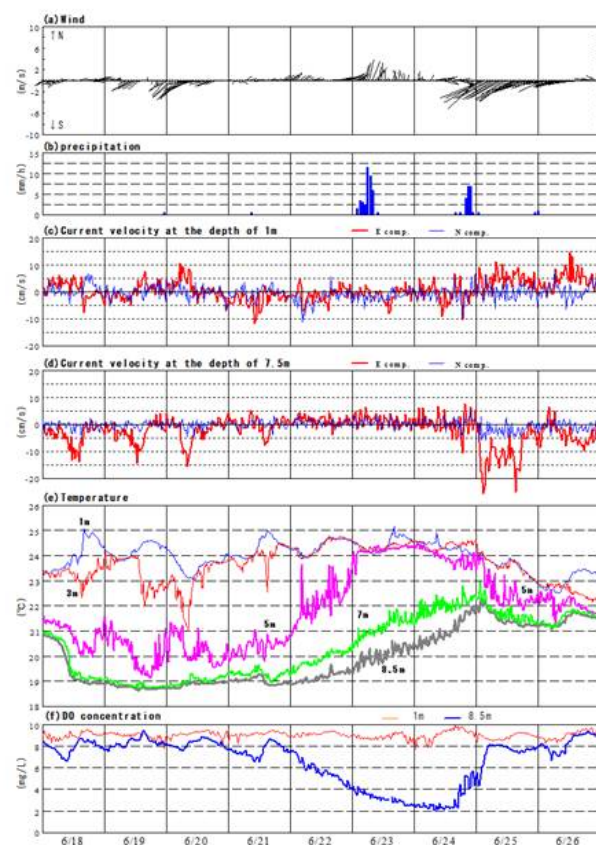


Fig.2. Temporal variations in (a)wind, (b)precipitation at Nanao, and (c)current velocity at the surface layer(1m), (d)current velocity at the bottom layer(7.5m), (e)Temperature at the depth of 1m, 3m, 5m, 7m, 8.5m, and (f)DO concentration at the surface and bottom layers from June 18 to 26 in 2016.