

1. Technical Session Theme :

Recent advances in coastal marine sciences ( poster presentation )

2. Abstract

## Occurrences of hypoxic water in the interior parts of the Ariake Sea and its preventive measures

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The Ariake Sea, which locates in Northern Kyushu Island, Japan, is a strongly closed and shallow inner bay with an area of about 1,700 km<sup>2</sup>. This bay has a very high bio-productivity and is used as the largest laver farming ground in Japan. But, in recent years, many environmental and biological changes such as the decrease in tidal range and current velocity, the sedimentation of mud and sludge on the sea bottom, the frequency of red tide and hypoxic water, and the extinction of bivalve occur in this bay. These changes cause extensive damage to the ecosystem and fisheries in the inner bay. The objectives of this study are to investigate the mechanism of occurrence of hypoxic water that is one of the most serious environmental problems in the interior parts of the Ariake Sea and to develop its preventive measures. First, the *in situ* measurements of temporal variations and vertical profiles of DO, velocity, salinity and water temperature in the study area were conducted in the summer of 2004 and 2005, and the prosperity and decay processes of hypoxic water were investigated on the basis of the field data. As the result, the occurrences of hypoxic water (DO less than 3.0mg/l ) were found over about 10 days at neap tide in the summer of 2004 and 2005 that rainfall amount was small and mean air temperature was high, and the closed relationships between the occurrence of hypoxic water and the stratified structures of salinity and water temperature were clarified. Moreover, it was considered that the magitude of vertical stirring force due to tidal current governed strongly the occurrence of hypoxic water, or its prosperity and decay processes. Next, based on the results of investigation, the measures to prevent the occurrence of hypoxic water in the study area were discussed using an experimental channel which could generate the co-oscillating tide similar to that in the Ariake Sea. Consequently, it was found that the increase in vertical stirring force near the lower layer by setting concave triangle blocks with height of one fourth of water depth on the sea bottom was effective as one of the preventive measures for the occurrence of hypoxic water.