[JJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-OS Ocean Sciences & Ocean Environment

[A-OS17]Ocean circulation and material cycle in coastal seas

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Costal seas have high biodiversity and high productivity, while various environmental problems such as eutrophication, red tide, and hypoxia are occurred by human activity. In order to understand material cycle and various phenomena and to maintain sustainable environment in costal seas, interdisciplinary research is needed. In the present session, we invite researchers who are interested in physical phenomena, material cycle, biological responsive dynamics, and those interactions in coastal seas. We do not confine study field, area, and method and welcome presentations of wide-range topics. We try to commoditize knowledge in terms of phenomena in coastal seas based on the presentations and discussion.

[AOS17-P02]Long term variation in hypoxia in the inner area of Ariake Sea

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In the inner area of Ariake Sea, hypoxic water mass developed every year and generated massive kills of bivalves. Therefore, it is an important environmental and fisheries problem. At least in the late 1980s, there was more rich fauna of macrobenthos than now suggesting small occurrence of hypoxia. However, it has been unknown how the hypoxia progressed for a long time since the terrestrial loads of organic matter and nutrients did not increased in Ariake Sea. Our recent reaches clarified that the progress of hypoxia in the inner area of Ariake Sea generated by 3 steps. First one is the increase of the oxygen demand in the bottom water generated by the increase of the organic matter concentration from 1970s to early 90s. The increase of organic matter concentration wad induced by the net ecosystem production. The second one is the influence of the Isahaya sea-dike construction in 1997. It weakened the tidal currents and tidal mixing at the mouth of Isahaya Bay and the coastal area of the Shimabara Peninsula. It enhanced the intrusion of dense water along the bottom to the inner area of Ariake Sea by the gravitational circulation. The dense water intrusion enhanced the stratification in the inner area of Ariake Sea. The third one is the decrease of tidal amplitude. The tidal amplitude in Ariake Sea decreased with the 18.6 years lunar nodal cycle from 1960s to 2000s. The amplitude of M2+S2 was smallest in 2007 which is equivalent to the mean tidal range in spring tide. There was a high correlation between the amplitude of M2+S2 and the stratification in the southern part of the inner area of Ariake Sea (the data with 11 years running mean were used). The correlation between the bottom DO was also high. They suggest that the decrease of the tidal mixing enhanced the stratification and decreased the oxygen supply to the bottom water. On the other hand, the bottom water COD was decreased. It suggests the increase of the intrusion of the offshore oligotrophic water.