



Eutrophication- and Natural-caused Hypoxia in the East China Sea: Some Notes from Observations and Modelling

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Patch-like hypoxic zones have been observed in the East China Seas, ranging from the Changjiang Estuary (CJE) to the offshore of the Zhejiang coast and the west of the Cheju Island. Compared to the general knowledge on generation of hypoxia, multiple factors may affect the evolution and distribution of hypoxia in the East China Sea due to complex circulations, different sources of organic matter and low-oxygen water etc. A suite of in situ and satellite observations were analyzed. A coupled physical-biogeochemical model was applied to diagnose the spatial-temporal characteristics of hypoxia. The model suggested that hypoxic extent off the CJE is highly variable in largely accordance with the Changjiang diluted water and could be partially influenced by the advection of the Kuroshio intruded water at bottom. High-concentration of riverine nutrients (anthropogenic eutrophication), along with cross-shelf intrude Kuroshio nutrients, causing frequent and severe HABs, is the essential BGC factor of hypoxia off the CJE. Hypoxia occurred ca 1-3 weeks later than diatom blooms. The core hypoxic zone occurred around the area of high-biomass diatom blooms, while offshore patched of hypoxic zones were generated due to the advection and subsequent remineralization of dissolved organic matter from the high-biomass HABs zone. Comparatively, the hypoxia and quasi-hypoxia conditions along the Zhejiang coastal water and west of the Cheju Island seem to be caused mostly by the cross-shelf intrusion of the Kuroshio.