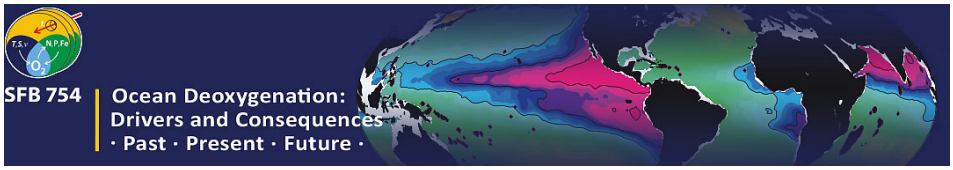

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On the eutrophication, hypoxia and ocean acidification in the coastal ocean

Thursday, 6 September 2018 15:00 (15)

Many studies have shown that coastal hypoxia is primarily associated with autochthonous organic carbon (Auto-OC) production, stimulated by coastal eutrophication resulting from excessive terrestrial nutrient runoff. Nutrients stimulate algal blooms in coastal surface waters. Sinking and remineralization of algal biomass drive dissolved oxygen (DO) consumption below the pycnocline. Therefore, Auto-OC is believed to be the predominant oxygen sink. Other studies, however, have suggested that Auto-OC may support only a fraction of DO consumption in the hypoxic zone. The relative contributions from eutrophication-induced autochthonous and terrestrially sourced allochthonous organic matter in causing coastal hypoxia are, however, still the subject of considerable debate despite decades of research. Another emerging but less studied environmental problem associated with entrophication is the enhanced ocean acidification (OA) in the coastal ocean, which often occurs accompanied by hypoxia. This enhanced acidification is typically induced by two processes. One is the in situ decomposition of the settled organic matter, which produces CO2 and decreases pH. The other is the decrease of the buffering capacity of the water, which further decrease pH.

This study examines major drivers of hypoxia and OA in both the East China Sea off the Changjiang estuary and in the lower Pearl River estuary off Hong Kong. Also examined is the interplays between eutrophication, hypoxia, and ocean acidification in these two highly impacted systems. My presentation highlights that both the hydrodynamic and biogeochemistry should be taken into consideration and multidisciplinary research approach is essential in order to diagnose individual processes in complex coastal environment.

Position

Professor

Affiliation

State Key Laboratory of Marine Environmental Science, Xiamen University, Xiamen 361005, China

Email Address

mdai@xmu.edu.cn

Are you a SFB 754 / Future Ocean member?

No

Primary author(s) : DAI, Minhan

Presenter(s) : DAI, Minhan

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