

Submarine groundwater discharge influenced benthic biogeochemistry in the Yellow River Estuary

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Submarine Groundwater Discharge (SGD) has been drawing more and more attention in coastal ocean biogeochemical studies. The Yellow River Estuary (YRE) is a typical high turbidity, heavy human regulated world class river estuary. We synthesis our past few years work in the YRE and highlight the significance of SGD to the biogeochemistry background of this area. By using a grid of radioactive tracers (such as radium, radon and uranium), we found the conservative estimated SGD fluxes were comparable with the Yellow River discharge. Significant SGD was located near the river mouth with coarser sandy sediment and water depth of 10-13 m. Biogeochemistry at the benthic layer of the YRE was significantly altered, characterized by low dissolved oxygen, low pH and high nutrient concentrations. SGD signatures were apparently affected by human water-sediment regulation activities in the Yellow River. Higher nutrient concentrations and more balanced nutrient stoichiometry ratios were observed during the regulation event.