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Riverine input of organic carbon and nitrogen in water-sediment system from the Yellow River estuary reach to the coastal zone of Bohai Sea, China

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ABSTRACT

The temporal-spatial distribution of the carbon and nitrogen contents and their isotopic compositions of suspended matter and sediments from the Yellow River estuary reach (YRER), the estuary to the offshore area were measured to identify the source of organic matter. The higher relative abundances of suspended and sedimentary carbon and nitrogen (POC, TOC, PN and TN) in the offshore marine area compared to those of the riverine and estuarine areas may be due to the cumulative and biological activity impact. The organic matter in surface sediments of YRER, the estuary and offshore area of Bohai Sea is basically the mixture of continental derived material and marine material. The values of $\delta^{13}\text{C}_{\text{sed}}$ fluctuate from values indicative of a land source ($-22.50\text{‰}\pm 0.31$) to those indicative of a sea source ($-22.80\text{‰}\pm 0.38$), which can be attributed to the fine particle size and decrease in terrigenous inputs to the offshore marine area. Contrary to the slight increase of POC and PN during the dry season, TOC and TN contents of the surface sediments during the flood season (October) were higher than those during the dry season (April). The seasonal differences in water discharge and suspended sediment discharge of the Yellow River Estuary may result in seasonal variability in TOC, POC, TN and PN concentrations in some degree. Overall, the surface sediments in the offshore area of Bohai Sea are dominated by marine derived organic carbon, which on average, accounts for 58%-82% of TOC when a two end-member mixing model is applied to the isotopic data.

Keywords

Temporal-spatial distribution; Sediment; Suspended matter; Stable isotope; Sources discrimination; Yellow River estuary reach

1. Introduction

Estuaries and coastal zones are the main areas situated between ocean and lands, and they trap significant

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