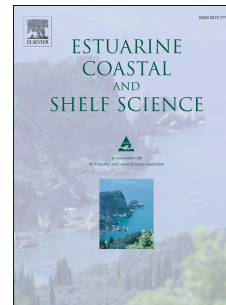


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Suspended sediment diffusion mechanisms in the Yangtze Estuary influenced by wind fields

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Abstract

Sediment suspended by waves and transported by currents are the dominant sediment transport mechanisms in estuarine and coastal areas, where both waves and currents play a vital role. The suspended sediment concentration (SSC) is much higher under combined wave and current action than when influenced solely by tidal currents. In order to evaluate the quantitative influence of wind fields on the SSC diffusion range, SSC was determined from three Envisat Medium-Resolution Imaging Spectrometer acquisitions, covering the Yangtze Estuary and adjacent water area under the same season and tidal conditions but with varying wind conditions. SSC was examined based on the Semi-Empirical Radiative Transfer model, which has been well validated with the observation data. Integrating the corresponding wind field information from European Centre for Medium-Range Weather Forecasts further facilitated the discussion of wind fields affecting SSC, and in turn the influence of water and suspended sediment transportation and diffusion in the Yangtze estuarine and coastal area. The results demonstrated that wind fields are one of the major factors controlling the range of turbid water diffusion, and their variation will result in changes to the spatial extent of the turbid water.

Highlights

- The SSC was generally higher in the Hangzhou Bay than the Yangtze Estuary.
- The SSC presented more distinctive fluvial features in the inner estuary.
- Wind direction and speed were major factors controlling the SSC diffusion range.

Keywords: Yangtze Estuary; MERIS; Suspended Sediment Concentration; Wind field; Suspended Sediment Diffusion

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