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## Response of suspended sediment concentration to tidal dynamics at a site inside the mouth of an inlet: Jiaozhou Bay (China)

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**Abstract.** Observations of fair weather currents and suspended sediment concentrations (SSC) were made using an acoustic Doppler current profiler and two YSI turbidity sensors over a neap to spring time cycle at a site near the inner mouth of a semi-enclosed mesotidal-macrotidal embayment (Jiaozhou Bay) to examine the influence of tidal dynamics on concentration and transport of suspended sediment. During the investigation, SSC varied from about 3 to 16 mg L<sup>-1</sup> at the surface and about 6 to 40 mg L<sup>-1</sup> close to the bed, while the current velocity reached 79 cm s<sup>-1</sup> at the surface and 61 cm s<sup>-1</sup> near the bed. SSC was tidally cyclic. The near-bed instantaneous SSC was closely related to current velocity with almost no time lag, indicating that the variability of SSC was governed by current-induced settling/resuspension. At the surface, however, instantaneous SSC was poorly related to instantaneous current velocity because the peak SSC tended to occur around ebb slack water. This suggests that the surface SSC was controlled by horizontal advection from landward higher concentration areas. Both at the surface and near the bed, on the other hand, tidally-averaged SSC was well correlated to tidal range and current speed. Current velocity and SSC were flood-dominated for all the tides investigated, which resulted in significant landward residual suspended sediment transport at the study site. The observed flood dominance was mainly attributed to the location of the study site on the landward side of the bay's inlet where flow separation is favoured during flood tide. It was concluded that tides are the dominant hydrodynamic component controlling the variability of SSC during fair weather at the study area.

**Keywords:** sediment, concentration, suspension, advection, currents, shoaling effect, Jiaozhou Bay, China

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