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A numerical analysis on the sediment dynamics near a sandy spit under wave-induced currents A numerical analysis on the sediment dynamics near a sandy spit under wave-induced currents A numerical analysis on the sediment dynamics near a sandy spit under wave-induced currents

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Surface gravity waves play an important role in sediment transport. However, previous study focused on bottom shear enhanced by surface wave orbital velocity. Surface wave-induced currents are seldom simulated to investigate their impact on the sediment dynamics. In this study, we embedded UNSW-sed model to POM model that includes a wave module and applied to a region near the sandy spit in the Sanniang Bay, off Guangxi Province of China. Simulated results of deposition rate show that the surface wave-induced currents dominate the evolution of sandy spit. The joint flow of flood tide and the southwesterly surface wave-induced currents control the deposition of the sandy spit. The dominant surface wave-induced currents counteract the ebb tide, and prevent the sediment from depositing outside the sandy spit. The deposition pattern is mainly attributed to the low energy region behind the tip of the sandy spit along direction of the wave-induced currents. The downward flow in the east causes the accumulation of suspended sediment in the bottom layer, which leads to the deposition.