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## Sediment dynamics near a sandy spit with wave-induced coastal currents

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Surface gravity waves play an important role in sediment transport. Previous studies have focused on the role of bottom shear enhanced by the surface wave orbital velocity. In this study, we embedded the University of New South Wales Sediment model into the Princeton Ocean Model, which includes a three-dimensional wave module to study sediment dynamics near a sandy spit in Sanniang Bay in the South China Sea. The simulated results for the deposition rate show that wave-induced currents play a dominant role in the maintenance of the sandy spit. The spit tip was formed as a result of the separation of wave-induced coastal flow. The spit tip was shown to be a barrier to the dominant wave-induced current, and the spit base was simulated to form via sand accumulation in the shelter of the spit tip. The deposition is mainly in the low-energy region behind the tip of the spit, which can counter the erosion effect of dominant wave-induced currents. The dominant wave-induced current prompts the lateral infilling of the spit tip when both the spit tip and base are above the water surface. The sediment carried by the coastal current is deposited along the flow branch of separation and forms the spit tip, which indicates that the sediment is deposited where the longshore current changes into an offshore current. As the water depth increases along the separated flow spindle, the bottom shear stress decreases, contributing to the deposition of the spit tip.