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MODELLING SAND WAVE FIELDS ON THE TAIWAN BANKS, NORTHERN SOUTH CHINA SEA: THE FORMATION OF TWO-SCALE SAND WAVES IN DIFFERENT PERIODS

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Tidal sand waves create a widespread seabed pattern on tide-dominated continental shelves around the world. The growth and migration of sand waves are of both scientific and practical relevance, as they can hamper navigation and cause exposure of cables. Field data acquired over the Taiwan Banks reveal co-existing sand waves on two distinct spatial scales: immobile large-scale sand waves (~15 m height, ~750 m wavelength) and small-scale sand waves (~1.5 m height, <100 m wavelength) with migration rates of 2-5m/yr (Zhou *et al.* 2018, see Figure 1).

These two-scale sand waves have not yet been linked to hydrodynamic conditions using a process-based sand-wave model. Considering borehole data and sea-level variation, we apply linear stability analysis (Campmans *et al.* 2017) to model the formation of the two-scale sand waves, attempting to link with appropriate hydrodynamic conditions under geological background, and investigating the sedimentary environment of the study area since the Last Glacial Maximum.

Model results produce ranges of wavelengths likely resulting from the prevailing hydrodynamic conditions. In particular, we find that the large-scale sand waves are not able to develop under present hydrodynamic conditions. Greater water depth by sea-level rise due to the large transgression in Holocene times provides the most likely hydrodynamic conditions for the formation of large-scale sand waves. Moreover, the small-scale sand waves have likely developed under shallower water depth and weaker tidal current amplitude.

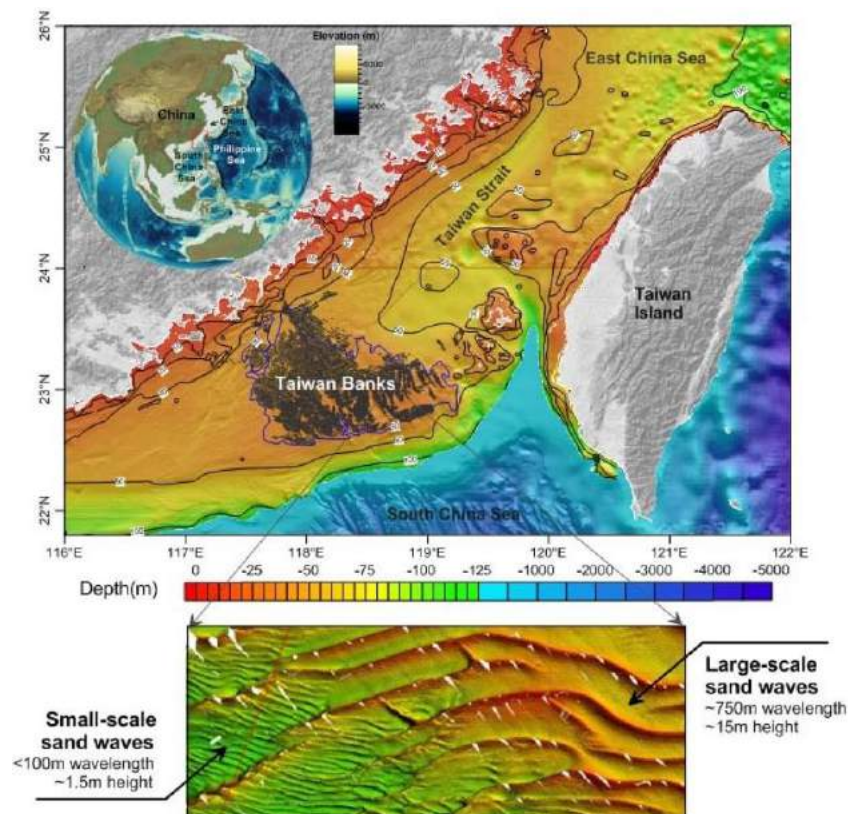


Figure 1. Location and geomorphology of the sand-wave fields on the Taiwan Banks, northern South China Sea.

Campmans, G.H.P., Roos, P.C., de Vriend, H.J., Hulscher, S.J.M.H. (2017). Modeling the influence of storms on sand wave formation: A linear stability approach. *Continental Shelf Research*, 137, 103-116.

Zhou, J.Q., Wu, Z.Y., Jin, X.L., Zhao, D.N., Cao, Z.Y. (2018). Sandwave fields on the Taiwan Banks, northern South China Sea: large-scale bedforms control of small-scale sediment transport patterns. *Under review*.