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Orientation: Ocean Observation and Global Change
Specialization Area: Global Change
Research Line: 1.8 Coastal Impact, Hydrography and Ocean Dynamics

PhD project: **Morphodynamics of coastal environments in mixed sediment beds**

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Summary: The majority of the world's coastal regions comprise heterogeneous sedimentary environments. At a tidal inlet the sediments grain size normally exhibits large gradients as the sediment particles in the runoff have a distinct origin from those which are transported by the littoral drift. On the other hand, the sand size and grading in nourishment projects can deviate substantially from those of the native sand. Furthermore, increased storminess and higher sea levels leads to increased erosion, adding to the heterogeneity of sediments in the coastal zone.

The mechanisms involved in the sediment transport of heterogeneous sands is not well understood. Indeed, a limited number of experiments involving sand mixtures have been conducted to date. The results have shown that are selective processes in sediment transport, with reduced transport of the fine sand fraction and enhanced transport of the coarse fraction within the mixed sand bed. As sediment transport depends on the sediment grain size, the morphological changes will depend on the heterogeneous distribution of sediments.

The following objectives will be addressed: To gain insights on the dynamics and transport of sediment mixtures under waves. This will be base in existing data sets and through a set of controlled large-scale wave experiments; -To develop improved sediment transport models that take into account the complexities of sediment mixtures under waves; - To include these improved models of selective sediment transport in morphodynamic models to describe the sediment dynamics and the morphology changes in coastal environments.