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Multi-scale shoreface morphodynamics in Ireland and France

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The shoreface is an important transitional zone between the beach and the inner shelf. Significant change on the shoreface occurs at long temporal time scales and over large spatial domains, making its study challenging. The shoreface's contribution to nearshore dynamics is also usually complex, acting as both a sediment source and a sediment sink, as well as facilitating or impeding sediment transport. To date, no universal agreement exists for the definition of the shoreface nor its exact spatial extent.

When considering the longer term and larger-scale evolution of coastal systems, the morphodynamics of the shoreface appears to be a determining factor in coastal and shoreline evolution. Along high-energy coastal areas, for instance western Ireland and North-western France, dominated by geomorphological features such as embayments, pocket beaches, sea cliffs and rock outcrops, the geological background plays a major role in the control of the coastal morphodynamics. This geological control acts to limit accommodation space, sediment availability and longshore sediment transport thus helping constrain the shape of the shoreface and therefore its dynamics and evolution.

The study of shoreface morphodynamics requires the combination of multiple datasets at variable temporal and spatial scales. In this study, the west coast of Ireland provides spatially extensive bathymetry (multi-beam) datasets to allow the study of shoreface morphology and extent. Furthermore, the existence of wave data from offshore buoys and reanalysis wave models, also allows the analysis of hydrodynamic behaviour (using SWAN modelling) and the identification of the seaward shoreface limit. The overall aim of the work is to advance our understanding of the morphodynamics of the shoreface in complex regions.