

DysACote: Integrated nearshore, shoreface and inner shelf sedimentary dynamics in western Brittany

Abstract of the project: The mechanism and evolution of coastal nearshore and beach face sediment accumulations is highly dependent on the cross-shore and along-shore sediment dynamics at play between the intertidal and subtidal compartments and up to the inner continental-shelf. These evolutions are controlled by sediment stocks, the sedimentary thicknesses over the rocky substrate and the weather conditions affecting the nearshore and the shoreface (climate, wave climate and storms events). Knowledge of sediment transfers is key to understand changes in coastal accumulations, as well as erosion coastal cliffs (rocky and soft cliffs), at the bottom of which shifting sediment levels affect the evolution. Current knowledge mainly consists of a limited set of multi-decadal time series of observations on intertidal beaches and dune accumulations. Obviously, further insight is impaired by the lack of regular observation and quantification of subtidal sedimentary transfers, the characterization of which would nevertheless contribute to the improvement of coastal management strategies through a better assessment of the oscillating coastal stocks and sedimentary volumes between these two compartments. Such improved knowledge would also enhance the means to predict future trends in coastline evolution, by producing the main input data that are essential for numerical modeling. Given these gaps, the thesis project DySACote proposes to analyze cross and along-shore sediment transfers at different spatial and time scales through research on closed (or with sufficiently well-defined limits) hydrosedimentary systems selected in Western Brittany. The objectives of the project are to map the sedimentary thicknesses (nearshore and coastal accumulations), to identify morphodynamic evolutions of coastal accumulations including the nearshore and beaches, in order to propose a pattern for how these systems work in terms of sedimentary transfers. The proposed research work, which is necessarily cross-disciplinary, will therefore rely on the respective methods and techniques of coastal physical geography and marine geosciences.