



Long-term evolution of the Northern France coastal zone and relationship with coastal hydrodynamics

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Along the Northern coast of France, bathymetric surveys were carried out since the early 19th century, and were stored in the French Hydrographic Service (Shom) archives. These hydrographic field sheets were made for mapping the seabed of the coastal zone where tidal sand banks are common, forming linear shore-parallel or slightly oblique massive sand bodies. Digitization of these historical records was undertaken in the course of this study, enabling to assess changes in sand bank morphology and position. Our analyses of bathymetry changes show significant morphological variations across the shoreface since the 19th century, which are largely due to sand bank mobility. Alongshore migration and elongation of sand banks can be related to tidal asymmetry directed to the east-north-east. Shore-perpendicular movement can be related to the action of storm waves that can be responsible for onshore-directed sediment transport. One of the objectives of this study is to attempt to relate the observed changes in coastal and nearshore morphology with possible changes in hydrodynamic processes. A simulation of tidal circulation and of wave propagation over bathymetry grids based on historical bathymetric soundings will enable to compare coastal hydrodynamics during distinct time periods and assess their possible effects on nearshore morphology change. This could lead to a better understanding of the long-term mechanisms responsible for coastal zone evolution.