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Morphological evolution of intertidal dunes during a spring-neap cycle, in macrotidal estuarine environment (Baie de Somme, Eastern English Channel).

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Like many estuaries in the Eastern English Channel, the Baie de Somme is currently infill by marine sands. Among the morphological figures characteristics of this estuarine bay, many fields of dunes emerge on the intertidal area, and their dynamic contributes largely to sediment transfer.
The aim of this study, performed on 25 consecutive neap and spring tides, is to quantify the morphological evolution of dunes, their migration rates and associated sedimentary fluxes associated, for various meteorological (wind, storm) and hydrodynamic (tide, wave, surge) conditions.
In January and February 2014, took place in situ measurements (topography using a 3D laser scanner, altimetry, currents, turbidity, superficial sediment samples, water samples and cores) during a semi-lunar cycle (neap-spring-neap), and including storm conditions.
Medium to large dunes (H: 0.3 to 0.6 m; λ: 8 to 13 m), with superimposed ripples, are present on the dunes field studied. During the lunar cycle, dune morphology is changing from asymmetrical (neap) to symmetrical (spring) shapes, and even flattening (high spring tides), depending on marine hydrodynamic forcing. The asymmetry is changing seaward shortly, but the residual migration is mainly landward in the direction of the strongest current (flood during periods of high agitation or ebb during periods of low agitation). Dunes are immobile in neap conditions, and migrate with rates up to 0.88 m/h in spring conditions, in accordance with their polarity. The residual sediment transport, measured or calculated was carried landward to the inner area of the Baie de Somme, with sedimentary flow by bedload and suspended transport. A size distinction between sand and silt/mud was made on the bed (during low water) and in the water column (during flow) using laser grain size analysis.
This huge data set of hydrodynamics and morphological observation permit to distinguish precisely the transport period of spring tide, associated with morphological evolutions, and stormy and to quantify this transfer.

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