

DECADAL-SCALE VARIATION IN DUNE EROSION AND ACCRETION AS THE RESULT OF EXTREME WATER LEVEL IMPACT ON THE VOUGOT BEACH (BRITTANY, FRANCE)

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Keywords: dune, erosion, accretion, runup, extreme water level, storm

Abstract

A high-frequency survey of beach/dune profile on the high-energy macrotidal Vougot beach in North Brittany (France) has been undertaken since 2004. This monitoring is a part of the french monitoring service called SNO DYNALIT (*Service National d'Observation des dynamiques du littoral et du trait de côte « DYNALIT »*). The survey of the dune dynamic has revealed significant morphological changes over the last decades. These changes are characterized by alternating phases of erosion and accretion, which have been compared with extreme water level calculation, defined as the sum of (i) astronomic tide; (ii) storm surge; and (iii) vertical wave runup. Therefore, an experimental study based on field measurements for runup parameterization was also conducted between 2008 and 2013. The approach was based on morphological (limit of swash elevation and beach slope $\tan\beta$) and hydrodynamic (wave H_{m0} , $T_{m0.1}$, and high tide water level – HTWL) field measurements in order to quantify *in-situ* environmental conditions and dimensional swash parameters for the best calibration of Battjes (1974) runup formula. A good correlation between this empirical equation ($1.01H_{m0}\xi_o$) and field runup measurements (R_{max}) was obtained (R^2 85%). The goodness of fit given by the RMSE was about 0.29 m. Extreme water levels were then used to explain the phases of dune erosion/accretion processes. A good relationship was noticed between dune erosion and high water levels when the water levels exceeded the dune foot elevation during storm conditions. In contrast, when extreme water levels were below the height of the toe of the dune sediment budget increased, inducing foredune recovery. These erosion and accretion phases may be related to the North Atlantic Oscillation Index.