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Xynthia storm impact on french south britanny coast-suscinio bay

A. Dubois, M Sedrati, and D Menier

marine geosciences and coastal geomorphology unit, Géoarchitecture EA2219, Université de Bretagne Sud, 56017 cedex Vannes, France.

The storm called Xynthia took place first offshore of Portugal and then affected French Atlantic shore during the night between the 27th and the 28th of February 2010. In the Vendée area, about 170km south, a few seawalls broke up and massive flood occurred into built areas and farmlands. 53 casualties counted and material damages evaluated about 1 billon euros cost. This winter storm head towards North-East and crossed France, Belgium and the Netherlands. Important wind speeds have been recorded on the shore and inland due to the route of the storm and its low atmospheric pressure (963 hpa, 18 m/s wind speed recorded in Belle-île island, offshore south Brittany). Moreover, this storm was combined with high spring tide (102). Even if the studied area was not located on the main route of the storm, it has been under impact of such event.
An hydrodynamic and topographic survey was conducted from the 26th of February to the 5th of march on Suscinio beach (south Brittany, western France). Hydrodynamic data were collected with adcp and S4adw current meters. Topographic data were conducted with DGPS Trimble GeoXH2008 each daylight tide from the 27th of February until the 4th of March 2010 where sensors were deployed. Just after the storm event, 9 beach profiles were conducted in order to compare the topographic change with the same last topographic survey conducted one month earlier. The studied area is a pocket beach embayed between rocky headlands exposed globally N105. The onshore of the beach is a steep reflective slope composed by heterogeneous coarse sand. The offshore is a flat dissipative low terrasse composed by fine and cohesive sand. This is a dune system protecting low swamps behind it. The deployment of three currentmeters in three different sites in the embayed beach highlights the behaviour of tidal currents under different windy conditions during high spring tides. The results of this survey during a winter storm can thus be compared to modal conditions recorded one month earlier. This highlights the role of wind forcing a few hours before stormy conditions and the impact on tidal currents. Xynthia storm is marked by a quick change of wind speed and direction. Sensors recorded a signicative surge about 63cm high above the predicted high tide of Port-Navalo by S.H.O.M. It recorded unexpected moderate Hs and low tidal currents speed. Surge effect has been absorbed because of The north-westward wind direction on the site. The hydrodynamic data recorded during the winter storm were less stronger compared to other datasets collected during this survey but the morphology of the beach was severely affected by a negative sedimentary balance and over washes deposits as far as the swamps backward. In the western part, 1,8 m backward movement of the shoreline have been measured. However, the morphological change measured highlighted on this beach thanks to Digital Terrain Model is not homogeneous but significant. This change is nevertheless representative of the storm impact on beach topography. Because of such results, beach topographic changes seem to be mainly led by the Xynthia storm surge rather than wind forcing.