

## **SIGNIFICANT SHORELINE EROSION IN BRITTANY COAST DURING THE WINTER 2013-14**

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### **Abstract**

The winter 2013-14 has been one of the most significant in terms of storm activity for the whole North European Atlantic coast. In Brittany, a cluster of about 12 storm events hit the coast with an exceptional frequency. However, analysis of hydrodynamic conditions shows that only three episodes promoted extreme shoreline erosion because they were combined with high spring tide level. It was the case of the beginning of January (1<sup>st</sup> to 5<sup>th</sup>), February (Jan. 31<sup>st</sup> to Feb. 4<sup>th</sup>), and March (Feb. 28<sup>th</sup> to Mar. 4<sup>th</sup>). During these three extreme events observed tide levels were above highest astronomical tide level (HAT). High frequency topomorphological measurements were achieved on several study sites located on the north, west and south Brittany coast to assess the effects of these storms on shoreline erosion. They show that during the first event (January 2014), shoreline erosion has been limited, with the exception of southern Brittany, due to the SW orientation of waves. The average rate was -2.7m, with minimum of -0.6m, and maximum of -6.20m. The second event of February was the most morphogenetic event of the winter. Shoreline erosion retreat reached -4.2m, with minimum of -1.5m and maximum of -9.5m. The third event of the beginning of March produced low shoreline retreat of -1m, with a minimum of -0.6m and a maximum of -1.9m. Considering the whole winter 2013-14 period, the global shoreline erosion reached an average rate of -6.3m, with a minimum of -0.2 m and a maximum of -30.1m.

Following the storm impact scale model of Sallenger (2000), the dynamic of the shoreline retreat was analysed by taking into account the different morphological characteristics (e.i. barrier elevation) and sedimentary (e.i.

grain size sediments) of the barriers, and the hydrodynamic conditions (e.i. wave height and tide level). The most erosive event of the beginning of February is partly explained by the large morphological sensitivity of beaches and barriers which were weakened by the previous storm events in the beginning of January, but also by very high water levels inducing impacting to inundation regime. Finally, the impact of this exceptional winter in terms of shoreline erosion, is analyzed over a longer period covering at least the last decades.