



## **Review of coastal extreme events during the last millennium in the French Atlantic coast**

Mohamed Maanan, Pierre Pouzet, and Marc Robin

Université de Nantes, UMR 6554 LETG, Nantes, France (mohamed.maanan@univ-nantes.fr)

**Abstract:** This research reviews historical storms with marine flooding that had a significant morphological impact into sensitive coastal stretches. It aims to help coastal societies to better understand the past stormy dynamics, a needed knowledge to face damaging events and build a more resiliency coastal system. Based on sedimentological analyses and historical archives, we try to determine the recurrence interval of these events and a possible correlation with past climate phases such as the Medieval Warm Period (MWP), the Little Ice Age (LIA) and the Anthropocene warming. Analyzing past storm impacts is a methodological challenge based on the analysis of various ecological indicators, which ensure accuracy for the reconstruction of the extreme environmental parameters creating these disturbances. Consequently, the methodology is built with a multidisciplinary approach using sedimentology, climatology and climate history. These different approaches were applied to four Atlantic study sites: the island of Yeu, the Traicts du Croisic, the Petite mer de Gâvres and La Belle Henriette lagoon. In the last millennium, the coupling of sedimentological data and historical archives characterizes twenty-nine extreme events with high environmental and societal impacts. The most intense storms with flooding were identified during warm periods: i) the Medieval Warm Period (950–1350 AD); ii) between LIA I (1450-1530) and LIA II (1720-1850) and iii) the actual Anthropocene warming. From the review of more than 19691 French historical documents, Athimon & Maanan (2018) note a markedly enhanced gale frequency during one of the coldest episodes of the LIA in the late seventeenth century towards the end of the Maunder Minimum (MM). The results indicate that the frequency of storms may decrease due to global warming, while the number of intense storms may increase. However, the connections between the climate change of the Little Ice Age and the North Atlantic Oscillation remains difficult to comprehend. These different approaches enable us to increase with more accuracy our knowledge of coastal hazards.

**Keywords:** Atlantic coast, marine flooding, coastal hazards, sedimentology, historical archives.