



## **Coastal sediment budget and shoreline changes for the Noirmoutier Island (France)**

Mohamed Maanan (1), Agnès Baltzer (2), and Marc Robin (1)

(1) Géolittomer, UMR-6554 LETG, Université de Nantes, France, (2) UMR 6143 M2C, Université de Caen, France

Around Noirmoutier Island, located on the west coast of France, increasing concentrations of people near the coastline induce more stress on coastal environments and involve risk for society (coastal erosion and inundation hazard). Considerable research interest attempts to assess on one hand the impact of management on coastal erosion and on the other hand the impact of coastal hazards on land use.

Shoreline position is a geoinicator of coastal processes, and is particularly sensitive to interaction between natural and human processes. It is commonly used (i) to measure and monitor gains and losses in land area, (ii) to evaluate the risk upon adjacent land use and land cover and (iii) to assess submersion risk. Shoreline position change has to be assessing with regards to sediment budget in order to allow accurate prediction, at different time and spatial scales.

In this study, high-resolution seismic-reflection profiles, side-scan sonar imagery and sediment samples were collected from the shelf part of the Noirmoutier Island littoral cell during February and June 2010. The shoreline position was monitored using (i) a range of data including old maps, aerial photographs, satellite images, LIDAR and ground surveys (ii) geomatic methods -databasis and spatial analysis-.

The diachronic analysis of available data upon a long term shows that the erosion of the west coast of Noirmoutier Island as occurred at variable speeds between 1832 and 2006 with a rate of 0.7 m/year. On a shorter term, the period between 1997 and 2006 has shown generalized erosion with an average rate of 1.9 m/year.

Shoreline evolution shows that Human activities are partly responsible for eastward shift shoreline position in the last 20 years. Since 1990 several civil constructions have been built in this area, including piers in the Morin; residences and streets near the beaches on the dunes. Such civil constructions have involved serious changes in erosion behaviour at dune/beach contact and sediment transport by winds and longshore current. This disequilibrium has caused coastal erosion which has produced great environmental and economic losses (costs for coastal protection: beach nourishment, groins, sea wall). According to geoindicators proposed by Bush and others (1999), Noirmoutier coastline presents erosion classified as severe.

**ACKNOWLEDGMENTS:** This work was supported by the French National Research Agency (ANR) through the Vulnerability Milieu and Climate program (VULSACO, no.ANR-06-VMC-009). The authors would like to thank the local authority of Noirmoutier Island (CNN) and particularly Martin Paillart for his collaboration to the project.