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Study of possible tsunamigenic seismic sources for the French coast (Atlantic and English Channel)

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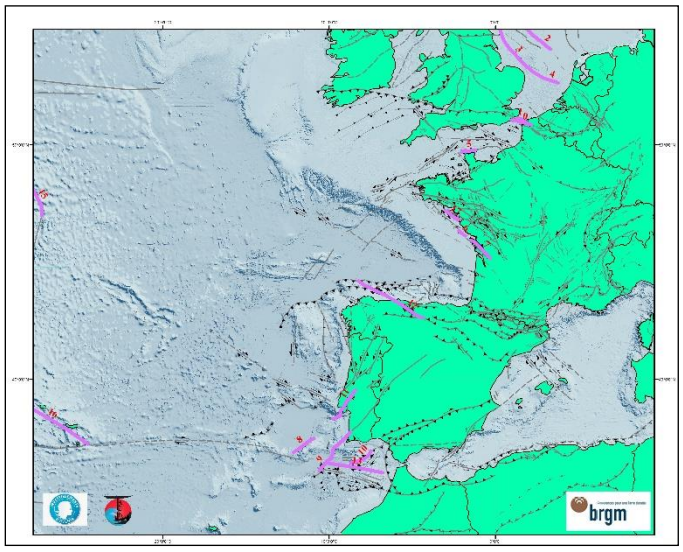
The present study is part of the Tandem project (Tsunamis in the Atlantic and the English ChaNnel: Definition of the Effects through numerical Modeling, 2014-2018), dedicated to the appraisal of coastal effects due to tsunami waves on the French coastlines. In this framework, the present abstract concerns 1) the inventory of the possible seismic sources located between the Celtic Sea and the Cadix gulf and 2) the proposal of the worst case source scenarios.

The study gathered and analysed a large number of information (databases, publications, maps) necessary for the realization of a seismotectonic synthesis of this western part of the European plate. The map of active or potentially active faults made is accompanied by a table of information indicating: the geometry of the fault (segmentation, length, dip) system, geological features, earthquakes attached to the structure, the current kinematic (movement type, strain rate), the main bibliographical references.



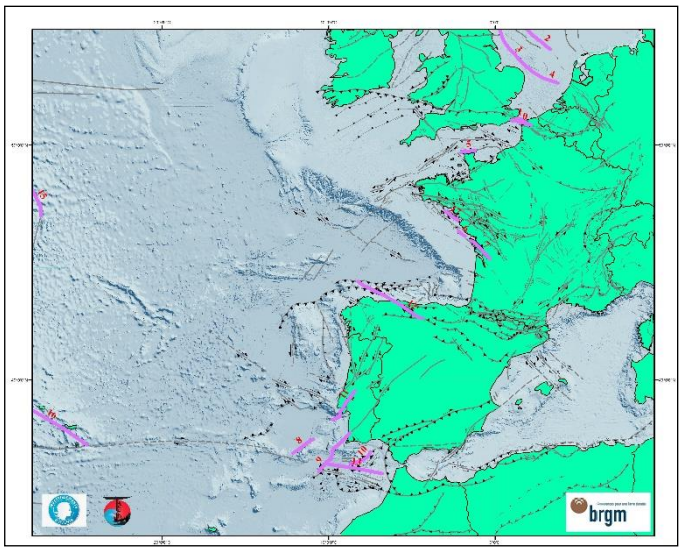


Figure 1 - Selected seismic sources (line in purple color) for the assessment of the tsunami susceptibility of the French Atlantic coast and English channel

From this seismotectonic synthesis, several scenarios for the simulation of tsunami have been chosen according to the size of the seismic sources (sufficient to generate at least 6-magnitude earthquakes), their location (at sea), and their current activity. The scenarios of seismic rupture proposed are, a priori, the most penalizing for the french Coast (along the Atlantic facade and English channel).

Each zone is characterized by: 1) the nature of the movement, 2) the major earthquakes associated with the structure, 3) the rate of deformation, 4) the possible maximal magnitude estimated on the basis of the paleoseismic datas and/or on the geometry of the fault, 5) the geometry of the coseismic rupture on the estimated maximum magnitude (and corresponding uncertainties).

The first results of modelling are presented. The continuation of this part of the Tandem project will concern the interpretation of the results in terms of susceptibility of the French coast for tsunamis generated by seismic ruptures.