



## **Could low-rate intraplate extension produce syn-tectonic basins and large earthquakes ? A multi-disciplinary analysis south of CSA (Western France)**

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We question the present-day active tectonics alongshore the Atlantic coast, to the south of the South Armorican crustal shear zone (CSA) of Variscan age. The coastal area from Nantes to Bordeaux presents a moderate but however regular background instrumental seismic activity. This area is made of numerous NW-SE trending basement faults apparently bounding Holocene marshlands (Marais Breton, Marais Poitevin. . .). Those faults are partly Variscan in origin and were reactivated several times, notably during the Mesozoic. Since 1962, three earthquakes with  $M_L$  ranging from 5 to 5.2 affected this coastal area. South of the CSA, most of the coastal events are characterized by focal mechanisms associated with pure/oblique extension to dextral strike-slip. A major historical earthquake ( $M \sim 6$ ), of unknown mechanism, struck the Marais Breton on the 1799 January 25<sup>th</sup>. This event generated strong site effects and destructions in the Marais, which is located southward along a major onshore/offshore discontinuity bounding the basin, the NW-SE trending Machecoul fault. We investigated the active fault system in this area following a multidisciplinary approach including an onshore seismological survey, two offshore seismic reflection surveys combined with high-resolution bathymetry, compilation of onshore drilling database (BSS, BRGM) and quantitative geomorphology. At this stage, our results suggest that the Machecoul Fault tectonically controlled as a dominantly normal fault, up to 25 m of syn-tectonic sedimentation postdating the Eocene, probably of Neogene age. This fault appears to be segmented, with some segment lengths compatible with the occurrence of Magnitude 6 earthquakes.

We suggest that this extension could partly control the distribution and geometry of the Neogene basins alongshore the Atlantic, south of the CSA. Inherited NW-SE faults are reactivated due the NW-SE trending  $\sigma_H$  in France which appears to be either  $\sigma_2$  (thus promoting extensional reactivation) or  $\sigma_1$  in the Western part of France. This discrete low-rate extensional deformation has to be accommodated by a free edge, possibly located to the North of Iberia.