

Comparison of Holocene marine paleoseismic records of two sectors of the Algerian margin: what's the reason for different responses from turbidites?

Antonio Cattaneo (1), Nathalie Babonneau (2), Gueorgui Ratzov (3), Karim Yelles (4), Rabah Bracène (5), Roza Si Bachir (4), and Jacques Déverchère (2)

(1) Ifremer, Géosciences Marines, Plouzané, France (antonio.cattaneo@ifremer.fr), (2) IUEM, UMR6538 Domaines Océaniques, Université de Brest (UBO), Plouzané, France, (3) Géoazur, UMR7329, Université de Nice Sophia-Antipolis, France, (4) Centre de Recherche en Astronomie, Astrophysique, et Géophysique (CRAAG), Algiers, Algeria, (5) SONATRACH Exploration, Boumerdès, Algeria

The Algerian margin is at the slow convergence (~ 3 mm/yr) of the African and European plates and it is affected by seismic activity linked to the presence of faults located in the coastal region and/or offshore. The historical seismicity record includes earthquakes located all along the margin from the west (1954 Orléansville M6.7; 1980 El Asnam M7.3), to the central area offshore Algiers (2003 Boumerdès M6.9, and also earthquakes of 1847, 1716 et 1365 AD), to the eastern area (two events offshore Djidjelli in 1856). Thanks to recent work on the signature of earthquakes in the deep offshore domain inferred from the analysis of successions of alternating turbidites and hemipelagites, the record of earthquakes could be extended back in time over most of the Holocene, at least in two analysed sectors offshore Kramis and Algiers.

Offshore Kramis, thirteen coastal paleoquakes over the last 8 ka support clusters of 3 to 6 events with mean recurrence intervals of ~ 300 -600 years, separated by two periods of quiescence of ~ 1.7 ka without major events on any fault. They imply alternation of broad phases of strain loading and shorter phases of strain release along the fault network (Ratzov et al., 2015). Offshore Algiers, thirty-six events are identified along the Algiers margin segment over the last 9 kyr and are tentatively interpreted as seismically triggered, including the historical events of 2003, 1716 and 1365 AD. The recurrence interval of events varies from 50 to 900 years with three quiescence periods of 800, 1400 and 500 years (7-6.2 ka BP, 5.4-4 ka BP, and 1.5-1 ka BP), supporting an irregular earthquake cyclicity.

Overall, the marine paleoseismicity record of the two study areas appears rather different. In particular, slope failures offshore Algiers could occur more frequently because of the proximity of lower magnitude earthquakes, explaining the high occurrence of turbiditic events, while the recurring interval of stronger earthquakes could be more easily comparable in the two margin sectors. Other possible explanations include: i) difference in the tectonic behavior of distinct margin sectors; (ii) temporal and spatial variability in sedimentary processes, possibly due to changes in sediment availability; (iii) different distance of the seismic sources from the areas of sediment destabilisation on the continental slope.

Ref.

Ratzov et al. (2015) *Geology* 43,4,331-334.