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Potential tsunamigenic earthquake sources along the Algerian Coast: Lessons learned from recent earthquakes and implications for the western Mediterranean Sea.

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The tsunami record during the 2003 Zemmouri earthquake (Mw 6.9) in the Mediterranean Sea is unique. However, the historical seismicity catalogue reports the occurrence of tsunamis following the January 2nd, 1365 at Jijel and August 21st, 1856 near Algiers along the Algerian coast. The seismic activity of northern Algeria is mainly related with the E-W to NE-SW trending thrust-and-fold system where recent earthquake ruptures indicate the seismic slip characteristics. The Atlas Mountains range and related seismicity run parallel to the Africa-Eurasia plate boundary and accommodate 4.4 to 5.5 mm/yr. NE-SW convergence (Nocquet & Calais, 2004). The long-term active deformation across the range, seismic moment tensor and paleoseismic results suggest a contractional rate of 2 to 3 mm/yr. Seismogenic faults are oblique to the east-west trending coastline and uplifted marine terraces and tsunami-induced deposits attest for the long-term activity. Active fault parameters and previous large earthquakes in northern Algeria suggest Mw 7.5. Our study of the Zemmouri earthquake also indicates that with a high-resolution bathymetry and tested seismic sources, models of tsunami initiation and propagation show significant sea-level variations (2 m peak to trough) in the Balearic Islands similar to that reported in 2003. The modelling of a tsunami generated by a large earthquake (Mw$>$7) in northern Algeria can help in the identification of affected coastlines and related damage in the western Mediterranean Sea.