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Seismicity and seismotectonics of northwestern Libya

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As a result of the relative motion of the African and European plates, Libya has experienced a considerable intraplate tectonism particularly at its northern regions. In this study we investigate the seismic activity and the seismotectonics of northwestern Libya.

The northwestern part of Libya has experienced a number of earthquakes including earthquakes of magnitude greater than six. The seismic activity shows three major seismic trends. The first trend is a NW-SE trending cluster of seismicity coinciding with the eastern boarder of the Hun Graben. A second trend is also a NW-SE direction in the offshore area northern of the city of Misuratah. The third cluster was located in the western Gulf of Sirt. The rest of seismicity is diffuse either offshore or in land, with no good correlation with well-mapped faults. Fault plane solution was estimated for 17 earthquakes recorded by the Libyan National Seismograph Network.

Fault plain solution for the first area suggests oblique reverse to strike slip faulting with dominant compressional P-axes trending NW-SE and NE-SW. The second area suggests strike-slip to reverse faulting with dominant compressional P-axes trending NW-SE and NE-SW. Fault plain solution for 3 earthquakes located southern Tripoli suggests an oblique normal faulting with dominant compressional P-axes trending E-W to NE-SW. Further west to the Tunisian boarder, fault plain solution suggests oblique normal faulting with dominant compressional P-axes trending NW-SE.