Geophysical Research Abstracts
Vol. 15, EGU2013-4146, 2013
EGU General Assembly 2013

The Beni-Ilmène earthquake sequence (Mw=5.5, 5.3, and 5.3) from 14 to 23 May, 2010, in the Biban region (Mansourah, Algeria): determination of sources parameters and stress transfer

Hamoud Beldjoudi (1), Hamou Djellit (1), Bertrand Delouis (2), Abdelkrim Yelles-Chaouche (1), and Sofiane Gharbi (1)

(1) CRAAG, Algiers, Algeria (h.beldjoudi@craag.dz), (2) GEOAZUR, Valbonne,France (delouis@geoazur.unice.fr)

A moderate earthquake with moment magnitude Mw=5.5 (first shock) hit the Subbibanique region in the East of Algeria at the locality of Beni-Ilmène (NW of Msila) on 14 May, 2010 at 12h29mn (GMT). The earthquake was located by the CRAAG at latitude 35.99° N and longitude 4.19° E, the depth was 6 km. Three persons were killed, hundred injured and huge damages were observed in the epicentral area (Béni-Ilmène, Samma, Bendaoud, Ounougha). The Focal Mechanism (FM) of the seismic source obtained by waveform modeling (near-field) shows left-lateral strike-slip for the nodal plane oriented N345° and right-lateral strike-slip for the second nodal plane oriented N254°. A second shock stroke the region on 16 May 2010 at 06h52mn (GMT) with moment magnitude Mw=5.3. It is localized 9 km SW of the first shock at latitude 35.96° N, longitude 4.06° E and 5 km of depth. The FM obtained by waveform modeling shows reverse faulting with nodal planes oriented NE-SW. A third shock hit the region on 23 may 2010 at 13h28 (GMT) with moment magnitude Mw=5.3, localized 7 km at the south of the first shock at the latitude 35.93° N, longitude 4.12° N and 6 km of depth. The FM obtained shows a left-lateral strike-slip plane oriented N355° and a right-lateral plane oriented N85° similar to that of the first shock. Field investigations, geologic and sismotectonic analysis lead us to conclude that the fault plane of the first shock is oriented NNW–SSE, i.e corresponding to the nodal plane [strike, Dip, Rake: 345°, 85°, 16°]. The second and the third shocks were generated by separate faults [strike, Dip, rake: 250°, 55°, 120°] and [Strike, Dip, rake: 355°, 90°,-12°] respectively. We show that the first shock raised the Coulomb Stress Failure level on the fault planes that generated the two following shocks of Mw 5.3.