

The main events of the July–August 2020 Mila (NE Algeria) seismic sequence and the triggered landslides

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Résumé:

Abstract:

We study the Mila (NE of Algiers) main events of the July–August 2020 seismic sequence including, respectively, the July 17th (Mw 4.6), the August 7th (Mw 4.8), and the August 7th (Mw 4.4) events. First, we located the events hypocenters. Second, we performed a waveform inversion of accelerograms to calculate the seismic moment, the moment magnitude, and the focal mechanisms of the events. The obtained moment magnitudes are, respectively, $M_w = 4.6$, $M_w = 4.8$, and $M_w = 4.4$, while the calculated seismic moments are, respectively, $0.1019E+17$ Nm, $0.1794E+17$ Nm, and $0.4653E+16$ Nm. The determined focal mechanisms yield pure strike-slip solutions for the three events with nodal planes oriented NE-SW and NE-SW. Additionally, we used InSAR analysis of two Sentinel-1A images, taken before and after the August 7th (Mw 4.8) event, to inventory the triggered landslides. Six landslide areas were identified, located along a 22-km-long and 6.5-km-wide corridor oriented NE-SW. This corridor fits well the spatial distribution of the determined epicenters and the NE-SW nodal plane of the obtained focal solutions. This suggests that the earthquakes are produced by a NE-SW trending left-lateral strike-slip, very close to the Beni-Haroun large dam as can be suggested by the recorded high peak ground acceleration (PGAs) values. Consequently, these results raised the need to reassess the seismic hazard and potential risk of this critical structure and to assess its impact in initiating and inducing seismicity. Also, the Mila earthquakes raised out the need of considering geohazards in seismically active mountainous areas.

Keywords Earthquake . Accelerograms . Inversion . Landslides . InSAR . Induced seismicity . Dam . Tell Atlas