

DELINEATE OF POTENTIAL SEISMIC SOURCES FOR SEISMIC HAZARD ASSESSMENT. CASE OF STUDY: SÉTIF REGION-EASTERN ALGERIA

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Keywords: Seismicity, Neotectonic indications, Seismotectonic, Fault parameters

The main purpose of this work is to present seismotectonic zonation of geological provinces showing neotectonic indications and a seismic activity in Sétif region belonging to Maghrebides of Eastern Algeria. By providing geological parameters of active and suspected active faults. These parameters are integrated afterward in the probabilistic approach to estimate the maximal magnitudes of credible earthquakes that can occurred.

We are focusing on regional structures, through field studies combined with topographical, geological maps and on a Digital Elevation Mode (DEM). We achieve active and suspected active faults mapping, by combining remote sensing completed by filed observations. Sétif region is marked by a numerous historical earthquakes. During the instrumental period, the majority of events recorded, are shallow with low to moderate magnitudes (Figure 1).

The majority of events are recorded during the instrumental period are superficial and have low to moderate magnitudes; 04 earthquakes of maximum intensity VII EMS have been recorded in Babors chain. The strong earthquakes recorded in Eulma earthquake, July 19 1867, with intensity $I_0 = V$ MSK and El Ourcia earthquake in November 13 1957 with evaluated intensity I_0 6-7 EMS. The earthquake that marked the High Plains on November 16, 1869 intensity $I_0 = VIII$ MSK, and evaluated magnitude $M_s=5.2$. The seismicity map shows three classes of earthquakes; (04) earthquakes with magnitudes ≥ 5 ; More than 40 earthquakes; (01) earthquake; earthquakes magnitude less than 3. In addition, during this decade, it recorded a small microseismicity not exceed magnitude 3.5. This seismicity is associated to regional context of actives faults. Principally Kherrata fault and Djemila fault. These are authentic case of Alpine faults that deserve neotectonic analysis in Sétif region (Figure 2). The active tectonics can be highlighted by Béni-Ourtlane and Kherrata active faults. The first fault seems to be the source of the earthquake that hit the Beni-Ourtlane region on 10 November 2000 ($M_s=5.7$, $I_0=VII$ MSK), it is reverse and has a length of 20 km direction NE-SW and a dip of 40° SE. The second fault was generated 17-04-1949 earthquake magnitude $M_s= 4.7$ and intensity $I_0=VII$ MSK (Rothé, 1950) Meghraoui (1988) associated the fault with a N070E active anticline. We integrate Djemila fault and Djebel Youcef fault as supposed actives faults. We present here geological observations: (i) Djemila Fault is a system of NE-SW to E-W reverse faults with significant length, 35 km in total. These segments put in abnormal contact Djemila overthrust nappe with Neogene basin in Northeast of Sétif; (ii) Djebel Youcef fault, 26 km in length belongs to the E-W alpine system. The activity of this fault is suspected by the seismicity recorded at the vicinity of Djebel Youcef anticline. The aim is to integrate the geometrical parameters of all inventoried actives and suspect faults in a model of seismotectonic zonation in order to assess the seismic hazard of Sétif region and its surrounding areas. Then after, under a probabilistic approach to estimate the maximal magnitude of credible probable earthquake (MCE). We propose two distinct seismotectonic zones; the northern seismic zone characterized by moderate



seismicity and identified active faults, the southern seismic zone with low seismicity reveals Plio-Quaternary tectonic indications.

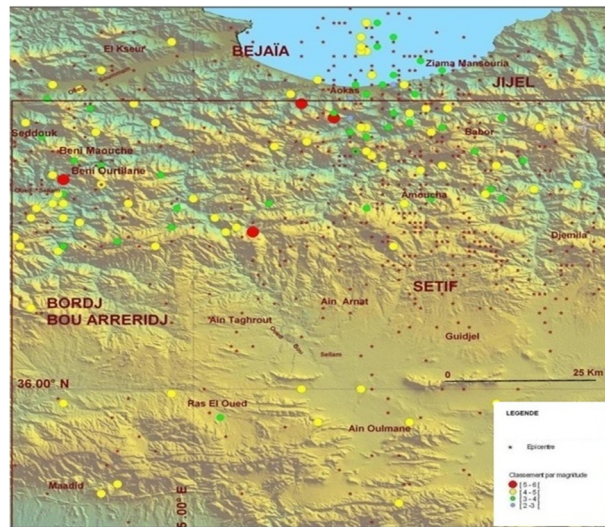


Figure 1. Seismicity map (from Harbi catalogue, 2010 and ISC catalogue (data from 2008 to January 2015)).

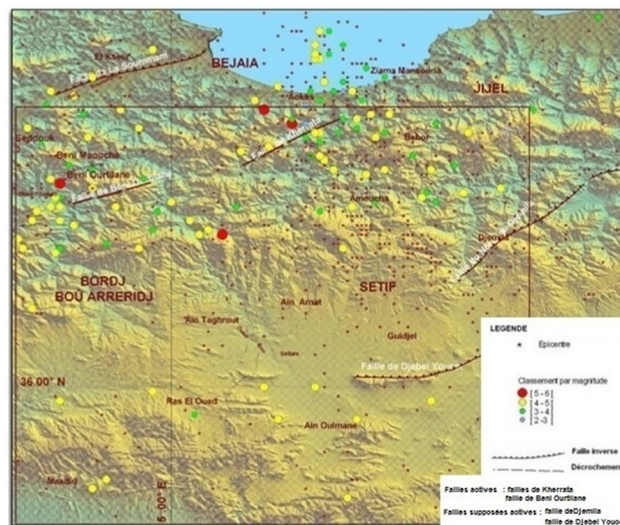


Figure 2. Map of active and supposed active faults.

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