ESC2016-239, 2016
35th General Assembly of the European Seismological Commission

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4–10 September 2016
Trieste

Induced seismicity near Beni-Haroun dam (northeastern Algeria)

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This seismicity is located around the largest dam in Algeria, Beni Haroun dam. This is a great strategic hydraulic complex in Algeria, located in the Mila Province (northeast of Algeria). The dam of 120 m high, is the largest one of its capacity of nearly a billion m3. The study of this seismicity over a period of five months between December 2011 and April 2012 when the dam is full to maximum capacity in February 12, 2012, shows that this seismicity is considered as induced related to the filling of the Beni Haroun dam.
Long before, in December 2007, the Mila region ($\sim$15 km south of the Beni-Haroun dam) experienced thousands of microearthquakes ($0.8 \leq Md \leq 3.9$). This crisis began after the waters transfer operation of Beni-Haroun dam to the Oued Athmania reservoir. The two dams are connected by pipelines and a large amount of the slightly pressurized water leaked through defective joints in a tunnel that passes through the Jebel. This water penetrated deeply into the soil with the assistance of preexisting fractures, faults, and karsts. Nine days after the first pumping started, a local increase in pore fluid pressures at shallow depths triggered seismicity southeast of Jebel Akhal, where the faults were probably close to failure. The events distribution and the focal mechanisms show that this crisis was provoked by a near vertical NNW–SSE strike-slip fault extending mainly in a horizontal band at about 1–2 km depth. During the pumping in 2007, only 45 % of the transferred water was recovered at the Oued Athmania reservoir.