



Seismotectonic model of the MITIDJA basin using gravity data and aftershock sequence of the BOUMERDES (may 21, 2003; ALGERIA) earthquake

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Abstract: The present study relates to the interpretation of gravity and seismological data in the Boumerdes area (Eastern part of the Mitidja Basin, Algeria), in relation to the earthquake of May 21, 2003 (Mw=6.8). The residual anomaly and the horizontal gradient maps made it possible to obtain the basement shape and gravity discontinuities.

The seismological data processing of the aftershock sequence recorded by 16 tri-component seismological stations allowed the location of 1987 events during the period of May 23 to June 30, 2003. A seismotectonic model obtained from the aftershocks distribution and gravity data is proposed. This model consists of three active faults; one lying offshore and two other onshore faults highlighted in this study. The offshore fault striking NE-SW is consistent with the USGS focal mechanism of the main event; the onshore faults strike NW-SE. This configuration emphasizes the failure mode complexity during the main shock. The geometry and location of the onshore faults are obtained from the spatial distribution of seismicity and focal solutions, supported by the results of gravity, but also by the coastal uplift and the Algiers canyon close to one of these faults. The topography of the basement obtained by 3D gravity inversion shows that all the aftershocks located onshore occurred in the basement. The 3D model of the basement also shows that the area between the two onshore faults was raised by their movement.

Keywords: Aftershock sequence, Algeria, Basement, Boumerdes earthquake, Gravity