Geophysical Research Abstracts
Vol. 14, EGU2012-14204, 2012
EGU General Assembly 2012

Tectonic and hydrothermal activities in Debbagh, Guelma Basin, Eastern Algeria

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Quaternary and Pliocene travertine, deposited from hot springs, can reveal much about tectonic and hydrothermal activities. The aim of this work is to understand the actual tectonic activity in the Guelma Basin and in one of its spas structure. Considering the fieldwork observations in the Hammam Debbagh area, gravity data were analyzed to better highlight the architecture of its subsurface underlying hydrothermal structures. Analysis of the gravity data included the computation of a Bouguer anomaly, upward continuations, as well as residual and derivative maps. Comparison of gravity maps, field geology, geomorphic observations and structural maps allowed us to identify the major structural features. As a result we propose a model of three subsurface structure sources at 0.2, 1 and 7 km depth from north to south, respectively. This confirms some structural elements collected from outcrops and defines subsurface structures, where the Hammam Debbagh active fault is superimposed to the hydrothermal active source in the NW-SE direction characterized by a negative gravity anomaly.