Geophysical Research Abstracts
Vol. 20, EGU2018-4736, 2018
EGU General Assembly 2018

Thermal regime and tectonic pattern of the central-northern Apennines

Massimo Verdoya and Paolo Chiozzi
UNIVERSITA DI GENOVA, DISTAV, GENOA, Italy (verdoya@dipteris.unige.it)

The central-northern part of the Apennines chain includes structural domains with different tectonic and geophysical features resulting from the superposition of extensional deformation on a pre-existing compressional architecture. To the west, the Tyrrhenian domain (TD) is characterized by a thinned lithosphere (50-60 km), shallow Moho (20-25 km), positive Bouguer anomalies and shallow seismicity, generally of extensional type. To the east, the Adriatic domain (AD) includes the chain axis and exhibits thicker lithosphere (70-90 km), deeper Moho (about 35-40 km), negative Bouguer anomalies and a complex seismic pattern. Under the chain axis, earthquakes of moderate magnitude occur in the uppermost crust along extensional faults, and light-moderate seismicity of compressive character takes place within the deep crust and at subcrustal depths. In the external zone of the AD, shallow seismic events, with strike-slip and thrust motions, suggest still active compression. The terrestrial heat-flow pattern is generally considered as both a piece of evidence and an interpretive key of the processes that have occurred in this area. On the other hand, the thermal structure may play a fundamental role in controlling the physical properties and consequently the geodynamics of the lithosphere. All the numerous heat flow studies published in last decades argued that the highest heat-flow values occur in TD (exceeding 100 mW/m2) and the lower values in the external sector of AD (<60 mW/m2). However, the spatial coverage of the heat-flow sites is not satisfactory and the data so far used are often of doubtful quality. In this paper, we review the available thermal database and analyse new information deriving from temperature records carried out in conventional geothermal holes and at the bottom of oil wells. In particular, temperature data recorded in the 2000-5000 m depth range are reprocessed, thermal conductivity is estimated under is-situ conditions and new heat-flow values are calculated with the thermal resistance approach. Attention is paid to anisotropy effects, porosity variation with depth and the temperature-dependence of thermal conductivity. The influence on the thermal regime of the regional groundwater circulation in the carbonate rocks, representing one of the major tectonostratigraphic units of the central Apennines, is also investigated. These data together with information from previous investigations allow us to give a more detailed and constrained picture of the surface heat flow which is interpreted in relation to the tectonic pattern.