Thermal structure in SPZ and southern part of OMZ

Maria Rosa Alves Duque

Departamento de Física ,ECT, Universidade de Évora, Portugal

e-mail: mrad@uevora.pt

The last work made by the author with data of heat flow density and thermal conductivity in the South of the country (South Portuguese zone and Southern part of the Ossa Morena Zone ) conjugated with relatively detailed seismic information on the thickness of the crust as well as values ​​of the velocity of seismic waves in the region allowed to define 5 regions with different thermal characteristics.

Using average values ​​of heat flow values obtained from the published data, relative to the region mentioned, it was possible to construct 5 geotherms (temperature curves as a function of depth). The temperature values ​​obtained at the base of the crust (between 616.3 and 647.9 °C) were used to collect information regarding maximum values ​​of density at the top of the lithospheric mantle. Considering that the region is in isostatic equilibrium and using altitude data it is possible to obtain information about the density of the lithosphere and, using the density of the mantle, to obtain crust density values. Although we only have 5 temperature profiles (four profiles in the South Portuguese Zone and one in the Ossa Morena Zone), obtained with average values, it was possible to identify lateral variations of temperature, which undergo changes at different depths. From the comparison of values ​​obtained at two different depths with variations in the velocity of propagation of seismic waves it was possible to establish a relation between temperature values ​​and seismic velocities. Low wave propagation rates will correspond, in principle, to regions with low density value and / or high temperature values.

Recently, studies with seismic data, presenting detailed variations of these parameters, have been published. There are horizontal and vertical profiles of velocity distribution and VP / Vs quotients, which allow us to obtain information about the rheological properties of the crust in the area. The objective of the present work is to obtain detailed information about temperature variation in the region, especially in the upper crust, where the main heat sources responsible for the anomalous values of heat flow measured in these regions (equal or greater than 70 mW/m2) seems to be located. Information will also be obtained for regions not covered by the previous study using radioactivity distribution measured in the region and comparing the values ​​obtained with those of the regions already studied.