



New estimates of temperatures and depths of groundwater circulation systems in six tectonic provinces in Brazil

Carlos Alexandrino (1), Fabio Vieira (2), and Valiya Hamza (3)

(1) National Observatory, Geophysics, Brazil (valiyahamza@gmail.com), (2) National Observatory, Geophysics, Brazil (fabiovieira@on.br), (3) Federal University of Jequitinhonha, Engineering, Brazil (carlos.alexandrino@ufvjm.edu.br)

Data on silica content of ground waters drawn from shallow wells have been employed in determining heat flow for more than 500 localities in Brazil, distributed over six tectonic provinces. The procedure adopted is based on the use of an improved geo-thermometry relation for solubility of silica in ground waters. It is coupled with a revised interpretation of the empirical relation between silica content and heat flow, that allows for independent determination of the depth of circulation of ground waters. According to the results obtained mean heat flow values obtained for sedimentary areas of the late Proterozoic Sao Francisco basin and the Paleozoic Amazon basins are in the range of 45 to 47mW/m². Similar range of heat flow values were found for the Precambrian Borborema province in the northeastern region of Brazil. Higher heat flow values of greater than 50mW/m² were encountered for the eastern coastal area of Sergipe – Alagoas. On the other hand, Parana basin in southeast Brazil is found to have heat flow values higher than 55mW/m². Such ranges of mean heat flow values are found to be in reasonably good agreement with those reported in earlier studies, using conventional methods. This trend is considered as indication that silica content of ground waters may be used for obtaining reliable estimates of conductive heat flow in areas where practical limitations impede use of conventional methods.