

RADIOGENIC HEAT PRODUCTION IN THE BASEMENT OF THE PARANA BASIN, SOUTHERN BRAZIL AND ITS CONTRIBUTION TO HEAT FLOW

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Heat flow at the surface of the Paraná Basin in southeastern Brazil increases from the central part to the margin of the basin by about 10 - 20 mW/m². The lower values are located in the central part of the basin, most of which is covered by the Serra Geral flood basalts. Higher and more variable heat flow occurs along the eastern margin, where the basalt cover is absent. We examine the contribution of lateral variation of the radiogenic heat production rate of the basement underneath the basin to the heat flow contrast at the surface. The mean of more than 150 measurements of the heat production rate of rocks sampled from various basement provinces is 1.7×10^{-6} W/m³, ranging from 0.35×10^{-6} to 6.2×10^{-6} W/m³. An underplate in the lower crust associated with the flood basalt eruption could provide a region of lower heat production rate. The Ribeira mobile belt that surrounds and underlies the eastern margin of the basin contains granitic rocks (of higher heat production rate) and the hypothetical existence of an Archean cratonic nucleus (with low heat production rate) underneath the basin could also be a source of lateral heat production variation. Numerical models indicate that heat production contrasts are part of the interpretation of the heat flow variation in the Paraná Basin, contributing up to 10 mW/m², depending on the depth distribution of heat production.