

RADIOGENIC HEAT PRODUCTION IN THE CENTRAL FENNOSCANDIAN SHIELD - COMPARATIVE MATERIAL FOR THE BRAZILIAN SHIELD

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We use the results of a geochemical survey (1150 outcrop samples) for heat production studies in a 120 km x 500 km study area, in the central Fennoscandian Shield. The area covers formations from the Archaean granite-greenstone terrain in the east to Palaeoproterozoic autochthonous and allochthonous covers to the west of it, as well as Palaeoproterozoic mobile belts, major granitoid areas and schist belts in central and western Finland. The results obtained so far suggest that there is no simple way to determine the heat production levels of a shield terrain, and that crustal heat production models must include careful consideration of the evolutionary history of the area under study. Generally, there is an increase in heat production rates from the Archaean to Proterozoic rocks in E-W direction but this trend is relatively weak and often overrun by lithological variations. The heat production rate of igneous rocks (mainly granitoids) and metavolcanites show a weak positive correlation with SiO₂, whereas metasediments show a negative or no correlation. The heat production rates of igneous rocks and metavolcanites show negative correlations with density but in the metasediments the correlation is positive. This can be attributed to the affection of heat producing elements in the pelitic (mica-rich) rock types which have low SiO₂ but high density. Generally, heat production shows only a very weak variation with P-wave velocity. The geochemical character and tectonic type of a rock seems to be more decisive for heat production levels than the geological age (Achaean vs. Proterozoic).