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# Anisotropy of thermal conductivity of Gneiss and Greywacke from the Tauern Window and the Vienna basin, Austria

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Thermal conductivity is one of the key parameters for geothermal studies. As part of a research project of the geothermal reserves of Austria the thermal conductivity of selected rock types are investigated. Experimental determinations of thermal conductivity are predominantly based on laboratory measurements because there are presently no logging methods (direct or indirect) for routine measurements available. For the here presented laboratory determinations a Tk04 device from TeKa (Berlin, Germany) was used which employs a transient technique using a line/needle source. Results from three samples, Granite gneiss (Mureckgranitgneiss), Gneiss (Stainzer Plattengneiss) and Greywacke (Ringlsdorf) are discussed in detail. Sample preparation involves cutting of a cubic samples and polishing of the faces to get a plane surface. This has been proven of being of significant importance because even small roughness causes errors. For thermal anisotropy studies measurements are conducted at various angles with respect to the foliation plane on each side of the cube. First results show that the mineral content controls thermal conductivity. In particular the Quartz content affects the measurements by increasing the bulk thermal conductivity due to its high thermal conductivity. However, not only the volume content is important but also the connection between the individual quartz components and the type of quartz. If quartz is recrystallised, thermal conductivity is larger than in an amorphous state. Especially Gneiss is characterised by a distinct anisotropy: the conductivity of parallel schistosity is larger than conductivity perpendicular to schistosity. However, not in all cases a simple transverse isotropy could be observed, as even within “layers” some anisotropy is present. Comparisons with model calculations for different types of symmetry are attempted. Simple model calculations can explain the influence of mineral composition (particularly quartz content) and anisotropy.