

Connecting low-grade deformation and temperature data in Neotethyan (meta)sediments

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Low-temperature deformation of sedimentary rocks at the ductile-brittle transition zone is very frequent in the upper crustal level of accretionary wedges, obduction-related lower-plates and orogenic belts. In the present study we tried to estimate the temperature of deformation with various methods (illite and chlorite crystallinity, Raman spectroscopy) to separate different low- to very-low-grade Late Jurassic to mid-Cretaceous nappes in the Bükk Mts, NE Hungary.

The research area is part of the western passive margin of the Neotethys Ocean during the Middle Triassic – Middle Jurassic time. The succession is composed of Middle to Late Jurassic dark slate, sandstone, limestone with pillow basalts, small-scale gabbro intrusions and dykes. The samples are part of either a continuous sedimentary succession or 3 different nappes. The style of deformation varies from well defined axial planar cleavage (lower nappe (?)) to shear related sigmoidal foliation which intersects the bedding in a small angle (upper nappes(?)).

We applied the RSCM method [1] on slates from the three ‘nappes’. There is no sharp change in the temperatures at the boundaries ($\sim 260 \pm 30$ °C) but a continuous decrease towards the upper part of the succession (220 ± 30 °C). Samples from the contact with the basalts/gabbro dykes show slightly higher temperatures ($\sim 300 \pm 30$ °C).

Our results show, that the different style of deformation is not related to temperature differences. The magmatic bodies are slightly younger than the enclosing sediments, while thermal contact is nicely proven. RSCM of the slates turned out to be a key method in temperature estimation in the investigated 200-300 °C range.

[1] Lünsdorf et al. (2017) *Geostand Geoanal Res*, 41: 593-612.