

Petrology and $^{40}\text{Ar}/^{39}\text{Ar}$ -chronology of metavolcanic rocks from the Northern Phyllite Zone (Southern Hunsrück and Taunus Mountains, Germany): insights into a late Variscan ductile shear zone.

Matthias Fladt (1), Christian Soder (1), Winfried Schwarz (1,2), Mario Trieloff (1,2)

(1) Institut für Geowissenschaften, Universität Heidelberg, Germany (M.Fladt@stud.uni-heidelberg.de), (2) Klaus-Tschira-Labor für Kosmochemie, Universität Heidelberg, Germany

The Northern Phyllite Zone (NPZ) is a low-grade mylonitic shear zone between the high-grade rocks of the Mid-German Crystalline Zone and the very low-grade rocks of the Rhenohercynian Zone of the Variscan orogen. The NPZ comprises low-grade metasedimentary and metavolcanic rocks. Basaltic, intermediate and rhyolitic metavolcanics from the Soonwald and the Southern Taunus Mountains show the following paragenesis: actinolite + chlorite + epidote + albite + phengite + titanite + quartz ± calcite ± stilpnomelane ± pumpellyite ± aegirine-augite; blue amphibole (winchite) + chlorite + phengite + stilpnomelane + albite + titanite + quartz + magnetite ± epidote ± hematite; quartz + albite + K-feldspar + phengite + chlorite + titanite ± stilpnomelane ± ilmenite ± magnetite ± hematite. Occasionally, relict magmatic phases are present. The foliation strikes SW-NE and dips 60-70° to the NW. Stretching lineations are subhorizontal. P-T-estimations were done on the basis of equilibrium assemblage modelling yielding peak metamorphic conditions of 300–350 °C and 6–6.5 kbar. Thus, burial depths of 20–22 km and a low geothermal gradient of 15–16 °C/km are inferred.

$^{40}\text{Ar}/^{39}\text{Ar}$ -dating of stepwise heated phengite separates (100–200 μm) results in plateau ages of ~ 320 Ma. Two of the examined separates show argon diffusive loss $^{40}\text{Ar}/^{39}\text{Ar}$ -age spectra, which yield a period of argon loss between ~ 145 and 130 Ma. Diffusive argon loss is possibly related to widespread Jurassic-Cretaceous hydrothermal activity in SW Germany.

We interpret the Northern Phyllite Zone as a sinistral shear zone documenting prolonged oblique convergence following the peak of the Variscan orogeny between 340–330 Ma until ~ 320 Ma.