

Combining Lu–Hf garnet geochronology with *in situ* trace element analyses in garnet allowed us to gain new insight into the metamorphic evolution of UHP–UHT rocks in the Stary Gierałtów region, in the Polish Sudetes. Prograde garnet growth recorded by Rayleigh-type heavy REE (HREE) zoning in the felsic granulites indicates that the obtained 386.6 ± 4.9 Ma Lu–Hf age represents the time of garnet crystallization on a prograde UHP metamorphic path. The surrounding rocks were metamorphosed at the same time as indicated by 381.2 ± 6.7 Ma Sm–Nd garnet age obtained for the mid-crustal metapelites. The second metamorphic episode, which affected most of the lower crust in the Orlica–Śnieżnik Massif (OSM) occurred at *ca.* 340 Ma as determined by U–Pb zircon and Sm–Nd garnet dating of granulites in this and previous studies is interpreted as a high temperature event, which took place on a retrograde path.

Trace element distribution in garnets from the layered granulites showed significant differences in distribution of medium and HREE in garnets from mafic and felsic protoliths over the course of the metamorphic evolution. This had strong impact on the isotopic dating results and led to “decoupling” of the Sm–Nd and Lu–Hf clocks, which recorded timing of the two different metamorphic episodes separated by as much as 40 Ma. Moreover, the preservation of the HREE growth zonation profile in garnets from the felsic granulites whose minimum metamorphic temperature was established at 900 °C implies that the Lu–Hf system under relatively dry conditions does not undergo significant diffusional re-equilibration even at such extreme temperatures and therefore it still provides the age of prograde garnet growth. Under hydrous conditions, at least some resetting will take place, as documented by the partially relaxed HREE zonation profile in the amphibolitised mafic granulite, which yielded a 10 Ma younger age. The HREE distribution study appeared to be a particularly valuable and essential tool, which allowed us to distinguish garnet growth from post-growth complexities and hence, provide improved age interpretation. Medium REE, on the other hand, did not show any obvious correlation with the isotopic signature of garnet.

Two distinct metamorphic episodes recorded in the Stary Gierałtów region show that buoyancy-driven uplift of UHP rocks can be arrested at the base of a continental crust if not supported by any additional force. In our case study, the UHP rocks would have never reached the surface if their uplift had not been resumed after a long pause under a different tectonic regime. The multistage, discontinuous uplift revealed by the UHP rocks of the OSM provides a new scenario for the exhumation of continental crust from mantle depths distinct from the fast-track exhumation histories recognized in UHP terranes elsewhere.