Mineralogical and textural records of thermal regime during exhumation of (ultra)high-pressure rocks

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Pressure-temperature path of crustal material subducted to mantle depths is controlled by thermal regime of subduction zone that based on geophysical data range between 7-10 ºC/km along the interface between the slab and overriding mantle (*e.g.*, Peacock, 1996). After oceanic crust is over, partial subduction of continental crust material occurs. Depending on the strength of crustal material, coherent slices of crystalline rocks can be subducted to mantle depths. Their subduction rate may be partially slowed down due to the low density of the crustal rocks, but overall, the rate is very close to that during subduction of slab. This is supported by the presence of unaffected or unequilibrated minerals and texture in central parts of the bodies subducted to UHP conditions. Exhumation of deep-seated rocks first occurs by cooling, but upon their transport to crustal levels in the orogenic wedge, heating may occur as result from mantle upwelling due to slab breakoff or slab rollback (Faryad & Cuthbert, 2020).

The above thermal gradient along the subduction zone is also well supported by petrological observations from most low-to medium temperature eclogites, which are not or less affected by subsequent amphibolite facies metamorphism. However, minerals from UHP rocks, exhumed to deeper levels in the orogenic wedge, can be partially or totally re-equilibrated depending on their thermal overprint in the mantle wedge. The preservation of prograde compositional zoning in garnet from these rocks do not support isothermal decompression from maximum depth, but rather suggest a short-term heating after their exhumation into crustal levels. Such a scenario is supported by the results of application of thermodynamic modeling combined with diffusion modeling in UHP rocks (Faryad *et al.*, 2022). This presentation is aimed to focus on (U)HP rocks from different orogenic zones to assess their P-T-t paths during subduction and exhumation.

Faryad, S. W., Cuthbert, S. J. 2020. High-temperature overprint in (U)HPM rocks exhumed from subduction zones; A product of isothermal decompression or a consequence of slab break-off (slab rollback)? *Earth-Science Reviews*, 202, 103108.

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Peacock, S. M. 1996. Thermal and petrologic structure of subduction zones. In G. E. Bebout, D. W. Scholl, S. H. Kirby, & J. P. Platt (Eds.), Subduction: Top to Bottom (Vol. 96, p. 119–133). Washington, D. C.: *American Geophysical Union*.