



Exhumation of high-pressure metamorphic rocks: Why extension would not be the rule?

Jean-Pierre Brun (1) and Philippe Yamato (1,2)

(1) University Rennes1, CNRS, Géosciences Rennes - UMR 6118, F-35000 Rennes, France
(jean-pierre.brun@univ-rennes1.fr), (2) Institut Universitaire de France, Paris, France

Since the discovery of ultra-high pressure (UHP) metamorphic rocks in the Alps and the Norwegian Caledonides, more than three decades ago, the exhumation of high pressure metamorphic rocks has been most often considered to occur in the frame of continental collision. However, numerous natural examples of (U)HP rocks, from early Paleozoic to late Tertiary, document that exhumation occurred in extension either driven by slab rollback prior to continental collision (e.g. in backarc basins like in Mediterranean, Papua New Guinea, Caribbean) or by extension after continental collision (e.g. in Norway). We first summarize the mechanisms of extensional exhumation in slab rollback and extension modes, using numerical models and natural examples. We then present a reappraisal of the tectonic history of some famous natural UHP rocks examples (e.g. Alps and Himalayas) either showing, or strongly suggesting, that exhumation occurred prior to continental collision likely driven by slab rollback. In addition, we recently showed that the pressure history, including a catastrophic pressure drop at the onset of exhumation, that is recorded in most well documented (U)HP rocks worldwide fits remarkably well with a two-fold tectonic history, from compressional during subduction to extensional during exhumation. On the basis of all above arguments we strongly suggest that the extensional exhumation of (U)HP metamorphic rocks, instead of being one mode of exhumation among others, is more probably the rule.