



Exhumation processes and orogeneses through time: what do PT paths tell us

D. Gapais¹, F. Cagnard^{1*}, *F.Gueydan*¹, *P.Barbey*², *M.Ballevre*¹

(1) Géosciences Rennes, UMR 6118 CNRS, Université de Rennes 1, France.

(2) CRPG-CNRS, Vandoeuvre les Nancy, France.

E-mail: denis.gapais@univ-rennes1.fr

PT paths contain information about collision tectonics, including degree of strain localization, dominant exhumation mode of deep crustal units, as well as orogen-induced topographies and associated erosion modes. We compare tectonic histories affecting units from modern collision zones and from weaker accretionary-type orogens associated with crustal growth and rather high geotherms, as particularly common in Precambrian times. The latter commonly record retrograde PT paths with combined pressure and temperature decrease. Paths may track geotherms, which indicates thermal equilibrium and suggests slow strain and exhumation rates, and distributed erosion of crustal domains affected by distributed shortening with limited strain localization and topographic gradients. Such behaviour differs from that recorded by PT paths that track isothermal decompression and involve high strain and exhumation rates along major shear zones, as observed in modern collision belts.

Reasons why PT paths may record crustal-scale deformation modes (localised vs distributed), as well as gradients of erosion and strain rates are discussed through results of combined field evidence and numerical and analogue modelling.