Rate and scale of anatectic processes during gneiss dome formation: Example from the Montagne Noire (french Massif Central)

CENKI-TOK, B.*[1], TRAP, P.[2], ROGER, F.[1] AND PAQUETTE, J.-L.[3]

[1]Géosciences Montpellier, UMR5243, Univ. Montpellier, Place E. Bataillon, 34090 Montpellier, France

*correspondance: cenkitok@gm.univ-montp2.fr

[2]Laboratoire Chrono-environnement – UMR 6249 - Univ. Franche-Comté, 16 rte de Gray, 25030 Besançon, France.

[3]LMV- UMR 6524, Univ. Blaise Pascal, 63038 Clermont-Ferrand, France

Gneiss domes are excellent target for the study of late orogenic crustal flow characterized by feedback relations between metamorphism, partial melting and deformation. We have recently re-assessed the structural and petrological framework for the genesis of the Montagne Noire Axial Zone gneiss dome (MNAZ; southern french Massif Central; [1] [2]). The dome-shape and finite strain pattern of the MNAZ result from the superimposition of three deformation D1, D2 and D3. The early flat lying S1 is folded by D2 upright ENE-WSW folds and locally transposed into steep D2 high strain zones. D3 structures are related to vertical shortening during coaxial thinning with a preferential NE-SW directed stretching. Migmatitic gneisses record a clockwise evolution culminating at *ca*. 725 °C and 8 kbar. The metasedimentary cover records a LP-HT evolution below 4 kbar and register geothermal gradients of 20 to 50 °C/km.

Based on this solid structural and petrological framework, we present novel geochronological U-Pb age data on monazite grains from syn-tectonic granites, migmatitic gneisses and micaschists. We can therefore precisely link ages to metamorphic and deformation events in the MNAZ. D1 deformation occurs between 312 and 307 Ma, almost synchronous to D2 deformation (315-305 Ma). D3 deformation is slighlty younger (307-300 Ma). The onset of partial melting occurs at *ca*. 315 Ma. This study highlights the rapid time span (10 to 15 Ma) of the genesis of the MNAZ during late Variscan times.

[1] Rabin, Trap, Carry, Freville, Cenki-Tok, Lobjoie, Goncalves & Marquer (2015), *Tectonics*, accepted. [2] Freville, Cenki-Tok, Trap, Rabin, Leyreloup, Régnier & Whitney (2015), *Journal of Metamorphic Geology*, under review.