A reappraisal of the Variscan tectono-metamorphic evolution in the basement of the Aiguilles-Rouges massif (Alpine External Crystalline Massifs, France-Switzerland).

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The Aiguilles-Rouges Massif (ARM) basement is mostly composed of migmatitic gneisses and micaschists hosting metric boudins of retrograded eclogites and amphibolites. In the SW part of the massif, these high-grade rocks are overlaid by low-grade metamorphosed Carboniferous volcano-detritic sediments

Three main deformations, named D1, D2 and D3, have been described in the Variscan basement of the ARM. When D1 relicts are preserved in low-D2 strain domains, they correspond to a flat-lying S1 foliation only preserved in the gneissic core. This D1 is associated with partial melting metamorphic event M1. D2 is characterized by three main orientations of planar fabrics, oriented toward N160, N0 and N20 directions and forming S2-C2-C2' structures, respectively. They are related to a bulk non-coaxial anastomosed system developed under dextral transpression. D3 corresponds to a flat-lying cleavage associated to vertical shortening and folding of previous foliations. This deformation has only been observed in the upper structural levels of the gneissic basement and within the Visean sediments.

Field observations and EBSD data on eclogitic boudins indicate that D1 deformation is posterior to the relictual high pressure paragenesis, while D2 is synchronous with the retrogression of the eclogites into amphibolites. U-Th-Pb LA-IC-PMS datings on Zircon, Monazite and Rutile indicate that high-pressure metamorphism is recorded at ca. 335-330 Ma in the eclogitic boudins, whereas the M2 peak of temperature in surrounding metapelites ranges between 325 and 315 Ma. The exhumation of the Variscan basement, related to D2 dextral shearing and D3 crustal thinning, occurred between 315 and 300 Ma. These new results indicate a Variscan geodynamic evolution from high pressure conditions to late exhumation ranging between ca. 335 and 300 Ma in the ARM.

Mots-clés: Variscan orogen, External Crystalline Massifs, transpression, polyphase metamorphism, U-Th-Pb geochronology