
Lesser Kabylia Paleozoic basement (Algeria): Variscan history & Alpine overprint

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Résumé

The Lesser Kabylia Massif is an allochthonous unit constituting the internal zones of the Alpine Algerian-Tell. Its basement, comprising granitoids, gneiss and schists, is subdivided into the Texenna-Skikda Upper Nappe (TS-UN) overthrusting the Beni-Ferguen Lower Nappe (BF-LN). This basement, of undefined Paleozoic age, is affected by a poorly constrained Alpine overprint. To address this knowledge gap, we combined a petrological study together with LA-ICP-MS U-Th-Pb dating on zircon and in-situ monazite, and LASS-ICP-MS U-Pb dating on monazite on different lithologies.

In the western part of the TS-UN (Texenna area), the high-grade gneiss unit is dominated by felsic migmatites. The lower part is composed of Grt–Pl–Ksp–Qtz–Bt±Sill/Fi±Sp and is cross-cut by the Beni Khettab granitoid. In contrast, the migmatites from the upper part are made of Grt–Bt–Ky–Kfsp–Plg–Qz–Rt±Ilm. Pseudosection modeling on Sill–Grt-bearing felsic migmatite constrain conditions at 6–4 kbar and ~580–680°C with a monazite U-Pb age continuum of 296–258 Ma. However, Gt–Ky migmatites from the same area yielded ages of

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279±2.5 and 25.34±0.20Ma. Peraluminous granodiorites revealed a dominant Permian zircon population at 280 Ma. In the eastern part of the TS-UN (Kerkera area), magmatic zircon from a mylonitic metagranite give a protolith age of ~280Ma, with U-rich rims at 230Ma. Monazite from surrounding Sill-migmatite shows a 300–260 Ma continuum. However, in a low-grade Bt–Sill–Std–And–Qz–Fsp–Ms paragneiss, Th-rich monazite cores containing aluminosilicate inclusions give significantly older dates at ca. 319 Ma.

In the BF-LN, a HP-LT◦ Gt-Ky-Ph paragneiss records a monazite age of 281±2.2Ma, whereas monazite surrounded by phengite gave an age of 28.47±0.37Ma, highlighting the Alpine overprint. Pending in-situ Rb-Sr phengite geochronology will further constrain this age. Our findings indicate that the Lesser Kabylia basement underwent a late Variscan HT event at Ca. 280Ma, producing Type-S Grt-granites, and was partially overprinted by Alpine orogenesis at ca. 28Ma. In both nappes, preliminary detrital zircon provenance study on Lower Cambrian meta-quartzite highlight affinity to the Saharan metacraton, hence confirming the allochthonous origin of the basement.

Mots-Clés: Lesser Kabylia Massif, Variscan metamorphism, Alpine overprint, geochronology, zircon, U, Pb dating, monazite, Algeria