Zircon U-Pb geochronology of the Moroccan Variscan plutonic complexes from the Western High Atlas Palaeozoic massif

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Résumé

The Western High Atlas (WHA) Palaeozoic massif (Meseta, Morocco Variscan belt) contains numerous igneous magmatic complexes. Recently, zircon U-Pb geochronology of granitoids from the Meseta has highlighted the importance of re-evaluating the age of these intrusions, for which generally only Rb-Sr ages were available. In this contribution, we present: (1) new LA-ICP-MS zircon U-Pb data from three different facies of the Tichka plutonic complex (granodiorite, monzogranite and muscovite-leucogranite) outcropping on the Tnine Tigouga 1:50 000 geological map; and (2) reprocessed SHRIMP zircon U-Pb analyses from the Bou Zouga (granite), Tawrirt-Adassil (granite) and Azegour (granite, microgranite and rhyolite), intrusions recently presented in the Addouz and Azegour geologcial maps (1:50 000; Geological Survey of Morocco).

For the Tichka complex, zircon U-Pb ages are 306.8 ± 1.8 Ma (granodiorite) and 307.7 ± 1.6 Ma (monzogranite), i.e. late Carboniferous, whereas the muscovite-leucogranite yields a younger age of 292.7 ± 1.6 Ma i.e. early Cisuralian. They are interpreted as crystallization ages. Notably, the muscovite-leucogranite also contains zircon clusters at 309.1 ± 2.4 Ma and 324.8 ± 3.2 Ma, likely antecrysts, indicating magmatic chamber activity extending since the Serpukhovian–Bashkirian transition. Moreover, samples show a significant cluster at ca. 250 Ma. These results show that magmatic activity began earlier than previously thought, i.e., late Carboniferous, not early Permian, as suggested by prior Rb-Sr studies. Comparatively, other WHA smaller intrusions are younger: Bou Zouga granite is dated at 271 ± 2 Ma, while Azegour granite, microgranite, and rhyolite give ages of 276.1 ± 3.7 Ma, 278.5 ± 3.7 Ma,

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and 277.7 ± 2.5 Ma, respectively. The Tawrirt-Adassil granite is intermediate at 301.8 ± 2.7 Ma.
Consequently, these ages show that the tempo of Variscan magmatic activity in the WHA is much protracted than expected, beginning in the late Carboniferous and continuing up to the late Cislurian - early Guadalupian. However, the widespread concordant dates at ca. 250 Ma might be correlated with magmatic and/or thermal fluid activity at the Permian-Triassic transition in relation with an aborted rifting event.

Mots-Clés: Granitoids, Zircon U–Pb geochronology, Western High Atlas Palaeozoic massif, Meseta, Variscan belt