

Zircon U–Pb ages and geochemistry of granitoids from the central massif of the Bas Draa inlier (Western Anti-Atlas, Morocco)

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Paleoproterozoic basement rocks are exposed in several inliers in the Anti-Atlas belt of Morocco. Granitoids constitute an important portion of those inliers and show a wide range of petrographical and geochemical compositions. Therefore, many studies have been devoted to the petrogenesis of these granitoids. This contribution presents new geochronological analyses (LA-ICPMS, U-Pb zircon) of the granitoids located in the central massif of the Bas Draa inlier. Petrographic investigations indicate that these granitoids can be categorized into five groups: garnet leucogranites, biotite granites, diorite, tonalite and quartz diorites. The studied granitoids are magnesian, metaluminous to peraluminous. All samples are characterized by a widely variable geochemical spectrum of 51.67–76.4 wt.% SiO₂, 0.2–9.08wt.% MgO, 0.48–4.82 wt.% K₂O and 7.27–3.13 wt.% total alkalis (Na₂O + K₂O). These rocks are enriched in light RE and LIL elements but depleted in HFS elements (Nb, Ta, Ti). The chondrite-normalized REE patterns of the Bas Draa granitoids show slightly enriched light REEs [(La/Sm)_N= 1.29–4.56], negative Eu anomalies [(Eu/Eu*)= 0.46–1.43] and flat heavy REE patterns [(Gd/Yb)_N= 0.82–4.20]. These features along with various geochemical discriminant diagrams suggest a subduction environment for the genesis of these granitoids. Geochronological data brings out that the earliest magmatic event in the Bas Draa inlier yielded Rhyacien period: 2051.4 ± 3.22 Ma for leucogranite, 2054.92±3.73 Ma for the quartz diorite, 2059.39±2.91 Ma for the diorite and 2055.50±1.31/2089.27±3.13 for the tonalite, following by Orosirian period: 2022.68±3.39 Ma for the biotite granite, 2040.16± 4.7 Ma and 2040.64±4.85 Ma. These ages are consistent with zircon U–Pb ages of granitoids from other inliers and confirms the existence of a widespread magmatic event at Paleoproterozoic Era (Rhyacien and Orosirian) periods in the Anti-Atlas belt.