



Monazite Geochronology of Al-Fe Granulites Of Amesmesa Area from In-Ouzzal Terrane (Western Hoggar, Algeria)

Benbatta Ahmed (1), Bendaoud Abderrahmane (1), Cenki-Tok Bénédicte (2), Adjerid Zohir (1,3), Bruguier Olivier (2), Garrido Marin Carlos Jesus (4), Djemai Safouane (1), and Ouzegane Khadija (1)

(1) University of Science and Technology Houari Boumediene, USTHB (Algeria), Earth Science and Country Planning, Laboratory of Geodynamics, Engineering Geology and Planetology, Algeria (benbatta.ahmed@gmail.com), (2) Géosciences Montpellier UMR5243, Université de Montpellier, Place Eugène Bataillon, F-34095 Montpellier, France., (3) Ecole Normale Supérieure-Kouba. Département des Sciences Naturelles, B.P. 92, Vieux Kouba, 16050-Alger., (4) Instituto Andaluz de Ciencias de la Tierra, Consejo Superior de Investigaciones Científicas–Universidad de Granada, Avenida de las Palmeras 4, 18100 Armilla, Granada, Spain.

ABSTRACT:

The In Ouzzal terrane in western Hoggar (South Algeria) preserves evidence of ultrahigh-temperature (UHT) crustal metamorphism. It consists in Archean crustal units, composed of orthogneissic domes and green stone belts, strongly remobilized during the Paleoproterozoic orogeny (2000 Ma, Peucat et al., 1996). Ouzegane et al. (2003) summarize this UHT metamorphic history as two granulitic stages of high temperature : a prograde evolution with peak conditions around 9-11 kbar and 950-1050°C, leading to the appearance of exceptional paragenèses with corundum-quartz, sapphirine-quartz and sapphirine-spinel-quartz in Al-Mg granulites, Al-Fe granulites and quartzites; followed by retrograde event characterized by a pressure drop to 5-7 kbar. This retrograde event is marked by intrusive carbonatite bodies and the occurrence of leptynites veins.

The present study is interested in Al-Fe granulites which outcrop in a still little known region situated in southeastern part of In-Ouzzal terrane. These granulites are mainly composed by quartz, spinel, garnet, sillimanite, cordierite, biotite, perthitic feldspar, ilmenite, ± corundum.

The study consist to dating these Al-Fe granulites by monazites (U-Pb - ICP-MS method) combined with their internal structures revealed by BSE imaging. The primary results suggest two major facts: 1- for the first time, the existence of at least one metamorphism older than 2.5 Ga; 2- a long live paleoproterozoic high temperature metamorphism.

These geochronological results completed and combined with a detailed phases relationship study of these Al-Fe granulites will be of major importance as for future discussion on the geodynamic context responsible for this regional UHT metamorphism as well as indicating a record the time of the different stages of granulitic metamorphism.

Keywords: UHT metamorphism, Granulites, Paleoproterozoic, Archaean; Southeastern In Ouzzal terrane; Monazite geochronology; Hoggar