

Ediacaran granites in the Tuareg shield, West Africa: alkalinity and end-Gondwanan assembly

P. BOWDEN¹, J-Y COTTIN^{1,2}, E. BELOUSOVA², Y. GREAU²,
W. L. GRIFFIN², S. Y. O'REILLY^{1,2},
A. AZZOUNI-SEKKAL³, N. REMACI-BENOUDA⁴
AND F. BECHIRI-BENMERZOU⁵

¹Dept Géologie, Université Jean Monnet, 42023 St Etienne
(Peter.Bowden@univ-st-etienne.fr)

²CCFS ARC Centre of Excellence, Macquarie University,
Sydney, NSW, Australia (Elena.Belousova@mq.edu.au)

³Université Abou Bekr Belkaid, 13000 Tlemcen, Algeria
(azzouniabra@gmail.com)

⁴Université d'Oran, Lab.Georen, 31000 Oran, Algeria
(remaci.nacera@lycos.com)

⁵LMMA-USTHB:ENS-kouba, Algiers, Algeria
(faty_benmerzoug@yahoo.fr)

The Tuareg Shield, NW Africa, consists of oceanic terranes interlayered with Palaeoproterozoic and Archæan basement. It was thrust westwards during the Pan African orogeny over the eastern margin of the West African craton, and eastwards over the LATEA metacraton in central Hoggar.

The LATEA metacraton represents parts of a deformed passive margin in Central Hoggar consisting of Archæan, Palaeoproterozoic and Neoproterozoic assemblages. High-level post-collisional intrusions of Early Ediacaran layered troctolite (631 Ma, ϵHf -5.55 to -4.99) and norite in the Laouni terrane are contemporaneous with a monzogranite (637-594 Ma) exhibiting a crustal signature (ϵHf -14.52 to -6.45); all are emplaced into a 2087 Ma migmatitic granite-gneiss basement (ϵHf -2.09 to +1.66). The Palaeoproterozoic granite derived from Late Archæan sources (T^{DMc} 2.68 Ga).

Late Ediacaran granitic ring complexes ranging in composition from high-K calc-alkaline to alkaline are collectively referred to as Silet Tourirts. The Late Ediacaran monzogranites (483-537 Ma) have ϵHf values (-6.27 to +0.25) suggesting a depleted mid-Mesoproterozoic mantle source (T^{DMc} = 1.60 Ga) with a less significant crustal component compared with the Early Ediacaran granites in the Laouni terrane. The Iskel alkaline granites (496-596 Ma) show more juvenile signatures (ϵHf +5.5 to +11.9; +2.58 to +7.52; T^{DMc} = 1.24Ga) possibly related to the influence of their rapid passage through a megashear zone.

Thus the key feature of final Gondwanan assembly in the Tuareg Shield is the juvenile alkalinity of the Late Ediacaran granite suites due to linear lithospheric delamination along megashear zones. Monzogranites represent contamination by the crust of alkaline granite magma derived more directly from the mantle.