

Unraveling the Age of HT Metamorphism in Eastern Senegal: Evidence from U-Pb *in-situ* Analyses on Monazite and Sm-Nd Garnet Geochronology

J. KONE^{1*}, L. BARATOUX², K.A. MANEIRO^{3,4}, E.F. BAXTER³, O. VANDERHAEGHE², S. DUCHENE², P.M. NDIAYE¹, P. PITRA⁵, G. DUFRECHOU², AND O. BRUGUIER⁶

¹Université Cheikh Anta Diop de Dakar, Senegal
(*correspondence : lenka.baratoux@gmail.com)

²Geosciences Environment Toulouse (GET), UPS, CNRS, IRD, CNES, Toulouse, France.

³Department of Earth and Environmental Sciences
Boston College, Chestnut Hill, Massachusetts 02467
USA.

⁴Wheaton College, 501 College Avenue, Wheaton, Illinois 60187, USA

⁵Univ Rennes, CNRS, Géosciences Rennes – UMR 6118, F-35000 Rennes, France

⁶Géosciences Montpellier, Université Montpellier, CNRS

Metasediments of the Paleoproterozoic Diale Dalema Basin are affected by a polyphase metamorphic evolution during the Eburnean Orogeny (2.25 - 2.00 Ga). The garnet-staurolite-sillimanite metapelites contain two generations of garnet. Garnet porphyroclasts wrapped in the S3 schistosity contain inclusions of chlorite, epidote, biotite, ilmenite, plagioclase, and quartz that delineate the S2 schistosity. The development of S3 is coeval with the growth of inclusion-free rims around the garnet porphyroclasts and by garnet neoblasts. Garnet displays a zoning pattern typical of prograde metamorphism associated with decompression from 9 to 6 kbar and an increase in temperature from 550 to 630 °C. Monazite neoblasts in the S3 schistosity yield LA-ICP-MS U-Pb ages of 2052 ± 7 Ma and 2048 ± 8 Ma, whereas inclusions in staurolite yield an older age at 2090 ± 16 Ma.

Sm-Nd garnet geochronology yields a bulk garnet age of 2080.2 ± 7.7 Ma on garnet porphyroclasts and 2049.1 ± 3.1 Ma on neoblasts. The results highlight an agreement between U-Pb ages from monazites and Sm-Nd ages from metamorphic garnets. The oldest ages are interpreted as the age of the prograde regional metamorphism during burial, while the youngest are attributed to the thermal peak.