

Geochemistry and petrogenesis of Archean Mafic rocks from the Amsaga Area, West African Craton, Mauritania

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This study focuses on the Archean crust from the West African Craton in Mauritania (Amsaga area). The Amsaga Archean crust mainly consists of TTG and thrust-imbricated slices of mafic volcanic rocks, which have been affected by polymetamorphic events from the amphibolite to granulite facies.

Here we report geochemical and Sm-Nd isotopic results on mafic rocks to identify their origin and to constrain their geodynamic setting.

Two groups are distinct in their geochemical signatures. The first group are tholeiitic basalts, showing near flat to slightly fractionated LREE and HREE ($La/Sm_N = 0.8-2.2$; $Gd/Yb_N = 1.03-1.6$). The second group are composed of enriched basalts and andesites, with LREE-enriched patterns and more fractionated LREE and HREE ($La/Sm_N = 3.7-4.6$; $Gd/Yb_N = 1.5-3.2$). Both groups have negative Nb and Ti anomalies. We have obtained a whole-rock isochron indicating that these mafics rocks formed at 3.3 ± 0.27 Ga. They have positive ϵNd_i values (+2.3 to +5.8), implying they were probably derived from a long-term LREE depleted mantle.

These groups could be related to arc-like basalts, as they show many similarities with some Archean mafic rocks that probably formed in a supra-subduction zone. Different scenarios will be discussed with regard to the Archean geodynamics.