

Geochemical and petrographic insights into the origin, weathering, and tectonic context of Deng-Deng metasedimentary rocks in the Central African Fold Belt.

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The Deng-Deng area belongs to the Adamawa-Yade domain within the Pan-African Central Africa Fold Belt in Cameroon (CAFB) and corresponds to the SW extension of the Lom series. The research aimed to explore the metasedimentary rocks, seeking insights into the nature of their source protolith and the tectonic context. The Deng-Deng metasedimentary rocks consist of garnet biotite gneiss, and Calc-silicate gneiss characterized by heterogranular granoblastic textures with assemblages of amphibolite (Grt + Bt + Qz + Kfs + Pl) and granulite (Cpx + Scp + Pl) facies. In the CaO-Al₂O₃-FeO+MgO, calc-silicate gneisses are linked to marls as their protolith, while garnet biotite gneisses point to grauwackes. Their chondrite-normalized REE patterns, are similar and fractionated (La_N/Yb_N of 5.69–7.59). All the studied samples exhibit LREE enrichment (La_N/Sm_N = 2.59–3.51) in comparison to HREE (Gd_N/Yb_N = 1.26–1.87), along with a noticeable negative Eu anomaly. Although both studied gneisses show similar REE patterns, the garnet biotite gneiss samples exhibit a more pronounced negative Eu anomaly (mean Eu/Eu* of 0.77) compared to that of the calc-silicate gneiss samples (mean Eu/Eu* of 0.68). The CIA and ICV indices of the studied metasediments, combined with their Sr depletion, show that they are predominantly immature and have undergone weak chemical alteration. The La/Sc, Th/Sc, Th/Co, Th/Sc, and Zr/Sc ratios of the Deng-Deng metasediments are like the sediments derived from felsic rocks. The felsic nature of the protoliths is attributed to intracrustal differentiation through sedimentary recycling, indicating the accumulation of zircon. The La vs. Th and Th-Sc-La diagrams for tectonic context discrimination indicate that the protolith of the Deng-Deng metasediments was deposited in an island arc, consistent with the tectonic setting of the Deng-Deng granitoids. The Deng-Deng metasediments are characterized as having undergone weak weathering, originating from felsic sources, and being deposited in an island arc setting. Deng-Deng's results differ from other regions like Mbondo-Ngazi Tina, Yaoundé Group, and Santa Quitéria in terms of weathering, source, and tectonic evolution.