Geochemistry of the Kouambo banded iron formation (BIF) and associated lithology from the paleoproterozoic Nyong series, Southern Cameroon: Implications for origin and tectonic setting

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The Kouambo Banded iron formation (BIF) belongs to the paleoproterozoic Nyong series in the Congo craton in Cameroon. The BIF slab of about 200m in length along a river bed is hosted in the garnet albite pyroxene gneiss.

Methods: 16 samples of both BIFs and associated garnet albite pyroxene gneiss were analysed by XRF for majors elements and ICP MS for traces and Rare Earth Elements at the IGGCAS in China.

Results: Geochemical study reveals that the BIF samples are composed of 95 wt% Fe_2O_3 and SiO_2 and have low concentrations of Al_2O_3, TiO_2 and trace HFSE, suggesting chemical precipitates of silica and iron. The Post-Archean Australian Shale (PAAS)-normalized REE-Y patterns display minor LREE depletion and HREE enrichment, a positive La anomaly of greater than 1, low Y/Ho ratio (average 29.26), weak positive Eu anomalies (average 1.67), with the low V (17.5 ppm), Co (6.1 ppm) and Ni (27.5 ppm) contents similar to other Superior-type BIFs [1].

Discussion: The geochemical data indicate that the Kouambo BIF was derived from the intermixture of submarine hydrothermal solution and seawater. The negative Ce anomalies (average 0.85) implies that the seawater was under oxic condition during the deposition of the Kouambo BIF. The Ti/Zr vs. La/Sc diagram [2] with Ti -/-Zr and La-/-Sc average ratios of 52.50 and 0.87 respectively of the garnet albite pyroxene gneiss associated with the Kouambo BIF show that it comes from a mafic igneous protolith originating in oceanic island arc setting. This suggests that the Kouambo BIF was deposited in a back arc basin environment.

[1] Gross & McLeod (1980) Can. Mineral 18, 223-229. [2] Bhatia & Crook (1986) Mineral Pet. 92, 181-193.