Mineralogy and geochemistry of the Bikoula banded iron formations in the Ntem complex, southern Cameroon

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Precambrian Banded Iron Formations (BIF) have been extensively studied to reconstruct the redox conditions of the early oceans, and may have been linked to the evolution of specific microbial metabolisms [1] [2].

Here we present the first results of mineralogical and geochemical analysis performed on fresh core samples that were collected during the drilling campaign of the Bikoula Iron Ore Project. The Bikoula BIF are a virtually unstudied iron formation outcropping in the early Archean Ntem complex, southern Cameroon. They occur in a ~3.1 Ga greenstone belt sequence that has been affected by amphibolite- to granulite-facies metamorphism [3]. At the mesoscopic scale, BIF samples show a conspicuous banding in spite of high-grade metamorphism. The mineralogy consists of quartz, magnetite, orthopyroxene, clinopyroxene and minor sulfides. Such an assemblage is typical of iron formations having undergone high-grade metamorphism [4].

Geochemical data show elevated Al_2O_3 (0.76 – 7.52 %) and TiO_2 (0.11 – 0.88 %) as well as a positive correlation between these components. This suggests that the protolith was not a pure chemical sediment but was contaminated by variable amounts of silicate detritus. Despite the high-grade metamorphism, PAAS-normalized REY patterns show that some of the samples have preserved seawater-like features (La and Y anomalies, and superchondritic Y/Ho ratios). Europium anomalies vary from strongly positive to negative, indicating that the REE in the Bikoula BIF may have been derived by mixing of hydrothermal and continental contributions [5] [6].

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