

Petrographic and Geochemical features of low to medium grade birimian metasedimentary rocks of the comoe basin (North of Alépé - South east part of Côte d'Ivoire)

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The Comoe Birimian Basin outcrops in three different countries (Côte d'Ivoire, Ghana and Burkina Faso). The southern part of this basin located in Côte d'Ivoire, precisely close to Alépé consists of metasedimentary rocks, affected by the low (greenschist) to medium (upper amphibolite) grade metamorphism. Petrographic studies of those rocks highlighted the presence of paragneisses, micaschists, mylonites, metawackes and schists. Paragneisses and micaschists are evolving according to the mineral composition from west to east and from south to north, respectively.

Using major elements, two main sedimentary units have been distinguished: shales group (micaschists, mylonites and schists) and sandstones group (paragneisses and metawackes). Rocks affected by medium metamorphism grade (in majority sandstones) located in the southern part show low PIA and CIA indexes. While PIA and CIA indexes are high for rocks located in the north part affected by greenschist metamorphism grade (in majority shales). PIA, CIA indexes with A-CN-K interpretation indicate that probably chemical weathering in the source area and recycling processes have been more important in the northern rocks (lower metamorphism) relative to the rocks affected by medium metamorphism grade (most of paragneisses). Shales samples have undergone a post-depositional K metasomatism.

Geochemical data suggest that the metasedimentary rocks come from intermediate to mafic igneous provenance, with the Archean greenstone sediments signature. The low ratio of Th/U below 3.5, for Comoe Basin metasedimentary rocks indicates that the source is mantle-derived volcanic rocks. Trace and major elements features suggest that the deposition of those rocks took place in island arc setting.

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