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Cu mineralisation in the Neoproterozoic glacial Mwale Formation (Tenke Fungurume Mining District; Democratic Republic of Congo)

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The Mwale Formation-Ng.1.1 (also known as Grand Conglomérat), which constitutes the base of the Nguba Group of the Neoproterozoic Katangan Supergroup in the Central Africa, has recently attracted renewed with regards to copper mineral exploration. Field observations combined with detailed logging and petrography of core (MWAS0001) drilled in the Shanika Syncline in the Tenke Fungurume mining district, show that the Mwale Formation consists of several periods of marine and fluviatile sedimentation alternating with glacial sedimentation characterized by diamictite. The main lithologies identified within the Mwale Formation are arkosic sandstones, lithic greywacke, greywacke and shale. The marine and fluviatile environments are indicated by the presence of primary inorganic soft sediment structures such as channels, scour-and-fill, flute marks, groove and tool marks, flat-bedding, graded bedding, cross-bedding, lamination and cross-lamination slumps, slides and load deformation structures. The lack of sorting and the immaturity of the sediments within the diamictite layers are typical of a glacial environment.

Low grade copper mineralisation consists mainly of disseminated chalcopyrite associated with pyrite and sometimes bornite and chalcocite. Mineralisation also occurs in carbonate-chlorite veins. At least three generations of veins with different compositions are observed. The carbonate-chlorite veins cross cut both unmineralised carbonate-feldspar-quartz veins and feldspar-quartz veins. A potassic alteration is marked by the presence of feldspar (adularia) as vein selvedges that is locally associated with silicification. However, the relationship between the potassic alteration, silicification and copper mineralization is not clear.

The typical presence of chlorite and dolomite in the mineralised veins suggests that hydrothermal alteration was associated with the sulphides. This mineralisation is late- to post-orogenic according to its in relationship with the later magnesian alteration recognised in the Copperbelt [1, 2, 3].

References

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