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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) that constitutes the base of the Nguba Group of the Neoproterozoic Katangan Supergroup in the Central Africa has recently attracted renewed interest in the frame of copper mineral exploration. The main lithologies identified within the Mwale Formation are arkosic sandstones, lithic greywacke, greywacke and shale which are consistent with marine, fluviatile and glacial environment. Field observations combined with detailed logging and petrography of well (MWAS0001) drilled in Shanika Synclinal 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 the presence of diamictite. The marine and fluviatile environments are indicated by the presence of primary inorganic sedimentary 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 to pyrite and sometimes bornite and chalcocite. Mineralisation occurs also in carbonate-chlorite veins. At least three generations of veins with different composition are observed. The carbonate-chlorite veins cross cut both unmineralised carbonate-feldspar-quartz veins and feldspar-quartz veins. The typical presence of chlorite and dolomite in the mineralised veins indicates a hydrothermal alteration associated with the sulphides. A potassic alteration is marked by the presence of feldspar (adularia) as vein selvedges that is locally associated with silicification. This mineralisation is late to post orogenic according to its in relationship with the later magnesian alteration recognized in the Copperbelt [1, 2, 3].

References

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