



Metallogenetic potential of the Paleoproterozoic mafic-ultramafic Hamutenha intrusion (SW Angola). New data from PLANAGEO project

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In the SW sector of the Angolan shield occur the Kunene Anorthositic Complex (KAC), one of the most remarkable magmatic anorthositic suites worldwide. The KAC is considered a long-lived magmatic system that operated in the area intermittently during the Mesoproterozoic (1450 ± 2 Ma to 1371 ± 2.5 Ma). Smaller mafic-ultramafic intrusive bodies ranging in composition from dunite to harzburgite, pyroxenite, troctolite and gabbro are located in the KAC periphery (e.g. Epupa, Ombuku, Hamutenha, Oncócuá). The Hamutenha body is a 3 km long oriented NW-SE, banded intrusion with internal zonation hosted in the Paleoproterozoic granitic rocks (1970 ± 2 Ma). The internal zone is composed by rocks with ultramafic nature, mostly harzburgites and dunites with diorites in the external zone.

The Hamutenha outcrop has been identified as having great potential to host Cr, Ni and PGE mineralizations. Previous soil geochemistry work, carried on dunitic outcrops (3000 samples) identified high anomalies in Cr ($12\,500\text{ mg/kg}^{-1}$), Ni (3100 mg/kg^{-1}) and Co (375 mg/kg^{-1}). The Hamutenha dunites are depleted in platinum-group elements (PGE) although the high Ti content in spinels (15.66 % of TiO_2) indicate a parental magma relatively rich in Ti, similar to another intrusions of same type with mineralizations of Fe-Ti-Cr and Pt-Pd sulfides.

In the PLANAGEO project (National Geology Plan of Angola), the National Laboratory of Energy and Geology (Portugal) (LNEG) carried out detailed geochemical and geophysical surveys in the Hamutenha outcrop in order to evaluate the metallogenetic potential. Soil geochemistry showed high contents in Cr (618 mg/kg^{-1}), Co (76 mg/kg^{-1}), Ni (100 mg/kg^{-1}) and 1.15% of TiO_2 over ultramafic rocks. The Hamutenha rocks project in the MORB-OIB field, very close to E-MORB composition, indicating that the enriched mantle (EMORB) was the source of the magma that generated ultramafic rocks. This samples show high content in Cr (1555 mg/kg^{-1}), Ni (1855 mg/kg^{-1}) and Co (145 mg/kg^{-1}). The PGE show low values, except in one sample with $21\text{ }\mu\text{g/kg}^{-1}$ of Pd. The mineralogical analysis using SEM showed that the opaques paragenesis of Hamutenha dunitic rocks are composed by Cr, Mg and Ti spinels, chromite, magnetite, titanomagnetite, pentlandite and Ni-Fe metallic alloys. The pentlandite shows appreciable values of Ni (30.46 – 32.40 wt.% of Ni)

and the chromiferous spinels 10.43 – 22.47 wt.% of Cr.