

## **THE MUSAYNA'AH PROSPECT : CU-MO-AU PORPHYRY-STYLE MINERALIZATION IN NEOPROTEROZOIC ROCKS OF THE SAUDI ARABIAN SHIELD.**

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The Musayna'ah prospect lies 20km South of the town of Hulayfah, in north-central Saudi Arabia. In the framework of setting up the new GIS based DMMR-BRGM geoscience database, it was reassessed as being one of the potentially major mineral occurrences of the Arabian Shield. The prospect encompasses two major sets of ancient copper workings corresponding to extensional veins that cross-cut Late Proterozoic Halaban plutonic and metavolcanic rocks. The last include a porphyritic andesitic dome, younger rhyolitic dykes, and a volcanic breccia. The succession was slightly folded during the Panafrican transpressional Nabitah orogeny. The old workings were previously drilled for massive sulfide. The main mineralizing event is recognized as being connected with a syntectonic granite-diorite pluton that is exposed 4Km farther South ; this intrusion shows an high late-magmatic-fluid activity with copper, magnetite pegmatite and tourmaline. The main porphyritic andesite is strongly altered with magnetite, K feldspar and biotite. Near the veins chlorite, sericite, carbonate increase. Two types of veins are recognized : (A) K-feldspar (partly adularia) biotite, hématite locally replacing magnetite, malachite replacing cuprite, tenorite, goethite, limonite and electrum replacing pyrite ; (B) mainly reniform chlorite and carbonate. Siliceous stockworks with cokade breccias and ribbon quartz are locally seen to cross-cut the silicified andesite. Chloritization of biotite is common. A porphyry system is indicated by the vertical geochemical zonation, with peripheral Pb,Zn, Ag mineralisation and Cu, Au, Mo mineralisation at depth, and a mineral-alteration pattern that is mainly propylitic outwards and potassic inwards. Further indications of a porphyry system are the presence of epithermal breccia and skarn type mineralisations in the vicinity .