Identification of target areas for base metal (Ni, Cr and Co) mineralization based on GIS and QEMSCAN analysis of stream sediments in the ultramafic-mafic terrains along the Shyok Suture Zone, North Pakistan

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This study demonstrates the strength of a GIS-based approach to the analysis of a stream sediment geochemical dataset and automated quantitative mineralogy using Quantitative Evaluation of Minerals by Scanning Electron Microscopy (QEMSCAN) to identify target areas for Ni-Cr mineralization along the Shyok Suture Zone, North Pakistan. A huge geochemical database (>2000 samples), generated as a result of extensive sampling campaigns by the Australian Aid Program (1992-1993), has been utilized for this study to identify prospect areas for mineralization.

The geochemical data was synthesized through Arc GIS 9.0 and generated spatial catchment maps with high concentration of Ni, Cr and Co directly related to mafic-ultramafic rocks along the Shyok Suture Zone. Representative stream sediment samples collected from these areas were subjected to advance mineralogical techniques in order to identify modal mineralogy and mineral associations. The dominant mineral phases are identified as pyrite, chalcopyrite, galena, pentlandite, cobaltite and chrome spinel. The high concentration of Ni, Cr and Co and mineral content in the studied samples suggests that the mafic-ultrmafic rocks of the Teru, Yasin, Pakora and Bagrot areas along the Shyok Suture Zone have high potentials for metallic mineralization.

A geochemical model has been established by correlating the results of the present study with those of known base metal mineralization in Chilas and Jijal along the Indus Suture Zone. It is hoped that this model will aid in the exploration of base metal deposits in the remote areas like northern Pakistan.