

Preliminary study of the rocks of Bagrot Valley, Gilgit-Baltistan, Pakistan with emphasis on gold and base metals mineralization

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Bagrot valley, a study area of this research, is located in Gilgit district of the Gilgit-Baltistan province in the northern areas of Pakistan. The geology of the area is mainly comprised of the Chalt volcanics and diorites belonging to Kohistan island arc (KIA). Chalt volcanics covers most part of the study area. These are strongly deformed, metamorphosed, and intensely sheared along shear zones. The diorites occur in the southern part of the study area and have intrusive contact with the Chalt volcanics. Yellowish-brown color staining due to the oxidation of sulfide bearing phases, especially pyrite and chalcopyrite, to limonite is very prominent along the shear zones within the Chalt volcanics and also along the contact zones with diorite. At places the development of malachite and azurite are also noticed in association with the Cu-bearing sulfides. These sulfide bearing zones are <1m to >10m thick and are extended up to >100m.

The rocks of the area, especially the sulfide bearing zones, are the main focus of this study in regard to gold, silver and base metal mineralization. To understand the chemical potential of the rocks of the area, bulk samples (>10kg) were collected in the field from both fresh rocks and sulfide bearing zones. These samples were treated for the chemical concentration of Au, Ag, Cu, Pb, Zn, Ni, Cr, Co, and Cd. The samples were crushed to 2mm size in jaw crusher and then pulverized to -100 mesh size by the tungsten carbide ball mill. Representative portion of each sample was digested with hydrofluoric acid, aqua regia (3HCl:1HNO₃) and other acid mixtures. These working solutions were used for the determination of base metals by Perkin Elmer 700 electrothermal atomic absorption spectrometer (AA) while gold was determined by the same technique after its extraction in methyle isobutyle ketone (MIBK). Au, Ag, Cu, Pb, Zn, Ni, Cr, Co, and Cd are present in the range of <5- 95ppb, 0.5- 11ppm, <0.5-198ppm, <0.5-3ppm, 2-36ppm, <0.5-75ppm, 22-72ppm and <0.5-4ppm respectively. It is concluded from the field and geochemical investigations that the rocks of the study area gave indications of gold, Ag and some base metals mineralization. Therefore, detailed study in regard to the economic potential and genesis of the mineralized sheared zone of the study area is needed to be carried out.