

Gold and base metals studies in the heavy mineral concentrates from Bannu Basin, Muslim Bagh Ophiolites, Indus River and Chagai Arc: In the regional context of Tethyan Metallogenic Belt

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Abstract

Tethyan Metallogenic Belt is a global porphyry copper-gold and base metals related mineralized zone that stretches from Central Europe, Turkey and Iran into Pakistan. In Pakistan, it covers the south-western, western and northwestern border and passes into the Tibetan Plateau from where it further extends into Philippines, Burma, Indonesia and New Guinea. This belt mainly consists of Kohistan Ireland Arc, Waziristan and Muslim Bagh ophiolites, Uthal-Bela mélanges and Chagai Magmatic Arc. Rivers emerging from these geological units have partially eroded the primary gold and base metals prospects and re-deposited it in the form of stream sediments. Heavy mineral concentrates (HMCs) from the stream sediments of some rivers which are draining the Tethyan Metallogenic Belt are the focus of the current research.

During this work HMCs were collected from four localities, the Indus River at Kund Khairabad, Zhob River tributaries in Muslim Bagh, Homki Nala in Mashki Chah area of Chagai and Kurram River in Bannu Basin. Follow up studies and sampling for gold, copper and other base metals was also done in the catchments of Homki Nala and Zhob River.

The geochemical concentrations of gold and base metals in HMCs from Indus and Kurram rivers suggest encouraging results and existence of potentially economical mineable placers at some localities. The gold grains morphology and heavy minerals studies in Indus and Kurram rivers indicate a distant source. On the other hand visual inspection of heavy minerals, float lithology and gold grains in the HMCs from Zhob River and Homki Nala have indicated a proximal source. Follow up study in the catchments of Zhob River lead us to the Bagh Viala copper and Ghunda Manra stibnite prospects as well as several small copper indications (alterations) in the Saplai and Jhang Tor Ghar Massifs of the Muslim Bagh Ophiolites. Some reconnaissance work in catchments of the Homki Nala has indicated scattered prospects of porphyry copper-gold in Durban Chah, Amir Chah, Siah Diq and Mashki Chah in foothills of the Pleistocene Dam Koh Volcano.