

## **Preliminary studies of heavy minerals and exploration of placer gold in the Siwaliks sandstone of Karak anticline and adjoining areas Karak, Khyber Pakhtunkhwa**

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Karak anticline is a well exposed geological structure which is located in the south east of Karak city in the province of Khyber Pakhtunkhwa (KPK). It starts from Karak city in the north and extends upto Banghar syncline in the south. The northern and southern limbs of Karak anticline are bounded by Mitta Khel fault and Banghar syncline, respectively. Karak anticline and its adjoining areas are generally composed of Chinji, Nagri, Dhok Pathan and Soan Formations of the Siwalik Group. However, Nagri and Dhok Pathan formations are dominantly exposed in the study area. These formations consist of sandstone, shale and conglomerates of clastic sediments of molasse and placer type.

The area has been investigated for the first time for exploration of heavy minerals, gold, silver and base metals. The samples collected from these formations were crushed to sand size and then treated with shaking table to separate concentrates, middlings and tails. The concentrates and were further investigated for heavy minerals, gold, silver and base metals. In Chinji, Nagri, Dhok Pathan and Soan Formations, the heavy minerals, identified with the help of binocular microscope are mainly zircon, garnet, tourmaline, apatite, epidote, hornblende and tremolite. The heavy minerals are present in variable amount in Chinji, Nagri, Dhok Pathan and Soan Formations. The concentrates, middlings and tails were pulverized to -200 mesh size by the tungsten carbide ball mill. Representative portion of each sample of concentrates, middlings and tails was treated with aqua regia and other acid mixture and the solutions were analyzed for Au, Ag and base metals (Cu, Zn, Pb, Cr, Ni, Co, Mn and Cd) by atomic absorption spectrometer in the geochemistry laboratory of NCE in Geology, University of Peshawar. The concentration of gold ranging from <0.1 to 11.5ppm, Cu from 0.5 to 225ppm, Co from 5.2 to 110ppm, Zn from 9.1 to 120.4ppm, Cd from 2.2 to 16.4ppm, Pb from 2.4 to 110.4ppm, Ag from 0.5 to 47.8ppm, Mn from 57.8 to 736ppm, Ni from 0.8 to 176ppm and Cr from 26.0 to 555.5ppm. The present study, therefore, suggest that the Karak anticline has the potential for economic concentration of heavy minerals, especially zircon, gold and silver.