Petrography and strength analysis of Jura granitoid, Neelum Valley, Azad Jammu and Kashmir

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Abstract

The granitic rocks of Jura in Neelum valley Azad Jammu and Kashmir (lesser Himalaya) were intruded in Precambrian Salkhala Formation. Dolerite dykes were later intruded in these granitoids. Detailed field and petrographic studies reveal that Jura granitoids are megaporphyritic in nature containing phenocrysts of plagioclase and perthitic feldspar. Other minerals include muscovite, biotite, sericite, tourmaline, andalusite, garnet, epidote, apatite and some accessory opaque minerals.

Jura Granitoid is lacking clay mineral traces and varies from granitic rocks exposed around Mansehra, Susalgali and Baffa, indicating their fresh nature and scarce weathering. However, some hydrothermal alterations like saussuritization and sericitization are observed in these rocks on small scale. Textural study shows that some of the plagioclase is formed by transformation of orthoclase along with wormlike intergrowth of quartz, giving rise to myrmekitic texture. Perthitic texture indicates slow cooling of rocks. The localized deformational banding and gneissosity is also observed in the studied granitoids.

These textural variations also affected the mechanical properties of the rocks. In addition to petrography, uniaxial compressive strength of these rocks was also determined to comment on their mechanical characteristics. The average uniaxial compressive strength value is approximately 80 Mpa. This high strength seeks further detailed geotechnical investigation of Jura granitoid to determine their suitability in construction of high load structures such as dams, bridges, high ways, and railway lines. Furthermore, the detailed geochemical analysis and trace element geochemistry of the granitoids is highly recommended for the classification of parent magma and petrogenesis of Jura granitoid.