

Segmental petrographic analyses of Kirana Hills shield rocks, Sargodha

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Abstract

The present study deals with petrographic analyses of some parts of the Kirana Hill rocks of Punjab plains, namely Buland, Hachi, Shaheenabad, Shaikh and Machh hills. On the basis of petrographic analyses, some corrections have been proposed in classification and nomenclature of rocks exposed in the above-mentioned areas. Chemical analyses have also been carried out in order to calculate CIPW norms and ultimately classification is done with help of "MAGMA SOFTWARE", to strengthen nomenclature scheme. Kirana volcanics represent the oldest remnants of widespread Precambrian bimodal igneous activity within the so-called Kirana-Malani Basin. Rhyolites predominate over the basalts/ dolerites, andesites, and phyllite/ slate. Rhyolitic rocks are light grey, greenish grey and light brown in color, aphanitic in nature. The observed microscopic textures are aphyric, phyrlic or porphyritic and micropoikilitic. Moreover, some rhyolitic rocks also show flow texture. They are either cryptocrystalline to microcrystalline or microcrystalline to cryptocrystalline. No glassy material has been observed in any thin section. Minerals observed in rhyolites during laboratory analyses are quartz, orthoclase, sericite, calcite/ ankerite, chlorite, hematite/ goethite, pyrite, iron (Fe) and minor amount of sodic plagioclase. Mafic rocks are characterized by the presence of chlorite, hypersthene, augite and occasional olivine and ilmenite usually associated with plagioclase. Amphibole {hornblende, actinolite (uralite)} is also encountered in basalts/ dolerites. Andesites exhibit mainly porphyritic texture, but aphyric texture has also been observed in few samples. Phenocrysts consist of plagioclase laths of oligoclase to andesine composition and minor biotite in some samples. Its groundmass includes chlorite, quartz, sericite/ muscovite, hematite/ goethite, calcite, pyrite and iron (Fe). Hydrothermal alterations are also very common in these rocks. Two types of tuffs have been observed i.e. Lithic Crystal Tuff and Lithic Tuff. Other identified and classified rocks include basaltic Andesite, rhyodacite/ dacite, slate/ phyllite, ankeritic rocks/ veins and quartzofeldspathic veins. Although quartzite has been reported by Geological Survey of Pakistan in some of above mentioned areas of Kirana, in previous literature, but no evidence of quartzite has been found in the samples collected from these areas. The presence of iron (Fe) suggests magma from deep mantle instead of crustal melting / anatexis.