

M.S.65. SANTOSH, M.—Petrochemistry, Related Mineralization and Genesis of the Ambalavayal Granite and Associated Pegmatites, Wynad District, Kerala—1988—Dr. Nair, N.G.K.

The Kerala region which forms a significant segment of the south-western Indian shield, dominantly comprises charnockites, khondalites and migmatitic gneisses of Precambrian age. Recent investigations have revealed the occurrence of a number of younger granite and syenite plutons in this region, spatially related to regional fault-lineaments. The granite of Ambalavayal in Wynad district of northern Kerala is a typical member of this suite of intrusives. A comprehensive study in terms of geology, petrology, geochemistry and petrogenesis of the

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Ambalavayal granite, basement gneisses, associated pegmatites, quartz veins and related mineralization that together cover an area of about 90 sq km in Wynad district of northern Kerala.

The dominant rock types of northern Kerala are charnockites and migmatitic gneisses. The granite pluton of Ambalavayal is emplaced within Precambrian biotite gneisses and is spatially related to the intersection of two regional fault-lineaments, namely, the Moyer and Calicut lineaments.

The granite shows a hypidiomorphic granular texture with quartz and alkali feldspar as the major minerals. Alkali feldspars show microcline cross-hatching. Greenish pleochroic hornblende is the major mafic mineral. Accessories include biotite, riebeckite, zircon, apatite, sphene, epidote, monazite and calcite. The Q-A-P proportions calculated from detailed modal analyses data assign the granite to be "alkali feldspar granite"—type. The molybdenite flakes are seen as leafy aggregates adhering to the silicate minerals and more commonly show preferential distribution along grain boundaries of quartz and feldspar.

Chemical analyses of molybdenite fractions yield an average Mo contents of 58.4%, with traces of Fe, Ni, Ti, Cu and Pb. X-ray analyses of molybdenite fractions indicate characteristic 2θ values and corresponding d-spacings and hkl values of the hexagonal 2 layer- $2H_1$ polytype.

Detailed fluid inclusion studies of quartz from the granite, pegmatites and quartz veins have been carried out. A number of doubly polished plates of quartz were prepared and fluid inclusion petrography has been documented. Heating studies were done using a Leitz-1350 heating stage and freezing runs using a CHAIXMECA freezing stage. Fluid inclusion petrography shows that there is a positive correlation between the abundance of carbonic inclusions and the hornblende/biotite ratio in the granite.

Major and trace element geochemistry of 24 representative samples of the biotite-gneisses, 3 samples of mafic-rich enclaves ('restites') and 2 samples of fuchsite quartzites are also presented.

The petrogenesis of the granite and its tectonic implications are brought out in detail. Based on Log Rb Vs. Log Sr plots, it is inferred that the depth of generation of the granite magma was about 20-30 Km. The generation of the granite magma is correlated with the pre-lift tectonics of the Indian continent. Crustal warping and distension lead to mantle degassing.