

PETROGRAPHY AND GEOCHEMISTRY OF THE VOLCANICS IN AND AROUND LICHI AREA, PAPUMPARE DISTRICT, ARUNACHAL PRADESH, INDIA

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Abstract

The volcanic rocks in and around Lichi area, Arunachal Pradesh are found to be associated with sandstones of the Gondwana Group of rocks along the Main Boundary Thrust (MBT). They are fine grained and light to dark green in colour. The rocks are separated from the Dafla Formation of Siwalik Group by the MBT. Petrographic studies reveal that the rocks are mostly basaltic-andesitic and trachytic in nature. The basalts comprise mostly of plagioclase, augite, iron oxide with minor quartz. The rocks are amygdaloidal and the amygdales are mostly calcite, zeolite and microcrystalline quartz. In some basalts, phenocrysts of sanidine and nepheline are clearly observed.

Geochemical analysis for the estimation of major oxides, the REE and Trace elements in representative samples shows that the rocks are basalt and andesite, calc-alkaline and shoshonitic in character. The samples showing low to moderate Alteration Index (AI) ranging from 34.88 to 48.77, indicate characteristics of pristine (MORB) and arc related volcanic rocks. From the QAPF plot for the normative mineral (CIPW), it is seen that the rocks fall in the basalt-andesitic field. Europium anomalies are quite insignificant, indicating the negligible role of plagioclase fractionation. Both the chondritic normalized and primitive mantle normalized trace element diagrams show enrichment from less compatible to more incompatible elements with negative strontium anomalies, which shows that the rocks have undergone fractional crystallization in the source magma itself. Low to moderate Y (from 9.20-26.7) and low HREE concentration ($Yb < 3.18$ ppm) coupled with fractionated HREE patterns ($(Dy/Yb)_N > 1$), suggest that garnet was likely to have been involved as a residual phase at some point during the process of partial melting.

Keywords: Lichi Volcanics, Gondwana, Siwaliks, MBT, MCT.