

USE OF CLINOPYROXENE COMPOSITION IN SOURCE DETERMINATION OF CLASTIC ROCKS, A CASE STUDY FROM CENTRAL IRAN

AMINI, A. Geology Department, Tehran University, Tehran, Iran

Detrital clinopyroxenes are part of accessory minerals in the volcanoclastic rocks of the Upper Red Formation in the area under study. Their analysis is part of a wider project that investigates the provenance of the formation in the central Iran. In terms of Ca, Mg, and Fe+Mn content the grains predominantly fall into augite, diopside, endiopside, and salite fields. The results on atomic proportion of Si, Ti, Al, Cr, Ca, Na, Mg, and Fe+Mn yield significant information about the nature of source rocks and their tectonic setting. Bivariate scatterplots of Ti/Ca+Na, Al/Ti, Al/Si and range of Fe+Mn content (8-24%) suggest a calc-alkaline source for the studied grains. On the basis of $\text{SiO}_2/\text{Al}_2\text{O}_3$ and $\text{SiO}_2/\text{TiO}_2$, most grains fall into the field of volcanic arc basalts. On the bivariate plots of Ti+Cr/Ca, analyzed grains dominantly fall within the orogenic fields. Absence of ferroaugite and low quantities of Fe+Mn in the grains supports their derivation from an orogenic source. In general, the compositional characteristics of clinopyroxenes suggest an intermediate to basic, calc-alkaline, orogenic volcanic source for the Upper Red Formation rocks. Analysis of dispersal system suggests that the Eocene volcanics lying to the south of the region acted as the major southern source. The Middle Eocene pyroclastics with intercalations of anesitic lava, which occupy the mountains to the north were most likely the northern source. Such results are strongly supported by the correlation between the compositional characteristics of clinopyroxenes in these rocks and those from the Upper Red Formation.