

GEOCHEMISTRY OF ANDESITES FROM KUEISHANTAO¹

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ABSTRACT

The porphyritic andesites on Kueishantao can be divided into two types i.e. olivine-bearing two pyroxenes andesite and olivine hornblende-bearing two pyroxenes andesite. In general Kueishantao andesites are similar to Ryukyu Islands andesites in chemistry except that the former has slightly lower Al_2O_3 content. When compared with Tatunshan andesite Kueishantao andesites are lower in Al, Fe, Ca and K but higher in Mg and Na contents and MgO/ΣFeO ratio. It should be noted that Kueishantao andesites contain lower Ca and Na contents and Na/K ratio but higher Mg and K than Coastal Range andesites. In general Cu, Li, Ni, Rb and Zn contents and K/Rb and Ni/Co ratios of Kueishantao andesites are similar to those of Tatunshan andesites. However the Sr content of Kueishantao andesites (avg 144 ppm) is much lower. The lithologic and chemical similarity between Ryukyu Island andesites and Kueishantao andesites indicate that these andesites may be closely related. The northward increase of Sr from Kueishantao through Keelungshan, Tatunshan to Pengchiahsu together with recent seismic data indicated that Kueishantao andesites may be generated by partial melting of basaltic rock or its eclogitic equivalent at the Benioff zone dipping northward. The smooth trends found in chemical variation diagrams indicate that the andesites may have involved in liquid crystal equilibrium after the formation of the initial liquid.

INTRODUCTION

Geochemical studies on andesites have attracted much attention in recent years (Kuno 1966, Dickinson 1968, De Long 1974, Chen, J. C. 1976). Special efforts have been paid to the spatial distribution of different rock series and the difference in mineral and chemical compositions between volcanic rocks of the island arc and that of continental margin (Jakes and White 1972).

There are two major andesite provinces in Taiwan, one is located at the Tatun volcano (Chen, C. H. 1975) and the other is along the Coastal Range (Chen, J. C. 1975) facing the Pacific. In addition andesites are also found on the offshore islets such as Keelungtao (Huh 1978), Pengchiahsu and Kueishantao.

Kueishantao is an islet located at long. $121^{\circ} 55'E$ and Lat. $24^{\circ} 51'N$ about 20 km northeast of Ilan with a total area of 2.7 sq. km².

Previous geological studies on Kueishantao were carried out by Ogasawara (1934), Yen (1958) and Hsu (1963). However, detailed geochemical data on these andesites are not available. It is the purpose of the present paper to investigate the chemical characteristics of Kueishantao andesites and to compare with andesites from the Ryukyu islands, Tatunshan and Coastal Range in order to deduce their possible origin.

SUMMARY OF GEOLOGY

Yen (1958) considered that Kueishantao may represent the western end of the Ryukyu volcanic arc. Hsu (1963) concluded that the volcanism of the islet took place in Pleistocene.

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