PETROGENESIS OF THE RECENT TRACHYTIC PYROCLASTIC SUCCESSION OF AGUA DE PAU VOLCANO, (SAO MIGUEL, AZORES)

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ABSTRACT

The recent stratigraphy of São Miguel records large numbers of trachytic pyroclastic deposits produced by plinian to sub-plinian eruptions. Tephrochronological studies by Booth, Croasdale and Walker (1978) have shown that in the last five thousand years there have been five such eruptions from Agua de Pau, one of three active stratovolcanoes on São Miguel.

A geochemical and electron microprobe study made on the resultant pyroclastic succession, revealed significant variations in pumice clast chemistry and mineralogy between the individual deposits. For example, Sr and Eu/Eu* decrease in value through the succession, whereas 'incompatible' elements such as La, Zr and Nb show stepwise enrichment attaining highest concentrations in the most recent deposit. The individual pyroclastic deposits are interpreted as representing

successive samples of a body of trachyte magma undergoing appreciable crystal fractionation.

However not all of the observed chemical and mineralogical variations of the pyroclastic deposits are consistent with simple differentiation. For example, evidence is presented that trachyte magma has periodically mixed with intermediate and basaltic magmas. Magma mixing has found to be a recurrent feature of many of the lavas and pyroclastic deposits from Agua de Pau.

Associated lavas possessing REE patterns with positive Eu anomalies and mineralogical peculiarities are also discussed.

A case is made for the existence of a compositionally zoned magma chamber beneath Agua de Pau volcano.

(This paper was not read at the Symposium)

REFERENCES

BOOTH, B., CROASDALE, R. and WALKER, G. P. L. (1978) : *A quantitative study of five thousand years of volcanism on São Miguel, Azores*. Philos. Trans. R. Soc. London A288 : 271-319.