

ABSTRACT

Approximately 55% of the island of St. Vincent is covered by pyroclast fall deposits, presumably of Late Pleistocene age. These deposits are exposed as vertical sections in cliffs and road cuttings all over the island but the best ones are to be found on the north-eastern flanks of the Soufriere volcano. The Soufriere is the source of these air fall layers and it is believed that they were ejected from an open summit crater in the approximate position of the "Old Crater" which erupted in 1902-03 and 1971-72.

The thickest sections, of just over 150 feet, occur along the area from Sandy Bay to Jumby Point but continuous gradual reduction, southwards from the volcano, results in thicknesses of 5-10 feet around the Kingstown area. The preservation of primary deposits is closely related to the nature of the underlying topography.

The fall units, which number about one hundred in the most complete section, are mainly black scoriae, yellow ash, lapilli and crystal ashes, containing xenoliths of lava and coarse grained gabbroic cumulates.

Good marker horizons are few and when present they usually show little lateral continuity therefore detailed correlation of the main outcrops is very difficult. Fossil soils are present within the sequence but, unlike that which underlies the basal fall unit of Late- Pleistocene age, they are quite shallow, representing only short periods of repose.

The single rock type is a two-pyroxene basalt with variable amounts of plagioclase as the main phenocryst. Hornblende and olivine are common ~~accessories~~ accessories.

The composition of the falls range from 48.0 - 56.6 wt. % SiO_2 with a broad mode centred on 52.0 wt. %. This makes them more basic than the underlying Soufriere lava flows which average 56.0 wt. % SiO_2 . Except for the crater wall

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area, lava flows are absent within the succession of air fall tephra and it is ^{also} assumed that the eruptions which produced these deposits were ^{mainly} Vulcanian-type involving a volatile-rich, basic magma which erupted with extreme violence.

The presence of the gabbroic cumulates and the basaltic nature of the magma suggest that fractional crystallisation was the major petrogenetic process responsible for the differentiation of the latter. Strontium isotope ratios which average 0.7041 for Soufriere suggest that magma generated in the area of this volcano was not contaminated, to any significant extent, by continental detritus.

The eruptive episode which produced these deposits, almost to the total exclusion of lava flows, is believed to be unique in the history of the volcano since nowhere else in the stratigraphy of the ~~strato~~strato-volcano is there a thick sequence of air fall tephra which may indicate a period of violently explosive activity similar to the Late-Pleistocene eruptions.

The total time span over which the Late-Pleistocene tephra were deposited is believed to be in the order of not more than a few hundred years with short periods of repose in between as marked by the erosion surfaces and thin palaeosols.