

Petrology and Mineralogy of Volcanic Centres in Southern St. Vincent, West Indies

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St. Vincent is composed of four major north-south trending stratovolcanic centres which show a northward migration in age from 3 Ma, near the south of the island, to 0.6 Ma at the Soufriere volcano. Variation in the chemistry and mineralogy of the rocks types which outcrop at these centres allow the definition of four compositional groups: basalts; basaltic andesites; andesites and coarse grained plutonic cumulates. Basalts (52% SiO₂) are present in relatively greater amounts than basaltic andesites (52-57% SiO₂) and andesites (57%-63% SiO₂). Two distinct basalt types have been identified in southern St. Vincent: one contains high MgO (9 wt.%), high Ni (143-434 ppm) and Cr (494 ppm) and low Al₂O₃ (17 wt.%), while the another has significantly less MgO (7 wt.%), Ni (129 ppm) and Cr (314) with higher Al₂O₃ (17-23 wt.%). The Mg-rich basalts contain forsteritic olivine (Fo₇₆₋₉₉), microcrystalline augite and feldspar (An₅₃₋₈₀) ± Cr-Spinel. The low-MgO basalts are similar in their chemistry and mineralogy to the basaltic andesites and are

composed of phenocrysts of olivine (Fo₂₇₋₉₀) + augite + plagioclase (An₁₆₋₉₆) + titanomagnetite ± diopside ± enstatite. Basaltic andesites are mainly holocrystalline with porphyritic to seriate texture and with plagioclase (An₂₂₋₉₆) + enstatite + augite + titanomagnetite ± diopside ± olivine (Fo₄₋₉₀) as the main phenocrysts phases. The feldspars are often bladed to lath-shaped with inclusions of glass and titanomagnetite. In some rocks lath-shaped microlites of plagioclase in the groundmass define a trachytic texture. Rocks of andesitic composition occur as domes, dykes and pyroclastic fragments. They also exhibit porphyritic to seriate textures with plagioclase (An₃₅₋₇₈) + enstatite + augite + titanomagnetite ± ferrosilite ± ilmenite as the major phases. Glomeroporphyritic clusters of titanomagnetite + augite ± plagioclase microphenocrysts are common in the groundmass of the basaltic andesites and andesites. Pigeonite occurs as rare microlites in the groundmass of all rock types.