

MAGMATIC EVOLUTION OF THE SANTA MARIA RHYOLITES, PARANÁ MAGMATIC PROVINCE, BRAZIL, AS INFERRED FROM WHOLE ROCK GEOCHEMISTRY AND MINERAL Sr ISOTOPE RATIOS

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Detailed field work in the Soledade-Gramado Xavier region, southern portion of the Paraná Magmatic Province, south Brazil, allowed us to define the stratigraphy for the low-Ti volcanic rocks, which is characterized by a basalt-dacite-rhyolite succession. The uppermost sequence, the Santa Maria rhyolites, corresponds to effusive glassy to hipocrystalline rocks occurring as lava-domes and flows. The rhyolites are chemically homogeneous, with 71-73 wt% SiO₂, 0.65-0.70 wt% TiO₂ and enriched in K₂O (4-5 wt%) and other incompatible elements (210-300 ppm Rb; 680-930 ppm Ba; ~350 ppm Zr and ΣREE ~300 ppm) compared to the associated dacite units. The Santa Maria rhyolites have the highest initial ratios of all succession ($^{87}\text{Sr}/^{86}\text{Sr}_0 = 0.7230$ to 0.7256), even when compared with the other acid units ($^{87}\text{Sr}/^{86}\text{Sr}_0 = 0.7125$ to 0.7132 and 0.7201 to 0.7202 for the Barros Cassal and Caxias do Sul units, respectively). ϵNd_0 values are also strongly negative (-8.1 to -8.4). The scarce (~3-5 vol.%) 0.5-1.5 mm plagioclase phenocrysts from the Santa Maria rhyolites have homogeneous cores with compositions varying from An₄₆ to An₅₄; resorption surfaces present in some crystals may be mantled by a thin, more calcic (An₅₇₋₆₀) rim. LA-ICP-MS analysis showed $^{87}\text{Sr}/^{86}\text{Sr}_0$ that are slightly higher than those obtained for whole rock (0.7267 to 0.7280). This indicates that they may correspond to antecrysts, whose isotopic and chemical signature suggest crustal contamination during magma ascent and storage before effusion. An increase in magma temperature is suggested by resorption textures and inverse zoning of plagioclase, and may have occurred immediately prior to eruption, as a result of heating by latent heat of crystallization or, more probably, reflecting injections of hotter magma, independently evidenced by the occurrence of scattered dm-sized ball-shaped dacitic enclaves.