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Felsic magma storage in ocean islands; Insights from Miocene micro-syenite samples from Gran Canaria, Canary Islands

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The exposed Miocene syenites of central Gran Canaria provide a rare opportunity to better understand the magma plumbing system that fed the highly explosive felsic volcanism of the island, but fresh syenitic material is rare due to pervasive hydrothermal alteration within the central sub-volcanic system. In this study, we employ fresh micro-syenite samples recovered from Miocene coastal conglomerates that escaped hydrothermal overprint, plutonic xenoliths in ignimbrite deposits, and cone sheet phonolites to reconstruct the storage conditions and evolution of the felsic magmatic system. Oxygen isotope values for the micro-syenite samples together with major element trends point to generation via magmatic fractionation coupled with a limited component of assimilation. Mineral-melt thermobarometry places the bulk of clinopyroxene crystallisation in magma reservoirs between 5 and 13 km depth, which coincides with the felsic plutonic complex inferred from seismic tomography to make up the core of the island.

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