



Sr isotope systematics in feldspars from post-collapse lavas of the Pico Teide/Pico Viejo complex and associated rift zones, Tenerife, Canary Islands

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To unravel magma chamber processes and eruption triggers of the central volcanic complex Pico Teide/Pico Viejo (TPV) and its adjacent rift zones on Tenerife we investigated 52 samples for their Sr isotope composition in feldspar phenocrysts. The ratio of ^{87}Sr to ^{86}Sr is ideal to discriminate between heterogenous batches of magma or an assimilation component of igneous/sedimentary oceanic crust and the island's core as it serves as a kind of petrogenetic DNA. Processes such as magma mixing and contamination, however, can be masked in whole-rock analyses that merely represent the integrated average of all component parts involved (crystals, liquid, xenoliths). Feldspar crystals may be one of the more reliable indicators of magmatic processes and we employ a micro-analytical approach to resolve these masking effects. LA-MC-ICPMS represents the best means to a) yield a stratigraphy of Sr isotope ratios over core-to-rim profiles of single phenocrysts contained within magmatic rocks, i. e. a 'timeline' of the magma's isotopic composition from which the crystals grow and b) to do this on a large number of samples in a short time to obtain a statistical record.

$^{87/86}\text{Sr}$ has been analysed in plagioclase phenocrysts of the most recent eruptive products on Tenerife that built the TPV-complex and effused from the rift zones to the NW and NE over the last 200,000 yrs [Carracedo et al., in press]. No correlation between $^{87/86}\text{Sr}$ and An content has been detected in feldspars of these Tenerife deposits, in concordance with the results from studies at other localities such as Merapi, Krakatau or BPIP [Chadwick et al., 2005; Gardner et al., 2006; Meade et al., 2006].

Crystal populations have been found to be very heterogenous, for the deposits analysed and, moreover, also within single samples [cf. Wallace & Bergantz, 2005], ranging from no significant variation in $^{87/86}\text{Sr}$ and An to significant rises and subsequent falls of $^{87/86}\text{Sr}$ in combination with normal or reverse zoning.

A wide array of combinations of processes such as FC, AFC and magma mixing are therefore suggested even for the evolution of single lava flows demonstrating the complexity of Tenerife's plumbing system and of magma chamber dynamics in general.