Intraplate magmatism and extensional tectonics: an example from Faial Island, Azores

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The Azores archipelago formed by the influence of both, an intraplate melting anomaly and a system of ultraslow spreading rift axes. Most recent submarine and subaerial eruptions in the Azores occur along volcanic rift zones and thus, rates and pathways of magma transport as well as magmatic processes are probably controlled by lithospheric extension [1]. We present new petrological and geochemical data providing insights into the interaction between a melting anomaly in the asthenosphere and extensional forces in the lithosphere. Submarine volcanic rift zones like those on the west flank of Faial island were the focus of RV METEOR cruises M113 and M128. Major element compositions, incompatible trace element ratios (e.g. Nb/Zr, Ba/La) and Sr-Nd isotope ratios of lavas from the active Capelinhos rift differ from those of the inactive Condor de Terra rift some 14 km further south. Lavas from the Capelinhos rift zone are chemically similar to the youngest subaerial lavas from Faial. The older subaerial lavas on Faial represent analogues to the geochemically distinct older submarine rift zones south and north of Capelinhos. Thus, magma sources varied with time and fed different volcanic rift zones where the recently active submarine rifts are connected to the magma plumbing system of the subaerial volcanoes. On the basis of Ar-Ar ages [2], seismic profiles, and direct observations of submarine lava formations at Capelinhos we develop a relative chronology of the magmatic evolution of the rift zones. Our model implies that dikes efficiently transport melts along the volcanic rift zones at Faial over length scales of >12 km while plumbing systems orthogonal to the rift axes are distinct over a similar length scale. Mantle source differences between the rift zones may indicate stagnation of melts at different depths during ascent. Thus, we aim to improve the understanding about the interaction between magmatic and tectonic processes by mineral thermobarometry.

[1] Galipp et al. (2006) *JVGR* **55(3–4)**, 285-306. [2] Beier et al. (2015) *GSA Special Papers* **511**, 27-55.