Eruptive pathways and melt-mantle interactions at a magma-starved mid-oceanic ridge.

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The easternmost section of South West Indian Ridge is at the lowest end of the melt supply spectrum among the global mid-oceanic ridge system. In some sections of the ridge, waning on-axis volcanic activity requires that plate divergence is accommodated by tectonic faulting, where large offset detachment faults are exhuming lithospheric mantle. One of these nearly amagmatic corridor, located at 64°E, has been the focus of several past cruises (bathymetry data, side-scan sonar, dredged samples and quasi-3-D seismic reflection and wide-angle velocity structure), making this area, one of the most studied ultra-low magma supply ridge [1-3]. In this region, successive detachment faults have repeatedly flipped polarity, shaping a landscape dominated by ultramafic seafloor, with sparse volcanics found mostly as small ridges and discrete volcanic edifices [1].

Here we report new geological interpretations and geochemical data from basalts collected during the most recent cruise to the area (ROVsmooth, RV Pourquoi Pas? dec-jan 2017). High resolution bathymetry combined with direct observations by submersible are an opportunity to recognize individual lava flows or volcanic mounts resulting from distinct eruption events. Based on a comprehensive geochemical dataset of these different volcanic products, we are seeking to reconstruct the eruptive history of this area. Our petrogenetic model shows the prevalence of melt-mantle reactions during their ascension through the lithosphere, in good agreement with results from [2]. Moreover, a careful examination of the geological map suggests that melt/rock ratio are fluctuating within individual eruptive events.

[1] Sauter et al., (2013) *Nature Geoscience, 6, p314–320.*

[2] Paquet et al., (2016) *Geochemistry, Geophysics, Geosystems,* 17 (11).

[3] Momoh et al., (2017) *Journal of Geophysical Research: Solid Earth,* 122(4).