



## **Textural features of changing eruptive styles from phreatomagmatic to strombolian activity of basaltic littoral cones: Los Erales cinder cone, Tenerife, Canary Islands**

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Montaña Los Erales is a 70m high Quaternary cinder cone in the Bandas del Sur region, Southeast Tenerife. Field observations on excavated sections and SEM analysis of tephra samples from the cone suggest that the eruption style of this vent changed progressively from an initial hydrovolcanic phase, through a transitional stage, to one that was entirely strombolian. Clast sizes increase from 1cm angular lapilli in hydrovolcanic samples to 15 cm bombs in strombolian samples. Vesicles also increase in size from 0.5mm to 1.2mm, becoming more rounded in the strombolian samples. Palagonitization, extensive in the hydrovolcanic deposits, becomes less noticeable in strombolian deposits. To investigate the causes for and the nature of these changes in eruptive style, products from each major unit were analysed for their morphology, using scanning electron microscopy with both SE and BSE, imaging as tephra morphologies are known to reflect the eruptive regime and degree of explosivity at the time of eruption (Heiken, 1972; Heiken and Wohletz, 1985). SEM imaging of hydrovolcanic samples illustrate angular fragments that have been rapidly quenched and contain high levels of palagonitisation and zeolitisation, whereas strombolian samples appear to be less altered and display larger clast sizes and vesicles. Our results confirm that the initial phase of activity was largely driven by magma-water (coolant) interaction, where magma interacted with a lens of fresh ground- or surface water, rather than sea water, causing intense fragmentation of the magma. With proceeding eruptive activity the water became exhausted, giving rise to an entirely

strombolian eruptive style. Fossil diatoms, found in hydrovolcanic samples, further emphasise the influence of a, probably fluvial, water source during the early phase of emplacement.

References: Heiken, G. 1972, Morphology and Petrography of volcanic ashes. Geol. Soc. Amer. Bul., 83: 1961-1988. Heiken, G. and Wohletz, K. 1985, Volcanic Ash. London: University of California Press, 8-14.