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Rifting, landsliding and eruptive nesting in the Canary Islands

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Rifts, probably the most influential structures in the geology of the Canary Islands, may also be responsible for the development of central felsic volcanoes. Readily observable felsic volcanoes consistently appear in the Canaries related to massive lateral collapses, nested in the collapse basins.

Three main types of post-collapse volcanism have been observed, particularly in the western Canaries: 1. Collapses followed by scant, non-differentiated volcanism inside the collapse depression (El Golfo, El Hierro; La Orotava and Güímar, Tenerife), 2. Those with important although short-lasting (tens of thousands of years) post-collapse activity including felsic (phonolitic, trachytic) central volcanism (Bejenado, La Palma; Vallehermoso, La Gomera), and 3. Those with very important, long-lasting ($>$100 kyr) post-collapse activity evolving to felsic magmas and developing very high stratovolcanoes (Teide and Micheque, Tenerife).

Preliminary analysis of grouping of dykes in the NE rift of Tenerife using geomagnetic polarities shows that intrusions of the same (or clearly predominant) polarity apparently group in alternating clusters, suggesting that eruptive activity may concentrate in relatively short and intense pulses followed by long periods of reduced activity or quiescence. This may tentatively account for the different volcanic responses to landsliding depending on the timing of the collapse: 1. If the giant landslide is derived only from gravitational instability, in periods of reduced volcanism or quiescence, or 2. The collapse occurs coinciding with one of these short and intense intrusive-eruptive periods and probably triggered by concurring extensional stresses at the rifts. In the second

scenario the intense volcanism at the rift would focus inside the collapse basin by depressurization, and magma evolve parallel to the progressive refill of the depression by residence in shallow reservoirs and crystal fractionation.

The tentative idea is that, ad contrarium, felsic nested volcanoes in the Canaries only form because giant landslides provide the particular conditions required for primitive rift magmas to differentiate.