



Volcanic rifts bracketing volcanoes: an analogue answer to an old unsolved problem

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It has been observed in Central America that many volcanoes have volcanic alignments and faults at their east and west feet. A quick look at many rifts indicates that this also occurs elsewhere. While this feature has been noted for at least 30 years, no explanation has ever really been convincingly put forward. During analogue experiments on rifting volcanoes we have mixed the presence of a volcanic edifice with an underlying intrusive complex. The models use a rubber sheet that is extended and provides a broad area of extension (in contrast to many moving plate models that have one localised velocity discontinuity). This well suits the situation in many rifts and diffuse strike-slip zones (i.e. Central America and the East African Rift). We have noted the formation of localised extension bracketing the volcano, the location of which depends on the position of the analogue intrusion. Thus, we think we have found the answer to this long standing puzzle. We propose that diffuse extension of a volcano and intrusive complex generates two zones of faulting at the edge of the intrusion along the axis of greatest extensional strain. These serve to create surface faulting and preferential pathways for dykes. This positioning may also create craters aligned along the axis of extension, which is another notable feature of volcanoes in Central America. Paired volcanoes and volcanic uplifts in the Danakil region of Ethiopia may also be a consequence of such a process and lead us to draw some new preliminary cross sections of the Erta Ale volcanic range.