Geochemical and petrological characterization of Corbetti Caldera (Main Ethiopian Rift) : insights into continental rift zone magmatism

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Corbetti Caldera is a quaternary volcanic complex in the central sector of the Main Ethiopian Rift. There is little published work on this complex [1,2] and its volcanic history is poorly costrained. This study reports a detailed stratigraphy of the caldera and its geochemical and petrological evolution.

Corbetti Caldera has a surface area of ~162 km^2 and contains two later obsidian domes (Chabbi and Urji), with associated pyroclastic flows. The stratigraphic sequence reveals a complex volcanic history (six eruptive units for Caldera Rim deposits, five for Urji vent , and seven for Chabbi vent), and is characterized by both effusive and explosive activity. Most Corbetti products have a peralkaline-rhyolitic composition (AI = 4.9), classified as pantellerite, and are metaluminous rocks (ASI = 0.69). A few samples from the youngest vent, Chabbi, show a trachydacitic copmposition. A rare caldera rim sample is basaltic. Major element concentrations in Corbetti Caldera products clearly show a compositional gap, typical of bimodal magmatism elsewhere in the Ethiopian Rift [3,4]. No single magmatic differentiation trend covers the entire stratigraphic sequence. The pattern of trace element (La, Sc, Sr, Rb, Th, Zr, V) concentrations also suggests two different magma sources for the end-members.
All rhyolites are charcterized by a low phenocryst content (5-20 vol%). Phenocrysts are, in order of abundance: sanidine, anorthoclase, hedenbergite, aengimatite and fayalite (Fo_{2-3}). Mineral zoning is conspicuously absent, except in cpx from caldera rim ignimbrites and tephras, suggesting limited pre-eruptive magma mixing.

When considered in the context of other volcanic systems along the central axis of the Main Ethiopian Rift, our new data provide further insight into magma sources and the processes which characterize magmatism in one of Earth's most active continental rifts.

[1] Di Paola (1970) *Bull. Volc.* **35,** 497-506 [2] Mohr (1966) *Bull. Volc.* **29,** 797-815 [3] Daniel *et al* (1994) *JGR* **199,** 2835-2869 [4] Ebinger *et al* (1998) *Nature* **395**, 788 -789