

The Central Series of the Rum Igneous Complex, NW Scotland: the rises and falls of magma in a large mafic-ultramafic volcano of the early NAIP

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Abstract

The Central Series of the Paleocene mafic to ultramafic Rum complex is the youngest of the three main cumulate series that make up the layered igneous complex of this famed Scottish island (Emeleus & Troll 2008). The Central Series lies along the Long Loch Fault and provides insights into the feeder system to the Rum intrusion at an erosion level of about two kilometres below the former land surface. Much of the Central Series consists of a mélange of steep sided bodies of magmatic breccias that stretch along the Long Loch Fault (LLF) in a relatively narrow zone and is composed of blocks and clasts of all sizes derived largely from break-up of the former conduit walls (Troll et al., 2020; Emeleus & Troll 2008). Repeated movements of the LLF are thought to have been responsible for opening and closing of the magma conduit, resulting in repeated replenishment events, each of which gave rise to new cumulate formation within the Central Series and the bordering Eastern and Western Layered Series, which crystallized under relatively tranquil conditions. The Central Series probably acted as the feeder zone supplying the neighbouring layered series. The more complete of these is the Eastern Layered Series in which 16 conformable units can be distinguished. Others are presumed either to lie unseen at depth or to have been stripped by erosion. The Central Series, although often neglected because of its relative inaccessibility and complexity, formed from successive magma replenishments alternating with large-volume side-wall collapses of previously deposited cumulate material (Upton et al., 2023). It could thus be thought of as representing the ‘pulsing heart’ to the Rum volcano and deserves to be regarded as a site of major volcanological and petrological importance.

References

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