The Rungwe Volcanic Province, Tanzania – A volcanological review

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Abstract

The Rungwe Volcanic Province in SW Tanzania is a densely populated area that is considered volcanically active. As part of the East African Rift System, a significant control of tectonic activity seems to exist on the location and also potential destabilization of volcanic edifices. Three large volcanoes, Ngozi, Rungwe, and Kyejo, dominate the landscape and all show contrasting eruptive behaviour in the recent geological past. Kyejo volcano is a flow-dominated volcano that had a historic lava flow eruption. Lake sediment cores, drilled in Lakes Malawi, Masoko, Rukwa, and Tanganyika, provide a record of frequent explosive eruptions in the last few tens of thousands of years. In combination with on-land stratigraphic observations, they constrain the minimum eruptive frequency of especially Rungwe and Ngozi volcanoes. Both volcanoes had Plinian-style eruptions in the Holocene. The most striking documented Rungwe eruption, the ca. 4 ka Rungwe Pumice, is a rare case of a Plinian eruption in near-wind-free conditions. Furthermore, the Rungwe Pumice, just like any other Rungwe tephra deposit, does not show any evidence of pyroclastic density current deposits. Apart from explosive eruptions at a range of scales happening every few hundred years at Rungwe, the volcano also experienced at least two sector collapse events generating debris avalanches. All existing evidence shows that the Rungwe Volcanic Province is prone to future significant explosive eruptions. To further assess, quantify and mitigate volcanic hazard risks, extensive and systematic multidisciplinary geological research, and both volcanic and tectonic monitoring are needed.

Keywords

- East African Rift System;
- Rungwe Volcanic Province;
- Explosive eruptions;
- Phonolite–trachyte;
- Volcano-tectonic interactions;

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