

## **Re-interpretation of the Mugogo 1957 eruption in the framework of the volcano-tectonic structure of the Virunga Volcanic Province, D.R.Congo and Rwanda**

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The Virunga Volcanic Province (VVP) is situated within the Western branch of the East African Rift system at the boundary of D.R.Congo, Rwanda and Uganda. The Western VVP comprises two active volcanoes. Nyamulagira is recently the most active volcano on the African continent, with 30 eruptions since 1900, while Nyiragongo hosts a semi-permanent lava lake in its crater and fed a catastrophic lava flow in 2002. The six volcanoes in the Central and Eastern VVP are supposedly historically inactive to the exception of an eruption that occurred in 1957, 11 km North of Visoke volcano. This so-called 'Mugogo' eruption constructed a scoria cone and a ~1.5 km long lava flow issued from an East-West oriented fissure. While the eruption was automatically attributed to Visoke Volcano due to its relative proximity, the magmatic source and the implications for the volcanic hazard in the area are poorly constrained. We re-assess the Mugogo 1957 eruption characteristics using the colonial time eruption report, the geochemistry of eruptions samples and a new volcano-tectonic map of the VVP. Geochemical sample analyses are compared to a new geochemistry database for the VVP volcanic products, compiled from the literature and colonial time reports, to constrain the magmatic source of the eruption. The boundaries of the lava flow and pyroclastic cone were traced from the interpretation of topographic and multispectral remote sensing data, as part of a new volcano-tectonic mapping effort for the whole VVP. The location and fissure orientation of the Mugogo cone relative to the surrounding volcanoes and scattered volcanic vents in the VVP is analysed. The Mugogo 1957 eruption illustrates the importance of the analysis of historic volcanic activity in the Central and Eastern region of the VVP for an assessment of potential Holocene activity in the Central and Eastern VVP. The event represents the first case study for the assessment of the potential volcanic risk in that region. The volcano-structural map and the geochemistry database assist the evaluation of the potential future eruption scenarios and the derivation of the spatial distribution of eruption probability for the entire VVP.