



## **Virunga Volcanoes Supersite: a collaborative initiative to improve Geohazards Assessment and Monitoring of Active Volcanoes in a highly populated region**

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Located within the western branch of the East African Rift System (EARS), the Virunga Volcanic Province is a young highly volcanically and seismically active region. It provides a unique opportunity to study deep mantle upwelling through the crust. Several Geohazards are encountered in this highly populated region, and include volcanic hazards (lava flows, volcanic gases and ash, ...), earthquake hazard; landslide, mud flows and floods hazards. In addition, the overturn of Lake Kivu (which lies in the Kivu Graben, western branch of the EARS) could release huge CO<sub>2</sub> and CH<sub>4</sub> into the atmosphere. A few days after the January 17, 2002 Nyiragongo eruption whose lava flows devastated Goma city, destroying the houses of ~120,000 people, forced a mass self-evacuation of ~300,000 people of Goma (of estimated ~400,000 inhabitants), and killed ~140 people; the international scientific community deployed a “dream scientific team” to evaluate the state of Geohazards in the Virunga region. Particularly, the team had to check whether the stability of Lake Kivu that dissolves ~300 and ~60 km<sup>3</sup> of CO<sub>2</sub> and CH<sub>4</sub> (at 0°C and 1 atm.) in its deep water was not disturbed due to Nyiragongo lava that entered the lake. Since 2002 several projects were funded with the main goal of accompanying the local scientific team to set up a more professional team to assess and continuous monitor Geohazards in the Virunga. For the time being, while Nyiragongo volcano solely threatens ~1.5 million inhabitants of Goma (DR Congo) and Gisenyi (Rwanda) cities in addition to people living in the surrounding villages, and Lake Kivu threatening ~3 million inhabitants of its catchment, the local scientists remain less qualified and equipped. Here we show that collaboration between Virunga local scientists and international scientists through the Geohazards Supersites network could be a most efficient pathway to improve Geohazards assessment and monitoring in the Virunga, and hence yield Disaster Risk Reduction in the region. Furthermore, the large amount of expected scientific results will provide new insights on the understanding of the continental rift process, thus promoting the advance of scientific research. The supersites initiative promotes broad international scientific collaboration and open access to a variety of space- and ground-based data, and hence improves geophysical scientific research and Geohazards assessment in support of Disaster Risk Reduction. Presently, the Goma Volcano Observatory collects ground-based seismic, geochemical (SO<sub>2</sub>, CO<sub>2</sub>, Rn, temperature) and ground-deformation (GPS, EDM and Extensometry) data, which, together with remote and additional ground-based data that could be collected through the supersites network; may improve Geohazards assessment and monitoring in the Virunga region.