



DEMOCRATIC REPUBLIC OF THE CONGO
MINISTRY OF SCIENTIFIC RESEARCH



Goma Volcano Observatory Virunga Supersite

Virunga Supersite Partnership and Data Policy

1. Context

The Goma Volcano Observatory (GVO) was established in 2009 and is the DR Congo government institute in charge of the monitoring of Virunga volcanoes, essentially the two presently active Nyiragongo and Nyamulagira. The GVO also monitors the stability of the CO₂ and CH₄-rich Lake Kivu and further assesses hazards related to both the volcanoes and the lake. The Nyiragongo and Nyamulagira volcanoes are located in the DR Congo but the Virunga volcanic field also covers part of Uganda and Rwanda territories. At regional scale, the Virunga area belongs to the western branch of the East African Rift (EAR) which extends in Burundi, Tanzania, Zambia, Malawi and Mozambique. All these countries along the western branch of the EAR are affected by seismic and landslide hazards. At regional scale there exist collaborations between some of these countries, which are still however essentially focused on environmental management, biodiversity conservation oriented. In the last few years natural hazards related issues have been increasingly considered, e.g. the ongoing discussions between DR Congo and Rwanda on establishing common and unique volcanic contingency plans. The two countries further exchange expertise for the monitoring of Lake Kivu, which is located along their common border.

Nevertheless, the full understanding of the Virunga volcanoes eruptive mechanisms, of Lake Kivu biochemistry and stability, and the assessment and forecasting of the related hazards, need contribution from international scientists and agencies involved elsewhere in similar activities. This is the reason why the GVO put forward a proposal to request from the GSNL Scientific Advisory Committee to consider the Virunga as a permanent supersite. The establishment of a supersite has the advantages to access a large number of a variety of satellite

images free of charge, and potentially supports the collection of ground-based data with support from international scientists for data processing and interpretation. Furthermore, such collaboration between local and international scientists and agencies is expected to yield the capacity building of local scientists and agencies, contributing to improve GVO's volcano early warning capacities. The CEOS Plenary, at its 31st session of October 19th - 20th, 2017 approved the Virunga Supersite following the positive evaluation of the GVO proposal that was sponsored by a large number of top-level scientists and agencies. The established Virunga Supersite covers a large area that includes the Virunga volcanoes field and Lake Kivu basin, which are Multi-Geohazards and densely populated regions.

With regards to the large interest from both local and international scientists and agencies to work on the Virunga Volcanoes and Lake Kivu in the framework of the Virunga Supersite, there is a strong need for the GVO to highlight the objectives of this Supersite and, in agreement with the GSNL Data Policy principles (<http://geo-gsnl.org/data/data-policy/>), to clarify the data sharing and management policy which apply to the Virunga Supersite.

2. Virunga Supersite objectives: what the GVO expects from this Supersite

Presently, key information for risk management are still lacking in many towns and cities of the Virunga and Lake Kivu basin in spite of being fundamental inputs for the development of strategic plans for integrated Disaster Risk Reduction (DRR) and prevention. The expectation of GVO and other local and regional institutions is to get support, through the Supersite, for an improved assessment and monitoring of natural hazards in the region. The active volcanoes are already monitored, although the GVO's capacity has to be reinforced in term of qualified human resources and equipment to collect reliable information. At regional scale, the final objective is to have natural hazards monitored through several structured and well-coordinated sectorial programs. Such a unique monitoring program will be able to collect and deliver information on hazards sources, their dynamics and dependencies at regional scale. It needs to include also the evaluation of the infrastructure and social vulnerabilities, the potential damages each hazard may individually cause or in synergy with others, and eventually yield DRR policies that will contribute to protect the population and the infrastructures. Hence, GVO expectations are to get support from the Supersite community for both Earth Observation (EO) and field data collection for the study, the assessment and the monitoring of the hazards. The capacity building of local scientists, occurring through the collaboration among local and international researchers and agencies, is also an expected result of the supersite.

3. Virunga Supersite Data Policy

The GVO strongly appreciate the observed large involvement of international scientists and agencies in the Virunga Supersite. However, such an involvement of various research groups may potentially create conflicts when considering the open data principles recommended by GEO and the GSNL initiative.

For instance, conflicts may arise from the fact that each researcher or research group collecting data in the Virunga area can have a different data policy. Furthermore, the GVO collects strategic data related to volcanic activity on which some restrictions are imposed by the DRC government to avoid, for instance, incorrect volcano eruption alert from non-authorized persons. Nevertheless, to reach the objectives stated in the previous section, a way must be found to allow the sharing of the data collected by different researchers or agencies.

The Data Policy of the Virunga Supersite is then defined below. All the scientists who want to access data generated within the activities of the Virunga Supersite should commit to respect this data policy. Such commitment can be expressed by a formal email to the Supersite Coordinator and GSNL SAC Chair.

1. EO data access

The EO data consist of satellite images provided by the CEOS agencies according to a pre-defined yearly quota. Such images may be provided as open access through different platforms and interfaces. Each agency grants the right to use the data through a License which details the conditions of use. These conditions must be accepted by any person who wants to use the data. Normally the data licenses need to be signed by each user but there might be different procedures, depending on the agency. The license acceptance by any researcher is supervised by the Supersite Coordinator, who is the principal contact point towards the CEOS agencies.

Access to the EO data is granted to researchers only for scientific purpose and only upon the acceptance of the present Data Policy.

All the scientists are expected to involve local researchers in the processing and interpretation of EO data, to contribute to the building of local capacities, which is an objective of the Supersite.

Scientists who have obtained results based on the EO data commit to share their results with the scientific community after publication, in digital format. During volcanic crises (eruption or unrest), the results should be shared with GVO even before publication if they can be used to support the emergency response. Scientists may deposit their results and assign a DOI to their reports before sharing. The Supersite coordinator will ensure that the results provided before publication are used only for the emergency management and that the authorship of the providers is recognized.

2. Ground-based data access

The international research community is welcome to collect data in the Supersite area and make them openly available according to the rules defined below. The Supersite Coordinator should be informed about all field activities occurring in the Supersite and will supervise the ground based data access.

All the scientists are expected to involve local researchers in the data acquisition and analysis, to contribute to the building of local capacities, which is an objective of the Supersite.

In agreement with the GEO-GSNL Data Policy Principles, the following restriction to full and open access is established.

- Ground based data and results should be made available for full and open access after publication or in any case within 2 years (“embargo period”) since their collection/generation. During the embargo period the data/results will only be available to the owner and to his co-authors, while the relative metadata will be openly available, so that the community is aware of the data/result existence. Once the embargo period has expired, the data and metadata will be put openly available for all.
- Even during the embargo period, the data/result owner is required to share its data with GVO for monitoring purposes, during eruption or unrest events, or for specific capacity building/training activities. Before sharing, the owner can protect his authorship by assigning a DOI and one of the recommended data licenses listed in section 3.

3. Data licenses

We recommend that ground-based data owners use one of the following Creative Commons licenses for data distribution (<https://creativecommons.org/share-your-work/>):

- CC:BY:SA – allows others to remix, refine, and build upon the supplied Data/Product, even for commercial purposes, as long as the author is credited and the new creations are licensed under the identical terms. All new works based on supplied Data/Product will carry the same license, so any derivatives will also allow commercial use;
- CC:BY:ND - allows for redistribution, commercial and non-commercial, as long as it is passed along unchanged and in whole, with credit to author;
- CC:BY:NC - allows others remix, tweak, and build upon the supplied Data/Product non-commercially. The new work must acknowledge author as well as be non-commercial;
- CC:BY:NC:SA - allows others to remix, tweak, and build upon the supplied Data/Product non-commercially as long as the author is credited and the new work will be licensed under the identical conditions;
- CC:BY:NC:ND – does not allow for commercial use as well as change of supplied Data/Product. Attribution is also required.

We also recommend using Persistent Identifiers (e.g., DOI) to uniquely identify the authors of datasets or results, and ensure proper citation.

4. Fair data use and capacity building

Since one of the objectives of the Virunga Supersite is to improve the scientific and technical capacities of GVO personnel, the use of both EO and in situ data is subject to the fair involvement of GVO scientists in collaborative research work. The collaboration should be carried out in such a way as to promote the growth of scientific and technical skills among the GVO personnel, where this is needed.

5. Data infrastructures

One of the long term objectives of the Virunga Supersite is to help the GVO to develop a local data management infrastructure able to host all the Supersite data from various disciplines. Until this local infrastructure is developed, the Supersite data can be hosted in external infrastructures made available by the GSNL community. Access to the data from the infrastructures will be granted upon acceptance of this Data Policy.

The infrastructure should allow an open consultation of metadata even for the datasets which are restricted during the embargo period.

The update, curation, and management of the data and metadata is a responsibility of the data owner.

6. Long term Cooperation

Any group or scientist that wishes to deploy equipment in the field for a long lasting data collection has to sign a Memorandum of Understanding with GVO, which will stipulate the modalities of the cooperation. This is based on the prevailing laws and regulations, procedures and policies of the DR Congo government.