DEVELOPING VOLCANIC RISK STRATEGIES IN ARGENTINA: CHALLENGES, ACHIEVEMENTS AND OPPORTUNITIES FOR A NEW VOLCANO OBSERVATORY

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Volcanic Risk in Argentina

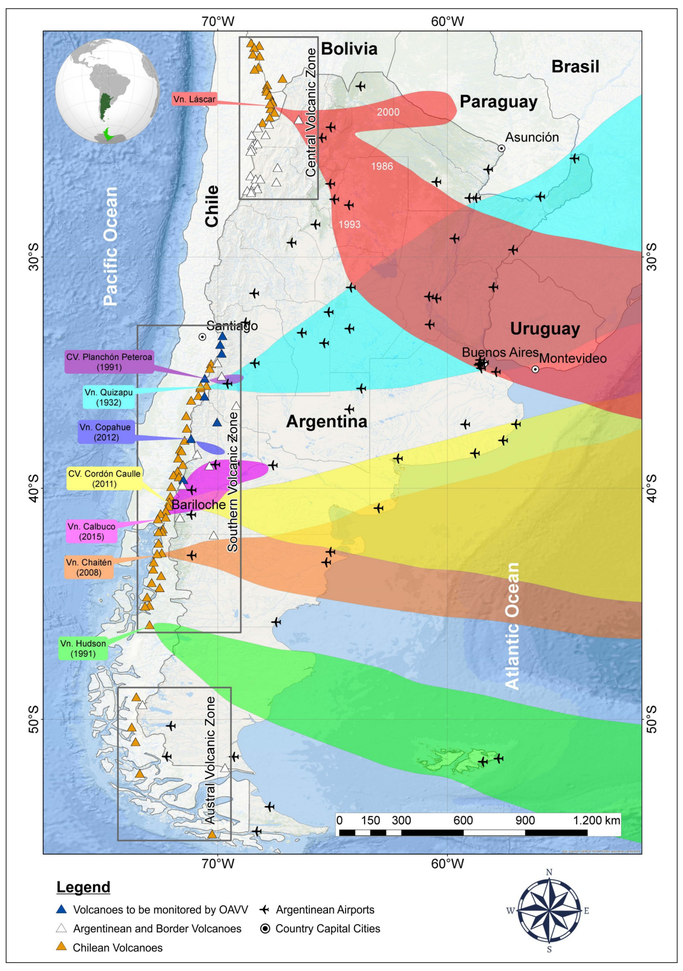


Figure: Map showing regions of ash dispersion from the most important historial eruptions that had an effect Argentine. territory [Garcia and Badi, 2021].

Argentina is a country that presents a complex situation regarding volcanic risk management, where a total of 38 volcanoes are considered active (Elissondo and Farias, 2024), most of them with very little knowledge on its eruptive history.

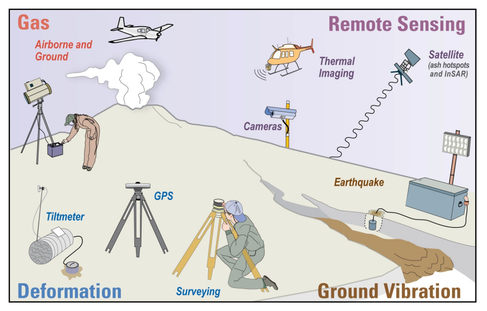
This places Argentina among the top 10 countries with the largest number of volcanoes in the world. Despite Argentina has no major cities close to these volcanoes, the continuous increase in economic activity and infrastructure near the Andean Codillera will increase exposure to volcano hazards in the future.

Further, volcanic activity on the border between Argentina and Chile poses a unique challenge in relation to volcano monitoring and the management of volcanic emergencies, where both countries share a total of 21 volcanoes along the border. Due to atmospheric circulation patterns in the region (from West to East), Argentina is exposed to ashfall and ash dispersion from frequent explosive eruptions from Chilean volcanoes.

Creation of OAVV

Following the impacts of the 2011 eruption of the Puyehue-Cordon Caulle Volcanic Complex, an idea emerged within SEGEMAR to create a specialized area dedicated to monitoring volcanoes that could affect Argentina. However, it wasn't until the eruption of the Copahue volcano on December 22, 2012, that the project to develop OAVV as the country's first Volcanological Observatory began. The goal was to implement globally used tools and techniques for monitoring and mitigating volcanic eruptions. However, it wasn't until 2017 that this project began to materialize, with the acquisition of the first equipments and the hiring of the first professionals that formed the core staff of the observatory. This way, its possible to consider OAVV as the youngest volcano observatory in the world.

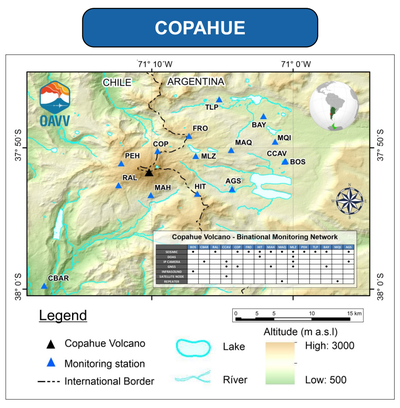
"The Observatorio Argentino de Vigilancia Volcánica (OAVV) is a specialized area of the Argentine Geological and Mining Survey (SEGEMAR) that has the goal to study and monitor active volcanoes whose activity could affect Argentine territory, its population, and infrastructure. In this way, OAVV generates early warnings, notifying Civil Protection authorities and the population, in order to mitigate volcanic risk in the country"

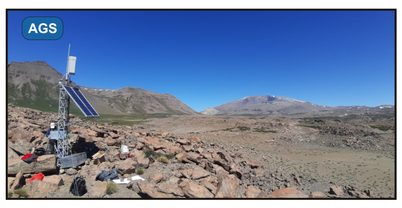


The creation of OAVV has strengthened the cooperation and communication channels with the Southern Andes Volcanological Observatory (OVDAS) of Chile, through the signature of multiple binational agreements between SEGEMAR and the National Geology and Mining Service of Chile (SERNAGEOMIN), related to joint monitoring and emergency management across the border.

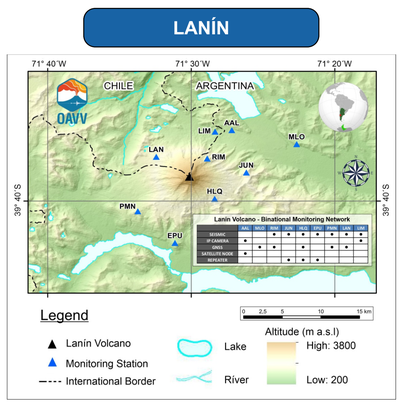
Development of volcano monitoring networks in Argentina

COPAHUE

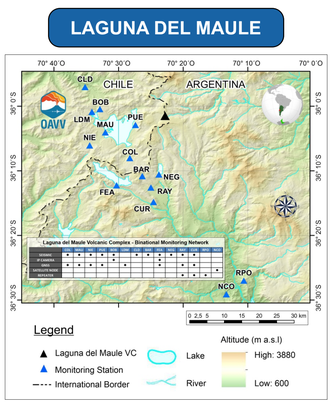


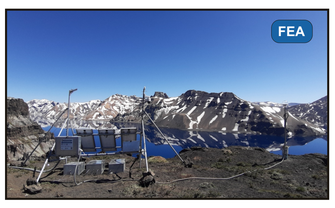


LANÍN

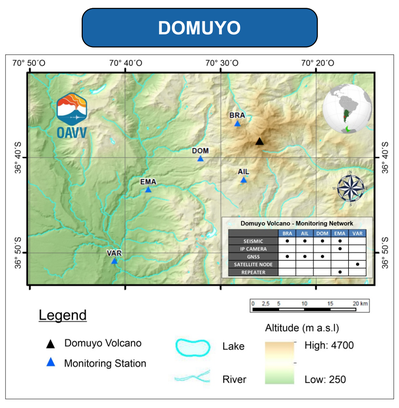


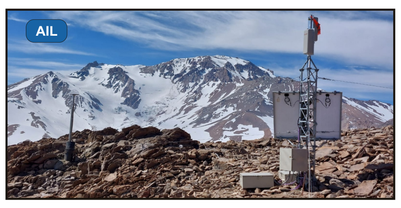
LAGUNA DEL MAULE



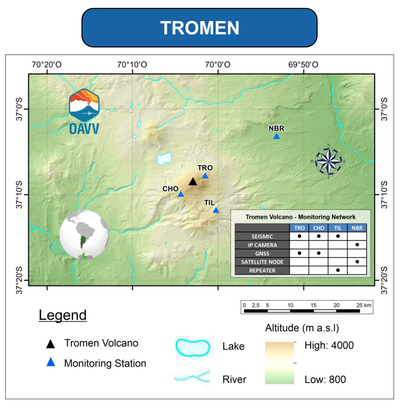


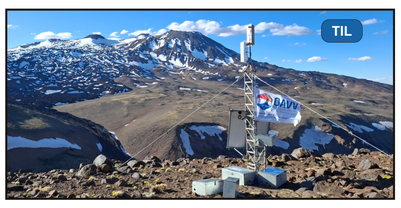
DOMUYO



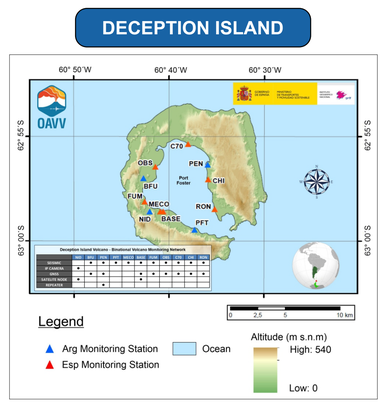


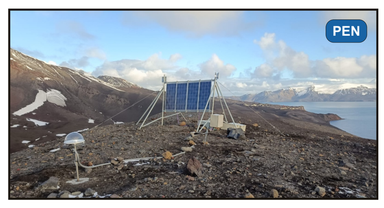
TROMEN





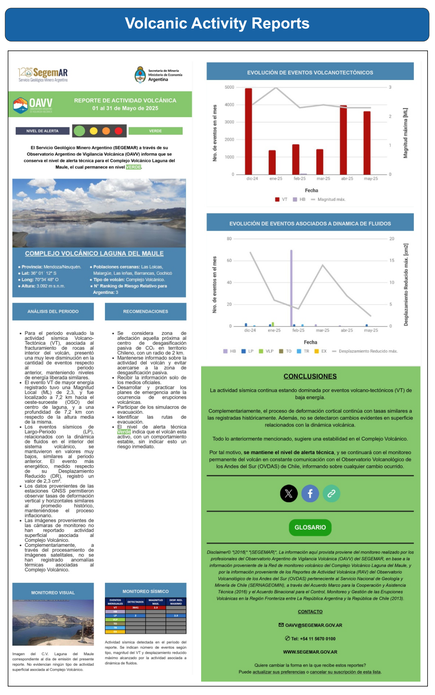
DECEPTION ISLAND





Reports and Volcanic Alerts

Volcanic Activity Reports



Volcanic Alert Levels for Argentina

ARGENTINA VOLCANIC ALERT LEVELS

GREEN ALERT	YELLOW ALERT	ORANGE ALERT	RED ALERT
Active volcano with stable behavior No imminent risk	Changes in the behavior of the volcanic activity	Probable major eruption or return period after an eruptive phase	Imminent Major Eruption or in Progress
Monthly Reports	Biweekly Reports	Daily Reports	Daily Reports

Since 2019, OAVV developed a Volcanic Alert Level System for Argentina, comprising 4 levels of activity (Green, Yellow, Orange and Red alert level). This are technical alert levels, related to the activity of the volcano.

Depending on the level of activity, Volcanic Activity Reports (RAV) are issued with different timespan. Also, Special Volcanic Activity Reports (REAV) are issued whenever anomalous activity is needed to be inform to authorities and the public.

To complement this, monitoring information can be access through a OAVV public webpage. There its possible to access seismograms from the diferent monitored volcanoes, monitoring time series, earthquake locations, live webcams, and download volcanic activity reports.

Online Monitoring Information

https://oavv.segemar.gob.ar/

Outreach and Community Engagement

Fig: Volcano Science Fair with the local school from Caviahue (CPEM 74) nearby copahue Volcano (Oct 2024).

Fig: Fig: Event organized by the National Park Administration to share ancestral knowledge and cosmovisions of Lanín Volcano through an interdisciplinary and intercultural approach (April 2022).

Fig: Citizen Science at Copahue volcano for ash collection.

Challenges Ahead for OAVV

- Become a reference institution for the population and authorities
- Improve Management of cross-border eruptions
- Increment of human resources and capacity building
- Increment networking and cooperation with other institutions
- Improve Presence in the Media
- Improve Visualization tools for authorities
- Continue with Outreach and community engagement activities
- Improve Volcanic Risk Perception in the Argentine Society