"From detection to action: A Lahar Early Warning System for Santiaguito Volcano, Guatemala"

Amilcar Roca[1], ***Roberto Mérida****[1], *Edy Maldonado*[2].*
[1] Instituto Nacional de Sismologia, Vulcanologia, Meteorologia e Hidrologia, INSIVUMEH
[2] Coordinadora Nacional para la Reducción de Desastres, CONRED.
*Presenting author | Email: ermerida@insivumeh.gob.gt

The SAAV project (Sistema de Alerta y Vigilancia por Actividad Volcánica en Guatemala y difundido en Centroamérica), funded by the Swiss Agency for Development and Cooperation (2020-2023), developed an integrated early warning system for lahars at Guatemala's Santiaguito Volcano. This end-to-end system combines real-time seismic monitoring, hazard assessment, and community-centered alert dissemination.

Implemented through collaboration between INSIVUMEH, CONRED, and local NGO Vivamos Mejor, with technical support from the Instituto de Geociencias UNAM and ETH Zurich, the system's core consists of:

- A network of multiparametric stations (seismometer, infrasound, rain gouges and webcams) with specialized detection algorithms, located around the Caliente dome and along the river channels that flow down from it.
- A four-stage messaging system involving prevention and response actions (Telegram channel) & ongoing transition to CAP-compliant SMS for standardized warnings.
- Precise delimitation of areas most susceptible to severe impacts, enabling the identification of key target groups for alerts and community preparedness.

The project has achieved:

- Risk maps for lahars and pyroclastic density currents in three different scenarios.

- Community risk assessments with local DRR committees, enabling the development of databases to assess the physical and social vulnerability of the most exposed communities.

The SAAV system demonstrates how scientific monitoring can be effectively coupled with community preparedness. The project has created a sustainable framework for risk reduction that continues to be enhanced through user feedback and institutional adoption. This presentation will address the challenges of implementing an Early Warning System (EWS), along with success stories from 2023 and 2024.