

## RESEARCHERS FROM THE SPANISH SOCIETY OF MINERALOGY (SEM) WORKING ON THE LA PALMA VOLCANO

**Mineralogic and geochemical study of ashes, leachates and fumarolic deposits of La Palma eruption.** M. Pilar Mata Campo, Javier Martínez Martínez, and the IGME CSIC research TEAM of Cumbre Vieja eruption

From the early moment of the volcanic eruption of Cumbre Vieja (La Palma island, Spain), several scientists from the CN IGME (CSIC) have been working near the volcano day and night, monitoring lava, gas, and ash deposits. One of the most important tasks carried out during the eruption has been called the “Cinderella operation,” where a periodic sampling of ashes was carried out along the island in order to study their composition, the evolution during the eruption, as well as the adsorbed materials present on the particle surfaces that, once dispersed, may affect vegetation, livestock, or people.

The nature and mineralogy of the basaltic lava (tephrite–basanite) is also detected in the composition of the ashes, mostly tachylites and sideromelanes with different grain size ranges, as a function of the distance from the source of emission. The composition of the leachates, analyzed according to international protocols, and the study of the salts investigated by electron microscopy on the surface of the ashes, indicate the presence of F and Al salts as micron-sized crystals. The products precipitated from the fumarolic exhalations during the final phases of the volcanic eruption, producing a wide spectrum of ammonium salts, sulfur, sulphates, etc., which are now the target of intense research.



IGME CSIC research team sampling rocks, ash, and fumarolic deposits during and after the volcanic eruption of Cumbre Vieja (La Palma island, Spain).



Reconstruction (February 2022) of the road connecting the neighborhood of La Laguna with Puerto Naos (West of La Palma), affected by 2021 lava flows.

**Materials from the 2021 volcanic eruption of La Palma (Canary Islands, Spain). Uses and geotechnical properties. Post-eruptive hydrothermal mineralizations.** J. Mangas, M. Campeny, J. Ibañez, J. Yepes, I. Menéndez, J. Rivera, and S. Álvarez

The strombolian eruption of Cumbre Vieja on the island of La Palma took place between September 19 and December 13, 2021. The emitted materials are lavas and pyroclasts with a basanite and tephrite geochemical composition. The volcanic flows occupy a surface of 1,173 hectares, and the pyroclasts extend tens of km<sup>2</sup> around the eruptive fissure. The land reclaimed from the sea by the lava flows is about 50 hectares. Some 1,628 buildings (homes, factories, industrial buildings, businesses, schools, temples) were affected by the eruption, 7,000 residents were evacuated, and 72.5 km of public roads were covered by lava flows.

For this reason, with the goal to rebuild the affected private and public buildings and infrastructures, the GEOGAR research group (attached to the IOCAG, Institute of Oceanography and Global Change, of the University of Las Palmas de Gran Canaria, Spain) collected samples of lava and pyroclasts to determine the geotechnical, geochemical, and petrographic characteristics, and possible uses of these volcanic materials (e.g., construction aggregates, agricultural and gardening uses).

In addition, the GEOGAR group and collaborators from Barcelona (Spain) from the University of Barcelona and Museum of Natural Sciences collected some samples of hydrothermal mineralization associated with fumaroles that appear in the main volcanic cone, secondary cones, as well as in fissures in nearby areas in February 2022. Along the fissures and cracks, there are fumaroles emitting hydrothermal volatiles (aqueous fluids with sulfur, carbon, chlorine, and fluorine), and precipitates are forming in and around the emission zones. Preliminary mineralogical studies (SEM, EMPA, XRD, petrographic microscope) confirm that outcrops contain native sulfur; carbonates of Ca, Na, etc.; sulfates of Ca, Mg, Fe, Na, etc.; chlorides of Na; and fluorides containing Ca, Mg, Na, Al, etc.