Hydrogeochemical survey for the Furna do Enxofre lake (Graciosa Island, Azores)

P. Antunes¹, F.C. Rodrigues¹
¹Centro de Investigação e Tecnologias Agrárias dos Açores, Angra do Heroísmo, Portugal

It was made four missions to sample the Furna do Enxofre water lake. The lake is located inside a lava cave at SE of Graciosa Island (Azores). The Azores archipelago is located in the North Atlantic between the latitudes 37°-40° N and the longitudes 25°-31° W. These islands represent the emerged portion of Azores plateau, which is defined by the bathimetric line of the 2000 meters. This area is situated close to the North American Plate, the Eurasian Plate and the African Plate. This complex geodynamic setting is responsible for an important seismovolcanic activity.

Sampled waters are cold (14.1-15.3 °C) with acid pH (min.=5.35; max.=6.07) and the electrical conductivity in the range of 591 to 596 µS/cm. The total carbon dioxide content varies between 223.72 and 456.14 mg/L and the bicarbonate between 200 and 268.4 mg/L. The alkaline earth metal concentration and the anions chloride and sulphur dioxide are very high when compared with others lakes in Azores archipelago.

The stable atmospheric temperature along the year, inside the lava cave, reflected the slight water temperature variation. The carbon dioxide dominated volatile input in lake hipolimnion, contribute to the depth enrichment of carbon dioxide concentration on water column and is responsible for the water acidification. The process that neutralise fluid acidity, by silicate mineral dissolution, explained the ions enrichment and the SiO₂ content. The volcanic fluids input, control the chemistry of the water lake and the hydrochemistry monitoring of this system can be an important tool in volcanic surveillance.