



Groundwater geochemical monitoring for the volcanic surveillance of Tenerife, Canary Islands

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The oceanic active volcanic island of Tenerife (2034 km²) is the largest of the Canarian archipelago. Tenerife has more than 1000 galleries (horizontal drillings) which are used for ground water exploitation and allows reaching the aquifer at different depths and elevations. These hydraulic infrastructures allow establishing a good hydrochemical monitoring program for the volcanic surveillance of Tenerife Island. In-situ measurements of physical-chemical parameters such as temperature, pH and electrical conductivity (EC) are weekly performed. Ground water samples are also weekly collected for the chemical and isotopic analysis of the dissolved species concentrations and gases in the ground waters. In this study the results from two different galleries are shown. The temperatures have a mean value of 28.4 °C and 19.2 °C for Fuente del Vale and San Fernando 3 galleries respectively, and the average pH values are 6.29 for Fuente del Valle and 7.12 for San Fernando 3. The EC have a mean value of 964 $\mu\text{S}\cdot\text{cm}^{-1}$ for Fuente del Valle and 1619 $\mu\text{S}\cdot\text{cm}^{-1}$ for San Fernando 3. Based in the chemical composition both galleries are the type sodium-bicarbonate. The isotopic composition of $\delta^{18}\text{O}$ and $\delta^2\text{H}$ show a meteoric origin with a strong water-rock interaction with a mean value of -6,24‰ and 6,17‰ vs VSMOW at Fuente del Valle and San Fernando 3, respectively. The isotopes of $\delta^{13}\text{C}-\text{CO}_2$ have a mean value of -3,06‰ and -5,4‰ vs VPDB Fuente del Valle and San Fernando 3, respectively. The results of this hydrogeochemical monitoring show relatively variations related to changes of seismic activity at Tenerife; therefore, this monitoring program is useful to strength the volcanic surveillance of Tenerife Island.