

**THE INFLUENCE OF THE DEGASSING PHASE OF THE TAGORO
SUBMARINE VOLCANO (CANARY ISLANDS) ON THE METAL CONTENT OF
THREE SPECIES OF CEPHALOPODS**

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Abstract: Underwater volcanic eruptions are a type of natural contamination that seriously affect all marine organisms at a local level (Eugenio et al., 2014). These eruptions usually end and begin a degassing stage of the volcano that, although they do not affect the magnitude of magma emanation, they do affect organisms to a lesser degree locally, such as cephalopods that, due to their metabolism and trophic level, are good bioindicators of contamination (Lozano-Bilbao et al., 2018; Penicaud et al., 2017; Santana-Casiano et al., 2016). A total of 180 samples of three species of cephalopods were caught for the study: sixty *Sepia officinalis*, sixty *Octopus vulgaris* and sixty *Loligo vulgaris* in the area of the

submarine volcano in El Hierro, Tenerife and Lanzarote in the Canary Islands (twenty samples per species in each location), and the metal concentrations (Al, Cd, Cr, Cu, Fe, Li, Ni, Pb and Zn) in each of the samples were analyzed. All species showed significant differences for all metals in El Hierro compared to Tenerife and Lanzarote.

All the analyzed species from El Hierro had higher concentrations of the nine studied metals, this is due to the fact that they were caught near the Tagoro submarine volcano, which at the time was in a state of degassing and discharged many metal-rich compounds.

Keywords: Volcano, metal, cephalopod, Canary Islands, bioindicators

References:

- Eugenio, F., Martin, J., Marcello, J., Fraile-nuez, E., 2014. Environmental monitoring of El Hierro Island submarine volcano, by combining low and high resolution satellite imagery. *Int. J. Appl. Earth Obs. Geoinf.* 29, 53–66. <https://doi.org/https://doi.org/10.1016/j.jag.2013.12.009>
- Lozano-Bilbao, E., Gutiérrez, Á.J., Hardisson, A., Rubio, C., González-Weller, D., Aguilar, N., Escánez, A., Espinosa, J.M., Canales, P., Lozano, G., 2018. Influence of the submarine volcanic eruption off El Hierro (Canary Islands) on the mesopelagic cephalopod's metal content. *Mar. Pollut. Bull.* 129, 474–479. <https://doi.org/https://doi.org/10.1016/j.marpolbul.2017.10.017>
- Penicaud, V., Lacoue-Labarthe, T., Bustamante, P., 2017. Metal bioaccumulation and detoxification processes in cephalopods: A review. *Environ. Res.* 155, 123–133. <https://doi.org/https://doi.org/10.1016/j.envres.2017.02.003>
- Santana-Casiano, J.M., Fraile-Nuez, E., González-Dávila, M., Baker, E.T., Resing, J.A., Walker, S.L., 2016. Significant discharge of CO₂ from hydrothermalism associated with the submarine volcano of El Hierro Island. *Sci. Rep.* 6, 25686. <https://doi.org/10.1038/srep25686>