



## **Submarine seismic monitoring of El Hierro volcanic eruption with a 3C-geophone string: applying new acquisition and data processing techniques to volcano monitoring**

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A submarine volcanic eruption took place near the southernmost emerged land of the El Hierro Island (Canary Islands, Spain), from October 2011 to February 2012. The Instituto Geogra [U+FB01] co Nacional (IGN) seismic stations network evidenced seismic unrest since July 2011 and was a reference also to follow the evolution of the seismic activity associated with the volcanic eruption.

Right after the eruption onset, in October 2011 a geophone string was deployed by the CSIC-IGN to monitor seismic activity. Monitoring with the seismic array continued till May 2012. The array was installed less than 2 km away from the new volcano, next to La Restinga village shore in the harbor from 6 to 12m deep into the water. Our purpose was to record seismic activity related to the volcanic activity, continuously and with special interest on high frequency events. The seismic array was endowed with 8, high frequency, 3 component, 250 Hz, geophone cable string with a separation of 6 m between them. Each geophone consists on a 3-component module based on 3 orthogonal independent sensors that measures ground velocity. Some of the geophones were placed directly on the seabed, some were buried. Due to different factors, as the irregular characteristics of the seafloor. The data was recorded on the surface with a seismometer and stored on a laptop computer.

We show how acoustic data collected underwater show a great correlation with the seismic data recorded on land. Finally we compare our data analysis results with the observed sea surface activity (ash and lava emission and degassing). This evidence is disclosing new and innovative techniques on monitoring submarine volcanic activity.

### Reference

Instituto Geográfico Nacional (IGN), “Serie El Hierro.” Internet: <http://www.ign.es/ign/resources/volcanologia/HIERRO.html> [May, 17. 2013]