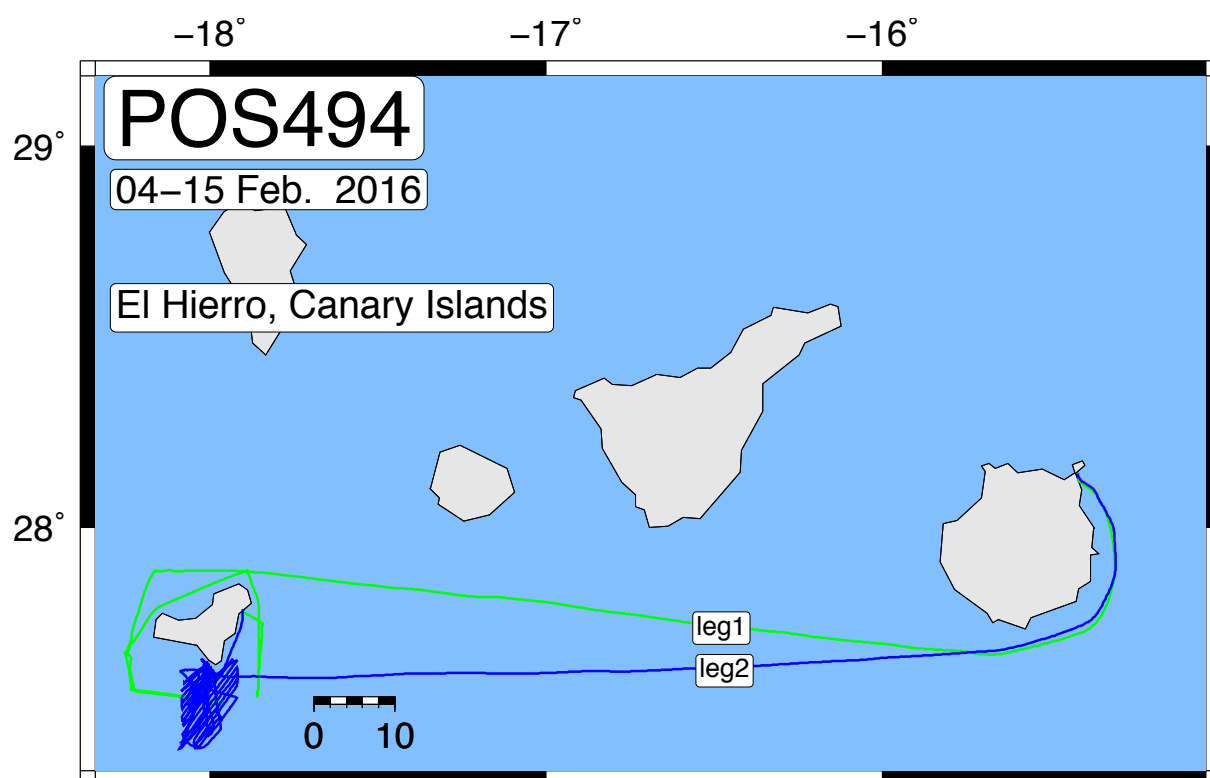


Poseidon No. 494, leg1 Technical Cruise Report

04th Feb. – 07th Feb., 2016

Las Palmas – La Estaca, El Hierro (Spain)

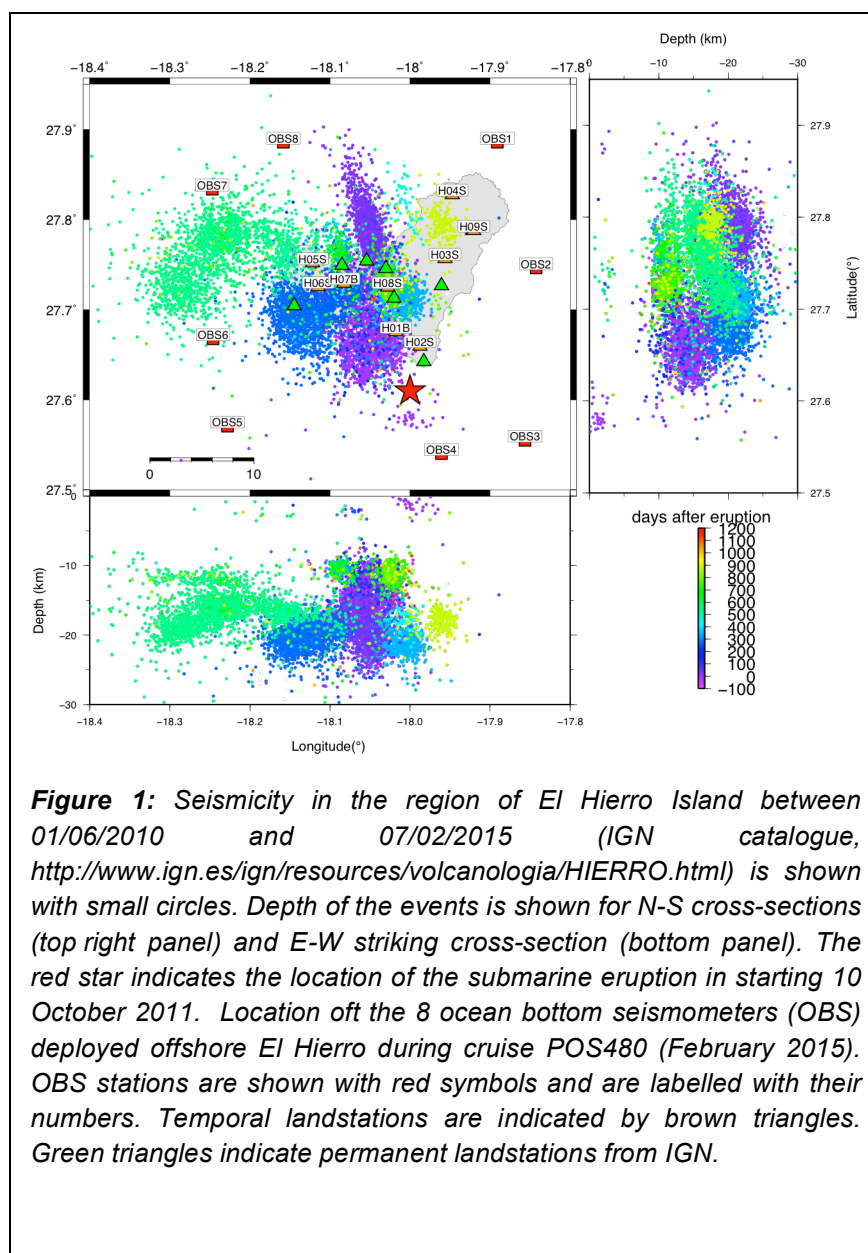


Dietrich Lange and cruise participants

Kiel, 1 June 2016

1.) Introduction

The ongoing unrest of El Hierro Islands started in 2011 with a submarine volcanic eruption 2 km South of El Hierro (Figure 1) and poses a significant hazard potential for the island and its inhabitants. The spatial distribution of seismicity is highly variable and a significant part of it occurs outside the network or offshore. In order to better characterize the seismicity the seismological network was densified during POS480 (February 2015) with 8 ocean bottom seismometers (OBS) and 9 onshore stations in March 2015. On 18 September 2015 an OBS was sighted offshore by a fishing boat and the station grounded on 19 September 2015 the rocky beach of El Hierro's northern coast close to the village of Frontera ($27^{\circ} 47,45'N$, $018^{\circ} 00,23'W$). Two days later the OBS07 (Figure 1) was rescued by helicopter from the local authorities and stored at the fire brigades of Valverde on El Hierro. The objective of POS494, leg1 was to recover the remaining 7 OBS stations from the seafloor.



2.) Narrative of POS494, leg1

Poseidon left the harbour of Las Palmas de Gran Canaria, Spain on Thursday February 4, 2016 at 09:00 local time which equals the UTC time zone. Weather conditions during the ~160 nm transit to El Hierro were good. On February 5 at 07:00 Poseidon arrived at the north-eastern side of El Hierro and station OBS1 (Figure 2). The release signal were sent repeatedly between 07:27 and 07:55. The station did not respond and could not be located on the water surface until 08:45. Thereafter Poseidon headed west in the direction of OBS8. The first release signal for OBS8 was sent 2.4 nautical miles before the reaching the stations and various times at OBS8. The sea state was very calm and equally here stations OBS8 could not be sighted nor the radio signals from the OBS stations could be received. At 13:27 and 15:30 LT the release signal for OBS5 and OBS6 were sent, respectively. Equally these two stations did not show up on the water surface nor a radio signal could be received. OBS04, located close to the 2011 eruption site, was released 18:57 LT and was sighted on the water surface at 19:10, as expected for an OBS installed in 1000 m water depth. The station could be ranged during the ascent and on the water surface. Due to freshening trade winds from the northeaster direction and sudden increase of wave heights it was difficult to lift the OBS04 on board and during the rescue procedure the pressure cylinder was lost (station touched ship's side). Inspection of OBS04 on deck showed that the station was massively corroded. During the night time weather conditions improved. Poseidon headed in western direction and counter clockwise around El Hierro for a second release of the missing stations. During the night Poseidon the release signal was sent to OBS5, OBS6 and OBS1, but none of the stations could be sighted on the water surface. On February 6 at 07:20 Poseidon arrived at OBS3 and on 11:00 OBS2. The release signal was sent various times using two different release devices and hydrophones, but both OBS did not appear on the water surface nor responded to ranging signals or enable commands of the releaser. Thereafter, Poseidon headed towards Puerto de la Estaca, reaching the port of El Hierro in the afternoon of February 06, 2012 at 16:00. On 17:00 LT the same day Nestor Padron Castañeda from CECOPIN together with colleagues from the local authorities who were involved in the rescue OBS7 visited Poseidon and the grounded station (OBS07) was exchanged. After the cruise the temporal landstations (brown triangles, Figure 1) were serviced (2.5 days, D.L., A.K., E.F.). All landstations worked as expected.

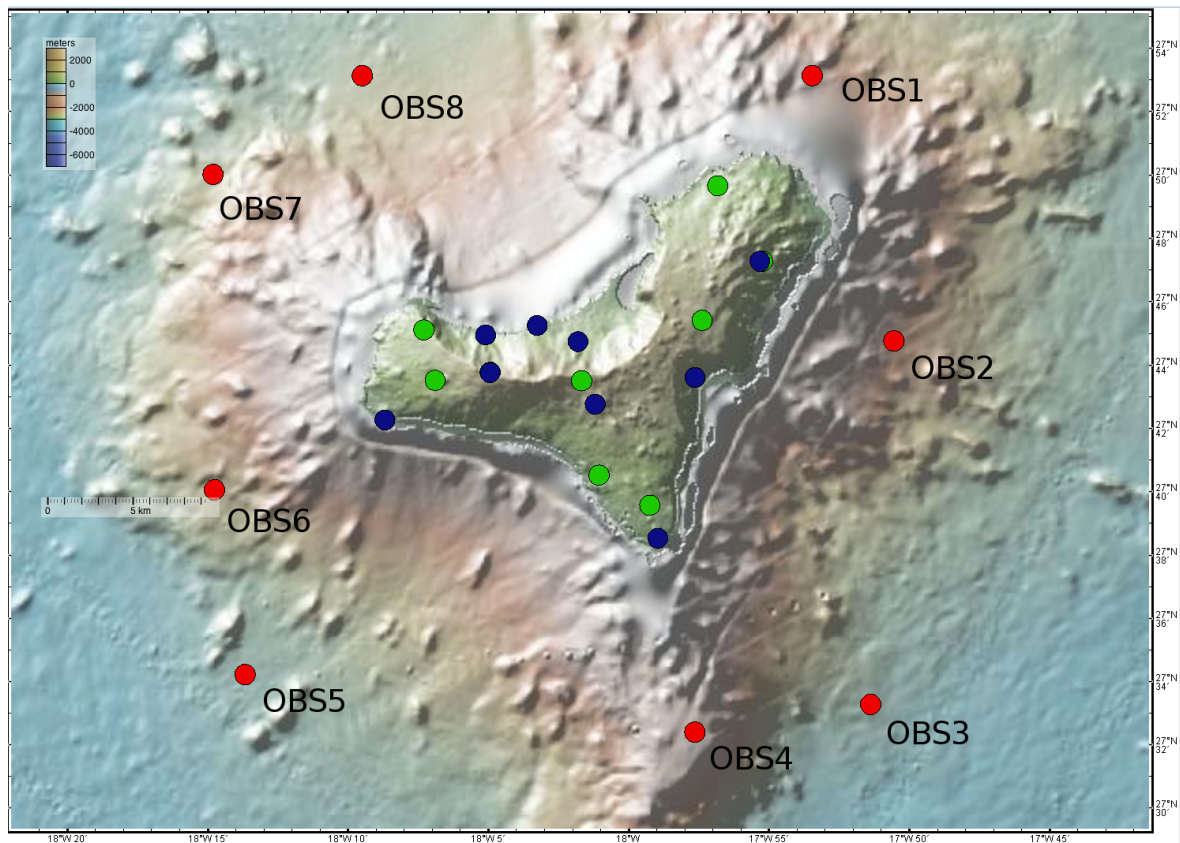


Figure 2: Map of the installed onshore and offshore stations. OBS stations are shown with red circles (coordinates are listed in Tab. 1). IGN and GEOMAR stations are indicated by green and blue circles, respectively.

3.) Scientific crew, POS494, leg1

1. Lange, Dietrich	GEOMAR	Chief Scientist
2. Krabbenhoeft, Anne	GEOMAR	OBS
3. Ernst Flüh	GEOMAR	OBS
4. Schauer, Jürgen	GEOMAR	JAGO Team
5. Hissmann, Karen	GEOMAR	JAGO Team
6. Striewski, Peter	GEOMAR	JAGO Team

4.) List of Stations

Table 1: List of Ocean-Bottom-Seismometers (OBS) deployed during POS480. Location of stations is shown in Figure 1 and 2. OBS07 grounded in September 2015 on the coast of El Hierro. OBS04 returned to the surface and was heavily corroded, all other stations did not reply to release signals.

Instrument	Coordinates		
	lat N	lon W	depth (m)
OBS 01	27°53.119	17°53.347	1584.9
OBS 02	27°44.763	17°50.518	1851.0
OBS 03	27°33.249	17°51.420	3075.0
OBS 04	27°32.420	17°57.660	1062.2
OBS 05	27°34.234	18°13.684	3149.0
OBS 06	27°40.049	18°14.79	2549.0
OBS 07	27°50.025	18°14.803	2700.0
OBS 08	27°53.157	18°09.498	2745.0

Acknowledgments

We thank Master Mattes Günther, and crew of the RV Poseidon cruise POS494 for excellent sea-going support and a great working environment. We thank the all individuals and authorities involved in the rescue of the grounded OBS07 from the northern coast of El Hierro in September 2015:

- Policía Local (Ayuntamiento de La Frontera).
- Consejería de Seguridad y Emergencias (Cabildo Insular de El Hierro).
- Ayuda en Emergencias Anaga (AEA).
- Grupo de Emergencias y Salvamento (GES), Dirección General de Seguridad y Emergencias, Gobierno de Canarias.