

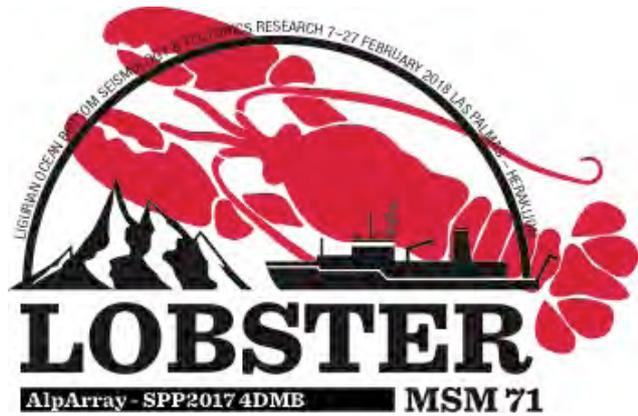
FS Maria S. Merian MSM71

Las Palmas – Heraklion

07.02.2018 – 27.02.2018

3. Weekly Report

25. Feb. 2018

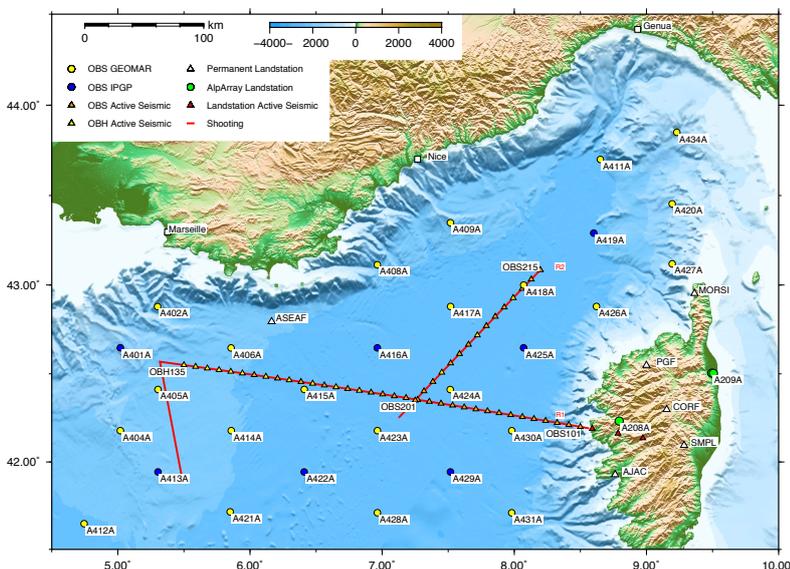


The 3. week of cruise MSM71 was characterized by the recovery of stations from the long-term AlpArray network, complemented by further acquisition of short-period refraction seismic data along a second profile. Military operations in our study region repeatedly required us to adjust our schedule and work plan. Furthermore, the majority of the AlpArray long-term ocean bottom seismometers could only be recovered during daylight hours, so that we had to plan our way points through the Ligurian Sea accordingly. Despite intermittent stormy conditions, all remaining eleven stations of the AlpArray network could be safely recovered by the end of the week.



On Feb. 19, 2018, we deployed 15 ocean bottom hydrophones and ocean bottom seismometers along a second refraction profile in the central Ligurian Basin. Data acquisition and station recovery was successfully completed by Feb. 22, 2018, when we returned to the eastern termination of the first refraction line to recover the remaining 12 stations along the profile.

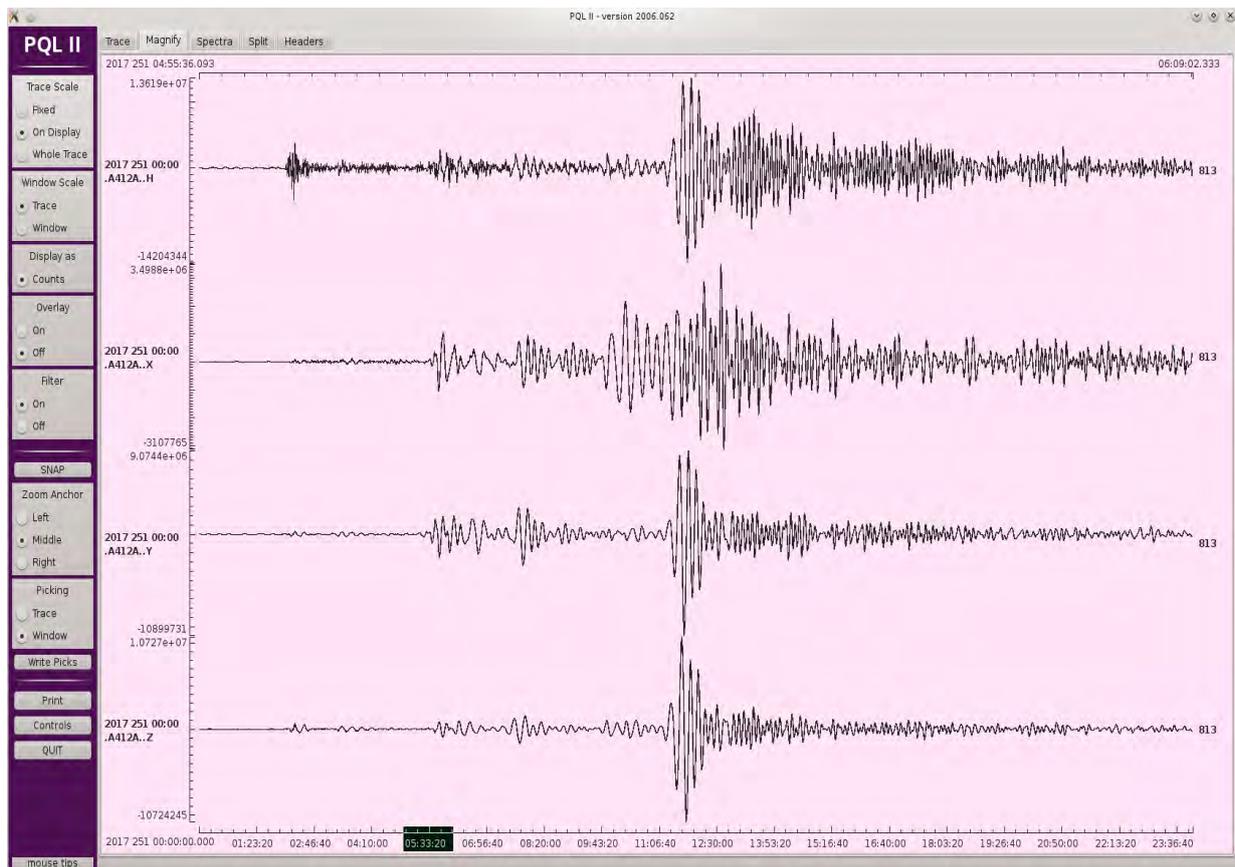
Deployment of an ocean bottom hydrophone from the working deck of RV Maria S. Merian. Photo: M. Neckel, GEOMAR/CAU



Map of the working area showing distribution of seismic stations and location of seismic profiles.

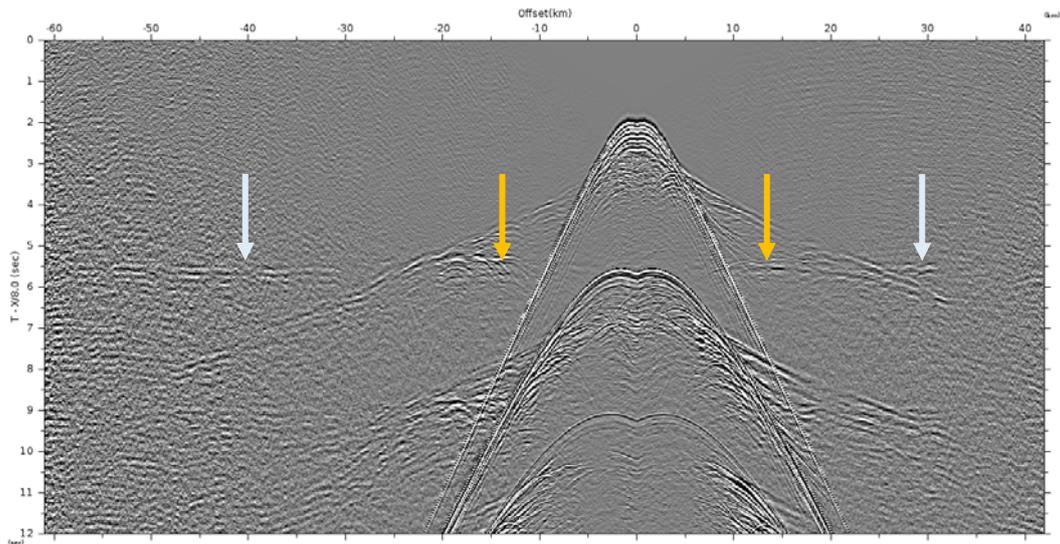
Map: A. Dannowski, GEOMAR

The quality of the long-term seismological data as well as of the short-period refraction data proved to be excellent. The teleseismic arrivals, as generated for example by the Sep. 8, 2017 magnitude Mw 8.2 Chiapas earthquake will yield a high-resolution image of the lithospheric structure at the transition from the Alpine orogen to the Apennine. The data offer the opportunity to answer unresolved questions regarding the Alpine orogenesis and the geometry of the subducting lithospheric slabs in the region.



Teleseismic arrivals from the magnitude Mw 8.2 Chiapas earthquake rupturing the subduction zone offshore Mexico on Sep. 8, 2017. D. Lange, GEOMAR / M. Thorwart, CAU

The majority of refraction seismic sections recorded clear phases generated in the upper mantle, which will allow the determination of the crustal thickness in the Ligurian Sea. The Ligurian Basin is a back-arc basin, generated by the southeastward trench retreat of the Apennines-Calabria-Maghrebides subduction zone during Oligocene-Miocene times. Back-arc extension led to continental thinning and subsidence and eventually to the formation of oceanic domains. The refraction seismic data recorded during MSM 71 show indications of a thinned oceanic crust in the central part of the Ligurian Basin. The data section of OBS205 below shows distinct mantle phases and Moho reflections, as recorded by the majority of stations on the profiles.



Seismic record section of OBS 205. White arrows indicate Pn phases through the upper mantle, orange arrows show reflection from the crust-mantle boundary (Moho). A. Dannowski, GEOMAR

On February 23, 2018 at 07:30 o'clock we terminated our working program in the Ligurian Sea and commenced our transit through the Strait of Bonifacio to the Strait of Messina. On February 25, 2018 at 01:15h we reached the GeoSEA Array location offshore Catania, where the seafloor geodesy array monitors flank stability of Mt Etna. We made advantage of this short stop-over to confirm that all seafloor stations are still in an upright position and tested the newly installed RANGER system on RV Maria S Merian to monitor the array's intercommunication. At 05:00h we continued our transit towards the port of Heraklion and will use these coming days for further data processing and analysis.

Everybody on board is doing well and looking forward to seeing the loved ones at home.

Kind greetings to everyone back home !

Heidrun Kopp

At sea, 37.34°N/16,07°E