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AlpArray offshore: Preliminary results of the Ligurian Sea OBS network and refraction lines

Heidrun Kopp (1,4), Wayne Crawford (2), Anne Paul (3), Dietrich Lange (1), Anke Dannowski (1), Felix Wolf (1), and Martin Thowart (4)

(1) GEOMAR, Kiel, Germany, (2) Institut de Physique du Globe de Paris, France, (3) Institut des Sciences de la Terre (ISTerre) CNRS & Université Grenoble Alpes, France, (4) University of Kiel, Germany

The north-eastern portion of the Ligurian Sea forms part of the transition zone from the Alpine orogeny to the Apennine orogeny. North of the Ligurian Sea, the Alpine slab subsides beneath the Alpine belt whereas to the southeast, the Adriatic plate subsides underneath the Apennine belt. The entire area is in the focus of the AlpArray initiative to provide state-of-the-art imaging of subsurface structures. The offshore component of AlpArray involves the deployment of 30 broadband ocean bottom seismometers (OBS) from France/Germany in the Ligurian Sea for a period of eight months. The network extends the dense seismometer network of the AlpArray initiative that covers the entire region of the Alps onshore. OBS recordings of teleseismic events will be essential to define subsurface structures at the transition from the Western Alps to the Apennines and improve our understanding of the 3D-geometry of the system and its kinematics. OBS deployment took place in June 2017 using the French RV PourquoiPas? as platform. In order to share ship-related costs between the two nations, recovery is conducted using RV Maria S. Merian in Feburary 2018. Here we present early results of the OBS long-term recordings as well as from an amphibious seismic refraction survey of the Ligurian basin covering the transition from the oceanic to the continental domain. Two active shoreline crossing wide-angle transects of 150 nm each unravel the upper structure of the Ligurian Basin at crustal scale resolution. A particular focus of the study is on the ocean-continent boundary at the Alps-Apennines junction, which is poorly defined due to the lack of modern refraction data. The Ligurian basin is a back-arc basin, created by the subduction roll-back of the Apennines-Calabria-Maghrebides subduction zone towards southwest. Caused by the roll back of the trench the continental crust was stretched and thinned and a back-arc spreading centre was created that produced new oceanic crust. Hypotheses about the evolution of the Ligurian basin are based on older geophysical and seismic data sets with limited resolution and depth penetration. The two newly acquired refraction seismic refraction lines, with short instrument spacing of 8 km and short shot interval of 50 s, will help to estimate the structure, nature, and the thickness of the crust and overlying sedments in order to consolidate existing theories. Furthermore, with the integration of the marine stations into the AlpArray seismic network, seismic traveltime tomographic approaches will be improved. Based on the acquired data, new insights on the location of the subducting slabs in the transition zone between the Alps and the Apennines will be gained and questions on the 3D-geometry of the subduction polarity reversal might be answered.