



Imaging the Sicily Channel Rift Zone (Central Mediterranean) with seismic ambient noise tomography.

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The tectonics of the Sicily Channel, located in the Central Mediterranean, are thought to be driven by the Calabrian back-arc system moving south-eastwards and the north moving African plate. The Channel is characterized by a seismically and volcanically active rift zone, which extends for more than 600 km in length offshore from the south of Sardinia to the south-east of Malta. Much of the observations we have today are either limited to the surface and the upper crust, or are broader and deeper from regional seismic tomography, missing important details about the lithospheric structure and dynamics. The project GEOMED () addresses this issue by processing all the seismic data available in the region in order to understand better the geodynamics of the Central Mediterranean.

We use seismic ambient noise recorded on more than 50 stations located on Algeria, Italy (Lampedusa, Linosa, Pantelleria, Sardinia (LISARD seismic network), Sicily), Libya, Malta, and Tunisia to generate high-resolution seismic tomography maps for the region at different depths. We measure Rayleigh-wave phase velocities with periods ranging from 5 to 100 seconds sampling through the entire lithosphere. We find that at short periods (<25 s), paths of station-pairs crossing across Africa and Italy have slower velocities than those crossing the Tyrrhenian and Ionian basins indicating that these paths are sampling thick continental crust. However, station pairs limited to the Sicily Channel Rift Zone (SCRZ) have faster phase velocities for periods > 20 s comparable to those beneath the basins suggesting that the SCRZ has a thinner crust. The seismic velocity maps are compared with the regional tectonics, seismicity, volcanic activity and other geophysical studies to present a more holistic understanding of the processes involved.

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