Geophysical Research Abstracts
Vol. 21, EGU2019-2644, 2019
EGU General Assembly 2019

Crustal Model Validation in the Mediterranean Sea

Gabi Laske (1), Amr El-Sharkawy (2), and Thomas Meier (2)
(1) UCSD, SIO, IGPP-0225, La Jolla, United States (glaske@ucsd.edu), (2) Christian-Albrechts Universität zu Kiel, Germany

It has been two decades since the publication of the 5-degree global crustal model CRUST5.1 in 1998. More recently, the 1-degree model CRUST1.0 was released for wide use in 2013. The more recent model was based on a comprehensive, updated database of crustal structure information from active source experiments as well as receiver function studies, Moho depth maps from regional seismic tomography and, in some instances, results from gravity studies. A change in strategy to compile CRUST1.0 also was an iterative model validation and subsequent update to fit global surface wave dispersion data. Yet, in an attempt to update CRUST1.0 to the final version, some discrepancies with surface wave constraints remained. This project zooms in on the Mediterranean Sea and compares model predictions with observations.

CRUST1.0 subsequently was used as a starting model to compile a global model of the entire lithosphere, LITHO1.0 that was released in 2014. This model is based on surface wave data alone, with an updated and larger database that includes proprietary data in the Eastern Mediterranean/Asia Minor area. While intermediate-period (40 – 29 s) Rayleigh wave phase velocity is well-explained by CRUST1.0, group velocities are underpredicted in the western Mediterranean and overpredicted in the eastern Mediterranean, by up to nearly 10%. Both CRUST1.0 and LITHO1.0 fail to model Love wave group velocities adequately, even at long periods (T$>$ 50 s).

Recently, new surface wave constraints collected around the Mediterranean area allow tomographic imaging to unprecedented detail. The extension to shorter periods than what is available on global scale allows assessment of structure not only on the crust in general but also in areas with thick sediment cover, such as the Nile Delta in the eastern Mediterranean. At this level, we validate the 1997 Laske and Masters global sediment model that was adopted into CRUST1.0.