Coda wave simulations across the Tyrrhenian Basin using radiative transfer

Chiara Nardoni¹, Luca De Siena², Fabio Cammarano³, and Elisabetta Mattei¹

¹Dipartimento di Matematica e Fisica, Università degli Studi Roma Tre, Rome, Italy
²Institute of Earth Sciences, Johannes Gutenberg University, Mainz, Germany
³Dipartimento di Scienze, Università degli Studi Roma Tre, Rome, Italy

Lateral variations in crustal structure may affect the propagation of Lg phases, guided waves that propagate efficiently only in the continental crust. Seismic paths crossing continental-oceanic transitions are characterized by Lg blockage due to the drastic decrease in crustal thickness. Here, we investigate the effects of crustal thinning on wave propagation in the Tyrrhenian basin using radiative transfer theory. We first model regional coda envelopes (600-800km) using the software tool Radiative3D (Sanborn & Cormier 2018, GJI). It allows to synthesize seismograms envelopes produced by earthquakes by propagating energy packets through a deterministic structure, taking into account the crustal layers, including Moho transition depth, and parameters describing the medium heterogeneities. Then, we approach the complex problem of meshing, including measured Moho depths, for simulations based on spectral elements (Komatitsch D. et al., 2012, SPECFEM3D, Computational Infrastructure for Geodynamics) and finite differences methods (Maeda et al., 2017, OpenSWPC). The results aim at understanding complex wave attenuation and leakage in the mantle, for future implementations into the Multi-Resolution Attenuation Tomography code (MuRAT – De Siena et al. 2014, JVGR)