Elaboration of active and passive seismic data along the CROP 04 line, Southern Apennines
Lucia Savastano (1) and Nicola Piana Agostinetti (2)

(1) University of Roma Tre, Department of Science, Italy (lucia.savastano@stud.uniroma3.it); (2) University of Vienna, Department of Geodynamics and Sedimentology, Austria

Abstract
The Southern Apennines collisional setting is characterized by deep structural complexities, which have been here investigated through the combination of different (active and passive) source seismic data. Several interpretations of the available seismic data and profiles have been already carried out in the last two decades in order to provide a consistent geological significance of the detected sub-structures: since these do not allow an univocal interpretation of the Apennine roots, strong disagreements exist among geologists about the tectonic style of the chain in that portion of the Italian peninsula. In this work, we have first combined five passive seismic datasets from the overall available literature; we have then projected them to relative depths on the active seismic profile (CROP 04) where our interpretation has finally been made. The general aim of the work is to shed light on the Southern Apennines structure at depths greater than 25 km where, through the adopted approach, an approximate shape of the lower crust and upper mantle structure can be delineated.

Methodology
Data were selected from a total of five previous works and projected along a 160 km long profile, according to their values of coordinates. An appropriate depth conversion of the active seismic line (from TWT to Kilometers) was then performed in order to make a correct comparison between the different data.

Acknowledgments
Large part of this work was realized as L. Savastano Master internship at Roma Tre University, in collaboration with C. Facenna. We would also like to thank Irene Molinari for having kindly provided supporting material from her work. N.P.A.’s research is funded by Austrian Science Foundation (FWF): project M2218-N29.

References

Geological interpretation
Conclusions
Our analysis of the combination of different source datasets along the CROP 04 seismic profile allows some hypotheses to be done:
1) In the studied area, during the Adriatic slab retreat, the Tyrrhenian margin was involved in a weaker process of thinning if compared with the Northern Apennines and Calabria cases. This may in turn be associated with a faster mechanism of extension.
2) Subduction has locally been stationary for a long time, leading to the complete eclogitization of the subducted crust and total regeneration of the Tyrrhenian Moho.
3) High velocities recorded at Moho depth in the Tyrrhenian region (observed nowhere else in the Apennine subduction setting) could be explained considering a complete fluid migration out of the mantle wedge.
4) At first, heat from the mantle wedge deformed the Moho surface in the westernmost sector, then the Adriatic slab promoted the creation of a close system beneath the Tyrrhenian crust, hindering the heat transfer from East.