

Geophysical Research Abstracts
Vol. 18, EGU2016-15550, 2016
EGU General Assembly 2016
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A wide-angle seismic survey across the Southern Tyrrhenian basin and the Northwestern Ionian (CHIANTI experiment): data and preliminary results

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In this work we present first results of two wide-angle seismic transects acquired in the Southern Tyrrhenian basin and Northwestern Ionian during the CHIANTI experiment (July 2015). The first transect runs NW to SE starting in the Vavilov basin, crossing the Marsili basin, the currently active volcanic arc of the Aeolian Islands and the Calabrian arc, ending in the accretionary prism of the NW Ionian. This transect is >500 km long and includes 46 OBS and 5 landstations. The second transect crosses the Vavilov basin from ~N to S at a longitude of 12.5°E. This one is ~180 km long and includes 15 OBS.

The preliminary interpretation of the OBS data clearly shows that the crustal structure is very similar in the Marsili and Vavilov basins. They show no crust-mantle boundary reflections and high apparent velocities of up to ~8 km/s a few kms below the top of the basement. These results are in good agreement with previous ones obtained in the central Tyrrhenian during the MEDOC-2010 experiment, in which a transition from extended continental crust to magmatically-affected back-arc crust to exhumed mantle that challenges current conceptual models of back-arc extension, has been interpreted. The combination of the results of these two experiments is providing a new view of the nature and configuration of the geological domains in the whole Tyrrhenian basin, giving first order constraints on the processes that have controlled its geodynamic evolution.

The extension of the profile across the Calabrian arc aims at obtaining the first picture of the complete system including the forearc, intra-plate boundary, active volcanic arc and back-arc basins.