



## **Crustal evidence of a low velocity Vp and Vs volume beneath Stromboli Volcano, Italy**

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An improvement in the knowledge of the local velocity structure in the northeastern part of Sicily and southern Calabria, by using local earthquakes and a classical LET three-dimensional tomography, has been provided by Neri et al. (2002) and Barberi et al. (2004). Today, significant improvements in hypocentral locations can be obtained by implementing algorithms that use event/clustering techniques. In fact, precise earthquake locations represent one of the most important elements for accurate seismic investigations, which can improve the resolution of a tomographic study and also provide a mean for "imaging" active faults at depth.

In the present study the 3D simultaneous inversions for hypocenters and velocity models in the northeastern Sicily and southern Calabria, including the Aeolian Archipelago, have been performed by applying the tomoDD algorithm (Zhang and Thurber, 2003).

The main goals are: i) to explore the differences between relative and absolute earthquake locations, ii) to determine spatial clusters in the seismicity, in order to identify the most active seismogenic zones and structures and iii) to recognize the presence of low velocity regions beneath the Aeolian Archipelago related to the presence of partial melting.

We used for the tomoDD tomographic inversion P- and S-wave readings from a thousand of local earthquakes recorded by seismic stations operating in Sicily and Calabria between 1994 and 2006. Focusing our attention on the Stromboli area, the most rel-

evant feature is the presence of a low  $V_p$  and  $V_s$  (average values around 5.4 and 3.1 km/s, respectively) elongated volume in the crust, suggesting the presence of partial melting. This volume, which extends up to 17 km in depth b.s.l., overlies a high  $V_p$  and  $V_s$  (values greater than 7.5 and 4.5 km /s, respectively) region that can be related to the presence of the Moho.

Finally, the tomographic results are analyzed jointly with the geophysical and geological information available in the literature in order to improve our knowledge of the crustal structure and seismogenic faults in the area.