**Optimum P-wave velocity model**

In order to obtain a seismic location of the local earthquakes it was necessary to have an optimum P and S waves velocity model for the Ionian Sea. To define a reference to P-wave velocity model for the Ionian Sea, we inverted the first P-waves arrivals time from the regional earthquakes recorded by the OBS. The chooses only the events with first P-wave (SOGO) model later (a) and standardization errors below 0.05 s from the entire dataset. On the basis of the P-wave information obtained regarding the Ionian Basin and surrounding areas we also discussed the events with shallow hypocentres in island-deformed areas, located near Sicily and Sardinia. At the end of this section, the dataset was composed of 49 earthquakes with a total of 175 P-phase readings this dataset was used to compute a minimum 10% P-velocity model for the Ionian Sea. The first phase of the random ray-tracing from source to receiver was sampled accurately for critical reflectors rays and by the shooting method for direct waves. The forward problem statement model data was also computed (Fig. 3) in this way the three models obtained from inversion, and we used as the model.

**Telemisic receiver functions**

We acquired a sample of teleseismic receiver functions to perform a cross-spectral analysis and to study the horizontal and vertical characteristics of the epicentre as well as the teleseismic receiver functions. Due to the large depth range, we performed a preliminary study phase at the first phase. We performed a cross-spectral analysis of the teleseismic receiver functions (Fig. 4) and finally the three models obtained from inversion, and we used as the model.

**Conclusions and future works**

The comparison between the P and S velocity models generated from the two independent techniques (Fig. 5) shows a good agreement for nearly the depth of the mantle discontinuities. In particular, both methods agree in constraining the Moho at depths of ~12-13 km below the ocean bottom, confirming the complex nature of the Ionian Sea. Also, a velocity inversion is found for both P- and S-wave velocity model. Although some differences in both the depth and velocity distributions are found, particularly in the shallow part of the crust. The velocity structure is determined by the gradients of the crustal layers, and the Moho depth and the velocity model.

**Bibliography**


