Determination of 1-D velocity model of the uppermost crust using the Neighbourhood algorithm

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The Neighbourhood algorithm (Sambridge, 1999) is a suitable tool for geophysical inversions. We have applied it to determine 1-D velocity model using sparse source depth distribution for synthetic as well as for real arrival times from a small region in the central part of the Corinth gulf. The corresponding subset of Corinth Rift Laboratory Network (CRLNET) data from the year 2001 is used. A three-layered model of the uppermost crust composed of homogeneous layers and three-layered model composed of layers with constant velocity gradient are searched for. The minimised misfit function is formed by the sum of square of the arrival time residuals of P and S waves. The grid search is used for the sources location. The lack of the sources in the uppermost crust might cause uncertainty in the obtained velocity-depth distribution. The performance of the Neighbourhood algorithm is also shown.

(M.Sambridge, 1999: Geophysical inversion with a neighbourhood algorithm-I. Searching a parameter space. *Geophys. J. Int.* 138, 479-494.)