



New differentiated approach for seismic tomography

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New scheme is developed to solve main typical problems are arising in inversion tasks. First, seismic tomography is large-size and sparse matrix inversion problem. Therefore the basic idea is to divide the initial linear system to small blocks (subsystems). Each block is small-size and non-sparse sub-matrix, which is defined by seismic rays are passing from the cluster of seismic activity to a common station. The stable value is selected in accordance with Tichonov's regularization theory. The second important problem is the presence of large data errors, which can totally destroy the correct solution. To restrict the influence of large errors on inversion result the over-determined system is solved using the algorithm, which differs from standard lsq method. The effectiveness of the proposed Differentiated Approach (DA) is proven by the high quality of reconstruction of synthetic complex fault model in Western Nagano (JAPAN). The fault main plane is well determined by velocity structure, which was obtained due application of DA to real data set. That was not revealed by the Double Difference tomography, which is based on the standard lsq technique.