Tomography by travel time analysis: a multiscale approach

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Performing accurate travel time tomography requires numerous data sets and leads to
solve very large linear algebraic systems. which is currently carried out through the
LSQR method. This method, however, cannot easily allow for a priori information on
the model.

In this communication, we present a flexible approach to the tomography by travel
time analysis which can take account of any a priori covariance kernel and any cor-
relation lengths. Our approach is also based on a numerical scheme that is related
to a conjugate gradient method. We show how to determine the optimal correlation
length corresponding to the scale of the problem, and how to evaluate uncertainties in
the models at different scales. Finally we give an illustration of our approach at three
different scales: 100 km, 10 km, 1 km.