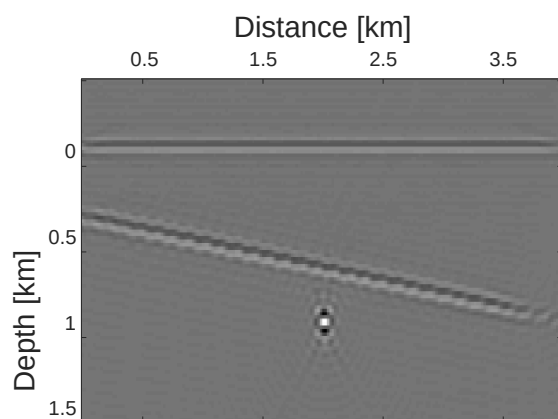


A fast image domain least squares migration method with local data target approach

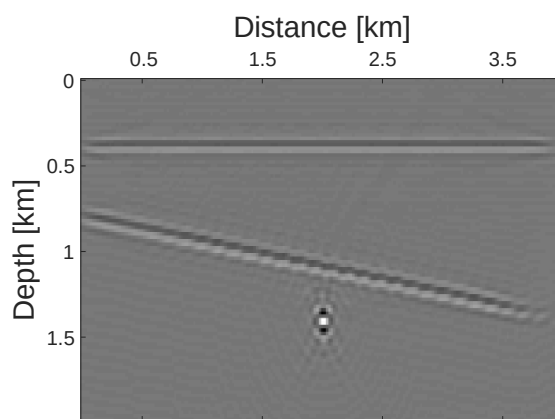
Ram Tuvir, Zeyu Zhao, and Mrinal K. Sen, Institute for Geophysics, University of Texas at Austin*

ABSTRACT

We consider the problem of image domain least squares migration (LSM) based on local Hessian construction. In the proposed approach, both the image and the Hessian are constructed using beams. Specifically, we use the ultra-wide-band phase space beam summation method. In this method, the beams are used as local basis functions, where the beam amplitudes are extracted from the scattering data. This approach enables us to a priori filter out beams since only beams with non-negligible amplitudes have to be taken into account. In addition, due to spatial localization of the beams, only beams which pass near certain point will contribute to the field there. These two properties reduce the computational complexity of computing the Hessian matrix - an essential ingredient for least squares migration. Here, we use these properties in order to construct a sparse target-data oriented local Hessian matrix. We demonstrate the method with numerical example with sparse data set, and compare it with full data set.



(a) Sparse



(b) Full

Images obtained using the (a)sparse and (b)full Hessian and data set.