



Marchenko redatuming: A novel approach to scaling factor estimation

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Marchenko redatuming has been presented as a tool to calculate up- and downgoing Green's functions inside of a medium using the surface seismic reflection response and a pair of auxiliary focusing functions. An estimate of the direct part of a downgoing focusing function is used together with the surface reflection data to iteratively construct the focusing functions and Green's functions at a desired virtual receiver position inside of the medium. The scheme requires the reflection data to be scaled by a factor which is typically unknown. We present a new optimization approach to find a suitable scaling factor based on optimum convergence of the 2D iterative redatuming scheme. We find that our method converges quickly compared to other published methods, which reduces its computational cost, and appears to be more robust with respect to the complexity of the medium. We demonstrate the performance of our method when faced with synthetic seismic data sets of increasing complexity.