



Extraction of multiple scattering Green's function using active sources and the application to seismic imaging

Ru-Shan Wu and Yaofeng He

(rwu@ucsc.edu)Earth and Planetary Sciences, University of California, Santa Cruz

Data collected on the surface for an array of active sources, such as the case of acquisition system in exploration seismology or crustal imaging, multiple scattering data are included in the records. However, usually the multiple scattered waves from targets are much weaker than the scattered waves from irregular subsurface sharp boundaries, including their primaries and multiples. In the standard imaging process, the images contributed from the useful multiple scattering signals are buried into the strong coherent noises. In this study, we propose a method to extract the useful multiple scattering Green's function at the sharp boundaries by suppressing the primaries. The process is consisted of backpropagation (refocusing) and cross-correlation. By this process we can numerically reacquire the data at the strong scattering points of the subsurface boundaries and then use the secondary scattered waves received at these points with sources from other scattering points to image the weakly illuminated targets by the surface sources. We demonstrated the theory and method by synthetic experiments of some simple scattering models. We also test the idea and method by using the 2D SEG-EAGE salt model data to improve the subsalt imaging. The results are encouraging and promising.