Amplitudes in seismic migration

Chris Stolk
Applied Mathematics, University of Twente
c.c.stolk@ewi.utwente.nl

Abstract

We discuss seismic migration theory based on the Born approximation. Denote by F the linearized forward map, that maps the mediumperturbation α (reflectivity) to linearized seismic data d. Under certain conditions the singularities of α can be reconstructed by migration methods based on ray calculations. This can be explained as follows. The normal operator $N = F^*F$ is pseudodifferential, with symbol that depends on ray-theoretic quantities, and that can be computed. A 'true-amplitude' migration method is then given by $N^{-1}F^*$. In wave-equation migration the rays are not explicitly computed, so the question is whether the factor N^{-1}, which acts as an amplitude factor and filter, can still be taken into account correctly, without computing the rays. In this talk we discuss different amplitude effects, due to aperture and geometrical optics in a variable coefficient medium, and ways of inverting for them.