

# Seismic interferometry by multi-dimensional deconvolution

by

Kees Wapenaar (Delft University of Technology)

Seismic interferometry has a wide range of applications, ranging from surface wave tomography using ambient noise, to creating virtual sources for improved reflection seismology. Despite its successful applications, the standard crosscorrelation approach also has its limitations. The main underlying assumptions are that the medium is lossless and that the wave field is equipartitioned. These assumptions are in practice often violated: the medium of interest is often illuminated from one side only, the sources may be irregularly distributed, and, particularly for EM applications, losses may be significant. These limitations may be overcome by reformulating seismic interferometry as a multidimensional deconvolution (MDD) process. We present a systematic analysis of seismic interferometry by crosscorrelation and by MDD. We illustrate both methods for controlled-source and passive data applications with numerical examples and discuss the advantages and limitations of both methods.