A WAVE THEORETICAL APPROACH TO THE ELIMINATION OF NEAR-SURFACE ANOMALIES (137)

C. P. A. WAPENAAR and A. J. BERKHOUT

The main assumption in pre-stack data processing is that the moveout curves in CMP gathers be hyperbolical. However, in marine as well as in land data, non-hyperbolic moveout curves often occur as a result of near-surface anomalies. These anomalies are caused by a low-velocity surface layer limited by a curved interface (seabottom, base of weathered layer, irregular topography). In practice a trace-to-trace alignment is often applied by means of a static correction process. This approach is not optimal, particularly for offset data.

In this paper a wave-theoretical dynamic correction process is proposed for the elimination of near-surface anomalies. By means of inverse wavefield extrapolation, CMP data are downward-continued to the base of the irregular low-velocity layer. Then, substituting the propagation velocity of the underlying layer, the CMP data are upward-continued to the surface. This velocity replacement procedure results in the elimination of the velocity discontinuity at the lower boundary of the surface layer.

Velocity replacement can be seen as a pre-processing technique for CMP data, transforming non-hyperbolic moveout curves in hyperbolic ones. During the presentation this important property is illustrated with examples.

Delft University of Technology, Department of Applied Physics, Delft, The Netherlands.