GEO 2006 Middle East Conference and Exhibition; 27-29 March, 2006; Manama, Bahrain

CRS-STACK-BASED SEISMIC IMAGING CONSIDERING TOP-SURFACE TOPOGRAPHY

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Summary. In the current situation of rapidly growing demand in oil and gas, on-shore exploration, even under difficult conditions, becomes again more and more important. Unfortunately, rough top-surface topography and a strongly varying weathering layer often result in poor data quality, which makes conventional data processing very difficult to apply.

As recent case studies demonstrated, the Common-Reflection-Surface (CRS) stack produces reliable stack sections with high resolution and superior signal-to-noise ratio compared to conventional methods. Particularly for land data, the increased computational expense required by the generalized high-density velocity analysis preceding the CRS stacking process may be worthwhile. In order to define optimal *spatial* stacking operators, the CRS stack extracts for every sample of the zero offset (ZO) section an entire set of physically interpretable stacking parameters. These so-called *kinematic wavefield attributes*, obtained as a by-product of the data-driven stacking process, can be applied to solve various dynamic and kinematic stacking, modeling, and inversion problems. By this means, a very flexible CRS-stack-based seismic reflection imaging workflow can be established. Besides the CRS stack itself, the main steps of this processing workflow are residual static correction, the determination of a macrovelocity model via tomographic inversion and limited aperture Kirchhoff migration.

The presented extention of the CRS-stack-based imaging workflow provides support for arbitrary top-surface topography. Both CRS stack and also CRS-stack-based residual static correction are applied to the original prestack data without the need of any elevation statics. Finally, a redatuming procedure relates the CRS-stacked ZO section, the kinematic wavefield attribute sections, and the quality control sections to a chosen planar measurement level. Thus, an ideal input for a preliminary interpretation and subsequent CRS-stack-based processing steps is provided.