We approximate the ‘recorded wave field’ by ray-theory synthetic seismograms. Then we apply ray-based Kirchhoff pre-stack depth migration to calculation of migrated sections in 2-D and 3-D single anisotropic velocity models.

Each velocity model is composed of two homogeneous layers separated by one curved interface. We use different types of anisotropy in the upper layer.

Computation of the recorded wave field in the model is performed using the ARASW software package (Kajino & Poushak, 1998). Two-point rays are calculated for reflected P-waves in models with isotropy (IV), transversely isotropic media with a horizontal symmetry axis (HTI), triclinic anisotropy (TA) and special case of nonelastic anisotropy (Mensch, 1995).

We use MODELL CRT, FORNAX and DATA packages for the Kirchhoff pre-stack depth migration (Cervený, Klima & Poushak, 1989; Bucha, 1999). The velocity model for migration is homogeneous.

We test Kirchhoff pre-stack depth migration in two ways: a) the anisotropy used for computation of the recorded wave field is the same as the anisotropy used for migration. b) the anisotropy used for computation of the recorded wave field differs from the anisotropy used for migration (for details see Bucha, 2010).

The velocity used for computation of the recorded wave field is the same as the velocity used for migration. Diffraction (for details see Bucha, 2010): The anisotropy used for computation of the recorded wave field differs from the anisotropy used for migration (for details see Bucha, 2010).

The 3-D model is simply derived from the 2-D model by extension in the perpendicular direction. The 3-D measurement configuration consists of 81 parallel profile lines.

We compute and stack migrated sections in 2-D plane (blue) located at the middle of the shot-receiver configuration.

The dimensions of the velocity models and measurement configurations are derived from the Marmousi model and dataset (Versieux & Grau, 1991).

The measurement configuration along each profile line is the same as for the 2-D measurement. The distance between parallel profile lines is 0.025 km. We also test measurement configuration with twice greater line step 0.05 km (4 profile lines).

KIRCHHOFF DEPTH MIGRATION IN ANISOTROPIC MODELS WITH A CURVED INTERFACE

Václav Bucha
Seismic Waves in Complex 3-D Structures
consortium research project, http://sw3d.cz
Department of Geophysics, Charles University, Prague, Czech Republic

Isotropy (IV)
P-wave velocity in the upper layer \( v_p = 2.5 \text{ km/s} \)

Two-point rays for selected shots 1, 120, 240

Detailed view for shot 1

Detailed view for shots 240 and 120

The anisotropy used for computation of the recorded wave field is the same as the velocity used for migration.

The anisotropy used for computation of the recorded wave field differs from the anisotropy used for migration (for details see Bucha, 2010).

The anisotropy used for computation of the recorded wave field is the same as the anisotropy used for migration. Diffraction (for details see Bucha, 2010): The anisotropy used for computation of the recorded wave field differs from the anisotropy used for migration (for details see Bucha, 2010).

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Detailed view for shot 1

Detailed view for shots 240 and 120

The anisotropy used for computation of the recorded wave field is the same as the anisotropy used for migration.

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