

FOCUSING PROBLEMS IN REFLECTION IMAGING OF THE CRUST

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Most crustal reflection surveys are high fold 2D crooked line profiles, and the reflectivity image is produced by some variant of common mid-point stacking. With typical recording parameters, the image should be highly sensitive to the required velocity model, at least in the upper crust. However, sharp focusing is rarely observed, and similar stacks can often be obtained over a wide range of velocities. Peaks in semblance may be observed for some reflections, but even though the events are strong enough to be visible on raw shot-gathers, maximum values are low and only part of the reflection signal survives into the stacked section. Among other consequences, this means that the amplitude and waveform studies on reflections may be faulty. We find that losses can be ameliorated by a mixture of improved correction of any time anomalies and more tolerant methods of combining trace signals. The philosophy is to stack data progressively from smaller to larger aperture, first using phase coherent stacking over limited offset ranges, followed by correction of time anomalies due to in-line and cross-line dip, and eventually using (if necessary) phase-insensitive amplitude stacking to include full aperture data. Tests have also been made of phase incoherence caused by complex reflector geometry. Examples of the problems and suggested remedies are given.