## Static correction issues for PS-wave surface seismic surveys

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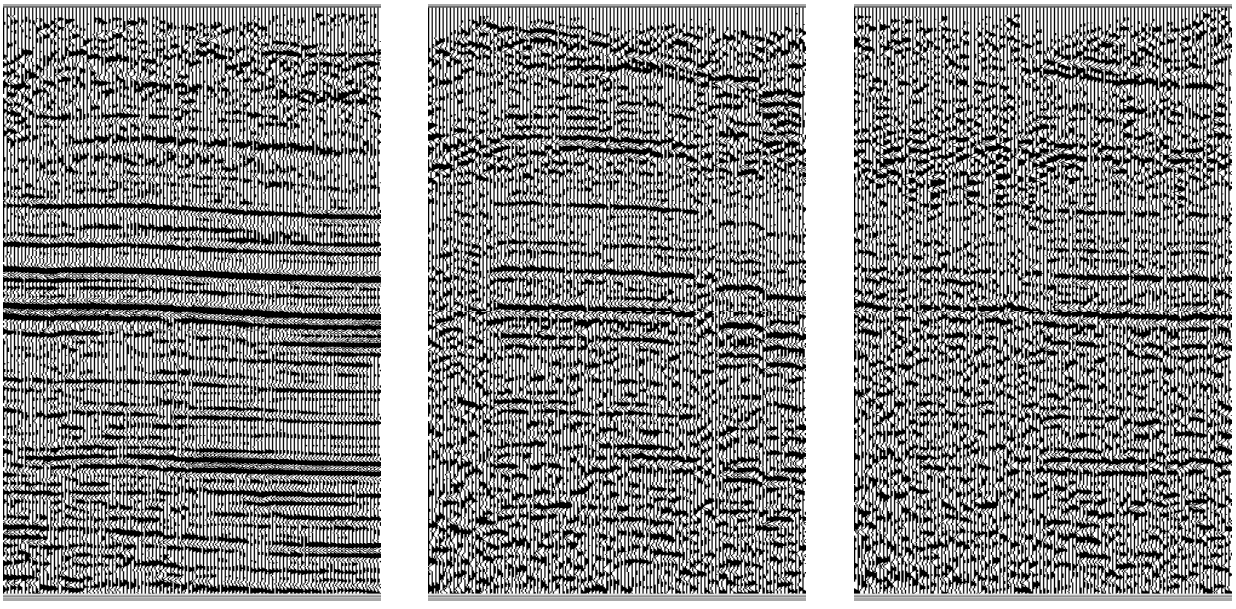
Several issues related to the calculation and application of surface-consistent static corrections are addressed in this presentation including datuming, long-period detector statics, and the integration of residual statics corrections with the CCP binning process. Each issue must be addressed during the processing sequence to properly position the prestack data for subsequent time or depth imaging. It is particularly important to resolve these static corrections prior to any prestack imaging that will destroy the surface-consistency of the data.

Proper datuming of PS-wave data using static time shifts can be inaccurate. This is particularly true when the source statics being used are the result of some method of refraction statics. Most refraction statics methods imply that the sources are repositioned at some intermediate datum below the weathering layer. This may not be appropriate for the shear-wave detector static correction. One solution that can help alleviate this inconsistency is the use of a different replacement velocity when calculating datum corrections for the detectors. In the absence of accurate near-surface velocity information, the choice of this replacement velocity can be challenging. Often the only way it can be determined is by scanning over reasonable values and selecting the best-stacked result. The offshore OBC case can present additional difficulty where water bottom topography is significant and a reasonable shear-wave replacement velocity for the water layer is needed.

Long-period shear-wave detector statics can be significant but are often difficult to estimate given the highly variable Vp/Vs values at the near surface. Conventional P-wave refraction statics methods are not generally useful due to the lack of easily picked, refracted shear-wave arrivals. One method available involves the use of P-wave common-detector stacks to estimate the geologic structure and correct the PS-wave data to match. To do this, the P-wave data must be stretched to simulate PS-wave time using some interpreted Vp/Vs. Cross-correlation methods may then be used to automatically calculate PS-wave detector statics. Figure 1 illustrates this procedure.

Finally, proper spatial positioning of the reflection point is critical in computing accurate residual statics. CCP binning methods that preserve surface-consistency must be iterated with residual statics computation and velocity analysis to improve convergence to a stable solution.



(a) (b) (c)

**Figure 1** – Common-detector stacks for a single detector line extracted from the Buffalo Valley 3-D/3-C survey. (a) Shows P-wave data stretched to PS-wave time, (b) shows PS-wave data with P-wave source statics applied and preliminary residual statics and (c) shows the same PS-wave data after automatic cross-correlation analysis using the P-wave data in (a) for structural control.