Polarization Filter by Eigenimages and Adaptive Subtraction to Attenuate Surface-Wave Noise

Stephen Chiu, Norman Whitmore, and Michael Gurch
ConocoPhillips, Houston, TX, United States
stephen.k.Chiu@ConocoPhillips.com

Abstract/Excerpt

Multi-component recording contains full wavefield information that can be used in polarizationnfiltering to attenuate surface-wave noise. The polarization filter used here is a station-by-stationbapproach that combines statics, signal-to-noise ratio, and eigenimages to construct a surfacewave noise model and then applies an adaptive subtraction to remove the noise. Statics and signal-to-noise ratio are two of the key components needed to construct a reliable noise model. Applications of this filter on synthetic and real data examples illustrate the effectiveness of this method.

A polarization filter that includes surface-wave modeling and adaptive subtraction effectively attenuates surface-wave noise on 3C data. The use of statics to align the 3C components within a station helps to better model the coherency of the surface wave. The signal-to-noise ratio constraint on the noise model minimizes the removal of primary energy and the use of adaptive subtraction improves the match between the noise model and input data. The filter is applicable to any acquisition geometry because it operates on a single station.