To BE® or Not to BE®

BE® (Bandwidth Extension) utilizes the Continuous Wavelet Transform (CWT) to model harmonics and subharmonics from the available bandwidth and convolves these with the seismic trace to recover both high and low frequencies. One to two octave improvements are very common.

BE® Highlights:

- *Superb at imaging thin beds, pinchouts and subtle faults*
- *Low frequency trends derived in a self-consistent manner*
- *Run both post-stack and pre-stack*
- *Amplitude preserving delivering great input to AVO and RockRes®*

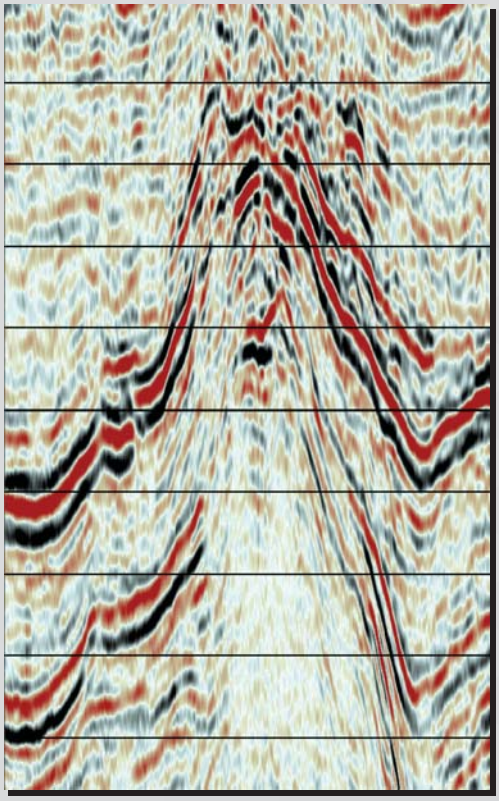


Figure 1
Input Data

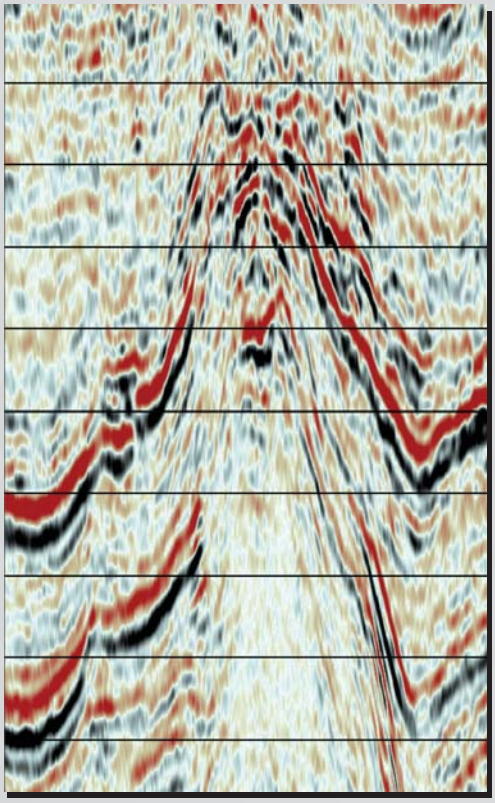


Figure 2
Low Frequency BE®

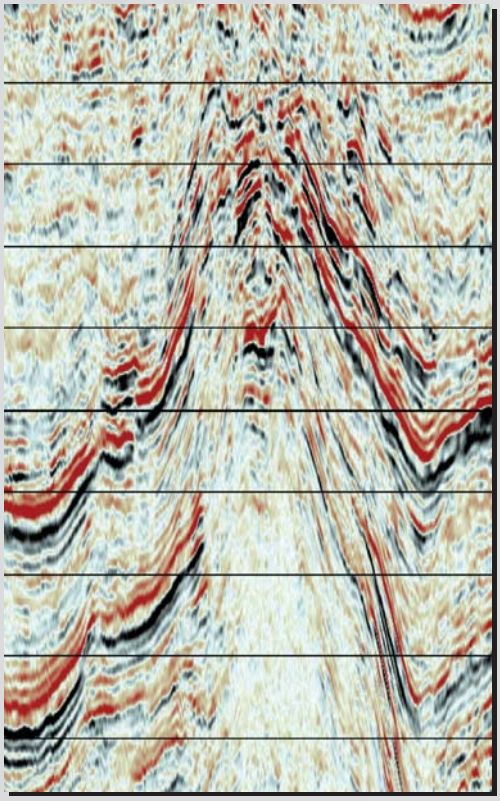
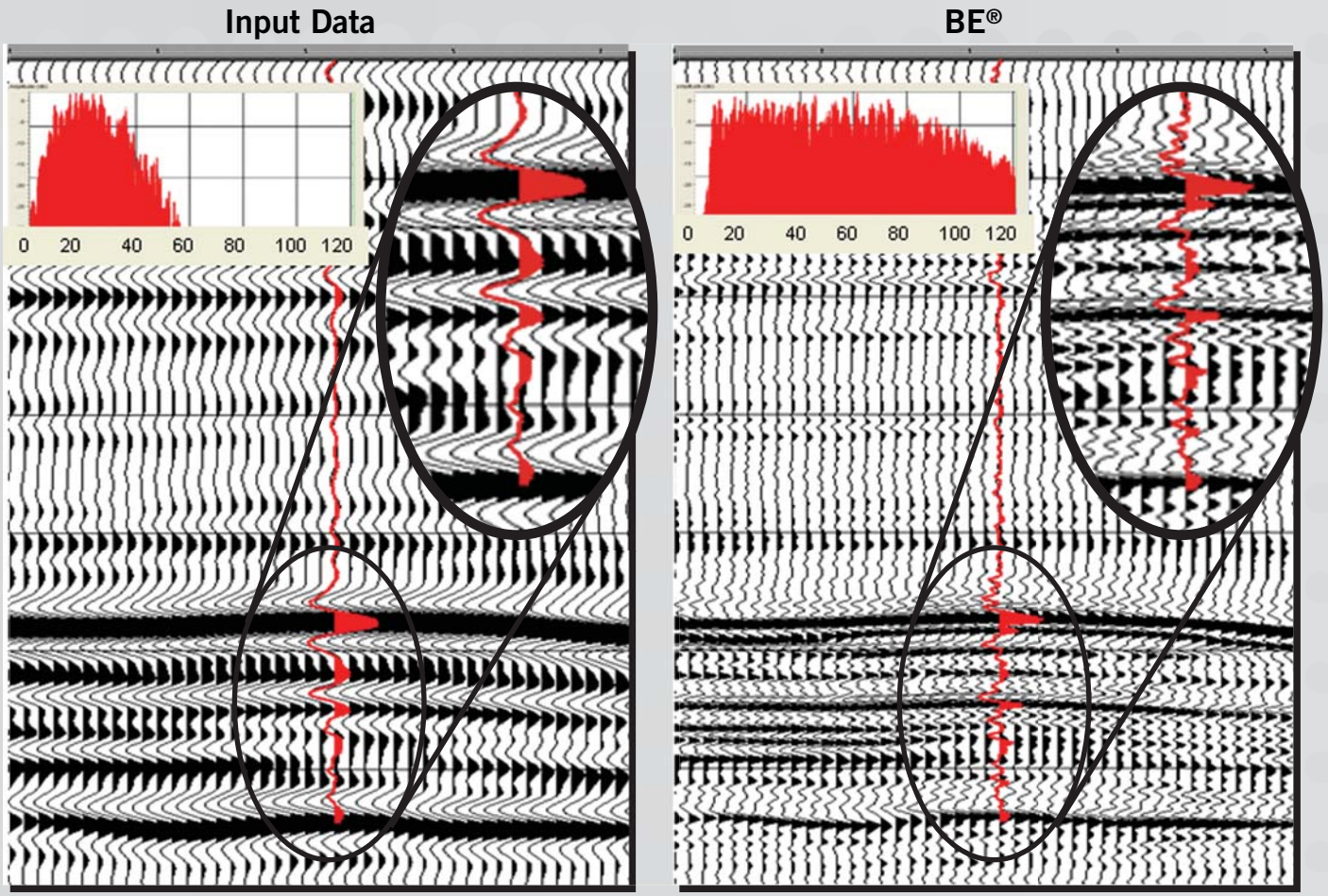


Figure 3
Low and High Frequency BE®

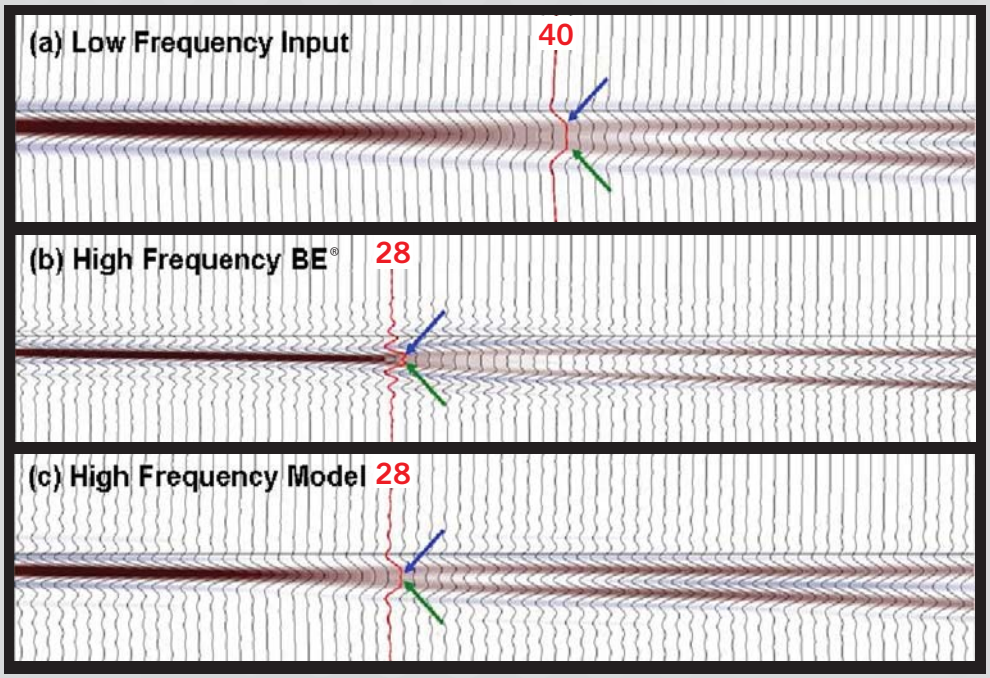
Figure 1 shows a salt dome from Breton Sound in offshore Louisiana before any bandwidth extension was applied. Figure 2 shows the result of applying BE® to extend the lower portion of the spectrum. The increase in bandwidth (lower end) reduced the “ringy" character evident in Figure 1. Figure 3 shows the results of applying BE® to the data in Figure 2 to extend the high frequency portion of the spectrum. The appearance of sharp minor faults, pinch outs, thin beds and other features that were previously unrecognizable in the lower frequency section are evident.

*Data is owned by Seismic Exchange, Inc., processing was performed for Cs Solutions, Inc.



Input data on the left with match-filtered synthetic overlaid resulted in a correlation coefficient above 70% and useable data to about 50 Hz. BE® on the right produces useable data to over 120 Hz and maintains a correlation coefficient above 70% with the match-filtered synthetic.

This method involves the modeling of higher and lower frequencies by computing the harmonics and sub-harmonics of the fundamental frequencies in the recorded data.



Wedge model (top and base reflectivity set to +1) before and after BE® and Ideal. Upper plot shows the model response at typical seismic bandwidth. The middle plot shows the result after BE®. The bottom plot shows the ideal high resolution model response. Note how the tuning region shrinks as a consequence of the higher resolution achieved by applying BE® and is comparable to the ideal model. The higher resolution allows the detection of thinner beds and subtle geological features.