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# Double The Value Of P-source Seismic Data

Bob A. Hardage, Bureau of Economic Geology, University of Texas-Austin Tuesday, January 3, 2017 - 7:00am  Print



In this time of economic stress across the oil patch, everyone is searching for techniques that can extract increased geological information from seismic data they already have or for methods that provide higher value seismic data across new prospects at the lowest possible cost. Seismic technology developed at the Bureau of Economic Geology provides options that allow these objectives to be realized for several types of land-based reservoir targets.

## Embedded images

The key concept that needs to be understood is that two separate independent seismic images are embedded in the responses of vertical geophones. However, only one of these images has been used for decades, this being the compressional (P-P) image. In this wavefield notation, the term P-P refers to data that involve a downgoing illuminating P wave and an upgoing reflected P wave.

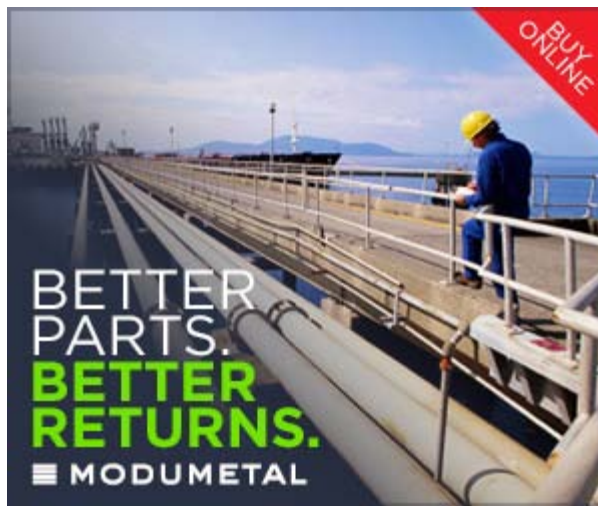
The other long-overlooked image that also resides in vertical geophone data is the “SV-P” image. This image is produced by a downgoing illuminating vertical shear (SV) wave that converts to a reflected upgoing P wave at rock interfaces. This is an important point about P-P and SV-P data. Both wavefields involve an upgoing P mode, and P modes are recorded by vertical geophones. Thus, for decades seismic interpreters have used only 50% of the image information that resides in vertical geophone data. In tough economic times it is not wise use of exploration dollars to ignore half of the geological information that is available in P-source vertical-geophone data.

## How SV-P data are created



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