Tu A01

Broadband Seismic - Has It delivered on Its promise?

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SUMMARY

Much has been said about broadband seismic. The initial excitement has passed, and now we should take time to reflect on what we have learned, what we have gained from the new technologies, and whether our new data have lived up to our expectations. First, I will present a brief history of broadband. What did “broadband seismic” mean in 2005, or in 2010, and what does it mean now?

Introduction

Much has been said about broadband seismic. The initial excitement has passed, and now we should take time to reflect on what we have learned, what we have gained from the new technologies, and whether our new data have lived up to our expectations. First, I will present a brief history of broadband. What did “broadband seismic” mean in 2005, or in 2010, and what does it mean now? We have gone from timidly avoiding the ghost notch by towing shallow, to boldly towing at depths that put the notch right in the middle of our usable spectrum. Which are the key technological advancements that have led us here, and which have been superseded or have fallen out of favor? What can we expect and what should we demand from our future surveys?

Secondly, many promises have been made about broadband, both by contractors eager to sell new products, and by geophysicists anxious to convince their managers to spend money on “better” seismic (present company included): “less acquisition down time”, “more high frequencies”, “more low frequencies”, “up to six octaves of bandwidth”, “no side lobes”, “less noise”, “fewer multiples”, “better data for inversions”.

Has broadband delivered? I will show a few examples from Statoil’s broadband portfolio from Brazil and the rest of the world that illustrate to what extent the data have delivered on these promises.

Figure 1 Comparison of 3D seismic data quality – data from the North Sea.

The uppermost figure displays vintage 3D seismic data. These data are not deghosted. The lowermost figure corresponds to 3D broadband data (deghosted).

When compared to conventional, broadband acquisition and processing, in this example, provide improved signal to noise ratio and a clearer definition of the overburden of the reservoir. These improvements can be seen e.g in the data within the square, the channel on the right, and the areas highlighted by the white arrows.