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Interpretation 101: How to tie a well to Seismic

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Summary

Well tie to seismic is one of the first and basic (but very important) steps in the process of Seismic Interpretation and Seismic Characterization. The process very often is overlooked, and the consequences not comprehended.
In this talk we will explore the basics of the well tie to seismic, starting with some basic seismic acquisition and processing concepts, definition and type of wavelets and a case study that will show the impact of using a wrong estimation of the time-Depth relationship (obtained from the well-tie process) in future workflows such as seismic inversion. We will explore the effect on using different wavelets in simple workflows such as synthetic gather generation, and the consequences it may represent if we force to stretch-squeeze events.

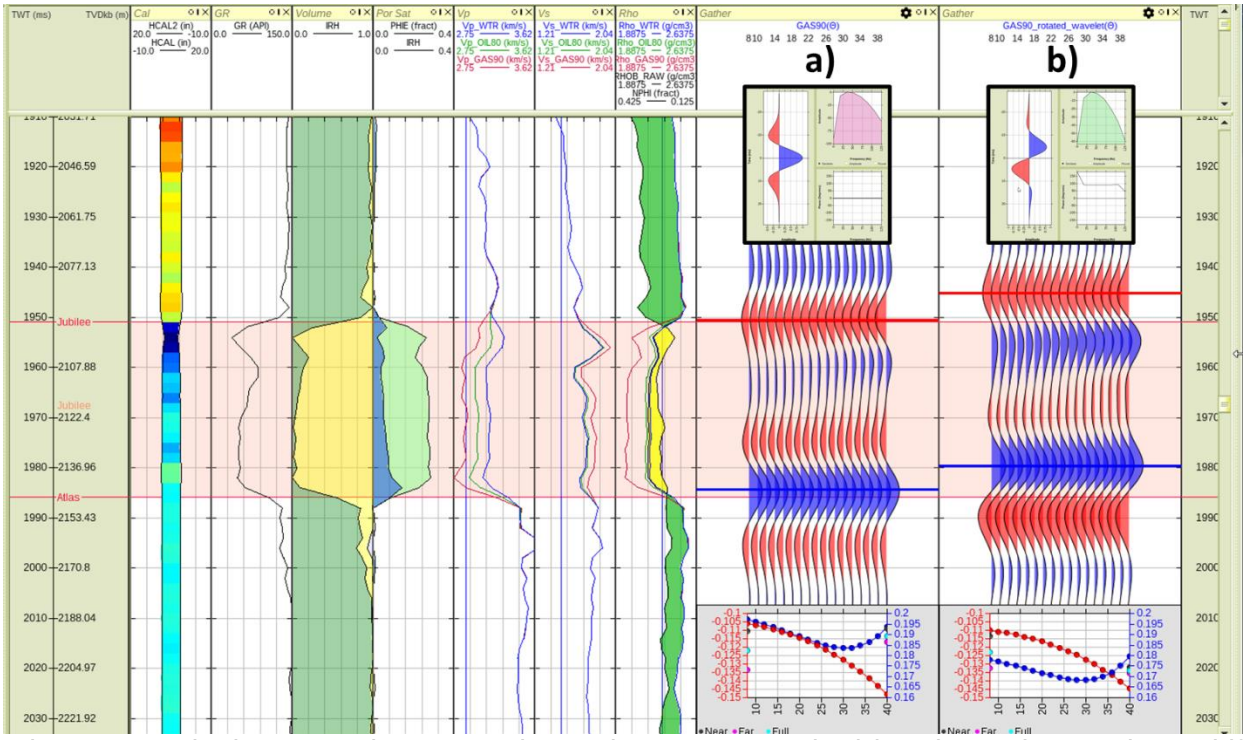

Figure 1. Synthetic AVO gather generation. Using a zero wavelet (a) and a 90 degree phase shift wavelet (b)

Figure 1 shows the effect on synthetic AVO gather generation using two different wavelets. The top and base of the reservoir is characterized by different events: a) a through and a peak for the zero-phase wavelet case and b) close to zero crossing in the case of the 90-degree phase rotated wavelet. Hence the importance of knowing the type of wavelet that describe the seismic data to avoid unnecessary stretch-squeeze and change of the velocity field.

In this workflow we will touch concepts such as NMO stretching, frequency balancing and stretch-squeeze, and the effect this have on the velocity field and wavelet estimations.
Concepts like Statistical and Deterministic wavelets will be introduced to participants and special emphasis will be giving to the Roy White's method to extract deterministic wavelets.

References

Reference Style (use Arial 9pt normal)