Seismic Frequencies: a Robust Interpretation Tool

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Amplitude and Frequency are the main seismic attributes that are being used in seismic interpretation and stratigraphic analysis. The amplitude attribute which is a layer boundary attribute was being studied in both pre-stack and post-stack domains. However, the utilization of the frequency attribute which is an intrinsic attribute not like the amplitude attribute is not as popular. I think both of the attributes compliments each other.

In this paper, I want to shed light on some of the uses of seismic frequency data in the interpretation field and how robust it is in providing important tool to map reservoir quality, thickness and fluid type.

Pre-stack frequency analysis is one of the tools investigated. I found that using mid offset stack attenuation attribute is the best in mapping areas with excellent reservoir filled with gas. This can be attributed to the quality of the data, less multiple effects and less noise, and might be also related to the angle of incidence.

Post-stack data were also investigated and I found that frequency tunning phenomenon can be used to map pinch-outs which can be used to delineate channels or any other geological features. We have extended this knowledge to even estimate thickness of thin reservoirs.