Time-Frequency Decomposition and Q Attenuation for Direct
Hydrocarbon Detection on Seismic Data

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SUMMARY

None

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Timefrequency

decomposition applied to seismic data has opened new possibilities for seismic interpreters, especially by facilitating the identification of sedimentary features and for their influence on the spatial resolution. Additionally, these methods have renewed the interest for finding a method for direct detection of hydrocarbons on seismic data, since decomposing data by its frequency content can make appear the attenuation associated with fluid content in rocks, specially for gas saturated reservoirs, which is shown on seismic sections in the effect known as “LowFrequency Gas Shadows”.

This paper have made an approach to these interesting issues, based on study and comprehension of tools such as Short Time Fourier Transform (STFT) or Continuous Wavelet Transform (CWT) for spectral analysis of seismic data, to know limitations and possibilities of its inclusion as complementary tool of a methodology for direct modeling of the problem of Q attenuation, generating seismic attributes that respond to the phenomenon of interest, testing its efficacy on different modeled conditions, by application of theoretical principles as Gassman's fluids substitution, reflectivity variation with incidence angle variation by using Zoeppritz Equations approximations, etc.