Superimposed Geologic Features in Seismic Interpretation

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In seismic interpretation, accurate identification of geological features builds a better understanding of subsurface geology, which turns a prospect into a success. Most often geological features are superimposed on a seismic map because of geophysical and analysis parameters, or geologic complexities. Additionally, the seismic data is always band-limited and it is often hampered by noise. If the geologic features (e.g. channels, faults, and other structural and/or stratigraphic features) are superimposed together with noise, interpretation and finding scientific explanations can become difficult. The issue is primarily in 3D analysis, which has its own merits but it adds misleading elements and pitfalls in interpretation. These problems can include limited observation, loss of evidences, and reservoir distribution. The first challenge in interpretation is to resolve the problem by distinguishing the features from one another (improving resolution and definition). In this paper, few examples are presented to demonstrate the issue. Solutions to the problem of superimposed features are sought by applying advanced seismic interpretation techniques. Several of the workflows are proposed here. To remove noise and improve the visibility of geologic features, a structurally oriented filter is applied. The resolution problem is improved by applying spectral enhancement and spectral decomposition, which have improved the efficiency of algorithms and seismic attributes. Apparent seismic attributes and spectrally enhanced seismic data are also considered as the optimal choices to improve the results. This paper attempts to present various workflows as solutions to the issues that would indirectly help the industry to manifest such problems in prospect identification.