Merging Technologies – High Resolution Seismic Inversion

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Abstract

Throughout the development and evolution of inversion methods, there has been a continued interest in combining inversion techniques, such as neural nets, seismic attributes and pattern recognition with other methods, toward better resolution of reservoir properties. Typically, the techniques have been cascaded - inversion has been run followed by something else. The idea has been to try and extract every last bit of information from the input data sets. The various methods have been difficult to assess, because of the wide variety of inversion methods which have been used. Recently, disparate techniques have been united within a common inversion framework. Levering upon the often subtle patterns discernible from a multi-channel (i.e. multi CDP) analysis, effective resolution can be increased. The methods work for both post-stack and AVO and can incorporate well information formally or not. When incorporating well logs *a priori*, the methods take on many of the attributes of geostatistical simulation. As resolution is pushed to its limits, it must be understood that there can be no single answer, only a collection of probable answers. The new technologies recognize this and in fact, the variability between realizations can be used to compute a probability of occurrence for reservoir properties of interest. All of this sounds very geostatistical, although upon closer examination, there are differences.

We will briefly review the theory of geostatistical inversion and show how the new methods adapt to and extend it. Examples of both post-stack and AVO high resolution inversion will be presented.