SEAM: The SEG Advanced Modeling Project

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Date & Time : 16:00 - 17:00 Feb 15, 2010 on Monday
Place : Research Center for Earthquake and Volcanic Eruption, Annex Bldg. #1 Meeting Room
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Abstract :

In his 1977 EAEG Presidential Address, P. N. S. O’Brien, research geophysicist with British Petroleum, wrote that all exploration geophysics is based on modeling, and our models are always wrong. This situation continues to be true today. What has changed, however, has been (1) the degree of complexity understood about subsurface structure, stratigraphy, and anisotropy, (2) the size, complexity, and detail of models that can be generated in practice, and (3) the ability to process large data sets with remarkable accuracy. Despite these advances in capability to address geophysical modeling on an unprecedented scale of complexity and size, to even begin to model the geophysical properties of the Earth’s subsurface anywhere near its true level of complexity and to model geophysical data that would be obtained for such properties is beyond the practical capability of any single company in the petroleum industry.

The SEAM Consortium is currently generating synthetic seismic and non-seismic datasets over a deep-water, Gulf of Mexico type sub-salt reservoir structure. These datasets will allow researchers to effectively and efficiently assess individual, as well as joint, geophysical acquisition and processing techniques for generating images of hydrocarbon reservoirs beneath and surrounding massive, complex salt bodies. Model dimensions are 40 km by 35 km in the horizontal directions and 15 km deep. For the model, a complex salt body, extracted from a field data set provided by one of the SEAM Participants, has been modified to include a number of features known to accentuate sub-salt imaging challenges. Formation boundaries have been established with geological input provided by active industry interpreters. A synthetic geostatistical grid derived to have characteristics similar to those of a high-quality deepwater region has been used to assign rock properties derived from a comprehensive deepwater well-log database, and reservoir bodies, representative of Gulf of Mexico geology, have been inserted into this stratigraphic background.

Issues related to model development, numerical simulation and reliability, quality control and data storage will be described.