



PHYSICS SEMINAR

Recent Advances in Geophysics

The Application of Marine Controlled-Source Electromagnetics to Petroleum Exploration



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Cancelled

Abstract: For more than a century, successful exploration for oil and gas has greatly benefited from a large number of technical breakthroughs from a wide array of scientific disciplines. New sophisticated prospecting methods have been developed and applied to help discover large reserves hidden in ever more complex geological settings. Exploration seismology has played a dominant role in this progress. As signal processing techniques advanced to allow successful use of large signal-to-noise ratios, the domain of exploration seismology expanded in the 1970s and 1980s from being a predominantly subsurface structural delineation domain to one that provides inference capability to directly identify subsurface fluid types, such as the ability to distinguish between oil, gas, and brine ahead of drilling. Much progress has been made in this area, but the uncertainty level associated with this identification problem remains substantial. For example, in certain geological settings such as thrust belts where the risk of inadequate hydrocarbon retention is large, the ability to distinguish between a high-saturation oil scenario and a low-saturation gas scenario is crucial. In such settings, available seismic tools for direct hydrocarbon identification are incapable of distinguishing between the two hypotheses mentioned above. Very promising progress towards a solution for this longstanding problem has been made in the last few years via the application of another geophysical technology unrelated to the seismic method—namely, controlled-source electromagnetics. Early years of the 21st century have witnessed a significant breakthrough leading to a substantial improvement in the ability to evaluate hydrocarbon retention risk in a number of complex geological settings, especially in deep-water environments. In this presentation, we give a brief historical and technical overview of the progress achieved by the application of various geophysical techniques to increase the probability of success in oil and gas exploration, with special emphasis on the fluid identification problem and the role played by recent advances in controlled-source electromagnetics to solve an important longstanding scientific problem.

2223 Chamberlin Hall • Monday, September 15, 2008 • 1:00 P.M.
cookies & coffee served at 12:30 p.m.