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Stratigraphic and Structural Controls on Fracture Distributions: Examples from California Basins

by

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ABSTRACT

Natural fractures have long been recognized as critical elements for production from many California reservoirs. Most Monterey Formation shale reservoirs rely on fractures for permeability, and in some fields these fractures provide significant storage capacity. Fractures also play an important but sometimes overlooked role in fluid flow within sandstone reservoirs, particularly those in secondary recovery phases such as waterflooding.

Fractures typically are distributed as a hierarchy of structural elements comprising the fracture network, ranging from microfractures to bed-bounded fractures to large multi-layer features and faults. Many aspects of the fracture network are predictable with an understanding of rock properties and stratigraphic stacking (mechanical stratigraphy), and the deformation history experienced by the rocks. We develop our conceptual framework by integrating outcrop observations with subsurface data (primarily image logs and core). These data are the basis for geologic and simulation models designed to predict fluid flow and well behavior.

This topic was the subject of field trip #15 offered in conjunction with the AAPG Long Beach Convention this past April. If you missed that event, this is a chance to catch the condensed version. If you did go on the trip, you can sit back and reminisce about 2 days along the coast, and look for yourself in some of the photos!

BIOGRAPHY

Jon has a B.S. in geology from Duke University (1980), and received his M.S. (1982) and Ph.D. (1992) from the University of Southern California. He began working with Exxon in 1982, with a wide range of assignments in exploration, production, and research. His main expertise is stratigraphy and reservoir characterization and his first exposure to Monterey fractures began in 1983! In 2000 Jon started working for Occidental characterizing the siliceous shale reservoirs at Elk Hills. Last year he joined Aera Energy LLC, and is currently involved with reservoir studies at the Ventura Avenue field.