Moving Targets – Petroleum System Modeling in Central California

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Abstract

Central California is a region rich with unique and intriguing geological features, as well as an abundance of wealth in hydrocarbon resources. But some of these geologic features also complicate our ability to model the region's basin histories, predict additional petroleum reserves, and explain the accumulations we see today. This presentation will explore the challenges in modeling the Salinas Basin, where two of California's noteworthy geological traits exist. First, this Neogene basin's history is profoundly impacted by strike-slip tectonism, manifested as basin-scale oblique-slip faults and related compressional folds. Secondly, stratigraphy is dominated by the ubiquitous biosiliceous Monterey Formation, which primarily comprises thermodynamically unstable forms of silica, making it prone to diagenetic alteration. The progressive, tectonically-driven evolution of the basin shape and the unstable nature of its sedimentary fill require an integrated and dynamic approach in assessing the burial and petroleum system history. We present a new method that integrates three-dimensional basin modeling with strike-slip fault motion. We will also present one- and two-dimensional burial history models that incorporate silica diagenesis. Wellbore, outcrop and seismic reflection data constrain the basin model parameters and boundary conditions. These numerical models align with conceptual models of basin history, and are self-consistent with inorganic and organic calibration indicators.

Bio

Tess Menotti is a PhD candidate in the Geological & Environmental Sciences Department at Stanford University under advisor Professor Steve Graham. Her interests lie in exploring the interplay of tectonics and petroleum system development. Her current research investigates the integration of strike-slip tectonism and silica diagenesis in modeling the Salinas Basin, California. Tess is a Pennsylvania-native, with a B.S. in Geosciences from Penn State University, and prior work experience in the shale gas play of the Appalachian Basin.