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A Mass-Balance Organic Geochemistry Approach to Characterizing Hybrid Unconventional Plays: Examples from the Montney and Green River Formations

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Unconventional oil and gas plays range from true source-rock mudstones with little to no reservoir lithofacies to tight conventional reservoirs with little to no source rock potential. Most unconventional systems fall somewhere along this spectrum and can be considered hybrid plays. Quantifying the degree of self-sourcing and/or hydrocarbon migration are critical for spatially characterizing the variability of hybrid systems. Several mass-balance organic geochemistry techniques are employed here to quantify hydrocarbon generation for comparison to resource in place and to produced oils. Two disparate formations and basins are used as examples: the Triassic Montney Formation (marine) of the Western Canadian Sedimentary Basin and the Eocene Green River Formation (lacustrine) of the Uinta Basin. These case studies highlight the importance of correctly characterizing unconventional systems and suggest implications ranging from identifying migration pathways to horizontal well-placement strategy.

Biography

William R. Drake is senior geologist with Kimmeridge Energy, focusing primarily on asset-scale to basin-scale characterization of stratigraphy, source rocks, and overall petroleum systems in most of the basins from Texas to western Canada. He holds a B.S. in geological science from the University of California, Santa Barbara and an M.S. in Geology from the University of Northern Arizona, where he researched the extensional tectonics and stratigraphy of Baja California Sur and the southern Gulf of California. Before Kimmeridge, Bill worked for Pioneer Natural Resources, QEP Resources, and Jonah Energy. Bill also served RMAG for five years as Executive Editor for the Mountain Geologist.