

Practical Applications of Natural Gas Isotope Geochemistry Across the Oil and Gas Well Life-Cycle

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Abstract

For almost a century, the stable isotopes of carbon have been used to discern important processes in the carbon cycle. For many decades, applications in petroleum geology and geochemistry have been developed. With the onset of exploration, development and production of tight oil and gas plays, the use of stable isotopes and the interpretation this technology provides to help with petroleum systems interpretations has become an integral component of our work process.

This presentation provides a comprehensive look at multiple applications of natural gas isotope geochemistry through the life-cycle of a well. Understanding single or multiple petroleum systems at work within an exploration play is aided by understanding the fluid geochemistry among multiple formations. Regional development of a play can be impacted by fluid type prediction. Oil, wet gas, dry gas can exhibit multiple accumulation mechanisms. Knowing fluid type ahead of drilling operations can greatly influence development decisions. Monitoring production can help to discern compartmentalization, communication and the efficiency of horizontal well spacing. Pre/post monitoring of near surface waters and production gases provide critical understanding of the complexity in hydro-carbon generation in the subsurface.

We continue to use this well-established technology to help the oil and gas industry create efficiencies in this challenging economic environment.