



Evaluation of Near-Surface Gases in Marine Sediments to Assess Subsurface Petroleum Gas Generation and Entrapment

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Summary

Gases contained within near-surface marine sediments can be derived from multiple sources: shallow microbial activity, thermal cracking of organic matter and inorganic materials, or magmatic-mantle degassing. Each origin will display a distinctive hydrocarbon and non-hydrocarbon composition as well as compound-specific isotope signature and thus the interpretation of origin should be relatively straightforward. Unfortunately, this is not always the case due to in situ microbial alteration, non-equilibrium phase partitioning, mixing, and fractionation related to the gas extraction method. Sediment gases can reside in the interstitial spaces, bound to mineral or organic surfaces and/or entrapped in carbonate inclusions. The interstitial sediment gases are contained within the sediment pore space, either dissolved in the pore waters (solute) or as free (vapor) gas. The bound gases are believed to be attached to organic and/or mineral surfaces, entrapped in structured water or entrapped in authigenic carbonate inclusions. The purpose of this talk is to provide a review of the gas types found within shallow marine sediments and examine issues related to gas sampling and extraction. In addition, the talk will discuss how to recognize mixing, alteration and fractionation issues to best interpret the seabed geochemical results and determine gas origin to assess subsurface petroleum gas generation and entrapment.

