

When Seismic is Not Available: Hydrocarbon Microseepage Surveys Focus Drilling Strategies for Mid-Continent Operators

Brooks Rountree and Daniel Hitzman
Geo-Microbial Technologies (GMT), Ochelata, OK

Working as exploration detectives, Mid-continent operators often gather clues from old drilling logs and “mature” seismic data. As they re-discover overlooked or under-explored trends, the cost of new seismic is often prohibitive for their small-scale and low-cost strategies.

Integrating hydrocarbon microseepage surveys with their traditional tools helps screen good prospects from bad.

Microseeps occur when light hydrocarbon gases (methane, ethane, propane, and butane) leak through reservoir seals and travel vertically to the surface. The size and bouyancy of these gas molecules and the natural permeability of reservoir seals and micro-fractures makes this “gas chimney” a measurable signature from surface soil and rock samples. Concentrations and characteristics of light hydrocarbon gases lead explorers to apical (not halo) surface anomalies -- distinguishable with either oil or gas or condensate reservoir sources. Additionally, microseep signatures are not preferential to structural reservoirs. Subtle stratigraphic accumulations are easily reflected by microseepage analyses leading operators to overlooked prospects previously screened by structure-only seismic interpretations.

Multiple examples and microseepage survey strategies will be presented from recent Mid-continent case studies.