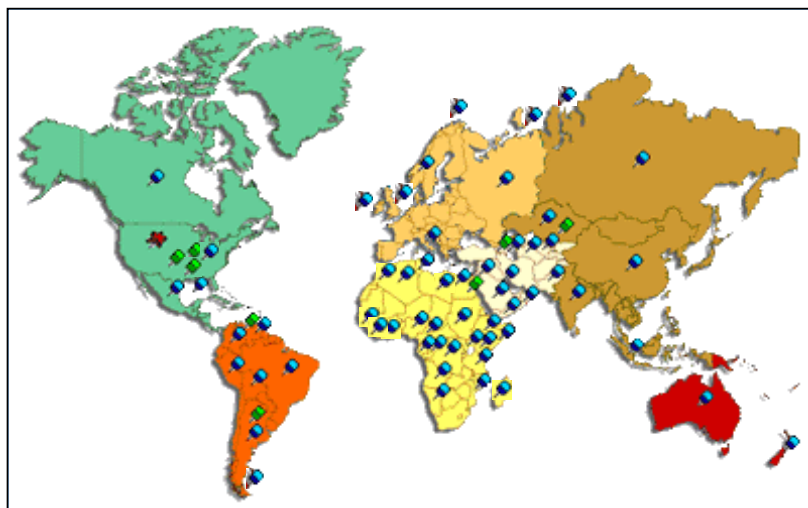




Petroleum Systems International, Inc.
interpretive and analytical services



Geographic summary of our global experience base ◆, strategic affiliates ◆, and headquarters ★

Prospectus for
Basin Studies
and
Petroleum Systems

*461 E 200 South, Suite 103
Salt Lake City, UT 84111*

Phone: (801) 322-2915

Fax: (801) 322-2916

www.petroleumsystems.com

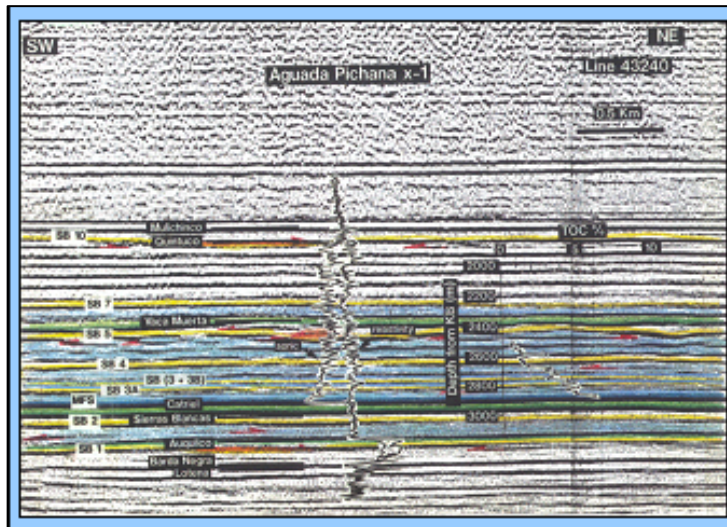


Collection of Miocene source rocks in Central Caspian (Dagastan) region.

Laboratory Services

PSI is well known to maintain the highest standards for geochemical analysis. This applies to routine screening runs as well as the most sophisticated analysis. A number of advanced analytical and interpretation methods have originally been developed by PSI staff. Our goal is to deliver quality products that provide the client with solutions to their most ambitious demands.

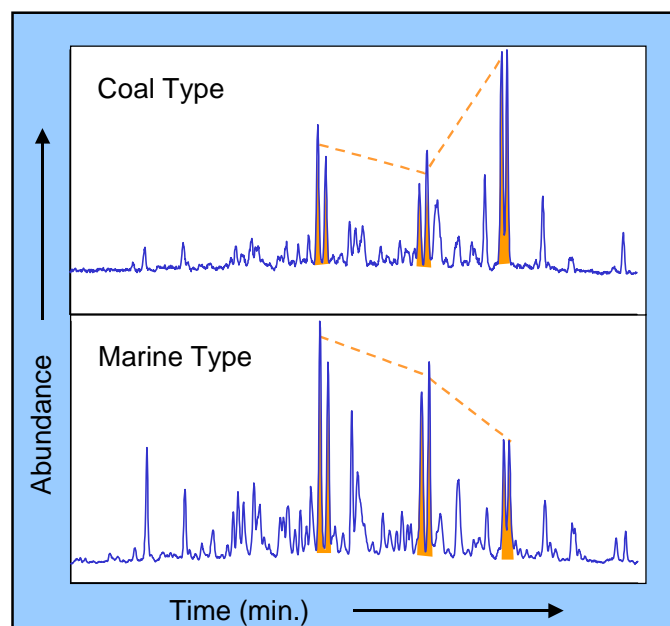
- Sample Preparation and Description
- Gas Analysis - Molecular and Isotopic
- Bulk Character - TOC, REval, Sulfur, Elemental, LC
- Fluid Properties - API, Pour Point, Viscosity, etc.
- Quantitative Gas Chromatography - FID, TCD, FPD
- Quantitative Gas Chromatography- Mass Spectrometry
- Optical - Reflected and Transmitted Light
- Thermal Extract-GC, Pyrolysis-GC/MS
- Water Analysis - Compositional and Isotopic
- Bulk and Compositional Kinetic Kerogen Analysis
- Analytical Technique Development - Special Challenges
- Database Development and Organization
- Construction of Mobile Laboratories & Well Site Ops
- Reservoir Bitumen Density Determination - Well Log Applications
- Global Database of Reference Oils and Source Rocks
- Specialists in Reservoir-scale Geochemistry



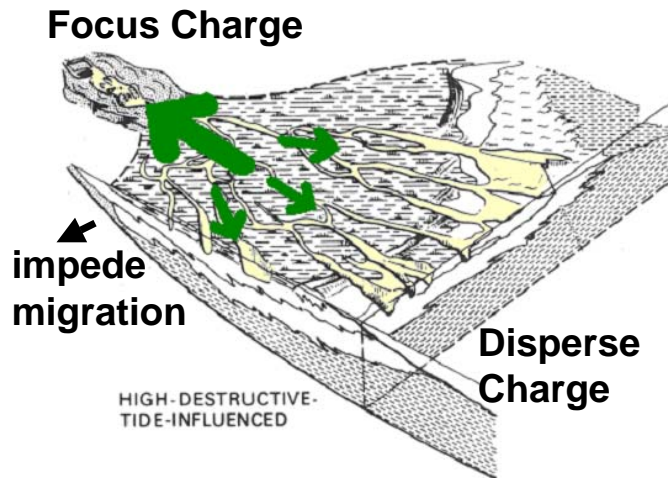
Integration of seismic, well logs, and geochemical data to facilitate petroleum systems analysis of Neuquen Basin (Argentina).

Organic Geochemistry

Organic geochemistry is the discipline responsible for characterizing organic components found in geologic systems. PSI routinely completes projects focusing on gas, liquid (oil and condensate), and rock modules. Each module provides analytical data to fulfill the stated objectives of the client. Whenever possible, we advocate the use of existing data and technology to increase its value *before* applying additional and more sophisticated analysis. Often times, the data to answer the question already exists in the files, but the right person has not looked at the information in the proper context. We combine off-the-shelf technology with expertise in developing *creative solutions* to provide our clients with products that answer key questions to reduce exploration risk. Our modules can be stand-alone or be integrated into multi-disciplinary consortiums such as those organized with our the strategic affiliates.



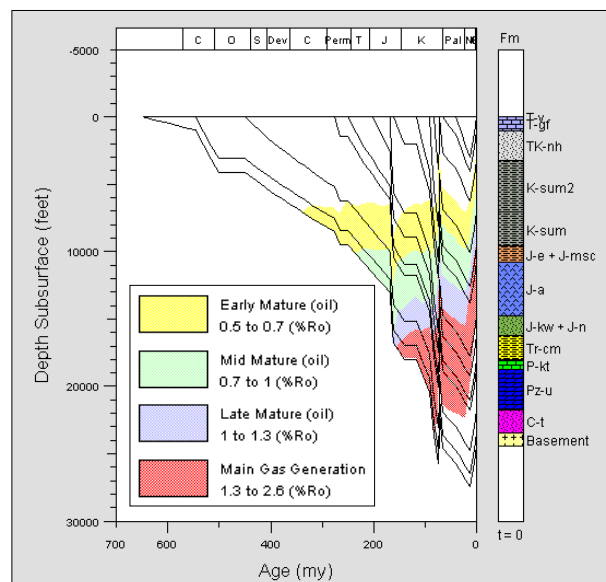
Biomarker analyses (steranes) to illustrate two end-member oil types correlated to Cretaceous source rocks in the Wind River Basin (Wyoming).



Depositional systems control the sedimentary fabric that influence the efficiency migration (channel character adapted from Morse, 1994).

Petroleum Systems

The geologic elements of a petroleum system include the petroleum source rock, reservoir rock, sealing units, and overburden rock. Geologic processes include a mechanism for trap formation, and those factors that drive the generation, migration, and accumulations of hydrocarbons. Accurate coordination of these elements and processes in time and space is critical to the exploration risk assessment process. At PSI, we maintain the perspective that organic geochemistry is only one of the disciplines used in petroleum systems analysis. This underscores our philosophy in coordinating input and collaborating with the client and/or other specialists/consultant companies. Projects involving PSI staff have a global reputation of providing the highest quality technical service, and lead the market in emphasizing the quantitative aspects of petroleum systems analysis.



Example of 1-D basin model output to determine timing for hydrocarbon generation for a well on the Colorado Plateau.

Technical Capabilities:

1. *Source Rock Assessment*
- richness, thermal maturity, oil- vs. gas-prone
2. *Predictive Source Rock Models*
- extrapolation with seismic methods
3. *Geochemical Inversion*
- age, depositional environment, generation temp.
4. *Petroleum Systems Assessment*
- risk analysis and volumetrics
5. *Prospect / Play Analysis*
- critical elements and processes
6. *Basin Modeling - Input Parameters & Verification*
- 1-, 2-, and 3-D methods
7. *Field-Based Sample Collection*
- source rocks, seeps, oil and gas samples
8. *Regional, Basin, and Local-Scale Projects*
- global experience in key geographic areas
9. *Reserve Analysis - Basin-Scale*
- assignments to quantify petroleum systems
10. *Field Size Assessments - Migration Efficiency*
- time-slice analysis
11. *Migration Pathway Analysis*
- sedimentary fabric and grain determination
12. *Shale Gas, Shale Oil, and Coal Bed Methane*
- resource potential, gas charge risk
13. *Offshore Piston Core Evaluation*
- high grade prospects, risk assessment
14. *Compilation / Integration of Databases*
- proprietary and public domain
15. *Global Database of Oils and Source Rocks*

Contact:

David A. Wavrek, Ph.D.
Petroleum Systems International, Inc.
dwavrek@petroleumsystems.com

461 E 200 South, Suite 103
Salt Lake City, UT 84111

Phone: (801) 322-2915
Fax: (801) 322-2916

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About Us:

David A. Wavrek, Ph.D.

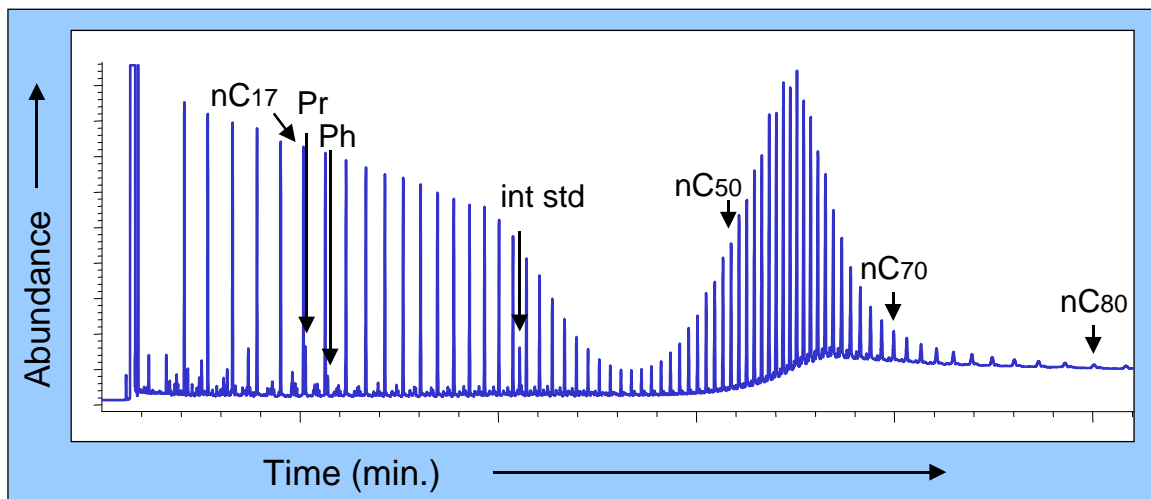
David Wavrek received his Ph.D. from the University of Tulsa in 1992, where he developed geochemical technologies that refine the quantitative aspects of petroleum systems analysis. Since the mid-80's, he has been conducting geochemical and petroleum systems analysis throughout the world (30+ countries) for clients that span mega-majors to independents. He has served as a Continuing Education instructor for the AAPG (2000-2007) in the disciplines of petroleum systems and reservoir geochemistry. He is currently president of *Petroleum Systems International, Inc.* – an oil field services company that develops and applies timely solutions to energy company problems by integrating disciplines of geochemistry, geology, and engineering.

Strategic Affiliates

The strategic affiliates of PSI represent a group of premier service providers in key international markets that work cooperatively as an integrated project team. Their global presence provides PSI clients with a competitive advantage of working with an organization that combines global experience, the latest technologies, and local knowledge. The affiliate companies provide expertise in all geologic disciplines, biostratigraphy, petrophysics, geophysics, and operations.

More Information

Additional details about the PSI project team are available at www.petroleumsystems.com. This includes a graphic display of our global expertise to the basin-scale, prospectus for various non-exclusive spec studies, and a summary of our professional activities in the form of down-loadable abstracts and papers.



Quantification of waxes responsible for abandonment of the Flat Mesa field (Uinta Basin) by high temperature gas chromatography.