

Advanced Petroleum Geochemistry

In-Person Course List of Modules:

1. Introduction to petroleum geochemistry
2. Source rock deposition and maturation
3. Hydrocarbons generation and expulsion
4. Recognising and characterising source rocks
5. Introduction to the p:IGI+ geochemical interpretation software
6. Relevance of geochemistry for BPSM
7. Workshop 1: Source rock characterisation
8. Introduction to molecular geochemistry
9. Analysis in molecular geochemistry
10. Introduction to biomarkers
11. Workshop 2: Laboratory report
12. Contamination of oils
13. Biomarkers and source
14. Biomarkers and depositional environments
15. Biomarkers and source rock lithology
16. Quiz: Biomarker interpretation
17. Workshop 3: Using biomarkers to interpret source and environment
18. Age-diagnostic biomarkers
19. Workshop 4: Age and environment biomarkers
20. Fundamentals of molecular maturity
21. Maturity assessment: Biomarkers
22. Maturity assessment: Aromatic hydrocarbons
23. Maturity assessment: Gasolines and diamondoids
24. Maturity overprinting by leaching
25. Workshop 5: Biomarker maturity
26. Petroleum migration and alteration
27. Fractionation, biodegradation, and alteration of petroleum
28. Workshop 6: Biodegradation

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29. Stable carbon isotope geochemistry of petroleum
30. Oil-oil and oil-source correlations
31. Oil-oil and oil-source correlations examples and case histories
32. Workshop 7: Oil-oil correlations
33. Recognising and deconvoluting mixtures
34. Reservoir and production geochemistry
35. Introduction to hydrocarbon gas geochemistry
36. Assessing the source and maturity of hydrocarbon gases
37. Migration, mixing and biodegradation of hydrocarbon gases
38. Workshop 8: tracing the origin of wet and dry gas
39. OPTIONAL WORKSHOP MODULE: “Live” interpretation of a selected proprietary case study (proprietary to the company)

Online Courses List of Modules

1. Introduction to molecular geochemistry
 - a. Types of molecules in molecular geochemistry
 - b. Sampling for petroleum geochemistry
 - c. Sample preparation for molecular analysis
 - d. Molecular analysis
 - e. Gasolines, aromatics and diamondoids
 - f. Introduction to biomarkers
2. Interpreting biomarkers
 - a. Types and origins of biomarkers
 - b. Biomarkers and organic matter sources
 - c. Biomarkers and depositional environment
 - d. Biomarkers and lithology
 - e. Age-diagnostic biomarkers (1) – Steranes
 - f. Age-diagnostic biomarkers (2) – Other compounds
3. Molecular indicators of maturity
 - a. Fundamentals of molecular maturity parameters

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- b. Biomarker maturity parameters
 - c. Aromatic hydrocarbon maturity parameters
 - d. Gasoline and diamondoids maturity
 - e. Maturity overprinting by leaching
- 4. Alteration of oils
 - a. Biodegradation – General concepts
 - b. Biodegradation – Physical and bulk changes
 - c. Biodegradation – Molecular changes
 - d. Phase fractionation
 - e. Water washing
 - f. Migration distance markers
- 5. Correlations
 - a. Introducing stable carbon isotopes
 - b. Concepts of correlation
 - c. Molecular parameters for correlation
 - d. Correlation – Multivariate statistics
 - e. Example PCA correlation
 - f. Correlation case study - Brazil
- 6. Reservoir geochemistry
 - a. Introduction to reservoir geochemistry
 - b. Methods in reservoir geochemistry
 - c. Contamination of oils
 - d. Recognising mixed maturity
 - e. Charging and compartmentalisation
 - f. Production geochemistry