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COURSE BROCHURE

# Sandstone Provenance and Diagenesis Training Course

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Barcelona

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Registered in the United Kingdom and Saudi Arabia

# Sandstone Provenance and Diagenesis Training Course

**Ref:** 2908_110840 **Date:** 18 – 22 October 2027 **Location:** Barcelona **Fees:** 6200 GBP

Sandstone Provenance and Diagenesis is a 1-week training course for geologists and petrophysicists who must explain why porosity and permeability change between wells in clastic reservoirs, producing a diagenetic sequence and reservoir quality interpretation. Mature sandstone fields and deeper exploration targets both depend on predicting where pore space survives burial. Jupiter Prime Training approaches the subject from grain to reservoir.

## Why Sandstone Provenance and Diagenesis Matters Now

Three forces shape the subject today. Exploration is moving to deeper, hotter sandstones where quartz cement and illite growth can destroy permeability, so drilling success depends on forecasting pore preservation before the well. Infill and waterflood decisions in mature fields need explanations for tight streaks and baffles that logs alone cannot give. Thin-section, electron microscope and heavy mineral studies are often contracted out, which leaves asset geologists to judge their meaning. Teams that link source area, burial path and cement history choose better well locations; teams that skip it treat every low-permeability zone as random.

## Who Gains Most from Sandstone Provenance and Diagenesis

- Geologists who describe cores and build depositional and petrographic interpretations
- Petrophysicists who explain mismatches between log porosity and measured permeability
- Exploration geoscientists who risk reservoir presence and quality at prospect stage
- Development geologists who map rock types and property trends for static models
- Specialists who commission and interpret petrographic laboratory studies

Subsurface groups gain most when the core geologist and the petrophysicist of the same asset attend together.

## Sandstone Provenance and Diagenesis Capabilities

The outcomes follow a sandstone from its source terrain through burial to the pore network that a well finally meets.

- Assess detrital framework composition and heavy mineral suites to infer source terrain — exploration fairway mapping
- Calculate compaction and cementation losses from point-count data — porosity prediction at depth
- Design a paragenetic sequence from textural relationships in thin section — reservoir quality explanation
- Weigh quartz overgrowth, carbonate cement and authigenic clay effects on permeability — completion and stimulation choices
- Apply temperature and burial history to forecast pore preservation — prospect risking
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Communicate rock quality trends to modelling and drilling colleagues — well placement

## Key Sandstone Provenance and Diagenesis Terms

- Provenance — the source area of sandstone grains, inferred from detrital minerals, rock fragments and heavy mineral assemblages.
- Detrital framework — the quartz, feldspar and lithic grains deposited with the sand, before any burial change.
- Paragenetic sequence — the ordered history of compaction, dissolution and cement growth reconstructed from thin-section textures.
- Intergranular volume — the space between framework grains, used to separate porosity lost to compaction from that lost to cement.
- Quartz overgrowth — silica cement growing in optical continuity on detrital quartz grains, common in deeply buried sandstones.
- Grain-coating chlorite — authigenic clay rims on grains that can inhibit quartz cement and preserve porosity at depth.

## Sandstone Provenance and Diagenesis Day by Day

## Day 1: Source Terrain and Sediment Supply

- Tectonic Setting And Sand Composition Diagrams — Placing Reservoirs In Basin Context
- Quartz, Feldspar And Lithic Fragment Point Counting — Classifying The Detrital Framework
- Heavy Mineral Assemblages And Ratios — Tracing Separate Sediment Sources
- Weathering And Transport Effects On Composition — Judging Original Grain Mineralogy
- Provenance Correlation Between Wells — Testing Sand Body Connectivity

## Day 2: Petrographic Methods

- Thin Section Preparation And Blue Dye Impregnation — Revealing Visible Pore Types
- Scanning Electron Microscopy Of Clay Habits — Identifying Pore-Bridging Illite
- X-Ray Diffraction Of Bulk And Clay Fractions — Quantifying Mineral Content
- Cathodoluminescence Imaging — Separating Detrital Grains From Quartz Cement
- Petrographic Sampling Plans Along Core — Linking Samples To Facies

## Day 3: Burial Processes and Porosity Loss

- Mechanical Compaction And Grain Rearrangement — Estimating Intergranular Volume Loss
- Chemical Compaction And Pressure Solution — Locating Silica Sources
- Quartz Overgrowth Kinetics With Temperature — Forecasting Cement At Target Depth
- Carbonate And Anhydrite Cement Distribution — Mapping Tight Streaks And Baffles
- Feldspar Dissolution And Secondary Porosity — Assessing Real Versus Apparent Pores

## Day 4: Clays and Reservoir Quality Links

- Kaolinite, Illite And Chlorite Growth Histories — Predicting Permeability Damage Risk
- Grain Coats And Porosity Preservation — Ranking Deep Prospect Quality
- Pore Throat Size From Mercury Injection — Relating Cement To Flow Capacity
- Petrographic Rock Typing For Static Models — Assigning Properties By Diagenetic Facies
- Fines Migration And Swelling Clay Sensitivity — Guiding Completion Fluid Choice

## Day 5: Practising the Diagenetic Sequence and Reservoir Quality Interpretation

- Point-Count Data Set From A Cored Well — Splitting Compaction And Cement Losses
- Burial And Temperature History Plot — Timing Each Diagenetic Event
- Provenance And Cement Maps Across A Field — Explaining Interwell Quality Trends
- Prospect Quality Forecast For An Undrilled Target — Setting Porosity Ranges
- Diagenetic Sequence And Reservoir Quality Interpretation — Presenting Results To The Asset

## Applying Sandstone Provenance and Diagenesis After the Course

- Rebuild the paragenetic sequence for one cored well from existing thin sections and point-count sheets.
- Compare intergranular volume and cement volume across key wells to explain a known permeability trend.

## Sandstone Provenance and Diagenesis Questions FAQ

### What is sandstone provenance and diagenesis and why does it matter now?

It is the study of where sandstone grains came from and how burial changed them into today's reservoir rock. It matters now because deeper targets and mature fields both need pore preservation forecasts that logs cannot supply.

### Which roles gain most from sandstone provenance and diagenesis?

Core geologists, petrophysicists and exploration geoscientists gain most, especially those who commission petrographic studies or must explain permeability trends to modelling teams.

### How does sandstone provenance and diagenesis differ from a carbonate reservoir geology course?

It focuses on clastic grains, quartz and clay cements and compaction in sandstones, whereas carbonate courses deal with limestone and dolomite fabrics, dissolution and dolomitisation.

### What do you bring back from sandstone provenance and diagenesis?

You bring back a dated paragenetic history and a reservoir quality explanation for a cored well, plus a method for forecasting porosity in undrilled sandstone targets.

## Sandstone Provenance and Diagenesis: The Way Forward

The diagenetic sequence and reservoir quality interpretation first informs which zones and prospects deserve porosity ranges different from the regional trend. Development geologists, petrophysicists and exploration teams use it when placing wells and building static models. After its first use, revisit the burial temperature assumptions, because new well data often shifts the timing of quartz cement.