

***Geopressure:
Prediction, Analysis and Risk Assessments for E &P
(5 days)***

Course Description

This is the most comprehensive course using the basic models of geology, rock-mechanics and hydrodynamics to predict and appraise subsurface geopressure and, consequently, evaluate your prospect risk pre-and post-drilling.

It focuses on **know how** to calculate and run your own pore pressure prediction and analyses, based on a geo-scientific foundation, rather than software design. The course applies a new method of calculating pore pressure and also discusses some of the pitfalls related to specific widely used applications.

The course proceeds from the known (measured pp) to the unknown (predicted pp). It explains the development of the subsurface geopressure compartments with depth and their impact on hydrocarbon entrapments, drilling prognoses and risk assessment.

With the knowledge gained from this course you will be able to QC the measured and predicted in put-data. You will also learn how to use the seismic velocities and the petrophysical data from offset wells to build the prediction model for a wildcat proposed location. We will lay down the foundation of establishing the prediction variables and exponents needed for each individual basin. Moreover, the course examines in depth the calibration process of the prediction model during and post drilling. Mud weight, casing programs and anticipated drilling challenges will be discussed.

Supra salt, sub-salt models, fault seals, Strat-geopressure fairways, and geopressure impact on AVO assessment are some of the main topics of this course. Moreover, the distribution of geological basins world wide and their impact on the geopressure profiles are discussed in case history forms.

Who should attend?

Geologists, geophysicists, drilling and reservoir engineers, well log analysts, basin-model specialists, managers, and support staff involved in exploration, development and drilling.

Learning outcomes:

1. Understand the causes, concepts and graphic representations of the geopressured and hydrodynamic systems
2. QC and calculate predicted pore pressure in shale (PPP) and their correlation to measured pressure in sand (MPP).
3. The impact of the geological setting on geopressure compartmentalization, hydrocarbon entrapments, and disparity between MPP and PPP.
4. Understand the impact of Salt emplacement and displacement on PPP.
5. Comprehend that prediction models and exponents do not apply equally world wide, and the impact of the global geological setting on hydrocarbon entrapments.

Course information:

- New approach to causes, models and definitions
- Geopressure vs. Hydrodynamics
- Pore pressure plots (PSI and PPG MWE), including some of their pitfalls
- PP-FP direct and pertinent measurements
- Transgression, regression, P decay, Centroid, and hydrocarbon effect
- Models and Methods used for PP prediction
- Data needed for PP prediction:
 - Overburden vs. PS especially in Salt Basins
 - Defining Top of Geopressure
 - Normal Compaction Trend (NCT) delineation and pitfalls
 - Assigning a model for PP-FP prediction
- Emphasis on the **Effective Stress Model** and Eaton's relationship
- PP predictions calibration methods

- **Technique used for PP and FP prediction**
 - ✓ Pre-drilling: Building the geological blocks
Seismic velocity-Qualification for PP predictions
Prediction model from seismic and offset wells
Limitations and pitfalls
 - ✓ While drilling: Calibration using direct and pertinent data
Model inversion for the purpose fine adjustment
 - ✓ Post-drilling: Compartmentalization, risk assessment and appraisal.

- **Analysis and applications for Lead and Prospect evaluation**
 - ✓ Compartmentalization, seal effectiveness and retention capacity
 - ✓ Transgression and regression
 - ✓ Geopressure compartmentalization vs. hydrocarbon entrapment
 - ✓ Strat-Geopressure Fairways analysis
 - ✓ AVO assessment due to subsurface geopressure profile
 - ✓ Supra-Sub Salt stress models and their application for PP-FP prediction
 - ✓ Build 2D and 3D geopressure models
 - ✓ Faults sealing capacity in relation to type and angle
 - ✓ Reserve and reservoir management
 - ✓ Drilling casing, and mud programs
 - ✓ Anticipated drilling challenges due to compartmentalization
 - ✓ Challenges in deep water and HTHP environments
 - ✓ Appraisal of the un-drilled offset structural segments on the prospect.

- **Global case histories and their implications:**
 - ✓ Gulf of Mexico/Trinidad
 - ✓ Continental North America
 - ✓ Mediterranean Basin and North Sea
 - ✓ Australia and Far East

Exercises, interpretations and analyses are conducted using case histories from the shelf and deep water in **analog** and **digital** formats.

Attendees need laptop with Microsoft Excel and imaging application (for example: Paint or Imaging for Windows etc).

“ I enjoyed the class on geopressure and found it to be most helpful and I came away with new ideas on working with service companies on geopressure “

John Rogers, Senior Geological Advisor, Petrobras America Inc.,2007

“ I enjoyed the class and learned a lot from you.”

Dr. Rone Shu, iMOSS Project Manager, Rock Solid Images., 2007