

# Best Practices in Pore Pressure and Fracture Pressure Prediction (G043)



## Tutor(s)

[Richard Swarbrick](#): Manager, Swarbrick GeoPressure.

## Overview

This course presents best practices in how data and standard techniques are combined to generate meaningful pore pressure (PP) and fracture pressure (FG) estimates from log, seismic and drilling data, and to use them to develop pre-drill predictions. The limitations are addressed, along with common pitfalls, leading to an understanding of the uncertainty and risk associated with PP and FG prediction.

The course begins by showing the types and reliability of subsurface data used to inform current knowledge, which will also calibrate PP and FG predictions at a remote location. Standard approaches to PP and FG prediction techniques are taught, with careful attention to where these have limitations on account of subsurface environment (thermal, tectonic) and data quality. A new approach to PP prediction using shales is taught as an independent guide to expected PP, especially valuable where only seismic data are available. Prediction of FG is taught by showing how to determine overburden stress and apply standard relationships, including new approaches with PP-stress coupling.

## Duration and Logistics

**Classroom version:** A 2-day classroom course comprising a mix of lectures and discussion (90%) and exercises (10%). The manual will be provided in digital format, and participants will be required to bring a laptop or tablet computer to follow the lectures and exercises.

**Virtual version:** Four 3.5-hour interactive online sessions presented over 2 to 4 days. A digital manual and exercise materials will be distributed to participants before the course. Some reading and several exercises are to be completed by participants off-line.

## Level and Audience

**Intermediate.** Intended for exploration and development geoscientists, petrophysicists, operations staff and drilling engineers. Familiarity with oilfield data and drilling practices is required. Experience shows that mixed classes of geoscientists and engineers benefit particularly from the discussions and sharing of approaches in this multi-disciplinary area of work.

## Objectives

You will learn to:

1. Distinguish the different types and quality of data that populate pressure-depth and EMW-depth plots for display of pressure predictions and calibration data in well planning.
2. Use best practice to create PP estimations and predictions from seismic, log and drilling data using standard porosity-based techniques, and from modelling geological systems.
3. Use best practice to create FG estimations and predictions by generating an overburden and

establishing its relationship with FG and PP.

4. Communicate Min-Expected-Max predictions effectively to both geoscience and engineering/operations staff involved in well planning.

## Course Content

### Session 1

- Introduction
- Pressure-depth and EMW-depth plots
- Geological context for pressure regimes

### Session 2

- Methods for estimation and prediction of PP using:
  - seismic velocities
  - wireline and drilling-conveyed log data
  - drilling including real-time monitoring
  - modelling

### Session 3

- Best practice PP prediction
- Methods of estimation and prediction of FG
- PP - FG coupling and new methodology for FG
- Best practice for FG

### Session 4

- Well planning - assessing a range of predictions (Min to Max)
- Global examples
- Uncertainty and risk

*Exercises of varied duration and complexity are given throughout the course to consolidate and improve participants' learning.*