Modelimi i Rezervuareve te Patos-Marinzës

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Content

Motivation

This is a work in progress

- Intro to Petrophysics
- Oil Reservoir Physical Parameters
- Actual quantities that monitored
- The Black-box model and reverse engineering
- Preliminary results.

- Oil industry plays a big role in the Albanians' economy.
- Oil engineers have developed different techniques/methods to improve the oil extraction efficiency from a given reservoir.
- Oil extraction industry requires minimizing costs
- Practical experience and the mathematical modelling are crucial:
  - for developing strategies of how an oil reservoir should be used
  - predicting the mid-long term behaviour of the reservoir
  - estimating the feasibility of oil extraction
- We focus here on Polymer injection methods

Questions

- How much oil is in the reservoir?
- How much oil can one extract from the reservoir?
- What is the cost per unit volume?
- Is it financially feasible?

These are hard questions with no simple answers. The answers of these questions incorporate engineering experience and mathematical modelling to estimate confidence intervals on different physical parameters.

Introduction to Petrophysics

Petrophysics

Petrophysics Definition

It studies:

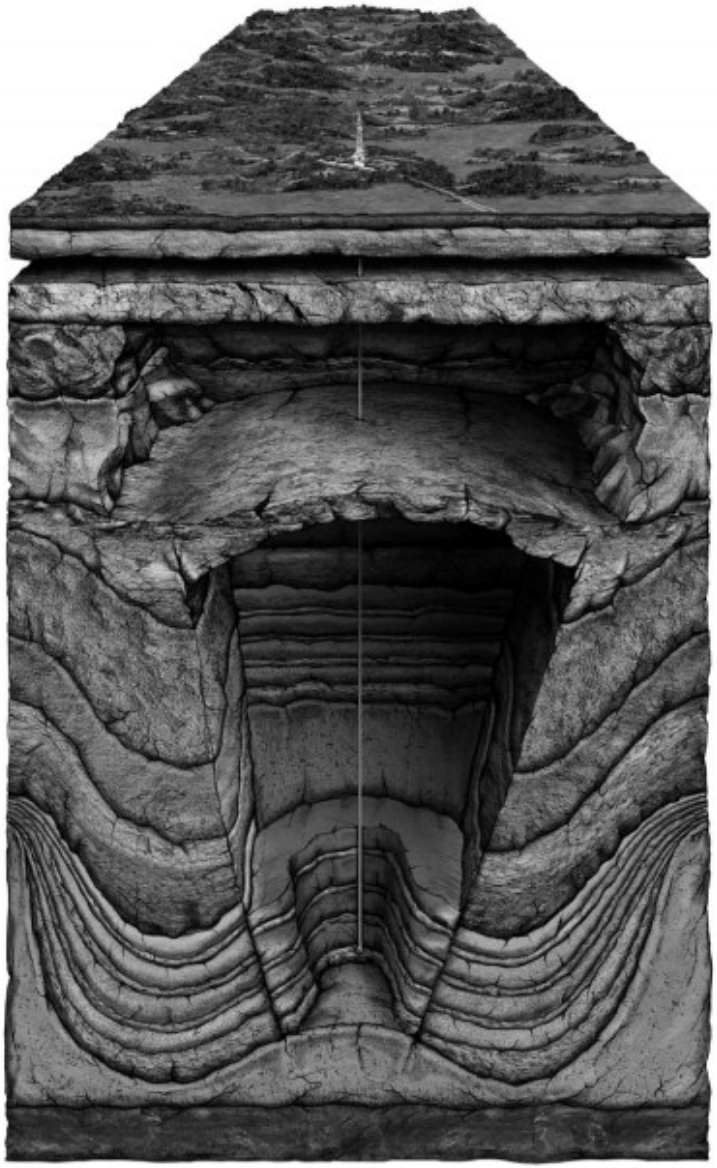
1. Physical properties of the **reservoir fluids** (oil, gas and water) at high pressure and temperature as well as the law that governs their phase-changing.
2. Physical properties of the **reservoir rocks** (porosity, permeability, saturation, and sensibility of the formation rocks).
3. Physical properties of **multiphase fluids in porous media** and their seepage mechanisms.

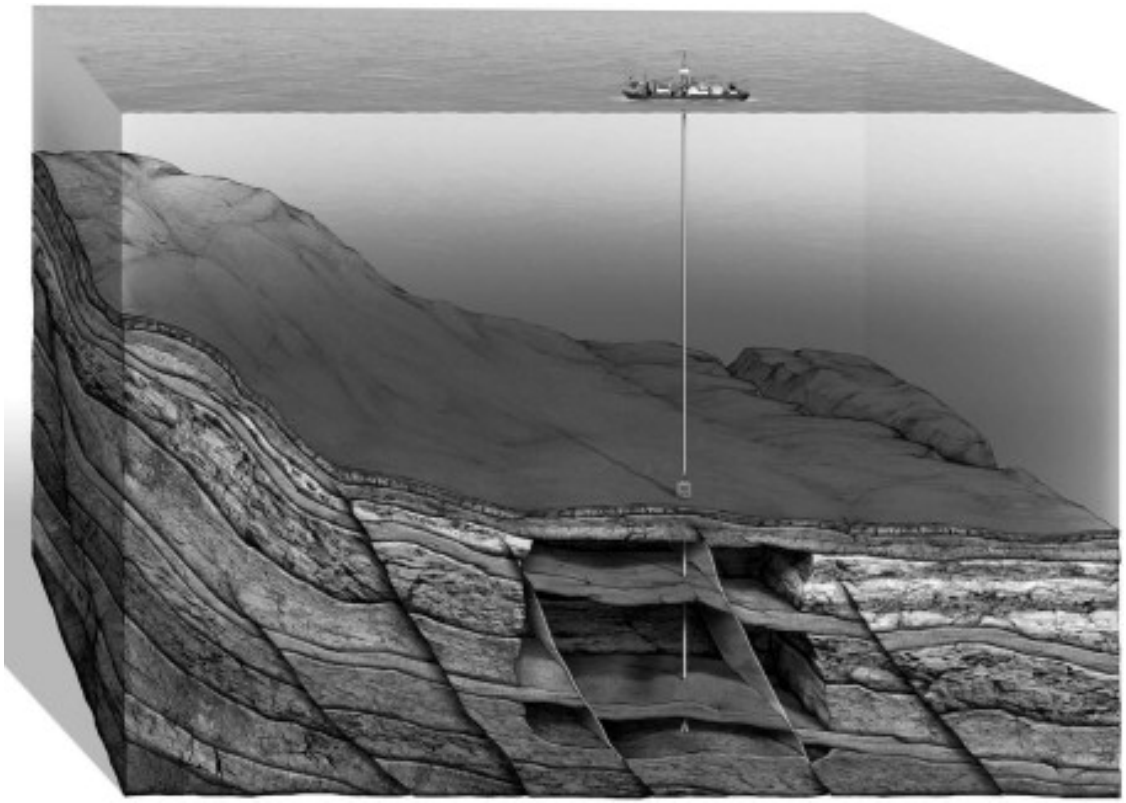
Petroleum Reservoir

Reservoir Definition

- A petroleum reservoir is **geological structure** which consists with **formation rock**, which is a **porous medium, and the oil and gas is contained in the porous medium**.
- The reservoir is **buried thousands of meters below the earth surface**, the reservoir fluids are under states of **high pressure and high temperature**.
- The **crude oil dissolves large volume of gas**, therefore, the physical properties of the underground reservoir fluids are vastly different from those in the surface.

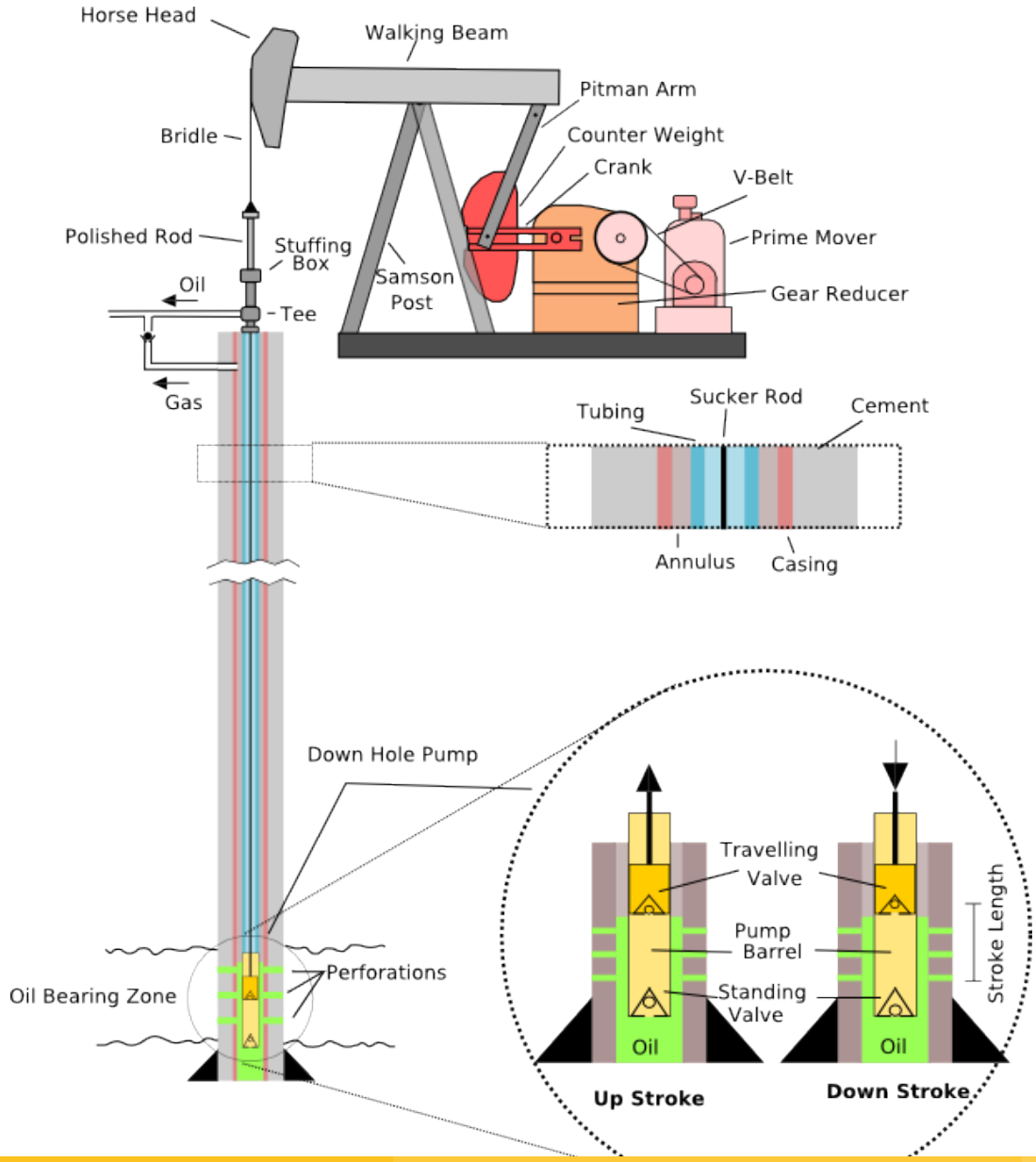
Petroleum Reservoir



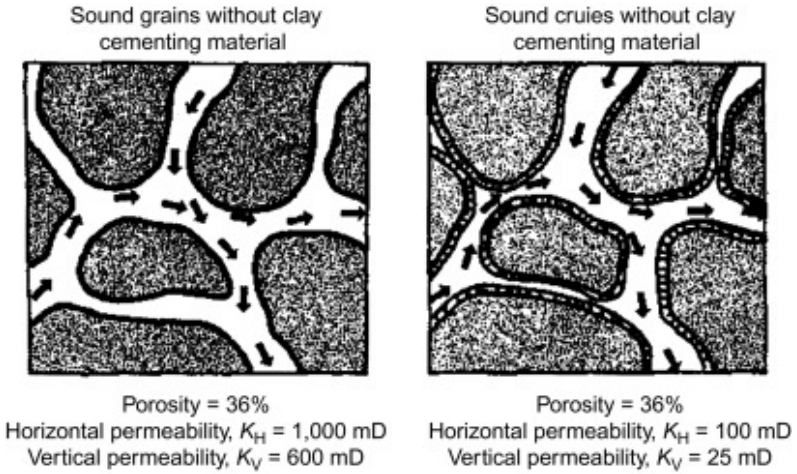


[ref: Wang & Economides (2009), "Advanced Natural Gas Engineering"]

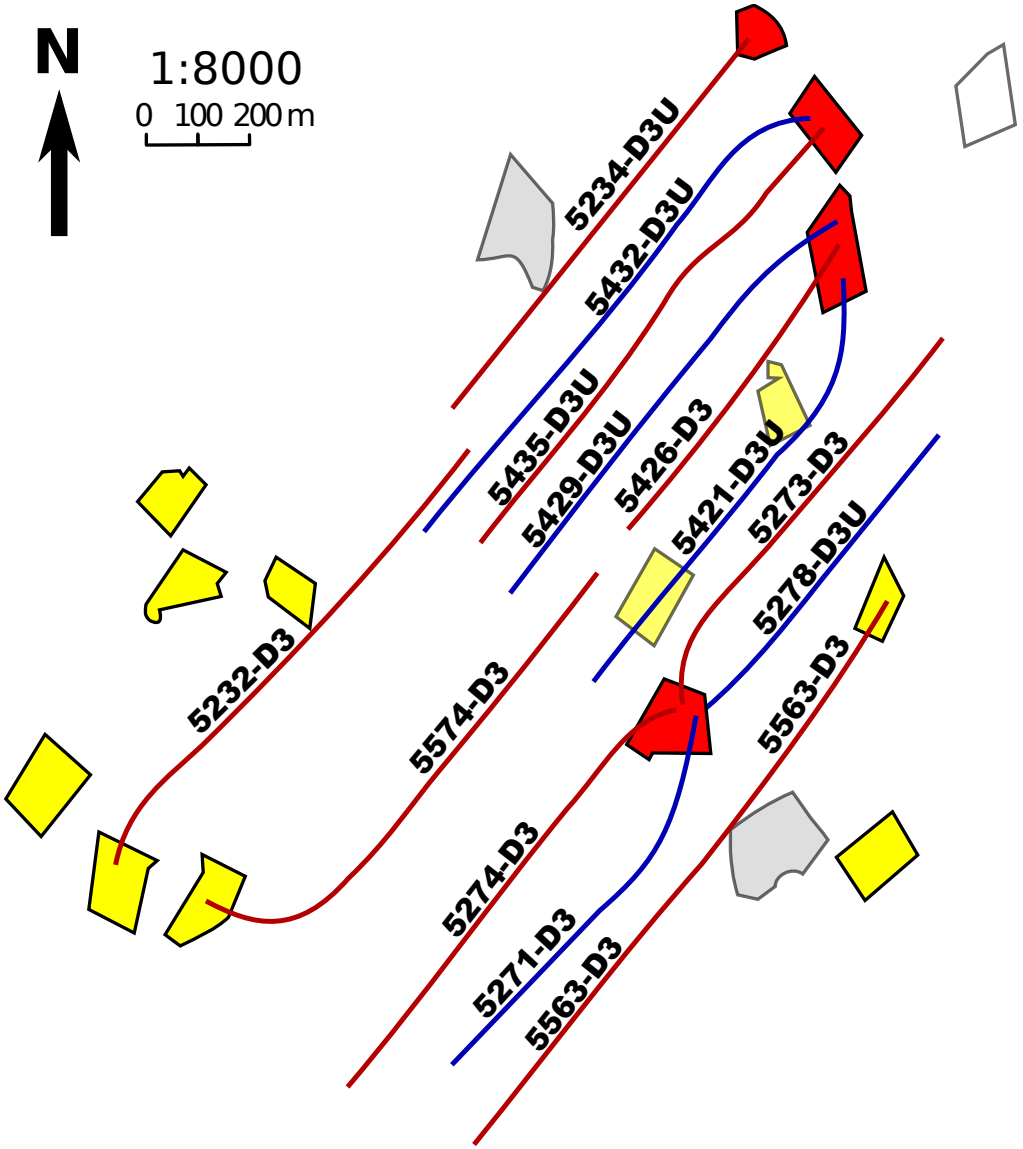
Petroleum Well



Rock Porosity



Patos-Marinza Oil Field



Thank You!