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2. Deepwater and Salt
1. Opening Session: Industry Challenges and Opportunities

**Conventional Petroleum Systems**
2. Deepwater and Salt
3. Structural Complexity
4. Reservoir in Petroleum Systems Modeling

**Theoretical Aspects**
5. Temperature and Pressure
6. Petroleum Generation and Migration

**Unconventional Petroleum Systems**
7. Shale Gas/Oil
8. Gas Hydrates

Campos Basin - 3D Petroleum Systems Model

- Roncador oil field
- Jubarte oil field
- Play Oligocene-Miocene
- Play Upper Cretaceous
- Post-salt marine source rock
- Pre-salt lacustrine source rocks

Pre-salt lacustrine source rocks
Post-salt marine source rock
Play Upper Cretaceous
Play Oligocene-Miocene
Roncador oil field
Jubarte oil field
3D Petroleum Systems Modeling

live demo Campos 3D
Petroleum Migration Modeling: Petroleum Property Prediction

Petrobras Application of 3D Petroleum Systems Modeling for petroleum property prediction (Santos Basin, post-salt prospect)

Case study 1: accumulation of marine-sourced black oil in a marginal basin in Southern Brazil

Pre-drilling prediction of petroleum charge history, volumetrics and properties (API gravities, GOR)

Post-drilling results (discovery)

Actual well data

API = 40.6°
GOR = 180 m³/m³

Courtesy of Petrobras
Campos Basin Present-Day Salt Distribution

at present
Campos Basin - Evolution of Salt Structures

112 my
After deposition

107 my

55 my
After opening of major salt windows

At present
Source Rock Maturation in Pre-Salt Source Rocks
Sub-Salt Pore Pressure

90 my
Early deposition high permeable

56 my
Before opening of salt windows

55 my
After opening of salt windows

At present

Upper Lagoa-Feia subsalt reservoir layer deposited 122-117my
Pore Pressure Prediction and Geomechanics

Pore pressure prediction with geo-process simulation
Calibration methods

Overpressure in Salt GoM Basin

Basin scale 3D Stress Prediction on geologic time scale with rock failure analysis coupled with fluid pressure

Overpressure in Salt Windows

Link technology to geophysical and rock physics based PPP (in Petrel)

Vertical Principle Stress on Top Salt Map

Link technology to structural analysis and reservoir geomechanics
Petroleum Migration Modeling in the Pre-Salt

56 my: before opening of the salt windows

Oil flow vectors below salt
Petroleum Property Predictions

Roncordor Field Report:
OOIP 2200 Mbarrels, API 28-31, GOR: 110

55 my: after opening of the salt windows