Seismic Stratigraphy

Instructor:
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Title: EPTS (Exploration & Production Training Services) Consultant Geologist

Objectives:
Participants will learn principles of stratigraphic interpretation of seismic data on basin and field scale. They can improve seismic stratigraphic interpretation skills with practical exercises.

Purpose of the course:
- Teach principles of stratigraphic interpretation of seismic data on basin and field scale
- Link seismic expression of stratigraphy with basin type and evolution
- Demonstrate the application of seismic stratigraphy to prospectivity evaluation of sedimentary basins
- Build-up seismic stratigraphic interpretation skills via a multitude of exercises, based on data from many different areas.
- Demonstrate applicability of seismic stratigraphy on a field scale reservoir analysis

Who should attend:
Geologists, geophysicists with 1-5 years’ experience and other personnel who need to improve their understanding of petroleum business.

Prerequisites:
Basic Knowledge of Geophysics, Geology and Some awareness of Seismic Interpretation

Course outline & contents:

Focus on sequences:
- What is seismic stratigraphy?
- Exercise 1
- Stratigraphic sequences
- Recognition of stratigraphic sequences on seismic data: onlap, downlap, and truncation
- Repeat of Exercise 1 applying new knowledge
- Exercise 2: recognize stratigraphic sequences
- Seismic facies
- Repeat of Exercise 1 applying new knowledge
- Repeat of Exercise 2: applying new knowledge

Focus on facies:
- Review lessons learned on day 1 (group discussion)
- Geometry of sedimentary bodies
- Exercise 3
- Effect of seismic processing on seismic facies expression; importance of display parameters
- Exercise 4: describe seismic facies part one
- Exercise 5: describe seismic facies part two
- Lithology, velocity, and seismic facies
- Exercise 7: lithology-seismic facies interpretation, incorporating velocity information. (Example from offshore Morocco)
- Exercise 6 (Example from Mar Cantabrico, Spain)

Focus on basins and sea level:
- Review lessons learned Day 2 (group discussion)
- Eustacy and relative sea-level changes through time
- Exercise 8: Gulf of Cadiz (Spain)
- Sea-level and sedimentation patterns
- Repeat of exercise 8 applying new knowledge
- The Chronostratigraphic chart
- Exercise 9: construct a chronostratigraphic chart
Finish Exercise 8, applying new knowledge
Basin formation processes and impact on sedimentation patterns
Exercise 10 (Jeanne d’Arc Basin, Canada)

**Focus on turbidites:**
- Review lessons learned Day 3 (group discussion)
- Exercise 17: Lacustrine reservoirs (Bohai Bay, China)
- Turbidite sedimentation patterns
- Exercise 13: Offshore Louisiana
- Exercise 14: Offshore Guyana
- Deposition of source rocks
- Exercise 15: recognition of source rocks on seismic data in lacustrine basin

**Focus on carbonates:**
- Review lessons learned Day 4 (group discussion)
- Mapping seismic facies and prospectivity assessment
- Exercise 18: mapping seismic facies, prospectivity assessment
- Carbonate depositional environments
- Exercise 11: Bali-Flores margin
- Exercise 12: Luconia (N-Borneo)
- Final group discussion & course evaluation

**Daily course schedule:**

<table>
<thead>
<tr>
<th>Day</th>
<th>Morning session</th>
<th>Afternoon Session</th>
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<tbody>
<tr>
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<td>10:00-12:45 (2h45min)</td>
<td>1:45- 6:00 (4h15min)</td>
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**Day 1**

**Focus on sequences:**
- What is seismic stratigraphy?
- Exercise 1
- Stratigraphic sequences

**Focus on facies:**
- Review lessons learned on day 1 (group discussion)
- Geometry of sedimentary bodies
- Exercise 3
- Effect of seismic processing on seismic facies expression; importance of display parameters

**Focus on basins and sea level:**
- Review lessons learned Day 2 (group discussion)
- Eustacy and relative sea-level changes through time
- Exercise 8 : Gulf of Cadiz (Spain)
- Sea-level and sedimentation patterns

**Day 2**

**Focus on sequences:**
- Recognition of stratigraphic sequences on seismic data: onlap, downlap, and truncation
- Repeat of Exercise 1 applying new knowledge
- Exercise 2: recognize stratigraphic sequences
- Seismic facies
- Repeat of Exercise 1 applying new knowledge
- Repeat of Exercise 2: applying new knowledge

**Focus on facies:**
- Exercise 4: describe seismic facies part one
- Exercise 5: describe seismic facies part two
- Lithology, velocity, and seismic facies
- Exercise 7: lithology-seismic facies interpretation, incorporating velocity information. (Example from offshore Morocco)
- Exercise 6 (Example from Mar Cantabrico, Spain)

**Focus on basins and sea level:**
- Repeat of exercise 8 applying new knowledge
- The Chronostratigraphic chart
- Exercise 9: construct a chronostratigraphic chart
- Finish Exercise 8, applying new knowledge
- Basin formation processes and impact on sedimentation patterns
- Exercise 10 (Jeanne d’Arc Basin, Canada)
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**Day 4**
**Focus on turbidites:**
- Review lessons learned Day 3 (group discussion)
- Exercise 17: Lacustrine reservoirs (Bohai Bay, China)
- Turbidite sedimentation patterns

**Focus on turbidites:**
- Exercise 13: Offshore Louisiana
- Exercise 14: Offshore Guyana
- Deposition of source rocks
- Exercise 15: recognition of source rocks on seismic data in lacustrine basin

**Day 5**
**Focus on carbonates:**
- Review lessons learned Day 4 (group discussion)
- Mapping seismic facies and prospectivity assessment
- Exercise 18: mapping seismic facies, prospectivity assessment

**Focus on carbonates:**
- Carbonate depositional environments
- Exercise 11: Bali-Flores margin
- Exercise 12: Luconia (N-Borneo)
- Final group discussion & course evaluation

**Course method:**
The course will be delivered as a combination of lecture and hands-on exercises (software is not used). This class contains a lot of practical exercises all done by hands.