Learn effective methods in predicting carbonate reservoir performance for field development

23-27 May 2016
Ho Chi Minh, Vietnam
This course provides the working knowledge in characterizing carbonate reservoirs, from understanding modern carbonate environments and their process in becoming potential reservoir rocks.

**Numerous Illustrations of Carbonate Architectures**
The program is equipped with a number of examples of outcrops from sequence stratigraphic perspective with seismic scale examples illustrated from outcrop.

**Includes Petrophysical Approaches to Reservoir Characterization of Fields**
Petrophysical approaches to reservoir characterization of fields are illustrated with emphasis on fracture modeling, fluid saturation modeling and hydraulic flow units.

You will also learn from a selection of carbonate oil and gas plays and fields from various parts of the world are discussed. Presentations are interspersed with videos and exercises.

**Course Overview**
Carbonate reservoirs as exploration targets are increasing more in the recent years. However, there are challenges as to how to further develop this type of reservoir successfully.

This course provides the working knowledge in characterizing carbonate reservoirs, from understanding modern carbonate environments and their process in becoming potential reservoir rocks.

**How Does This Course Benefits You?**

**Identify a Good Carbonate Reservoir**
Identify a good carbonate reservoir by understanding the complexity of a carbonate depositional system

**Manage the Uncertainties in Predicting Depositional Environments**
Manage the uncertainties in predicting depositional environments through understanding the factors in affecting carbonate reservoir characterization

**Examine Susceptibilities of Carbonates to Post-Depositional (diagenetic) Changes**
Examine susceptibilities of carbonate to post-depositional changes in order to fully characterize carbonate reservoirs

**Develop a more Holistic Model with Integrated G&G Analysis**
Develop a more holistic model of carbonate reservoirs by learning how to integrate an calibrate with geology and geophysics data

**PetroSync Quality Assurance**
All PetroSync courses are developed with top quality to address all your training needs and purposes. Our courses are vetted strictly to ensure that we always deliver the best courses with the best industry expert.

**PetroSync Inhouse Solutions**
PetroSync can tailor our courses to meet your specific needs at your preferred location and schedule. Contact us for more information at +65 6415 4500 or email to general@petrosync.com
**PetroSync Distinguished Instructor**

**Practical & Consulting**
Tony is specialized in carbonate reservoir sedimentology, reservoir characterization, and 3D modeling. He has over 40 years of international experience in the oil and gas exploration and development. Previously worked for BP Exploration mainly as Senior Development Geologists for 20 years; Abu Dhabi Company for Onshore Oil Operations (ADCO) as Geological Specialist; Landmark Graphics as Senior Technical Consultant; Reservoir Characterization Research and Consulting Inc. (RC)2 as Managing Director; and Schlumberger as a Principal Geologist.

**Training**
Taught Field Courses and Training Programs for ADCO, Landmark Graphics, and (RC)2, PDO, Statoil, BP, Occidental, AAPG, SPE and others.

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**Who Needs This Program**

- This course is designed for but not limited to those who are directly involved with carbonate reservoir characterization, and those who need a deeper understanding of the complexity and problems associated with carbonate reservoirs.
- This course assumes that participants have at least the basic understanding of reservoir characterization and modeling to fully appreciate the course.

**Job Titles Include:**

- Development Geologists
- Development Geophysicists
- Exploration Geologists/Geophysicists/Geoscientists
- E&P Managers
- Petrophysicists
- Sedimentologists
- Reservoir & Petroleum Engrs

**Course Schedule**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>08:00—09:00</td>
<td>Registration (Day 1)</td>
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<tr>
<td>09:00—11:00</td>
<td>Session I</td>
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<tr>
<td>11:00—11:15</td>
<td>Refreshment Session I</td>
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<tr>
<td>11:15—13:00</td>
<td>Session II</td>
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<tr>
<td>13:00—14:00</td>
<td>Lunch</td>
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<tr>
<td>14:00—15:30</td>
<td>Session III</td>
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<tr>
<td>15:30—15:45</td>
<td>Refreshment Session II</td>
</tr>
<tr>
<td>15:45—17:00</td>
<td>Session IV (Last Session)</td>
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Course Agenda — 5 Days

DAY 1
CARBONATE ESSENTIALS AND MODERN DEPOSITIONAL ENVIRONMENTS

Carbonate Grains and Classifications

Carbonate Study Techniques

Carbonate Ramps and Platforms
- Examples from Middle East, Alps, UK and the Bahamas

Modern Carbonate Depositional Environments
- Abu Dhabi – a classic location for studying arid coastal carbonates
- Caribbean – humid climate carbonates of Bahama Bank, Caicos Platform and Florida

DAY 2
CARBONATE FACIES AND SEQUENCE STRATIGRAPHY

Aeolian Deposition and Deflation
- Examples from Abu Dhabi

Evaporites
- Modern and ancient sabkhas and salinas
- Examples from British West Indies, Permian Zechstein of North Sea, Upper Jurassic Arab Fm., Miocene Mediterranean Salinity Crisis

Modern and Ancient Microbial Mats (stromatolites and thrombolites)
- Examples from UK, Shark Bay Australia, Brazil Santos and Campos Basins, Angola Modern and Ancient Reefs

Modern and Ancient Reefs
- Examples from Majorca, Great Barrier Reef, Gulf of Suez, Far East, UK, British West Indies

Carbonate Sands with emphasis on grainstone accumulations, including oolites

Bioturbation by fauna and flora

Resedimented Carbonates
- Examples from Italian Dolomites, Pyrenees, United Arab Emirates, UK

Sequence Stratigraphy with rock outcrop examples

DAY 3
DIAGENETIC ALTERATIONS AND RESERVOIR CHARACTERIZATION

Diagenetic Alterations
- Cementation (vadose and phreatic; early and late burial; palaeosols)
- Replacement (focusing especially on dolomitization mechanisms)
- Neomorphism (factors affecting mineral transformations)
- Dissolution (secondary porosity with focus on karstification processes)
- Compaction (mechanical and chemical – pressure solution)

Modern and Ancient Reefs
- Examples from Majorca, Great Barrier Reef, Gulf of Suez, Far East, UK, British West Indies

Reservoir Characterization
- Petrophysics (pore types; permeability prediction, Archie equation and its constants, rock typing)
- Seismic (attributes including inversion, spectral imaging, shear wave splitting)
- 3D Modelling (deterministic and stochastic)
- Saturation Modeling (pros and cons of a range of techniques)
- Fracture Modeling - Continuous Fracture Modeling (CFM) and Discrete Fracture
- Network Modeling (DFN)
- Quantifying Volumetric Uncertainty (carbonate field case study example)
- Flow Units (Flow Zone Indicators)
DAY 4
ANCIENT CARBONATE SEQUENCES

Carbonate Source Rocks

Ancient Carbonate Sequences

- Triassic Dolomites of the Italian Alps with emphasis on the Sella Platform
- Lower Carboniferous Ramp and Platform Carbonates of the UK
- Miocene Carbonates of the Mediterranean:
  - Malta - shallow carbonate build-ups to carbonate oozes and large scale collapse
  - features
  - Southern Spain - Sorbas and Nijar Basins
  - Balearic islands - Majorca and Menorca

DAY 5
CASE STUDIES OF CARBONATE PETROLEUM PLAYS AND FIELDS

SOUTHEAST ASIAN REGION:

- **Indonesia** - Arun (North Sumatra), Kangean BD (East Java Sea), Madura (East Java Sea), Kampang Buru (Sulawesi), Walio (Salawati Basin, Irian Jaya), Kasim (Salawati Basin, Irian Jaya), empang Buru (East Java), Tonasa carbonate platform/ramp (Sulawesi)
- **Malaysia**: Natuna (Sabah), Luconia Province (Sarawak)
- **China**: Liuhua (Pearl River Mouth Basin, offshore China)
- **Philippines**: Nido reef complex (Palawan Basin), Sarap carbonate platform (offshore Palawan Island)
- **Vietnam**: Offshore build-ups, Da Nang (offshore central Vietnam)

INTERNATIONAL:

- **Middle East** - Tunisia, Sidi El Kilani field (Upper Cretaceous reservoir), Libya fields - Hamada field (Palaeocene dolomite reservoir), Gulf of Suez - Zeit Bay and Ras Fanar fields (Miocene carbonates)
- **Oman** - Qarn Alam field (Upper Cretaceous reservoir), Arabian Gulf, etc.
- **North Africa** - vuggy and fractured carbonate reservoirs of Tunisia and Libya
- **Mexico** - The Golden Lane plays
- **Offshore Brazil** - Pre-salt microbial carbonates of Santos and Campos Basins
- **Gulf of Suez** - Miocene Carbonate Reservoirs
- **North Sea** - Permian Zechstein, Cretaceous Chalk

Register For This Course Now!

Kindly fill up your particulars in the registration form placed at the end of this brochure, and send it to us or email to registration@petrosync.com
COURSE DETAILS
Title: CARBONATE RESERVOIR CHARACTERIZATION
Date: 23-27 May 2016
Location: Ho Chi Minh, Vietnam

INVESTMENT PACKAGES (Please Circle)

<table>
<thead>
<tr>
<th>INVESTMENT PACKAGE</th>
<th>DEADLINE</th>
<th>FULL MASTERCLASS</th>
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<tbody>
<tr>
<td>Standard Price</td>
<td>20 May 2016</td>
<td>USD 3,395</td>
</tr>
<tr>
<td>Early Bird Offer</td>
<td>22 April 2016</td>
<td>USD 3,295</td>
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<tr>
<td>Group Discount (3 or more Delegates)</td>
<td>20 May 2016</td>
<td>USD 3,055</td>
</tr>
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Group Discount is based on Standard Price
* To enjoy the promotion & discount offer, payment must be made before deadline
* For 7 or more delegates, please inquire for more attractive package.
* Prices include lunches, refreshments and materials. Promotion & discount cannot be combined with other promotional offers.
* Important: Please note that registration without payment will incur a SGD 200 administration fee.

DELEGATES DETAILS
1st Delegate Name: 
Direct Line Number: 
Job Title: 
Department: 
Head of Department:
2nd Delegate Name: 
Direct Line Number: 
Job Title: 
Department: 
Head of Department:
3rd Delegate Name: 
Direct Line Number: 
Job Title: 
Department: 
Head of Department:

INVOICE DETAILS
Attention Invoice to: 
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Industry: 
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Country: Email: 

Please note:
- If you have already registered by Phone, Fax, Email or Web, please quote your invoice number(s) on remittance advice.
- If you have not received an acknowledgement before the training, please call us to confirm your booking.

PAYMENT METHOD
- By Credit Card: 
  Please debit my credit card: Visa, MasterCard, AMEX, Security Code: 
  Card Number: Expiry Date: 
  Name Printed on Card: 

- By Direct Transfer: Please quote invoice number(s) on remittance advice
  PetroSync Global Pte Ltd Bank Details:
  Account Name: PetroSync Global Pte Ltd
  Bank Name: DBS Bank Ltd
  Account No: SGD: 288-901898-0 USD: 0288-022682-01-6
  All bank charges to be borne by payer. Please ensure that PetroSync Global Pte Ltd receives the full invoiced amount.

CONFIRMATION
I agree to PetroSync’s terms & conditions, payment terms and cancellation policy.

Authorized Signature: ______________________________

PAYMENT TERMS: Payment is due in full at the time of registration. Full payment is mandatory for event attendance.