

16-18 APRIL 2024

JW MARRIOTT COPACABANA HOTEL

RIO DE JANEIRO, BRAZIL

Water Injection in Carbonate Reservoir

Carbonate rocks may have different behavior when submitted to water injection or EOR methods.

Rock-fluid interactions, dual-porosity, and dual-permeability porous structure and 4D seismic surveillance are examples of issues that need an unconventional approach during the reservoir exploitation. A very significant proportion of world's oil reserve are in carbonate reservoirs, including some giant oilfields in Brazil, Middle East, and Asia.

Water injection commingled with gas injection and EOR methods have been evaluated to improve these reserves. Also, new research and developments in reservoir flow simulation are necessary to take account of all those phenomena, and its consequence in the rock and fluid properties. As a multidisciplinary problem, different types of areas are dealing with those questions, like reservoir engineering, geology, geochemistry, geomechanics, and well engineer.

There are few events related to reservoir aspects of water injection, mainly for carbonated reservoir. The importance of such a kind of workshop increases when special methods are considered including optimized water chemical composition, WAG, foam injection, and polymer flooding.



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Technical Agenda (as of 28 March 2024)

All Technical Session take place at the Wayana Ballroom

TUESDAY, 16 APRIL

0700–0800	Registration Check-In and Welcome Coffee	Wayana Ballroom Foyer
0700–1800	Prayer Room	Tupi
0800–0815	Welcome Remarks by Chairpersons	
0815–0900	Keynote Speaker: Ganesh Thakur, University of Houston: “Effective Water Injection Management of Carbonate Reservoirs to Maximize Economic Recovery”	
0900–1000	Session 1: Rock-Fluid Interaction and Reactive Transport: Laboratory and Modeling	<p>Chairs: <i>Shirish Liladhar Patil, King Fahd University of Petroleum & Minerals</i> <i>Yannick Peysson, IFPE</i></p> <p>Gemini Surfactant Performance in Saudi Carbonate Cores</p> <p><i>Sidqi Abu Khamsin, King Fahd University of Petroleum and Minerals (KFUPM)</i></p>
	Quantitative Characterisation of Diagenetically Induced Flow Properties in Carbonate Reservoir Rocks	<i>Fadi Henri Nader, IFP Energies</i>
1000–1030	Coffee Break	
1030–1230	Session 2: Rock-Fluid Interaction and Reactive Transport: Field Scale Evidence	<p>Chairs: <i>Aline Novaes, Petrobras</i> <i>Emad W. Al Shalabi, Khalifa University of Science and Technology</i></p> <p>Why Capillary Forces are Important in Oil Mobilization From Carbonate Reservoirs?</p> <p><i>Skule Strand, University of Stavanger</i></p>
	Field Evidence of Rock-Fluid Interactions Predicted in Modeling and Simulation	<i>Aline Novaes, Petrobras</i>
	Mineral Scale Deposition During CO ₂ -WAG in Dolomite-Rich Reservoir	<i>Fabio Bordeaux Rego, Oxy</i>
	Experimental Evaluation of the Calcite-oil-smart Water Geochemical Interactions in a Coreflooding System During Oil Recovery	<i>Ladislane Dos Santos Bastos, UFBA</i>
1230–1400	Networking Luncheon	Hotel Restaurant
1400–1530	Session 3: Technologies to Add More Value Beyond Water Injection	<p>Chairs: <i>Emad W. Al Shalabi, Khalifa University of Science and Technology</i> <i>Subhash Ayirala, Saudi Aramco</i></p> <p>Ten Years of WAG Injection in Pre-Salt: History, Results and Way Forward</p> <p><i>Raphael Vieira, Petrobras</i></p>
	Advancements and Insights in the Development and Application of Particle Gels for Conformance Control Technologies in Mature Oilfields	<i>Bai Baojun, Missouri University of Science and Technology</i>
	Nanobubble Enhanced Imbibition in Oil-Wet Carbonates	<i>Mohammad Piri, University of Wyoming</i>
1530–1600	Coffee Break	
1600–1730	Session 4: Water Injection Surveillance—Part 01	<p>Chairs: <i>Bruno Roussennac, Shell</i> <i>Jorge Pizarro, PPSA</i></p> <p>On-Demand Ocean Bottom Nodes (OD OBN) for Low-Cost Reservoir Monitoring</p> <p><i>Jorge L. Lopez, Shell</i></p>
	Hybrid Models to Automate and Accelerate Reservoir Surveillance for Waterfloods: Addressing Carbonate Reservoir Challenges Using Deployment Learnings from Middle East, South Asia and America	<i>Ashwin Venkatraman, Resermine</i>
	Next Step in Capitalizing FO Data: Automated Zonal Allocation from RT Data Steam for Dynamic Reservoir	<i>Dmitry Kortukov, SLB</i>
1730–1830	Welcome Reception	Copacabana Lounge

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LEARN AND CONNECT

WEDNESDAY, 17 APRIL

0700-0800 **Registration and Welcome Coffee** Wayana Ballroom Foyer

0700-1800 Prayer Room Tupi

Panel Session: R&D Strategies and Advances in Water Injection

Panelists:

- **Ali Yousef**, Chief Technologist of Reservoir Engineering Technology, EXPEC Advanced Research Center, Saudi Aramco
- **Roberta Alves Mendes**, General Manager of Reservoir Technology, Petrobras R&D Center
- **Jorge L. Lopez**, Manager Brazil Subsurface Technology, Senior Principal Geophysicist, Shell
- **Marysilvia Costa**, Technology & Innovation Director of COPPE/UFRJ, Federal University of Rio de Janeiro (UFRJ)

Moderator:

- **Bruno Moczdylower**, Subsurface & Flow Assurance Executive Manager, Petrobras

1000-1030 **Coffee Break**

1030-1200 **SPE Training Course: Water Injection Management by Ganesh Thakur, University of Houston**
 1.5 hours; 0.15 Continuing Education Credits (CEU's)/1.5 Professional Development Hours (1.5 PDHs)

1200-1330 **Networking Luncheon**

1330-1430 **Session 5: Water Injection Surveillance—Part 02** **Chair:** Claudio Furtado, Petrobras

Enhancing Reservoir Characterization through Integration of Time-Lapse Seismic Data in a Presalt Reservoir with Water-Alternate-Gas Injection

Alexandre Emerick, Petrobras

Water Shut-off by Using Tracer in a Carbonate Reservoir *Kjersti Jevanord, Resman*

1430-1530 **Session 6: Water Injection Performance—Modelling and Simulation** **Chair:** Yannick Peysson, IFPE
 José Sérgio Cavalcante, Petrobras

Managing and Optimizing Water-floods with a Physics Embedded AI Workflow: Practical Applications and Case Studies

Carlos Calad, Tachyus

Two-Phase Flow in Fractured Porous Media: From Pore-Scale Physics to Darcy-Scale Modeling

Marcio S. Carvalho, PUC Rio

1530-1600 **Coffee Break**

1600-1730 **Session 7: Water Injection Performance—Data Acquisition from Lab and Field Scale** **Chairs:** José Sérgio Cavalcante, Petrobras
 Bruno Rousseillac, Shell

Steady-State Relative Permeability Measurements in Rough-Walled Fractures *Mohammad Piri, University of Wyoming*

“PLT in a Bottle”—Continuous Zonal Quantification of Water Inflow Rates Using Tracers *Kjersti Jevanord, Resman*

Towards Relative Permeability Characterization for Heterogenous PreSalt Carbonate Rocks *Santiago Drexler, Shell*

THURSDAY, 18 APRIL

0700-0800 **Registration and Welcome Coffee** Wayana Ballroom Foyer

0700-0930 **Prayer Room** Tupi

0800-0930 **Session 8: Geomechanics Aspects of Water Injection in Carbonate Reservoirs** **Chairs:** Claudio Furtado, Petrobras

The Evaluation of Salt Creep and Thermal Effect During Cold Water Injection in Carbonate Reservoirs, as Applied to the Assessment of Maximum Injection Pressure *Ricardo Chaves, Petrobras*

Water Injection Simulation in Fractured Reservoirs *Philippe Devloo, Unicap*

TBD *Clifford Allen, Halliburton*

0930-1000 **Coffee Break**

1000-1130 **SPE Training Course: Domain Led AI and the use of Hybrid Models for Optimizing Mature Field Operations by Ashwin Venkatraman, Resermine**
 1.5 hours; 0.15 Continuing Education Credits (CEU's)/1.5 Professional Development Hours (1.5 PDHs)



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WORKSHOP FORMAT

Workshops maximize the exchange of ideas among attendees and presenters through brief technical presentations followed by extended Q&A periods. Focused topics attract an informed audience eager to discuss issues critical to advancing both technology and best practices.

Many of the presentations are in the form of case studies, highlighting engineering achievements and lessons learned. In order to stimulate frank discussion, no proceedings are published and members of the press are not invited to attend.

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