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with SEPM (Society for Sedimentary Geology) and Canadian Society of Petroleum Geologists (CSPG)

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TECHNICAL PROGRAM WEDNESDAY

*Denotes presenter is other than first author

Wednesday Morning Technical Sessions

Theme 2: Advances in Carbonate Diagenesis

Hall B, Room 1

Co-Chairs: J. Bishop and C. Hollis

8:00 **Introductory Remarks**

8:05 **Diagenetic Evolution of the Cangulo Formation Pre-Salt Carbonates (Onshore Namibe Basin, Angola):** V. Baqués, M. Moragas, L. Fabio, M. Zeller, D. Hunt, E. Casciello, J. Vergés, I. Cruz, G. Messager, I. Sharp, S. Higgins, U. Freitag, H. Ferreira, V. Machado

8:25 **Spatial Distribution of Diagenetic Geobodies in Carboniferous Host Rock, Picos de Europa, Northern Spain:** V. Vandeginste, A. Peskin, G. J. Hampson

8:45 **Constraints on the Burial History of Tengiz Field From Clumped Isotope Paleothermometry:** J. W. Bishop, T. Playton, D. Katz, W. Narr, E. Earnest-Heckler, J. Dickson, K. Snell, K. Bergmann, J. Eiler

9:05 **Clumped Isotope Paleothermometry in Bahamian Dolomites:** S. Murray, P. Swart

9:25 **Refreshment Break**

10:10 **A Case for Caution When Using Geochemical Models to Make Predictions About Dolomite:** S. E. Kaczmarek, F. F. Whitaker, M. Avila, D. Lewis, P. J. Saccocia

10:30 **Hydrothermal Dolomitization Paradigms and the Manetoe Dolomite: Are All HTDs Fault-Related?:** D. Morrow

10:50 **Depositional and Diagenetic Investigation of a Tertiary Isolated Carbonate Platform: Evidence for Gas-Charge-Related Dolomitization:** J. M. Rivers, L. Meyer, D. Walley, J. Anthony, S. Becker

11:10 **Carbonate Reef Collapse as Top Seal Risks to Gas Re-Injection Sequestration Projects:** K. R. Barrett

11:30 **Application of Quantitative 2-D Image Analysis to Geologic Core Description: Example From Steamflooded First Eocene Reservoir, Wafra Field, Kuwait-Saudi Arabia Partitioned Zone:** R. J. Barnaby

Theme 6: WCSB Unconventional Plays

Hall B, Room 2

Co-Chairs: L. Dunn and D. Rokosh

8:00 **Introductory Remarks**

8:05 **Western Canada Resource Plays: The Phoenix Awaits:** M. Fockler, B. McKenzie

8:25 **Reservoir Facies Impact on Drilling, Completion and Production in the Cardium Tight Oil Play:** R. D. Czypionka, D. Gulewicz, D. Keith, M. Rey

8:45 **Comparison of Geological Factors Affecting Production in the Cardium Tight Light Oil Play, Alberta, Canada:** P. K. Pedersen, R. Van, H. Nicholas, A. Fraser, J. Fic

9:05 **De-Risking the Duvernay:** R. Stadlwieser, S. Labonte, M. Hrudey, C. T. Wilhelm

9:25 **Refreshment Break**

10:10 **Determination of Reservoir Properties From XRF Elemental Data in the Duvernay Formation:** T. Weedmark, R. Spencer

10:30 **Grey: De-Risking the Duvernay Formation Oil Window Through an Integrated Core Analytics, Petrographic and Geochemical Approach:** L. Dunn, C. Fairhurst, N. Marcano, C. DeBuhr, F. F. Krause

10:50 **Souring of Kaybob Duvernay Wells: Investigation of Frac Barrier Effectiveness, Completions Design and Pre-Duvernay Structural Features:** G. R. Chalmers

11:10 **Stratigraphic Architecture and Sedimentology in Relation to the Mid-Montney Sequence Boundary in Northeast British Columbia:** A. Gegolick, C. M. Furlong, M. Gingras, D. Prenoslo, S. C. Sanders, J. Zonneveld

11:30 **Strategies for Success in Unconventional Plays With Examples From the Montney Formation in Western Canada:** D. Russum, L. Boyd, J. Cantin

Theme 4: Petroleum Systems: In Honor of Leslie B. Magoon (50 Years!)

Hall B, Room 3

Co-Chairs: W. Dow, A. Hosford Scheirer and K. Peters

8:00 **Introductory Remarks**

8:05 **Petroleum Systems Modeling Since AAPG Memoir 60:** B. Wygrala, T. Hantschel

8:25 **Petroleum Systems of the Scotian Basin:** M. Fowler, J. Webb, M. Obermajer, F. Monnier, A. Mort, M. Luheshi, A. MacDonald

8:45 **Expulsion and Primary Migration of Hydrocarbons — Observations in Outcrops:** H. Læseth, P. Cobbold, N. Rodrigues, L. Wensaas, T. Leith, A. Steen, M. Gading

9:05 **Dual Application Research Programs at a Time of Rapid Industry Transition: What's the Future for Petroleum Geochemistry?:** S. Larter

9:25 **Refreshment Break**

10:10 **All Models Are Wrong — Some Are Useful:** Z. He

10:30 **Madison Group Source Rocks, Williston Basin, USA:** D. M. Jarvie, J. Lefever, S. H. Nordeng

10:50 **Identification of Western Canada Sedimentary Basin Petroleum Systems Using Produced Oil Geochemistry:** J. B. Curtis, J. Zumberge, S. Brown

11:10 **Experimental Investigation of the Generation and Expulsion Characteristics of Different Source Rocks and the Impact Onto the Composition of Hydrocarbons:** M. Stockhausen, R. Galimberti, L. Di Paolo, L. Schwark

11:30 **Petroleum System Analysis: What Have We Learned Since Magoon and Dow's Memoir 60?:** A. S. Pepper

CONTROL ID: 2382722

TITLE: Diagenetic Evolution of the Cangulo Formation Pre-Salt Carbonates (Onshore Namibe Basin, Angola)

AUTHORS (FIRST NAME, LAST NAME): Vinyet Baqués[1], Mar Moragas[1], Lapponi Fabio[2], Michael Zeller[2], David Hunt[2], Emilio Casciello[1], Jaume Vergés[1], Israel Cruz[1], Grégoire Messager[2], Ian Sharp[2], S. Higgins[2], Ulrike Freitag[2], Herrcinda Ferreira[3], Vladamir Machado[3]

INSTITUTIONS (ALL): 1. Group of Dynamics of the Lithosphere , Institute of Earth Sciences Jaume Almera (ICTJA), CSIC, Barcelona, Spain.
2. Statoil Research Development and Innovation, Bergen, Norway.
3. Sonangol, P&P, Luanda, Angola.

ABSTRACT BODY: The Cangulo Fm., exposed onshore within the Namibe Basin of Angola, belongs to the Pre-Salt succession, characterized by fluvial to marginal marine sediments deposited during Early Aptian times along the entire West African margin. This unit is composed of two types of carbonate separated by an erosional unconformity.
Prevailing carbonate facies below the unconformity are peritidal-like dolostones deposited during a transgressive period. The petrological and geochemical data points to slightly evaporated marine waters responsible for the early dolomitization of these carbonates. In addition, oxidation of organic matter occurred during this time as suggested by the highly depleted values of $\delta^{13}C$.
The erosive surface recorded in the Cangulo Valley is related to a major regressive event. The development of karstic systems affecting the peritidal-like carbonates together with the calcitization of the dolomite cements and Fe-rich mineralization, indicate that meteoric fluids circulated during this period. The drop-off of the phreatic level caused the spring flow onset from basement highs and precipitation of tufa deposits. The $\delta^{18}O$ and $\delta^{13}C$ values together with the Mg/Ca molar ratios of these deposits are coherent with the precipitation from low temperature meteoric waters. The progressively depletion of $\delta^{13}C$ and the decreasing trend of Mg/Ca molar ratio indicate an input of soil-derived CO_2 in the system and the transition from phreatic to a vadose diagenetic environment.
Tidally-influenced sandstones onlap the tufa deposits. The geochemistry of the cements together with the values from the partially dolomitized tufa carbonates, suggest that mixed marine and meteoric waters were circulating at this time. The end of the transgression is marked by deposition of the Aptian evaporites (Bambata Fm.) representing the maximum transgressive stage in the Cangulo Valley.
The tectono-sedimentary and diagenetic reconstruction of the Pre-Salt succession in the Namibe Basin demonstrates a periodic marine influence in the sedimentary record, linked to at least two transgressive events. These are separated by a major forced regression that generated an erosional gap, the consequent drop-off of the phreatic level and the tufa system development. These new data appear to indicate that the latest Pre-Salt succession is not a simple transgressive succession, but rather there is a more complex transgressive-regressive story that needs to be examined in more detail.

SESSION TITLE: Theme 2: Advances in Carbonate Diagenesis (SEPM)

SESSION TYPE: Oral

SESSION DAY & DATE: Wednesday, June 22, 2016