

Message from the President

by *Xu-Dong Jing*

Dear Colleague,

Welcome to this edition of SCANews.

The year has passed quickly! It's almost a year since I took over as President of the SCA. It's a great honour to serve the Society in this capacity. I am privileged and proud to have had the opportunities to work with so many colleagues and volunteers in the past year through the SCA Board and its committees. The energy and enthusiasm to serve the SCA and its membership, mostly in their spare time (how little we have these days!) and under tight deadlines, deeply impressed me and remained a constant source of encouragement.

Some of the highlights of the past year are:

- The "Digital Project" to convert all the past SCA papers (including all the Eurocas volumes) from hard copy papers to digital files for CD ROM and online access is near completion. We expect to have the CDs containing all SCA papers to date available at the Pau symposium, and will soon have all SCA papers uploaded to the SCAweb for online keyword based searching and downloading.
- The SCA Shop has been set up on our website to allow online conference registration, membership and

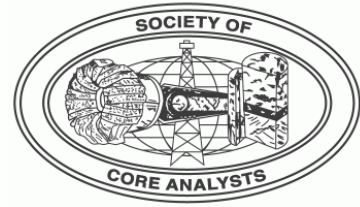
sponsorship application and renewal.

The Society's website is drawing an ever increasing number of daily visits and remains popular among our members and other professionals interested in core analysis. One particularly encouraging note: SCAweb has so far attracted 28 corporate sponsors – an impressive achievement by any standard in the E&P arena! I take this opportunity to thank all our web sponsors and thank Bas Schipper personally for diligently looking after the SCAweb over the years in addition to his other responsibilities as a Board director.



- We have successfully completed the SCA office move from Texas to California and appointed Stacy Feil as the new Office Manager. This has helped streamline the office operation as well as

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offer better and more efficient services to our members. Many thanks to Jake Rathmell for all the hard work and dedication in overseeing this major office move.

- The planning and preparation for SCA 2004 in Abu Dhabi is underway through the leadership of Waddah Al-Hanai and Ali Al-Habshi. The tentative theme has been set: Challenges in Carbonates and Solutions in Field Development. We all look forward to returning to Abu Dhabi next year.
- The Society's finances remain sound. An up-to-date finance report from our Secretary/Treasurer Abby Matteson will be given during the symposium in Pau. The SCA continues to publish one special issue of the Petrophysics Journal of the SPWLA per year. This year's issue (July-August) edited by our VP Publications Marios Ioannidis features selected best papers from last year's SCA symposium. You will read a report on membership update elsewhere in this SCANews edition.
- In the past year, we welcomed on Board the following new regional directors:
 - Australasia Director: Kevin Flynn
 - China Director: Shen Pingping
 - Europe Director: Jon Knut Ringen
 - Europe Director: Nicola Bona
 - Japan Director: Kazuhito Oseto
 - South East Asia Director: Dave Bowen
 - Russia Director: Vladimir Fedortsov

- We also said farewell and thank you to retiring Board members who served the Society in various capacities for many years:

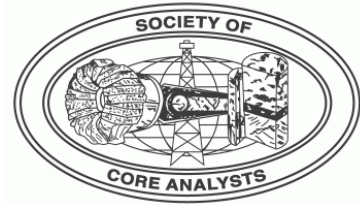
- Director at large: Jake Rathmell
- European Director: Luis Cuiec
- Australasia Director: Neil Williams

In conclusion, I hope that by now you have already made your registration and travel/hotel arrangements to attend this year's SCA annual symposium in Pau, France. This year's programme features 10 technical sessions plus poster sessions, a workshop on CO2 sequestration and a geological fieldtrip entitled The North Pyrenean petroleum system – From rifting to foothills. The technical programme was formulated based on a record number of abstracts submitted from authors representing 20 countries and reflect the truly international nature of our Society. In addition, three excursions have been planned for accompanying spouses to discover the Béarn Region and the Basque Country which together constitute the Department of the Pyrénées Atlantiques. I congratulate the SCA 2003 symposium technical committee led by Olga Vizika-Kavvadias and the local organizing committee headed by Jean-François Raynaud for their hard work in putting together such an impressive symposium programme. We look forward to a record attendance and a successful symposium in Pau. For more details of the SCA 2003 programme, please read the relevant contributions from the organizing committees in this news issue or refer to www.scaweb.org.

See you in Pau!

X.D.Jing
SCA President

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Note from the VP Arrangements

by *Jean-François Raynaud*

Inscriptions for this year's SCA Symposium are gradually increasing and we hope therefore to have a number of participants which at least equals the attendance at the Symposium in Monterey 2002: a hope reinforced by the record number of abstracts for posters and papers which were sent to the VP Technology. We would like to thank all those participants who have already responded to our request to register early, and would ask all those who intend to come to Pau to register immediately. In doing so, you would greatly facilitate the task of the LOC, and would be assured of a very warm welcome.

Weather permitting, you will certainly appreciate your 4-days in the most floral village in France and, without having to take the underground, bus or car, to go to the Palais Beaumont to have your breakfast and watch the sun come up over the Pyrenees. The setting makes for perfect working conditions, where you will be able to exchange knowledge and ideas with your colleagues and the 11 exhibitors which are expected to attend.

If you are going on the Field trip (one of the happy 52!), it is highly likely that, in the depths of the beautiful Aspe Valley, you will meet colleagues who have come from Spain on a Field trip from the AAPG conference in Barcelona.

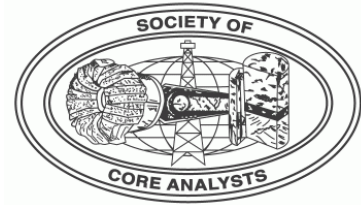
The accompanying persons will have more time to discover the 7 centuries of French history in the towers and museum of the Château, and to explore the Basque country, where every village is picturesque. They might also have the time to visit the Golf course in Pau, the first Golf course opened in continental Europe in 1894 by the Scots, and to see the stele dedicated to the Wright brothers, who established the world's first pilot school in 1909. Spare a thought for them when you land at the Pau-Pyrénées airport.



We have just four days to convince you that life in Pau is easy, but we hope that those four days will seem all too short to you.

Jean-François Raynaud
VP Arrangements

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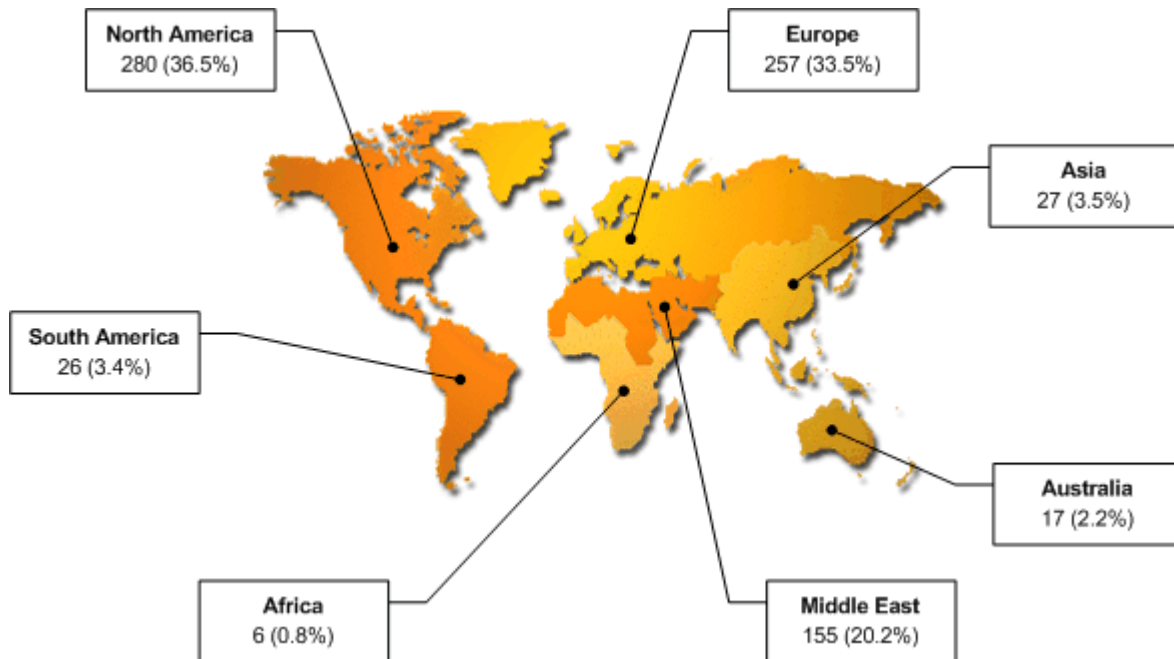
Note from the VP Membership by *Bas Schipper*

When visiting the membership database at the SCA website you will find the following Information:

Database information

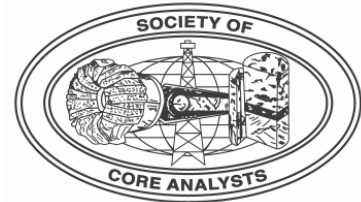
Total # of records:	768
Last updated:	Mon Aug 11 20:00:55 2003
Current time:	Tue Aug 19 22:38:13 2003
Database size:	51126 bytes

The total number of records are the members that have paid their membership fee for the current year but also include members that have paid their fees for 2002 but not (yet) for 2003. Reviewing the 768 members listed in the membership database shows that the geographical distribution is weighted in favour of North America and Western Europe:



However from the active member count per region as given in the table below, it shows that the Middle East region membership has increased the last few years. The table also shows that the other active hydrocarbon regions are barely represented.

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Region	August 2001	August 2002	August 2003	2001-2003 period
Africa	1	3	6	+ 5
Asia	21	24	27	+ 6
Australia	18	17	17	- 1
Europe	228	242	257	+ 29
Middle East	98	170	155	+ 57
North America	285	254	280	- 5
South America	26	24	26	0
	677	734	768	+ 91

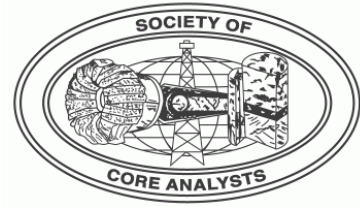
The member distribution per country is as follows:

Country	Members	Country	Members
USA	255	Mexico	3
United Arab Emirates	128	Belgium	2
United Kingdom	93	India	2
Norway	50	Kuwait	2
France	32	Poland	2
Netherlands	26	Qatar	2
Canada	25	Turkey	2
Russia	21	Argentina	1
Australia	17	Bahrain	1
Saudi Arabia	16	Brunei	1
Venezuela	16	Hungary	1
Denmark	13	Iran	1
Japan	10	Israel	1
Germany	7	Korea	1
Brazil	6	Malaysia	1
China	6	Malta	1
Indonesia	6	Nigeria	1
Egypt	5	Portugal	1
Italy	5	Spain	1
Oman	4		

It is the intention of the VP membership together with the help of the Regional directors to increase membership the coming years with the focus on geographic expansion.

We ask all active members to help increase the membership by directing colleagues to the SCA Website at www.scaweb.org.

Bas Schipper
VP Membership



Synopsis from the VP Technology
by *Olga Vizika-Kavvadias*

2003 SCA ANNUAL INTERNATIONAL SYMPOSIUM
22-25 SEPTEMBER 2003, PAU, FRANCE

TECHNICAL PROGRAM

Session: Wettability: Determination and Restoration

SCA2003-01 L.Y. Yang, J.X. Wang, J.S. Buckley "Effect of Crude Oil Composition on Wettability of Mica"

The study focuses on specific features of the composition of produced oil samples and their relation to the extent to which these oils alter the wetting of mica surfaces under controlled conditions. Relationships between specific oil properties and wetting alteration at standard conditions have been demonstrated by linear and non-linear multivariate analyses of a large set of wetting and oil property data.

SCA2003-02 H. Tie, Z. Tong, N.R. Morrow "The Effect of Different Crude Oil/Brine/rock Combinations on Wettability through Spontaneous Imbibition"

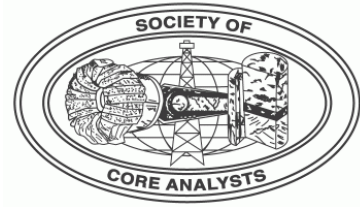
Mixed wettability (MXW and MXW-F) wetting states are compared through spontaneous imbibition measurements for crude oil/brine/rock combinations that include one sandstone and one limestone with each rock type exposed to an asphaltic and a moderately asphaltic crude oil and these oils with reduced solvency through addition of alkanes. Changes in wettability to MXW (crude oil) cores were always less than the change observed for the MXW-F cores with films deposited by the corresponding parent crude oil.

SCA2003-03 D. Potocki, M. Ding, A. Kantzas "Carbonate Rock Wettability Interpreted from Capillary Pressure and Imbibition Resistivity Index Analyses"

The wettability of five carbonate reservoirs, assumed by some during routine appraisal to be water wet, is notably *not* water wet but ranges from weakly water wet to mixed wet to mildly oil wet. Restored Archie saturation exponents in the two oil wet reservoirs are ~3 indicating that the typical use of a standard Archie "n"=2 will overestimate hydrocarbon volumes in these oil wet rocks.

SCA2003-04 J. Barro, Ph. Blanc "Efficiency of Cleaning Techniques for Oil and Ester Based Muds on Unconsolidated and Tight Sands"

"Geochemical analyses and Amott wettability tests to demonstrate oil- or ester-based mud filtrate invasion and wettability influence on unconsolidated permeable sands, and our cleaning procedure efficiency."



Session: Wettability Effects on Displacement

SCA2003-05 A. Skauge, B. Vik, B. Ottesen "Variation of Special Core Analysis Properties for Intermediate Wet Sandstone Material"

Improved understanding of the intermediate wet state by dividing the intermediate wet group into three subclasses. Fractionally-wet (FW), where oil and water wet sites are random with respect to pore size, and two mixed wet defined by water and oil wet pores that are sorted by pore size.

SCA2003-06 I. Chatzis, D. Liu "The Accessibility of Waterflood Residual Oil by the Oil Bank when Slugs of Solvent Alternate with Slugs of Water (SAW) under Oil-wet and Water-wet Conditions"

" This paper examines the accessibility of waterflood residual oil by the oil bank during miscible solvent injection using 2-D glass micromodels. For oil-wet conditions, the accessibility of the residual oil was found to be complete. For water-wet conditions, the extent of residual oil accessibility depends on pore structure, capillary number conditions and on the pore volume of solvent injected".

SCA2003-07 V. Sygouni, C.D. Tsakiroglou, A.C. Payatakes "Correlation of the Dynamic Immiscible Displacement Patterns with the Fractional Wettability of Porous Media"

Visualization experiments performed at low Ca values on transparent networks of varying fractional wettability indicated that the displacement growth pattern is correlated with the spatial variation of wettability. Specifically, a compact displacement growth pattern is observed in areas characterized by a small variability of wettability, whereas capillary fingering dominates over areas where the spatial variation of wettability is quite large.

SCA2003-08 A. Graue, B.A. Baldwin, E. Aspenes, J. Stevens, D.P. Tobola, D.R. Zornes
"Complementary Imaging Techniques Applying NTI and MRI Determined Wettability Effects on Oil Recovery Mechanisms in Fractured Reservoirs"

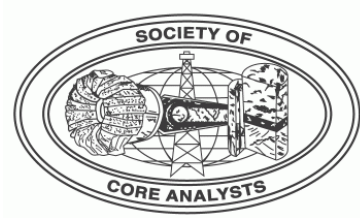
The effects of fractures on oil recovery and *in-situ* saturation development in fractured chalk have been determined and visualized for several representative wettabilities using two complimentary two-dimensional *in-situ* imaging techniques; nuclear tracer imaging (NTI) and high spatial resolution magnetic resonance imaging (MRI) to visualize fluid flow inside fractures.

Session: Pore Scale Modeling

SCA2003-09 H. Okabe, M.J. Blunt "Multiple-Point Statistics to Generate Geologically Realistic Pore-Space Representations"

A multiple-point statistics methodology to generate three-dimensional pore-space representations of real rocks has been tested using Fontainebleau sandstone. We show that the use of multiple-point statistics allows the long-range connectivity of the structure to be preserved, in contrast to traditional two-point statistics methods that tend to underestimate the connectivity of the pore space.

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SCA2003-10 E. Amirtharaj, M.A. Ioannidis, I.F. Macdonald "Statistical Synthesis of Image Analysis and Mercury Porosimetry for Multiscale Pore Structure Characterization"

Fractal measures of pore structure, accessible by mercury porosimetry, are combined with BSEM image data within a statistical framework. Assuming that the pore space has a locally spherical geometry, the continuous distribution of pore size is derived in the range of 0.01 μm to 1000 μm for a suite of sandstone and carbonate rock samples.

SCA2003-11 I. Bondino, S.R. McDougall, G. Hamon "Interpretation of a Long-Core Heavy Oil Depletion Experiment Using Pore Network Modeling Techniques"

A depressurization pore-network simulator has been used for the matching and interpretation of the production data of a heavy oil core depletion experiment. It is shown how the overall performance is not only correlated to the particular experimental conditions (rates of depletion) but also to the fluid (heavy oil) and core properties (pore connectivity).

SCA2003-12 A. Moctezuma-Berthier, S. Bekri, O. Vizika "A Dual-Network Model for Relative Permeability of Bimodal Rocks: Application in a Vuggy Carbonate"

A numerical simulator is presented, that calculates multiphase flow transport properties in vuggy carbonates taking into account their specific pore structure parameters (primary porosity, secondary porosity, pore space connectivity). An original methodology permits to deduce experimentally realistic pore size data to construct the network model taking into account the complex structure of the bimodal rocks.

Session : Displacement Mechanisms I

SCA2003-13 G. Hamon, M. Bennes "Two-Phase Flow Rock-Typing: Another Approach"

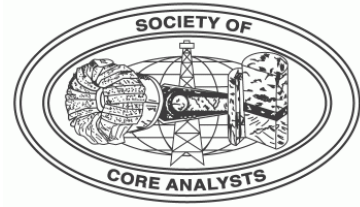
Based on a large number of core flood results, it is shown that the usual rock-typing methods may not capture the actual variability of relative permeability curves. It is also shown that: 1) Multivariate descriptions, including petrophysical characteristics and wettability indicators, should be the basis for the generation of multiphase flow rock-types. 2) Two-phase flow rock-types should be dependent on the recovery process.

SCA2003-14 K. Suzanne, G.Hamon, J. Billiotte, V. Trocme "Residual Gas Saturation of Sample Originally at Residual Water Saturation in Heterogeneous Sandstone Reservoirs"

This paper is based on the Sgr-Sgi relationships of sixty samples which were selected from sandstone formations. Sgr at irreducible water saturation were found equal to maximum trapped gas saturation. This suggests that Sgr at irreducible water saturation, is not a function of Swir, but depends mainly on rock quality.

SCA2003-15 P. Egermann, S. Banini, O. Vizika "Depressurization under Tertiary Conditions in the Near-wellbore Region: Experiments, Visualization and Radial Flow Simulations"

The paper combines experimental results, obtained on both core and transparent micromodel, with radial flow depletion simulations that are representative of the conditions prevailing in the near-wellbore region. It is shown that gas relative permeability under tertiary conditions is lower than the one obtained under secondary conditions, and that the critical gas saturation is a function of the distance to wellbore.



SCA2003-16 D. Ruth, G. Mason, N. Morrow "A Numerical Study of the Influence of Sample Shape on Spontaneous Imbibition"

This paper uses a numerical study to explore the effects of shape and the position of open surfaces on spontaneous imbibition into core samples originally fully saturated with a non-wetting phase.

Session : Displacement Mechanisms II

SCA2003-17 S. Abdobal, M. Fourar, R. Lenormand "Experimental Results for High Flow Rates of Oil and Water through High Permeability Media"

In some reservoirs, oil and water are produced at very high flow rate through zones of high permeability (super K). Experimental studies are presented and the main conclusion is that the formation of emulsion can limit the utility of standard models based on relative permeabilities.

SCA2003-18 M.S. Valavanides, A.C. Payatakes "Prediction of Optimum Operating Conditions for Steady-State Two-Phase Flow in Pore Network Systems Using the *DeProF* True-to-Mechanism Theoretical Model"

A predictive model is presented ("DeProF", acronym for "Decomposition into Prototype Flows") that considers steady-state two-phase flow in porous media as an in-parallel combination of three flow patterns, namely Connected-oil Pathway Flow, Ganglion Dynamics and Drop Traffic Flow. The key difference between these prototype flow patterns is the degree of disconnection of the non-wetting phase ('oil') which, in turn, affects the relative magnitude of the rate of energy dissipation caused by capillary effects compared to that caused by viscous stresses.

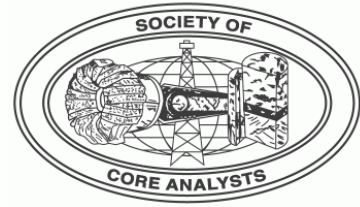
SCA2003-19 R.B. Grigg, R.K. Svec "Co-injected CO₂-Brine Interactions with Indiana Limestone"

This paper reports findings of coreflooding limestone with co-injected carbon dioxide and tracer (metal chlorides) brine at reservoir pressure and temperature. Core segment porosity and permeability changes indicate both dissolution and deposition that was confirmed by chemical analysis and back-scattered electron imaging (BSEI).

SCA2003-20 F. Pairoys, D. Lasseux, H. Bertin "An Experimental and Numerical Investigation of Water-oil Flow in Vugular Porous Media"

Water/oil displacements are performed in artificial vugular porous media with a direct visualization in the vugs. 2D numerical simulation is performed testing different forms of relative permeabilities in the vugs.

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Session: In situ Saturation Imaging. Advances in SCAL

SCA2003-21 F.E. Alvarado, A.S. Grader, O. Karacan, P.M. Halleck "Visualization of Three Phases in Porous Media using Micro Computed Tomography"

It is shown that micro computed tomography (MCT) is a useful technique to study multi-phase flow mechanisms in porous media. This method provides the possibility to obtain three-dimensional saturation data that can be used for simulator development and calibration of models.

SCA2003-22 D. Maloney, D. Zornes "Trapped Versus Initial Gas Saturation Trends from A Single Core Test"

This paper describes an approach for determining trapped versus initial gas saturation trends from a single test by comparing final and initial saturations in situ at discrete locations within the core plug.

SCA2003-23 P. Mitchell, K. Sincock, J. Williams "On the Effect of Reservoir Confining Stress on Mercury Intrusion-derived Pore Frequency Distribution"

"New data showing the effect of confining stress on sample pore structure as measured by high-pressure mercury intrusion are presented. Systematic changes occur to the frequency distribution, notably significant change in both entry pressure and microporosity content"

Session: NMR Fundamentals and Applications

SCA2003-24 B. Sun, K.J. Dunn, G.A. LaTorraca, D.M. Wilson "NMR Imaging with Diffusion and Relaxation"

Novel NMR imaging techniques are developed which can be used to characterize fluid distribution and pore sizes in rock samples. They allow to identify how the fluid is distributed within the core plug using the contrast in the diffusion coefficients, as well as the characteristics of the pore fabric using the T1 relaxation time distribution. It also provides a means of inferring the surface wettability in the spatial image of a core plug.

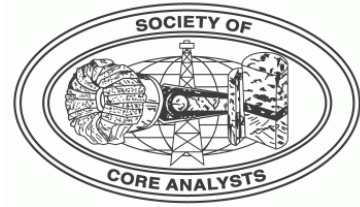
SCA2003-25 C.A. Grattoni, S. H. Al-Mahrooqi, A.K. Moss, A.H. Muggeridge, X.D. Jing "An Improved Technique for Deriving Drainage Capillary Pressure from NMR T2 Distributions"

An improved method to derive primary drainage capillary pressure from NMR T2 distributions of fully saturated rocks using a physically-based model was presented. The calculated drainage capillary pressures have a better agreement with experimental data from reservoir sandstone samples than previous models.

SCA2003-26 M.D. Hürlimann, A. Matteson, J.E. Massey, D.F. Allen, E.J. Fordham, F. Antonsen, H.G. Rueslåtten "Application of NMR Diffusion Editing as Chlorite Indicator"

"A new NMR technique, diffusion editing, has been tested on a suite of samples with varying amounts of chlorite. This technique, which is designed to separate diffusion and relaxation effects, generally gives more reliable S_w values and it can also be used to derive an indicator of chlorite content."

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SCA2003-27 Hendrik Rohler "The Scaling of Surface-to-Pore-Volume Ratio Estimates and its Use in Predicting NMR Log Derived Permeabilities in Clastic Rocks. Model Driven Field Applications from the Lublin Basin, Poland"

Working method to relate NMR relaxation times to inner surface area values derived from various lab procedures. A fractal pore surface model is used to explain the observed correlations and to derive permeability estimators.

Session: Resistivity and Log Calibration

SCA2003-28 J-B. Clavaud, J. LaVigne "Anisotropy of Resistivity in Oil Bearing Thin-bedded Formation: Experiment and Modeling"

"Anisotropy of resistivity of thin-bedded formation is investigated experimentally and numerically. Both experiment and modeling show that when oil saturation increases, electrical anisotropy increases and that this is due to the difference of saturation between the sand layer (oil bearing) and the fine grain layers (water bearing)".

SCA2003-29 C. Durand "Improvement of Fluid Distribution Description during Floods by Combined Use of X-ray CT Scan and Continuous Local Resistivity Measurements"

"The procedure described in the paper improves the consistency of the measurements, and thus the quality of the parameters that can be drawn from experiments, and which may be of paramount importance in log interpretation. Examples are given on Fontainebleau sandstones."

SCA2003-30 P.F. Worthington "Characterization of the Intrinsic Porosity Exponent through Dual-salinity Measurements of Electrical Conductivity"

Dual-salinity conductivity measurements of fully water-saturated reservoir rocks allow us to identify a petrofacies-specific intrinsic porosity exponent m^* . The method requires fewer data than traditional multiple-salinity conductivity studies and yet it is more definitive than approaches that use an electrochemical measurement of non-Archie conductivity.

SCA2003-31 M. Fleury "Advances in Resistivity Measurements using the FRIM Method at Reservoir Conditions. Applications to Carbonates."

The Fast Resistivity Index Measurement (FRIM) method is a recent technique to measure continuous resistivity index curves on core samples. This paper presents the use of this technique at reservoir conditions during drainage and imbibition on various reservoir carbonate samples. Two semi-empirical RI-Sw relationships useful for describing the various non-Archie curves are also given.

Session: Case Studies I

SCA2003-32 W. Hammervold Thomas, J.K. Ringen, S.O. Rasch "Effect of Glauconite on Petrophysical Properties as Revealed by Core Analysis"

High content of glauconite grains with high microporosity can be a challenge to special core analyses, and interpretation and implementation of data. This field exploration exercise proved the importance of taking core and determining water saturation directly on the cores. The effect of the glauconite shows that unusual results make detailed mineralogical description and interpretation necessary.

SCA2003-33 P. Ayyalasomayajula, L. Silpngarmlers, J. Berroteran, J. Sheffield, J. Kamath
"Measurement of Relevant Gas Condensate Relative Permeability Data for Well Deliverability Predictions for a Deep Marine Sandstone Reservoir"

An extensive data set on four rock samples from a deep marine sandstone reservoir is presented. These data span the k_{rg}/k_{ro} and capillary number parameter space. The issues behind the design of the experiments and also results of numerical simulation of these specialized corefloods are discussed.

SCA2003-34 J. Williams, K. Sincock, P. Mitchell "Investigation of the Oil Saturation of the Swept Zone of the Harding Field, UKCS"

A Special Core Analysis study was performed to replicate the in-situ environment of measurement to determine the appropriate Archie parameters for estimation of the remaining oil saturation in the swept zone. The results of the study showed a clear directional electrical anisotropy and a range of Archie parameters.

SCA2003-35 D.K. Potter, A.H. Le, P.W.M. Corbett, C. McCann, S. Assefa, T.Astin, J. Sothcott, B. Bennet, S. Larter, A. Lager "Genetic Petrophysics Approach to Core Analysis – Application to Shoreface Sandstone Reservoirs.

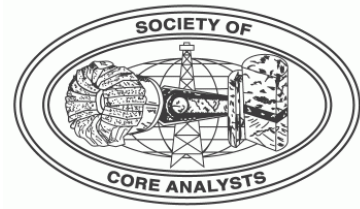
Genetically focused neural nets have allowed good predictions of permeability, even where the porosity - permeability relationship is poor, using extremely limited but representative core and wireline log training data. The genetic approach has allowed other geophysical and geochemical parameters, in addition to petrophysical parameters, to be rapidly predicted in large intervals from minimal representative training data from conventional or SCAL plug analyses.

Session: Case Studies II

SCA2003-36 S.K. Masalmeh, X.D. Jing, W. van Vark, S. Christiansen, H. van der Weerd, J. van Dorp
"Impact of SCAL on Carbonate Reservoirs: How Capillary Forces Can Affect Field Performance Predictions"

The effect of capillary forces in addition to viscous and gravity forces on sweep efficiency of immiscible displacement in a heterogeneous porous medium at different wetting conditions is examined. The results show that there is a subtle balance between viscous, gravity and capillary forces during oil displacement. The study shows that for the subject carbonate reservoir water-flood recovery is strongly dependent on the shape of the imbibition capillary pressure curves.

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SCA2003-37 T.M. Okasha, J.J. Funk, A-J. Al-Shiwaish "Evaluation of Recovery Efficiency and Residual Oil Saturation of Two Distinct Arabian Carbonate Reservoirs"

Extensive SCAL work was carried out on preserved core plugs recovered from two distinct carbonate Arabian reservoirs. The purpose was to provide and evaluate waterflood recovery efficiency and residual oil saturations. The test results indicated that pore structure, pore size distribution, rock fabric, and environment of deposition are important factors that affect microscopic oil and water flow in porous media and the development efficiency of an oil field developed by water injection.

SCA2003-38 N. Springer, U. Korsbech, H.K. Aage "Resistivity Index Measurement without the Porous Plate: A Desaturation Technique Based on Evaporation Produces Uniform Water Saturation Profiles and More Reliable Results for Tight North Sea Chalk"

" In resistivity index measurement established drainage techniques often fail in producing uniform saturation distributions when measuring low permeable reservoir rocks, and the calculated saturation exponent values will be biased. A desaturation technique based on evaporation eliminates the porous plate, produces uniform saturation profiles, and more reliable resistivity data are obtained for the Lower Cretaceous carbonates in the Danish North Sea".

Alternates/Posters

SCA2003-39 M. Ding, A. Kantzas "Investigation of Liquid Imbibition Mechanisms Using NMR"

In this study, on-line NMR relaxometry is introduced as a method for monitoring co-current imbibition. A group of plugs from a Western Canada sandstone reservoir was selected and a series of primary and spontaneous imbibition tests were run for both water and oil at the same conditions. Comparing current results with previous results in soils, it becomes evident that spontaneous imbibition with on-line NMR measurements can become a tool for wettability assessment.

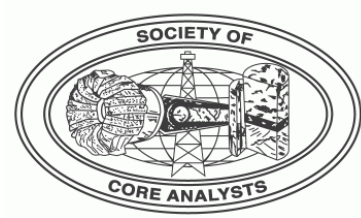
SCA2003-40 S. Siddiqui, T.M. Okasha, J.J. Funk, A.M. Al-Harbi "New Representative Sample Selection Criteria for Special Core Analysis"

This paper describes some of the effective criteria and tests required for the selection of representative samples for use in SCAL tests. The proposed technique is essential to insure that high quality core plugs are chosen to represent appropriate flow compartments or facies within the reservoir.

SCA2003-41 E. Hassanzadeh, S. Saleh Hendi, A. Kato "A Method for Estimating Permeability of Carbonate Rocks from CT Scan Data"

CT scan data of carbonate core samples have been studied using artificial neural networks to investigate relationships between permeability with density related CT numbers and other laboratory measurements. It was shown that the trained networks were able to predict/estimate permeability comparable to that of actual core measurements.

SCA2003-42 A.A. Garrouch, Liaqat Ali "Development of a Type-Curve Technique for Estimating Rock Permeability Using Capillary-Pressure Data"



SCA2003-43 M.-R. Esfahani, E.-A. Kazemzadeh, S.-M. Hashemi "Determination of Wettability of Iranian Carbonate Reservoir Rocks in Restored-State"

Some wettability experiments have been performed on Iranian carbonate reservoir rocks which consists of quantitative and qualitative experiments. Quantitative results by the Amott method show that the most carbonate samples had intermediate wettability characteristics, but the results from combined Amott-USBM testing indicated that system is mostly oil-wet.

SCA2003-44 S. Saner, M. Kissami "Critical Salinity for Archie - Non Archie Models in the Jauf Sandstone Reservoir, Saudi Arabia"

"The Archie model may be valid for water saturation calculation in shaly sands at high salinity formation environments. When formation brine salinity is low or salinity equilibrium is changed during drilling and production operations, application of an appropriate non-Archie model is required. In the Jauf reservoir of Saudi Arabia, the shaliness effect (BQv) has been investigated and critical formation salinity has been experimentally determined to be 100 kppm. "

SCA2003-45 R. Murali "Evaluation of Effect of Capillary Forces on Measurements in Linear Waterfloods by Simulation"

"This paper attempts to evaluate the effects of capillary number, viscosity-ratio, wettability and heterogeneity on the relative permeability determined by unsteady-state coreflood experiments."

SCA2003-46 Liu Qingjie, Shen Pingping, Li Xianbing "The Characteristics of Relative Permeability Curves in Chemical Flooding by Pore Scale Network Modeling"

The work present a dynamic pore scale network model aims at evaluation of the characteristics of relative permeabilities in chemical flooding by the introduction of chemical flooding factors, such as interfacial tension reduction and water viscosity enhancement. The authors believe the simulations provide some hope that pore-scale modeling will have implications for chemical flooding practices.

Posters

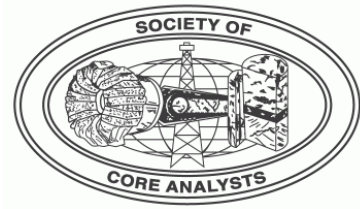
SCA2003-47 L. Tomutsa, V. Radmilovic "Focussed Ion Beam Assisted Three-dimensional Rock Imaging at Submicron Scale"

To achieve submicron resolution, a new method of sample serial sectioning and imaging using Focused Ion Beam (FIB) technology has been developed and 3D pore images of the pore system for diatomite and chalk have been obtained. Using secondary electrons or ions, resolutions as high as 10 nm can be obtained. Afterwards, the 2D images are stacked in the computer and the 3D pore structure is reconstructed.

SCA2003-48 A. Moctezuma-Berthier, O. Vizika, P. Adler "Core Reconstruction from CT-Scan Porosity Maps"

A systematic study to generate reconstructed cores using CT-scan porosity maps was conducted. This technique was applied to two CT-scan porosity maps for two carbonates. The macroscopic transport

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properties of conductivity and permeability were calculated in real and reconstructed samples using the "box integration method", and the results are compared with laboratory measurements.

SCA2003-49 M.T. Tweheyo, E. Knudsen, O. Torsæter, J.K. Ringen "Sensitivity Studies of Fluid Flow across Water-Saturated Faults with High Entry Pressure"

"The paper presents simulation and experimental studies of fluid flow across fault zones in compartmentalized reservoirs. The results show that oil breakthrough and recovery are controlled by the interplay of fault and rock properties."

SCA2003-50 Z. Karpyn, A. Alajmi, C. Parada, A.S. Grader, P.M. Halleck, O. Karacan "Mapping Fracture Apertures Using Micro Computed Tomography"

This paper highlights several examples where artificially created fractures were imaged and the distributions of fracture apertures were determined. The fracture apertures were up to about 1000 microns and as low as 50 microns. The fracture aperture maps can be used as the basis for multi-phase simulation of fracture transport.

SCA2003-51 B.M. Freifeld, T.J. Kneafsey, L. Tomutsa, J. Pruess "Development of a Portable X-Ray Computed Tomographic Imaging System for Drill-Site Investigation of Recovered Core"

A portable x-ray computed tomography system has been developed for drill-site investigation of recovered core. This instrument brings state of the art imaging and analysis capability out of the laboratory and into the field, where it has been applied under varied conditions, from shipboard to arctic.

SCA2003-52 R. Lenormand "Interpretation of Mercury Injection Curves to Derive Pore Size Distribution"

Interpretation of mercury porosimetry is re-examine and several definitions of the threshold distribution are proposed. The procedure for fitting and smoothing the experimental data is also presented.

SCA2003-53 G. Chauveteau, Y. Kuang, M. Fleury "A Structural Model to Predict Transport Properties of Granular Porous Media"

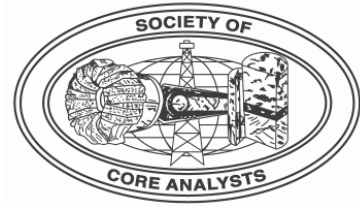
The paper shows that the Grain and Pore Throat model, a simple but realistic enough description of the flow cell at pore scale, is an efficient tool to derive numerous transport laws from simple geometrical characteristics of flow pathways. This model points out that transport properties must be related to the difference between porosity (or saturation) and the critical value below which there is no transport.

SCA2003-54 P. Egermann, J. Behot, R. Lenormand "Measurement of the Formation Factor on Drill Cuttings"

In this paper an original method to determine the formation factor of the rock from cuttings is presented. The method is rather simple and quick to operate. It has been tested on rocks of different porosity and the results are in good agreement with core measurements.

SCA2003-55 A. Graue, E. Aspenes, B. Kvamme, B.A. Baldwin, J. Stevens, D.P. Tobola, D.R. Zornes "Monitoring the Formation and Dissociation of Gas Hydrates in Reservoir Rock using Magnetic Resonance Imaging"

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Formation and dissociation of gas hydrate have been monitored in a sandstone core plug using Magnetic Resonance Imaging (MRI). This paper describes the experimental procedures developed to form carbon dioxide (CO₂) and methane (CH₄) hydrate in sandstone rock while monitoring the process with MRI.

SCA2003-56 G.P. Matthews "Enhanced Modelling of Mercury Porosimetry, Absolute Permeability and Formation Damage using a Three-dimensional Pore-network Model"

A method is demonstrated for obtaining enhanced information from the mercury intrusion porosimetry of core plugs. It is based on simulated three-dimensional void networks, of simple Euclidean geometry, which have porosities identical to those of the experimental samples, and simulated intrusion curves which fit closely to experimental curves at all pressures. Although the geometry of the network is simplistic, it is nevertheless flexible enough to closely simulate the percolation properties of actual sandstone samples.

SCA2003-57 V.V. Fedortsov, V.G. Toporkov, B. Hairullin "Effectiveness of a Complex Approach towards the Study of the West Siberia, Pokurian Suite Reservoirs Presented by Poorly Cemented Rocks"

Complex approach of low invasion coring technology and laboratory core study in poor cemented reservoir provide a good quality petrophysical data. Comparison of low invasion core data with oil based core data demonstrates a high effectiveness of low invasion core.

SCA2003-58 S. Siddiqui, A. Khamees, W. Hughes, K. Sadler "A Density-Based Imaging Technique to Supplement FMI Images for Sedimentary Facies Modeling"

This paper discusses the development of a practical algorithm for extracting data from near the external surface of the three dimensional density based images for comparing against the corresponding FMI logs. Practical applications of this technique proved to be extremely useful in characterizing some of the interesting facies in a Lower Aptian reservoir in the Middle-East.

SCA2003-59 F. Manalo, D. Lastockin, J. Bryan, A. Kantzas "Using NMR Spectra to Determine Compositions of Unconsolidated Sand/Clay/Brine/Heavy Oil Samples"

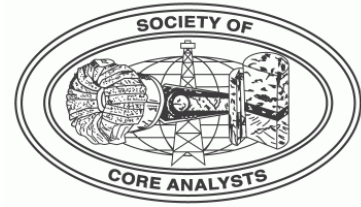
A preliminary predictive algorithm was developed to use NMR data for calculating heavy oil, water and clay content in samples containing heavy oil and clay bound water. This was created to overcome the problematic fact that NMR cannot detect the complete heavy oil spectrum.

SCA2003-60 A.F. Alajmi, A.S. Grader "Multi-Phase Flow in the Presence of a Fracture Tip: Experiments and Modeling"

This paper focuses on multi-phase flow in the presence of a fracture tip. This work studies two-phase water-oil displacements in layered Berea Sandstones that have been artificially fractured with single extensional fracture perpendicular to the natural layers.

SCA2003-61 P. Such, G. Lesniak "Factors Affecting Relative Permeability Measurements for the Miocene and the Rotliegend Poorly Consolidated Sandstones"

"Pore space of poorly consolidated Miocene and Rotliegend sandstones is often damaged by a flow of reservoir water. Authors extracted various types of pore space damages and connected them with relative permeability parameters"



SCA2003-62 T. Miller, J. Shafer "Calculating In Situ Stresses in Overpressured Settings"

Accurate porosity and permeability measurements and rock mechanics tests, e.g., for reservoir compressibility, depend on correct estimates of the in situ reservoir stresses. These stresses, in turn, depend on the reservoir's burial depth, its burial history, and the magnitude and history of pore pressures. This paper focuses on the effects of the magnitude of excess pore pressures and pore pressure history on reservoir stresses.

SCA2003-63 C.U. Hatiboglu, U. Karaaslan, S. Akin "Spontaneous Imbibition in Low Permeability Carbonates"

Gas-water spontaneous imbibition experiments conducted using low permeability heterogeneous limestone core plugs were modeled using a mathematical model where the porous medium is represented as a bundle of equal but tortuous capillary tubes. It was observed that the model successfully explained the imbibition process in samples where pores with varying circularity were present and average number of pore throats meeting at one pore in the pore skeleton was less than six for all cases.

SCA2003-64 S. M. Hashemi, E.A. Kazemzadeh, M.R. Esfahani "Determination of Accessible Pore Volumes of a Porous Media During Miscible Displacement Using Tracer Analysis Techniques"

In this study the tracer analysis method is developed to determine the accessible pore volume. For this purpose a series of tracer analysis tests were performed to determine the effluent concentration profile. Using the slope of the concentration profile and the solution of convection-dispersion equation, the accessible pore volume of the porous media can be calculated.

SCA2003-65 V.G. Toporkov, S.Yu. Rudakovskaya, M.Yu. Rakhmanin, A.S. Denisenko "Examination of Unconsolidated Core by Nuclear-Magnetic Resonance Method"

Experiments on unconsolidated sand and clay reservoirs confirm that the low temperature technology ($T = -196^{\circ}\text{C}$) for cutting out core specimen will not cause substantial changes either in the permeation and storage properties or in the pore space structure. The NMR investigation suggests that the low temperatures have an insignificant influence and a minimum effect on the pore space structure and the surface properties of the mineral skeleton of the rock.

SCA2003-66 A.K. Moss, A. Zacharopoulos, M.H. de Freitas "Shale Volume Estimates from NMR Core Data"

The NMR signal from outcrop core plugs with a range of clay content and volume, at varying saturation states was measured. The study illustrates how NMR can be used to measure the differing water adsorption properties of core plugs of varying clay content and calibrate a model that can directly predict shale volumes.

SCA2003-67 G.M. Hamada "Accuracy Analysis of Water Saturation Models in Clean and Shaly Layers"

This paper presents a new technique to determine Archie parameters a , m and n . The developed technique is based on the concept of three dimensional- regression (3-D) plot of water saturation, formation resistivity and porosity. 3D technique provides simultaneous values of Archie parameters and overcomes the uncertainty problems due to the separate use of formation resistivity factor- porosity and water saturation equations.