

4th International Conference on Fault and Top Seals 2015

Art or Science?

**Almeria, Spain
20-24 September 2015**

ISBN: 978-1-5108-1417-2

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2015) by the European Association of Geoscientists & Engineers (EAGE)
All rights reserved.

Printed by Curran Associates, Inc. (2015)

For permission requests, please contact by the European Association of Geoscientists & Engineers (EAGE)
at the address below.

European Association of Geoscientists & Engineers (EAGE)
PO Box 59
3990 DB Houten
The Netherlands

Phone: +31 88 995 5055
Fax: +31 30 634 3524

eage@eage.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

A Post-mortem Study on Fault Retention Capacity.....	1
<i>R. Castilla, J. Despoines</i>	
An Innovative Approach for the Prediction of Column Heights in Multi-fault Traps Using Deterministic Fault Seal Analysis.....	6
<i>P. Bretan</i>	
Integrated Fault and Top Seals Study in South Sumatra Wrench Basin.....	11
<i>P. Ariyanto</i>	
Geomechanical Assessment of Flow Barriers Observed from 4D Time-lapse Survey for CO₂ Storage in Snøhvit Field	16
<i>J. Choi, E. Skurtveit, B. Bohloli, L. Grande</i>	
The Effect of Fluid Flow in Relay Ramps on Seismic Images.....	21
<i>C. Botter, N. Cardozo, I. Lecomte, A. Rotevatn, G. Paton</i>	
Application of Seismic Attribute Volumes for Detailed Interpretation of Fault Interactions and Growth.....	26
<i>H. Joergensen, B. Alaei</i>	
Relationships between Overburden Brights and Leakage from Underlying Reservoirs in the Barents Sea.....	31
<i>C. Hermanrud, T. Simmenes, R. Ersland, L. Georgescu</i>	
Fault-seal Risk Analysis for CO₂ Storage in the Petrel Sub-basin, NW Australia	36
<i>G. Yielding, C. Consoli, P. Boult</i>	
Preliminary Analysis of Containment Integrity for Geological Storage of CO₂ at the South West Hub Project, Western Australia.....	41
<i>L. Langhi, Y. Zhang, B. Ciftci, C. Piane, J. Strand, D. Dewhurst, L. Stalker, K. Michael</i>	
Keynote Speech - The Importance of Fault and Top Seals	46
<i>J. Davis, F. Corona</i>	
Keynote Speech - Hydrodynamic Constraints on Fault Seal Analysis - Linking Capillary and Fault Reactivation Processes.....	51
<i>J. Underschultz</i>	
Relating Structural Elements to Cross-fault Flow - Implications for Fault Permeability Estimation.....	55
<i>M. Kettnerman, J. Urai, P. Vrolijk</i>	
Deformation Bands in Chalk and Their Impact on Fluid Flow - An Example from Pegwell Bay, Kent.....	60
<i>I. Kaminskaite, Q. Fisher, C. Grattoni</i>	
Permeability Estimation in a Multi-fractured Top Seal.....	65
<i>R. Rizzo, D. Healy, L. Siena</i>	
Shallow Gas Offshore Netherlands - The Role of Faulting and Implications for CO₂ Storage	70
<i>J. Williams, C. Gent</i>	
Clay Smear Processes in Unlithified Clay-sand Sequences of the Hambach Lignite Mine	75
<i>M. Kettermann, J. Urai, S. Thronberens, S. Asmus</i>	
Modeling of Stress and Pressure Dependence of the Sealing and Transport Properties of the Fault.....	80
<i>A. Rozhko</i>	
Permeability Heterogeneity in Fault Damage Zones and Its Relationship to Deformation Band Connectivity	85
<i>P. Edwards, D. Sanderson, Y. Kim</i>	
Cataclastic Faulting and Cementation Interplay in Shallow Porous Sandstones - Insight from a Groundwater Context	90
<i>S. Philit, R. Soliva, P. Labaume, C. Gout</i>	
Seismic Imaging of Fault Facies Models – A Pilot Study.....	95
<i>D. Kolyukhin, V. Lisitsa, D. Qu, M. Protasov, V. Tcheverda, J. Tveranger, D. Vishnevshky</i>	
The Role of Mechanical Anisotropy in Controlling Fault Trajectories within Multilayered Carbonate and Clay-rich Rocks	100
<i>C. Giorgetti, B. Carpenter, M. Scuderi, T. Tesei, M. Barchi, C. Collettini</i>	
Usinskoye Field (Timan-Pechora Province) - Lower Serpukhovian Oil Pools Sealing and Scattering	105
<i>E. Rile</i>	
3D Fault Plane Geometry and Fault Scaling Studies Using Seismic Attributes	110
<i>B. Alaei, A. Torabi</i>	
Characterization of Fault Zones for Reservoir Modeling - An Example from the Illizi Basin, Algeria	115
<i>L. Mattioni, B. Caradec, L. Jeannin, R. Cherif</i>	

Geological Condition and Characteristics for Formation of Deformation Bands - Example from Jizhong Depression, China	120
<i>Z. Liu, Y. Sun, X. Fu, L. Meng</i>	
Estimating the Coulomb Failure Function Using Seismic Velocities	125
<i>T. Colson, B. Boterhoven, D. Castillo, M. Keep</i>	
Characterization and Prediction of Seal Lithological Variability from Log and Seismic Data	130
<i>K. Kurtev</i>	
Geometry, Microstructure and Petrophysical Properties of Compaction and Shear Bands at Silica Dome, Valley of Fire State	135
<i>A. Torabi, B. Jarsto, A. Cilona, S. Deng</i>	
Growth Juxtaposition Diagrams - A New Angle on an Old Technique	140
<i>H. Anderson, C. Reilly</i>	
Filling the Gaps – From Microscopic Pore Structures to Transport Properties in Shales	145
<i>T. Schafer, R. Dohr, C. Greenwell, M. Jensen</i>	
Assessment of Fault-seal Integrity for Underground Storage of Natural Gas in Porous Sandstone	150
<i>L. Meng, X. Fu, X. Zhang, T. Li, J. Liu</i>	
Fault Seal Analysis of a Natural CO₂ Reservoir	155
<i>J. Miocic, G. Johnson, S. Gilfillan, C. McDermott, R. Haszeldine</i>	
Predicting Hydraulically Conductive Fractures – A Comparison of Methods	160
<i>S. Weihmann, D. Healy</i>	
Geometry and Rock Properties Modelling of the Callovo-Oxfordian Claystone from a 3D High Resolution Seismic Cube	165
<i>B. Yven, M. Garcia, A. Chabiron</i>	
Mechanical Anisotropy Characterization of the Draupne Formation, North Sea	170
<i>E. Skurtveit, J. Choi, M. Soldal, L. Grande, R. Maurer, P. Horsrud</i>	
Chemical-mechanical Coupled Modelling Subjected to Long-term Integrity of Faulted Caprock	175
<i>S. Waldmann, E. Veer, P. Fokker</i>	
Pressure-dependent Permeability of Shales	180
<i>E. Rutter, J. Mecklenburgh, R. McKernan, R. Taylor</i>	
Past and Present Permeability, Fluid Flow and Self Sealing in a Marl-limestone Sequence in Northern Switzerland	185
<i>M. Mazurek, G. Deplazes, P. Marschall, D. Traber</i>	
Experimental Observations of the Flow of Water and Gas along Fractures in Shales and Clay Gouge	190
<i>R. Cuss, J. Harrington, C. Graham, A. Graham</i>	
Fault Seal Analysis Incorporating Shale Smear - Implications for Upscaling	195
<i>N. Grant</i>	
Permeability Anisotropy in Faulted Sandstone - Implications for Fault Seal	200
<i>N. Farrell, D. Healy</i>	
Tectonic Control on Cataclastic Strain Distribution and Permeability Reduction in Porous Sandstone Reservoirs	205
<i>G. Ballas, R. Soliva, H. Fossen, R. Schultz</i>	
The Rôle of Faults on Hydrothermal Circulations in the Têt Valley (Eastern Pyrénées)	210
<i>A. Taillefer, G. Martin, R. Soliva</i>	
Flow Around Fault Zones in Siliciclastic Reservoirs Based on Limited Available Data During Hydrocarbon Exploration	215
<i>J. Heege, G. Bruin</i>	
Dynamic Modelling of Faults for CO₂ Storage - Insights from the CO₂CRC Otway Project	220
<i>E. Tenthorey, T. Dance, J. Ennis-King, Y. Cinar, J. Strand</i>	
Widening of Normal Fault Zones During Vertical Propagation	225
<i>V. Roche, C. Homberg, M. Baan, M. Rocher</i>	
Importance of Decompaction and Restoration for Temporal Fault Displacement and Fault Seal Analysis	229
<i>C. Reilly, H. Anderson</i>	
Structural Architecture and Paleofluid Evolution of Strike-slip and Normal Fault Zones, Jabal Qusaybah Anticline, Oman	234
<i>L. Clementzi, F. Balsamo, F. Storti, M. Mozafari, J. Solum, R. Swennen, C. Taberner, C. Tueckmantel</i>	
Investigating Fault Zone Development, Geometries and Properties in Mixed Carbonate and Clastic Successions	239
<i>T. Cain, S. Clarke, A. Leslie</i>	
Static and Dynamic Fault Seal Potential in Carbonates	244
<i>J. Solum</i>	

Frictional and Hydraulic Behaviour of Carbonate Fault Gouge During Fault Reactivation – An Experimental Study	249
<i>C. Piane, A. Giwelli, B. Clennell, J. Raimon</i>	
Using Field and Lab Data to Improve the Simulation of Faulted Carbonate Reservoirs.....	254
<i>E. Michie, G. Yielding, Q. Fisher</i>	
Significance of Fault Seal in Assessing Prospect Fill Scenarios - A Case Study from the Southern North Sea.....	259
<i>B. O'Sullivan, A. Kay, P. Bretan, G. Yielding</i>	
The Value of Fault Property Analysis for Field Development Planning.....	264
<i>A. Frischbutter, Q. Fisher, G. Namazova, S. Dufour</i>	
Impact of Fault Rock Properties and Sub-seismic Scale Faults on Fluid Flow in Penguins C Field, North Sea	269
<i>U. Onyeagoro</i>	
Structural Modelling and History Matching to Understand Aquifer Behaviour in the Hewett Field, UK Southern North Sea	274
<i>A. Clarke, J. Imber, G. Yielding, R. Davies, J. Hunen, S. Daniels, A. Heafford</i>	
Changes in Reservoir Fault Seal Behaviour through Time, Offshore Congo	279
<i>C. Wibberley, J. Gonzalez, O. Billon</i>	
Author Index	