

85th EAGE Annual Conference & Exhibition Workshop Programme 2024

Oslo, Norway
10 - 13 June 2024

ISBN: 979-8-3313-0978-7

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© (2024) by the European Association of Geoscientists & Engineers (EAGE)
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

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: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Fault Zone Structure and Fluid Flow Behaviour in Shale-Rich Sequences.....	1
<i>C. Wibberley</i>	
QC of a Marine Vibrator.....	5
<i>T. Elboth, T.A. Nilsen, A. Nilsen, J.P. Merlin Ertel</i>	
The Physics of CO ₂ Being a Greenhouse Gas	10
<i>L. Amundsen, M. Landrø</i>	
Over 30 Years of Migration Velocity Analysis Based on Differential Semblance Optimization.....	15
<i>H. Chauris, M. Farshad</i>	
Designing a Deep-Sea Mining System for Seafloor Massive Sulphides in the Norwegian Jurisdiction	20
<i>M. Lesage</i>	
The Energy Transition, Societal Issues and How Geoscience Can Contribute.....	25
<i>P. Ringrose</i>	
Industry Application of Fault Seal Prediction Methods. Experience from Petrophysical Data and Fault Process Understanding.	30
<i>S. Ottesen</i>	
Fault Permeability in Porous Sandstone Reservoirs: A Short Review of Controlling Factors.....	34
<i>F. Balsamo, M. Pizzati, C.F. Nogueira, F.H. Bezerra, F. Storti, J.A. Souza</i>	
Cascaded Least-Squares Multiple Imaging for Reduced Multiple Crosstalk	40
<i>G. Poole, M. Farshad</i>	
Ultra-Resolution Nodal Seismic and Machine Learning for Geohazard Analysis.....	45
<i>D. Colombo, E. Sandoval-Curiel, T. Alyousuf, E. Turkoglu, D. Rovetta</i>	
The Iris License CCS Project – Fast Track to Success	48
<i>C. Dybbroe Tang, T. Roth, A. Szabados</i>	
Sinkhole and Cavity Detection Through Satellite Radar Data: Exploring Potentialities and Addressing Challenges	53
<i>A. Ferretti, S. Cespa, S. Presezi</i>	
Remote Detection of Karst – from Remote Sensing to Seismic	57
<i>A. Laake</i>	
Characterisation and Monitoring of Injected CO ₂ Using Multiphysics Approaches: An Example from a Carbonate Reservoir.	62
<i>L. MacGregor, N. Ralim, J. Kho, T. Jayasangar</i>	
Application of Digital Core Analysis to Carbon Storage: Luna Project Case Study	67
<i>A. Fogden, T. Bollermann, E. Huebner, S. Alakbarov</i>	
Characterization of Subseismic Fault Zone Heterogeneity for Fault Seal Analyses.....	72
<i>J. Solum, S. Jolley, N. Duffin, K. Onyeagoro</i>	

From Generic Monitoring-Concepts to a Risk-Based and Site-Specific MMV-Strategy for the Porthos CCS-Project.....	77
<i>G. Thuerschmid, L. De Groot, H. De Haan, M. Bouts</i>	
Fault Damage Zone in Seismic Data	81
<i>C. Botter</i>	
Data Domain and Joint Domain Compressive Sensing	86
<i>Y. Zhang, L. Duan, Y. Yang, F. Chen, J. Song</i>	
Complex Slip Dynamics of a Fault Zone: Decoding and Interpreting Seismic Observation Using Numerical Model.....	91
<i>N. Kheirdast, M. Almakari, C.D. Villafuerte, H.S. Bhat, M.Y. Thomas</i>	
Geophysical Challenges for Seabed Mineral Exploration	96
<i>S.A. Frivik, L. Combee</i>	
Strategic Deployment of AUVs for Data-Driven Exploration of Seafloor Massive Sulfides: Bridging Scales and Knowledge Gaps	99
<i>A. Lim</i>	
Integrated Cuttings Sample Analysis as Tool for CO ₂ Storage Capacity Assessment, Well 10/4-1, EXL006, North Sea	104
<i>O. Weidlich, A. Günther, E. Walter, F. Schipperski, R. Bussert</i>	
Geomechanical Risk Assessment of the Luna Carbon Dioxide Storage Site, Offshore Norway.....	109
<i>L. Douma, R. Newman, S. Alakbarov, A. Dunbar, E. Huebner</i>	
Lithologic-Stratigraphic Control of the Karst Breakdown Mechanism in Miocene Gypsum of the Northern Carpathian Foredeep	114
<i>B. Ridush, U. Kostiuk</i>	
Maximizing the Contribution of Reflections by Dynamic Resolution Time-Lag Full-Waveform Inversion.....	119
<i>M. Wang, Y. Xie, P. Deng, Y. Chen, J. Wang</i>	
Environmental Measurement Monitoring and Verification for Offshore Storage – Challenges and Solutions.....	124
<i>J. Blackford</i>	
Distributed Fibre Optic Sensing for CO ₂ Storage Monitoring.....	129
<i>A. Stork, M. Mondanos, A. Chalari, C. Maldaner, G. Naldrett, F. Stanek</i>	
CSEM as a Tool for CO ₂ Monitoring: Sensitivity and Technology Requirements	132
<i>K. Eide, D. Andreis, Ø. Frafjord, X. Wu, H. Tseng</i>	
Carbon Management Canada’s CaMI-FRS CCS Pilot Site: Advancing Technologies for Carbon Storage Monitoring.....	137
<i>M. Macquet, B. Kolkman-Quinn, D. Lawton, J. Cooper</i>	
Navigating the Future: Insights from Recent CCS Baseline and Development 3D Streamer Seismic Surveys	141
<i>M. Widmaier, C. Roalkvam, O. Orji, A. Goertz, A. Tantsereva</i>	
The Role of AI in Structural Seismic Interpretations – Potential and Pitfalls	144
<i>N. Grobys</i>	

Northern Lights CCS Monitoring: A Plan in Continuous Evolution	147
<i>C. Acuna, M. Vinchon, A. Furre, I. Torsnes, N. Thomson</i>	
Irregular Spatial Sampling: Rank Reduced and Sparse Interpolation.....	152
<i>L. Pesudo, D. Le Meur</i>	
Sparse Seismic Monitoring in the Greensand Project	157
<i>T. Roth</i>	
Modeling Marine Vibrator Data in the Presence of a Time-Varying Free Surface	161
<i>K. Almuteri, J. Shragge, P. Sava</i>	
Risk-Based MMV for Efficient, Long-Term Storage of CO ₂ : Lessons Learnt from Quest	166
<i>S. Minisini, M. Dean</i>	
Prospect Definition, Risking and Portfolio Generation in the Oil and Gas Industry	169
<i>J. De Jager</i>	
A Unified Mathematical Framework to Extension and Convexification Methods for Full Waveform Inversion.....	173
<i>L. Metivier, R. Brossier</i>	
Common Acquisition Platforms for the Energy Evolution Including SMS – a Discussion.....	178
<i>B. Kjølhamar, D. Helland-Hansen</i>	
Why Geostatistics Can Be Useful in Seismic Processing and Modelling?.....	183
<i>J. Mari, A. Shtuka</i>	
Underground Gas Storage Monitoring with Seismic Ambient Noise Interferometry: Attempts & Perspectives.	188
<i>T. Kremer, A. Kasantsev, L. Duboeuf, J. Ars, T. Gaubert-Bastide, A. Grauls</i>	
Introduction to Marine Vibrators	193
<i>P. Hanssen</i>	
Navigating Seismic Processing Challenges for Marine Vibrator Data	197
<i>G. Poole, G. Jones, K. Cichy</i>	
Robust and Cost-Effective Monitoring of Induced Seismicity in CCS	202
<i>B. Goertz-Allmann, N. Langet, K. Iranpour, A. Baird, D. Kuhn, J. Vernier, S. Oates, V. Oye</i>	
Human Choices to Define Data Structures to Aid Development of Better AI Applications.....	205
<i>H. Tijhof, J. Solum</i>	
Detecting Near-Surface Cavities and Shallow Heterogeneities Through Surface Wave Attributes: Methods and Applications	210
<i>C. Colombero, V. Socco</i>	
A Seismic Toolbox for Early Screening of Adverse Subsurface Conditions	215
<i>M. Staring, A. Boleve, M. Fliedner, F. Janod, F. Balestrini, S. Sol, R. Eddies</i>	
Joint Migration Inversion with an Extended Reflectivity Based on the Local Harmonic Or Spherical Harmonic Decomposition.....	220
<i>R. Soubaras</i>	

Cost-Constrained Seismic Monitoring: Robust Time-Lapse Wavefield Imaging from Sparse DAS Data	225
<i>H. Li, B. Biondi</i>	
Ocean Current Interaction with Seamounts: Implications for Sediment Plume Transport and Dispersion.....	228
<i>D.W. Schmid</i>	
The General Dynamics Applied Physical Sciences Marine Vibrator System Overview	233
<i>D. Roy, J. Fasano</i>	
Assessing the Sufficiency of Training Datasets for Deep Neural Networks: Techniques and Insights	237
<i>T. Colwell, R. Kurian, N. Riazi</i>	
Methodology for Implementing Clay Type Repository in Meuse/Haute-Marne	242
<i>M. Hayet</i>	
Screening Germany's Subsurface: The Search for a Deep Geological Repository for High-Level Radioactive Waste	247
<i>C. Derer, H. Thomas</i>	
Applied In-Situ Testing and Monitoring Methods in the Swiss Site Selection Program for a Radioactive Waste Repository	251
<i>T. Trick</i>	
GeoMetEr – Development of Geophysical Methods for Site Selection in Germany	256
<i>G. Gabriel, S. Nordsiek, D. Rippe</i>	
Unravelling CO ₂ Leakage Through Legacy Wells: A Toolbox and Technical Workflow for Assisting Risk Assessment in Storage Studies.	261
<i>A. Bello Palacios, L.K. Borgerud, M. Torsæter</i>	
Carbon Dioxide Storage (CCS) in Saline Aquifers Versus Depleted Gas Fields.....	266
<i>R. Worden</i>	
Elements of an Autonomously Operated Marine Vibrator Source Trial	271
<i>T. Manning, J. Dellinger, D. Duke, D. Nams, E. Rich</i>	
Development of Exploration Programs Within the German Site Selection Procedure to Find a Final Repository of High-Level Radioactive Waste	276
<i>F. Meier</i>	
Finding the Most Boring Hot-Spot – the Site Selection Procedure from a Regulator Perspective.....	280
<i>M. Riede</i>	
From Nation-Wide Screening to Confirming Site Scale Studies - Geophysics in the Finnish Siting Programme	284
<i>M. Paananen</i>	
Imaging the Asse Salt Structure (Germany)	289
<i>C. Nachtweide, C. Buxbaum-Conradi, M. Warsitzka, M. Scholze, V. Becker, H. Ding</i>	

Author Index