

Fourth EAGE Borehole Geophysics Workshop 2017

Abu Dhabi, United Arab Emirates
19 - 22 November 2017

ISBN: 978-1-5108-5720-9

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© (2017) by the European Association of Geoscientists & Engineers (EAGE)
All rights reserved.

Printed by Curran Associates, Inc. (2018)

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

INNOVATION IN PROCESSING AND IMAGING

3D Reflectivity-Guided Joint Migration Inversion of Multi-Well Borehole Data	1
<i>B. El Marhfoul, D. J. Verschuur</i>	
Interferometric VSP Multiples Imaging: A Case Study from Saudi Arabia	6
<i>A. Aldawood, S. Alsaadan, N. Palacios</i>	
Characterization of a Fractured Reservoir Using DAS VSP—A Model-Based Reflection Amplitude Study	11
<i>R. Zhou, M. E. Willis, D. Cheng, K. Green</i>	
VSP Anisotropic NMO Correction and Its Application to Attenuate Noise	16
<i>M. Lou, H. Simpson</i>	
From VSP Optimum Imaging to Reservoir Characterization	21
<i>N. El Yadari, A. Suleiman, C. Planchart Marquez, S. Saadan, M. Ahmed</i>	
Imaging Salt Flank by a Rig-source VSP	26
<i>M. Lou</i>	

MULTI-COMPONENT PROCESSING AND IMAGING

Subsalt Imaging Using Walkabove and Walkaway VSP in the Transition Zone of the Red Sea	31
<i>C. A. Planchart, M. J. Vega, J. Jiao, N. El Yadari, Y. K. Fadolkarem</i>	
Estimation of Maximum Horizontal Stress Direction using a Walkaround VSP dataset: A Case Study from the Red Sea, Saudi Arabia	36
<i>N. Palacios, C. Planchart, M. Vega</i>	

ADVANCES IN ACQUISITION TECHNIQUES

Vertical Cable Seismic Processed Using VSP Methods	41
<i>J. Bailey, E. Asakawa, M. Humphries, K. Tara</i>	
DAS Versus Geophones: a Quantitative Comparison of a VSP Survey at a Dedicated Field Laboratory	46
<i>J. Correa, L. Van Zaanen, K. Tertyshnikov, T. Dean, R. Pevzner, A. Bona</i>	
The Merits of DAS Acquisition on Multimode Optical Fiber	51
<i>A. Constantinou, A. Hartog, P. Dickenson, G. Lees</i>	

MONITORING

Successful Deployment of a Microseismic Network for Monitoring Steam Enhanced Oil Recovery, Sultanate of Oman	56
<i>S. Alazri, O. Alharri, R. Alkiyumi, S. Holyak, Y. El-Taha, Q. Alsiyabi, S. Alrawahi, O. Kibitkina</i>	
Offset VSP for the Reservoir Monitoring	60
<i>K. Tertyshnikov, A. Egorov, R. Pevzner, A. Bona</i>	
Large-scale Imaging of Microseismic Events Recorded at a Field in Oman	65
<i>Al Siyabi, A. Shaista, L. Rothenberg, S. Azri, R. Kiyumi, J. Goudswaard</i>	
Application of 4D VSP for Monitoring Of Small-Scale Supercritical CO2 Injection: Stage 2C of CO2CRC Otway Project Case Study	68
<i>H. Alnasser, R. Pevzner, K. Tertyshnikov, D. Popik, M. Urosevic</i>	

DATA INTEGRATION AND CASE STUDIES

Elastic Anisotropy Estimation in the North Sea from Walkaway VSP and Sonic Data	73
<i>C. Mogensen, M. L. Khaitan, R. Guerra, L. Dahlhaus, S. Leaney, J. Jocker, E. Wielemaker</i>	
High Resolution Imaging Using Crosswell Seismic with Complex Stratum in Western China	78
<i>J. J. Wu, Y. P. Li, Q. H. Zhang, J. H. Huang, Y. Z. Chen, C. Chen, Y. H. Wang, Z. D. Cai</i>	

Application of Walkaway-VSP Technology in Volcanic Rocks	83
<i>C. Wang, H. Zhao, Y. Chen, Y. Li, H. Fan, J. Huang, Z. Cai, C. Chen</i>	
Utilizing the Uniqueness of Vertical Seismic Profiling for Deepwater Exploration	88
<i>M. L. Khaitan, P. Ranjan, S. Chandrasekhar, B. Kumar</i>	
3D VSP Processing and Imaging: A Case Study in Eastern China	93
<i>Y. Z. Chen, Y. H. Wang, H. Y. Zhao, Y. P. Li, J. H. Huang</i>	
Characterisation and Imaging of a Near-vertical Fault Zone in Crystalline Rock from Hydrophone VSP Data	99
<i>A. Greenwood, E. Caspari, J. Hunziker, L. Baron, T. Zahner, D. Egli, K. Holliger</i>	

SINGLE WELL IMAGING

Application of Far Field Shear Wave Reflection Imaging To Identify The Precise Location Of A Horizontal Well In A Formation	104
<i>T. Bradley, A. Przebindowska, N. Aarseth</i>	
Single- and Multi Well Imaging Field Survey With the SPWD-wireline Prototype at the Piana di Toppo Test Site in Italy	110
<i>R. Giese, K. Krüger, K. Jaksch, C. Virgil, M. Neuhaus, F. Poletto, A. Schleifer, M. Amro, S. Reichmann</i>	

MONITORING

Key Considerations In 4DVSP Survey Design and Acquisition.....	115
<i>B. Al-Ajmi, K. S. Eldin, W. Zahran, D. Inala, S. Anwar, R. Stott, J. Tinnin, A. Hamilton</i>	

OPENING ADDRESS

Extracting More Information from Rig Source 3C-VSPs	123
<i>C. Naville, A Rivet, V. Lesniov</i>	

POSTER SESSION

Orientation Method Applied to onshore 3-Component VSP's Recorded with a Relative Bearing Sensor in Partially Low Deviated Boreholes	128
<i>K. Kazemi, C. Naville</i>	
Walkaway VSP Velocity Tomography Modeling and Prestack Depth Migration Imaging of Complex Surface.....	133
<i>J. G. Li, J. H. Huang, Y. P. Li, Z. D. Cai, Y. Z. Chen</i>	
Orientation of a 3-C VSP Dataset Acquired by Integrated Geophone Sensor and MEMS Inclinator Devices	138
<i>W. Wills, C. Naville, M. Nott-Bower, G. Tubridy</i>	
Application of Dual Walkaway VSP Technology in Oilfield Development.....	144
<i>C. Wang, Q. Zhang, Z. Cai, Y. Wang, X. Zhang</i>	
Application of Adaptive Time-frequency Distribution for Reservoir Prediction: A Case Study of the VSP in Tarim Basin, China.....	149
<i>Z. Cai, G. Yu, Q. Zhang, Y. Li, C. Wang</i>	
Complex Geologic Modeling Using Walkaway-VSP Imaging: a Case Study from Jiuquan Basin,China.....	154
<i>C. Chen, J. Wu, H. Tang, W. Jiao, Y. Jiang, Q. Shi, X. Sun</i>	
Author Index	