

# MARWAN CHARARA

## PERSONAL INFORMATION

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Born March 24, 1966. Married with one child (15 year-old). French citizenship.

## EDUCATION

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**1996:** PhD, Geophysics, Institut de Physique du Globe de Paris (Paris VII), France.  
Thesis: “Tomography of a visco-elastic medium by seismic waveform fitting”. Advisor: A. Tarantola

**1991:** Master, Geophysics, Institut de Physique du Globe de Paris, France

**1990:** Bachelors, Civil Engineering, American University of Beirut, Lebanon

## PROFESSIONAL EXPERIENCE

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### **2015- *Skolkovo Institute of Science and Technology***

**Oct. 2015 – Associate Professor (Center of Hydrocarbon Recovery)**

- Teaching courses: Introduction to Petroleum Engineering & Petroleum Geophysics
- Research in the fields of geophysical modeling and inversion

**Feb. 2015 – Sept 2015 Consultant**

- For the Center of Hydrocarbon Recovery: Evaluation of research projects between Skotlech and Universities (Texas A&M University, Calgary University, Moscow State University, Institute of Physics of the Earth...)

### **2006-2014 *Schlumberger Moscow Research, Moscow***

**May 2014 Promoted Scientific Advisor in the fields of Applied Mathematics & Geophysics in the Schlumberger Eureka Technical Careers (SETC)**

**Jan. 2013 – Dec. 2014 Program manager, Acoustic Modeling & Imaging**

- New Answer Products for sonic: Finite Element modeling (SEM) for sonic in anisotropic media for Techlog™ and slowness dispersion curves for general anisotropy
- New sonic tool: Participated in the design of the new sonic Tool (impact of eccentricity, impact of anisotropy)

**Jan. 2010 – Dec. 2012 Program manager, Borehole seismics**

- New answer products for Borehole Seismics: Anisotropic elastic full waveform inversion in Omega™, Fresnel zone attribute in Petrel™, Finite element modeling (SEM) for viscoelastic seismic wave propagation

- New borehole seismic acquisition tool: Optimal tool design with respect to answer products

***Jan. 2007 – Dec. 2009 Program manager, Electrokinetics***

Coordinated with other Schlumberger research center (Boston) and engineering (Japan) on the design of the electrokinetic logging tool prototype

- Conducted 3 field tests in Catoosa (Oklahoma USA) to prove the concept

***Jan. 2006 – Dec. 2006 Principal Research Scientist***

- Initiated lab experiments on electrokinetics in SMR (with a mock-up of an electrokinetic tool)
- Won a Schlumberger Future of Research to build the EKL tool (electrokinetic logging tool)

**1996-2005 Schlumberger Riboud Product Centre, Paris**

***Jan. 2005 – Dec. 2005 Physicist and Principal research scientist***

Studied the physics for the feasibility of the wireless telemetry in cased hole (EM & Acoustics):

- Successful field test evaluation in Cameron (USA).
- Software development for optimal station locations.

***Jan. 2002 – Dec. 2004 Ekl Project Manager and Principal research scientist***

Project coordinator on the continuous permeability logging based on the electrokinetic effect (EKL). Worked at the Institut of Physique du Globe de Paris (IPGP) with Prof. Maria Zamora in the framework of SLB/IPGP joint research project on electrokinetics:

- Developed modeling tools and conducted lab experiments on electrokinetics showing that the effect is measureable and can be correlated to rock/fluid properties
- Filed several patents (3 of them granted) on wireline tools using these measurements

***Sept. 1997 – Dec. 2001 Reservoir Monitoring Interpretation Geophysicist***

- Design and interpretation of permanent sensor arrays for the Shell/Schlumberger Dynamic Reservoir Drainage Imaging project (1998-2000)
- Participated on the development of Prejob Design software (RAPIDS), Data Validation software (RAMSES) and Interpretation software (RAISE) for permanent electrical/induction monitoring.

***March 1996 – August 1997 Borehole Seismic Geophysicist***

- Field support for processing VSP data while developing VSP modules in Geoframe™ (Signal processing, wave separations, acoustic impedance inversion, seismic finite difference modeling)

## PATENTS AND PUBLICATIONS

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### *External publication papers*

- More than 50 technical publications
- 8 in peer reviewed journals

### *Patents*

- 11 patents granted
- 5 patent applications

### *Schlumberger internal reports*

- 26 confidential internal reports

## ADDITIONAL PROFESSIONAL ACTIVITIES

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### *Lectures*

- **Dec. 2014** Lecturer at the Institut de Physique du Globe de Paris on the open hole logging interpretation (GPX master program)
- **Nov. 2012** Lecturer at Petromodel (Saint Petersburg; organized by the Moscow State University) "Waveform modeling and inversion, specifically in porous and fractured rocks".
- **2004-2005** Lectures given at the Institut de Physique du Globe de Paris on the open hole logging interpretation (Master program)
- **2003-2004** Lectures given at the Institut de Physique du Globe de Paris on inversion methods in geophysics (Master program)
- **2001-2002** Lectures given at the École des mines de Paris (Mines ParisTech) on the physics of the logging tools (Engineering)

### *Courses taught in Schlumberger*

- **2011** Advanced Borehole Seismic Modeling School - GeoSolutions Hi-End VSP course (Houston; June)
- **1996-1997** VSP school for Borehole geophysics software with the Geoframe BORSEIS module for field engineers and computer center geophysicists.

### *Thesis jury*

- **2014** Member of the thesis jury of Sven Schilke "*Physics of Measurement in Distributed Fiber Optic Sensor Systems*" Ecole des Mines de Paris (Mines ParisTech)
- **2003** Member of the thesis jury of Sylvain Nguyen defended at the Ecole des Mines de Paris entitled "*Seismic reflection imaging: use of the data slopes in the depth migration*".
- **2000** Member of the thesis jury of Marc Pessel defended at the University of Rennes entitled "*Electrical tomography: methodological developments and applications*".

### *Invited Speaker*

- "*Nonlinear inversion of seismic waveforms: A North Sea offset VSP example*", In memory of Albert Tarantola, Invited speaker to SEG, Denver (2010)
- "*Viscoelastic full waveform inversion*", Hommage to Albert Tarantola, Invited speaker to Institut de Physique du Globe de Paris, Paris (2010)

- *"Full waveform inversion: State of the art"*, Invited speaker to Lawrence Berkeley National Laboratory. (San Francisco) (2004)
- *"Monte Carlo inversion of arrival times and Full waveform seismic inversion by gradient methods for a visco-elastic medium"*, Invited speaker at the Instituto Mexicano del Petroleo (IMP) (Mexico City). (1997)
- *"Full waveform inversion of borehole seismic data for a visco-elastic medium"*, Invited speaker at the Imperial College Exploration Geophysics Research (London). (1997)

#### *Referenced Works*

- In Klaus Mosegaard *"Quest for consistency, symmetry, and simplicity - The legacy of Albert Tarantola"*, *Geophysics. vol. 76, no. 5 (september-october 2011); p. w51-w6. (2011)*
- In Albert Tarantola, *Inverse Problem Theory And Methods For Model Parameter Estimation, Society for Industrial & Applied, (2004)*
- In Stephen R. Pride et al., *Permeability dependence of seismic amplitudes, The Leading Edge 22, 698, p 519-525 (June 2003)*

#### *Professional society activities*

- **2015-** SEG Research Committee
- **2014** - Russian SPE program committee
- **Since 2004** Chairman for the EAGE annual meeting
- **Since 2003** Reviewer for the EAGE annual meeting
- **Occasionally** Reviewer for "Geophysics" a SEG journal and "Geophysical Prospecting" an EAGE journal

#### PROFESSIONAL MEMBERSHIPS

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SEG, EAGE, SPE, AGU

#### LANGUAGES

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French, English, Arabic: fluent, Russian: intermediate level

#### COMPUTER SKILLS

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- *Systems:* Linux, Sun Unix, MS Windows
- *Development:* C++, C, Fortran 95, Shell scripts, Nvidia Cuda (SIMD)
- *Software:* Matlab, Python, Mathematica, Comsol, MS Office, LaTeX
- *Geoscience software:* Petrel, Geoframe (VSP module), Eclipse (Black oil module)

#### AWARDS RECEIVED

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- *2011: ECA symposium (best innovation paper)*
- *2007: Schlumberger Russia Reservoir Symposium best research paper award (paper presented at the Reservoir symposium in China)*
- *2007: Schlumberger Future Of Research ( Best research project with 3 year funding)*
- *2000: Henri Doll Medal award for the best forum paper during the 2000 OFS symposium (Sept. 2000).*

## PUBLICATIONS

### PATENTS & PATENT APPLICATIONS

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#### Patents

1. Charara, M., Chertov, M., US 9,250,346: Awarded, 2016, Method for determining geometric characteristics of a hydraulic fracture
2. Goujon; N., Kragh; J., Christie; Ph., Coste; E., Kostov; C., Teigen; O., Ikegami; T., Charara; M.; US 9,038,765, Awarded, 2015, Neutrally-buoyant borehole investigation tools and methods
3. Charara; M., Parsbin, A., Dysblyuk; E.; Zozulya; Oleg. Safonov., S.; US 8,607,628: Awarded, 2013, Method for a formation properties determination
4. Charara, M., Chertov, M., RU2011121930, 2011, Method for determining geometric characteristics of a hydraulic fracture
5. Charara; M., Parsbin, A., Dysblyuk; E.; Zozulya; Oleg. Safonov., S.; RU200914, 2009, Method for formation properties determination
6. Plyushchenkov; B.; Nikitin; A., Charara, M., RU2009130069, 2009, Method, system and logging tool for estimating permeability of a formation
7. Zburavlev; O.; Koroteev; D.; Charara; M.; RU2007147227, 2009, Method to monitor reservoir fracture development and its geometry
8. Ligneul; Patrice, Charara; Marwan, US7,259,564, Awarded, 2007, Method and device for determining the position of an interface in relation to a bore hole
9. Charara; Marwan, Pride; Steven, Ligneul; Patrice, US7,150,188, Awarded, 2007, Non-invasive measurement of fluid-pressure diffusivity using electro-osmosis
10. Ligneul; Patrice, Charara; Marwan, US7,148,693, Awarded, 2007, Process and device for prospecting a porous geological formation
11. Delhomme; Jean-Pierre, Manin; Yves, Charara; Marwan, US6,778,918, Awarded, 2006, Methods for monitoring fluid front movements in hydrocarbon reservoirs using permanent sensors

#### Patent Applications

1. Kostov; C., Charara; M, US 20160320511, A borehole seismic tool and method of seismic surveying.
2. Plyushchenkov; B.; Nikitin; A., Charara, M., US20110019500, 2011, Method, system and logging tool for estimating permeability of a formation
3. Zburavlev; O.; Koroteev; D.; Charara; M.; US20090166030 A1, 2009, Method to monitor reservoir fracture development and its geometry
4. Charara; Marwan, Ligneul; Patrice, US20070150200, 2007, Characterizing properties of a geological formation by coupled acoustic and electromagnetic measurements
5. Di, Cao; Delhomme, Jean-Pierre; Manin; Yves; Charara, Marwan; Lacour-Gayet, Philippe, US20080105426, 2008, Method and Apparatus for Estimating the Permeability Distribution During a Well Test

### EXTERNAL PUBLICATIONS

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#### Refereed publications

1. J. Onus, O. Podgornova, M. Charara, S. Leaney, A. Campbell, S. Ali, I. Borodin, L. Nutt, H. Menkiti "Anisotropic Elastic Full Waveform Inversion of Walkaway VSP Data from the Arabian Gulf", *Geophysical Prospecting*, 64, 38-53, (2016)
2. C. Barnes and M. Charara "The domain of applicability of acoustic full-waveform inversion for marine seismic data". *Geophysics*, 74, no. 6, WCC91-WCC103, (2009)
3. C. Barnes, M. Charara and T. Tsuchiya, "Feasibility study for an anisotropic full waveform inversion of cross-well seismic data". *Geophysical Prospecting*, 2008, 56, 897-906 (2008)
4. Charara, M., Manin, Y., Bacquet, C. and J.P. Delhomme, "Use of the permanent resistivity and transient pressure measurement for time-lapse saturation mapping", *Reservoir Evaluation & Engineering, SPE 80433*, p. 472-479, (2002)
5. Charara, M., Barnes, C., and Tarantola, A., "Full waveform inversion of seismic data for a visco-elastic medium", *Inverse Methods: Interdisciplinary elements of methodology, computation and application. Lecture Notes in Earth Sciences 92*, Springer, (2000)
6. Barnes, C., Charara, M. and Tarantola, A., "Geological information and the inversion for seismic data", *Inverse Methods: Interdisciplinary elements of methodology, computation and application. Lecture Notes in Earth Sciences 63*, Springer, 113-121, (1996)
7. Charara, M., Barnes, C., and Tarantola, A., "Constrained seismic well data waveform inversion", 1996, *Inverse Methods: Interdisciplinary elements of methodology, computation and application. Lecture Notes in Earth Sciences 63*, Springer, 98-112, (1996).
8. Charara, M. and Tarantola, A., "Boundary conditions and the source term for one-way acoustic depth extrapolation", *Geophysics*, 61, no. 01, 244-252, (1996)

## Communications & Proceedings

1. M. Charara & D. Sabitov, *Spectral Element Method with curvilinear mesh for complex borehole acoustic modeling*, SEG annual meeting, Anaheim, CA, USA (2018)
2. M. Charara, C. Barnes, T. Tsuchiya, N. Yamada, *Timelapse DAS/Geophone VSP Viscoelastic Full Waveform Inversion for CO2 Monitoring*, SEG Summer Research Workshop: Recent Advances and Applications in Borehole Geophysics, Galveston, Texas (2018)
3. C. Barnes & M. Charara, *Multi-scale travelttime inversion: a robust method for velocity estimation in difficult geological context*, 80th EAGE Annual Conference and Exhibition, Copenhagen, Denmark (2018)
4. V.Y. Miroshnichenko, M. Charara & D. Sabitov, *Automatization of seismic migrated data segmentation by implementing machine learning techniques*, Geomodel 2018, Gelendzhik, Russia (2018)
5. R.A. Ponomarenko, D. Sabitov & M. Charara, *Spectral Element modeling of Seismic Wave propagation on Non-Conforming Mesbes*, Geomodel 2018, Gelendzhik, Russia (2018)
6. Y.A. Nikonenko & M. Charara, *Wave modes study for acoustic TTI equations*, Geomodel 2018, Gelendzhik, Russia (2018)
7. A.A. Nikitin & M. Charara, *Processing and interpretation of experimental acoustic-electrical logging data*, Geomodel 2018, Gelendzhik, Russia (2018)
8. A. Dotsenko, J. De Carli, V. Stukachev & M. Charara, *Active Fracture Monitoring with Triaxial Ultrasonic Laboratory Experiment: Elastic Waves Velocities Analysis in Preheated and Triaxially Loaded Westerly Granite Core Sample*, SPE Russian Petroleum Technology Conference, Moscow, Russia (2018)
9. M. Charara, C. Barnes, T. Tsuchiya & N. Yamada, *Time-lapse VSP viscoelastic full-waveform inversion for CO2 monitoring*, SEG's 87th Annual Meeting in Houston, Texas, (2017)
10. C. Barnes, M. Charara, T. Tsuchiya & N. Yamada, *CO2 Monitoring by Using VSP-FWI - Time-lapse Elastic Parameters Estimation*, EAGE/SEG Research Workshop, Trondheim, Norway (2017)
11. T. Tsuchiya, N. Yamada, U.P. Iskandar, M. Kuribara, C. Barnes & M. Charara, *Monitoring by Using VSP-FWI – Synthetic Study on CO2-saturation and Pressure-buildup Differentiation*, EAGE/SEG Research Workshop, Trondheim, Norway (2017)
12. D. Sabitov, M. Charara, A. Dotsenko, *Curvilinear Spectral Elements Application for Sonic Logging Forward Modeling*, Geomodel (2017)
13. M. Charara, D. Sabitov, A. Dotsenko, Y.A. Nikonenko, *Wave Modes Study for Acoustic VTI Equations*, Geomodel (2017)
14. C. Barnes, M. Charara & "Efficient and accurate 3D TTI Eikonal solver based on hybrid schemes", Eage Paris (2017)
15. M. Charara, D.I. Sabitov & A.M. Shoychakov, "Applicability Study of 2.5D Axisymmetric Forward Modeling for Inversion in Marine Seismic", Geomodel 18th Science and Applied Research Conference on Oil and Gas Geological Exploration and Development (2016)
16. A.A. Nikitin, E.N. Dyshlyuk, B.D. Pnyshchenkov & M. Charara, "Extraction Borehole Modes from Laboratory Thermoacoustic Measurements Involving Simulation", Geomodel 18th Science and Applied Research Conference on Oil and Gas Geological Exploration and Development (2016)
17. Charara M., Barnes C. "Multi-parameter Viscoelastic Full Waveform Inversion of Cross-well Seismic Data", 78th EAGE Conference and Exhibition, Vienna (2016)
18. V.G. Baydin, M. Charara\* and L.E. Dorigilovich, "Elastic Orthorhombic Full-waveform Inversion for 3D VSP Case", EAGE Madrid (2015)
19. A. Nikitin, D.R. Mulyukov & M. Charara, "About Surface Waves in Borehole and Procedure of Their Extraction", Geomodel, 17th science and applied research conference on oil and gas geological exploration and development (2015)
20. C. Barnes, M. Charara, P. Williamson, "P & S wave attenuation effects on full-waveform inversion for marine seismic data", SEG Denver (2014)
21. O. Podgornova, S. Leaney, M. Charara and E. von Lunen, "Elastic Full Waveform Inversion for Land Walkaway VSP Data from British Columbia, Canada", EAGE Amsteram (2014)
22. M. Charara, M. Jervis, D. Sabitov & I. Seleznev, "3D spectral element modelling for acoustically sensing a well from a nearby well", EAGE London (2013)
23. J.C. Onusu, O. Podgornova, M. Charara, S. Leaney, A. Campbell, S. Ali, I. Borodin, L. Nutt & H. Menkiti, "Anisotropic Elastic Full-Waveform Inversion for a Real Walkaway VSP Data from The Arabian Gulf; Towards High Frequencies", EAGE London (2013)
24. M. Charara, D. Sabitov & G. Pekar, "Spectral Element Method in Anisotropic Viscoelastic Media for Borehole Seismic", EAGE Workshop, Malta (2013).
25. J.C. Onusu, O. Podgornova, M. Charara, S. Leaney, A. Campbell, S. Ali, I. Borodin, L. Nutt & H. Menkiti, "Anisotropic Full Waveform Inversion of Walkaway VSP data from the Arabian Gulf", EAGE Workshop, Malta (2013).
26. E. Deger, M. Charara, H-P Valero, D. Sabitov, G. Pekar, "Simulation of Sonic Logging for Deviated Wells in Anisotropic Formations", International Congress on Acoustics, Montreal (2013)
27. Barnes, C and Charara, M "A Priori Model Estimation for FWI from Constrained Kinematic Inverse Problem" 74th EAGE Conference & Exhibition (2012)

28. Podgornova, O and Charara, M "Multiscale time-domain full-waveform inversion for anisotropic elastic media", SEG, Expanded Abstracts, 30, no. 1, 2459-2464, (2011)
29. Charara, M and Vershinin, A., "3D Spectral Element Modeling of Wave Propagation in Anisotropic Viscoelastic Media", ICLAM, July, Vancouver, Canada (2011).
30. Podgornova, O., Charara, M., Vershinin, A, Goncharuk, V., "Time domain full-waveform inversion of anisotropic elastic media based on the spectral element method", ICLAM, July, Vancouver, Canada (2011).
31. E. Dyshlyuk, A. Parshin, M. Charara, A. Nikitin, B. Pilyshchenko "InSitu Viscosity from Acoustic Logging" ATCE 2011, SPE, 29 Oct. - 02 Nov. 2011, Denver (Co), USA. (2011)
32. Charara, M, Vershinin, A, Deger, E, Sabitov, D and Pekar, G. "3D spectral element method simulation of sonic logging in anisotropic viscoelastic media", SEG, Expanded Abstracts, 30, no. 1, 432-437, (2011)
33. O. Podgornova, M. Charara, C. Barnes "Anisotropic Full Waveform Inversion for Cross-well Experiment", 73rd EAGE Conference & Exhibition (2011)
34. M. Charara, A. Vershinin, D. Sabitov, G. Pekar "SEM Wave Propagation in Complex Media with Tetrahedral to Hexahedral Mesh" 73rd EAGE Conference & Exhibition (2011)
35. M. Charara, C. Barnes "Constrained viscoelastic full waveform inversion of North Sea offset VSP data" EAGE, Borehole Geophysics Workshop - Emphasis on 3D VSP (2011)
36. M Charara, C Barnes "Nonlinear inversion of seismic waveforms: A North Sea offset VSP example", SEG/Denver (2010)
37. C Barnes and M Charara "Anisotropic anelastic full waveform inversion: Application to North Sea offset VSP data", SEG/Denver (2010)
38. C Barnes and M Charara "Constrained Full-waveform Inversion of Multi-component Seismic Data", 72nd EAGE Conference & Exhibition, (2010)
39. C Barnes and M Charara "Viscoelastic full waveform inversion of North Sea offset VSP data", SEG, Expanded Abstracts, 28, no. 1, 2278-2282, (2009)
40. M. Charara, I. Zaretsky, M. Zamora "Seismoelectric Modeling of Laboratory Experiments", 71st EAGE Conference & Exhibition, (2009)
41. M Charara, A Myasnikov, D Sabitov "Finite difference modeling of elastic wave propagation on curvilinear grid: a generalized rotated operator approach", SEG International Exposition and 78th Annual Meeting from 9-14 November in Las Vegas, USA, (2008)
42. C Barnes, M Charara "Full-waveform inversion results when using acoustic approximation instead of elastic medium", SEG International Exposition and 78th Annual Meeting from 9-14 November in Las Vegas, USA, (2008)
43. Charara, M., Feld, A., and M. Zamora "Laboratory studies on seismoelectric effects", European Geosciences Union, Vol. 8, 08395, (2006)
44. Charara, M., Lopez, O., Zuddas, P., "A new overall kinetic model describing calcite precipitation from brine-like solutions", AGU Fall meeting, San Francisco, (2005)
45. M Charara, C Barnes, T Tsuchiya, "Crosswell seismic data tomography for heterogeneous viscoelastic media", 74th Ann. Internat. Mtg. Soc. of Expl. Geophys. (2004)
46. C. Barnes, M. Charara\* & T. Tsuchiya, "Full-wave anisotropic elastic inversion of synthetic crosswell seismic data", 74th Ann. Internat. Mtg. Soc. of Expl. Geophys. (2004)
47. C. Barnes, M. Charara\* & T. Tsuchiya "Borehole Seismic Data Inversion for Attenuating Media", Paris 2004, 66th EAGE Conference & Exhibition, Paris, France, 7 - 10 June (2004)
48. Manin Y., Charara M. and J.P. Delhomme, "Characterization of Reservoir Fluid Dynamics from Multiple Downhole Permanent Sensors", SPE European Petroleum Conference, Aberdeen, UK, paper SPE 78350, 9 p. (2002)
49. Delhomme J.P., Charara M., Manin Y. and E. Tartarus, "Coupling Electrical, Seismic, and Pressure Sensor Arrays for Effective Reservoir Monitoring", Proceedings of the 64th EAGE Conference, Extended Abstract H-04, 4 p. (2002)
50. Charara, M., Manin, Y., Bacquet, C. and J.P. Delhomme "Use of the permanent resistivity and transient pressure measurement for time-lapse saturation mapping", SPE 72148, presented at the SPE Asia Pacific, Improved oil recovery, 8-9 October 2001, Kuala Lumpur, Malaysia. (2001)
51. R. van Kleef, R. Hakvoort, V. Bhushan, S. Al-Khodhori, W. Boom, C. de Bruin, K. Babour, C. Chouzenoux, J.P. Delhomme, Y. Manin, D. Pohl, E. Rioufol, M. Charara and R. Harb, "Water Flood Monitoring in an Oman Carbonate Reservoir Using a Downhole Permanent Electrode Array", SPE 68078, presented at the SPE 12th Middle East Oil Show & Conference, 31 March-3 April 2001, Bahrain. (2001)
52. Barnes, C., Tsuchiya, T. and Charara, M., "Full-wave inversion of borehole seismic data for viscoelastic media", presented at 5th SEGJ International Symposium, 24-26 January 2001, Tokyo, JAPAN. (2001)
53. Y. Manin, C. Chouzenoux, J.P. Delhomme, D. Pohl, E. Rioufol, M. Charara, K. Babour, R. Harb and M.Y. Chen, "Water Flood Monitoring of a Middle-East Carbonate Reservoir using a Downhole Permanent Electrode Array", OFS symposium, Stavanger, Norway, Sept. 18-20, (2000)
54. Charara M., Magniant I., Manin Y., Delhomme J.P., Eberle N., "The Benefit of Coupling Geophysical Inversion Problems with Fluid Flow Simulation" presented at the 7th European Conference on the Mathematics of Oil Recovery, Baveno, Italy, Sept. 5-8, (2000).
55. I. Bryant et al., "Use of cemented resistivity array and pressure gauge to monitor water flooding". SPE ATW, Puerta la Cruz, January (2000)
56. Barnes, C., Charara, M. and Tarantola, A., "Monte Carlo inversion of arrival times for multiple phases in OVSP data", 1998, 68th Annual Internat. Mtg., Soc. Expl. Geophys., Expanded Abstracts, 1871-1874. (1998)
57. Charara, M., Barnes, C. and Tarantola, A., "Full waveform inversion of seismic data for a visco-elastic medium", 1998, Conference on inverse theory and application of inverse methods (IIC98), Copenhagen. (1998)

58. Delbomme J.P., Manin Y., Charara M. and Ph. Souhaité, "Potential Applications of Downhole Electrical Sensors for Permanent Reservoir Monitoring", 1998, Proceedings of EAGE Workshop on "Reservoir Monitoring: The Route to Greater Value", Leipzig, 2 p.(1998)
59. Charara, M., Barnes, B., Tarantola, A., Gaillard, A., Barnes, A., 1997, "Tomography of a visco-elastic medium by waveform fitting", Rapport Scientifique du Centre National de Calcul Parallele en Sciences de la Terre., 48-53.(1997)
60. Charara, M., Barnes, C. and Tarantola, A., "The state of affairs in inversion of seismic data: An OVSP example", 1996, 66th Annual Internat. Mtg., Soc. Expl. Geophys., Expanded Abstracts, 1999-2002.(1996)
61. Charara, M., Barnes, C., Gaillard, A., Tarantola, A., 1995, "Multi-parameter waveform inversion of seismic well data", 1995, Rapport Scientifique du Centre National de Calcul Parallele en Sciences de la Terre., 87-89.(1995)
62. Charara, M., Barnes, C. and Tarantola, A., "Waveform inversion for VSP data", 1995 Conference on inverse theory and application of inverse methods (IIC95), Aarhus.(1995)
63. Charara, M., Barnes, C. and Tarantola, A., "Constrained seismic well data waveform inversion", 1995, AGU meeting, San Francisco - U.S.A, December 1995, EOS Transactions, Vol 76, No 46, Nov 7.(1995)
64. Tarantola, A., Charara, M., Barnes, C., Paillet, P., "Inversion of vertical seismic data with offset", 1994, Rapport Scientifique du Centre National de Calcul Parallele en Sciences de la Terre, 30-31.(1994)
65. Tarantola, A., Noble, M., Barnes, C., Charara, M., Igel, H., Lindgren, J., Roth, G. and Roxis, N., "1992, 54th Mtg. Eur. Assoc. Expl Geophys., Abstracts, 108-109.(1992)

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## INTERNAL SCHLUMBERGER PUBLICATIONS

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1. O. Podgornova, M. Charara, S. Leaney, A. Campbell, S. Ali, I. Borodin, L. Nutt, H. Menkiti, "Anisotropic Elastic Full Waveform Inversion of Walkaway VSP Data from the Arabian Gulf. Part 2: high frequencies", OFSR-rn-2014-017-BoreholeAcoustics-C (2014)
2. Timur Zhamikov, Denis Syresin, Denis Sabitov, Grigory Pekar, Marwan Charara "Modeling eccentricity effect for the slim dipole tool model. Anisotropic formation case", ofsr-rn-2014-029-boreholeacoustics-c (2014)
3. A. Shevchenko, Y. Pico, M. Charara, I. Sofronov, C. Kostov, E. Shevchenko, "Next generation borehole seismic tool. Evaluation of concepts and field experiments with non-clamped receivers", OFSR/RN/2013/196/BoreholeAcoustics/C(2013)
4. Timur Zhamikov, Denis Sabitov, Denis Syresin, Gregory Pekar, Marwan Charara, "Modeling eccentricity effect for the slim dipole tool model. Isotropic case", OFSR-rn-2013-100-SMRMM-C (2013)
5. Podgornova, O. and Charara, M. "Multi-parameter anisotropic Elastic Full-waveform inversion with applications to 2D/2C VSP acquisitions; VTI media", OFSR-rn-2013-017-SMRMM-C (2013)
6. Podgornova, O. and Charara, M. "Anisotropic elastic full waveform inversion of walkaway VSP data from Arabian Gulf. Part 1: Intermediate frequencies and offsets". OFSR-rn-2013-016-SMRMM-C (2013)
7. Seleznev, I. and Charara, M., "Computations of seismic Fresnel-zone attributes in Petrel 2011: implementation and comparison with analytical solutions", OFSR/DN/2012/017/SMRMM/C (2012)
8. Silvestrov, I., Neklyudov, D., Puckett, M., Tcheverda, V., Podgornova, O., Charara, M. and Kostov, C., "Resolution and stability analysis of offset VSP acquisition scenarios with applications to full-waveform inversion", OFSR/RN/2012/063/SMRMM/U (2012)
9. Chertov, M., and Charara, M., "Hydraulic Fracture Monitoring with Active Source. Research Proposal", OFSR/DN/2010/024/SMRMM/C (2010).
10. Dysblyuk E., Charara M. "Investigation of electro-kinetic logging methodology by laboratory experiments". OFSR/RN/2010/086/OTHER/C (2010).
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