

# **23rd European Meeting of Environmental and Engineering Geophysics 2017**

Held at Near Surface Geoscience Conference and Exhibition  
2017

Malmo, Sweden  
3 - 7 September 2017

ISBN: 978-1-5108-5079-8

**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. (2017)

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](mailto: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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## TABLE OF CONTENTS

<b>MO 23 A01: 2.75-D ERT - ZIGZAG ELECTRODE ACQUISITION STRATEGY TO IMPROVE 2-D PROFILES.....</b>	1
<i>A. Robbins, A. Plattner</i>	
<b>MO 23 A02: PRELIMINARY RESULTS FROM THE FIRST AIRBORNE EM SURVEY CONDUCTED IN YELLOWSTONE NATIONAL PARK .....</b>	7
<i>K. Dickey, W.S. Holbrook, C. Finn, E. Auken, B. Carr, K. Sims, P. Bedrosian, J. Lowenstern, S. Hurwitz, J. Pe</i>	
<b>MO 23 A03: THE FORGOTTEN HOLOCAUST IN LITHUANIA - GEOPHYSICAL INVESTIGATIONS AT THE PONARY EXTERMINATION SITE .....</b>	8
<i>A. McClymont, P. Bauman, R. Freund, J. Seligman, H. Jol, K. Bensimon, P. Reeder</i>	
<b>MO 23 A04: GEOPHYSICAL CHARACTERISTICS OF PERMAFROST DEGRADATION ACROSS BOREAL LANDSCAPES AFTER DISTURBANCE BY FIRE OR WATER .....</b>	9
<i>B. Minsley, N. Pastick, B. Wyllie, D. Brown, A. Kass</i>	
<b>MO 23 A05: SHEAR-WAVE REFLECTION-SEISMIC AND ERT INVESTIGATION FOR SLOPE STABILITY .....</b>	10
<i>G. Sauvin, A.O.K. Lysdahl, S. Bazin</i>	
<b>MO 23 A06: AN ALL IN RESISTIVITY AND SEISMIC PORTABLE FIELD SYSTEM .....</b>	15
<i>F.E.R. Almeida, R. Baieta, A. Ferreira</i>	
<b>MO 23 A07: INVESTIGATION OF A WASTE FILL .....</b>	20
<i>A.C. Duncan, G.J. Street</i>	
<b>MO 23 A08: GEOPHYSICAL SITE INVESTIGATION AT DALBY-ÖNNESLOV USING JOINT INVERSION .....</b>	22
<i>M. Ronczka, P.I. Olsson, M. Rossi, A. Malehmir, T. Dahlin</i>	
<b>MO 23 A09: CLUSTER ANALYSIS ON GEOPHYSICAL PARAMETERS FOR SUBSOIL INVESTIGATION.....</b>	27
<i>G. Bohm</i>	
<b>MO 23 A10: RISK BASED SITE INVESTIGATIONS FOR HORIZONTAL DIRECTIONAL DRILLING.....</b>	32
<i>L. Klinkby, J. Colberg-Larsen, K. Pedersen, M. Laier, S. Petersen, K. Buus</i>	
<b>MO 23 A11: CHARACTERIZATION OF HOLOCENE SEDIMENTS USING GEOPHYSICAL METHODS AND BOREHOLE INFORMATION - EBRO DELTA (SPAIN).....</b>	37
<i>B. Benjumea, A. Gabas, A. Macau, F. Bellmunt, S. Figueras</i>	
<b>MO 23 B05: DEVELOPMENTS IN RESISTIVITY INVERSION WITH ELECTRODE DISPLACEMENTS FOR LANDSLIDE MONITORING .....</b>	42
<i>M.H. Loke, P.B. Wilkinson, J.E. Chambers, S. Uhlemann, P.I. Meldrum</i>	
<b>MO 23 B06: COMPARISON OF FREQUENCY-DOMAIN AND TIME-DOMAIN SPECTRAL INDUCED POLARIZATION METHODS AT FIELD SCALE .....</b>	47
<i>P.K. Maurya, G. Fiandaca, M. Weigand, A. Kemna, A.V. Christiansen, E. Auken</i>	
<b>MO 23 B07: THE RELATIONSHIP BETWEEN PORE RADII AND INDUCED POLARIZATION STUDIED WITH A MEMBRANE POLARIZATION MODEL.....</b>	52
<i>A. Hordt, M. Bucker, K. Bairlein, H. Stebner</i>	
<b>MO 23 B08: A NEWLY DEVELOPED 2D DC AND TIME-DOMAIN IP INVERSION ALGORITHM -APPLICATION ON DATA ACQUIRED ON AN ORE DEPOSIT IN TURKEY .....</b>	57
<i>B. Tezkan, J. Adrian</i>	
<b>MO 23 B09: 3D ERT MONITORING OF LEVEE FLOODING EXPERIMENT USING MULTI-CURRENT TRANSMISSION TECHNIQUE.....</b>	62
<i>Y.Y. Yamashita, T. Kobayashi, H.S. Saito, T. Sugii, T. Kodaka, K.M. Maeda, Y.C. Cui</i>	
<b>MO 23 B10: COMBINED OPTIMIZATION OF MEASUREMENT CONFIGURATIONS AND ELECTRODE PLACEMENT FOR ELECTRICAL RESISTIVITY TOMOGRAPHY SURVEY .....</b>	67
<i>S.S. Uhlemann, P.B. Wilkinson, H. Maurer, F.M. Wagner, J.E. Chambers</i>	
<b>MO 23 B11: WHICH EM PROPERTIES WITH MULTI-FREQUENCY LOW INDUCTION NUMBER SLINGRAM APPARATUS?.....</b>	72
<i>F.X. Simon, J. Thiesson, A. Tabbagh</i>	
<b>MO 23 B12: PROCESSING OF DENSELY SAMPLED ELECTROMAGNETIC INDUCTION DATA COLLECTED ACROSS PEAT DEPOSITS .....</b>	77
<i>J. Guillemeau, P. Koyan, J. Tronicke</i>	

<b>MO 23P1 01: SOLVING THE PROBLEMS OF OBTAINING GEOLOGICAL INFORMATION WITH USING GEOPHYSICAL METHODS OF RESEARCH DURING ENGINEERING-GEOLOGICAL SURVEYS .....</b>	82
<i>V.B. Pisetski, I.V. Abaturova, L.A. Storozhenko, I.A. Savintsev, I.G. Petrova</i>	
<b>MO 23P1 02: ARCTIC SHELF INTEGRATED ENGINEERING SURVEYS SPECIFICS .....</b>	87
<i>P.S. Solov'yev, D.I. Chernikov, D.A. Naumenko, M.I. Chudakov</i>	
<b>MO 23P1 03: CROSSHOLE SEISMIC TESTING ON PRESSURE AND SHEAR WAVES - AN EXAMPLE OF EFFECTIVE USAGE OF THE METHOD .....</b>	93
<i>A.I. Konkov, A.N. Oshkin, N.A. Ragozin, V.I. Ignatev, R.Y. Ermakov</i>	
<b>MO 23P1 04: APPLICATION OF ERT TO IDENTIFY BURIED COVERED KARST FEATURES IN THE DESIGN OF LINEAR CONSTRUCTIONS .....</b>	98
<i>D.V. Makarov, I.N. Modin, A.A. Pelevin, A.D. Skobelev, K.D. Efremov</i>	
<b>MO 23P1 05: POTENTIAL OF GROUND-PENETRATING RADAR FOR IMAGING ACTIVE LAYER AND ICE WEDGES IN PERMAFROST AREAS .....</b>	103
<i>S.S. Schenken, S.S. Brichëva, J.T. Tronicke</i>	
<b>MO 23P1 09: CONCEPTUAL MODEL FOR EXPLORING GEOTHERMAL RESOURCES IN LA SEVA BASIN (NE SPAIN) FROM INTEGRATED GEOPHYSICAL DATA .....</b>	108
<i>M. Torrens, R. Lovera, M. Himi, A. Sendros, J.C. Tapias, X. Font, L. Rivero</i>	
<b>MO 23P1 10: THE USE OF SLINGRAM METHOD TO MAP THE MARINE WATER INTRUSION: A CASE STUDY FROM THE TRABZON, TURKEY .....</b>	113
<i>K.H. Coban, A.E. Babacan, E. Durmaz, S. Ceylan</i>	
<b>MO 23P1 11: GROUNDBASED TEM SURVEY IN THE SUBSIDING MEKONG DELTA .....</b>	118
<i>T. Bording, A.V. Christiansen, E. Auken, J.L. Gunnik, G.H.P.O. Essink</i>	
<b>MO 23P1 12: PROBABILISTIC INVERSION OF TIME-LAPSE EMI DATA FOR SPATIOTEMPORAL MONITORING OF SOIL MOISTURE .....</b>	123
<i>K.Z. Jadoon, D. Moghadas, M.F. McCabe</i>	
<b>MO 23P1 13: NEAR SURFACE GEOPHYSICAL METHOD APPLICABLE FOR WATER SENSITIVE URBAN DESIGN PROJECTS .....</b>	128
<i>O.F. Nielsen, S.W. Nielsen</i>	
<b>MO 23P1 17: DATA ADAPTIVE DENOISING OF MAGNETIC ANOMALY MAPS .....</b>	133
<i>J. Tronicke, E. Luck</i>	
<b>MO 23P1 18: INVESTIGATION OF SUBSURFACE ARCHAEOLOGICAL REMAINS OF KALECIK CASTLE USING GPR METHOD (ARAKLI, TRABZON, TURKEY) .....</b>	138
<i>A. Seren, Z.O. Aydin, A.E. Babacan, K. Gelisli</i>	
<b>MO 23P1 19: THE USE OF VLF-EM AND ELECTROMAGNETIC INDUCTION METHODS FOR MAPPING THE ANCIENT FORT OF KUTA LUBOK TSUNAMI HERITAGE .....</b>	143
<i>M. Yanis, M.A. Bakar, N. Ismail</i>	
<b>MO 23P2 17: ANALYSIS PROCEDURES OF AN ERT MONITORING NETWORK TO ASSESS MOUNTAIN PERMAFROST DEGRADATION RATE .....</b>	148
<i>C. Mollaret, C. Hilbich, C. Hauck</i>	
<b>MO 23P2 18: MONITORING THICKNESS AND WETNESS OF SNOW SHEETS AT A CATALAN PYRENEES SKI RESORT USING GPR, TDR AND CHEMICAL ANALYSIS ME .....</b>	153
<i>J. Medina, L. Rivero, R. Lovera, M. Himi, A. Sendros, A. Urruela, A. Casas</i>	
<b>MO 23P2 20: 2D-SEA METHODOLOGY FOR GPR REFLECTIONS .....</b>	158
<i>D. Bullo, N. Bonomo, A. Osella</i>	
<b>MO 23P2 21: INVESTIGATION OF ERZINCAN AIRPORT LANDING FIELD WITH GPR METHOD .....</b>	163
<i>I. Saricicek, Z.O. Aydin, A. Seren</i>	
<b>MO 23P2 22: DETERMINATION OF HORIZONTAL AND VERTICAL CHANGES OF ESIROGLU FORMATION IN AKOLUK DISTINCT USING GPR AND ERT METHODS .....</b>	168
<i>Z.O. Aydin, A. Seren</i>	
<b>MO 23P2 23: IAG/USP TEST SITE - II - CONSTRUCTION AND PRELIMINARY GPR RESULTS ON PVC/METAL PIPES AND CERAMIC TUBES .....</b>	177
<i>J.L. Porsani, V.R. Elis, A.A. Ferreira, B. Poluha</i>	
<b>MO 23P2 24: INVESTIGATION OF CONCRETE INTERNAL STRUCTURES WITH GPR METHOD .....</b>	182
<i>A. Seren, I. Saricicek</i>	
<b>TU 23 A01: MAPPING BEDROCK LITHOLOGY IN URBAN ENVIRONMENT VIA LARGE SCALE TIME DOMAIN INDUCED POLARIZATION TOMOGRAPHY .....</b>	187
<i>M. Rossi, P.I. Olsson, T. Dahlén</i>	

<b>TU 23 A02: BEFO 382 - DETAILED COMPARISON STUDY OF 3D-CHARACTERIZED ROCK MASS AND GEOPHYSICAL MODELS .....</b>	192
<i>P.I. Olsson, P. Jonsson, S. Johansson, L. Johansson</i>	
<b>TU 23 A03: DETAILED 3D GEOLOGICAL MODELLING AT A CONTAMINATED STREAM USING GEOPHYSICAL, GEOLOGICAL AND CHEMICAL DATA - A CHALLENGE.....</b>	197
<i>I. Moeller, P.K. Maurya, G. Fiandaca, N. Balbarini, V. Ronde, A.J. Kallesoe</i>	
<b>TU 23 A04: PROBABILITY OF SENSITIVE CLAY FROM AEM DATA.....</b>	202
<i>A.O.K. Lysdahl, A.A. Pfaffhuber, H. Anschutz, K. Kasin, S. Bazin</i>	
<b>TU 23 A05: COMBINED GEOPHYSICAL SURVEYS TO INVESTIGATE THE CAUSE OF THE RAINFALL INDUCED SHALLOW LANDSLIDE .....</b>	207
<i>Y. Okada, C. Konishi</i>	
<b>TU 23 A06: TOWARDS A TIME MONITORING OF THE CHALK AQUIFER (BEAUVAIS, NORTH OF FRANCE) USING THE MAGNETIC RESONANCE SOUNDINGS .....</b>	212
<i>P. Lutz, J.F. Girard, L.Z. Zouhri, P.E. Meurant</i>	
<b>TU 23 A07: SURFACE NUCLEAR MAGNETIC RESONANCE WITH COMPACT MULTICOMPONENT RECEIVERS .....</b>	217
<i>M.A. Kass, T.P. Irons, A. Behroozmand, D. Grombacher, B.R. Bloss</i>	
<b>TU 23 A08: MODELLING RELAXATION DURING PULSE EFFECTS FOR THE COMPLEX INVERSION OF SURFACE NMR DATA; GAINING INSIGHT INTO WHICH RELA .....</b>	222
<i>D. Grombacher, E. Auken</i>	
<b>TU 23 A09: A MULTICHANNEL, LOW NOISE SURFACE NMR RECEIVER SYSTEM WITH WIRELESS CONNECTIONS TO SIGNAL AND REFERENCE COILS.....</b>	227
<i>L. Liu, D. Grombacher, E. Auken, J.J. Larsen</i>	
<b>TU 23 A10: AQUIFER IMAGING USING 2D MAGNETIC RESONANCE TOMOGRAPHY WITH STRUCTURAL CONSTRAINTS FROM GPR.....</b>	232
<i>C.D. Jiang, J. Igel, R. Dlugosch, T. Gunther, M. Muller-Petke</i>	
<b>TU 23 A11: SIMULTANEOUS REORIENTATION AND REDATUMING OF VERY HIGH RESOLUTION SEISMIC RECORDINGS IN SHALLOW WATER SURVEYS .....</b>	237
<i>N. Jones</i>	
<b>TU 23 A12: MULTI-FREQUENCY SEAFLOOR CHARACTERIZATION USING SEISMIC SOURCES OF OPPORTUNITY.....</b>	242
<i>M.N. Banda, P. Blondel, M. Burnett</i>	
<b>TU 23 A13: NEAR SURFACE MODELLING IN SHALLOW MARINE SETTING USING TURNING RAY TOMOGRAPHY APPROACH.....</b>	247
<i>R.S. Alsaad, L. Wong, A. Al-Hamoud</i>	
<b>TU 23 B01: AQUIFER CHARACTERIZATION USING ELASTIC FULL-WAVEFORM INVERSION .....</b>	252
<i>N. Athanasopoulos, T. Bohlen</i>	
<b>TU 23 B02: SURFACE WAVE FWI ON COMPLEX MODELS - THE ROBUSTNESS OF THE INVERSION TO ASSUMPTIONS AND FORWARD MODELING APPROXIMATIONS.....</b>	257
<i>Z. Xing, A. Mazzotti</i>	
<b>TU 23 B03: FULL-WAVEFORM SEISMIC INVERSION FOR ESTIMATING AQUIFER DIMENSIONS AND HYDROLOGIC PARAMETERS .....</b>	262
<i>T. Lahivaara, A. Pasanen, A. Malehmir, J. Kaipio</i>	
<b>TU 23 B04: PARTICLE SWARM OPTIMIZATION OF ELECTROMAGNETIC DATA WITH PARALLEL COMPUTING IN THE 2D CASE .....</b>	267
<i>F. Pace, A. Santilano, A. Godio</i>	
<b>TU 23 B05: BAYESIAN INVERSION OF SURFACE-BASED ERT DATA USING A STRUCTURE-BASED PRIOR .....</b>	272
<i>G. de Pasquale, J. Doetsch, N. Linde</i>	
<b>TU 23 B11: TIME-LAPSE ELECTRICAL RESISTIVITY SURVEYS AND UNFROZEN WATER CONTENT IN COLD CONTINUOUS PERMAFROST .....</b>	277
<i>G.A. Oldenborger, A.M. LeBlanc</i>	
<b>TU 23 B12: A TIME-LAPSE GEOPHYSICAL MODEL FOR DETECTING CHANGES IN GROUND ICE CONTENT BASED ON ELECTRICAL AND SEISMIC MIXING RULES.....</b>	282
<i>C. Hauck, C. Hilbich, C. Mollaret</i>	
<b>TU 23 B13: SPECTRAL INVERSION OF CAPACITIVE RESISTIVITY DATA FOR THE INVESTIGATION FROZEN GROUND.....</b>	287
<i>J. Mudler, G. Fiandaca, A. Hordt, C. Hauck, P.K. Maurya, A. Przyklenk</i>	
<b>TU 23P1 01: RE-PARAMETERIZATION OF THE COLE-COLE MODEL FOR IMPROVED SPECTRAL INVERSION OF INDUCED POLARIZATION DATA .....</b>	292
<i>G. Fiandaca, L.M. Madsen, P.K. Maurya</i>	

<b>TU 23P1 02: A NETWORK MODEL OF MEMBRANE POLARIZATION TO SIMULATE THE INDUCED POLARIZATION RESPONSE OF SANDSTONE SAMPLES .....</b>	297
<i>H. Stebner, M. Halisch, A. Hordt</i>	
<b>TU 23P1 03: THE POTENTIAL OF X-RAY TOMOGRAPHY AND IMAGE ANALYSIS FOR INTERPRETATION OF SPECTRAL INDUCED POLARIZATION MEASUREMENTS .....</b>	302
<i>S. Johansson, M. Rossi, T. Dahlin</i>	
<b>TU 23P1 04: CONTRIBUTION OF STERN LAYER AND MEMBRANE POLARIZATION TO THE SPECTRAL INDUCED POLARIZATION OF POROUS MEDIA .....</b>	307
<i>M. Rossi, A. Brovelli, G. Cassiani, S. Johansson, T. Dahlin</i>	
<b>TU 23P1 05: SIMULATED TIME-LAPSE DC-IP MONITORING OF DENSE NON-AQUEOUS PHASE LIQUIDS (DNAPLS) - AN INITIAL APPROACH.....</b>	312
<i>C. Power, P. Tsourlos, J.I. Gerhard, T. Dahlin</i>	
<b>TU 23P1 06: MAPPING POSSIBLE FLOWPATHS OF CONTAMINANTS THROUGH SURFACE AND CROSS-BOREHOLE SPECTRAL TIME-DOMAIN INDUCED POLARIZATION .....</b>	317
<i>T. Bording, G. Fiandaca, P.K. Maurya, E. Auken</i>	
<b>TU 23P1 07: RESOLUTION OF DC RESISTIVITY-THICKNESS EQUIVALENCES BY INCLUSION OF INDUCED POLARIZATION DATA.....</b>	322
<i>L.M. Madsen, G. Fiandaca, E. Auken, A.V. Christiansen</i>	
<b>TU 23P1 08: SERIES EXPANSION BASED INVERSION TO PROCESS LABORATORY TD INDUCED POLARIZATION DATA .....</b>	327
<i>A. Kiss, M. Dobroka</i>	
<b>TU 23P1 09: GENERALIZED RELATIVE AND CUMULATIVE RESPONSE FUNCTIONS FOR CONDUCTIVITY METERS OPERATING AT LOW INDUCTION NUMBERS .....</b>	332
<i>F.C.M. Andrade, T. Fischer</i>	
<b>TU 23P1 10: PRACTICAL INVERSION OF ELECTRIC RESISTIVITY IN 3D FROM FREQUENCY-DOMAIN LAND CSEM DATA.....</b>	337
<i>F. Breteau, S. Penz, N. Coppo, P. Wawrzyniak, M. Darnet</i>	
<b>TU 23P1 11: A CASE-STUDY FOR COMPARING A MOBILE DC SYSTEM AND A MULTI-CONFIGURATION EMI SENSOR FOR DEPTH-TO-SOIL MAPPING .....</b>	342
<i>E. Luck, J. Guillemeau, J. Klose</i>	
<b>TU 23P1 13: GPR AND GEOELECTICAL STUDIES IN A HISTORICAL SITE IN BUENOS AIRES, ARGENTINA, FOR LOCATING AN OLD CISTERNS AND EVALUATING .....</b>	347
<i>V. Grunhut, H.P. Martinelli, N.E. Bonomo, M.V. Bongiovanni, A. Pinio, A.M. Osella</i>	
<b>TU 23P1 14: LAKE BAIKAL – A UNIQUE SITE FOR TESTING AND CALIBRATION OF NEAR-SURFACE TEM SYSTEMS.....</b>	352
<i>M.V. Sharlov, N.O. Kozhevnikov, R.V. Sharlov</i>	
<b>TU 23P1 21: INCREASING THE SIGNAL-TO-NOISE RATIO OF FIELD NMR (SNMR) MEASUREMENTS BY MEANS OF PRE-POLARIZATION .....</b>	357
<i>T. Radic</i>	
<b>TU 23P1 22: REMOVAL OF CO-FREQUENCY POWERLINE HARMONICS FROM MULTICHANNEL SURFACE NMR DATA.....</b>	362
<i>J.J. Larsen, L. Liu, D. Grombacher, E. Auken</i>	
<b>TU 23P1 23: APPLICATION OF MAGNETIC RESONANCE SOUNDINGS AND ERT MEASUREMENT TO CHARACTERIZE THE TRANSITION BETWEEN SEDIMENT AND CRYSTALS .....</b>	367
<i>C. Jodry, J.F. Girard, J. Porte, J.R. Dujardin, P.D. Matthey</i>	
<b>TU 23P2 01: ANALYSIS OF SEVERELY ALIASED SURFACE WAVES FROM A 2D SEISMIC REFLECTION LINE .....</b>	372
<i>L. Onnis, A. Osella</i>	
<b>TU 23P2 02: RADIOMAGNETOTELLURIC STUDIES OF LANDFILLS OF INDUSTRIAL WASTES ON THE KARELIAN Isthmus.....</b>	377
<i>A.K. Saraev, A.E. Simakov, B. Tezkan, I.V. Tokarev, A.A. Shlykov</i>	
<b>TU 23P2 03: GEOELECTRIC SURVEYS IN HANDLING URBAN ENVIRONMENTAL AND GEOTECHNICAL PROBLEMS .....</b>	382
<i>Z. Plank, D. Polgar</i>	
<b>TU 23P2 04: HIGH-RESOLUTION GEOPHYSICS IN THE INVESTIGATION OF THE INNER STRUCTURE OF WALLS AND COLUMNS OF BATALHA ABBEY .....</b>	387
<i>M.J.S. Matias, F. Almeida, R. Moura, N. Barraca</i>	
<b>TU 23P2 05: CONTRIBUTION OF ERI, PHOTOGRAHAMMETRY AND SURFACE RESISTIVITY PROBE METHODS FOR ASSESSING AN UNDERGROUND MINE PILLAR .....</b>	392
<i>L.D. Dore, Y. Fargier, S. Palma-Lopes, R.A. Antoine, C.F. Fauchard</i>	

<b>TU 23P2 06: A NEW DATABASE STRUCTURE GUIDING THE COMBINATION OF GEOPHYSICAL AND GEOTECHNICAL METHODS FOR LEVEE INVESTIGATION .....</b>	397
<i>T. Dezert, S. Palma-Lopes, Y. Fargier, P. Cote, C. Jodry</i>	
<b>TU 23P2 07: ASSESSMENT OF PHYSICAL PROPERTIES OF A SEA DIKE USING MULTICHANNEL ANALYSIS OF SURFACE WAVES AND 3D FORWARD MODELING .....</b>	402
<i>D.P. Pageot, M. Le Feuvre, D. Leparoux, Y. Capdeville, P. Cote</i>	
<b>TU 23P2 08: GEOPHYSICAL MEASUREMENTS FOR SEISMIC MICROZONATION OF THE CITY OF HUELVA, SPAIN .....</b>	407
<i>A. Macau, B. Benjumea, S. Figueras, A. Gabas, A. Roca, F.M. Alonso-Chaves</i>	
<b>TU 23P2 09: VARIATION OF ULTRASONIC WAVE VELOCITY WITH SOME ENGINEERING PROPERTIES OF LIMESTONE - A LABORATORY STUDY IN SRI LANKA .....</b>	412
<i>U. de Jayawardena</i>	
<b>TU 23P2 21: COMPLEX TRACE ATTRIBUTES OF HIGH-RESOLUTION CRS STACKED DATA TO INTERPRET THE NEAR-SURFACE - THE EXAMPLE OF SOLFATARA CR .....</b>	417
<i>P.P. Bruno</i>	
<b>TU 23P2 22: HYDROGEOLOGICAL AND GEOPHYSICAL CHARACTERIZATION OF FRACTURED AQUIFER OF ÓDENA (BARCELONA, CATALUNYA) .....</b>	422
<i>M. Himi, D. Rodriguez-Fernandez, A. Folch, R. Lovera, C. Domenech, M. Rosell, L. Riv</i>	
<b>TU 23P2 23: DEVELOPMENT OF THE ELECTROMAGNETIC MONITORING SYSTEM UNDER THE CONDITIONS OF URBANIZED TERRITORY .....</b>	427
<i>T. Laskina</i>	
<b>TU 23P2 24: IDENTIFICATION AND CHARACTERIZATION OF HARD ROCKS WEATHERING PROFILE BY ELECTRICAL RESISTIVITY IMAGING .....</b>	432
<i>A. Portal, P. Belle, F. Mathieu, P. Lachassagne, N. Brisset</i>	
<b>TU 23P2 25: RESEARCH OF THE INCREASED INDUCED SEISMICITY IN COMPLEX GEOECOLOGICAL MONITORING OF SHALLOW SUBSURFACE OF UKRAINIAN MINI .....</b>	437
<i>O.K. Tiapkin, O.V. Kendzera, P.H. Pihulevskii</i>	
<b>WE 23 A01: CSRT SURVEY ON FROZEN LAKE - A NEW TECHNIQUE WITH AN EXAMPLE FROM THE STOCKHOLM BYPASS TUNNEL .....</b>	442
<i>S. Mehta, M. Bastani, A. Malehmir, L.B. Pedersen</i>	
<b>WE 23 A02: GEOPHYSICAL INVESTIGATIONS TO ASSESS THE EXTENT OF DISTURBANCE IN EXCAVATED ROCK FACES AT HINKLEY POINT C .....</b>	447
<i>A.L. Stork, A.C. Butcher, J.P. Verdon, A. Koe</i>	
<b>WE 23 A03: COMBINED APPLICATION OF GPR AND ERT TO THE DETECTION OF VOIDS DURING THE CONSTRUCTION PHASE OF A BUILDING COMPLEX IN KOZ .....</b>	452
<i>G. Vargemezis, P. Tsourlos, D. Aggelis, I. Fikos</i>	
<b>WE 23 A04: SHALLOW VS STRUCTURE ESTIMATION FOR SEISMIC SITE RESPONSE USING THE ACTIVE MASW METHOD - A CASE STUDY AT THE URBAN AREA .....</b>	457
<i>E.A. Obando</i>	
<b>WE 23 A05: GEOBIM FOR INFRASTRUCTURE PLANNING .....</b>	462
<i>M. Svensson</i>	
<b>WE 23 A06: REPROCESSING OF GEOPHYSICAL DATA, COMPARISON WITH TUNNELING RESULTS FROM THE BERGEN RING-ROAD AND SUBSEQUENT REFRACTION .....</b>	467
<i>G.A. Tassis, J.S. Ronning, S. Rohdewald, T. Kirkeby, M. Wale</i>	
<b>WE 23 A07: GPR SURVEY FOR THE DETECTION OF VOIDS IN EMBANKMENT OF A HIGHWAY - CASE STUDY IN EGNATIA HIGHWAY IN NORTHERN, GREECE .....</b>	472
<i>I. Fikos, G. Vargemezis, P. Tsourlos, D. Angelis</i>	
<b>WE 23 A08: 3D GROUND MODEL USING GEOPHYSICAL AND GEOTECHNICAL DATA - A CASE STUDY FROM THE NETHERLANDS .....</b>	477
<i>V. Minoretti, D.H.R. Brouwer, K. Van Kesteren</i>	
<b>WE 23 A09: SHEAR WAVE VELOCITY STRUCTURE DERIVED FROM THE MICROTREMOR H/V RAYLEIGH WAVE ENERGY RICH PART .....</b>	482
<i>R. Yazdanfar, N. Hafezi</i>	
<b>WE 23 A10: BEDROCK DEPTH ESTIMATIONS AND THEIR LIMITATIONS - COMPARISON BETWEEN REFRACTION SEISMOICS AND GEOTECHNICAL INVESTIGATIONS .....</b>	487
<i>R. Behrendt, E. Lundberg, C. Juhlin, F. Zhang, T. Lehtimaki</i>	
<b>WE 23 A11: HIGH-FREQUENCY SURFACE WAVE MEASUREMENTS FOR THE INVESTIGATION OF PAVEMENT STRUCTURE .....</b>	492
<i>T. Inazaki, H. Kisanuki, K. Hayashi, S. Imamura</i>	
<b>WE 23 A12: SEQUENTIAL PHASE-VELOCITY AND WAVEFORM INVERSION OF SHALLOW-SEISMIC SURFACE WAVES – A FIELD EXAMPLE FOR BEDROCK MAPPING .....</b>	497
<i>Y. Pan, L. Gao, T. Bohlen</i>	

<b>WE 23 A13: BEDROCK AND FRACTURE ZONE DELINEATION USING DIFFERENT NEAR-SURFACE SEISMIC SOURCES.....</b>	502
<i>B. Brodic, A. Malehmir, C. Juhlin</i>	
<b>WE 23 A14: JOINT SHEAR WAVE REFLECTION SEISMIC AND GEOTECHNICAL DRILLING FOR SITE INVESTIGATION AT TØNSBERG HOSPITAL AREA .....</b>	507
<i>U. Polom, J.S. Ronning, G. Tassis, J. Gellein</i>	
<b>WE 23 A15: STIFFNESS OF A FRACTURE FROM AVO INVERSION INCORPORATING LINEAR SLIP BOUNDARY CONDITION - EXPERIMENTAL INVESTIGATION .....</b>	512
<i>S.H. Minato, R. Ghose, G. Osukuku</i>	
<b>WE 23 A16: MODELLING TIME-LAPSE S-WAVE VELOCITY CHANGES IN AN UNSATURATED RIVER DYKE DUE TO WATER INFILTRATION .....</b>	517
<i>A. Suzaki, R. Ghose, S. Minato</i>	
<b>WE 23 A17: ELECTRODE INFLUENCE ON MICRO-ERT FIELD DATASET SUBJECTED TO FIRE .....</b>	522
<i>C. Verdet, C. Sirieix, Y. Anguy, R. Clement, C. Gaborieau</i>	
<b>WE 23 A18: CHALLENGES IN IDENTIFYING KARST POROSITY IN A CALEDONIAN NAPPE SETTING USING GRAVIMETRIC MAPPING.....</b>	527
<i>T. Solbak, C. Fichler, W. Wheeler, S.E. Lauritzen, P. Ringrose</i>	
<b>WE 23 B01: ESTIMATING TIME-LAPSE NEAR-SURFACE VELOCITY MODELS USING GROUND ROLL FROM COARSELY SAMPLED 2-D LAND CROOKED SURVEYS.....</b>	532
<i>C. Barajas-Olalde, A.J. Livers, S.A.S. Burnison, J.A. Hamling, C.D. Gorecki</i>	
<b>WE 23 B02: MONITORING OF THE TIDAL RESPONSE OF A SEA DIKE USING SEA WAVES AS SEISMIC NOISE.....</b>	537
<i>M. Le Feuvre, P. Cote, A.J. Joubert</i>	
<b>WE 23 B03: ON THE ACCURACY OF SEISMIC WAVEFIELD SPATIAL GRADIENTS .....</b>	542
<i>N. Allouche, E. Muyzert, P. Edme</i>	
<b>WE 23 B04: ELECTRICAL RESISTIVITY TOMOGRAPHY (ERT) FOR TIME-LAPSE MAPPING OF IN-SITU SELF-SUSTAINING TREATMENT FOR ACTIVE REMEDIATION .....</b>	548
<i>L.M. Trento, P. Tsourlos, J.I. Gerhard, M. McMaster, A. Sims</i>	
<b>WE 23 B05: CAVE-SURFACE ELECTRICAL RESISTIVITY TOMOGRAPHY IN "CASTELLO DI LEPRE" KARST SYSTEM (MARSICO NUOVO, SOUTHERN ITALY) .....</b>	553
<i>E. Rizzo, M. Guerriero, E. Gueguen, L. Capozzoli, G. De Martino, F. Perciante</i>	
<b>WE 23 B06: STREAMING CURRENT SIGNALS ASSOCIATED WITH PUMPING TEST EXPERIMENTS .....</b>	558
<i>K.V. Titov</i>	
<b>WE 23 B07: SPATIO-TEMPORAL MONITORING OF HEAT STORAGE IN A SHALLOW AQUIFER USING ELECTRICAL RESISTIVITY 4D IMAGERY AND DTS .....</b>	563
<i>N. Lesparre, T. Hermans, F. Nguyen, T. Kremer, T. Robert</i>	
<b>WE 23 B08: INTEGRATING SMALL-SCALL ELECTRICAL RESISTIVITY WITH MULTI-COMPARTMENT SAMPLER TECHNIQUES TO MONITOR SOLUTE FLUXES .....</b>	568
<i>E. Bloem, Z. Koelma, P. Fernandez, H.K. French</i>	
<b>WE 23 B09: USING GEOPHYSICAL HARD DATA TO ENHANCE THE RELIABILITY OF HYDROLOGICAL MODELS .....</b>	573
<i>G. De Schepper, C. Paulus, J. Molron, P.Y. Bolly, T. Hermans, T. Robert</i>	
<b>WE 23 B11: GEOSTATISTICAL REGULARIZATION AND CROSS-GRADIENTS OPERATORS FOR JOINT INVERSE PROBLEMS ON IRREGULAR MESHES .....</b>	578
<i>C. Jordi, J. Doetsch, T. Gunther, C. Schmelzbach, J.O.A. Robertsson</i>	
<b>WE 23 B12: TOWARDS 3D PROBABILISTIC INVERSION WITH GRAPHCUTS.....</b>	583
<i>N. Linde, M. Cardiff, G. Mariethoz, J. Bradford, G. Pirot</i>	
<b>WE 23 B13: PROCESSING AND MODELING OF TIME DOMAIN INDUCED POLARIZATION DATA.....</b>	588
<i>A. Nivorolis, P. Tsourlos, G. Vargemezis, G. Tsokas, J.H. Kim</i>	
<b>WE 23 B14: QUANTIFICATION OF TEMPERATURE WITH TIME-LAPSE ELECTRICAL RESISTIVITY USING THE PREDICTION-FOCUSED APPROACH -A FIELD CASE .....</b>	593
<i>T. Hermans, F. Nguyen, J. Caers</i>	
<b>WE 23 B15: ESTIMATION OF VELOCITY DISTRIBUTION IN TREE TRUNKS AND REFLECTION IMAGING BY GPR CONSIDERING CURVED RAYPATHS .....</b>	598
<i>K. Takahashi, K. Aoike</i>	
<b>WE 23 B16: INTRICACIES IN THE INTERPRETATION OF VERTICAL RADAR PROFILING CAUSED BY BOREHOLE EFFECTS.....</b>	603
<i>M. Rossi, G. Cassiani, G. Vignoli, J. Irving, R. Deiana, A. Binley</i>	

<b>WE 23 B17: IDENTIFICATION OF PIPE FLANGES IN GPR IMAGES BY USING NEURAL NETWORKS.....</b>	608
<i>P. Bordon, H.P. Martinelli, N.E. Bonomo</i>	
<b>WE 23 B18: CONSTRUCT AND INTERPOLATING A GPR MULTI-OFFSET DATA BY FIXED-OFFSET DATA .....</b>	613
<i>S.S. Martins, J.M. Travassos, E. Gomes, W.J. Mansur</i>	
<b>WE 23P1 01: NEW SEISMIC SURVEY TECHNIQUES FOR SEAFLOOR MASSIVE SULPHIDE (SMS) EXPLORATION.....</b>	618
<i>E. Asakawa, F. Murakami, S. Saito, K. Tara, M. Kato, H. Tsukahara, S. Lee, T. Sumi, T. Yamakawa</i>	
<b>WE 23P1 02: REFLECTION SEISMIC IMAGING OF IRON-OXIDE DEPOSITS - AN EXAMPLE FROM BERGSLAGEN MINING DISTRICT OF SWEDEN .....</b>	623
<i>G. Maries, A. Malehmir, E. Backstrom, M. Schon, P. Marsden</i>	
<b>WE 23P1 03: GEOPHYSICAL MEASUREMENTS TO DETECT AHEAD OF BUCKET WHEEL EXCAVATORS THE PROBLEMATIC HARD FORMATIONS IN COAL MINES.....</b>	628
<i>G. Apostolopoulos, A. Vafidis, N. Economou, T. Michalakopoulos, P. Kofaksi</i>	
<b>WE 23P1 04: DETECTING WEAKENED MINE PILLARS USING SEISMO-ACOUSTIC NOISE - RESULTS OF PHYSICAL MODELLING .....</b>	633
<i>Y.I. Kolesnikov, K.V. Fedin</i>	
<b>WE 23P1 05: DETERMINATION OF GOLD MINERALIZATION ZONES USING INDUCED POLARIZATION AND RESISTIVITY METHODS IN DARREH-ASHKI AREA, CENT .....</b>	638
<i>Z. Bagheri-Kargar, A. Kamkar-Rouhani, A. Arab-Amiri</i>	
<b>WE 23P1 06: A CASE STUDY ON RESISTIVITY AND SPECTRAL IP PROPERTIES OF MODERN SEAFLOOR HYDROTHERMAL DEPOSITS IN JAPAN .....</b>	643
<i>S. Komori, Y. Masaki, W. Tanikawa, J. Torimoto, Y. Ohta, M. Makio, L. Maeda, J. Ishibashi, T. Nozaki, O. Tadai, H. Kumagai</i>	
<b>WE 23P1 07: IMAGING VOLCANIC STRATIGRAPHY BENEATH GLACIAL COVER USING MAGNETIC FIELD METHODS AND PETROPHYSICS .....</b>	648
<i>E. Veglio, H. Ugalde, I. Lenauer, C. Bank, B. Milkereit</i>	
<b>WE 23P1 08: QUANTITATIVE INTERPRETATION OF GEMAGNETIC DATA IN CHOPANAN AREA OF YAZD, IRAN .....</b>	653
<i>M.S. Doost, S. Shokri, H. Riahi, M. Kangaziayn</i>	
<b>WE 23P1 11: QUANTITATIVE INTERPRETATION OF SHALLOW SEDIMENTS THROUGH SEISMIC ELASTIC INVERSION .....</b>	658
<i>A.W.O. Oguro, V.S. Spiess</i>	
<b>WE 23P1 12: REVEALING VERY SHALLOW STRUCTURES IN A HETEROGENEOUS DYKE THROUGH INTERFEROMETRIC SUBTRACTION OF SURFACE WAVES IN A SEIS .....</b>	663
<i>J. Liu, R. Ghose, D. Draganova</i>	
<b>WE 23P1 13: SEISMIC FACIES CHARACTERIZATION OF THE OVERDEEPENERED GLACIAL TANNWALD BASIN .....</b>	668
<i>T. Burschil, H. Buness, D. Tanner, G. Gabriel, C. Krawczyk</i>	
<b>WE 23P1 14: SUBMARINE LANDSLIDE AND GRAVITY FLOW ON THE WESTERN SLOPE OF THE OKINAWA TROUGH.....</b>	673
<i>Q. Li, F.C. Cai</i>	
<b>WE 23P1 15: ASSESSING THE EFFECTIVENESS OF A PORTABLE IMPACT SEISMIC SOURCE FOR SHALLOW GEOPHYSICAL SURVEYS .....</b>	678
<i>J. Moreno, L. Rivero, R. Lovera, M. Jimenez, A. Sendros, A. Urruela, A. Casas</i>	
<b>WE 23P1 16: MULTI-BEAM ECHOSOUNDER SYSTEM USED IN THE VOLUME CALCULATION OF ARTIFICIAL REEF AREA OF THE LAIZHOU BAY.....</b>	683
<i>X. Wu, J. Xing, X. Jiang</i>	
<b>WE 23P1 17: SEISMIC SHEAR-WAVE ACQUISITION PARAMETERS FOR CHARACTERIZATION OF CHALK RESERVOIR ANALOGUES .....</b>	688
<i>J. Kammann, J. Baekgaard, C. Albrechtsen, A. Malehmir, L. Nielsen</i>	
<b>WE 23P1 18: SUBSURFACE IMAGING USING APPROXIMATE STATIONARY POSITIONS.....</b>	693
<i>X. Li, D.J. Min</i>	
<b>WE 23P1 19: AN IMPROVED VIRTUAL REAL SOURCE METHOD TO ESTIMATE SOURCE WAVELET FROM SURFACE WAVES.....</b>	698
<i>L. Gao, G. Tian, J. Xia, Y. Pan</i>	
<b>WE 23P1 21: 3D MODELING AND BEDROCK DETERMINATION USING ELECTRICAL RESISTIVITY INVERSION .....</b>	703
<i>A. Najafabadi, H.J. Kamali</i>	
<b>WE 23P1 22: SEISMOSTRATIGRAPHIC MODELING USING CONSTRAINED HVSR DATA .....</b>	708
<i>R. Martorana, M. Agate, P. Capizzi, F. Caverla, A. D'Alessandro</i>	

<b>WE 23P1 23: AN MASW SURVEY FOR LANDSLIDE RISK ASSESSMENT IN NOVI SEHER, BOSNIA AND HERZEGOVINA – A CASE HISTORY.....</b>	713
<i>K. Suto, M. Urosevic, S. Komatina</i>	
<b>WE 23P1 24: MORPHOMETRIC ANALYSIS FOR LANDSLIDE SUSCEPTIBILITY IN SUKASARI AND SURROUNDING AREA, TANJUNGSARI, WEST JAVA, INDONESIA .....</b>	718
<i>M.L. Dwiyoga, M.F. Mawaridi, M.A.J. Anandi</i>	
<b>WE 23P2 11: APPLYING BAT METAHEURISTIC ALGORITHM FOR BUILDING SHEAR WAVE VELOCITY MODELS FROM SURFACE WAVE DISPERSION CURVES .....</b>	723
<i>R. Poormirzaee</i>	
<b>WE 23P2 12: ADDRESSING THE NON-LINEARITY OF FULL-WAVEFORM INVERSION WITH A PROBABILISTIC APPROACH .....</b>	728
<i>J. Hunziker, E. Laloy, N. Linde</i>	
<b>WE 23P2 13: IMAGING AJI CHAI SALT DOME THROUGH 3D BINARY INVERSION.....</b>	733
<i>S.Y. Sayyadi, H.V.V. Ghazvini</i>	
<b>WE 23P2 14: 2D JOINT INVERSION OF MT AND FULL-WAVEFORM SEISMIC DATA .....</b>	738
<i>C. Lin, L. Zhou, H. Tan, Z. Hu, H. Yang</i>	
<b>WE 23P2 16: 2D GRAVITY INVERSION USING PARTICLE SWARM OPTIMIZATION METHOD.....</b>	743
<i>D. Darisma, U. Said, W. Srigutomo</i>	
<b>WE 23P2 17: AMBIENT NOISE TOMOGRAPHY BENEATH THE GOTVAND-E OLYA RESERVOIR (SOUTH-WEST OF IRAN).....</b>	748
<i>M.R. Ebrahimi, M. Tatar</i>	
<b>WE 23P2 18: QUICK INVERSION OF MULTI-CONFIGURATION ELECTROMAGNETIC INDUCTION DATA USING CUMULATIVE RESPONSE FUNCTIONS.....</b>	753
<i>F.C.M. Andrade, T. Fischer</i>	
<b>WE 23P2 19: MODELLING THE INFLUENCE OF GROUND SURFACE RELIEF ON ELECTRICAL SOUNDING CURVES AND 2D INVERSION RESULTS.....</b>	758
<i>B. Mukanova, I.N. Modin, T. Mirgalikyzy, K. Baranchuk</i>	
<b>WE 23P2 21: GEOPHYSICAL AND GEOTECHNICAL CHARACTERISTICS OF CHAMPLAIN SEA SEDIMENTS IN THE OTTAWA VALLEY, CANADA.....</b>	763
<i>H. Crow, G.A. Oldenborger, A.J.M. Pugin, J.A. Hunter, B. Dietiker</i>	
<b>WE 23P2 22: THE TOPSOIL PROJECT - INTEGRATED APPROACH OF NEAR SURFACE GEOPHYSICS AND GROUNDWATER MODELLING .....</b>	768
<i>H. Wiederhold, M.A. Rahman, M. Grinat, R. Kirsch, W. Scheer</i>	
<b>WE 23P2 23: CLUSTER ANALYSIS FOR CAVITY DETECTION USING SEISMIC REFRACTION AND ELECTRICAL RESISTIVITY TOMOGRAPHY .....</b>	769
<i>P. Capizzi, R. Martorana, A. Carollo, M. Vattano</i>	
<b>WE 23P2 24: GEOPHYSICAL STUDY OF A POTENTIAL SOURCE OF SECONDARY RAW MATERIALS - THE AIJALA MINE TAILINGS AREA SOUTHERN FINLAND .....</b>	774
<i>T. Valjus, T. Huotari, J. Lerssi, M. Markovaara-Koivisto, T. Tarvainen</i>	
<b>Author Index</b>	