

25th Symposium on the Application of Geophysics to Engineering and Environmental Problems 2012

(SAGEEP 2012)

**Tucson, Arizona, USA
25-29 March 2012**

**ISBN: 978-1-62276-043-5
ISSN: 1554-8015**

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© (2012) by the Environmental and Engineering Geophysical Society
All rights reserved.

Printed by Curran Associates, Inc. (2012)

For permission requests, please contact the Environmental and Engineering Geophysical Society
at the address below.

Environmental and Engineering Geophysical Society
1720 South Bellaire
Suite 10
Denver, Colorado 80222-4303

Phone: (303) 531-7517

Fax: (303) 820-3844

staff@eegs.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

BEST OF 2011 EAGE/NSGD

MONITORING WATER MIGRATION PROCESSES IN CRACKING CLAY SOIL WITH DEPTH PROFILES OF SQUARE ARRAY RESISTIVITY MEASUREMENTS	1
<i>Anna Greve</i>	
THE NORMALIZED INTEGRATION METHOD - AN ALTERNATIVE TO FULL WAVEFORM INVERSION?	5
<i>Henri Calandra</i>	
A COMPARISON BETWEEN GPR AND ULTRASONIC TECHNIQUES FOR VOID DETECTION BENEATH REINFORCED CONCRETE SECTIONS	9
<i>Nigel Cassidy</i>	
TIME-LAPSE CAPACITIVE RESISTIVITY IMAGING – A NOVEL METHODOLOGY FOR THE MONITORING OF PERMAFROST PROCESSES IN BEDROCK.	13
<i>Oliver Kuras</i>	

ADVANCES IN AGRICULTURAL GEOPHYSICS

PROFILING USGA PUTTING GREENS USING GPR	17
<i>Robert Freeland, Barry Allred</i>	
USING ELECTROMAGNETIC INDUCTION METHODS TO DETERMINE ENVIRONMENTAL SUSTAINABILITY OF VEGETATIVE TREATMENT BEEF FEEDLOT RUNOFF CONTROL SYSTEMS IN IOWA AND NEBRASKA	18
<i>Bryan Woodbury, Roger Eigenberg, David Parker, Mindy Spiehs</i>	
USE OF A RESISTANCE METER TO MONITOR GROUNDWATER IMPACTS NEAR WASTEWATER HOLDING PONDS	19
<i>Roger Eigenberg</i>	
A SIMPLE AND EFFECTIVE DATA ACQUISITION PLANNING, PROCESSING AND GUIDANCE SYSTEM FOR CONDUCTING PARALLEL SWATH ELECTROMAGNETIC SURVEYS USING GEM 2 IN SUBSURFACE DRIP IRRIGATION MONITORING, POWDER RIVER BASIN, WYOMING	20
<i>Garret Veloski</i>	
FIFTH YEAR OF SUBSURFACE DRIP IRRIGATION MONITORING USING GEM2 ELECTROMAGNETIC SURVEYS, POWDER RIVER BASIN, WYOMING	21
<i>Bruce Smith</i>	
USING LANDMAPPER TO MONITOR SOIL SALINITY AND MITIGATE ITS EFFECTS ON RICE PRODUCTION AT US GULF COAST	22
<i>Larisa Golovko, Anatoly Pozdnyakov</i>	
A STUDY OF SOIL-PIPE FLOW AND INTERNAL EROSION BY ACOUSTIC TECHNIQUES	31
<i>Zhiqu Lu, Glenn Wilson</i>	
EXPLORING THE POTENTIAL OF NEAR-SURFACE GEOPHYSICAL METHODS TO DELINEATE A SHALLOW HARDPAN IN A SOUTHEASTERN U.S. SANDY COASTAL PLAIN SOIL	32
<i>Barry Allred, Hamid Farahani, Ahmad Khalilian</i>	

ADVANCES IN HYDROGEOPHYSICAL MONITORING

MONITORING ENHANCED RECOVERY OF A MINE HEAP: AN APPLICATION OF REAL-TIME ELECTRICAL RESISTIVITY	33
<i>Dale Rucker, Nigel Crook, Michael McNeill, Jeffrey Winterton, Chris Baldyga, Gillian Noonan, Shawn Calendine</i>	
THREE-DIMENSIONAL RESISTIVITY IMAGING FOR DETERMINATION OF AIR-FILLED PORE SPACE IN THE DESIGN OF GROUNDWATER AIR SPARGING SYSTEMS	34
<i>Boyce Clark, Mark Klemmer, Bill Zahniser</i>	
SELF-CALIBRATING WATER QUALITY MONITORING SYSTEM	35
<i>Trent Armstrong, Gail Heath, Candice Teichert, Clark Scott, Smith Casey</i>	

HYDROGEOPHYSICAL INVESTIGATIONS FOR MONITORING REMEDIATION PROCESSES AT THE UNIVERSITY OF CONNECTICUT LANDFILL: 2004-2011	36
<i>Carole Johnson, Eric White, Peter Joesten</i>	
MONITORING A NOVEL APPROACH TO MONITOR ENHANCED RECHARGE WITH TIME LAPSE GRAVITY	57
<i>Ty Ferre, Deborah Tosline, Damian Gosch</i>	
GRAVITY-MEASURED WATER STORAGE CHANGE AND SUBSURFACE HYDRAULIC PROPERTIES AT A MANAGED RECHARGE FACILITY IN TUCSON, USA.	58
<i>Jeffrey Kennedy, Ty Ferre, Benjamin Creutzfeldt, Andreas Güntner</i>	

ADVANCES IN MINING GEOPHYSICS

INNOVATIVE USE OF GEOPHYSICAL DATA FOR ASSESSING CONCEALED MINERAL RESOURCES	59
<i>Mark Bultman</i>	
GEOELECTRICAL EXPLORATION FOR HEAVY OIL IN MADAGASCAR	60
<i>Paul Bauman</i>	
SLOPE MONITORING WITHIN OPEN-PIT MINES BY GROUND-BASED RADAR: METHODOLOGY, DATA PROCESSING AND CASE STUDIES REVIEW	61
<i>Francesco Mariotti, Giovanni Amoroso, Davide Giudici, Davide D'Aria, Paolo Farina</i>	
REMOTE ROCK-FALL MONITORING WITH AN INTERFEROMETRIC RADAR SYSTEM	73
<i>Patrick Miller, Adrian Weaver, Colin Leek, Larry Olson</i>	

ADVANCES IN THE GEOPHYSICAL CHARACTERIZATION AND MONITORING OF FRACTURED ROCK AQUIFERS

GROUND PENETRATING RADAR INVESTIGATIONS ON THE RELATIONSHIP BETWEEN SALINITY IN FLUID-FILLED HORIZONTAL SUB-WAVELENGTH 'THIN-LAYER' BEDROCK FRACTURES AND REFLECTION AMPLITUDES	88
<i>Carolyn Tewksbury-Christle, Gregory S. Baker</i>	
GPR CHARACTERIZATION OF DISCRETE FRACTURES AND MONITORING OF CHANNELLED FLOW: ELUCIDATING THE FORWARD MODEL	89
<i>George Tsoflias, Matthew Becker</i>	
INFORMED INVERSION APPROACH TO ELECTRICAL RESISTIVITY IMAGING IN A FRACTURED-ROCK SETTING	90
<i>Judith Robinson, Timothy Johnson, Lee Slater, Dimitris Ntarlagiannis, Pierre Lacombe</i>	
MEASUREMENT OF FRACTURE/MATRIX HEAT EXCHANGE USING FIBER OPTIC DISTRIBUTED TEMPERATURE SENSING	91
<i>Adam Hawkins, Matthew Becker, George Tsoflias</i>	

AIRBORNE GEOPHYSICS: RECENT ADVANCES AND NOVEL APPLICATIONS

MAGNETIC ANOMALIES OF IMPACT CRATERS AT LOW MAGNETIC LATITUDES	92
<i>Les Beard</i>	
A HELICOPTER TIME DOMAIN SURVEY OF A PORTION OF THE PARADOX VALLEY, COLORADO AND UTAH	101
<i>Jared Abraham, Kenneth R. Watts, Benjamin R. Bloss, Bruce Smith, Andrew J. Nicholas, Paul Bedrosian, George R. Breit</i>	
RESULTS OF FREQUENCY BASED INTERPRETATIONS OF ONSHORE PASSIVE ELECTRO MAGNETIC SURVEY DATA	103
<i>Marius Mes, David R. Bruns, Howard Barrie</i>	
NEAR SURFACE RESOLUTION AND TURNOFF TIMES IN AIRBORNE TEM INVESTIGATIONS	104
<i>Kurt Sørensen, Nicklas Nyboe</i>	
PROUDLY PRESENTING MAISIE, A NEW AIRBORNE EM PLATFORM FOR POLAR RESEARCH	109
<i>Andreas A. Pfaffhuber, Stefan Hendricks, Yme A. Kvistedal, Erik Lied, Ivar-Kristian Warum, Steven Hayes, Philip Hayes, Mathieu Boda, Frank Myrvoll, Matthew J. Lato</i>	

EFFICIENT AND SCALABLE ALGORITHMS FOR THE INVERSION OF VERY LARGE AEM DATASETS	110
<i>Casper Kirkegaard, Esben Auken</i>	
A COMPARISON OF AEM INVERSION METHODS FOR DISCONTINUOUS PERMAFROST NEAR FORT YUKON, ALASKA	111
<i>Burke Minsley, Leif Cox, Ross Brodie, Glenn Wilson, Jared Abraham, Micheal Zhdanov</i>	
EXAMPLES OF THE CONTRIBUTION OF A-PRIORI INFORMATION TO IMPROVING INVERSION OF AEM DATA	112
<i>Andrea Viezzoli, Tim Munday, Antonio Menghini, Anne-Sophie Høyer, Esben Auken</i>	
THE USE OF AIRBORNE EM AS AN AID TO UNDERSTANDING AQUIFERS SYSTEMS IN SOUTH AUSTRALIA'S ARID REGIONS: A CASE STUDY ON THE CAPABILITY OF DIFFERENT SYSTEMS	113
<i>A. Yusen Ley-Cooper, Tim Munday</i>	
RESULTS OF RECENT VTEM HELICOPTER SYSTEM DEVELOPMENT TESTING OVER THE SPIRITWOOD VALLEY ACQUIFER, MANITOBA	114
<i>Jean Legault, Alexander Prikhodko, Jack Dodds, James Macnae, Greg Oldenborger</i>	
DIFFERENT AEM SYSTEMS = DIFFERENT RESULTS... OR SHOULD THAT NECESSARILY BE THE CASE?	131
<i>Camilla Sorensen, Tim Munday, Kevin Cahill</i>	
AIRBORNE TIME-DOMAIN ELECTROMAGNETICS FOR THREE-DIMENSIONAL MAPPING AND CHARACTERIZATION OF THE SPIRITWOOD VALLEY AQUIFER	132
<i>Greg Oldenborger, Andre Pugin, Susan Pullan</i>	
AIRBORNE ELECTROMAGNETIC SURVEYS FOR GROUNDWATER CHARACTERIZATION	137
<i>Jared Abraham, Burke Minsley, Paul Bedrosian, Bruce Smith, James Cannia</i>	

APPLICATION OF GEOPHYSICS TO CONTAMINANT INVESTIGATIONS

APPLICATION OF ELECTRICAL RESISTIVITY TOMOGRAPHY IN MAPPING SUBSURFACE HYDROCARBON CONTAMINATION	138
<i>Elijah Ayolabi, Adetayo Folorunso, Samuel Idem</i>	
SPECTRAL INDUCED POLARIZATION SIGNATURES OF MINERAL PRECIPITATION AND HYDROXIDE ADSORPTION IN POROUS MEDIA	139
<i>Chi Zhang, Lee Slater, George Redden, Yoshiko Fujita, Timothy Johnson, Don Fox</i>	
FIELD VALIDATION OF THE LONG-ELECTRODE ELECTRICAL RESISTIVITY METHOD FOR SUBSURFACE CHARACTERIZATION AND MONITORING	140
<i>Dale Rucker, Meng Loke, Gillian Noonan, Danney Glaser, Marc Levitt, Michael McNeill, Brian Cabbage</i>	
GROUNDWATER QUALITY AND GEOPHYSICAL STUDIES IN THE VICINITY OF TAILING PONDS OF THERMAL POWER PLANTS NEAR NAGPUR IN INDIA	141
<i>C. Padmakar, Paras Pujari, Ramya Sanam, Baijnath Deshmukh, Pawan Labhasetwar, Bijendra Khandekar</i>	
CONCEPTUAL SITE MODEL DEVELOPMENT USING BOREHOLE GEOPHYSICS AT THE SAVAGE MUNICIPAL WATER SUPPLY SUPERFUND SITE	143
<i>Andrew Fuller, James Soukup, Kenneth Richards</i>	
INTEGRATION OF TOTAL GAMMA AND SPECTRAL GAMMA LOGGING OVER EXTENDED PERIODS FOR INVESTIGATION AND MONITORING OF RADIOACTIVE CONTAMINATION IN THE VADOSE ZONE	144
<i>Rick McCain</i>	
MULTIPLE METHOD SUBSURFACE ANALYSIS OF A CLUTTERED INDUSTRIAL SITE TO DETERMINE LNAPL SOURCE AND MIGRATION PATHWAY	145
<i>Gregory Byer</i>	
DETECTING FRACTURE-DRIVEN HYDROLOGIC ANISOTROPY USING AZIMUTHAL SEISMIC FIRST-ARRIVAL TOMOGRAPHY (ASFT)	146
<i>Matthew Edmunds, Gregory S. Baker, David Watson, Scott Brooks</i>	
CHEMOMETRIC DESIGN OF EXPERIMENTS APPLIED TO PHYSICOCHEMICAL AND GEOPHYSICAL LABORATORY EXPERIMENTS	147
<i>Dale Werkema</i>	

ARCHAEOLOGICAL AND FORENSICS APPLICATIONS OF NEAR-SURFACE GEOPHYSICS

GEOPHYSICAL MAPPING OF FOUNTAIN CAVE ANGUILLA, BWI	149
<i>Sandy Nettles, Bret Jarrett</i>	

GPR STUDY FOR DECIPHERING THE PRESENCE OF SEEPAGE PATHWAYS IN AJANTA CAVES IN INDIA	150
<i>Paras Pujari, C. Padmakar, Pawan Labhasetwar</i>	
GROUND PENETRATING RADAR AND ELECTROMAGNETIC ARCHAEOGEOPHYSICAL INVESTIGATIONS AT LEGIO, ISRAEL	156
<i>Jessie Pincus, Tim Desmet, Yotam Tepper, Matthew J. Adams</i>	
3-D GPR IMAGING ON DIFFICULT TERRAIN: EXAMPLES FROM THE PYRAMID COMPLEX OF PHARAOH SENWOSRET III AND THE THEBAN TEMPLE OF FEMALE PHARAOH TAUSRET (EGYPT)	157
<i>Douglas Sassen, Pearce Paul Creasman</i>	
MAPPING THE ARCHEOLOGICAL POTENTIAL OF THE ROTTERDAM HARBOR AREA (THE NETHERLANDS), USING MARINE GEOPHYSICS IN A MULTI-DISCIPLINARY AND MULTI-STAKEHOLDER STUDY.	158
<i>Marco De Kleine, Peter C. Vos, Bjorn Smit, Henk Weerts, Dimitri Schiltmans, Wil Borst, Wouter Waldus</i>	

DAM SAFETY-THE USE OF GEOPHYSICAL METHODS FOR ITS DIAGNOSTICS AND MONITORING

FINDING A DEEP BURIED BEDROCK HIGH USING GEOPHYSICS AND REMOTE SENSING AT A FLOOD CONTROL STRUCTURE (DAM) DURING A SUBSIDENCE HAZARD STUDY IN THE DESERT SOUTHWEST	160
<i>Michael Rucker, Sean Hulburt</i>	
USE OF GROUND PENETRATING RADAR FOR DAM SPILLWAY AND CONDUIT INVESTIGATIONS	161
<i>Richard Markiewicz, Dan Liechty, Kristen Pierce, Justin Rittgers</i>	
ASSESSING SEEPAGE FLOW CONDITIONS THROUGH A DAM QUICKLY AND ACCURATELY WITHOUT DRILLING OR DRAWING DOWN THE RESERVOIR	163
<i>Val Kofoed, Mike Jessop, Michael Wallace</i>	
GEOPHYSICAL SIGNATURES OF CRACKING AND SELF-HEALING OF SOILS DURING LAB-SCALE SIMULATIONS	177
<i>Justin Rittgers, Minal Parekh, Robert Rinehart</i>	
TIME-LAPSE SEISMIC TOMOGRAPHY AND DYNAMIC POISSON'S RATIO MAPS OF A SMALL EMBANKMENT DAM WITH POSSIBLE ZONES OF WEAKNESS.	N/A
<i>Leti Teklu Wodajo, Craig Hickey</i>	
FULL WAVEFIELD SEISMIC ANALYSIS BENEATH THE A.V. WATKINS DAM, UTAH	179
<i>Richard D. Miller, Richard Markiewicz, Bevin Bailey, Justin Schwarzer, Shelby Peterie, Julian Ivanov, Kristen Pierce, Craig Hendrix</i>	
INVESTIGATION OF SEEPAGE AND SETTLEMENT PROBLEMS AT THE MORNOS EARTH DAM, GREECE, BY GEOPHYSICAL METHODS.	180
<i>Vassilis Karastathis, Petros Karmis</i>	
SELF-POTENTIAL DATA ACQUISITION USING WIRELESS SENSOR NETWORKS	181
<i>Justin Rittgers, Brian Hoenes, Kerri Stone, Scott Ikard</i>	
FISSURE MONITORING AND DETECTION IN FLOOD EMBANKMENTS USING ELECTRICAL RESISTIVITY TOMOGRAPHY	183
<i>Gareth Jones, Marcin Zielinski, Philippe Sentenac</i>	
ASSESSING CULTURAL (ELECTRICAL) INTERFERENCE OF DEEP WENNER RESISTIVITY SOUNDINGS AT FLOOD CONTROL STRUCTURES (DAMS) FOR SUBSIDENCE HAZARD STUDIES IN THE DESERT SOUTHWEST	192
<i>Michael Rucker, Sean Hulburt</i>	
APPLICATION OF ERT TO LEAKAGE INVESTIGATION: A CASE STUDY AT THE SHIN-SHAN EARTH DAM	193
<i>Chih-Ping Lin, Yin-Chun Hung, Wei-Jin Wu, Zen-Hung Yu</i>	

DETERMINATION OF SHEAR WAVE VELOCITIES FOR GEOLOGICAL AND ENGINEERING APPLICATIONS

COMPARISON OF FV, FP, AND FK FOR DISPERSION ANALYSIS OF SURFACE WAVES	194
<i>Don Zhao</i>	

NONCONTACT MASW METHODS FOR NEAR SURFACE SOIL/PAVEMENT SHEAR WAVE VELOCITIES MEASUREMENTS	195
<i>Zhiqu Lu</i>	
COMPARING SHEAR WAVE VELOCITY MEASUREMENTS FROM MASW AND DOWNHOLE SEISMIC METHODS	196
<i>Ahmed Ismail, Andrew Stumpf, Neil Anderson, William Dey</i>	
JOINT SHEAR-WAVE ANALYSIS USING MASW AND REFRACTION TRAVELTIME TOMOGRAPHY	197
<i>J. Tyler Schwenk, Richard D. Miller, Julian Ivanov, Steven Sloan, Jason McKenna</i>	
ESTIMATING DEEP S-WAVE VELOCITY STRUCTURE USING MICROTREMOR ARRAY MEASUREMENTS AND THREE-COMPONENT MICROTREMOR MEASUREMENTS IN SAN FRANCISCO BAY AREA	207
<i>Koichi Hayashi, Deborah Underwood</i>	

DEVELOPMENT AND APPLICATIONS OF NUCLEAR MAGNETIC RESONANCE TECHNIQUES FOR NEAR-SURFACE INVESTIGATIONS

MRSMATLAB2.0 – MODULES FOR MRS MODELING INVERSION AND DATA-PROCESSING	217
<i>Mike Müller-Petke, Jan Walbrecker, Marian Hertrich</i>	
A NOVEL SURFACE NMR PULSE SEQUENCE FOR IMPROVED ESTIMATION OF LONGITUDINAL T1 RELAXATION TIMES	218
<i>Elliot Grunewald, David Walsh</i>	
INCORPORATING DEPHASING DYNAMICS INTO SNMR FID INVERSIONS IN THE HIGH PLAINS AQUIFER	219
<i>Trevor Irons, Jared Abraham, James Cannia, Yaoguo Li, Jason McKenna</i>	
A PHYSICS-DRIVEN APPROACH USING SINGLE-PORE-MODES (SPM) FOR ESTIMATING AN AVERAGE PORE RADIUS AND SURFACE RELAXIVITY FROM NMR DATA	220
<i>Mathias Ronczka, M. Müller-Petke, R. Dlugosch, T. Günter</i>	
EARTH'S FIELD NMR FOR REMOTE DETECTION OF OIL UNDER ARCTIC SEA-ICE	225
<i>Eiichi Fukushima, Andrew McDowell, Stephen Altobelli</i>	
INTERPRETING NUCLEAR MAGNETIC RESONANCE RELAXATION MEASUREMENTS IN UNSATURATED POROUS MEDIA	226
<i>Sam Falzone, Kristina Keating</i>	
BOREHOLE NMR PERMEABILITY ESTIMATES AND UNCERTAINTY IN AN UNCONSOLIDATED FLUVIAL AQUIFER, KANSAS, USA	227
<i>Andrew Parsekian, Katherine Dlubac, James Butler, Elliot Grunewald, Rosemary Knight, David Walsh</i>	
APPLICATION OF SURFACE NMR MEASUREMENTS TO CHARACTERIZE VADOSE ZONE HYDROLOGY	229
<i>David Walsh, Elliot Grunewald</i>	
CHARACTERISING THE VARIABILITY ASSOCIATED WITH THE QUATERNARY LIMESTONE AQUIFERS OF THE SOUTHERN EYRE PENINSULA IN SOUTH AUSTRALIA USING BOREHOLE NMR	231
<i>Aaron Davis, Mike Hatch, Kevin Cahill, Tim Munday</i>	
MONITORING IN SITU BIOREMEDIATION AT THE RIFLE, COLORADO IFRC SITE WITH NUCLEAR MAGNETIC RESONANCE AND MAGNETIC SUSCEPTIBILITY MEASUREMENTS	232
<i>Kristina Keating, Kenneth Williams, Dimitris Ntarlagiannis, Lee Slater</i>	
USE OF BOREHOLE AND SURFACE NUCLEAR MAGNETIC RESONANCE METHODS AT HADDAM MEADOWS STATE PARK, CONNECTICUT	233
<i>Carole Johnson, Kristina Keating, David Walsh, John Lane, Sam Falzone</i>	
A SURFACE NMR STUDY FOR GROUNDWATER RESOURCE ASSESSMENT IN THE ULEY BASIN, SOUTH AUSTRALIA	234
<i>Aaron Davis, Kevin Cahill, Tim Munday</i>	

EDUCATIONAL INNOVATIONS INVOLVING NEAR-SURFACE GEOPHYSICS

IMAGING IN KARST TERRAIN USING ELECTRICAL RESISTIVITY TOMOGRAPHY AND SURFACE WAVE METHODS	235
<i>Evgeniy Torgashov, Neil Anderson, Mengxing Li, Ahmed Ismail, Adel Elkry</i>	

THE EFFECTS OF VARYING ACQUISITION PARAMETERS AND ARRAY ORIENTATIONS: AN MASW CASE STUDY	236
<i>Mengxing Li, Adel Elkry, Evgeniy Torgashov, Ahmed Ismail, Neil Anderson</i>	
CREDIBILITY OF THE OPTIMUM XY SPACING OF THE GENERALIZED RECIPROCAL METHOD IN INTERPRETATION OF SHALLOW REFRACTION SEISMIC DATA	237
<i>Hamdy Seisa</i>	
MULTIPLE SEISMIC METHODS AND GRAVITY FOR DEFINING THE ANCESTRAL MISSOURI RIVER CHANNEL NEAR GREAT FALLS, MT, USA	238
<i>Curtis Link, Larry Smith</i>	

GEOPHYSICAL METHODS IN DAM, SPILLWAY, AND LEVEE INVESTIGATIONS

USE OF ELECTRICAL METHODS TO CHARACTERIZE PREFERENTIAL GROUND WATER FLOW IN ENBANKMENT DAMS	239
<i>Andre Revil, Abdel Jardani</i>	
ASSESSMENT OF THE TEM-8 AIRBORNE ELECTROMAGNETIC SYSTEM FOR GROUND CONDUCTIVITY MEASUREMENTS	240
<i>William Doll, Jeff Gamey, Jeannemarie Norton, Bret Watkins, Barry Kinsall, J. Scott Holladay, J. Ben Tatum</i>	
ELECTRICAL RESISTIVITY TOMOGRAPHY INVESTIGATIONS	250
<i>Evgeniy Torgashov, Neil Anderson, Ahmed Ismail, Jeremiah Obi</i>	
BURROW GEOMETRY AND HAZARDS: CASE HISTORIES OF GPR FOR MAPPING ANIMAL BURROWS	251
<i>Laura Sherrod, William Sauck, Jarred Swiontek, Kenneth Schlosser, Edward Simpson</i>	
USE OF ELECTRICAL RESISTIVITY AND SELF-POTENTIAL SURVEYS FOR DAM SEEPAGE INVESTIGATIONS	252
<i>Richard Markiewicz, Kristen Pierce, Dan Liechty</i>	

GEOPHYSICAL STUDIES OF THE VADOSE ZONE

OPTIMIZING ERT SURVEYS FOR TUNNEL DETECTION	254
<i>Tomas Goode, Ty Ferre</i>	
SQUARE ARRAY RESISTIVITY MEASUREMENTS TO MONITOR CRACK DYNAMICS AND PREFERENTIAL FLOW IN CRACKING CLAY SOILS	N/A
<i>Anna Greve, Martin Andersen, Ian Acworth</i>	
UNDERSTANDING THE SPATIOTEMPORAL DISTRIBUTION OF SOIL MOISTURE AT INTERMEDIATE SPATIAL SCALES USING GEOPHYSICAL METHODS	256
<i>Trenton Franz, Ty Ferre, Marek Zreda</i>	
DEPTH OF CINDER DEPOSITS AND WATER-STORAGE CAPACITY AT CINDER LAKE COCONINO COUNTY, AZ	257
<i>Jamie Macy, Lee Amoroso, Jeffrey Kennedy, Joel Unema</i>	
SIMULATING P-WAVE VELOCITY VARIATIONS DURING FLUID INFILTRATION IN THE VADOSE ZONE USING FINITE-DIFFERENCE SEISMIC MODELING IN A VISCOELASTIC MEDIA	258
<i>Rachel E. Storniolo, Gregory S. Baker</i>	
USE OF HIGH DATA DENSITY MULTI-WELL TRANSDUCER ARRAYS TO CHARACTERIZE COMPLEX RIVER-AQUIFER INTERACTIONS AT A RCRA LANDFILL SITE	259
<i>Gregory Byer</i>	

GEOPHYSICS IN RIVERS AND STREAMS

STREAM CHANNEL RESISTIVITY WITHIN THE SCHUYLKILL HEADWATERS TO IDENTIFY FLOW LOSS IN A WATERSHED IMPACTED BY ABANDONED MINE DRAINAGE	260
<i>Jarred Swiontek, Laura Sherrod, Jeff Kadegis</i>	
NUMERICAL MODELING TO ASSESS THE IMPACT OF POSITIONAL ERRORS DURING THE ACQUISITION OF WATERBORNE CONTINUOUS RESISTIVITY MEASUREMENTS	261
<i>Brad Hansen, Adam Pidlisecky</i>	
COMPARISON OF TIME-LAPSE RESISTIVITY AND WELL DATA IN THE HYPORHEIC ZONE BENEATH STREAMS	263
<i>Jonathan Nyquist, Laura Toran, David O'Donnell, Robert Ryan</i>	

GEOPHYSICS-ASSISTED EVALUATION OF GEOTECHNICAL/TRANSPORTATION PROCESS AND CONSTRUCTION

GEO-ELECTRICAL IMAGING BASED IN-SITU AND SITE-SPECIFIC TRANSFORMS FOR GEOTECHNICAL CHARACTERIZATION OF A CIVIL CONSTRUCTION SITE..... 264
Rambhatla G. Sastry, P. K. R. Gautam, M. N. Viladkar

ELECTRICAL GEOPHYSICS FOR PERMAFROST TERRAIN CHARACTERIZATION ALONG HIGHWAY INFRASTRUCTURE..... 274
Greg Oldenborger, Christopher Stevens, Stephen Wolfe

GEOTECHNICAL APPLICATIONS OF GROUND PENETRATING RADAR AT REMOTE SITES IN WESTERN CANADA..... 281
Eric Johnson

BOREHOLE GPR TO DETECT AND MAP DEVIATED H-PILE FOUNDATIONS..... 282
Rowland French, Thomas Pennington, Roy Cook, Tammy Cleys

GEOPHYSICAL TECHNOLOGY TO SUPPLEMENT USACE NON-UXO SITE REDEVELOPMENT PROGRAMS..... 283
Raye Lahti, Christopher Buckman, Andri Hanson

UNKNOWN BRIDGE CHARACTERISTICS PROGRAM..... 284
Frank Jalinoos

HYDROLOGIC APPLICATIONS FOR BOREHOLE GEOPHYSICS-NEW DEVELOPMENTS

20+ YEARS OF EXPERIENCE, OBSERVATIONS, AND LESSONS LEARNED OF WITH THE MODERN DIGITAL ACOUSTIC TELEVIEWERS, AND THEIR IMPACT ON DATA QUALITY AND WITH FOCUS ON PRODUCTION MINING APPLICATIONS. PART I – BASIC THEORY, APPLICATIONS, PROCESSING STEPS, RESOLUTION..... 285
Robert Crowder, John Stowell

PART II – DATA QUALITY ISSUES, SOURCES OF ERROR, NUMEROUS DATA EXAMPLES, AND GUIDELINES FOR QC..... 287
John Stowell, Robert Crowder

UNDERSTANDING GEOLOGIC CONTROLS ON GROUNDWATER USING BOREHOLE GEOPHYSICS EXAMPLE: LANDFILL IN EAST-CENTRAL NEW YORK..... 288
Mario Carnevale

SENSITIVITY OF BOREHOLE NMR MEASUREMENTS TO WELL CONSTRUCTION AND DEVELOPMENT..... 290
David Walsh, Elliot Grunewald, James Butler, Ed Reboulet, Steve Knobbe, Rosemary Knight

THE VIRTUAL PACKER METHOD – INTERVAL-SPECIFIC DATA FROM WIRELINE LOGS IN OPEN BOREHOLES..... 291
Frederick Paillet, James Lococo

BOREHOLE IP RESPONSE IN TRADITIONAL AND NON-TRADITIONAL TARGETS USING VARIABLE INJECTION TIMES..... 292
Robert Crowder, John Stowell, James Lococo

KARST GEOPHYSICS APPLIED TO ENVIRONMENTAL, HYDROGEOLOGICAL AND GEOTECHNICAL PROBLEMS

INTEGRATED, STUDENT-LED HYDROGEOLOGICAL INVESTIGATIONS AT A SUSPECTED CENTRAL TEXAS SINKHOLE..... 293
Jeff Paine, John Holt, John Sharp, Benjamin Bass, Georges Comair, Erik Fathy, Kealie Goodwin, Prabhas Gupta, Kevin Meyer, Brendan Murphy

INVESTIGATION OF A COASTAL KARST AREA TO DELINEATE PREFERENTIAL GROUNDWATER FLOW-PATHS USING MARINE AND TERRESTRIAL ELECTRICAL RESISTIVITY TOMOGRAPHY..... 294
Yvonne O'Connell, Eve Daly, Garret Duffy, Tiernan Henry

MAPPING SUBSURFACE CAVITIES AND FRACTURES USING INTEGRATED SURFACE AND BOREHOLE GEOPHYSICS NEAR A SUPERFUND SITE SOUTH OF ROCKFORD, ILLINOIS..... 295
Ryan Adams, Phillip Carpenter

GEOPHYSICAL RESULTS OF MAIN BARTON SPRINGS (PARTHENIA) AND THEIR IMPLICATIONS ON THE GROUNDWATER FLOW PATTERN INTO BARTON SPRINGS POOL, AUSTIN, TEXAS	296
<i>Mustafa Saribudak</i>	

LABORATORY MEASUREMENTS OF NEAR SURFACE GEOPHYSICAL PROPERTIES

LAB STUDIES OF ACOUSTIC BEHAVIORS OF UNSATURATED SOILS	297
<i>Zhiqu Lu, Craig Hickey, Glenn Wilson, James Sabatier</i>	
LINKING LABORATORY MEASUREMENTS OF GEOPHYSICAL PROPERTIES TO ENGINEERING PROPERTIES, QUANTITATIVE AND QUALITATIVE MINERALOGY, AND FIELD DATA	298
<i>Ryan North, William Folks, Julie Kelley, Jason McKenna</i>	
LABORATORY MEASUREMENTS OF ACOUSTIC, ELECTRICAL RESISTIVITY, AND ERODIBILITY OF SOILS DURING A COMPACTION PROCESS	299
<i>Craig Hickey, Cameron Ehn, Gregory Hanson, Zhiqu Lu</i>	
DETERMINING THE BASALTIC FLOW DIRECTION AT EL MINYA AREA IN EGYPT USING MAGNETIC AND ANISOTROPY OF MAGNETIC SUSCEPTIBILITY MEASUREMENTS	300
<i>Mahmoud Mekkawi, Ahmed Saleh, Ahmed Ismail</i>	

MULTICHANNEL GPR TECHNIQUES, ADVANCES AND CASE HISTORIES

3D GPR REAL-TIME AUTOMATED DETECTION OF BURIED UTILITIES	309
<i>Paolo Mazzucchelli, Diego Molteni, Nicola Di Buono, Edoardo Cottino</i>	
IMPACT OF 3D GPR ON SUBSURFACE UTILITY ENGINEERING QUALITY LEVELS	316
<i>Ralf Birken</i>	
LOCATING UNDERGROUND STORAGE TANKS USING A GROUND PENETRATING RADAR AND METAL DETECTOR	317
<i>Evgeniy Torgashov, Adel Elkrry, Neil Anderson</i>	
A GPR ARRAY SYSTEM FOR TRAFFIC EMBEDDED MONITORING OF BRIDGES AND ROADWAYS	318
<i>Charles Oden, Ralf Birken</i>	
HIGH-RESOLUTION STEP-FREQUENCY 3D GPR SYSTEM USING WIDEBAND ANTENNA ARRAYS	319
<i>Egil Eide, Jacopo Sala</i>	
LOCATING UNMARKED GRAVES IN HISTORIC CEMETERIES USING GROUND PENETRATING RADAR	320
<i>Evgeniy Torgashov, Neil Anderson</i>	
3DGPR FOR DISASTER MITIGATION AND ARCHAEOLOGICAL SURVEY IN JAPAN	321
<i>Motoyuki Sato, Kazunori Takahashi, Yuya Yokota</i>	
A GPR ARRAY SYSTEM FOR FAST ARCHAEOLOGICAL MAPPING: STREAM X AT AQUINUM ROMAN SITE (CASTROCELO, ITALY)	322
<i>Salvatore Piro, Gianfranco Morelli, Alexandre Novo, Dean Goodman, Giuseppe Ceraudo</i>	
ALIS- GPR 3-D IMAGING FOR HUMANITARIAN DEMINING	330
<i>Motoyuki Sato, Kazunori Takahashi, Yuya Yokota</i>	

MUNITIONS AND EXPLOSIVES OF CONCERN - INSTRUMENTATION, CLASSIFICATION, AND APPLICATION TO LIVE SITES

GEOPHYSICAL ANALYSIS OF THE UPPER SIX METERS OF SOIL, EAST-CENTRAL DUGWAY PROVING GROUND, IN SUPPORT OF MILITARY AND HOMELAND SECURITY INTERESTS	331
<i>Kevin Parkman, Lee Perren, Seth Broadfoot, Jason McKenna, Lillian Wakeley</i>	
NOISE SOURCES AND PARAMETER ESTIMATION VARIATION IN RECENTLY DEVELOPED EMI SENSORS USED FOR UXO DISCRIMINATION	332
<i>Bruce Barrow</i>	
OPTIMIZING THE METALMAPPER FOR STATIC “CUED ID” MEASUREMENTS OVER UXO	333
<i>Donald Snyder, Charles Oden</i>	

OPTIMIZING UXO RISK MITIGATION THROUGH QUANTIFIED DETECTION DEPTHS AND TARGETED SITE INVESTIGATIONS	348
<i>Brian Barrett, David White, Mike Sainsbury, Asger Eriksen</i>	
THEORETICAL AND PRACTICAL COMPARISON OF ELECTROMAGNETIC INSTRUMENTS AND METHODS WORKING IN FREQUENCY DOMAIN.....	349
<i>Vit Gregor</i>	
OVERCOMING OVERLAPPED FIELDS AND GEOLOCATION ERRORS IN POINT-DIPOLE MAGNETIC FIELD INVERSIONS	350
<i>Raymond Rene, Ryan Rene, Ki Young Kim, Chan Hong Park</i>	
A SENSITIVITY COMPARISON OF TWO COMMERCIAL TIME-DOMAIN EMI SENSORS FOR UXO DETECTION	364
<i>Matthew Casari, Lance Besaw</i>	
MAN-PORTABLE TEMTADS 2X2 TIME-DOMAIN EMI SENSOR ARRAY FOR UXO CLASSIFICATION.....	365
<i>Daniel Steinhurst, Thomas Bell, James Kingdon, Glenn Harbaugh</i>	
CLASSIFICATION OF MEC WITH THE ALLTEM AT CAMP STANLEY, TEXAS.....	366
<i>Ted Asch, Craig Moulton, David V. Smith</i>	
AVO RELATIONSHIPS OF BURIED LANDMINE SURROGATES IN VARIABLE HYDROLOGIC CONDITIONS.....	367
<i>Adam Mangel, Stephen Moysey</i>	
MEC TARGET CLASSIFICATION USING EM61 INTERROGATION DURING REACQUISITION	368
<i>Alexander Kostera, Richard Satkin, Kent Boler</i>	

ROLE OF GEOPHYSICAL METHODS IN GEOTECHNICAL EARTHQUAKE & HAZARDS ENGINEERING

GEOPHYSICAL AND GEOTECHNICAL FEATURES OF THE LEVEE SYSTEMS DAMAGED BY THE EAST JAPAN EARTHQUAKE	376
<i>Tomio Inazaki</i>	
LANDSLIDE INVESTIGATION OF A CLAY SLOPE IN SOUTH-CENTRAL TRINIDAD USING ERT.....	384
<i>Malcom Joab, Martin Andrews</i>	
NATURAL AND MAN-MADE VIBRATIONS IN LAKE KIVU, RWANDA	N/A
<i>Robert Stewart, De-Hua Han</i>	
INTEGRATION OF DOWNHOLE ACOUSTIC TELEVIEWER IMAGING, ULTRASONIC LABORATORY SHEAR WAVES VELOCITY MEASUREMENTS AND MULTI-CHANNEL ANALYSIS OF SURFACE WAVES FOR GEOTECHNICAL SITE CHARACTERIZATION: RILEY AND DOUGLAS COUNTIES SITES, KANSAS, USA.....	386
<i>Amelia Fader-Chumbley, Abdelmnoeam Raef, Assad Esmaily</i>	
NEAR-SURFACE SEISMIC SURVEYING ALONG THE GREEN VALLEY FAULT, SAN FRANCISCO BAY AREA, CALIFORNIA	387
<i>Mitchell Craig, Uyanga Ganbaatar, Joanne Chan</i>	

ROLE OF GEOPHYSICS IN ADDRESSING CIVIL, GEOTECHNICAL AND GEOENVIRONMENTAL ENGINEERING PROBLEMS

PROPOSAL TO STANDARD DIGITAL FILE FORMAT OF GEOPHYSICAL SECTIONS FOR CIVIL ENGINEERING INVESTIGATIONS IN JAPAN	388
<i>Koichi Hayashi, Tomio Inazaki, Toru Takahashi</i>	
GEOPHYSICAL INVESTIGATION AT THE PROPOSED CONCENTRATOR AREAS, IN AN IMPORTANT PROJECT IN SOUTH OF PERU, USING MEASUREMENTS OF COMPRESSIVE (P) AND SHEAR (S) WAVES.	397
<i>Walter Saul Mejia Gomez</i>	
INTEGRATED WELL-LOG, VSP, AND SURFACE SEISMIC ANALYSIS OF NEAR-SURFACE GLACIAL SEDIMENTS: RED LODGE, MONTANA	N/A
<i>Robert Stewart, Daisy Huang, Joe Wong</i>	
DETECTING BLIND FAULTS USING RAYLEIGH WAVE REFLECTIVITY	400
<i>Craig Hyslop, Robert Stewart</i>	

COMBINED GRAVITY AND ELECTRICAL IMAGING IN LANDSLIDE INVESTIGATIONS AT NARAYAN BAGAR, GARHWAL, HIMALAYA, INDIA	401
<i>Rambhatla G. Sastry, Suman K. Mondal, Ashok K. Pachauri</i>	
MAPPING FRACTURES IN VERTICAL ROCK CUTS USING A 400 MHZ GROUND PENETRATING RADAR ANTENNA	411
<i>Adnan Aqeel, Norbert Maerz, Neil Anderson</i>	
PROGRESS ON GEOPHYSICAL TECHNOLOGIES IN BUSY TOWN OF CITY.....	412
<i>Zhong Shihang</i>	
ELECTRICAL GEOPHYSICS FOR DEEP TUNNEL DETECTION AT A GOLD MINE REMEDIATION SITE.....	413
<i>Nicole Pendrigh, Phil Sirls, Paul Ivancie, Douglas Labrecque</i>	
USING ERT TO LOCATE A HISTORICAL MINE TUNNEL.....	414
<i>Douglas Labrecque, Russell Brigham, Brady Flinchum, Nicole Pendrigh, Phil Sirls, Paul Ivancie</i>	
USE OF ELECTRICAL RESISTIVITY SURVEYING TO EVALUATE COLLAPSE POTENTIAL RELATED TO ROAD CONSTRUCTION OVER A CAVE.....	415
<i>Douglas Lambert, Glen Adams, Boston Fodor</i>	
PROGRESS ON LANDSONAR SURVEYING SINGLE MIDDLE OR SMALL KARST CAVE	423
<i>Zhong Shihang</i>	
CHARACTERIZATION OF WASTE DENSITY AND SETTLEMENT VIA MICROGRAVITY	424
<i>Kyle Harris, Claire Samson, Paul Van Geel</i>	
APPLICATION OF GROUND PENETRATING RADAR AND ELECTRICAL RESISTIVITY TECHNIQUES FOR SUBSURFACE STRATIGRAPHIC MAPPING IN SOUTHWESTERN NIGERIA.....	432
<i>Adekunle Adepelumi, Olalekan Fayemi</i>	
GEO-ELECTRICAL IMAGING BASED IN-SITU AND SITE-SPECIFIC TRANSFORMS FOR GEOTECHNICAL CHARACTERIZATION OF A CIVIL CONSTRUCTION SITE.....	N/A
<i>Rambhatla G. Sastry</i>	
QUANTITATIVE ANALYSIS OF MAGNETIC ANOMALIES IN THE EASTERN MEDITERRANEAN: A REVIEW.....	451
<i>Lev Eppelbaum</i>	
PRELIMINARY SEISMIC SURVEY ON THE UNSTABLE SLOPE OF MADESIMO (NORTHERN ITALY)	452
<i>Tiziana Apuani, Diego Arosio, Eusebio Stucchi, Luigi Zanzi, Adriano Ribolini</i>	
 <u>SEISMIC REFRACTION TOMOGRAPHY</u>	
UNCERTAINTY IN NEAR-SURFACE REFRACTION INVERSION	460
<i>Derecke Palmer</i>	
A HYBRID METHOD FOR FIRST BREAK AUTO PICKING.....	469
<i>Don Zhao</i>	
INTERPRETING COLIN ZELT'S "SHOOTOUT" SEISMIC REFRACTION DATA SET USING THE GENERALIZED RECIPROCAL METHOD.....	470
<i>Charles Stoyer</i>	
VARIABILITY OF GRM AND REFRACTION TOMOGRAPHY RESULTS EXAMPLE: WATER RESOURCE INVESTIGATIONS IN WESTERN MASSACHUSETTS	479
<i>Mario Carnevale</i>	
OBTAINING VELOCITY MODELS FROM SYNTHETIC FIRST-ARRIVAL TRAVEL TIMES USING REFRACTION TOMOGRAPHY METHODS	480
<i>Julian Ivanov, Richard D. Miller, J. Tyler Schwenk, Shelby Peterie</i>	
FULL WAVEFORM NON-LINEAR P AND S WAVE SEISMIC TOMOGRAPHY INVESTIGATION PERFORMED TO IDENTIFY KARST FEATURES AND BEDROCK TOPOGRAPHY WITHIN STORMWATER BASIN IN WESTERN US	481
<i>Christopher Buckman, Raye Lahti, Finn Michelsen, Lisa Shea</i>	
COMBINING FREQUENCY-DEPENDENT TRAVELTIME TOMOGRAPHY AND FREQUENCY-DOMAIN WAVEFORM TOMOGRAPHY FOR NEAR-SURFACE SEISMIC REFRACTION DATA	482
<i>Colin Zelt, Jianxiong Chen, Priyank Jaiswal</i>	

THE USE OF GEOPHYSICAL DATA FOR EVIDENCE-BASED GROUNDWATER MANAGEMENT

INTEGRATED GEOPHYSICAL SURVEY FOR MAPPING LATI-ANDESITE INTRUSIVE BODIES, CINO VALLEY, ARIZONA	483
<i>Hesham El-Kaliouby, Ben Sternberg, John Hoffmann, Victoria Langenheim</i>	
USE OF GEOPHYSICAL METHODS TO CHARACTERIZE THE HYDROGEOLOGY OF ASSATEAGUE ISLAND NATIONAL SEASHORE, WORCESTER COUNTY, MARYLAND, 2010	495
<i>Carole Johnson, John Masterson, Eric White, Emily Voytek, Peter Joesten, Brandon Fleming, John Lane</i>	
JOINT USE OF SEISMIC REFLECTION AND TIME-DOMAIN ELECTROMAGNETIC METHODS TO AID GROUND WATER MODELING	497
<i>Jacob Sheehan, Phil Sirls, Nicole Pendrigh, Mayo Thompson</i>	

WATER RESOURCES AND SUPPLY

BASIN DEFINITION USING GRAVITY AND MAGNETIC DATA: CASE STUDY FROM EL QAA PLAIN, SINAI, EGYPT	498
<i>Mohamed Ahmed, William Sauck, Mohamed Sultan, Farouk Soliman, Mohamed Rashed</i>	
FACILITATING LONG-TERM OUTBACK WATER SOLUTIONS (FLOWS) IN SOUTH AUSTRALIA: THE ROLE OF AIRBORNE GEOPHYSICS	499
<i>Tim Munday</i>	
THE DARDADINE PALAEOCHANNEL PROJECT: USING AIRBORNE GEOPHYSICS TO SUPPORT REGIONAL COMMUNITIES IN WESTERN AUSTRALIA	500
<i>Tim Munday, Jasmine Rutherford</i>	
GOUNDWATER EXPLORATION EXAMPLES USING CSAMT AND NSAMT	501
<i>Norman Carlson</i>	
CALIBRATING SEISMIC REFRACTION MEASUREMENTS FOR ACCURATE AQUIFER VOLUME ESTIMATION IN A TROPICAL AREA: CAIRNS, AUSTRALIA	502
<i>Douglas Desper, Curtis Link, Paul Nelson</i>	
VERTICAL ELECTRICAL SOUNDING AND SELF-POTENTIAL METHODS TO SURVEY FOR PLACEMENT OF POTABLE WATER WELLS	503
<i>Larisa Golovko, Anatoly Pozdnyakov, Terry Waller</i>	
ARGHANDAB BASIN AQUIFER EXPLORATION AND CONCEPTUALISATION	N/A
<i>Drew Clemens</i>	

POSTER SESSION ONE

INVESTIGATING THE SPECTRAL INDUCED POLARIZATION RESPONSE OF A CRUDE OIL SPILL SITE UNDERGOING INTRINSIC BIOREMEDIATION	520
<i>Farag Mewafy, Estella Atekwana, Dale Werkema, Dimitris Ntarlagiannis, Lee Slater, Andre Revil</i>	
NEURAL NETWORK AND SUPPORT VECTOR MACHINE CLASSIFICATION OF UXO USING MAGNETICS FINITE ELEMENT MODELING DATA	521
<i>Matthew Bray, Curtis Link, Clifton Youmans</i>	
FIFTH YEAR OF SUBSURFACE DRIP IRRIGATION MONITORING USING GEM2 ELECTROMAGNETIC SURVEYS, POWDER RIVER BASIN, WYOMING	522
<i>James Sams</i>	
MOBILE ACOUSTIC SUBSURFACE SENSING (MASS) FOR THE SUBSURFACE PROPERTIES OF PAVEMENTS	523
<i>Yinghong Cao, Yifeng Lu, Yi Zhang, Gregory McDaniel, Ming Wang, Ralf Birken</i>	
APPLICATIONS OF SURFACE WAVES TO ENHANCE SUBSURFACE BORING EXPLORATION IN THE DELINEATION OF UNDOCUMENTED LANDFILL CELLS	524
<i>Amin Tomeh, Robert Smith, Sam Alyateem, Kiavash Sartipi</i>	
RESULTS FROM GEOSPATIAL ANALYSIS OF RESISTIVITY TO DELINEATE CONTAMINATION ANOMALIES. A CASE STUDY OF A CONTROLLED DUMP - NORTH PORTUGAL	534
<i>Rui Moura, Maria João Fontoura, Vitor Goncalves, Paulo Dias, Beatriz Sousa Santos, Antonio Guerner Dias, Jorge Espinha Marques</i>	
MONITORING SALT REMEDIATION BY INTEGRATING 3D ELECTRICAL RESISTIVITY TOMOGRAPHY AND POINT CHEMISTRY SAMPLING USING KRIGING WITH LOCAL VARYING MEAN	543
<i>Franklin Head, Laurence Bentley, Michael Callaghan</i>	

EVALUATION OF DETECTION SURVEY ANOMALY AMPLITUDES AND ADVANCED CLASSIFICATION RESULTS OF UNEXPLODED ORDNANCE GEOPHYSICAL SURVEYS	544
<i>Steve Saville</i>	
SHALLOW ELECTRICAL AND SEISMIC IMAGING OF THE PINETO MUD VOLCANO (CENTRAL ITALY)	545
<i>Patrizio Torrese, Mario Luigi Rainone, Sergio Rusi, Patrizio Signanini</i>	
GEOSCIENTISTS WITHOUT BORDERS - LASTING CHANGES AT AN AFFORDABLE COST	558
<i>Rhonda Jacobs, Bernadette Ward, Debra Starnes</i>	
UTILIZING GEOPHYSICS: DEVELOPING GROUNDWATER SOURCES IN RESPONSE TO REFUGEE CRISIS IN LIBERIA	559
<i>Kyle Hoover</i>	
ASSESSING THE ACCURACY OF ANOMALY DENSITY ESTIMATES USING TRANSECT SAMPLING METHODS FOR UXO SITE CHARACTERIZATION	560
<i>Craig Murray</i>	
NEAR-SURFACE VOID DETECTION USING A SEISMIC LANDSTREAMER AND HORIZONTAL VELOCITY AND ATTENUATION TOMOGRAPHY	561
<i>Sean Buckley, John Lane</i>	
MODELING HYDRAULICALLY SIGNIFICANT SUBSURFACE FEATURES UTILIZING MASW FOR ENVIRONMENTAL APPLICATIONS	572
<i>Amin Tomeh, Robert Smith, Sam Alyateem</i>	
APPLICATION OF SURFACE ELECTRICAL METHODS FOR MAPPING SOIL CONDITIONS IN PIPELINE INTEGRITY ASSESSMENTS	580
<i>Ravin Deo, James Cull</i>	

POSTER SESSION TWO

MAPPING SOIL PROFILES USING A CONTINUOUS GALVANIC CONTACT RESISTIVITY SCANNING APPROACH	581
<i>Viacheslav Adamchuk, Luan Pan, Erik Lund</i>	
APPLICATION OF ELASTIC WAVE TOMOGRAPHY FOR DAM SAFETY	582
<i>Chih-Hsin Hu, Sheng-Hsung Hsieh, Chih-Hsien Hsieh, Jen Kai Huang, Chao-Ming Lin</i>	
EFFECT OF SOIL REPLACEMENT OPTION ON SURFACE DEFLECTIONS FOR EXPANSIVE CLAY PROFILES	N/A
<i>Anushree Bharadwaj, Sandra Houston, Bruno Welfert</i>	
EARTHEN EMBANKMENT DAM INSPECTION USING ELECTRICAL RESISTIVITY TOMOGRAPHY	584
<i>Jared Case, Craig Hickey, Gregory Hanson</i>	
INVESTIGATION FOR HYDRAULIC CONDUITS INVOLVED IN SINKHOLE FORMATION THROUGH THE USE OF INTEGRATED SURFACE AND BOREHOLE GEOPHYSICS	585
<i>Lauren Schroeder, Phillip Carpenter</i>	
APPLICATION OF SPECTRAL INDUCED POLARIZATION AND ELECTRICAL IMPEDANCE TOMOGRAPHY ON MIXTURES OF BIOCHARS AND ACTIVE CARBONS WITH SAND	586
<i>Franz-Hubert Haegel, Egon Zimmermann, Odilia Esser, Nicolai D. Jablonowski, Johan A. Huisman, Harry Vereecken</i>	
ANALYSIS OF THE IVI MINIVIBI PERFORMANCE FOR HIGH FREQUENCY REFLECTION DATA	598
<i>Craig Hendrix, Richard D. Miller</i>	
SIMULTANEOUS PROXIMAL SENSING OF SOIL PHYSICAL, CHEMICAL, AND BIOLOGICAL PROPERTIES	599
<i>Erik Lund, Chase Maxton</i>	
EVALUATING TRANSIENT ELECTROMAGNETIC DATA IN A HIGH NOISE ENVIRONMENT	600
<i>Daniel Friedman, Becky Hollingshaus, Benjamin Lee, Collin Wilson, Paul Bedrosian, Louise Pellerin</i>	
ARCHAEOGEOPHYSICAL STUDIES CONDUCTED ON SINOP BALATLAR CHURCH	610
<i>Fethi Ahmet Yuksel, Gulgun Koroglu, Mehmet Safi Yildiz</i>	
PROPOSAL TO PERFORM DESIGN OF SHALLOW FOUNDATIONS USING MASW (MULTI ANALYSIS OF SURFACE WAVES) COMBINED WITH DCP (DYNAMIC CONE PENETROMETER)	612
<i>Cristian Ulloa</i>	
AN INVESTIGATION OF THE CONDITIONS AROUND A REHABILITATED GOLD MINE IN MONARCH AREA OF FRANCISTOWN, BOTSWANA	613
<i>Elisha Shemang, Kevin Mickus</i>	

TIME-LAPSE HIGH-RESOLUTION SEISMIC MONITORING FOR A SMALL-SCALE CARBON DIOXIDE GAS INJECTION TEST AT SHALLOW DEPTHS.....	614
<i>Tomio Inazaki, Naomi Kano, Toshiyuki Tosha, Takeshi Sugiyama</i>	
MULTI-PURPOSE MAGNETIC DATA SETS FOR ARCHAEOLOGY AND ARCHAEOLOGICAL PARK MANAGEMENT.....	615
<i>Daniel Bigman, Kevin Hurley, Ross Johnson</i>	
THE TUCSON MOUNTAINS CALDERA: USING GRAVITY AND MAGNETIC ANOMALIES TO TEST TRAPDOOR SUBSIDENCE AND LOCATE SUBSURFACE PLUTONIC BODIES.....	626
<i>Leandra Marshall, Philip Stokes</i>	
CHARACTERISATION OF BURIED SUBAQUEOUS OUTWASH STRUCTURE BY INTEGRATION OF BOREHOLE AND GEOPHYSICAL DATA.....	627
<i>Pierrick Chasseriau</i>	
Author Index	