


2nd International Workshop on Geoelectrical Monitoring GELMON 2013, VIENNA, 04.12.-06.12.2013



Supported by:

 Geological Survey of Austria

 KIGAM Korea Institute of Geoscience
and Mineral Resources

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 AGS Österreichische Geophysikalische Gesellschaft
Austrian Geophysical Society

Special Course on Geoelectrical Monitoring 4D Data Inversion and Monitoring Instrumentation

J.-H. Kim, KIGAM, Korea

R. Supper, GBA, Austria

3.12.2013

10:00 a.m. to 05:00 p.m.

Location: Geological Survey of Austria, Vortragssaal
Neulinggasse 38, 1030 Vienna

Topics: Monitoring Instrumentation
 Data Processing
 Data Quality Assessment
 Installation Procedures
 4D Data Inversion
 Supplementary Monitoring Parameters
 Case Studies



10.00-11.15: Instrumentation, Processing, Quality Assessment, Installation
11.15-11.30: Coffee Break
11.30-12.30: Installation Procedures, Practical Exercises
12.30-13.30: Lunch Break
13.30-15.00: 4D Data Inversion
15.00-15.15: Coffee Break
15.15-16.00: Practical Exercise Data Inversion
16.00-17.00: Supplementary Monitoring Parameter, Case Studies
18.00-20.00: Dinner at "Winklers ZUM POSTHORN"

GENERAL WORKSHOP PROGRAM OVERVIEW

Wednesday, Dec. 4th

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|-------------|---|
| 10.00-10.30 | Workshop Opening |
| 10.30-12.30 | Applications in CO ₂ and Hydrocarbon Monitoring |
| 13.30-15.10 | Applications in Contamination Monitoring |
| 15.30-16.30 | Applications in Permafrost Monitoring |
| 16.30-17.30 | <i>Discussion Group</i> : Data Quality Assessment |
| 17.30-18.30 | POSTER SESSION 1: CO ₂ , Contamination, Permafrost |
| 18.30-21.00 | Icebreaker; social gathering at the „Christkindlmarkt“ |

Location:

Presentation Hall of the Ministry of Science and Technology (BMWF), Freyung 3, 1010 Vienna.

Thursday, Dec. 5th

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| 08.30-10.10 | Applications in Landslide Monitoring |
| 10.30-12.10 | Time Lapse Data Inversion and Modeling |
| 13.30-16.50 | Applications in Hydrology |
| 17.00-18.30 | POSTER SESSION 2: Hydrology, Landslides, Inversion |
| 19:00-24:00 | Conference Dinner at “Wiener Rathauskeller” |

Friday, Dec. 6th

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| 08:30-09.30 | Applications in Geothermal Monitoring |
| 09.30-10.30 | <i>Discussion Group</i> : Temperature Correction |
| 10.50-12.10 | Special Topics |
| 12.30-13:25 | <i>Panel Discussion</i> : Future Perspectives of Geoelectrical Monitoring: Possible Applications to HYDROCARBON EXPLORATION / MONITORING |
| 13.25-13:30 | Closing of Workshop |

WEDNESDAY

10.00-10.30	Workshop Opening		
APPLICATIONS IN CO2 AND HYDROCARBON MONITORING			
10.30-10.50	Combination of constrained resistivity inversion and seismic reflection with an application to 4D imaging of the Ketzin CO2 storage site, Germany	P. Bergmann, M. Ivandic, B. Norden, C. Rücker, D. Kiessling, S. Lueth, C. Schmidt-Hattenberger, C. Juhlin	1
10.50-11.10	DC/IP Monitoring of Injected CO2 in a Shallow Aquifer	G. Fiandaca, J. Doetsch, E. Auken, A. Vest Christiansen	2
11.10-11.30	Large-scale repeated DC geoelectric surveying for CO2 monitoring at the Ketzin pilot site, Germany	A. Just, A. Schmidt, R. Voigt, C. Flechsig	3
11.30-11.50	Investigation of time-saving monitoring techniques to detect possible brine migration into shallow aquifers as an impact of geological CO2 storage	M. Möller, C. Schmidt-Hattenberger	4
11.50-12.10	Estimating optimum electrode locations for high-resolution cross-hole resistivity monitoring	F. Wagner, T. Günther, C. Schmidt-Hattenberger, H. Maurer	5
12:10-12.30	Geo-electrical Monitoring of Oil (and Gas) reservoirs	J.A.C. Meekes	6

12.30-13.30	Lunch Break
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APPLICATIONS IN CONTAMINATION MONITORING			
13.30-13.50	Geoelectrical Monitoring for Mapping of Gas Migration in Landfills	T. Dahlin, S. Johansson, H. Rosqvist, M. Svensson	7
13.50-14.10	3D ERT monitoring of the reactivation of waste biodegradation with fresh leachate injection	G. Dumont, T. Robert, T. Pilawski, F. Nguyen	8
14.10-14.30	5D SIP monitoring of stimulated uranium bio-remediation	A. Flores Orozco, K. Williams, A. Kemna	9
14.30-14.50	Geoelectrical monitoring to support the decommissioning of legacy silos at the Sellafield Site, UK	O. Kuras, P. Wilkinson, P. Meldrum, L. Oxby, S. Uhlemann, J. Chambers, A. Binley, J. Graham, G. Dewey, N. Atherton	10
14.50-15.10	Time-lapse ERT monitoring of DNAPL Source Zone Remediation	C. Power, J.I. Gerhard, P. Tsourlos, M. Karaoulis, A. Giannopoulos	11

15.10-15.30	Coffee Break
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APPLICATIONS IN PERMAFROST MONITORING			
15.30-15.50	Automatic ERT monitoring in permafrost areas: logistical challenges and high-resolution process analysis	C. Hilbich, A. Flores-Orozco, A. Kemna, C. Hauck	12
15.50-16.10	Monitoring of active layer refreezing in Greenlandic permafrost	J. Doetsch, A.V. Christiansen, E. Auken, G. Fiandaca, T. Ingeman-Nielsen	13
16.10-16.30	Comparison of alternative electrode types for improvement of electrode-ground coupling in highly-resistive environment. Experience from the time lapse geoelectrical station for high-latitude permafrost monitoring, Ilulissat, West Greenland.	S. Tomaskovicova	14
16.30-17.30	Discussion Group: Data Quality Assessment		
17.30-18.30	Poster Session 1: CO2, Contamination, Permafrost		

18.30-20.00	Icebreaker
20.00-21.00	Social gathering at the „Christkindlmarkt“

THURSDAY

APPLICATIONS IN LANDSLIDE MONITORING

08.30-08.50	Long term monitoring of landslide processes by automated time-Lapse Electrical Resistivity Tomography	A. Merritt, J.E. Chambers, P.B. Wilkinson, S.S. Uhlemann, W. Murphy, L.J. West, P.I. Meldrum, D.A. Gunn	15
08.50-09.10	Geoelectrical Investigations and Monitoring in the Context of Disaster Response at the landslide in Pechraben, Austria	R. Supper, S. Gruber, D. Ottowitz, B. Jochum, S. Pfeiler	16
09.10-09.30	Estimation of electrode positions from sparsely distributed reference points for long term geoelectric monitoring of an active landslide	S.S. Uhlemann, J.E. Chambers, P.B. Wilkinson, A. Merritt, P.I. Meldrum, O. Kuras, L. Oxby, D. Gunn, M. Kirkham	17
09.30-09.50	One year time-lapse electrical data to monitor natural hydrological processes acting on a clayey landslide	J. Gance, P. Sailhac, J.-P. Malet, R. Supper, B. Jochum, D. Ottowitz, G. Grandjean	18
09.50-10.10	Time-lapse resistivity measurements in landslide monitoring on example of a complex slope deformation Čeřeniřtř (České řředohoří Mts, Czech Republic)	P. Tábořík, F. Hartvich, J. Blahůt	19

10.10-10.30	Coffee Break
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TIME LAPSE DATA INVERSION AND MODELING

10.30-10.50	Simultaneous optimization of resistivity structure and electrode locations in ERT	J.H. Kim, M.J. Yi, R. Supper, D. Ottowitz	20
10.50-11.10	Time lapse ERT Inversion Incorporating Structural Information	M. Karaoulis, P. Tsourlos, A. Revil, J.H. Kim	21
11.10-11.30	Minimum gradient support and geostatistics regularization approaches for inverting time-lapse data	F. Nguyen, T. Hermans, T. Robert	22
11.30-11.50	Time-lapse optimised survey design for geoelectrical resistivity monitoring	L. Oxby, P. Wilkinson, S. Uhlemann, J. Chambers, P. Meldrum, O. Kuras	23
11.50-12.10	Comparison of Timelapse inversion approaches for monitoring infiltration processes	T. Günther, U. Noell	24

12.10-13.30	Lunch Break
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APPLICATIONS IN HYDROLOGY

13.30-13.50	Measurements in a freshwater/saltwater transition zone with an automated electrical resistivity tomography system	M. Grinat, W. Südekum, D. Epping, R. Meyer	25
13.50-14.10	Cross-hole ERT monitoring to investigate mixing processes of freshwater injection in a hyper-saline aquifer	K. Haaken, G.P. Deidda, G. Cassiani, A. Kemna, R. Deiana, M. Putti, C. Scudeler, C. Paniconi	26
14.10-14.30	Monitoring hillslope infiltration on mountainous catchments using ERT and tensiometers	R. Hübner, T. Günther, K. Heller, A. Kleber	27
14.30-14.50	Electrical Resistivity Tomography Monitoring of a Water Infiltration Test on Johannishus Esker, Sweden	İ. Ulusoy, T. Dahlin, B. Bergman	28
14.50-15.10	SaMoLEG – development of a geoelectrical large scale monitoring system using long electrodes	M. Ronczka, T. Günther, C. Rücker	29

15.10-15.30	Coffee Break
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THURSDAY

APPLICATIONS IN HYDROLOGY

15.30-15.50	Geoelectrical Monitoring of infiltration processes at two embankment dams during the 100-year flood in Austria.	D. Ottowitz, R. Supper, B. Jochum, S. Gruber	30
15.50-16.10	Long-term geoelectrical monitoring for estimation of changes in water content of the slope of an embankment	S. Takakura, M. Yoshioka, T. Ishizawa, N. Sakai	31
16.10-16.30	Imaging of hydrological processes in a lowland wetland of the Lambourn river, Berkshire, UK	S.S. Uhlemann, J.P.R. Sorensen, J.E. Chambers, P.B. Wilkinson, L. Oxby, D.C. Gooddy, G.H. Old, O. Kuras, P.I. Meldrum	32
16.30-16.50	Electric Imaging to Investigate the Pavement Failure at the Bangkok International Airport	P.H. Giao	33
17.00-18.30	Poster Session 2: Hydrology, Landslides, Inversion		
19.00-23.00	Conference Dinner at „Wiener Rathauskeller“		

POSTER PRESENTATIONS 1

3D time-lapse ERT monitoring on a small Municipal Solid Waste Landfill cell	M. Audebert, R. Clément, J. Grossin-Debattista, S. Moreau	P1
ERT Monitoring of a Reclaimed Landfill in Thessaloniki (N. Greece)	P. Tsourlos, I. Fikos, G. Vargemezis, N. Kazakis	P2
4D-High resolution ERT for monitoring the nutrient infiltration in biostimulation	J. Scheibz, T. Reichenauer, B. Wimmer, H. Häusler	P3
Application of geoelectrical monitoring techniques at a natural CO2 release site to identify degassing areas and related transport processes	U. Sauer, C. Schütze, C. Sandig	P4
Electrical Resistivity Tomography (ERT) as a permanent monitoring tool to image the CO2 migration at the Ketzin pilot site – Experiences from more than five years of operation	C. Schmidt-Hattenberger, P. Bergmann, T. Labitzke, F. Wagner	P5
Geotechnical properties of CO2 hydrate bearing sediments for CO2 storage in shallow-sea sediments	Kang-Ryel Lee, Kyoung-Yul Kim, Dae-Soo Lee, Woo-Sang Oh	P6
Data error quantification for improved time-lapse ERT monitoring of Alpine permafrost.	A. Flores Orozco, C. Hilbich, A. Kemna, C. Hauck	P7
Challenges of automatic ERT monitoring for permafrost studies in mountain and polar areas (Antarctica)	C. Hauck, G. Vieira, F. Santos, M. Ramos, C. Hilbich	P8
Highlights from two years of geoelectrical monitoring of permafrost at the Magnetköpfl/Kitzsteinhorn	B. Jochum, D. Ottowitz, S. Pfeiler, R. Supper	P9

POSTER PRESENTATIONS 2

Assessing the influence of cover crop management on the spatio-temporal dynamic of soil water content under a maize crop by electrical resistivity tomography	M. Chélin, S. Garré	P10
Long Electrode ERT: modeling and field experiment	M. Ronczka, T. Günther, C. Rücker	P11
Time-lapse ERT monitoring of changes in groundwater content and flows in an epikarst system : implementation and challenges.	A. Watlet, M. Van Camp, O. Kaufmann	P12
Imaging and characterization of crop root systems using electrical impedance tomography at the rhizotron scale	M. Weigand, A. Kemna	P13
Time-lapse inversion of daily ERT data from eight weeks Super Sauze landslide monitoring	J.C. Santoyo Campos, S. Rothmund, M. Joswig	P14
Methodology to point out significant changes in resistivity en IP responses for time-lapse experiments assessed on a synthetic model.	A. Etienne, O. Kaufmann	P15
Constraining time-lapse ERT inversions by hydrological point measurements	J. Doetsch, T. Günther, E. Auken, A.V. Christiansen, G. Fiandaca	P16
3D ERT interpretation of a segment of Sudetic Marginal Fault: towards recognition of fault kinematics using resistivity survey and trenching	F. Hartvich, P. Tábořík, P. Štěpančíková	P17

FRIDAY

APPLICATIONS IN GEOTHERMAL MONITORING

08.30-08.50	Reliability of resistivity-derived temperature: insights from laboratory measurements	T. Robert, T. Hermans, G. Dumont, F. Nguyen	34
08.50-09.10	Monitoring temperature changes during heat tracing experiments using electrical resistivity tomography	T. Hermans, S. Wildemeersch, F. Nguyen	35
09.10-09.30	Geoelectric measurements as an efficient monitoring strategy for shallow geothermic reservoirs	L. Firmbach, S. Schelenz, T. Vienken, O. Kolditz, P. Dietrich	36
09.30-10.30	Discussion Group: Temperature Correction		

10.30-10.50	Coffee Break
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SPECIAL TOPICS OF GEOELECTRIC MONITORING

10.50-11.10	Development of a Geophysical and Geotechnical remote observatory platform	P.I. Meldrum, J.E. Chambers, P.B. Wilkinson, O. Kuras, S. Uhlemann, D. Gunn, L. Oxby, E. Haslam	37
11.10-11.30	Long term ERT monitoring of sinkholes using 3D surface arrays: a laboratory experiment	J. Deceuster, P.B. Wilkinson, J.E. Chambers, O. Kuras, O. Kaufmann	38
11.30-11.50	Integrated Geophysical Monitoring for a Reclaimed Land with Geotechnical Investigation	S. Oh, H. Lee, S. Lee, E. Im	39
11.50-12.10	Adopting 4D resistivity survey to Geocentrifuge for efficient monitoring the inside of the physical model.	E. Bang, H. Cho, M. Yi, Y. Choo, J.H. Kim, D.S Kim	40

12.10-12.30	Coffee Break
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12.30-13.25	Panel Discussion: Future Perspectives of Geoelectrical Monitoring – Possible Applications in the Area of Hydrocarbon Exploration / Monitoring Sjef Meekes (TNO), Marc Merz (SchlumbergerWestern Geco), Martin Schachinger (Rohöl-Aufsuchungs AG, RAG), Robert Supper (GBA) and others		
13.25-13.30	Closing of Workshop		

The Venue and Time Schedule

The Workshop will be held in the Presentation Hall of the Ministry of Science and Technology (BMWF), Freyung 3, 1010 Vienna.

The workshop will start on Dec. 4th, 10:00 a.m. and close on Dec. 6th, 01:30 p.m.

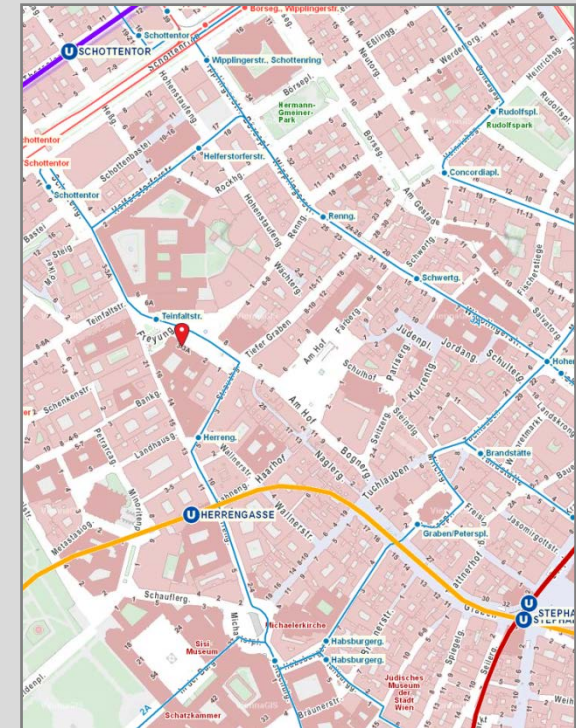
The Special Course will be held at the main building of the Geological Survey of Austria, Vortragssaal, ground floor (intermediate storey), Neulinggasse 38, 1030 Vienna on Dec. 3rd, 10:00 a.m. to 04:00 p.m.

Participants have to bring their own laptop.

Venue of GELMON 2013 – Special Course



Venue of GELMON 2013 – Workshop



Scientific Program Committee:

SUPPER Robert (Geological Survey of Austria)

KIM Jung-Ho (Korea Inst. of Geoscience and Mineral Resources)

CHAMBERS Jonathan E. (British Geological Survey)

TSOURLOS Panagiotis (Aristotle University of Thessaloniki)

DAHLIN Torleif (Lund University)
