

## 3DEM-4 – Scientific program

Friday, September 28, 2007

9.00–9.40 Opening

### **Theory – Forward modelling**

9.40–10.00 *D. W. Oldenburg, E. Haber, R. Shekhtman*  
Rapid forward modelling of multi-source TEM data

10.00–10.20 *R.-U. Börner, O. G. Ernst, K. Spitzer*  
Fast 3D simulation of transient electromagnetic fields by model reduction in the frequency domain using Krylov subspace projection

Coffee break

10.50–11.10 *S. Mukherjee, M. E. Everett*  
Three dimensional finite element analysis of electromagnetic induction in geologic formations containing magnetic bodies

11.10–11.30 *M. Blome, H. R. Maurer*  
Advances in 3D geoelectric forward solver

11.30–11.50 *C. Schwarzbach, K. Spitzer*  
On the matrix condition number of finite element approximations to the frequency domain Maxwell's equations

11.50–12.10 *M. Zaslavsky, S. Davydycheva, V. Druskin, A. Abubakar, T. Habashy, L. Knizhnerman*  
Finite-difference solution of the 3D EM problem using divergence-free preconditioners

Lunch break

14.00–17.00 Poster session

## Saturday, September 29, 2007

### Application – Model studies

- 9.00–9.20 *A. Maxey, L. MacGregor, M. Sinha, V. C. Baranwal*  
Borehole CSEM for offshore hydrocarbon mapping
- 9.20–9.40 *N. Han, M. J. Nam, H. J. Kim, T. J. Lee, Y. Song, J. H. Suh*  
A study on the efficient 3D inversion of MT data using various sensitivities
- 9.40–10.00 *A. Franke, S. Kütter, R.-U. Börner, K. Spitzer*  
Numerical simulation of magnetotelluric fields at Stromboli
- 10.00–10.20 *R. Streich, J. van der Kruk*  
Analysis of polarization effects of buried pipes in vector-migrated 3-D ground-penetrating radar data

Coffee break

### Theory – Inversion and resolution analysis

- 10.50–11.10 *M. Braun, U. Yaramanci*  
Resistivity inversion of magnetic resonance sounding – Assessment of sensitivity and reliability
- 11.10–11.30 *J. Kamm, M. Müller-Petke, U. Yaramanci*  
Modelling of multi-transmitter arrays in magnetic resonance sounding
- 11.30–11.50 *A. Avdeeva, D. Avdeev*  
Three-dimensional magnetotelluric inversion using quasi-Newton minimization
- 11.50–12.10 *A. Kelbert, G. D. Egbert, A. Schultz*  
Non-linear conjugate gradient inversion for the spherical earth

Lunch break

- 14.00–17.00 Poster session

## Sunday, September 30, 2007

### Theory – Inversion and resolution analysis

- 9.00–9.20 *B. J. Minsley, F. D. Morgan*  
3D source inversion of self-potential data

### Application – Alternative developments

- 9.20–9.40 *J. Schünnemann, T. Günther, A. Junge*  
3-dimensional subsurface investigation by means of large-scale tensor-type dc resistivity measurements
- 9.40–10.00 *F. C. Schoemaker, D. M. J. Smeulders, E. C. Slob*  
Laboratory measurements of electrokinetic phenomena
- 10.00–10.20 *L. Szarka, A. Franke, E. Prácser, J. Kiss*  
Hypothetical mid-crustal models of second-order magnetic phase transition

Coffee break

### Application – Case histories

- 10.50–11.10 *P. Bedrosian, L. Pellerin, S. Box*  
Fitting a round peg in a square hole: 3D inversion of complex MT profile data
- 11.10–11.30 *W. Heise, T. G. Caldwell, H. M. Bibby*  
3D inversion of magnetotelluric data from the Rotokawa geothermal field, Taupo Volcanic Zone, New Zealand
- 11.30–11.50 *T. Uchida*  
Comparison of 3D inversions of AMT and MT data at Ogiri geothermal field, Japan
- 11.50–12.10 *R. Eso, D. W. Oldenburg*  
3D forward modelling and inversion of CSEM data at the San Nicolás massive sulphide deposit

Lunch break

- 14.00–17.00 Poster session

## Posters

### Theory – Forward modelling

*M. Afanasjew, O. G. Ernst, S. Güttel, M. Eiermann, R.-U. Börner, K. Spitzer*

Krylov subspace approximation for TEM simulation in the time domain

*A. Franke, R.-U. Börner, K. Spitzer*

3D finite element simulation of magnetotelluric fields using unstructured grids

*E. Haber, S. Heldmann, D. W. Oldenburg*

Adaptive mesh refinement for 3D electromagnetic modeling

*T. Hanstein, S. L. Helwig, G. Yu, K. M. Strack, R. Blaschek, A. Hördt*

The effect of a horizontal axial metallic conductor in marine EM

*G. A. Oldenborger, D. W. Oldenburg*

Finite-volume time-domain EM modelling for high conductivity

*P. Weidelt*

Exact 3D free-decay modes for a uniformly discretized open box

### Application – Model studies

*V. C. Baranwal, A. Franke, R.-U. Börner, K. Spitzer*

Unstructured grid based 2D inversion of plane wave EM data for models including topography

*G. Li, D. Taylor, B. Hobbs, Z. Dzhatieva*

Calculation of 3D transient responses

*R. Logunovich, M. Berdichevsky, D. Avdeev*

The effect of 3D anisotropic asthenosphere structures

*A. Martí, M. Miensopust, A. G. Jones, P. Queralt, J. Ledo, A. Marcuello*

Testing dimensionality of inverted models responses using WSINV3DMT code

*M. Miensopust, A. G. Jones*

Testing of the 3D inversion routine engine – the 3D forward algorithm – by comparison with 2D forward modelling results

*M. Miensopust, A. Martí, A. G. Jones*

Inversion of synthetic data using WSINV3DMT code

*K. Spitzer, M. Panzner, F. Sohl*

Numerical simulation of a permittivity probe for measuring the electric properties of planetary regolith

### Theory – Inversion and resolution analysis

*M. Berdichevsky, V. Dmitriev*

Succession of partial MT and MV inversions – from 2D to 3D

*J. Chen, M. Jegen-Kulcsar, B. Heincke*

Joint inversion and topographic correction of geophysical data

*P. S. Martyshko, A. L. Roublev*

On the electromagnetic inverse problem solving for some models

*M. Müller-Petke, U. Yaramanci*

Efficient datasets – An alternative approach that analyses the data space

*U. Schmucker*

Separate multi-dimensional models for conductivity and resistivity

### Application – Alternative developments

*R. Blaschek, A. Hördt*

Numerical modeling of the IP-effect at the pore scale

*A. N. Kuznetsov, I. P. Moroz, V. M. Kobzova*

Physical modeling of seismoelectric effects above three-dimensional heterogeneities of geological environment

*M. Montahaei, M. A. Riahi*

Simulation of seismoelectric signals generated at an interface

*G. Muñoz, O. Ritter, T. Krings, M. Becken*

A new, faster technique of three-dimensional magnetotelluric data acquisition

### **Theory – Data analysis**

*M. Berdichevsky, V. Kuznetsov, N. Palshin*

1. Decomposition of 3D magnetovariational response functions in models of (2D+2D)-type

*M. Berdichevsky, V. Kuznetsov, N. Palshin*

2. Decomposition of 3D magnetovariational response functions in models of (2D+3D)-type

*M. Berdichevsky, V. Kuznetsov, N. Palshin*

Magnetic perturbation ellipses

*F. E. M. (Ted) Lilley, J. T. Weaver*

Examples of magnetotelluric data: invariants of rotation, and phases greater than 90 deg.

### **Application – Case histories**

*T. Burakhovich, S. Kulik*

3D geoelectrical model of the Ukrainian shield

*M. Gurk, M. Smirnov, A. S. Savvaidis, L. B. Pedersen, O. Ritter*

A 3D magnetotelluric study of the basement structure in the Mygdonian Basin (Northern Greece)

*G. J. Hill, T. G. Caldwell, W. Heise, R. A. F. Cas, J. P. Cull, H. M. Bibby*

Identifying and modelling 3-dimensional structure using coordinate invariants of the magnetotelluric phase tensor: Mount St. Helens, USA

*D. Kalisperi, G. Romano, D. Rust, F. Vallianatos, J. P. Makris*

Magnetotelluric investigation of the crust of western Crete, Greece

*T. J. Lee, S. K. Lee, Y. Song, M. J. Nam, T. Uchida*

Three-dimensional interpretation of MT data from mid-mountain area of Jeju Island, Korea

*V. Maris, P. Wannamaker, Y. Sasaki*

Three-dimensional inversion of magnetotelluric data over the Coso geothermal field, using a PC

*T. Ndougsa-Mbarga, A. Meying*

Evaluation of marble deposits in the Moulvouday-Kaele area (Far North Cameroon) from a 2D geoelectrical modelling

*Njignti-Nfor, T. Ndougsa-Mbarga*

Determination of the dip of the sedimentary-metamorphic contact around the eastern edge of the Douala sedimentary basin in Cameroon, based on the audiomagnetotelluric iso-resistivity contour maps

*K. Schwalenberg, C. Scholl, R. Mir, E. C. Willoughby, R. N. Edwards*

Three dimensional marine controlled source electromagnetic responses of confined shallow resistive structures: application to gas hydrate deposits in Cascadia, Canada

*S. Thiel, R. Maier, K. Selway, G. Heinson*

Static shift corrected three-dimensional inversion: an example of the Gawler Craton, South Australia