

3DEM-5 Technical Program

May 7 (Tuesday)

9:40 ~ 10:00 **Opening Session**

10:00 ~ 12:40 **Session 1 Forward modeling**

S1-01 J. Koldan, V. Puzyrev and J. M. Cela
(10:00~) Parallel Finite-Element Method for 3-D Electromagnetic Modelling in Geophysics

S1-02 Z. Ren, T. Kalscheuer, S. Greenhalgh and H. Maurer
(10:20~) A goal-oriented adaptive finite-element approach for plane wave 3D electromagnetic modeling

(Coffee Break)

S1-03 M. Kordy, V. Maris, P. Wannamaker and E. Cherkaev
(11:00~) 3D Edge Finite Element Solution for Scattered Electric Field using a Direct Solver Parallelized on an SMP Workstation

S1-04 H. Jahandari and C. G. Farquharson
(11:20~) Finite volume modelling of electromagnetic data using unstructured staggered grids

S1-05 M. Cherevatova, G. D. Egbert, M. Y. Smirnov and A. Kelbert
(11:40~) 3D electromagnetic modeling using multi-resolution approach

S1-06 B. Zhou, G. Heinson and A. Rivera-Rios
(12:00~) Frequency-domain 3D geo-electromagnetic modeling with sub-domain Chebyshev spectral method

S1-07 J. Sun and A. Kuvshinov
(12:20~) Accelerating an EM integral equation forward solver for global geomagnetic induction using SVD based matrix decomposition method

(Photograph and Lunch Break)

14:00 ~ 17:00 **Poster (Session 1)**

17:00 ~ 17:30 **Discussion**

17:30 ~ 18:00 **Business meeting**

May 8 (Wednesday)

9:00 ~ 12:40 **Session 2 Inversion and Resolution Analysis**

- S2-01** G. Egbert, A. Kelbert and N. Meqbel
(9:00~) ModEM: developing 3D EM inversion for the masses
- S2-02** M. S. Zhdanov, M. Endo, L. H. Cox and M. Čuma
(9:20~) Recent advances in three-dimensional large-scale electromagnetic modeling and inversion
- S2-03** D. Yang, D. Oldenburg and E. Haber
(9:40~) Massive parallelization of 3D electromagnetic inversion using local meshes
- S2-04** J. Bakker and A. Kuvshinov
(10:00~) A novel 3-D MT inverse solver: its implementation and outlook
- S2-05** W. Wilhelms, R.-U. Börner and K. Spitzer
(10:20~) Preparation for a 3D magnetotelluric inversion -- specific characteristics of the all-at-once approach

(Coffee Break)

- S2-06** Y. Sasaki
(11:00~) Anisotropic 3D inversion of marine CSEM data
- S2-07** A. Kuvshinov and O. Pankratov
(11:20~) Towards quantitative resolution analysis of 3-D EM inversion results. Efficient calculation of the Hessian matrix of frequency-domain EM data misfit using adjoint sources approach
- S2-08** N. Imamura, T. Goto, J. Takekawa and H. Mikada
(11:40~) Resolution of full waveform inversion using controlled-source electromagnetic exploration
- S2-09** M. S. G. McMillan and D. W. Oldenburg
(12:00~) Enhancing Resolution of 3D-EM Inversion Models through a Co-operative Approach
- S2-10** N. Meqbel and O. Ritter
(12:20~) New Advances for a joint 3D inversion of multiple EM methods

(Lunch Break)

14:00 ~ 17:00 **Poster Session (Session 2, 3)**

17:00 ~ 17:30 **Discussion**

18:30 ~ 20:30 **Banquet**

May 9 (Thursday)

9:00 ~ 9:40 **Session 2 Inversion and Resolution Analysis**

S2-11 M. A. Meju
(9:00~) Tailored fit-for-purpose 3D interpretation of marine CSEM data

S2-12 G. A. Newman, E. Um and M. Commer
(9:20~) A Framework for three-dimensional coupled seismic-electromagnetic inversion

9:40 ~ 10:40 **Session 3 New Methodologies**

S3-01 A. Geraskin
(9:40~) Programming in 3-D electromagnetics: look from outside

S3-02 J. Börner, M. Afanasjew, F. Eckhofer, J. Weißflog and K. Spitzer
(10:00~) Monitoring concepts using borehole transient electromagnetic and DC resistivity methods: 3D simulation studies for the effective detection of CO2 leakages

S3-03 R. Peng, X. Hu, Y. Liu and Z. He
(10:20~) The potential of magnetotelluric using for reservoir monitoring

(Coffee Break)

11:00 ~ 12:40 **Session 4 Applications**

S4-01 K. Noh, Y. Chung, S. J. Seol, J. Byun and T. Uchida
(11:00~) Three-dimensional inversion of small-loop electromagnetic data: Water leak detection in an artificial sandy ground

S4-02 A. Rödder and B. Tezkan
(11:20~) Transient electromagnetic survey on the Araba fault, Jordan: A 3D conductivity model

S4-03 S. Hautot and P. Tarits
(11:40~) Importance of the MT diagonal tensor coefficients for 3D inversion

S4-04 E. Bertrand, T. G. Caldwell, G. J. Hill and S. L. Bennie
(12:00~) 3-D inversion of a 200+ site magnetotelluric array for deep geothermal exploration

S4-05 N. Tada, K. Baba and H. Utada
(12:20~) Three-dimensional electrical conductivity structure beneath the Philippine Sea using three-dimensional marine MT inversion dealing with topographic effect

(Lunch Break)

13:45 ~ 16:15 **Poster Session (Session 4)**

16:15 ~ 16:45 **Discussion**

16:45 ~ 17:00 **Closing Session**

Posters

Session 1 Forward modeling (14:00~17:00, May 7)

- SP1-01** *A. M. Rivera-Rios, B. Zhou, G. Heinson and S. Thiel*
Multi-order Vector Finite Element Modelling of 3D Magnetotelluric Data including complex geometry and anisotropic earth
- SP1-02** *A. Franke-Börner, R.-U. Börner and K. Spitzer*
Convergence studies for the finite element simulation of the 3D MT boundary value problem
- SP1-03** *M. G. Persova, Y. G. Soloveichik, M. G. Tokareva, P. A. Domnikov, D. V. Vagin and T. G. Shashkova*
Finite element 3D Modeling of Geoelectromagnetic Fields for Controlled and Natural Sources
- SP1-04** *M. Afanasjew, R.-U. Börner, M. Eiermann, O. G. Ernst and K. Spitzer*
Efficient Three-Dimensional Time Domain TEM Simulation Using Finite Elements, a Nonlocal Boundary Condition, Multigrid, and Rational Krylov Subspace Methods
- SP1-05** *R.-U. Börner, O. G. Ernst and S. Güttel*
Three-dimensional transient electromagnetic simulation using Rational Krylov subspace projection methods
- SP1-06** *S. Ansari and C. G. Farquharson*
Three dimensional modeling of controlled-source electromagnetic response for inductive and galvanic components
- SP1-07** *T. Koyama*
Forward modeling for CSEM excited by the cable current with finite length
- SP1-08** *S. A. Allah, T. Mogi and E. Fomenko*
Three-dimensional electromagnetic modeling of sea and topographic effects on electromagnetic field induction by grounded electrical source airborne transient electromagnetics (GREATEM) survey systems
- SP1-09** *X. Zhou, X. Hu and B. Han*
3D finite-difference time-domain forward modeling with convolutional perfectly matched layers (CPML) absorbing boundary condition for marine CSEM
- SP1-10** *D. V. Shantsev and F. A. Maaø*
Rigorous interpolation near interfaces in 3D finite-difference EM modeling
- SP1-11** *M. Sommer, S. Hölz, M. Moorkamp, A. Swidinsky, B. Heincke, C. Scholl and M. Jegen*
Speeding up a marine 3D CSEM code with GPU
- SP1-12** *J. Ge, M. E. Everett and C. J. Weiss*
3D modeling of fractional diffusion to describe electromagnetic induction in fractured geological media

Session 2 Inversion and Resolution Analysis (14:00~17:00, May 8)

- SP2-01** C. Püthe and A. Kuvshinov
Mapping 3-D mantle electrical conductivity from space. Development of a new 3-D inversion scheme based on analysis of matrix Q-responses
- SP2-02** S. Schnaidt and G. Heinson
Bootstrapping as a means of uncertainty analysis in inversion modelling of magnetotelluric data
- SP2-03** K. Tietze, O. Ritter and G. Egbert
3D inversion of magnetotelluric phase tensor and apparent resistivity & phase data with ModEM and its application to a 250-site MT array data set from the San Andreas fault, California
- SP2-04** T. J. Lee, J. Choi, J. Yang, S. K. Lee, I.-H. Park and Y. Song
An approach for the three-dimensional interpretation of MT data distorted by the sea- and static effects
- SP2-05** M. Tani, H. Mikada, T. Goto, J. Takekawa and W. Siripunvaraporn
Removable of galvanic distortion on 3-D MT inversion
- SP2-06** O. Peredo, V. Puzirev, J. Koldan, G. Houzeaux, M. Vázquez, J. de la Puente and J. M. Cela
Inverse modelling of 3D Controlled-Source Electromagnetics using a Parallel Discrete Adjoint method
- SP2-07** C. Schwarzbach and E. Haber
Inversion of large scale airborne time domain electromagnetic data
- SP2-08** M. Scheunert, M. Afanasjew, R.-U. Börner, M. Eiermann, O. G. Ernst and K. Spitzer
3-D inversion of helicopter electromagnetic data
- SP2-09** F. Eckhofer, J. Weißflog, R.-U. Börner, M. Eiermann, O. G. Ernst and K. Spitzer
Regularization for 3D DC resistivity inversion
- SP2-10** A. D. Garnadi and H. Grandis
Gauss-Newton inversion algorithm to estimate resistivity parameter using a dual-optimal grid approach
- SP2-11** M. G. Persova, Y. G. Soloveichik, M. G. Tokareva, P. A. Domnikov, M. V. Abramov, D. V. Vagin and E. I. Simon
Three-dimensional inversion for transient electromagnetic sounding technologies with loop source and for induced polarization using finite element approximation

Session 3 New Technologies (14:00~17:00, May 8)

- SP3-01** *A. Ullmann, B. Siemon and M. Miensopust*
Automatic detection and classification of induction anomalies in helicopter-borne electromagnetic data sets
- SP3-02** *S. K. Verma, T. Mogi, S. A. Allah, S. P. Sharma and E. Fomenko*
3D 'Tau' imaging of subsurface conductors by contemporary helicopter borne time domain EM systems
- SP3-03** *R. Streich, M. Becken and O. Ritter*
Robust processing of onshore controlled-source electromagnetic data from a three-phase galvanic source
- SP3-04** *D. Hyodo, H. Mikada, T. Goto and J. Takekawa*
Downward-continued pseudo resistivity section using normalized full gradient (NFG) in VLF-EM method

Session 4 Applications (13:45~16:15, May 9)

- SP4-01** *N. Zorin and A. Yakovlev*
Telluric method of natural field induced polarization
- SP4-02** *L. Zhang, H. Utada, H. Shimizu, K. Baba and T. Maeda*
Three-dimensional simulation of the electromagnetic fields induced by tsunamis: A case study for the 2011 Tohoku Tsunami
- SP4-03** *K. Okazaki, Y. Ito, T. Mogi, H. Ito, Y. Yuuki and A. Jomori*
Case study of three-dimensional geotechnical evaluations for tunnel design and construction by helicopter-borne geophysical survey
- SP4-04** *M. P. Miensopust, B. Siemon and A. Ullmann*
Three-dimensional modeling of frequency-domain helicopter-borne electromagnetic data: A case study of the Cuxhaven Valley
- SP4-05** *A. Grayver, R. Streich and O. Ritter*
3D inversion of land-based CSEM data from the Ketzin CO2 storage formation
- SP4-06** *A. Younis, G. EL-Qady, M. A. Abdalla, M. Abdel Zaher, A. E. khalil and M. G. Al Ibiary*
Integrated geophysical tools for hydrocarbon exploration in Nile delta area, Egypt
- SP4-07** *A. Avdeeva, M. Y. Smirnov, A. S. Savvaidis, M. Gurk and L. B. Pedersen*
A 3D magnetotelluric study of the basement structure in the Mygdonian Basin (Northern Greece) including galvanic distortion correction.
- SP4-08** *H. Ichihara, T. Mogi, K. Tanimoto, Y. Yamaya, T. Hashimoto, M. Uyeshima and Y. Ogawa*
3-D electrical resistivity models in the Erimo area, southern central Hokkaido
- SP4-09** *T. Uchida and T. Ueda*
Three-dimensional magnetotelluric survey over Yunodake and Idosawa Faults in Iwaki area, Fukushima Prefecture

- SP4-10** Y. Yamaya, T. Mogi, R. Honda, H. Hase, A. Suzuki, T. Hashimoto and M. Uyeshima
Three-dimensional Resistivity Imaging beneath the Fold-and-thrust Belt, Ishikari-teichi-toen Fault Zone, Hokkaido, NE Japan
- SP4-11** T. G. Caldwell, W. Heise, Y. Ogawa, G. J. Hill, E. A. Bertrand, S. L. Bennie, H. M. Bibby and G. R. Jiracek
Electrical conductivity structure of the Alpine Fault, New Zealand - a 3D anisotropic problem
- SP4-12** T. Kaya, Y. Ogawa, T. Kasaya, S. B. Tank, M. K. Tunçer, N. Oshiman, Y. Honkura, M. Matsushima, and W. Siripunvaraporn
Investigation of the lithospheric structures and North Anatolian Fault Zone underneath the Marmara Sea by 3D Magnetotelluric modeling.
- SP4-13** F. Febriani, P. Han, C. Yoshino, K. Hattori, B. Nurdiyanto, N. Effendi, I. Maulana, Suhardjono, P. Hardjono and E. Gaffar
2D inversion of Pelabuhan Ratu magnetotelluric data, Indonesia
- SP4-14** R. Yoshimura, Y. Ogawa, Y. Yukutake, W. Kanda, S. Komori, T. Goto, R. Honda, M. Harada, T. Yamazaki, M. Kamo, Y. Yasuda and M. Tani
Heterogeneous resistivity structure around high seismicity regions in Hakone volcano, Japan
- SP4-15** Y. Ogawa, H. Fukino, M. Ichiki, and W. Kanda
Three-dimensional imaging of fluids under the volcanic arc, around Naruko Volcano, NE Japan
- SP4-16** M. Hata, N. Oshiman, R. Yoshimura, Y. Tanaka and M. Uyeshima
Interpretation on magmatism beneath the Kyushu subduction zone with 3D electrical resistivity image
- SP4-17** M. Uyeshima, S. Yamaguchi, H. Murakami, T. Tanbo, R. Yoshimura, H. Ichihara and K. Omura
On elucidation of the regional anomalous phase contained in the Network-MT data in the Chubu district, central Japan
- SP4-18** N. Meqbel, G. D. Egbert and P. E. Wannamaker
Three dimensional modelling of a large scale magnetotelluric data: Final results from 3-D inversion of the US-Transportable Array
- SP4-19** K. Baba, N. Abe, N. Hirano and M. Ichiki
Three-dimensional inversion analysis of seafloor magnetotelluric data collected in the northwestern Pacific and implications for the source of petit-spot volcanoes