

AGU | SEG Workshop

American
Geophysical
Union

Society of
Exploration
Geophysicists

Keystone, Colorado, USA
25–26 August 2015

Potential-Field and Electromagnetic Methods Applied to Basin Studies



Society of Exploration Geophysicists
The international society of applied geophysics

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Scientific Program

TUESDAY, 25 AUGUST

- 8:30 a.m.– 10:00 a.m. **Case Histories I**
Presiding: Darcy McPhee
Convener(s): Michal Ruder
- 8:30 a.m. –8:40 a.m. Introductory Remarks
- 8:40 a.m. –9:00 a.m. **Oliver Salz Boyd |** USGS Conterminous United States Crustal Model for Seismic Hazard Studies
- 9:00 a.m. –9:20 a.m. **Richard J Blakely |** The Cascadia “string of pearls”—Forearc basins of the Salish lowland and implications for the tectonic evolution and earthquake hazards of the Pacific Northwest
- 9:20 a.m. –9:40 a.m. **Roberta M Vidotti |** Tectonic Framework of Parecis Basin, Brazil
- 9:40 a.m. –10:00 a.m. **Anjana K Shah |** Aeromagnetic survey data used to map features of the Cook Inlet and Susitna basins, Alaska
- 10:00 a.m.– 10:20 a.m. **Break**
- 10:20 a.m.– 11:50 a.m. **Case Histories II**
Presiding: Darcy McPhee
Convener(s): Michal Ruder
- 10:20 a.m. –10:40 a.m. **Icaro Vitorello |** Tectonic and prospect implications of cryptic magmatic structures in the subtrappean crust of the South American Paraná Magmatic Province (PMP), inferred from natural Electromagnetic Induction ground systems
- 10:40 a.m. –11:00 a.m. **Isa Mansoori Kermanshahi |** Exploration of Hydrocarbon Reservoirs by Modelling of the Magnetotelluric Data
- 11:00 a.m. –11:20 a.m. **Mohamed Ahmed |** Quantifying the Volume of Water in the Red Sea and Gulf of Suez Rift-Related Basins using Gravity and Magnetic Data
- 11:20 a.m. –11:30 a.m. Concluding Remarks

- 11:50 a.m.– 1:30 p.m. **Lunch (on own)**
- 1:30 p.m.– 3:00 p.m. **Advances in Methodology I**
Presiding: Benjamin Drenth
Convener(s): Christian Hardwick
- 1:30 p.m. –1:40 p.m. Introductory Remarks
- 1:40 p.m. –2:00 p.m. **Clive A Foss** | Sharp-Focus Magnetic-Source Modelling to Map Depth to Prospective Albany-Fraser Basement beneath the Gunbarrel Basin
- 2:00 p.m. –2:20 p.m. **William R Petrick** | 3D Magnetotelluric Inversion and 3D Depth-to-Basement Gravity Inversion for Great Basin Minerals Exploration
- 2:20 p.m. –2:40 p.m. **Sophie Hautot** | Recent advances in 3-D inversion of MT data for shallow crustal investigation: Application to Northern Turkana and Southern Omo sedimentary rift basins (East African Rift)
- 2:40 p.m. –3:00 p.m. **Ken Witherly** | Evolution of EM techniques to the exploration for unconformity uranium deposits, Athabasca Basin, Saskatchewan, Canada
- 3:00 p.m.– 3:20 p.m. **Break**
- 3:20 p.m.– 4:30 p.m. **Advances in Methodology II**
Presiding: Benjamin Drenth
Convener(s): Christian Hardwick
- 3:20 p.m. –3:40 p.m. **David Schwartz** | Airborne Gravity Gradiometry in Basin Studies
- 3:40 p.m. –4:00 p.m. **James Brewster** | Noise Reduction in Full Tensor Gradiometry Data Using the Fourier Method
- 4:00 p.m. –4:20 p.m. **Desmond James FitzGerald** | Finding and Characterizing Sedimentary Basins – Using Offshore Gravity Data
- 4:20 p.m. –4:30 p.m. Concluding Remarks

4:30 p.m.– 5:30 p.m.

Case Histories Posters I

Presiding: Darcy McPhee

Convener(s): Michal Ruder

- T-1 **Mark E Odegard** | Partial Resolution of Several Structural and Tectonic Questions about the Greater Gulf of Mexico
- T-2 **Andrew Patrick Lamb** | Investigating Relationships Between the Yakima Fold and Thrust Belt and Basement Structure in Washington State Using Matched Filtering of Gravity and High-Resolution Aeromagnetic Data
- T-3 **Kehinde Ayodele Olawuyi** | Integration of Magnetic, Gravity and Geologic Data in Mapping Geologic Structures: A Case Study of a Part of Lafiagi [Sheet 203], Southwestern Nigeria.
- T-4 **Pavankumar Gayatri** | Transient Electromagnetic investigations for delineation of aquifer layer along Anjar-Rapar Corridor, eastern Kachchh basin, Gujarat

4:30 p.m.– 5:30 p.m.

Advances in Methodology Posters

Presiding: Benjamin Drenth

Convener(s): Christian Hardwick

- T-5 **Clive A Foss** | The Significance of Station Spacing in Subsequent Modelling of Basin Structure from Enhancement of Gravity Data – an Example from the Ngalia Basin, Australia
- T-6 **Desmond James FitzGerald** | Magnetic Vector Gradient Compensation for Survey Aircraft
- T-7 **Anand Singh** | Imaging of Subsurface Conductors using VLF Electromagnetic Data- A Development and Comparison
- T-8 **Anand Singh** | Finite Difference Inverse Modeling of VLF and VLF-R data over 2-D Earth- A Development and Comparison
- T-9 **Les R Denham** | Lightning, a Strikingly New Unconventional Electromagnetic Exploration Tool
- T-10 **Durra Handri** | 1-D Magnetotelluric Inversion using Particle Swarm Optimization Algorithm

- T-11 **Durra Handri** | 1-D Magnetotelluric Data Inversion using Guided Grid Search Algorithm
- T-12 **Jefferson C Chang** | Gravity Modeling with Vertical Line Elements
- T-13 **Kevin Crain** | Targeting Uranium Alteration Zone with 3D Gravity and 3D Geology
- T-14 **Kevin Crain** | The Southern Mid-Content Rift Regional Gravity Removal with Geology Constrained Density Inversion

WEDNESDAY, 26 AUGUST

- 8:30 a.m.– 10:00 a.m. **Case Histories III**
 Presiding: Anjana Shah
 Convener(s): Mark Odegard
- 8:30 a.m. –8:40 a.m. Introductory Remarks
- 8:40 a.m. –9:00 a.m. **V J S Grauch** | Making rift connections: Geophysical insights into the geometry and temporal evolution of the Embudo transfer zone and the basin-bounding Sangre de Cristo fault, northern Rio Grande rift, New Mexico
- 9:00 a.m. –9:20 a.m. **Luelseged Mengesha Emishaw** | Lithospheric and Preexisting Upper Crustal Structures of the Broadly Rifted Zone
- 9:20 a.m. –9:40 a.m. **Tadesse Berhanu Alemu** | Gravity Study of the Mekelle IntraCONTinental Sag (ICONS) Basin, Northern Ethiopia.
- 9:40 a.m. –10:00 a.m. **Paul Bedrosian** | Mapping lacustrine deposits and faults within the San Luis Valley, Rio Grande Rift, using airborne electromagnetic surveys
- 10:00 a.m.– 10:20 a.m. **Break**
- 10:20 a.m.– 11:50 a.m. **Case Histories IV**
 Presiding: Anjana Shah

Convener(s): Mark Odegard

- 10:20 a.m. –10:40 a.m. **Benjamin Drenth** | Airborne Gravity Gradient Mapping of Concealed Range Front Structure, Great Sand Dunes National Park, Rio Grande Rift, Colorado
- 10:40 a.m. –11:00 a.m. **Joseph M Kruger** | Integration of Ground-Based Gravity Data with Geologic Maps, DEMs, Well Control, and Seismic Data for Detailed Basin-Scale Structural Analysis: Examples from Extensional Basins in SE Idaho and Northern Utah
- 11:00 a.m. –11:20 a.m. **Darcy McPhee** | Geophysical studies of Mono Basin -- Insights into the nature of a ‘volcano-tectonic depression’ in eastern California
- 11:20 a.m. –11:40 a.m. **Andrew B Katumwehe** | ESTIMATING HEAT FLOW AND GEOTHERMAL GRADIENT FROM MAGNETIC AND GRAVITY DATA. AN EXAMPLE FROM THE ALBERTINE GRABEN EAST AFRICA
- 11:40 a.m. –11:50 a.m. Concluding Remarks
- 11:50 a.m.– 1:30 p.m. **Lunch (on own)**
- 1:30 p.m.– 3:00 p.m. **Integrated Studies I.**
Presiding: Roberta Vidotti
Convener(s): Clive Foss
- 1:30 p.m. –1:40 p.m. Introductory Remarks
- 1:40 p.m. –2:00 p.m. **G Randy Keller Jr** | Gravity Data: A Foundation for Integration of Geological and Geophysical Data
- 2:00 p.m. –2:20 p.m. **Luise Sander** | Using Airborne Gravity and Magnetic Data to Improve Seismic Outcomes - De-Risking Hydrocarbon Exploration in a Frontier Basin in Colombia
- 2:20 p.m. –2:40 p.m. **Ernest Berkman** | Regional Geology and Exploration Potential of Kazakhstan and Uzbekistan Utilizing Public Domain Information Including Gravity and Magnetic Data

- 2:40 p.m. –3:00 p.m. **David M. Velozzi** | A Multi-Physics Approach for High-Grading Oil Prospectivity within the Lower Mancos Shale of the San Juan Basin
- 3:00 p.m.– 3:20 p.m. **Break**
- 3:20 p.m.– 4:30 p.m. **Integrated Studies II**
 Presiding: Roberta Vidotti
 Convener(s): Clive Foss
- 3:20 p.m. –3:40 p.m. **Anne Marit Oestvedt Ghazi** | Integration of 3D CSEM and MMT with Seismic and Well Data Yields New Geologic Insights in North Flemish Pass Basin, Offshore Canada
- 3:40 p.m. –4:00 p.m. **Naftaly Goldshleger** | Mapping and predicting sinkholes by integration of active remote sensing and spectroscopy methods
- 4:00 p.m. –4:20 p.m. **Christian Hardwick** | Application of Geophysical data for resolving Geothermal Stratigraphic Reservoirs: A target beneath the Black Rock Desert, Utah, USA
- 4:20 p.m. –4:30 p.m. Concluding Remarks
- 4:30 p.m.– 5:30 p.m. **Case Histories Posters II**
 Presiding: Anjana Shah
 Convener(s): Mark Odegard
- W-1 **Daniel Fianto** | CAP ROCK ZONE INTERPRETATION BASED ON 2D MODEL OF MAGNETOTELLURIC DATA IN AKESAHU, TIDORE, NORTH MALUKU, INDONESIA
- W-2 **Tom Popowski** | Magnetic data modelling to support seismic exploration in distinguishing volcanics at the reservoir level in the Outer Browse Basin NW Australia.
- W-3 **Kseniia M. Antashchuk** | Joint interpretation of AMT, gravity and magnetic surveys data along the regional profile across the Pasha-Ladoga rift zone (NW Russia).
- W-4 **Benjamin Drenth** | 3D Gravity Modeling of the San Luis Basin, Northern Rio Grande Rift, Colorado and New Mexico

W-5 **Zhan Liu** | Application of multiple constraints 3D gravity and magnetic inversion for imaging of volcanics in the basin

4:30 p.m.– 5:30 p.m.

Integrated Studies Posters

Presiding: Roberta Vidotti

Convener(s): Clive Foss

W-6 **Mark E Odegard** | Mapping Sag and Rift Basins from Inverted Gravity and Magnetic Compilations: Potiguar Basin, Brazil; the East African Rift System and Applications to Petroleum Systems Analysis

W-7 **Sheila Anabel Anci** | *Interpretation Of The Upper Crust From Potential Methods In The Region Of Payenia And Malargüe Fold And Thrust Belt*

W-8 **Wenyue Zhou** | Research and Application of Interpretation Technology of Gravity Magnetic and Seismic Joint Inversion

W-9 **Jie Chen** | The inverse problem of the electroseismic conversion

5:30 p.m.– 7:00 p.m.

Dinner Banquet