

Fis 2012
①
A

The role of geophysics in near-surface exploration

An overview of methodologies will be presented with a focus on the application of inverse theory to electrical and electromagnetic methods for characterization of contaminated sites, evaluation of groundwater and geotechnical structures, and archeological mapping.

Louise Pellerin, *Green Engineering, Inc, Anchorage, AK, USA*. Louise Pellerin received her BS degree from the University of California, Berkeley and her MS and Ph.D. degrees from the University of Utah – all in geophysics. Her expertise is in the theory, acquisition and interpretation of electrical and electromagnetic geophysical methods applied to crustal studies, geothermal exploration and near surface investigations. She is the manager of geophysical services for Green Engineering, Inc., a consulting professor at Stanford University, and a faculty member for the Summer of Applied Geophysical Experience – a summer field program.

Current developments in electromagnetic induction methods

The course will outline the theoretical and practical concepts of electromagnetic induction in the earth for both natural and active sources. An overview of methods will be given, including magnetotellurics, transient EM and frequency EM. Case studies include application on the seafloor, to hydrogeological, tectonic and geothermal problems.

Heinrich Brasse. Freie Universitaet Berlin Fachrichtung Geophysik, Berlin, Germany. His main working areas are related to Geoelectromagnetic and geoelectric methods and has been working actively in the Andes of Bolivia and Chile. CV: <http://userpage.fu-berlin.de/~hbrasse/>

Seismic Methods

Processing and Inversion of Seismic Data via sparse priors and rank reduction techniques

This short course discusses the solution of a set of inverse problems that arise in seismic data processing and imaging. These problems are: Estimation of the Earth's Impulse response, the design of transformations to separate coherent noise from seismic signals,

denoising and multi-dimensional (5D) seismic reconstruction from inadequately sampled data sets. All these problems can be tackled via regularization methods that utilize sparse priors and rank reduction methods. This course also includes a first introduction to seismic methods.

Mauricio D. Sacchi, *Professor and Chair, Department of Physics, University of Alberta, Edmonton, Canada*. He works in Geophysical data processing and inversion with emphasis on the processing of seismic records in applied seismology. He is co-author of the book : *Information-Based Inversion and Processing with Applications*, T.J. Ulrych and M. Sacchi, Elsevier, 436 pp., 2005. CV: <http://www.ualberta.ca/~msacchi/>. He is currently Assistant Editor of Geophysics (SEG Journal).

Acoustic-electromagnetic analogy. Applications in Geophysics

Wave theory is the basis of all non-destructive geophysical techniques, as for instance, the seismic-reflection method and ground-penetrating radar. In this short course, I present the acoustic-electromagnetic mathematical analogy and show how to exploit it for various applications, such as oil prospecting, environmental problems, earthquake science and medical ultrasound.

José M. Carcione. *Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), Trieste – Istituto de Acustica Corbino, CNR, Rome, Italia*. His current research deals with numerical modeling, the theory of wave propagation in acoustic and electromagnetic media, and their application to geophysical problems. He has published more than 140 papers, and he is the author of the book *Wave Fields in Real Media. Theory and numerical simulation of wave propagation in anisotropic, anelastic, porous and electromagnetic media*. 2007, Elsevier. He is currently Assistant Editor of Geophysics (SEG Journal).

CV: <http://www.lucabaradello.it/carcione/>

Borehole seismic including SWD, and seismic interferometry

The first part of the course is focused on borehole seismics, vertical seismic profiling (VSP) basic concepts and applications. The second part of the course gives an introduction to seismic while drilling (SWD) concept, method and applications. The third part of the course includes wavefield representation by seismic interferometry, using

different approaches based on crosscorrelation, crossconvolution and deconvolution. Concept and examples.

Flavio Poletto. *Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), Trieste, Italia.* His research activity includes borehole geophysics, acoustic and seismic while drilling, with applications extended to drilling diagnostics and geosteering. He has written the book: *Seismic While Drilling Fundamentals of Drill-Bit Seismic for Exploration*, 2004, Handbook of geophysical exploration, Seismic exploration series, Vol. 35, Elsevier. CV: <http://www.lucabaradello.it/poletto/index.html>

Concepts and Applications in the GPR Method

The primary objective of this course is to provide a broad and intuitive understanding of the GPR method, enabling geoscientists to make the appropriate decisions regarding data acquisition, processing, imaging and interpretation. The course is designed in such way to raise awareness on applications and to allow a quick integration of the given information into a given practical project. Mathematical details are kept to a minimum.

Jandhir Travassos. *Observatório Nacional, Sao Cristovao, Rio de Janeiro, Brazil.* Bachelor degree in Physics and a MSc in Geology, concentration in Geophysics, from the Federal University at Rio de Janeiro and PhD in Geophysics from the University of Edinburgh in 1987. Developed research on applied Geophysics at Observatorio Nacional with emphasis on electromagnetic methods, mainly but not restricted to the magnetotelluric and GPR methods. Developed postdoctoral research on the GPR method at the Lamont-Doherty Earth Observatory of Columbia University (98/99). His work has been frequently carried out in collaboration to Petrobras and, more recently with FUGRO.

| Time | MONDAY | TUESDAY | WENDSDAY |
|-------------|---|---|--|
| 08:30-9:30 | REGISTRATION | Current developments in electromagnetic induction methods | Current developments in electromagnetic induction methods |
| 9:30-10:00 | OPENING | Current developments in electromagnetic induction methods | Current developments in electromagnetic induction methods |
| 10:00-10:20 | GEOPHYSICS-AN OVERVIEW OF PROSPECTING METHODS | Break | Break |
| 10:20-10:45 | GEOPHYSICS-AN OVERVIEW OF PROSPECTING METHODS | Concepts and Applications in the GPR Method | Concepts and Applications in the GPR Methods |
| 11:00-12:30 | Current developments in electromagnetic induction methods | Concepts and Applications in the GPR Method | Concepts and Applications in the GPR Methods |
| | LUNCH | LUNCH | LUNCH |
| 14:00-15:30 | Developmentes in Seismic methods | Processing and Inversion of Seismic Data | Acoustic-electromagnetic analogy. Applications in Geophysics |
| 15:30-16:15 | Processing and Inversion of Seismic Data | Processing and Inversion of Seismic Data | Acoustic-electromagnetic analogy. Applications in Geophysics |
| 16:15-17:30 | Processing and Inversion of Seismic Data | Processing and Inversion of Seismic Data | WORKSHOP-POSTER SESSION |
| 17:30-18:15 | | WORKSHOP-POSTER SESSION | WORKSHOP -CHARLA |
| | | | |
| | | | |

20

| Time | THURSDAY | FRIDAY |
|-------------|--|--|
| 08:30-9:30 | The role of geophysics in near-surface exploration | The role of geophysics in near-surface exploration |
| 9:30-10:00 | The role of geophysics in near-surface exploration | The role of geophysics in near-surface exploration |
| 10:00-10:20 | COFFEE BREAK | COFFEE BREAK |
| 10:20-10:45 | BOREHOLE GEOPHYSICS | BOREHOLE GEOPHYSICS |
| 11:00-12:30 | BOREHOLE GEOPHYSICS | BOREHOLE GEOPHYSICS |
| | LUNCH | LUNCH |
| 14:00-15:30 | Acoustic-electromagnetic analogy. Applications in Geophysics | WORKSHOP -CHARLAS |
| 15:30-16:15 | Acoustic-electromagnetic analogy. O CHARLA | WORKSHOP -CHARLA |
| 16:15-17:30 | WORKSHOP-POSTER SESSION | CLOSING |
| 17:30-18:15 | WORKSHOP -CHARLA | |
| | | |

17