



Geo-soundings

NEWSLETTER – DECEMBER 2006

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WELCOME

Welcome to the 4th edition of Geosoundings for 2006. During this final and busy quarter there have been 4 Journal Publications, 9 Conference Presentations and 7 Public Presentations. Two academic staff are participants in two ARC grants, which is very good news and we congratulate both Boris Gurevich and Anton Kepic on these achievements. Research field work has also been a high priority during this past quarter with two updates included under the CHDG. We have also been busy finalising the tuition year and we are now looking forward to taking some annual leave over the festive season.

We wish all our readers a Merry Christmas and a Happy New Year and we look forward to sending you our newsletter in 2007.

JOURNAL PUBLICATIONS

Bergman B., Tryggvason A. and Juhlin C., 2006, *Seismic tomography studies of unconsolidated sediment cover thickness and near-surface bedrock velocities*. Geophysics, 71, p77-84.

Juhlin C. and Stephens M., 2006, *Gently dipping fracture zones in Paleoproterozoic metagranite, Sweden: Evidence from reflection seismic and cored borehole data, and implications for the disposal of nuclear waste*. J. Geophys. Res., 111, B09302, doi: 10.1029/2005JB003887.

Förster A., Norden B., Zinck-Jørgensen K., Frykman P., Kulenkampff J., Spangenberg E., Erzinger J., Zimmer M., Kopp J., Borm G., Juhlin C., Cosma C., and Hurter S., 2006, *Baseline characterization of the CO2SINK geological storage site at Ketzin, Germany*. Environmental Geosciences, 13, p145-160.

Gurevich B and Ciz R, 2006, *Shear wave dispersion and attenuation in periodic systems of alternating solid and viscous fluid layers*, International Journal of Solids and Structures, 43, 7683-7683

CONFERENCE PRESENTATIONS

SEGJ International Symposium, Japan, November

Evans B, Wandler A, Link C, 2006, *Observations of the AVO response of hydrocarbons versus CO2: a physical model experiment*

SEG International Exposition and 76th Annual Meeting, New Orleans, October

Brown L, Gurevich B, Makarynska D, Ciz R, Arns C.H and Knackstedt M.A, 2006, *Fluid substitution in porous rocks with aligned cracks: theory versus numerical modelling*

Gurevich B, Vermeulen J, Urosevic M, Landa E 2006, *Enhancing coherency analysis for fault detection and mapping using 3D diffraction imaging*

Muller T.M and Gurevich B, 2006, *Effective fluid transport properties of deformable rocks*

Brajanovski M, Muller T.M and Gurevich B, 2006, *Cross-over frequencies of seismic attenuation in fractured porous rocks*

Saenger E.H, Kruger O.S, Shapiro S.A, Ciz R and Gurevich B, 2006, *Slow compressional wave in porous media: finite difference simulations on micro-scale*

EAGE International Geophysics Conference and Exhibition, St Petersburg, Russia, October

Gurevich B, Brajanovski M, Galvin R and Lambert G, 2006, *Which parameters control seismic attenuation in a fractured porous rock?*

Gurevich B, Gerhardt A, Lambert G, Griffiths D.M and Dyt C, 2006, *Numerical modelling of seismic character of depositional sequences*

EAGE Workshop, Dubai, December

Hatherly P, Evans B, Luo X, 2006, *Early stress experiments using microseismicity in underground coal mines*

PUBLIC PRESENTATIONS

Curtin Reservoir Geophysics Consortium Annual General Meeting, Rottneest Island, December 7 and 8

The Annual Meeting of the Curtin Reservoir Geophysics Consortium (CRGC) was held 7-8 December 2007 on Rottneest Island. The technical program included 15 presentations by CRGC staff, students and academic visitors, covering a wide range of topics in seismic signal processing, multicomponent seismic as well as theoretical and experimental rock physics. The meeting was attended by representatives of seven CRGC sponsor companies who expressed strong satisfaction with the progress of the CRGC research and renewed their commitment to continue supporting petroleum geophysics research at Curtin.

CO2CRC Research Symposium, Hunter Valley, 14-16 November

Wisman P, Dance T, Urosevic M, 2006, *The geophysical characterisation of the Otway Basin Pilot Project demonstration site*

Hartley B, 2006, *High resolution seismic for CO2 detection*

Lwin M, 2006, *Modelling CO2 using tank experiments*

Kepic A, 2006, *Practical multi-censor completion for OBPP*

Urosevic M, 2006, *Naylor field – CO2 sequestration test site, assessment, predictions, initial results and monitoring program*

CRC LEME Regolith Symposium 2006, Hahndorf, 5-9 November

Wilkes P, 2006, *Geoscience, Water and Salinity in WA Rural Towns*

Meyers J, Davis O, Urosevic M, 2006, *Seismic reflection studies of Uranium bearing stratigraphy at the Beverly Mine, South Australia*

AWARDS/PRIZES/SCHOLARSHIPS/GRANTS

ARC Grant – Prof Boris Gurevich

Prof. Boris Gurevich along with Arcady Dyskin from UWA, Tobias Müller from Karlsruhe University and Lincoln Paterson from CSIRO has been awarded an ARC Discovery Project entitled "*Seismic response of a partially saturated petroleum reservoir zones: towards quantitative recovery monitoring*" in the amount of \$220,000

ARC Grant – Dr Anton Kepic

Congratulations are also in order to Dr Anton Kepic and his colleagues at UWA, CALM, Newcrest Mining, University of Newcastle and Duke University, for being part of a successful team who acquired an ARC Discovery Project Grant entitled: "*Ecohydrological feedbacks between vegetation and soil in natural and engineered landforms in arid Australia*" in the amount of \$1,028,287

Vice Chancellor's List

Mr. Owen Davis has been nominated for the **Vice Chancellor's List** as the best performing student at the conclusion of Semester 2, 2006. Owen will be honoured with his award at the next Vice Chancellor's Annual Induction Ceremony, to be held in February 2007.

CIRTS (Curtin International Research Tuition Scholarship)

One CIRTS PhD scholarship has been awarded to international student during the last quarter of 2006. The student is:

Mr Florian Karpfinger from Germany, to be supervised by Bruce Hartley and Boris Gurevich. Florian has also been awarded a Shell Scholarship in 2006 to support his research project entitled "**Modelling and inversion of tube-wave signatures for formation permeability changes in producing boreholes**".

WA ASEG Student Night Presentations

At the recently held WA ASEG Student Night Presentation meetings held in October, Honours student **Mr. Owen Davis** was awarded as the '**Best Student Presentation**' for his talk entitled "*Seismic reflection studies of uranium bearing stratigraphy at Beverley in-situ leach mine, South Australia*". Owen received a laser pointer and a framed certificate.

Graduating Students

Dr Said Amiri Besheli has been awarded his PhD entitled "*Using seismic anisotropy for AVO-based reservoir characterisation*". Said was also awarded two unconditional passes and a letter of commendation from the Chancellor.

Mr Shahid Ur Rehman has been awarded his Masters entitled "*Measurement of fractures induced seismic anisotropy in laboratory*".

Thirteen Honour Students will also be graduating after completion of their coursework and research projects. They are:

Mr Lee Davey, supervised by Bruce Hartley and Mark Lwin and his thesis was entitled "*Measuring of acoustic wave propagation in multi-scattering media*".

Mr Owen Davis, supervised by Jayson Meyers and Milovan Urosevic and his thesis was entitled "*Seismic reflection studies of uranium bearing stratigraphy at Beverley in-situ leach mine, South Australia*".

Mr Matthew Dielesen, supervised by Milovan Urosevic and his thesis was entitled "*AVA modelling of wide angle seismic data – Marley Prospect, Barrow Sub-Basin*".

Mr Russell Eade, supervised by Paul Wilkes and his thesis was entitled "*Investigating geophysical signatures of gold bearing epithermal high sulphidation systems and applications to tropical terrains*".

Miss Megan Halbert, supervised by Boris Gurevich and her thesis was entitled "*Rock physics models for unconsolidated sands and shales*".

Mr Marshall Hood, supervised by Anton Kepic and Brett Harris and his thesis was entitled "*Evaluation of controlled source electromagnetic data for offshore exploration, West Africa*".

Mr Stephen Irvine, supervised by Brian Evans and Mark Lwin and his thesis was entitled "*Investigations into physically modelling the turning effect in seismic data*".

Mr Erik Kristiansen, supervised by Paul Wilkes and Brett Harris and his thesis was entitled "*Geophysical investigations to assist hydrogeological studies and salinity mitigation in Dowerin WA*".

Mr David Mackay, supervised by Bruce Hartley and his thesis was entitled "*Numerical modelling of continuous signals*".

Mr Alexander Maekivi, supervised by Milovan Urosevic and his thesis was entitled "*An analysis into a directional variation in seismic image quality*".

Miss Jennie Powell, supervised by Milovan Urosevic and her thesis was entitled "*AVO modelling in the Tiof Field Mauritania, West Africa*".

Mr Jacob Smith, supervised by Anton Kepic, Milovan Urosevic and C.Wijns (Resolute Mining) and his thesis was entitled "*Land seismic to define structure at Ravenswood Gold Mine, Queensland*".

Mr Paul Wellington, supervised by Bruce Hartley and Boris Gurevich and his thesis was entitled "*Evaluation of adaptive subtraction techniques for multiple attenuation*".

CENTRE OF EXCELLENCE

Yandal-Wiluna Greenstone Project

Jayson Meyers and Anton Kepic conducted seismic surveys at three mines in the Yandal-Wiluna Greenstone belts in November. Lines of high-resolution seismic reflection using a networked array were carried out with the ANSIR mini-vibroiseis as the source. The lines were located at Leinster, Jubilee, and Jundee mines. The lines were extremely challenging due to the ongoing mining operations and abundant seismic and electrical noise. The seismic experiments were partially funded by the CHDCoE and the remainder by the sponsor companies. It is hoped that the seismic information will provide structural and direct targeting detail of ore bodies below the mines to help target deep drillholes and extend mine life. Preliminary results will be available to sponsors in January 2007.

Yeal Seismic Reflection Project

The first stage of the Pinjar Anticline High Definition Seismic Reflection Survey was completed in the northern Yeal area between 4th and 15th Dec 2006. Three transects (i.e. a total of 15 line kms) of seismic data were acquired to the South East of Gingin town site. The area is of high significance for understanding Perth Basin's hydrogeology and for developing future groundwater management strategies for Perth. The survey's objective are to a) develop seismic technologies and methods for hydrogeology and b) to reveal the hydraulic connection or disconnection between Perth's major aquifer systems in the depth range from surface to 1000m below ground level. During this first stage of data acquisition in the Yeal area a range of survey parameters were trialed. These include geophone and source spacing down to 5 m with max fold of 120, and MiniVib sweep frequency ranges of 20 to 120 Hz and 20 to 200 Hz. The trial data is being processed and optimal survey parameters will be designed. The Pinjar Anticline High Definition Seismic Reflection for Hydrogeology project is a research partnership between Water Corporation of Western Australia and Curtin Universities, Department of Exploration Geophysics.

VISITORS

Dr Anatoly Tikhonov – Russian Academy of Science

Dr Anatoly Tikhonov from Russian Academy of Science is visiting our department over two weeks. Anatoly is Russian VSP specialist and will conduct a number of presentations to Curtin and CSIRO staff. He is also working on experimental data recorded in Otway Basin as part of CO2 sequestration monitoring program within CO2CRC.

Professor Chris Juhlin – Uppsala University (Sweden)

Prof. Chris Juhlin from Uppsala University (Sweden) will be working with us for the next 2 months. Chris is working on 3D VSP imaging issues and is implementing the program for us. Chris is also in charge of the seismic monitoring program at Ketzin (Germany) CO2 sequestration test site.

We hope to establish a long-term cooperation with both Anatoly and Chris in the future.

GRADUATION DINNER

The Graduation dinner was held at The Como on November 23rd. It was an enjoyable night with 33 people in attendance. We extend our congratulations to all our graduating 3rd and 4th year students who put in a lot of hard work throughout the year.

*We would like to wish everyone
a Safe and Happy Christmas
and Prosperous New Year*

