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Geo-soundings

NEWSLETTER – MARCH 2014



Welcome to the first edition of Geo-soundings for 2014.

Semester 1 is well underway as the enrolment numbers below indicate. Over the summer both academic staff and senior students have been enthusiastically engaged in presenting and publishing their research work as summarised. We look forward to keeping our readers informed of our activities during 2014 and hope that the year ahead is rewarding and productive for all.

Enrolments 2014

Total enrolments for 2014 are:

BSc (Geophysics) (<i>Phasing Out</i>)	9
BSc Science (Geophysics Major)	21
BSc Science (Honours)	8
Graduate Diploma in Geophysics (<i>Phasing Out</i>)	1
MSc (Geophysics) – Coursework (<i>Phasing Out</i>)	1
MSc Science (Geophysics Major)	24
MPhil (Geophysics) – Research	4
PhD – Research	26

Graduates for 2013

Doctor of Philosophy

Greenwood, Andrew John – Passed 30/7/2013; Title: Application of vertical seismic profiling for characterisation of hard rock.

Pethick, Andrew Meng Leong – Passed 27/8/2013; Title: Multidimensional computation and visualization for marine controlled source electromagnetic methods.

Strobach, Elmar – Passed 16/7/2013; Title: Hydrogeophysical investigation of water recharge into the Gngangara Mound.

Wisman, Putri Sari – Passed 16/7/2013; Title: Rock physics changes due to CO2 injection: the CO2CRC Otway Project.

Master of Science (Geophysics) Coursework

Abdullah AlJayan, John-Paul Mubita, Austin Oyinkuro Oki and Santos Gerado Perez Ramos.

Graduate Diploma in Geophysics

Richard Allpike and Paul Dragicevich.

BSc (Honours) Science

Baqir Al-Asadi, Aldo De Rooster, Zenon Platritis, Nathan Tabain, Rebecca Tung, Kai Fu Kevin Ung, Luke Van Leeuwen and Simon Yuk Siong Wong.

BSc (Geophysics)

Nicholas Adams (mid-year graduate), Michael Adamson, Alexander Costal, Melissa Davies, Richard Elks and Mathew Fleay (mid-year graduate), Aaron Hollingsworth (mid-year graduate), Danny Husodo, Sandy Jones, Anthony Jumeau (mid-year graduate), Matthew Kovacevic, Alexander Landwehr, Tavis Lavell (mid-year graduate), Alex Tieu Onn Ling (mid-year graduate), Jarrad Luce, Bradley McMiles, Mahesh Raghvani, Adam Ramage, Jay Van Berlo, Layne Van Zaanen (mid-year graduate), Benjamin Williams (mid-year graduate).

RESEARCH ACTIVITIES

Harvey 2D Seismic Survey Update

Dr Milovan Urosevic, Dr Anton Kepic, Lee Ignacio, Dr Roman Pevzner and Andrew Greenwood have all been involved in the 2D seismic acquisition along Riverdale Road, Harvey in Western Australia. It has been completed as a part of ANLEC project with new NGL UNIVIB trucks. Excellent resolution and depth penetration has been achieved. Results show that these broadband, low footprint mini-vibes will be excellent for the CO2 monitoring objectives Australia wide. In April 2014 UNIVIBs will be used with the new NGL Sercel hybrid system to acquire high resolution 3D survey for delineation of the major structures in Harvey area.

Field Trip

The third year field trip this year was sponsored by Independence Group. Ex-Curtin student and Independence employee **Mike Whitford** facilitated the visit to the Jaguar mine site, 60 km north of the town of Leonora. Staff members **Dr Anton Kepic, Andrew Greenwood, Dominic Howman and Anna Podolska** lead teams of students performing seismic reflection, magnetics, gravity and GPS measurements. Being a complicated, logistical effort each year, this trip proved no different. Most equipment was shipped ahead of time. The gravity meter, kindly donated by Atlas geophysics, had to be driven from Perth to the site and back. The GPS equipment was rented prior to leaving and had to fly with the students and Anna to Leonora. The students were met by the remaining three staff and an Independence employee who had flown to Kalgoorlie, rented two buses and two 4WDs then driven to Leonora.



Staff News

The Department Welcomes...

Lee Ignacio joined the Department of Exploration Geophysics on the 14 October 2013 and has taken up a **Senior Technical Officer** position within the department. Lee comes from Geokinetics Australasia Pty Ltd where he worked as a GSR Seismic Data Manager. He brings within him a significant experience within the Oil and Gas Seismic Exploration Industry with a unique combination of technical expertise and production support. Lee will oversee the use and maintenance of the National Geosequestration Laboratory (NGL) facilities and monitor the inventory of all Seismic Acquisition Equipment and VSP Tools.



Andrew Greenwood commenced a three year contract from the 4th August 2013 as a Research Fellow.

Eva Caspari commenced as a Research Associate on the 8th August 2013 for a one year appointment.

Konstantin Tertysnikov commenced a one year appointment on the 17th February 2014 as a Research Associate. Konstantin very recently completed and submitted his PhD for examination.

Conny Kitzig completed her contract with the Department on the 7th March 2014. Conny will continue her association with the Department as a full time enrolled PhD student.

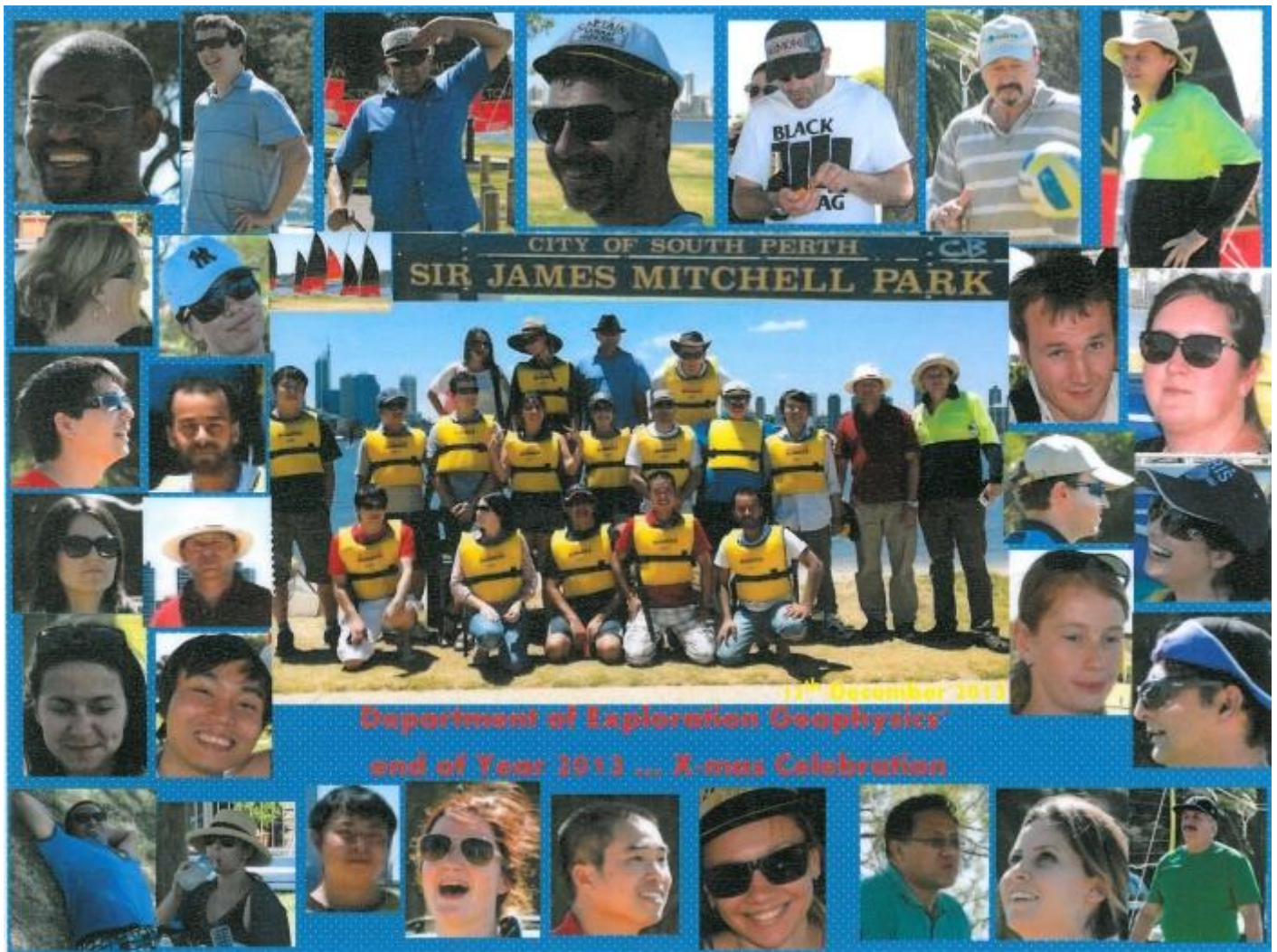
Mr Andrew Pethick has resumed the part-time Research Associate, 12 month extension July 2015

Professor Boris Gurevich is currently on a well-earned sabbatical at MIT - Massachusetts Institute of Technology, Boston, USA from the 1st January – 29th June 2014 and in his absence Dr Andrej Bona has kindly agreed to serve as Acting Head of Department. Boris will include some annual leave while overseas and plans to return back to the department on Monday 7th July 2014.

Ms Liliya Malovichko's last working day in the department was Friday 20th December 2013. Lillya has returned to Hobart with her family.

DEPARTMENT OF EXPLORATION GEOPHYSICS XMAS PARTY 2013

The department celebrated their End of year Xmas Function on Thursday 12th December 2013 at Sir James Mitchell Park South Perth Foreshore, big thanks to Dominic Howman and Rhiannon Howe who organised the day events, packed with yummy food and drink and then we had water activities to keep us cool and refreshed and it was a good opportunity to have some fun and try out catamaran sailing and (SUP) stand up paddle boarding.



Upcoming Events 2014

[GEO2014 11th Middle East Geosciences Conference and Exhibition](#), 9th–12th March, Bahrain.

[APPEA Conference and Exhibition 2014](#), 6th–9th April, Perth, WA.

[EAGE Geosciences Investing in the Future](#), 9th–12th April, St Petersburg, Russia.

[EAGE Shale Workshop](#), 9th–12th April, Porto Portugal.

[EAGE CO2 Geological Storage Workshop](#), 23rd–25th April, Stavanger, Norway.

[76th EAGE Conference & Exhibition 2014](#), 16th–19th June, Amsterdam, Netherlands.

Past Events 2013

SEG International Exposition and 83rd Annual Meeting, 22nd–27th September, Houston Texas.
7th Congress of the Balkan Geophysical Society, 7th–10th October, Tirana, Albania.
13th SAGA Biennial Conference, 7th–9th October, South Africa.
EAGE Workshop on Seismic Attenuation, 28th–30th October, Singapore.
CO2CRC Symposium, 19th–20th November, Wrest Point, TAS.
DETCRC Annual Conference, Uncovering the Future III, 20th–22nd November, Hahndorf, SA.
Curtin Reservoir Geophysics Consortium (CRGC) Annual Meeting, 5th–6th December, Rottneest Island.

Journal Publications 2013

Lebedev, M., M. Pervukhina, V. Mikhaltsevitch, T. Dance, O. Bilenko, and B. Gurevich, 2013, An experimental study of acoustic responses on the injection of supercritical CO₂ into sandstones from the Otway Basin, *Geophysics*, **78**, no. 4 (JULY-AUGUST 2013); P. D293–D306.

Peng, J., L. Li and A. Squelch, 2013, Hybrid Surgery Cutting using Snapping Algorithm, Volume Deformation and Haptic Interaction. *Journal of Man, Machine and Technology*, **2**, no. 1, June 2013.

Tertyshnikov, K., A. Bóna, and R. Pevzner, 2013 Prestack time imaging algorithm with simultaneous velocity estimation in hard rock environment. Published in *Exploration Geophysics*.

Asgharzadeh, M., A. Bóna, R. Pevzner, M. Urosevic, and B. Gurevich, 2013, Reliability of the slowness and slowness-polarization methods for anisotropy estimation in VTI media from 3C walkaway VSP data, *Geophysics*, **78** no 5, WC93–WC102. doi: 10.1190/geo2012-0409.1

Alonaizi, F, R. Pevzner, A. Bóna, M. Alshamry, E. Caspar and B. Gurevich, 2013, Application of diffracted wave analysis to time-lapse seismic data for CO₂ leakage detection, Published in *Geophysical Prospecting*, **62**, Issue 2

Journal Publications 2014

Myers, M., A. Podolska, C. Heath, M. V. Baker, and B. Pejčica, 2014, Pore size dynamics in interpenetrated metal organic frameworks for selective sensing of aromatic compounds. Published in *Science Direct Analytica Chimica Acta*.

Conference Publications

International Exposition and SEG 83rd Annual Meeting, Houston Texas, Sept 2013

Alajmi, M., A. Bona, and R. Pevzner, 2013, Modelling of depth variable 3D time-lapse seismic noise based on measured noise at the CO₂CRC Otway project.

Mikhaltsevitch, V., M. Lebedev, and B. Gurevich, 2013, Laboratory measurements of the elastic and anelastic parameters of limestone at seismic frequencies.

Lebedev, M., O. Bilenko, V. Mikhaltsevitch, M. Pervukhina and B. Gurevich, 2013, Laboratory measurements of ultrasonic velocities in CO₂ saturated brines.

7th Congress of the Balkan Geophysical Society, October 2013, Tirana, Albania

Yavuz, S., J. Kinkela, A. Greenwood, M. Penney, V. Araujo, R. Neto, A. Dzunic, and M. Urosevic, 2013, Direct Targeting of VMS through Amplitude Consistent Seismic Imaging.

13th SAGA Biennial Conference, October 2013, South Africa

Posters

Okan, E., 2013, Feasibility of Using Regional Seismic Reflections Surveys to Discover Iron Oxide Copper Gold Deposits in the Gawler Craton, South Australia.

EAGE Workshop on Seismic Attenuation, October 2013, Singapore

Galvin, R., T. M. Muller, R. Pevzner, and B. Gurevich, 2013, Estimation of Scattering Attenuation from Zero-offset VSP Data: CO2CRC Otway Project Case Study.

Mikhailsevitch, V., M. Lebedev, and B. Gurevich, 2013, An Experimental Study of Attenuation in Sandstones at Seismic Frequencies.

Pevzner, R., T. Muller, R. Galvin, A. Alasbali, M. Urosevic and B. Gurevich, 2013, Seismic Attenuation from VSP and Well Log Data: Approaches, Problems and Relative Contribution of Scattering.

DETCRC Annual Conference, Uncovering the Future III, Hahndorf, November 2013

Oral Presentations

Menu F., A. Greenwood, A. Kepic, and E. Takam, 2013, The cross-hole seismic reflection technique: A thin bed detecting and high resolution tool.

Kepic, A., and A. Gordon, 2013, Downhole sensing with DET CRC's Autonomous Sonde.

Bona, A., 2013, Sensing ahead of the bit: how to make it work.

Kepic, A., and A. Podolska, 2013, Downhole geochemical and petrophysical analysis: developments and future possibilities.

Harris, B., E. Takam, A. Pethick, 2013, Joint and cooperative inversion based on petrophysical, geostatical and structural.

Kepic, A., 2013, Joint inversion- What data is needed and how should it be acquired?

Takam, E., 2013, 3D MT constrained post stack inversion.

Harris, B., 2013, 3D seismic dip attributes and conductivity gradients.

Posters

Bilenko, O., M. Lebedev, and Y. Uvarova, 2013, Acoustic properties of compacted rock powders.

Okan, E., 2013, On The Feasibility of Using Regional 3-D Seismic Reflections Surveys to Discover Iron Oxide Copper Gold Deposits in the Gawler Craton

Menu, F., and A. Greenwood, 2013, The cross-hole seismic reflection technique: A thin bed detecting and high resolution tool

Van Anh Cuong, L., B. Harris, A. Kepic, and E. Takam , 2013, Joint Inversion of Magnetotelluric and Seismic Data

Hossain, M., M. Urosevic, and A. Kepic, 2013, Interpretation of 3D high-resolution seismic data from Hillside, SA.

Sun, B., A. Bona, C. Dupuis, R. Pevzner, B. Zhou, and A. King, 2013, In-Front-Bit Imaging Seismic-While-Drilling

Tertyshnikov, K., R. Pevzner, and A. Bóna, 2013, Steering migration with diffractions in seismic exploration for hard rock environments

[CO2CRC Symposium , November 2013, Wrest Point, Tasmania](#)

Oral / Posters Presentations

Lebedev, M., 2013, Laboratory experiments for calibration of petrophysical properties for CO2 sequestration monitoring: CO2CRC Otway Project case study.

Pevzner, R., 2013, CO2CRC Otway site permanent receiver array: preliminary design.

Podolska, A., 2013, Quantum dots and metal-organic framework optical fibre/fluorescence based sensor for down hole chemical sensing.

Bona, A., 2013, Passive seismic borehole measurements for monitoring changes in the overburden using tubewaves – feasibility study using CRC1 well data.

Lebedev, M., 2013, Seismic frequency laboratory measurements of the elastic and anelastic properties of the sandstone flooded with supercritical CO2.

Lebedev, M., 2013, Elastic moduli weakening in water saturated carbonates: experimental study.

Lebedev, M., 2013, Laboratory measurements of acoustic velocities of CO2 / brine mixtures at elevated temperatures and pressures.

Caspari, E., 2013, Velocity-saturation relations at different scales.

M. Alajmi, 2013, Empirical 3D depth/time dependent coherent noise model for likelihood analysis of time lapse signal detection.

Lebedev, M., V. Mikhaltsevitch and B. Gurevich, 2013, Seismic frequency laboratory measurements of the elastic and anelastic properties of the sandstone flooded with supercritical CO2.

Lebedev, M., and V. Mikhaltsevitch, 2013, Elastic moduli weakening in water saturated carbonates: experimental study.

Lebedev, M., and O. Bilenko, 2013, Laboratory measurements of acoustic velocities of CO₂ / brine mixtures at elevated temperatures and pressures.

A. Podolska, R. Pevzner, M. Myers, and I. Cole, 2013, Quantum dots and metal-organic framework optical fibre/fluorescence based sensor for downhole chemical sensing.

Curtin Reservoir Geophysics Consortium Annual Meeting, December 2013, Rottneest WA

Oral/Poster Presentations

Menu F., A. Greenwood, A. Kepic, and E.T Takam, 2013, The cross-hole seismic reflection technique: A thin bed detecting and high resolution tool.

Lebedev, M., and V. Mikhaltsevitch, 2013, An experimental study of solid matrix weakening in water saturated Savonnières limestone.

Caspari, E., B. Gurevich, R. Pevzner and M. Lebedev, 2013, Rock physics modelling of time lapse effects - a case study of the CO₂CRC Otway project.

Qi, Q., T. M. Müller, B. Gurevich, S. Lopes, M. Lebedev, and E. Caspari, 2013, Capillary effects in patchy saturation models.

Bóna, A., M. Alajmi, and R. Pevzner, 2013, Generation of time-lapse noise realisations for statistical 4D models.

Gurevich, B., 2013, Wave localization in disordered media: review and potential geophysical applications.

Glubokovskikha, S., V. Rok, and B. Gurevich, 2013, Modelling stress-dependency of rock properties.

Mikhaltsevitch, V., M. Lebedev and B. Gurevich, 2013, An Experimental Study of Attenuation and Dispersion in Sandstones at Low Frequencies.

Carson, M., and M. Lebedev, 2013, Ultrasonic Attenuation in Fontainebleau Sandstone.

Khoshnavaz, M J., A. Bona, and M. Urosevic, 2013, Extraction of velocity model from seismic common source gather for seismic migration.

Al Hosni, M., 2013, Velocity-Saturation relationship at various scales for CO₂ sequestration.

Alkaff, M., 2013, Integration of Stratigraphic & Rock Physics Models to Generate 3D Synthetic Seismic.

Meira, M., and B. Gurevich, 2013, Seismic monitoring of carbonate reservoirs using stochastic time lapse inversion.

Madadi, M., 2013, Finite Element Simulation of Seismic Wave Propagation.

Takam Takougang, E. M., 2013, Full waveform inversion for oil and gas exploration.

Posters

Ziramov, S, and M. Urosevic, 2013 Joining diverse 3D geometries in PSTM.

Tertyshnikov, K. R. Pevzner and A. Bóna, 2013, Diffraction imaging - a case study of the Solwara 1 project.

GEO2014 11th Middle East Geosciences Conference and Exhibition, Bahrain, March 2014

Oral/ Poster Presentations

Alajmi, M., A. Bona, and R. Pevzner, 2013, Modelling of Depth Dependent 3D Time-Lapse Seismic Noise.

Lebedev, M., V. Mikhaltsevitch, and B. Gurevich, 2014, Acoustic Response of Brine Saturated Reservoir Rocks During Injection of Supercritical Carbon Dioxide.

Lebedev, M., and V. Mikhaltsevitch, 2014, Carbonates Water Weakening: Experimental Study.

Pevzner, R., T. Mueller, A. Alasbali, R. Galvin, and B. Gurevich, 2014, Seismic Attenuation from Vertical Seismic Profiling and Log Data Analysis: A Multi Well Study.

Alonaizi, F., K. Tertyshnikov, R. Pevzner, A. Bona, and B. Gurevich, 2014, Application of 3D Diffracted Wave's Analysis to Improve Imaging in Poor Signal/ Noise Conditions.

Bona, R. Pevzner, 2014, Use of a Drill-rig as a Source for Multichannel Analysis of Surface Waves.

Educational Software Grants and Programs

A big thank you to all our software vendors who provide us with the continuing support and software resources we need for our teaching and research programs.

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