

PREVIEW

AUSTRALIAN SOCIETY OF EXPLORATION GEOPHYSICISTS



NEWS AND COMMENTARY

2014 AGM: President's Report

2014 AGM: Treasurer's Report

2014 OzSTEP Courses Announced

2015 ASEG Honours & Awards

ASEG-PESA 2015 Call for Abstracts

GEOPHYSICISTS IN SOCIETY

Geophysics for natural disasters:

The Balkans cries for help!



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ADVERTISERS INDEX

| | |
|--------------------------------|-----|
| Alpha Geoscience | 30 |
| Archimedes Financial Planning | 30 |
| ASEG eBook | 16 |
| Borehole Wireline | 30 |
| CoRMaGeo Instruments | 30 |
| Daishsat | IBC |
| EMIT | OBC |
| Fairfield Nodal | IFC |
| GEM Geophysics | 30 |
| Geophysical Software Solutions | 30 |
| Geosensor | 30 |
| GPX Surveys | 2 |
| Groundwater Imaging | 30 |
| MagneticEarth | 31 |
| Minty Geophysics | 31 |
| Mira Geoscience | 31 |
| SEG | 7 |
| Technoimaging | 25 |
| Tensor Research | 31 |
| Thomson Aviation | 19 |
| Vortex Geophysics | 25 |
| Zonge | 13 |

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CONTENTS

| | |
|---------------------------|----|
| Editor's Desk | 2 |
| ASEG News | |
| President's Piece | 3 |
| Executive Brief | 5 |
| Branch News | 12 |
| Honours and Awards | 16 |
| Continuing Education | 17 |
| Geophysicists in Society | 18 |
| News | |
| Conferences and Events | 20 |
| Canberra Observed | 22 |
| Geophysics in the Surveys | 23 |
| Data Trends | |
| Seismic Window | 27 |
| Book Review | 28 |
| Business Directory | 30 |
| Calendar of Events | 32 |

FRONT COVER



Complex fires burning in the open-cut coal mine, servicing the Hazelwood power station in Latrobe Valley, Victoria, posed serious health risks to the citizens of Morwell and firefighting personnel. ('Morwell open-cut mine'; courtesy CSIRO Publishing, Science Image)

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John A. Theodoridis

Many still perceive geophysics to be synonymous with Minerals & Petroleum exploration: applications to archaeology, civil engineering, agriculture and environmental monitoring etc. appear to be either inconsequential or of secondary value – labelling geoscience, as such, is a misnomer and quite limiting.

To serve humanitarian needs with geoscience is indubitably a noble undertaking.

Commencing 13 May 2014, and continuing over a number of days, rainfall accompanying cyclone Tamara befell the Balkan nations of Serbia, Bosnia and Herzegovina (BiH), and Croatia. This rainfall, the heaviest on record, caused extensive flooding and devastation,

affecting an estimated 1.6 million (22% of the population) in Serbia, 1.5 million (39% of the population) in BiH and 38 000 in Croatia. In addition to the immense damage to both infrastructure and economies, came one of the cruellest effects of the deluge in the form of many thousands of landslides, that continue to compound the suffering, hindering both rescue and recovery efforts. Most frightening, landslides dislodged active unexploded ordnances (UXO), from the minefields of previous conflicts, which subsequently dispersed into waterways and populated areas.

An open letter addressed to the geophysical community by Snežana Komatina – Petrović, President of the Association of Geophysicists and Environmentalists of Serbia (AGES), Milovan Urosevic, of Curtin University and Koya Suto, former ASEG President, gives urgency to the 'Balkan Cries for Help', calling upon geophysicists to volunteer their expertise and services to help mitigate the threat of landslides (see *Geophysicists in Society*, p. 18). The opportunity exists for the community to donate money to disaster relief efforts, via a dedicated account established between the Serbian government and

Commonwealth Bank. Please visit the 'Embassy of the Republic of Serbia, Canberra, Australia' website (www.canberra.mfa.gov.rs), or the AGES website (www.ageserbia.com) for additional information.

This is my last editorial piece. I assumed the role of Editor in Issue 159, with great trepidation and enthusiasm – adopting my own particular style, as did my predecessors – whilst being ever mindful of the responsibilities bestowed upon me by the ASEG Federal Executive. As I relinquish my duties, I end the last of three positions which I held in service to the ASEG: the other two being Victorian Branch Secretary and Social & Events Chair to the Melbourne ASEG-PESA IGC&E 2013. Above all, I thank our readership, and my fellow ASEG members, along with my friends and colleagues, for their support and granting me the wonderful opportunity to contribute to this prestigious society. *Adieu!*

Next issue... please welcome our New Editor of *Preview Magazine*, Lisa Worrall – may her experience be as fulfilling and as enjoyable as my own.

Call for Associate Editors: *Preview Magazine*

Expressions of interest are sought from ASEG members to fill multiple positions as Associate Editor for the following columns: Industry News; Canberra Observed and Minerals & Environment. Successful applicants shall be required to independently source material and submit quality articles to be overseen by the Editor, whilst adhering to stringent publication schedules for the bimonthly publication.

Interested persons are encouraged to contact the Editor of *Preview*, Lisa Worrall, by email: previeweditor@aseg.org.au.

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New friends and new opportunities

This is my first report, as ASEG President in 2014, since my last presidency some 25 years ago when *Preview* was just a printed folded newsheet. It is wonderful to see how it has grown to be what it is today.

I look back at how things have progressed in those 25 years. In my last term as president the Research Foundation was established. This year will see some \$142 000 allocated to research projects and the cumulative total reach \$1 000 000. In 1989 we also set up the first of the standing committees that direct the various activities of the ASEG including conferences, publications, honours and awards, history etc. All these committees are active today. The work of the volunteers on those committees ensures the ongoing corporate memory and the ASEG runs smoothly. I estimate that almost 10% of the total membership plays some role in the running of the ASEG. This includes state committees, conference committees and standing committees as well as the Federal Executive and publications editors. There is, however, always room for more volunteers. As many of my colleagues head towards retirement we must look to the future. I have my ideas of where the society will go, but I am sure those of the younger members have different and I hope better ideas. Perhaps mine are more rooted in the past, although experience always helps in understanding the possibilities of the future.

If you have your personal goals, issues or desires for the future of the society I encourage you to get involved. There is always room for your involvement on state committees, conference organising

committees and standing committees of the society. Do not stand back and say the society does not work for me. As a member you are as much a part of the society as I am. Make the ASEG be what you what it to be.

I write this piece in a hotel room in Myanmar a country that has been cut off from developments in geophysics for the last 50 years. I see Myanmar as Australia was more than 40 years ago with only an emerging geophysics industry. It is great to see Australian companies here getting involved in the petroleum sector, but there is also much development to be done in terms of education and training. Later this year I hope to bring some Australian colleagues to Myanmar to run a first short training course in modern geophysical methods for mineral exploration, in conjunction with the Myanmar Geosciences Society. If we are to expand our profession then training is one way but training also helps in development of the third world and it is one way we can do our small bit towards raising people out of poverty. What a profession this is that allows me to travel and meet new people in some of the most fascinating places in the world. I can see a future for Myanmar that involves the introduction of technology, such as geophysics, as the country shakes off the past of military rule and moves towards democracy. However, where is Australia going in future?

At present in Australia we are in one of the most depressed periods in mineral exploration that I have seen since I graduated. The boom and bust mentality of the market is one of the most frustrating things in our profession. Just

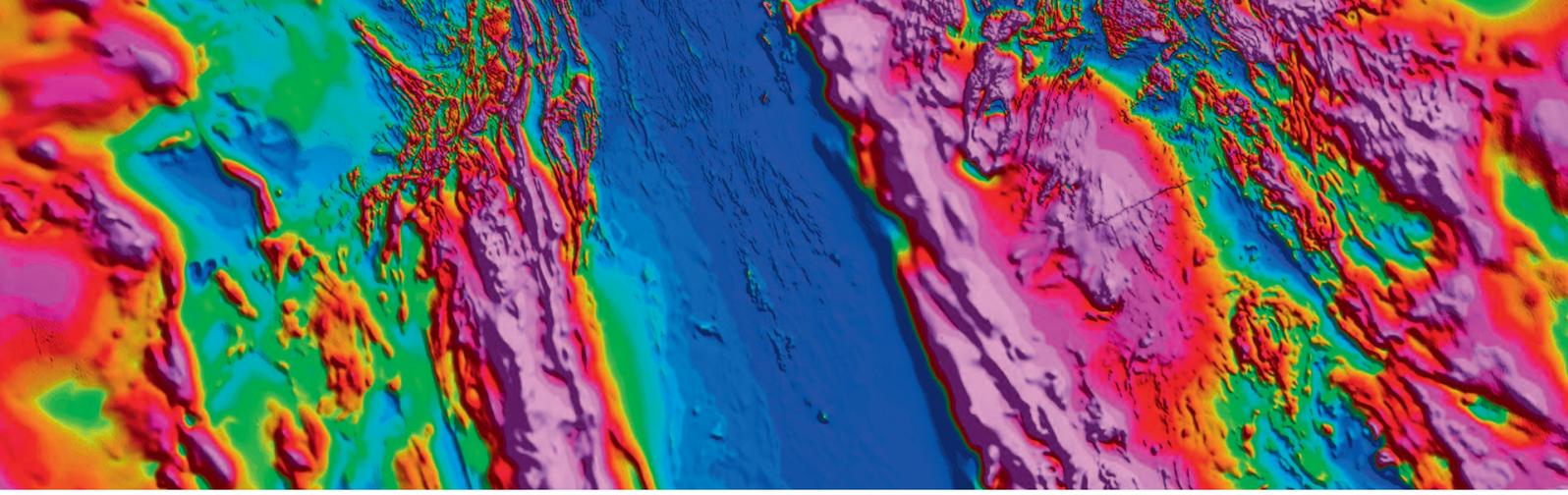
as things are going well the investors take fright and the area that is most affected is greenfields exploration. People are laid-off; many leave the profession and never return. In the past year I have seen many friends retrenched and I remain mystified of the mindset of those who control the minerals exploration market. I would have thought that the business graduates in major companies should be able to think beyond next week. The process from exploration to mining is not instantaneous and those deposits discovered in the next year will come on stream at a time when metals prices will rise again and pass the levels set in the previous boom. This process is even longer for world class deposits. It is more than a decade since we have discovered a world class ore body of the scale of Broken Hill, Mt Isa and Olympic Dam. These deposits will not be found without spending money. Where does that take us as a profession? This lull in exploration will result in greater urgency for discoveries in the future. The next decade will need geophysics to aid such discoveries and the next decade will be a time of great opportunity for geophysicists. Stay with it and times will get better. I speak as one who has seen four or five such periods.

So you might have some time on your hands, then it is time to enhance your profile. I encourage you to present at local meetings; publish your successes or failures as case histories in *Exploration Geophysics*; write something for *Preview*; do a bit of research and/or present at the next ASEG conference. The society needs your experience and I assure you your contributions will be rewarded in the long term. I have always enjoyed my involvement in the ASEG and believe it has resulted in opportunities that otherwise would have not come my way. Harry Siegel, one of the founders of modern geophysics, and my boss at the time, once said to me, 'In geophysics you do business with your friends, get out there and make some new friends'. The ASEG is a way to make friends, colleagues and business opportunities. A recession in the exploration market is a time to do just that and the ASEG can provide the vehicle. Some of my best friends are in the exploration industry.

Greg Street
ASEG President
president@aseg.org.au



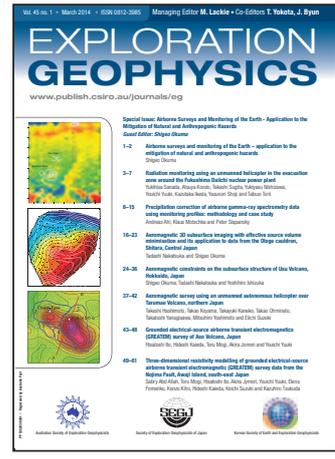
Fieldwork in Shan State, Myanmar.



Exploration Geophysics

The Journal of the Australian Society of Exploration Geophysicists

Publishing excellent research, technical papers, case histories, advances in data interpretation and theoretical developments in applied geophysics.



Preview

The Magazine of the Australian Society of Exploration Geophysicists

News and reviews on the exploration industry, advances in geophysical techniques and communication among ASEG members.



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New members

The ASEG extends a warm welcome to 58 new members (52 student, 5 active and 1 associative) approved by the Federal Executive (see table).

| Name | Organisation | Country/State | Membership grade |
|-------------------------------|-------------------------|------------------------|------------------|
| Approved 27 March 2014 | | | |
| Joelene Barron | – | Qld | Student |
| Katrina Bourke | – | Qld | Student |
| Sheree Louise Burdinat | – | Qld | Student |
| Maria Cornelia | – | WA | Student |
| Declar Cox | – | Qld | Student |
| Daniel Patrick Franks | – | Qld | Student |
| Katherine Gioseffi | – | Qld | Student |
| Nicholas Josephs | – | Qld | Student |
| Mark Kohler | – | Qld | Student |
| Amy Leask | – | Qld | Student |
| Jessica Martin | – | Qld | Student |
| Misha Mashkin | – | Qld | Student |
| Genna McDonagh | – | Qld | Student |
| Mathesu Mon | – | Qld | Student |
| Jackson Newton | – | Qld | Student |
| Ahmed Wasan Wabib Radha | – | Qld | Student |
| Shahid Ramzan | – | NSW | Student |
| Alexander George Robson | – | SA | Student |
| Alec Anthony Saxuik | – | Qld | Student |
| Cooper Michael Simpson | – | Qld | Student |
| Bryce Tian Wei Teo | – | WA | Student |
| Jackson Trezise | – | QLD | Student |
| Remke Leander Van Dam | VU University Amsterdam | Kingdom of Netherlands | Active |
| Samantha Ware | – | Qld | Student |
| Ambrose Watson | – | Qld | Student |
| Damian Weibler | – | Qld | Student |
| Sinem Yavuz | – | WA | Student |
| Approved 24 April 2014 | | | |
| Adrian Goldberg | ENI | WA | Active |
| Patrick Mee | Bruce Beer & Associates | Qld | Associate |
| Joshua Meetens | – | WA | Student |
| Aida Muratbegovic | UTS Geophysics | WA | Active |
| Benjamin Patterson | – | NSW | Student |
| Lisa Worrall | Protean | ACT | Active |
| Approved 29 May 2014 | | | |
| Brandon Alessio | – | SA | Student |
| Brianna Marie Clark | – | SA | Student |
| Natalie Debenham | – | SA | Student |
| Nicholas Walter Eckert | – | SA | Student |
| Oleg Ermakov | GHD | Vic. | Active |
| Gorgina Falster | – | SA | Student |
| Michael Connor Genockey | – | SA | Student |
| Joel Herbert | – | NSW | Student |
| Sarah Jean | – | WA | Student |

Continued

| Name | Organisation | Country/State | Membership grade |
|----------------------------|--------------|---------------|------------------|
| Peter Karlin | - | NSW | Student |
| Samuel Angus McKindlay | - | SA | Student |
| Alison Kirby | - | SA | Student |
| Maria Cornelia Kitzig | - | WA | Student |
| Richard John Lewis | - | SA | Student |
| Stacey Patricia Lock | - | SA | Student |
| Martin Manser | - | SA | Student |
| Georgia Matthews | - | SA | Student |
| Matthew McIntyer | - | SA | Student |
| Hamish Prodan | - | SA | Student |
| Paul Soeffky | - | SA | Student |
| Michael David Stepan | - | SA | Student |
| Alan Stoate | - | SA | Student |
| Maria Then | - | SA | Student |
| Alexander Robert Tunnadine | - | NSW | Student |
| Matteo Anthony Villani | - | NSW | Student |



SEG

www.segweb.org

September 27-30, 2014

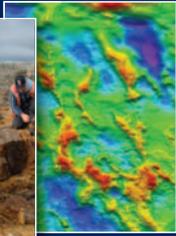
Keystone, Colorado, USA

SEG 2014 CONFERENCE

Building Exploration Capability for the 21st Century

www.seg2014.org





The conference will include plenary as well as simultaneous sessions.

Sub-themes:

| | |
|--|--|
| <p>Program</p> <ul style="list-style-type: none"> ■ Fundamental Advances in Economic Geology ■ Innovations in Exploration Technology ■ Exploration Management & Targeting ■ Case Studies of 21st Century Exploration Success | <ul style="list-style-type: none"> ■ Deposit Footprints ■ Mineral System Science |
|--|--|

Workshops

- Advanced GIS Techniques – Maximizing Your Data
- Application of Multi-Element Geochemical Data: Exploring Datasets for Better Targeting & Domaining
- Future of Mineral Exploration Drilling & Sampling
- Exploration in 2025: The Tools and Techniques to Explore Under Cover
- Getting More from Drill Core – Automated, Spectral-Based Mineral & Texture Mapping

Field Trips

- Porphyry and Skarn Systems of the Southwest U.S.
- Non-Ferrous Mineralization Associated with the Wawa-Abitibi Terrane & Duluth Complex Cu-Ni-PGM Deposits, Northeastern Minnesota
- Colorado Porphyry-Molybdenum Deposits & Leadville District
- Cripple Creek & Victor Gold Mine
- The Viburnum Trend: A World-Class Pb-Zn-Cu MVT District in SE Missouri
- Uncovering the Bingham & Stockton Cu-Mo-Au Porphyries
- Gold & Silver Mines of the Sierra Madre Occidental, Mexico

PATRON

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 KGHM
 RioTinto
COPPER & GOLD INTERNATIONAL

GOLD

 **BARRICK**
  **NEWMONT**
  **RANDGOLD**
RESOURCES

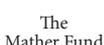
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NYSE MKT: GORO
  **hundin mining**
  **decla**
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BRONZE

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  **The Mather Fund**
  **MILPO**
  **newgold**

 FOR REGISTRATION, SPONSORSHIP OPPORTUNITIES, AND EXHIBITS, VISIT SEG2014.ORG

President's Report

Prepared for the Annual General Meeting held on 10 April 2014

Introduction

When I took over the presidency in April 2013, I expected a smooth ride through the year – many outstanding projects were either completed or in their final stage:

- by then the preparations for the Melbourne ASEG–PESA 23rd IGC&E were well underway;
- the new joint ASEG–SEG book, *Geological Interpretation of Airborne Magnetic Data*, which had been in preparation for nearly three years, drew near to completion;
- negotiations with SEG to list in *Exploration Geophysics* were almost complete;
- the new ASEG website opened with continued development; and
- preparations for the ASEG's own training course, OzSTEP, were well on the way.

A change occurred after the Melbourne conference. We noticed some discrepancies within the membership database, including failings to update members' information in a timely manner. A major investigation ensued, followed by a 'clean-up' of the membership database and its link with the ASEG website. In turn, this prompted us to review the secretariat's ability to keep up with the change of scope of service to the ASEG and the modern IT environment. This resulted in our tendering and appointing a new secretariat.

Finance

The current financial position of ASEG is sound, with our reserve improving considerably this year. As the Treasurer's Report describes, the current balance of ASEG account is close to one and a half million dollars – a large increase from the balance at the end of 2012 being just over one million dollars. The success of the Melbourne ASEG–PESA 23rd IGC&E, held in August 2013, is a major contributor to this growth, returning over \$400 000.

Conference

The Melbourne conference proved successful:

- the total number of attendees came to 846, of which about half were ASEG members;
- the 300 submissions received included 197 oral presentations and 56 posters;
- 18 workshops were held; and
- 82 exhibitors displayed their products in 110 booths.

All of which resulted in an outstanding financial return.

The next conference, Perth ASEG–PESA 24th IGC&E, 15–18 February 2015 (www.conference.aseg.org.au), is in preparation.

Publication

Our journal *Exploration Geophysics* entered its second year as joint journal with our sister societies in Japan (SEGJ) and South Korea (KSEG). The number of articles grew from 27 in 2012 to 34 in 2013. Its impact factor improved from 0.619 (2010), 0.634 (2011) to 0.667 (2012). (Note: The 2013 impact factor is due for release in mid-2014.)

The negotiation with SEG to list *Exploration Geophysics* in their Digital Library is complete, its implementation occurred in December 2013. This enhanced the exposure of our journal to the world geophysical community, and we expect the download of articles to increase. Table 1 shows the number of downloads during the introductory period.

A similar arrangement with Deutsche Forschungsgemeinschaft (German equivalent of ARC) through our publishers CSIRO Publishing is on the way. CSIRO Publishing plans to list all their journals with them.

Throughout the year, *Preview* publications arrived on time; the August issue combined with the conference handbook. Room still exists for expansion

Table 1. *Exploration Geophysics* articles download via the SEG Digital Library

| | Abstract downloads | Full paper downloads |
|------------------|--------------------|----------------------|
| Jan 2014 | 749 | 1340 |
| Feb 2014 | 1193 | 1841 |
| To 24 March 2014 | 1360 | 1016 |

and enrichment, with regular contributions sought from our members.

We also oversaw a milestone in the ASEG: a joint ASEG–SEG book, *Geological Interpretation of Airborne Magnetic Data*, published in August 2013.

Membership

The membership at the end of February was 1209 compared with 1186 in 2013.

Membership fees came under review and the policy on setting fees consolidated. This review took place because of the increased complexity of membership structure due to introduction of digital publication and option to receive digital and/or printed copies. The subscription for 2014 remains the same as 2013. We abolished the annual fee for student members, who do not receive printed copies of publications.

The membership database underwent major checking, with each record checked manually, revealing some discrepancies in the old Access database at the former secretariat – perhaps caused by the system of updating information and some handling procedures. Multiple databases existing in the secretariat, website and publisher caused problems. In the near future, we will develop a single database system to supply information for membership updates, renewal, mailing, members' login and access to publications.

Education

Continuous education programmes in association with SEG and EAGE hosted seven lecturers totalling 28 sessions in the past year (Table 2). ASEG subsidises their tour in Australia above their budgeted itinerary so that the members in many state branches can take advantage of these programmes. Unfortunately, the SEG decided not to send Spring Distinguished Lecturer, Gerald Schuster, to Australia this year.

ASEG's own training course OzSTEP started in October: Michael Asten and Dennis Cooke hosted one-day courses for branches.

ASEG continued support to the Teacher Earth Science Education Programme

Table 2. EAGE and SEG distinguished lecture tours

| | | QLD | NSW | ACT | VIC | TAS | SA | WA |
|--|---|-----|-----|-----|-----|-----|----|----|
| SEG Fall DL Manika Prasad | Shales and imposters: understanding shales | | ● | | ● | | | ● |
| Asia Pacific HL Dave Isles | Aeromagnetism – a driver for discovery & development of earth resources | ● | ● | ● | ● | | ● | ● |
| EAGE EET6 Olav Inge Barkved | Seismic surveillance for reservoir delivery | | | | ● | | | |
| SEG DISC David H. Johnston | Making a difference with 4D: practical applications of time lapse seismic data | ● | | | ● | | | ● |
| SEG Fall DL Carl Regone | Acquisition modeling: expect the unexpected | ● | ● | ● | ● | ● | ● | ● |
| SEG Near Surface HL Valentina Socco | Surface wave analysis for near-surface characterisation: introduction, theme and variations | ● | | | | | ● | |
| Pacific South HL Sandeep Chandola | Marine seismic acquisition | ● | ● | ● | ● | | ● | ● |

(TESEP), the Australasian Universities Geoscience Educators Network (Augen) and Australian Curriculum, Assessment and Reporting Authority (ACARA).

Website

Delay to the progress of populating the ASEG website is due to priority been given to the membership database and payment system updates. The Webmaster had to address a number of issues to interface the ISP and the former secretariat with the membership database. This caused frustration to some members as well as Federal and State committees. The problems are being resolved, with access authority soon to be issued to branches and committees to enable updating of their respective pages once the website manual is ready.

Technical standards

Preparations for the new standard format for the exchange of electric survey data named ‘ASEG-ESF’ are complete and documented on the ASEG website, with notifications issued to the Government Geoscience Information Committee (GGIC) and the Chief Government Geologist Committee (CGGC) for use in mandatory data submissions. This new standard format is considered flexible enough to allow for unforeseen future changes in instrument output and, being

in ASCII format, it will ensure platform independence and durability.

Honours and Awards

In 2013, the ASEG awarded two Honorary Memberships: one to Phil Harman and the other to Mike Asten. Other awards presented include the following: Lindsay Ingall Memorial Award (Pat Cunneen); Graham Sands Award (Malcolm Cattach, Keith Matthews, Edward Campbell and Symon Bouwman); Service Medal (Peter Priest), Service Certificates (Andrea Rutley; Patrick Hillsdon); Early Achievement Award (Cara Danis Jacques); and Shanti Rajagopalan Memorial Award (Cara Danis Jacques). The Conference Organising Committee selected the winners of the Laric Hawkins and presented to P Kovesi, E-J Holden & J Wong, for ‘Interactive multi-image blending for data visualisation and interpretation’.

The Honours and Awards Committee is following up the suggestion of nominating members for Civilian Awards.

History

The History Committee started its posting of ‘The History of ASEG’ on our website with the foundation of the ASEG, ‘A brief history of the formation of the

ASEG’, posted on June 2013 and compiled by Mike Smith and Roger Henderson. The plan is to include the history of education of geophysics; biographies of prominent members whose names we commemorate with awards; collections of conference themes and logos; and links to historical articles published in *Preview*.

The collection of museum material has started, and a collection policy was organised in the later part of the year.

Research Foundation

During 2013, the ASEG Research Foundation offered grants for six projects totalling \$106 900; the projects will take up to three years. Over its life, the Research Foundation committed awards totalling \$947 550; a figure expected to exceed one million dollars upon approval of the next round of awards later this month. Thanks to the corporate members and individual members who donated funds to the Research Foundation.

International affairs

The ASEG signed two new association agreements in 2013: Sociedade Brasileira de Geofisica (SBGf) and Geophysical Society of Mongolia (GSM).

The SEG, EAGE, SEGJ, KSEG and SBGf each had booths at the Melbourne Conference. In turn, the ASEG enjoyed reciprocal representation in the following foreign conferences: EAGE (London, June; by Koya Suto); Near-Surface Geophysics Asia-Pacific (Beijing, July; by Koya Suto); SBGf (Rio de Janeiro, September; by Des Fitzgerald); SEG (Houston, September; by Koya Suto); SAGA (Kruger National Park, October; by Greg Street & Katherine McKenna); SEGJ (Yokohama, November; by Greg Street & Koya Suto); and SAGEEP (Boston, March; by Koya Suto).

The ASEG participated in the first Near-Surface Geophysics Asia-Pacific conference led by the SEG. About 300 delegates attended this conference, returning a modest (~\$3800) surplus to ASEG. This conference will be hosted in Hawaii next in 2015, and then in Australia in 2017.

Secretariat change

Federal Executives decided to tender for a new secretariat in October. The old secretariat at CASM had been working

with us for ten years. During that time, the ASEG grew considerably with changes in the business IT environment. Accordingly, our expectations for secretariat work also changed. We found CASM did not meet our changing expectations, e.g. the issues with the membership database. So, the Federal Executive (FedEx) thought it appropriate to seek a new contract with a new set of scopes; after an intensive selection process it chose 'The Association Specialists' (TAS) to work with us. In the initial two months, TAS showed a committed service culture with knowledge of business and keen initiatives.

Federal Executive members

Michael Asten, who served in the FedEx since 2008, including as President in 2009, retired in August 2013. Reece Foster, member of the FedEx since 2009 and Treasurer in 2012, is retiring at this (April 2014) AGM. Also retiring is Philip Heath, who looked after state branch liaisons since 2012.

Tania Dhu joined the FedEx in September 2013. Other FedEx members for 2013 include the following: Greg Street, President-Elect; Phil Schmidt and Mark Tingay, Vice-Presidents; Barry Drummond, Hon Secretary; Kim Frankcombe, Immediate Past President; Carina Kemp; Katherine McKenna; and Wendy Watkins.

I thank them for their contributions throughout the year. I would like to note three of the members who undertook particularly hard tasks this year: Katherine McKenna, for resolving the membership database problem; Carina Kemp, for interfacing the database and website; and Kim Frankcombe, for leading the secretariat tendering process.

New challenges

We have drawn a five-year strategic plan. We identified that education is a key element in the ASEG's role in the geophysical community. The first stage, implementation of OzSTEP, has already taken place. Soon to be formed are Specialist Groups canvassing several disciplines: these groups will promote communication amongst interested members via our website, newsletters and meetings. Additionally, these Specialist Groups will assist future conferences in organising technical sessions.

The UNCOVER initiative held a summit meeting in Adelaide. Many geophysics contents are included and we expect a higher level of activities in our field – the ASEG may be of help in this initiative.

Further enhancement of membership service through the website is in the plan. State branches, Secretariat and committees will be able to post their information on respective web pages. Carina Kemp as Webmaster is working on manuals for the participants. We need more people to share her workload.

Our journal *Exploration Geophysics* and magazine *Preview* will continue to deliver high-quality articles to members. The ASEG Research Foundation will continue to support studies in geophysics.

The forthcoming conferences in Perth in February 2015, then in Adelaide 2016 will be our largest regular events to provide members with opportunities to refresh their technical skills and to meet colleagues. In addition, the ASEG is hosting the Near-Surface Geophysics Asia-Pacific conference in 2017. This conference is smaller than our regular conferences, offering opportunities for venues that cannot accommodate ASEG conferences. As this is an international conference, we are considering an

attractive venue for international delegates as well as our members.

To close off

I thank all the individual and corporate members for their support of ASEG, particularly those who participated in committees at all levels: editors, associate editors, the publisher and secretariats. I also thank our associate society friends who promoted our conference, who provided lecturers, who are partners in *Exploration Geophysics*, and who participated in the Near-Surface Geophysics Asia-Pacific conference.

I note *Preview* did not publish any obituary. This no news is good news. Wishing all another safe and healthy year, I pass the gavel to Greg Street, my successor.

Thank you for the opportunity to be your President for the past year.



Koya Suto hands over the ASEG Presidency to Greg Street.

Koya Suto
President, ASEG
2013–2014



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www.publish.csiro.au/earlyalert

Treasurer's Report

Prepared for the Annual General Meeting held on 10 April 2014

Presented here are the Audited financial statements of the year ending 31 December 2013 for the Australian Society of Exploration Geophysicists (ASEG). The financial statements refer to the consolidated funds held by the society as a whole, including the State Branches.

The Society's funds go towards promoting the science and profession of geophysics throughout Australia, achieved by:

- funding publications (*Exploration Geophysics*, *Preview* and the *Membership Directory*);
- supporting State Branch functions;
- funding the national administration of the Society;
- continuing education programs;
- provision of loans and grants for conventions;
- provision of subsidies for student members; and

- supporting the ASEG Research Foundation.

As of 31 December 2013, the Income Statement for the year shows a net surplus of \$144 579, and a Total Equity of \$1 426 878. The Society's revenue source continues to be derived from:

- publications advertising: \$187 000;
- membership subscriptions: \$149 000;
- events and sponsorship: \$127 000;
- conferences: \$572 000;
- interest from accumulated investments: \$38 000; and
- donations to the Research Foundation: \$20 000.

The actual income for the year is significantly higher than the budgeted amount. Conferences account mostly for the significant increase in income – specifically, the 2013 ASEG Conference.

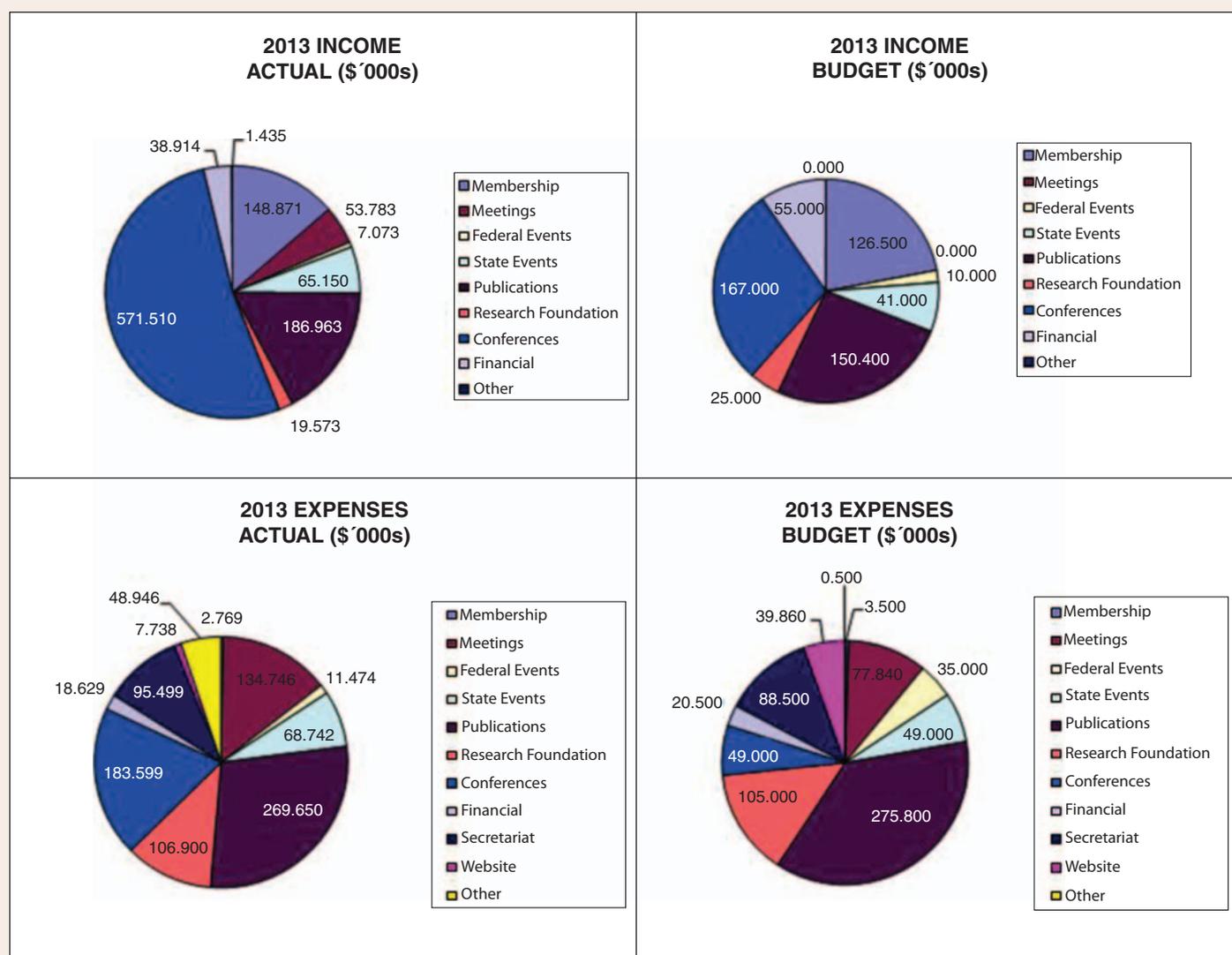
The major expenses for the Society include:

- publications: \$270 000;
- events: \$264 000;
- research foundation support: \$107 000;
- secretariat fees: \$95 000;
- conferences: \$184 000; and
- financial: \$19 000.

Expenditure is slightly higher than budgeted, mainly due to more conference related expenses. The Society is in a very sound financial position going into 2014. The equity held will cover the uncertainty of income from future conferences.

Charts of Income and Expense Items

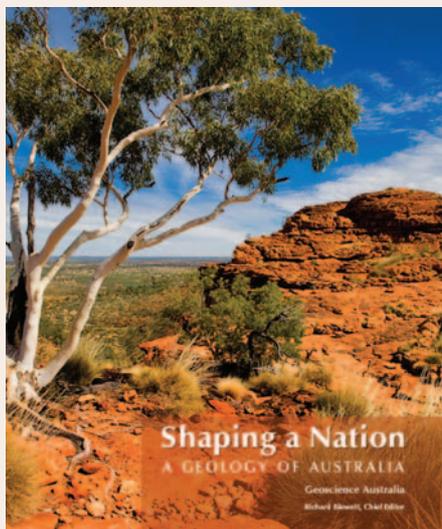
Reece Foster – 1 April 2014
Honorary Treasurer (2013–2014)
treasurer@aseg.org.au



Australian Capital Territory

In April, the ACT branch of the ASEG hosted the Federal Executive AGM. It offered us a great opportunity to spend more time with the Federal Executive than usual. The branch extended thanks to Koya Suto for his leadership as President and to Kim Frankcombe for his inspired talk 'Deep Exploration using Electrical Methods' by presenting them both a copy of *Shaping a Nation: A Geology of Australia* edited by Dr Richard Blewett. This visually spectacular book is available free of charge in PDF format, downloadable from ANU Press (<http://press.anu.edu.au/titles/shaping-a-nation>) and, yes, it does highlight geophysics.

The ACT branch has called for applications for two student awards. The first student award is for \$2000 and will be awarded in June 2014 for an outstanding undergraduate or postgraduate student (second year or above) studying geophysics or a geophysics-related discipline in the ACT. The second award is a student conference travel award to support attendance at an ASEG conference. This award includes student registration fee and pre-approved travel costs to a maximum value of \$1000. The award is open to ACT students studying geophysics or a geophysics-related discipline, or those using geophysical data or concepts in a major project. For further details, please contact Marina Costelloe actpresident@aseg.org.au or Millie Crowe actsecretary@aseg.org.au. Applications for 2014 closed prior to the publication of this edition. Awards will be announced in the next edition of *Preview*.



The Act Branch awarded hard copies of *Shaping a Nation* to Koya Suto and Kim Frankcombe.

On 14 May 2014, the ACT Branch hosted the EAGE course 'Seismic Fracture Characterisation: Concepts and Practical Applications' given by Enru Liu of ExxonMobil. As part of the EAGE's Education Tour 8, this course received support, to a degree, by the ASEG and, for the Canberra visit, by PESA. Around 20 people attended the course, including a substantial cohort of students availing themselves of the free places generously offered by the EAGE.

Marina Costelloe
ACT Branch President

New South Wales

In March, we hosted the 2014 Pacific South Honorary Lecturer, Sandeep Chandola.

Sandeep spoke about Marine Seismic Acquisition, giving an overview of the field as well as showing many examples of what is currently done. Sandeep then discussed future possibilities and what he thought future trends would be. Much discussion followed his presentation and ample red wine was consumed discussing the finer points of broadband acquisition.

In April, Nathaniel Butterworth from the University of Sydney spoke about big data-mining techniques for porphyry deposits. Nathaniel discussed how data-mining large multidimensional datasets and applying machine learning techniques is moving us toward constructing next-generation reference frames. Nathaniel took us through applying such techniques in looking at porphyry deposits in South America.

Also in April we awarded a Scholarship to our 2014 ASEG NSW Student Scholarships recipient. The recipient is Ben Patterson from Macquarie University. The Scholarship is to assist the student with their geophysics research topic.

An invitation to attend NSW Branch meetings is extended to interstate and international visitors who happen to be in town at that time. Meetings are held on the third Wednesday of each month from 5:30 pm at the Rugby Club in the Sydney CBD. Meeting notices, addresses and relevant contact details can be found at the NSW Branch website.

Mark Lackie

Victoria

On Friday 14 March 2014 the ASEG Victoria Branch hosted SEG 2014 Pacific

South Honorary Lecturer Sandeep K. Chandoola from Petronas presenting 'Marine Seismic Acquisition: Expanding the Possibilities!' Sandeep hosted the noontime lunch meeting at the Victoria Hotel to a small, but enthusiastic, group of geophysicists, not only from the ASEG branch but also from PESA.

Wednesday 16 April 2014 saw the return of the Annual General Meeting (AGM) of the ASEG Victorian Branch: John Theodoridis stepped down as Victorian Branch Secretary prior to an interstate move, and Theo Aravanis handed over the role of Victorian Branch Treasurer in preparation for a more federal role in the ASEG. Both left with thanks and appreciation for their work with the Victorian Branch over the past years. We held the AGM at the historic Kelvin Club in Melbourne's CBD. Members re-elected Asbjorn Norlund Christensen as Victorian Branch President, and elected Seda Rouxel as Victoria Branch Secretary and Luisa D'Andrea as Victorian Branch Treasurer.

Following the AGM Richard Schodde from MinEx Consulting presented 'The Rise and Rise of Geophysics: an Overview of Minerals Exploration Trends over the Past Century'. Richard presented the results of a detailed study he has carried out which assessed the exploration techniques used on to discover over 2000 significant gold and base metal deposits around the world from 1900 to present. Prior to 1950, most discoveries were made by prospecting, but in recent decades, geochemistry and geophysics have progressively become more important – especially geophysics for prospect-scale exploration of base metal deposits under cover. From his work, it is clear that geophysics will play an increasingly critical role in finding the next generation of mines.

On 30 April 2014, we hosted the one-day SEG Distinguished Instructor Short Course (DISC) 'Microseismic Imaging of Hydraulic Fracturing: Improved Engineering of Unconventional Shale Reservoirs', by Shawn Maxwell of Schlumberger. We are indeed fortunate that SEG will sponsor such events.

On 21 May 2014, James Macnae from RMIT presented 'Airborne IP is coming!' at the Kelvin Club. James convincingly argued that with recent improvements in signal/noise ratios of helicopter TEM systems, the late-time effects of induced polarisation from near-surface sources are commonly observed in survey data.

However, in order to detect polarisable targets such as a copper porphyry or tabular sulphide body under say 100 or 150 m of moderately conductive cover, it is necessary to make several changes to airborne EM systems. This includes changing system geometry to separate transmitter from receiver by about 200 m, lowering the base frequency to 10 Hz (or lower) and obtaining adequate signal/noise at this low frequency during both on- and off- times of the transmitter. Research and limited airborne testing has shown that the key requirement of signal/noise can be achieved at 12.5 Hz in central-loop AEM geometries. However, the requirement of a 200 m separated transmitter–receiver is one that is difficult to overcome.

It is going to be a busy winter and spring season at the ASEG Victoria Branch:

- We are currently seeking a speaker for a technical evening meeting in July, so watch out for email alerts.
- On Wednesday 6 August 2014, it will be time for the *Annual Joint ASEG–PESA–SPE Mid-Winter Social*.
- On Thursday 7 August 2014, we will host the SEG 2014 Distinguished Lecture: ‘3D seismic image processing for interpretation of faults and horizons’, presented by Dave Hale from Colorado School of Mines. This will be a noontime lunch meeting.
- On Friday 19 September 2014, we will host the ASEG 2014 OzStep one-day course ‘The Gamma-ray Spectrometric Method for Mineral Exploration and Environmental Mapping’, to be presented by Brian Minty.
- On Wednesday 8 October 2014, we will host an evening technical meeting with the SEG 2014 Near Surface Honorary Lecture: ‘Integrated Geophysical Methods Applied to Geotechnical and Geohazard Engineering: From Qualitative to Quantitative Analysis and Interpretation’, by Koichi Hayashi from Geometrics.

We look forward to seeing many ASEG Victoria Branch members at the meetings in the coming months.

Asbjørn Nørlund Christensen
VIC Branch President

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SEG 2014 Pacific South Honorary Lecturer Sandeep K. Chandoola from Petronas presenting to the ASEG Victoria Branch.



UPCOMING EVENT

REGISTRATION OPEN FROM JULY 7

A Practical One-Day Workshop on: Geophysical Inversion for Mineral Explorers

presented by the WA Branch of the Australian Society of Exploration Geophysicists

Targeting geologists and geophysicists, this event will be a one-day seminar series focused on the application of geophysical inversion in modern mineral exploration. Presentations will cover a wide range of geophysical techniques, commodities and geological settings.

PROVISIONAL PROGRAM

- Practical theory
- Case studies I
- Case studies II
- Recent and future developments

PROVISIONAL SPEAKERS

Helen Gibson, Kim Frankcombe, James Reid, Chris Wijns, Michael Webb, Brett Harris, Yusef Ley Cooper, Tim Chalke and many more!

Sponsored by



WHEN & WHERE

September 2nd, 2014
City West Function Centre
45 Plaistowe Mews, West Perth, WA

REGISTRATION RATES*

| | |
|----------------------|-------------|
| ASEG and AIG members | \$200 |
| Non-members | \$300 |
| Students | \$50 |

* Includes GST, morning & afternoon teas, lunch and sundowner

For further information contact Regis Neroni (rneroni@fmgl.com.au), John Joseph (john.joseph@groundprobe.com) or Antonio Huizi (antonio@sgc.com.au)

ASEG National Calendar: Technical Meetings, Courses and Events

| Date | State branch | Event | Presenter | Time | Venue |
|-------------|----------------|--|--|-----------|---------------------------|
| 2014 | | | | | |
| 6 Aug | Melbourne, VIC | Annual Joint ASEG–PESA–SPE Mid-Winter Social | | TBA | TBA |
| 13 Aug | Perth, WA | Humanitarian geophysics | Jeff Shragge, UWA, Perth | 1730–1900 | City West Function Centre |
| 10 Sept | Perth, WA | New logging and sensing technologies for mineral exploration | Brett Harris, Curtin University, Perth | 1730–1900 | City West Function Centre |
| 13 Nov | Perth, WA | Honours and Masters Students Research Presentations | various | 1730–1930 | City West Function Centre |
| 10 Dec | | AGM and Christmas Party | | 1730–2030 | TBA |

OzSTEP One day course
'4D Seismic Reservoir monitoring'
Presented by David Lumley

EAGE Distinguished Lecturer Programme (DLP): 1h Webinar Q&A on 16 July at 1300 EST

'Controlled Source EM and Magnetotelluric Data for Sub Basalt Imaging'

Presented by G. M. Hoversten

To access the abstract and biography, visit the EAGE homepage (www.eage.org) and follow the tabs: Education > Learning Geoscience > Classroom Training > DLP > Overview DLP Lectures.

(Please contact Wendy Watkins at continuingeducation@aseg.org.au for additional information.)

2014 SEG/AAPG Distinguished Lecturer

'3D seismic image processing for interpretation of faults and horizons'

Presented by David Hale, Colorado School of Mines, Golden Colorado, USA

Supported by CGG and Paradigm.

(www.seg.org)

| Date ^{TBC} | State branch | – | – | Time | Venue |
|---------------------|-----------------|---|---|------------|---------------------------|
| 4 Aug | Brisbane, Qld | | | TBA | TBA |
| 5 Aug | Canberra, ACT | | | TBA | TBA |
| 7 Aug | Melbourne, Vic. | | | 1200 | TBA |
| 8 Aug | Hobart, Tas. | | | TBA | TBA |
| 11 Aug | Adelaide, SA | | | TBA | TBA |
| 12 Aug | Perth, WA | | | 1730 start | City West Function Centre |

OzSTEP One day course

'The Gamma-ray Spectrometric Method for Mineral Exploration and Environmental Mapping'

Presented by Brian Minty

| Date | State branch | – | – | Time | Venue |
|--------|-----------------|---|---|------|-------|
| 19 Sep | Melbourne, Vic. | | | TBA | TBA |

2014 SEG Near Surface Honorary Lecturer

'Integrated geophysical methods applied to geotechnical and geohazard engineering: from qualitative to quantitative analysis and interpretation'

Presented by Koichi Hayashi, Geometrics San Jose, California

(www.seg.org)

| Date | State branch | – | – | Time | Venue |
|--------|-----------------|---|---|------------|---------------------------|
| 8 Oct | Melbourne, Vic. | | | TBA | TBA |
| 10 Oct | Perth, WA | | | 1730 start | City West Function Centre |

TBA, to be advised (please contact your state branch secretary for more information); TBC, to be confirmed.



Initial Notification for Nominations for the 2015 ASEG Honours and Awards

Presentation at the ASEG–PESA 24th International Geophysical Conference and Exhibition, 15–18 February 2015, Perth, WA



Categories include:

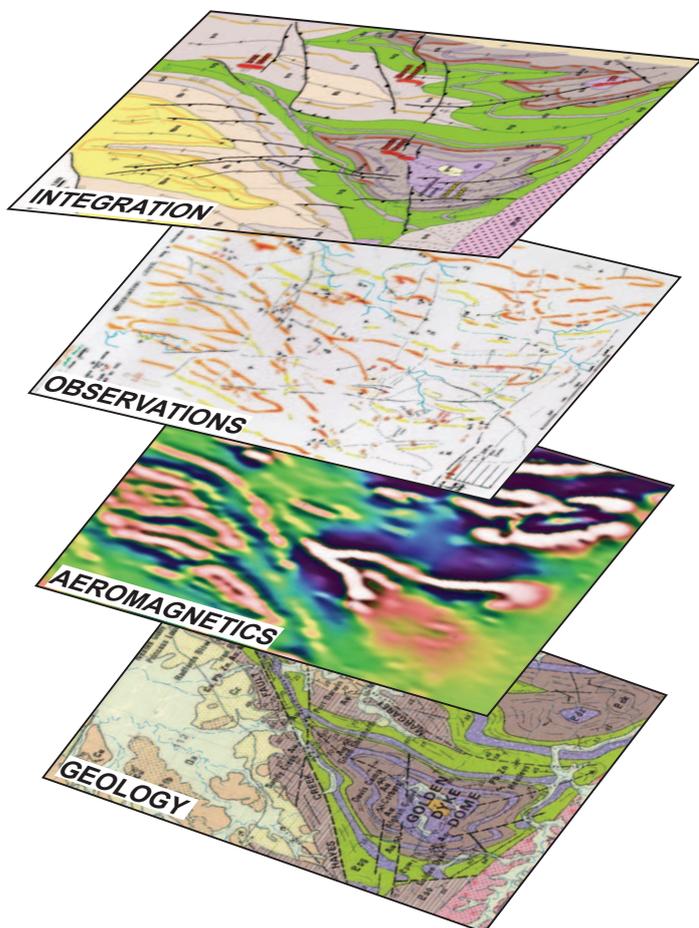
- Outstanding contributions to the geophysical profession
- Outstanding contributions and service to the ASEG
- Recognition of innovative technological developments
- Promotion of geophysics to the wider community
- Significant achievements by younger ASEG members

Nomination guidelines:

- ASEG website www.aseg.org.au/awards
- Further details in the next issue of *Preview*

For further information, or to request a nomination pro forma or submit an initial nomination advice, please contact:

Andrew Mutton
ASEG Honours and Awards
Committee Chair
awards@aseg.org.au



GEOLOGICAL INTERPRETATION of AEROMAGNETIC DATA

a **NEW** e-BOOK by Dave Isles and Leigh Rankin

This book is a practical manual for aeromagnetic interpretation written primarily for geologists.

As well as covering the basic physics of magnetic anomalies and chemistry of magnetisation in rocks, it features three expansively worked examples illustrating the integration of aeromagnetics and geology in terrains ranging from Archaean 'granite-greenstone' to Phanerozoic sedimentary basins.

It generously illustrates modern imagery and the basic steps in the integration and interpretation process.

Based on the short course "Geological Interpretation and Structural Analysis of Aeromagnetic Data" conducted by the authors since 1995, the book aims to provide readers with the basic qualitative observation and interpretation skills necessary for integration of aeromagnetics with geology.

It is suited to both explorers and mappers, and covers the basic targeting concepts used in mineral, hydrocarbon and groundwater exploration.

Published by ASEG



Australian Society of
Exploration Geophysicists

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www.aseg.org.au/aseg-books or

www.seg.org/resources/publications/books

For further information email secretary@aseg.org.au

ASEG Specialists Travelling Education Programme (OzSTEP)

Presenters for 2014 announced!

In 2013, the ASEG proudly presented two inaugural OzSTEP courses. The one-day courses, divided into two streams: Minerals and Petroleum, aim to provide further education for members given by presenters with a particular specialisation in geophysics. The ASEG would like to thank Michael Asten and Dennis Cooke for presenting the inaugural 2013 courses. Following the success of the 2013 programme, the ASEG is pleased to announce the continuation of these courses into 2014.

Minerals stream

‘The Gamma-Ray Spectrometric Method for Mineral Exploration and Environmental Mapping’
Presented by Brian Minty

Intended audience

Geophysicists and geologists seeking to broaden their knowledge of the gamma-ray spectrometric method and its geoscience applications.

Course outline

Session 1:

- Course overview and scope
- Fundamentals of gamma-ray spectrometry
- Introduction to ground and airborne surveying

Session 2:

- Calibration and data processing
- Spectral methods for reducing noise

- Data reduction methods
- Radioelement baselines and back-calibration

Session 3:

- Contract specifications and survey monitoring
- Quality control for airborne gamma-ray surveys
- Radon effects in gamma-ray surveys

Session 4:

- Gamma-ray fundamentals for effective interpretation
- Disequilibrium and accuracy
- Measurement precision
- Presentation and interpretation

Biography

Brian Minty graduated from Rhodes University (BSc) in 1976 with majors in mathematics and physics. He then received a BSc (Hons) in 1977 specialising in geophysics from the University of the Witwatersrand, and a MSc (Cum Laude, 1982) in exploration geophysics from the University of Pretoria, and a PhD (1997) from the Australian National University. Early in his career, Brian worked for the Geological Survey of South Africa (1977–1981), and Hunting Geology and Geophysics (1982–1986). In South Africa he worked on airborne surveys targeting uranium, and it was during this period that he developed a life-long interest in airborne geophysics and, in particular, the gamma-ray spectrometric method. In 1986, he joined Geoscience Australia, and soon found himself in a research role. He

has published techniques for mapping caesium fallout, the micro levelling of airborne magnetic data, the estimation of atmospheric radon background, and the multichannel processing of airborne gamma-ray spectrometric data. He also developed a methodology for the automatic merging of gridded airborne geophysical survey data. After 25 years with Geoscience Australia, and its predecessors, Brian started his own consultancy (Minty Geophysics) in 2011. Over the years, he has undertaken a number of international training consultancies – mainly in the field of airborne gamma-ray spectrometry. These include consultancy work for the Geological Survey of France, Geological Survey of Norway, Anglo American Corporation, the South African Geophysical Association, and the Iranian Geophysical Society. He has also represented Australia on two International Atomic Energy Agency consultancies – looking at the standardisation of acquisition, calibration and data processing procedures for gamma-ray spectrometry.

Petroleum stream

‘4D Seismic Reservoir Monitoring’
Presented by David Lumley

Please contact Wendy Watkins or your local ASEG Branch for additional information.

Wendy Watkins
Continuing Education
continuingeducation@aseg.org.au



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Geophysics for natural disasters – Balkan cries for help!

Snezana Komatina^{1,4}, Milovan Urosevic² and Koya Suto³

¹President of Association of Geophysicists and Environmentalists of Serbia (AGES), Dimitrija Avramovica 38, 11030 Belgrade, Serbia

²Curtin University, Perth, Australia

³Terra Australis Geophysica Pty Ltd, Queensland, Australia

⁴Corresponding author. Email: komsne@yahoo.com

Dear colleagues and friends

We are sure that you have been informed about tragedy in Serbia and Bosnia caused by torrential rainfall. Continuous, heavy rainfall, commencing on 13 May, has resulted in extensive flooding in Serbia, Bosnia and Herzegovina (BiH) and Croatia. Three months' worth of rain fell in only three days. In Serbia, more than 1.6 million people are affected by the floods (22% of the population). The most affected is Serbian capital Belgrade and surrounding towns. In BiH, an estimated 1.5 million people are affected (39% of the population)! In Croatia, 38 000 people are affected.

Heavily affected areas are shown in Figure 1. More than 120 000 households in Serbia are without electricity and more

than one million people do not have access to water in BiH. Relief efforts are being hampered by landslides, damaged infrastructure, broken telecommunications, blocked roads, blackouts and particularly in BiH shifting minefields. It is also likely to affect the provision of assistance, and the Government is warning against the use of alternative roads without prior clearance.

Hundreds of bridges have been damaged and 3500 km of roads need substantial repairs, key railway lines will be closed for at least a month. More than 500 000 children affected by the floods now live living in makeshift homes or on the streets.

Can geophysics and geophysicists help?

As of 22 May some 2610 landslides have been reported throughout affected regions of Serbia and BiH. The worst is that landslides have moved landmines (UXO) to unknown locations and swept away many of the warning signs around the minefields (UNISDR 19/05/2014). Understanding and predicting landslides is of key importance for reducing the global impact of natural disasters.

In general, landslides are complex geological forms or bodies. They are composed of layers of contrasting and/or gradational physical properties (Bogoslovsky and Ogilvy, 1977). Internal geometry, rock composition and strength may result in different landslide scenarios. It is therefore of a prime importance to investigate the internal structure of the landslides. The traditional methods of engineering geology need to be accomplished by geophysical investigations (Bogoslovsky and Ogilvy, 1977). DC electrical resistivity profiling could nicely reveal internal structure of a landslide (Jongmans and Garambis, 2007). More often electrical and seismic methods are jointly used to investigate internal geometry and estimate the slope stability. Such an example is found in Frasheri et al. (1998), where geological information where complemented by geophysical investigations. Primary geophysical objectives are to determine the thickness of the body and slip zone. Internal structure is also important (Jongmans and Garambois, 2007).

Ground geophysical methods are not limited to electrical and seismic applications. Time-lapse geophysical and temperature measurements are also used for monitoring the activity of landslides. Combinations of magnetic, electric and temperature measurements seem to be effective for that purpose (Bogoslovsky and Ogilvy, 1977).

However, in case of the latest landslide disasters in Serbia and BiH, the area affected is enormous and it may take many years for ground geophysical investigations to become effective on such scale. Modern airborne geophysical techniques such as SkyTEM offering a suite of geophysical measurements capable of delivering high resolution information may be required to cover large areas and help characterise landslides in a timely manner.

Currently it is of capital importance to delineate landslides containing UXO. The threat there is that some are composed of plastic and as such can enter the river systems and cause problems in surrounding countries. Both ground and airborne investigations are immediately required. Several key UXO groups have been identified providing exceptional expertise, most of them based on time-domain EM. A ground based expert

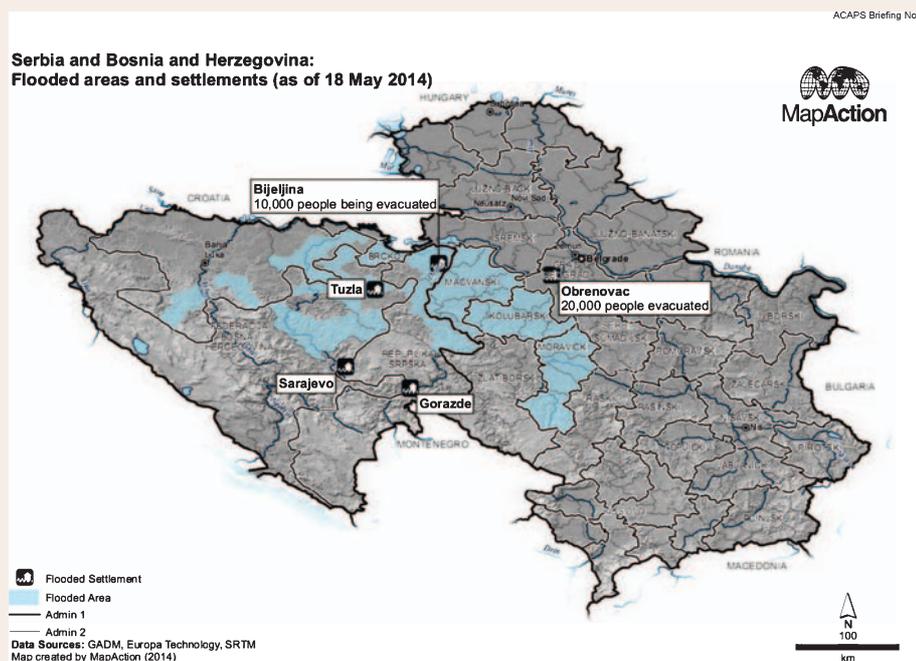


Fig. 1. Areas affected by flood across three Balkan countries. (Image courtesy: Assessment Capabilities Project - report from acaps, 19 May 2014, 'Floods in Serbia, Bosnia and Herzegovina; acaps briefing note'. Available at: <http://reliefweb.int/report/serbia/floods-serbia-bosnia-and-herzegovina-19-may-2014> [Accessed 28 May 2014])

group from Japan (Professor Sato of Tohoku University) is likely to be the first on the ground in Serbia and BiH. All geophysical societies including the two main SEG and EAGE are considering the ways of contributing. SEG's 'Geophysics Without Borders' project is one of them.

There is a long-term needs for the application of geophysics for characterising numerous and widespread landslides and monitoring their activity. Immediate action is needed for delineating UXO sites to prevent further human losses and spreading of the disaster to surrounding countries.

How can geophysicists and their societies help?

It is clear that geophysicists-volunteers could be recruited in numbers, much easier than the required financial structure necessary to support mobilisation of the equipment, transport of geophysicists and daily expenses related to investigations. This may be achieved primarily through the activities of our societies such as:

- The EAGE Presidents' charity dinner in Amsterdam – all participants to be

invited by the EAGE President to donate individual support or support of their society (if each Associated Society donates 100 EUR, there will be 6600 EUR).

- The same type of event could be organised during the SEG Annual Meeting (long-term help will be necessary).
- Research grants both short and long term.

Next, expert support is sought:

- Expert teams for UXO (companies).
- 'Geoscientists Without Borders'.
- Expert consultants and individuals.

Will anybody who can volunteer with their expertise please contact the AGES President, Snezana Komatina, komsne@yahoo.com. Individual donations may be made to the official account of the governments of Serbia and BiH in Australia below or to AGES (please contact Snezana Komatina for instructions).

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Donations

For those members who wish to give donations towards disaster relief, the Serbian government has opened a dedicated account with the Commonwealth Bank – donations into this account are tax deductible in Australia.

For additional information, or to make an online donation, please visit the 'Embassy of the Republic of Serbia, Canberra, Australia' website (www.canberra.mfa.gov.rs).

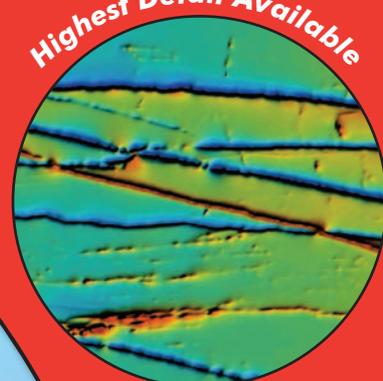
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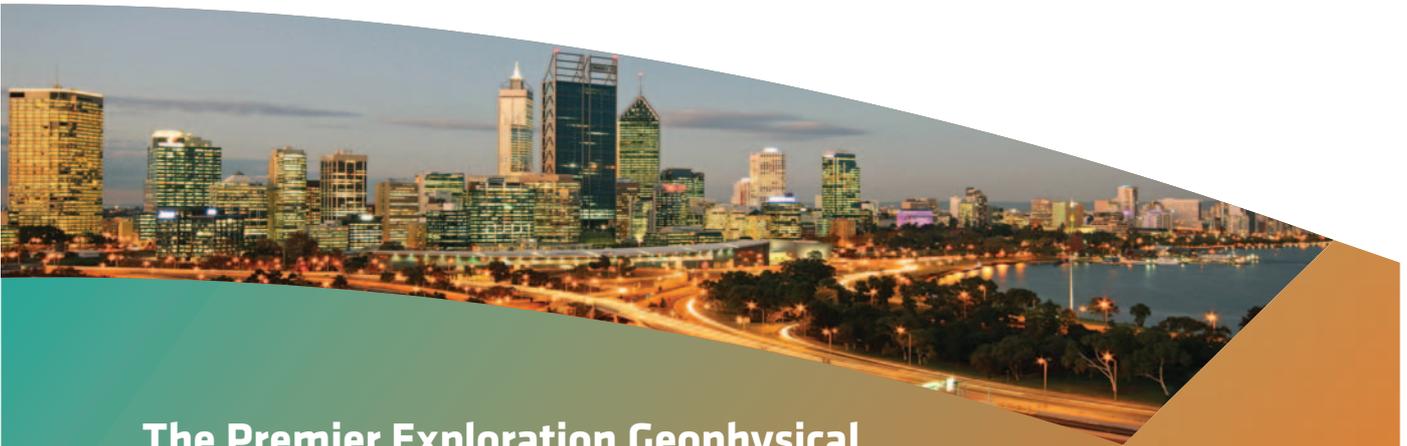




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Budget 2014 full of paradoxes

The 2014–15 Australian Budget tabled by the Treasurer, Joe Hockey, on 13 May 2014 is one of the more unusual budgets I have encountered. It is full of paradoxes and unexplained directions. For example, we are told on the one hand, there is a budget crisis and the government will fix it. On the other hand, we are going to buy fifty-eight more F35 Joint Strike fighter planes (making a total of seventy-two) at a cost of \$12 billion as part of increasing defence spending to 2% of GDP. Yet, no arguments have been made to suggest that we are in any more danger now than we were one year ago, or considerations that drone technology may well overtake the need for most of the reconnaissance roles of the F35s in the not too distant future.

The government is going to scrap the carbon tax, which generates about \$4 billion per year, despite its effectiveness in reducing carbon emissions from electricity generating plants, and that most people are not even aware they are paying this tax. Nearly everybody, however, will feel the increase in petrol excise imposed by the government without the benefit of generating anything like \$4 billion per year. In addition, the Direct Action plan to reduce carbon dioxide emissions – where a \$2.55 billion Emissions Reduction Fund, paid for by the taxpayer, will be established to pay the biggest polluters to reduce their carbon emissions – is just another example of an unnecessary expense.

The government is introducing a \$7 co-payment charge on everyone who goes to see a GP, has a blood test or an image taken. However, the revenue generated is not going to help in reducing the deficit if it is going towards a new \$20 billion research fund to cure diseases.

It should be noted that the National Health and Medical Research Council (NHMRC) is already set to receive \$1 billion in 2014–15, which is more than the \$905 million allocated for the whole of

| Agency | Resources 2013–14 (\$M) | Resources 2014–15 (\$M) |
|--|-------------------------|-------------------------|
| Australian Nuclear Science and Technology Organisation | 314 | 366 |
| Australian Research Council | 913 | 905 |
| Australian Institute of Marine Science | 52 | 62 |
| Bureau of Meteorology | 346 | 344 |
| CSIRO | 1305 | 1252 |
| Geoscience Australia | 135 | 130 |
| NHMRC | 878 | 1000 |

the Australian Research Council (ARC). Furthermore, there does not appear to be any new programmes to improve the health of the nation by preventing diseases or tackling chronic life style afflictions. It seems to me that the national research effort is in danger of being distorted in favour of curing rather than preventing. In any case, Australia is unlikely to have the capacity to manufacture or market any new drugs discovered: profits are not likely to return to Australia, but will go to the Pfizers of this world.

The 2014 budget proposes to maintain the savage efficiency dividends (2% per year) on government agencies introduced by the previous Labor government. This is a lazy way of cutting government programs without any proper prioritisation. I would have thought that in this day and age, when we rely so heavily on science and technology, the government science programmes might have been spared or even expanded, but this is not to be.

The table below summarises the resource allocations for the main science agencies, taken from the budget papers.

As you can see ANSTO, AIMS and NHMRC appear to have had their budgets increased, whilst all the others are going backwards. Geoscience Australia has a \$5 million reduction; on top of this will be reductions in external earnings from other government departments, because they cannot afford GA's services.

The other strange announcement in the budget is the allocation of the entire new

infrastructure funding to building more roads, mostly in and around Sydney and Melbourne, where the benefits will probably be only temporary (most new roads in cities seem to become clogged very soon), and in the apparent absence of a national cost benefits analysis.

For me, infrastructure should include a whole range of systems, such as water storage and supply, sewerage systems, waste management, electrical grids and telecommunications; in other words, systems that improve the nation's living conditions. All we seem to be getting are more roads near the major cities – mid-20th century thinking.

For one-tenth of the costs of the roads proposed we could build a National Broadband Network (NBN) to service just about everybody. This would allow more people to work at home or away from the congested cities...but then, that is only my suggestion!



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Update on the Geophysical Survey Progress from the Geological Surveys of Western Australia, South Australia, Northern Territory, Queensland and WA Department of Water (information current on 8 May 2014)

Tables 1–3 show the continuing acquisition of the airborne magnetic, radiometric, gravity and AEM data of the Australian continent respectively.

Geoscience Australia (GA) managed all surveys. Select locality maps accompany Tables 1 and 2, shown in Figures 1, 2 and 3 respectively. Further information

on these surveys is available from Murray Richardson at GA via email at murray.richardson@ga.gov.au or telephone on (02) 6249 9229.

Table 1. Airborne magnetic and radiometric surveys

| Survey name | Client | Contractor | Start flying | Line (km) | Spacing AGL Dir | Area (km ²) | End flying | Final data to GA | Locality diagram (Preview) | GADDS release |
|----------------------------------|--------|------------------|--------------|-----------|---------------------------|---|----------------------------------|--------------------|--------------------------------|---------------|
| Kalgoorlie East & Kurnalpi North | GSWA | Thomson Aviation | 5 Aug 13 | 122 000 | 100 m 50 m E–W | Kalgoorlie: 11 000; Kurnalpi N: 11 000 | 100% complete at 15 Mar 14 | TBA | Issue 165 (Aug 13) p. 11 | TBA |
| Widgiemoooltha North | GSWA | UTS Geophysics | 25 Jul 13 | 92 000 | 100 m 50 m E–W | 8200 | 100% complete at 27 Jan 14 | Expected 8 May | Issue 165 (Aug 13) p. 11 | TBA |
| Menzies South | GSWA | GPX Surveys | 28 Nov 13 | 92 000 | 100 m 50 m E–W | 8200 | 100% complete at 16 Mar 14 | Expected 15 May | Issue 165 (Aug 13) p. 11 | TBA |
| Kurnalpi South | GSWA | UTS Geophysics | 28 Jan 14 | 92 000 | 100 m 50 m E–W | 8200 | 92.0% complete at 4 May 14 | TBA | Issue 165 (Aug 13) p. 11 | TBA |
| Coompana | GSSA | TBA | TBA | TBA | Survey design is underway | The proposed survey may cover all or part of Noorina, Wyola, Cook, Coompana, Nullarbor, Ooldea, Maurice, Wells and Birksgate standard 1 : 250 000 standard Map Sheets | | | | |
| Dunmarra | NTGS | TBA | TBA | 102 500 | 400 m 80 m N–S | The Quotation Request was released on 29 April, closing on 15 May. The proposed survey covers the Katherine, Larrimah, Hodgson Downs, Daly Waters, Tanumbirini and Newcastle Waters standard 1 : 250 000 Map Sheets | | | | |
| Yalgoo | GSWA | TBA | TBA | 108 000 | 100/200 m 50 m E–W | The Quotation Request is in preparation by GA. The proposed survey covers the four 1 : 100 000 Map Sheets centred at the common point (117°E, –29°E) of the Yalgoo, Kirkalocka, Perenjori and Ninghan standard 1 : 250 000 Map Sheets | | | | |

See Figures 2 and 3 for the locality maps of the Southern Thomson and Gippsland Basin surveys respectively. TBA, to be advised.

Table 2. Gravity surveys

| Survey name | Client | Contractor | Start survey | No. of stations | Station spacing (km) | Area (km ²) | End survey | Final data to GA | Locality diagram (Preview) | GADDS release |
|---|----------------------|------------|--------------|---|---|-------------------------|---|---|--|---------------|
| WA Reconnaissance Gravity Surveys Stage 3 | GSWA | TBA | TBA | Approx. 53 900 in total across 7 proposed surveys | 2.5 km regular grid and 2 km road traverses | TBA | TBA | The Quotation Request opened on 28 Jan 14 and closed on 27 Feb 14 | The proposed surveys are located in: 1. Ngururrpa Region, 1 survey: Stansmore and surrounds 2. NE Yilgarn, 4 surveys: Herbert-Rober, Throssel, Sir Samuel and Wiluna-Nabberu 3. SW Yilgarn, 2 surveys: Perth and Albany | |
| West Amadeus | NTGS | TBA | TBA | TBA | 4 km regular with areas to be defined for 2 km infill | 45 050 | The Quotation Request was released on 23 Apr and closes on 8 May. The proposed survey may cover all or part of Mount Rennie, Bloods Range, Petermann Ranges, Ayers Rock, Lake Amadeus and Mount Liebig standard 1 : 250 000 standard Map Sheets | | | |
| Southern Thomson | GA/ GSNSW/ GSQ | TBA | TBA | 3660 | 8 traverses at 333 m station spacing | TBA | The Quotation Request was released by GA on 2 May and closes on 23 May | | | |
| Gippsland | GSV | TBA | TBA | 1440 | 12 traverses at 500 m station spacing | 8358 | The Quotation Request was planned for release on 9 May, closing three weeks later | | | |

See Figure 2 for locality of the Gippsland Basin survey. TBA, to be advised.

Table 3. AEM surveys

| Survey name | Client | Contractor | Start flying | Line (km) | Spacing AGL Dir | Area (km ²) | End flying | Final data to GA | Locality diagram (Preview) | GADDS release |
|--|------------------------|--------------------------|--------------|--|-----------------|-------------------------|----------------------------|---|----------------------------|---------------|
| Swan/Scott Coastal Plain and Albany/ Esperance | WA Department of Water | CGG Aviation (Australia) | 25 Mar 13 | 8607 | 300/600 m | TBA | 100% complete to 15 May | Final data to GA 20 Jan 14 | Issue 163 (Apr 13) p. 17 | TBA |
| Capricorn Orogen | GSWA | CGG Aviation (Australia) | 19 Oct 13 | 29 697 | 5 km N-S | 146,300 | 100% complete at 9 January | Updated datasets - 28 Apr 14 | Issue 166 (Oct 13) p. 34 | TBA |
| Southern Thomson Orogen | GA/GSNSW/ GSQ | Geotech Airborne Ltd | 8 Apr 14 | 4198 (3327 in survey and 871 in traverses) | 5 km E-W | 16 270 | 100% complete at 5 May | Additional work (traverses) over the Paroo and Darling Rivers to examine the potential for new groundwater resources is being finalised | Issue 168 (Feb 14) p. 24 | TBA |

TBA, to be advised.

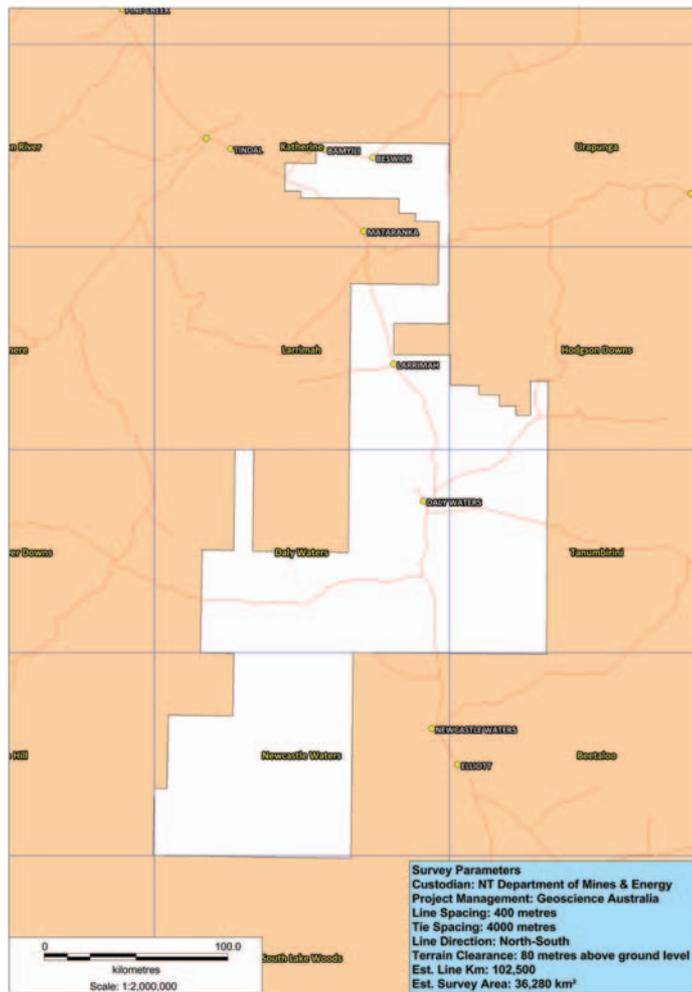


Fig. 1. Locality map outlining the Dunmarrah survey (detailed within Table 1).

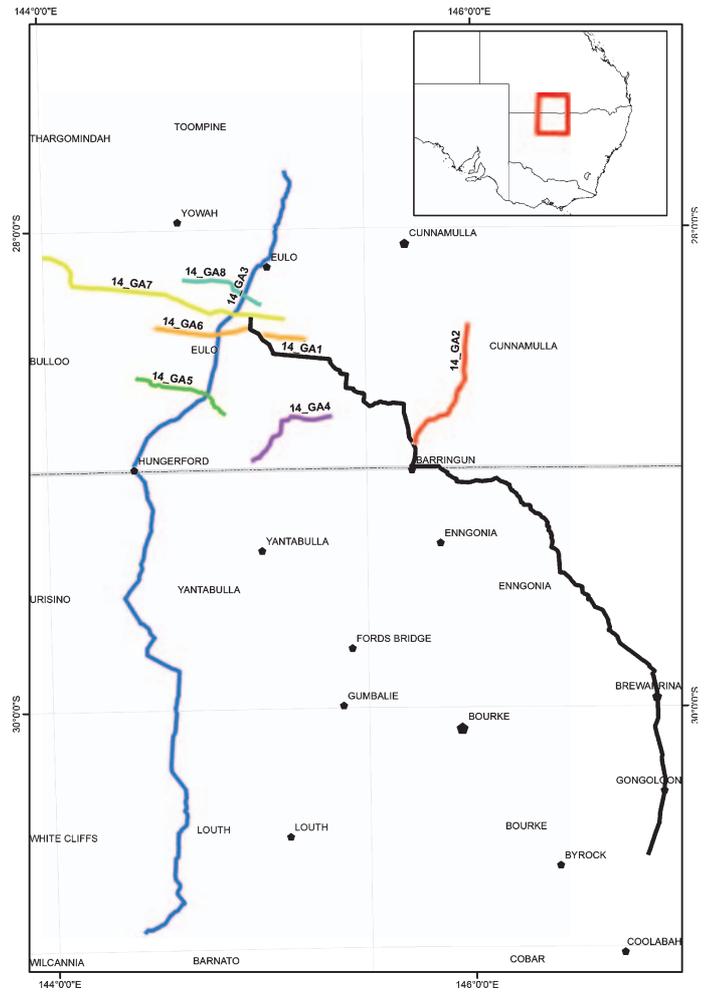


Fig. 2. Locality map outlining the Southern Thomson survey (detailed within Table 2).

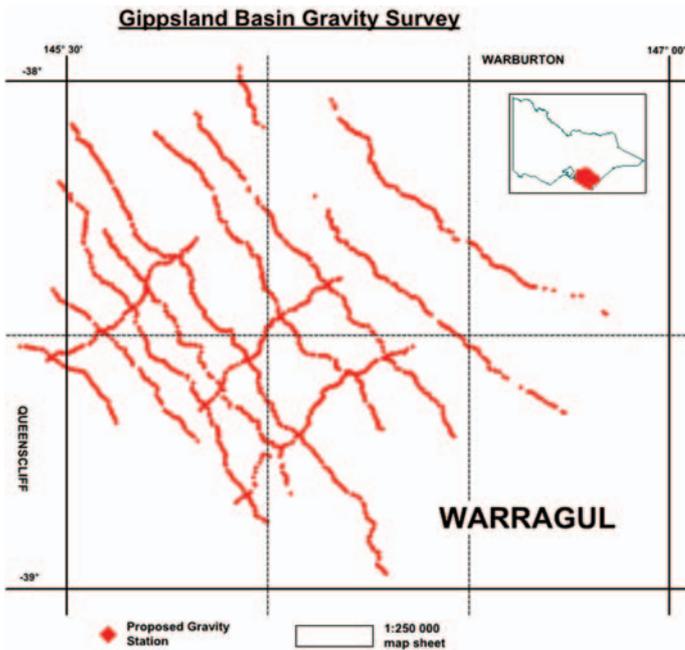


Fig. 3. Locality map outlining the Gippsland Basin survey (detailed within Table 2).

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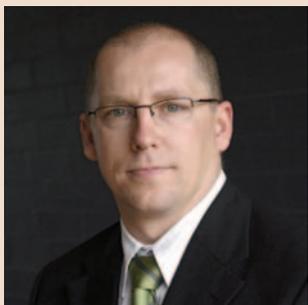
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The next battlefield



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Over the years, I bore witness to the degradation of many a type of storage media used in the oil and gas industry. Storage media once thought totally reliable are now becoming the bane of our existence, and should be significant sources of concern for our data collections.

Someone once not so famously said, that the best recording media for data, hands down, is microfilm – with this I agree. All you need to recover data from microfilm is a magnifying glass and a flashlight. No fancy electronic devices or magnetic decoding required. However, the reality being we chose to use magnetic tapes, hard disks, memory sticks and a range of other devices, far more technical than microfilm, to store the vast majority of our information. So now, we must deal with the consequences.

From 1960 to present day, there has been a variety of media types created and mass-produced: some of them stood the test of time, whilst many others fell to the wayside almost immediately after their release into the market. The following generalised technology timeline, outlining the uptake of different types of storage media specific to the oil and gas industry over time, reveals our predicament:

- 1950s to 1970s – we used 9-Track Reel-to-Reel Tape

- 1970s to 1980s – a sign of relief ensued as we moved into 3480 closed cartridges.
- 1980s to 1990s – we moved from 3480 to 3490, DLT, 8 mm and 4 mm data cartridges
- 1990s to 2000 – the 8 mm, 4 mm and 3490 technology dropped in popularity as we moved to 3590 and LTO began
- 2000 to present day – we see various LTO types and 3592 as our mainstay

There were also some other odd media types in here like Sony AIT, Travan and DEC, which had brief bouts of traction, but did not really become part of the mainstay of the industry (in many ways, we should be thankful).

There are a number of standout technologies: some for the right reasons and others for the wrong reasons. Let us start with the positives and look at technologies that are in good stead even after many years of use and storage:

1. Almost all IBM engineered cartridge media types (3480, 3490, 3590 and 3592) are excellent. The 3480 is still readable after 30 years and showing very little signs of deterioration.
2. LTO technologies are seemingly performing well. Although, the sheer number of different manufacturers of this media and drive technology means that someone will figure out a way to screw things up. It will be another five to ten years before we really know how this media holds up.

On the negative front, we see the following:

1. Floppy disk technology: One look at a floppy disk today and you know it will be trouble. Funnily enough, back in the 80s they looked pretty damn cool. Given computers are no longer fitted with a floppy reader anymore, it is time to get the data off these disks or consider it lost forever.

2. 4 mm and 8 mm Data Cartridges: This consumer grade technology found its way into the oil and gas industry: the 4 mm data cartridge became heavily embedded into the well logging area; whereas the 8 mm data cartridge, ended up being a great transport media for processed seismic. The high tension placed by a drive on media of such narrow width, meant trouble from the start. Add in the fact that the tape drive heads that write this data do so using Helical Scan technology (basically, 100 more moving parts than necessary). In all, recovery of damaged or deteriorated data cartridges is becoming nearly impossible.
3. 7-, 9-, 14- and 21-track reel-to-reel tapes: Yes, the ones featured in the old James Bond movies in Q's office where he built all of the cool gadgets. Interestingly, the manufacturer of the tape media itself most heavily influences the recoverability of this media type. Some manufacturers put a lot of time and energy into the creation of the media; others cut corners and came out with budget brands. The budget brands simply did not stand the test of time. I can take one look at a brand of media and tell you if the data will be recoverable or not. In almost all occasions, the best tape brand, stored in the worst possible conditions, is better than the worst tape brand, stored in the best possible storage conditions.

In Australia, the 9-track tape is not such a significant source of concern compared to eight years ago, due to the great reduction of this media in collections. Today's battlefield needs to look closely at 4 mm and 8 mm data cartridges that hold a lot of final products and rare well log data. These tapes are seriously suffering; recovery is not getting any easier. If you have some of these in your collection, I strongly recommend that you kick into gear and save what you can, whilst you can.

What is negative time?



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Negative time is an interesting concept. It invokes images of time travellers going back to the past and changing the course of history. Recently, two things got me thinking about going back in time.

The first is quite eerie and links the dates 1965, 1976, 1988 and 2012. Two years ago, my wife, Sharon, received a postcard as a 'secret Santa' present. Sharon collects old things (like me) and one of her friends thought this card (Figure 1) would be an appropriate gift. The postcard was sent from Mawson base in Antarctica in February 1965 and the stamp cost 5 pence – a year before the introduction of decimal currency in Australia. The written message is unremarkable: it describes the weather and mentions a girl, but what is interesting is the signature.

The card is signed by John Haigh, a well-known geophysicist and prime mover in the establishment of Geox – an Australian geophysical contracting group based in Adelaide until 1983. My wife's friend did not know that John and I were geophysicists. Somewhat eerie? Here is the spooky bit. John gave me my first job in the exploration industry, hiring me in 1976 to work in an IP crew based in Cobar. He also hired other graduates that year: Nic Limb, Chris Anderson and Andy Mills – all of whom became well regarded in their fields. In 1988, John succumbed to a brain tumour, a great loss to both his family and the industry. A staunch supporter of the ASEG, John co-chaired the ASEG/SEG International Geophysical Conference and Exhibition (Adelaide 88) at the time of his death.

Although the first event is quite weird, the second is just annoying. Whilst attending a prospect presentation recently, I noted one of the displays had seismic two-way travel times shown as negative numbers. Geophysically, this is just wrong. Two-way travel time is a measure of the time it takes for a seismic wave to travel from the source down to a reflection point and back up to a receiver. It can't be less than zero. A negative two-way time implies a reflection arrives before the activation of the source. We all know this is impossible. Yet no matter how incorrect,

the vendor of one of the industry's most used software packages insists on using negative time values for seismic displays and calculations. As far as I know, this vendor has no plans to change this sign convention – I believe this shows contempt for industry standards and conventions. How hard is it to program software to conform to established practices?

This may seem pedantic, but it has a daily effect as data moves from one software package to another, or when calculations involve two-way travel times.

There are geophysical uses for negative time (used in its proper sense). For example, it is common for seismic vibrators to use an upsweep, whereby the sweep starts at low frequency and increases to the high frequency, despite some advantages in down sweep acquisitions. Mathematically, the harmonic ghosts, created by an upsweep, occur in negative time on the correlated records, before the sweep start time – thereby eliminated.

So what is negative time? It can be in the past, if you are Dr Who travelling the universe, or an old geo reminiscing, it can be a mathematical convenience, or if you like to do your own thing and cause havoc, it can be the two-way time of a reflector below ground level. I think I'll stick to reminiscing.

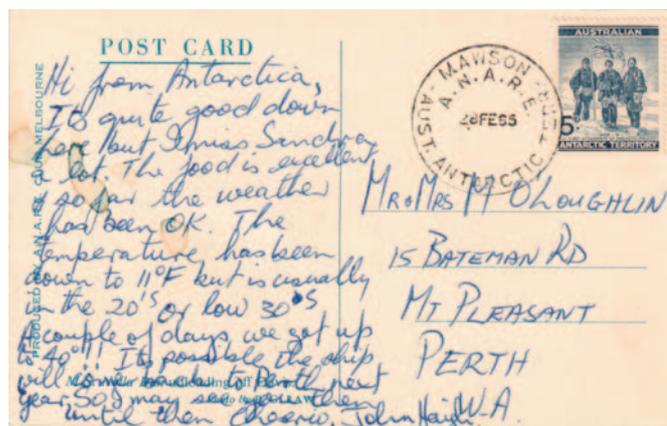
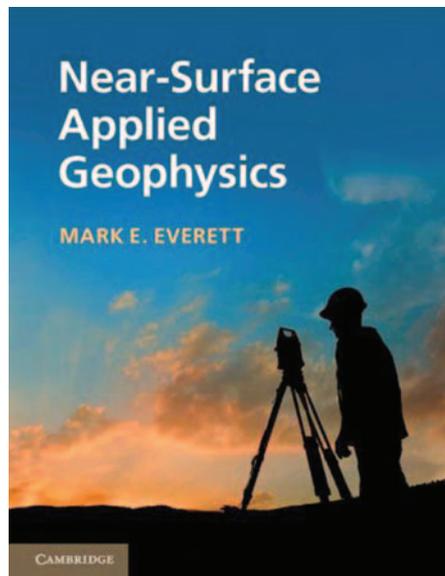


Fig. 1. Front and back of a postcard sent from Antarctica by John Haigh on 28 February 1965.

Near-Surface Applied Geophysics

by Mark E. Everett



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2013, 415 pp.*

Hard Back

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Near-Surface Applied Geophysics, by Professor Mark Everett from Texas A&M University, is a comprehensive introduction to the techniques used within shallow geophysical surveys. This textbook, aimed at senior undergraduate and graduate students specialising in geophysics, comprehensively summarises the theory behind magnetics, electrical resistivity, induced polarisation, self-potential, seismic reflection, refraction and surface wave analysis, electromagnetic induction and ground-penetrating radar; as well as introducing emerging techniques: surface nuclear magnetic resonance, time-lapse microgravity, induced seismicity studies, landmine discrimination, passive ground-penetrating radar (GPR) interferometry and seismoelectric coupling. Professor Everett, who is particularly known for his work on important archaeological sites, such as the D-Day landing site in Normandy and on the island of Alcatraz, also provides a comprehensive introduction to linear and non-linear

inversions during the concluding chapters of this volume. This is a challenging and rigorous text well supported by clear illustrations that is sure to become an important part of university curricula around the world and should find a happy home with the libraries of many practising geophysicists.

The greatest strength of this book is the in-depth discussion of each specific technique which is well augmented by pertinent case studies. For example, GPR scholars will be gratified by the excellent discussion of topics such as the GPR fundamentals, dielectric constant and electrical conductivity, dielectric properties of rocks and soils, resolution, data acquisition, basic data processing, electromagnetic plane waves, GPR antennas, GPR radiation patterns and target polarisation. All topics are concisely discussed, supported by suitable equations, diagrams and illustrations and suitable references which effectively facilitate further reading. The case studies in the GPR chapter include the mapping of bedrock to predict the vector of perchlorate transport by groundwater, the detection of plastic landmines, mapping of depositional facies in a coastal dune and the location of voids beneath reinforced concrete, provide a good cross section of possible applications of this method. The inclusion of a chapter on emerging geophysical techniques is particularly interesting, although some readers, particularly in the agriculture sector, may be disappointed by the omission of radiometrics.

Whilst I am very impressed with this book overall, I am disappointed that Professor Everett did not include a chapter on survey positioning. Effective use of appropriate techniques is particularly important in the high-resolution surveys undertaken for small and subtle geophysical targets found in shallow geophysics. Although this field is outside of the explicit remit of geophysics, an introduction to differential GPS, Real Time Kinematic-Differential GPS, Total station, Robotic Total Station and high-resolution photography and photogrammetry using unmanned aerial vehicles and satellite platforms is essential for any contemporary geophysical survey in this field. It is disappointing that the author chose to

repeat greyscale figures shown in the text as colour in the plates section. I believe it would have been more appropriate to include a broader selection of images for this very visual discipline, referring the reader to the plates section to show those best displayed in colour. My major criticism of this text is, however, that the introductory chapters and the beginning of each section on a particular technique failed to enthuse me about the great potential for geophysical methods to make an important contribution to society. Everett is clearly a passionate practitioner and an outstanding scholar in the field of near-surface geophysics, but his dry writing style and immediate concentration on technical topics such as data analysis is a shame. I can't help feeling that those students who are new to this area – or perhaps augmenting their skills beyond some of the areas serviced by shallow geophysics such as geology, environmental science, engineering, archaeology and agriculture – may not be stirred to put in the hard work that this book deserved.

Despite these minor criticisms, this book provides a solid intellectual foundation to advanced students discovering near-surface geophysics for the first time, thus deserving a place in every geophysicist's library. Whilst it is not the most accessible book on the market, it is rigorous and comprehensive. I anticipate that my copy shall be well thumbed by repeated readings over time.



Reviewed by Ian Moffat^{1,2}

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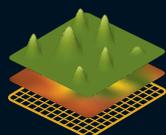
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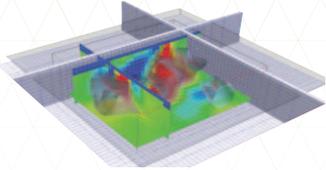
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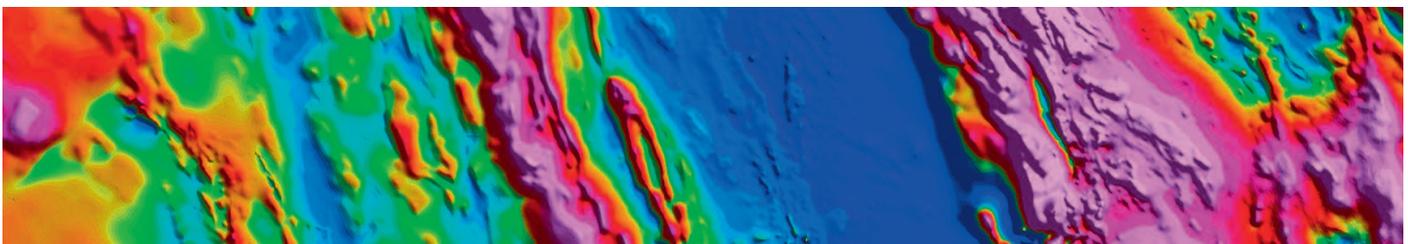
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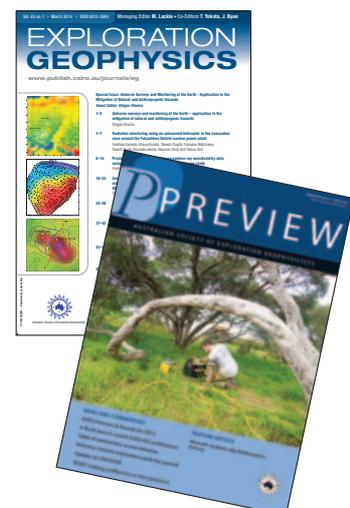
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| 15–17 | EAGE Near Surface Geoscience 2014 20th European Meeting of Environmental and Engineering Geophysics of the Near Surface Geoscience Division of the EAGE http://www.eage.org | Athens | Greece | |
| 28–2 Oct | 2014 Canadian Geotechnical Conference <i>Conference website pending. Please email cgs@cgs.ca for additional information or visit the CGS website (www.cgs.ca).</i> | Regina | Canada (Saskatchewan) | |
| October | | | 2014 | |
| 21–23 | 131th SEGJ Conference www.segj.org | Shizuoka | Japan | |
| 26–31 | SEG International Exhibition and 84th Annual Meeting http://www.seg.org | Denver | USA | |
| 27–29 | KazGeo 2014: From Challenges to Opportunities http://www.eage.org | Almaty | Kazakhstan | |
| December | | | 2014 | |
| 10–12 | The 8th International Petroleum Technology Conference (IPTC) http://www.iptcnet.org | Kuala Lumpur | Malaysia | |
| January | | | 2015 | |
| 11–14 | 3rd South Asian Geosciences Conference and Exhibition http://geo-india.com/ | New Delhi | India | |
| February | | | 2015 | |
| 15–18 | ASEG–PESA 2015: <i>Geophysics and Geology together for Discover</i> 24th International Geophysical Conference and Exhibition http://www.conference.aseg.org.au/ | Perth | Australia | |
| March | | | 2015 | |
| 18–21 | PACRIM 2015 http://www.pacrim2015.ausimm.com.au | HongKong | China | |
| May | | | 2015 | |
| 17–22 | 20th Caribbean Geological Conference http://www.thegst.com | Port-of-Spain | Trinidad and Tobago | |
| June | | | 2015 | |
| 1–4 | 77th EAGE Conference and Exhibition 2015 http://eage.org | Madrid | Spain | |
| July | | | 2015 | |
| 7–10 | Near-Surface Geophysics Asia-Pacific conference (NSGAP) (website TBA) | Waikoloa Village (Hilton), Hawaii | USA | |
| October | | | 2015 | |
| 18–23 | SEG International Exhibition and 85th Annual Meeting http://www.seg.org | New Orleans | USA | |
| December | | | 2015 | |
| 7–9 | The 9th International Petroleum Technology Conference (IPTC) http://www.iptcnet.org | Doha | Qatar | |
| October | | | 2016 | |
| 16–21 | SEG International Exhibition and 86th Annual Meeting http://www.seg.org | Dallas | USA | |
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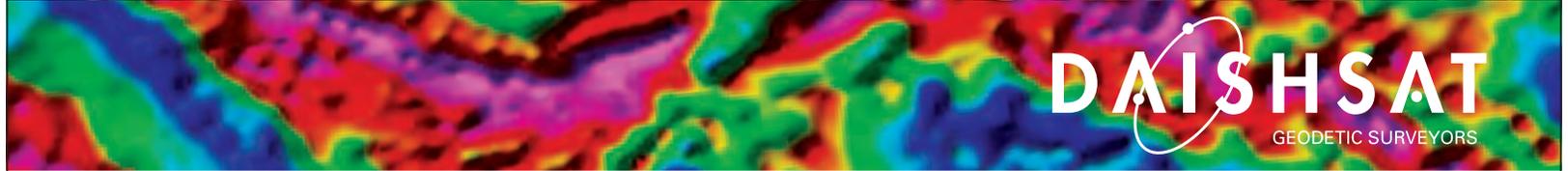
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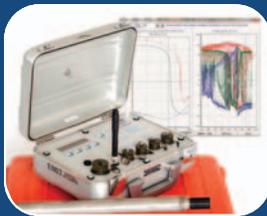
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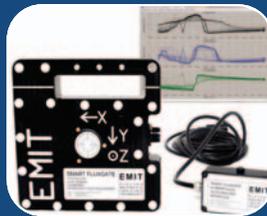
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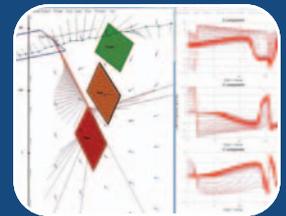
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