10.1071/PVv2011n150ASEGnews

The challenge of 'under' cover

In August 2010, the Australian Academy of Science convened a Theo Murphy High Flyers Think Tank to address the issue of 'Searching the Deep Earth: the Future of Australian Resource Discovery and Utilisation'. The workshop assembled a group of scientists that heavily represented Geoscience Australia, CSIRO, Government Surveys and various universities with very minimal industry representation. In fact, the ASEG only found out about it through their press release. The recommendations that came out of the workshop were released on 11 January (visit www.science.org.au/events/thinktank/thinktank2010/index.html) and read like a scientific business plan for Geoscience Australia rather than a future vision for the industry.

I won't repeat them here, but they cover topics that have been widely discussed among Australian academics and geologists for decades. For such a well qualified group, the outcomes were at best of predictable 'bi-plane' standard and at worst unexciting. Worse still, if the meeting was about the future of the industry, it read like a geologist's grab bag rather than an industry one. Maybe it wasn't the fault of the participants but more the terms of reference developed by those who set up the Think Tank. The issues contained in the Roadmap and the Outcomes have been articulated before and are not new.

The issue of cover has been around for decades. Regardless of the perceived challenges, we have actually been very successful at it over the past 40 years. This has been without any special government intervention other than the normal 'stuff' Geological Surveys and Geoscience Australia (or was it the BMR) are good at, the most important being the completion of the continental aeromagnetic coverage. Olympic Dam 300 m, Acropolis 300 m, Cannington 40 m, Prominent Hill 100 m, Admirals Bay 1500 m, Carapateena 470 m, Ridgway 500 m, to name a few. All were discovered by drilling through cover, the targets however were generated from the data sets available or acquired at the time and with the geological nous and commitment of the exploration teams who made the discoveries. More importantly, these teams were backed by mining company managements that had a commitment to the future of their companies and the industry.

I agree that the issues identified by the Think Tank are important and that the future of discovery for certain deposit types is under cover, however there are two questions that come to my mind. Firstly, 'what' deposits are we looking for under cover and secondly 'who' is going to discover them?

The contribution of gold and base metal deposits, while locally important to the Australian economy, is insignificant compared to that of coal, iron ore and bauxite (aluminium). Strategically, these are our most important mining industries. The largest single sector expenditure on minerals exploration is on gold exploration, a notoriously difficult commodity to target under cover. I doubt that a strategy to look under cover will add one ore deposit to these industries, so the question of 'what' deposits is just as important as 'how'.

On the question of 'who' will find them? It will be those that can afford to. There is a certain mythology that says it will be junior companies but in general, they neither have the capital necessary nor the time to face the high cost and risk of looking for 'blind' deposits. There is no real incentive for shareholders to invest in such risky ventures.

Previously it was predominantly the major companies, however over the past couple of decades there has been a fundamental shift in the structure of our industry. Current mega company managers are mining the great discoveries of the past 50 years. Responding to the 'short-termism' of fickle capital markets, they see greater potential for short term rewards in mergers and acquisitions rather than in the risk of long term exploration.

Since the 1990s, exploration teams have been systematically disassembled while others have disappeared as part of efficiency gains in mergers. Even if they did want to embark on grassroots exploration again, a lot of the skill and knowledge built up over thirty years has been lost or forgotten. All of us who have been involved in exploration know that it takes enthusiasm, science, money, time and luck to make major discoveries. Funny though, as a particular golf professional once commented on luck, 'the more you practise the luckier you get'. Many of the majors are seriously out of practice.

So, back to the Think Tank. All of the proposals are worthwhile but I have heard of all of them in different guises before, some in the current Deep Exploration Technologies CRC with which I am involved and others at various meetings I have attended. The issue of cover has been on the research agenda for many years. The fact is that there is more than enough data in Australia to make discoveries under cover…we have a track record of doing it!

The real issue is to encourage risk money into exploring under cover in the face of appalling odds. In the recent debate about the mining super profits tax this point has been entirely overlooked, in fact sacrificed. The industry consultative committee was chaired by a banker and an ex trade union official (the Minister). Invited participants hardly represented the exploration industry and while I have a high regard for those I know personally, the exploration issue was entirely sidelined, in fact sacrificed, to the interest of current profits.

I hope that the Minister doesn't think that the assembled 'fendis' at the Academy of Sciences Think Tank represented the industry because in fact the industry was barely visible.

On another note, as I write this I am totally distracted by the serious flooding in Queensland and elsewhere in Australia. My heart goes out to all of those people who have lost loved ones and property as a result. On behalf of the Federal Executive, I pass on our best wishes thoughts to any member of the ASEG family that has been affected in any way whatsoever.

Phil Harman
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ASEG News

ASEG Federal Executive 2010–11

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Notice of 2011 AGM

The ASEG's AGM will be held on Tuesday 12 April 2011 at 5.30 pm in the City West Function Centre, 45 Plaistowe Mews, West Perth.

An important part of the meeting will be to elect a President, President-Elect, Treasurer and Secretary for the period 2011–2012, in accordance with the Articles of Association.

We are calling for nominations for all these positions. They should be lodged with the Secretariat no later than COB Monday 14 March 2011 and must be supported by a proposer and a seconder.

The contact details for the ASEG Secretariat are:

PO Box 8463, Perth Business Centre, WA 6849

Tel: +61 8 9427 0838
Fax: +61 8 9427 0839
Email: secretary@aseg.org.au

Please contact me or the Secretariat for any further information.

David Denham
Secretary

New members

The ASEG extends a warm welcome to 8 new members to the Society (see table below). These memberships were approved at the Federal Executive meeting held on 25 November 2010.

Name	Organisation	State	Member grade
Richard John Carter	Self Employed	WA	Active
Christopher Moore	Moore Geophysics	VIC	Active
Robert Lewis Richardson	Geotangent Pty Ltd	NSW	Active
M. Andy Kass	Broken Spoke Development	USA	Active
Alex Lukomskyj	Australian National University	ACT	Student
Charles Gianfriddo	University of Melbourne	VIC	Student
Thy Kim Thi Nguyen	University of Melbourne	VIC	Student
Terence Paul Kratzer	RMIT University	VIC	Student

Remembering Grahame Sands

Grahame Sands

It has been 25 years since the demise of (Duncan) Grahame Sands in an aircraft accident on 27th February 1986. Grahame was 40. The accident also took the life of pilot, Brian Mickelberg. Physicist, Bob Groves was the sole survivor.

It is in Grahame's memory and honour that the award known as the Grahame Sands Award for 'Innovation in Applied Geophysics' is awarded to nominated recipients who significantly contribute to the advancement of geophysical exploration. The award was inaugurated in 1986 and has been presented by the ASEG, on 11 occasions.

Grahame's introduction to exploration was as a vacation field assistant (1968) in Cloncurry, Queensland, with Australian Selection (Seltrust). After a brief flirtation with Vet Science at Sydney University terminated in colourful circumstance (a larrikin born), Grahame entered the Army Survey Corps as part of his National Service.

Serving a stint in New Guinea, Sapper Sands began a lifelong interest in surveying. The career of this free thinking scientist with a disdain for questionable regimentation had begun.

The next larrikin/scientist conflict occurred with a termination a year before graduation from the Bendigo School of Mines. His indiscretions are legend and have been subject to many interpretations and exaggerations by his peers over the years.

From Bendigo, Grahame and family were sent to Kalgoorlie (1971) by Seltrust. After a brief time in field work, he was assigned to estimating the ore reserves for the Perseverance nickel deposit. Grahame completed a degree in Mining Geology from the Kalgoorlie School of Mines based on this work. At this time, Grahame learnt the 1970s limitations of computer power (Seltrust had purchased a HP9100), and the imprecise borehole measurement of dip and azimuth in magnetic ore bodies.

Grahame experimented with his home brand of computer to enable computation and graphics to be integrated. He met with some success and with his enthusiasm, plus the fact that he was being distracted from his assigned task, Grahame convinced Seltrust management to purchase a then state-of-the-art HP8945, a work station that preceded PCs.

His experimental directional borehole logger based on angular accelerometers was an object of curiosity in Seltrust's Kalgoorlie office. The instrument was later (1980) patented by Aerodata/ Grahame Sands when Aerodata expanded its business into downhole logging.

His enthusiasm for computer evolution and applications was to be the catalyst for his joining fledgling airborne geophysical company, Aerodata.

In 1979, Seltrust, with Grahame as technical advisor, engaged Aerodata to conduct an airborne magnetic survey in the search for the potentially diamond bearing lamproite intrusives. Aerodata utilised a HP9825 computer as the controller for the aircraft acquisition system. With his previous Hewlett Packard experience, Grahame wrote algorithms and converted them to FORTRAN programs for the band width filters to extract the signature of the lamproites. Several lamproitic intrusions were thus identified.

Subsequently, with technical and social compatibility having been tested at Fitzroy Crossing, Grahame invested in and joined Aerodata as a director and technical driver.

With Aerodata's commitment to research and development, Grahame's innovations flourished. Some of his innovations were:

- The digitising of flight paths and the production of standard projection maps. This led to image processing of magnetic and radiometric data. Grahame launched an imaging project with Dr Frank Honey, resulting in Aerodata being an early leader in geophysical image processing.
- Demagnetisation of an aircraft's magnetic signature was poorly understood in the 1980s. Grahame established the determination of induced and permanent component of an aircraft's magnetic field, allowing each component to be nulled individually and quantitatively.

Grahame died while testing a hybrid navigation system aimed at eliminating the use of aerial photography and radio triangulation as the primary sources of aircraft navigation. The system he pioneered utilised the Navstar Global Positioning System (begun in 1984 by the US Air Force) and the Omega Global Nav. System (GNS). The Omega system was instituted by the US Navy as a navigation aid. It comprised VLF signals from fixed transmitters and gave absolute accuracy of approximately 6km. With limited GPS satellite coverage at the time, Grahame developed an interface to take velocity and heading data from the Omega GNS system to provide '*x*' and '*y*' coordinates between GPS fixes. The '*z*' component was obtained from a radar altimeter, fitted with a standard rubidium clock.

The first commercial survey utilising the GPS system occurred in 1988 when a survey was conducted in the Arafura Sea as part of the exploration of the Timor Gap. Full GPS satellite coverage for routine use was not completed until 1993 and is now routinely used as the primary navigation tool.

Grahame was posthumously awarded a Masters degree in Geophysics from Curtin University for his technical work on a horizontal airborne magnetic gradiometer system which he designed and built. After Grahame's death, the system as the first of its kind, continued to operate commercially. This system was the precursor of many systems in operation today. His written notes and ideas were compiled into thesis form by Aerodata's Gary Spencer with theory input from Bob Groves. His many and disparate unwritten ideas will never be known.

Widely revered by his peers this family man, friend, scientist, innovator and larrikin, Grahame created a legacy of innovation and technical excellence deservedly recognised by the award which bears his name.

'Do great talent and misfortune make a pair?' Nguyan Da, Vietnamese Poet

Bob Timmins
Email: hayou@iinet.net.au

Craig Hoffman – 13 January 1961, Strathalbyn, SA – 3 December 2010, Aldinga, SA

Craig Hoffman

Craig Hoffman was a well known personality in the Australian geophysical community. He was one of the first employees of the Australian branch of Zonge Engineering, commencing in 1984 and continuing through until 2006.

Craig began as a field assistant then crew chief for many years, finishing his career in equipment maintenance and as the Zonge Safety Officer. During his last years at Zonge he worked diligently toward certification in both electronic engineering and Occupational Health and Safety. He then worked freelance for a number of companies both as a field geophysicist and in equipment maintenance.

In 2010 he started a new job in Melbourne as a Health and Safety Officer/Trainer attending the 2010 ASEG Sydney conference with renewed energy.

Many of us were aware of his significant health issues, culminating in three years of dialysis and a kidney transplant in 2005. Shortly after the Sydney ASEG conference he was diagnosed with a brain tumor and died of associated complications in early December. He was characteristically optimistic until the end, complaining indignantly about his physiotherapy treatment and that he was better than most people at balancing on one leg with his eyes closed.

Craig is survived by his wife Mela, son Yatha, mother Marlene and brother Peter.

He will be missed.

Michael Hatch and Kelly Keates

ASEG News

Australian Capital Territory

The technical aspects of 2010 drew to a close for the ACT Branch with two talks on 24 November by Yusen Lay and Aaron Davis. Both gave slightly updated versions of their 2010 conference talks, which allowed those members who weren't at the conference to hear some of the latest developments in Airborne EM. Both Aaron and Yusen were kept honest by interstate ASEG visitor and AEM expert Jim Macnae.

Yusen's presentation mainly dealt with the importance of calibrating borehole conductivity instruments, a process that evidently involved visits to Batemans Bay, Canberra's Lake Burley Griffin and even the swimming pool at the Australian Institute of Sport. Yusen also impressed on the audience that AEM is more than just mineral and groundwater explanation and proved this point by showing some examples of using AEM for mapping rock slide areas on the flanks of Norway's spectacular fjords.

Aaron's talk stressed the importance of calibrating different AEM systems against each other. This process ensures compatibility before different datasets measured with different AEM systems are combined and modelled. He demonstrated the benefits of this process by showing seamless conductivity maps of the Broken Hill region and also highlighted the strong links between Australia and Denmark in AEM circles.

On 7 December, the ACT Branch combined with the local branches of the GSA and AusIMM to gather for a pre-Christmas BBQ using the new facilities recently set-up at Geoscience Australia. Despite a wetter than normal spring in Canberra (like just about everywhere else), the weather cooperated and many lingered in the twilight chatting and even enjoying beer on tap from the local Zierholz Premium Brewery.

The program of events for 2011 is beginning to take shape. At this stage Canberra will be hosting SEG Pacific South Honorary Lecturer Richard Lane on 20 April at the ANU. Andrey Bakulin, SEG 2011 Distinguished Lecturer is also expected in Canberra on 17 June. Mark these dates in your diary now and keep an eye on the branch web page for details.

We wish all members a very geophysical 2011 and also a Happy 150th to *Preview*!

Ron Hackney

Queensland

Student night 2010 was held in December at the University of Queensland. Three excellent presentations were made and Steve Hearn also spoke. Steve described how students had volunteered to do honors over 2 years so that they could take all the classes that were currently on offer at UQ. Terry Ritchie and Peter Fullager are contributing their considerable talents to this cause. I'm sure many of us were concerned about the low numbers of graduates but the calibre of the student presentations gave great comfort. The meeting was held at the same time as a Geomodellers workshop and almost 40 people attended the evening. Well done Steve!

Henk van Paridon

Preview – 25 years and 150 issues

This issue marks a significant milestone for *Preview* – the 150th issue. *Preview* Issue 1 was published in January, 1986 and *Preview* Issue 150 will be published in February, 2011 – so the 150th issue also marks the 25th birthday for our magazine. From humble beginnings as a simple photocopied newsletter, *Preview* has evolved into a professionally produced, glossy colour magazine. It is freely available online and is being read by a global audience in its digital format (see article on p. 11 for more).

The first meeting of the ASEG was held in January 1970. Before the first issue of *Preview* in 1986, an A4 newsletter was distributed under the guidance of the ASEG Executive, then based in Sydney. In April 1985, the ASEG Executive moved to Adelaide. Peter Elliott was Honorary Secretary and preparation and distribution of the ASEG Newsletter was included in his responsibilities. In an effort to reduce costs, Peter discovered that publications attracted a lower postage charge than ordinary mail. And thus, the Newsletter became a publication with the name *Preview*. It started as an A5 booklet (which also reduced production and distribution costs) printed on coloured paper.

Over the next 14 or 15 years the editorship of *Preview* moved with the ASEG Secretariat and Federal Executive.

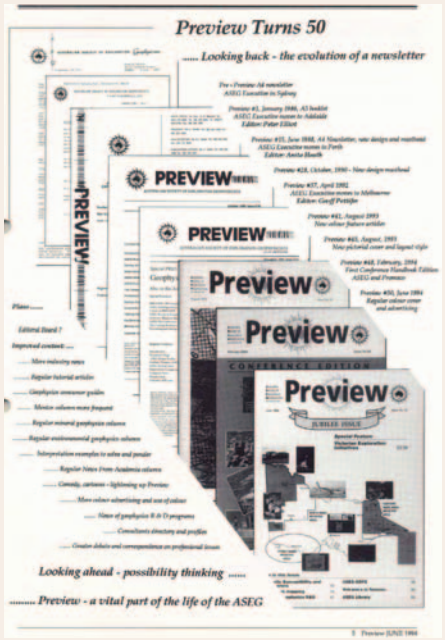

Fig. 1. *A pictorial history of the first 50 issues – p. 5,* Preview *Issue 50, June 1994.*

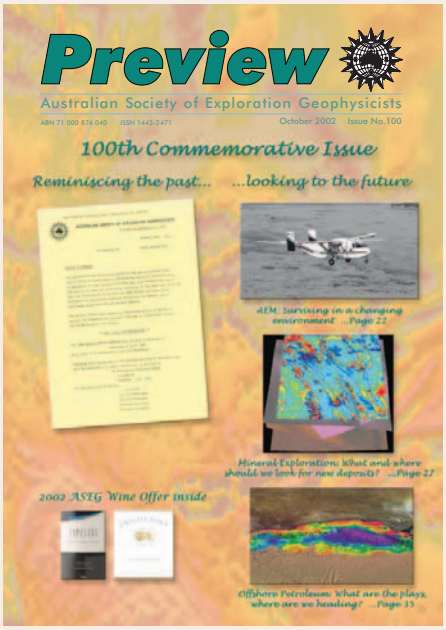

Fig. 2. *Cover of* Preview *Issue 100, October 2002.*

In Adelaide, Issues 1–4 were produced by Peter Elliott and then Issues 5–14 by Reg Nelson. In 1988 the Federal Executive moved to Perth and Anita Heath edited Issues 15–36. Geoff Pettifer edited issues 37–60 following the Federal Executive move to Melbourne in 1992. With the move to Brisbane in 1996, Mike Shalley edited Issues 61–67 and then Henk van Paridon steered the magazine through Issues 68–81. For more on the early story of *Preview* see p. 5 of Issue 50 (Figure 1) and p. 6 of *Preview* Issue 100 (October 2002 – see Figure 2).

During this period the magazine gradually evolved, with each editorial team contributing new developments. Issues 1–14 were A5 booklets. Issue 15 saw a change to A4 format with a new design and masthead, and a further masthead change in Issue 28. The first colour feature article 'Geophysics in AGSO' by David Denham, Jim Colwell, Doug Finlayson and Colin Reeves appeared in Issue 41. At this time contributors could purchase 4 colour pages (with extra monochrome pages as required) for an article and advertising for $2100 or only 1 colour page of advertising for the same cost – sounds like a good incentive to write articles with lots of colour figures! Issue 45 saw the introduction of a pictorial cover and Issue 50 saw the start of a regular colour cover and colour advertising. The Advertiser's Index was introduced in Issue 67 and this also

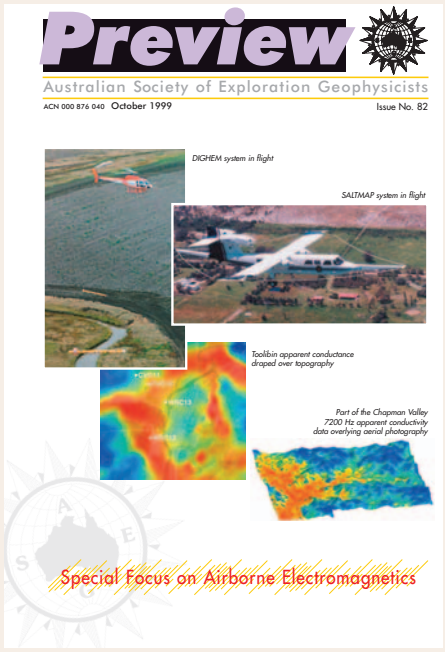

Fig. 3. *Cover of* Preview *Issue 82, October 1999.*

heralded a new era where advertising and routine contributions became the responsibility of the then printer, Jenkin Buxton Printers Pty Ltd. The magazine had now evolved to the stage where a printer/publisher took responsibility for advertising, layout and production and the Editor sourced and checked the content.

Issue 82 (October 1999 – see Figure 3) was the beginning of David Denham's era as Editor. David steered the magazine through 58 issues and still contributes items to nearly every issue of the magazine. He has made a truly wonderful contribution to *Preview* in the second half of its life thus far. Issue 82 was also the first issue produced by a new publisher, RESolutions Resource Energy Services, based in Perth. RESolutions published *Preview* for the next seven years, and then at the beginning of 2007 *Preview* and *Exploration Geophysics* transferred to CSIRO Publishing. CSIRO Publishing has produced *Preview* from Issue 126 to the present and has also contributed significantly to the development of *Preview*'s online presence.

The most rewarding aspect of the exploration of the *Preview* archives was simply to reflect on the diversity of information stored in the pages of our magazine. The magazine provides a wonderful historical record of the activities of our Society at Branch level,

through conferences, and through records of various Executive Committee activities. For example, news from the ASEG Research Foundation has been a regular feature from almost the earliest *Preview* issues. *Preview* was first used as the Conference Handbook when it was published as the Conference Edition for the 10th ASEG Conference in Perth in February 1994 (Issue 48 – Figure 4).

Over the years, a wide variety of topics have been explored. Special issues on topics such as borehole geophysics, airborne electromagnetics, radiometrics, and seismic have been produced. The magazine has looked at wider issues associated with our industry such as safety, professional accreditation, shortage of geoscience graduates (a recurring theme!), and women in geophysics. Numerous technical papers have been published to showcase new technology, interesting case studies, and the excellent databases of geophysical and geospatial data that cover our continent. The article describing BHP's development of the world's first airborne gravity gradiometry

Fig. 4. *Cover of* Preview *Issue 48, February 1994 – the first Conference Edition of Preview.*

published in *Preview* Issue 86 was a scoop for the magazine, in what is now becoming a standard exploration tool. Applications of geophysics to minerals, petroleum, groundwater and environment, engineering, bathymetry, geohazards, archaeology, astronomy and others have been reported. The work of individuals, companies, research organisations, government bodies, educators and professional associations has also been represented.

So, the evolution of *Preview* to a modern, professional magazine has clearly involved the dedication and hard work of many people. The Editors have been supported by a host of excellent Associate Editors and many regular contributors. The chairmen of the Publications Committee, Andrew Mutton (1998 to 2004) and Phil Schmidt (2005 to present), have both provided excellent leadership and support liaising between Editors, Federal Executive and the publishers. This publication is one of which our Society should be justly proud. Long may it continue!

Ann-Marie Anderson-Mayes
Editor

ASEG publications doing well

Access to *Preview* and *Exploration Geophysics* is one measure of how well the ASEG's publications are being used. And at the moment the news is all good!

First, citations for *Exploration Geophysics* are increasing rapidly as shown in Figure 1. An approximate three-fold increase can be seen for 2008 to 2009 and then again for 2009 to 2010. This is excellent news for *Exploration Geophysics* because journals that begin to attract citations generally attract more readers, more citations, and thus potentially increased subscriptions.

Second, audited numbers of PDF and XML downloads for the two publications are also good. For *Preview*, the 2008 total was 34 000, 2009 was also 34 000 and 2010 was 30 400. These numbers are holding steady indicating sustained interest in the publication. For *Exploration Geophysics*, the 2008 total was 19 800, 2009 was also 54 000 and 2010 was 46 900. The big jump made in 2009 has been reasonably maintained in 2010. Also, online access to the Extended Abstracts has been steadily increasing with download totals of 1400 in 2008, 10 000 in 2009 and 14 700 in 2010. It should be noted that until recently, *Preview* was a single PDF download, whereas for *Exploration Geophysics* each article is a separate download in either PDF or XML format. Thus the two publications cannot be compared to each other directly – it is the trends that are important.

Data from Google Analytics enables us to understand more about the visitors to the *Exploration Geophysics* and *Preview* websites. In 2009 there were 113 008 views of *Exploration Geophysics* web pages and in 2010 this number was 106 700. Figure 2 shows the distribution by region for web visitors accessing the *Exploration Geophysics* website in 2009 and 2010. The top ten countries for both years are Australia, USA, Canada, UK, India, Germany, China, Indonesia, Iran and France. As you would expect for a home-grown journal, Australia is the largest viewer of *Exploration Geophysics* pages (note that visitors coming via the ASEG website redirection are interpreted as Australian), but in 2010 70% of visitors were coming from websites outside Australia. Once again, in terms of the citation data above this is excellent news.

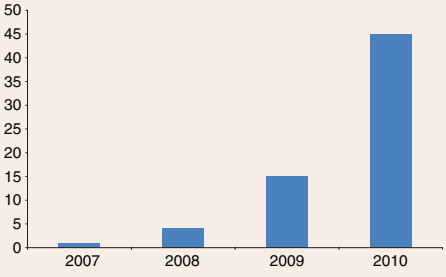

Fig. 1. *Annual citations attributed to Exploration Geophysics in each calendar year from 2007 to 2010.*

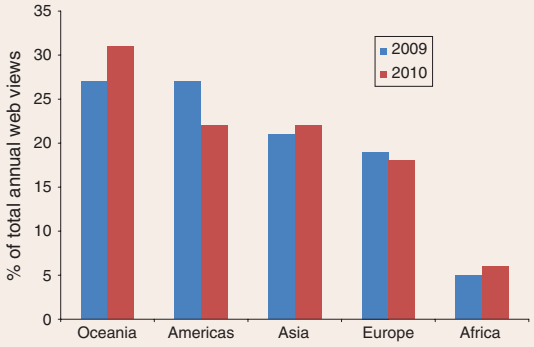

Fig. 2. *Distribution by region for visitors to the Exploration Geophysics website in 2009 and 2010 sourced from Google Analytics data.*

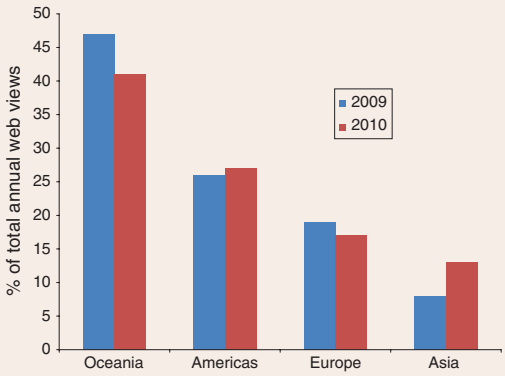

Fig. 3. *Distribution by region for visitors to the Preview website in 2009 and 2010 sourced from Google Analytics data.*

The results are similar for *Preview*. Figure 3 shows the distribution by region for web visitors accessing the *Preview* website in 2009 and 2010. In 2009 *Preview* attracted 6400 views and in 2010 there were 7300 views. The top four countries in both years are Australia, USA, Canada and the UK. The remaining six top ten places over the two years include Norway, New Zealand, Saudi Arabia, Germany, Belgium, India, China, Denmark, Taiwan, France and Argentina. And again, whilst 40% of the *Preview* readership is interpreted as Australian, 60% of the readership is outside of Australia. Given that only 18% of the ASEG membership is outside of Australia, it is fair to deduce that the readership of *Preview* is extending internationally beyond ASEG members only. This would seem to suggest that a large number of readers are taking advantage of the fact that *Preview* is freely available online. If we take the view that one role for *Preview* is to promote the ASEG and Australian geophysics, then this wider readership should be viewed as a positive. Let me know what you think – I would welcome your feedback.

Sincere thanks go to Richard Hecker at CSIRO Publishing for providing all the data for this article.

Ann-Marie Anderson-Mayes
Editor