PREVIEW

AUSTRALIAN SOCIETY OF EXPLORATION GEOPHYSICISTS
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Contents

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Introduction

Congratulations to all those students who presented winning papers at Students' Nights. I look forward to publishing your abstracts in PREVIEW.

Please note the forthcoming AGM in March next year and transfer of the Federal Executive to Melbourne after this date. Nominations are now being received for key positions on the Executive.

It has been rumoured that certain large mining companies are not allowing their staff to apply for positions on the Executive. This is a great surprise to me as a member of the Perth Executive as I find that my position does not interfere with my work and only occupies one day a month of my time, as well as encouraging rapport with my professional colleagues.

The aim of this Society is to promote interaction between research and industry in the field of geophysics. We try to promote this interaction through our conferences, publications and meetings and as such this can only be advantageous to exploration companies.

On a lighter note, wishing you a Merry Christmas and a prosperous New Year.

Seasons Greetings
The Editor

Branch News

New South Wales

At the October meeting of the Branch, Stephen Greaves of Fletcher Challenge Petroleum (Indonesia) gave an interesting talk entitled "Indonesia: An Explorationist's View", which informed many and reminded a few of life and work in the islands.

The ASEG/ERF Seminar "Geophysical Techniques in Urban and Industrial Environments" held 15th November provided delegates with a new realm of geophysical applications. Gravity, Radar, EM and so forth were demonstrated to have helped solve problems ranging from cavity detection to mapping groundwater contamination. The agenda provided a stimulating basis for discussions. Don Emerson and Roger Henderson are to be congratulated for providing an interesting and informative day. The proceedings will be published in forthcoming editions of Exploration Geophysics.

The Annual General Meeting for the NSW Branch has tentatively been planned for the end of January 1992.

Juliet Szabados
Secretary

South Australia

The SA Branch have, despite keeping a low profile nationally, been quite active locally. Recent events have been:

25 Sept	*Evening Meeting, Wine Tasting*
8 Oct	*Evening Committee meeting. Select final wines from finalists picked on 25 Sept.*
29 Oct	*Evening meeting, Dr Bob Smith of CRA. Talk and slides on his visits to Russia followed by an open discussion about the Research Foundation.*
5 Nov	*Melbourne Cup Luncheon*

The evening meeting of 25 September proved popular. Starting with some 32 wines, the selection was narrowed down by 3 rounds of voting and some enthusiastic tasting by the members to the finalists of 5 whites and 5 reds.

The Committee then took it upon themselves to further "test" these wines until the two final wines were selected.

These are a 1988 Primo Estate Shiraz and a 1990 Clare Valley Sauvignon Blanc. For those of you who have ordered they will be available for collection in December before Christmas.

The evening meeting of 29 October provided the attendees with an interesting talk by Bob Smith on his trips to Russia. I'm not sure how Bob picks his travelling companions, the one with the moustache and braces looked a bit suspect! All the lady interpreters (language interpreters not seismic) all looked more acceptable.

After his talk about Russia Bob opened the floor to questions about the Research Foundation. The discussion also ranged over a variety of topics including ways to encourage students into geophysics.

At the close of the meeting the attendees, on a show of hands, agreed in principle to donate to the Foundation $1200 from an investment held by the SA Branch. The final decision is to be made at the next Committee meeting.

The Melbourne Cup Luncheon was again a success despite the Race being delayed an hour compared to previous years. The number of attendees was down to about 50 as compared to about 70 last year. This however did not dampen the spirit of those who did attend. Rumour has it that some attendees were still out and about, Melbourne Cup Lunching, 10 hours after the Race had finished!

This years' Christmas BBQ is to be held at President Terry Crabb's abode on 4 December, from 6.00 pm at 4 Robertson Place, Marino.

Nick Fitzgerald
Secretary

Victoria

The Victorian Branch has been going through a restructuring over the past few months in preparation for the handover of the Federal Executive in 1992.

The next meeting is planned for Tuesday, 10 December, when Stephen Reford of Paterson, Grant and Watson will discuss recent developments in geophysics in Canada.

David Gamble
Secretary

Queensland

A Branch meeting was held in Brisbane on 6 November in conjunction with the "Underground Coal Exploration Workshop" presented by the Australian Coal Association. Dr Peter Hatherly of ACIRL presented results of research into the application of seismic methods to fault detection in coal seams. The preliminary results indicate significant scope for geophysical methods in coal exploration - a field notable for its low level of utilisation of geophysical expertise.

An attendance of in excess of 200 delegates, and a widespread interest in the application of geophysical techniques were features of the Coal Workshop. To address this increasingly important market for geophysics the 1992 ASEG Conference Committee are planning to hold a Coal Geophysics seminar as part of the Gold Coast Conference in October. The co-ordinator of the seminar is Wayne Stasinowsky (Ph 07-279 1928).

The final Branch activities for the year are the Annual Dinner and Students Night. The Dinner is on Saturday 30 November at the Korea Restaurant, Fortitude Valley. Students Night will be held at the University of Queensland on Tuesday 3 December. Presenters and topics are as follows:

- Anthony Christensen - Integral Equation to Magnetic Field Modelling Problems
- John McMonagle - Processing ccomparison of Powergel and Shotgun Reflection Field Records
- Darren Rutley - An Evaluation of Seismic Stratigraphic Techniques in the Gippsland Basin
- Conrad Schmidt - Synthetically Focussed Resistivity Logging

With the 1992 Conference just around the corner, the Queensland Branch Committee would like to solicit as much assistance as possible to maintain Branch activity at a reasonable level. Any members intending on moving to the Brisbane region in the new year, and who would like to lend a hand, are asked to contact me on 07-854 1488.

Voya Kissitch
Secretary

Western Australia

The Student Night was a great success - it certainly attracted the largest crowd we've seen for a while. Congratulations to Michael House and Kim McInerney who took out Best Technical and Best Presented respectively. Congratulations also to Shaun Gregory for giving a very good presentation.

All of these students are from the University of Western Australia - well done to everyone who took part and don't forget to include it on your resume.

The Annual Christmas Social Dinner will be at the Trots, Gloucester Park on Friday, 13 December. 7.00 pm start. Call me for details (321 5477).

The golf day was a big hit! Everyone had a ball!!

Andie Lambourne
Secretary

ACT

The ACT Branch held the Annual Christmas Dinner at the School of Tourism and Hospitality, ACT Institute of TAFE, on 14 November. An enjoyable evening was had by all, with the mystery guest speaker being Mike Sexton with the topic "Geophysics - A View from Below". The talk discussed future directions for geophysics and geophysicists, and prompted some lively after talk discussions onf uture ASEG ACT Branch meetings.

Hopefully 1992 will be a more active year for the ACT Branch of the ASEG with revitalised energies after the Chrismas and New Year festivities. The ACT Branch wishes all ASEG members Merry Christmas and a revitalised propserous New Year for 1992.

Kevin Wake-Dyster
Secretary

Radio Imaging Method (RIM) in Coal Exploration*

* Adapted from a paper by R Doyle in Advances in the Study of the Sydney Basin, 25th Symposium, Department of Geology, University of Newcastle, Proceedings, pp 95-101

Reprinted from Minfo, No. 33, October 1991

The Radio Imaging Method (RIM) is an electromagnetic geophysical technique which uses medium frequency (50-520 Khz) radio waves to evaluate subsurface geology. RIM has considerable potential for defining clear coal areas (areas free of anomalies) and structural features in coal mines and the technique also has applications in metalliferous mines. The technique can be shot from roadway to roadway (in-mine or RIM I) or from borehole to borehole (RIM II). RIM is an effective and relatively inexpensive technique when compared with alternative geophysical techniques used for the same purpose. This article discusses RIM I; RIM II will be discussed in a future issue of Minfo.

RIM relies on propagating radio waves through layered strata such as a coal seam. The resulting EM wave signal will attenuate (lose strength) as a direct response to variation in the conductivity of the strata. The radio wave is confined to the seam by the roof and floor rocks, allowing easy transmission of the signal to the receiver.

When the frequency of the signal wave is increased the range decreases but the resolution increases and vice versa.

Two types of surveys can be used; the Direct Ray Path survey or the Diagonal Ray Path survey.

In the *Direct Ray Path* survey the signal is passed via the shortest path across the longwall block from each of a series of stations spaced equidistantly along one side of the block to a corresponding station on the other side of the block.

In the *Diagonal Ray Path* survey (or tomography) the signal is passed from each station to all of the stations on the other side of the block. This survey is more time consuming but gives a far more detailed representation than the Direct Ray Path survey. Tomography is therefore useful in investigation of known or suspected problems or anomalies revealed by a Direct Ray Path survey. The station spacing in the Test 1 example was 10m, but the spacing can vary according to the needs of the specific survey.

The RIM I equipment uses circular "hula-hoop" antenna about 1m in diameter or a modified elongate version for insertion in drill holes. The equipment is intrinsically safe.

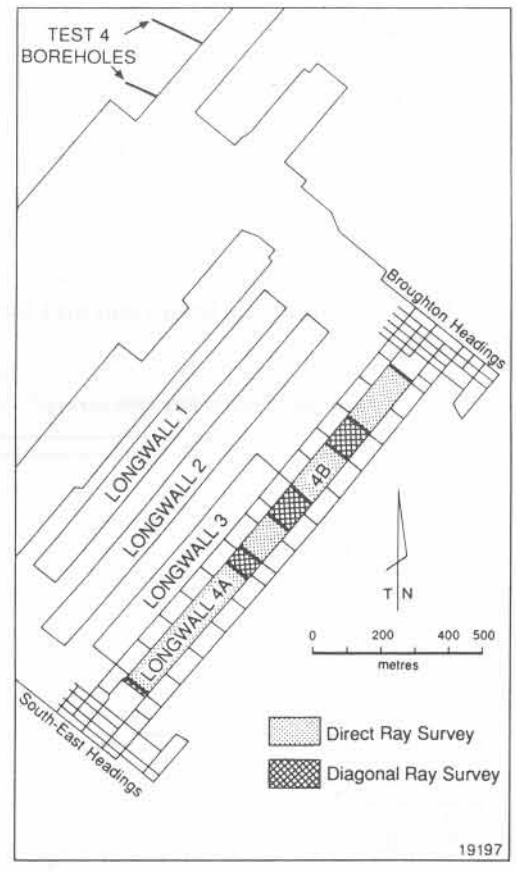
Test I: Tower Colliery Longwall 4

This test aimed to determine the accuracy and reliability of the method and to give "clear coal" results in an area of concern. The directions and size of known faults within the long wall block needed to be confirmed.

The Direct Ray Path survey was shot from points of similar distance on either side along the full length of Longwall 4 (figure 8).

During the survey, seven anomalous zones were distinguished by the varying attenuation rates (figure 9). Of these, three were considered major features (A, B and C). Anomalies B and C were faults mapped prior to the survey while anomaly A, a strike-slip fault, had not been previously recorded in the workings. The most critical aspect of this survey was the "clear coal" designation between anomalies B and C indicated by the low attenuation of the signal.

Figure 8: Tower Colliery workings showing Longwall 4 and location of Tests 1 and 4.



Anomaly C was a significant hazard to longwall mining and the equipment was moved and re-installed into Longwall 4B. RIM aided the optimum placement of the equipment and saved some 50 000 tonnes of prime Bulli seam coal from being sterilised. The cost of the survey was recovered with one shear on the longwall.

Anomalies D, E, F and G were considered real, but of a nature that would not impede longwall mining. Constant production rates during mining of this section confirmed this assessment. Anomaly G, the tail end of a dyke, was represented by a zone of shearing.

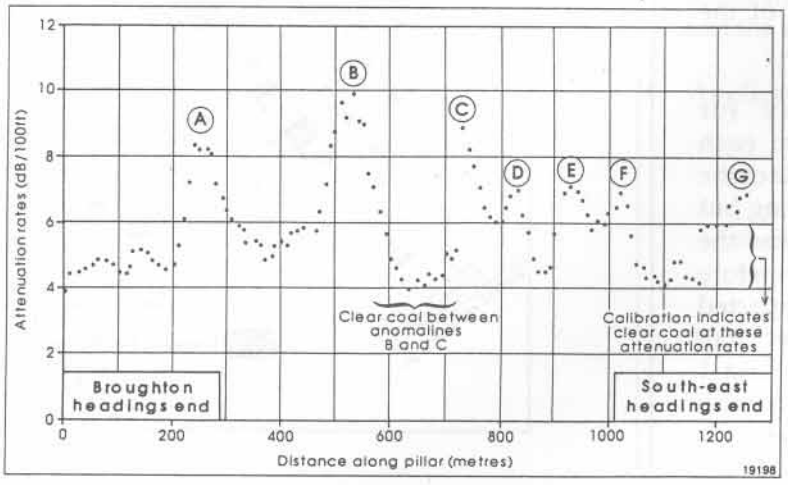
Following the Direct Ray Path survey, a Calibration survey was conducted to establish how well the radio waves are transmitted over distance in the Bulli seam at Tower Colliery. The results were excellent and proved up the distance to a possible 500m with realistic resolution of geological features to 300m.

Tomographic surveys were conducted to highlight the major anomalies located during the Direct Ray Path survey. Figure 10 shows the ray paths covering Anomaly C, while figure 11 shows the tomographic image. The darkened area represents the trace of the fault plane which can be seen to bifurcate. These results agreed with the expected geology, in that the fault projected across the block, decreasing in throw. The results of the Tomographic survey enhanced the accuracy of the Direct Ray Path survey predictions.

Test 2: Appin Colliery Longwall 20

At Appin Colliery, a fault was located on one side of Longwall 20 and not on the other (figure 12). A survey was conducted to trial the RIM method and to determine the extent and location of the fault.

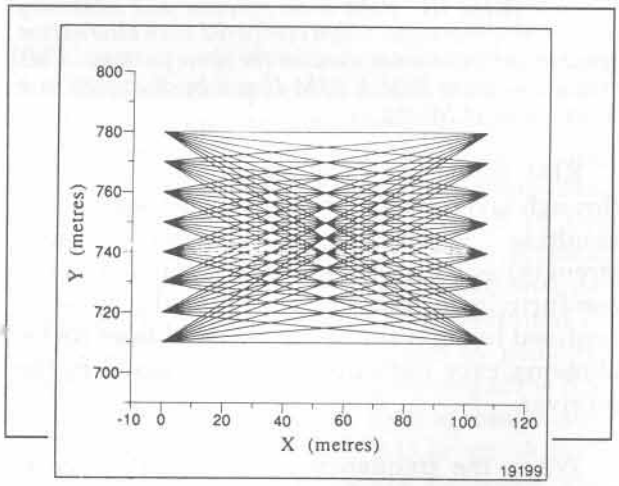
Figure 9. Results of Test 1, Direct Ray Path survey



From underground mapping, the fault plane had a relatively straight trace and a throw of 1.5m adjacent to Longwall 20. What the fault did inside the 200m longwall block was uncertain. A Diagonal Ray Path survey was conducted to highlight this zone.

The results of the survey indicated an unusual arcuate fault trace, that the fault would terminate at a position 120m within the block and that it would occur as an en-echelon type feature. This result was not postulated prior to the survey. Had this survey not been conducted, mining through this hazard would have involved considerable risk. At production levels of 10 000 tonnes per day, delays due to uncertain geological conditions or damage to the shearer are very costly.

Figure 10. Diagonal Ray Paths covering Anomaly C, test 1.



Test 3: Appin Colliery Longwall 21

Longwall 21 also contained a fault of 2.3m throw adjacent to the longwall. Logistically it was a very similar problem to the previous test. A Direct Ray Path survey was conducted and followed by a Diagonal Ray Path survey of two anomalous areas within Longwall 21.

The location, extent and trace of the fault are shown in figure 12. Fault A was predicted to increase in fault magnitude and/or water content prior to dying out. The prediction of fault B was to rend some 180m across the block, decreasing in magnitude all the way. As well, there were "clear coal" zones recognised.

Mining decisions were made to remove the longwall equipment prior to approaching fault A, due to an increase in throw and the possibility of poor roof conditions associated with the curvilinear fault plane. RIM assisted in this decision making process.

Figure 11. Tomographic image of Anomaly C from Diagonal Ray Path survey, test 1.

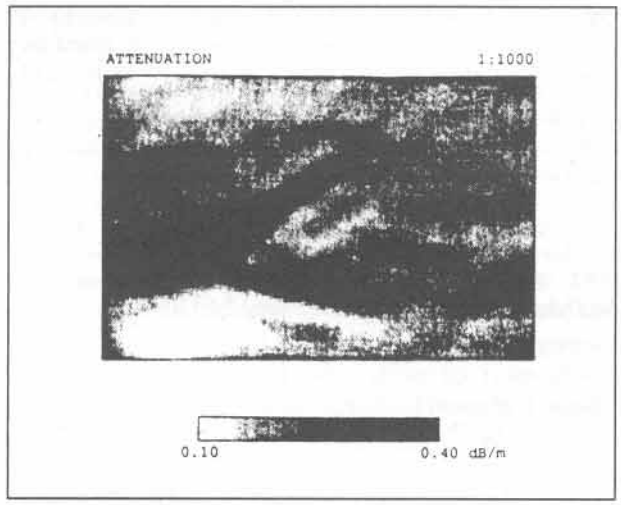
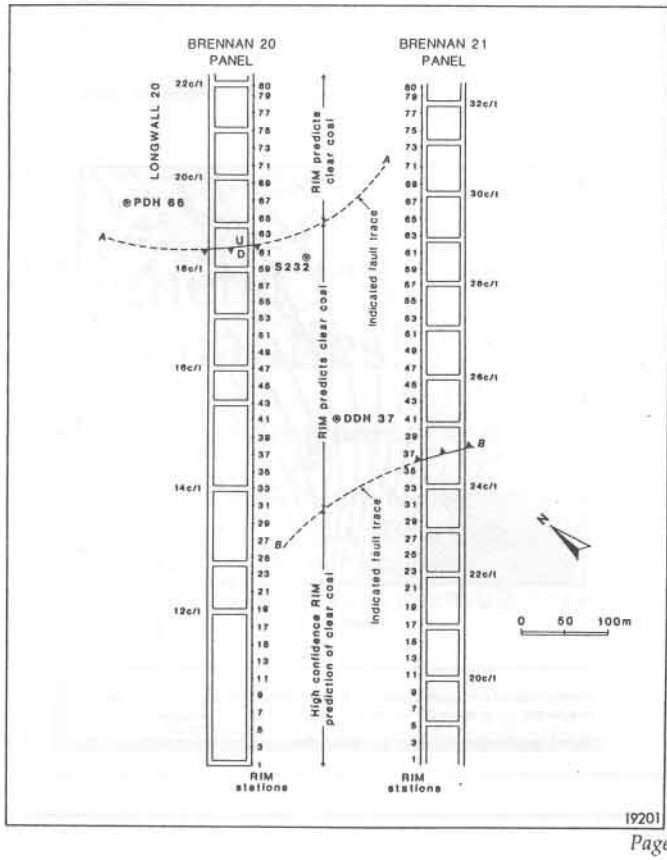


Figure 12. Appin Colliery, Longwalls 20 and 21 showing RIM layout and fault traces



Test 4: Tower Colliery North-East Intakes

A National Energy Research, Development and Demonstration Council (NERDDC) test was conducted at Tower Colliery. The test used pre-existing methane drainage holes to a depth in-seam of 165m.

The purpose of this test was twofold: to determine if a fault, identified by a high-resolution seismic survey and terminating in the vicinity of the test site, was present in the area and, secondly, to test the technique in in-seam horizontal boreholes.

The survey involved a pulley/winch-operated system of inserting and removing the transmitter and receiver in the boreholes. Antistatic and flame-retardent plastic pipes were installed in the holes to facilitate sliding of the transmitter and receiver. A distance of 200m separated the two boreholes and the area covered by the survey was over virgin coal. No anomalies were located.

Importantly, the technique proved to be effective in the search for features in virgin coal conditions. The results of such a survey technique conducted in advance of longwall development could have significant implications for mine development.

This successful test at Tower Colliery was the first at this magnitude in an underground mining operation in Australia.

* * * * * *

AGRF - Revision of the Australian Geomagnetic Reference Field

Charles Barton
Geomagnetism Section
Bureau of Mineral Resources, Geology and Geophysics

A revision of the Australian Reference Field for the interval 1985-1995 (AGRF90) is now available from BMR Geology and Geophysics as a software package.

The Australian Geomagnetic Reference Field (AGRF) is a set of numerical models of the broad-scale regional magnetic field over Australia and adjoining areas. It represents a combination of the Earth's main (core) field and the intermediate-to-long wavelength crustal field. AGRF is generally more accurate over Australia and more detailed than global models of the field, such as the International Geomagnetic Reference Field (IGRF). AGRF90 supersedes the previous AGRF85 model, and is developed for use within the interval 1985 to 1995.

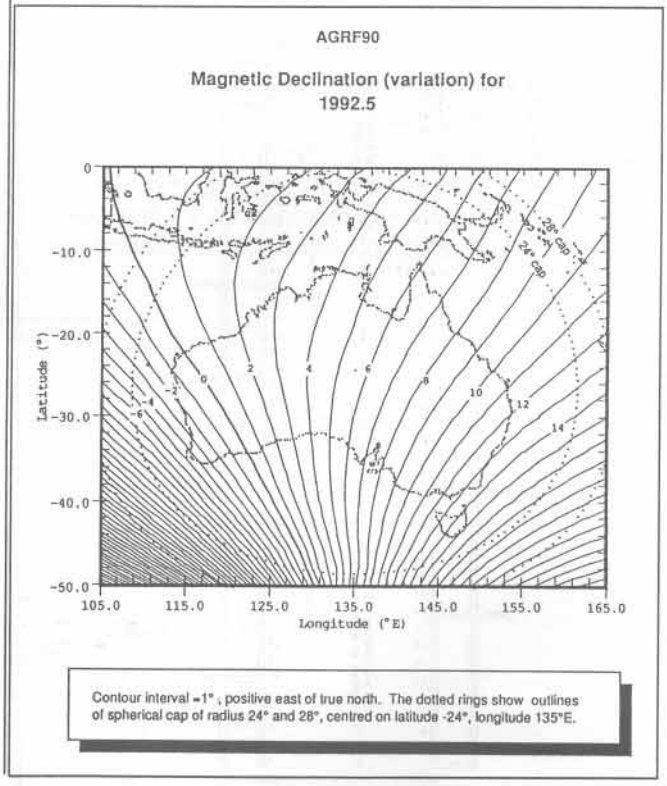
The AGRF software package allows all the elements (components) of the magnetic field to be computed at a given site, or on a regular latitude-longtitude grid. AGRF90 is recommended as the best available field model for regional direction-finding applications, eg compass navigation, determination of magnetic bearings, surveying and directional drilling. Local irregularities in the magnetic field are not represented in AGRF. However, AGRF can be used to update local magnetic survey data.

The field model for AGRF is based on a large data set comprising all the available vector survey data - BMR's Third-Order ground survey (1967-1981), MAGSAT (1980), the US Navy's Project Magnet high elevation aeromagnetic surveys (1983-1990), and magnetic observatory and repeat station data for the region. The secular (annual) variation model incorporated into AGRF90 is based on observatory and repeat station data sets.

AGRF90 is developed as a spherical cap harmonic model of the residual crustal field after removal of a global spherical harmonic reference field model, USGS90 (produced by the US Geological Survey). This procedure is analogous to the procedure used for producing AGRF85, namely rectangular harmonic analysis of the "regional residual field" with respect to IGRF1985. However, the differences in modelling methodology are such that an entirely new set of subroutines is required for AGRF90. The spherical cap-shaped region that is modelled is centred on latitude 24°S, longitude 135°E with radius 28°. Because of edge-effects associated with the numerical modelling, it is suggested that the model be used only within a radius of 24° (illustrated in Figure 1).

The AGRF90 software package, including FORTRAN source code, is available on 3.5 inch or 5.25 inch diskette for MS-DOS computers (IBM PC's and compatibles), or on 3.5 inch diskette for the Apple Macintosh. A4 sized contour charts of particular elements of the field (PC graphics quality) can be prepared on request. A full set of magnetic field charts for the region, based on AGRF90, will become available in 1992. The price of the AGRF90 software package is $250 for the first copy, plus $50 for additional copies. Orders should be addressed to: Geomagnetism Section, BMR Geology and Geophysics, GPO Box 378, CANBERRA ACT 2601, Tel: (06) 249 9111 Fax: (06) 257 6041. Enquiries about AGRF models and applications should be addressed to: Charlie Barton, Telephone: (06) 249 9611. Enquiries about charts should be addressed to: Andrew McEwin, Telephone: (06) 249 9392

Figure 1: Magnetic declination (variation) for the Australian region at epoch 1992.5 based on AGRF90. The contour interval is 2°, positive eastwards of true north. The outer dotted ring shows the limits of the modelled region - a spherical cap of radius 28° centred on 24°S, 135°E. The inner ring shows the limits of the spherical cap of radius 24° within which the model is relatively free from spurious edge-effects.



Commercialisation of IGRF - rejected

Charles Barton
Geomagnetism Section
Bureau of Mineral Resources, Geology and Geophysics

The proposal to commercialise IGRF has formally been rejected by the International Association of Geomagnetism and Aeronomy (IAGA).

During the last year there has been widespread debate on a proposal to charge commercial users a fee for the use of the International Geomagnetic Reference Field (IGRF). The purpose of the proposal was to raise funds to support the rapidly growing number of magnetic observatories in poorer countries that are facing imminent closure. Many such observatories have already ceased providing data routinely. The accuracy of IGRF depends heavily on the effectiveness of the global network of magnetic observatories.

IAGA, the organisation responsible for producing IGRF, deemed that the issue should be resolved by a formal vote of national delegates, votes being weighted according to respective financial contributions to IUGG. The result of the vote, taken during the recent IUGG meeting in Vienna, August 1991, was defeat of the proposal by a 75% majority.

This ends any possibility of commercialisation of IGRF in the foreseeable future. The problem of how to maintain a viable global network of magnetic observatories remains.

Magnetic Personalities!

First there were magnetic pigeons:

The Ionospheric Prediction Service (IPS) sends out weekly bulletins on solar flares and magnetic storms to the cream of Australia's mineral explorers. Some recipients of a recent IPS Weekly Geophysical Report were:

- TESLA 10 Applecross
- TNT Bulkships Operations Alice Springs
- Total Mining Australia Sydney
- **Victoria Homing Association Montmorency**
- Western Mining Corporation Kalgoorlie
- Zonge Engineering Fullerton

And now, we have:

Magnetic salmon

Reprinted from The Australian Geologist, Newsletter No, 80, September 30, 1991
By Nigel Hawkes, Science Editor
The Times, 14 August 1990

The mystery of how the salmon finds its way back across thousands of miles of ocean to the river where it was born may have been solved. Three British scientists have detected the presence of magnetic particles in the brain and along the lateral line of the Atlantic salmon. The scientists think that the salmon use these particles of magnetite to detect and follow the Earth's magnetic field.

Particles of magnetite have been found in the brains of other creatures with navigational skills, including racing pigeons, turtles and honey bees. However, according to the scientists, whose report appears in the *Philosophical Transactions of the Royal Society*, this is the first time that they have been so accurately pin-pointed in a migratory fish.

Using a highly sensitive magnetometer, they found minute beads of magnetic material in the frontal region of the skull and along the lateral line, which runs the length of the fish and is connected to the central nervous system. The lateral lines are used by the fish to balance, to maintain distance in shoals, and to detect predators. Dr Moore said "It would seem that the Atlantic salmon has evolved to develop magnetic particles in the lateral lines which would be sensitive to the geomagnetic field, helping it to orientate itself during the high-seas phase of its migration."

Ten times as much magnetic material was found in the adult fish as in the smolts, suggesting that the fish generates the particles as it grows. The absence of any measurable quantities of other metals seems to demonstrate that the magnetic particles are biological in origin, not the result of pollution of the sea by metals.

★ ★ ★ ★ ★ ★

Geophysical Measurements in Tasmania in 1792

F E M (Ted) Lilley
Chairman, Specialist Group on Solid Earth Geophysics
Research School of Earth Sciences

Letter to the Editor
Reprinted from The Australian Geologist Newsletter No. 80, September 30, 1991

I write to support the call of H J Harrington (TAG 79, p44) for bicentennial celebrations of Australian geoscience and to point out that in addition to the anniversary of the gravity expedition which Harrington mentions, an earlier occasion will occur as soon as next May. That occasion will be the bicentenary of the magnetic intensity measurements made on 11 May 1792 in Recherche Bay, Van Diemen's Land (southern Tasmania) by the expedition of Bruny D'Entrecasteaux. The observations are described by De Rossel (1808).

As measurements of intensity they were very significantly more than measurements of magnetic declination, the deviation of magnetic north from true north, which were contributed by a number of mariners of that era. Indeed the nineteenth century reviewer Sabine (1838) states that the full set of De Rossel's intensity measurements showed for the first time that magnetic intensity varied with position on the globe, and in particular that it increased with increasing magnetic inclination (or dip). The expedition's measurements were made by timing the period of an oscillating dip needle, disturbed from its equilibrium position. It is an interesting contrast with current practice in science that the expedition's data for this study, at the end of three years, consisted effectively of just six such determinations; yet the critical evidence was there. The report of the D'Entrecasteaux expedition, in two volumes accompanied by a superb atlas Beautemps-Beaupre, (1807) of maps in folio size, is held in the National Library, Canberra; I plan to submit more information from this source to the December 1991 issue of "Geophysics Down Under", the newsletter of the GSA Specialist Group on Solid Earth Geophysics.

Meanwhile, as a preliminary for such a bicentenary, on the Friday afternoon of the last Australian Geological Convention held in Hobart in February 1990, four of us made a reconnaissance trip to Recherche Bay. The party consisted of W Dudley Parkinson (eminent senior geomagnetist), Graham S Heinson (enthusiastic research student), E June Fizelle (local knowledge consultant) and myself (driver). We visited D'Entrecasteaux's "Port du Sud", and in fact walked close by the point where the expedition made a second set of measurements (on 7 February 1793) upon returning to Recherche Bay after a wide sweep of the Pacific, including the circumnavigation of New Holland (Australia, as we now know it).

We envisaged, at that time, returning to celebrate the 1792 bicentenary by reoccupying the stations and repeating the measurements of De Rossel. I hope it may be possible to do so by boat; from the water, mountains form a spectacular backdrop to the bay. Anyone interested in joining the party is invited to contact me, and I will keep them advised of arrangements.

If there is sufficient interest we could precede such an excursion by a meeting of a day or two in Hobart or nearby, focussed on a topic such as "Progress in Geomagnetism in Australia: a Bicentennial Review".

References

(Beautemps-Beaupre , C.F. (1807). "Atlas du voyage de Bruny-D'Entrecasteaux...en 1791, 1792 et 1793...." Paris, Depot general des cartes et plans de la marine et des colonies.

De Rossel, E P E (1808). "Voyage de D'Entrecasteaux, envoye a la recherche de La Perouse". Paris, de l'imprimerie imperiale, 2 vols.

Sabine, E (1838). "Report on the variations of magnetic intensity observed at different points on the Earth's surface, in: Report of the Seventh Meeting of the British Association for the Advancement of Science (held in Liverpool, England in 1837); vol VI, pp 185.

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1991 ASEG/PESA Golf Classic

The 1991 ASEG/PESA Gold Classic took place on Friday, 22nd November. The venue was again Royal Fremantle Golf Club.

After a light lunch, 95 "GOLFERS" hit off for a most enjoyable round of gold (although some scores indicated most enjoyment was obtained from the on-course watering holes). Many hard luck stories surfaced during post match drinks and on into the buffet dinner.

Prize presentation was once again wittily handled by Derek Evans. The quality of prizes was very high with many people receiving probably the first and last prize for their golfing career.

The Sponsors - listed below - should be thanked for their tremendous support which helped to make the day an outstanding success. Thanks also to Derek Evans and others who helped organise the day.

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The Digital Cumulative Index, a two-year project by the SEG Publications Committee, provides the working geophysicist with a powerful, computerised working resource typically found only in major oil companies. The Digital Index bridges the gap between a printed index that sits on a bookshelf and powerful on-line data bases accessed by large research libraries.

The Digital Cumulative Index contains 13,000 journal articles, books and reprints of four geophysical societies - SEG, EAEG, and the Australian and Canadian SEGs. For the first time, annual meeting titles, for which Expanded Abstracts are available, are included. Unique to the Index is complete cross-referencing of discussions, replies, errata and addenda. The geophysicist can quickly search for key information on authors, titles and keywords, and create a bibliography of all papers on a specific topic. References can be easily formatted in any of the supplied bibliographic styles (including GEOPHYSICS and *Geophysical Prospecting*). The formatted references may then be printed or added to your word-processor document.

Most users will purchase the Index with run-time bibliographic software (EndNote or Papyrus for the PC; EndNote Plus for the Macintosh). These programs are fully compatible with common word-processing programs such as Microsoft Word and Word-Perfect. Other formats, such as text-delimited ASCII are easily imported into existing database programs on desktop workstations and mainframe computers. *The main advantage, though, is that the base price of the Index is only A$21.* An article describing the background and use of the Index, with detailed technical information, was published in the October 1991 issue of THE LEADING EDGE. The following summary of technical informatino will be helpful in ordering.

Technical Information

The Digital Cumulative Index is distributed in five separate files for ease of use and maximum flexibility. Version 1.0 of the database, released October 1, 1991 is complete and up to the end of 1990. These files are:

Table 1: File Descriptions

Filename	Description	# Titles	Size ASCII	Size Bibl.*
GEOTLE	Geophysics and The Leading Edge	5343	960	1750
SEGBKS	SEG books and book chapters	1142	290	480
EAEG	Geophysical Prospecting, First Break and EAEG Workshops	2102	380	660
ASEGC	Publications of the Australian SEG and Canadian SEG	1147	300	450
SEGCON	SEG Annual Meetings	3466	1050	1650
Total		13200	2980	4990

* EndNote or Papyrus bibliographic format

Database formats

EndNote and Papyrus Internal Bibliographic Format. These formats are used in the database libraries of End Note and Papyrus. The runtime versions of these programs allow the user to perform all the major bibliographic functions, but not to add to, or modify the database. The bibliographic software provided, being a run-time only version, can only be used with the SEG database. If the user wishes to add other references, reference types or styles, the complete software package (EndNote or Papyrus) should be purchased.

Text Delimited. This is a field-delimited, variable-length ASCII format, suitable for importing into common database programs. This format is also known as a sequential data file or text file:

Field delimiter	*Double Quotes*
Field separator	*Comma*
Item separator (within field)	*Semicolon*
Physical record delimiter	*CR/LF (ie after each reference)*

Each record has 20 fields. Depending on the reference type, some fields may be empty. Several fields are reserved for future use. An example is given below:

"GEO40 05 08510864", "Zonge, Kenneth L.; Wynn, Jeffrey C.","1975","Recent advances and applications in complex resistivity measurements*","","","","Geophysics", "40","5","851-864","spectral, rock, induced polarization, sulphide","","Discussion in GEO-42-0100120; Reply in GEO-4201-0121","","","","","","","

Refer format. Refer is a simple text file in which each field is listed separately on a new line and preceded by a tag to indicate the type of information on the line. The Refer tags used for the four publication types are shown in Table 2. Files in Refer format can be imported into EndNote or Papyrus bibliographic programs (but not into the run-time or demonstration versions). Refer files (also known as BibIX) are also compatible with Nroff/Troff in Unix. Several supplementary tags (eg, $0) are used to facilitate import. An example of Refer format is given below:

% F GEO40 05 08510864
% A Zonge, Kenneth L.
% A Wynn, Jeffrey C.
% D 1975
*% T Recent advances and applications in complex resistivity measurements**
% J Geophysics
% V 40
% N 5
% P 851-864
% K spectral, rock induced ploarization, sulphide
% O Discussion in GEO-42-01,0120; Reply in GEO-42-01-0121

End Note and Papyrus Bibliographic Software. While it is not the policy to SEG to endorse third-party software products, the Cumulative Index Subcommittee has selected these two bibliographic programs for their ease of use and low price. EndNote (and Endnote Plus) is available from Niles and Associates, 2000 Hearst Street, Berkeley, CA 94709; phone 510-649-8176. Endnote Plus has more powerful search capabilities than Endnote and supports sorting.

Endnote for the PC has a convenient windows-like user environment. Both Endnote and Endnote Plus are available for Macintosh computers. Note that the run-time versions of these programs do not support automatic

formatted export, but allow the full range of search and retrieval.

Table 2. Refer Tags*

Database Field	Refer tag	Item	Journal Article	Book	Book Section	Conference proceeding
1	%F	Identifier (label)	%F	%F	%F	%F
2	%A	Author(s)	%A	%A	%A	%A
3	%D	Year	%D	%D	%D	%D
4	%T	Title	%T	%T	%T	%T
5	%E	Editor(s)			%E	%E
6	%?	Translator		%?	%?	
7	%I	Publisher		%I	%I	%I
8	%C	Place Published		%C	%C	%C
9	%B	Edited book or conference title			%B	%B
10	%J	Journal	%J			
11	%V	Volume	%V	(%V)	(%V)	(%V)
12	%N	Issue	%N			(%N)
13	%P	Pages	%P	(%P)	%P	%P
14	%K	Keywords	(%K)	(%K)	(%K)	(%K)
15	%S	Authors' affiliation				(%S)
16	%O	Notes	(%O)	(%O)	(%O)	(%O)
17	%X	Abstract (not used yet)				

* Items in parentheses are optional

Papyrus is available from Research Software Design, 2718 SW Kelly Street, Suite 181, Portland, OR 97201; phone 503-796-1368. Papyrus is extremely flexible in it use, but takes somewhate longer to learn than Endnote. It does, however, offer unlimited exporting in the run-time version. Run-time Papyrus is supported on PCs under Dos, and also on Vaxes under VMS. A Macintosh version is scheduled for late 1992.

Table 3. Software specifications

	EndNote	EndNote Plus	Papyrus
Hardware (hard drive strongly recommended)	IBM PC or compatible with 512K memory; mouse optional		IBM PC or compatible, inc PS/2; 512K memory
	Macintosh 512KE, plus SE/30 or Mac II family	Macintosh 512KE Plus SE/30 or MacII family	
Operating System	Dos 2.0 or higher (3.0 or higher preferred)	Mac 4.2 or higher (inc System 7)	MS Dos 2.0 or higher (disk catching s/w pref). Windows as Dos application.
	Mac 4.2 or higher (incl System 7)		
Capacity	32 000 references	32 000 references	2 000 000 references
Maximum record length	64 000 characters/ record 32 000 characters/field	64 000 characters/ record 32 000 characters/ field	16 000 characters/ record 16 000 characters/field
Word processor compatibility	PC wordPerfect, any ASCII file, Rich Text Format	PC WordPerfect, any ASCII file. Rich Text format	WordPerfect, Microsoft Word, Wordstar Prof, Wordstart 2000, Xywrite, PCWrite, MSWordwindows, ASCII files, RichText Format
	Mac: Microsoft word, Word perfect, WriteNow, MacWrite	Mac: Microsoft Word, Word Perfect, WriteNow, MacWrite	
Rec retail price*	US$149	US$249	US$99

*Considerably cheaper at discount software houses. Currently not avail from ASEG

Digital Cumulative Index Ordering Information

SINGLE CPU LICENSE:

COMPUTER AND MEDIA: P.C. ☐ Mac ☐ Other ☐ (Computer) 3½" ☐ 5¼" ☐ (Diskette) HD ☐ DD ☐ (Density) 9-track 1600 bpi ☐ (Magnetic Tape)

DATABASE FORMAT: Text Delimited ☐ Refer ASCII ☐ EndNote Run-time ☐ EndNote Plus Run-time ☐ (not available for PC) Papyrus Run-time ☐ (not available for MAC)

Diskette Base Price *A$21.00* ..... $_____

Add *A$7.00* Run-Time EndNote or EndNote Plus ... $_____

9-Track Tape *A$55.00* ..... $_____

SITE LICENSE: *All CPUs at a single company location* .....*A$675.00*..... $_____

CORPORATE LICENSE: *All CPUs anywhere within your corporation*.....*A$2700.00*..... $_____

SHIPPING & HANDLING: *DISKS* .....*A$12.00* *TAPES*.....*A$36.00*..... $_____

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Book Review from the AMF

Field geology of high-grade gneiss terrains

C.W. Passchier, J.S. Myers and A. Kroner. Berlin: Springer-Verlag, 1990, ix, 150p: ill; 25 cm. Includes bibliographies and index. ISBN 0-387-53053-3 (Australian agent: D.A. Book (Aust) Pty Ltd, 648 Whitehorse Road, Mitcham Vic 3132). Price: DM29.80 OR ORDER THROUGH THE AMF BOOKSHOP.

Very few students are confronted with mapping high-grade gneiss complexes as part of their undergraduate projects, partly because they are inordinately difficult for beginners, but chiefly it is suspected, because such terrains do not lend themselves to the straight-forward interpretation usually desirable for supervised exercises. For whatever reason, when a graduate is landed upon his first gneiss complex he is forced back to basics notwithstanding a good grounding in the microscopy of metamorphic rocks and an ability to recognise the petrological fine points in thin section. It is usually the case that field observations are of much greater structural and genetic significance than those made under the microscope; not only is the scale more relevant for regional interpretation but the selection of appropriate samples for petrological examination requires long experience. This small manual is thus designed to lead the field geologist through the steps necessary for the adequate recording of gneiss terrains - not necessarily the production of detailed maps, but the significant structures and fabrics which imply the metamorphic history and petrogenesis. The volume is the result of an IUGS-AGID workshop on the evolution of high-grade gneiss terrains held at Kandy, Sri Lanka, in 1987 at which the unavailability of a suitable student text was noted.

The opening chapter emphasises the importance of field mapping as the primary pre-requisite for the comprehension of geological relationships in general and of high-grade metamorphic terrains in particular. The authors are adamant that only by field observation is it possible to assess metamorphic conditions, to understand the regional evolution of the terrain, and to establish the three dimensional relationships of the petrological suites and units. So we are taken through the elements and working procedures of outcrop analysis, the selection of significant observations, and the development of a first working model against which to test the interpretation. Later chapters outline the principles which should be comprehended before attempting field mapping, such as fabric development and the geometry of ductile flow, the development and significance of shear zones, fabric distribution in shear zones, and the interpretation of structures and fabrics including problems of overprinting and the effects of intrusives. Final chapters deal with the elucidation of the metamorphic history, with the geochemistry, isotope geochemistry and geochronology, and with the ultimate interpretation of the study area in terms of origin and metamorphic evolution. For good measure, a "problem chapter" is provided in which some common but informative misinterpretations are discussed, and a series of outcrop close-up photographs are displayed for the reader's interpretation of the sequence of metamorphic events (with solutions).

Here is a valuable "first" for students of high-grade terrains. This reviewer regrets the absence of such a field aid in earlier years when many a high-grade terrain was dismissed as a "metamorphic complex" beyond detailed understanding.

The three authors are associated respectively with the Institute of Earth Sciences, Budapestlaan, Utrecht, The Netherlands; the Geological Survey of Western Australia; and the Institute of Geosciences, University of Mainz, Germany.

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Membership

1992 Subscription Dues

The Subscription Dues form for 1992 has been posted out to all members.

Unfortunately, due to inflation, the ASEG has had to increase membership prices as follows:

Active/Associate	From $45 to $50
Corporate	From $275 to $300
Student	From $15 to $20

The ASEG financial year is from January to December 1992. Payment should be received by the Secretariat as soon as possible.

Where Are They???

Does anyone have the new address for any of the following members:

Mr P R GOURLAY formerly of Tasmania
Mr P MILLS formerly of Botswana
Mr M C NOBLE formerly of Digital Exploration, QLD
SCHLUMBERGER SEACO INC formerly of North Sydney, NSW
Mr J L SEARA formerly of West Germany
Mr R J TAYLOR formerly of Adelaide

Change of Address

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To: CSIRO
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S R GREAVES
From: Indonesia
To: c/- Ampol Exploration
PO Box A323
SYDNEY SOUTH NSW 2060

D A ROMPOTES
From: Victoria
To: 10 Road 250, Maadi
PO Box 69 New Maadi
CAIRO EGYPT

R J SCHRODER
From: Pymble NSW
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