



THE ASSOCIATION OF EXPLORATION GEOCHEMISTS NEWSLETTER

P.O. Box 523 (Metropolitan Toronto),
Rexdale, Ontario, M9W 5L4 Canada

No. 56

July 1986

President's Message - Glen Allcott

I believe the membership can be proud of the association's role in the GEOEXPO/86 symposium and wish to thank the organizers and participants on your behalf. The recent symposium in Vancouver was a well balanced and well organized meeting. The technical papers were of excellent quality and sessions such as those on marine mineral deposits no doubt stimulated new thoughts about exploration technology in this environment.

What of the future? As President Thomson mentioned last year, the mid 1980's is a time of contrasting change. We find ourselves now in a year with meetings being held in Canada, Greece, South Africa and China -- more regional meetings than ever before. Yet, the Association faces the potential for a declining membership/budget because of continued reductions in exploration activity. Your Council will face some difficult decisions in setting priorities

for association support for symposium and other activities.

I would like to encourage you, the membership, to take a more active personal role in the Association. Any one's thoughts of how to improve our Association will be carefully considered. Please feel free to call or write. I am looking forward to your communication.

Glen Allcott

Personal column

Information on Association Members is received from around the world. To keep your fellow members informed of your latest moves, send a brief summary to the Rexdale office and please indicate that this information is intended for the Newsletter.

Bill Coker, formerly Chief Geochemist with Kidd Creek Mines Ltd., has been appointed Research Geochemist with the Geological Survey of Canada, Ottawa. He may be contacted at:

Geological Survey of Canada,
601 Booth Street,
Ottawa, Ontario K1A 0E8

Dr. Keith Nicholson left the University of Glasgow, Scotland at the beginning of the year to take up a Lectureship in Chemistry and Geochemistry at the University of Papua, New Guinea. He can now be contacted at:

Department of Chemistry,
University P O,
Box 320,
Papua, New Guinea

Dr. R. Beeson, previously Supervising Research Geologist with Billiton Australia Ltd. in Melbourne,

has taken up a secondment with Billiton Research B.V.
P.O. Box 40
(Westervoortsedijk 67d)
6800AA Arnhem.

JGE Publication

Issue	Year	Approximate Publication Date
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Vol 25(3)	1986	May 1986
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New Members

Names of the following candidates have been recommended by the Admissions Committee and have been approved by Council. According to the Association's by-laws, the names of candidates are to be published for consideration by the membership. If you wish to comment on any candidate, please do so in writing to the secretary within 60 days.

Voting Members

M.N. Cagatay (Trans.)	Lecturer in Geochemistry, Univ. of Petroleum and Minerals, UPM 895, Dhahran 31261 Saudi Arabia
R.R. Craig	Geochemist, Newmont Explorations, 234 West Ash Street, Elko, Nevada 89801 U.S.A.
J.L. Gravel (Trans.)	Geochemist, GHS Geochemical Services Ltd., Ste 311-1930 West 3rd Street, Vancouver, B.C. Canada V6J 1L1
C. Gourmelon	Comp. Total Mins., 218/228 Ave. du Haut L'Eveque, 2.1. Dorsal 33600 Pessac, France
S. Olerud	Senior Geologist, Geological Survey of Norway, Box 3006 7001 Trondheim, Norway
K.I. Olson	Geologist, Boks 83, 1321 Stabekk, Norway
A.D. Oyembamija	Geochemist, Nigerian-Italian, Ceramic Prods. Ltd., P.M.B. 311, IFON Ondo State, Nigeria
G.R. Peatfield	Consulting Geologist, c/o Mine Quest Exploration Assoc. Ltd. 311 Water Street, Vancouver, B.C., Canada V6B 1B8
C. Reimann	Research Geochemist, Joanneum Research Society, Roseggostr 15, A-8700 Leoben, Austria

K. Sand Geochemist,
Geological Survey of Norway,
P.O. Box 3006, N-7001 Trondheim,
Norway

I. Sutherland Geologist,
Kidd Creek Mines,
701-1281 West Georgia Street,
Vancouver, B.C., Canada V6E 3J7

Affiliate Members

E.A. Sandberg Exploration Geologist,
Outokumpu Exploration,
PL 26, SF 67101, Kokkola,
Finland

S. Sinabantu Geology Dept., Makerere University,
P.O. Box 7062, Kampala, Uganda

Student Members

D.S. Clarke Dept. of Applied Geology, School of
Mines, University N.S.W.,
Kensington, New South Wales,
Australia, 2033

S.P. Dalal RCL, ONGC,
Makarpura Road,
Baroda -390 009 India

S.J. Day 130-3755 West 6th Ave.,
Vancouver, B.C., Canada V6R 1T9

D.I. Dennison Eastern Washington University,
729 West 5th Ave., #1,
Cheney, Washington, 99004 U.S.A.

Computer Software Pool

The following programs are available from the Association: TERNARY PLOTTING PACKAGE (\$12.00), BINARY PLOTTING PACKAGE (\$12.00), IRVBAR JENSEN, JENBND and STRNET (all \$6.00).

The programs originally supplied in hardcopy paper format are being discontinued in favour of programs that have been written to run on IBM-PC (DOS) microcomputers. One program is now available on disk comprising the following:

BOUNDARY: This program plots the following ternary and binary diagrams as well as any data that is input. It is useful primarily for analyzing lithochemical data of volcanic rocks.

AFM DIAGRAM: Plots the ternary diagram as well as the calc-alkaline-tholeiite boundary curve as described by Irvine & Baragar (1971, CJES).

JENSEN DIAGRAM: plots the ternary diagram as well as the calc-alkaline-tholeiite boundary, komatiite-tholeiite boundary as described by Jensen (1976).

ALKALIES-SILICA DIAGRAM: plots the binary diagram SiO_2 vs $\text{Na}_2\text{O}+\text{K}_2\text{O}$ and the alkaline-subalkaline boundary line as described by Irvine & Baragar (1971).

This program is provided in source code (FORTRAN 77) and was developed using IBM Professional FORTRAN. The plotting routines use ISPP (Industry Standard Plotting Package (CALCOMP)). The plotting drivers are not provided and must be supplied by the user.

The program uses the following subroutines that can be useful in themselves: CHEM, BARTH, CIPW, JENSEN, IRVBAR, JENBND, IRVBND and ALKBND.

A brief description of each subroutine is as follows:

CHEM: recalculates weight % oxides to 100% and calculates cation % for the following oxides - SiO_2 , Al_2O_3 , Fe_2O_3 , FeO , MgO , CaO , Na_2O , K_2O , TiO_2 , P_2O_5 , MnO , CO_2 , S , H_2O^+ , H_2O^-

BARTH: This subroutine computes the normative minerals according to the method of Barth (ref. - see I&B for ref) and is based on volume representative of minerals.

CIPW: This subroutine computes normative minerals according to the C.I.P.W. convention.

JENSEN: This subroutine computes a rock name from the cation % components of a chemical analysis of volcanic rocks. Developed by L.S. Jensen (1976). It cannot be applied to alkaline volcanics. It uses Al, Fe, Ti and Mg for the classification and is useful for discriminating ultramafic volcanics.

IRVBAR: This subroutine computes rock names and types as outlined by the method of Irvine & Baragar. Rock names and types are calculated using weight % oxides and Barth-Niggli normative minerals. It can be used for most types of volcanic rocks although it is not very useful for ultramafic volcanic rocks.

JENBND: This subroutine draws the lines that distinguish the various petrological fields in the Jensen Cabin diagram (Jensen, 1976). The routine uses standard CALCOMP like calls for plotting.

IRVBND: This routine draws the tholeiite-calc-alkaline boundary curve on the AFM diagram as shown by IRVINE & BARAGAR (1971). The routine uses standard CALCOM-like calls for plotting.

ALKBND: This routine draws the dividing line between alkalines vs. subalkalines as defined by Irvine & Baragar (1971). The routine uses standard CALCOMP-like calls for plotting.

The cost of the disk and documentation is \$15.00.

The Association of Exploration Geochemists or anyone else affiliated with the authorship or distributing of the computer programs assumes no responsibility for any problems or errors that arise from the use of any of the programs. All users assume use of the programs entirely at their own risk.

Please note that all orders for software should be made to

Future Meetings

International South European Symposium in Exploration Geochemistry - Athens, Greece, November 10-11, 1986

The Institute of Geology and Mineral Exploration (Greece) and the Association of Exploration Geochemists is sponsoring the International South European Symposium in Exploration Geochemistry. This Symposium will be held in Athens, Greece, on November 10-11, 1986. The program includes two days of technical sessions (general and special sessions, poster presentations and exhibitions), field trips and program for guests and spouses. Members who did not receive the second circular can obtain one through the AEG Rexdale Office.

Registration and a welcoming reception on November 9, 1986. For further information and registration forms write to:

Organizing Committee,
International South European
Symposium in Exploration
Geochemistry,
Institute of Geology and Mineral
Exploration,
70 Messoghion Street, 115 27,
Athens, Greece
Telex: 021 6357 IGME GR

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The Association of Exploration
Geochemists
P.O. Box 523
Rexdale, Ontario, Canada
M9W 5L4

For further information, requests,
submissions, contact:
Eric Grunsky
Ontario Geological Survey
911-77 Grenville Street
Toronto, Ontario, Canada
M5S 1B3
416-965-7046

Short Course

**Exploration Geochemistry:
Design and Interpretation of
Soil Surveys - Quality Inn, San
Antonio, Texas,
November 6-9, 1986**

The third Society of Economic Geologists short course will be held jointly with the Association of Exploration Geochemists from Thursday November 6 to Sunday November 9 at the Quality Inn, San Antonio, Texas, prior to the 1986 annual meeting of the Geological Society of America. The

course is designed to update practising exploration geologists on design, implementation and interpretation of soil geochemical surveys including choice of appropriate analytical and statistical methods. Case studies will be used as worked examples to illustrate both the problems that can arise, and the benefits of a systematic approach to anomaly definition and rating based on sound understanding of geochemical processes in surficial media.

Instructors will be W.K. Fletcher, S. Hoffman, M.B. Mehrtens, A.J. Sinclair and I. Thomson. The registration fee of

\$375 includes all course fees, Volume 3 of Reviews in Economic Geology, lodging (based on double occupancy) for the nights of November 5 through 8, and lunches on the meeting days. The course is limited to 60 participants, with applications accepted on a first-come first-served basis. Deadline for registration is September 26, 1986. For information and registration forms contact: Lois Elms, Western Experience, 2369 Carriage Circle, Oceanside, CA 92056, 619-722-0027.

**12th International Geochemical
Exploration Symposium
4th Symposium on Methods of
Geochemical Prospecting (12th
I.G.E.S. - 4th S.M.G.P.).
Orleans, France,
April 23rd-26th, 1987**

Call For Papers

Sponsored by the Association of Exploration Geochemists and the International Association of Geochemistry and Cosmochemistry working group, the Bureau de Recherches Geologiques et Minières (BRGM) will host the 12th I.G.E.S.-4th S.M.G.P. at Orleans La Sources, France, from April 23rd to 26th, 1987. Proposals for papers and posters on the following topics are invited

o Integrated Mineral Explorations combining Geochemical Techniques and other approaches.

o Geochemical Prospecting for Precious Metals.

o Geochemical Exploration under extreme climatic conditions (Deserts, Tropical Rainforest) with emphasis on weathering effects.

o Recent Developments in Analytical Chemistry, Data Processing, Expert Systems, Hydrogeochemistry
Proposals must be submitted in French or English as extended abstracts (up to 1000 words) by November 30th, 1986 to:

The Organizing Committee,
12th I.G.E.S. - 4th S.M.G.P.
BRGM
B.P. 6009 45060 Orleans
Cedex 02 France

**Prospecting in Areas of
Glaciated Terrain
Kuopio, Finland,
September 1-5, 1986**

Final Notice

The seventh symposium in the series 'Prospecting in areas of glaciated terrain', organized by the Institution of Mining and Metallurgy and the Geological Survey of Finland, will be held at Hotel Rauhalampi, in Kuopio, Finland on September 1 and 2, 1986. In addition to the technical sessions, a post-symposium three-day excursion will take place on September 3rd-5th.

Papers presented in the symposium will deal mainly with geochemical exploration. In addition, there will be papers concerning glacial transport, various geophysical methods and other types of prospecting in glaciated terrain.

Excursions are planned to massive

sulphide ores in Outokumpu and Pyhaselka, an apatite mine in Siilinjärvi and talc and soapstone mining and industry in Polvijärvi and Juuka. Geochemical and geophysical prospecting techniques as well as the use of dogs in prospecting will also be demonstrated.

Note that the deadline for pre-registration is August 4th, 1986.

For further information, contact:

Conference Office
Institution of Mining and
Metallurgy
44 Portland Place
London W1N 4Br
England

Dr. R. Salminen
Geological Survey of Finland
P.O. Box 237
70101 Kuopio
Finland

CAME 1986 Publication

The highly successful Computer Applications in Mineral Exploration (CAME) symposium, sponsored by the Prospectors and Developers Association, the Toronto Geological Discussion Group, the Geological Association of Canada, the Canadian Institute of Mining and Metallurgy, the Canadian Exploration Geophysical Society and the Association of Exploration Geochemists was held in Toronto in January, 1986. Copies of the Extended Abstracts, Program and Exhibition

Guide Publications are available from:

Patricia Sheahan
Konsult Intl. Inc.
44 Gemini Road
Willowdale, Ontario
M2K 2G6 Canada

Cost of the Extended Abstracts Publications is Cdn. \$15.00, U.S. \$12.00 and cheques or money orders should be made payable to Patricia Sheahan. **Only prepaid orders will be accepted.**

Third Chinese Exploration
Geochemistry Symposium,
Guilin, China,
November 10th-15th, 1986

Second Circular

The Organizing Committee warmly welcomes members to attend the Third Chinese Exploration Geochemistry Symposium to be held in Guilin, China from November 10th to 15th, 1986. During the technical sessions, presentations will be given on topics including regional geochemical explorations, local geochemical explorations, primary dispersion, case histories, advances in analytical techniques, data processing and interpretation. Three field trips to gold, copper and tin deposits are planned. Authors wishing to submit papers are requested to send an abstract (500 words maximum) and a draft of their oral presentations for preparation of the simultaneous translation. In view of the June 15th deadline for the response to the second circular (copy enclosed), please complete and return the questionnaire as soon as possible to:

Prof. Xie Xuejing
Chairman, Organizing Committee,
3rd Chinese Exploration
Geochemistry Symposium,
Institute of Geophysical and
Geochemical Exploration,
Langfang, Hebei 102801
People's Republic of China

Mineral Exploration Computer
Applications, Vancouver,
British Columbia,
November 17-18th, 1986

The Vancouver section of the Computer Orientated Geological Society (C.O.G.S.) will host a two-day conference on the applications of computers to mineral exploration. This conference, sponsored by the Geological Association of Canada (Cordilleran Section), is aimed at informing management and exploration personnel on computer applications in explorations and mining. For further information concerning C.O.G.S. membership or the conference, contact Bruce Downing at 604-682-6291 (Newmont Exploration of Canada Ltd.).

Secretary's Notes

The energetic efforts of those individuals who form the executive, serve on Council or Committees or provide support in a variety of other roles are, to a large part, responsible for the continued vitality of our Association. In view of our present membership size, it is particularly encouraging that so large a group of individuals are prepared to volunteer their time in addition to other demanding, professional activities. New volunteers, especially among new members, are more than welcome so that the Association can continue to maintain a high reputation in the international geoscience community. I would therefore like to invite any member who wishes to become more active in the Association's affairs to offer their services by contacting either the President, Glen Allcott, or myself. Members may also like to seek nomination as an Ordinary Councillor for the 1987-88 term by completing the Nomination Form enclosed with this Newsletter. Please note that the Form must be completed by six voting members and should then be returned to the Secretary by November 1st, 1986. Nominees who may have difficulties in contacting the necessary voting members in their area should write to me for further information.

Periodically there are complaints from members concerning non-arrival of Journal of Geochemical Exploration issues. There may be several reasons for delays in receiving the Journal. First, there may be a delay in distribution and, to avoid this problem, I have listed the expected publication of issues under "Journal Publication Schedule". Second, members may move and, in this case, I would urge you to send your new address to the Association's office as soon as possible. Third, it must be stressed that the Journal (unlike the Newsletter) is only distributed to members who have paid annual dues by January 1st of any year. Currently there are still over 300 members who have not paid their 1986 dues and will therefore not have received Journal issues for this year. When outstanding dues are received, the

publishers are notified and the issues will be sent, but there will invariably be a further delay before the issues are received. In order to avoid these delays, I would urge you to send in your outstanding membership dues as soon as possible.

Recently the topic of advertising in the Newsletter was discussed by Council. At present, any announcements of employment opportunities (and requests for employment) will be published at no cost in the Newsletter. In addition the Newsletter will also be accessible to a limited number of professional-card type adverts suitable for consultants and service organizations. These adverts may be either 3" x 1" size (Cdn. \$50.00/insertion) or 3" x 2" size (Cdn. \$100/insertion) with the stipulation that the adverts will be accepted on a first-come, first-served, camera-ready, cash with advert basis.

Finally, several items of more general interest to members, I would like to thank Dr. Ian Devereaux for his very practical suggestions that the complete address of new members be published in the "Admissions Sections".

On behalf of the Association, I would like to congratulate Colin Dunn, David Jenkins, Malcolm Mason, Bill Millar, Chet Nichols and J.P. Saheurs on their election as Ordinary Councillors and also thank those nominees who were unsuccessful. I hope they will agree to renomination in the future. Incidentally, the Minutes of the Annual General Meeting, President's, Secretary's and Treasurer's Reports will be published in the September Newsletter.

After several years Don Runnels has resigned from the post of Bibliography Update Compiler. I am certain that all members would wish to join with me in sincerely thanking Don for his efforts in regularly preparing the Bibliography Updates for the Newsletter. At the same time we would like to thank Graham Closs for volunteering to continue compiling the updates.

Ray Lett

GEOEXPO/86 Report

The GEOEXPO/86 symposium is now history. The meeting was attended by about 350 participants from Canada, the U.S.A., Australia, Japan and the United Kingdom. The symposium was a joint effort with the Cordilleran Section of the Geological Association of Canada. Geological papers formed a network cementing exploration-oriented presentations. One session was devoted to black smokers and how these features are changing our understanding of ore genesis. Other sessions described a variety of topics ranging from primary geochemistry through fluid inclusion studies, lead isotopes and organic geochemistry.

Leading off the meeting were three workshops. The heavy minerals workshop stimulated spirited debate as new procedures were recommended to complement or replace standard heavy mineral strategies. The litho-geochemical workshop reviewed relationships associated with VMS, sedex, and epithermal gold deposit types, and probed into advances accompanying inexpensive multi-element analysis and computer pattern recognition techniques. The desert environments workshop noted that geochemistry works, but that investigators better be prepared to conduct orientation surveys to select optimal survey parameters (i.e., size fraction for analysis).

Technical sessions

Technical sessions were well attended and speakers, in general, delivered excellent presentations. Slide quality and delivery style have certainly improved over the past few years, and all speakers are to be commended.

Case histories were featured at the meeting describing exploration projects in Canada, the United States and elsewhere. The role of geochemistry was outlined in relation to deposit discovery and to the geological framework. Emphasis was placed on the need for complementary efforts from the different exploration methodologies: geology, geophysics and geochemistry.

Case histories were presented for the QR (Au), Bear Totem (Au-Ag), Willa (Au-Cu-Ag), Shasta (Au-Ag), Congress (Au), Dolly Varden (Ag) and Silbak Premier (Au) deposits in Canada and the Tonkin Springs (Au), Gold Quarry (Au), Alligator Ridge (Au) and Delamar (Ag) deposits in the United States.

Geochemical technology stressed advances in heavy mineral geochemistry. Case histories describing diamond exploration were also of interest to many. Anomaly interpretation procedures were reviewed in a series of analytical and sampling papers which revealed that exploration efforts could be frustrated or fail completely if so called 'standard methods' were accepted without question.

Abstract volumes

A limited number of abstract volumes (89 pp) are available from the organizing committee at a cost of U.S. \$6.00 or Cdn. \$8.00, postpaid. These can be obtained by enclosing a return address label and payment to:

GEOEXPO/86

P.O. Box 49330, Bentall Station
Vancouver, B.C., Canada
V7X 1P1

Field trips run in conjunction with the symposium visited mineral deposits on Vancouver Island; Nevada bulk tonnage Au deposits; Montana Au, Ag, Pt deposits; and northern Washington State Au deposits.

Symposia of the AEG are held regularly. Next scheduled meetings are in Johannesburg, S.A., July 7-11, 1986; Athens, Greece, November 9-11, 1986; and Guilin, China, November 10-15, 1986. The next international meeting is at Orleans, France in April 23-26, 1987. The organization of a symposia requires much effort on behalf of volunteers, and as chairman of the GEOEXPO/86 organizing committee, I extend thanks to the members of the committee, speakers, and participants for a very successful meeting.

Stan Hoffman

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