



SGA News

March 2006
Number 20

Mineralisation associated with the 1076 Ma Giles mafic-ultramafic intrusions, Musgrave Complex, central Australia; a review

Franco Pirajno, Hugh R. Smithies and Heather M. Howard

Geological Survey of Western Australia, 100 Plain Street, East Perth, WA 6004, Australia

Introduction and regional setting

The Musgrave Complex, in central Australia forms part of the Paterson Orogen and covers an area of approximately 140 000 km². It is located between three major crustal elements (Fig. 1), the West Australian Craton, the North Australian Craton and the South Australian Craton and truncates the Albaby-Fraser orogen (Fitzsimons, 2003; Tyler, 2005). The Musgrave Complex consists of a Mesoproterozoic basement of high grade quartzofeldspathic metamorphic rocks including rocks of sedimentary or volcanosedimentary protolith. These have been intruded by mafic-ultramafic and felsic rocks of various ages and multiply deformed and metamorphosed between 1600 Ma and 500 Ma. At around 1076 Ma the Musgrave Complex was intruded by mafic-ultramafic intrusions of the Giles Suite and temporally associated felsic volcanic rocks and alkaline granites, prior to further high-grade metamorphism (Smithies et al., 2004). The mafic-ultramafic intrusions of the Giles Suite are part of the 1076 Ma Warakurna large igneous province (WLIP; Wingate et al. 2004; Morris and Pirajno, 2005). The WLIP was the result of a widespread thermal event (Giles event) which, in the Musgrave region, also produced bimodal volcanic rocks, A-type granitic

rocks and mafic dyke swarms (Alcurra dyke swarm). The WLIP is estimated to cover about 1.5x10⁶ km², extending from the sill complexes of the Mesoproterozoic Edmund basin (Bangemall Supergroup; Martin and Thorne, 2004), through to the Glenayle sill complexes in the Collier and Earahedy basins in central Western Australia (Martin and Thorne, 2004; Pirajno et al., 2004), to the Mann and Musgrave ranges in southern central Australia; a total west to east distance in excess of 2400 km. The formation of WLIP is postulated to be the result of a mantle plume that impinged onto the base of the lithosphere at about 1100 Ma (Morris and Pirajno, 2005).

In this contribution the focus is on the mafic-ultramafic intrusions of the Giles Suite (hereinafter referred to as Giles intrusions) and a review of the mineralisation associated with them, as known at the time of writing. We also discuss the exploration potential of the Giles event in the Musgrave Complex.

The Giles intrusions

The Giles intrusions form at least 20 sheet-like bodies that extend roughly for 550 km along an E-W trend, with a total north-south extent of over 100 km, from

page 13 ►

CONTENTS

Mineralisation in the Giles mafic-ultramafic intrusions, Australia	1
From the President of SGA	2
Highlights of the 8th Biennial SGA Meeting, Beijing, China	3
New members	9
News of the Society	11
SGA homepage on internet	20
GEOCHIM 30th Anniversary	22
Forthcoming events	25
SGA and the other societies	28
UNESCO-SEG Latin-American Metallogeny course	30
SGA Membership Application Form	32

MAIN FEATURES

From the SGA President	2
Highlights of the 8th Biennial SGA Meeting, Beijing, China, 18-21 August 2005	3

A message from the new President of SGA

Hartwig Frimmel

As incoming president of SGA I would like to thank you, the SGA membership at large, for the trust and confidence you expressed through your votes in the last round of elections. My sincere thanks go also to the past council and especially our past president, David Leach, for their efforts in making SGA a really remarkable international professional society. David Leach, who committed much of his time and energy even for an extra year in addition to the usual two-year term, did such an outstanding job in taking SGA to new heights that it will be difficult for any successor to follow his example. Peter Herzig, who served as Treasurer for more than a decade, had to step down because of extra work load emanating from his relatively recent appointment to director of the Leibniz Institute of Marine Sciences in Kiel – one of the leading research institutions in Germany. We are most grateful to Peter for inheriting a society in a healthy financial position. However, this financial health cannot be taken for granted and needs to be guarded carefully in the future. This requires continuity in the position of Treasurer, and luckily David Leach agreed to continue serving SGA and to share his experience in the future management of our financial affairs.

Elsewhere in this issue, you will find the entire new Council listed and you might notice that we expanded the Council and made use of the maximum number of councilors permitted by our constitution. This is a reflection of the metamorphosis of SGA from a rather Europe-centred organization to a truly international one, with both an increasing membership and an increased level of activities in all regions. The most exciting result from this change in SGA has been the break of the tradition of holding Biennial Meetings only in Europe. Last year, the 8th Biennial SGA Meeting was held in Beijing, China. For more details on this highly successful event – a real milestone in the history of SGA – see the report by the past president in this edition of SGA News.

There is no doubt that SGA managed to go from strength to strength over the past



Hartwig Frimmel

years, which would have been impossible without the willingness of numerous individuals to sacrifice much of their free time for the Society – and this must be underlined, on a voluntary basis. Working with a sense of real team spirit towards better economic geology and better economic geologists is what makes active involvement in SGA a rewarding experience indeed. Any society can only be successful if as many as possible of its members are not just statistics in membership directories, but become actively involved. SGA is no exception. I therefore urge you to join us in shaping the future of SGA. Of course we are proud of our flagship society journal, *Mineralium Deposita* – after all it has become the top professional journal in its field. But membership of SGA should encompass more than just receiving *Mineralium Deposita*, browsing through the abstracts, reading one or the other article, and then decorating the office book shelf with it. There are many ways of transforming from an “ordinary” regular or student member to an extraordinary active member. Suggestions for, organization of, and participation in field

SGA News

No. 20 March 2006

EDITOR

Massimo Chiaradia
Department of Mineralogy
University of Geneva
Geneva
SWITZERLAND

SGA News is a publication of SGA (Society of Geology Applied to Mineral Deposits) and appears twice a year. SGA News

can be also read in the SGA homepage on Internet:

<http://www.e-sga.org>
maintained by Bernd Lehmann and Fred Tuerck, Institut für Mineralogie, TU Clausthal, Adolph-Roemer Str. 2a, D-38678 Clausthal-Zellerfeld;
Fax: +49 5323 72 2321;
e-mail: tuerck@min.tu-clausthal.de

CONCEPT AND PRINTING

design & production GmbH
Heidelberg, Germany

LAYOUT

Massimo Chiaradia, Geneva, Switzerland

INFORMATION FOR CONTRIBUTORS

Items for publication may be sent to: SGA News (see address below)
Manuscripts should be sent by e-mail using Microsoft Word. Please always send a paper copy and indicate the format you are using.

DEADLINE FOR SGA News No. 21
30 September 2006

SGA NEWS - MAILBOX

Dr. Massimo Chiaradia
Department of Mineralogy
University of Geneva
Rue des Maraîchers 13
CH-1205 Geneva
Fax: +41 22 379 32 10
e-mail: Massimo.Chiaradia@terre.unige.ch

trips, workshops, short courses, meetings, lectures, be it for academia or industry or both, are but a few examples. Submit your best research results to Mineralium Deposita, share exciting news in the SGA Newsletter, and if you are a student, consider forming a student chapter. In addition, or at least, let your Council know your wishes and expectations of SGA, your ideas and suggestions as how we can improve the Society. Please do not hesitate to contact me (hartwig.frimmel@mail.uni-wuerzburg.de) or any of your Regional Vice-presidents or other council members with any comment pertaining to the future of SGA. Although the next Council will be elected only in two years, I would like to stress now already the importance of representation. All members must have the opportunity, and should make use of it, to be involved in the nomination of council members. Changes of the by-laws that will hopefully encourage and enable more of you to shape the composition of future SGA councils were approved at the last council meeting.

In spite of the success of the previous Council, there is no time to rest on our laurels. Considerable challenges are facing our profession and thus also SGA. The mining and exploration sector might still remain on top of the wave for another few years, but are we preparing for the next lean cycle? What have we learned for our profession from past cycles? How can we ensure proper training of the next generation of economic geologists when geology departments at universities worldwide are under more and more pressure? Are we focusing our research efforts into the right directions? And ultimately, how can we optimize the exploration for, as well as the management and fair utilization of, our limited mineral resources on and in our planet? The list of questions is by no means exhaustive but should remind us of our responsibilities as members of a professional society. We are a small community compared to most other professions and thus we can only succeed if we all pull on the same rope in the same direction. Fortunately we have enjoyed good cooperation with our sister organizations, SEG and IAGOD. Many of the active SGA members are actively involved in these organizations and vice versa. It is of paramount interest to our profession as a whole to continue and foster this cooperation. In this sense let me finish with emphasizing that I really look forward to working together with you for an even better SGA.

Highlights of the 8TH BIENNIAL SGA MEETING, BEIJING, CHINA, AUGUST 18-21, 2005

David Leach, SGA Treasurer

The 8th Biennial SGA Meeting in Beijing marked a major milestone for SGA as it was the first Biennial Meeting outside of Europe. The venue for the meeting was the Academic Exchange Center of the China University of Geosciences. The conference brought together scientists from 46 countries to focus mineral resource exploration and ore deposit research on the challenges facing the world's increasing need for mineral resources. The meeting was attended by 654 participants, among them nearly 100 post-graduate students and 47 accompanying guests. The scientific program included 15 thematic sessions, including some organized by SEG, IAGOD and IGCP projects. Some 460 abstracts were published as a two-volume proceeding edited by Jingwen Mao (Secretary General of the meeting) and Frank Bierlein (SGA Regional Vice President for Australia/Oceania). A third volume containing 61 abstracts was

published by the China Land Publishing House and edited by Caisheng Zhao and Baojian Guo.

An important measure of the success of the Beijing meeting was the exceptional participation by students. This reflected the generous contributions by industry to financially support students and economically disadvantaged professionals making presentations. Considerable appreciation is due to the Beijing Student Advisory Committee led by Jorge Relvas, Zhang Xinliang, Chai Fengmei and the Student Representative on SGA Council, Anna Vynazalova, for their efforts to assist students attending the Beijing meeting.

Much credit is due to the Beijing Organizing Committee and to the many volunteers for the achievements of the conference. We especially thank Jingwen Mao, Richard Goldfarb, Yitian Wang, Frank Bierlein, Bernd Lehmann, Doug Kirwin, Sabina Lange,



Opening session. Shown are members of the organizing committee: Prof. MAO Jingwen, Secretary General of the Beijing meeting; Dr. CHAI Yucheng, Vice Chairman of the organizing committee, National Natural Science Foundation of China; Prof. ZHAO Pengda, President of the China University of Geosciences; David Leach, SGA President; Mr. MENG Xianlai, President of the China Geological Survey and the Chinese Academy of Geological Sciences; Mr. ZHANG Hongren, President of the IUGS; Prof. CHEN Yuchuan, President of the Economic Geology Committee, Geological Society of China; Prof. WU Ganguo, President of the China University of Geosciences (Beijing).



Anna Vymazalova and Jorge Relevas (Beijing student committee members) together with Richard Goldfarb announcing the winners of the best student presentations and posters.

Georges Beaudoin, Gregor Borg, Richard Herrington, Hartwig Frimmel, Jan Pasava, Peter Herzig, Reimer Seltman, Craig Hart, Susan Leach, Steve and Joan Scott, Meifu Zhou, and David Groves for their efforts.

Corporate Sponsors: When SGA deliberated holding a Biennial meeting in Beijing, concerns were expressed about the potential impact of travel expenses on student participation. Thanks to a number of corporate sponsors that graciously provided funds to support students presenting talks and posters, the Beijing conference saw the highest level of student participation of any SGA Biennial Meeting. The corporate donations were completely committed to sponsoring students and economically disadvantaged professionals. SGA Council extends its great appreciation to the corporate donors for their generous commitment to our future professional geologists.

Comments From the Student Committee: The participation of almost one hundred post-graduate students in the 8th Biennial SGA Meeting in Beijing was one of the most memorable parts of the conference. The large student attendance to this meeting was especially satisfying because it was a notable departure from the growing tendency to find progressively older audiences in economic geology conferences. The Beijing experience lived by the students will certainly last in their memories and will likely have long lasting effects on their professional lives. The Beijing meeting was a special moment for ore deposit research and exploration, where both academia and industry

came together to encourage and support the increasing need for highly skilled young geology students. The Beijing meeting raised very high the standard for future meetings. The challenge for the next SGA meetings will be to do even better than Beijing. Less will definitely be "not enough". The student Committee wishes to express our sincere thanks to corporate sponsors for a generous financial support that enabled a large number of students to attend the meeting. All together, 65 students from 13 countries received financial support to attend the meeting (2 - Argentina, 7 - Australia, 1 - Canada, 32 - China, 2 - Czech Republic, 2 - Germany, 1 - Hong Kong, 6 - Iran, 3 -

Japan, 1 - Macedonia, 4 - Portugal, 1 - UK, 3 - Uzbekistan). Students also received support to attend pre- and post-meeting field trips. Sixteen students from 7 countries (Australia, China, Czech Republic, Japan, Portugal, UK, and Ukraine) received free field trip participation.

In order to encourage students and increase their participation SGA Council decided to award the Best Student Oral and Poster Presentation. Based on scientific merit, quality and presentation format, the Conference Selection Committee (comprised of the Student Advisory Committee, Student Representative on SGA, MD editor and representative of the Scientific Program Committee), selected the two best student oral presentation and the best student poster. The recipients are:

Pang Kwan Nang et al. (University of Hong Kong) : Fe-Ti-V oxide mineralization in the Permian Panzhihua Gabbro, Emeishan large igneous province, SW China - the Best Student 's Presentation

Karen M. Volp (James Cook University) : The Estrela copper deposit, Carajas, Brazil: Geology and implications of a Proterozoic copper stockwork - the Best Student 's Presentation

Setijadji Lukas Donny et al. (Kyushu University) : Evolution of Cenozoic arcs in East Java (Sunda Arc, Indonesia), high Sr/Y magmatism, and melt controls on metallogeny - the Best Student 's Poster.

Student volunteers: A delightful surprise at the meeting was the enthusiastic and hard working group of student volunteers from



Bernd Lehmann, Co-editor of Mineralium Deposita announcing the winner of the Mineralium Deposita best paper award.



SGA Sponsors of the 8th BIENNIAL SGA MEETING

Platinum Sponsors

ANGLO AMERICAN
ANGLOGOLD ASHANTI (China)
BHP BILLITON WORLD EXPLORATION INC.
PLACER DOME INC. (Exploration)



Gold Sponsors

IVANHOE MINES
SGEG AUSTRALIA
SINO GOLD LTD.
SRK CONSULTING
TECK COMINCO LTD.



Silver Sponsors

DE BEERS
GARRISON INTERNATIONAL LTD.
GOLD FIELDS AUSTRALIA PTY LTD.
NEWMONT MINING CORP.
OXIANA RESOURCES N.L.
RIO TINTO, LONDON
SINO-QZ GROUP PTY LTD./HT MINING LTD.
SILVERCORP METALS INC.



the local universities. Each day, the student volunteers were the first to arrive and the last to leave—helping with everything from registration, finding a taxi, to audiovisual technical assistance in the technical sessions. There were the cheerful “problem solvers” that in some way, touched the spirits of all attendees.

Field trips, short courses and workshops: The field trip chairpersons, Rich Goldfarb and Yitian Wang, did an exceptional job in working with the field trip organizers to provide outstanding field trip opportunities for the delegates. Delegates from 76 organizations and 23 countries attended the nine field trips offered by the conference. Among them, 14 students were given grants for the field trips. The nine field trips provided a chance to see 33 deposits

of gold, copper, lead, zinc, silver, nickel, molybdenum, iron, PGE, REE, barite and phosphorus. Seven deposits were in China and one each in Mongolia and Japan. Included in the deposits visited were several famous world-class ore deposits, such as the Jiadong gold deposits, Jinchuan Cu-Ni deposits in China, Oyu Tolgoi porphyry Au-Cu deposits in Mongolia, and the Hishikari Au-Ag deposits in Japan. Feedback from participants was generally positive and participants were satisfied with the good arrangements and excellent hospitality provided by the trip organizers, participating mining companies and geological departments. Short courses and workshops were well attended. Particularly successful was the Metalogeny Short Course organized by Steve Scott and assisted by Joan Scott, Guochen Dong and Kaihui Yang that attracted about

100 participants. The lecturers spoke in English but simultaneous translation in Chinese and the excellent course notes, translated into Chinese by Guochen Dong helped make the course highly successful.

One very popular and timely workshop that was presented by Larry Meinert and Bernd Lehmann, the SGA Mineralium Deposita (MD) Editors, on how to prepare and submit a scientific manuscript for publication in MD. This well attended workshop was particularly useful for the large number of students who were present at the conference.

Social Program

Guests who accompanied SGA conference-attendees were treated to 4 days of the Beijing area's treasures. Little was missed, starting with Tiannanmen Square, a visit to a Chinese medical office, and a stroll through the peaceful Lama Temple gardens. Participants escaped the August heat on a river boat ride to the Summer Palace, and were happily jostled in rickshaws as they peered into the city's ancient Hutong neighborhoods. They ascended The Great Wall and paid homage to bygone emperors at the Ming Tombs. And they gave new meaning to Shop-'Til-You-Drop, bargaining to states of exhaustion on designer goods and lovely artisanal objects. The tour company provided delicious meals and led the guests through a short-course in Chinese history and culture.

Best paper in Mineralium Deposita Award: W.E. Halter, Ch. Heinrich, Th. Pettke (2005): Magma evolution and the formation of porphyry Cu-Au ore fluids: evidence from silicate and melt inclusions. Mineralium Deposita vol. 39: 845-863 The award consists of a citation, certificate, EUR 1500 and travel expenses for the first author associated with the receipt of the award. The award was presented at the Opening Ceremony of the 8th SGA Biennial Meeting in Beijing.

SGA Young Scientist Award:

Council approved Dr. Alexandre Raphael CABRAL (Brazilian scientist) to be the second recipient of this SGA prestigious award. It consists of a citation, certificate, EUR 1500 and travel expenses to the place of

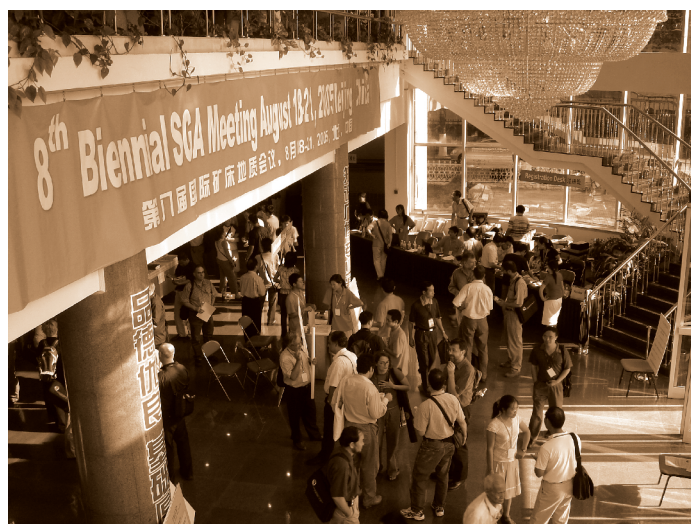
Biennial Meeting for the presentation. The award was presented at the Opening Ceremony of the 8th SGA Biennial Meeting in Beijing.



The alley leading to the Academic Exchange Center of the China University of Geosciences with banners advertising the SGA Meeting



Academic Exchange Center of the China University of Geosciences



The hall of the Academic Exchange Center of the China University of Geosciences



Steve Scott (organizer for the metallogeny short course), and lecturers Dave Leach and Noel White.



Participants of field trip 8, left to right: Wang Ruiting, leader of field trip, nameless Terra Cotta Warrior, Murray Hitzman (SEG President) Anna Vymazalova (Student Representative on SGA Council), John Paul Hunt, and Maeve Boland.



Members of field trip 8 returning from a 1600 km long field trip.