

Editorial

Welcome to the June 2010 edition of the SGGMP Newsletter.

The Australian Earth Sciences Convention, to be held in Canberra from 4-8 July, will herald a changing of the guard for the SGGMP with the ACT taking over the executive. If you are at the AESC, don't miss the AGM (or should that be BGM) to be held on Wednesday lunchtime (see p. 3 for details). Nominations for some positions have been received, but more are welcome and can be accepted at the meeting.

The SGGMP is hosting a symposium on Australian mineralogy on the Tuesday afternoon of the convention. The symposium is in honour of Ernie Nickel, who passed away in July 2009 (see p. 9). While on the subject of Australian mineralogy, Andrew Christy has provided an update on some new minerals with an Australian connection either approved or submitted for approval to the IMA (pp. 6-8).

A highlight of 2009 was the SGGMP meeting held on Kangaroo Island from 8-13 November. Huge thanks to John Foden of Adelaide University and the Executive of SGGMP for the organisation of this very successful event. The value of the meeting to our next generation of researchers is emphasised in the report from Kerrie Taylor-Jones (p. 5).

Best wishes to the incoming committee, and we look forward to the next SGGMP meeting.

Janet Muhling

SGGMP OFFICE BEARERS 2008-10

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Membership of the Specialist Group for Geochemistry, Mineralogy and Petrology for 2010 stands at 311.

SPECIALIST GROUP FOR GEOCHEMISTRY, MINERALOGY AND PETROLOGY: CHAIRMANS REPORT 2009

The past year has been a relatively active one for the SGGMP with a number of activities undertaken. They included:

- The largest activity for the SGGMP in 2009 was the KI09 conference held on Kangaroo Island from the 8th to the 13th of November. There were approximately 50 participants who enjoyed a week of talks and fieldtrips. The conference was organized by Professor John Foden (University of Adelaide) and the SGGMP executive with the financial and administrative tasks being handled by the central GSA and our thanks go to Sue Fletcher and her team for helping with this complex job.
- This year we also canvassed the membership about receiving a copy of *Elements* magazine through their SGGMP membership. The proposal also included a \$16 increase in the annual membership fee. We received 112 votes of which 75 voted for the inclusion of *Elements* in their annual subscription. This change will take effect from 2011.
- The SGGMP proposed a session at the 2010 AESC in Canberra. The proposal was accepted and Lin Sutherland will be organizing the Ernie Nickel Tribute session. The SGGMP will be financially supporting the attendance of a couple of the speakers in this session.

The current committee will hand over to the new ACT committee at the AESC in Canberra, and we are looking forward to another successful year in 2010.

Chris Clark
Chair

Geological Society of Australia – Specialist Group for Geochemistry, Mineralogy and Petrology.



Chairman - Chris Clark

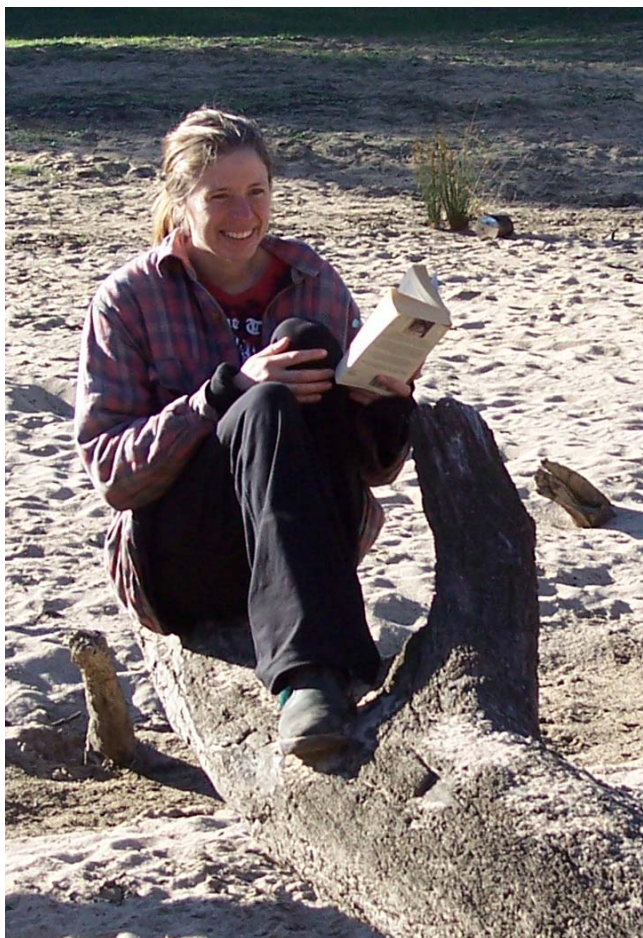


Secretary - Nick Timms

SPECIALIST GROUP FOR GEOCHEMISTRY, MINERALOGY AND PETROLOGY: TREASURERS REPORT 2009

A preliminary balance sheet for the 2009 calendar year is provided on page 4. I will highlight the following points from the statements:

- As of 31 December 2009 the SGGMP has \$16,834.52 which is held in a Unicredit account.
- Membership dues (capitation) received from Head Office were \$2,345.70.
- The largest contributors to the budget are the income and outgoings from the KI09 conference. Most of the finances for this were handled by central GSA and our thanks go to Sue Fletcher and her team for helping with this complex job. The conference resulted in



Treasurer - Katy Evans

a small profit for the SGGMP.

- The net financial result for the SGGMP at the end of 2009 was a profit of \$3201.93.

At the end of 2009 the overall budget remains healthy, though it is always important to remember that making a surplus is not the main function of a specialist group. Additional costs in 2010 will arise from sponsorship of participants at the AESC (Australian Earth Sciences Convention), and accounting fees.

The committee will hand over to the new ACT committee at the AESC, and we are looking forward to another successful year in 2010.

Katy Evans

Treasurer

Geological Society of Australia – Specialist Group for Geochemistry, Mineralogy and Petrology.

AGM in Canberra

The SGGMP AGM will be held on Wednesday 7th July at the AESC in the Swan Room between 12:20 and 13:40.

All members are welcome.

The agenda will be posted later this week, but the main business concerns the formation of the new committee. The executive will pass to Canberra, following the AESC. The following nominations for the new committee have been received:

Chair: Hugh O'Neill

Secretary: Greg Yaxley

Treasurer: Daniella Rubatto

Newsletter editor:

Conference Organiser:

Website Manager:

WA rep: Katy Evans

Tas rep: Ralph Bottrill

Vic rep: Bill Birch

NSW rep:

QLD rep:

SA rep:

NT rep:

NZ rep:

If anybody is interested in joining this committee, which is relatively light work but very rewarding, then please contact k.evans@curtin.edu.au

SGGMP Account Summary for 01/01/09 to 31/12/09**Opening Balance** **13632.59****Income**

Capitation 2345.7

KI09 conference 23952.97

Interest 34.37

NB some KI09 expenses still to come
70.99 cashed Jan 2010

130.00 uncashed cheque to John Fox

438.74 for reconnaissance work

total = 639.73

Outgoings

IMA Membership -541.32

Stationery -60.61

KI09 Conference -22529.18

Closing Balance **16834.52****Profit/Loss** **3201.93****KI09 Details****Income**

Registrations 22589.33

Sponsorship 1363.64

Outgoings

Wine -3233.86

Conference venue -5818.18

Transport -12787.14

Additional bursaries -690



Kangaroo Island 2009. Photo courtesy of Alison Ord.

Kangaroo Island 2009

from Kerrie Taylor-Jones

This November I was fortunate enough to attend the biennial conference of the Specialist Group for Geochemistry, Mineralogy and Petrology, held on picturesque Kangaroo Island. Even within this specialist group, contributions covered a broad spectrum of topics: from earliest core formation, right through to geochemical techniques for reconstructing paleoclimates. The format worked well, with half-hour time slots allowing presenters to cover in some detail how the research was undertaken, in addition to the salient results. For those of us starting out, this was great for extending awareness of the many techniques applicable in this area. Presentations were followed by lively debates and discussions. Sessions were interspersed with a variety of field excursions, including a visit to the spectacular, zebra-banded rocks of Harvey's Return.

The social side of the conference was well taken

care of, with the evening at Snelling's Bay a stand out. Here, the nearby faulted contact and even the BBQ were temporarily disregarded in favour of a dip in the cool waters of the bay. The journeys to and from Kangaroo Island also provided some incidental team building exercises, as we contrived to shift our ample group luggage on and off numerous vehicles. There is nothing like meeting a fellow delegate whilst manhandling a weighty BBQ or recalcitrant poster board. As a student, this conference was an excellent opportunity to meet established researchers in a relaxed social setting. The personal atmosphere meant it was easy to speak with presenters and have more involved discussions about their work. I also valued the chance to present some of my own work and receive feedback from specialists doing topical research. There is no doubt that this conference was a resounding success, and I for one found it a particularly rewarding experience. For this success, my thanks go out to all the delegates, but in particular, to the organising committee. I look forward to 2011.



Kangaroo Island 2009. Photo courtesy of Richard Taylor.

Australian New Minerals: 2008-present

from Andrew Christy

The last few months have been somewhat busier than usual for characterisation of crystalline compounds newly found in nature, i.e. new minerals. Just over 100 new species have been approved out of those proposed since the beginning of 2008, suggesting that the rate of approvals has increased from a historic average of about 50 per year to more like 70 per year. Australia makes up 5.2% of the Earth's land surface, so it is nice to know that we are slightly over-represented, since seven of these new species have Australian type localities. This represents a lot of hard work by only a dedicated few individuals, to judge from the recurrence of a small number of first author names. No less than three of the seven species are from the open cuts at Broken Hill, New South Wales, Australia's most diverse source of mineral species.

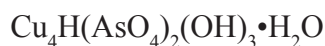
Names and detailed data are confidential until released by the proposers. Those which have been approved by the International Mineralogical Association, but for which descriptions have not yet been published, have had summary data put up on the www site of the Commission on New Minerals and Mineral Classification of the IMA, hosted by Pete Williams at <http://pubsites.uws.edu.au/ima-cnmmc/>. The information released includes the IMA proposal number, type locality, lead author of the proposal, chemical formula, comments on group membership or crystal structure type if applicable, unit cell parameters and sometimes X-ray powder diffraction data.

Summary data for the six new species lacking full published descriptions follows:

IMA No. 2009-016

Dome Rock mine, 42 km N of Mingary railway siding, South Australia, Australia (148°24'E 31°52'S)

Peter Elliott



New structure type

Triclinic: $P(-)1$; structure determined

a 5.378(11), b 8.962(18), c 9.841(2) Å,

α 75.25(3), β 83.56(3), γ 79.97(3)°

IMA No. 2008-063

Kintore opencut, Broken Hill, New South Wales, Australia

Stuart J. Mills

$\text{Pb}[\text{Zn}_{0.25}[\]_{0.75}]\text{Fe}_3\text{H}(\text{AsO}_4)_2(\text{OH})_6$; a solid-solution series extends to $\text{Pb}[\text{Zn}_{0.5}[\]_{0.5}]\text{Fe}_3(\text{AsO}_4)_2(\text{OH})_6$

Jarosite group

Monoclinic: $C2/c$; structure determined

a 25.8898(6), b 14.8753(2), c 12.1700(2) Å,
 β 110.681(1)°, 6.034(45), 3.719(31), 3.114(100),
2.844(25), 2.569(21), 2.280(37), 2.259(18),
1.508(19)

IMA No. 2008-047

Block 14 Open cut, Broken Hill, New South Wales, Australia

Peter Elliott



Hureaulite group

Monoclinic: $C2/c$; structure determined

a 18.062(4), b 9.341(19), c 9.844(2) Å,
 β 96.12(3)°

IMA No. 2008-048

Block 14 Open cut, Broken Hill, New South Wales, Australia

Peter Elliott



Structurally related to rimkorologite and bakhchisaraitsevite

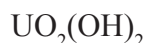
Triclinic: $P(-)1$; structure determined

a 8.299(17), b 9.616(19), c 12.175(2) Å,
 α 71.68(3), β 82.02(3), γ 80.18(3)°

IMA No. 2008-022

Radium Ridge near Mt Painter, near Arkaroola, Northern Flinders Range, South Australia

Joël Brugger



Uranyl hydroxide

Monoclinic (pseudo-orthorhombic)

Space Group: Systematic extinctions are consistent with any monoclinic space group.

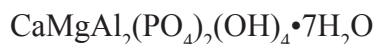
a 4.281, b 10.230, c 6.865 Å, β 90.35°
5.085(64), 3.424(100), 3.405(27), 2.848(18),

2.483(23), 1.9854(13), 1.9737(23), 1.7820(9)

IMA No. 2008-008

Angaston, in the Mount Lofty Ranges, 100 km NNE of Adelaide, South Australia, Australia

Stuart J. Mills



Triclinic: *P*1

a 19.819, *b* 12.858, *c* 5.468 Å, α 90.088, β 89.067, γ 91.032°

The following two new species from last year have had their description papers published commendably fast, and have abstracts reproduced below. One is the seventh new species with an Australian type locality, and has been named after an Australian who has a long association with that locality. The other is from a well-known source of exotic secondary minerals in Montana, but has been named after an enthusiastic Swiss-Australian characteriser of new species. Congratulations to Ian and Joël on their eponymous minerals!

IMA No. 2008-034 = Joëlbruggerite

Mills, S.J., Kolitsch, U., Miyawaki, R., Groat, L.A., Poirier, G. (2009): Joëlbruggerite, $\text{Pb}_3\text{Zn}_3(\text{Sb}^{5+}, \text{Te}^{6+})\text{As}_2\text{O}_{13}(\text{OH}, \text{O})$, the Sb^{5+} analogue of dugganite, from the Black Pine mine, Montana. *American Mineralogist*, **94**, 1012-1017.

Joëlbruggerite, ideally $\text{Pb}_3\text{Zn}_3(\text{Sb}^{5+}, \text{Te}^{6+})\text{As}_2\text{O}_{13}(\text{OH}, \text{O})$, is a new arsenate mineral (IMA 2008-034) and the Sb^{5+} analog of dugganite, from the Black Pine mine, 14.5 km northwest of Philipsburg, Granite County, Montana. It is usually found perched on mimetite; other species that may be present include malachite, azurite, pseudomalachite, chalcocite, beudantite-corkite, duftite, dugganite and kuksite, in milky quartz veins. Joëlbruggerite occurs as barrel-shaped or prismatic crystals up to about 50 μm across in various shades of purple. The crystals have an adamantine luster and a white streak. Mohs hardness is about 3. The fracture is irregular, and the tenacity is brittle. Joëlbruggerite crystals are uniaxial (–) with a calculated refractive index of $n = 1.993$, and weakly pleochroic: $X = Y = \text{gray}$, $Z = \text{purple}$; absorption: $Z > X \approx Y$. Crystals show straight extinction and are length-fast. The empirical chemical formula (mean of 5 electron

microprobe analyses) calculated on the basis of 14 [O + OH] anions is $\text{Pb}_{3.112}(\text{Zn}_{2.689}\text{Fe}_{0.185})_{\Sigma 2.874}(\text{Sb}^{5+}_{0.650}\text{Te}^{6+}_{0.451})_{\Sigma 1.101}(\text{As}_{1.551}\text{P}_{0.203}\text{Si}_{0.160})_{\Sigma 1.914}\text{O}_{13.335}(\text{OH})_{0.665}$.

Joëlbruggerite is trigonal, space group *P*321, *a* = 8.4803(17), *c* = 5.2334(12) Å, *V* = 325.94(12) Å³, *Z* = 1. The five strongest lines in the powder X-ray diffraction pattern are [*d*_{obs} in Å (*I*)(*hkl*)]: 3.298 (100)(111), 3.008 (89)(021), 1.905 (39)(122,131), 2.456 (36)(012,121,030), and 1.609 (30)(112,132,231,140). The crystal structure was solved from single-crystal X-ray data and refined to *R*₁ = 0.038 on the basis of 604 unique reflections with *F* > 4σ(*F*). It is composed of heteropolyhedral sheets of edge-sharing (Sb,Te)O₆ octahedra and PbO₈ disphenoids, oriented parallel to (001). The sheets are cross-linked by AsO₄ and ZnO₄ tetrahedra, which share corners to form an interlinked, two- and three-connected two-dimensional net parallel to (001). The mineral is named for Joël Brugger (born 1967), Swiss-Australian mineralogist, for his contributions to mineralogy.

IMA No. 2008-013 = Plimerite

Elliott, P., Kolitsch, U., Giester, G., Libowitzky, E., McCammon, C., Pring, A., Birch, W.D. (2009): Description and crystal structure of a new mineral – plimerite, $\text{ZnFe}^{3+}_4(\text{PO}_4)_3(\text{OH})_5$ – the Zn-analogue of rockbridgeite and frondelite, from Broken Hill, New South Wales, Australia. *Mineralogical Magazine*, **73**, 131-148.

Plimerite, ideally $\text{ZnFe}^{3+}_4(\text{PO}_4)_3(\text{OH})_5$, is a new mineral from the Block 14 Opencut, Broken Hill, New South Wales. It occurs as pale-green to dark-olive-green, almost black, acicular to prismatic and bladed crystals up to 0.5 mm long and as hemispherical aggregates of radiating acicular crystals up to 3 mm across. Crystals are elongated along [001] and the principal form observed is {100} with minor {010} and {001}. The mineral is associated with hinsdalite-plumbogummite, pyromorphite, libethenite, brochantite, malachite, tsumebite and strengite. Plimerite is translucent with a pale-greyish-green streak and a vitreous lustre. It shows an excellent cleavage parallel to {100} and {010} and distinct cleavage parallel to {001}. It is brittle, has an uneven fracture, a Mohs' hardness of 3.5-4, *D*(meas.) = 3.67(5) g/cm³ and *D*(calc.) = 3.62 g/cm³ (for the empirical

formula). Optically, it is biaxial negative with $\alpha = 1.756(5)$, $\beta = 1.764(4)$, $\gamma = 1.767(4)$ and $2V(\text{calc.})$ of -63° ; pleochroism is X pale-greenish-brown, Y pale-brown, Z pale-bluish-green; absorption $Z > X > Y$; optical orientation $XYZ = \mathbf{cab}$. Plimerite is orthorhombic, space group $Bbmm$, unit-cell parameters: $a = 13.865(3) \text{ \AA}$, $b = 16.798(3) \text{ \AA}$, $c = 5.151(10) \text{ \AA}$, $V = 1187.0(4) \text{ \AA}^3$ (single-crystal data) and $Z = 4$. Strongest lines in the X-ray powder diffraction pattern are [d (\AA), I , hkl]: 4.638, (50), (111); 3.388, (50), (041); 3.369, (55), (131); 3.168, (100), (132); 2.753, (60), (115); 2.575, (90), (200); 2.414, (75), (220); 2.400, (50), (221); 1.957, (40), (225). Electron microprobe analysis yielded (wt.%): PbO 0.36, CaO 0.17, ZnO 20.17, MnO 0.02, Fe_2O_3 29.82, FeO 2.98, Al_2O_3 4.48, P_2O_5 32.37, As_2O_5 0.09, H_2O (calc) 6.84, total 97.30 (Fe³⁺/Fe²⁺ ratio determined by Mössbauer spectroscopy). The empirical formula calculated on the basis of 17 oxygens is $\text{Ca}_{0.02}\text{Pb}_{0.01}\text{Zn}_{1.68}\text{Fe}^{2+}_{0.28}\text{Fe}^{3+}_{2.53}\text{Al}_{0.60}\text{P}_{3.09}\text{As}_{0.01}\text{O}_{17.00}\text{H}_{5.15}$. The crystal structure was solved by direct methods and refined to an R_1 index of 6.41% for 1332 observed reflections from single-crystal X-ray diffraction data (Mo- K_α radiation, CCD area detector). The structure of plimerite is isotypic with that of rockbridgeite and is based on face-sharing trimers of ($M\phi_6$) octahedra which link by sharing edges to form chains, that extend in the \mathbf{b} -direction. Chains link to clusters comprising pairs of corner-sharing ($M\phi_6$) octahedra that link to PO_4 tetrahedra forming sheets parallel to (001). The sheets link via octahedra and tetrahedra corners into a heteropolyhedral framework structure. The mineral name honours Professor Ian Plimer for his contributions to the study of the geology of ore deposits.

The final species to get a mention in this report has just had its description published, and although its type locality is in the USA, it has since been found at several Australian localities. Note that the already-known potassium analogue has had its name changed slightly to maintain consistency with the new sodium-dominant species.

IMA No. 2007-024 = Meurigite-Na

Kampf, A.R., Adams, P.M., Kolitsch, U., Steele, I.M. (2009): Meurigite-Na, a new species, and the relationship between phosphofibrite and meurigite. *American Mineralogist*, **94**, 720-727.

The new mineral meurigite-Na, $[\text{Na}(\text{H}_2\text{O})_{2.5}] [\text{Fe}_8^{3+}(\text{PO}_4)_6(\text{OH})_7(\text{H}_2\text{O})_4]$, is monoclinic with space group $C2/c$ and cell parameters $a = 28.835(2)$, $b = 5.1848(4)$, $c = 19.484(1) \text{ \AA}$, $\beta = 106.983(6)^\circ$, $V = 2785.8(2) \text{ \AA}^3$, and $Z = 4$. It is the Na analog of meurigite, which is now named meurigite-K. The type locality of meurigite-Na is the Silver Coin mine, Valmy, Iron Point district, Nevada, where it occurs as radial sprays of cream-colored, flattened fibers (thin laths) to 0.4 mm in length. At the Silver Coin mine, meurigite-Na occurs very late in a paragenetic sequence that includes (in approximate order from early to late) quartz, barite, apatite-(CaF), goethite, rockbridgeite, cacoxenite, alunite, wardite, turquoise/chalcosiderite, leucophosphite, lipscombite/zinclipscobite, kidwellite, strengite/variscite, crandallite/perhamite, and jarosite. Meurigite-Na also occurs at Tom's quarry and Moculta quarry in South Australia, Australia, Lake Boga quarry and probably Rixon's Sandstone quarry in Victoria, Australia, and at an unnamed pegmatite prospect near Linopolis, Minas Gerais, Brazil. The streak is white, the luster is silky, and the Mohs hardness is about 3. The measured density is $2.94(2) \text{ g/cm}^3$ and the calculated density is 2.954 g/cm^3 . Optical properties: biaxial (-), $\alpha = 1.740(3)$, $\beta = 1.759(3)$, $\gamma = 1.763(3)$, $2V_{\text{meas}} = 50(10)^\circ$; $X \approx \mathbf{c}$, $Z = \mathbf{b}$. The strongest powder X-ray diffraction lines are [$d(hkl)I$]: 13.8(200)20, 9.35(002)100, 4.843(111)20, 3.206(12)40, 3.107(13)30, 2.971(513)15, and 2.593(116)15. Meurigite-Na is insoluble in concentrated HCl. Evaluation of powder XRD and chemical-analytical data in light of the structure determination for meurigite-K leads to the conclusion that type phosphofibrite is isostructural with meurigite and represents the alkali-deficient member of a series with meurigite-K.

Andrew G. Christy,
Australian representative,
Commission on New Minerals and Mineral Classification,
International Mineralogical Association
Research School of Earth Sciences,
Australian National University

VALE ERNIE NICKEL

Following a short battle with cancer, Exploration and Mining Fellow, Ernie Nickel, passed away on Saturday 18 July, 2009, aged 83. Ernie was one of those rare souls everybody liked and will be fondly remembered by his friends and colleagues.

Until recently, even though a post-retirement fellow of 24 years, Ernie still went to work every day on his bicycle. His distinguished career in mineralogical research has seen him publish over 100 papers and write two books. He even had a mineral, Ernienickelite, named after him. He boasted one of the highest citation records in CSIRO and was ranked in the ISI Highly Cited list for researchers in geosciences.

Ernie's career accolades include two lifetime memberships of the Mineralogical Association of Canada for the best published papers in the society's journal on two occasions, and a fellowship in the mineralogical Society of America.

After completing his university qualification in mineralogy, he was employed in the Mines Branch of the Canada Centre for Minerals and Energy Technology (Canmet), but a minerals boom in Australia enticed him down under. He came to Australia to escape from the senior administrative role he had risen to in Canmet and wanted to return to science. In 1971, he was offered three positions in Australia – and he chose CSIRO.

Ernie took early retirement at the age of 60, but continued to come to work in the same laboratory and office for the next 24 years. His reason for 'retiring' was to allow his salary to be used to employ more young scientists.

In the past few years, Ernie was responsible for managing and cataloguing CSIRO's impressive collection of gold – over 500 specimens of gold nuggets kindly donated by Australian prospector Mark Creasy.

Ernie was also a keen gardener, earned the title of National Master in bridge, spoke fluent German, read French, Italian and Russian, and was a very important mentor to many people in mineralogy.

He will be sorely missed by all those who had the privilege to know him.



A symposium in honour of Ernie Nickel will be held at AESC in Canberra.

From <http://www.csiro.au/news/newsletters/SIROSCOPE/2009/July09/htm/nickel.htm>

NEO 2010: NEW ENGLAND OROGEN TECTONICS & RESOURCES.

November 16 - 19, 2010 in Armidale, NSW.

NEO 2010 will follow in the tradition of previous "Voisey" style New England conferences and will honour Peter Flood's contribution to New England geology on the occasion of his retirement. The conference will be organised into three major themes:

1. Tectonic evolution of the New England Orogen: The Peter Flood Symposium.
2. Geochronology, stratigraphy, neotectonics.
3. Granites and related rocks, geothermal, mineralisation.

At this stage the meeting will be preceded by field trip (November 13 - 15) examining geology in the Nundle, Tamworth, Currabubula, Manilla, Attunga, Moonbi and Uralla areas; and a post-conference field trip (November 20 - 22) to the Hillgrove, Tingha, Emmaville and Tenterfield areas finishing in Brisbane.

The deadline for abstract submission is 31 August, 2010. For further information, visit the conference website <http://sites.google.com/site/newenglandorogenconference/home>.

AuScope at KI09

The third biennial conference of the Specialist Group for Geochemistry, Mineralogy and Petrology was held on Kangaroo Island from the 8-13th of November.

AuScope was prominent at the meeting, acting as a co-sponsor with the Geological Society of Australia, and an hour-long discussion session was devoted to AuScope, outlining current developments, access and opportunities with further discussion focussing on positioning the geochemical and petrological communities to be much more heavily involved in future large infrastructure rounds. What was particularly pleasing was that a number of presentations used data from AuScope-supported capabilities. Notably, one speaker presented data that had been wholly derived from the Cameca 1280 in Perth, which was only opened in August, highlighting the immediacy of such instrumentation to geoscientific research.

The Cameca 1280 and its little brother the NanoSIMS 50 are located in the Centre for Microscopy, Characterisation and Analysis at the University of Western Australia. See http://cmca.uwa.edu.au/sims_facility for more information on instrument capability and access.



Cameca IMS 1280 ion microprobe at the University of Western Australia