



## Appendix 1: Participants

### GEMOC PARTICIPANTS 2005/2006

#### MACQUARIE UNIVERSITY

#### Department of Earth and Planetary Sciences

#### *Academic and GEMOC Managerial Staff*

##### *(Teaching and Research)*

- Dr Kelsie Dadd (Physical  
vulcanology, geochemistry,  
tectonics)
- Dr Nathan Daczko (Structural and  
metamorphic geology, tectonics,  
geodynamics)
- Dr Richard Flood (Volcanic geology,  
application of magnetic fabrics  
to reconstruction of volcanic  
terrains)
- Professor W.L. Griffin, Program  
Leader (Technology development  
and industry liaison)
- Dr Simon Jackson (Trace element  
geochemistry, metallogeny)
- Dr Mark Lackie (Rock magnetism,  
paleomagnetic reconstructions)
- Professor Suzanne Y. O'Reilly,  
Director (Crust and mantle  
evolution, lithosphere modelling)
- Dr Norman Pearson (Manager  
GAU)
- Professor Simon Turner (Isotopic  
Geochemistry)
- Professor Bernard Wood  
(Experimental Petrology)

#### *Research Staff*

- Dr John Adam
- Dr Olivier Alard
- Dr Debora Araujo
- Dr Elena Belousova
- Dr Alex Corgne
- Ms Tara Deen

- Dr Anthony Dosseto
- Dr Rhiannon George
- Dr Kevin Grant
- Emeritus Professor Trevor Green
- Dr Oliver Kreuzer
- Dr Vladimir Malkovets
- Dr Laure Martin
- Dr Sune Nielsen
- Dr Lev Natapov
- Dr Craig O'Neill
- Dr Yvette Poudjom Djomani
- Emeritus Professor John Veevers
- Emeritus Professor Ron Vernon
- Dr Kuo-Lung Wang
- Dr Helen Williams
- Dr Ming Zhang

#### *Professional Staff*

- Ms Manal Bebbington (rock  
preparation)
- Dr Eloise Beyer (Geochemist)
- Mrs Nikki Bohan (Administrator  
from May 2005)
- Mr Stephen Craven (Rock  
preparation)
- Ms Suzy Elhlou (Geochemist)
- Dr Oliver Gaul (Research Officer)
- Ms Sally-Ann Hodgekiss (Research  
Officer, Design consultant)
- Dr John Ketchum (Geochemist)
- Ms Carol Lawson (Technical Officer)
- Ms Maureen McMahon (Research  
Officer)
- Dr Norman Pearson (Manager, GAU)
- Dr William Powell (Research  
Officer)
- Dr Ayesha Saeed (Geochemist)
- Dr Kirsty Tomlinson (Geochemist)
- Mr Peter Wieland (Geochemist)
- Ms Tin Tin Win (Geochemist)

#### *Adjunct Professors*

- Professor Bruce Chappell (Granite  
petrogenesis, geochemistry)
- Professor Nicholas Fisher
- Professor Mike Etheridge
- Dr Richard Glen
- Professor W.L. Griffin
- Dr Jingfeng Guo
- Dr John Hronsky (BHP-Billiton)
- Professor Paul Morgan (University  
of Northern Arizona, Geophysics  
and tectonics)
- Professor Else-Ragnhild Neumann
- Professor Xisheng Xu

#### *Visiting Professors*

- Professor Tom Andersen (University  
of Oslo)
- Professor Jean-Yves Cottin  
(University Jean-Monnet, St  
Etienne)
- Dr Phil Schmidt

#### *Visiting Fellows*

- Associate Professor Ian Metcalfe  
(Tectonics, Asian terrain  
reconstructions, Gondwana  
breakup)

#### *Honorary Associates*

- Professor Tom Andersen
- Dr Kari Anderson
- Dr Anita Andrew
- Dr Sonja Aulbach
- Dr E.V.S.S.K. Babu
- Dr Graham Begg
- Ms Kim Berlo
- Dr Yerraguntia Bhaskar Rao
- Dr Phillip L. Blevin
- Ms Rosa Maria Bomparola
- Professor Hannes Brueckner
- Dr Robert Bultitude
- Dr Gilles Chazot
- Mr David Clark (CSIRO)

Professor Massimo Coltorti  
Professor Kent Condie  
Dr Jean-Yves Cottin  
Dr Karsten Gohl  
Dr Michel Grégoire  
Dr Bram Janse  
Dr Mel Jones  
Dr Felix Kaminsky  
Dr Oliver Kreuzer  
Dr Bertrand Moine  
Dr Geoff Nichols  
Dr Boris Panov  
Dr Mark C. Pirlo  
Dr Peter Robinson  
Ms Sonal Rege  
Dr Chris Ryan (CSIRO)  
Dr Stirling Shaw  
Dr Simon Shee  
Dr Zdislav Spetsius  
Dr Nancy van Wagoner  
Dr Steve Walters  
Professor Xiang Wang  
Mr Bruce Wyatt  
Ms Chunmei Yu  
Professor Jin-Hai Yu  
Professor Jianping Zheng

#### **FORMAL COLLABORATORS**

##### ***University of Wollongong***

Professor Allan Chivas (DEST  
Systemic Infrastructure partner)

##### ***Monash University***

Dr Bruce Schaefer (LIEF and  
Research partner)

##### ***University of Newcastle and James Cook University***

Professor W. Collins (DEST  
Systemic Infrastructure partner)

##### ***University of Sydney***

Dr G. Clarke (DEST Systemic  
Infrastructure partner)

Dr Dietmar Muller

##### ***University of Western Sydney***

Professor Peter Williams (DEST  
Systemic Infrastructure partner)

##### ***CSIRO Division of Exploration and Mining***

Dr N. Evans (PGE geochemistry  
and Re/Os systematics)

Dr Brent McInnes (Cu/Au  
metallogeology)

Dr C.G. Ryan (Proton microprobe,  
fluid analysis)

Dr P. Schmidt (Rock magnetism,  
terrane evolution)

##### ***Australian National University (Research School of Earth Sciences)***

Professor Geoff Davies

Professor Brian Kennett

Professor Gordon Lister

##### ***GA***

Dr L. Wyborn (Crustal evolution,  
metallogeology through time,  
implementation of GPS/GIS)

##### ***PIRSA (South Australian Geological Survey)***

Dr Anthony Reid

Dr Justin Gum

##### **OTHER COLLABORATORS ON PROJECT BASIS**

Dr Bernard Bingen (Geological  
Survey of Norway, Trondheim)

Professor J.-L. Bodinier (Université  
Montpellier, France)

Professor Chen-Hong Chen,  
(National Taiwan University)

Professor Chen Daogong (University  
of Science and Technology of  
China, Hefei)

Professor Sun-Lin Chung (National  
Taiwan University)

Professor Massimo Coltorti  
(University of Ferrara, Italy)

Dr Yuriy Erinchek (VSEGEI)

Professor Weiming Fan (Resource  
and Environment Department,  
Chinese Academy of Sciences)

Professor A. Giret (Université Jean  
Monnet, St Etienne)

Dr L.M. Larsen (Greenland  
Geological Survey)

Dr J.-P. Lorand (Museum National  
d'Histoire Naturelle)

Professor Fengxiang Lu (China  
University of Geosciences at  
Wuhan)

Professor Ma Hongwen (China  
University of Geosciences at  
Beijing)

Professor S.R. Paterson (University  
of Southern California)

Dr Patrice Rey (University of  
Sydney)

Dr Csaba Szabo (Eotvos University  
Budapest)

Professor O.T. Tobisch (University  
of California, Santa Cruz)

Professor P. F. Williams (University  
of New Brunswick)

Professor Yuan Xuecheng (China  
Geological Survey)

Professor Zhou Xinmin (Nanjing  
University)

##### ***Technology Partners***

Agilent Technologies (Hewlett  
Packard)

New Wave Research

Spectro Instruments

Nu Instruments

## Appendix 2: Publications

A full list of GEMOC Publications is available at

<http://www.es.mq.edu.au/GEMOC/>

**Reid, A.J., Wilson, C.J.L., Belousova, E. and Pearson, N.J.** 2006. Mesozoic plutons of the Yidun Arc, SW China: U/Pb geochronology and Hf isotopic signature. *Ore Geology Reviews*. (in press).

**Poudjom Djomani, Y., O'Reilly, S.Y., Griffin, W.L., Natapov, L.M., Pearson, N.J. and Doyle, B.J.** 2005. Variations of the effective elastic thickness ( $T_e$ ) and structure of the lithosphere beneath the Slave Province, Canada. *Exploration Geophysics*, 36, 266-271.

**Veevers, J.J., Saeed, A., Belousova, E.A. and Griffin, W.L.** 2005. U-Pb ages and source composition by Hf-isotope and trace-element analysis of detrital zircons in Permian sandstone and modern sand from southwestern Australia and a review of the palaeogeographical and denudational history of the Yilgarn Craton. *Earth Science Reviews*, 68, 245-279.

**Prendergast, K., Clarke, G., Pearson, N.J. and Harris, K.** 2005. Genesis of pyrite-Au-As-Zn-Bi-Te zones associated with Cu-Au skarns: Evidence from the Big Gossan and Wanagon Gold deposits, Ertzberg District, Papua, Indonesia. *Economic Geology*, V100, 1021-1050.

**Moore, A. and Belousova, E.** 2005. Crystallization of Cr-poor and Cr-rich megacryst suites from the host kimberlite magma: implications for mantle structure and the generation of kimberlite magmas. *Contributions to Mineralogy and Petrology*, 149, 462-481.

**Zheng, J.P., Zhang, R.Y., Liou, J.G., Griffin, W.L. and O'Reilly, S.Y.** 2005. Heterogeneous and metasomatised mantle recorded by trace elements in minerals of the Donghai garnet peridotites, Sulu UHP terrane, China. *Chemical Geology*, 221, 243-259.

**Karmalkar, N.R., Rege, S., Griffin, W.L. and O'Reilly, S.Y.** 2005. Alkaline magmatism from Kutch, NW India: Implications for plume-lithosphere interaction. *Lithos*, 81, 101-119.

**Choukroun, M., O'Reilly, S.Y., Griffin, W.L., Pearson, N.J. and Dawson, J.B.** 2005. Hf isotopes of MARID (mica-amphibole-rutile-ilmenite-diopside) rutile trace metasomatic processes in the lithospheric mantle. *Geology*, 33, 45-48.

**Halpin, J.A., Gerakiteys, C.L., Clarke, G.L., Belousova, E.A. and Griffin, W.L.** 2005. In-situ U-Pb geochronology and Hf isotope analyses of the Rayner Complex, east Antarctica. *Contributions to Mineralogy and Petrology*, 148, 689-706.

**Stevenson, J.A., Daczko, N.R., Clarke, G.L., Pearson, N. and Klepeis, K.A.** 2005. Direct observation of adakite melts generated in the lower continental crust, Fiordland, New Zealand. *Terra Nova*, 17, 73-79.

**Andersen, T.** 2005. Detrital zircons as tracers of sedimentary provenance: Limiting conditions from statistics and numerical simulation. *Chemical Geology*, 216, 249-270.

**Griffin, W.L., Natapov, L.M., O'Reilly, S.Y., van Achterbergh, E., Cherenkova, A.F. and Cherenkov, V.G.** 2005. The Kharamai kimberlite field, Siberia: Modification of the lithospheric mantle by the Siberian Trap event. *Lithos*, 81, 167-187.

**Xu, X., O'Reilly, S.Y., Griffin, W.L., Deng, P. and Pearson, N.J.** 2005. Relict Proterozoic basement in the Nanling Mountains (SE China) and its tectonothermal overprinting. *Tectonics*, 24, TC2003, doi:10.1029/2004TC00165.

**Smith, D. and Griffin, W.L.** 2005. Garnetite xenoliths and mantle-water interactions below the Colorado Plateau, southwestern United States. *Journal of Petrology*, 46, 1901-1924.

**Zheng, J.P., Griffin, W.L., O'Reilly, S.Y., Liou, J.G., Zhang, R.Y. and Lu, F.** 2005. Late Mesozoic-Eocene mantle replacement beneath the eastern North China Craton: evidence from the Paleozoic and Cenozoic peridotite xenoliths. *International Geology Review*, 47, 457-472.

**Griffin, W.L., Belousova, E.A., Walters, S.G. and O'Reilly, S.Y.** 2006. Archean and Proterozoic crustal evolution in the Eastern Succession of the Mt Isa District, Australia: U-Pb and Hf-isotope studies of detrital zircons. *Australian Journal of Earth Sciences, (Mt Isa Special Volume)*, 53, 125-149.

**Bingen, B., Griffin, W.L., Torsvik T.H. and Saeed, A.** 2005. Timing of Late Neoproterozoic glaciation on Baltica constrained by detrital zircon geochronology in the Hedmark Group, Southeast Norway. *Terra Nova*, 17, 250-258.

**Xiong, X.L., Adam, J. and Green, T.H.** 2005. Rutile stability and rutile/melt HFSE partitioning during partial melting of hydrous basalt: Implications for TTG genesis. *Chemical Geology*, 218, 339-359.

**Daczko, N.R., Mosher, S., Coffin, M.F. and Meckel, T.A.** 2005. Tectonic implications of fault-scarp-derived volcanoclastic deposits on Macquarie Island: Sedimentation at a fossil ridge-transform intersection? *Geological Society of America Bulletin*, 117, 18-31.

- McDermott, F., Delfin, F.G., Defant, M.J., Turner, S. and Maury, R.** 2005. The petrogenesis of volcanics from Mt. Bulusan and Mt. Mayon in the Bicol arc, the Philippines. *Contributions to Mineralogy and Petrology*, 150, 652-670.
- George, R., Turner, S., Morris, J., Plank, T., Hawkesworth, C. and Ryan, J.** 2005. Pressure-temperature-time paths of sediment recycling beneath the Tonga-Kermadec arc. *Earth and Planetary Science Letters*, 233, 195-211.
- Adams, C.J., Campbell, H.J. and Griffin, W.L.** 2005. Isotopic microanalysis of seawater strontium in biogenic calcite to assess subsequent rehomogenisation during metamorphism. *Chemical Geology*, 220, 67-82.
- Yu, J., Zhou, X., O'Reilly, S.Y., Zhao, L., Griffin, W.L., Wang, R., Wang, L. and Chen, X.** 2005. Formation history and protolith characteristics of granulite facies metamorphic rock in Central Cathaysia deduced from U-Pb and Lu-Hf isotopic studies of single zircon grains. *Chinese Science Bulletin*, 50, 2080-2089.
- Yu, J., O'Reilly, S.Y., Xu X. and Wang, R.** 2006. Element diffusion ability in metasomatic agents and its effect on chemical characteristics of metasomatized peridotites. *Science in China*. (in press).
- Baker, T., Mustard, R., Brown, V., Pearson, N., Stanley, C.R., Radford, N.W. and Butler, I.** 2005. Textural and chemical zonation of pyrite at Pajingo: A potential vector to epithermal gold veins. *Geochemistry - Exploration, Environment, Analysis*, 5, 1-11.
- Condie, K.C., Beyer, E., Belousova, E., Griffin, W.L. and O'Reilly, S.Y.** 2005. U-Pb Isotopic Ages and Hf Isotopic Composition of Single Zircons: The Search for Juvenile Precambrian Continental Crust. *Precambrian Research*, 139, 42-100.
- McInnes, B.I.A., Evans, N.J., Fu, F.Q., Garwin, S., Belousova, E., Griffin, W.L., Bertens, A., Sukarna, D., Permanadewi, S., Andrew, R.L. and Deckart, K.** 2005. Thermal history analysis of selected Chilean, Indonesian and Iranian porphyry Cu-Mo-Au deposits. In *Porter, T.M. (ed), Super porphyry copper and gold deposits: a global perspective*. PGC Publishing, Adelaide, V1, 27-42.
- Belousova, E.A., Griffin, W.L. and O'Reilly, S.Y.** 2006. Zircon crystal morphology, trace-element signatures and Hf isotope composition as a tool for petrogenetic modelling: examples from eastern Australian granitoids. *Journal of Petrology*, 47, 329 - 353.
- Rege, S., Jackson, S., Griffin, W.L., Davies, R.M., Pearson, N.J. and O'Reilly, S.Y.** 2005. Quantitative trace-element analysis of diamond by laser ablation inductively coupled plasma mass spectrometry. *Journal of Analytical Atomic Spectrometry*, 20, 601-611.
- Pearson, N.J., Griffin, W.L., Alard, O. O'Reilly, S.Y.** 2006. The isotopic composition of magnesium in mantle olivine: Records of depletion and metasomatism. *Chemical Geology*, 226, 115-133.
- O'Reilly, S.Y. and Griffin, W.L.** 2006. Imaging global chemical and thermal heterogeneity in the sub-continental lithospheric mantle with garnets and xenoliths: Geophysical implications. *Tectonophysics*, 416, 289-309.
- Kaminsky, F.V., Zakharchenko, O.D., Khachatryan, G.K., Griffin, W.L. and Der Channer, D.M.** 2006. Diamond from the Los Coquitos area, Bolivar State, Venezuela. *The Canadian Mineralogist*. (in press; corr proof online)
- Alard, O., Luguet, A., Pearson, N.J., Griffin, W.L., Lorand, J.-P., Gannoun, A., Burton, K.W. and O'Reilly, S.Y.** 2005. *In-situ* Os isotopes in abyssal peridotites bridge the "isotopic gap" between MORB and their source mantle. *Nature*, 436, 1005-1008.
- Odegard, M., Skar, O., Schiellerup, H. and Pearson, N.** 2005. Preparation of a synthetic titanite glass calibration material for *in situ* microanalysis by direct fusion in graphite electrodes: A preliminary characterization by EPMA and LA-ICP-MS. *Geostandards and Geoanalytical Research*, 29, 197-209.
- Veevers, J.J.** 2005. Edge tectonics (trench rollback, terrane export) of Gondwanaland-Pangea synchronized by supercontinental heat. *Gondwana Research*, 8, 449-456.
- Poudjom Djomani, Y.H., Griffin, W.L., O'Reilly, S.Y. and Doyle, B.J.** 2005. Lithospheric domains and controls on kimberlite emplacement, Slave Province, Canada: evidence from elastic thickness and upper mantle composition. *Geochemistry, Geophysics and Geosystems*, 6, Q10006, doi 10.1029/2005GC000978.
- Yu, J.-H., O'Reilly, S.Y., Zhang, M., Griffin, W.L. and Xu. X.** 2006. Roles of melting and metasomatism in the formation of the lithospheric mantle beneath the Leizhou Peninsula, South China. *Journal of Petrology*, 47, 355-383.
- Klein, E.L., Moura, C.A.V., Krymsky, R.S. and Griffin, W.L.** 2005. The Gurupi Belt, northern Brazil: lithostratigraphy, geochronology and geodynamic evolution. *Precambrian Research*, 141, 83-105.

## Appendix 2: Publications

- Veevers, J.J., Belousova, E.A., Saeed, A., Sircombe, K., Cooper, A.F. and Read, S.E. 2006. Pan-Gondwanaland detrital zircons from Australia analysed for Hf-isotopes and trace elements reflect an ice-covered Antarctic provenance of 700-500 Ma age,  $T_{DM}$  of 2.0-1.0 Ga, and alkaline affinity. *Earth-Science Reviews*, 76, 135-174.
- Veevers J.J. 2006. Updated Gondwana (Permian–Cretaceous) earth history of Australia. *Gondwana Research*, 9, 231-260.
- Powell, W. and O'Reilly, S. Y. 2006. Metasomatism and sulfide mobility in lithospheric mantle beneath eastern Australia: implications for mantle Re-Os chronology. *Lithos*. (in press)
- Nielsen, S.G., Rehkämper, M., Norman, M.D. and Halliday, A.N. 2005. Thallium isotopic evidence for ferromanganese sediments in the mantle source of Hawaiian basalts. *Nature*, 439, 314-317.
- Zheng, J., Griffin, W.L., O'Reilly, S.Y., Zhang, M. and Pearson, N.J. 2006. Granulite xenoliths and their zircons, Tuoyun, NW China: Insights into southwestern Tianshan lower crust. *Precambrian Research*, 145, 159-181.
- Zheng, J., Griffin, W.L., O'Reilly, S.Y., Zhang, M., Pearson, N.J. and Pan, Y 2006. Widespread Archean basement beneath the Yangtze craton. *Geology*, 34, 417-420.
- Deen, T., Griffin, W.L., Begg, G., O'Reilly, S.Y. and Natapov, L.M. 2006. Thermal and compositional structure of the subcontinental lithospheric mantle: Derivation from shear-wave seismic tomography. *Geochemistry, Geophysics and Geosystems*, 7, Q07003, doi:10.1029/2005GC001120.
- Zheng, J., Griffin, W.L., O'Reilly, S.Y., Zhang, M., Pearson, N.J. and Luo, Z. 2006. The lithospheric mantle beneath the southwestern Tianshan area, NW China. *Contributions to Mineralogy and Petrology*, 151, 457-479.
- Nielsen, S.G., Rehkämper, M. and Halliday, A.N. 2006. Large thallium isotopic variations in iron meteorites and evidence for lead-205 in the early solar system. *Geochimica et Cosmochimica Acta*, 70, 2643-2657.
- Beyer, E., Griffin, W.L. and O'Reilly, S.Y. 2006. Transformation of Archean lithospheric mantle by refertilisation: evidence from exposed peridotites in the Western Gneiss Region, Norway. *Journal of Petrology*, 47, 1611-1636.
- Downes, P.J., Griffin, B.J. and Griffin, W.L. 2006. Mineral chemistry and zircon geochronology of xenocrysts and altered mantle and crustal xenoliths from the Aries kimberlite pipe: Constraints on the composition and age of the central Kimberley Craton, Western Australia. *Lithos* (in press, March 2006)
- Griffin, W.L., Pearson, N.J., Belousova, E.A. and Saeed, A. 2006. Comment: Hf-isotope heterogeneity in zircon 91500. *Chemical Geology* (in press; corr proof online)
- Adam, J. and Green, T. 2006. Trace element partitioning between mica- and amphibole-bearing garnet lherzolite and hydrous basanitic melt: 1. Experimental results and the investigation of controls on partitioning behaviour. *Contributions to Mineralogy and Petrology*, 152, 1-17.
- Lackie, M.A. and McMahon, K.L. 2006. Seismic Reflection Studies of the Amery Ice Shelf, East Antarctica. *Geophysical Journal International*, 166, 757.
- Zheng, J., Griffin, W.L., O'Reilly, S.Y., Yang, J.S. and Zhang, R.Y. 2006. A refractory mantle protolith in younger continental crust, east-central China: Age and composition of zircon in the Sulu UHP peridotite. *Geology*. (in press)
- Paterson, S.R., Vernon, R.H. and Zak, J. 2005. Mechanical instabilities and physical accumulation of K-feldspar megacrysts in granitic magma, Tuolumne Batholith, California, USA. *Journal of the Virtual Explorer*, 18, 1-20.
- Kruhl, J.H. and Vernon, R.H. 2005. Syndeformational emplacement of a tonalitic sheet-complex in a Late-Variscan thrust regime: fabrics and mechanism of intrusion, Monte's Senes, Northeastern Sardinia, Italy. *The Canadian Mineralogist*, 43, 387-407.
- Zheng, J., Griffin, W.L., O'Reilly, S.Y., Zhang, M. and Pearson, N. 2006. Zircons in mantle xenoliths record the Triassic Yangtze-North China continental collision. *Earth and Planetary Sciences*, 247, 130-142
- Andersen, T., Griffin, W.L. and Sylvester, A.G. 2006. Sveconorwegian underplating in southwestern Fennoscandia: LAM-ICPMS Hf isotope evidence from granites and gneisses in Telemark, southern Norway. *Lithos*. (in press)
- Dosseto, A., Turner, S.P. and Douglas, G.B. 2006. Uranium-series isotopes in colloids and suspended sediments: Timescale for sediment production and transport in the Murray-Darling River System. *Earth and Planetary Science Letters*. (in press)
- Zheng, J., Griffin, W.L., O'Reilly, S.Y., Yang, J., Li, T., Zhang, R.Y. and Liou, G.J. 2006. Mineral Chemistry of Garnet Peridotites from Paleozoic, Mesozoic and Cenozoic Lithosphere: Constraints on Mantle Evolution beneath Eastern China. *Journal of Petrology*. (in press).

## Appendix 3: Visitors/ GAU users

### GEMOC VISITORS 2005 (Excluding Participants in Conferences and Workshops) Macquarie

- Dr Chris Adams (Institute of Geological & Nuclear Sciences, Lower Hutt NZ)
- Dr Olivier Alard
- Mr Phil Baker (WMC Resources)
- Dr Graham Begg (BHP-Billiton)
- Dr Steve Beresford (BHP-Billiton)
- Ms Kim Berlo (Dept of Earth Sciences, University of Bristol, UK)
- Ms Mai-Fei Chu (Taiwan National University)
- Professor Sun-Lin Chung (Taiwan National University)
- Professor Massimo Coltorti (University of Ferrara)
- Dr Craig Cook (Waikato University, Hamilton, NZ)
- Professor Jon Davidson (Durham University, UK)
- Andy Du Frane (University of New Mexico)
- Professor Jim Gill (Santa Cruz University, California)
- Dr Alan Goode (AMIRA International)
- Mr Rabea Haredy (School of Earth and Environmental Sciences, University of Wollongong)
- Dr Jeff Harris (Department of Geographical and Earth Sciences, University of Glasgow and De Beers)
- Dr Chris Hatton (DeBeers Johannesburg)
- Ms Adriana Heimann (Dept of Geological and Atmospheric Sciences, Iowa State University)
- Mr Jim Hill (RSI, Colorado, USA)
- Dr Jon Hronsky (BHP-Billiton)
- Dr Martin van Kranendonk (Geological Survey of Western Australia)
- Ms Yu-Hsuan Liang (Taiwan National University)
- Dr Geordie Mark (Dept of Geological Sciences, Monash University)
- Mr Paul Montague (Kennelec Scientific P/L)
- Dr Michael Palin (Department of Geology, Otago University, NZ)
- Dr Chris Ryan (CSIRO)
- Professor Mike Sandiford (University of Melbourne)
- Dr Simon Shee (DeBeers Australia)
- Dr Keith Sircombe (Geoscience Australia)
- Mr Darren Stephens (BHP Billiton)
- Mr Fraser Tabart (WMC Resources)
- Dr Tadashi Usuki (Institute of Earth Science, Academia Sinica, Taipei)
- Dr Esmé van Achterbergh (Rio Tinto)
- Professor Bernard Wood (Dept of Earth Sciences, University of Bristol, UK)
- Professor Jianping Zheng (China University of Geosciences, Wuhan)

### Appendix 3: Visitors/ GAU users

#### EXTERNAL USERS OF THE GEOCHEMICAL ANALYSIS UNIT FACILITIES IN 2005

(Note: this does not include  
commercial or contract work  
through AccessMQ)

- Dr Chris Adams (Institute of Geological and Nuclear Science, New Zealand)
- Dr Manish Arora (Faculty of Dentistry, University of Sydney)
- Dr Dioni Cendon (School of Geosciences, University of Wollongong)
- Professor Alan Chivas (School of Geosciences, University of Wollongong)
- Professor Massimo Coltorti (Università di Ferrara, Italy)
- Dr Craig Cook (University of Waikato)
- Mr Andy Du Frane (University of New Mexico)
- Dr Marco Fiorentini (University of Western Australia)
- Professor Jim Gill (University of California, Santa Cruz, USA)
- Dr Peter Grave (School of Human and Environmental Studies, Archaeology and Palaeoanthropology, University of New England)
- Mr Rabea Haredy (School of Geosciences, University of Wollongong)
- Ms Adriana Heimann (Dept of Geological and Atmospheric Sciences, Iowa State University, USA)
- Dr Brian Jones (School of Geosciences, University of Wollongong)
- Dr Florence Le Hebel (School of Geosciences, University of Sydney)
- Dr Geordie Mark (School of Geosciences, Monash University)
- Dr Terry Mernagh (Geoscience Australia)
- Ms Marianne Sandstrom (University of Adelaide)
- Dr Giovanna Sapienza (Università degli Studi di Bologna, Italy)
- Dr Bruce Schaefer (School of Geosciences, Monash University)
- Dr Qiang Wang (School of Geosciences, University of Sydney)
- Dr Derek Wyman (School of Geosciences, University of Sydney)
- Dr Oskar Thalhammer (University of Leoben)



## Appendix 4: Abstract titles

### TITLES OF ABSTRACTS FOR CONFERENCE PRESENTATIONS IN 2005

Full abstracts available at  
<http://www.es.mq.edu.au/GEMOC/>

#### COLLOQUIUM AND ANNUAL GENERAL MEETING OF THE ATLANTIC GEOSCIENCE SOCIETY (AGS), SAINT JOHNS, NEW BRUNSWICK, CANADA, FEBRUARY 4-6 2005

##### Phreatomagmatism of the Silurian Passamaquoddy Bay Subbelt, Maine and New Brunswick

R.W.D. Lodge<sup>1</sup>, N. Van Wagoner<sup>1</sup> and  
K. Dadd<sup>2</sup>

1. Acadia University, Geology  
Department, Wolfville, Nova Scotia,  
Canada, 2. GEMOC, Macquarie

#### JOINT MEETING OF THE GEOLOGICAL ASSOCIATION OF CANADA, THE MINERALOGICAL ASSOCIATION OF CANADA, THE CANADIAN SOCIETY OF PETROLEUM GEOLOGISTS AND THE CANADIAN SOCIETY OF SOIL SCIENCES (GAC/MAC), HALIFAX, NOVA SCOTIA, CANADA, MAY 15-18 2005

##### Origin and Evolution of the Lithospheric Mantle beneath the Central Slave Craton (Canada)

S. Aulbach<sup>1</sup>, W.L. Griffin<sup>1,2</sup>, N.J. Pearson<sup>1</sup>,  
S.Y. O'Reilly<sup>1</sup> and K. Kivi<sup>2</sup>

1. GEMOC, Macquarie, 2. Kennecott  
Canada Exploration Inc., Thunder Bay,  
ONT., Canada

##### Evolution of the Makkovik Province, Labrador, Canada: tectonic processes during 200 Ma at a Paleoproterozoic active margin

N. Culshaw<sup>1</sup>, J. Ketchum<sup>2</sup>, and S.M. Ball  
1. Department of Earth Sciences,  
Dalhousie University, Halifax, Canada,  
2. GEMOC, Macquarie

##### Restite in S-Type Granites of the Lachlan Fold Belt, SE Australia

R.H. Vernon  
GEMOC, Macquarie

##### Late Ordovician to Silurian arc and back-arc sequences: southwestern New Brunswick and eastern Maine

N. Van Wagoner<sup>1</sup>, M. McLeod<sup>2</sup>, K.  
Dadd<sup>3</sup> and M. Leybourne<sup>4</sup>

1. Acadia University, Geology  
Department, Wolfville, Nova  
Scotia, Canada, 2. New Brunswick  
Department of Natural Resources,  
Geological Surveys Branch, Sussex,  
New Brunswick, 3. GEMOC,  
Macquarie, 4. Department of Geology,  
Department of Geosciences, University  
of Texas at Dallas, Richardson, Texas,  
US

##### Comparative volcanology of the Silurian Passamaquoddy Bay Subbelt, Maine and New Brunswick: Implications for correlation and Volcanic Setting

N. Van Wagoner<sup>1</sup>, K. Dadd<sup>2</sup>

1. Acadia University, Geology  
Department, Wolfville, Nova Scotia,  
Canada, 2. GEMOC, Macquarie

#### 15<sup>TH</sup> ANNUAL V. M. GOLDSCHMIDT CONFERENCE, UNIVERSITY OF IDAHO, MOSCOW, IDAHO USA, MAY 20-25 2005

##### The eclogite mantle reservoir: <sup>176</sup>Hf/<sup>177</sup>Hf, Nb/Ta and Zr/Hf of rutile

S. Aulbach<sup>1</sup>, W.L. Griffin<sup>1,2</sup>, N.J.  
Pearson<sup>1</sup> and S.Y. O'Reilly<sup>1</sup>

1. GEMOC, Macquarie, 2. CSIRO  
Exploration and Mining, North Ryde,  
Australia

##### Os-Hf-Nd Isotope Constraints on Subcontinental Lithospheric Mantle Evolution, Slave Craton (Canada)

S. Aulbach<sup>1</sup>, W.L. Griffin<sup>1,2</sup>, N.J.  
Pearson<sup>1</sup>, S.Y. O'Reilly<sup>1</sup> and K. Kivi<sup>2</sup>

1. GEMOC, Macquarie, 2. CSIRO  
Exploration and Mining, North Ryde,  
Australia, 3. Kennecott Canada Expl.  
Inc., Thunder Bay, ONT, Canada

##### The isotopic composition of subduction fluid: High-, low-, or normal $\delta^{18}\text{O}$ ?

I. Bindeman<sup>1,2</sup>, S. Turner<sup>3</sup>, J. Eiler<sup>2</sup> and  
M. Portnyagin<sup>4</sup>

1. Geological Science, University of  
Oregon, Eugene, OR, USA, 2. GPS,  
Caltech, Pasadena, CA, USA, 3.  
GEMOC, Macquarie, 4. GEOMAR,  
Kiel, Germany

##### Mantle and crustal metasomatism of garnet-bearing peridotite in the Western Gneiss Region of the Norwegian Caledonides

H. Brueckner<sup>1,2</sup>, D.A. Carswell<sup>3</sup>,  
W.L. Griffin<sup>4</sup>, L.G. Medaris Jr. and E. Beyer<sup>4</sup>

1. Queens College and The Graduate  
Center of CUNY, USA, 2. Lamont-Doherty  
Earth Observatory of Columbia University,  
USA, 3. Department of Geography,  
University of Sheffield, UK, 4. GEMOC,  
Macquarie, 5. Department of Geology and  
Geophysics, University of Wisconsin-  
Madison, Wisconsin, USA

##### Rapid response of erosion to recent climatic changes: New insights from uranium-series

A. Dosseto<sup>1</sup>, B. Bourdon<sup>2</sup>, J. Gaillardet<sup>2</sup>,  
C.J. Allegre<sup>2</sup>, and N. Filizola<sup>3</sup>

1. GEMOC, Macquarie, 2. Laboratoire  
de Geochimie et Cosmochimie, IPGP,  
Paris, France, 3. IRD-LMTG, Universite  
Paul Sabatier, Toulouse, France

##### Understanding radioactive disequilibrium in river-borne material: dependence on colloid/ particle size

A. Dosseto<sup>1</sup>, G.B. Douglas<sup>2</sup> and S. Turner<sup>1</sup>

1. GEMOC, Macquarie, 2. CSIRO Land  
and Water, Wembley, WA, Australia

##### Magma differentiation and storage at Katmai-Novarupta 1912: comparing U-series time scales with thermal models

R.M. George<sup>1</sup>, S. Turner<sup>1</sup>, M. Reagan<sup>2</sup>,  
M. Sandiford<sup>3</sup>, C. Hawkesworth<sup>4</sup> and  
W. Hildreth<sup>5</sup>

1. GEMOC, Macquarie, 2. Department  
of Geoscience, University of Iowa, Iowa  
City, USA, 3. School of Earth Sciences,  
University of Melbourne, Victoria,  
Australia, 4. Department of Earth  
Sciences, Bristol University, Bristol,  
UK, 5. US Geological Survey, CA, USA

## Appendix 4: Abstract titles

### ***In-situ* U-Pb geochronology and Hf isotope analyses of the Rayner Complex, east Antarctica**

J.A. Halpin<sup>1</sup>, C.L. Gerakiteys<sup>1</sup>, G.L. Clarke<sup>1</sup>, E.A. Belousova<sup>2</sup> and W.L. Griffin<sup>2,3</sup>

1. School of Geosciences, University of Sydney, Sydney, Australia, 2. GEMOC, Macquarie, 3. CSIRO Exploration and Mining, North Ryde, Australia

### **Laser ablation MC-ICP-MS: shedding new light on *in-situ* isotope ratio measurement**

N. Pearson, W.L. Griffin and S.Y. O'Reilly  
GEMOC, Macquarie

### **<sup>210</sup>Pb-<sup>226</sup>Ra-<sup>230</sup>Th implications for timescales of island arc magma degassing**

S. Turner<sup>1</sup> and K. Berlo<sup>2</sup>

1. GEMOC, Macquarie, 2. Department of Earth Sciences, University of Bristol, UK

### **Proterozoic mantle lithosphere beneath the East African Rift (Southern Ethiopia): In situ Re-Os evidence**

K.L. Wang<sup>1,2</sup>, S.Y. O'Reilly<sup>1</sup>, W.L. Griffin<sup>1</sup>, N. Pearson<sup>1</sup>, R. Matsumura<sup>3</sup> and R. Shinjo<sup>3</sup>

1. GEMOC, Macquarie, 2. Department of Geosciences, National Taiwan University, Taipei, Taiwan, 3. Department of Physics and Earth Sciences, University of the Ryukyus, Nishihara, Okinawa, Japan

### **Early J2 basalts in SE China: The incipience of large-scale late Mesozoic magmatism**

X. Xie<sup>1</sup>, X. Xu<sup>1</sup>, H. Zou<sup>2</sup>, S. Jiang<sup>1</sup>, M. Zhang<sup>3</sup> and J. Qiu<sup>1</sup>

1. State Key Laboratory of Mineral Deposit Research, Department of Earth Sciences, Nanjing University, Nanjing, China, 2. Department of Earth and Space Sciences, University of California, Los Angeles, USA, 3. GEMOC, Macquarie

### **EUROPEAN GEOSCIENCES UNION GENERAL ASSEMBLY 2005 VIENNA, AUSTRIA, APRIL 24-29 2005**

#### ***In-situ* Os isotopic compositions in sulfides from Kerguelen mantle xenoliths (Indian Ocean): Proterozoic subcontinental mantle fragments under the Kerguelen Archipelago?**

G. Delpech<sup>1,2</sup>, M. Grégoire<sup>2,3</sup>, J.P.

Lorand<sup>4</sup>, S.Y. O'Reilly<sup>2</sup> and J.Y. Cottin<sup>1,2</sup>  
1. University of Jean Monnet, Saint-Etienne, France, 2. GEMOC, Macquarie, 3. Observatoire Midi-Pyrenees, Toulouse, France, 4. Museum d'Histoire Natrelle, Paris, France

#### **The age of Os isotope reason in the sub-continental lithospheric mantle**

N.J. Pearson<sup>1</sup>, W.L. Griffin<sup>1</sup>, O. Alard<sup>1,2</sup> and S.Y. O'Reilly<sup>1</sup>,

1. GEMOC, Macquarie, 2. CNRS, Université de Montpellier, Montpellier, France

### **AGU 2005 JOINT ASSEMBLY, NEW ORLEANS, LA, USA, MAY 23-27 2005**

#### **A sharp continent-ocean transition in the area of the Canary Islands: Evidence from upper mantle and lower crustal xenoliths**

E.-R. Neumann<sup>1</sup>, R. Vannucci<sup>2,3</sup>, M. Tiepolo<sup>3</sup>, W.L. Griffin<sup>4</sup>, N.J. Pearson<sup>4</sup> and S.Y. O'Reilly<sup>4</sup>

1. Physics of Geological Processes, University of Oslo, Oslo, Norway, 2. Dipartimento di Scienze della Terra, Università di Pavia, Pavia, Italy, 3. CNR - Istituto di Geoscienze e Georisorse, sezione di Pavia, Pavia, Italy, 4. GEMOC, Macquarie

### **AGOS, ASIA OCEANIA GEOSCIENCES SOCIETY 2<sup>ND</sup> ANNUAL MEETING, SINGAPORE, JUNE 20-24 2005**

#### **Magma differentiation and storage at Katmai-Novarupta 1912: comparing U-series time scales with thermal models**

R.M. George<sup>1</sup>, S. Turner<sup>1</sup>, M. Reagan<sup>2</sup>, M. Sandiford<sup>3</sup>, C. Hawkesworth<sup>4</sup>

1. GEMOC, Macquarie, 2. Department of Geoscience, University of Iowa, Iowa City, USA, 3. School of Earth Sciences, University of Melbourne, Victoria, Australia, 4. Department of Earth Sciences, Bristol University, Bristol, UK

#### **Consequences of U-series disequilibria for thermal maturation models for silicic magma production and the time scales involved**

S. Turner<sup>1</sup>, A. Dosseto<sup>1</sup>, R. George<sup>1</sup>, K. Berlo<sup>2</sup>

1. GEMOC, Macquarie, 2. Department of Earth Sciences, Bristol University, Bristol, UK

### **IUGS-SECE, THE ORIGIN, EVOLUTION AND PRESENT STATE OF SUBCONTINENTAL LITHOSPHERE CONFERENCE, CHINA, JUNE 25-30 2005**

#### **Mapping the Lithospheric Mantle: Tomography meets Geochemistry and Geothermics**

W.L. Griffin<sup>1,2</sup>, S.Y. O'Reilly<sup>1</sup>, T. Deen<sup>1</sup>, G. Begg<sup>3</sup> and Y. Poudjom Djomani<sup>1</sup>

1. GEMOC, Macquarie, 2. CSIRO Exploration and Mining, North Ryde, Australia, 3. WMC Resources Ltd., Belmont, WA, Australia

#### **Persistence of ancient lithospheric mantle: consequences for geodynamics and basalt geochemistry**

S.Y. O'Reilly<sup>1</sup>, W.L. Griffin<sup>1,2</sup>, M. Zhang<sup>1</sup> and Y. Poudjom Djomani<sup>1</sup>

1. GEMOC, Macquarie, 2. CSIRO Exploration and Mining, North Ryde, Australia

**Re-Os isotopes in mantle xenoliths from SE China: age constraints and evolution of lithospheric mantle**

X. Xu<sup>1,2</sup>, W.L. Griffin<sup>2</sup>, S.Y. O'Reilly<sup>2</sup>, and N.J. Pearson<sup>2</sup>

1. State Key Laboratory for Mineral Deposits Research, Department of Earth Sciences, Nanjing University, Nanjing, China, 2. GEMOC, Macquarie

**Secular (136 to 0 Ma) chemical variation of mantle-derived mafic magmas in the Sino-Korean Craton: constraints on mantle evolution**

M. Zhang<sup>1</sup>, W. Fan<sup>1,2</sup>, S.Y. O'Reilly<sup>1</sup>, J. Zheng<sup>1,3</sup> and W.L. Griffin<sup>1,4</sup>

1. GEMOC, Macquarie, 2. Lab of Lithospheric Tectonic Evolution, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing, China, 3. Faculty of Earth Sciences, China University of Geosciences, Wuhan, China, 4. CSIRO Exploration and Mining, North Ryde, NSW, Australia

**Late Mesozoic-Eocene mantle replacement beneath the eastern North China Craton: evidence from the Paleozoic and Cenozoic peridotite xenoliths**

J. Zheng<sup>1</sup>, W.L. Griffin<sup>2,3</sup>, S.Y. O'Reilly<sup>2</sup> and F. Lu<sup>1</sup>

1. State Key Laboratory of Geological Processes and Mineral Resources, Faculty of Earth Sciences, China University of Geosciences, Wuhan, China, 2. GEMOC, Macquarie, 3. CSIRO Exploration and Mining, North Ryde, NSW, Australia

**Mineral chemistry of garnet peridotites from Paleozoic and Cenozoic lithosphere and Mesozoic UHP terrain: constraints on lithospheric evolution, east China**

J. Zheng<sup>1</sup>, W.L. Griffin<sup>2,3</sup>, R.Y. Zhang<sup>4</sup>, S.Y. O'Reilly<sup>2</sup> and J.G. Liou<sup>4</sup>

1. State Key Laboratory of Geological Processes and Mineral Resources, Faculty of Earth Sciences, China University of Geosciences, Wuhan, China, 2. GEMOC, Macquarie, 3. CSIRO Exploration and Mining, North Ryde, NSW, Australia, 4. Department of Geological and Environmental Sciences, Stanford University, CA, USA

**GEOLOGICAL SOCIETY OF SOUTH AFRICA, DURBAN, SOUTH AFRICA, JULY 4-7 2005**

**Structural aspects of igneous cumulates (invited lecture)**

R.H. Vernon  
GEMOC Macquarie

**SPECIALIST GROUP IN GEOCHEMISTRY, MINERALOGY AND PETROLOGY (SGGMP) GEOLOGICAL SOCIETY OF AUSTRALIA FIRST BIENNIAL CONFERENCE, PORT MACQUARIE, JULY 13-15 2005**

**Plutonism and metamorphism at the root of a Cretaceous magmatic arc**

S.A. Carroll and N.R. Daczko  
GEMOC, Macquarie

**High-pressure mafic migmatites, Fiordland, New Zealand: does migmatitisation promote recrystallisation to garnet granulite?**

N.R. Daczko<sup>1</sup> and G.L. Clarke<sup>2</sup>  
1. GEMOC, Macquarie, 2. School of Geosciences, University of Sydney, Sydney, Australia

**Tracking crustal differentiation and assimilation processes at arc volcanoes: a Uranium series isotope perspective**

R.M. George<sup>1</sup>, S.P. Turner<sup>1</sup>, R. Price<sup>2</sup>, C. Cook<sup>2</sup> and B. Finney<sup>3</sup>

1. GEMOC, Macquarie, 2. School of Science and Technology, University of Waikato, Hamilton, New Zealand, 3. Department of Earth Sciences, University of Bristol, Bristol, UK

**Insights into magma generation and evolution at White Island, New Zealand**

Z. Hayworth<sup>1</sup>, R.M. George<sup>2</sup>, B.F. Schaefer<sup>1</sup> and S.P. Turner<sup>2</sup>

1. School of Geosciences, Monash University, ACT, Australia, 2. GEMOC, Macquarie

**Thermobarometry of Early Cretaceous high-pressure contact metamorphic aureole near Resolution Island, Fiordland, New Zealand**

L.A. Milan<sup>1</sup>, N.R. Daczko<sup>1</sup>, I. Turnbull<sup>2</sup>, and A. Allibone<sup>2</sup>

1. GEMOC, Macquarie, 2. Institute of Geological and Nuclear Sciences, Dunedin, New Zealand

**Thallium isotopic evidence for ferromanganese sediments in the mantle source of Hawaiian basalts**

S.G. Nielsen<sup>1,2</sup>, M. Rehkamper<sup>1,3</sup>, M. Norman<sup>4</sup> and A. Halliday<sup>1,5</sup>

1. Department of Earth Sciences, ETH Zurich, Zurich, Switzerland, 2. GEMOC, Macquarie, 3. Imperial College, London, United Kingdom, 4. Research School of Earth Sciences, Australian National University, Canberra, ACT, Australia, 5. Department of Earth Sciences, University of Oxford, Oxford, United Kingdom

**Facies analysis, geochemistry and tectonic setting of the Frampton Volcanics, southeastern New South Wales**

A.C. Plioplis and K.A. Dadd  
GEMOC, Macquarie

**Systematics in two phase REE and Y partitioning coefficients in mafic granulites**

F.C. Schroter<sup>1</sup>, G.L. Clarke<sup>1</sup>, R.W. White<sup>2</sup> and N.J. Pearson<sup>3</sup>

1. School of Earth Sciences, University of Sydney, NSW, Australia, 2. School of Earth Sciences, University of Melbourne, Victoria, Australia, 3. GEMOC, Macquarie

**Tectonic significance of low-grade mineralization of seafloor spreading-related faults, Macquarie Island**

J-Y. Talbot and N.R. Daczko  
GEMOC, Macquarie

**Time scales of magmatic processes: a review of recent U-series results**

S. Turner  
GEMOC, Macquarie

## Appendix 4: Abstract titles

### **Iron Isotopes as a potential new tool in igneous geochemistry and cosmochemistry**

H.M. Williams<sup>1,2</sup>, A.N. Halliday<sup>3</sup>, C.A. McCammon<sup>4</sup>, A.H. Peslier<sup>5</sup>, N. Teutsch<sup>1</sup>, S. Levasseur<sup>1</sup> and J.-P. Burg<sup>1</sup>  
1. Department of Earth Sciences, ETH-Zurich, Switzerland, 2. GEMOC Macquarie, 3. Department of Earth Sciences, University of Oxford, Oxford, UK, 4. Bayerisches Geoinstitut, Universitat Bayreuth, Bayreuth, Germany, 5. Texas Centre for superconductivity and Advanced Materials, University of Houston, Houston, TX, USA

### **Where do high-level granite magmas come from?**

R.H. Vernon  
GEMOC, Macquarie

### **8<sup>TH</sup> BIENNIAL SGA MEETING, MINERAL DEPOSIT RESEARCH: MEETING THE GLOBAL CHALLENGE, BEIJING, CHINA, AUGUST 18-21 2005**

### **Upper mantle composition: tools for smarter diamond exploration**

W.L. Griffin<sup>1,2</sup> and S.Y. O'Reilly<sup>1</sup>  
1. GEMOC, Macquarie, 2. CSIRO Exploration and Mining, North Ryde, Australia

### **The evolution of lithospheric domains: a new framework to enhance mineral exploration targeting**

S.Y. O'Reilly<sup>1</sup>, J. Hronsky<sup>2</sup>, W.L. Griffin<sup>1,3</sup> and G. Begg<sup>2</sup>  
1. GEMOC, Macquarie, 2. WMC Resources Ltd., Belmont, WA, Australia, 3. CSIRO Exploration and Mining, North Ryde, NSW

### **SPECIALIST GROUP IN TECTONICS AND STRUCTURAL GEOLOGY CONFERENCE ("STOMP"), TOWNSVILLE, QUEENSLAND, AUGUST 29 - SEPTEMBER 2 2005**

### **Structural evidence for identifying granite cumulates**

R.H. Vernon  
GEMOC, Macquarie

### **WEST ANTARCTICA ICE SHEET INITIATIVE (WAIS) WORKSHOP, STERLING, VIRGINIA, USA, SEPTEMBER 28 - OCTOBER 1 2005**

### **Seismic studies of the Amery Ice Shelf, East Antarctica**

K. McMahon  
GEMOC, Macquarie

### **INTERNATIONAL CONFERENCE IN HONOUR OF RON H. VERNON ON "SHEARED MAGMAS IN NATURE AND EXPERIMENT: BRIDGING THE BRITTLE AND DUCTILE FIELDS", KLOSTER SEEON, BAVARIA, GERMANY, OCTOBER 4-7 2005**

### **Problems of extraction and sources of felsic magma**

R.H. Vernon<sup>1</sup> and S.R. Paterson<sup>2</sup>  
1. GEMOC, Macquarie, 2. Earth Sciences, University of Southern California, Los Angeles, USA.

### **2005 AGU FALL MEETING, SAN FRANCISCO, CA, USA, DECEMBER 5-9 2005**

### **Campbell Plateau, New Zealand: Seismic Analysis and Models From a Rifted Submarine Plateau of Continental Origin**

J. Grobys<sup>1</sup>, K. Gohl<sup>1</sup>, G. Uenzelmann-Neben<sup>1</sup>, B. Davy<sup>2</sup>, D. Barker<sup>2</sup> and T. Deen<sup>3</sup>  
1. Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany, 2. GNS Science, Lower Hutt, New Zealand, 3. GEMOC, Macquarie

### **Runaway growth of Mars and implications for core formation relative to Earth**

A.N. Halliday<sup>1</sup>, B.J. Wood<sup>2</sup> and T. Kleine<sup>3</sup>  
1. University of Oxford, Earth Sciences, Oxford, United Kingdom, 2. GEMOC, Macquarie, 3. ETH Zentrum, Earth Sciences, Zurich, Switzerland

### **Deciphering multistage crystal histories in arc magmas**

R. George<sup>1</sup>, S. Turner<sup>1</sup>, K. Berlo<sup>2</sup> and N. Pearson<sup>1</sup>  
1. GEMOC, Macquarie, 2. Department of Earth Sciences, University of Bristol Wills Memorial Building, United Kingdom

### **Transitional melt flow in downwelling arc mantle**

N. Petford<sup>1</sup> and S. Turner<sup>2</sup>  
1. Kingston University, Centre for Earth and Environmental Science Research, London, United Kingdom, 2. GEMOC, Macquarie

### **Mass transfer in subduction zones: an elemental and isotopic perspective**

S. Turner and R. George  
GEMOC, Macquarie

### **Kelvin revisited: Cooling and core formation after the giant impact**

B.J. Wood<sup>1</sup> and A.N. Halliday<sup>2</sup>  
1. GEMOC, Macquarie, 2. Oxford University, Department of Earth Sciences, Oxford, United Kingdom

### **Core formation and the oxidation state of the Earth**

B.J. Wood<sup>1</sup>, J. Wade<sup>2</sup> and M.J. Walter<sup>3</sup>  
1. Department of Earth and Planetary Sciences, Macquarie University, Sydney, Australia, 2. University of Bristol, Department of Earth Sciences, Bristol, United Kingdom, 3. Australian Centre for Astrobiology, Macquarie University

## Appendix 5: Funded research projects

### GRANTS AND OTHER INCOME FOR 2005

Funding Source	Investigators	Project Title	Amount
ARC Discovery	Alard	Toward the use of metal stable isotopes in geosciences	\$115,073
ARC Discovery	Belousova	Crustal evolution in Australia: Ancient and young terrains	\$106,348
ARC Discovery	Daczko	A new approach to understanding the mechanisms and deep crustal controls of continental rifting	\$51,050
ARC Discovery	Jackson	Isotopic fractionation of the ore minerals (Cu, Fe, Zn): A new window on ore-forming processes	\$102,100
ARC Discovery	O'Reilly, Griffin, Gohl, Morgan, Cottin, Neumann, Xu	How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction	\$279,073
ARC Discovery	Turner, Hawkesworth, Reagan, Kirchner	The time scales of magmatic and erosional cycles	\$88,816
ARC Linkage International	O'Reilly, Griffin, Cottin, Grégoire, Xu	How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction	\$41,796
ARC Linkage Projects	O'Reilly, Griffin, WMC	Global lithosphere architecture mapping (including industry contribution)	\$196,734
ARC LIEF Grant	Turner, Schaefer, Brierley, O'Reilly, Griffin, Haydon	A ThermoFinnigan Triton high-sensitivity thermal ionisation mass spectrometer for constraining geoscience rates and environmental processes via Ra and Os analysis	\$495,000
ARC LIEF Grant (MU contribution)	Turner, Schaefer, Brierley, O'Reilly, Griffin, Haydon	A ThermoFinnigan Triton high-sensitivity thermal ionisation mass spectrometer for constraining geoscience rates and environmental processes via Ra and Os analysis	\$175,000
ARC Federation Fellowship	Turner	The time scales of geochemical cycles and Earth processes	\$310,325
ARC Federation Fellowship (MU contribution)	Turner	The time scales of geochemical cycles and Earth processes	\$92,243
ARC Federation Fellowship	Wood	Origin and evolution of Earth's chemical reservoirs	\$310,325
ARC Federation Fellowship (MU contribution)	Wood	Origin and evolution of Earth's chemical reservoirs	\$180,000

## Appendix 5: Funded research projects

Funding Source	Investigators	Project Title	Amount
MU capital equipment	DEPS	Alpha counting system	\$25,000
Dept. Earth and Planetary Sciences	O'Reilly, DEPS	GAU Maintenance contribution	\$30,000
Industry partner sponsorship BHP-Billiton, Codelco, Tech Cominco, Gold Fields, Newmont, Placer Dome, WMC Resources, Geoinformatics Exploration, Jackaroo Exploration	Etheridge	Improving mineral exploration performance by superior management of risk, uncertainty and value	\$179,928
MU DEST RIBG	Turner et al	Facility for the study of short-lived isotopes in mid-ocean ridge basalt glasses	\$65,064
MU DEST RIBG	Wood et al	New Wave Micromill	\$48,059
MUECRG Scheme	Belousova	Developing a geochronological framework for the Gawler Craton, South Australia	\$20,000
MUECRG Scheme	Belousova	Developing a geochronological framework for the Gawler Craton, South Australia (Industry contribution)	\$20,000
MUECRG	O'Reilly	Links between plume-mantle interaction, mantle sulfides and Ni-PGE endowment in large igneous provinces	\$40,000
MUECRG WMC	O'Reilly	Links between plume-mantle interaction, mantle sulfides and Ni-PGE endowment in large igneous provinces (industry contribution)	\$40,000
MURDG	Malkovets	Age and evolution of the upper mantle beneath the Siberian Craton and Siberian Platform	\$21,920
MURF	Malkovets	Age and evolution of the upper mantle beneath the Siberian Craton and Siberian Platform	\$72,695
MURDG Safety Net Scheme	Veever	Zircon analysis of Cretaceous and Eocene sediments of Lambert Graben-Prydz Bay, Antarctica	\$17,706
MU Safety Net Scheme	George	Timing and mechanisms of melt migration and interaction at mantle, lithospheric and crustal levels	\$20,000
MU New Staff Scheme	Belousova	Enhancing the use of zircon in crustal studies and mineral exploration: trace-element and statistical approach	\$19,208
MU New Staff Scheme	Malkovets	Structure and evolution of the upper mantle beneath the Siberian Craton	\$19,906

<b>Funding Source</b>	<b>Investigators</b>	<b>Project Title</b>	<b>Amount</b>
MU New Staff Scheme	Williams	The oxidation state of the early Earth mantle: new clues from iron isotopes	\$19,978
PGRF	McMahon	Fracturing and deformation along the Amery Ice Shelf: A Seismic Study	\$4,000
PGRF	Murgulov	Crust-mantle evolution and metallogeny, E. Australia	\$4,000
APA	Murgulov	Crust-mantle evolution and metallogeny, E. Australia	\$18,837
IPRS and iMURS	Chevet	Gabbroic rocks from the Kerguelen Island (Indian Ocean): a petrologic, geochemical and isotopic investigation of their origin	\$40,837
IPRS and iMURS	Cunningham	A U-series isotope study of magma residence times, degassing and petrogenesis of Rabaul Caldera, Papua New Guinea	\$40,837
IPRS and iMURS	Hartman	Tofua Volcano in Northern Tonga: U-series Isotope and Melt Inclusion Studies Along the Tonga-Kermadec Island Arc	\$40,837
IPRS and iMURS	Mwandu	The origin of kimberlites from the Kundelungu region (D.R. Congo) and the nature of the underlying lithospheric mantle	\$40,837
IPRS and iMURS	Nikolic	Evolution of crust-mantle systems near a young rift: NW Spitsbergen, Norway	\$40,837
IPRS and iMURS	Rege	Trace elements in diamonds: genetic and forensic implications	\$30,627
RAACE	Carroll	The mechanisms and deep-crustal controls on continental rifting	\$18,837
RAACE	Milan	The emplacement, pressure-temperature-time path and structural evolution of lower crust gneisses in Fiordland, New Zealand	\$18,837

#### **FUNDED RESEARCH PROJECTS FOR 2006**

<b>Funding Source</b>	<b>Investigators</b>	<b>Project Title</b>	<b>Amount</b>
ARC Discovery	Alard	Toward the use of metal stable isotopes in geosciences	\$121,378
ARC Discovery	Daczko	A new approach to understanding the mechanisms and deep crustal controls of continental rifting	\$36,414
ARC Discovery	Daczko	Spreading ridge sedimentation processes: a novel approach using Macquarie Island as a natural laboratory	\$61,140
ARC Discovery	Jackson	Isotopic fractionation of the ore minerals (Cu, Fe, Zn): A new window on ore-forming processes	\$62,424

## Appendix 5: Funded research projects

Funding Source	Investigators	Project Title	Amount
ARC Discovery	O'Reilly, Griffin, Gohl, Morgan, Cottin, Neumann, Xu	How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction	\$284,375
ARC Discovery	Turner, Hawkesworth, Kirchner	The time scales of magmatic and erosional cycles	\$90,503
ARC Discovery	Nielsen	Thallium isotopes: a novel geochemical tracer to map recycling in Earth's mantle	\$105,000
ARC Discovery	Wood	The behaviour of geochemical tracers during differentiation of the Earth	\$150,000
ARC Linkage International	O'Reilly, Griffin, Cottin, Grégoire, Xu	How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction	\$42,590
ARC Linkage Projects	O'Reilly, Griffin, WMC	Global lithosphere architecture mapping (including industry contribution)	\$199,711
ARC Federation Fellowship	Wood	Origin and evolution of Earth's chemical reservoirs	\$316,222
ARC Federation Fellowship (MU contribution)	Wood	Origin and evolution of Earth's chemical reservoirs	\$180,000
ARC Federation Fellowship	Turner	The time scales of geochemical cycles and Earth processes	\$316,222
ARC Federation Fellowship (MU contribution)	Turner	The time scales of geochemical cycles and Earth processes	\$168,390
Dept. EPS	O'Reilly, DEPS	GAU Maintenance contribution	\$30,000
MQERCG	O'Reilly, Griffin	Trace-element analysis of diamonds	\$50,000
MQERCG (Rio Tinto)	O'Reilly, Griffin	Trace-element analysis of diamonds	\$102,000
MQERCG	Griffin, O'Reilly	Lithosphere evolution across a craton margin, southern Africa	\$50,000
MQERCG (de Beers)	Griffin, O'Reilly	Lithosphere evolution across a craton margin, southern Africa	\$81,000
MURF	O'Neill	Episodicity in mantle convection: effects on continent formation and metallogenesis	\$18,400
MURF	O'Neill	Episodicity in mantle convection: effects on continent formation and metallogenesis	\$66,136



<b>Funding Source</b>	<b>Investigators</b>	<b>Project Title</b>	<b>Amount</b>
MU Safety Net	Turner	Mantle melting dynamics and the influence of recycled components	\$19,700
Capital equipment	Lackie	Ground penetrating radar system	\$64,550
Capital equipment	Flood	Rocklab grinding mill	\$19,500
Capital equipment	Flood	Portable computer laboratory upgrade	\$23,100
LIEF	Kennett, Heinson and O'Reilly	Instrumentation for combined seismic and electromagnetic Earth sounding	\$350,000
PGRF	Milan	The emplacement, pressure-temperature-time path and structural evolution of lower crustal gneiss in Fiordland, New Zealand	\$4,000
PGRF	Nikolic	Evolution of crust-mantle systems near a young rift: NW Spitsbergen, Norway	\$4,000
APA	Murgulov	Crust-mantle evolution and metallogeny, E. Australia	\$19,231
IPRS and iMURS	Caulfield	Tofua volcano- Tonga Arc, Eruption history and timescales of Magma Chamber Processes	\$42,231
IPRS and iMURS	Chevet	Gabbroic rocks from the Kerguelen Island (Indian Ocean): a petrologic, geochemical and isotopic investigation of their origin	\$42,231
IPRS and iMURS	Cunningham	A U-series isotope study of magma residence times, degassing and petrogenesis of Rabaul Caldera, Papua New Guinea	\$42,231
IPRS and iMURS	Kobussen	Composition, structure and evolution of the lithospheric mantle beneath Southern Africa	\$42,231
IPRS and iMURS	Li	Stable metal isotope geochemistry of the Cadia and Northparkes porphyry Cu-Au deposits	\$42,231
IPRS and iMURS	Mwandu Batumike	The origin of kimberlites from the Kundelungu region (D.R. Congo) and the nature of the underlying lithospheric mantle	\$42,231
IPRS and iMURS	Nikolic	Evolution of crust-mantle systems near a young rift: NW Spitsbergen, Norway	\$42,231
IPRS and iMURS	Portner	Spreading ridge sedimentation processes: a novel approach using Macquarie Island as a natural laboratory	\$42,231
RAACE	Milan	The emplacement, pressure-temperature-time path and structural evolution of lower crust gneisses in Fiordland, New Zealand	\$19,231

ARC Research Projects initiated prior to 2005 are available at our website: <http://www.es.mq.edu.au/GEMOC/>  
Follow the Annual Report Link to Appendix 5 of the previous Annual Reports.

# Appendix 6: Flowsheets for courses in geology and geophysics

## Bachelor of Science ENVIRONMENTAL GEOLOGY

Other variations available. Approximate load of 24 credit points per year.

### Are you interested in:

- Earth's Environment
- Contaminated Land Remediation
- Geochemistry
- Groundwater Contamination

Environmental geology explores the interaction of people and the geologic environment. This field covers the movement of toxins into the ground and through the groundwater system; the identification of these toxins and the remediation of the site. Environmental Geology combines the classic observation skills of geology with those of geochemistry, geophysics, land use planning and government policy implementation.

### FIRST YEAR

**Units:** GEOS112 Planet Earth  
GEOS114 Global Environmental Crises  
GEOS115 Earth Dynamics, Materials and the Environment  
GEOS224 Introduction to Field Geology (vacation unit)  
CHEM103, BIOL114

### SECOND YEAR

**Units:** GEOS230 Field and Laboratory Studies in Geoscience  
GEOS260 Marine Depositional Environments  
GEOS265 Introduction to Resource and Environmental Management  
GEOS266 Earth Surface Processes  
GEOS268 Introduction to Geophysics  
GEOS251 Minerals, Energy and the Environment

### THIRD YEAR

**Units:** GEOS315 Environmental and Groundwater Geophysics  
GEOS377 Environmental Geology  
GEOS399 Soils  
GEOS437 Geochemical Applications  
GEOS398 Applied Geomorphology or  
GEOS307 Field Geology and Mapping or  
GEOS328 Land Management

### FOURTH YEAR (HONOURS)

1. **HONOURS:** The honours year consists of an 8 or 16 credit point research thesis and 8 or 16 credit points of coursework, generally at 400 or 800 level.
2. **MASTERS PROGRAM:** A research MSc is undertaken over a two year period; this may include up to 4 units and a major research project. A coursework program is possible.

*These notes are only intended to guide your selection, and you should seek Academic advice and read the Calendar's Unit descriptions and coherencies for details. The offering of Units may change from year to year.*

For more information please contact: The Executive Officer, Earth and Planetary Science  
Ph. 61-2-9850 8373 Fax. 61-2-9850 6904  
Email: eps@mq.edu.au



Earth and Planetary Sciences

## Bachelor of Science or Arts GEOLOGY MAJOR

Other variations available. Approximate load of 24 credit points per year.

### Are you interested in:

- Volcanoes
- Earthquakes
- Seismology
- Exploration
- Earth History

Geologists aim to understand the way the earth works and how it has evolved over the 4-6 billion years since its formation. Geology can be combined with geophysics, biology, archaeology, history, chemistry, maths, physics and law. Employment can be found in areas such as Mining and Exploration companies, teaching, public service, law, conservation and environment, stock market, engineering and research.

### FIRST YEAR

**Core:** GEOS115 Earth Dynamics, Materials and the Environment  
GEOS112 Planet Earth or GEOS116 Marine Geosciences and  
GEOS224 Introduction to Field Geology (vacation unit)

**Plus additional units from:** BIOL, CHEM, MATH, PHYS140 or PHYS, COMP, or other.

### SECOND YEAR

**Core:** GEOS235 Palaeontology  
GEOS230 Field and Laboratory Studies in Geoscience  
GEOS260 Marine Depositional Environments  
GEOS268 Introduction to Geophysics

**Optional:** GEOS251 Minerals, Energy and the Environment  
GEOS272 Earth's Evolving Environment  
GEOS266 Earth Surface Processes  
GEOS237 Natural Hazards  
GEOS264 Geographic Information Systems

### THIRD YEAR

**Core:** Geos307 Field Geology and Mapping

**And at least 3 units from:**  
GEOS308 Structural and Metamorphic Geology  
GEOS312 Invertebrate Palaeontology  
GEOS314 Magmas, Fluids and Ore Deposits  
GEOS385 Global Tectonics  
GEOS397 Applied Palaeontology and Biogenic Sediments

**Suggested additional units:** GEOS373 Volcanic Geology Fieldwork  
GEOS528 Coral Reef Environment

### FOURTH YEAR (HONOURS)

1. **HONOURS:** The honours year consists of an 8 or 16 credit point research thesis and 8 or 16 credit points of coursework, generally at 400 or 800 level.
2. **MASTERS PROGRAM:** A research MSc is undertaken over a two year period; this may include up to 4 units and a major research project. A coursework program is possible.

*These notes are only intended to guide your selection, and you should seek Academic advice and read the Calendar's Unit descriptions and coherencies for details. The offering of Units may change from year to year.*

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Email: eps@mq.edu.au



Earth and Planetary Sciences

## Bachelor of Science GEOPHYSICS MAJOR

Other variations available. Approximate load of 24 credit points per year.

### Are you interested in:

- How the Earth Works
- Earthquakes
- Earth's Environment
- Exploration

Geophysics is the study of the physics of the Earth. The field of geophysics can be split into two broad areas - "Global" - the study of the Earth's structure and evolution, and "Explorations" - with near surface study in the fields of mineral, petroleum, environmental, groundwater and engineering geophysics.

### FIRST YEAR

**Core:** GEOS115 Earth Dynamics, Materials and the Environment

**Optional:** GEOS112 Planet Earth  
GEOS116 Marine Geoscience  
GEOS224 Introduction to Field Geology (vacation unit)  
MATH130, MATH135, MATH136, PHYS140, PHYS143  
COMP115 or ISYS123 or COMP125, CHEM101

### SECOND YEAR

**Core:** GEOS268 Introduction to Geophysics

**Optional:** GEOS260 Marine Depositional Environments  
GEOS251 Minerals, Energy and the Environment  
GEOS230 Field and Laboratory Studies in Geoscience  
GEOS272 Earth's Evolving Environment  
MATH235, MATH236, PHYS201, COMP238

### THIRD YEAR

**Core:** GEOS315 Environmental and Groundwater Geophysics or  
GEOS316 Exploration Geophysics  
GEOS385 Global Tectonics  
GEOS420 Data Image and Processing in Geophysics and Exploration

**Optional:** Appropriate Geology, Atmospheric Science or Maths,  
Physics and Computing units, depending on individual interest.

### FOURTH YEAR (HONOURS)

1. **HONOURS:** The honours year consists of an 8 or 16 credit point research thesis and 8 or 16 credit points of coursework, generally at 400 or 800 level.
2. **MASTERS PROGRAM:** A research MSc is undertaken over a two year period; this may include up to 4 units and a major research project. A coursework program is possible.

*These notes are only intended to guide your selection, and you should seek Academic advice and read the Calendar's Unit descriptions and coherencies for details. The offering of Units may change from year to year.*

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Earth and Planetary Sciences

**Bachelor of Technology**  
**EXPLORATION GEOSCIENCE - Geochemistry Strand**

72 Credit points required

**Are you interested in:**

- **Exploration and Technology**
- **Environment**
- **Mining**
- **Earth's Internal Processes**

Exploration geoscientists seek to apply modern techniques that interface between geology, geophysics and geochemistry to assist in targeting major prospective areas on or near the surface and ensuring environmental best practice in developing such areas. This is vital to Australia's future export earnings. Employment can be found in mining exploration and environmental consultancy companies, geoanalytical laboratories, government advisory bodies, research and teaching

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**FIRST YEAR**

**Core:** GEOS115 Earth Dynamics, Materials and the Environment  
GEOS116 Marine Geosciences and  
GEOS224 Introduction to Field Geology (vacation unit)  
CHEM101

**And one of:** PHYS140, PHYS143, MATH135, MATH136, COMP115

**SECOND YEAR**

**Core:** GEOS260 Marine Depositional Environments  
GEOS268 Introduction to Geophysics  
GEOS230 Field and Laboratory Studies in Geoscience  
CHEM207

**Optional:** GEOS266 Earth Surface Processes  
GEOS272 Earth's Evolving Environment  
GEOS315 Environmental and Groundwater Geophysics or  
GEOS316 Exploration Geophysics  
STAT170 or STAT171

**THIRD YEAR**

**Core:** GEOS307 Field Geology Mapping  
GEOS314 Magmas, Fluids and Ore Deposits  
GEOS377 Environmental Geology  
GEOS437 Geochemical Applications and Techniques  
MPCE360


**Optional:** GEOS315 Environmental and Groundwater Geophysics or  
GEOS316 Exploration Geophysics  
GEOS373 Volcanic Geology Fieldwork  
COMP238

**FOURTH YEAR (HONOURS)**

**HONOURS:** Honours year consists of a thesis of 16 credit points based on research using the latest equipment and 8 credit points of coursework, generally at 400 or 800 level.

*These notes are only intended to guide your selection, and you should seek Academic advice and read the Calendar's Unit descriptions and coherencies for details.  
The offering of Units may change from year to year.*

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Email: eps@mq.edu.au



**Earth and Planetary Sciences**

**Bachelor of Marine Science**  
**MARINE GEOSCIENCE MAJOR**

**Are you interested in:**

- **Origin and evolution of the ocean basins**
- **Ocean circulation and global climate**
- **Evolution of the marine biosphere**
- **Sediments and lavas of the ocean basins**
- **Marine fossil fuels**
- **Marine Ore deposits**

Marine geoscientists aim to understand how and when the present ocean basins, the water that fills them and the biota that inhabit them were generated. Oceans are intimately connected with the atmosphere; circulation in each effects the other. The atmosphere and oceans exert a vital influence on global climate. A knowledge of the oceans is vital as the present oceans influence the redistribution of solar energy away from the equator, supply a significant amount of the world's food, act as sinks for carbon dioxide and modern and ancient oceans have produced much of the fossil fuel and mineral resources used by modern societies. The marine realm is still imperfectly understood and even more imperfectly managed in an environmental sense. Scientists who understand this huge part of the Earth's surface are needed to conduct research and to advise the increasing number of private and public groups who use the marine environment.

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**FIRST YEAR**

**Core:** GEOS115 Earth Dynamics, Materials and the Environment  
GEOS116 Marine Geoscience  
GEOS117 Biophysical Environments  
BIOL114 Evolution and Biodiversity

**One from each line:** CHEM102 or CHEM103  
ATH130 or MATH135 or MATH136  
GEOS112, PHYS140, PHYS143, PHYS159, STAT170, STAT171

**SECOND YEAR**

**Core:** GEOS216 The Atmospheric Environment  
ELS201 Marine Science  
GEOS260 Marine Depositional Environments

**Plus at least 10 credit points from:**  
GEOS224 Introduction to field geology  
GEOS235 Palaeontology  
GEOS264 Geographic Information Systems  
GEOS266 Earth Surface Processes  
And any 200 level physics, chemistry or mathematics unit


**THIRD YEAR**

**Core:** ELS3YY Oceanography  
ELS3XX Advanced Marine Science

**Plus at least 12 credit points from:**  
GEOS301 Global Climates  
GEOS312 Invertebrate Palaeontology  
GEOS371 Geographic Information Systems: technical Issues  
GEOS397 Applied Palaeontology and Biogenic Sediments  
GEOS428 Coral Reef Dynamics  
And any 300 level mathematics unit

*These notes are only intended to guide your selection, and you should seek Academic advice and read the Calendar's Unit descriptions and coherencies for details.  
The offering of Units may change from year to year.*

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Email: eps@mq.edu.au



**Earth and Planetary Sciences**

**Bachelor of Technology**  
**EXPLORATION GEOSCIENCE - Geophysics Strand**

72 Credit points required

**Are you interested in:**

- **Exploration and Technology**
- **Environment**
- **Mining**
- **Earth's Internal Processes**

Exploration geoscientists seek to apply modern techniques that interface between geology, geophysics and geochemistry to assist in targeting major prospective areas on or near the surface and ensuring environmental best practice in developing such areas. Employment can be found in mining, exploration and environmental consultancy companies, geoanalytical laboratories, government advisory bodies and teaching.

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**FIRST YEAR**

**Units:** GEOS115 Earth Dynamics, Materials and the Environment  
GEOS116 Marine Geosciences and  
GEOS224 Introduction to Field Geology (vacation unit)  
PHYS140, PHYS143, MATH135, MATH136, COMP115  
And one of CHEM101, CHEM103

**SECOND YEAR**

**Core:** GEOS260 Marine Depositional Environments  
GEOS268 Introduction to Geophysics  
MATH235, MATH236, ELEC166  
GEOS315 Environmental and Groundwater Geophysics or  
GEOS316 Exploration Geophysics

**Optional:** GEOS230 Field and Laboratory Studies in Geoscience  
PHYS201, PHYS202

**THIRD YEAR**

**Core:** GEOS385 Global Tectonics  
GEOS430 Data and Image Processing in Geophysics and Exploration  
GEOS315 Environmental and Groundwater Geophysics or  
GEOS316 Exploration Geophysics  
GEOS460 Solid Earth Geophysics  
MPCE360 Technology Management


**Optional:** GEOS314 Magmas, Fluids and Ore Deposits  
GEOS307 Field geology and Mapping  
GEOS373 Volcanic Geology Fieldwork  
COMP238, ELEC274

**FOURTH YEAR (HONOURS)**

**HONOURS:** Honours year consists of a thesis of 16 credit points based on research using the latest equipment and 8 credit points of coursework, generally at 400 or 800 level.

*These notes are only intended to guide your selection, and you should seek Academic advice and read the Calendar's Unit descriptions and coherencies for details.  
The offering of Units may change from year to year.*

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Email: eps@mq.edu.au



**Earth and Planetary Sciences**

## Appendix 7: GEMOC postgraduate opportunities

Postgraduate  
scholarship  
information as  
well as a list of  
Scholarships  
currently open  
for application is  
available at:  
[www.ro.mq.edu.au/  
HDRU/scholar.htm](http://www.ro.mq.edu.au/HDRU/scholar.htm)

### POSTGRADUATE OPPORTUNITIES

GEMOC has a flourishing postgraduate research environment with postgraduate students from many countries (including France, Germany, China, Russia, USA and Australia). Scholarships funding tuition fees and a living allowance are available for students with an excellent academic record or equivalent experience. These include:

- **Australian Postgraduate Awards (APA):** available for Commonwealth citizens to cover tuition fees and living allowance, with a closing date in late October annually
- **Research Areas and Centres of Excellence (RAACE) scholarships:** available for Australian citizens who wish to undertake a postgraduate program in a Centre of Excellence at Macquarie University (eg GEMOC)
- **International Postgraduate Research Scholarships (Endeavour Scholarships):** available to overseas students to cover tuition fees with a closing date in late August annually
- **International Macquarie University Research Scholarships (iMURS):** that can provide a living allowance and which can be applied for at any time if the applicant has been accepted for enrolment in a higher degree

Macquarie University also provides research funding through a competitive internal scheme and GEMOC's funded projects (see *Appendix 5*) provide further resources to support postgraduate research projects.

Postgraduate projects are tailored to your expertise and interests within the framework of GEMOC's research goals. GEMOC carries out interdisciplinary research across the boundaries of petrology, geochemistry, tectonics, metallogenesis, geodynamics and geophysics to explore the nature and evolution of the lithosphere and global geodynamics. Current funded projects are based in Australia, Antarctica, Canada, China, Taiwan, Italy, France, Siberia, Norway, North America, South America, Africa, Kerguelen Islands and other global locations (see the section on GEMOC's *Research Program*).

GEMOC postgraduate programs have opportunities through access to our outstanding analytical facility (see *Technology Development* section) with currently unique technologies and instrumentation configurations to tackle exciting large-scale problems in the Geosciences.

Examples of broad PhD project areas include:

- Lithosphere structure and geochemistry: mantle provinciality and tectonism
- Granitoid and mineralised provinces along western Pacific convergent margins
- Fluid-vapour transfer of elements in the crust and mantle
- Heat production and evolution of the crust: crust-mantle interaction
- Geophysical applications to lithosphere studies
- Isotopic and trace element geochemistry: mantle and crustal systems
- Metal isotopes: applications to ore formation
- Magma genesis and crustal evolution: includes trace elements of accessory minerals, isotopic fingerprints
- High-pressure experimental studies

Potential applicants should discuss possible projects with a potential supervisor and the Director of GEMOC before applying.

## Appendix 8: Goldschmidt Advertisement



# 16th Annual V.M. Goldschmidt Conference



**27 August – 1 September 2006**  
Melbourne Exhibition & Convention Centre, Australia

**Conference themes:**

- Techniques
- Mineral Deposits/Ore Geochem
- Solar System Formation
- Convecting Mantle
- Lithosphere Evolution
- Subduction Processes

- Geochemical Constraints on Timescales and Mechanisms of Tectonic Processes
- Biogeochemistry and the Origin and Evolution of Life
- Aquatic Geochemistry and Fluids in the Crust
- Surface Processes, Low Temperature Systems and Landscape Evolution

- Ocean Chemistry and Circulation/Climate and Environment

All submissions of abstracts to be submitted online at:  
[www.goldschmidt2006.org](http://www.goldschmidt2006.org)

**Deadline for receipt of abstracts:**  
**13 April 2006**

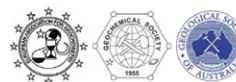
For the first time, the Goldschmidt Conference comes to the southern hemisphere, in Melbourne, Australia in 2006. Australia's unique, plate-scale natural laboratory has driven a rich tradition of geochemical, experimental, cosmochemical and isotope research, from the extraordinary archives of past climate of the Great Barrier Reef to the oldest known terrestrial materials of Mount Narryer and Jack Hills. The conference is to be held in the state-of-the-art facilities of the Melbourne Convention Centre. We hope that you will be able to join us Down Under for the Goldschmidt 2006.

Expected delegates will comprise of: Geologists • Geochemists • Cosmochemists • Hydrogeologists • Geochronologists • Biogeochemists

[www.goldschmidt2006.org](http://www.goldschmidt2006.org)

Contact Details: Goldschmidt 2006 Conference Managers  
GPO Box 128 Sydney NSW 2001 Australia  
Tel: + 61 2 9265 0700 Fax: + 61 2 9267 5443  
Email: [goldschmidt2006@tourhosts.com.au](mailto:goldschmidt2006@tourhosts.com.au)

Sponsored by:  
European Association for Geochemistry  
Geochemical Society  
Geological Society of Australia



## Appendix 9: Goldschmidt Pre-Meeting Workshop 2006



### 16<sup>th</sup> Goldschmidt 2006 – Pre-Meeting Workshop at GEMOC,



Department of Earth and Planetary Sciences, Macquarie University, Sydney

### Geochemical Fingerprinting of Lithosphere and Deep Earth Processes

- \* 1-day session (invited speakers, discussions, demonstrations) on advanced methodologies and techniques for trace-element and isotopic analysis

#### using:

- LAM ICPMS
- MC-ICPMS  
(Nu Instruments)
- LAM MC-ICPMS
- TIMS (Triton)

#### Including:

- ✓ In-situ Re-Os, Hf isotopes,  
*TerraneChron*<sup>®</sup>
- ✓ Stable metal isotopes
- ✓ U-series
- ✓ Laser ablation techniques
- ✓ Database mining
- ✓ GLITTER data reduction system  
for LAM-ICPMS

- \* 1-day of invited and volunteered presentations on applications of geochemical datasets to explore:

- Composition, structure and timing of processes of the Earth's lithosphere
- the nature, evolution and geodynamic consequences of the convecting and deep mantle as revealed through geochemical and geophysical datasets
- insights on geophysical datasets from geochemistry

- \* Harbour Cruise

Ideal base for exploring Sydney (the Harbour City) –  
and Blue Mountains (scenery) and Hunter Valley (wine) day-trips before Melbourne

## Contact details

<http://www.es.mq.edu.au/GEMOC/gemoc@mq.edu.au>

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## GLOSSARY

ACILP	Australia China Institutional Links Program
AGU	American Geophysical Union
AMIRA	Australian Mineral Industry Research Association
ANU	Australian National University
APA (I)	Australian Postgraduate Award (Industry)
APD	Australian Postdoctoral Fellowship
ARC	Australian Research Council
ARC LIEF	Australian Research Council Linkage Infrastructure Equipment and Facilities
ASAC	Antarctic Science Advisory Committee
CNRS	French National Research Foundation
CORES	Concentrations of Research Excellence
CRC	Co-operative Research Centre
CSIRO (EM)	Commonwealth Scientific Industrial Research Organisation (Exploration and Mining)
DEST (SII)	Department of Education, Science and Training (from 2002) (Strategic Infrastructure Initiative)
DIATREEM	Consulting company within AccessMQ
EMP	Electron Microprobe
(D)EPS	(Department of) Earth and Planetary Sciences
EURODOC	The council for postgraduate students and junior researchers in Europe
FIM	Facility for Integrated Microanalysis
GA	Geoscience Australia (formerly AGSO)
GAU	Geochemical Analysis Unit (DEPS, Macquarie University)
GIS	Geographic Information System
GLITTER	GEMOC Laser ICPMS Total Trace Element Reduction software
GPS	Global Positioning System
HIAF	Heavy Ion Analytical Facility
ICESAT	Ice, Cloud and land Elevation Satellite
ICPMS	Inductively Coupled Plasma Mass Spectrometer
iMURS	International Macquarie University Research Scheme
IPRS	International Postgraduate Research Scholarship
JCU	James Cook University
LAM-ICPMS	Laser Ablation Microprobe - Inductively Coupled Plasma Mass Spectrometer
MC-ICPMS	Multi-Collector ICPMS
MOUs	Memoranda of Understanding
MRL	Macquarie Research Limited
MUECRG	Macquarie University External Collaborative Research Grants
MUIPRA	Macquarie University International Postgraduate Research Award
MURAACE	Macquarie University Research Award for Areas and Centres of Excellence
MURDG	Macquarie University Research Development Grant
MURF	Macquarie University Research Fellowship
NASA	National Aeronautics and Space Administration
NSF	National Science Foundation
PIRSA	Primary Industries and Resources, South Australia
RAACE	Research Areas and Centres of Excellence Postgraduate Scholarships
RIBG	Research Infrastructure Block Grant
RSES	Research School of Earth Sciences at ANU
SGA	Society for Geology Applied to Mineral Deposits
UN'cstle	University of Newcastle
UNE	University of New England
USYD	University of Sydney
UW'gong	University of Wollongong
UWS	University of Western Sydney
XRF	X-Ray Fluorescence

**ARC National  
Key Centre for the  
Geochemical Evolution and  
Metallogeny of Continents**