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 Vevers
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 Hodgkiss (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 Bonparola
Professor Hannes Bueneckner
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

**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 metallogeny)  
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, metallogeny 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/


Appendix 2: Publications


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 Hronskey (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 Tabeart (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/

Phreatomagmatism of the Silurian Passamaquoddy Bay Subbelt, Maine and New Brunswick
R.W. Lodge1, N. Van Wagoner1 and K. Dadd1
1. Acadia University, Geology Department, Wolfville, Nova Scotia, Canada, 2. GEMOC, Macquarie

Phreatomagmatism of the Silurian Passamaquoddy Bay Subbelt, Maine and New Brunswick: Implications for correlation and volcanic setting
N. Van Wagoner1, K. Dadd2
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 Wagoner1, K. Dadd2
1. Acadia University, Geology Department, Wolfville, Nova Scotia, Canada, 2. GEMOC, Macquarie

The eclogite mantle reservoir: 176Hf/177Hf, Nb/Ta and Zr/Hf of rutile
S. Aulbach1, W.L. Griffin1,2 and K. Kivi1
1. GEMOC, Macquarie, 2. Kennecott Exploration and Mining, North Ryde, Australia

Os-Hf-Nd Isotope Constraints on Subcontinental Lithospheric Mantle Evolution, Slavonian Craton (Canada)
S. Aulbach1, W.L. Griffin1,2, N.J. Pearson1, S.Y. O’Reilly1 and K. Kivi1
1. GEMOC, Macquarie, 2. CSIRO Exploration and Mining, North Ryde, Australia, 3. Kennecott Canada Expl. Inc., Thunder Bay, ONT, Canada

Restite in S-Type Granites of the Lachlan Fold Belt, SE Australia
R.H. Vernon
GEMOC, Macquarie

The isotopic composition of subduction fluid: High-, low-, or normal δ18O?
I. Bindeman1,2, S. Turner1, J. Eiler1 and M. Portnyagin1
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. Brueckner1,2, D.A. Carswell1, W.L. Griffin1, L.G. Medaris Jr. and E. Beyer1
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. Dosseto1, B. Bourdon2, J. Gaillardet1, C.J. Allegre1, and N. Filizola1
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. Dosseto1, G.B. Douglas2 and S. Turner1
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. George1, S. Turner1, M. Reagan1, M. Sandiford1, C. Hawkesworth1 and W. Hildreth1
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. Halpin1, C.L. Gerakiteys1, G.L. Clarke1, E.A. Belousova2 and W.L. Griffin3
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

210Pb-226Ra-230Th implications for timescales of island arc magma degassing
S. Turner1 and K. Berlo2
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. Wang1,2, S.Y. O’Reilly3, W.L. Griffin1, N. Pearson1, R. Matsumura1 and R. Shinjo1
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. Xie1, X. Xu1, H. Zou2, S. Jiang1, M. Zhang1 and J. Qiu1
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

In-situ Os isotopic compositions in sulfides from Kerguelen mantle xenoliths (Indian Ocean): Proterozoic subcontinental mantle fragments under the Kerguelen Archipelago?
G. Delpech1,2, M. Grégoire1,3, J.P. Lorand1, S.Y. O’Reilly1 and J.Y. Cottin1,2

The age of Os isotope reason in the sub-continental lithospheric mantle
N.J. Pearson1, W.L. Griffin1, O. Alard1,2 and S.Y. O’Reilly3
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. Neumann1, R. Vannucci2,3, M. Tiepolo1, W.L. Griffin1, N.J. Pearson1 and S.Y. O’Reilly3
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

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. Delpech1,2, M. Grégoire1,3, J.P. Lorand1, S.Y. O’Reilly1 and J.Y. Cottin1,2

The age of Os isotope reason in the sub-continental lithospheric mantle
N.J. Pearson1, W.L. Griffin1, O. Alard1,2 and S.Y. O’Reilly3
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. Neumann1, R. Vannucci2,3, M. Tiepolo1, W.L. Griffin1, N.J. Pearson1 and S.Y. O’Reilly3
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

AGUOS, ASIA OCEANIA GEOSCIENCES SOCIETY 2ND 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. George1, S. Turner1, M. Reagan2, M. Sandiford3, C. Hawkesworth4
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. Turner1, A. Dosseto1, R. George1, K. Berlo2
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. Griffin1,2, S.Y. O’Reilly1, T. Deen1, G. Begg1 and Y. Poudjom Djomani3
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’Reilly1, W.L. Griffin1,2, M. Zhang1 and Y. Poudjom Djomani3
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. Xu1,2, W.L. Griffin1, S.Y. O’Reilly2, and N.J. Pearson2
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. Zhang1, W. Fan1,2, S.Y. O’Reilly1, J. Zheng1,3, and W.L. Griffin1,4
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. Zheng1, W.L. Griffin1,3, S.Y. O’Reilly1, and F. Lu1
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 Paleoaeic and Cenozoic ultrahigh pressure terrain: constraints on lithospheric evolution, east China
J. Zheng1, W.L. Griffin1,3, R.Y. Zhang4, S.Y. O’Reilly2, and J.G. Liou4
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

Thermobarometry of Early Cretaceous high-pressure contact metamorphic aureole near Resolution Island, Fiordland, New Zealand
L.A. Milani1, N.R.DACZKO1, I. Turnbull1, and A. Allibone2
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. Nielsen1,2, M. Rehkamper1,3, M. Norman4 and A. Halliday1,5
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
E.C. Schröter1, G.L. Clarke1, R.W. White1 and N.J. Pearson2
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
Iron Isotopes as a potential new tool in igneous geochemistry and cosmochemistry
H.M. Williams¹,², A.N. Halliday³, C.A. McCammon¹, A.H. Peslier³, N. Teutsch¹, S. Levasseur¹ and J.-P. Burg¹
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

Upper mantle composition: tools for smarter diamond exploration
W.L. Griffin¹ and S.Y. O’Reilly¹
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’Reilly¹, J. Hronsky², W.L. Griffin¹ and G. Begg²
1. GEMOC, Macquarie, 2. WMC Resources Ltd., Belmont, WA, Australia, 3. CSIRO Exploration and Mining, North Ryde, NSW

Campbell Plateau, New Zealand: Seismic Analysis and Models From a Rifted Submarine Plateau of Continental Origin
J. Grobys¹, K. Gohl¹, G. Uenzelmann-Neben¹, B. Davy², D. Barker² and T. Deen³
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. Halliday¹, B.J. Wood² and T. Kleine³
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. George¹, S. Turner¹, K. Berlo² and N. Pearson¹
1. GEMOC, Macquarie, 2. Department of Earth Sciences, University of Bristol Wills Memorial Building, United Kingdom
## Appendix 5: Funded research projects

### Grants and other income for 2005

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Investigators</th>
<th>Project Title</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARC Discovery</td>
<td>Alard</td>
<td>Toward the use of metal stable isotopes in geosciences</td>
<td>$115,073</td>
</tr>
<tr>
<td>ARC Discovery</td>
<td>Belousova</td>
<td>Crustal evolution in Australia: Ancient and young terrains</td>
<td>$106,348</td>
</tr>
<tr>
<td>ARC Discovery</td>
<td>Daczko</td>
<td>A new approach to understanding the mechanisms and deep crustal controls of continental rifting</td>
<td>$51,050</td>
</tr>
<tr>
<td>ARC Discovery</td>
<td>Jackson</td>
<td>Isotopic fractionation of the ore minerals (Cu, Fe, Zn): A new window on ore-forming processes</td>
<td>$102,100</td>
</tr>
<tr>
<td>ARC Discovery</td>
<td>O’Reilly, Griffin, Gohl, Morgan, Cottin, Neumann, Xu</td>
<td>How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction</td>
<td>$279,073</td>
</tr>
<tr>
<td>ARC Discovery</td>
<td>Turner, Hawkesworth, Reagan, Kirchner</td>
<td>The time scales of magmatic and erosional cycles</td>
<td>$88,816</td>
</tr>
<tr>
<td>ARC Linkage</td>
<td>O’Reilly, Griffin, Cottin, Grégoire, Xu</td>
<td>How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction</td>
<td>$41,796</td>
</tr>
<tr>
<td>ARC Linkage</td>
<td>O’Reilly, Griffin, WMC</td>
<td>Global lithosphere architecture mapping (including industry contribution)</td>
<td>$196,734</td>
</tr>
<tr>
<td>ARC LIEF Grant</td>
<td>Turner, Schaefer, Brierley, O’Reilly, Griffin, Haydon</td>
<td>A ThermoFinnigan Triton high-sensitivity thermal ionisation mass spectrometer for constraining geoscience rates and environmental processes via Ra and Os analysis</td>
<td>$495,000</td>
</tr>
<tr>
<td>ARC LIEF Grant</td>
<td>Turner, Schaefer, Brierley, O’Reilly, Griffin, Haydon</td>
<td>A ThermoFinnigan Triton high-sensitivity thermal ionisation mass spectrometer for constraining geoscience rates and environmental processes via Ra and Os analysis</td>
<td>$175,000</td>
</tr>
<tr>
<td>ARC Federation Fellowship</td>
<td>Turner</td>
<td>The time scales of geochemical cycles and Earth processes</td>
<td>$310,325</td>
</tr>
<tr>
<td>ARC Federation Fellowship (MU contribution)</td>
<td>Turner</td>
<td>The time scales of geochemical cycles and Earth processes</td>
<td>$92,243</td>
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<tr>
<td>ARC Federation Fellowship</td>
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<td>Origin and evolution of Earth’s chemical reservoirs</td>
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<td>Origin and evolution of Earth’s chemical reservoirs</td>
<td>$180,000</td>
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### Appendix 5: Funded research projects

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Investigators</th>
<th>Project Title</th>
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<tr>
<td>MU capital equipment</td>
<td>DEPS</td>
<td>Alpha counting system</td>
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<tr>
<td>Dept. Earth and Planetary Sciences</td>
<td>O'Reilly, DEPS</td>
<td>GAU Maintenance contribution</td>
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<tr>
<td>Industry partner sponsorship BHP-Billiton, Codelco, Tech Cominco, Gold Fields, Newmont, Placer Dome, WMC Resources, Geoinformatics Exploration, Jackaroo Exploration</td>
<td>Etheridge</td>
<td>Improving mineral exploration performance by superior management of risk, uncertainty and value</td>
<td>$179,928</td>
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<tr>
<td>MU DEST RIBG</td>
<td>Turner et al</td>
<td>Facility for the study of short-lived isotopes in mid-ocean ridge basalt glasses</td>
<td>$65,064</td>
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<tr>
<td>MU DEST RIBG</td>
<td>Wood et al</td>
<td>New Wave Micromill</td>
<td>$48,059</td>
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<tr>
<td>MUECRG Scheme</td>
<td>Belousova</td>
<td>Developing a geochronological framework for the Gawler Craton, South Australia</td>
<td>$20,000</td>
</tr>
<tr>
<td>MUECRG Scheme</td>
<td>Belousova</td>
<td>Developing a geochronological framework for the Gawler Craton, South Australia (Industry contribution)</td>
<td>$20,000</td>
</tr>
<tr>
<td>MUECRG</td>
<td>O'Reilly</td>
<td>Links between plume-mantle interaction, mantle sulfides and Ni-PGE endowment in large igneous provinces</td>
<td>$40,000</td>
</tr>
<tr>
<td>MUECRG WMC</td>
<td>O'Reilly</td>
<td>Links between plume-mantle interaction, mantle sulfides and Ni-PGE endowment in large igneous provinces (industry contribution)</td>
<td>$40,000</td>
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<tr>
<td>MURDG</td>
<td>Malkovets</td>
<td>Age and evolution of the upper mantle beneath the Siberian Craton and Siberian Platform</td>
<td>$21,920</td>
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<tr>
<td>MURF</td>
<td>Malkovets</td>
<td>Age and evolution of the upper mantle beneath the Siberian Craton and Siberian Platform</td>
<td>$72,695</td>
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<td>MURDG Safety Net Scheme</td>
<td>Veevers</td>
<td>Zircon analysis of Cretaceous and Eocene sediments of Lambert Graben-Prydz Bay, Antarctica</td>
<td>$17,706</td>
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<tr>
<td>MU Safety Net Scheme</td>
<td>George</td>
<td>Timing and mechanisms of melt migration and interaction at mantle, lithospheric and crustal levels</td>
<td>$20,000</td>
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<tr>
<td>MU New Staff Scheme</td>
<td>Belousova</td>
<td>Enhancing the use of zircon in crustal studies and mineral exploration: trace-element and statistical approach</td>
<td>$19,208</td>
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<tr>
<td>MU New Staff Scheme</td>
<td>Malkovets</td>
<td>Structure and evolution of the upper mantle beneath the Siberian Craton</td>
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### Funded Research Projects for 2006

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

### Funded Research Projects for 2006

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Investigators</th>
<th>Project Title</th>
<th>Amount</th>
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<tbody>
<tr>
<td>ARC Discovery</td>
<td>Alard</td>
<td>Toward the use of metal stable isotopes in geosciences</td>
<td>$121,378</td>
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<td>ARC Discovery</td>
<td>Daczko</td>
<td>A new approach to understanding the mechanisms and deep crustal controls of continental rifting</td>
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<td>ARC Discovery</td>
<td>Daczko</td>
<td>Spreading ridge sedimentation processes: a novel approach using Macquarie Island as a natural laboratory</td>
<td>$61,140</td>
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<td>ARC Discovery</td>
<td>Jackson</td>
<td>Isotopic fractionation of the ore minerals (Cu, Fe, Zn): A new window on ore-forming processes</td>
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### Appendix 5: Funded research projects

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<th>Funding Source</th>
<th>Investigators</th>
<th>Project Title</th>
<th>Amount</th>
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<tr>
<td>ARC Discovery</td>
<td>O’Reilly, Griffin, Gohl, Morgan, Cottin, Neumann, Xu</td>
<td>How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction</td>
<td>$284,375</td>
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<tr>
<td>ARC Discovery</td>
<td>Turner, Hawkesworth, Kirchner</td>
<td>The time scales of magmatic and erosional cycles</td>
<td>$90,503</td>
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<td>ARC Discovery</td>
<td>Nielsen</td>
<td>Thallium isotopes: a novel geochemical tracer to map recycling in Earth’s mantle</td>
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<td>ARC Discovery</td>
<td>Wood</td>
<td>The behaviour of geochemical tracers during differentiation of the Earth</td>
<td>$150,000</td>
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<tr>
<td>ARC Linkage International</td>
<td>O’Reilly, Griffin, Cottin, Grégoire, Xu</td>
<td>How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction</td>
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<tr>
<td>ARC Linkage Projects</td>
<td>O’Reilly, Griffin, WMC</td>
<td>Global lithosphere architecture mapping (including industry contribution)</td>
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<tr>
<td>ARC Federation Fellowship</td>
<td>Wood</td>
<td>Origin and evolution of Earth’s chemical reservoirs</td>
<td>$316,222</td>
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<tr>
<td>ARC Federation Fellowship (MU contribution)</td>
<td>Wood</td>
<td>Origin and evolution of Earth’s chemical reservoirs</td>
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<td>ARC Federation Fellowship</td>
<td>Turner</td>
<td>The time scales of geochemical cycles and Earth processes</td>
<td>$316,222</td>
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<td>Dept. EPS</td>
<td>O’Reilly, DEPS</td>
<td>GAU Maintenance contribution</td>
<td>$30,000</td>
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<tr>
<td>MQERCG</td>
<td>O’Reilly, Griffin</td>
<td>Trace-element analysis of diamonds</td>
<td>$50,000</td>
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<tr>
<td>MQERCG (Rio Tinto)</td>
<td>O’Reilly, Griffin</td>
<td>Trace-element analysis of diamonds</td>
<td>$102,000</td>
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<tr>
<td>MQERCG</td>
<td>Griffin, O’Reilly</td>
<td>Lithosphere evolution across a craton margin, southern Africa</td>
<td>$50,000</td>
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<tr>
<td>MQERCG (de Beers)</td>
<td>Griffin, O’Reilly</td>
<td>Lithosphere evolution across a craton margin, southern Africa</td>
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<tr>
<td>MURF</td>
<td>O’Neill</td>
<td>Episodicity in mantle convection: effects on continent formation and metallogenesis</td>
<td>$18,400</td>
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<td>MURF</td>
<td>O’Neill</td>
<td>Episodicity in mantle convection: effects on continent formation and metallogenesis</td>
<td>$66,136</td>
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<tr>
<td>Funding Source</td>
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<td>MU Safety Net</td>
<td>Turner</td>
<td>Mantle melting dynamics and the influence of recycled components</td>
<td>$19,700</td>
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<tr>
<td>Capital equipment</td>
<td>Lackie</td>
<td>Ground penetrating radar system</td>
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<tr>
<td>Capital equipment</td>
<td>Flood</td>
<td>Rocklab grinding mill</td>
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<td>Capital equipment</td>
<td>Flood</td>
<td>Portable computer laboratory upgrade</td>
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<td>LIEF</td>
<td>Kennett, Heinson and O’Reilly</td>
<td>Instrumentation for combined seismic and electromagnetic Earth sounding</td>
<td>$350,000</td>
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<tr>
<td>PGRF</td>
<td>Milan</td>
<td>The emplacement, pressure-temperature-time path and structural evolution of lower crustal gneiss in Fiordland, New Zealand</td>
<td>$4,000</td>
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<td>PGRF</td>
<td>Nikolic</td>
<td>Evolution of crust-mantle systems near a young rift: NW Spitsbergen, Norway</td>
<td>$4,000</td>
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<tr>
<td>APA</td>
<td>Murgulov</td>
<td>Crust-mantle evolution and metallogeny, E. Australia</td>
<td>$19,231</td>
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<tr>
<td>IPRS and iMURS</td>
<td>Caulfield</td>
<td>Tofua volcano- Tonga Arc, Eruption history and timescales of Magma Chamber Processes</td>
<td>$42,231</td>
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<td>IPRS and iMURS</td>
<td>Chevet</td>
<td>Gabbroic rocks from the Kerguelen Island (Indian Ocean): a petrologic, geochemical and isotopic investigation of their origin</td>
<td>$42,231</td>
</tr>
<tr>
<td>IPRS and iMURS</td>
<td>Cunningham</td>
<td>A U-series isotope study of magma residence times, degassing and petrogenesis of Rabaul Caldera, Papua New Gunea</td>
<td>$42,231</td>
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<tr>
<td>IPRS and iMURS</td>
<td>Kobussen</td>
<td>Composition, structure and evolution of the lithospheric mantle beneath Southern Africa</td>
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<td>IPRS and iMURS</td>
<td>Li</td>
<td>Stable metal isotope geochemistry of the Cadia and Northparkes porphyry Cu-Au deposits</td>
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<td>IPRS and iMURS</td>
<td>Mwandu Batumike</td>
<td>The origin of kimberlites from the Kundelungu region (D.R. Congo) and the nature of the underlying lithospheric mantle</td>
<td>$42,231</td>
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<tr>
<td>IPRS and iMURS</td>
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<td>Evolution of crust-mantle systems near a young rift: NW Spitsbergen, Norway</td>
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<td>IPRS and iMURS</td>
<td>Portner</td>
<td>Spreading ridge sedimentation processes: a novel approach using Macquarie Island as a natural laboratory</td>
<td>$42,231</td>
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<tr>
<td>RAACE</td>
<td>Milan</td>
<td>The emplacement, pressure-temperature-time path and structural evolution of lower crust gneisses in Fiordland, New Zealand</td>
<td>$19,231</td>
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</tbody>
</table>

ARC Research Projects initiated prior to 2005 are available at our website: [http://www.es.mq.edu.au/GEMOC/](http://www.es.mq.edu.au/GEMOC/)
Follow the Annual Report Link to Appendix 5 of the previous Annual Reports.
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 examines the interaction of geologic processes and environmental change, and the identification of processes and the remediation of sites. This stream combines the classic observation skills of geology with those of geophysics, geology, land use planning and government policy implementation.

FIRST YEAR

Units:
- GEOS112 Planet Earth
- GEOS114 Global Environmental Issues
- GEOS265 Introduction to Resource and Environmental Management
- GEOS266 Earth Surface Processes
- GEOS268 Introduction to Geophysics
- GEOS307 Field Geology and Mapping

SECOND YEAR

Units:
- GEOS251 Minerals, Energy and the Environment
- GEOS253 Terrestrial Geophysical Applications
- GEOS266 Earth Surface Processes
- GEOS268 Introduction to Geophysics
- GEOS307 Field Geology and Mapping
- GEOS321 Minerals, Energy and the Environment

THIRD YEAR

Units:
- GEOS385 Global Tectonics
- GEOS437 Geochemical Applications
- GEOS498 Applied Geomorphology
- GEOS528 Coral Reef Environment
- MATH235, MATH236, PHYS201, COMP238

Bachelor of Science

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

Are you interested in:
- Volcanism
- Earthquakes
- Palaeontology
- 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, geography, history, culture, engineering, and exploration; it is useful in law, public service, tourism, conservation and environment, stock market, engineering and research.

FIRST YEAR

Cours;
- GEOS115 Earth Dynamics, Materials and the Environment
- GEOS117 Planet Earth or GEOS116 Marine Geosciences and Exploration
- GEOS180 Introduction to Field Geology (vacation unit)

Further additional units
- BIOL, CHEM, MATH, PHYS140 or PHYS, COMP, or other.

SECOND YEAR

Cours;
- GEOS235 Palaeontology
- GEOS253 Terrestrial Geophysical Applications
- GEOS254 Oceanic Geophysical Applications
- GEOS255 Introduction to Geophysics
- GEOS265 Introduction to Earth Sciences
- GEOS267 Natural Hazards

Optional:
- GEO123 Materials, Energy and the Environment
- GEOS267 Natural Hazards
- GEOS312 Invertebrate Palaeontology
- GEOS325 Geographic Information Systems
- GEOS326 Geomorphic Processes

THIRD YEAR

Cours;
- GEOS385 Global Tectonics
- GEOS316 Exploration Geophysics
- GEOS386 Ground Water Geophysics
- GEOS392 Sedimentary Geology
- MATH391 Geophysical and Magnetic Sediments

Suggested additional units
- GEOS387 Volcanic Geology Fieldwork
- GEOS526 Coastal 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. 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.

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.

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

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: "Geodetic" — the study of the Earth's rotation and evolution, and "Exploration" — with near surface study of the fields of mineral, petroleum, environmental, groundwater and engineering geophysics.

FIRST YEAR

Core:
- GEOS115 Earth Dynamics, Materials and the Environment
- MATH130, MATH135, MATH136, PHYS140, PHYS143
- COMP115

Optional:
- COMP125, CHEM101

SECOND YEAR

Core:
- GEOS235 Palaeontology
- GEOS253 Terrestrial Geophysical Applications
- GEOS254 Oceanic Geophysical Applications
- GEOS265 Introduction to Geophysics
- GEOS267 Natural Hazards
- GEOS312 Invertebrate Palaeontology
- GEOS325 Geographic Information Systems
- GEOS326 Geomorphic Processes

Optional:
- GEO123 Materials, Energy and the Environment
- GEOS267 Natural Hazards
- GEOS312 Invertebrate Palaeontology
- GEOS325 Geographic Information Systems
- GEOS326 Geomorphic Processes

THIRD YEAR

Core:
- GEOS385 Global Tectonics
- GEOS316 Exploration Geophysics
- GEOS392 Sedimentary Geology
- GEOS399 Soils
- MATH391 Geophysical and Magnetic Sediments

Suggested additional units:
- GEOS387 Volcanic Geology Fieldwork
- GEOS526 Coastal 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. 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.

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.

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
Bachelor of Technology
EXPLORATION GEOCIENCE - 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 solve major problems that arise on or near the surface and moving environmental processes in order to find new resources. This is vital to Australia’s current export earnings, employment can be found in mining exploration and environmental consultancy companies, geoanalytical laboratories, government advisory bodies, teaching and research.

FIRST YEAR
Core:
GEOS115 Earth Dynamics, Materials and the Environment
GEOS116 Marine Geosciences and Geophysics
GEOS235 Palaeontology
And one of:
PHYS140, PHYS143, MATH135, MATH136, COMP115

SECOND YEAR
Core:
GEOS260 Marine Depositional Environments
GEOS268 Introduction to Geophysics
GEOS272 Earth’s Evolving Environment
GEOS316 Exploration Geophysics or
GEOS315 Environmental and Groundwater Geophysics

Optional:
GEOS297 Field Geology, Mapping
GEOS314 Magmas, Fluids and Ore Deposits
GEOS317 Environmental Geology

THIRD YEAR
Core:
GEOS266 Earth Surface Processes
GEOS315 Environmental and Groundwater Geophysics or
GEOS316 Exploration Geophysics
GEOS377 Volcanic Geology Fieldwork

Optional:
GEOS373 Volcanic Geology Fieldwork

FOURTH YEAR (HONOURS)
HONOURS: Honours year consists of a thesis of 16 credit points based on research in the field complemented by 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. 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. 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. 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. 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.

Bachelor of Geology
EXPLORATION GEOCIENCE - Geology Strand
72 Credit points required

Are you interested in:
• Exploration and Technology
• Environment
• Mining
• Earth’s Internal Processes

Exploration geologists seek to apply modern techniques that interface between geology, geophysics and geochemistry to solve major problems that arise on or near the surface and moving environmental processes in order to find new resources. This is vital to Australia’s current export earnings, employment can be found in mining exploration and environmental consultancy companies, geoanalytical laboratories, government advisory bodies, teaching and research.

FIRST YEAR
Core:
GEOS115 Earth Dynamics, Materials and the Environment
GEOS116 Marine Geosciences and Geophysics
GEOS235 Palaeontology
And one of:
PHYS140, PHYS143, MATH135, MATH136, COMP115

SECOND YEAR
Core:
GEOS260 Marine Depositional Environments
GEOS268 Introduction to Geophysics
GEOS272 Earth’s Evolving Environment
GEOS316 Exploration Geophysics or
GEOS315 Environmental and Groundwater Geophysics

Optional:
GEOS297 Field Geology, Mapping
GEOS314 Magmas, Fluids and Ore Deposits
GEOS317 Environmental Geology

THIRD YEAR
Core:
GEOS266 Earth Surface Processes
GEOS315 Environmental and Groundwater Geophysics or
GEOS316 Exploration Geophysics
GEOS377 Volcanic Geology Fieldwork

Optional:
GEOS373 Volcanic Geology Fieldwork

FOURTH YEAR (HONOURS)
HONOURS: Honours year consists of a thesis of 16 credit points based on research in the field complemented by 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. 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. 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. 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. 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.
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 (e.g., 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.

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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
Appendix 8: Goldschmidt Advertisement

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

Conference themes:
- Techniques
- Mineral Deposits/Ore Geochem
- Solar System Formation
- Converging Mantle
- Lithosphere Evolution
- Subduction Processes
- Ocean Chemistry and Circulation/Climate and Environment
- 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

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

Contact Details: Goldschmidt 2006 Conference Managers
GPO Box 129 Sydney NSW 2001 Australia
Tel.: +61 2 9325 0700 Fax: +61 2 9325 0702
Email: goldschmidt2006@tourhosts.com.au

Sponsored by:
European Association for Geochemistry
Geological Society of Australia
16th 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®
- 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
IFRS 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