

Appendix 1: Participants

GEMOC PARTICIPANTS 2004/2005

MACQUARIE UNIVERSITY

Department of Earth and Planetary Sciences

Academic 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)

Professor Simon Turner (Isotopic
Geochemistry)

Research Staff

Dr John Adam

Dr Elena Belousova

Ms Tara Deen

Dr Anthony Dosseto

Dr Lev Natapov

Dr Yvette Poudjom Djomani

Dr Rhiannon George

Emeritus Professor Trevor Green

Dr Vladimir Malkovets

Professor Simon Turner

Emeritus Professor John Veevers

Emeritus Professor Ron Vernon

Dr Kuo-Lung Wang

Dr Ming Zhang

Adjunct Professors

Professor Bruce Chappell (Granite
petrogenesis, geochemistry)

Professor Nicholas Fisher

Dr Richard Glen

Professor W.L. Griffin

Dr Jingfeng Guo

Dr John Hronsky (WMC Resources
Ltd)

Professor Paul Morgan (University
of Northern Arizona, Geophysics
and tectonics)

Professor Mike Etheridge

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 Yong-Joo Jwa (Korea)

Professor Nicholas Fisher (Statistics,
quality management)

Dr Phil Schmidt (see CSIRO)

Visiting Fellows

Dr Gilles Chazot (University of
Clermont-Ferrand)

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

Honorary Associates

Dr Natsue Abe

Dr Kari Anderson

Ms Sonja Aulbach

Dr Evssk Babu

Dr Graham Begg

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)

Dr Jean-Yves Cottin

Professor Kent Condie

Dr Richard Glen

Dr Karsten Gohl

Dr Michel Grégoire

Dr Bram Janse

Dr Mel Jones

Dr Felix Kaminsky

Dr Bertrand Moine

Dr Geoff Nichols

Dr Boris Panov

Dr Mark C. Pirlo

Dr Peter Robinson

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

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 (Scientific Officer)
 Dr Oliver Gaul (Research Officer)
 Ms Sally-Ann Hodgekiss (Research Officer, Design consultant)
 Dr John Ketchum (Geochemist)
 Ms Carol Lawson (XRF, Laboratories)
 Ms Valeria Murgulov (Geochemist)
 Ms Leigh Newton (Administrator until September 2004)
 Dr Norman Pearson (Manager, GAU)
 Dr Ayesha Saeed (Geochemist)
 Dr Kirsty Tomlinson (Geochemist)
 Mr Peter Wieland (Geochemist)
 Mr William Powell (Research Assistant)

FORMAL COLLABORATORS

University of Wollongong

Professor Allan Chivas (DEST Systemic Infrastructure partner)

Monash University

Dr Bruce Schaefer

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 Anita Andrew (Stable isotopes)
 Mr D. Clark (Paleomagnetism, magnetic modelling)
 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)
 Ms Tin Tin Win (Hydrothermal systems, mantle petrology)

Australian National University (Research School of Earth Sciences)

Professor Geoff Davies
 Professor Brian Kennett
 Professor Gordon Lister

GA

Dr Barry Drummond (Geophysics)
 Dr L. Wyborn (Crustal evolution, metallogeny through time, implementation of GPS/GIS)

Geological Survey of Western Australia

Dr I. Tyler (zircon U-Pb/Hf isotopes)

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-Ling Chung (National Taiwan University)
 Dr 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 T.-L. Knudsen (Geologisk Museum, Norway)

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)

Mr Michael Schwarz (PIRSA)

Dr Csaba Szabo (Eotvos University Budapest)

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

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

Professor Xue Jiyue (Nanjing University)

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/>

300. **Griffin, W.L., Belousova, E.A., Shee, S.R., Pearson, N.J. and O'Reilly, S.Y.** 2004. Archean crustal evolution in the northern Yilgarn Craton: U-Pb and Hf-isotope evidence from detrital zircons. *Precambrian Research*, 131, 231-282.
301. **Yu, J., O'Reilly, S.Y., Griffin, W.L., Xu, X. and Zhou, X.** 2003. The thermal state and composition of the lithospheric mantle beneath the Leizhou Peninsula, South China. *Journal of Volcanology and Geothermal Research*, 122, 165-189.
302. **Yu, J., Xu, X., O'Reilly, S.Y., Griffin, W.L. and Zhang, M.** 2003. Granulite xenoliths from Cenozoic Basalts in SE China provide geochemical fingerprints to distinguish lower crust terranes from the North and South China tectonic blocks. *Lithos*, 67, 77-102.
303. **Griffin, W.L., O'Reilly, S.Y., Abe, N., Aulbach, S., Davies, R.M., Pearson, N.J., Doyle, B.J. and Kivi, K.** 2003. The origin and evolution of Archean lithospheric mantle. *Precambrian Research*, 127, 19-41.
304. **Pisarevsky, S.A. and Natapov, L.M.** 2003. Siberia and Rodinia. *Tectonophysics*, 375, 221-245.
305. **Xu, X., Deng, P., O'Reilly, S.Y., Griffin, W. L., Zhou, X. and Tan, Z.** 2003. Single zircon LAM-ICPMS U-Pb dating of the Guidong Complex (SE China) and its petrogenic significance. *Chinese Scientific Bulletin*, 48, 17, 1892-1899.
306. **Johnson, S.E., Fletcher, J.M., Fanning, C.M., Vernon, R.H., Paterson, S.R. and Tate, M.C.** 2003. Structure, emplacement and lateral expansion of the San Jose tonalite pluton, Peninsular Ranges batholith, Baja California, Mexico. *Journal of Structural Geology*, 25, 219-232.
307. **Vernon, R.H., Collins, W.J. and Richards, S.W.** 2003. Contrasting leucosomes in metapelitic and metapsammitic migmatites in the Cooma Complex, Australia. *Visual Geoscience*, 8, 45-54.
308. **Paterson, S.R., Pignotta, G.S. and Vernon, R.H.** 2004. The significance of microgranitoid enclave shapes and orientations. *Journal of Structural Geology*, 26, 1465-1481.
309. **Bryant, C.J., Chappell, B.W., Bennett, V.C. and McCulloch, M.T.** 2004. Lithium isotopic compositions of the New England Batholith: correlations with inferred source rock compositions. *Transactions of the Royal Society of Edinburgh: Earth Sciences*, 95, 199-214.
310. **Abe, N., Takami, M. and Arai, S.** 2003. Petrological feature of spinel lherzolite from Oki-Dogo Island: an implication for variety of the upper mantle peridotite beneath SW Japan. *Island ARC*, 12, 219-232.
311. **Jackson, S.E. and Gunther, D.** 2003. The nature and sources of laser induced-isotopic fractionation in laser ablation-multi collector-inductively coupled plasma-mass spectrometry. *Journal of Analytical Atomic Spectrometry*, 18, 205-212.
312. **Gagnevin, D., Ethien, R., Bonin, B., Moine, B., Feraud, G., Gerbe, M.C., Cottin, J.-Y., Michon, G., Tourpin, S., Mamias, G., Perrache, C. and Giret, A.** 2003. Open-system processes in the genesis of silica-oversaturated alkaline rocks of the Rallier-du-Baty Peninsula, Kerguelen Archipelago (Indian Ocean). *Journal of Volcanology and Geothermal Research*, 123, 267-300.
313. **Adam, J. and Green, T.** 2003. The influence of pressure, mineral composition and water on trace element partitioning clinopyroxene, amphibole and basanitic melts. *European Journal of Mineralogy*, 15, 831-841.
314. **Veevers, J.J.** 2003. Pan-African is Pan-Gondwanaland: oblique convergence drives rotation during 650-500 Ma assembly. *Geology*, 31 (6), 501-504.
315. **Clarke, D.B., McCuish, K.L., Vernon, R.H., Maksaev, V. and Miller, B.V.** 2002. The Port Mouton Shear Zone: intersection of a regional fault with a crystallizing granitoid pluton. *Lithos*, 61, 141-159.
316. **Green, T.H. and Adam, J.** 2003. Experimentally-determined trace element characteristics of aqueous fluid from partially dehydrated mafic oceanic crust at 3.0 GPa, 650-700°C. *European Journal of Mineralogy*, 15, 815-830.
317. **Kurosawa, M., Jackson, S.E. and Sueno, S.** 2002. Trace element analysis of NIST SRM 614 and 616 glass reference materials by laser ablation microprobe-inductively coupled plasma-mass spectrometry. *Geostandards Newsletter – The Journal of Geostandards and Geoanalysis*, 26, 75-84.
318. **Gaul, O.F., O'Reilly, S.Y. and Griffin, W.L.** 2003. Lithosphere structure and evolution in southeastern Australia. *Geological Society of Australia Special Publication*, 22, 179-196.
319. **Wang, K., O'Reilly, S.Y., Griffin, W.L., Chung, S. and Pearson, N.J.** 2003. Proterozoic mantle lithosphere beneath the extended margin of the South China block: *In situ* Re-Os evidence. *Geology*, 31 (8), 709-712.

320. **Brueckner, H.K., Van Roermund, H.L.M. and Pearson, N.J.** 2004. An Archean (?) to Paleozoic evolution for a garnet peridotite lens with sub-Baltic Shield Affinity within the Seve Nappe Complex of Jamtland, Sweden, Central Scandinavian Caledonides. *Journal of Petrology*, 45 (2), 415-437.
321. **Davies, R.M., Griffin, W.L., O'Reilly, S.Y. and Andrew, A.** 2003. Unusual mineral inclusions and carbon isotopes of alluvial diamonds from Bingara, eastern Australia. *Lithos*, 69, 51-66.
322. **Poudjom Djomani, Y.H., O'Reilly, S.Y., Griffin, W.L., Natapov, L., Erincheck, Y. and Hronsky, J.** 2003. Upper mantle beneath Eastern Siberia: Evidence from gravity modelling and mantle petrology. *Geochemistry, Geophysics and Geosystems*, 4 (7), 1066, doi:10.1029/2002GC000420.
323. **Anderson, K.L., Lackie, M.A., Clark, D.A. and Schmidt, W.** 2004. Return to Black Mountain: palaeomagnetic reassessment of the Chatsworth and Ninmaroo formations, western Queensland, Australia. *Geophysical Journal International*, 157, 87-104.
324. **Anderson, K.L., Lackie, M.A. and Clark, D.A.** 2004. Palaeomagnetic Results from the Palaeozoic basement of the Southern Drummond Basin, Central Queensland. *Geophysical Journal International*, 159, 473-485.
325. **Lorand, J.-P., Delpech, G., Grégoire, M., Moine, B., O'Reilly, S.Y. and Cottin, J.-Y.** 2004. Platinum-group elements and the multi-stage metasomatic history of Kerguelen lithospheric mantle (South Indian Ocean). *Chemical Geology*, 208, 195-215.
326. **Griffin, W.L., Graham, S., O'Reilly, S.Y. and Pearson, N.J.** 2004. Lithospheric evolution beneath the Kaapvaal Craton: Re-Os systematics of sulfides in mantle-derived peridotites. *Chemical Geology*, 208, 89-118.
327. **Pirlo, M. and Giblin, A.** 2004. Application of groundwater-mineral equilibrium calculations to geochemical exploration for sediment-hosted uranium: observations from the Frome Embayment, South Australia. *Geochemistry: Exploration, Environment, Analysis*, 4, 113-127.
328. **Schroter, F.C., Stevenson, J.A., Daczko, N.R., Clarke, G.L. and Pearson, N.J. and Klepeis, K.A.** 2004. Trace element partitioning during high-P partial melting and melt-rock interaction; an example from northern Fiordland, New Zealand. *Journal of Metamorphic Geology*, 22, 443-457.
329. **Moine, B.N., Grégoire, M., O'Reilly, S.Y., Delpech, G., Sheppard, S.M.F., Lorand, J.P., Renac, C., Giret, A. and Cottin, J.Y.** 2004. Carbonatite melt in oceanic upper mantle beneath the Kerguelen Archipelago. *Lithos*, 239-252.
330. **Zheng, J., O'Reilly, S.Y., Griffin, W.L., Zhang, M., Lu, F. and Liu, G.** 2004. Nature and evolution of Mesozoic-Cenozoic lithospheric mantle beneath the Cathaysia block, SE China. *Lithos*, 74, 41-65.
331. **Delpech, G., Grégoire, M., O'Reilly, S.Y., Cottin, J.Y., Moine, B., Michon, G. and Giret, A.** 2004. Feldspar from carbonate-rich silicate metasomatism in the shallow oceanic mantle under Kerguelen Islands (South Indian Ocean). *Lithos*, 75, 209-237.
332. **Powell, W., Zhang, M., O'Reilly, S.Y. and Tiepolo, M.** 2004. Mantle amphibole trace-element and isotopic signatures trace multiple metasomatic episodes in lithospheric mantle, western Victoria, Australia. *Lithos*, 75, 141-171.
333. **Andersen, T., Griffin, W.L., Jackson, S.E., Knudsen, T.-L. and Pearson, N.J.** 2004. Mid-Proterozoic magmatic arc evolution at the southwest margin of the Baltic Shield. *Lithos*, 73, 289-318.
334. **Andersen, T. and Griffin, W.L.** 2004. Lu-Hf and U-Pb isotope systematics of zircons from the Storgangen intrusion, Rogaland Intrusive Complex, SW Norway: Implications for the composition and evolution of Precambrian lower crust in the Baltic Shield. *Lithos*, 73, 271-288.
335. **Wang, K.-L., Chung, S.-L., O'Reilly, S.Y., Sun, S.-S., Shinjo, R. and Chen, C.-H.** 2004. Geochemical constraints for the genesis of post-collisional magmatism and the geodynamic evolution of the northern Taiwan region. *Journal of Petrology*, 45, 5, 975-1011.
336. **Nairn, I.A., Shane, P.R., Cole, J.W., Leonard, G.J., Self, S. and Pearson, N.** 2004. Rhyolite magma processes of the ~AD 1315 Kaharoa eruption episode, Tarawera volcano, New Zealand. *Journal of Volcanology and Geothermal Research*, 131, 265-294.
337. **Reid, A.J., Wilson, C.J.L., Belousova, E. and Pearson, N.J.** 2005. Mesozoic plutons of the Yidun Arc, SW China: U/Pb geochronology and Hf isotopic signature. *Ore Geology Reviews*. (in press)
338. **Lorand, J.-P., Alard, O., Luguet, A. and Keays, R.R.** 2003. Sulfur and selenium systematics of the subcontinental lithospheric mantle: Inferences from the Massif Central xenolith suite (France). *Geochimica et Cosmochimica Acta*, 67(21), 4137-4151.
339. **Zheng, J., Griffin, W.L., O'Reilly, S.Y., Lu, F., Wang, C., Zhang, M., Wang, F. and Li, H.** 2004. 3.6 Ga lower crust in central China: New evidence on the assembly of the North China craton. *Geology*, 32 (3), 229-232.

Appendix 2: Publications

340. **Luguet, A., Lorand, J-P., Alard, O. and Cottin, J-Y.** 2004. A multi-technique study of platinum group elements systematic in some Ligurian ophiolitic peridotites, Italy. *Chemical Geology*, 208, 175-194.
341. **Yu, J-H., Xu, X., O'Reilly, S.Y., Griffin, W.L. and Zhang, M.** 2004. Granulite xenoliths from Cenozoic basalts in SE China provide geochemical fingerprints to distinguish lower crust terranes from the North and South China tectonic blocks – Reply. *Lithos*, 73, 135-144.
342. **Van Achterbergh, E., Griffin, W.L., Ryan, C.G., O'Reilly, S.Y., Pearson, N.J., Kivi, K. and Doyle, B.J.** 2004. Melt inclusions from the deep Slave lithosphere: Implications for the origin and evolution of mantle-derived carbonatite kimberlite. *Lithos*, 76, 461-474.
343. **Davies, R.M., Griffin, W.L., O'Reilly, S.Y. and McCandless, T.E.** 2004. Inclusions in diamonds from the K14 and K10 kimberlites, Buffalo Hills, Alberta, Canada: diamond growth in a plume? *Lithos*, 77, 99-111.
344. **Graham, S., Pearson, N., Jackson, S., Griffin, W. and O'Reilly, S.Y.** 2004. Tracing Cu and Fe from source to porphyry: *in situ* determination of Cu and Fe isotope ratios in sulfides from the Grasberg Cu-Au deposit. *Chemical Geology*, 207, 147-169.
345. **Jackson, S.E., Pearson, N.J., Griffin, W.L. and Belousova, E.A.** 2004. The application of laser ablation-inductively coupled plasma-mass spectrometry to *in situ* U-Pb zircon geochronology. *Chemical Geology*, 211, 47-69.
346. **Aulbach, S., Griffin, W.L., O'Reilly, S.Y. and McCandless, T.E.** 2004. Genesis and evolution of the lithospheric mantle beneath the Buffalo Head Terrane, Alberta. *Lithos*, 77, 413-451.
347. **Shaw, S.E., Todd, V.R. and Grove, M.** 2003. Jurassic peraluminous gneissic granites in the axial zone of the Peninsular Ranges, southern California. *Geological Society of America Special Paper*, 374, 157-183.
348. **Griffin, W.L., O'Reilly, S.Y., Doyle, B.J., Pearson, N.J., Coopersmith, H., Kivi, K., Malkovets, V. and Pokhilenko, N.** 2004. Lithosphere Mapping beneath the North American plate. *Lithos*, 77, 873-922.
349. **Graham, S., Lambert, D. and Shee, S.** 2004. The petrogenesis of carbonatite, melnoite and kimberlite from the Eastern Goldfields Province, Yilgarn Craton. *Lithos*, 76, 519-533.
350. **Todd, V.R., Shaw, S.E. and Hammarstrom, J.M.** 2003. Cretaceous plutons of the Peninsular Ranges batholith, San Diego and westernmost Imperial Counties, California: Intrusion across a Late Jurassic continental margin. *Geological Society of America Special Paper*, 374, 185-235.
351. **Condie, K., Cox, J., O'Reilly, S.Y., Griffin, W.L. and Kerrich, R.** 2004. Distribution of high field strength and rare earth elements in mantle and lower crustal xenoliths from the southwestern United States: the role of grain-boundary phases. *Geochimica Cosmochimica Acta*, 68, 3919-3942.
352. **Aulbach, S., Griffin, W.L., Pearson, N.J., O'Reilly, S.Y., Kivi, K. and Doyle, B.J.** 2004. Mantle formation and evolution, Slave Craton: constraints from HSE abundances and Re-Os isotope systematics of sulfide inclusions in mantle xenocrysts. *Chemical Geology*, 208, 61-88.
353. **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 (Te) and structure of the lithosphere beneath the Slave Province, Canada. *Exploration Geophysics*, 36 (3). (in press)
354. **Zheng, J., Griffin, W.L., O'Reilly, S.Y., Lu, F., Yu, C., Zhang, M. and Li, H.** 2004. U-Pb and Hf-isotope analysis of zircons in mafic xenoliths from Fuxian kimberlites: evolution of the lower crust beneath the North China Craton. *Contributions to Mineralogy and Petrology*, 148, 79-103.
355. **Beyer, E.E., Brueckner, H.K., Griffin, W.L., O'Reilly, S.Y. and Graham, S.** 2004. Archean mantle fragments in Proterozoic crust, Western Gneiss Region, Norway. *Geology*, 32(7), 609-612.
356. **Veevers, J.J.** 2004. Gondwanaland from 600-570 Ma assembly through 320 Ma merger in Pangea to 180-100 Ma breakup: Supercontinental tectonics via stratigraphy and radiometric dating. *Earth Science Reviews*, 68, 1-132.
357. **Matsumoto, T., Honda, M., McDougall, I., Yatsevich, I. and O'Reilly, S.Y.** 2004. Isotope fractionation of neon during stepheating extraction?: A comment on "Re-interpretation of the existence of a primitive plume under Australia based on neon isotope fractionation during step heating" by Gautheron and Moreira (2003). *Terra Nova*, 16, 23-26.
358. **Veevers, J.J., Saeed, A., Belousova, E.A. and Griffin, W.L.** 2005. U-Pb ages and source composition 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.

359. **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 Big Gossan and Wanagon Gold deposits, Ertzberg District, Papua, Indonesia. *Economic Geology*. (in press)
360. **Neumann, E., Griffin, W.L., Pearson, N.J. and O'Reilly, S.Y.** 2004. The evolution of the upper mantle beneath the Canary Islands: Information from trace elements and Sr isotope ratios in minerals in mantle xenoliths. *Journal of Petrology*, 45, 2573-2612.
361. **Davies, R.M., Griffin, W.L., O'Reilly, S.Y. and Doyle, B.J.** 2004. Mineral inclusions and geochemical characteristics of microdiamonds from D027, A154, A21, A418, D018, DD17 and Ranch Lake kimberlites at Lac de Gras, Slave Craton, Canada. *Lithos*, 77, 39-55.
362. **Xu, X., Fan, Q., O'Reilly, S.Y., Jiang, S., Griffin, W.L., Wang, R. and Qui, J.** 2004. U-Pb dating of zircons from quartz diorite and its enclaves at Tongguanshan in Anhui and its petrogenetic implication. *Chinese Science Bulletin*, 49, 2073-2082.
363. **Wang, X. and Griffin, W.L.** 2004. Unusual Hf contents in metamorphic zircons from coesite-bearing eclogites of the Dabie Mountains, east-central China: implications for the dating of ultrahigh-pressure metamorphism. *Journal of Metamorphic Geology*, 22, 629-637.
364. **Andersen, T., Laajoki, K. and Saeed, A.** 2004. Age, provenance and tectonostratigraphic status of the Mesoproterozoic Blefjell quartzite, Telemark sector, southern Norway. *Precambrian Research*, 135, 217-244.
365. **Pirlo, M.C.** 2004. Hydrogeochemistry and geothermometry of thermal groundwaters from the Birdsville Track Ridge, Great Artesian Basin, South Australia. *Geothermics*, 33, 743-774.
366. **Cooper, S.A. and Belousova, E.A.** 2004. Granite gneiss basement on Flinders Island, South Australia. *Australian Journal of Earth Sciences*, 51, 611-619.
367. **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 (4), 462-481.
368. **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*. (in press)
369. **Blevin, P.L.** 2004. Redox and compositional parameters for interpreting the granitoid metallogeny of eastern Australia: Implications for gold-rich ore systems. *Resource Geology*, 54, 241-252.
370. **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.
371. **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.
372. **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.
373. **Hollis, J.A., Clarke G.L., Klepeis, K.A., Daczko, N.R., and Ireland T.R.** 2004. The regional significance of Cretaceous magmatism and metamorphism in Fiordland, New Zealand, from U-Pb zircon geochronology. *Journal of Metamorphic Geology*, 22, 607-627.
374. **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.
375. **Andersen, T.** 2005. Detrital zircons as tracers of sedimentary provenance: Limiting conditions from statistics and numerical simulation. *Chemical Geology*, 216, 249-270.
376. **White, A.J.R. and Chappell, B.W.** 2004. Petrographic discrimination of low- and high-temperature I-type granites. *Resource Geology*, 54, 215-226.
377. **Chappell, B.W. and Wyborn, D.** 2004. Cumulate and cumulative granites and associated rocks. *Resource Geology*, 54, 227-240.
378. **Griffin, W.L., Natapov, L.M., O'Reilly, S.Y., van Acherbergh, 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.
379. **Martinez Catalán, J.R., Fernández-Suárez, J., Jenner, G.A., Belousova, E. and Díez Montes, A.** 2004. Provenance constraints from detrital zircon U-Pb ages in the NW Iberian Massif: implications for Palaeozoic plate configuration and Variscan evolution. *Journal of the Geological Society of London*, 161, 463-476.

Appendix 2: Publications

380. 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.
381. Chappell, B.W. 2004. Towards a unified model for granite genesis. *Transactions of the Royal Society of Edinburgh: Earth Sciences*, 95, 1-10.
382. Chappell, B.W., White, A.J.R., Williams, I.S. and Wyborn, D. 2004. Low- and high-temperature granites. *Transactions of the Royal Society of Edinburgh: Earth Sciences*, 95, 125-140.
383. Smith, D. and Griffin, W.L. 2005. Garnetite xenoliths and mantle-water interactions below the Colorado Plateau, southwestern United States. *Journal of Petrology*. (in press)
384. 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: evidences from the Paleozoic and Cenozoic peridotite xenoliths. *International Geology Review*, 47, 457-472.
385. Griffin, W.L., Belousova, E.A., Walters, S.G and O'Reilly, S.Y. 2005. 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). (in press)
386. 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.
387. 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.
388. 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.
389. Berlo, K., Turner, S., Blundy, J., and Hawkesworth, C. 2004. The extent of U-series disequilibria produced during partial melting of the lower crust with implications for the formation of the Mount St. Helens dacites. *Contributions to Mineralogy and Petrology*, 148, 122-130.
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391. Vernon, R.H. 2004. A practical guide to rock microstructure. Cambridge University Press, Cambridge, 606pp.
392. Turner, S., Black, S., and Berlo, K. 2004. ^{210}Pb - ^{226}Ra and ^{228}Ra - ^{232}Th systematics in young arc lavas: Implications for magma degassing and ascent rates. *Earth and Planetary Science Letters*, 227, 1-16.
393. Johnson, S.E., Vernon, R.H. and Upton, P. 2004. Foliation development and progressive strain-rate partitioning in the crystallizing carapace of a tonalite pluton: microstructural evidence and numerical modeling. *Journal of Structural Geology*, 26, 1845-1865.
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395. George, R., Reagan, M., Turner, S., Gill, J., and Bourdon, B. 2004. Comment on "Steady-state ^{226}Ra / ^{230}Th disequilibrium in mantle minerals: Implications for melt transport rates in island arcs" by M.D. Feineman and D.J. DePaolo [Earth Planet. Sci. Lett. 215 (2003) 339-355]. *Earth and Planetary Science Letters* 228, 563-567.
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398. McDermott, F., Delfin, F.G., Defant, M.J., Turner, S., and Maury, R. 2005. The petrogenesis of magmas from Mt. Bulusan and Mayon in the Bicol arc, the Philippines. *Contributions to Mineralogy and Petrology*. (in press)
399. 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.

400. **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.
401. **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*. (in press)
402. **Yu, J., O'Reilly, S.Y., Xu X. and Wang, R.** 2005. Element diffusion ability in metasomatic agents and its effect on chemical characteristics of metasomatized peridotites. *Science in China*. (in press)
403. **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 and Analysis*. (in press)
404. **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*. (in press)
405. **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. (in press)
406. **Belousova, E.A., Griffin, W.L. and O'Reilly, S.Y.** 2005. Zircon Crystal Morphology, Trace-Element Signatures and Hf-Isotope Composition as a Tool for Petrogenetic Modelling: Examples From Eastern Australian Granitoids. *Journal of Petrology*. (submitted)
407. **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 (7), 601-611.
408. **Pearson, N.J., Griffin, W.L., Alard, O. and O'Reilly, S.Y.** 2005. The isotopic composition of magnesium in mantle olivine: Records of depletion and metasomatism. *Chemical Geology*. (in press)
409. **O'Reilly, S.Y. and Griffin, W.L.** 2005. Imaging global chemical and thermal heterogeneity in the sub-continental lithospheric mantle with garnets and xenoliths: geophysical implications. *Physics of Earth and Planetary Interiors*. (in press)
410. **Kaminsky, F.V., Zakharchenko, O.D., Khachatryan, G.K., Griffin, W.L., Der Channer, D.M.** 2005. Diamond from the Los Coquitos area, Bolivar State, Venezuela. *The Canadian Mineralogist*. (in press)
411. **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: bridging the "isotopic gap" between MORB and their source mantle. *Nature*. (in press)
412. **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 Characterisation by EPMA and LA-ICP-MS. *Geostandards and Geoanalytical Research*, 29, 2. (in press)
413. **Veevers, J.J.** 2005. Edge tectonics (trench rollback, terrane export) of Gondwanaland-Pangea synchronized by supercontinental heat. *Gondwana Research*. (in press)
414. **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*. (in press)
415. **Yu, J.-H., O'Reilly, S.Y., Zhang, M., Griffin, W.L. and Xu, X.** 2005. Roles of melting and metasomatism in the formation of the lithospheric mantle beneath Leizhou Peninsula, South China. *Journal of Petrology*. (in press)

Appendix 3: Visitors/ GAU users

GEMOC VISITORS 2004 (Excluding Participants in Conferences and Workshops) Macquarie

Dr Chris Adams (Institute of Geological and Nuclear Sciences, New Zealand)	Ms Adriana Heimann (University of Iowa)	Dr Dmitri Zedgenizov (Institute of Mineralogy and Petrography, Russia)
Dr Andrew Allibone (James Cook University, Australia)	Mr Bryce Healy (University of Newcastle)	Dr Jianping Zheng (China University of Geosciences, Wuhan)
Dr EVSSK Babu (National Geophysical Research Institute, India)	Prof. Brian Kennett (Australian National University, Canberra)	
Dr Graham Begg (Western Mining Resources Limited, Perth)	Ms Yu-Hsuan Liang (National Taiwan University, Taipei)	
Prof. Ron Boyd (University of Newcastle)	Prof. Gordon Lister (Australian National University, Canberra)	
Mr Steve Bussey (Western Mining Resources Limited, Perth)	Dr Bertrand Moine (Université Jean-Monnet, St. Etienne, France)	
Ms Mei-Fei Chu (National Taiwan University, Taipei)	Dr Catherine McCammon (Universitat Bayreuth, Germany)	
Dr Geoff Clark (University of Sydney)	Dr Y.J. Bhaskar Rao (National Geophysical Research Institute, India)	
Dr Massimo Coltorti (University of Ferrara, Italy)	Dr Patrice Rey (University of Sydney)	
Dr Robert Creaser (University of Alberta, Canada)	Prof. Mike Sandiford (University of Melbourne)	
Dr Remi Freydier (UMR 5562 "Dynamique Terrestre et Planétaire, Observatoire Midi-Pyrénées)	Dr Giovanna Sapienza (Università degli Studi di Bologna, Italy)	
Dr Richard Glen (NSW Geological Survey)	Dr Anders Schersten (Bristol University, UK)	
Dr Michel Grégoire (UMR 5562 "Dynamique Terrestre et Planétaire, Observatoire Midi-Pyrénées)	Mr Michael Schwarz (PIRSA)	
Dr. Karsten Gohl (Alfred Wegener Institute for Polar and Marine Research, Germany)	Dr Zdislav Spetsius (Institute of Diamond Industry, Russia)	
	Prof. Paul Spry (University of Iowa)	
	Dr Csaba Szabo (Eotvos University Budapest)	
	Dr Jamie Williams (Nu Instruments, UK)	
	Prof. Bernie Wood (University of Bristol)	
	Prof. Xisheng Xu (Nanjing University, P. R. China)	
	Prof. Jinhai Yu (Nanjing University, P. R. China)	
	Ms Lei Zhao (Nanjing University, P. R. China)	

**EXTERNAL USERS OF THE
GEOCHEMICAL ANALYSIS UNIT
FACILITIES IN 2004**

**(Note: this does not include
commercial or contract work
through Macquarie Research
Limited)**

- Dr Chris Adams (Institute of Geological and Nuclear Sciences, New Zealand)
- Dr EVSSK Babu (National Geophysical Research Institute, India)
- Ms Verity Borthwick (University of Sydney)
- Dr Graziella Caprarelli (University of Technology, Sydney)
- Ms Mei-Fei Chu (National Taiwan University, Taipei)
- Dr Massimo Coltorti (University of Ferrara, Italy)
- Ms Shannon Davies (University of Newcastle)
- Dr Joel Fitzherbert (University of Sydney)
- Dr Remi Freydier (UMR 5562 Dynamique Terrestre et Planétaire, Observatoire Midi-Pyrénées)
- Dr Richard Glen (NSW Geological Survey)
- Dr Michel Grégoire (UMR 5562 Dynamique Terrestre et Planétaire, Observatoire Midi-Pyrénées)
- Ms Adriana Heimann (University of Iowa)
- Mr Bryce Healy (University of Newcastle)
- Dr Florence Le Hebel (University of Sydney)
- Ms Yu-Hsuan Liang (National Taiwan University, Taipei)
- Mr Sam Lui, (University of Sydney)
- Dr Terry Mernagh, (Geoscience Australia)
- Dr Bertrand Moine (Université Jean-Monnet, St. Etienne, France)
- Dr Y.J. Bhaskar Rao (National Geophysical Research Institute, India)
- Dr Anthony Reid (University of Adelaide/PIRSA)
- Dr Giovanna Sapienza (Universite degli Studi di Bologna, Italy)
- Mr Florian Schröter (University of Sydney)
- Mr Michael Schwarz (PIRSA)
- Dr Zdislav Spetsius (Institute of Diamond Industry, Russia)
- Dr Csaba Szabo (Eotvos University Budapest)
- Prof. Xisheng Xu (Nanjing University, P. R. China)
- Prof. Jinhai Yu (Nanjing University, P. R. China)
- Ms Lei Zhao (Nanjing University, P. R. China)
- Dr Dmitri Zedgenizov (Institute of Mineralogy and Petrography, Russia)
- Dr Jianping Zheng (China University of Geosciences, Wuhan)

Appendix 4: Abstract titles

TITLES OF ABSTRACTS FOR CONFERENCE PRESENTATIONS IN 2004

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

17TH AUSTRALIAN GEOLOGICAL CONVENTION, HOBART, TASMANIA, 8 – 13 FEBRUARY 2004

Zircon as a multi-faceted tool for petrogenic modelling: applications to eastern Australian granitoids

E. A. Belousova¹, W. L. Griffin^{1,2} and
S. Y. O'Reilly¹

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

Archean mantle fragments in Proterozoic crust, Western Gneiss Region, Norway: In-situ and whole- rock Re-Os evidence

E. Beyer, S. Y. O'Reilly and W. L. Griffin
GEMOC, Macquarie

Tectonic implications of fault-scarp- derived volcanoclastic deposits on Macquarie Island: Sedimentation at a fossil ridge-transform intersection?

N. Daczko¹, S. Mosher², M. Coffin³,
T. Meckel⁴ and A. Hunter⁴

1. GEMOC, Macquarie, 2. University
of Texas at Austin, USA, 3. University
of Tokyo, Japan, 4. Colby College, USA

Extension along the Australian-Pacific transpressional transform plate boundary near Macquarie Island

N. Daczko¹, K. Wertz², S. Mosher²,
M. Coffin³ and T. Meckel⁴

1. GEMOC, Macquarie, 2. Jackson School
of Geosciences, University of Texas at
Austin, USA, 3. Ocean Research Institute,
University of Tokyo, Japan, 4. Department
of Geology, Colby College, USA

The ODP Undergraduate Student Trainee program: taking part in experimental learning at sea

K. Dadd and R. Sandwell
GEMOC, Macquarie

Possible source directions for the Mesoproterozoic Eucarro Rhyolite, Gawler Ranges: evidence from phenocryst lineations

F. Della Pasqua¹, J. McPhie¹, S. Allen¹,
R. Berry¹, M. Lackie² and G. Ferris³

1. School of Earth Sciences, University
of Tasmania, 2. GEMOC, Macquarie,
3. Primary Industries and Resources
S.A.

Overview of Tasmanian Tertiary basalts

J. L. Everard¹, M. Zhang², C-H. Lo³,
S. Y. O'Reilly² and S. M. Forsyth¹

1. Tasmanian Geological Survey,
Mineral Resources Tasmania,
2. GEMOC, Macquarie, 3. Department
of Geosciences, National Taiwan
University, Taipei, Republic of China

Constraints on the mechanism and timing of sediment recycling in the Tonga-Kermadec arc from beryllium isotopes

R. George¹, S. Turner¹, J. Morris²,
T. Plank³, C. Hawkesworth⁴

1. GEMOC, Macquarie, 2. Department
of Earth and Planetary Sciences,
Washington University, St. Louis, MO,
USA, 3. Department of Earth Sciences,
Boston University, Boston, MA, USA,
4. Department of Earth Sciences,
Queens Road, Bristol, UK

TerranechronTM: A new way to explore crustal evolution

W. L. Griffin, E. A. Belousova,
S. Y. O'Reilly and S. G. Walters
GEMOC, Macquarie

A 3D model of the gravity signature of the Moonbi and Bendemeer adamellites

M. Lackie and B. Bailey
GEMOC, Macquarie

Magnesium isotopic composition of olivine by laser ablation multiple collector ICPMS

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

Defining age constraints for mantle events from Re-Os isotopes and tracking metasomatic processes in lithospheric mantle domains beneath New England

W. Powell, GEMOC, Macquarie

Trace element analysis of diamond by LAM-ICPMS: Methodology and preliminary results

S. Rege¹, R. Davies², W. L. Griffin^{1,3},
S. Jackson¹, N. Pearson¹ and S. Y.
O'Reilly¹

1. GEMOC, Macquarie, 2. Department
Earth and Planetary Sciences,
American Museum of Natural History,
New York, 3. CSIRO Exploration and
Mining, North Ryde, Australia

U-series isotope constraints on melting processes and degassing time scales at island arc volcanoes

S. P. Turner¹, M. Regelous², R. George¹
and C. Hawkesworth¹

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

Petrogenesis of Tasmanian Tertiary Basalts

M. Zhang¹, S. Y. O'Reilly¹, J. L. Everard²
and W. L. Griffin^{1,3}

1. GEMOC, Macquarie, 2. Tasmanian
Geological Survey, Australia, 3. CSIRO
Exploration and Mining

INTERNATIONAL WORKSHOP ON TECTONICS AND EVOLUTION OF THE PRECAMBRIAN SOUTHERN GRANULITE TERRAIN, INDIA AND GONDWANIAN CORRELATIONS, HYDERABAD, INDIA, 18-25 FEBRUARY 2004

Early crustal history of the Slave craton, northwestern Canada

J. W. F. Ketchum, GEMOC, Macquarie

**SEISMIC HETEROGENEITY IN
THE EARTH'S MANTLE: THERMO-
PETROLOGIC AND TECTONIC
IMPLICATIONS SYMPOSIUM,
COPENHAGEN, 26-28 FEBRUARY 2004**

**Imaging Petrological and Thermal
Heterogeneity in the Lithospheric
Mantle: Implications for
interpretation of geophysical data**

W. L. Griffin, S. Y. O'Reilly and
Y. Poudjom Djomani
GEMOC, Macquarie

**GEOLOGICAL ASSOCIATION
OF CANADA-MINERALOGICAL
ASSOCIATION OF CANADA,
JOINT ANNUAL MEETING, BROCK
UNIVERSITY, ST CATHERINES,
ONTARIO, CANADA, 12-14 MAY 2004**

**Probing the secular evolution of
the mid-to lower continental crust**

J. W. F. Ketchum¹, J. A. Percival² and
R. M. Easton³

1. GEMOC, Macquarie 2. Geological
Survey of Canada, Ottawa, 3. Ontario
Geological Survey, Sudbury, Canada

**Mid-crustal recrystallization of
zircon in Grenvillian eclogites
– evidence from a CL and SHRIMP
study**

T. Rivers¹, J. W. F. Ketchum² and
R. Cox³

1. Department of Earth Sciences,
Memorial University, St. John's, NL,
Canada, 2. GEMOC, Macquarie,
3. School of Earth and Ocean Sciences,
University of Victoria, Victoria, BC,
Canada

**Combined U-Pb and Hf isotopic
study of zircon provenance from till
samples northwestern Superior
Province, Manitoba**

K. Y. Tomlinson¹, W. L. Griffin^{1,2},
B. J. Doyle³ and S. Y. O'Reilly¹

1. GEMOC, Macquarie, 2. CSIRO
Exploration and Mining, North Ryde,
Australia, 3. Kennecott Canada
Exploration Inc., Vancouver, BC,
Canada

**AGU JOINT ASSEMBLY 2004,
MONTREAL, CANADA, 17-21 MAY 2004**

**Correlations between Os isotopic
composition and trace element
abundance in Chinese Cu-Ni
deposit sulfides**

S. Graham^{1,2}, W. J. Griffin², S. J. Barnes¹
and G. Begg³

1. UQAC, University of Quebec,
Chicoutimi, Canada, 2. GEMOC,
Macquarie, 3. WMC Resources,
Belmont, Perth, Australia

**Cu and Fe isotope variation in
Candelaria Sulfides: Tracing to
origins of fluid components in a
stratiform ore deposit**

S. Graham^{1,3}, W. L. Griffin¹,
N. J. Pearson¹, S. Jackson¹,

S. Y. O'Reilly¹ and R. Rutherford²
1. GEMOC, Macquarie, 2. Phelps
Dodge, Sydney, Australia, 3. UQAC,
University of Quebec, Chicoutimi,
Canada

**14TH ANNUAL V. M. GOLDSCHMIDT
CONFERENCE, UNIVERSITY OF
COPENHAGEN, ØSTERVOLDGADE,
DENMARK, 5-11 JUNE 2004**

**Os isotopes systematic of magmatic
sulfides in abyssal peridotites**

O. Alard¹, A. Luguett², J. P. Lorand³,
N. J. Pearson⁴, W. L. Griffin⁴ and
S. Y. O'Reilly⁴

1. The Open University, Milton Keynes,
UK, 2. DTM-Carnegie, Washington,
USA, 3. MNHN, Paris, France, 4.
GEMOC, Macquarie

**Sveconorwegian underplating and
granitic magmatism in the Baltic
Shield: LAM-ICPMS Hf isotope
evidence**

T. Andersen¹, W. L. Griffin² and A. G.
Sylvester³

1. Department of Geosciences,
University of Oslo, Blindern, Oslo,
Norway, 2. GEMOC, Macquarie, 3.
Department of Geological Sciences,
Univ. of California, Santa Barbara, USA

**Trace element partition coefficients
for mica and a variety of mantle
derived melts and fluids**

T. H. Green and J. Adam
GEMOC, Macquarie

**Partitioning of H₂O between mantle
minerals and silicate melts**

E. H. Hauri¹, G. A. Gaetani² and
T. H. Green³

1. Department of Terrestrial
Magnetism, Carnegie Institution
of Washington, 2. Woods Hole
Oceanographic Institution, Woods
Hole, MA, USA, 3. GEMOC,
Macquarie

**Source compositional variability
beneath the Bicol arc, the
Philippines**

F. McDermott¹, F. G. Delfin Jr.², M. J.
Defant³, S. Turner⁴ and R. Maury⁵

1. Department of Geology, University
College Dublin, Belfield, Ireland,
2. School of Policy, Planning and
Development, University of Southern
California, Los Angeles, USA, 3.
Department of Geology, University
of South Florida, USA, 4. GEMOC,
Macquarie, 5. Laboratoire de
Petrologie, Université Bretagne
Occidentale, France

**Earliest stages of formation of
oceanic lithosphere in the central
Atlantic Ocean: The oceanic plate
beneath the Canary Islands**

E.-R. Neumann¹, R. Vannucci², M.
Tiepolo², W. L. Griffin³ and N. J.
Pearson³

1. Physics of Geological Processes,
University of Oslo, Blindern, Oslo,
Norway, 2. CNR-Istituto – Institute
of Geosciences and Earth Resources,
Pavia, Italy, 3. GEMOC, Macquarie

**In-situ high pressure Hf isotope
ratio measurement using laser
ablation MC-ICPMS: Mass bias and
isobaric interference corrections**

N. J. Pearson¹, W. L. Griffin^{1,2}, and
S. Y. O'Reilly¹

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

Appendix 4: Abstract titles

Geochemistry and origin of mantle sulfides in spinel peridotites xenoliths from Penghu Islands, Taiwan

K.-L. Wang, S. Y. O'Reilly, W. L. Griffin, N. J. Pearson and M. Zhang
GEMOC, Macquarie

Heterogeneous and metasomatised mantle recorded by mineral trace elements in Donghai garnet peridotites of the Sulu UHP terrane eastern China

J. Zheng^{1,2,3}, R. Y. Zhang², J. G. Liou², W. L. Griffin³ and S. Y. O'Reilly³
1. Earth Sciences, University of Geoscience, Wuhan, China, 2. Geology and Environmental Science, Stanford University, CA, USA, 3. GEMOC, Macquarie

DE BEERS DIAMOND CONFERENCE, WARWICK, 5TH-7TH JULY 2004

Trace element analyses of diamond by LAM ICPMS: Standardisation, results and directions

W. L. Griffin^{1,3}, S. Rege¹, R. M. Davies^{1,2}, S. Jackson¹ and S. Y. O'Reilly¹
1. GEMOC, Macquarie, 2. Department of Earth and Planetary Sciences, American Museum of Natural History, New York, USA, 3. CSIRO Exploration and Mining, North Ryde, Australia

AUSTRALIAN SOCIETY OF EXPLORATION GEOPHYSICISTS 17TH GEOPHYSICAL CONFERENCE AND EXHIBITION, DARLING HARBOUR, SYDNEY, 15-19 AUGUST 2004

The integration of geophysics and geochemistry reveals the nature of the lithosphere beneath the Slave Craton (Canada)

Y. Poudjom Djomani¹, S. Y. O'Reilly¹, W. L. Griffin¹, L. M. Natapov¹, N. J. Pearson¹ and B. J. Doyle²
1. GEMOC, Macquarie, 2. Kennecott Canada Exploration Ltd, Vancouver, Canada

2004 WESTERN PACIFIC GEOPHYSICS MEETING, HONOLULU, HAWAII, 16-20 AUGUST 2004

Rare Earth Element Chemistry of apatites from the Cretaceous to Paleogene Granitoids, Southeastern Tibet

M.F. Chu¹, S.L. Chung¹, X.R. Liang², W.L. Griffin³, N.J. Pearson³, Y. Iizuka⁴, X.H. Li², Y.Q. Zhang²
1. Department of Geosciences, National Taiwan University, Taipei, Taiwan, 2. Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou, China, 3. GEMOC, Macquarie, 4. Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan

32ND INTERNATIONAL GEOLOGICAL CONGRESS, FLORENCE, ITALY, 20-28 AUGUST 2004

Origin and evolution of the lithospheric mantle beneath the Slave Craton (Canada)

S. Aulbach¹, W. L. Griffin¹, N. J. Pearson¹, S. Y. O'Reilly¹ and K. Kivi²
1. GEMOC, Macquarie, 2. Kennecott Canada Exploration Ltd, Vancouver, Canada

Origin of garnet peridotites from the Western Gneiss Region, Norway: Refertilisation of depleted Archean lithosphere

E. E. Beyer, W. L. Griffin and S. Y. O'Reilly
GEMOC, Macquarie

Composition of clinopyroxenes from mantle xenoliths as indicator of lithospheric evolution

C. Bonadiman¹, M. Coltorti¹, W. L. Griffin² and S. Y. O'Reilly²
1. Department of Earth Sciences, Ferrara University, Italy, 2. GEMOC, Macquarie

Amphiboles in mantle xenoliths from anorogenic and orogenic settings. Evidence bearings of different style of metasomatism and implication for Nb and Ti anomalies in calc-alkaline magmas

M. Coltorti¹, C. Bonadiman¹, B. Faccini¹, M. Grégoire² and S. O'Reilly¹
1. Department of Earth Sciences, Ferrara University, Italy, 2. CNRS, Observatoire Midi-Pyrénées, Toulouse, France, 3. GEMOC, Macquarie

Trace element and isotopic fingerprints in clinopyroxenes from the oceanic lithosphere beneath Kerguelen Islands (Indian Ocean)

G. Delpech¹, S. Y. O'Reilly¹, M. Grégoire², J.-Y. Cottin³ and N. J. Pearson¹
1. GEMOC, Macquarie, 2. "Dynamique Terrestre et Planétaire", Observatoire Midi-Pyrénées, Toulouse, 3. Department of Geology "Magmas et Volcans", University of Jean Monnet, Saint-Etienne, France

Crust-mantle boundary beneath the Kerguelen Plume-Ridge System

M. Grégoire¹, J. Y. Cottin², S. Y. O'Reilly³
1. CNRS, Observatoire Midi-Pyrénées, Toulouse, France, 2. Department of Geology "Magmas et Volcans", University of Jean Monnet, Saint-Etienne, France, 3. GEMOC, Macquarie

Imaging Petrological and thermal heterogeneity in the lithospheric mantle: Tectonic and geophysical implications

W. L. Griffin, S. Y. O'Reilly and Y. Poudjom Djomani
GEMOC, Macquarie

Cenozoic thermal and compositional structure of the lithosphere in eastern China: xenolith derived profile of the uppermost mantle

H.-W. Ma¹, S. Y. O'Reilly², F.-X. Lu³ and W. L. Griffin^{2,4}

1. National Laboratory of Mineral Materials, China University of Geosciences, Beijing, China, 2. GEMOC, Macquarie, 3. Department of Geology, China University of Geosciences, Beijing, China, 4. CSIRO Exploration and Mining, North Ryde

The upper mantle beneath the Canary Islands: from passive margin to intra-plate magmatism

E. R. Neumann¹, W. L. Griffin² and N. J. Pearson²

1. PGP, University of Oslo, Norway, 2. GEMOC, Macquarie

Origin and evolution of continental lithospheric mantle: Buoyant blobs, intracratonic eddies and fertile upwellings?

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

The isotopic composition of magnesium in mantle olivine: Records of depletion and metasomatism

N. J. Pearson¹, W. L. Griffin^{1,2}, S. Y. O'Reilly¹ and G. Delpech¹

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

Nature of the lithospheric mantle beneath the Slave Craton (Canada) from an integration of geophysics and mantle petrology

Y. Poudjom Djomani¹, S. Y. O'Reilly¹, W. L. Griffin^{1,2}, L. M. Natapov¹, N. J. Pearson¹ and B. J. Doyle³

1. GEMOC, Macquarie, 2. CSIRO Exploration and Mining, North Ryde, Australia, 3. Kennecott Canada Exploration Ltd, Vancouver, Canada

Evidence for sulfide mobility in mantle fluids beneath eastern Australia: Implications for the interpretation of mantle Re-Os ages

W. Powell and S. Y. O'Reilly
GEMOC, Macquarie

Mechanism of lithosphere extension beneath the eastern margin of the South China Block

K.-L. Wang, S. Y. O'Reilly, W. L. Griffin, N. J. Pearson and M. Zhang
GEMOC, Macquarie

Hf isotopes, U-Pb ages and trace elements of zircons in intermediate granulite xenoliths from Cenozoic Hannuoba basalts: significance for petrogenesis and Neoproterozoic crust-mantle interaction beneath the North China Sea

J. Zheng¹, W. L. Griffin², S. Y. O'Reilly² and M. Zhang²

1. Faculty of Earth Sciences, China University of Geosciences, Wuhan, China, 2. GEMOC, Macquarie

2ND INTERNATIONAL MAAR CONFERENCE, HUNGARY, SLOVAKIA, GERMANY 15 SEP -17 SEP 2004

Controls on maar volcanism: evidence from sills and dykes of the Silurian Eastport Formation, Maine, USA

N. A. Van Wagoner¹, R. D. W. Lodge¹, K. A. Dadd²

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

SEG 2004 PREDICTIVE MINERAL DISCOVERY UNDER COVER, PERTH, WESTERN AUSTRALIA, 27 SEP – 1 OCT 2004

Research, Exploration and Predictive Mineral Discovery

M. A. Etheridge^{1,2}

1. GEMOC, Macquarie, 2. Predictive Mineral Discovery CRC

Thermal histories of Indonesian porphyry copper-gold deposits determined by U-Th-He, U-Pb, Re-Os, K-Ar and Ar-Ar methods

B. I. A. McInnes¹, N. J. Evans¹, D. Sukarna², S. Permanadewi², S. Garwin³, E. Belousova⁴, W. L. Griffin⁴ and F. Fu⁵

1. CSIRO Exploration and Mining, Bentley, WA, Australia, 2. Geological Research and Development Centre, Bundung, Indonesia, 3. Geoinformatics Exploration Australia, West Perth, Australia, 4. GEMOC, Macquarie, 5. Dept of Geosciences, University of Sydney, NSW, Australia

TerraneChron™: Delivering a competitive edge in exploration

S. Y. O'Reilly¹, W. L. Griffin^{1,2} and E. A. Belousova¹

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

LITHOPROBE – THE CELEBRATORY CONFERENCE, TORONTO, CANADA, 12-15 OCT 2004

Evolution of the Slave Province and Abitibi Subprovince based on U-Pb dating and Hf isotopic composition of zircon

J. W. F. Ketchum¹, W. Bleeker², W. L. Griffin¹, S. Y. O'Reilly¹, N. J. Pearson¹ and J. A. Ayer³

1. GEMOC, Macquarie, 2. Geological Survey of Canada, Ottawa, ON, Canada, 3. Ontario Geological Survey, Sudbury, ON, Canada

2004 IAVCEI GENERAL ASSEMBLY, PUCON, CHILE, 14-19TH NOVEMBER

Mafic volcanism in a tidal flat environment: facies and eruptive mechanisms with examples from the Silurian of Maine, USA and New Brunswick, Canada

K. Dadd¹ and N. Van Wagoner²

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

Appendix 4: Abstract titles

Interrogating the paradigm of the compositionally-zoned magma chamber: a stratigraphically-constrained ^{238}U - ^{230}Th - ^{226}Ra study of Katmai-Novarupta 1912

R. George¹, S. Turner¹, M. Reagan²,
C. Hawkesworth³, W. Hildreth⁴.

1. GEMOC, Macquarie, 2. Department of Geoscience, University of Iowa, Iowa City, USA, 3. Department of Earth Sciences, Bristol University, Bristol, UK, 4. US Geological Survey, Menlo Park, CA, USA

^{210}Pb - ^{226}Ra - ^{230}Th implications for the time scales of differentiation and degassing of island arc magmas

S. Turner¹, S. Black², K. Berlo³

1. GEMOC, Macquarie, 2. School of Human and Environmental Sciences, University of Reading, Reading, UK, 3. Department of Earth Sciences, University of Bristol, Bristol

2004 AGU FALL MEETING, SAN FRANCISCO, USA 13-17TH DECEMBER

Detrital zircon study along the Tsangpo River, SE Tibet

Y.-H. Liang¹, S.-L. Chung¹, D.-Y. Liu²,
S. Y. O'Reilly³, M.-F. Chu¹, J.-Q. Ji⁴,
B. Song², N. J. Pearson³

1. Department Geosciences, National Taiwan University, Taipei, Taiwan, 2. Institute of Geology, Chinese Academy of Geological Sciences, Beijing, China, 3. GEMOC, Macquarie, 4. School of Earth and Space Sciences, Peking University, Beijing, China

Appendix 5: Funded research projects

GRANTS AND OTHER INCOME FOR 2004

Funding Source	Investigators	Project Title	Amount
Macquarie University Host Institution Support	O'Reilly	GEMOC Key Centre Contribution	\$120,000
ARC Discovery	Alard	Toward the use of metal stable isotopes in geosciences	\$140,000
ARC Discovery	Belousova	Crustal evolution in Australia: Ancient and young terrains	\$99,345
ARC Discovery	O'Reilly, Griffin, Gohl, Morgan, Cottin, Neumann, Xu	How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction	\$285,000
ARC Discovery	Turner, Hawkesworth, Reagan, Kirchner	The time scales of magmatic and erosional cycles	\$100,000
ARC Linkage International	O'Reilly, Griffin, Cottin, Grégoire, Xu	How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction	\$40,000
ARC Linkage Projects	O'Reilly, Griffin, WMC	Global lithosphere architecture mapping (including industry contribution)	\$190,000
ARC Federation Fellowship	Turner	The time scales of geochemical cycles and Earth processes	\$290,000
ARC Federation Fellowship (MU contribution)	Turner	The time scales of geochemical cycles and Earth processes	\$190,000
ARC Federation Fellowship	Wood	Origin and evolution of Earth's chemical reservoirs	\$155,527
Nu Instruments	Griffin, O'Reilly	GEMOC - Nu Instruments Research Fellowship	\$312,929
DEST SII	O'Reilly	Advanced technology for a clever geoscience future in Australia	\$1,830,000
MU RIBG	O'Reilly	SAMx automation package for Cameca SX50	\$55,000
MU RIBG	Turner	A PicoTrace clean air work station equipped with a 16 sample digestion system	\$23,000
MUECRG	Daczko	Melt escape and trace element partitioning during high- pressure partial melting in the lower crust, northern Fiordland, New Zealand	\$18,615

Appendix 5: Funded research projects

Funding Source	Investigators	Project Title	Amount
MUECRG	Griffin, Pearson, O'Reilly, Daczko, NSWGS	Testing Ordovician-Devonian tectonic models for the Lachlan group (including industry contribution)	\$25,000
MUECRG	Griffin, Pearson, O'Reilly, Daczko, NSWGS	Testing Ordovician-Devonian tectonic models for the Lachlan group (including industry contribution)	\$25,000
MUECRG - Rio Tinto	Griffin, O'Reilly, Rio Tinto	Lithosphere Mapping beneath the Dharwar Craton, India	\$30,000
MUECRG - Rio Tinto	Griffin, O'Reilly, Rio Tinto	Lithosphere Mapping beneath the Dharwar Craton, India (industry contribution)	\$30,800
MUECRG - Anglo	Jackson, Griffin, Pearson	Application of metal isotopes in exploration for magmatic nickel and volcanic-hosted copper deposits	\$39,870
MUECRG - Anglo	Jackson, Griffin, Pearson	Application of metal isotopes in exploration for magmatic nickel and volcanic-hosted copper deposits (industry contribution)	\$39,870
MUECRG	O'Reilly, Zhang, WMC	Continental flood basalts: geochemical discrimination with relevance to exploration for nickel and platinum-group elements	\$30,000
MUECRG	O'Reilly, Zhang, WMC	Continental flood basalts: geochemical discrimination with relevance to exploration for nickel and platinum-group elements (industry contribution)	\$30,000
MURIF	Smith, O'Reilly, Parfitt, Esselle	Inversion scattering, remote sensing and data inversion	\$247,681
MURF	Malkovets	Evolution of the upper mantle beneath the Siberian Craton and the Siberian Platform	\$66,949
MURF	Wang	Geochemical characteristics of mantle xenoliths from Taiwan and Penghu Islands, SE China: Implications for mantle process and geodynamics	\$32,482
MURDG	Lackie, Flood	3D shape of the Mole Granite and thickness of the Torrington Pendant	\$12,000
MURDG	Jackson	Isotopic fractionation of the ore metals (Cu, Fe): A new window on ore-forming processes	\$16,700
MURDG	Wang	Lithosphere extension in East Asia: tectonic and geochemical consequences	\$19,555
Teaching Development grant	Dadd	Bringing the workplace into the classroom: the redesign of GEOS 377 using problem-based learning and real workplace scenarios	\$5,928
VC Development Fund	Etheridge	Improving mineral exploration performance by superior management of risk, uncertainty and value	\$100,000

Funding Source	Investigators	Project Title	Amount
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	\$108,000
Capital Equipment	Flood	Precision lapping and polishing machine	\$90,000
Capital Equipment	Lackie	Frequency FM Equipment	\$42,000
Maintenance Macquarie	O'Reilly, DEPS	GAU Maintenance contribution	\$30,000
CRC Discretionary Fund	O'Reilly	System Earth: the mantle engine	\$25,000
Postgraduate Research Fund	Brad Bailey	Law Dome: Ice and crust mass balance studies	\$3,500
IPRS and MUIPRA	Guo	An integrated geophysical investigation of the Hunter-Mooki and Peel Faults	\$39,284
IPRS and iMURS	Rege	Trace elements in diamonds: genetic and forensic implications	\$39,284
IPRS and MUIPRA	Touron	Geochemical fingerprinting of the Massif Central (France) mantle	\$39,284
iMurs	Nikolic	Evolution of crust-mantle systems near a young rift: NW Spitsbergen, Norway	\$39,284
RAACE	Milan	The emplacement, pressure-temperature-time path and structural evolution of lower crust gneisses in Fiordland, New Zealand	\$18,484

FUNDED RESEARCH PROJECTS FOR 2005

Funding Source	Investigators	Project Title	Amount
ARC Discovery	Alard	Toward the use of metal stable isotopes in geosciences	\$110,000
ARC Discovery	Belousova	Crustal evolution in Australia: Ancient and young terrains	\$99,345
ARC Discovery	Daczko	A new approach to understanding the mechanisms and deep crustal controls of continental rifting	\$50,000

Appendix 5: Funded research projects

Funding Source	Investigators	Project Title	Amount
ARC Discovery	Jackson	Isotopic fractionation of the ore minerals (Cu, Fe, Zn): A new window on ore-forming processes	\$100,000
ARC Discovery	O'Reilly, Griffin, Gohl, Morgan, Cottin, Neumann, Xu	How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction	\$255,000
ARC Discovery	Turner, Hawkesworth, Reagan, Kirchner	The time scales of magmatic and erosional cycles	\$85,000
ARC Linkage International	O'Reilly, Griffin, Cottin, Grégoire, Xu	How has the continental lithosphere evolved? Processes of assembly, growth, transformation and destruction	\$40,000
ARC Linkage Projects	O'Reilly, Griffin, WMC	Global lithosphere architecture mapping (including industry contribution)	\$190,000
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	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 (MU contribution)	\$175,000
ARC Federation Fellowship	Turner	The time scales of geochemical cycles and Earth processes	\$290,000
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	\$290,000
ARC Federation Fellowship (MU contribution)	Wood	Origin and evolution of Earth's chemical reservoirs	\$180,000
Australian Antarctic Division	Daczko, Mosher	The environmental and tectonic implications of volcanoclastic deposits on Macquarie Island	\$79,000
Dept. Earth and Planetray Sciences	O'Reilly, DEPS	GAU Maintenance contribution	\$30,000
MUECRG Scheme	Belousova	Developing a geochronological framework for the Gawler Craton, South Australia	\$20,000

Funding Source	Investigators	Project Title	Amount
MUECRG Scheme	Belousova	Developing a geochronological framework for the Gawler Craton, South Australia (Industry contribution)	\$20,000
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	\$179,9280
MUECRG	O'Reilly	Links between plume-mantle interaction, mantle sulfides and N-PGE endowment in large igneous provinces	\$40,000
MUECRG WMC	O'Reilly	Links between plume-mantle interaction, mantle sulfides and N-PGE endowment in large igneous provinces (industry contribution)	\$40,000
MURDG Safety Net Scheme	Veevers	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	Malkovets	Structure and evolution of the upper mantle beneath the Siberian Craton	\$19,906
MU New Staff Scheme	Williams	The oxidation state of the early Earth mantle: new clues from iron isotopes	\$19,978
IPRS and iMURS	Rege	Trace elements in diamonds: genetic and forensic implications	\$30,627
iMurs	Hartman	Tofua Volcano in Northern Tonga: U-series Isotope and Melt Inclusion Studies Along the Tonga-Kermadec Island Arc	\$40,837
iMurs	Nikolic	Evolution of crust-mantle systems near a young rift: NW Spitsbergen, Norway	\$40,837
RAACE	Milan	The emplacement, pressure-temperature-time path and structural evolution of lower crust gneisses in Fiordland, New Zealand	\$18,847
APA	Murgulov	Crust-mantle evolution and metallogeny, E. Australia	\$18,847
Postgraduate Research Fund	McMahon	Fracturing deformation along the Amery Ice Shelf: a seismic study	\$4,000

**ARC Research Projects initiated prior to 2004 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.

Interested in:
•Earth's Environment •Contaminated Land Remediation
•Geochemistry •Groundwater Contamination

Environmental Geology explores the interaction of people and the geologic environment. The 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

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

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

THIRD YEAR

GEOS315 Environmental and Groundwater Geophysics, GEOS399 Soils
GEOS377 Environmental Geology
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 also possible.

These notes are only intended as a guide, and the Calendar should be referred to for further details. Academic advice should be sought for any program queries.



EARTH AND PLANETARY SCIENCES

BACHELOR OF SCIENCE OR ARTS GEOLOGY MAJOR

Course Structure

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

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 Geoscience 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 Geosciences
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, GEOS428 Coral Reef Environments

FOURTH YEAR (HONOURS)

1. Honours: The honours year consists of a 16 credit point research thesis and 8 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 courses and a major research project. A coursework MSc is also possible.



EARTH AND PLANETARY SCIENCES

BACHELOR OF SCIENCE GEOPHYSICS MAJOR

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

Interested in:
•Understanding 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", which is the study of the earth's structure and evolution, and "Exploration", which is concerned 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)
MATH135, MATH136, PHYS140, PHYS143
COMP123 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 Geosciences
GEOS272 Earth's Evolving Environment
MATH235, MATH236, PHYS201, COMP238

THIRD YEAR

Core
GEOS315 Environmental and Groundwater Geophysics or
GEOS316 Exploration Geophysics
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 also possible.

Students not proceeding to a fourth year may undertake less Units in mathematics, physics and computing. These notes are only intended as a guide, and the Calendar should be referred to for further details. Academic advice should be sought for any program queries.



EARTH AND PLANETARY SCIENCES

Bachelor of Technology Exploration Geoscience Geochemistry Strand

72 Credit Points Required

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, underpinned as they are by the mineral industry. Employment may be found in mining, exploration and environment consultancy companies, geoanalytical laboratories, government advisory bodies, research and teaching.

FIRST YEAR

GEOS115 Earth Dynamics, Materials and the Environment
GEOS116 Marine Geoscience
GEOS224 Introduction to Field Geology (vacation unit)
CHEM101
and one of: PHYS140, PHYS143,
MATH135, MATH136, COMP155

SECOND YEAR

Core	Optional
GEOS260 Lithospheric Environments GEOS268 Introduction to Geophysics GEOS230 Field and Laboratory Studies in Geoscience CHEM207	GEOS266 Earth Surface Processes GEOS272 Earth's Evolving Environment GEOS315 Environment and Groundwater Geophysics or GEOS316 Exploration Geophysics STAT170 or STAT171

THIRD YEAR

Core	Optional
GEOS307 Field Geology and Mapping GEOS314 Ore Deposits Geology GEOS377 Environmental Geology GEOS437 Geochemical Applications and Techniques MPCE360	GEOS315 Environmental and Groundwater Geophysics or GEOS316 Exploration Geophysics GEOS373 Volcanic Geology Fieldwork COMP238

FOURTH YEAR (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.



EARTH AND PLANETARY SCIENCES

Bachelor of Technology Exploration Geoscience Geophysics Strand

72 Credit Points Required

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, underpinned as they are by the mineral industry. Employment may be found in mining, exploration and environment consultancy companies, geoanalytical laboratories, government advisory bodies, research and teaching.

FIRST YEAR

GEOS115 Earth Dynamics, Materials and the Environment
GEOS116 Marine Geosciences and
GEOS224 Introduction to Field Geology (vacation unit)
PHYS140, PHYS 143
MATH135, MATH136, COMP155
and one of: CHEM101 or CHEM103

SECOND YEAR

Core	Optional
GEOS260 Marine Depositional Environments GEOS268 Introduction to Geophysics MATH235, MATH236, ELEC176 GEOS315 Environment and Groundwater Geophysics or GEOS316 Exploration Geophysics	GEOS230 Field and Laboratory Studies in Geoscience PHYS201 PHYS202

THIRD YEAR

Core	Optional
GEOS385 Global Tectonics GEOS420 Data and Image Processing in Geophysics and Exploration GEOS315 Environmental and Groundwater Geophysics or GEOS316 Exploration Geophysics GEOS460 Solid Earth Geophysics MPCE360 Technology Management	GEOS 314 Magmas, Fluids and Ore Deposits GEOS 307 Field Geology and Mapping GEOS 373 Volcanic Geology Fieldwork COMP238 ELEC260

FOURTH YEAR (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.



EARTH AND PLANETARY SCIENCES

Appendix 7: GEMOC postgraduate and honours opportunities

Honours
Scholarships
of up to \$2,500
are available
for students
with exceptional
undergraduate
track records who
are undertaking
an Honours
Program within
the framework
of GEMOC's
goals. For further
information,
see the Annual
Reports on the
GEMOC website for
examples of past
Honours projects.

POSTGRADUATE OPPORTUNITIES

GEMOC has a flourishing postgraduate research environment with postgraduate students from many countries (including France, Germany, China, Russia 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 (IPRS):** available to overseas students to cover tuition fees with a closing date in late September 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

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



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

**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

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

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European Association for Geochemistry
Geochemical Society
Geological Society of Australia



Appendix 9: Goldschmidt Pre-Meeting Workshop 2006



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