Appendix 18: CV's of Principal Investigators

Peter B. Kelemen, Arthur D. Storke Memorial Professor
Dept. of Earth & Environmental Sciences, Columbia University **Telephone:** 845 365 8728
Lamont Doherty Earth Observatory, Palisades NY 10964 **E-mail:** peterk@ldeo.columbia.edu

PROFESSIONAL PREPARATION:

1980 A.B, Dartmouth College, Cum Laude, Honors in Earth Science.
1985 M.Sc., University of Washington, Department of Geological Sciences
1987 Ph.D., University of Washington, Department of Geological Sciences

APPOINTMENTS, 2004-2012

2012–present Vice Chair, Dept. of Earth & Environmental Sciences, Columbia University
2012 Chapman Lecturer, University of Alaska
2010 CIRES Distinguished Lecturer, University of Colorado
2009 Visiting Professor, Université de Lausanne
2008 MARGINS Distinguished Lecturer
2007 Hallimond Lecturer, Mineralogical Society
2006–present Fellow, Mineralogical Society of America
2004–present Arthur D. Storke Memorial Professor, Dept. of Earth & Environmental Sciences, Columbia University and Lamont Doherty Earth Observatory
2004–present Assoc. Research Scientist, Dept. of Earth and Planetary Sci., Amer. Museum Natural History
2004–present Adjunct Scientist, Woods Hole Oceanographic Institution
2004–present Fellow, American Geophysical Union
2001-04 Tenured Senior Scientist & Charlies Francis Adams Chair, Woods Hole Ocean. Inst. (WHOI)

PUBLICATIONS MOST CLOSELY RELATED TO THIS PROPOSAL, PAST FIVE YEARS*:*

Kelemen, P., A. Al Rajhi, M. Godard, B. Ildefonse, J. Koepke, C. MacLeod, C. Manning, K. Michibayashi, S. Nasir, E. Shock, E. Takazawa and Damon Teagle, Scientific drilling and related research in the Samail Ophiolite, Sultanate of Oman, Scientific Drilling J., submitted 2012.

Kelemen, P.B., Workshop on Scientific Drilling in the Samail Ophiolite, Oman, EOS, in press 2012

Kelemen, P.B. and G. Hirth, Reaction-driven cracking during retrograde metamorphism: Olivine hydration and carbonation, Earth Planet. Sci. Lett. 345–348, 81–89, 2012.

Paukert, A.P., J.M. Matter, **P.B. Kelemen,** E.L. Shock and J.R. Havig, 2012, Reaction path modeling of enhanced in situ CO2 mineralization for carbon sequestration in the peridotite of the Samail Ophiolite, Sultanate of Oman: Chem. Geol. 330-331, 86-100, 2012

Peucker-Ehrenbrink, B., K, Hanghøj, T. Atwood and **P.B. Kelemen**, Rhenium-osmium isotope systematics and platinum group element concentrations in oceanic crust, Geology 40, 199-202, 2012

Rioux, M., S. Bowring, **P. Kelemen**, S. Gordon, F. Dudás, R. Miller, Rapid crustal accretion and magma assimilation in the Oman-U.A.E. ophiolite: High precision U-Pb zircon geochronology of the gabbroic crust, J. Geophys. Res. 117, B07201, doi:10.1029/2012JB009273, 2012.

Rioux, M., S. Bowring , **P. Kelemen ,** S. Gordon , R. B. Miller , F. Dudas, Tectonic development of the Samail ophiolite: High precision U-Pb zircon geochronology and Sm-Nd isotopic constraints on crustal growth and emplacement, J. Geophys. Res., submitted 2012.

Streit, E., **P.B. Kelemen**, and J. Eiler, Coexisting serpentine and quartz from carbonate-bearing serpentinized peridotite in the Samail Ophiolite, Oman, Contrib. Mineral. Petrol., 164, 821-837 2012.

Achenbach, K.L., M.J. Cheadle, U. Faul, **P. Kelemen** and S. Swapp, Lattice-preferred orientation and microstructure of peridotites from ODP Hole 1274A (15°39′N), Mid-Atlantic Ridge: Testing models of mantle upwelling and tectonic exhumation, Earth Planet. Sci. Lett. 301, 199–212, 2011.

Kelemen, P.B., J. Matter, E.E. Streit, J.F. Rudge, W.B. Curry, J. Blusztajn, Rates and mechanisms of mineral carbonation in peridotite: Natural processes and recipes for enhanced, *in situ* CO_2 capture and storage, Ann. Rev. Earth Planet. Sci. 39, 545–76, 2011.

Godard, M., **P. Kelemen**, S. Nasir and D. Teagle, 2011, WORKSHOP REPORT: Geological carbon capture & storage in mafic and ultramafic rocks; IODP/ICDP Workshop, http://ccs-oman2011.org/, 2011.

Collier MI & **PB Kelemen**, Case for reactive crystallization at mid-ocean ridges, J Pet 51, 1913-1940, 2010

Hanghøj, K., **P.B. Kelemen**, D. Hassler and M. Godard, Composition and genesis of depleted mantle peridotites from the Wadi Tayin massif, Oman ophiolite. Major and trace element geochemistry, and Os isotope and PGE systematics, J. Petrol. 51, 206-227, 2010.

Homburg, J., G. Hirth, and **P.B. Kelemen**, Investigation of the strength contrast at the Moho: A case study from the Oman Ophiolite, Geology 38, 679-682, 2010.

Rudge, J.F., **P.B. Kelemen** and M. Spiegelman, A simple model of reaction induced cracking applied to serpentinization and carbonation of peridotite. Earth Planet. Sci. Lett. 291, 215-227, 2010.

Skemer, P., J. Warren, **P. Kelemen** and G. Hirth, Microstructural and rheological evolution of a mantle shear zone, J. Petrol. 51, 43-53, 2010.

Sundberg, M, G. Hirth and **P.B. Kelemen**, Trapped melt in the Josephine peridotite: Implications for permeability and melt extraction in the upper mantle, J. Petrol. 51, 185-200, 2010.

Kelemen, P.B., The origin of the land under the sea, Scientific American 300, no. 2, 52-57, February 2009

Kelemen, **P.B.** and 10 others, White Paper for IODP Decadal Science Planning Meeting, INVEST, *In situ* mineral carbonation in peridotite and basalt for CO_2 capture and storage, available online, 2009.

Matter, J. and **P.B. Kelemen**, Geochemical controls on permanent CO_2 storage in geologic reservoirs, Nature Geoscience 2, 837-841, 2009.

Matter, J.M and **P.B. Kelemen**, Permanent storage of carbon dioxide in geological reservoirs by mineral carbonation , Nature Geoscience 12, 837-841, 2009.

Kelemen, P.B. and **J. Matter**, *In situ* mineral carbonation in peridotite for CO_2 storage, Proc. National Acad. Sci. 105, 17,295-17,300, 2008.

Morgan, Z., Y. Liang and **P.B. Kelemen**, Significance of the concentration gradients associated with dunite bodies in the Josephine and Trinity ophiolites, G-cubed 9, doi:10.1029/2008GC001954, 2008.

Suhr, G., **P.B. Kelemen** and H. Paulick, Microstructures in Hole 1274A peridotites, ODP Leg 209, Mid-Atlantic Ridge…, G-cubed 9, Q03012, doi:10.1029/2007GC001726, 2008.

VanTongeren, J.A., **P.B. Kelemen** and K. Hanghøj,, Cooling rates in the lower crust of the Oman ophiolite: Ca in olivine, revisited, Earth Planet. Sci. Lett. 267, 69-82, 2008.

Warren, J.M., G. Hirth and **P.B. Kelemen**, Evolution of olivine lattice preferred orientation during simple shear in the mantle, Earth Planet. Sci. Lett. 272, 501-512, 2008.

SYNERGISTIC ACTIVITIES

1. TEACHING AT COLUMBIA: Intro. Earth Sciences every fall, undergrad non-majors; Earth Resources & Sustainable Development, every fall, undergrad and graduate sections; Petrology every other spring, majors & grad students; 9 month/yr Geodynamics Seminar; other seminars, occasional grad field courses

2. OUTREACH ACTIVITIES 2007-12: visited Congress on behalf of NSF, AGU in 2009, 2011, wrote articles for Scientific American, Popular Mechanics, Huffington Post, Oceanus magazine; public lectures include several at Farragut Middle School & Hillside Elementary School, Earth2Class Workshop for Teachers, NY 07, Riverdale Country School, NY 08, 09; MARGINS Distinguished Lecturer 07-08; Lamont Advisory Board 06, 09, 11; JP Morgan Private Bank 09; Alliance Bernstein 10; Columbia University Trustees 10, NY Assoc. Energy Economics 11, Trinity School NY 12; numerous press interviews

3. SCIENCE PLANNING 2007-12: 9/11: keynote EarthScope Inst. Lithosphere/Asthenosphere Boundary, **9/11:** keynote GeoPRISMS Alaska Planning Workshop, **9/11:** keynote Cornell Continental Crust symposium, **9/10:** keynote Deep Carbon Observatory/IODP Workshop: Mantle Frontier – Moho and Beyond; **9/09:** keynote, IODP INVEST, Bremen, GE; **7/09:** keynote, InterRidge-IODP Workshop, Southampton, UK; **6/09**: rapporteur, air capture of CO2, National Academy of Sciences Workshop on Geoengineering; **3/09**: invited participant, American Physical Society CO2 Air Capture Meeting, Princeton; **3/09**: presentation at Coalition for National Science Funding Exhibition and Reception for the US Congress; **2/09**: invited speaker, British Petroleum CO2 Capture from Air Symposium, New York; **08-10:** member CO2 Sub-Committee, Society of Exploration Geophysicists Research Committee; **11/07**: Keynote MARGINS Izu-Bonin-Marianas Workshop; **3/07** Lead Proponent (1 of 5), Mission Moho, IODP

4. MEETING CONVENOR 2006-12: 9/12: Oman Drilling Project Workshop (ICDP)**; 8/12** Gordon Conf Rock Deformation, Chair; **1/11** IODP-ICDP Mineral Carbonation Workshop, Oman; **8/10** Gordon Conf. Rock Deformation, Vice Chair; **9/08** Chapman Conf/5th Int'l Workshop Orogenic Lherzolites, Mt Shasta, CA; **7/06** Penrose Conf Arc Crustal Genesis, Valdez, Alaska

Curriculum Vitae – Jürg M. Matter

Lamont Associate Research Professor
Lamont-Doherty Earth Observatory
Columbia University, Palisades NY 10964

Telephone: 845 365 8543
E-mail: jmatter@ldeo.columbia.edu

PROFESSIONAL PREPARATION

Swiss Federal Institute of Technology Zürich, Earth Sciences	M.S. 1997
Swiss Federal Institute of Technology Zürich, Natural Sciences	Ph.D. 2001
Lamont-Doherty Earth Observatory, New York, Postdoctoral Training	2002-2004

APPOINTMENTS

2010-Date	Lamont Associate Research Professor, Columbia University
2005-2009	Doherty Associate Research Scientist, LDEO, Columbia University
2001-2004	Postdoctoral Research Scientist, LDEO, Columbia University
1997-2001	Research Assistant, Swiss Federal Institute of Technology Zurich
1997	Teaching Assistant Swiss Federal Institute of Technology Zurich

5 PUBLICATIONS MOST CLOSELY RELATED TO THIS PROPOSAL

Kelemen, P. B., Matter, J., Streit L., Rudge, J., Curry, Blusztajn, J. Rates and mechanisms of mineral carbonation in peridotite: natural processes and recipes for enhanced, in situ CO_2 capture and storage. Annu. Rev. Earth Planet. Sci. 2011. 39:545-76

Matter, J. M., Kelemen, P. B. Permanent storage of carbon dioxide in geological reservoirs by mineral carbonation. Nature Geoscience (2009) 2, 837-841, doi: 10.1038/NGEO683.

Kelemen, P.B., Matter, J. In situ mineral carbonation in peridotite for CO_2 storage, Proc. National Acad. Sci. 105, 17,295-17,300, 2008.

Matter, J. M., Goldberg, D. S., Morin, R. H., Stute, M. Contact zone permeability at intrusion boundaries: new results from hydraulic testing and geophysical logging in the Newark Rift basin, Hydrogeology Journal (2006) 14:689-699, 2005.

Matter, J.M., Waber, N. H., Loew, S., Matter, A. Recharge areas and geochemical evolution of groundwater in a shallow alluvial aquifer system in the Sultanate of Oman. Hydrogeology Journal 14(1-2): 203-224, 2005.

5 OTHER RELEVANT PUBLICATIONS

Paukert, A. N., Matter, J. M., Kelemen, P. B., Shock, E. L., Havig, J. R. Reaction path modeling of enhanced in situ CO2 mineralization for carbon sequestration in the peridotite of the Samail Ophiolite, Sultanate of Oman. Chemical Geology 2012. 330-331: 86-100.

Gislason, S. R., Wolff-Boenisch, D., Stefansson, A., Oelkers, E., Gunnlaugsson, E., Sigurdardottir, H., Sigfusson, B., Broecker, W., Matter, J., Stute, M., Axelsson, G., T. Fridriksson (2010). Mineral sequestration of carbon dioxide in basalt: The CarbFix project. International Journal of Greenhouse Gas Control 4 (2010), 537-545.

Oelkers, E.H., Gislason, S. R., Matter, J. Mineral carbonation of CO_2. Elements, Vol. 4, 331-335, 2008.

Assayag, N., Matter, J. M., Ader. M., Goldberg, D., Agrinier, P. Water-rock interaction during a CO_2 field injection test: Implications on host rock dissolution and alteration effects. Chemical Geology 265, 227-235, 2008.

Matter, J.M., Takahashi, T., Goldberg, D. Experimental evaluation of in situ CO_2-water-rock reactions during CO_2 injection in basaltic rocks: implications for permanent CO_2 sequestration. Geochemistry, Geophysics, Geosystems, v. 8(2), doi:10.1029/2006GC001427, 2006.

SYNERGISTIC ACTIVITIES

(1) COURSES, COLUMBIA UNIVERSITY Curriculum Development for CAMEL (Climate, Adaptation, and Mitigation e-learning) NCSE Program; Environmental Chemistry, MPA for Environmental Science and Policy, School of International and Public Affairs (2010-present); Responding to Climate Change, Department of Earth & Environmental Sciences (2011-present); Carbon Capture and Storage, Department of Earth & Environmental Engineering (2008-present).

(2) OUTREACH PRESENTATIONS INCLUDING K-12 EDUCATION AND PRESS COVERAGE Ridgewood High School, NJ (2012); European Embassy Science Series Event, Washington DC (2010); Montclair State University, Weston Science Scholar Program (2006/2007); Public Lecturer at the Lamont-Doherty Earth Observatory Public Lecture Series (2006); Public Lecturer at the Ministry of Water Resources, Sultanate of Oman (1999, 2002, 2009). **Press coverage** of Kelemen & Matter, *In situ* mineral carbonation in peridotite for CO_2 storage, Proc National Acad Sci 2008 and Matter & Kelemen, Nature Geoscience 2009 papers involved interviews for print, radio and web-based video: Reuters, Economist, Physics Today, The Christian Science Monitor, El Pais (Spain), El Mundo (Spain), Spiegel (Germany), Frankfurter Allgemeine (Germany), CleanSkies TV (CBS), Forbes, NPR Living on Earth, Gizmag (Australia), MSNBC, ORF Radio (Austria), DRS 1 (Swiss Radio), Naked Scientist BBC, Discovery Magazine, Livescience.com, OnEarth, Good Magazine, Australian National Radio, Deutsche Welle Radio (Germany), Gulf Times, The Times of Oman, Toronto Star, Times of India.
Consultant to Discovery Channel for Climate Mitigation Technologies

(4) SCIENCE PLANNING: Big Sky Carbon Sequestration Partnership, U.S. Department of Energy (2006-present); Invited speaker ICDP workshop on scientific drilling in the Samail Ophiolite, Sultanate of Oman (2012). Invited speaker USGS workshop on CO_2 sequestration in unconventional reservoirs (2012); Invited speaker IODP/ICDP workshop on the role of oceanic and continental scientific drilling, Sultante of Oman (2011); Invited speaker U.S. Department of Energy, Office of Fossil Energy workshop on "Strategic initiatives for carbon capture and storage (CCS) deployment" (2009)

(5) MEETING CONVENOR/Co-CONVENOR: 2010 AGU Fall Meeting, San Francisco; 10th Intern. Conference on Greenhouse Gas Control Technologies, Amsterdam, The Netherlands (2010); Goldschmidt Conference, Knoxville, TN (2010); 8th International Conference on Greenhouse Gas Control Technologies, Trondheim, Norway (2008).

COLLABORATORS

M. Ader, Institute de Physique du Globe de Paris, France; P. Agrinier, Institute de Physique du Globe de Paris, France; E. S. Aradóttir, Reykjavik Energy; A. Bonneville, Pacific Northwest National Laboratory; W. Broecker, Columbia University; D. DePaolo, UC Berkeley; S. R. Gislason, University of Iceland, Iceland; D. Goldberg, Columbia University; P. Kelemen, Columbia University; K. Lackner, Columbia University; P. McGrail, Batelle Pacific Northwest Laboratory; R. Morin, USGS; E. Oelkers, University of Toulouse, France; Ah-Hyung A. Park (Columbia University); T. S. Ramakrishnan, Schlumberger-Doll Research Laboratory; P. Schlosser, Columbia University; E. Shock, Arizona State University; L. Spangler (Montana State); M. Stute, Barnard College; T. Takahashi, Columbia University

MATTER'S ADVISORS

M.Sc.: D. Bernoulli, ETH Zurich Switzerland; Ph.D.: S. Loew, W. Kinzelbach, ETH Zurich Switzerland; Postdoctoral Scholarship: D. Goldberg, T. Takahashi, Columbia University

ADVISOR: COLUMBIA UNIVERSITY

PhD: Jennifer Hall (2016); Jonathan Levine (2011); Amelia Paukert (2014), Lisa Streit (co-advising with P. Kelemen, 2013) **LDEO postdocs:** Qiang Yiang (10-13), Cantwell Carson (11-13)

Ph.D. or M.Sc. committee: Diana Fernandez de la Reguera (2010), Jonathan Levine (Columbia 2010), Tim Rappold (Columbia 2010), Samuel Krevor (Columbia 2008); Anna Wall (Columbia 2007), Oliver Lopez (Institute de Physique du Globe de Paris, France 06); Nelly Assayag (Institute de Physique du Globe de Paris, France 07).

BIOGRAPHICAL SKETCH

DAMON A.H. TEAGLE

PLACE AND DATE OF BIRTH AND CITIZENSHIP:

Lower Hutt, Wellington, New Zealand; 24th September, 1963; New Zealand Citizen

CURRENT POSITION:

Director of Research, Ocean and Earth Science, National Oceanography Centre Southampton, University of Southampton, European Way, Southampton, SO14 3ZH, UK; Sept, 2012–

Deputy Director (Research) – Southampton Marine and Maritime Institute (SMMI); Apl 2012–.

Professor of Geochemistry (since Sept., 2007), Ocean and Earth Science, University of Southampton

POSTS HELD:

2011-2012: Head PhD Recruitment, Graduate School National Oceanography Centre Southampton

2011-2012: Acting Head – Graduate School of the National Oceanography Centre Southampton

2006-2009 Co-Chair NOCS Geochemistry Research Group

2004-2007 University Reader, University of Southampton

2003-2009 Co-Chair Geology and Geophysics Curricular Committee.

1999-2004 University Lecturer, University of Southampton

1997-1999 Assistant Research Scientist, Dept. Geological Sciences, Univ. Michigan

1993-1997 Post-Doctoral Research Fellow, Dept. Geological Sciences, Univ. Michigan

DEGREES:

1993: Ph.D., Earth Sciences, University of Cambridge, UK.

1987: M.Sc. (with Distinction), Geology, University of Otago, New Zealand

1985: B.Sc. (Hons.), Geology, University of Otago, New Zealand

SHIPBOARD/OCEAN DRILLING EXPERIENCE, EXPEDITIONS AND COMMUNITY SERVICE

2011: Co-Chief Scientist, IODP Expedition 335: Superfast 4 (Apr–June, 2011)

2001: Co-convener "Geological carbon capture and storage in mafic and ultramafic rocks" Oman

2010-2012: IODP Science Advisory Structure Executive Committee (SASEC) and SIPCom

2010-2011: IODP Renewal Science Plan Working Group

Co-I RRS *James Cook* JC021 – Hess Deep Site Survey, Jan-Feb, 2008

Co-I RRS *James Cook* JC018 – Montserrat – Ash-Seawater Interactions, Dec, 2007

2005: Co-chief Scientist on IODP Expeditions 309312, Superfast 2-3 (Petrologist on Superfast 3)

2004-2009: Editor: G-Cubed Special Theme – "Formation & Evolution of the Ocean Crust"

2003 Leader – Australian Antarctic Division Project #2327 "Hydrothermal alteration of Macquarie Island", 55th Australian National Antarctic Research Expedition

2002: Co-chief Scientist on ODP Leg 206 Superfast Spreading Rate Crust

2000 – 2006: UK representative on ODP/IODP Science Steering Evaluation Panel

2000 – 2006: UK-ODP/IODP Steering and Peer-review Committee

1993 to 1998: Petrologist: ODP Leg 183, Kerguelen Plateau; 169, Sedimented Ridges II; 163, SE Greenland Margin; 148, Costa Rica Rift.

PROFESSIONAL SOCIETIES:

American Geophysical Union, Geochemistry Society, Geoscience Soc. NZ, Member Royal Soc. NZ.

AWARDS, PRIZES AND SCHOLARSHIPS:

2009 Excellence in Reviewing Citation – AGU – G-cubed, Tarduno, Ed., EOS 90(28) 14 July

2008 Roy. Soc. NZ: International Science & Technology (ISAT) Linkages Exchange.

1995 Sokol Postdoctoral Fellowship, University of Michigan.

1991 Cambridge Philosophical Society Research Studentship.

1988 William Georgetti Scholarship for Social, Cultural & Economic Development of NZ

1988 Commonwealth Scholarship (Cambridge).

1987 Kendall Postgraduate Bursary of Science, Churchill College, Cambridge.

1987 Cambridge Commonwealth Trust Overseas Student Bursary.

1986 James Park Scholarship in Economic Geology (University of Otago).

MEDIA ENGAGEMENT (2011 ONWARDS – principally about to Teagle & Ildefonse Nature 2011 – on MoHole):

Huffington Post – "Talk Nerdy to Me" (29/10/2012); CNN (01/10/2012); New Scientist (30/03/2012); National Geographic Magazine (01/01/2012); BBC Radio 4 (23/03/11); BBC Five Live Drive (23/03/11); NZ National Programme – Morning Report (24/03/11); ABC-Melbourne (24/03/2011); USA National Public Radio Science Friday (25/03/2011); Radio Ireland (29/03/11); ABC-Sydney (30/03/11); Costa Rica Television (13/04/2011); Reuters (13/04/2011);

SELECTED RECENT PUBLICATIONS

Loxham, M, Cooper, M.J., Gerlofs-Nijland, M.E., Flemming, C.R., D.E., Palmer, M.R., **Teagle**, D.A.H., Physicochemical Characterization of Airborne Particulate Matter at a Mainline Underground Railway Station, Environmental Science and Technology, submitter Nov., 2012

Gao, Y.; Vils, F.; Cooper, K. M.; Banerjee, N.; Harris, M.; Hoefs, J.; **Teagle**, D. A. H.; Casey, J. F.; Elliott, T.; Laverne, C.; Alt, J. C.; Muehlenbachs, K. (2012) Downhole variation of lithium and oxygen isotopic compositions of oceanic crust at East Pacific Rise, ODP Site 1256 Geochem. Geophys. Geosyst., Vol. 13 Q10001, 24 PP., 2012 doi:10.1029/2012GC004207.

Teagle, D.A.H., Ildefonse, B., Blum, P., and the Expedition 335 Scientists, 2012. *Proc. IODP,* 335: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.335.2012

Teagle, D.A.H., Ildefonse, B., Blum, P., and Expedition 335 Shipboard Scientists (2012) IODP Expedition 335: Deep Sampling in ODP Hole 1256D. Scientific Drilling 13:28-34, doi:10.2204/iodp.sd.13.04.2011

Hunt, J.E., Wynn, R.B., Masson, D.G., Talling, P.J., **Teagle**, D.A.H., (2011) Sedimentological and geochemical evidence for multistage failure of volcanic island landslides: a case study from Icod landslide on north Tenerife, Canary Islands. Geochem. Geophys. Geosys. 12, Q12007, doi:10.1029/2011GC003740

Coggon, R. M., **Teagle**, D. A. H., and Dunkley Jones, T., (2011), Comment on "What do we know about the evolution of Mg to Ca ratios in seawater?" by Wally Broecker and Jimin Yu, Paleoceanography, 26, PA3224, doi:10.1029/2011PA002186.

Expedition 335 Scientists, (2011). Superfast spreading rate crust 4: drilling gabbro in intact ocean crust formed at a superfast spreading rate. IODP Prel. Rept., 335. doi:10.2204/iodp.pr.335.2011

Coggon, R.M., and **Teagle, D.A.H.,** (2011) Hydrothermal calcium carbonate veins reveal past ocean chemistry, Trends. Anal. Chem. 30(8):1252-1267. doi:10.1016/j.trac.2011.02.011

Teagle, D.A.H., and Ildefonse, B. (2011) Journey to the mantle of the Earth, Nature 471:437-439

Bickle, M.J., Pälike, H., and **Teagle**, D.A.H., (2010) Secrets of the sea floor, Nature Geoscience, 4:3-4

Teagle, D.A.H, Ildefonse, B., and Blum, P., 2010. Superfast spreading rate crust 4. IODP Sci. Prosp., 335. doi:10.2204/iodp.sp.335.2010

Coggon, R.M., **Teagle**, D.A.H., Smith-Duque, C.E., Alt, J.C., Cooper, M.J., (2010) Reconstructing past seawater Mg/Ca and Sr/Ca from mid-ocean ridge flank hydrothermal $CaCO_3$ veins. Science 327:1114-1117

Alt, J.C. Laverne, C., Coggon, R.M., **Teagle**, D.A.H., Banerjee, N.R., Morgan, S., Smith-Duque, C.E., Harris, M., Galli, L., (2010) The Subsurface Structure of a Submarine Hydrothermal System in Ocean Crust Formed at the East Pacific Rise, ODP/IODP Site 1256, Geochem. Geophys. Geosys.11(10) Q10010, doi:10.1029/2010GC003144

Pitcairn, I.K., Olivo, G.R., **Teagle**, D.A.H., and Craw, D., (2010) Sulfide and oxide evolution during metamorphism of the Otago and Alpine Schists, New Zealand. Canadian Mineralogist, 48: 1267-1295. doi:10.3749/canmin.48.5.000

Tominaga, M., **Teagle**, D. A. H. Alt, J. C. and Umino, S., (2009), Determination of the volcano-stratigraphy of oceanic crust formed at superfast spreading ridge: Electrofacies analyses of ODP/IODP Hole 1256D, Geochem. Geophys. Geosyst., 10, Q01003,doi:10.1029/2008GC002143

Vance, D., **Teagle**, D.A.H., Foster, G.L., (2009) Variable Quaternary chemical weathering fluxes and imbalances in marine geochemical budgets. Nature, 458:493-496, doi:10.1038/nature07828

Teagle D. A. H., Alt J. C., Umino S., Miyashita S., Banerjee N. R., Wilson D. S., and Expedition 309/312 Scientists. (2006). Proceedings of the Integrated Ocean Drilling Program Volume 309/312 Expedition Reports "Superfast 2 and 3 – An intact section of ocean crust formed at a superfast spreading rate" Integrated Ocean Drilling Program Management International, Inc. (DVD)

Wilson D. S., **Teagle** D. A. H., Alt J. C., Banerjee N. R., et al., (2006) Drilling to gabbro in intact ocean crust. Science 312, 1016-1020.

CURRICULUM VITAE

BIOGRAPHICAL SKETCH- ***Raeid M. M. Abed***

Assistant Professor
Sultan Qaboos University
Biology Department
Sultan Qaboos University
Al-Khoud 123, Oman

Tel: 968-2414-2406
Fax: 968-2414-1437
E-mail: rabed@squ.edu.om

PROFESSIONAL PREPARATION:

1993	B.Sc. (*first class*) in Microbiology, Zoology & Chemistry, Bangalore University, India
1995	M.Sc.(*first class*) in Biotechnology, Mysore University, India
2001	Ph.D. in Marine Microbiology, Max-Planck Institute for Marine Microbiology, Germany
2001- 2003	Postdoctoral Fellow at Max-Planck Institute for Marine Microbiology, Bremen, Germany

APPOINTMENTS:

08/2007- present	Assistant Professor at the Biology Department, College of Science, Sultan Qaboos University, Al-Khoud, Oman
01/2004- 08/2007	Research Scientist and Project Leader at Max-Planck Institute for Marine Microbiology, Bremen, Germany

FIVE PUBLICATIONS MOST RELEVANT TO THE PROPOSED RESEARCH:

1. Weber M., Lott C., Kohls K., Polerecky L., **Abed R. M. M.**, Ferdelman T., Fabricius K. E., de Beer D. (2012) The mechanism of coral damage by runoff sediments. *Proceedings of The National Academy of Sciences of the United States of America* (PNAS). Published online. doi: 10.1073/pnas.1100715109.
2. Kohls K., **Abed R. M. M.**, Polerecky L., Weber M., de Beer D. (2010) Halotaxis of cyanobacteria in an intertidal hypersaline microbial mat. *Environmental Microbiology* 12: 567-575.
3. Neretin L. N., **Abed R. M. M**., Schippers A., Schubert C., Kohl K., Kuypers M. M. M. (2007) Inorganic carbon fixation by sulfate-reducing bacteria in the Black Sea water column. *Environmental Microbiology*. 9: 3019-3024.
4. **Abed R. M. M.**, Kohls K., de Beer D. (2007) Effect of salinity changes on the bacterial diversity, photosynthesis and oxygen consumption of cyanobacterial mats from an intertidal flats of the Arabian Gulf. *Environmental Microbiology*. 9: 1384-1392.
5. **Abed R. M. M.**, Polerecky L., Al Najjar, M., de Beer, D. (2006) Effect of temperature on photosynthesis, light respiration and sulfide production in an extremely hypersaline cyanobacterial mat. *Aquatic Microbial Ecology*. 44:21-30.

FIVE OTHER SIGNIFICANT PUBLICATIONS:

1. **Abed R. M. M.**, Ramette A., Huebner V., De Dekker P., de Beer D. (2012) Microbial diversity of aeolian dust sources from saline lake sediments and biological soil crusts in arid southern Australia. *FEMS Microbiology Ecology* 80: 294-304.

2. **Abed R. M. M.**, Al-Kindi S., Schramm A., Barry M.J. (2011) Short-term effects of flooding on bacterial community structure and nitrogenase activity in microbial mats from a desert stream. *Aquatic Microbial Ecology*. 63:245-254
3. **Abed R. M. M.**, Al-Kharusi S., Schramm A., Robinson M. (2010) Bacterial diversity, pigments and nitrogen fixation of biological desert crusts from the Sultanate of Oman. *FEMS Microbiology Ecology* 72: 418-428.
4. **Abed R. M. M.**, Safi N., Köster J., de Beer D., El-Nahhal Y., Rullkötter J., Garcia-Pichel F. (2002) Microbial diversity of a heavily polluted microbial mat and its community changes following degradation of petroleum compounds. *Applied and Environmental Microbiology* 68: 1674-1683.
5. **Abed R. M. M.**, Schönhuber W., Amann R., Garcia-Pichel F. (2002) Picobenthic cyanobacterial populations revealed by 16S rRNA-targeted *in situ* hybridization. *Environmental Microbiology* 4: 375-382.

.

SYNERGISTIC ACTIVITIES:

- *Ad hoc* reviewer of manuscripts (Environmental Microbiology, Environmental Microbiology Reports, FEMS Microbiology Ecology, Journal of Applied Microbiology, Applied and Environmental Microbiology, Microbial Ecology, Water Research, Marine Pllution Bulletin and Journal of Phycology) and research proposals - NSF (USA), NOW (Netherlands), ANR (France) and GA CR (Czech Republic)-
- Conference Chair (ISBCSAR 2013). International Symposium on Biotechnology and Conservation of Species from Arid Regions
- Invited Speaker (Germany, USA, Belgium, UAE and Saudi Arabia)
- Research Committee. SQU from 2008-now.
- Organizer of several workshops on molecular and microsensor techniques (Barcelona, Dubai and Oman)
- Consultant by oil companies in Oman on bioremediation projects
- Distinguished Lecturer- SQU 2012
- Distinguished Researcher- SQU 2010
- Obtained Research Grant from funding agencies in Germany (DFG, EU) and Oman (TRC, HM)

GARDUATE AND POSTDOCTORAL STUDENTS SUPERVISED: Postdoctoral- (1, Elke Allers); Graduate- (4 Ph.D., 1 at the MPI (Katharina Kohls) and 3 at SQU), (20 M.Sc., 10 at the MPI and 10 at SQU)

COLLABORATORS WITHIN THE PAST 48 MONTHS:
Dirk de Beer, Peter Stief and Phyllis Lahm (MPI-Germany), Natuschka Lee (TUM, Munich), T. McGenity (UE, UK), S. Golubic (BU, USA), K. Palinska (ICBM, Germany), S. Dobretsov (SQU, Oman), T. Vogel (UL, France), S. Kumar (USM, Malaysia)

GRADUATE ADVISORS AND POSTDOCTORAL SPONSORS:

Dr. Katharina Kohls	Ph.D. Advisor	DFG, Germany
Samiha Al-Kharusi	Ph.D. Advisor	TRC, Oman
Sumiya Al-Kindi	Ph.D. Advisor	TRC, Oman
Thirumahal Muthukrishnan	Co-Advisor	HM, Oman

CVURRICULM VITAE

Personal Information

Name:	Title:	Date of Birth:	Place of Birth:	Nationality:
Ali Salim Ali Al- Rajhi	Geologist	19/12/1969	Oman	Omani

Marital status:
Married
Address:
P.O. Box: 550 Muscat , PC:113,
Sultanate of Oman

Tel. No.:
Res.: (+968) 26714000
GSM: (+968) 99360366

Academic Packground

Degree	Major	School	Degree Date
PhD Degree	3D Modeling of Sur Tertiay Basin, eastern Oman	JVRCCS Sultan Qaboos University, Oman	2008
MSc Degree	Sedimentology	Bern University (Switzerland)	1998
Bachelors Degree	Earth Science	Sultan Qaboos University (OMAN)	1991

Professinal Experience

Start. Date	End. Date	Company, Location	Title	Responsibilities
10/2009	Crt.	Ministry of Commerce and Industry (MOCI)	Asistant Director General of Minerals	Replacement of the director general in his absence. Supervising various work activities of the departments. Contribution to future plans and stratigies of the Directorate. Conduction of reseach. Supervising mineral agreement with local and international companies, organisation and universities. Giving advice concerning mineral permits.
4/2007	10/2009	Ministry of Commerce and Industry (MOCI)	Director of Research and Geological Survey	Supervising activities of the geological survey and georesearch in the Sultanate. Supervising the production of geological maps and updating old ones at different scales. Making available data base for geosciences through the GIS department for investor in mieral sector. Preparing technical specifications for geological projects to be implimented by forigen and local companies. Coordinating with other government departments concerning siesmic activities, natural hazards, dams and other construction projects.
9/2006	4/2007	Ministry of	Head of non-	Studying available geological data such as

		Commerce and Industry (MOCI)	metalic minerals exploration department	geological maps and reports. Evaluating rocks and industrial minerals. Studying non-metalic mineral concession areas and issuing prospecting permits and exploration licenses for minerals investors.
9/2002	9/2006	Joint Virtual Reality Center for Carbonate Studies (JVRCCS) Sultan Qaboos University, Oman & Bordeaux University, France	PhD candidate	"3D modeling of Sur Tertiary basin, eastern Oman".
1/2000	9/2002	Ministry of Commerce and Industry (MOCI)	Head of non metalic minerals exploration department	Evaluating industrial rocks and minerals. Responsible for issuing prospecting and exploration permits.
6/1998	12/1999	Ministry of Commerce and Industry (MOCI)	Geologist	Carried out geological work, prospected for metalic and non-metalic minerals areas. Worked as a counter-part with JICA group for Exploration methodology and the discovery of massive sulphide deposites in the Batinah Coastal area.
4/1996	5/1998	(Bern University) Switzerland	MSc candidate	Studied the Lithostratigraphy of the Tertiary Formations in the Batain Plain,Sur region. Mapping of Sur sheet at the scale of 1:100,000.
12/1991	3/1996	Ministry of Petrol. & Mineral (MPM) Oman	Geologist	Carried out geological work (mapping, sampling ... etc) and studies for the following: - Al Kamil Coal fields Development project. - Ghabah Gypsum Project. –Hatat Lead and Zinc Project.

Additional Responsibilities

- Member of the Energy and Indusries Sector in the Reaseach Council.
- Member of the Oman Geological Society.

Publications:

2001 PETERS, TJ., AL BATTASHY, M., BLÄSI, R., HAUSER, M., IMMENHAUSER, A**.**, MOSER, L. AND **AL RAJHI**, A. Geological map of Sur and Al Ashkharah – Explanatory Notes to Sheet **NF 40-8F** and Sheet **40-12C**. Directorate General of Minerals, Oman Ministry of Commerce and Industry.

Shoji Arai

PERSONAL INFORMATION

Date of Birth: OCTOBER 27, 1948
Position: PROFESSOR OF EARTH SCIENCES, KANAZAWA UNIVERSITY

EDUCATION

B.S. in Geology, University of Tokyo, Tokyo, Japan: March 1971.
M.S. in Geology, University of Tokyo, Tokyo, Japan: March 1973.
DSc. in Geology, University of Tokyo, Tokyo, Japan: March 1976.

EMPLOYMENT HISTORY

April 1976-March 1977: Research Associate, University of Tokyo, Japan
April 1977-April 1979: Research Associate, Shizuoka University, Japan
May 1979-March 1981: Assistant Professor, Shizuoka University, Japan
April 1981-November 1985: Assistant Professor, University of Tsukuba, Japan
December 1985-March 1989: Associate Professor, University of Tsukuba, Japan
April 1989-present: Professor, Kanazawa University

SOCIAL ACITIVITY

Member of IODP Planning Committee of Japan (2002-2005)
Member of IODP Science Planning Committee of Japan (2003-2006)
Chairman of Committee of Earth's Interior of Japanese Drilling Earth Science Consortium (2003-2006)
Co-chair of Science Steering and Evaluation Panel of IODP (2003-2005)
Member of ICDP SAG (Science Advisory Group) (2007-2009)
Member of IODP SASEC (Science Advisory Structure Executive Committee) (2010-2012)
President of Japanese Association for Petrologists, Mineralogists and Economic Geologists (2002-2004)

RESEARCH INTEREST (SEE BELOW)

I have been working on petrology of deep-seated rocks (mainly peridotite and related rocks) from the ocean floor, the island arc and continent. I have also been interested in the geological aspects of emplacement of mantle materials.

List of Publication (selected from 253 peer-reviewed papers)

Akizawa, N., Arai, S. and Tamura, A. (2012) Behavior of MORB magmas at uppermost mantle beneath a fast-spreading axis: an example from Wadi Fizh of the northern Oman ophiolite. Contrib. Mineral. Petrol., 164, 601-625.

Arai, S., Ishimaru, S. and Mizukami, T. (2012) Methane and propane micro-inclusions in olivine in titanoclinohumite-bearing dunites from the Sanbagawa high-P metamorphic belt, Japan: hydrocarbon activity in a subduction zone and Ti mobility. Earth Planet. Sci. Lett., 353-354, 1-11.

Gahlan, H.A., Arai, S., Abu El-Ela, F.F. and Tamura, A. (2012) Origin of wehrlite cumulates in the Moho Transitio Zone of the Neoproterozoic Ras Salatit Ophiolite, Central Eastern Desert, Egypt. Contrib. Mineral. Petrol., 163, 225-241.

Ishimaru, S. and Arai, S. (2011) Peculiar Ca-Mg-Si metasomatism along a shear zone within the mantle wedge: inference from fine-grained xenoliths from Avacha volcano, Kamchatka. Contrib. Mineral. Petrol., 161, 703-720.

Santosh, M., Rajesh, V. J., Tsunogae, T. and Arai, S. (2010) Diopsidites from a Neoproterozoic-Cambrian

suture in southern India. Geol. Mag., 147, 777-788.

Khedr, M. Z., Arai, S., Tamura, A. and Morishita, T. (2010) Clinopyroxenes in high-P metaperidotites from Happo-O'ne, central Japan: implication for wedge-transversal chemical change of slab-derived fluids. Lithos, 119 439-456.

Rajesh, V.J., Arai, S., Santosh, M. and Tamura, A. (2010) LREE-rich hibonite in ultrapotassic rocks in southern India. Lithos, 115, 40-50.

Khedr, M.Z. and Arai, S. (2010) Hydrous peridotites with Ti-rich chromian spinel as a low-temperature forearc mantle facies; evidence from the Happo-O'ne metaperidotites (Japan). Contrib. Mineral. Petrol., 159, 137-157.

Arai, S. (2010) Possible recycled origin for ultrahigh-pressure chromitites in ophiolites. J. Mineral. Petrol.Sci., 105, 280-285.

Payot, B.D., Arai,, S., Tamayo, R.A., Jr. and Yumul, G.P., Jr. (2009) What underlies the Philippine Island Arc?: Clues from the Calaton Hill, Tablas Island, Romblon (central Philippines). Jour. Asian Earth Sci., 36, 371-389.

Ishimaru, S, Arai, S & Shukuno, H (2009) Metal-saturated peridotite in the mantle wedge inferred from metal-bearing peridotite xenoliths from Avacha volcano, Kamchatka. Earth Planet Sci Lett, 284, 352-360.

Arai, S. & Ishimaru, S. (2008) Insights into petrological characteristics of the lithosphere of mantle wedge beneath arcs through peridotite xenoliths: A review. Jour. Petrol., 49 (D.H. Green vol.), 665-695.

Tamura, A., Arai, S., Ishimaru, S. and Andal, E.S. (2008) Petrology and geochemistry of peridotites from IODP Site U1309 at Atlantis Massif, MAR 30oN: micro- and macro-scale melt penetrations into peridotites. Contrib. Mineral. Petrol., 155, 491-509. (doi: 10.1007/s00410-007-0254-0)

Arai, S., and Y. Takemoto (2007) Mantle wehrlite from Hess Deep as a crystal cumulate from an ultra-depleted primary melt in East Pacific Rise, Geophys. Res. Lett., 34, L08302, doi:10.1029/2006GL029198.

Python, M., Ceuleneer, G., Ishida, Y., Barrat, J.-A. and Arai, S. (2007) Oman diopsidites: a new lithology diagnostic of very high temperature hydrothermal circulation in mantle peridotite below oceanic spreading centres. Earth Planet. Sci. Lett., 255, 289-305.

Ishimaru, S., Arai, S., Ishida, Y., Shirasaka, M., and Okrugin, V.M. (2007) Melting and multi-stage metasomatism in the mantle wedge beneath a frontal arc inferred from highly depleted peridotite xenoliths from the Avacha volcano, southern Kamchatka. Jour. Petrol., 48, 395-433.

Arai, S. (1994) Characterization of spinel peridotites by olivine-spinel compositional relationships: Review and interpretation. Chem. Geol., 113, 191-204.

Arai, S. and Yurimoto, H. (1994) Podiform chromitites of the Tari-Misaka ultramafic complex, southwestern Japan, as mantle-melt interaction products. Econ. Geol., 89, 1279-1288.

Arai, S. (1992) Chemistry of chromian spinel in volcanic rocks as a potential guide to magma chemistry. Mineral. Mag., 56, 173-184.

Arai, S. & Hirai, H. (1985) Relics of H_2O fluid inclusions in mantle-derived olivine. Nature, 318, 276-277.

Arai, S. (1975) Contact metamorphosed dunite-harzburgite complex in the Chugoku district, western Japan. Contrib. Mineral. Petrol., 52, 1-16.

CV and list of publications
Wolfgang Bach

Affiliation:	University of Bremen
	Geoscience Department
	Klagenfurter Str., 28359 Bremen
Phone:	0421-21865400
Fax:	0421-21865429
e-mail:	wbach@uni-bremen.de

Academic education and career

1991:	Diploma in Mineralogy (University of Giessen)
1996:	PhD (Dr. rer.nat.) in Geochemistry (University of Giessen)

Employment

1995 - 1996	Scientific Associate, University of Potsdam
1996 – 1999	Postdoctoral Scholar, Woods Hole Oceanographic Institution
1999 – 2003	Assistant Scientist, Woods Hole Oceanographic Institution
2003 – 2005	Associate Scientist, Woods Hole Oceanographic Institution
2005 – present	Professor (W3), University of Bremen

Major Research Interests

- Geochemical and isotopic evolution of the Earth's crust and mantle
- Ocean-lithosphere exchange budgets
- Seafloor hydrothermal systems
- Thermodynamics and kinetics of fluid-rock interactions
- Bioenergetics of chemosynthesis-based ecosystems

Expert Activities

- Reviewer for Nature, Science, PNAS, Geology, Earth and Planetary Science Letters, Journal of Petrology, Geochimica et Cosmochimica Acta, Chemical Geology, Lithos, Astrobiology, Geobiology,
- Referee for DFG, NSF, NERC, SNSB, IODP
- Associate Editor for Geochimica et Cosmochimica Acta
- Organization of the ECORD Summer School on Mid-Ocean Ridge Processes in 2009
- Participation as lecturer in four Ridge/InterRidge Summer Schools
- Associate Partner of Coordination Action for Research Activities on life in Extreme Environments (CAREX)
- Member of Scientific Committee for Oceanic Research (SCOR) Working Group on HydrothermalEnergy Transfer and its Impact on the Ocean Carbon Cycles
- Senior Personnel of the Seamount Biogeoscience Network
- Participant of the Deep Sea & Subsea Frontier (DS^3F); Working Package 1: Lithosphere – biosphere interaction and resources
- Co-chair of Steering Committee IODP New Ventures in Exploring Scientific Targets
- Chair of Academic Programs, Geoscience Department (2008-2010)
- Member of the InterRidge Workgroup Deep Earth Sampling
- Session and Theme convenor in numerous Goldschmidt and AGU conferences
- Representative of the IODP Science Steering and Evaluation Panel (2003-2005)
- Participant in five ODP cruises and co-chief scientist of one IODP cruise; participant in nine other cruises and chief scientist of three.
- Supervisor of five completed Ph.D. Theses and three pending ones

Relevant Recent Publications

Bach W, Jöns N, and Klein F (2012) Metasomatism of the Ocean Crust. In: Metasomatism and Metamorphism (Harlov D, Austrheim H, editors) *Lecture Notes in Earth Sciences*, Springer, 253-288, DOI: 10.1007/978-3-642-28394-9_8

Ziebis W, McManus J, Ferdelman T, Schmidt-Schierhorn F, Bach W, Muratli J, Edwards K, Villinger H (2012) Interstitial fluid chemistry of sediments underlying the North Atlantic Gyre and the influence of subsurface fluid flow. *EPSL* 323-324, 79-91

Berndmeyer C, Birgel D, Brunner B, Wehrmann L, Jöns N, Bach W, Arning E, Föllmi K, Peckmann J (2012): The influence of bacterial activity on phosphorite formation in the Miocene Monterey Formation, California. *Palaeogeography, Palaeoclimatology, Palaeoecology* 317-318, 171-181

Hentscher M, Bach W (2012) Geochemically induced shifts in catabolic energy yields explain past ecological changes of diffuse vents in the East Pacific Rise 9°50′N area. *Geochem. Trans.* 13:2. doi:10.1186/1467-4866-13-2

Bach W, Rosner M, Jöns N, Rausch S, Robinson LF, Paulick H, Erzinger J (2011) Carbonate veins trace subseafloor circulation of seawater during uplift of mantle rocks: ODP Leg 209. *EPSL* 311: 242-252.

Petersen JM, Zielinski FU, Pape T, Seifert R, Moraru T, Amann R, Hourdez S, Girguis PR, Wankel SD, Barbe V, Pelletier E, Fink D, Borowski C, Bach W, Dubilier N (2011) Hydrogen is an energy source for hydrothermal vent symbioses. *Nature* 476: 176-180

Amend JP, McCollom TM, Hentscher M, Bach W (2011) Metabolic Energy for Chemolithoautotrophs in Peridotite-Hosted and Basalt-Hosted Hydrothermal Systems *Geochim. Cosmochim. Acta* 75: 5736-5748

John T, Scambelluri M, Frische M, Barnes JD, Bach W (2011) Dehydration of subducting serpentinite: implications for halogen mobility in subduction zones ... *Earth Planet Sci Lett* 308: 65-76

Edwards KJ, Glazer BT, Rouxel OJ, Bach W, Emerson D, Davis RE, Toner BM, Chan CS, Tebo BM, Staudigel H, Moyer CL (2011) Ultra-diffuse Hydrothermal Venting Supports Fe-oxidizing Bacteria ... *The ISME Journal: Multidisciplinary J. Microbial Ecol.* doi:10.1038/ismej.2011.48

Orcutt BN, Bach, W, Becker K, Fisher AT, Hentscher M, Toner BM, Wheat CG, and Edwards KJ (2010) Colonization of subsurface microbial observatories deployed in young ocean crust *The ISME Journal: Multidisciplinary Journal of Microbial Ecology* doi:10.1038/ismej.2010.157

Jöns N, Bach W, and Klein F (2010) Magmatic influence on reaction paths and element transport during serpentinization. *Chemical Geology* 274: 196-211

Bach W, and Früh-Green GL (2010) Alteration of the Oceanic Lithosphere ... *Elements* 6: 173-178.

Santelli CM, Banerjee N, Bach W, & Edwards KJ (2010) Tapping the Subsurface Ocean Crust Biosphere: Low Biomass and Drilling-Related Contamination Calls for Improved Quality Controls. *Geomicrobio J. l* 27: 158-169

Bach W, Ravelo C, Behrmann J, Camoin G, Duncan R, Edwards K, Gulick S, Inagaki F, Pälike H, and Tada R (2010) IODP New Ventures in Exploring Scientific Targets (INVEST): Defining the New Goals of an International Drilling Program. *Scientific Drilling* 5: 54-64

Eickmann B, Bach W, Kiel S, Reitner J, and Peckmann J (2009) Evidence for cryptoendolithic life in … pillow basalts of Variscan orogens, Germany. *Palaeoceanog, Palaeoclimat, Palaeoeco* 283: 120–125

Klein F, Bach W, Jöns N, McCollom TM, Moskovitz B, and Berquo T (2009) Iron partitioning and hydrogen generation during serpentinization of abyssal peridotites from 15°N on the Mid-Atlantic Ridge *Geochimica et Cosmochimica Acta* 73(22): *6868-6893*

Klein F & Bach W(2009) Fe-Ni-Co-O-S phase relations in peridotite-seawater interaction *J. Petrol.* 50: 37-59

Bach W & Klein F (2009) Petrology of rodingites: Insights from geochemical reaction path modeling, *Lithos* 112: 103-117

Jöns N, Bach W, and Schroeder T (2009) Formation and alteration of plagiogranites in an ultramafic-hosted detachment fault at the Mid-Atlantic Ridge (ODP Leg 209), *Contrib. Mineral. Petrol.* 157: 625-639

McCollom TM, and Bach W (2009) Thermodynamic constraints on hydrogen generation during serpentinization of ultramafic rocks, *Geochim. Cosmochim. Acta* 73: 856-879

Santelli CM, Orcutt BN, Banning E, Bach W, Moyer CL, Sogin ML, Staudigel H, and Edwards KJ (2008) Abundance and diversity of microbial life in ocean crust, *Nature* 453: 653 - 656

KEIR BECKER

I. Education and Appointments: A.B., 1975, Physical Sciences, cum laude, Harvard College Ph.D., 1981, Oceanography, Scripps Institution of Oceanography, UC San Diego Assistant Research Geophysicist, Scripps Institution of Oceanography, and Staff Scientist, Deep Sea Drilling Project, 1981-1985 Assistant Professor, RSMAS - MGG, University of Miami, 1985-1987 Associate Professor, RSMAS - MGG, University of Miami, 1987-1994 Professor, RSMAS - MGG, University of Miami, 1994-present

II. Activities Related to Scientific Ocean Drilling:

A. Shipboard Participant, Scientific Ocean Drilling (* = Chief or Co-Chief Scientist): DSDP Legs 70, 78B, 83, 92 ODP Legs 102, 109, 111*, 118, 137*, 139, 148, 158, 168, 174B*, 190, 196* IODP Expeditions 301, 327, 336 (Participant in 33 other oceanographic cruises since 1978; total time at sea ~5 yrs)

B. JOI-USSAC Distinguished Lecturer, 1994-1995

C. DSDP/ODP/IODP Panel Service and Workshop Co-Convener/Steering Committees JOIDES Downhole Measurements Panel (liaison or member), 1982-1990 JOIDES Tectonics Panel, 1984-1986 JOIDES Lithosphere Panel, 1986-1990 USSAC, 1988-1990 USSAC Executive Committee, 1989-1990 JOIDES Planning Committee, 1990-1994 Chairman, JOIDES Engineering Development Review Committee, 1993-1994 Co-convener, SCORE (Sediment-Covered Ocean Ridges) Workshop, Portland, 1994 Co-convener, BOREHOLE Observatory Workshop, Miami, 1994 Steering Committee, ION/ODP Workshop, Marseilles, 1995 COMPOST-II (host), Miami, 1997 Co-chair, JOIDES Long-Term Observatories PPG, 1997-1999 Co-convener, Advanced CORKs Workshop, Scripps, 1997 and College Station, 1998 Co-convener, Hydrogeology of Oceanic Lithosphere Workshop, Santa Cruz, 1998 Chairman, JOIDES/ODP Science Committee (SCICOM), 2001-2003 Chairman, JOIDES/ODP Operations Committee (OPCOM), 2001-2003 Chairman, IODP Arctic Scoping Group (for ACEX Expedition 302), 2003 IODP Science Planning Committee (SPC), 2003-2007 (Vice-chair, 2004-2005) Chairman, IODP Science Planning Committee (SPC), 2005-2007 IODP Science Advisory Structure Executive Committee (SASEC), 2006-07, 2008-11 IODP-MI Thematic Review Committee, Deep Biosphere & Subseafloor Ocean, 2009 IODP-MI Second Triennial Review Committee, 2010 IODP Science Implementation and Policy Committee (SIPCom), 2012-present

D. Director, final rotation of JOIDES Office, 2001-2003

E. Co-originator, ODP/IODP CORK hydrogeological observatories, with E. Davis, B. Carson, and T. Pettigrew. Participant in 7 ODP/IODP CORK-installation and 21 submersible CORK-servicing expeditions (2 of 7 and 12 of 21 as chief scientist)

F. ODP third-party downhole tool developer: Drillstring packer (1984-1991; transferred to ODP-TAMU, 1991) Downhole flowmeter, 1990-1991 High-temperature, memory temperature logging tool, 1993-1994

G. Principal Investigator, 18 NSF-ODP grants for CORKS and downhole tools since 1984

III. Other Significant National/International Committee Service

RIDGE Steering Committee, 1994-1997 Co-Chairman, DEOS Steering Committee (predecessor to OOI), 1997-2000 NAS/NRC Committee on Seafloor Observatories, 1999-2000 NAS/NRC Committee on Future Needs in Deep Submergence Science, 2003 ORION Science and Technology Advisory Committee (STAC), 2005-2007 NSF/WHOI Replacement HROV Oversight Committee (RHOC), 2005-present ESF EUROMARC Review Panel, 2006-2011 NSF-OCE Integrative Programs Section Committee of Visitors, 2008

IV. Ten Significant DSDP/ODP/IODP-related Publications (out of nearly 100 drilling publications)

Becker, K., R.P. Von Herzen, T.J.G. Francis, R.N. Anderson, J. Honnorez, A.C. Adamson, J.C. Alt, R. Emmermann, P.D. Kempton, H. Kinoshita, C. Laverne, M.J. Mottl, and R.L. Newmark, 1982, In situ electrical resistivity and bulk porosity of the oceanic crust, Costa Rica Rift, Nature, 300, 594-598.

Becker, K., M.G. Langseth, R.P. Von Herzen, and R.N. Anderson, 1983, Deep crustal geothermal measurements, Hole 504B, Costa Rica Rift, J. Geophys. Res., 88, 34473457.

Becker, K., et al., 1989, Drilling deep into young oceanic crust at Hole 504B, Costa Rica Rift. Rev. Geophys., 27, 79-102.

Davis, E., Becker, K., Pettigrew, T., Carson, B., and MacDonald, R., CORK: a hydrologic seal and downhole observatory for deep ocean boreholes, in Davis, E., Mottl, M., et al., Proc. ODP. Init. Repts., 139, 43-53.

Becker, K., and Fisher, A.T., 2000, Permeability of upper oceanic basement on the eastern flank of the Juan de Fuca Ridge determined with drill-string packer experiments, J. Geophys. Res., 105, 897-912.

Becker, K., and Davis, E.E., 2003, New evidence for age variation and scale effects of permeabilities of young oceanic crust from borehole thermal and pressure measurements, Earth Planet. Sci. Lett., 210, 499-508.

Becker, K., Davis, E.E., Spiess, F.N., deMoustier, C.P., 2004, Temperature and video logs from the upper oceanic crust, Holes 504B and 896A, Costa Rica Rift flank: implications for the permeability of upper oceanic crust, Earth Planet. Sci. Lett., 222, 881-896.

Becker, K., and Davis, E.E., 2005, A review of CORK designs and operations during the Ocean Drilling Program, Proc. IODP, Exp. Rept., 301, doi:10.2204/iodp.proc.301.104.2005.

Becker, K., and A. T. Fisher, 2008, Borehole packer tests at multiple depths resolve distinct hydrologic intervals in 3.5-Ma upper oceanic crust on the eastern flank of Juan de Fuca Ridge, J. Geophys. Res., 113, B07105, doi:10.1029/2007JB005446.

Orcutt, B.N., W. Bach, K. Becker, A.T. Fisher, M. Hentscher, B.M. Toner, C.G. Wheat, K.J. Edwards, 2010, Colonization of subsurface microbial observatories deployed in young ocean crust, Intl. Soc. Microbial Ecology Journal, 5, 692-703, doi: 10.1038/ismej.2010.157.2011.

Françoise, Irène BOUDIER

Born : March 4th, 1938, Fontenay-sous-Bois (94) (France)
Unmaried, no child
Professional Address : **Université Montpellier2,**
Laboratoire de Tectonophysique, Place eugene Bataillon,
CC049, 34095 Montpellier cedex 5, France

STUDIES

Baccalauréat, 1956, Clermont-Ferrand, (France)
Graduation in Earth Sciences, 1959, Clermont-Ferrand, (France)
DEA (Master), in Petrology, 1962, Clermont-Ferrand, (France)
Doctorat IIIè cycle, in Structural Geology and Petrofabrics, 1972, Nantes, (France)
Doctorat d'Etat, in Structural Petrology and Petrofabrics, 1976, Nantes, (France)

LANGUAGES

French : native language
English : fluent
Arabic : poor

UNIVERSITY POSITIONS

Assistant lecturer at University of Nantes, Earth Sciences Department, 1964-1975
Lecturer at University of Nantes, Earth Sciences Department, 1975-1981
Professor at University of Nantes, 1981-1986
Professor at University of Montpellier, since 1986
Prefessor Emeritus at University of Montpellier, since feb 2003

ADMINISTRATIVE INVOLVEMENTS

Organization of the newly created Department of Earth Sciences of University of Nantes, 1964-1967
Member of the University Council, University of Nantes, 1976-1978
Secretary of the Third International Conference on Kimberlites hold in Clermont-Ferrand, 1982
Member of National Committee of Earth Sciences of the CNRS, 1982-1985
Head of Second Cycle Studies, University of Montpellier, 1989-1993

TEACHING

Pratical Teaching in Mineralogy, Fondamental Geology, Petrography, Structural Geology, University of Nantes, 1964-1981
Magistral Teaching
1978-1986, Fondamental Geology (1st cycle), University of Nantes
1981-1986, Tectonophysics (3rd cycle), University of Paris XI
since 1986, Mineralogy, Petrology (1st cycle), University of Montpellier
Geodynamics, Tectonophysics (2nd and 3rd cycles), University of Montpellier

SCIENTIFIC ACTIVITY

Covers the domain of Structural geology and Petrofabrics. Co-discovery in 1971 of the principles of kinematic analysis in plastically deformed rocks, mechanisms of ductile deformation and recrystallization, application to mantle flow and anisotropy, oceanic lithosphere (involvement in oceanographic cruises), mechanisms of sea-floor spreading as deduced from structural studies in ophiolites, particularily the Oman Ophiolite (20 years of continuous involvement).

86 scientific publications in international scientific journals
CITATION REPORT 2393 (web of science 2012)
Co-editor of Three Special Issues of International Journals:
'The ophiolites of Oman', *Tectonophysics*,1988.
'Adolphe Nicolas Volume', *Tectonophysics*, 1997
'The ophiolite of Oman and United Arab Emirates', *Journal of Geophysical Researches*, 2000.

BIBLIOGRAPHY F. BOUDIER SINCE 2000

Nicolas A. and **F. Boudier**, Large mantle upwellings and related variations in crustal thickness in the Oman ophiolite, Geological Society America Bulletin, 349, 67-73, 2000.

Boudier F., M. Godard and C. Armbruster, Significance of noritic gabbros in the gabbro section of the Oman ophiolite., Marine Geophysical Researches, 21, 307-326, 2000.
Nicolas A., **F. Boudier**, K. Michibayashi and L. Gerbert-Gaillard, Aswad massif (United Arab Emirates), Archetype of the Oman-UAE ophiolite belt, Geological Society America Bulletin, 349, 499-512, 2000.
Nicolas A., B. Ildefonse, **F. Boudier** and W. Ben Ismail, Dikes in Oman-United Arab Emirates ophiolite, Marine Geophysical Researches, 21, 269-287, 2000.
Boudier F. and T. Juteau, ed. The ophiolite of Oman and United Arab Emirates, Kluwer. 2000
Dewandel B., **F. Boudier,** H. Kern, W. Warsi and D. Mainprice, Seismic wave velocity and anisotropy of serpentinized peridotite in the Oman ophiolite, Tectonophysics, 370, 77-94, 2003.
Nicolas, A., and **F. Boudier**, Where ophiolites come from and what do they tell us, Geological Society America Bulletin, 273 : 137-152, 2003.
Nicolas, A., D. Mainprice, and **F. Boudier**, High temperature seawater circulation throughout crust of oceanic ridges : A model derived from the Oman ophiolite, J. Geophys. Res., 108 : 2371, on line, 2003.
Bosch, D., M. Jamais, **F. Boudier**, A. Nicolas, J.-M. Dautria, and P. Agrinier, Deep and high temperature hydrothermal circulation in the Oman ophiolite-Petrological and isotopic evidence, J. Petrology., 45 (6), pp. 1181-1208, 2004.
Dewandel B., P. Lachassagne, **F. Boudier**, S. Al-Hattali, B. Ladouche, JL. Pinault, Z. Al-Suleimani. A conceptual hydrogeological model of ophiolite hard-rock aquifers in Oman based on a multiscale and multidisciplinary approach. Hydrogeology Journal, 13, 708-726. 2005.
Boudier , F., A. Nicolas, and D. Mainprice, Does anisotropy of thermal contraction control hydrothermal circulation at the Moho level below fast spreading oceanic ridges?, in International Geology Review, edited by C. Coleman, pp. 101-112, GSA Robert, G., 2005.
Boudier, F and A. Nicolas. Comment on « dating the geologic history of Oma,'s Semail ophiolite : insight from U-Pb geochronology » by C.J. Warren, R.R. Parrish, D.J. Waters and M.P. Searle. Contrib. Miner. Petrol. 154, 11-113, 2007.
Nicolas A., and **Boudier F.** (2008) Large shear zones with no relative displacement. Terra Nova 3, 200-205, doi:10.1111/j.1365-3121.2008.00806.x
Nicolas A., **Boudier F**., Koepke J., France L., Ildefonse B., and Mével C. (2008) Root zone of the sheeted dike complex in the Oman ophiolite. Geochemistry, Geophysics and Geosystems 9, Q05001, doi:10.1029/2007GC001918.
Boudier F., Baronnet A., and Mainprice D. (2009) Oriented Serpentine Minerals Replacements of Natural Olivine and their seismic implications: Oceanic Lizardite versus Subduction-Related Antigorite. J. Petrol. 51, 495-512. doi:10.1093/petrology/egp049.
Burg J.P., Bodinier J.L., Gerya T., Bedini R.M., **Boudier F**., Dautria J.M., Prikhodko A., Efimov A., Pupier E. and Balanec J.L. (2009) Translithospheric mantle diapirism: geological evidence and numerical modelling of the Kondyor zoned ultramafic complex (Russian Far-East). J. Petrol. 50, 289-321. doi:10.1093/petrology/egn083
Koepke J., Schoenborn S., Oelze M., Wittmann H., Feig S.T., Hellebrand E., **Boudier F**., and Schoenberg R. (2009) Petrogenesis of crustal wehrlites in the Oman ophiolite: Experiments and natural rocks, Geochem. Geophys. Geosyst., 10, Q10002, doi:10.1029/2009GC002488
Nicolas A., **Boudier F**., France L. (2009) Subsidence in magma chamber and the development of magmatic foliation in Oman ophiolite gabbros. Earth Planet. Sc. Lett. 284, 76-87. doi:10.1016/j.epsl.2009.04.012.
Boudier F., Baronnet A., and Mainprice D. (2009) Oriented Serpentine Minerals Replacements of Natural Olivine and their seismic implications : Oceanic Lizardite versus Subduction-Related Antigorite. J. Petrol. 51, 495-512. doi:10.1093/petrology/egp049.
Meshi A., **Boudier F**., Nicolas A., and Milushi I. (2009) Structure and tectonics of lower crustal and upper mantle rocks in the Jurassic Mirdita ophiolites, Albania. International Geology Review,52: 117 - 141, doi:10.1080/00206810902823982.
Menzies, M. ; Kelemen, P. ; Dick, H. ; Bodinier, J.L. ; **Boudier, F.** ; Hirth, G. ; Grove, T. ; Tommasi, A. and Takazawa E. (2010) Shallow Mantle Composition and Dynamics : Fifth International Orogenic Lherzolite Conference : Foreword. J. Petrol., 51 : 3-7 ; doi:10.1093/petrology/egp098
Morales, L. F. G., **Boudier F**.. and Nicolas A. (2011) Microstructures and crystallographic preferred orientation of anorthosites from Oman ophiolite and the dynamics of melt lenses, Tectonics, 30, TC2011 doi:10.1029/2010TC002697
Boudier, F. & Nicolas, A. (2011) Axial melt lenses at oceanic ridges – A case study in the Oman ophiolite. Earth Planet. Sci. Lett., 304, 313-325, doi:10.1016/j.epsl.2011.01.029.
Nicolas, A. & **Boudier, F**. (2011) Structure and dynamics of ridge axial melt lenses in the Oman ophiolite. J. Geophys. Res., 116, B03 103, doi:10.1029/2010JB007934.

Georges Ceuleneer - Director of Research – CNRS - France

PERSONAL INFORMATION

Date of birth: December 10th, 1959 - Place of birth: Brussels (Belgium)
Nationality: Belgian - Family situation : Married, 3 children.
Office Address: " GET" Observatoire Midi-Pyrénées - 14, av. E. Belin, 31400 Toulouse, FRANCE.
Tél. + 33 (0)5 61 33 29 60 - e-mail: Georges.Ceuleneer@get.obs-mip.fr

EDUCATION + EMPLOYMENT HISTORY

1977-81: Graduate studies in Geology, Université Libre de Bruxelles, Belgium.
1981-82: Master in Geophysics - Université de Paris XI, Orsay, France.
1982-86: PhD (Lab. Tectonophysics, Nantes). Structural study of the Oman ophiolite.
1986: Military duty in the Belgian Navy (1 year).
1987-88: Post-Doc in the National Space Agency (Toulouse, France), ESA scholarship.
1988: Engaged as Researcher by the CNRS.
1999: Director of Research (Senior Scientist) in the CNRS.

INVOLVMENT IN DRILLING EXPEDITIONS AND ADMINISTRATION

Cruises: . ODP-LEG-153 (Mantle peridotites along the MAR 22°N).
. IODP-Expedition 345 (Hess Deep Crust)
. Site survey (Dives with Shinkaï-6500) for LEG 209 (MAR Peridotites 15°N).
Committees: . Chair of IODP-France and alternated of ESSAC French Representative since 2011.
. Co-author of the Thematic Review "Oceanic crustal structure and formation", 2009.
. ODP Science Steering and Evaluation Committee from 1997 to 1999.
. Speaker at the European Ocean Drilling Forum. Edinburgh, 1998.

RESEARCH INTEREST

. Melt migration in the oceanic mantle and genesis of the oceanic crust.
. Modelling of mantle convection and of melt migration in the Earth's mantle.
. Geological mapping using remote sensing hyperspectral techniques (Earth and Planets).

Other oceanographic cruises:
. Several dives with the submersibles *Nautile* and *Shinkaï-6500*.
. Geophysical surveys of the Mid-Atlantic Ridge (*L'Atalante*).

Field work in ophiolites:
. About 25 field seasons in Oman, USA, Venezuela and Europe.

OTHER COMMITTEES and RESPONSABILITIES

. Director and deputy director of a CNRS lab (2007 – 2010).
. Member of the French oceanographic cruises projects committee (2003-2010).
. Member and Chair of « Groupe Ocean » (Post-cruise funding of french cruises) (2000-2002).
. "Chargé de mission" for the french Ministry of Research (2007-2008); evaluation of labs, international funding applications, etc…

PhD supervised in Toulouse University (all about the Oman ophiolite)

Isma Amri (1992-1995)
Mathieu Benoit (1994-1997)
Marie Python (1998-2002)
Harold Clénet (2005-2009)
Bénédicte Abily (2007-2011)

Teatching and diffusion of knowledge

. Lectures in petrology in master classes and lessons for college teachers in natural sciences.
. Organiser of annual summer schools for researchers and PhD student.
. Conferences (Clubs of mineralory, Museums, "Free Time Universities", Schools, Jails, …).
. Contributions to newspapers (La Recherche, etc…).
. Leader of field trips in the Oman ophiolites, for researchers and teatchers.

Publications (selection)

Ceuleneer G., Monnereau M. and Amri I. Thermal structure of a fossil mantle diapir inferred from the distribution of mafic cumulates. **Nature**, 379, 149-153, 1996.

Benoit M., Ceuleneer G. and Polvé M. The remelting of hydrothermally altered peridotite at mid-ocean ridges by intruding mantle diapir. **Nature**, 402, 514-518, 1999.

Abily B., Ceuleneer G. and Launeau P. Syn-magmatic normal faulting in the lower oceanic crust: evidence from the Oman ophiolite. **Geology**, 39, 391-394, 2011.

Abily B. and Ceuleneer G. The dunitic mantle/crust transition zone in the Oman ophiolite: Residue of melt rock-interaction, cumulates from high-MgO melts, or both? **Geology**, in press, 2013.

Borisova A., Ceuleneer G., Kamenetsky V., Arai S., et al. A new view on the petrogenesis of the Oman ophiolite chromitites from microanalyses of chromite-hosted inclusions. **J. Pet**., 53, 2411-2440, 2012.

Dantas C., Ceuleneer G., Grégoire M., Python M., Freydier R., Warren J. and Dick H.J.B. Pyroxenites from the southwest indian ridge, 9°-16°E : cumulates from incremental melt fractions produced at the top of a cold melting regime. **J. Petrol**., 48, 647-660, 2007.

Python M. and Ceuleneer G. Nature and distribution of dykes and related melt migration structures in the mantle section of the Oman ophiolite. **Geochem. Geophys. Geosyst.,** 4(7), 8612, doi :10.1029/2002GC000354, 2003.

Ceuleneer G. and Rabinowicz M. Mantle flow and melt migration beneath ocean ridges: models derived from observations in ophiolites, in Mantle flow and melt generation at mid-ocean ridges, **AGU Geophys. Monograph 71**, J.P. Morgan, D.K. Blackman and J. M. Sinton editors, 123-154, 1992.

Dannowski A., Grevemeyer I., Ranero C.R., Ceuleneer G., Maia M., Phipps Morgan J. and Gente P. Seismic structure of an oceanic core complex at the Mid-Atlantic Ridge, 22°19'N. **J. Geophys. Res.,** 115, B07106, doi:10.1029/2009JB006943, 2010.

Clénet H., Ceuleneer G., Pinet P., Abily B., Daydou Y., Harris E., Amri I. and Dantas C. Thick sections of layered ultramafic cumulates in the Oman ophiolite revealed by an airborne hyperspectral survey: ... **Lithos**, 114, 265-281, doi:10.1016/j.lithos.2009.09.002, 2010.

Nonnotte P., Ceuleneer G. and Benoit M. Genesis of andesitic-boninitic magmas at mid-ocean ridges by melting of hydrated peridotites : geochemical evidence from DSDP Site 334 gabbronorites. **Earth Planet. Sci. Lett**., 236, 632-653, 2005.

Ceuleneer G. and Cannat M. High temperature ductile deformation of the site 920 peridotites. In : Karson J.A., Cannat M., Miller D.J. and Elthon D., Eds., **Proc. Ocean Drilling Progam, Scientific Results, 153**, College Station, Texas, U.S.A., 23-34, 1997.

Cannat M., Ceuleneer G. and Fletcher J. Localization of ductile strain and the magmatic evolution of gabbroic rocks at the Mid-Atlantic Ridge (23°N). In : Karson J.A., Cannat M., Miller D.J. and Elthon D., Eds., **Proc. ODP, Scientific Results, 153,** College Station, Texas, U.S.A., 77-98, 1997.

Ceuleneer G. and le Sueur E. The Trinity ophiolite (California) : the strange association of fertile mantle peridotite with ultra-depleted crustal cumulates**. Bull. Soc. Geol. France**, t. 179, n° 5, 503-518, 2008.

Python M., Ceuleneer G., Ishida Y., Barrat J.-A. and Arai S. Oman diopsidites : a new lithology diagnostic of very high temperature hydrothermal circulation in mantle peridotite below oceanic spreading centres. **Earth Planet. Sci. Lett.**, 255, 289-305, 2007.

Rabinowicz M. and Ceuleneer G. The effect of sloped isotherms on melt migration in the shallow mantle : … based on observations in the Oman ophiolite. **Earth Planet. Sci. Let**., 229, 231-246, 2005.

Amri I., Benoit M. and Ceuleneer G. Tectonic setting for the genesis of oceanic plagiogranites: evidence from a paleo-spreading structure in the Oman ophiolite. **Earth Planet. Sci. Lett**., 139, 177-194, 1996.

CURRICULUM VITAE

LAURENCE A. COOGAN

School of Earth and Ocean Sciences
University of Victoria
Victoria, B.C.
Canada

Phone 250 472 4018
Fax 250 721 6200
lacoogan@uvic.ca

Professional Preparation:

University of Leicester (UK) PhD (1998) University of Liverpool (UK) BSc. (1993)

Appointments:

2008-present: Associate Prof. (University of Victoria)
2004-2008: Assistant Prof. (University of Victoria)
2002-2004: NERC Post-doctoral Research Fellow (Leicester University)
1998-2002: Post-doctoral Researcher (Cardiff University)

Awards:

2011: UVic Faculty of Science Teaching Award
2007: Mineralogical Association of Canada Young Scientist Award
2002: NERC Post Doctoral Fellowship

Five publications relevant to this proposal:

Coogan, L.A. and Dosso, S. (2012) An internally consistent, probabilistic, determination of ridge-axis hydrothermal fluxes, Earth and Planetary Science Letters v. 323-4 p 92-101.

Coogan, L.A., (2007), The lower oceanic crust, *in* Turekian, K., and Holland, H.D., eds., Treatise on Geochemistry, Elsevier. (Revised version in press in forthcoming 2nd edition).

Coogan, L.A., Jenkin, G.R.T. and Wilson, R.N., 2007. Contrasting cooling rates in the oceanic lithosphere at fast- and slow-spreading mid-ocean ridges derived from geospeedometry. Journal of Petrology, 48: 2211-2231.

Perk, N., Coogan, L.A., Karson, J.A., Klein, E.M. and Hanna, H., 2007. Primitive cumulates from the upper crust formed at the East Pacific Rise. Contributions to Mineral Petrology: DOI:10.1007/s00410-007-0210-z.

Coogan, L.A., Howard, K.A., Gillis, K.M., Bickle, M.J., Chapman, H.J., Boyce, A.J., Jenkin, G.R.T., and Wilson, R.N., (2006), Chemical and thermal constraints on focused fluid flow in the lower oceanic crust: American Journal of Science.

Five other significant research publications:

Coogan, L.A., (2008) Reconciling temperatures of metamorphism, fluid fluxes and heat transport in the upper crust at intermediate- to fast-spreading mid-ocean ridges. *Geochemistry Geophysics Geosystems,* DOI: 10.1029/2007GC001787

Gillis, K.M. and Coogan, L.A., (2011). Secular variation in carbon uptake into the ocean crust. Earth and Planetary Science Letters, v302, p 385-392

Coogan, L.A. and Hinton, R.H., 2006. Do the trace element compositions of detrital zircons require

Hadean continental crust? Geology, 34(8): 633-636.
Coogan, L.A., Kasemann, S., and Chakraborty, S., 2005, Rates of hydrothermal cooling of new oceanic upper crust derived from Li-geospeedometry: Earth Planet. Sci. Lett., v. 240, p. 415-424.
Costa, F., Coogan, L.A., and Chakraborty, S. (2009) The time scales of magma mixing and mingling involving primitive melts and melt-mush interaction at Mid-ocean ridges: Contributions to Mineral Petrology, DOI 10.1007/s00410-009-0432-3

Recent collaborators:

A. Barker (Upsala), S. Chakraborty (U. Bochum), F. Costa (Singapore), R. Dohmen (U. Bochum), S. Dosso (UVic), K. Gillis (UVic), R. Hinton (Edinburgh), G. Jenkin (Leicester), S. Kasemann (Edinburgh), J. Naden (BGS), N. Pester (U.Min), A. Saunders (Leicester – PhD advisor), W. Seyfried (U.Min), R. Wilson (Leicester),

Graduate Students supervised:

Archana Shejwalkar, (PhD – in progress, UVic), Brock Anderson (PhD – in progress, UVic), Casey Brant (PhD – in progress, UVic), Simon Jowitt (PhD, Leicester), Graham Banks (PhD, Cardiff), Kathi Faak (PhD, U. Bochum), Richard Thomas (PhD, Cardiff), Zhihuan Wan (MSc, UVic.), Lisa Worrell (PhD, Liverpool)

Field experience:

Numerous field seasons in both the Oman and Troodos ophiolites. Seagoing experience with submersible, ROV, portable rock-drills and dredging.

Synergistic Activities:

2007-present: member of the editorial board of LITHOS
2004-present: NEPTUNE Canada ‘ridge-fluids’ science planning committee member

KATHRYN M. GILLIS

School of Earth and Ocean Sciences
University of Victoria
P.O. Box 3055
Victoria, BC V8W 3P6 CANADA

Tel: (250) 472-5133; FAX: (250) 472-4030; e-mail: kgillis@uvic.ca

Professional Preparation

B.Sc. (Hons.), Geology, Queen's University, Kingston, Ontario, 1981

Ph.D., Geology, Dalhousie University, Halifax, Nova Scotia, 1987

NSERC Postdoctoral Scholar, Université de Montréál and Woods Hole Oceanographic Institution, 1986-1989

Positions Held

2011 - present	Associate Dean, Faculty of Science and Professor, School of Earth and Ocean Sciences, University of Victoria
2004 - 2011	Professor and Director, School of Earth and Ocean Sciences, University of Victoria
1997 - 2004	Associate Professor, School of Earth and Ocean Sciences, University of Victoria
1994 - 1997	Assistant Professor, School of Earth and Ocean Sciences, University of Victoria
1993 -1994	Associate Scientist, Dept. of Geology and Geophysics, Woods Hole Oceanographic Institution
1989 - 1993	Assistant Scientist, Dept. of Geology and Geophysics, Woods Hole Oceanographic Institution

Five Most Relevant Publications:

Kirchner, T. and Gillis, K.M., 2012. Mineralogical and strontium isotopic record of hydrothermal processes in the lower ocean crust at and near the East Pacific Rise, Contrib. Mineral. Petrol., doi:10.1007/s00410-012-0729-5.

Gillis, K.M., 2008, The roof of an axial magma chamber: a hornfelsic heat exchanger, *Geol*, 36, 299-302.

Gillis, K.M., Coogan, L.A., and Pedersen, R., 2005. Strontium isotope constraints on fluid flow in the upper oceanic crust at the East Pacific Rise, *Earth Planet. Sci. Lett*. 232, 83-94.

Gillis, K.M., Coogan, L.A. and Chaussidon, M., 2003. Volatile behavior (Cl, F, B) in the roof of an axial magma chamber from the East Pacific Rise, *Earth Planet. Sci. Lett*. 213, 447-462. Gillis, K.M., Muehlenbachs, K., Stewart, M., and Gleeson, T., 2001. Fluid flow patterns in fast-spreading East Pacific Rise crust. *J. Geophys. Res*. **106**, 26,311-26,329.

Gillis, K.M., Muehlenbachs, K., Stewart, M., and Gleeson, T., 2001. Fluid flow patterns in fast-spreading East Pacific Rise crust. *J. Geophys. Res*. **106**, 26,311-26,329.

Gillis, K.M., 1995. Controls on hydrothermal alteration in fast-spreading oceanic crust, *Earth Planet. Sci.* Lett., 134, 473-489.

Five Other Significant Publications:

Barker, A.K., Coogan, L.A., Gillis, K.M., Hayman, N., and Weis, D., 2010. Direct observation of a fossil high temperature, fault–hosted hydrothermal upflow zone in crust formed at a fast-spereading East Pacific Rise, *Geology*, 38, 379-382, doi: 10.1130/G30542.1.

Heft, K., Gillis, K.M., Pollock, M., Karson, K., and Klein, E., 2008, Constraints on the nature of axial hydrothermal systems from the sheeted dike complex exposed at Pito Deep, *Geochem, Geophys., Geosys*., *9*, doi:10.1029/2007GC001926).

Barker, A., Coogan, L.A., Gillis, K.M., and Weis, D., 2008. Strontium isotopic constraints on fluid flow in the sheeted dike complex of fast-spreading crust: Part I – pervasive fluid flow at Pito Deep, *Geochem, Geophys., Geosys*., *9*, doi:10.1029/2007GC001901.

Coogan, L.A., Howard, K.A., Gillis, K.M., Bickle, M.J., Chapman, H.J., Boyce, A.J., Jenkin, G.R.T., and Wilson, R.N., 2006, Chemical and thermal constraints on focused fluid flow in the lower oceanic crust: *Am. J. Sci.*, 306, 389-427.

Coogan, L.A., Gillis, K.M., MacLeod, C.J., Thompson, G.M., and Hékinian, R., 2002. Petrology and geochemistry of the lower ocean crust formed at the East Pacific Rise and exposed at Hess Deep: a synthesis and new results. *Geochem., Geophys., Geosys.*, **3**, Paper Number 2001GC000230.

Synergistic Activities

Research results are routinely incorporated into undergraduate and graduate courses at U. Victoria; supervision of undergraduate research projects that involve deep sea samples; Member, NEPTUNE Canada SAC; Member, Canadian Consortium for Ocean Drilling.; co-chief scientists for IODP Exp 345 to Hess Deep.

Recent Collaborators (last 48 months): L. Coogan (U. Victoria), J. Karson (Syracuse U.), E. Klein (Duke U.), D. Weis (UBC), A. Barker, C. MacLeod (Cardiff U.), D. Teagle (U. Southampton), D. Shillington (LDEO), J. Snow (Houston).

Graduate & Postdoctoral Advisors

Graduate Advisor (Dalhousie): P. Robinson (Dalhousie, retired)
Post-doctoral Supervisor (U. Montréal): J. Ludden (British Geological Survey)
Post-doctoral Supervisor (WHOI): G. Thompson (WHOI, retired)

Thesis Advisor and Postgraduate-Scholar Sponsor (*last 5 years; *=current*)

Graduate students: B. Anderson (PhD)*, C. Brant (PhD)*, C. Fitzgerald (Ashton Mining), K. Heft (Mineral Exploration consultant), A. Klumb (Mineral Exploration consultant), H. Paul (IODP Technician), T. Kirshner (MSc), K. Zoeller*.

Postdoctoral Advisor for: A. Barker (Assist. Professor, Uppsala Universitet).

Marguerite Godard
Géosciences Montpellier
UMR CNRS-UM2 5243
Université Montpellier 2 - cc60
Place Eugene Bataillon
34095 Montpellier - FRANCE
Senior Researcher CNRS

Geochemistry

Tel : + (0) 467 14 39 37
Tel : + (0) 467 14 36 03
email: Marguerite.Godard@um2.fr

DEGREES :
1993 : Thèse de Doctorat « Physique et chimie de la Terre » (PhD), Univ. Montpellier 2, France.
2010 : Habilitation à Diriger les Recherches « Sciences de l'Univers », Univ. Montpellier 2, France.

POSITIONS :
1990-1993: Fellowship, French Ministry of Research and Technology, Univ. Montpellier 2, France.
1994: Associate Researcher, Water ResourceS Research Unit, University of Newcastle, UK.
1994-today: Chargée de Recherche CNRS (1994-2012), Directeur de Recherche CNRS (2012-…)
Univ. Montpellier 2, France

PROFESSIONAL ACTIVITIES, TEACHING, SYNERGISTIC ACTIVITIES AND SERVICES

• Co-chair of IODP/ICDP workshop "Geological carbon capture & storage in mafic and ultramafic rocks" (2011); Chair of WG "CO_2 sequestration" at conference on IODP New Ventures in Exploring Scientific Targets (2009).
• Participation to Scientific Drilling proposals: IODP Proposal 758-Full2 "Serpentinization and life: Biogeochemistry and tectono-magmatic processes in young mafic and ultramafic seafloor" – PI: G. Frueh-Green (status : sent to OTF); ICDP Workshop "Oman Ophiolite Drilling Project" – PI : P. Kelemen (status : accepted).
• Co-chair of sessions at EGU, AGU and Goldschmidt conferences; Invited speaker at EGU; lecturer at ECORD summer school.
• Member of the governing board for Doctoral Studies SIBAGHE, Université Montpellier 2 (2011-…); Co-direction of the Master of Geology, Université Montpellier 2 (2003 -2007).
• Teaching in Master Courses (12h/year); Supervision of 10 Master (DEA) research projects – Université Montpellier 2 (1998-…).
• Supervision and participation to the supervision of 6 PhD projects.
• Referee for: INSU, ANR & NSF research proposals and manuscripts submitted to *Earth and Planetary Science Letters, Geochimica et Cosmochimica Acta, Swiss Journal of Geosciences, G-cubed, Terra Nova, Journal of Petrology, Journal of Asian Earth Sciences, Journal of Greenhouse Gas Control, Lithos.*

Publications *(http://www.researcherid.com/rid/A-7127-2008)*: **34**
Meetings: 102

PUBLICATIONS (2008-2012)

Godard, M., Lagabrielle, Y., Alard, O. and Harvey, J., **2008**, Geochemistry of the highly depleted peridotites drilled at ODP Sites 1272 and 1274 (Fifteen-Twenty Fracture Zone, Mid-Atlantic Ridge): Implications for mantle dynamics beneath a slow spreading ridge. *Earth Planet. Sci. Lett.*, 267(3-4): 410-425, doi:10.1016/j.epsl.2007.11.058.

Andreani, M., Luquot, L., Gouze, P., Godard, M., Hoise, E. and Gibert, B., **2009**. Experimental study of carbon sequestration reactions controlled by the percolation of CO_2-rich brine through peridotites. *Environ. Sci. Technol.*, 43(4): 1226-1231; doi: 10.1021/es8018429.

Drouin, M., Godard, M., Ildefonse, B., Bruguier, O. and Garrido, C., **2009**. In situ geochemistry of olivine-rich troctolites (IODP Hole U1309D, Atlantis Massif, Mid-Atlantic Ridge, 30°N): a record of magmatic impregnation in the lower oceanic lithosphere. *Chem. Geol.*, 264: 71-88, doi:10.1016/j.chemgeo.2009.02.013.

Godard, M., Awaji, S., Hansen, H.-E., Hellebrand, E., Brunelli, D., Johnson, K.T.M., Yamasaki, T., Maeda, J., Abratis, M., Christie, D., Kato, Y., Mariet, C. and Rosner, M., **2009**. Geochemistry of a

long in-situ section of intrusive slow-spread lithosphere: Results from IODP Site U1309 (Atlantis Massif, 30°N Mid-Atlantic-Ridge). *Earth Planet. Sci. Lett.*, 279: 110-122, doi:10.1016/j.epsl.2008.12.034.

Lorand, J.-P., Alard, O. and Godard, M., **2009**. Platinum-group element signature of the Primitive Mantle rejuvenated by melt-rock reactions : evidence from Sumail peridotites (Oman Ophiolite). *Terra Nova*, 21(1): 35-40, doi: 10.1111/j.1365-3121.2008.00850.x.

Marchesi, C., Garrido, C., Godard, M., Belley, F. and Ferré, E., **2009**. Migration and accumulation of ultra-depleted subduction-related melts in the Massif du Sud ophiolite (New Caledonia). *Chem. Geol.*, 266: 180–195. doi:10.1016/j.chemgeo.2009.06.004.

Deschamps, F., Guillot, S., Godard, M., Chauvel, C., Andreani, M. and Hattori, K., **2010**. In situ characterization of serpentinites from forearc mantle wedges: Timing of serpentinization and behaviour of fluid-mobile elements in subduction zones. *Chem. Geol.*, 269(3-4): 262-277; doi:10.1016/j.chemgeo.2009.10.002.

Hanghoj, K., Kelemen, P., Hassler, D. and Godard, M., **2010**. Composition and genesis of depleted mantle peridotites from the Wadi Tayin massif, Oman ophiolite. Major and trace element geochemistry, and Os isotope and PGE systematics. *J. Petrol*, 51(1&2), 201-227, doi:10.1093/petrology/egp077.

Drouin, M., Ildefonse, B. and Godard, M., **2010**. A microstructural imprint of melt impregnation in slow-spread lithosphere: olivine-rich troctolites from the Atlantis Massif (Mid-Atlantic Ridge 30°N, IODP Hole U1309D). Geochem. Geophys. Geosyst. 11, Q06003, doi:10.1029/2009GC002995.

Blackman, D.K., Ildefonse, B., John, B.E., Ohara, Y., Miller, D.J., Abe, N., Abratis, M.W., Andal, E.S., Andreani, M., Awaji, S., Beard, J.S., Brunelli, D., Charney, A., Christie, D., Delacour, A.G., Delius, H., Drouin, M., Einaudi, F., Escartin, J., Frost, B.R., Fryer, P.B., Gee, J.S., Godard, M., Grimes, C.B., Halfpenny, A., Hansen, H.-E., Harris, A.C., Tamura, A., Hayman, N.W., Hellebrand, E., Hirose, T., Hirth, J.G., Ishimaru, S., Johnson, K.T.M., Karner, G.D., Linek, M., Maeda, J., Mason, O.U., MacLeod, C.J., McCaig, A.M., Michibayashi, K., Morris, A., Nakagawa, T., Nozaka, T., Rosner, M., Searle, R.C., Suhr, G., Tominaga, M., von der Handt, A., Yamasaki, T. and Zhao, X., **2011**. Drilling constraints on lithospheric accretion and evolution at Atlantis Massif, Mid-Atlantic Ridge 30°N. J. Geophys. Res., 116(B07103): doi:10.1029/2010JB007931.

Deschamps, F., Guillot, S., Godard, M., Andreani, M. and Hattori, K., **2011**. Serpentinites act as sponges for fluid-mobile elements in abyssal and subduction zone environments. Terra Nova: doi: 10.1111/j.1365-3121.2011.00995.x.

Debret, B., Nicollet, C., Andreani, M., Schwartz, S., Godard, M., **2012**. Three steps of serpentinization in an eclogitized oceanic serpentinization front (Lanzo Massif - Western Alps). J. Metam. Pet., doi:10.1111/jmg.12008.

Deschamps, F., Godard, M., Guillot, S., Chauvel, C., Andreani, M., Hattori, K., Wunder, B., France, L., **2012**. Behavior of fluid-mobile elements in serpentines from abyssal to subduction environments: Examples from Cuba and Dominican Republic. Chem. Geol. 312, 93-117.

Lafay, R., Deschamps, F., Schwartz, S., Guillot, S., Godard, M., Nicollet, C., ***in press***. High-pressure serpentinites, a trap-and-release system controlled by metamorphic conditions: Example from the Piedmont zone of the western Alps. Chem. Geol.

Lissenberg, C.J., MacLeod, C.J., Howard, K.A., Godard, M., ***in press***. Pervasive Reactive Melt Migration Through Fast spreading Lower Oceanic Crust (Hess Deep, equatorial Pacific Ocean). Earth Planet. Sci. Lett.

Steven L. Goldstein
Lamont-Doherty Earth Observatory of Columbia University
61 Rt. 9W
Palisades, NY 10964

Phone: 845-365-8787 Fax: 845-365-8155 Email: steveg@ldeo.columbia.edu

(A) Professional Preparation:

BA	Columbia University, New York, NY	Chemistry	1976.
MA	Harvard University, Cambridge, MA	Geological Sciences	1978.
PhD	Columbia University, New York, NY	Geological Sciences	1986.

(B) Appointments:

2005- present	Professor, Columbia University.
1998- 2005	Associate Professor, Columbia University.
1996-98	Assistant Professor, Department of Earth and Environmental Sciences, Columbia University, Palisades, NY 10964.
1985-96	Staff Scientist, Max-Planck-Institut für Chemie, Mainz, Germany.

(C) Publications

(i) Five recent mantle geochemistry publications

Straub, S,M., Goldstein, S.L., Class, C., and Schmidt, A., "Mid-ocean ridge basalt of Indian type in the northwest Pacific Ocean basin", Nature Geoscience, 2, 286-289, 2009.

Class, C., Goldstein, S.L., and Shirey, S.B., "Osmium isotopes in Grande Comore lavas: a new extreme among a spectrum of EM-type endmembers" Earth and Planetary Science Letters, 284, 219-227, 2009.

Goldstein, S.L., Soffer, G., Langmuir, C.H., Lehnert, K.A., Graham, D.W., and Michael, P.J., "Origin of a 'Southern Hemisphere' geochemical signature in the Arctic upper mantle", Nature 453, 89-93; doi:10.1038/nature06919, 2008.

Zhang, H.F., Goldstein, S.L., Zhou, X-H., Sun, M., Zheng, J.-P., Cai, Y., "Transformation of ancient sub-continental lithospheric mantle beneath Archean blocks, eastern China: Re-Os isotopic evidence from mantle xenoliths of Paleozoic kimberlites and Mesozoic basalts", Contributions to Mineralogy and Petrology 155, 271-293, 2008.

Class, C. and Goldstein, S.L., "Evolution of helium isotopes in the Earth's mantle", Nature, 436, 1107-1112, 2005.

(ii) Five other recent publications

Cole, J.M., Goldstein, S.L., deMenocal, P.B., Hemming, S.R., and Grousset, F.E., "Contrasting compositions of Saharan dust in the eastern Atlantic Ocean during the last deglaciation and African Humid Period, Earth and Planetary Science Letters, 278, 257-266, 2009.

Pahnke, K., Goldstein, S.L., and Hemming, S.R. "Abrupt changes in Antarctic Intermediate Water circulation over the past 25,000 years", Nature Geoscience, 1, 870-874, 2008.

van de Flierdt, T., Goldstein, S.L., Hemming, S.R., Roy, M. Frank, M., and Halliday, A.N., "Global neodymium-hafnium isotope systematics–revisited", Earth and Planetary Science Letters, 259, 432-441, 2007.

Thompson, W.G. and Goldstein, S.L. "Open system coral ages reveal persistent suborbital sea-level cycles", Science, 308, 401-404, 2005.

Piotrowski, A.M., Goldstein, S.L., Hemming, S.R., and Fairbanks, R.G., "Temporal relationships between ocean circulation and carbon cycling during glacial-interglacial transitions", Science 307, 1933-

1938, 2005.

(D) Synergistic Activities:

Journal Editor: Chemical Geology, Editorial Advisory Board (1990-2002); Earth and Planetary Science Letters, Editorial Advisory Board (1991-present); Journal of Geophysical Research-Solid Earth, Associate Editor (1995-1997), Geochimica et Cosmochimica Acta, Associate Editor (2000-2002), Chemical Geology, Editor-in-Chief (2002-2008).

Professional Service: AGU Hess Medal Committee (1998-1999). Co-Organizer: *ICDP Workshop on a Deep Drill Hole in the Dead Sea*, 2002; *Workshop on Curation of Terrestrial Scientific Cores, Samples, and Collections*, Houston, 2004; *Workshop on Linking Information Systems in Marine and Terrestrial Geosciences: Sediment Geochemistry*, Washington, D.C., June 2004, '*SESAR: Designing Interoperability for Sample-based Data Management via the International Geo Sample Number IGSN*', San Diego; *GERM (Geochemical Earth Reference Model) Workshop*, New York, 2006. Oversight Committee, Northeast National Ion Microprobe Facility (NENIMF), 2004-present; AGU VGP Nominations Committee, 2009-present; Visiting Committee, Korean Basic Science Institute, 2010; Chair or Vice Chair, Dept. of Earth and Environmental Sciences, Columbia University, 2006-2012.

Teacher Education: Goldstein, S.L. "Hawaii and hotspots; a window to the deep mantle" in "Earth; Inside and Out", ed. by E. Mathez, New Press. New York, NY, p. 93-99; essays on the Earth for K-12 teachers; 2001. Lecturer, Earth2Class Program for K-12 teachers.

Undergraduate Research: Advisor for LDEO Summer Intern Program and Columbia undergraduates (1996-present).

Public Outreach: Lamont-Doherty Earth Observatory Annual Open House (1996-present), public lectures laboratory tours and demonstrations; geological field trips for Boy Scouts; Columbia University Alumni Association Lectures, Lamont-Doherty Earth Observatory Public Lecture Series, Public School Lectures on Earth Science, Science Clubs in Retirement Communities, lecturer in Earth2Class Program middle and high school teachers.

(E) Collaborators and Other Affiliations:

(i) Collaborators Over the Past Four *Years*: *B. Haley (OSU), M. Dungan (U Oregon), E. Ito (U Minn.); C. Langmuir (Harvard), K. Pahnke (Max-Planck Inst., Oldenburg), H. Scher (U S. Carolina), M. Stein (Geol. Survey of Israel).*

(ii) Graduate Advisors: *R.K. O'Nions (Pres., Imperial Coll.), C. Langmuir (Harvard), A. Zindler.*

(iii) Primary thesis advisor to the following graduate students:

At MPI: *C. Class (LDEO), K. Haase (U of Erlangen), A. Haase-Schramm (private sector); G. Loock (3 women, 1 man).*

At Columbia: *Y. Cai (LDEO), K. Jones (Exxon-Mobil), A. Hartman (PhD student, Columbia U), J. Jweda (PhD student, Columbia U), W. Jacobson (Ph.D. student, Columbia U), A. LaGatta (Adjunct Professor, St. Mary's College, California), A. Piotrowski (Lecturer, Cambridge U), R. Rutberg (Associate Professor, Hunter College, CUNY), K. Simons (Exxon-Mobil), W. Thompson (Associate Scientist, WHOI), Y. Wu (PhD student, Columbia U). (6 women, 5 men).*

Curriculum Vitae – Philippe Gouze
CNRS Researcher
Géosciences
Université de Montpellier,
Montpellier 34095/5, France

Telephone: +33 467 144 258

E-mail: philippe.gouze@um2.fr

PROFESSIONAL PREPARATION:
1989 M.Sc., Université de Montpellier, Centre de Geology et Geophysique
1993 Ph.D. degree (modelling transport in porous media) University of Paris VI

APPOINTMENTS:
1994 EC grant (Postdoc), *Water Resource Systems Research Unit*, Department of Civil Engineering, University of Newcastle upon Tyne, UK,
1995 – present CNRS researcher at the University of Montpellier.
2003-2006 Vice-director of the *Tectonophysic* research Unit (CNRS UMR 5568)
2010 – present Head of the *Transport in Porous Media* group at *Geosciences Montpellier* research Unit (CNRS UMR 5243).

5 publications most closely related to this proposal, 2008-2010*:*

Andreani M., P. Gouze, L. Luquot, P. Jouanna (2008), Changes in seal capacity of fractured claystone caprocks induced by dissolved and gaseous CO2 seepage, Geophys. Res. Lett., 35, L14404, doi:10.1029/2008GL034467.

Andreani M., L. Luquot, P. Gouze, M. Godard, E. Hoisé, B. Gibert (2009) Experimental study of carbon sequestration reactions controlled by the percolation of CO2-rich brine through peridotites, Environ. Sci. Technol., 43 (4), pp 1226–1231

Gouze P., Y. Melean, T. Le Borgne, M. Dentz, J. Carrera (2008), Non-Fickian dispersion in porous media explained by heterogeneous microscale matrix diffusion, Water Resour. Res., 44, W11416, doi:10.1029/2007WR006690.

Gouze P. and L. Luquot (2011), On the characterization of porosity-permeability relationships and reactive surface areas during heterogeneous dissolution induced by CO2 injection in limestone reservoir, Journal of Contaminant Hydrology, 120–121, 45–55, doi:10.1016/ j.jconhyd.2010.07.004.

Luquot L., P. Gouze (2009) Experimental determination of porosity and permeability changes induced by massive injection of CO_2 into carbonate reservoirs, Chemical Geology 265, 148–159, doi:10.1016/j.chemgeo.2009.03.028.

REASEARCH ACTIVITIES

1. Groundwater hydrology. This includes conceptual, mathematical and numerical modelling of groundwater flow and contaminant transport in heterogeneous aquifers, sea water intrusion into coastal aquifers, pumping tests to determine aquifer coefficients, (non-Fickian) dispersion measurements from laboratory to borehole scale, flow and transport in fractures, and borehole geophysics for application to hydrogeology.

2. Fluid-rock mass transfer in reservoir. This research focuses on experimental characterization and modelling hydrodynamical properties (porosity, permeability, reaction surface area) changes induced by dissolution-precipitation processes in the course of reservoir diagenesis and underground CO2 storage, with emphasis on carbonation processes.

3. Geothermal energy & hydrothermal processes in low enthalpy environments. This includes laboratory scale experimental characterization and modelling of flow, transport and fluid-rock-gas reactions

associated with natural hydrothermal cycles at the mid-ocean ridges and forced borehole extraction of heat in geothermal areas (ex: Iceland).

4. Diffusion in low permeability media, for applications to nuclear waste disposal in claystones. This research concerns for example the measure of diffusion coefficient and sorption of the radioelements (iodine) in natural conditions.

5. Microstructure and macroscopic properties of heterogeneous materials. This research focuses on the development of numerical tools for deterministic and statistical characterization of the heterogeneity from X-ray micro-tomography imagery.

COLLABORATORS : M. Dentz, R. Carrera, L. Luquot (CSIC, SP); A. Guadagnini (Politechnico di Milan, IT), A. Neimi (Upsala University, S); J. Bensabat (EWRE, IS); S. Savoye (CEA, FR), C. Wittebroodt (IRSN, FR), J. Bear (Technion, IS); S. Gilfillan, C. McDermott (U. Edinburg); P. Besse (Bureau Veritas, FR); O. Silva (CIUEDEN, SP); R. Zimmerman, A. Gringarten (Imperial College, UK); A. Hauradou (FAST, FR); M. Andréani (U. Lyon, FR); P. Benezeth, O. Pokrovsky (U. Toulouse, FR); B. Menez (IPGP, FR); P. Kelemen, J Mattre (DEO, US); D. Tartakovsky (UCSD, US); I. Battiato (Clemson U., US); P. Lichtner (LANL, US); M. Lescane (TOTAL, FR); T. Dutta (U. Kolkata Jadavpur, IN); D. Guerillot, J. Nunes (Petrobras, BR);

ON-GOING PROJECT closely related to this proposal:
FP7-MUSTANG, A multiple space and time scale approach for the quantification of deep saline formations for CO2 storage (2009 -2013);
FP7-PANACEA, Predicting and monitoring the long-term behavior of CO2 injected in deep geological formations (2011-2014);
FP7 TRUST, High resolution monitoring, real time visualization and reliable modeling of highly controlled, intermediate and up-scalable size pilot injection tests of underground storage of CO2 (2012-2015);

MEETING CONVENOR : December 2011, AGU, December 2012, AGU,

GOUZE'S ADVISORS: Professor G. de Marsily (college de France); Professor R. Carrera (CSIC Barcelone Darcy's Medial).

ADVISOR:
PhD: Alain Cartalade (-2001), Catherine Noiriel (-2005), Sandra Tenchine (-2004), Linda Luquot (-2007), Charles Wittebrodt (-2010) Charlotte Garing (-2011); Halidi Abdoulgafour (-2012), Mohamed Kassab (Collaboration Polytechn. Milan, -2011); Ousmane Papa Mangane (-), Filip Gjevaj (-), Ikram Fatnassi (-)
PostDoc: Muriel Andréani (2007-2008), Yasmin Melean (2004-2006), Linda Luquot (2009-2011), Jallal Dweik (2010- 2011), Olivier Rodriguez (2010-2011), C. Garing (2011-), S. Sadhukhan (2011-), C. Blitz (2012-), A. Russian (2012-).

GREG HIRTH

Department of Geological Sciences
Brown UniversityProvidence, RI
02912 Greg_Hirth@Brown.edu

Experience:

Brown University, Department of Geological Sciences
2010-present Professor 2007-2009 Associate Professor
2002-2007 Adjunct Associate Professor

Woods Hole Oceanographic Institution, Department of Geology and Geophysics
1998-2007 Associate Scientist (Tenured in 2001) 1994-1998 Assistant Scientist 1993 Postdoctoral Scholar

Rice University, Department of Earth Science
Spring 2010 Weiss Visiting Professor

University of Montpellier, Laboratoire de Tectonophysique
Spring 2007 Visiting Scientist

Massachusetts Institute of Technology, Dept. Earth, Atmospheric, and Planetary Sciences
1993-2007 Research Affiliate,

California Institute of Technology, Division of Geological and Planetary Sciences Fall 1999 Visiting Professor of Geophysics,

University of Minnesota, Dept. of Geology and Geophysics
1991-1992 Postdoctoral Research Associate

Brown University, Department of Geological Sciences
1985-1991 Graduate Research Assistant

Education:

Ph.D. Geological Sciences, Brown University, 1991 Sc.,
M. Geological Sciences, Brown University, 1987
B.S. Geological Sciences, Indiana University, 1985

Professional and Synergistic Activities:

Fellow MSA (2006) and AGU (2008) Panelist, NSF MARGINS (OCE), 2000; Tectonics (2001-2004) Co-convener, Rock Deformation GRC 2008 President-Elect, Tectonophysics Section, AGU, 2010-present Co-convener, Earthscope Institute on the Lithosphere-Asthenosphere Boundary, 2011

Five publications relevant to proposed research

Homburg, J.M., G. Hirth and P.B. Kelemen, Investigation of the strength contrast at the Moho: A case study from the Oman Ophiolite, *Geology*, 38, DOI:10.1130/G30880.1, 679-682, 2010.

Roland, E., M. Behn and G. Hirth, Thermal-mechanical behavior of oceanic transform faults- Implications for the spatial distribution of seismicity, *Geochemistry, Geophysics, and Geosystems (G-cubed),* 11, Q07001, DOI: 10.1029/2010GC003034, 2010.

Kelemen, P.B., and G. Hirth, Reaction-driven cracking during retrograde metamorphism: Olivinehydration and carbonation, *Earth Planet. Sci. Lett.*, vol 345-348, 81-89, http://dx.doi.org/10.1016/j.epsl.2012.06.018, 2012.

Mehl, L., and G. Hirth, Plagioclase recrystallization and preferred orientation in layered mylonites: Evaluation of flow laws for the lower crust, *J. Geophys. Res.*, 113, B05202, doi:10.1029/2007JB005075, 2008.

deMartin, B., G. Hirth, B. Evans, Experimental Constraints on Thermal Cracking of Peridotite at Oceanic Spreading Centers, in J. Lin, ed., *The Thermal Structure of the Oceanic Crust and Dynamics of Hydrothermal Circulation*, Geophysical Monograph 148, American Geophysical Union, Washington, D.C., 148, 167-185, 2004.

Five other recent publications

Kohli, A. H., D. L. Goldsby, G. Hirth, and T. E. Tullis, Flash weakening of serpentinite at near-seismic slip rates, *J. Geophys. Res.*, doi:10.1029/2010JB007833, 116, B03202, 2011.

Hirth, G., and D. Kohlstedt, Rheology of the Upper Mantle and the Mantle Wedge: A View From the Experimentalists, in Inside the Subduction Factory, John Eiler (ed.), Geophysical Monograph 138, 83-105, American Geophysical Union, Washington, D.C., 2003.

Freed, A.M, G. Hirth, and M.D. Behn, Using short-term postseismic displacements to infer the ambient deformation conditions of the upper mantle, *J. Geophys. Res.*, 117, B01409, doi:10.1029/2011JB008562, 2012.

Chernak, L., G. Hirth, J. Selverstone, and J. Tullis, The effect of aqueous and carbonic fluids on the dislocation creep strength of quartz, *J. Geophys. Res.*, 114, B04201, doi:10.1029/2008JB005884, 2009.

Boettcher, M., G. Hirth, and B. Evans, Olivine friction at the base of oceanic seismogenic zones, *J. Geophys. Res.*, 112, B01205, doi:10.1029/2006JB004301, 2007.

Graduate Advisor: Jan Tullis, Brown University

Postdoctoral Advisor: David Kohlstedt, University of Minnesota

Collaborators (non-Brown Univ., last 48 months): G. Abers (Lamont), M. Behn (WHOI), J.Collins (WHOI), J. Escartin (IPG Paris), B. Evans (MIT), R. Evans (WHOI), A. Freed (Purdue), J.Gaherty (Lamont), B. Hacker (UCSB), B. Hager (MIT), B. Holtzman (Lamont), P. Kelemen(Lamont), D. Kohlstedt (U. Minn.), D. Lizarralde (WHOI), P. Molnar (U. Colorado), A. Sheehan (U. Colorado), H. Stuntiz (Tromso), C. Teyssier (U. Minn), D. Whitney (U. Minn). **Students, Post-docs and recent collaborators (last 48 months):** W. Behr (U. Texas), M. Billen (UC Davis), M. Boettcher (UNH), M. Braun (ExxonMobil), L. Chernak (U. Rochester), B. deMartin (ExxonMobil), J. Escartin (IPG Paris), E. Goergen (FEI), J. Homburg (ExxonMobil), J.Hustoft, G. Jaroslow (SEA), A. Kohli (Stanford), L. Mehl (Alaska Pacific Univ.), L. Montesi (Maryland), J. Muto (Tohoku U.), J. Pikser (Lamont), J. Precigout (ETH), E. Roland (USGS), P Skemer (WUSTL), M. Sundberg (ExxonMobil), J. Warren (Stanford), W. Zhu (Maryland).

Curriculum Vitae

Albrecht Werner Hofmann

Date of birth: 11 March 1939 in Zeitz (Germany)

Marital status: Married, 2 children

Citizenship: German

Education:

Elementary: 1945-46 Schlitz (Germany)
1946-49 Stuttgart

Secondary: 1949-52 Stuttgart
1952-58 Ravensburg

University: 1958-59 Duke University, Durham, North Carolina, USA
1959-62 Universität Freiburg i.Br., Germany
1962-68 Brown University, Providence, R.I., USA
1965 M.Sc.
1968 Ph.D. Major: Geochemistry, minors mineralogy and thermodynamics (advisor B.J. Giletti).

Professional Career:

1968-70 Assistant, Laboratorium für Geochronologie, Heidelberg
1970-72 Postdoctoral Fellow, Geophysical Laboratory, Carnegie Institution of Washington
1972-80 Scientific Staff Member, Department of Terrestrial Magnetism, Carnegie Institution of Washington
1980-2007 Director, Geochemistry Division, Max-Planck-Institut für Chemie, Mainz
1987- Adjunct professor at the University of Mainz
1989-91; 98-2000 Managing Director of the Max-Planck-Institut für Chemie.
Since 04/07 Max Planck Emeritus
Visiting Senior Research Scientist at Lamont-Doherty Earth Observatory, Columbia University, New York.
Adjunct Professor at the University of Nanjing, China.

Honors:

1987 Jaeger-Hales Lectureship at the Australian National University;
1994 Fellow of the American Geophysical Union;
1994 Chevalier de l'Ordre des Palmes Académiques;
1995 Sherman-Fairchild Scholarship at California Institute of Technology;
1996 MESR/Humboldt Award of the Ministère de l'Enseignement Supérieur et de la Recherche and the Alexander-von-Humboldt-Foundation;
1996 V.M. Goldschmidt Medal of the Geochemical Society;
1996 Geochemistry Fellow of the European Association of Geochemistry and the Geochemical Society.
1999 U.S. National Academy of Sciences (Foreign Associate)
1999 Fellow of the Geological Society of America
2001 Harry H. Hess Medal of the American Geophysical Union
2003 ISI “Highly Cited Researcher” in Geoscience
2010 Hamilton Visiting Scholar, Southern Methodist University, Dallas, Texas.

2011 Horace Mann Medal by Brown University, Providence, Rhode Island.

Editing (at various times):

Chemical Geology, Editor;
Geochimica et Cosmochimica Acta, Associate Editor;
Contributions to Mineralogy and Petrology, Associate Editor.
Editor of "Frontiers Section" of Earth & Planetary Science Letters (2008-09)

Memberships and Offices in scientific organizations:

Max-Planck-Gesellschaft, Member;
European Union of Geosciences , Founding Council Member, President 1997-99;
European Association of Geochemistry, President 1999-2000;
Geochemical Society, Member, Member of Board of Directors 1998-2001;
American Geophysical Union, Member;
Geological Society of America, Member;
Deutsche Mineralogische Gesellschaft, former Council Member;
Geologische Vereinigung, former Council Member
Forschungskollegium Geochemie e.V., Founder and Member;
Forschungskollegium Mineralogie, Member;
Comité Scientifique, France (Member 1989-1993).

Service in Committees: Member of visiting/evaluation committees at:
ETH Zurich
Harvard University,
Wood Hole Oceanographic Institute,
U.S. Geological Survey in Washington,
Department of Terrestrial Magnetism of the Carnegie Institution of Washington,
University of Munich,
GEOMAR (University of Kiel, Germany),
University of Bremen, Germany;
Member and chairman of AGU Fellows Committee,
Member and chairman of the Harry Hess Medal Committee of the AGU, 2011-2012
Member of search committee for director to the Department of Terrestrial Magnetism, Carnegie Institution for Science, 2011
Member of medal nominations committee of the Geochemical Society, 2011
Member of the Vetlesen Prize Committee 2004 and 2012
Organized or helped organize two major meetings of the European Union of Geosciences in Strasbourg (1983 and 1999)
Co-organizer of two Goldschmidt Conferences (Heidelberg 1996 and Cologne 2006) and several smaller conferences such as Mantle Plume conferences in Schloss Ringberg, Germany, and in Hawaii.

Benoît ILDEFONSE
Born 14 October 1962, Married, 2 children
CNRS, Géosciences Montpellier Université Montpellier 2, CC 60, 34095 Montpellier cedex 05, France
Tel : +33 467143818 (office) / +33 689838536 (mobile), email : ildefonse@um2.fr

Education :
• 2002 : "Habilitation à diriger des recherches", Université Montpellier 2
• 1987 : "Thèse de doctorat" (PhD), Université Lyon 1
• 1985 : DEA Pétrologie et Minéralogie. Université Lyon I

Academic employment :
• 2008-present : "Directeur de Recherches" (Senior Research Scientist) CNRS, France
• 1991-2008 : "Chargé de Recherches" CNRS, France
• 1989-1991 : Swiss National Fond fellowship, ETH Zürich, Switzerland

Main research topic :
Formation and evolution of the oceanic lithosphere

Scientific animation, management, and outreach
• Head of "Manteau & Interfaces" Research Team in CNRS UMR5243 (Géosciences Montpellier) (2011-)
• Member of French "Commission Nationale Flotte Hauturière" (2011-)
• Member of ISSEP (1999-2002), SciCom et ExCom (2003), iPC/SPC (2003-2006), OTF (2005-2006), ESSAC (2003-2010) in ODP & IODP; alternate member of SASEC (2007-2011)
• Chairman of IODP-France (Oct 2003-2010); Vice-chairman of ODP-France (Oct 2001-2003)
• Chairman of InterRidge "Deep Earth Sampling" Working Group (2004-2010)
• Lead Proponent of "Mission Moho" proposal (2007; http://missionmoho.org)
• Co-Lead Proponent of "MoHole to the Mantle" proposal (2012; http://mohole.org)
• ECORD Distinguished lecturer, 2007-2008, 2013-2014
• Co-chairman/organizer of workshops:
- "Mission Moho", Portland, Oct. 2006 (http://missionmoho.org)
- "Melting, Magma, Fluids and Life", Southampton, July 2009 (http://www.interridge.org/WG/DeepEarthSampling/workshop2009)
- "The MoHole, a crustal journey and mantle quest", Kanazawa, June 2010 (http://mohole.org)
• Steering Committees:
- IODP-DCO "Reaching the Mantle Frontier" Workshop, Carnegie Inst., Washington DC (2010; https://dco.gl.ciw.edu/september2010mohoworkshop)
- Geologic carbon capture and storage in mafic and ultramafic rocks. IODP/ICDP Workshop, Suktan Qaboos University, Oman (2011; http://ccs-oman2011.org/)
- ICDP-DCO Workshop : Oman Drilling project, Palisades, New York (2012, https://dco.gl.ciw.edu/icdp-workshop-oman-drilling-project)
- CHIKYU+10 Steering Committee (2012-)

Fieldwork and Cruises
• 1985 to 1990 : Fieldwork in Italian and French Alps
• 1991 to 1999, 2007-2008 : Fieldwork in the Oman Ophiolite
• 1997 and 2003: ODP Legs 176 and 209 (D/V JOIDES Resolution)
• 2000 : MANAUTE cruise (R/V L'Atalante + Nautile). Manus Basin. New Starmer Program.
• 2001 : SWIFT cruise (R/V Marion Dufresne). SouthWest Indian Ridge
• 2005 : IODP Expedition 305 (D/V JOIDES Resolution), *Co-chief Scientist*

• 2007 : MoMAR-DREAM cruise (R/V Pourquoi Pas ? + Nautile). MAR, Rainbow Massif
• 2008 : JC21 cruise (RRS James Cook + ROV Isis). Sampling & mapping at Hess Deep
• 2008 : MoMAR−DREAM 2 cruise (R/V Atalante + ROV Victor). MAR, Rainbow Massif
• 2011 : IODP Expedition 335 (D/V JOIDES Resolution), *Co-chief Scientist*
• 2012-2013 : IODP Expedition 445 (D/V JOIDES Resolution)

Selected recent publications

Complete list at: http://www.researcherid.com/rid/A-6205-2009

• Violay, M., Pezard, P. A., ildefonse, B., Célérier, B., & Deleau, A., **2012**. Structure of the hydrothermal root zone of the sheeted dikes in fats-spread oceanic crust: a core-log integration study of ODP Hole 1256D, Eastern Equatorial Pacific. Ofioliti, 37, 1-11. doi:10.4454/ofioliti.v37i1.402
• Teagle, D.A.H., Ildefonse, B., Blum, P., and the Expedition 335 Scientists, **2012**. Proc. IODP, 335: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.335.2012
• Koepke, J., France, L., Mueller, T., Faure, F., Goetze, N., Dziony, W., and Ildefonse, B., **2011**. Gabbros from IODP Site 1256 (Equatorial Pacific): Insight into axial magma chamber processes at fast-spreading ocean ridges, Geochem. Geophys. Geosyst., 12, Q09014, doi:10.1029/2011GC003655
• Blackman, D.K., Ildefonse, B., John, B.E., Ohara, Y., Miller, D.J., and IODP 304-305 Science Party, **2011**. Drilling Constraints on Lithospheric Accretion and Evolution at Atlantis Massif, Mid-Atlantic Ridge 30°N. J Geoph. Res., 116, B07103, doi:10.1029/2010JB007931
• Lartaud, F., Little, C.T.S., de Rafelis, M., Bayon, G., Dyment, J., Ildefonse, B., Gressier, V., Fouquet, Y., Gaill, F., Le Bris, N., **2011**. Fossil evidence for serpentinization fluids fueling chemosynthetic assemblages. Proceedings of the National Academy of Sciences of the United States of America 108, 7698-7703. doi:10.1073/pnas.1009383108
• Teagle, D., and Ildefonse, B., **2011**. Journey to the Mantle of the Earth, Nature, 471, 437-439. doi:10.1038/471437a
• Drouin, M., B. Ildefonse, and M. Godard, **2010**. A microstructural imprint of melt impregnation in slow spreading lithosphere: Olivine-rich troctolites from the Atlantis Massif, Mid-Atlantic Ridge, 30°N, IODP Hole U1309D, Geochem. Geophys. Geosyst., 11, Q06003, doi:10.1029/2009GC002995.
• France L, Ildefonse B, Koepke J, Bech F, **2010**. A New Method to Estimate the Oxidation State of Basaltic Series from Microprobe Analyses. Journal of Volcanology and Geothermal Research.189, 340-346. doi:10.1016/j.jvolgeores.2009.11.023
• France, L., Koepke, J., Ildefonse, B., Cichy, S.B., and Deschamps, F., **2010**. Hydrous partial melting in the sheeted dike complex at fast spreading ridges: experimental and natural observations. Contrib. Mineral. Petrol., 160(5): 683-704. doi:10.1007/s00410-010-0502-6
• Ildefonse, B., Abe, N., Blackman, D.K., Canales, J.P., Isozaki, Y., Kodaira, S., Myers, G., Nakamura, K., Nedimovic, M., Skinner, A.C., Seama, N., Takazawa, E., Teagle, D.A.H., Tominaga, M., Umino, S., Wilson, D.S., and Yamao M., **2010**. The MoHole: A Crustal Journey and Mantle Quest, Workshop in Kanazawa, Japan, 3–5 June 2010. Scientific Drilling, 10, 56-62. doi:10.2204/iodp.sd.10.07.2010
• Violay, M., Pezard, P.A., Ildefonse, B., Belghoul, A., Laverne, C., **2010**. Petrophysical properties of the root zone of sheeted dikes in the ocean crust: A case study from Hole ODP/IODP 1256D, Eastern Equatorial Pacific. Tectonophysics, 493, 139–152. doi:10.1016/j.tecto.2010.07.013
• Beard J.S., Frost B.R., Fryer P., McCaig A., Searle R., Ildefonse B., Zinin P., and Sharma S.K., **2009**. Onset and progression of two-stage serpentinization and magnetite formation in olivine-rich troctolite from IODP Hole U1309D. J. Petrol. 50, 387-403. doi:10.1093/petrology/egp004
• Drouin, M., Godard, M., Ildefonse, B., Bruguier, O., and Garrido, C., **2009**. Geochemical and petrographic evidence for magmatic impregnation in the oceanic lithosphere at Atlantis Massif, Mid-Atlantic Ridge (IODP Hole U1309D, 30°N), Chemical Geology. doi:10.1016/j.chemgeo.2009.02.013
• France, L., Ildefonse, B., and Koepke, J., **2009**. Interactions between magma and hydrothermal system in Oman ophiolite and in IODP Hole 1256D: fossilization of a dynamic melt lens at fast spreading ridges. Geochem. Geophys. Geosyst. doi:10.1029/2009GC002652
• Mainprice, D., and Ildefonse, B., **2009**. Seismic anisotropy of subduction zone minerals : contribution of hydrous phases. In : Subduction Zone Geodynamics (S. Lallemand & F. Funiciello, eds), 'Frontiers in Earth Sciences' Springer-Verlag Berlin Heidelberg, p. 63-84. doi:10.1007/978-3-540-87974-9
• Ildefonse, B., Blackman, D.K., John, B.E., Ohara, Y., Miller, D.J., MacLeod, C.J., and the Expedition 304/305 Scientists, **2007**. Oceanic Core Complexes and Crustal Accretion at Slow-Spreading Ridges. Geology, 35, 623-626. doi:10.1130/G23531A.1

CV Bjørn Jamtveit, Physics of Geological Processes (PGP), University of Oslo
Born 21.09.60 in Notodden, Norway.

a) Professional preparation
PostDoc (1991-1993) Dept of Geology, University of Bristol, UK
PhD, Geology (September 1990) Department of Geology, University of Oslo .
Master of Science, Geology (March 1986) Mineralogical-Geological Museum, University of Oslo. Grades: Thesis:1.2, Oral: 1.2 (top 1%)
Bachelor of Science University of Oslo (1982) Topics: Geology (33 credit points), Chemistry (35 credit points), Mathematics/Physics (20 credit points). Average grades: 1.4 (top 1%)
Military service: 08.07.86 - 07.07.87, Infantry at Terningmoen, Elverum and at the Norwegian Museum of Defence in Oslo.

b) Appointments

2006-:	Director of PGP, a Center of Excellence at the University of Oslo
2003-2006:	Co-director of PGP
2000-2001:	Group leader, Center for Advanced Studies, Norwegian Academy of Science
1993- :	Professor of Petrology, University of Oslo
1991-1993:	Odd Hassel research grant from the Norwegian Research Council to stay at the University of Bristol, UK (In 1991, two such grants were awarded within physical sciences in Norway).
1990-1991:	Post-Doc grant from the Norwegian Research Council, University of Oslo
1987-1990:	PhD grant from the Norwegian Research Council, University of Oslo
1985-1987:	Scientific Assistant, University of Oslo

c) Publications
i) 5 relevant publications

Jamtveit, B, Austrheim, H., and Malthe-Sørensen, A., 2000. Accelerated hydration of the Earth's deep crust induced by stress perturbations. *Nature,* 408, 75-79

Iyer, K., **Jamtveit, B**., Mathiesen, J., Malthe-Sørenssen, A., and Feder, J., 2008, Reaction assisted hierarchical fracturing during serpentinization. *Earth and Planetary Science Letters,* 267, 503-516.

Jamtveit, B., Malthe-Sørenssen, A., and Kostenko, O., 2008, Reaction enhanced permeability during retrogressive metamorphism. *Earth and Planetary Science Letters*, 267, 620-627.

Jamtveit, B., Kobchenko, M., Austrheim, H., Malthe-Sørenssen, A., Røyne, A., and Svensen, H., 2011, Porosity evolution and crystallization-driven fragmentation during weathering. *Journal of Geophysical Research,* B12204, doi:10.1029/2011JB008649

Plümper, O., Røyne, A., Sola, A.M., and **Jamtveit, B**., The interface-scale mechanism of reaction-induced fracturing during upper mantle serpentinization. *Geology* (in press)

ii) Significant publications

Svensen, H., Planke, S., Malthe-Sørenssen, A., **Jamtveit, B**., Myklebust, R., Rasmussen, T; and Rey, S., 2004, Explosive release of methane from volcanic basins. A triggering mechanism for global climate change. *Nature,* 429, 542-545

Hammer, Ø., Dysthe, D.K., **Jamtveit, B**., 2007, The dynamics of travertine dams. *Earth Planet Sci Letters,* 26, 258-263

Malthe-Sørenssen, A., **Jamtveit, B**., and Meakin, P., 2007, Fracture patterns generated by diffusion-controlled volume changing reactions. *Phys. Rev.Letters*, 96, art no. 245501

Røyne, A., **Jamtveit, B**., Mathiesen, J., Malthe-Sørenssen, A., 2009, Controls on weathering rates by reaction induced hierarchical fracturing. *Earth and Planetary Science Letters,* 275, 364-369

Meakin, P., and **Jamtveit, B.,** 2010, Geological pattern formation by growth and dissolution in aqueous systems. *Proceedings of the Royal Society A*, 466, 659-694

Jamtveit, B., and Hammer, Ø., Sculpting of rocks by reactive fluids. *Geochemical*

Perspectives,1, No.3, 340-480

d) Synergistic activities

i) Founder of the cross disciplinary research center 'Physics of geological processes' (PGP), a Norwegian Center of Excellence hosted by the University of Oslo. PGP comprises researchers with background from geology, physics, geophysics and applied matemathics. Ca 400 PGP papers have been published in ISI journals since the start in 2003 and currently receive ca 1200 citations/year. PGP also includes a cross-disciplinary Master program and a research school for PhD students. Ca 50 students have graduated from PGP. Ca 50% of these work for Academic institutions in Norway or abroad.

ii) Organizer of the annual Kongsberg seminar; A high quality cross-disciplinary international conference series run yearly since 1994.

iii) Convenor and co-convenor of numerous special sessions at international conferences, including the AGU Fall meeting and the Goldschmidt conferences. Also co-organizer of the 2004 Goldschmidt meeting in Copenhagen. Member of the Board, European Association of Geochemistry (2000-2004)

iv) Have also published on the dynamics of research organizations (cf. **Jamtveit, B**., Jettestuen, E., and Mathiesen, J., Scaling properties of European research units. *PNAS,* 106, 13160-13163 (doi: 10.1073/pnas.0903190106) and Mathiesen, J., **Jamtveit, B**., and Sneppen, K., Organizational structure and communication networks in a university environment. *Physical Review E, 82, 01610)* and has significant competence in the management of research units.

v) Extensive outreach activities, including participation in ca 30 radioprograms, and four Science/Art exhibits + numerous popular papers in Newspapers and magazines during the last 5 years.

e) Collaborators & Other Affiliations

i) Collaborators & Co-editors last 24 months. 20-25 people including:
Austrheim, Haakon, University of Oslo
Feder, Jens, University of Oslo, Norway
Iyer, Karthik, University of Kiel, Germany
Mathiesen, Joachim, Niels Bohr Institute, Copenhagen, Denmark
Meakin, Paul, Idaho National Lab
Putnis, Andrew, University of Münster, Germany
Renard Francois, University of Grenoble, France
Sneppen Kim, Niels Bohr Institute, Copenhagen, Denmark

ii) My own advisor and postdoc
PostDoc sponsor – personal grant from the Norwegian research Council.
Main scientific contact.
Prof. B.J.Wood, University of Bristol
PhD adviser – Prof Kurt Bucher (now Univ of Freiburg, Germany
Master adviser – Prof Willian L Griffin (now at Maquarie university)

iii) Students and postdocs
5 Master students
7 PhD students
15-20 Postdocs

CURRICULUM VITAE
FRIEDER KLEIN

Dept. of Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, Woods Hole, MA 02543, Phone: (508)-289-3355, E-mail: fklein@whoi.edu

Education:

2003	B.S. (distinction), Geosciences, University of Bremen
2005	Dipl. Geow. (distinction), Geosciences, University of Bremen
2009	Dr. rer. nat. (summa cum laude), Geosciences, University of Bremen

Professional Experience:

Since Oct. 2011	Assistant Scientist, WHOI
2010 – 2011	Visiting Research Associate, Laboratory for Atmospheric & Space Physics
2009 – 2011	Post-doctoral Scholar, WHOI
2009	Post-doctoral Fellow, Instituto Andaluz de Ciencias de la Tierra (IACT), Consejo Superior de Investigaciones Científicas (CSIC), Granada, Spain
2008	Research Fellow, Marum Center for Marine Environmental Sciences, University of Bremen
2005 – 2008	Research Assistant, Geosciences Department, University of Bremen
2002 – 2005	Student Assistant, Geosciences Department and Marum Center for Marine Environmental Sciences, University of Bremen

Professional Affiliations

Geochemical Society, American Geophysical Union, Mineralogical Society of America, European Association for Geochemistry, Deutsche Mineralogische Gesellschaft

Research Interests

Fluid-rock interactions in the Earth's lithosphere
Mineral replacement reactions
Geochemistry and petrology of metamorphic and metasomatic rocks
Applications of spectroscopic techniques, hydrothermal experiments and thermodynamics to study fluid-rock interactions

Cruise participation

R/V Atlantis/Jason II, Mid Cayman Rise, January 2012
R/V Maria S. Merian; North Pond, February 2009
R/V Maria S. Merian/ BGS Rockdrill II; Logatchev Hydrothermal field, November 2006
R/V Meteor; Shelf off NW Africa, June 2005

Relevant Publications:

Klein, F., Bach, W. McCollom, T. (in review) Compositional controls on hydrogen generation during serpentinization of ultramafic rocks.

Bach, W., Jöns, N., Klein, F. (2012) Metasomatic processes in the oceanic lithosphere. Invited book chapter, Lecture Notes in Earth Sciences, Springer.

Klein, F. and Garrido, C.J., (2011). Thermodynamic constraints on mineral carbonation of serpentinized peridotite, Lithos, 10.1016/j.lithos.2011.07.020.

Jöns, N., Bach, W., Klein, F. (2010) Magmatic influence on reaction paths and element transport during serpentinization. Chemical Geology v. 274, 196–211, doi:10.1016/j.chemgeo.2010.04.009.

Klein, F. and Bach, W., (2009) Fe-Ni-Co-O-S phase relations in peridotite-seawater interactions. Journal of Petrology, v. 50 (1), 37-59, doi:10.1093/petrology/egn071.

Bach, W. and Klein, F., (2009) The petrology of seafloor rodingites: Insights from geochemical reaction path modeling. Lithos, v. 112 (1-2), 103-117, doi:10.1016/j.lithos.2008.10.022.

Klein, F., Bach, W., Jöns, N., McCollom, T., Moskowitz, B. and Berquo, T. (2009) Iron partitioning and hydrogen generation during serpentinization of abyssal peridotites from 15°N on the Mid-Atlantic Ridge. Geochimica et Cosmochimica Acta, v. 73 (22), 6868-6893, doi:10.1016/j.gca.2009.08.021.

Nakamura, K., Morishita, T. Bach, W., Klein, F., Hara, K., Okino, K., Takai, H. and Kumagai, H. (2009) Serpentinized troctolites exposed near the Kairei Hydrothermal Field, Central Indian Ridge: Insights into the origin of the Kairei hydrothermal fluid supporting a unique microbial ecosystem. Earth and Planetary Science Letters, v. 280 (1-4), 128-136, doi:10.1016/j.epsl.2009.01.024.

Klügel, A. and Klein, F., 2006. Complex magma storage and ascent at embryonic submarine volcanoes from the Madeira Archipelago. Geology, v. 34 (5), 337-340. doi: 10.1130/G22077.1.

Students advised: Niya Grozeva (Ph.D. in progress), co-advisor for Gregory Horning (Ph.D. in progress), Tristan Kading (Ph.D. in progress), Adam Sarafian (guest student, U. Georgia)

Collaborators (last 48 months)

T. McCollom (U. Colorado), K. Edwards (USC), B. Toner (U. Minn), C. Garrido (U. Granada), A. Templeton (U. Colorado), D. Goldsby (Brown U.), W. Kahl (U. Kiel), J. Warren (U. Stanford), A. McCaig (U. Leeds), M. Hentscher (U. Bremen), N. Joens (U. Bremen), W. Bach (U. Bremen), M. Tominaga (WHOI), H. Marschall (WHOI), Sune Nielsen (WHOI), Weifu Guo (WHOI), J. Seewald (WHOI), J. Lin (WHOI), H. Dick (WHOI), S. Humphris (WHOI)

Graduate and Post-Doctoral Advisors

Post-Doc Advisors at WHOI	Jeff Seewald, Susan Humphris, Henry Dick
Post-Doc Advisor at the CSIC	Carlos Garrido
Ph.D. Advisor	Wolfgang Bach
Dipl. Geow. Advisor	Andreas Klügel
B.Sc. Advisor	Colin Devey

Synergistic Activities

Gave talks about the petrology seafloor serpentinization at WHOI Geology and Geophysics seminar class (graduate level students) and at the Bridgewater State College (undergraduate level students); wrote the screenplay and acted in the DFG (German Science Foundation) Science TV documentary 'Schwarze Raucher' (Black Smokers) about seafloor hydrothermal systems produced for high school- and undergraduate-level students (available online http://www.dfg-sciencetv. de/de/projekte/blaues-wunder/2008-05-27). Volunteer Falmouth Public High School. Session chair at the Goldschmidt 2011 conference. Session chair and student liaison the AGU Fall 2011 meeting.

Prof. Dr. Jürgen Koepke
Institut für Mineralogie
Leibniz Universität Hannover
Callinstrasse 3 · D-30167 Hannover

Leibniz Universität Hannover

Telephone: +49-(0)511-762 4084
Fax: +49-(0)511-762 3045
email: koepke@mineralogie.uni-hannover.de

Curriculum Vitae ***Hannover, November, 2012***

Personal

Institut für Mineralogie, Leibniz Universität Hannover, Callinstrasse 3, 30167, Germany
koepke@mineralogie.uni-hannover.de; 0049511 7624084 (phone); 0049511 7623045 (fax)
Born in Braunschweig, Germany, on Oct. 28, 1955
2 daughters; Jenny Koepke, born Dec. 29. 1983 & Nina Koepke, born Jan. 25, 1989
Private: Tonstrasse 3, 30449 Hannover, 0049511 9215153 (phone)

Education

M.Sc. (1981) Mineralogy, Technical University Braunschweig, Germany: "Petrology of the Upper Cretaceous crystalline complex of Leda (Uppermost unit, Asterousia Mountains, Crete)"

PhD (1986) Mineralogy, Technical University Braunschweig, Germany: "Ophiolites of the Southern Aegean Islands: Petrology and Geochronology"

Professional Experience

1982-1985: Scientific assistant, Inst. for Mineralogy, Technical University Braunschweig

1082-1985: Commercial mineral separation

1985-1994: Scientific assistant, Inst. for Physical Chemistry, Leibniz University of Hannover; head of the microanalytical lab

1994: Scientific assistant, Inst. for Mineralogy, Leibniz University of Hannover; head of the electron microprobe lab

2004: Postdoctoral lecture qualification (Habilitation), Inst. for Mineralogy, Leibniz University of Hannover: "Experimental investigations in hydrous basic systems: Differentiation of MORB, partial melting and trace element diffusion in melts"

2004: Appointment to "Privatdozent" at the Inst. for Mineralogy, Leibniz University of Hannover

2010: Appointment to "Professor" at the Inst. for Mineralogy, Leibniz University of Hannover

Research Interests

Petrology and geodynamics of ocean ridges; magmatic processes at the interface between igneous and hydrothermal processes; role of water during construction of the ocean crust

Experimental petrology of basalts and gabbros, especially the role of aH_2O and fO_2 on phase equilibria and the evolution of SiO_2-rich melts within basaltic systems

Development and application of microprobe techniques

Experimental geochemistry on properties of silicate melts and magmas

Important Funded Projects

Deutsche Forschungsgemeinschaft (DFG), Project Leader: 15 projects (see http://gepris.dfg.de)

Deutsche Forschungsgemeinschaft (DFG), Co-Project Leader: 10 projects (see http://gepris.dfg.de)

Person in charge of a Joint Research Project with Russian Federation funded by DFG (co-operation partner: Sergei Silantyev, Vernadsky Institute, Moscow)

Person in charge of a DAAD PROCOPE Exchange Program with the University of Montpellier, France (co-operation partner: B. Ildefonse)

Person in charge of a DAAD PROCOPE Exchange Program with the University of Montpellier, France (co-operation partner: F. Boudier, A. Nicolas)

Person in charge of 7 projects on the development of synchrotron microprobe techniques and application to silicate melt properties at HASYLAB, Deutsches Elektronen-Synchrotron DESY, Hamburg

German supervisor in two joint doctorate funded by the "Cotutuelle" Program within the Deutsch-Französische Hochschule; based on an agreement between the Universities of Hannover and Montpellier, France (co-operation partner: B. Ildefonse)

German supervisor in a joint doctorate funded by the "Cotutuelle" program; based on an agreement between the Universities of Hannover and Toulouse, France (co-operation partner: G. Ceuleneer)

Co-Proponent for the IODP Mission Proposal "Mission Moho", submitted in 2007

Co-Proponent for the IODP Drilling Proposal "Superfast-Spreading Crust IV" (522-Full4), submitted in 2006

Co-Proponent for the IODP MDP Proposal "MoHole to Mantle (M2M)", submitted in 2012

Co-Proponent for the IODP Proposal "Nature of the Lower Crust and Moho at Slower-spreading Ridges" submitted in 2012

Supervisor Activity

MSc and BSc supervisor for: A. Tegge-Schüring, S.T. Feig, S. Graßmann, A. Schimroscyk, M. Johannson, T. Attia, V. Petrov, S. Schönborn, J. Stichnothe, K. Ziaja, J. Blume, D. Penner, W. Dziony, A. Matthias, M. Pump, T. Stampehl, E. Wolff, M. Albrecht, D. Kosanke, P. Nasemann, N. Götze, K. Voges, J. Wiencke, T. Müller, L. Fischer

MSc and BSc co-supervisor for: M. Freise, K. Klimm, M. Haack, O. Beermann, S. Cichy, F. Rohlfs, A. Stechern, J. Probst, L. Kuschel, C. Bonnecke, A. Fiege, C. Kirchner, J. Probst, M. Oeser (Münster), M. Tiedke, M. Singer, S. Wilke, C. Klahn, R. Brodehl, N. Strube, K. Streuff (Kiel),

PhD supervisor for: J. Berndt, S.T. Feig, W. Dziony, C. Kirchner, E. Wolff, M. Erdmann, T. Müller

PhD co-supervisor for: A. Tegge-Schüring; M. Hahn, R. Almeev, L. France (in the framework of a joint doctorate with the University of Montpellier, France), B. Abily (in the framework of a joint doctorate with the University of Toulouse, France)

Post-doctoral co-supervisor for: R. Botcharnikov; R. Almeev; C. Zhang

Long-term responsibilities in the Administration of the Leibniz University Hannover

Program coordinator BSc, MSc "Earth Sciences" at Leibniz University of Hannover

Member of the audit committee "Earth Sciences" at Leibniz University of Hannover

International program coordinator "Earth Sciences" within the Natural Science Faculty

Member of the selection committee for MSc "Earth Sciences" at Leibniz University of Hannover

5 selected Publications

Koepke, J., France, L., Müller, T., Faure, F., Goetze, N., Dziony, W., Ildefonse, B. (2011): Gabbros from IODP Site 1256 (Equatorial Pacific): Insight into axial magma chamber processes at fast-spreading ocean ridges. Geochem Geophys Geosyst 12: doi:10.1029/2011GC003655.

Koepke, J., Berndt, J., Feig, S.T., Holtz, F. (2007): The formation of SiO_2-rich melts within the deep oceanic crust by hydrous partial melting of gabbros. Contrib. Mineral. Petrol. 153, 67–84.

Koepke, J., Feig, S.T., Snow, J. (2005): Late-stage magmatic evolution of oceanic gabbros as a result of hydrous partial melting: Evidence from the ODP Leg 153 drilling at the Mid-Atlantic Ridge. Geochem. Geophys. Geosyst. 6, 2004GC000805, pp. 1-27.

Koepke, J., Feig, S.T., Snow, J., Freise, M. (2004): Petrogenesis of oceanic plagiogranites by partial melting of gabbros: An experimental study. Contrib. Mineral. Petrol. 146, 414-432.

Koepke, J., Behrens, H. (2001): Trace element diffusion in andesitic melts: An application of synchrotron X-ray fluorescence analysis. Geochim. Cosmochim. Acta 65, 1481-1498.

CURRICULUM VITAE

CHARLES H. LANGMUIR
Department of Earth and Planetary Sciences
20 Oxford Street
Harvard University
Cambridge, MA 02138
Langmuir@eps.harvard.edu

EDUCATION:

1973	:	B.A. with honors - Harvard University - History of Science and Geology
1980	:	Ph.D. - SUNY, Stony Brook

FELLOWSHIPS AND AWARDS:

1973 - 1974	:	Henry Russell Shaw traveling fellowship from Harvard University
1980 - 1981	:	Post-doctoral fellowship from Lamont-Doherty
1983 - 1985	:	Alfred Sloan Research Fellow
1993	:	Fellow, American Geophysical Union
1996	:	N. L. Bowen Award, American Geophysical Union
1997	:	Fellow, American Academy of Arts and Sciences
1998	:	Daly Lecturer, American Geophysical Union
1998		Fellow, Geochemical Society and European Geochem. Soc.
2003	:	Arthur Holmes Medal, European Union of Geosciences
2006	:	National Academy of Sciences
2010	:	Urey Medal, European Association of Geochemistry
2010	:	Leverhulme Fellowship, Oxford University
2011	:	Christensen Fellow, Oxford University

PROFESSIONAL ACTIVITIES:

1998 - 2000	:	Co-founder, *Geochemistry, Geophysics, Geosystems*
1999-		PI for PetDB, the Petrological Database of the Ocean Floor
2007-2010	:	AAAS Program Committee
2002 - 2006	:	Ridge 2000 Steering Committee
2006 -	:	Adjunct Scientist, Woods Hole Oceanographic Institution
2006 -	:	Director of the Mineralogical and Geological Museum, Harvard University

EMPLOYMENT:

1981 - 1986	:	Assistant Professor, Lamont-Doherty Earth Obs., of Columbia University, Palisades, New York 10964
1986 - 1988	:	Associate Professor, Lamont-Doherty Earth Obs.
1988 - 2002	:	Professor, Lamont-Doherty Geol. Obs.
1989 - 2002	:	Arthur D. Storke Memorial Professor, Lamont-Doherty
1989 - 1990	:	Visiting Scientist, Institut de Physique du Globe, Paris
2002 - 2003	:	Visiting Scientist, Institut de Physique du Globe, Paris
2002 - 2006	:	Professor of Geochemistry, Harvard University
2006 -	:	Higgins Professor of Geochemistry, Harvard University
2010 -2011	:	Visiting Professor, Oxford University

SEAGOING EXPERIENCE: 15 cruise, 8 as Chief Scientist

Recent cruises:

2001	USCGC Healy	Gakkel Ridge, Arctic Ocean, Co-chief scientist
2004	R/V Kilo Moana	Lau Basin, South Pacific, Chief Scientist
2012	R/V Knorr	Mid-Atlantic Ridge, Chief Scientist

PUBLICATION LIST

Book: Charles Langmuir and Wallace Broecker, *How to Build a Habitable Planet*, 2nd ed. Princeton University Press, 2012.

Selected papers:

Langmuir, C., Bender, J., Batiza, R. (1986). Petrologic and tectonic segmentation of the East Pacific Rise from 6°-14°N. *Nature,* 332, 422-429.

Klein, E. and Langmuir, C. (1987). Global correlations of ocean ridge basalt chemistry, axial depth, crustal thickness. *J. Geophys. Res.* 92, 8089-8115.

Langmuir, C. (1989). Geochemical Consequences of *In Situ* Crystallization. *Nature,* 340, 199-205.

Langmuir, C., Klein, E., Plank, T. (1992). Petrological systematics of mid-ocean ridge basalts: Constraints on melt generation beneath ocean ridges. *AGU Monograph,* 71, 183-280.

Lehnert, K., Su, Y., Langmuir, C. (1999). A global geochemical database structure for rocks. *Geochem. Geophys. Geosyst. 1,* Paper # 1999GC000026.

Michael, P., Langmuir, C., Dick, H., Snow, J., Goldstein, S., Graham, D., Lehnert, K., Kurras, G., Jokat, W., Mühe, R., Edmonds, H. (2003). Magmatic and amagmatic seafloor generation at the ultraslow-spreading Gakkel ridge, Arctic Ocean. *Nature,* 423, 956-961.

Langmuir, C., Bezos, A., Escrig, S., Parman, S. (2006). Chemical systematics and hydrous melting of the mantle in back-arc basins. *AGU Geophysical Monograph Series* 166, 87-146.

Escartin, J., Smith, D., Cann, J., Schouten, H., Langmuir, C., and Escrig, S. (2008). Central role of detachment faults in accretion of slow-spreading oceanic lithosphere. *Nature*, 455, 790-794, doi:10.1038/nature07333.

Bézos, A., S. Escrig, C. H. Langmuir, P. J. Michael, and P. D. Asimow (2009). Origins of chemical diversity of back-arc basin basalts: A segment-scale study of the Eastern Lau Spreading Center, *J. Geophys. Res.,* 114, B06212, doi:10.1029/2008JB005924.

Escrig, S., A. Bézos, S. L. Goldstein, C. H. Langmuir, and P. J. Michael (2009). Mantle source variations beneath the Eastern Lau Spreading Center and the nature of subduction components in the Lau basin–Tonga arc system. *Geochem. Geophys. Geosyst.* 10, Q04014, doi:10.1029/2008GC002281.

Curriculum vitae – Christopher John MacLeod

School of Earth & Ocean Sciences, Cardiff University, Cardiff CF10 3AT, Wales, UK

Tel: *+44 29 20874332;* ***Fax****: +44 29 20874326;* ***E-mail:*** *macleod@cardiff.ac.uk*

Nationality: *British* ***Date of birth:*** *8th August 1964*

Employment history:

2009	Professor, School of Earth & Ocean Sciences, Cardiff University
2002-2009	Senior Lecturer in Marine Geology, Cardiff University
2005-2007	Chair, ESSAC (Science Support & Advisory Committee of the European Consortium for Ocean Research Drilling), and Director of the ESSAC Office
1995-2002	Lecturer in Marine Geology, Cardiff University
1993-1995	NERC Fellow, Inst. Oceanographic Sciences/University of Leicester: *'Application of borehole imaging techniques to structural geological studies with the Ocean Drilling Program: structure of the lower oceanic crust in Hess Deep'*
1991-1993	NERC PDRA, Inst. Oceanographic Sciences: *'Tectonic evolution of the Lau Basin, SW Pacific, from structural studies of ODP core and geophysical well logs'*
1990-1991	Open University Research Fellow *'Geological evolution of the Southern Troodos Transform Fault Zone, Cyprus'*
1988-1989	Royal Society European Exchange Fellow, Université de Montpellier 2, France *'Oceanic spreading axis segmentation in the Oman ophiolite'*

Qualifications:

Ph.D. (Open University, 1988): *'Tectonic Evolution of the Eastern Limassol Forest Complex Troodos Ophiolite, Cyprus'* (supervisor: Professor I.G. Gass, F.R.S., now deceased)

B.Sc. (Hons.) Geology, Upper Second Class (University of Durham, 1984)

Relevant research cruise/field experience:

- Semail ophiolite, Sultanate of Oman/UAE 9 months field experience 1989-2012
- Troodos ophiolite, Cyprus ~24 months field experience since 1985
- Chief Scientist, RRS James Cook cruise JC021, Hess Deep (2008)
- Co-Chief Scientist, RRS James Cook cruise JC007, Mid-Atlantic Ridge 13°N (2007)
- Chief Scientist, RRS James Clark Ross cruise JR63, Mid-Atlantic Ridge 15°45'N (2001)
- Co-Chief Scientist, RRS James Clark Ross cruise JR31, Atlantis Bank (1998)
- ODP Leg 147, Hess Deep (1992-93) *Structural geologist + JOIDES logging scientist*
- ODP Leg 135, Lau Basin (1990-91) *Structural geologist + JOIDES logging scientist*
- participant in four further research cruises in Atlantic, Indian & Pacific oceans (1992-2010)

Professional appointments and memberships:

- Chair, ESSAC (ECORD Science Support & Advisory Committee), 2005-2007
- Vice-Chair, ESSAC, 2003-2005, 2007-2008; UK representative ESSAC, 2003-2008
- ECORD Representative, IODP Science Planning Committee (SPC), 2003-2007
- IODP INVEST Session Chair 'Variability in ocean crust composition and structure', Sept 2009
- IODP Thematic Review Committee 'Oceanic Crustal Structure and Formation', 2008-2009
- IODP Science Advisory Structure Executive Committee Permanent Alternate, 2007-09
- InterRidge Deep Earth Sampling Working Group member, 2004-2009
- NERC UK ODP & IODP Strategy Group and Grants Committee member, 1995-2008
- UK representative, ODP (JOIDES) Science Committee (SCICOM), 2001-2003
- UK representative, ODP Scientific Measurements Panel, 1997-1999
- ODP Curatorial Advisory Board member, 1997-2000
- UK representative, ODP Information Handling Panel, 1995-1997

Selected research grants

- NERC grant NE/J021741/1 (2014-2017, £103,941) *'Role and extent of detachment faulting at slow-spreading mid-ocean ridges'* (with T. Reston & C. Peirce)
- *NERC grant IP1193-1110 (2011-2013; £33,000) *'Geodynamics of the Oman/UAE ophiolite: spatial and temporal variability in lithospheric accretion at the onset of intraoceanic subduction'*
- *NERC grant NE/C509023/1 (2008-2011; £332,992) *'Accretion of the lower oceanic crust at fast-spreading ridges: a rock drill and near-bottom seafloor survey at Hess Deep'*
- *NERC grant NE/B500058/1 (2007-2010; £147,575) '*Geological and Geophysical Studies of the Mid-Atlantic Ridge, 12°30'N to 14°30'N'*
- NERC grant NE/E003079/1 (2007-2009; £18,446) *'Spatial and temporal scales of crustal accretion in slow-spreading rate oceanic crust (IODP Site U1309)*
- *NERC + ECORD Managing Agency (2005-2007, £295,240) *Management of the ESSAC Office and ECORD education & outreach activities*
- *NERC grant GR3/11767 (1999-2004, £155,234) *'A low-angle detachment fault on the MAR'*
- *NERC grants GR3/10791+ GST/02/2293 (1997-2001, £169,699) *'Plutonic foundation of the oceanic crust: portable rock drilling on the SW Indian Ridge'*
- NERC grant GST/02/1166 (1996-1998, £56,549) *'Sea trials of the oriented hard-rock corer'*
- NERC grant GST/02/996 (1995-1996, £82,265) *'A seafloor drill for oriented rock cores'*

[= first-named Principal Investigator];* + in-kind contributions (shiptime, ROV hire, NERC facilities use): £2,799,540*;* + 10 further grants from miscellaneous other sources: £882, 721

Selected relevant publications:

MacLeod CJ, Lissenberg, CJ, & Bibby, LE, 2013. 'Moist MORB' axial magmatism in the Oman ophiolite: the evidence against a mid-ocean ridge origin. *Geology*, **41**, doi:10.1130/G33904.1, *in press.*

MacLeod CJ, et al., 2009. Life cycle of oceanic core complexes. *Earth Planet. Sci. Lett.*, **287**, 333-344.

MacLeod CJ, Escartín J, et al., 2002. Direct geological evidence for oceanic detachment faulting: the Mid-Atlantic Ridge, 15°45'N. *Geology*, **30**, 879–882.

Coogan LA, Thompson G & **MacLeod CJ**, 2002. A textural and geochemical investigation of high level gabbros from the Oman ophiolite. *Lithos*, **63**, 67-82.

MacLeod CJ & Yaouancq G, 2000. A fossil melt lens in the Oman ophiolite: implications for magma chamber processes at fast-spreading ridges. *Earth Planet. Sci. Lett*., **176**, 357-373.

Manning CE, **MacLeod CJ** & Weston PE, 2000. Lower-crustal cracking front at fast-spreading ridges: evidence from the East Pacific Rise and the Oman ophiolite. *Geol. Soc. Am. Spec. Pap.*, **349**, 261-272.

Yaouancq G. & **MacLeod CJ**, 2000. The use of the anisotropy of magnetic susceptibility in petrofabric investigation of gabbros from the Oman ophiolite. *Mar. Geophys. Res.*, **21**, 289-305.

MacLeod CJ, et al., 1995. Further techniques for core reorientation by core-log integration: application to structural studies of lower oceanic crust in Hess Deep, Eastern Pacific. *Scientific Drilling*, **5**, 77-86.

Gass IG, **MacLeod CJ**, et al., 1994. *The Geological Evolution of the Southern Troodos Transform Fault Zone*. Cyprus Geological Survey Memoir, **9**, Geol. Surv. Dept., Nicosia, Cyprus, 218pp.

MacLeod CJ & Rothery DA, 1992. Ridge axial segmentation in the Oman ophiolite: evidence from along-strike variations in the sheeted dyke complex. *Spec. Publ. Geol. Soc. London,* **60**, 39-63.

MacLeod CJ, Allerton S, Gass IG & Xenophontos C, 1990. Structure of a fossil ridge-transform intersection in the Troodos ophiolite. *Nature*, **348**, 717-720.

MacLeod CJ, et al., 1992. Identification of tectonic rotations in boreholes by the integration of core information with Formation MicroScanner and Borehole Televiewer images. *Spec. Publ. Geol. Soc. London* **65**, 235-246.

Biographical Sketch – Craig E. Manning

Professional Preparation

University of Vermont	Geology	BA, 1982
Stanford University	Geology	MS, 1986
Stanford University	Geology	Ph.D, 1989
U.S. Geological Survey	Geochemistry	Postdoctoral Scientist, 1989-90

Appointments

2010-	Affiliate Member, UCLA Insitute of the Environment
2008-2012	Chairman, Dept. of Earth and Space Sciences, UCLA
2002-2008	Vice-Chairman, Dept. of Earth and Space Sciences, UCLA
2008-	Humboldt Fellow, Bayerisches Geoinstitut, Bayreuth, Germany
2007,2008	Visiting Scientist, École Normale Supérieur de Lyon, France
2006	Visiting Scientist, GeoForschungsZentrum, Potsdam, Germany
2002-	Professor of Geology and Geochemistry, UCLA
2000	Visiting Professor, Swiss Federal Institute of Technology (ETH Zürich)
1996-2002	Associate Professor of Geology and Geochemistry, UCLA
1990-1996	Assistant Professor of Geology and Geochemistry, UCLA
1989-1990	Postdoctoral Scientist, U.S. Geological Survey, Menlo Park, Ca.
1983	Geological Field Assistant, U.S. Geological Survey, Menlo Park, Ca.
1981-1982	Field Geologist, Wagner, Heindel and Noyes, Consulting Hydrologists, Burlington, Vt.

Relevant Publications

Dolejs D., and Manning, C. E., 2010, Thermodynamic model for mineral solubility in aqueous fluids: theory, calibration, and application to model fluid-flow systems. Geofluids, v. 10, p. 20-40.

Manning, C. E., Antignano, A., Lin, H. A., 2010, Premelting polymerization of crustal and mantle fluids, as indicated by solubility of albite + paragonite + quartz in H_2O at 1 GPa and 350-620°C. Earth and Planetary Science Letters, v. 292, p. 325-336.

Ingebritsen, S. E., and Manning, C. E., 2010, Permeability of the continental crust: Dynamic variations inferred from seismicity and metamorphism. Geofluids, v. 10, p. 193-205.

Manning, C. E., MacLeod, C., and Weston, P. E., 2000, Lower-crustal cracking front at fast-spreading ridges: evidence from the East Pacific Rise and the Oman ophiolite. In Dilek, Y., Moores, E., Elthon, D., and Nicolas, A., eds., Ophiolites and Ocean Crust: New Insights From Field Studies and Ocean Drilling Program, Geological Society of America Special Paper 349, p. 261-272.

Manning, C. E., Weston, P. E., and Mahon, K. I., 1996, Rapid high-temperature metamorphism of East Pacific Rise gabbros from Hess Deep: Earth and Planetary Science Letters, v. 144, p. 123-132.

Five Other Publications

Manning, C. E., and Ingebritsen, S. E., 1999, Permeability of the continental crust: constraints from heat flow models and metamorphic systems. Reviews in Geophysics, v. 37, p. 127-150.

Manning, C. E., 1997, Coupled reaction and flow in subductions zones: Si metasomatism in the mantle wedge. In: Jamtveit, B., and Yardley, B. W. D., eds., Fluid Flow and Transport in Rocks, Chapman Hall, p. 139-148.

Manning, C. E., 1994, The solubility of quartz in H_2O in the lower crust and upper mantle. Geochimica et Cosmochimica Acta, v. 58, p. 4831-4839.

Newton, R. C., and Manning, C. E., 2002, Solubility of silica in equilibrium with enstatite, forsterite, and H_2O at deep crust/upper mantle pressures and temperatures and an activity-concentration model for polymerization of aqueous silica. Geochimica et Cosmochimica Acta, v. 66, p. 4165-4176.

Manning, C. E., and MacLeod, C. J., 1996, Fracture-controlled metamorphism of Hess Deep Gabbros, Site 894: Constraints on the root zones of mid-ocean ridge hydrothermal systems at fast spreading centers. In: Mével, C., Gillis, K. M., Allan, J. F., and Meyer, P. S., eds., Proceedings of the Ocean Drilling Program, Scientific Results, v. 147, College Station, TX (Ocean Drilling Program), p. 189-209.

Five Synergistic Activities

2012-13	GeoPRISMS Distinguished Lecturer
2011-	Co-Chair, Physics and Chemistry of Carbon Direcotrate, Deep Carbon Observatory

2006-08 Secretary, American Geophysical Union VGP section
2001-03 Councilor, Mineralogical Society of America
1997-2000 Panelist, Ocean Drilling Program Scientific Steering and Evaluation Panel

Collaborators and Other Affiliations

Collaborators (last 4 years)

J. Boyce (UCLA)
E. Cowgill (UC Davis)
I. Daniel (ENS Lyon, France)
D. Dolejs (U Bayreuth, Germany)
J. Hanchar (Memorial U)
M. Harrison (UCLA)
D. Hirsch (Western Washington U)
S. Ingebritsen (USGS Menlo Park)
E. Johnson (James Madison U)
P. Kapp (U Arizona)
A. Kavner (UCLA)
H. Keppler (U Bayreuth, Germany)
J. Mavrogenes (ANU Canberra, Australia)
T. McCollum (U Colorado)
S. Mojzsis (U Colorado)
R. Newton (UCLA)
T. Plank (Columbia U)
E. Schauble (UCLA)
C. Schmidt (GeoForschungsZentrum, Potstdam, Germany)
D. Sverjensky (Johns Hopkins U)
A. Thompson (ETH Zürich)
P. Tropper (U Innsbruck)
M. Wilke (GeoForschungsZentrum, Potstdam, Germany)
A. Yin (UCLA)
E. Young (UCLA)

Graduate and Postdoctoral Advisors

D. Bird (Stanford U)
S. Bohlen (Joint Oceanographic Inst.)
R. Coleman (Stanford U)
J. Liou (Stanford U)

PhD students[§], MS students[‖] and Postdoctoral Scientists[†] mentored in last 5 years

A. Antignano[§] (Exxon Research)
S. Briggs[§] (William Lettis & Associates)
C. Colasanti[‖] (PhD cand., U Munich)
M. Cruz[‖] (PhD cand., Stanford U)
L. Hayden[†] (Researcher, USGS)
Michael Huh[‖*]
J. Hunt[§](Postdoc, Lawrence Livermore)
C. Lazar[§] (Postdoc, Geophysical Lab)
C. Macris[§*]
A. Mahkluf[§*]
C. Menold[§] (Asst Prof, Albion College)
A. Shahar[§] (Staff Scientist, Geophysical Lab)
R. Thomas[‖*]
A. Wohlers[†] (Researcher, GFZ Potsdam)
J. Wykes[‖§#] (PhD cand., ANU Canberra)

[*]Current graduate student or postdoctoral scientist at UCLA
[#]Australian National U student who did experimental part of MS work at UCLA; in residence at UCLA in 2010-11 as a Fulbright Fellow
Total students = 13; total postdoctoral scientists = 2

Katsuyoshi MICHIBAYASHI

Contact Information

Institute of Geosciences
Shizuoka University
Shizuoka, 422-8529, JAPAN

Tel: +81-54-238-4788
Fax: +81-54-238-0491
Email: sekmich@ipc.shizuoka.ac.jp

Education

Shizuoka University, Japan	Geology	B.Sc	**1988**
Shizuoka University, Japan	Structural Geology	M.Sc	**1990**
James Cook University of North Queensland, Australia	Structural Geology	Ph.D	**1994**

Work Experience

April/12-	Professor at Shizuoka University, Japan
April/02-March/12	Associate Professor at Shizuoka University, Japan
Aug/97-Aug/99	JSPS Postdoctoral Fellow at Université Montpellier II, France
Oct/94-March/02	Assistant Professor at Shizuoka University, Japan
April/94-April/94	JSPS Postdoctoral Fellow at the University of Tokyo, Japan

Shipboard Experience

8/Oct/11-28/Oct/11	JAMSTEC R/V Yokosuka YK11-08
17/Sept/10-1/Oct/19	JAMSTEC R/V Yokosuka YK10-12
3/May/09-22/May/09	JAMSTEC R/V Yokosuka YK09-05
8/July/08-22/July/08	JAMSTEC R/V Yokosuka YK08-08
27/Aug/06-5/Sept/06	JAMSTEC R/V Yokosuka YK06-12
11/Jan/05-3/March/05	IODP Exp305

Professional & Synergistic Activities

IODP SSEP 2010-2011; PEP 2011-present
J-DESC IODP Steering Committee 2010-present
Geological Society of Japan Representative Member 2010-present

Selected Publications

Michibayashi, K., Kusafuka, Y., Satsukawa, T. and S. Nasir, 2012. Seismic properties of peridotite xenoliths as a clue to imaging the lithospheric mantle beneath NE Tasmania, Australia. *Tectonophysics*, 522-523, 218-223.

Ohara, Y., Reagan, M., Fujikura, K., Watanabe, H., Michibayashi, K., Ishii, T., Stern, R. J., Pujana, I., Martinez, F., Girard, G., Ribeiro, J., Brounce, M., Komori, N. and Kino, M., 2012. A serpentine-hosted ecosystem in the Southern Mariana Forearc. *Proceeding of the National Academy of Science*, 109, 2831-2835.

Satsukawa, T., Michibayashi, K., Anthony, E. Y., Stern, R. J., Gao, S. S. and Liu, K. H., 2011. Seismic anisotropy of the uppermost mantle beneath the Rio Grande rift: Evidence from Kilbourne Hole peridotite xenoliths, New Mexico. *Earth and Planetary Science Letters*, 311, 172-181.

Harigane, Y., Michibayashi, K. and Ohara, Y., 2011b. Deformation and hydrothermal metamorphism of gabbroic rocks within the Godzilla Megamullion, Parece Vela Basin, Philippine Sea. *Lithos*, 124, 185-199.

Harigane, Y., Michibayashi, K. and Ohara, Y., 2011a. Relicts of deformed lithospheric mantle within serpentinites and weathered peridotites from the Godzilla Megamullion, Parece Vela Back-Arc Basin, Philippine Sea. *Island Arc*, 20, 174-187.

Muramoto, M., Michibayashi, K., Ando, J. and Kagi, H., 2011. Rheological contrast between garnet and clinopyroxene in the mantle wedge: an example from Higashi-akaishi peridotite mass, SW Japan. *Physics of*

the Earth and Planetary Interiors, 84, 14-33.
Satsukawa, T., Michibayashi, K., Raye, U., Anthony, E. Y., Pulliam, J. and Stern, R. J., 2010. Uppermost mantle anisotropy beneath the southern Laurentian margin: Evidence from Knippa peridotite xenoliths, Texas. *Geophysical Research Letters*, 37, L20312, 5pp.
Hirauchi, K., Michibayashi, K., Ueda, H and Katayama, I., 2010. Spatial variations in antigorite fabric across a serpentine subduction channel: Insight from the Ohmachi Seamount, Izu-Bonin frontal arc. *Earth and Planetary Science Letters*, 299, 196-206.
Harigane, Y., Michibayashi, K. and Ohara, Y., 2010. Amphibolitization within the lower crust in the termination area of the Godzilla Megamullion, an oceanic core complex in the Parece Vela Basin, *Island Arc*, 19, 718-730.
Kamei, A., Obata, M., Michibayashi, K., Hirajima, T. and Svojtka, M., 2010. Two contrasting fabric patterns of olivine observed in garnet- and spinel-peridotite from a mantle-derived ultramafic mass enclosed in felsic granulite, the Moldanubian Zone, Czech Republic. *Journal of Petrology*, 51, 101-123.
Ohuchi, T., Nakamura, M. and Michibayashi, K., 2010. Effect of grain growth on cation exchange between dunite and fluid: implications for chemical homogenization in the upper mantle. *Contribution to Mineralogy and Petrology*, 160, 339-357.
Katayama, I., Michibayashi, K., Terao, R., Ando, J. and Komiya, T., 2010. Water content of the mantle xenoliths from Kimberley and implications for explaining textural variations in cratonic roots. *Geological Journal*, 46, 173-182.
Katayama, I., Hirauchi, K. Michibayashi, K. and Ando, J., 2009. Trench-parallel anisotropy produced by serpentine deformation in the hydrated mantle wedge. *Nature*, 461, 1114-1117.
Michibayashi, K., Oohara, Y., Satsukawa, T., Ishimaru, S., Arai, S. and Okrugin, V. M., 2009. Rock seismic anisotropy of the low velocity zone beneath the volcanic front in the mantle wedge. *Geophysical Research Letters*, 36, L12305, doi:10.1029/2009GL038527.
Michibayashi, K., Ohara, Y., Stern, R.J., Fryer, P., Kimura, J.-I., Tasaka, M., Harigane, Y. and Ishii, T., 2009. Peridotites from a ductile shear zone within backarc lithospheric mantle, southern Mariana Trench: results of a Shinkai6500 dive. *Geochemistry Geophysics Geosystems*, doi:10.1029/2008GC002197.
Michibayashi, K., Hirose, T., Nozaka, T., Harigane, Y., Escartin, J., Delius, H., Linek, M. and Ohara, Y., 2008. Hydration due to high-T brittle failure within in situ oceanic crust, 30°N Mid-Atlantic Ridge. *Earth and Planetary Science Letters*, 275, 348-354.
Harigane, Y., Michibayashi, K. and Ohara, Y., 2008. Shearing within lower crust during progressive retrogression: structural analyses of gabbroic rocks from the Godzilla Mullion, an oceanic core complex in the Parece Vela backarc basin. *Tectonophysics*, 457, 183-196.
Tasaka, M., Michibayashi, K. and Mainprice, D., 2008. B-type olivine fabrics developed in the fore-arc side of the mantle wedge along a subducting slab. *Earth and Planetary Science Letters*, 272, 747-757.
Michibayashi, K., Tasaka, M., Ohara, Y., Ishii, T., Okamoto, A. and Fryer, P., 2007. Variable microstructure of peridotite samples from the southern Mariana Trench: evidence of a complex tectonic evolution. *Tectonophysics*, 444, 111-118.
Michibayashi, K., Ina, T. and Kanagawa, K., 2006. The effect of dynamic recrystallization on olivine fabric and seismic anisotropy: Insights from a ductile shear zone in the Oman ophiolite. *Earth and Planetary Science Letters*, 244, 695-708.
Michibayashi, K., Abe, N., Okamoto, A., Satsukawa, T., Michikura, K., 2006. Seismic anisotropy in the uppermost mantle, back-arc region of the northeast Japan arc: petrophysical analyses of Ichinomegata peridotite xenoliths. *Geophysical Research Letters*, 33, L10312.
Michibayashi, K. and Mainprice, D., 2004. The role of pre-existing mechanical anisotropy on shear zone development within oceanic mantle lithosphere: an example from the Oman ophiolite. *Journal of Petrology*, 45, 405-414.
Michibayashi, K., Gerbert-Gaillard, L. and Nicolas, A., 2000. Shear sense inversion in the Hilti mantle section (Oman ophiolite) and active mantle uprise. *Marine Geophysical Researches*, 21, 259-268.

D. JAY MILLER

Integrated Ocean Drilling Program
Texas A&M University
1000 Discovery Drive
College Station, TX 77845

Phone: (979) 845-5740
FAX: (979) 845-0856
email: miller@iodp.tamu.edu

Professional History

2009-present	Manager**,** Technical and Analytical Services Department Integrated Ocean Drilling Program, Texas A&M University
2008-2009	Project Manager, Scientific Ocean Drilling Vessel Refit Integrated Ocean Drilling Program. Texas A&M University
2003-2008	Expedition Project Manager Integrated Ocean Drilling Program. Texas A&M University
1993-2003	Staff Scientist Ocean Drilling Program, Texas A&M University

Education

PhD, Geochemistry-Ore Petrology Program	Purdue University, 1992
M.Sc., Geology	University of Texas, Arlington 1988
B.S., Geology	University of Texas, Arlington 1985

Professional and Synergistic Activities

Project Management Institute certified Project Management Professional
Project Manager Scientific Ocean Drilling Vessel (SODV) conversion
Project Manager/Science Coordinator for nine expeditions of the Ocean Drilling Program and two expeditions of the Integrated Ocean Drilling Program
Contributing scientist for eleven ODP expeditions, two IODP expeditions and two Alvin dive programs
Fulbright Fellow, Nordic Volcanological Institute
Penrose Conference on Ophiolites Invited Presenter and Closing Session Panelist
National Science Foundation Distinguished Lecturer

Five publications relevant to proposed research

Carlson, R. L., and Miller, D.J., 2003. Mantle wedge water contents estimated from seismic velocities in partially serpentinized peridotites, *Geophys. Res. Lett.,* 30(5), 1250.

Carlson, R. L., and Miller, D. J., 2004. Influence of pressure and mineralogy on seismic velocities in oceanic gabbros: Implications for the composition and state of the lower oceanic crust. *J. Geophys. Res.,* Vol. 109, No. B9, B09205
10.1029/2003JB002699

Kelemen, P.B., Kikawa, E., and Miller, D.J., 2007. Processes in a 20-km-Thick Conductive Boundary Layer beneath the Mid-Atlantic Ridge, 14°–16°N. *In* Kelemen, P.B., Kikawa, E., and Miller, D.J., (Eds.), *Proc. ODP, Sci. Results,* 209 [Online]. Available from World Wide Web: http://www-odp.tamu.edu/publications/209_SR/.

Ildefonse, B., Blackman, D.K., John, B.E., Ohara, Y., Miller, D.J., MacLeod, C.J., and Shipboard Scientific Party, 2007. Oceanic core complexes and crustal accretion at slow spreading ridges. *Geology.* 35, 623-626.

Carlson, R. L., Miller, D.J., and Newman, J., 2009. Olivine enigma: Why alteration controls the seismic properties of oceanic gabbros, Geochem. Geophys. Geosyst., 10, Q03O16, doi:10.1029/2008GC002263.

Five other recent publications (student co-authors*)

D'Hondt, S., Jørgensen, B.B., Miller, D.J., et al., 2004. Distributions of microbial activities in deep subseafloor sediments, *Science.* 306:2216-2221.

Carlson, R.L., and Miller, D.J., 2005. Unraveling the structure and composition of the ocean crust. *Sea Technology*, 46:10:10-13.

Miller, D.J., Vanko, D.A., and Paulick, H., 2006. Petrology and geochemistry of fresh, recent dacite lavas at Pual Ridge, Papua New Guinea, from an active, felsic-hosted seafloor hydrothermal system. *In* Barriga, F.J.A.S., Binns, R.A., Miller, D.J., and Herzig, P.M. (Eds.), *Proc. ODP, Sci. Results,* 193 [Online]. Available from World Wide Web: <http://www-odp.tamu.edu/publications/193_SR/208/208.htm>.

Hart*, D., and Miller, D.J., 2006. Analysis and correlation of volcanic ash in marine sediments from the Peru margin, Ocean Drilling Program Leg 201: explosive volcanic cycles of the north-central Andes. *In* Jørgensen, B.B., D'Hondt, S.L., and Miller, D.J. (Eds.), *Proc. ODP, Sci. Results,* 201 [Online]. Available from World Wide Web: http://www-odp.tamu.edu/publications/201_SR/122/122.htm.

Miller, D.J., Eisenbach*, T., and Luo, Z.P., 2009. Characterization of sulfide minerals from gabbroic and ultramafic rocks by electron microscopy. *In*, Blackman, D.K., Ildefonse, B., John, B.E., Ohara, Y., Miller, D.J., and MacLeod, C.J., and the Expedition 304/305 Scientists, *Proc. IODP, 304/305*: College Station, TX (Integrated Ocean Drilling Program Management International, Inc). doi:10.2204/iodp.proc.304304.203.2009

Collaborators and Other Affiliations

Graduate and Postgraduate advisors
John Wolff, University of Texas at Arlington, Nik Christensen, Purdue University

Collaborators and Co-Editors
Barriga, F., (U of Lisbon), Binns, R., (CSIRO), Blackman, D., (Scripps), Cannat, M. (U Pierre et Marie Curie), Casey, J., (U of Houston), Christie, D., (OSU), D'Hondt, S., (URI), Dick, H., (WHOI), Elthon, D., (U of Houston), Fouquet, Y., (IFREMER), Herzig, P., (Freiburg), Humphris, S., (WHOI), Ildefonse, B., (Montpellier), John, B., (Wyoming), Jørgensen, B, (Bremen), Karson, J., (Duke U), Kelemen. P. , (WHOI), Kikawa, E., (JAMSTEC), Natland, J., (RSMAS), Normark, W., (USGS), Ohara, Y., (ORL), Pederson, R., (U of Bergen), Von Herzen, R., (WHOI), Zierenberg, R., (UC Davis)

Curriculum Vitae

Sumio MIYASHITA

Date of Birth: 20 October, 1946

Office Address: Faculty of Science, Niigata University
2-8050, Ikarashi, Nishi-ku, Niigata, 950-2181 Japan
Tel: 81-25-262-6193, Fax: 81-25-262-6194
e-mail: miyashit@geo.sc.niigata-u.ac.jp

Position: Emeritus Professor

Education:

Bachelor of Science, Hokkaido University, 1970.
Master of Science, Hokkaido University, 1973.
Doctor of Philosophy, Hokkaido University, 1979.

Position after Graduation:

1979-1984	Research Fellow, Faculty of Science, Hokkaido University
1984-1986	Research Fellow, Université de Orléan (France)
1987-1991	Assistant Professor, Faculty of Science, Niigata University
1991-1998	Associate Professor, Faculty of Science, Niigata University
1998-2012	Professor, Faculty of Science, Niigata University

Other activitiy:

2008-2012	President of the Geological Society of Japan

Publications (last 10 years):

Tsuchiya, N., Shibata, T., Yoshikawa, M., Adachi, Y., Miyashita, S., Adachi, T., Nakano, N., & Osanai, Y., 2013, Petrology of Lasail plutonic complex, northern Oman ophiolite, Oman: an example of arc-like magmatism associated with ophiolite detachment. *Lithos*, 156–159 (2013) 120–138.

Kusano, Y., Adachi, Y., Miyashita, S. and S. Umino, 2012, Lava accretion system around mid-ocean-ridges: Volcanic stratigraphy in the Wadi Fizh area, northern Oman ophiolite. *Geochem. Geophys. Geosys*., **13**, 2012 Q05012, doi:10.1029/2011GC004006

Kusano, Y., Miyashita, S. and Ikeda, K., 2010, Petrology of metabasalts from the Ashio belt in the Gosen area, Niigata Prefecture, Central Japan. *Jour. Geol. Soc. Japan*, **116**, 260-282. *

Neo, N., Yamazaki, S. and Miyashita, S., 2009, Data report: bulk rock compositions of samples from the IODP Expedition 309/312 Sample Pool from ODP Hole 1256D . in Teagle, D.A.H., Alt, J.C., Miyashita, S., Banerjee, N.R., Wilson, D.S., and the Expedition 309/312 Scientists, *Proc. IODP,* 309/312, doi: 10.2204/iodp.proc.309312. 204.2009.

Yamazaki, S., Neo, N. and Miyashita, S., 2009, Data report: Whole-Rock Major and Trace Elements, and Mineral Composition of Sheeted Dike-Gabbro Transition in ODP Hole1256D. in Teagle, D.A.H., Alt, J.C., Miyashita, S., Banerjee, N.R., Wilson, D.S., and the Expedition 309/312 Scientists, *Proc. IODP,* 309/312, doi: 10.2204/iodp.proc.309312. 203.2009.

Umino, S., Crispini, L., Tartarotti, P., Teagle, D. A. H., Alt, J. C., Miyashita, S. and Banerjee, N. R., 2008, Origin of the sheeted dike complex at superfast spread East Pacific Rise revealed by deep ocean crust drilling at Ocean Drilling. *Geochem. Geophys. Geosys*., **9** (June 14, 2008): Q06O08.

Miyashita, S., Adachi, Y. and Umino, S., 2008, Architecture of oceanic crsut and its formation process. *J. Geography*, **117**, 168-189.*

Miyashita, S., Adachi, Y., Tanaka, S., Nakagawa, M. and Kimura, J., 2007. Genesis of the Poroshiri ophiolite, Hokkaido, Japan: Inference form geochemical evidence. *Jour. Geol. Soc. Japan,* **113**, 212-221.*

D. S. Wilson, D.A.H. Teagle, J. C. Alt, N. R. Banerjee, S. Umino, S. Miyashita, et al., 2006, Drilling to Gabbro in Intact Ocean Crust. *Science*, **312**, 1016-1020.

A'Shaikh, D., Matsueda, H., Mizuta, T. and Miyashita, S., 2006 Hydrothermal Alteration of Oman Ophiolite Extrusives in Ghuzayn Area. Resource Geol., 56, 167-183.

Teagle, D.A.H., Alt, J.C., Umino, S., Miyashita, S., Banerjee, N.R., Wilson, D.S., and the Expedition 309/312 Scientists, 2006. *Proc. IODP,* 309/312: doi: 10.2204/iodp.proc.309312.2006.

A'Shaikh, D., Miyashita, S. and Matsueda, H., 2005, The petrological and geochemical characteristics of a volcanic suite within Oman ophiolite. *Jour. Mineral. Petrol. Sci.*, **100**, 202-220.

Ueda, H. and Miyashita, S., 2005, Ophiolitic accretionary complex originated from intraoceanic remnant arc in Hokkaido, Japan: A new species of circum-Pacific ophiolites. *Island Arc*, **14**, 582-598.

Kadarusman, A., Miyashita, S., Maruyama, S., Ishikawa, A. and Parkinson, C. D., 2004, Petrology, geochemistry and paleogeographic reconstruction of the East Sulawesi Ophiolite, Indonesia. *Tectonophysics*, **392**, 55-83.

Morishita, T., Maeda, J., Miyashita, S. and Dick, H. J. B., 2004, Magmatic srilankite (Ti_2ZrO_6) in gabbroic vein cutting oceanic peridotites: an unusual product of peridotite-melt interactions beneath slow-spreading ridges. *American Mineralogist,* **89**, 759-766.

Miyashita, S., Adachi, Y. and Umino, S., 2003, Along axis magmatic system in the northern Oman ophiolite: Implications of compositional variation of the sheeted dike complex. *Geochem. Geophys. Geosyst*. **4**, 8617, DOI 10.1029/2001GC000235.

Adachi, Y. and Miyashita, S., 2003, Geology and petrology of the gabbroic complexes in Wadi Fizh area of the northern Oman ophiolite: Multiple magmatic events and sgment structure in the northern Oman ophiolite. *Geochem. Geophys. Geosyst.* **4**, 8619, DOI 10.1029/2001GC000272.

Umino, S., Miyashita, S., Hotta, F. and Adachi, Y., 2003, Along-strike variation of the sheeted dike complex in the Oman ophiolite: Insights into subaxial ridge segment structures and magma plumbing system. *Geochem. Geophys. Geosyst*. **4**, 8618, DOI 10.1029/2001GC000233.

Ueda, H. and Miyashita, S., 2003, Discovery of sheeted dikes in the Cretaceous accretionary complex of the Idonnappu Zone, Hokkaido, Japan. *Jour Geol. Soc. Japan,* **109**, 559-562.

Miyashita, S., and Maeda, J., 2003, Constitution of oceanic crust and ocean ridge magmatism. *Jour. Geography*, **112**, 668-683.*

Matsumoto, T., Miyashita, S., Arai, S., Morishita, T., maeda, J., Kumagai, H., Ohtomo, Y. and Dick, H., 2003, Magmatism and "crust-mantle boundary" on the ultra-slow spreading ridge as obseved in Atlantis Bank, Southwest Indian Ridge. *Jour. Geography*, **112**, 705-719.*

Ueda, H and Miyashita, S., 2003, Crustal lithology and stratigraphy of remnant arcs induced from ophiolitic rocks in the Idonnappy zone accretionary complex (Hokkaido, Japan): Comparison with Philippine Sea remnant arcs. *Jour. Geography*, **112**, 769-780.*

Nagahashi, T. and Miyashita, S., 2002, Petrology of the greenrocks of Lower Sorachi Group in the Sorachi –Yezo Belt, Central Hokkaido, Japan: with a special reference to discrimination between oceanic plateau basalt and MORB. *The Island Arc*, **11**, 122-141.

Miyashita, S., Adachi, Y. and Umino, S., 2002, A new perspective of ophiolite studies with special refrerence to the Oman ophiolite. *Jour. Geol. Soc. Japan*, **108**, 520-535.*

Adachi, Y., Tomatsu, T., Okazawa, S. and Miyashita, S., 2002, Layereing structures of gabbros of the Oman ophiolite. *Jour. Geol. Soc. Japan*, **108**, XVII-XVIII.

* in Japanese with English abstract

Full Name: Sobhi jabber Nasir
Position: Professor, HoD
Specialty : Mineralogy/Petrology
Office: 087, Tel/ 00968-24141444

Education

B.Sc. Geology & Mineralogy 1978 Dept. of Geology Jordan
M.Sc. Metamorphic rocks 1981 Dept. of Geology Jordan
PhD. Mineralogy/Geochemistry 1986 Instit. Of Mineralogy Wuerzburg Germany

Research Interests :

Environmental Science, Applied Mineralogy, Applied geochemistry, Metamorphic petrology, Crystallography, Igneous Petrology, Isotope Geology, economic geology, Heavy minerals, Magnetism, Mössbauer, crystal chemistry, ophiolite, lithosphere, Upper mantle and lower crustal rocks, carbonatites, kimberlite, cement industry.

Selected Publications (last 5 years): Total: 75 International papers, 45 Conference papers, 5 Proceedings, 5 books, 25 internal reports.

Nasir, S., Salah Al-Khirbash, Hugh Rollinson Abdulrahman Al-Harthy Abdulrazak Al-Sayigh, Ali Al-Lazki, ., T. Theye, H.J. Massone E. Belousova F **(2011).** Petrogenesis of ultramafic lamprophyres and carbonatites from the Batain Nappes, eastern Oman continental margin **Contribution to Mineralogy and Petrology, 161, 47-74.**
Nasir , S. J. . Everard, J., McClenaghan, MP., Bombardieri , D., M. A. Worthing, MA. (2010). The petrology of high pressure xenoliths and associated Cenozoic basalts from Northeastern Tasmania. **Lithos** 118, 35-49
Nasir, S., Rollinson, H. **(2009).** The nature of the subcontinental lithospheric mantle beneath the Arabian Shield: mantle xenoliths from southern Syria. **Precambrian Research 172, 323-333**

Nasir, S (2009) Multiphase mineral inclusions in ferrikaersutite megacrysts: Implications for post-magmatic alteration of the kaersutite host. **SQU Journal For Science 14, 25-43.**

Nasir, S , Theye T.and Hans-Joachim Massonne **(2009)** REE-rich aeschynite minerals in Tertiary apatite-dolomite carbonatite, eastern Oman Mountains **Open Journal of Mineralogy 3,17-27**

Al-Safarjalani, A., **Nasir, S**., Fockenberg, T., Massonne, H.J., **(2009)** Chemical composition of an intermediate part of the lower crust beneath southwestern Syria. **(Chemie der Erde) 69:359-375**
(impact Factor 1.139) doi:10.1016/j.chemer.2009.05.005

Al-Rawas, A., **Nasir, S**., Gismelseed, A., **(2008)** ^{57}Fe Mössbauer spectroscopy study of phlogopite megacrysts from an evolved carbonatitic kimberlite in the northeastern Oman Mountains. **Hyperfine Interaction 186, 147-151**

Worthing, M.**, Nasir, S**. **(2008)**: Cambro-Ordovician potassic (alkaline) magmatism in central Oman: Petrological and geochemical constraints on petrogenesis**. Lithos 106, 25-38**

Nasir, S., Al-Saad, H., Al-Saiygh, A., Weidlich O. **(2008):** Petrology and mineralogy of the Hurmoz Dolomite: Constrains from the Shraouh and Halul Islands, Qatar. **Asian J. Earth Sci. 33, 357-365**

Al-Sayigh, A., **Nasir, S**. Steven N., Schulpe A**. (2008)**: The first record of Arsinoitherium from Oman: Paleogeographic implication. **Palaeoworld 17,** 41-46**.**

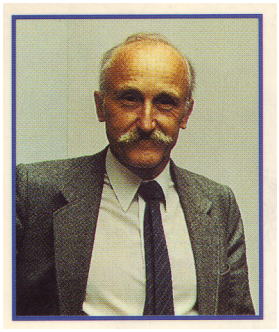
Nasir, S., Al-Saiygh, A., Safarjalani, A., **(2007)**: Sedimentology of the Hofuf Formation, Eastern Province of Saudi Arabia. **N. Jahrb for Geologie und Pal. Abh.** 243, 325-342.)

Nasir, S., Al Harthy, A., Al Sayigh, A., Al-Khirbash, S., Al-Jaaidi,, O, Musllam, A., Al-Mishwat**, A,** Al-Bu'saidi, S. **(2007)**: Mineralogical and geochemical characterization of listwaenite from the Semail Ophiolite, Oman. **Chemie der Erde** (**Geochemistry)** 67**,** 213-228

Nasir, S. Rawas, A. **(2006)**: Moesbauer characterization of upper mantle ferrikaersutite. **Amer. Min.** 91, 1163-1193

Nasir,, S., Al-Saiygh , A., Al Harthy, A., Lazki, A. **(2006)**: Geochemistry and petrology of Tertiary volcanic rocks and related ultramafic xenoliths from the central and eastern Oman Mountains. **Lithos,** Vol 90/3-4 pp 249-270

Adolphe Nicolas, Curriculum Vitae



Born : February 18th, 1936, Rennes 35000 (France)
Maried, 4 children
Professional Address : Université Montpellier2, Laboratoire de Tectonophysique, Place Eugène Bataillon, CC049, 34095, Montpellier cedex 5, France

STUDIES

Baccalauréat, first part, 1953, New York (USA)
Baccalauréat second part, 1954, Rabat (Morocco)
Graduation in physics, chemistry and geology, 1958, Paris, (France)
Doctorat IIIè cycle, 1961, Paris, (France)
Doctorat d'Etat, 1966, Grenoble, (France)

UNIVERSITY POSITIONS

Assistant, Nancy, 1958-1963
Maître Assistant, Nancy, 1963-1965
Maître Assistant, Nantes, 1965-1968
Maître de Conférences, Nantes, 1968-1978
Professor, Nantes, 1978
Professor (classe exceptionnelle), Nantes, 1984
Professor (classe exceptionnelle), Montpellier, 1986
Professor Emeritus, Montpellier, 2004

DISTINCTIONS

Officier des Palmes Académiques
Chevalier de la Légion d'Honneur
Fellow of the AGU
Silver Medal CNRS
Veinig Meinez Medal
Senior member of Institut Universitaire de France
Hess Medal from the AGU
Prix Dolomieu de l'Académie des Sciences
Académie of Montpellier, member

ADMINISTRATIVE INVOLVEMENTS

Member of Inter-Union Commission on Lithosphere
Member of International Geological Commission Program, Chairman of the French committee
Member of " Petroleum Club of CNRS "
Member of Scientific Committee on Submarines of National Center for exploitation of Oceans
Member of Council of " European Union of Geosciences "
Member of the Editorial Board of " Société Géologique de France ", " Tectonophysics " and " Terra Nova "
Senior editor of series "Petrology and Structural geology" for Kluwer Academic Publisher
Associated Director of Earth Sciences Department from the CNRS from 1979 to 1981
Chairman Working Group n°4 " Dynamics and Bilans of the Earth " (INSU-CNRS program)
Chairman of Working Group ECORS-ALPES
Chairman Working Group n°4 from COSOD II ocean International Drilling Program
Member of National Committee of Earth Sciences from the CNRS
Member of " Comité National des Universités "
Director of Tectonophysics Laboratory, Nantes, 1968-1986
Director of the Laboratory of Tectonophysics, Université of Montpellier France, 1986-1998
Director of the Institut des Sciences de la Terre, de l'Eau et de l'Espace de Montpellier (ISTEEM), 1994-1998
Advisor at the French Ministry of Research, in charge of Earth, Planetary and Environmental Sciences, 1999-2003

SELECTED BIBLIOGRAPHY SINCE 1997

NICOLAS, A. ET ILDEFONSE, B., 1996. Flow mechanism and viscosity in basaltic magma chambers. Geophys. Res. Lett., 23: 2013-2016.

NICOLAS, A., BOUDIER, F. ET ILDEFONSE, B., 1996. Variable crustal thickness in the Oman ophiolite-Implication for oceanic ridges. J. Geophys. Res., 101: 17941-17950.

BOUDIER, F., NICOLAS, A., ILDEFONSE, B. ET JOUSSELIN, D., 1997. EPR microplates, a model for the Oman Ophiolite. Terra Nova, 9: 79-82.

CHENEVEZ, J., MACHETEL, P. ET NICOLAS, A., 1998. Numerical models of magma chamber in the Oman ophiolite. J. Geophysical Research, 103: 15,443-15,455.

DELOUIS, B., NICOLAS, A., ILDEFONSE, B. ET PHILIP, H., 1998. Earthquake focal mechanism and oceanic thrust in easter microplate. Analogy with Oman ophiolite. Geophys. Res. Lett., 25: 1443-1446.

JOUSSELIN, D., NICOLAS, A. ET BOUDIER, F., 1998. Detailed mapping of a mantle diapir below a paleo-spreading center in the Oman ophiolite. J. Geophys. Res., 103: 18 153-18 170.

NICOLAS, A., BOUDIER, F. ET MESHI, A., 1999. Slow spreading accretion and mantle denudation in the Mirdita ophiolite (Albania). J. Geophys. Res., 104: 15,155-15,167

NICOLAS, A., BOUDIER, F., ILDEFONSE, B. ET BALL, E., 2000. Accretion of Oman and United Arab Emirates ophiolite -discussion of a new structural map. Marine Geophysical Research, 21-3/4: 147-179.

JOUSSELIN, D. ET NICOLAS, A., 2000. The Moho transition zone in Oman ophiolite-relation with wehrlites in the crust and dunites in the manlte. Marine Geophysical Research, 21-3/4: 229-241.

JOUSSELIN, D. ET NICOLAS, A., 2000. Oceanic ridge off-axis deep structure in the Mansah region (Sumail massif, Oman ophiolite). Marine Geophysical Researches, 21-3/4: 243-257.

NICOLAS, A. ET BOUDIER, F., 2001. Large mantle upwellings and related variations in crustal thickness in the Oman ophiolite. Geological Society America Bulletin, 349: 67-73.

NICOLAS, A., BOUDIER, F., MICHIBAYASHI, K. ET GERBERT-GAILLARD, L., 2001. Aswad massif (United Arab Emirates), Archetype of the Oman-UAE ophiolite belt. Geological Society America Bulletin, 349: 499-511.

NICOLAS, A. and POLIAKOV, A., 2001. Melt migration and mechanical state in the lower crust of ocean ridge. Terra Nova, 13 : 64-69.

NICOLAS, A and BOUDIER, F 2003 Where ophiolites come from and what do they tell us, GSABull, 273:137-152

NICOLAS, A.,. MAINPRICE, D, and BOUDIER,F., 2003. High temperature seawater circulation throughout crust of oceanic ridges : A model derived from the Oman ophiolite, J. Geophys. Res., 108 : 2371, on line.

BOSCH, D., JAMAIS, M., BOUDIER, F., NICOLAS, A., DAUTRIA, J.M., and AGRINIER, P., 2004. Deep and high temperature hydrothermal circulation in the Oman ophiolite-Petrological and isotopic evidence, J. Petrol., 45: 1181-1208.

Boudier , F., A. Nicolas, and D. Mainprice, Does anisotropy of thermal contraction control hydrothermal circulation at the Moho level below fast spreading oceanic ridges?, in International Geology Review, edited by C. Coleman, pp. 101-112, GSA Robert, G., 2005.

Nicolas A., and Boudier F**.** (2008) Large shear zones with no relative displacement. Terra Nova 3, 200-205, doi:10.1111/j.1365-3121.2008.00806.x

Nicolas A., Boudier F., Koepke J., France L., Ildefonse B., and Mével C. (2008) Root zone of the sheeted dike complex in the Oman ophiolite. Geochemistry, Geophysics and Geosystems 9, Q05001, doi:10.1029/2007GC001918.•.

Nicolas A., Boudier F., France L. (2009) Subsidence in magma chamber and the development of magmatic foliation in Oman ophiolite gabbros. Earth Planet. Sc. Lett. 284, 76-87. doi:10.1016/j.epsl.2009.04.012.

Meshi A., Boudier F., Nicolas A., and Milushi I. (2009) Structure and tectonics of lower crustal and upper mantle rocks in the Jurassic Mirdita ophiolites, Albania. International Geology Review,52: 117 - 141, doi:10.1080/00206810902823982.

Morales, L. F. G., Boudier F.. and Nicolas A. (2011) Microstructures and crystallographic preferred orientation of anorthosites from Oman ophiolite and the dynamics of melt lenses, Tectonics, 30, TC2011 doi:10.1029/2010TC002697

Boudier, F. & Nicolas, A. (2011) Axial melt lenses at oceanic ridges – A case study in the Oman ophiolite. Earth Planet. Sci. Lett., 304, 313-325, doi:10.1016/j.epsl.2011.01.029.

Nicolas, A. & Boudier, F. (2011) Structure and dynamics of ridge axial melt lenses in the Oman ophiolite. J. Geophys. Res., 116, B03 103, doi:10.1029/2010JB007934

BIOGRAPHICAL SKETCH- ***Matthew O. Schrenk***

Assistant Professor
East Carolina University
Department of Biology
Howell Science Complex, S303
Greenville, NC 27858

Tel: 252-328-5276
Fax: 252-328-4178
E-mail: schrenkm@ecu.edu
Web: www.schrenklab.com

PROFESSIONAL PREPARATION:

1998	B.Sc. in Geology & Geophysics and S. Asian Studies, University of Wisconsin-Madison
2001	M.Sc.in Oceanography, University of Washington
2005	Ph.D. in Oceanography, Certificate in Astrobiology, University of Washington
2005-2008	Postdoctoral appointment in Astrobiology, Carnegie Institution for Science

APPOINTMENTS:

2008 to present	Assistant Professor, Department of Biology, Adjunct Professor, Department of Geological Sciences East Carolina University, Greenville, NC
2007 to 2008	Postdoctoral Associate, Carnegie Institution of Washington, Geophysical Laboratory and Department of Terrestrial Magnetism
2005 to 2007	NASA Astrobiology Institute, Postdoctoral Fellow
1998-2005	Research Assistant, University of Washington, School of Oceanography
2003	Teaching Assistant, Oceanography 443-444, University of Washington
2000	Consultant, American Museum of Natural History, New York, NY
1996-1998	Undergraduate Research Assistant, University of Wisconsin-Madison, Department of Geology and Geophysics

FIVE PUBLICATIONS MOST RELEVANT TO THE PROPOSED RESEARCH:

1. **M.O. Schrenk**, W.J. Brazelton, S.Q. Lang. 2013. Serpentinization, Carbon, and Deep Life. *Reviews in Mineralogy and Geochemistry.* In press.
2. Brazelton, W.J., B. Nelson, **M.O. Schrenk.** 2012. Metagenomic evidence of H_2 oxidation and H_2 production by serpentinite-hosted subsurface microbial communities. *Frontiers in Microbiology* 2:268. doi: 10.3389/fmicb.2011.00268
3. Szponar, N., W.J. Brazelton, **M.O. Schrenk,** D.M. Bower, A. Steele, P. Morrill. 2012. Biogeochemistry of a continental site of serpentinization in the Tablelands ophiolite, Gros Morne National Park: A Mars Analogue. *Icarus.* In press.
4. **M.O. Schrenk,** J.A. Huber, K.J. Edwards. 2010. Microbial Provinces in the Subseafloor. *Annual Review of Marine Science.* 2:279-304.
5. W.J. Brazelton, **M.O. Schrenk**, D.S. Kelley, J.A. Baross. 2006. Methane and sulfur metabolizing microbial communities dominate in the Lost City Hydrothermal Field ecosystem. *Appl. Environ. Microbiol.* 72(9):6257-6270.

FIVE OTHER SIGNIFICANT PUBLICATIONS:

1. Y. Jiao, G.D. Cody, A.K. Harding, P. Wilmes, **M. Schrenk,** K.E. Wheeler, J.F. Banfield, M.P. Thelen. 2010. Characterization of Extracellular Polymeric Substances from Acidophilic Microbial Biofilms. *Appl. Environ. Microbiol.* 76: 2916-2922.
2. **Schrenk, M.O.,** J.F. Holden, J.A. Baross. 2008. Magma-to-Microbe Networks in Seafloor Sulfide Deposits. *In* Magma to Microbe at Mid Ocean Ridges. AGU Monograph. R. Lowell, A. Metaxas, M. Perfit (Eds.). 233-258.

3. Baross, J.A., J.A. Huber, and **M.O. Schrenk**. 2006. Limits of Carbon Life on Earth and Elsewhere. In *Planets and Life: The Emerging Science of Astrobiology*. J.A. Baross and W.T. Sullivan (Eds). Cambridge University Press. 275-291.
4. **Schrenk, M.O.,** S.A. Bolton, D.S. Kelley, and J.A. Baross. 2004. Low archaeal diversity linked to subseafloor geochemical processes at the Lost City Field, Mid Atlantic Ridge. *Environ. Microbiol.* 6(10):1086-1095.
5. Kelley, D.S., J. Karson, G. Früh-Green, D. Yoerger, T. Shank, D. Butterfield, J. Hayes, **M.O. Schrenk**, E. Olson, G. Proskurowski, M. Jakuba, A. Bradley, B. Larson, K. Ludwig, D. Glickson, K. Buckman, A.S. Bradley, W. Brazelton, K. Roe, M. Elend, A. Delacour, S. Bernasconi, M. Lilley, J. Baross, R. Summons, S. Sylva. 2005. A Serpentinite-hosted ecosystem: The Lost City Hydrothermal Field. *Science. 307*: 1428-1434.

SYNERGISTIC ACTIVITIES:

- Courses taught at ECU; *Introduction to Microbiology* (4 cr.); *Astrobiology: The Planetary Context of Life* (3 cr.); *Microbial Biotechnology* (3 cr.); *Microbial Biogeography* (3 cr.); *The "Dark Energy" Biosphere* (1 cr.); *Virology* (1 cr.)
- *Ad hoc* reviewer of manuscripts (Arch. Microbiol., Astrobiology, Environmental Microbiology, FEMS Microbiology Ecology, Frontiers in Microbiology, Geobiology, Geology, Geomicrobiology J., JGR-Biogeosciences, ISME J.) and research proposals (NSF, NASA, NOAA)
- Co-convener. Census of Deep Life Session. American Geophysical Union Meeting, San Francisco, CA (Dec. 2012)
- Co-Convener and Organizer. Serpentinization in Astrobiology. Astrobiology Science Conference. Atlanta, GA (April 2012)
- Co-organizer. Microbiology of Deep Marine Sediments Workshop. Chapel Hill, NC (March 2011).
- Distinguished Lecturer. NSF RIDGE 2000 Program. (2010)
- Science Steering Committee- Deep Life Directorate, Deep Carbon Observatory
- Science Steering Committee- Center for Dark Energy Biosphere Investigations.
- Coordinating Committee- North Carolina Space Grant at ECU
- Primary Faculty Member- North Carolina Center for Biodiversity

STUDENTS SUPERVISED: Postdoctoral- W. Brazelton, M. Crespo-Medina, D. Morgan-Smith. Graduate- K. Twing (ECU- Ph.D., IDPBS), J. Blackburn, H. Blumenfeld, C. George, A. Kloysuntia, Q. Woodruff (ECU- M.Sc.)

COLLABORATORS WITHIN THE PAST 48 MONTHS:
J. Amend (USC), J. Banfield (UC-Berkeley), J. Baross (UW), D. Cardace (URI), G. Cody (CIW), K. Edwards (USC), G. Früh-Green (ETH-Zurich), P. Girguis (Harvard), J. Holden (UMass), J. Huber (MBL), D. Kelley (UW), D. Meyer-Dombard (UIC), S. Mitra (ECU), P. Morrill (Memorial U.), S. Seager (MIT)

GRADUATE ADVISORS AND POSTDOCTORAL SPONSORS:

Dr. John A. Baross	Ph.D. Advisor	U. of Washington
Dr. George D. Cody	Post-doctoral advisor	Carnegie Institution
Dr. Sara Seager	Post-doctoral advisor	MIT

BARBARA SHERWOOD LOLLAR, F.R.S.C.

Dept. of Earth Sciences, University of Toronto, Toronto, ON M5S 3B1
Phone: 416-978-0770, Fax: 416-978-3938, E-mail: bslollar@chem.utoronto.ca

1. Professional Preparation

B.A. Geological Sciences, Harvard University, 1985.
Ph.D. Earth Sciences, University of Waterloo, 1990.

2. Appointments

NSERC Postdoctoral Fellow, University of Cambridge	1990-92
Professor, Dept. of Earth Sciences and Director, Stable Isotope Laboratory	1992-present
Canada Research Chair (Isotope Geochemistry)	2007-2014

Awards and Fellowships

Eni Award for Protection of the Environment	2012
Geological Society of America Geobiology and Geomicrobiology Award	2012
Distinguished University Professor, University of Toronto	2010
Canada Council Killam Research Fellowship, University of Toronto	2004-2006
TIME Magazine – profiled as one of "Leaders for 21st Century"	2000
Darcy Lecturer (U.S. National Ground Water Association)	1998

3. Publications, 5 most relevant

1. Gilfillan, S.M.V., Sherwood Lollar, B., Holland, G., Blagburn, D., Stevens, S., Schoell, M., Cassidy, M., Ding, Z. Lacrampe-Couloume, G., Zhou, Z. and Ballentine, C.J. (2009) Solublity trapping in formation water as dominant CO_2 sink in natural gas fields. **Nature** 458:614-618. **Cover story**
2. Sherwood Lollar, B. and McCollom, T.M. (2006) Biosignatures and abiotic constraints on early life. (2006) **Nature** 444:E18. Dec. 14, 2006.
3. Lin, L.-H., Wang, P.-L., Rumble, D., Lippmann-Pipke, J., Boice, E., Pratt, L., Sherwood Lollar, B., Brodie, E. Hazen, T., Andersen, G., Moser, D.P., Kershaw, D. and Onstott, T.C. (2006) Long-term sustainability of a high energy, low diversity crustal biotome. **Science** 314:479-482.
4. Sherwood Lollar, B., Lacrampe-Couloume, G., Slater, G.F., Ward, J., Moser, D.P., Gihring, T.M., Lin, L.-H. and T.C. Onstott. (2006) Unravelling abiogenic and biogenic sources of methane in the Earth's deep subsurface. **Chemical Geology** Vol. 226:328-339. **One of top 10 most highly cited 2005-2010 in Chemical Geology.**
5. Sherwood Lollar, B., Westgate, T., Ward, J., Slater, G.F., and Lacrampe-Couloume, G. (2002) Abiogenic formation of alkanes in the Earth's crust as a minor source for global hydrocarbon reservoirs. **Nature** Vol. 416:522-524.

4. Publications, 5 other significant

1. Sherwood Lollar, B., Voglesonger, K., Lin, L.-H., Lacrampe-Couloume, G., Telling, J., Abrajano, T.A., Onstott, T.C. and Pratt, L.M. (2007) Hydrogeologic controls on episodic H_2 release from Precambrian fractured rocks - Energy for deep subsurface life on Earth and Mars. **Astrobiology** 7:971-986.
2. McCollom, T.M., Sherwood Lollar, B., *Lacrampe-Couloume, G.* and Seewald, J.S. (2010) The influence of carbon source on abiotic organic synthesis and carbon isotope fractionation under hydrothermal conditions. **Geochimica et Cosmochimica Acta** 74:2717-2740. **One of the "Top-25 most cited articles" Geochimica et Cosmochimica Acta for 2010.**
3. Allen, M., Sherwood Lollar, B., Runnegar, B., Oehler, D.Z., Lyons, J.R., Manning, C.E., Summers, M.E. (2006) Is Mars Alive? **EOS Transactions,** American Geophysical Union. 87 (41): 433, 439.

4. Lin, L.-H., Slater, G.F., Sherwood Lollar, B., Lacrampe-Couloume, G., and T .C. Onstott. (2005) The yield and isotopic composition of radiolytic H_2, a potential energy source for the deep subsurface biosphere. **Geochimica Cosmochimica Acta** Vol. 69(4):893-903.
5. Ballentine, C.J., Marty, B., Sherwood Lollar, B. and Cassidy, M. (2005) The Ne isotopic ratio of the convecting mantle and the origin of volatiles in the Earth. **Nature** Vol. 433:33-38.
Plus >100 additional papers

5. Synergistic Activities (up to 5 examples)

1. Member of National Research Council National Academies of Sciences Committee on Astrobiology and Planetary Science (2011-2014). Executive Committee member of the Sloan Foundation Deep Carbon Observatory and co-investigator of Deep Energy Directorate.
2. Member of MEPAG sub-committee developing the White paper on design of the Mid-Range Rover mission for Mars. NASA Mid-Range Rover Science Analysis Group member (MRR-SAG 2009). Co-author of the 2007 Astrobiology Strategy for the Exploration of Mars (ISBN 978-0-309-10851-5).
3. International collaborator with the NAI Indiana-Princeton-Tennessee team (co-PIs Pratt and Onstott) (2003-2008) and while on that team participated in the NAI Distributed Workshop "Methane on Mars' hosted by the NASA Goddard Space Flight Center. With Mark Allen of JPL co-authored "Is Mars Alive?" EOS Transactions AGU 87(41):433-439.
4. Vice-President of the Geochemical Society (2012-2014) and President-elect for 2014-2016. Executive Program Committee Co-Chair, Goldschmidt 2008; Organizing Committee, AbSciCon 2010.
5. Co-PI on $1.6 million NSERC Canadian Astrobiology Training grant to McGill-Toronto-Western Ontario-McMaster to fund international student and postdoctoral fellow research in astrobiology. International partners include NASA Ames (McKay; Stoker, Rothschild), JPL (Mielke), Cornell (Bell), SETI (Anderson), the OU (Cockell) and Princeton (Onstott).

6. Thesis advisor and post-graduate scholar sponsor, last 5 years

Penny Morrill (now Ass. Prof. Memorial University), Sarah Hirschorn (NWMO), Silvia Mancini (Golder Associates), Jennifer Gray McKelvie (NWMO), Michelle Chartrand (University of Ottawa), Martin Elsner (Helmholtz Zentrum Munich), Jon Telling (University of Bristol), Ken Voglesonger (Northeastern Illinois University), L. Li (now Ass. Prof. Univ. of Alberta). Current are L. Douglas (PhD), T. Brisco (MSc), B. Esen (MSc); S.Mundle (PDF), K. Wilkie (PDF), E. Passeport (PDF).
Total number of graduate students advised is 25. Total number of postdoctoral scholars sponsored is12.

7. Collaborators

E. Edwards (University of Toronto), B. Sleep (University of Toronto), G. Slater (McMaster University), M. Simpson (University of Toronto), S. Mabury (University of Toronto), J. Brenan (University of Toronto), D. Muir (CCIW), N. Roulet (McGill University), L. Whyte (McGill University), C. McKay (NASA Ames), M. Allen (NASA JPL), T.C. Onstott (Princeton), J. Gossett (Cornell University), J. Spain (Georgia Tech), K.K. Lehmann (University of Virginia), P. Mahaffy (NASA Goddard), L. Pratt (Indiana University), S. Pfiffner (University of Tennessee), T. Phelps (ORNL), F. Brockman (PNNL), T. Kieft (NMIMT), T. Hazen (LBNL), S. Clifford (LPI), W. Pollard (McGill University), N. Perreault (McGill University), D. Anderson (SETI), J.K. Fredrickson (PNNL), K. Pederson (Goteborg University), C.J. Ballentine (University of Manchester), G. Southam (University of Western Ontario), G. R. Osinski (University of Western Ontario), N. Banerjee (University of Western Ontario), D. Moser (DRI), T. McCollom (LASP), J. Seewald (WHOI).

8. Consultation / advising to government bodies, etc.

NASA Mid-Range Rover Science Analysis Group member (MRR-SAG 2009)
NASA E2E SAG Advisory member (Sept. 2010- June 2011)
National Academies of Sciences Space Studies Board COEL committee (2005-11) and CAPS (2011-41)
Executive Committee Carnegie Institution of Washington Deep Carbon Observatory (2010-2013)
In Canada serve on Council (Advisory Board) for our national research funding organization (NSERC).

Biographical Sketch for Everett L. Shock
School of Earth & Space Exploration,
and Dept. of Chemistry & Biochemistry
Arizona State University, Tempe, AZ, 85287

Professional Preparation

Undergraduate: Univ. of California, Santa Cruz	Earth Sciences	B.S. 1978
Graduate: Univ. of California, Berkeley	Geology	Ph.D. 1987

Appointments

Professor, School of Earth & Space Exploration and Department of Chemistry & Biochemistry, Arizona State University (since July 2002).

Director, W.M. Keck Foundation Laboratory for Environmental Biogeochemistry, Arizona State University (since July 2002).

Director, Environmental Studies Program, Washington University, St. Louis, MO, USA (1993-2001).

Professor, Associate Professor, and Assistant Professor, Department of Earth and Planetary Sciences, Washington University, St. Louis, MO, USA: (1987-2002).

Research Assistant, U.C. Berkeley: theoretical research in high-pressure/temperature inorganic and organic aqueous solution chemistry, chemical interaction of minerals and organic compounds with aqueous solutions in geochemical processes (six years).

Teaching Assistant, U.C. Berkeley: structural geology, introductory geology, theoretical geochemistry (one year).

Five Recent Publications Most Closely Related

Dick, J.M. and Shock, E.L. (2011) Calculation of the relative chemical stabilities of proteins as a function of temperature and redox chemistry in a hot spring. *PLoS ONE* 6(8), e22782. doi:10.1371/journal.pone.0022782

Manning, C.E., Shock E. L. and Sverjensky, D.A. (2013) The chemistry of carbon in aqueous fluids at crustal and upper-mantle conditions: experimental and theoretical constraints. *Reviews in Mineralogy & Geochemistry* (in press).

Paukert, A.P., Matter, J.M., Kelemen, P.B., Shock, E.L. and Havig, J.R. (2012) Reactive transport modeling of enhanced *in situ* CO_2 mineralization in the peridotite of the Samail ophiolite aquifer, Sultanate of Oman. *Chemical Geology* **330-331**, 86-100.

Shock, E.L. and Canovas P.C. (2010) The potential for abiotic organic synthesis and biosynthesis at seafloor hydrothermal systems. *Geofluids* **10**, 161-192.

Shock E.L., Holland, M.E., Meyer-Dombard, D.R., Amend, J.P., Osburn, G.R., and Fischer, T. (2010) Quantifying inorganic sources of geochemical energy in hydrothermal ecosystems, Yellowstone National Park, USA. *Geochim. Cosmochim. Acta* **74**, 4005-4043.

Five Additional Publications of Relevance to this Proposal

Cox, A. Shock, E. and Havig, J. (2011) The transition to microbial photosynthesis in hot spring ecosystems. *Chemical Geology* **280**, 344-351.

Havig, J.R., Raymond, J., Meyer-Dombard, D., Zolotova, N., and Shock, E.L. (2011) Merging isotopes and community genomics in a siliceous sinter-depositing hot spring. *Journal of Geophysical Research* **116**, G01005, doi:10.1029/2010JG001415.

Meyer-Dombard, D.R., Shock, E.L. and Amend, J.P. (2012) Effects of elevated trace element concentrations on culturing thermophiles. *Extremophiles* doi:10.1007/s00792- 012-0432-5.

Swingley, W.D., Meyer-Dombard, D.R., Alsop, E.B., Falenski, H.D., Havig, J.R., Shock, E.L. and Raymond, J. (2012) Coordinating environmental genomics and geochemistry reveals metabolic transitions in a hot spring ecosystem. *PLoS ONE* 7(6): e38108. doi:10.1371 /journal.pone.0038108.

Yang, Z., Gould, I.R., Williams, L., Hartnett, H., and Shock, E.L. (2012) The central role of ketones in reversible and irreversible hydrothermal organic functional group transformations. *Geochim.*

Cosmochim. Acta **98**, 48-65.

Synergistic Activities

- Development of thermodynamic databases for aqueous organic and inorganic species that are freely distributed over the internet, and used around the world.
- Application of High-Resolution Inductively-Coupled Plasma Mass Spectrometry to trace element studies of natural and human-impacted water resources, hydrothermal fluids, petroleum, and soils.
- Director of field research on hydrothermal ecosystems at Yellowstone National Park involving scientists from Arizona State University, Washington University, University of New Mexico, Yale, Stanford, MIT, University of Colorado, Carleton College, University of Waikato, McMaster University, Lawrence Livermore National Lab, Woods Hole Oceanographic Institution, University of North Carolina, University of Nevada-Las Vegas, NASA-Ames, University of Illinois-Chicago, Montana State University, University of Oslo, Universidad Nacional Autónoma de México, and China University of Geosciences - Wuhan.

Collaborators & Other Affiliations

Jan Amend (USC) Ariel Anbar (ASU), Eric Boyd (MSU), Steve Desch (ASU), Jeremy Dodsworth (UNLV), Tobias Fischer (U. New Mexico), Ian Gould (ASU), Hilairy Hartnett (ASU), Brian Hedlund (UNLV), Melanie Holland (Geotek), D'Arcy Meyer-Dombard (U. Ill. Chicago), John Peters (MSU), Sandra Pizzarello (ASU), Panjai Prapaipong (ASU), Jason Raymond (ASU), Matthew Stott (GNS-New Zealand), Paul Westerhoff (ASU), Lynda Williams (ASU), Hongyu Yu (ASU), Natalya Zolotova (ASU).

PhD Advisor: Harold C. Helgeson (UC Berkeley; deceased) *Postdoctoral Advisor:* none

Graduate Advisees: David Sassani (PhD, 1992, Golder Associates); Marc Willis (MS, 1993, Fullerton College); Tom McCollom (PhD, 1996, U. Colorado); Laura Wetzel (PhD, 1997, Eckerd College); Mitch Schulte (PhD, 1997, NASA HQ); Laura Griffith (PhD, 1998, Charleston Collegiate School); Panjai Prapaipong (PhD, 2001; ASU); Samantha Fernandes (MS, 2002; consulting); D'Arcy Meyer-Dombard (PhD, 2004, U. Ill. Chicago); Jennifer Smith (MS, 2006, Dugway Data Services Team); Brandon McLean (MS, 2007, HydroSystems, Inc.); Jeff Havig (PhD, 2009, Penn State); Todd Windman (PhD, 2010, ASU); Tracy Lund (MS, 2010, Dept. of Health, Minnesota); Xiaoding Zhuo (PhD, 2010, Germinian Capital, Boston); Ziming Yang (MS, 2011, PhD, current, C&B); Chris Glein (PhD, 2012, Geophysical Lab, Carnegie Institution, Washington, DC); Peter Canovas (PhD, current, SESE); Kris Fecteau (PhD, current, C&B); Brian St. Clair (PhD, current, ELS); Grayson Boyer (PhD, current, C&B); Kirt Robinson (PhD, current, C&B); Kristin Johnson (PhD, current, C&B); Apar Prasad (PhD, current, C&B); Peter Marsala (PhD, current, SESE); Alta Howells (PhD, current, Microbiology).
Post-doctoral Advisees: David Sassani (Golder Associates), Johnson Haas (U. Western Michigan), Jan Amend (Washington University), Mikhail Zolotov (ASU), Andrey Plyasunov, Melanie Holland (Geotek), Natalya Plyasunova, Jenny Cox (U. Guelph), Florian Schwandner (Earth Observatory of Singapore), Jeffrey Dick (Curtin University), Jeff Havig (Penn State), Jordan Okie (ASU).

Totals: Masters: 6; PhD: 21; Post-docs: 12.

Satish Singh

Laboratoire de Geosciences Marine
Institut de Physique du Globe de Paris
1 rue Jussieu, 75238 Paris, France
singh@ipgp.fr

EDUCATION

1987 Ph.D., Theoretical Seismology, University of Toronto, Canada 1980 Master of Science, Exploration Geophysics, Banaras Hindu University, India

PROFESSIONAL EXPERIENCE

2012 to-date Professor Class Exceptional, IPG Paris, France 1999 to 2012 Professor First Class, IPG Paris, France 1999 to-date Principal Research Fellow, University of Cambridge, U.K. 1997-1999 Senior Research Fellow, University of Cambridge, U.K. 1990-1997 Senior Assistant in Research, University of Cambridge, U.K. 1989-1990 Research Scientist, Elf Research Centre, Pau, France 1988-1989 Post-doctoral Fellow, Institut de Physique du Globe de Paris, France

AWARDS/SCHOLARSHIPS

2012 Prime d'Excellence Scientifique by the French Ministry of Education 2012 Laureate of the Agence Nationale de Recherche, Chaire Industrielle 2011 Grand Prix, French Academy of Sciences 2010 Elected AGU Fellow 2009 Distinguished Lecturer for European Association of Geoscientists and Engineers 2009 2009 Laureate of the French Ministry of Research in Scientific Innovation and Ecole des Mines de Paris and industry partners

Creation 2009 Cecil Green Scholar, Scripps Institution of Oceanography, California 2008 Cecil Green Scholar, Scripps Institution of Oceanography, California 2007 Visiting Scientist, Scripps Institution of Oceanography, California 2004 Visiting Scientist, Woods Hole Oceanographic Institution 1999 NERC Senior Research Fellowship 1996 Cecil Green Scholar, Scripps Institution of Oceanography, California 1983-1987 University of Toronto Open Fellowship. 1980 Gold Medal, Banaras Hindu University, India

ACADEMIC ACHIEVEMENTS

Publications: Author of more than 120 articles in international peer reviewed journals, and 10 in *Nature*, *Science*, *Nature Geoscience* Ph.D.: Supervised 27 Ph.D. students Present Ph.D.: Supervise (Co-) 15 Ph. D. Students in Paris and one in Cambridge Post-docs: Supervised 25 post-doctoral fellows LITHOS: Founder of LITHOS consortium of oil and service companies Marine Geosciences: Founder of Marine Geosciences Department at the IPG Paris French Ocean Bottom Seismometer Pool: Founder of the French OBS Pool SAGER: Creator of Sumatra Andaman Great Earthquake Research Initiative Master of Research: Creator of Master of Research in Exploration Geophysics in partnership with

SCIENTIFIC RESPONSIBILITIES

Director of Paris Exploration Geophysics (GPX) Group, 2012-2016 Member of the Scientific Council of Institut Francais du Pétrole Energies Nouvelles, 2012-2014 Director of Marine Geosciences Department, IPG Paris, 2001-2008

Project Leader, SAGER Project, 2005-2009 Director of LITHOS, 1998-2012, consortium of oil and service companies Director of the French OBS Pool, 2001-2010 Member of the Scientific Council of Institut de Physique du Globe de Paris, 2012-2014 Coordinator of NERIES broadband OBS (European Broadband Seismometer Network): 2006-2010 NSF Review Panel 2008-2011 NSF R/V Markus Langseth Panel, invited guest 2009-2010

RESEARCH EXPEDITIONS

Co-Chief Scientist, RHUM-RUM, 2012, R/V Marion Dufresne, Indian Ocean Chief Scientist, Pre-Tsunami Survey, 2009, S/V Geowave Champion (CGGVeritas), Sumatra Chief Scientist, PreTI-Gap cruise, 2008, R/V Baruna Jaya (Indonesia), Sumatra Chief Scientist, Sumatra-OBS, 2006, R/V Marion Dufresne (France), Sumatra Chief Scientist, Sumatra-Deep, 2006, WesternGeco Geco Searcher (Schlumberger), Sumatra Chief Scientist, SISMOMAR, 2005, N/O L'Atalante (France), Mid-Atlantic Ridge Chief Scientist, Test-OBS, 2004, N/O Suroît (France), Offshore Toulon Chief Scientist, SHALIMAR, 2003, N/O Suroît (France), Offshore Lebanon Chief Scientist, SEISMARMARA, 2001, N/O Le Nadir (France), Marmara Sea Chief Scientist, FIRST, 1998, R/V Pacific Horizon (Spectrum), 2D MCS, Falkland Co-Chief Scientist, ARAD, 1997, R/V Ewing (USA), 3D MCS and OBS, EPR Chief Scientist, SWABS, 1992, R/V Shatsky (Geco-Prakla), two vessels MCS and OBS, North Sea

IMPORTANT PUBLICATIONS

Singh, S.C. et al. (2011). Aseismic zone and earthquake segmentation associated with a deep subducted seamount in Sumatra, *Nature Geoscience*, 4, 308-311. **Singh**, S.C. & Macdonald, K. (2009). Mantle skewness and ridge segmentation, *Nature*, 458, E11-12, doi: 10.1038/nature07887. **Singh**, S.C., Carton, H., Tapponnier, P. et al. (2008). Seismic evidence of broken crust in the 2004 Sumatra earthquake epicentral region, *Nature Geosciences,* 1, 777-781.

Singh, S.C., Crawford, W., Carton, H., Seher, T., Combier, V., Cannat, M., Canales, J., Dusunur, D., Escartin, J., Miranda, M. (2006a). Discovery of magma chamber and faults beneath a hydrothermal field at the Mid-Atlantic Ridge, *Nature*, 442, 1029-1033.

Singh, S.C., Harding, A., Kent, G., Sinha, M.C., Combier, V., Hobbs, R., Barton, P., White, R., Tong, V., Pye, J., Orcutt, J. (2006b). Seismic reflection images of Moho underlying melt sills at the East Pacific Rise, *Nature*, 442, 287-290.

Singh, S.C., Taylor, M. and Montagner, J.P. (2000). On the presence of liquid in Earth's inner core, *Science* 287, 2471-2474.

Kent, G.M, **Singh**, S.C, Harding, A.J., Sinha, M.C., Tong, V., Barton, P.J., Hobbs, R., White, R., Bazin, S., and Pye, J. (2000). Evidence from three-dimensional seismic reflectivity images for enhanced melt supply beneath mid-ocean-ridge discontinuities, *Nature*, 406, 614-618.

Singh, S.C. and Montagner, J.P. (1999). Anisotropy of iron in the inner core, *Nature*, 400, 629.

Singh, S.C., Kent, G., Collier, J., Harding A. and Orcutt J. (1998). Melt to Mush variations in the crustal magma properties beneath the Southern East Pacific Rise, *Nature*, 394, 874-878.

Singh, S.C., Minshull, T.A. and Spence, G.D. (1993). Velocity structure of a gas hydrate reflector, *Science*, 260, 204-20

ROBERT A. SOHN
Associate Scientist
Woods Hole Oceanographic Institution, Woods Hole, MA 02543

Born:
3 August, 1965; Indianapolis, Indiana U.S. citizen

Education:
Ph.D. 1996, Scripps Institution of Oceanography, Oceanography
B.S. 1987, Purdue University, Mechanical Engineering

Professional Appointments:

2003-present	Associate Scientist, Woods Hole Oceanographic Institution
1999-2003	Assistant Scientist, Woods Hole Oceanographic Institution
1998-1999	Assistant Project Scientist, Scripps Institution of Oceanography
1996-1998	Post-graduate researcher, Scripps Institution of Oceanography
1991-1996	Graduate Research Assistant, Scripps Institution of Oceanography
1987-1991	Project Engineer, McDonnell Douglas Inc., Long Beach, CA

Publications: Five Publications Relevant to the Proposed Project

Sohn, R. A., R. E. Thomson, A. B. Rabinovich, and S. F. Mihaly, Bottom pressure signals at the TAG deep-sea hydrothermal field: Evidence for short-period, flow-induced ground deformation, *Geophys. Res. Lett*., 36, L19301, doi:1029/2009GL040006, 2009.

Sohn, R. A., Stochastic analysis of exit-fluid temperature records from the active TAG hydrothermal mound (Mid-Atlantic Ridge, 26°N), 1. Modes of variability and implications for sub-surface flow, *J. Geophys. Res*., *112*, B07101, doi:10.1029/2006JB004435, 2007.

deMartin, B. J., R. A. Sohn, J. P. Canales, S. E. Humphris, Kinematics and geometry of active detachment faulting beneath the TAG hydrothermal field on the Mid-Atlatntic Ridge, *Geology*, 35(8), 711-714, doi: 10.1130/G23718A.1, 2007.

Sohn, R. A., A. H. Barclay, and S. C. Webb, Microearthquake patterns following the 1998 eruption of Axial Volcano, Juan de Fuca Ridge: Mechanical relaxation and thermal strain, *J. Geophys. Res*., *109*, B01101, doi:10.1029/2003JB002499, 2004.

Sohn, R. A., J. A. Hildebrand, and S. C. Webb, A microearthquake survey of the high-temperature vent fields on the volcanically active East Pacific Rise, *J. Geophys. Res*., *104(11)*, 25,367-25,378, 1999.

Five Other Publications

Karlstrom, L., S. Hurwitz, R. Sohn, J. Vandemeulebrouck, F. Murphy, M. R. Rudolph, M. Johnston, M. Manga, R. B. McCleskey, Eruptions at Lone Star Geyser, Yellowstone National Park, USA, Part 1: Energetics and Eruption Dynamics, *J. Geophys. Res*., submitted.

Pontbriand, C. W., S. A. Soule, R. A. Sohn, S. E. Humphris, C. Kunz, H. Singh, K. Nakamura, M. Jakobsson, T. Shank, Effusive and explosive volcanism on the ultraslow-spreading Gakkel Ridge, 85°E, *Geochem, Geophys. Geosyst*, *13(10)*, Q10005, doi:10.1029/2012GC004187, 2012.

Zhao, M., J. P. Canales, R. A. Sohn, Three-dimensional seismic structure of a Mid-Atlantic Ridge segment characterized by active detachment faulting (Trans-Atlantic Geotraverse, 25°55'N-26°20'N), *Geochem, Geophys. Geosyst*, *13(1)*, Q0AG13, doi:10.1029/2012GC004454, 2012.

Barreyre, T., S. Adam Soule, Robert A. Sohn, Dispersal of volcaniclasts during deep-sea eruptions: Settling velocities and entrainment in buoyant seawater plumes, *J. Volc. Geotherm. Res.*, 205, 84-93, doi:10.1016/j.jvolgeores.2011.05.006, 2011.

Sohn, R. A., and the *AGAVE* science team, Explosive volcanism on the ultraslow-spreading Gakkel ridge, Arctic Ocean, *Nature*, *453*, doi:10.1038/nature07075, 2008.

Synergistic Activities

Teaching: Active Source Marine Seismology (2006), Introduction to Marine Geology and Geophysics (2002-2005), Computational Data Analysis (2001), Geodynamics Seminar – Plume/Ridge Interactions (2001).

Professional Panels, Committees, and Societies: WHOI Marine Operations Committee (2006-2012), NSF R2K Distinguished Lecturer (2009), NSF R2K Steering Committee (2004-2007), ECOR Specialist Panel on Under-Ice AUV Operations (2006-2007), iODP Site Survey Panel (2001-2004), NSF Innovation in Graduate Education and Research Training Panel (2000), American Geophysical Union (member 1993-present).

Outreach: Research featured in NPR WNYC Radiolab (Season 5, Episode 5), "*Yellow Fluff and Other Curious Encounters*", and The Field Museum of Chicago exhibit, "*Exploring the Arctic Seafloor*".

Collaborators and Other Affiliations

Ph.D. advisors: Spahr Webb (LDEO), John Hildebrand (SIO)

Collaborators: Shaul Hurwitz (USGS, Menlo Park), Susan Humphris (WHOI), Rick Thomson (PGC – Canada), Jean Vandemuelebrouck, (IS Terre, France), Dan Fornari (WHOI), Ken Sims (U. Wyoming), Uri ten Brink (USGS), Pablo Canales (WHOI), Hedy Edmonds (UT), Tim Shank (WHOI), Hanu Singh (WHOI), Dana Yoerger (WHOI), Louis Whitcomb (Johns Hopkins), Militza Stojakovic (MIT), Dave Akin (U. Maryland), Robert Dunn (U. Hawaii), Timothy Crone (LDEO), Leif Karlstrom (Stanford), Malcolm Johnston (USGS, Menlo Park).

Students advised**:** Gregory Horning (Ph.D., exp. 2017), Thibaut Barryere (Ph.D. exp. 2013 – IPGP France), Claire Pontbriand (Ph.D, exp. 2012), Andrea Llenos (Ph.D., 2010), Bhaskar Deo (summer intern, 2010), Brian deMartin (Ph.D., 2007), Sacha Wichers (M.Sc., 2005), Juliana Gay (summer intern, 2006), Don Pfitsch (summer intern, 2000), Shawn Sorenson (summer intern, 1998).

Eiichi TAKAZAWA

Office Address: *Home Address:*
Dept. of Geology, Faculty of Sceince 2-14-3, Ikarahi-Nakajima Niigata University Niigata, 950-2162, Japan Niigata, 950-2181 Japan +81 (25) 261-3121 Phone & Fax: +81 (25) 262-6114takazawa@geo.sc.niigata-u.ac.jp

Personal Born February 9, 1963, Saitama, Japan

Education **Massachusetts Institute of Technology** Cambridge, MADoctor of Philosophy in Geochemistry, September 1996. Thesis under Professor F. A. Frey and Dr. N. Shimizu on "Geodynamic Evolution of the Horoman Peridotite, Japan: Geochemical Study of Asthenospheric and Lithospheric Processes". Investigation of melt-mantle interaction based on trace element abundances and radiogenic isotope ratios of peridotites derived from the upper mantle.

Hokkaido University Sapporo, Japan
M.S. degree in Geology, March, 1989. Thesis under Professor K. Niida on "Petrological Study of the Horoman Ultramafic Complex, Japan".Investigation of melting process in the upper mantle based on major element compositions of the Horoman ultramafic rocks.

Hokkaido University Sapporo, Japan
B.S. degree in Geology, March, 1986. Thesis under Professor K. Niida on "Stratification of the Horoman Ultramafic Complex, Japan". Geologic mapping and petrographic investigation of the Horoman ultramafic rocks.

Professional Experience **Japanese Society for the Promotion of ScienceResearch Fellow -DC** Kumamoto UniversityApril - August 1990

Research Assistant Massachusetts Institute of TechnologySept 1990 - Jan 1994; June 1994 - June 1996

Teaching Assistant Massachusetts Institute of TechnologyFeb - May 1994 (Analysis of Geological Material)

COE Fellow National Institute for Research in Inorganic MaterialsAugust 1996 -September 1997

Lecturer Niigata UniversityOctober 1997 - June 1999

Associate Professor Niigata UniversityJuly 1999 - present

Professional Societies American Geophysical UnionGeochemical SocietyGeological Society of JapanGeochemical Society of JapanJapan Association of Mineralogical SciencesVolcanological Society of Japan

Research Field Petrology and geochemistry of orogenic peridotites, abyssal peridotites and ophiolite mantle section

ODP&IODP Experience ODP Leg 209 to Mid-Atlantic Ridge 15°20' Fracture Zone as igneous scientist May to July 2003

Organization of 2nd Post-cruse meeting for ODP Leg 209, Samani, Hokkaido, Japan (June 23 -25, 2005)

SSEP member from April 2007 to March 2010

J-DESC IODP section executive committee member from April 2007 to March 2011

PEP member from December 2011 to present

Publications

Agashev, A.M., Pokhilenko, N.P., Takazawa, E., McDonald, J.A., Vavilov, M.A., Watanabe, T., Sobolev, N.V. (2008) Primary melting sequence of a deep (> 250 km) lithospheric mantle as recorded in the geochemistry of kimberlite–carbonatite assemblages, Snap Lake dyke system, Canada. *Chemical Geology*, **255**, 3-4, 317-328.

Takazawa, E., Abe, N., Seyler, M. and Meurer, W. P. (2007) Hybridization of Dunite and Gabbroic Materials in Hole 1271B from Mid-Atlantic Ridge 15°N: Implications for Melt Flow and Reaction in the Upper Mantle. In Kelemen, P.B., Kikawa, E., and Miller, D.J. (Eds.), *Proceedings of Ocean Drilling Program, Science Results*, **209**, 1–23, doi:10.2973/odp.proc.sr.209.005.2007.

Morishita, T., Takazawa, E. et al. (2006) Corundum-bearing mafic granulites in the Horoman (Japan) and Ronda (Spain) Peridotite Massifs: Possible remnants of recycled crustal materials in the mantle. Island Arc, 15, 2-3.

Shuto, K., Ishimoto, H., Hirahara, Y., Sato, M., Matsui, K., Fujibayashi, N., Takazawa, E., Yabuki, K., Sekine, M., Kato, M., and Rezanov, A. I. (2006) Geochemical secular variation of magma source during Early to Middle Miocene time in the Niigata area, NE Japan: Asthenospheric mantle upwelling during back-arc basin opening. Lithos, 86, 1-33.

Obata, M. and Takazawa, E. (2004) Compositional continuity and discontinuity in the Horoman peridotite, Japan, and its implication for melt extraction processes in partially molten upper mantle. *J. Petrol*., **45**, 223-234.

Takazawa, E., Okayasu, T. and Satoh, K. (2003) Geochemistry and origin of the basal lherzolites from the northern Oman ophiolite (northern Fizh block). *Geochem. Geophys. Geosyst.,* 4(2), 1021, doi:10.1029/2001GC000232.

Toramaru, A., Takazawa, E., Morishita, T. and Matsukage, K. (2001) Model of layering formation in a mantle peridotite (Horoman, Hokkaido, Japan). *Earth and Planetary Science Letters*, vol. 185, pp. 299-313.

Saal, A.E., Takazawa, E., Frey, F.A., Shimizu, N. and Hart, S.R. (2001) Re-Os isotopes in the Horoman Peridotite: evidence for refertilization? *Journal of Petrology*, vol. 42, pp. 25-37

Dr. Alexis S. Templeton
Department of Geological Sciences, University of Colorado, Boulder CO 80309-0399

EDUCATION

2002	Ph.D. in Aqueous and Environmental Geochemistry, Stanford University
1996	M.S. in Geochemistry, Dartmouth College
1993	A.B. with high honors in Earth Sciences, Dartmouth College

APPOINTMENTS

20012-Present	***Associate Professor***
	Department of Geological Sciences, University of Colorado at Boulder
2005-2001	***Assistant Professor***
	Department of Geological Sciences, University of Colorado at Boulder
2002-2005	***NSF Postdoctoral Fellow,*** Microbial Biology
	Scripps Institution of Oceanography, Marine Biology Research Division
1997-2002	***Graduate Research Assistant***
	Geological & Environmental Sciences, Stanford University
1995-1997	***Senior Research Associate***, Center for Isotope Geochemistry,
	Earth Sciences Division, Lawrence Berkeley National Laboratory
1993-1995	***Graduate Research Assistant***
	Department of Earth Sciences, Dartmouth College

AWARDS AND HONORS

2012	Geobiology & Geomicrobiology Division Award, GSA
2011	Department of Energy Early Career Award
2006	David and Lucille Packard Foundation Fellowship
2006	F.W. Clarke Medal, Geochemical Society
2005	Popular Science 4th Annual Brilliant 10
2004	Rosalind Franklin Young Investigator Award, Advanced Photon Source
2002-2004	NSF Microbial Biology Postdoctoral Fellowship
1999	Wolf Vishniac Award, ISEB

RELEVANT EXPERIENCE

Field experience in subsurface fluid-flow, subsurface biosphere and water-rock interactions in terrestrial and submarine environments in New Zealand, Colorado, Canadian High Arctic, Hawaii and Samoa. Specific expertise in microbe-mineral interactions & life detection, including the development of synchrotron-based X-ray spectroscopic techniques, cultivation of chemo-lithoautotrophic bacteria, and application of electron microscopy & isotope geochemistry.

SELECTED SYNERGISTIC ACTIVITIES

Advisory Member: NSF-RCN Seamount Biogeosciences Network, 2005-Present

Recent Participant, ICDP-Sloan sponsored "Oman Drilling workshop" and DOE-ERSP Strategic Planning Workshop in "Subsurface Complex System Science".

Panelist: NASA Exobiology and Evolutionary Biology Panel; National Science Foundation Low-Temperature Geochemistry & Geobiology

Editorial Board: *Geobiology Journal*; Review Editor: *Frontiers in Microbiological Chemistry.*

TEN RECENT PUBLICATIONS MOST RELEVANT TO PROPOSAL

Gleeson, D.F., Pappalardo, R.T., Anderson, M.S., Grasby, S.E., Wright, K.E., **Templeton, A.S**., 2012, Life detection at an Arctic analog to Europa. *Astrobiology Journal* v. 12, 135-150.

Swanner, E.D., **Templeton, A.S.**, 2011 Potential for nitrogen fixation and nitrification in the granite subsurface at Henderson Mine, CO. *Frontiers in Extreme Microbiology* 2:254.

Mayhew, L.E., Webb, S.M., and **Templeton, A.S.**, 2011, Microscale imaging and identification of Fe speciation and distribution during fluid-mineral interactions under highly reducing conditions. *Environmental Science and Technology*. doi:10.1021/es104292n.

Swanner, E.D., Nell, R., and **Templeton, A.S.**, 2011, *Ralstonia* species mediate Fe-oxidation in circumneutral, metal-rich subsurface fluids of Henderson Mine, CO. *Chemical Geology,* v. 284, p. 339-350.

Gleeson, D.F., Williamson C.H.D., Grasby S.E., Spear J.R., Pappalardo R.T., **Templeton A.S.**, 2011, Low temperature S^0 biomineralization at a supraglacial spring system in the Canadian High Arctic, *Geobiology Journal* v. 9, p. 360-375.

Templeton, A.S., Knowles, E.J., Eldridge, D.L., Arey, B.W., Dohnalkova, A., Webb, S.M., Bailey, B.E., Tebo, B.M., Staudigel, H.S., 2009, A seafloor microbial biome hosted within incipient ferromanganese crusts. *Nature Geoscience* v. 2, p. 872-876.

Templeton, A., and Knowles, E., 2009, Microbial transformations of minerals and metals: recent advances in Geomicrobiology derived from synchrotron-based x-ray spectroscopy and x-ray microscopy. *Annual Reviews in Earth and Planetary Sciences*, v.37, p. 245-260.

Templeton, A.S., Conrad, M.E., Chu, K.H., Alvarez-Cohen, L., 2006, Metabolic controls on the carbon isotope fractionations expressed by methane-oxidizing bacteria. *Geochimica et Cosmochimica Acta* v. 70, p.1739-1752.

Templeton, A.S., Staudigel, H., Tebo, B.M., 2005, Diverse Mn(II)-oxidizing bacteria isolated from submarine basalts at Loihi Seamount *Geomicrobiology Journal*, v. 22, 129-137.

ADVISORS

Dr. Gordon Brown (Stanford University), Dr. Page Chamberlain (Stanford University), Dr. Bradley Tebo (Oregeon Health Sciences University).

GRADUATE STUDENTS ADVISED

Dr. Damhnait Gleeson (Center for Astrobiology, Spain), Dr. Elizabeth Swanner (University of Tubingen, Germany), Dr. Lisa Mayhew (University of Colorado), Dr. Emily Knowles (Jet Propulsion Laboratory), Dr. Katherine Wright (University of Bristol), Graham Lau (current), Hannah Miller, Current.

RECENT COLLABORATORS

Thomas McCollom (University of Colorado), Spear, John (Colorado School of Mines), Thomas Trainor (University of Alaska), Peter Eng (University of Chicago), Sam Webb (SSRL), Robert Pappalardo (JPL), Steven Grasby (Canadian GS), Staudigel, Hubert (UCSD), Tebo, Bradley (OHSU), Butler, Alison (University of California, SB), Connell, Laurie (University of Maine), Dohnalkova, Alice (PNNL), Arey, Bruce (PNNL), Harald Furnes (University of Bergen), Nicola McLoughlin (University of Bergen), Conrad, Mark (LBNL), Kieft, Tom (New Mexico Tech), Smith, Dick (US Geological Survey), Wanger, Greg (Craig Ventner Institute), Gorby, Yuri (Craig Ventner Institute), Brandy Toner (University of Minnesota), Katrina Edwards (USC), Richard Wirth (Helmholtz Center, Potsdam), Daniel Fliegel (University of Berge

Susumu UMINO

Department of Earth Sciences
Kanazawa University
Kakuma-Machi, Kanazawa-Shi
Ishikawa 920-1192, Japan

Phone: +81-76-264-6522
Email: sesumin@staff.kanazawa-u.ac.jp
Citizenship: Japan

Education:
B.S., Petrology & Geology, University of Tokyo, 1981
M.S., Petrology & Geology, University of Tokyo, 1983
PhD, Petrology & Geology, University of Tokyo, 1987

Professional Experience:
Research fellow of JSPS, 1987-1988
Assistant Professor, Institute of Geosciences, Faculty of Science, Shizuoka University, 1988-1992
Lecturer, Department of Biology and Geosciences, Faculty of Science, Shizuoka University, 1992-1993
Associate Professor, Department of Biology and Geosciences, Faculty of Science, Shizuoka University, 1993- 2004
Professor, Department of Geosciences, Faculty of Science, Shizuoka University, 2004- 2007
Professor, Department of Earth Sciences, Kanazawa University, 2008-Present

Selected seagoing experience:
1991 JOIDES Resolution, DOP Leg 140, Costa Rica Rift, site 504B
1998 YOKOSUKA-KAIKO, Off Hawaii Islands
2002 YOKOSUKA-SHINKAI 6500, Off Hawaii Islands
2002- 2003 JOIDES Resolution, ODP Leg 206, Cocos plate off Nicaragua, site 1256
2004 YOKOSUKA-SHINKAI 6500, southern East Pacific Rise14S (Chief Scientist)
2005 JOIDES Resolution, IODP EXP 309, Cocos plate off Nicaragua, site 1256 (D. Teagle, S. Umino, co-chiefs)
2008 YOKOSUKA-SHINKAI 6500, Mariana Trough (Chief: Fujiwra, T.)
2009 YOKOSUKA-SHINKAI 6500, Bonin Ridge (Chief: Ishizuka, O.)
Selected international workshop on scientific drilling experience:
1997 CONference on Cooperative Ocean Riser Drilling, Tokyo
2006 Mission Moho Workshop, Portland
2009 Melting, Magma, Fluids and Life, NOC Southampton
2009 IODP New Ventures in Exploring Scientific Targets (INVEST), Bremen
2010 The MoHole, Kanazawa

Synergistic activities:
Guest editor of Geophysics, Geochemistry, Geosystems, AGU, 2001-2004
Member, Earth Interior Panel, Japan Drillin Earth Science Consortium, 2003-2006
Member, Science Steering and Evaluation Panel, Integrated Ocean Drilling Program, 2003-2006
Member, Science Planning committee, Integrated Ocean Drilling Program, 2009-2011
Editor-in-Chief, Island Arc, Geological Society of Japan, 2012-

Selected Publications

Kanayama, K., Umino, S., and Ishizuka, O., 2012. Eocene volcanism during the incipient stage of Izu–Ogasawara Arc: Geology and petrology of the Mukojima Island Group, the Ogasawara Islands. Island Arc, 21, 288 – 316, DOI: 10.1111/iar.12000.

Umino, S., 2012. Emplacement mechanism of off-axis large submarine lava field from the Oman Ophiolite. J. Geophys. Res., 117, B11210, doi:10.1029/2012JB009198.

Kusano, Y., Adachi, Y., Miyashita, S. and Umino, S., 2012. Lava accretion system around mid-ocean-ridges: Volcanic stratigraphy in the Wadi Fizh area, northern Oman ophiolite, Geochem. Geophys. Geosyst. , 13, Q05012, doi:10.1029/2011GC004006.

Asada, M., Fujiwara, T. and Umino, S., 2012. Implications of volcanic activity in the central Mariana Trough median valley, based on the deep-towed side-scan sonar imagery and manned submersible observations (in Japanese with English abstract). Bull. Volcanol. Soc. Japan, 57, 1 - 18.

Ishizuka, O., Tani, K., Reagan, M.K., Kanayama, K., Umino, S., Harigane, Y., Sakamoto, I., Miyajima, Y., Yuasa, M. and Dunkley, D.J., 2011. The timescales of subduction initiation and subsequent evolution of an oceanic island arc. Earth Planet. Sci. Lett., 306, 229 - 240.

Tominaga, M. and Umino, S., 2010. Lava deposition history in ODP Hole 1256D: Insights from log-based volcanostratigraphy. Geochem. Geophys. Geosyst., Q05003, doi: 10.1029/2009GC002933.

Umino, S., Crispini, L., Tartarotti, P., Teagle, D.A.H., Alt, J.C., Miyashita, S. and Banerjee, N.R., 2008. The origin of the sheeted dike complex at superfast spread East Pacific Rise revealed by deep ocean crust drilling at ODP Hole 1256D. Geochem. Geophys. Geosyst., Q06O08, doi: 10.1029/2007GC001760.

Geshi, N., Umino, S., Kumagai, H., Sinton, J.M., White, S.M., Kishimoto, K. and Hilde, T.W., 2007. Discrete plumbing systems and heterogeneous magma sources of a 24 km3 off-axis lava field on the western flank of East Pacific Rise, 14°S. Earth Planet. Sci. Lett., 258, 61 - 72.

White, S.M., Umino, S. and Kumagai, H., 2006. Transition from seamount chain to intraplate volcanic ridge at the East Pacific Rise. Geology, 34, 293 - 296.

Umino, S., Nonaka, M. and Kauahikaua, J., 2006. Emplacement of subaerial pahoehoe lava sheet flows into water: 1990 Kūpaianaha flow of Kilauea Volcano at Kaimū Bay, Hawai`i. Bull. Volcanology, 69, 125-139. DOI 10.1007/s00445-006-0059-4.

Umino, S., Miyashita, S., Hotta, F. and Acachi, Y., 2003. Along-Strike Variation of the Sheeted Dike Complex in the Oman Ophiolite — Insights into Subaxial Ridge Segment Structures and Magma Plumbing System. Geochem. Geophys. Geosyst., 8618, doi:10.1029/2001GC000233.

Umino, S., Obata, S., Lipman, P., Smith, J.R., Shibata, T., Naka, J. and Trusdell, F., 2002. Emplacement and Inflation Structures of Submarine and Subaerial Pahoehoe Lavas From Hawaii. In Takahashi, E. et al., (eds.), Hawaiian Volcanoes: Deep Underwater Perspectives, AGU Monograph, 128, 85-101.

Umino, S., Lipman, P.W. and Obata, S., 2000. Subaqueous lava flow lobes, observed on ROV KAIKO dives off Hawaii. Geology , 28, 502 - 506.

Biographical Sketch - Jessica M. Warren

Education

University of Cambridge	B.A., Natural Sciences, 1999
University of Cambridge	M.Sci., Earth Sciences, 2000
University of Cambridge	M.A., Natural Sciences, 2003
MIT/WHOI Joint Program	Ph.D., Geochemistry & Geophysics, 2007
Carnegie Institution of Washington	Postdoctoral Fellow, Geochemistry, 2008-2010

Academic Appointments

2010-present	*Assistant Professor*, Stanford University
2008-present	*Guest Investigator*, Woods Hole Oceanographic Institution
2008-2010	*Postdoctoral Fellow*, Carnegie Institution of Washington
2007	*Postdoctoral Investigator*, Woods Hole Oceanographic Institution
2005-2006	*COE-21 Collaborative Researcher*, Okayama University at Misasa
2001-2007	*Graduate Research Assistant*, MIT/WHOI Joint Program

Five Publications Related to Proposed Research:

Warren, J.M. and S.B. Shirey (2012). Pb and Os isotopic constraints on the oceanic mantle from single abyssal peridotite sulfides, *Earth and Planetary Science Letters*, 359-360, 279-293.

Skemer, P., J.M. Warren, P.B. Kelemen, and G. Hirth (2010). Microstructural and rheological evolution of a mantle shear zone, *J. Petrology*, 51(1-2), 43-53.

Warren, J.M., N. Shimizu, C. Sakaguchi, H.J.B. Dick, and E. Nakamura (2009). An assessment of upper mantle heterogeneity based on abyssal peridotite isotopic compositions, Journal of Geophysical Research, *J. Geophys. Res.*, 114, B12203, doi:10.1029/2008JB006186.

Warren, J.M., G. Hirth and P.B. Kelemen (2008). Evolution of olivine lattice preferred orientation during simple shear in the mantle, *Earth and Planetary Science Letters*, 272, 501-512.

Warren, J.M. and G. Hirth (2006). Grain Size Sensitive Deformation Mechanisms in Naturally Deformed Peridotites, *Earth and Planetary Science Letters*, 248, 423-435.

Five Additional Publications

Recanati A., M.D. Kurz, J.M. Warren, J. Curtice, 2012. Helium distribution in a mantle shear zone from the Josephine Peridotite, *Earth and Planetary Science Letters*, 359-360, 161-172.

Skemer, P., J.M. Warren and G. Hirth, 2012. Interpreting mantle seismic anisotropy in complex kinematic settings, *G-Cubed*, 13, Q03006, doi:10.1029/2011GC003988.

Warren, J.M. and N. Shimizu (2010). Cryptic Variations in Abyssal Peridotite Composition: Evidence for Recent Melt-Rock Reaction at the Ridge, *J. Petrology*, 51(1-2), 395-423.

Dick, H.J.B., C.J. Lissenberg and J.M. Warren (2010). Mantle Melting, Melt Transport, and Delivery Beneath a Slow-Spreading Ridge: The Paleo-MAR from 23°15'N to 23°N, *J. Petrology*, 51(1-2), 425-467.

Kurz, M.D., J.M. Warren and J. Curtice (2009). Mantle deformation and noble gases: helium and neon in oceanic mylonites, *Chemical Geology*, 266, 10-18.

Synergistic Activities:

(i) Educational Activities:

Stanford, 2012-2013: GES190 *Ultramafics of California and Oregon (2 week field class)*; GES 315 *Literature of Structural Geology*; GES340 *Oxidation State of the Earth's Interior*
Stanford, 2011-2012: GES209 *Microstructures*; GES382 *Mantle Geochemistry*; GES104 *Introduction to Petrology*;
Stanford, 2010-2011: GES340 *Volatiles in the Mantle*; GES104 *Introduction to Petrology*.

(ii) Service:
Steering committee, 2011-present: Physical Properties of Earth Materials, AGU focus group;
Council member, 2009: Geological Society of Washington.

(iii) Reviewer:
Proposal reviewer, 2008-present: NSF, DOE, InterRidge; FONDECYT.
Manuscript reviewer, 2002-present: *Nature, Nature Geoscience, G-Cubed, Contributions to Mineralogy and Petrology*, *Earth and Planetary Science Letters*, *Journal of Petrology*.

(iv) Conference Sessions:
Co-convener, 2011 AGU Fall Meeting: *Volatiles in the Earth's Mantle*;
Co-convener, 2011 AGU Fall Meeting: *Integrated Study of Oceanic Spreading Centers: From Mid-Ocean Ridges to Back-Arc Basins*;
Co-convener, 2009 AGU Fall Meeting: *Using Small-Scale Observations to Answer Big Questions in Earth Sciences: Advances From 30 Years of Ion Microprobe Analysis*;
Co-convener, 2007 AGU Fall Meeting: *Origin and Evolution of Continents: Lithospheric and Asthenospheric Perspectives*.

(v) Workshop Participation:
2012 – Workshop on Scientific Drilling in the Samail Ophiolite, Sultanate of Oman; 2012 – Workshop on Advancing Experimental Rock Deformation Research; 2012 – IODP Building U.S. Strategies for 2013-2023 Scientific Ocean Drilling; 2011 – EarthScope Institute on the Lithosphere-Asthenosphere Boundary; 2010 – DCO Workshop on Reaching the Mantle Frontier; 2009 – MARGINS Theoretical and Experimental Institute: Volatiles in the Subduction Factory; 2009 – CIDER Community Workshop; 2009 – Marine Geoscience Leadership Symposium; 2006 – 2nd Cooperative Inst. for Deep Earth Research.

Collaborators & Other Affiliations

Collaborators: J. Blusztajn (WHOI); E. Cottrell (Smithsonian); P. Craddock (Schlumberger); J. Curtice (WHOI); N. Dauphas (U Chicago); J. Day (Scripps); H. Dick (WHOI); M. Godard (U Montepllier II); J. Harvey (U Leeds); E. Hauri (CIW); G. Hirth (Brown U); B. Ildefonse (U Montepllier II); C. Johnson (PSI); P. Kelemen (LDEO); M. Kurz (WHOI); K. Lawrence (PSI); J. Lissenberg (Cardiff U); E. Nakamura (ISEI); A. Recanati (ENSG, France); S. Roeske (UC Davis); C. Sakaguchi (ISEI); A. Shahar (CIW); N. Shimizu (WHOI); S. Shirey (CIW); P. Skemer (Washington U in St Louis); C. Teyssier (U Minnesota); R. Walker (U Maryland); M. Zimmerman (U Minnesota).

Graduate Advisors and Postdoctoral Sponsors: Graduate: Henry J.B. Dick (WHOI), Greg Hirth (Brown U), Nobumichi Shimizu (WHOI); Postdoctoral: S.B. Shirey (CIW).

Thesis Advisor: Megan D'Errico (current); Nik Deems (current); Suzanne Birner (current); Katie Kumamoto (current).
Postgraduate-Scholar Sponsor: Lars Hansen (2012-present).