Scott David Wankel

Harvard University, Department of Earth and Planetary Sciences
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EDUCATION

PhD, January 2007 — Stanford University
Dept of Geological and Environmental Sciences — Stanford, California USA
Dissertation Title: Nitrate sources and cycling in coastal ecosystems: Insights from a nitrogen and oxygen stable isotope approach

Master of Environmental Science, October 2000 — Miami University
Institute of Environmental Science — Oxford, Ohio USA
Areas of Concentration: Water Resources, Environmental Geology

B.S. in Geology, June 1996 — Furman University, Greenville, South Carolina, USA

B.A. in German Literature, June 1996 — Furman University, Greenville, South Carolina, USA

PROFESSIONAL EXPERIENCE

Research Associate – Johnston Lab — July 2010 - present
Harvard University, Dept of Earth and Planetary Sciences
Hoffman Labs, Rm 305, 20 Oxford St., Cambridge, MA 02138

Research Associate – Girguis Lab
Harvard University, Dept of Organismic and Evolutionary Biology — Jan 2009 – July 2010
Biology Labs, Rm 3092, 16 Divinity Ave., Cambridge, MA 02138

Postdoctoral Fellow – Girguis Lab
Harvard University, Dept of Organismic and Evolutionary Biology — Jan 2007 – Jan 2009
Biology Labs, Rm 3092, 16 Divinity Ave., Cambridge, MA 02138

Stable Isotope Biogeochemist GS-1310-11 — Jan 2000 – Dec 2009
US Geological Survey, Stable Isotope Tracers Project,
345 Middlefield Rd., MS 434, Menlo Park, CA 94025

PROFESSIONAL ACTIVITIES AND RECOGNITION

HONORS AND AWARDS

- Best Student Presentation - Applied Isotope Geochemistry VI Prague, Czech Republic, 2005
- US Geological Survey Service Award (2003, 2004, 2005, 2006)

- Outstanding Student Award, Institute of Environmental Sciences, Miami University, 1998
- IES Comprehensive Exam, Honors, (passed with high distinction) May 1998
- Fallaw Outstanding Senior Award, Furman University, Geology, 1996

GRANTS, FELLOWSHIPS AND SCHOLARSHIPS

- National Ocean Partnership Program – Office of Naval Research Grant: *Development of an autonomous in situ stable isotope analyzer*. 2008 - 2011. Co-Principal Investigator ($940,302)
- National Oceanic and Atmospheric Administration (NOAA) National Estuarine Research Reserve Graduate Fellowship 2003 – 2006 (~$18,000/yr)
- Significant Processes, Observations and Transformations of Oceanic Nitrogen (SPOT-ON) Student Travel Scholarship $1000
- Stanford School of Earth Sciences McGee Fund - Research Grant: *Nitrogen Cycling in Tropical Marine Systems: A Stable Isotope Approach* - May 2002, $2500
- Shell Foundation Grant: November 2001, $500; September 2003, $500; February 2006, $500

OCEANOGRAPHIC EXPERIENCE

- ***R/V Point Lobos*. Chief Scientist. Nov 2009. Monterey Bay, CA**
  In situ profiling of sediment porewater methane isotopic composition with integrated cavity optical spectroscopy (ICOS) instrument at hydrocarbon cold seeps. Sediment pushcore collection.
- ***R/V Point Lobos*. Chief Scientist. Aug 2009. Monterey Bay, CA**
  Deployment of *in situ* ICOS instrument, survey of methane concentration and stable isotopic composition at hydrocarbon cold seep environments. Pushcore collection.
- ***R/V Point Lobos*. Chief Scientist. Dec 2008. Monterey Bay, CA**
  Test dives for development of *in situ* ICOS instrument for measuring methane concentration and stable isotopic composition at hydrocarbon cold seeps.
- ***R/V Atlantis*. Research Scientist. July-Aug 2008. Juan de Fuca Ridge, Canada**
  Survey of volatile composition in vent fluids with *in situ* mass spectrometer. Collection of animal and microbial mat samples. Use of gas-tight and major samplers.
- ***R/V Atlantis*. Research Scientist. July-Aug 2007. Juan de Fuca Ridge, Canada**
  Collection of animal, microbial mat and sediment pushcore samples. Use of gas-tight and major samplers for dissolved isotopic and geochemical analyses.
- ***R/V Polaris*. Research Scientist. Jul-Aug 2004. San Francisco Bay, CA**
  Regional Monitoring Program collecting water and sediment samples for isotopic, geochemical and microbial analyses.
- ***R/V Point Lobos*. Research Scientist. 2002 – 2006 (12 cruises). Monterey Bay, CA**
  Monthly Surface Water Survey CTD casts. Sampling for nitrate isotopic analyses.

MEMBERSHIPS

- American Geophysical Union –Member since 2000
- American Society of Limnology and Oceanography –Member since 2000
- Geochemical Society – Member since 2008

PUBLISHED JOURNAL ARTICLES

Wankel, SD, A Mosier, CM Hansel, A Paytan, CA Francis. *In Press*. Diversity, abundance and acitivity of ammonia-oxidizing archaea and bacteria in coastal estuarine sediments of Elkhorn Slough, CA. *Applied and Environmental Microbiology*. **77**(11).

Wankel, SD, SB Joye, VA Samarkin, SR Shah, G Friederich, J Melas-Kyriazi, and PR Girguis. 2010. New constraints on methane fluxes and rates of anaerobic methane oxidation in a Gulf of Mexico brine pool via in situ mass spectrometry. *Deep Sea Research II*. **57**:2022-2029.

Wankel, SD, Y Chen, C Kendall, A Paytan. 2010. Sources of aerosol nitrate to the Gulf of Aqaba: Evidence from $\delta^{15}N$ and $\delta^{18}O$ of nitrate and trace metal chemistry. *Marine Chemistry*. **120**(1-4):90-99.

Wankel, SD, C Kendall, A Paytan. 2009. Using nitrate dual isotopic composition ($\delta^{15}N$ and $\delta^{18}O$) as a tool for exploring sources and cycling of nitrate in an estuarine system: Elkhorn Slough, CA. *Journal of Geophysical Research – Biogeosciences*. **114**(G01011): 10.1029/2008JG000729.

Wankel, SD, A. Paytan, C. Kendall, TF Pennington, and F. Chavez. 2007. Nitrification in the euphotic zone as evidenced by nitrate dual isotopic composition: Observations from Monterey Bay, California. *Global Biogeochemical Cycles*. **21(**2): 10.1029/2006GB002723.

Derse E, K Knee, **SD Wankel**, C Kendall and A. Paytan,. 2007. Identifying the sources of nitrogen to Hanalei Bay, Kauai utilizing the nitrogen isotope signature of macroalgae. *Environmental Science and Technology*. **41**(15): 5217-5223.

Elliott, EM, C Kendall, **SD Wankel**, EW Boyer, DA Burns, DJ Bain, K Harlin, TJ Butler, and R Carlton. 2007. An Isotopic Tracer of Stationary Source NO_x Emissions Across the Midwestern and Northeastern United States. *Environmental Science and Technology*. **41**(22): 7661-7667.

Ewing SA, GM Michalski, M Thiemens, RC Quinn, JL Macalady, S Kohl, **SD Wankel**, C Kendall, CP McKay, R Amundson. 2007. The rainfall limit of the nitrogen cycle on earth. *Global Biogeochemical Cycles*. **21**(3): 10.1029/2006GB002838.

Kendall, C, EM Elliott and **SD Wankel**. 2007. Stable isotopic composition of nitrogen-bearing compounds in the environment: Tracers for sources and cycling. *In* Stable Isotopes in Ecology and Environmental Science. K Lajtha and RH Michener (eds.). Blackwell Scientific Publications, Oxford.

Leichter, JL, A Paytan, **SD Wankel**, K Hanson, S Miller, and M Altabet. 2007. Nitrogen and oxygen isotopic signatures of subsurface nitrate: E vidence of deep water nutrient sources to the Florida Keys reef tract. *Limnology and Oceanography*. **52**:1258-1267.

Ruehl C, AT Fisher, M Los Huertos, **SD Wankel**, CG Wheat, C Kendall, C Hatch, and C Shennan. 2007. Nitrate dynamics within the Pajaro River, a nutrient rich, losing stream. *Journal of the North American Benthological Society*. **26**(2):191-206

Wankel SD, C Kendall, CA Francis, and A Paytan. 2006. Nitrogen sources and cycling in the San Francisco Bay Estuary: A nitrate dual isotopic composition approach. *Limnology and Oceanography*. **51**(4): 1654-1664.

Chang, C, SR Silva, C Kendall, GM Michalski, KL Casciotti, and **SD Wankel**. 2005. Preparation and analysis of nitrogen-bearing compounds in water for stable isotope ratio measurement. *In* Handbook of Stable Isotope Analytical Techniques. PA de Groot (ed.). Chapter 15. Elsevier.

Paytan, A, F Martinez-Ruiz, M Eagle, A Ivy, and **SD Wankel**. 2004. Using sulfur isotopes to elucidate the origin of barite associated with high organic matter accumulation events in marine sediments *in* Amend JP, Edwards KJ, and Lyons TW eds. Sulfur Biogeochemistry – Past and Present: Boulder, Colorado, *Geological Society of America Special Paper 379*, p. 151-160.

Ohte, N, SD Sebestyen, JB Shanley, DH Doctor, C Kendall C, **SD Wankel**, and EW Boyer. 2004. Tracing sources of nitrate in snowmelt using a high-resolution isotopic technique. *Geophysical Research Letters*. **31**, L21506, doi:10.1029/2004GL020908.

Rumbold, DG, LE Fink, KA Laine, SL Niemczyk, T Chandrasekhar, **SD Wankel**, and C Kendall. 2002. Levels of mercury in alligators (*Alligator mississippiensis*) collected along a transect through the Florida Everglades. *The Science of the Total Environment*, **297**(103):239-252.

PENDING PUBLICATIONS – IN REVIEW

Wankel, SD, L Germanovich, M Lilley, G Genc, CJ DiPerna, E Olson, R Lowell and PR Girguis. Geochemical flux and metabolic activity associated with the deep hydrothermal subsurface. *Nature Geosciences.*

PENDING PUBLICATIONS – IN PREP FOR SUBMISSION 2010-2011

Wankel, SD, M Gupta, R Provencal, and PR Girguis. *In situ* stable isotopic detection of anaerobic oxidation of methane in Monterey Bay cold seeps via off-axis integrated cavity output spectroscopy. *For submission to Environmental Science and Technology.*

Wankel, SD, MM Adams, D Johnston, and PR Girguis. Thermophilic and mesophilic anaerobic methane oxidation in the hydrothermal sediments of Middle Valley, Juan de Fuca Ridge. *For submission to Geobiology.*

INVITED PRESENTATIONS – SEMINARS

Woods Hole Oceanographic Institute – Marine Chemistry and Geochemistry Seminar. 2010. From the light into the dark: New insights on surface ocean nitrogen cycling and volatile fluxes from the hydrothermal subsurface. Woods Hole, MA.

Miami University – Institute of Environmental Science Symposium. 2010. Applying environmental problem solving methods to issues of global marine biogeochemistry. Oxford, OH.

MIT/Woods Hole Oceanographic Institute – Chemical Oceanography Seminar. 2009. *In situ* integrated cavity optical spectroscopy (ICOS) at deep-sea hydrocarbon seeps: Real-time methane stable isotopic composition. Cambridge, MA.

Japanese Agency of Marine Science and Technology Seminar. 2009. Advances in deep-sea instrumentation: *In situ* mass spectrometry and integrated cavity optical spectroscopy at deep hydrothermal vents and hydrocarbon seeps. Tokyo, Japan.

United States Geological Survey 6th Annual Western Region Science Symposium. 2006. Frontiers in Nitrate Isotopes. Menlo Park, CA.

INVITED PRESENTATIONS – CONFERENCES

Ecological Society of Japan Annual Meeting. 2009. Dual nitrate isotopes as a tool for constraining nitrogen cycling process. Ecological Society of Japan - Annual Meeting. Morioka, Japan.

American Chemical Society National Meeting. 2007. Nitrification in the euphotic zone as evidenced by dual nitrate isotopic composition in Monterey Bay. Boston, MA.

VOLUNTEERED PRESENTATIONS

Goldschmidt Conference. 2009. Advances in deep sea *in situ* instrumentation. Davos, Switzerland.

American Society of Limnology and Oceanography – American Geophysical Union Ocean Sciences Meeting. 2008. Measurement of dissolved gases at Gulf of Mexico hydrocarbon seeps with the In Situ Mass Spectrometer. Orlando, FL.

American Society of Limnology and Oceanography – American Geophysical Union Ocean Sciences Meeting. 2006. Temporal and spatial variability in denitrification rates as measured by isotope pairing in flow-through core incubations, Elkhorn Slough, CA. Honolulu, HI.

Applied Isotope Geochemistry VI. 2005. ^{17}O Anomalies in Atmospheric Nitrate: A Case Study in New England, USA. Prague, Czech Republic.

Significant Processes, Observations and Transformations of Oceanic Nitrogen (SPOT-ON). 2005. Nitrogen and Oxygen Isotopes of Nitrate as a Tracer of Nitrogen Sources and Cycling. Warnemünde, Germany.

American Geophysical Union Fall Meeting. 2005. Nitrogen sources and cycling in the San Francisco Bay Estuary: A nitrate dual isotopic composition approach. San Francisco, CA.

American Geophysical Union Fall Meeting. 2004. Nitrogen and Oxygen Isotopes of Nitrate – Indicators of Nitrogen Utilization in Monterey Bay, CA. San Francisco, CA.

Estuarine Research Federation Annual Meeting. 2003. New Stable Isotopic Techniques of Nitrate Applied to Investigation of Estuarine Nitrogen Cycling, Elkhorn Slough, CA. Seattle, WA.

American Geophysical Union Fall Meeting. 2003. New Stable Isotopic Techniques of Nitrate Applied to Investigation of Estuarine Nitrogen Cycling, Elkhorn Slough, CA. San Francisco, CA.

American Society of Limnology and Oceanography – American Geophysical Union Ocean Sciences Meeting. 2002. Exploring nitrogen sources in oligotrophic shallow water carbonate marine system using $\delta^{15}N$ of marine plants, San Salvador, Bahamas. Honolulu, HI.

Stable Isotope Ecology Annual Meeting. 2002. Bioaccumulation of Environmental Contaminants in Riverine Systems of the United States: Examination of the USGS Isotope Biomonitoring Project Datasets. Flagstaff, AZ.

American Geophysical Union Fall Meeting. 2002. Quantifying Atmospheric Nitrate Loading to Watersheds Using Nitrate Isotopes (^{15}N, ^{17}O, ^{18}O). San Francisco, CA.

American Geophysical Union Fall Meeting. 2001. Using $\delta^{15}N$ of marine plants to characterize nutrient sources and transport in an oligotrophic shallow-water marine system, San Salvador, Bahamas. San Francisco, CA.

TEACHING EXPERIENCE

HARVARD UNIVERSITY

Guest Lecturer

- 2010 Biogeochemistry: The Global Nitrogen Cycle
- 2010 Stable Isotope Geochemistry: Marine Nitrogen Biogeochemistry
- 2008 Environmental Microbiology: Microbial Nitrogen Cycling

STANFORD UNIVERSITY

Teaching Assistant, Geological and Environmental Science

- 2004 Marine Chemistry/Biological Oceanography; Marine Isotope Biogeochemistry
- 2003 Environmental Applications of Stable Isotopes; The Glacial World
- 2002 Freshman Seminar Series
- 2001 Sophomore Seminar Series

MIAMI UNIVERSITY

Teaching Assistant, School of Interdisciplinary Studies

- 1998, 1999, 2000 Field Course: Tropical Marine Ecology
- 1998 Field Course: Tropical Ecology of Costa Rica

Instructor, School of Interdisciplinary Studies

- 1999 Natural Systems II: Paradigm Shifts of Science in Society
- 1998 Natural Systems I: From the Universe to the Duck Pond

FURMAN UNIVERSITY

Teaching Assistant, Earth and Environmental Science

- 1996 Mineralogy; Igneous and Metamorphic Petrology
- 1995 Environmental Geology
- 1994, 1995 Introduction to Geology