

Curriculum Vitae

Dr. Sune G. Nielsen



Address

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RESEARCH INTERESTS

My work is centered on using isotope tracers to investigate a variety of different processes on Earth and in the Solar System. My research interests span topics such as Cenozoic ocean chemistry and the link to climate change; hydrothermal fluid fluxes through oceanic crust; mantle geochemistry and the link between subduction and mantle plumes; the early Earth and the formation and evolution of continental crust and the mantle; and timing and effect of core segregation on Earth and other terrestrial planets.

EDUCATION

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| 2001-2005 | Ph.D. at ETH Zurich, Switzerland
Thallium isotope variations in terrestrial materials and meteorites. Supervisors: Dr. Mark Rehkämper and Prof. Alex N. Halliday. |
| 1999-2001 | M.Sc. at University of Copenhagen, Denmark
Thesis title: Petrogenetic study of early Archean norite dike, Isua, West Greenland. Supervisors: Dr. Joel Baker, Dr. Eirik Krogstad, Prof. Robert Frei. Classes included physical chemistry, isotope geochemistry, igneous petrology, and mass spectrometry. |
| 1996-1999 | B.Sc. at University of Copenhagen, Denmark
Bachelors project title: Crystal growth mechanisms and petrology of layered mafic intrusions. Classes included mathematics, physics, chemistry, and geology. |

APPOINTMENTS

Current positions:

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| 2018 – present | Associate Scientist with Tenure, Woods Hole Oceanographic Institution, MA, USA |
| 2011 – present | MIT/WHOI Joint Program Faculty |

Past positions:

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| 2015 – 2018 | Associate Scientist, Woods Hole Oceanographic Institution, MA, USA |
| 2011 – 2015 | Assistant Scientist, Woods Hole Oceanographic Institution, MA, USA |
| 2010 – 2011 | Visiting Research Scientist, Rice University, Houston, USA |
| 2008 – 2011 | NERC Research Fellow, University of Oxford, UK |
| 2006 – 2008 | Departmental Research Fellow in Analytical Geochemistry, Dept. of Earth Science, University of Oxford, UK |
| 2005 – 2006 | Danish Research Council Postdoc. Res. Fellow, Macquarie University, Australia |

PUBLICATIONS

- student advised, * - postdoc advised

In revision and submitted

- Nielsen, S.G., Horner, T.J., Pryer, H.V., Blusztajn, J., *Shu, Y., Kurz, M. and Le Roux, V.: Barium isotope evidence for pervasive sediment recycling in the upper mantle, *Science Advances*, *in revision*
- Them, T.R., Gill, B.C., Caruthers, A.H., Gerhardt, A.M., Gröcke, D.R., Lyons, T.W., Marroquín, Nielsen, S.G., Owens, J.D.: Global Oceanic Deoxygenation and the Toarcian Oceanic Anoxic Event, *PNAS*, *Submitted*

Published and In Press

48. Blusztajn, J., Nielsen, S.G., Marschall, H.R., *Shu, Y., *Ostrander, C.M., and Hanyu, T. (2018): Thallium isotope systematics in volcanic rocks from St. Helena – Constraints on the origin of the HIMU reservoir, *Chem. Geol.*, 476, 292-301
47. *Conrad, T.A., Nielsen, S.G., Peucker-Ehrenbrink, B., Blusztajn, J., Winslow, D., Hein, J.R., and Paytan, A. (2017): River sediment sources to the Monterey Submarine Canyon System– constraints from Fe-Mn crust Os, Nd, and Pb isotopes, *Geochim. Geophys. Geosyst.*, 18
46. Horner, T.J., Pryer, H.V., Nielsen, S.G., Crockford, P.W., Gauglitz, J.M., Wing, B.A. and Ricketts, R.D. (2017): Biogenic barite precipitation at micromolar ambient sulfate, *Nature Communications*, 8, 1342
45. *Shu, Y., Nielsen, S.G., Zeng, Z.; Shinjo, R., Blusztajn, J., Wang, X., Chen, S. (2017): Tracing subducted sediment inputs to the Ryukyu arc-Okinawa Trough system: Evidence from thallium isotopes, *Geochim. Cosmochim. Acta*, 217, 462-491
44. Owens, J.D., Nielsen S.G., Horner, T.J., *Ostrander, C.M., Peterson, L.C. (2017): Tracking global manganese-oxide burial using thallium isotope analysis of organic-rich sediments, *Geochim. Cosmochim. Acta*, 213, 291-307
43. *Sarafian, A.R., Nielsen, S.G., Marschall, H.R., Gaetani G., Hauri, E., Righter, K., and Sarafian E. (2017): Angrite meteorites record the onset and flux of water to the inner solar system, *Geochim. Cosmochim. Acta*, 212, 156-166
42. *Ostrander, C.M., *Owens, J.D. and Nielsen S.G. (2017): Constraining the timing of progressive ocean deoxygenation leading up to Oceanic Anoxic Event 2, *Science Advances*, 3: e1701020
41. Nielsen, S.G., Prytulak, J., Blusztajn, J., *Shu, Y., Auro, M., Regelous, M., Walker, J. (2017): Thallium isotopes as tracers of recycled materials in subduction zones: review and new data for lavas from Tonga-Kermadec and Central America, *J. Volcanol. Geotherm. Res.*, 339, 23-40
40. Nielsen, S.G. and Marschall, H.R. (2017): Geochemical evidence for mélange melting in global arcs, *Science Advances*, 3: e1602402
39. *Sarafian, A.R., Hauri, E.H., McCubbin, F.M., Lapen, T.J., Berger, E., Nielsen, S.G., Marschall, H.R., Gaetani, G.A., Righter, K., Sarafian, E. (2017): Early accretion of water and volatile elements to the inner solar system: Evidence from angrites, *Phil. Trans. R. Soc. A*, 375: 20160209
38. Nielsen, S.G., Rehkämper M. and Prytulak, J. (2017): Investigation and application of thallium isotope fractionation, *Reviews in Mineralogy and Geochemistry*, 82, 759-798
37. Nielsen, S.G. (2016): Thallium isotopes, *Encyclopedia of Geochemistry*, doi:10.1007/978-3-319-39193-9_53-1
36. Le Roux, V., Nielsen, S. G., Sun, C. G., Yao, L. J. (2016): Ubiquitous melt-rock reactions in the mantle revealed by timing of pyroxenite formation, *Earth and Planetary Science Letters*, 454, 103-112
35. Gueguen, B., Reinhard, C.T., Algeo, T.J., Peterson, L.C., Nielsen, S.G., Wang, X. and Planavsky, N. (2016): The chromium isotope composition of reducing and oxic marine sediments, *Geochim. Cosmochim. Acta*, 184, 1-19
34. Nielsen, S.G., Yogodzinski, G., Prytulak, J., Plank, T., Kay, S.M., Kay, R.W., Blusztajn, J., *Owens, J.D., Auro, M. and #Kading, T. (2016): Tracking along-arc sediment inputs to the Aleutian arc using thallium isotopes, *Geochim. Cosmochim. Acta*, 181, 217-237
33. Nielsen, S.G., *Owens, J.D., and *Horner, T.J. (2016): Analysis of high precision vanadium isotope ratios by medium resolution MC-ICP-MS, *J. Anal. Atom. Spec.*, 31, 531-536

32. Nielsen, S.G., Klein, F., *Kading, T.K., Bluzstajn, J. and *Wickham, K. (2015): Thallium as a tracer of fluid–rock interaction in the shallow Mariana forearc, *Earth Planet. Sci. Lett.*, 430, 416–426
31. *Horner, T.J., *Kinsley C.W. and Nielsen, S.G. (2015): Barium-isotopic fractionation in seawater mediated by barite cycling and oceanic circulation, *Earth Planet. Sci. Lett.*, 430, 511–522
30. *Horner, T.J., Williams, H.M., Hein, J.R., Burton, K.W., Halliday, A.N. and Nielsen, S.G. (2015): Dominance of Deeply Sourced Iron in the Pacific Ocean, *PNAS*, 112, 1292–1297
29. Nielsen S.G., Shimizu N., C.T.A. Lee and Behn M. (2014): Chalcophile behavior of thallium during MORB melting and implications for the sulfur content of the mantle, *Geochem. Geophys. Geosyst.*, 15, 4905–4919
28. *Sarafian, A., Nielsen, S.G., Marschall, H.R., McCubbin, F. and Monteleone, B. (2014): Early accretion of water in the inner Solar System from a carbonaceous chondrite-like source. *Science*, 346, 623–625
27. Nielsen S.G., Prytulak J., Wood B.J. and Halliday A.N. (2014): Vanadium isotopic difference between the silicate Earth and meteorites, *Earth Planet. Sci. Lett.*, 389, 167–175
26. Nielsen S.G., Peacock C., Wasylenki L., Rehkämper M., Moon E. and Zichen X. (2013): Towards an understanding of thallium isotope fractionation during adsorption to manganese oxides, *Geochim. Cosmochim. Acta*, 117, 252–265
25. Moynier, F., Fujii, T., Brennecka, G. and Nielsen, S.G. (2013): Nuclear field shift in natural environments, *Comptes Rendus Geoscience* 345 150–159
24. Prytulak, J., Nielsen, S.G., Barker, M., Plank, T., Elliott, T. (2013): Assessing the utility of thallium and thallium isotopes for tracing subduction zone inputs to the Mariana Arc, *Chem. Geol.* 345, 139–149
23. Nielsen S.G. and Lee C.T.A. (2013): Determination of thallium and 17 other trace elements in the USGS glass reference materials BIR-1G, BHVO-2G and BCR-2G and their application to quantitative Tl concentrations by laser ablation ICPMS, *Geostandards and Geoanalytical Research*, 37, 337–343
22. Prytulak, J., Nielsen, S.G., Ionov, D.A., Halliday, A.N., Harvey, J., Kelley, K.A., Niu, Y., Peate, D.W., Shimizu, K. and Sims, K.W.W. (2013): The stable vanadium isotope composition of the mantle and mafic lavas, *Earth Planet. Sci. Lett.*, 365, 177–189
21. Nielsen S.G., Goff M., Hesselbo S.P., Jenkyns H.C., LaRowe D.E. and Lee C.T.A. (2011c): Thallium isotopes in early diagenetic pyrite – A paleoredox proxy?, *Geochim. Cosmochim. Acta*, 75 (21), 6690–6704
20. Nielsen S.G., Gannoun A., Marnham C., Burton K.W., Halliday A.N. and Hein J.R. (2011b): New age for ferromanganese crust 109D-C and implications for isotopic records of lead, neodymium, hafnium, and thallium in the Pliocene Indian Ocean *Paleoceanography*, 26, PA2213, doi:10.1029/2010PA002003
19. Nielsen S.G., Prytulak J. and Halliday A.N. (2011a): Determination of high precision $^{51}\text{V}/^{50}\text{V}$ isotope ratios by MC-ICPMS, Part 1: Chemical separation of vanadium and mass spectrometric protocols *Geostandards and Geoanalytical Research*, 35 (3), 293–306
18. Prytulak J., Nielsen S.G. and Halliday A.N. (2011): Determination of high precision $^{51}\text{V}/^{50}\text{V}$ isotope ratios by MC-ICPMS, Part 2: Verification of precision and accuracy for standard reference materials *Geostandards and Geoanalytical Research*, 35 (3), 307–318
17. Nielsen S.G. and Rehkämper M. (2011): Thallium isotopes and their application to problems in earth and environmental science, *Handbook of Environmental Isotope Geochemistry*, Chapter 13, pg. 247–270
16. Nielsen S.G. (2010): Potassium and Uranium in the upper mantle controlled by Archean ocean crust recycling *Geology*, 38 (8), 683–686
15. Horner T.J., Schönbächler M., Rehkämper M., Nielsen S.G., Williams H.M., Halliday A.N., Xue Z., Hein J.R. (2010): Ferromanganese crusts as archives of deep-water Cd isotope compositions *GSG*, 11 (4), Q04001
14. Nielsen S.G., Williams H.M., Griffin W.L., O'Reilly S.Y., Pearson N. and Viljoen K.S. (2009b): Thallium isotopes as a potential tracer for the origin of cratonic eclogites *Geochim. Cosmochim. Acta* 73, 7387–7398

13. Baker R.G.A., Rehkämper M., Hinkley T.K., Nielsen S.G., Toutain J.P. (2009): Investigation of thallium fluxes from subaerial volcanism – Implications for the present and past mass balance of thallium in the oceans *Geochim. Cosmochim. Acta* 73, 6340-6359
12. Williams H.M., Nielsen S.G., Renac C., Griffin W.L., O'Reilly S.Y., McCammon C.A., Pearson N., Alt J.C. and Halliday A.N. (2009): Fractionation of oxygen and iron isotopes in the mantle: implications for crustal recycling and the source regions of oceanic basalts *Earth Planet. Sci. Lett.* 283, 156-166
11. Nielsen S.G., Mar-Gerrison S., Gannoun A., LaRowe D., Klemm V., Halliday A.N., Burton K.W. and Hein J.R. (2009a): Thallium Isotope Evidence for Increased Marine Organic Carbon Export in the Early Eocene *Earth Planet. Sci. Lett.* 278, 297-307
10. Wood B.J., Nielsen S.G., Rehkämper M. and Halliday A.N. (2008): The effects of core formation on the Pb- and Tl- isotopic composition of the silicate Earth *Earth Planet. Sci. Lett.* 269, 325-335
9. Nielsen S.G., Rehkämper M., Brandon A.D., Norman M.D., Turner S. and O'Reilly S.Y. (2007): Thallium isotopes in Iceland and Azores lavas - Implications for the role of altered crust and mantle geochemistry *Earth Planet. Sci. Lett.* 264, 332-345
8. Nielsen S.G., Rehkämper M., Teagle D.A.H., Butterfield D.A., Alt J.C. and Halliday A.N. (2006c): Hydrothermal fluid fluxes calculated from the isotopic mass balance of thallium in the ocean crust *Earth Planet. Sci. Lett.* 251 (1-2): 120-133
7. Nielsen S.G., Rehkämper M., and Halliday A.N. (2006b): Large thallium isotopic variations in iron meteorites and evidence for lead-205 in the early solar system *Geochim. Cosmochim. Acta* 70: 2643-2657
6. Nielsen S.G., Rehkämper M., Norman M.D. and Halliday A.N. (2006a): Thallium isotopic evidence for ferromanganese sediments in the mantle source of Hawaiian basalts. *Nature*, 439, 314-317
5. Nielsen S.G., Rehkämper M., Porcelli D., Andersson P., Halliday A.N., Swarzenski P., Latkoczy C., and Günther D. (2005): The thallium isotope composition of the upper continental crust and rivers – An investigation of the continental sources of dissolved marine thallium. *Geochim. Cosmochim. Acta* 69, 2007-2019
4. Nielsen S.G., Rehkämper M., Baker J.A., and Halliday A.N. (2004): The precise and accurate determination of thallium isotope compositions and concentrations for water samples by MC-ICPMS. *Chem. Geol.*, 204, 109-124
3. Rehkämper M. and Nielsen S.G. (2004): The mass balance of dissolved thallium in the oceans. *Mar. Chem.*, 85, 125-139
2. Nielsen S.G. and Baker J.A. (2004): Reply to comment by Stefan Bernstein on "Petrogenesis of an early archean (3.4 Ga) norite dyke, Isua, West Greenland: evidence for early Archean crustal recycling?" *Precam. Res.*, 128, 195-196
1. Nielsen S.G., Baker J.A., and Krogstad E.J. (2002): Petrogenesis of an early Archaean (3.4 Ga) norite dyke, Isua, West Greenland: evidence for early Archaean crustal recycling? *Precam. Res.*, 118, 133-148

PRESENTATIONS

Invited Seminars

19. Mass transfer processes from subducted slabs: evidence for mélange melting in global arcs, Nordic Winter Meeting 2018, Technical University of Denmark, Denmark. [Plenary Lecture].
18. Geochemical evidence for mélange melting in global arcs, *Brown University*, 2016
17. Ocean oxygenation across global climate perturbations recorded by thallium isotopes, *Goldschmidt Conference 2016*, Yokohama, Japan. [Keynote].
16. Tracking sediment composition and transport from slab to surface along the Aleutian arc using a multi-isotopic approach. *MIT*, 2016
15. Tracking sediment composition and transport from slab to surface along the Aleutian arc using a multi-isotopic approach. *University of Gottingen*, Germany, 2015
14. The application of thallium isotopes to problems in Earth science: From paleoceanography to mantle geochemistry. *Ecole Normale Supérieure*, Lyon, France, 2014

13. Vanadium isotopes: A new tool to investigate deep Earth and early Solar System processes, *University of Frankfurt*, 2014
12. Tracking recycled material from subduction zones to the deep mantle using thallium isotopes, *University of Frankfurt*, 2014
11. Thallium isotope fractionation mechanisms in Mn oxides and the use of thallium isotopes as a paleoceanographic tool. *University of Rhode Island*, USA, 2013
10. Vanadium isotopic difference between Earth and meteorites and high-energy irradiation in the early Solar System. *Washington University St. Louis*, USA, 2012
9. The application of thallium isotopes to problems in Earth science: From paleoceanography to mantle geochemistry. *University of Brest*, France, 2012
8. Vanadium isotopes in silicate Earth and meteorites: Implications for chondritic Earth? *MIT*, USA, 2011
7. Potassium and uranium in the mantle controlled by Archean weathering? *University of South Carolina*, USA, 2011
6. The application of thallium isotopes to problems in Earth science: From paleoceanography to mantle geochemistry. *Woods Hole Oceanographic Institution*, USA, 2010
5. Potassium and uranium in the mantle controlled by Archean weathering? *Woods Hole Oceanographic Institution*, USA, 2010
4. Vanadium isotopes in silicate Earth and meteorites: Solar system heterogeneity or planetary differentiation? *Lunar and Planetary Institute*, Houston, USA, 2010
3. The application of thallium isotopes to problems in Earth science: From paleoceanography to mantle geochemistry. *Rice University*, Houston, USA, 2009
2. Potassium and uranium in the mantle controlled by Archean weathering? *University of Bristol*, UK, 2009
1. Evidence for the existence of live ^{205}Pb in the early solar system. *Macquarie University*, Sydney Australia, 2006

Conferences and workshops

- student supervised, * - postdoc supervised

77. Tristan J. Horner, Maureen E. Auro, Adina Paytan, and **Sune G. Nielsen**: What the flux? Isotopic constraints on the marine barium budget. Goldschmidt Conference 2017, Paris, France
76. *Fei Wu, Jeremy Owens, **Sune G. Nielsen**, Florian Scholz, Natascha Riedinger, Larry C. Peterson, Timothy W. Lyons: The vanadium isotope composition of marine sediments. Goldschmidt Conference 2017, Paris, France
75. Jerzy Blusztajn, **Sune G. Nielsen**, Horst R. Marschall, Yunchao Shu and Takeshi Hanyu: Thallium isotope systematics in volcanics from St. Helena Island. Constraints on the origin of the HIMU reservoir. Goldschmidt Conference 2017, Paris, France
74. **Sune G. Nielsen** and Horst R. Marschall: Arc lavas form from melting of mélange rocks; sediment melts and slab-derived fluids are not major contributors. Goldschmidt Conference 2017, Paris, France
73. #Adam R. Sarafian, **Sune G. Nielsen**, Horst R. Marschall, Glenn A. Gaetani, Erik H. Hauri, Kevin Righter, Eve L. Berger: Volatile content of 4-Vesta: evidence from unequilibrated eucrites. Goldschmidt Conference 2017, Paris, France
72. *Dalton S. Hardisty, Tristan J. Horner, Scott D. Wankel, Jerzy Blusztajn, **Sune G. Nielsen**: A novel tracer method to provide principle constraints on iodine redox chemistry. Goldschmidt Conference 2017, Paris, France
71. Erik H. Hauri, #Adam R. Sarafian, **Sune G. Nielsen**, Horst R. Marschall, Glenn A. Gaetani, and Kevin Righter: Timing and evolution of water delivery to the earliest differentiated parent bodies. Workshop on Solar system accretion processes, Nice, France 2017
70. Horst R. Marschall and **Sune G. Nielsen**: Melange formation at the slab-mantle interface as a key process in the generation of arc lavas: Geochemical evidence, ZIP conference, Barcelona, Spain, April 2017
69. **Sune G. Nielsen**, Tomas Magna and Klaus Mezger: The vanadium isotopic composition of Mars and evidence for solar system heterogeneity during planetary accretion, LPSC 2017, Houston, TX

68. #Adam R. Sarafian, **Sune G. Nielsen**, Horst R. Marschall, Glenn A. Gaetani, Erik H. Hauri, Kevin Righter, Eve L. Berger: Volatile concentrations and H-isotope composition of unequilibrated eucrites, LPSC 2017, Houston, TX
67. Julie Prytulak, **Sune G. Nielsen** and Mark Rehkämper: Thallium isotope geochemistry, Workshop for Reviews in Mineralogy and Geochemistry, December 2016
66. Jeremy D. Owens, Chad M. Ostrander, **Sune G. Nielsen**, Christopher T. Reinhard, Benjamin C. Gill, Christopher M. Lowery, Gordon D. Love, Megan Rohrsen, Dalton S. Hardisty, Zunli Lu, Hugh C. Jenkyns, Timothy W. Lyons: The stepwise evolution of marine de-oxygenation during a Cretaceous OAE2, GSA Annual Meeting 2016
65. #Adam R. Sarafian, **Sune G. Nielsen**, Horst R. Marschall, Glenn A. Gaetani, Erik H. Hauri, Kevin Righter, Emily Sarafian: Volatile Addition to the Inner Solar System between 4.566 and 4.564 Ga: Evidence from Angrite Meteorites, Microscopy & Microanalysis 2016 Meeting
64. **Sune G. Nielsen**, #Chadlin Ostrander, *Jeremy Owens: Ocean oxygenation across global climate perturbations recorded by thallium isotopes, KEYNOTE at Goldschmidt Conference 2016, Yokohama, Japan
63. Veronique Le Roux, **Sune G. Nielsen**, Chenguang Sun, Lijing Yao: Timing of melt migration and pyroxenite formation in the mantle, AGU Fall Meeting 2015, San Francisco, CA
62. **Sune G. Nielsen**, Julie Prytulak, Terry Plank, Gene Yogodzinski, Tristan Kading, Jerzy Blusztajn, Maureen Auro, Suzanne Kay, Robert Kay, Jeremy Owens: Tracking along-arc sediment inputs to the Aleutian arc using thallium isotopes, AGU Fall Meeting 2015, San Francisco, CA
61. #Tracey Conrad, **Sune G. Nielsen**, Bernhard Peucker-Ehrenbrink, Jerzy Blusztajn, James R. Hein, Adina Paytan: The End of Monterey Submarine Canyon Incision and Potential River Source Areas- Os, Nd, and Pb Isotope Constraints from Hydrogenetic Fe-Mn Crusts, AGU Fall Meeting 2015, San Francisco, CA
60. #Chadlin Ostrander, *Jeremy Owens, **Sune G. Nielsen**: Thallium Isotopes Tracking Mn-Oxide Burial – A Proxy for Deoxygenation During Oceanic Anoxic Event 2, AGU Fall Meeting 2015, San Francisco, CA
59. #Adam Sarafian, **Sune G. Nielsen**, Horst Marschall, Glenn Gaetani, Emily Sarafian, Erik Hauri, Kevin Righter: Jupiter's Migration and the Hydration of the Early Inner Solar System, AGU Fall Meeting 2015, San Francisco, CA
58. #Tianyi Huang, *Jeremy Owens, #Adam Sarafian, *Indra Sen, *Kuo-Fang Huang, Jerzy Blusztajn, **Sune G. Nielsen**: Development of analytical techniques of vanadium isotope in seawater, AGU Fall Meeting 2015, San Francisco, CA
57. *Jeremy Owens, **Sune G. Nielsen**, #Chadlin Ostrander, Larry Peterson, Ariel Anbar: Development and Applications of Thallium isotopes: a new proxy tracking the extent of manganese oxide burial, AGU Fall Meeting 2015, San Francisco, CA
56. Katie Murphy, Mark Rehkämper, Tina van de Flierdt, Katrin Abraham, Alex Halliday, James R. Hein, **Sune G. Nielsen**, Chris Reinhard: Cadmium Isotopic Composition of Cenozoic Seawater from Ferromanganese Crusts, Goldschmidt Conference 2015, Prague, Czech Republic
55. #Christopher Kinsley, *Tristan Horner, **Sune G. Nielsen**, Phoebe Lam: Barium-Isotopic Cycling in Southern Ocean Particulate Matter, Goldschmidt Conference 2015, Prague, Czech Republic
54. #Adam Sarafian, **Sune G. Nielsen**, Horst Marschall, Erik Hauri, Kevin Righter, Emily Sarafian, Brian Monteleone: Accretion of water and volatiles to planetesimals: Evidence for the timing of Jupiter's migration to the inner solar system?, Gordon Research Conference, 2015, South Hadley, MA
53. **Sune G. Nielsen**, #Adam Sarafian and *Jeremy D. Owens: Vanadium isotope heterogeneity of the solar system: new data for achondrites, Lunar and Planetary Science Meeting 2015, Woodlands, TX
52. #Adam Sarafian, **Sune G. Nielsen**, Eve L. Berger, Glenn A. Gaetani, Erik H. Hauri, Scott M. Messenger, Kevin Righter, Tom J. Lapen, Emily Sarafian, Brian D. Monteleone, Horst R. Marschall: Wet Angrites? A D/H and Pb-Pb Study of Silicates and Phosphates. Lunar and Planetary Science Meeting 2015, Woodlands, Texas
51. *Jeremy D. Owens and **Sune G. Nielsen**: Thallium isotopes: a new tool for tracking the global marine ferromanganese burial, AGU Fall meeting 2014, San Francisco, USA
50. *Tristan J. Horner, Helen M. Williams, James R. Hein, Kevin W. Burton, Alex N. Halliday and **Sune G. Nielsen**: Dominance of deeply sourced iron in the Pacific Ocean. Goldschmidt Conference 2014, Sacramento, USA

49. *Katie M. Wickham, Greg B. Arehart and **Sune G. Nielsen**: Tl Isotope Implications for the Metalliferous Source of Carlin-type Deposits in northern Nevada. Goldschmidt Conference 2014, Sacramento, USA
48. Julie Prytulak, Paolo Sossi, Hugh O'Neill, Terry Plank, Tim Elliott, **Sune G. Nielsen** and Alex N. Halliday: Veritas in Vanadium? Stable Isotope Signatures from the Marianas, MORB and Magnetite. Goldschmidt Conference 2014, Sacramento, USA
47. **Sune G. Nielsen**, Cin-Ty A. Lee, Nobumichi Shimizu and Mark Behn: The sulfur abundance of the mantle deduced from trace element ratios. Goldschmidt Conference 2014, Sacramento, USA
46. **Sune G. Nielsen**, *Tristan Kading, Jerzy Bluzstajn, Terry Plank, Julie Prytulak and Gene Yogodzinski: Using thallium isotopes to trace slab fluxes in the Aleutian arc. Goldschmidt Conference 2014, Sacramento, USA
45. *Adam R. Sarafian, **Sune G. Nielsen**, Horst R. Marschall, Francis M. McCubbin and Brian Monteleone: The source of water for 4-Vesta: carbonaceous chondrites. Goldschmidt Conference 2014, Sacramento, USA
44. *Tristan J. Horner, Y.-T. Hsieh, Samantha N. Burgess, Phoebe J. Lam and **Sune G. Nielsen**: The barium-isotopic composition of pelagic barites. Goldschmidt Conference 2014, Sacramento, USA
43. *Adam R. Sarafian, Horst R. Marschall, **Sune G. Nielsen**, Francis M. McCubbin and Brian Monteleone: An Earth-like hydrogen isotopic composition of Vesta as revealed by apatite. Lunar and Planetary Science Meeting 2014, Woodlands, Texas
42. *Adam R. Sarafian, Horst R. Marschall and **SUNE G. NIELSEN**: Could the eucrite Graves Nunataks 98098 be Vesta's equivalent to Lunar KREEP? AGU Fall meeting 2013, San Francisco, USA
41. Corey Archer, **SUNE G. NIELSEN**, Kevin Burton, James R. Hein: Tracing perturbations in the oxygenation of the Cenozoic ocean using Molybdenum isotopes. Goldschmidt Conference 2013, Florence, Italy.
40. Mark Rehkämper, Frank Wombacher, **Sune G. Nielsen**, Maria Schönbächler, Manuela Fehr, Tanya Goldberg, Fiona Larnier, A Laycock, M Paul, Tina van de Flierdt: Analytical challenges and (more than) standard solutions. Goldschmidt Conference 2013, Florence, Italy
39. Mark Kurz, Veronique Le Roux, Jessica Warren, Joshua M. Curtice, **Sune G. Nielsen**: Helium isotopic and concentration variations in a clinopyroxenite vein, and some implications for mantle evolution. Goldschmidt Conference 2013, Florence, Italy
38. **Sune G. Nielsen**, Cin-Ty Lee, Nobumichi Shimizu: The geochemical behavior of thallium in mantle-derived basalts. Goldschmidt Conference 2012, Montreal, Canada.
37. Caroline L. Peacock, **Sune G. Nielsen**, Laura E. Wasylenki, Ellen M. Moon and Mark Rehkämper: Deciphering the Cenozoic Tl isotope record of marine ferromanganese crusts – new evidence from adsorption experiments. Goldschmidt Conference, 2012, Montreal, Canada.
36. Julie Prytulak, **Sune G. Nielsen**, Terry Plank, Monica Barker, Tim Elliott: Assessing the Utility of Thallium and Thallium Isotopes for Tracing Subduction Zone Inputs. VMSG Conference 2012, Edinburgh, UK
35. Julie Prytulak, **Sune G. Nielsen**, Alex N. Halliday: An estimate of the stable vanadium isotope composition of the bulk silicate Earth. Goldschmidt Conference 2011, Prague, Czech Republic
34. **Sune G. Nielsen**, Julie Prytulak, Bernard J. Wood, Alex N. Halliday: Large vanadium isotope difference between silicate Earth and meteorites. Goldschmidt Conference 2011, Prague, Czech Republic
33. **Sune G. Nielsen**: Potassium and Uranium in the upper mantle controlled by Archean oceanic crust recycling. Goldschmidt Conference 2010, Knoxville, USA
32. **Sune G. Nielsen**, Abdelmouhcine Gannoun, Kevin W. Burton, Alex N. Halliday, James R. Hein: Miocene Os and Tl isotopes in the Indian Ocean: Implications for Antarctic water export and the residence time of Os. Goldschmidt Conference 2009, Davos, Switzerland
31. Helen M. Williams, **Sune G. Nielsen**, Kevin W. Burton, Chris Siebert, Alex N. Halliday: Temporal variations in the iron isotope signatures of Pacific hydrogenetic Fe-Mn crusts. Goldschmidt Conference 2009, Davos, Switzerland
30. Julie Prytulak, **Sune G. Nielsen**, Edwin A. Schauble, Alex N. Halliday: Vanadium Stable Isotopic Fractionation in Geologic Materials Measured by MC-ICPMS. Goldschmidt Conference 2009, Davos, Switzerland

29. **Sune G. Nielsen**, Julie Prytulak and Alex N. Halliday: Vanadium isotope ratios in meteorites: A new tool to investigate planetary and nebular processes. Lunar and Planetary Science Conference 2009, Houston, USA
28. **Sune G. Nielsen**, *Sarah Mar-Gerrison, Veronika Klemm, Doug LaRowe, Alex N. Halliday, Kevin W. Burton, James R. Hein: Thallium isotopes in ferromanganese crusts as a proxy for marine productivity. AGU Fall Meeting 2008, San Francisco, USA
27. **Sune G. Nielsen**, Caroline L. Peacock, Mark Rehkämper, Alex N. Halliday: Investigation of thallium isotope fractionation during adsorption onto δ -MnO₂. Goldschmidt Conference 2008, Vancouver, Canada
26. Tristan J. Horner, Maria Schönbächler, Mark Rehkämper, Helen M. Williams, **Sune G. Nielsen**, Alex N. Halliday, and James R. Hein: The cadmium isotope composition of ferromanganese crusts. Goldschmidt Conference 2008, Vancouver, Canada
25. Richard G. A. Baker, Mark Rehkämper, **Sune G. Nielsen**, Todd Hinkley, Jean Paul Toutain: Tl isotope constraints on early Cenozoic climate change. Goldschmidt Conference 2008, Vancouver, Canada
24. Richard G. A. Baker, Bernard J. Wood, Mark Rehkämper, Maria Schönbächler, **Sune G. Nielsen**: Core formation and the Pb and Tl isotope evolution of the silicate Earth. Goldschmidt Conference 2008, Vancouver, Canada
23. Helen M. Williams, **Sune G. Nielsen**, Christophe Renac, Catherine A. McCammon, Bill W. Griffin, Suzanne Y. O'Reilly: Fractionation of Fe and O isotopes in the mantle: implications for the origins of eclogites and the source regions of mantle plumes. Goldschmidt Conference 2007, Cologne, Germany
22. **Sune G. Nielsen**, Veronika Klemm, Doug LaRowe, Alex N. Halliday, James R. Hein: Systematic thallium isotope variation in Fe-Mn crusts: A proxy for changes in ocean chemistry? Goldschmidt Conference 2007, Cologne, Germany
21. Mark Rehkämper, Maria Schönbächler, Frank Wombacher, Richard G. A. Baker, **Sune G. Nielsen**, Helen M. Williams: Heavy Isotope Fractionation in the Solar System – a Volatile Perspective. Goldschmidt Conference 2007, Cologne, Germany
20. Richard G. A. Baker, **Sune G. Nielsen**, Mark Rehkämper, Todd Hinkley, Jean Paul Toutain: Volcanic Outgassing and the Tl Isotope Composition of the Oceans. Goldschmidt Conference 2007, Cologne, Germany
19. Mark Rehkämper, Richard G. A. Baker, **Sune G. Nielsen**, Maria Schönbächler, Bernard J. Wood, Alex N. Halliday: Thallium Isotope Constraints on Earth's Accretion. Goldschmidt Conference 2007, Cologne, Germany
18. Alex N. Halliday, R. Bastian Georg, **Sune G. Nielsen**, Helen M. Williams: Isotopes and formation of the Earth's core. EUG Conference 2007, Vienna, Austria
17. **Sune G. Nielsen**, Mark Rehkämper, Marc D. Norman, Simon Turner, Alan D. Brandon, Alex N. Halliday: The use of thallium isotopes to trace ferromanganese sediments in the mantle sources of ocean island basalts. AGU Fall Meeting 2006, San Francisco, USA
16. **Sune G. Nielsen**, Bernard J. Wood, Mark Rehkämper, Alex N. Halliday: Partitioning of thallium into the core: Implications for Earth accretion and the composition of bulk Earth. AGU Fall Meeting 2006, San Francisco, USA
15. **Sune G. Nielsen**, Mark Rehkämper, Marc D. Norman, Alex N. Halliday: The use of thallium isotopes to trace ferromanganese sediments in the mantle sources of ocean island basalts. IAVCEI Conference 2006, Guangzhou, China
14. **Sune G. Nielsen**, Bernard J. Wood, Mark Rehkämper, Alex N. Halliday: An experimental study of thallium partitioning and isotope fractionation during planetary core formation processes. EMPG Conference 2006, Bristol, UK
13. Mark Rehkämper, **Sune G. Nielsen**, Helen M. Williams, Maria Schönbächler, Alex N. Halliday: Radiogenic and Stable Thallium isotope variations in iron meteorites. Meteoritical Society Conference 2006, Zurich, Switzerland
12. **Sune G. Nielsen**, Bernard J. Wood, Mark Rehkämper, Alex N. Halliday: An experimental study of thallium partitioning and isotope fractionation during planetary core formation processes. Meteoritical Society Conference 2006, Zurich, Switzerland

11. **Sune G. Nielsen**, Mark Rehkämper, Marc D. Norman, Alex N. Halliday: Thallium isotopic evidence for ferromanganese sediments in the mantle source of Hawaiian basalts. SGGMP Conference 2005, Port Macquarie, Australia
10. Mark Rehkämper, **Sune G. Nielsen**, Jeff C. Alt, David A. Butterfield: Thallium Isotope Constraints on Hydrothermal Water Fluxes at Mid-Ocean Ridge Axes and Flanks, AGU Fall Meeting 2004, San Francisco, USA
9. **Sune G. Nielsen**, Mark Rehkämper, Alex N. Halliday: An Internal ^{205}Pb - ^{205}Tl Isochron for the Iron Meteorite Toluca and the Initial Solar System Abundance of ^{205}Pb . AGU Fall Meeting 2004, San Francisco, USA
8. Mark Rehkämper, **Sune G. Nielsen**, Jeff C. Alt, David A. Butterfield: What can Tl isotopes tell us about hydrothermal fluxes? Goldschmidt Conference 2004, Copenhagen, Denmark
7. **Sune G. Nielsen**, Mark Rehkämper, Alex N. Halliday: First evidence of live ^{205}Pb in the early solar system. Goldschmidt Conference 2004, Copenhagen, Denmark
6. **Sune G. Nielsen**, Mark Rehkämper, Jeff Alt, David Butterfield, Karsten Haase, Alex N. Halliday, Jun-ichiro Ishibashi, Kei Okamura, Yoshiki Sohrin: An elemental and isotopic study of the marine geochemistry of thallium. AGU Ocean Science Meeting 2004, Portland, Oregon, USA
5. **Sune G. Nielsen**, Mark Rehkämper, Alex N. Halliday: Isotopic fractionation during weathering indicated by the thallium isotopic composition of rivers. EGS/AGU/EUG Conference 2003, Nice, France
4. Mark Rehkämper, **Sune G. Nielsen**, Martin Frank, James R. Hein, Alex N. Halliday: Cenozoic marine geochemistry of thallium deduced from isotopic studies of ferromanganese crusts. EGS/AGU/EUG Conference 2003, Nice, France
3. Mark Rehkämper, **Sune G. Nielsen** and Alex N. Halliday: Isotopic studies of the present and past mass balance of dissolved thallium in the oceans. Goldschmidt Conference 2003, Kurashiki, Japan
2. **Sune G. Nielsen**, Mark Rehkämper, Don Porcelli, Peter Swarzenski, Alex N. Halliday: Isotopic compositions and concentrations of estuarine thallium. Goldschmidt Conference 2002, Davos, Switzerland
1. **Sune G. Nielsen**, Joel A. Baker, Eirik J. Krogstad: Petrogenesis of an early Archean (3.4 Ga) norite dike, Isua, West Greenland: Evidence for early Archean crustal recycling. Isua workshop, 2002, Harnack Haus, Berlin

FUNDING OBTAINED

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|------|---|
| 2005 | Danish Research Council Postdoctoral Fellowship: Tracing crustal recycling in the mantle and subduction zones via thallium isotope measurements |
| 2008 | NERC Postdoctoral Fellowship: Tracking changes in ocean chemistry using thallium isotopes |
| 2009 | Co-PI on Departmental Rolling Grant, University of Oxford, UK funded by STFC: Planetary Origins and Development. |
| 2011 | NSF EAR Grant, PI: Using thallium isotopes to assess relative contributions of pelagic sediments and altered oceanic crust to arc magmas, 297,000\$ |
| 2011 | Independent Investigator Award, Woods Hole Oceanographic Institution, PI: First measurement of the vanadium isotope composition of seawater, 56,618\$ |
| 2011 | Deep Ocean Exploration Institute Award, Woods Hole Oceanographic Institution, PI: The geochemical behavior of thallium in mantle-derived basalts, 54,000\$ |
| 2011 | Deep Ocean Exploration Institute Award, Woods Hole Oceanographic Institution, co-PI: Thallium Isotopes as tracers of the origin serpentinizing fluids in the Mariana Fore Arc, 52,000\$ |
| 2012 | American Chemical Society, Petroleum Research Fund, PI: Stable vanadium isotopes in crude oils and their source rocks: A new tool to understand the processes governing petroleum generation, 100,000\$ |
| 2013 | Independent Investigator Award, Woods Hole Oceanographic Institution, PI: Development of Barium Stable Isotopes as a Novel Tool to 'Fingerprint' Marine Barite, 54,471\$ |
| 2013 | Interdisciplinary Award, Woods Hole Oceanographic Institution, co-PI: Combining proteomics and metal stable-isotope analyses to investigate marine trace metal cycling, 104,178\$ |
| 2014 | Independent Investigator Award, Woods Hole Oceanographic Institution, PI: How did Earth get its |

- water? 44,530\$
- 2014 NSF OCE Grant, co-PI: Fingerprinting and Calibrating Low Oxygen Conditions Using Vanadium Isotopes, 369,520\$
- 2014 NSF PLR Grant, co-PI: Calibration of a Novel Nutrient Paleoproxy in the Southern Ocean, 388,639\$
- 2015 NSF EAR Grant, PI: Investigating mantle recycling and the origin of the HIMU component with stable thallium isotopes, 250,001\$
- 2015 IR&D Award, Woods Hole Oceanographic Institution, PI: Precise isotopic analysis of low vanadium materials by mass spectrometry: Development and validation of high-resolution protocols, 100,000\$
- 2016 NASA Emerging Worlds Grant, PI: Using Vanadium Isotope Ratios to Investigate the Source Material of Earth, Moon and Mars, 632,000\$
- 2016 IR&D Award, Woods Hole Oceanographic Institution, PI: The Barium Isotopic Composition of the Mantle, 99,024\$
- 2016 NASA Exobiology Grant, co-PI: Tracking the Initiation of Marine Ocean Oxygenation Through Manganese-Oxide Burial Using Thallium Isotopes, 431,423\$
- 2017 IR&D Award, Woods Hole Oceanographic Institution, PI: Establishing a sample set appropriate to describe oxic marine output fluxes for novel metal isotope systems, 72,873\$
- 2017 Interdisciplinary Award, Woods Hole Oceanographic Institution, PI: Quantifying Magnesium Isotope Fractionation during Serpentinization with Implications for Subduction Zone Processes, 100,000\$
- 2018 IR&D Award, Woods Hole Oceanographic Institution, PI: The Composition of Hawaii-Emperor Seamounts Subducting Underneath Kamchatka, 88,054\$

TEACHING AND TRAINING ACTIVITIES

Students as primary supervisor:

Charles Marnham (M.Sc., University of Oxford, 2008), Sarah Mar-Gerrison (M.Sc., University of Oxford, 2008), Matt Goff (M.Sc., University of Oxford, 2009), Monica Barker (M.Sc., University of Oxford, 2009), Tristan Kading (M.Sc., MIT/WHOI JP, 2013), Adam Sarafian (PhD, MIT/WHOI JP, 2017), Tianyi Huang (MIT/WHOI JP, 2015-2017)

Guest Students in my lab:

Paul Caffrey (Northeastern University, 2012), Adam Sarafian (University of Georgia, 2012), Katie Wickham (University of Nevada at Reno, 2013), Tracey Conrad (University of California at Santa Cruz, 2013, 2014 and 2015), Christopher Kinsley (MIT/WHOI JP, 2014), Chadlin Ostrander (Summer Student Fellow from Arizona St. University, 2015 and 2017), Helena Pryer (University College London, 2015-2016), Yunchao Shu (Chinese Academy of Sciences, Qingdao, 2015-present), Elliott Mueller (Northeastern University, 2016), David Davis (PEP student from Georgia State University, 2017)

Postdocs trained/supervised:

Indra Sen (2012-13), Kuo-fang Huang (2012-13), Tristan Horner (2012-2015), Jeremy Owens (2013-2015), Dalton Hardisty (2016-present), Ann Dunlea (2017-present), Fei Wu (Florida St. University, 2017)

Courses taught:

Mineral identification practical class for undergraduate students at ETH Zurich, 2003-2005 (regular Teaching Assistant)

Seminar presentation skills (course number 12.754) taught together with Dr. Mark Behn for graduate students enrolled in the MIT/WHOI joint program, 2012-2014

Solid Earth Geochemistry (course number 12.749) taught together with Dr. Nobu Shimizu and Dr. Glenn Gaetani for graduate students enrolled in the MIT/WHOI joint program, 2016

COMMUNITY SERVICE

Conferences/seminars:

Convened session at the 2015 AGU Fall meeting in San Francisco, USA

Convened session at the 2012 Goldschmidt Conference in Montreal, Canada

Organized Geology and Geophysics Departmental seminar series 2011-2012

Journal reviewer:

Nature Geoscience; Science Advances; Nature Astronomy; Geology; Earth and Planetary Science Letters; Geochimica Et Cosmochimica Acta; Geochemical Perspective Letters; Journal of Analytical Atomic Spectrometry; Chemical Geology; American Mineralogist; Arctic, Antarctic and Alpine Research; Analytical Chemistry; Journal of Geophysical Research; Philosophical Transactions of the Royal Society; Environmental Science and Technology; Estuarine, Coastal and Shelf Science; Ore Geology Reviews; Meteoritics and Planetary Science; and Geochemistry, Geophysics, Geosystems.

Proposal reviewer:

National Science Foundation

NASA

American Chemical Society

German Science Foundation

Committees:

NASA Exobiology panel member (2016)

NASA Emerging worlds panel member (2016)

NSF panel member (2016)

WHOI Independent study award panel (2016)

WHOI plasma mass spectrometry facility steering committee member (2011-2017)

WHOI plasma mass spectrometry facility steering committee chair (2017-present)

WHOI G&G Department Health and Safety Committee (2016-present)

WHOI G&G postdoc mentoring committee (2017-present)

General exam committee for MIT/WHOI JP student Christopher Kinsley (2015)

Thesis committee of MIT/WHOI JP student Simone Moos (2015-2017)

Chair of Thesis defense for MIT/WHOI JP student Ben Linhoff (2015)