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Marine Chemistry and Geochemistry Dept.

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### Positions

2019-Present Woods Hole Oceanographic Institution, Woods Hole, USA – Assistant Scientist  
2014-2018 University of Oxford, UK – Postdoctoral Research Associate  
2012-2014 University of Tennessee, Knoxville, USA (NSF EAR-Postdoctoral Fellow)

### Academic Preparation

2011-2012 Scripps Institution of Oceanography, UCSD, USA – (President’s Dissertation Fellow)  
2006-2012 Scripps Institution of Oceanography, UCSD, USA – Ph.D. Earth Sciences  
2006-2011 Scripps Institution of Oceanography, UCSD, USA – M.S. Oceanography  
2008 The University of Tokyo, Japan – AORI – visiting researcher (NSF EAPSI Fellow)  
2004 The State University of New York at Geneseo, USA – B.A. Geological Sciences

### Research Interests

Fluids and volatile recycling, stable isotope and noble gas geochemistry; petrology – magmatic processes and the petrogenesis of volcanic/igneous rocks; geochemical co-evolution of Earth’s mantle and lithosphere; crust-fluid interaction; fluid-gas partitioning in crustal systems

### Peer-Reviewed Publications

51. **Barry, P.H.**, Negrete-Aranda, R., Spelz, R., Seltzer, A.M., D.V. Bekaert, Virrueta, C., Kulongoski, J.T. (2020) Volatile sources, sinks and pathways: a helium-carbon isotope study of Baja California fluids and gases. *Chemical Geology*, In Review.

50. Zhang, M., Guo, Z., Xu, S., Hilton, D.R., **Barry, P.H.**, Sano, Y., Halldórsson, S.A., Zhang, L., Cheng, Z., Liu, C., Li, S., Lng, Y., Li, Z. and Li, L. (2020) Mantle degassing responses to late Cenozoic southeastward growth of the Tibetan Plateau. *PNAS*. In Review.

49. Broadley M.W., **Barry, P.H.**, Bekaert, D.V., Caracausi, A., Ballentine, C.J., Marty, B., (2020) Chondritic Krypton and Xenon in the Yellowstone Mantle Plume. *PNAS*. In Review.

48. Labidi, J., **Barry, P.H.**, Bekaert, D.V., Broadley M.W., Marty, B., Giunta, T. Warr, O., Sherwood Lollar, B., Fischer T.P., Avicé, G., Caracausi, A., Ballentine, C.J., Halldórsson, S.A., Stefánsson, A., Kurz, M., Kohl, I., Young E.D., (2020) Hydrothermal  $^{15}\text{N}$  abundances constrain the origins of mantle nitrogen. *Nature*. In Press.

47. Giovannelli, D., **Barry, P.H.**, de Moor, J. M., Lloyd, K.G., Schrenk, M.O. (2020) The role of biology in volatile cycling across a subduction zone. *EOS*, *101*, <https://doi.org/10.1029/2020EO140906>.

46. Byrne, D.J., **Barry, P.H.**, Lawson, M., Ballentine, C.J., (2020) Tracing subsurface fluid flow in the East Texas Basin using noble gas isotopes. *Geochim. Cosmochim. Acta*. 268, 186-208.  
doi:<https://doi.org/10.1016/j.gca.2019.10.001>.

45. Gannibal, M., Kolobov, V., **Barry, P.H.**, Tyne, R.L., Tarakanov, S., Tolstikhin I. (2019) Helium isotope abundances in 10 km deep ground waters. *Chemical Geology*. 119442.

44. **Barry, P.H.**, Nakagawa, M., Giovannelli, D., de Moor, J. M., Schrenk, M.O., Seltzer, A.M., Manini, E., Fattorini, D., di Carlo, M., Regoli, F., Fullerton, K., Lloyd, K.G. (2019) Helium, inorganic and organic

carbon isotopes of fluids and gases across the Costa Rica convergent margin. *Nature, Sci Data* 6, 284.  
doi:10.1038/s41597-019-0302-4.

43. Tyne, R.L., **Barry, P.H.**, Hillegonds, D.J., Hunt, A.G. Kulongoski, J.T., Landon, M.K., Stephens, M.J., Byrne, D.J., Ballentine C.J. (2019) A novel method for the extraction, purification and characterisation of noble gases in produced waters. *Geology, Geophysics, and Geosystems (G-Cubed)*, Technical Briefs. doi: <https://doi.org/10.1029/2019GC008552>.

42. Pernet-Fisher, J.F., **Barry, P.H.**, Day, J.M.D., Pearson, D.G., Woodland, S., Agashev, A.M., Pokhilenko, L.N. (2019) Heterogeneous kimberlite metasomatism revealed from a combined He-Os isotope study of Siberian dunite xenoliths. *Geochim. Cosmochim. Acta.* 226, 220-236. doi: <https://doi.org/10.1016/j.gca.2019.07.054>.

41. McMahon, P.B., Vengosh, A., Davis, T.A., Landon, M.K., Tyne, R.L., Wright, M.T., Kulongoski, J.T., Hunt, A.G., **Barry, P.H.**, Kondash, A.J., Wang, Z., Ballentine, C.J. (2019) Occurrence and Sources of Radium in Groundwater Associated with Oil Fields in the Southern San Joaquin Valley, California. *Environmental Science & Technology.* 53, 16, 9398-9406. doi: <https://doi.org/10.1021/acs.est.9b02395>

40. **Barry, P.H.**, de Moor, J. M., Giovannelli, D. Schrenk, M.O., Hummer, D.R., Lopez, T., Pratt, C.A., Alpizar Segura, Y., Battaglia, A., Beaudry, P., Bini, G., Cascante, M. d'Errico, G., di Carlo, M., Fattorini, D., Fullerton, K., Gazel, E., González, G., Halldórsson, S. A., Iacovino, K., Kulongoski, J.T., Manini, E., Martínez, M., Miller, H., Nakagawa, M., Ono, S., Patwardhan, S., Ramírez, C.J., Regoli, F., Smedile, F., Turner, S., Vetriani, C., Yücel, M., Ballentine, C.J., Fischer, T.P., Hilton, D.R., Lloyd, K.G., (2019) Forearc carbon sequestration reduces long-term volatile recycling into the mantle. *Nature*, 568, 487-492. doi: <https://doi.org/10.1038/s41586-019-1131-5>.

39. Le Voyer, M., Hauri, E.H., Cottrell, E., Kelley, K.A., Salters, V.J.M, Langmuir, C.H., Hilton, D.R., **Barry, P.H.**, Füre, E., (2019) Carbon fluxes and primary magma CO<sub>2</sub> contents along the global mid-ocean ridge system. *Geology, Geophysics, and Geosystems (G-Cubed).* 20(3), 1387-1424. doi: <https://doi.org/10.1029/2018GC007630>.

38. **Barry, P.H.**, Lawson, M., W.P. Meurer, Cheng, A., Ballentine, C.J., (2018) Noble gases in deep-water oils of the U.S. Gulf of Mexico. *Geology, Geophysics, and Geosystems (G-Cubed).* 19(11), 4218-4235. doi: <https://doi.org/10.1029/2018GC007654>.

37. Byrne, D.J., **Barry, P.H.**, Lawson, M., Ballentine, C.J., (2018) Determining gas expulsion vs retention during hydrocarbon generation in the Eagle Ford Shale using noble gases. *Geochim. Cosmochim. Acta*, 241, 240-254. doi: 10.1016/j.gca.2018.08.042.

36. Broadley, M.W., **Barry, P.H.**, Ballentine, C.J., Taylor, L.A., Burgess, R. (2018) Plume-induced liberation of recycled volatiles triggers global environmental change. *Nature Geoscience*, 11 (9), 682. doi: 10.1038/s41561-018-0215-4.

35. Gannon, R.S., Saraceno, J.F., Kulongoski, J.T., Teunis, J.A., **Barry, P.H.**, Tyne, R.L., Kraus, T.E.C., Hansen, A.M., and Qi, S.L., (2018) Produced water chemistry data for the Lost Hills, Fruitvale, and North and South Belridge study areas, Southern San Joaquin Valley, California: U.S. Geological Survey data release. doi: 10.5066/F7X929H9.

34. **Barry, P.H.**, Kulongoski, J.T., Landon, M.K., Tyne, R.L., Gillespie, J.M., M.J. Stephens, Hillegonds, D.J., Byrne, D.J., Ballentine, C.J. (2018) Tracing enhanced oil recovery signatures in casing gases using noble gases. *Earth and Planetary Science Letters*, 496, 57-67. doi: 10.1016/j.epsl.2018.05.028.

33. Hunt, J.A., Zafu, A., Mather, T.A., Pyle, D.M., **Barry, P.H.**, (2017) Spatially Variable CO<sub>2</sub> Degassing in the Main Ethiopian Rift: Implications for Magma Storage, Volatile Transport, and Rift-Related Emissions. *Geochemistry, Geophysics, Geosystems*, 18(10), 3714-3737. doi: 10.1002/2017GC006975.

32. Byrne, D.J., **Barry, P.H.**, Lawson, M., Ballentine, C.J., (2017) Noble gases in conventional and unconventional petroleum systems. Geological Society, London, Special Publications, 468, SP468-5. doi: 10.1144/SP468.5.
31. **Barry, P.H.**, (2017) Deep mantle: Enriched carbon source detected. *Nature Geoscience*, 10(9), 625. doi: 10.1038/ngeo3001.
30. **Barry, P.H.**, Lawson, M., Meurer, D. Danabalan, Mabry, J.C., and Ballentine, C.J., (2017) Determining fluid migration and isolation times in multiphase crustal domains using noble gases, *Geology* 45 (9), 775-778. doi: 10.1130/G38900.1.
29. Ballentine, C.J. and **Barry, P.H.**, (2017) Noble gases. Springer Earth Sciences Series. Encyclopedia of Geochemistry. doi: 10.1007/978-3-319-39193-9\_195-1.
28. Mikhail, S., **Barry, P.H.**, and Sverjensky, D.A., (2017) The role of pH on the deep-Earth nitrogen cycle. *Geochim. Cosmochim. Acta*, 209, 149-160. doi: 10.1016/j.gca.2017.04.007
27. **Barry, P.H.**, Lawson, M., Meurer, W.P., Warr, O., Mabry, J.C., Byrne, D.J., and Ballentine, C.J. (2016) Noble gases solubility models of hydrocarbon charge mechanisms in the Sleipner Vest methane field. *Geochim. Cosmochim. Acta*, 194, 291-309. doi: 10.1016/j.gca.2016.08.021.
26. **Barry P.H.**, and Hilton, D.R. (2016) Release of subducted sedimentary nitrogen throughout Earth's mantle. *Geochemical Perspectives Letters*, 2, 138-147. doi: 10.7185/geochemlet.1614.
25. Correale, A., Rizzo, A.L., **Barry, P.H.**, Lu, J., Zheng, J. (2016) Refertilization of lithospheric mantle beneath the Yangtze Craton, South East China: evidence from the noble gas geochemistry. *Gondwana*, 38, 289-303. doi:10.1016/j.gca.2015.12.021.
24. Halldórsson, S.A., Hilton, D.R., **Barry, P.H.**, Füre, E., Grönvold, K. (2016) Recycling of Phanerozoic crustal material by the Iceland mantle plume: new evidence from nitrogen elemental and isotope systematics of subglacial basalts. *Geochim. Cosmochim. Acta*, 176, 206-226. doi:10.1016/j.gca.2015.12.021.
23. Füre, E., **Barry, P.H.**, Taylor, L.A., Marty, B. (2015) Indigenous nitrogen in the Moon: Constraints from coupled nitrogen-noble gas analyses of mare basalts. *Earth and Planetary Science Letters*, 431, 195-205. doi:10.1016/j.epsl.2015.09.022.
22. Fischer, T. P., Ramirez, C., Mora Amador, R. A., Hilton, D. R., Barnes, J. D., Sharp, Z. D., Le Brun, M., de Moor, J. M., **Barry, P. H.**, Füre, E., and Shaw, A. M. (2015) Temporal variations in fumarole gas chemistry at Poás volcano, Costa Rica. *Journal of Volcanology and Geothermal Research*, 294, 56-70. doi:10.1016/j.jvolgeores.2015.02.002.
21. Pernet-Fisher, J.F., Howarth, G.H., Pearson D.G., **Barry, P.H.**, Woodland S., Pokhilenko N.P., Pokhilenko L.N., Agashev A.M. and Taylor, L.A. (2015) Plume impingement on the Siberian SCLM: Evidence from Re-Os isotope systematics. *Lithos*, 218, 141-154. doi: 10.1016/j.lithos.2015.01.010.
20. Day, J. M. D., **Barry, P. H.**, Hilton, D.R., Burgess, R., Pearson D.G., and Taylor, L.A. (2015) The helium flux from the continents and ubiquity of low-<sup>3</sup>He/<sup>4</sup>He recycled crust and lithosphere. *Geochim. Cosmochim. Acta*, 153, 116-133. doi: 10.1016/j.gca.2015.01.008.
19. **Barry, P. H.**, Hilton, D. R., Day J.M.D., Pernet-Fisher, J.F., Howarth, G.H., Agashev A.M., Pokhilenko N.P., Pokhilenko L.N., and Taylor, L.A. (2015) Helium isotope evidence for modification of the cratonic

lithosphere during the Permo-Triassic Siberian flood basalt event. *Lithos*, 216-217, 73-80. doi: 10.1016/j.lithos.2014.12.001.

18. Howarth, G. H., Pernet-Fisher, J. F., Balta, B. J., **Barry, P. H.**, Bondar, R. J. and Taylor, L. A. (2014) Two-stage polybaric formation of the new enriched, pyroxene-oikocrystic/lherzolitic shergottite, NWA 7397. *Meteoritics and Planetary Science*, 1-19. doi: 10.1111/maps.12357.

17. Howarth, G.H., Sobolev, N.V, Pernet-Fisher, J.F., **Barry, P.H.**, Penumadu, D., Puplampu, S., Ketcham, R.A., Maisano, J., Taylor, D., and Taylor, L.A. (2014) The secondary origin of diamonds: multi-modal radiation tomography of diamondiferous mantle xenoliths. *International Geology Review*, 56 (9), 1172-1180. doi: 10.1080/00206814.2014.926784.

16. **Barry, P.H.**, Hilton, D.R., Fűri, E., Halldórsson, S.A., Grönvold, K. (2014) Carbon isotope and abundance systematics, and CO<sub>2</sub> fluxes from Icelandic geothermal gases, fluids and subglacial basalts, *Geochim. Cosmochim. Acta*, 134, 74-99. doi: <http://dx.doi.org/10.1016/j.gca.2014.02.038>.

15. Pernet-Fisher, J.F., Howarth, G.H., Lui, Y. **Barry, P.H.**, Carmody, L., Valley, J.W., Bodnar, R.J., Spetsius, Z.V., Taylor, L.A. (2014) Komsomolskaya Diamondiferous Eclogites: Evidence for Oceanic Crustal Protoliths. *Contributions to Mineralogy and Petrology*, 167, 981. doi: 10.1007/s00410-014-0981-y.

14. Howarth, G.H., **Barry, P.H.**, Pernet-Fisher, J.F., Baziotis, I.P., Pokhilenko, N.P., Pokhilenko, L.N., Bodnar, R.J., Taylor, L.A. (2014) Superplume Metasomatism: Evidence from Siberian mantle xenoliths, *Lithos*, 184–187, 209–224. doi: 10.1016/j.lithos.2013.09.006

13. Carmody, L., **Barry, P.H.**, Shervais J.W., Kluesner, J.W. Taylor, L.A. (2013) Oxygen Isotopes in Subducted Oceanic Crust: A New Perspective from Siberian Diamondiferous Eclogites. *Geology, Geophysics, and Geosystems (G-Cubed)*, 14. doi: 10.1002/ggge.20220.

12. Mposkos, E., Baziotis, I., Leontakianakos, G., **Barry, P.H.** (2013) The metamorphic evolution of the high-pressure Kechros complex in East Rhodope (NE Greece): implications from Na-Al-rich leucocratic rocks within antigorite serpentinites. *Lithos* 177, 17-33. doi: <http://dx.doi.org/10.1016/j.lithos.2013.06.012>.

11. **Barry, P.H.** and Taylor, L.A. (2013) Age of the Earth. In: Rink W., Thompson J. (Ed.) *Encyclopedia of Scientific Dating Methods*. doi: 10.1007/978-94-007-6326-5\_65-7.

10. de Moor, J.M., Fischer, T.P., King, P.L., Botcharnikov, R.E., Hervig, R., Hilton, D.R., **Barry, P.H.**, Mangasini, F., and Ramirez, C. (2013) Volatile-rich silicate melts from Oldoinyo Lengai volcano (Tanzania): Implications for carbonatite genesis and eruptive behavior. *Earth and Planetary Science Letters* 361, pp 379-390. doi: <http://dx.doi.org/10.1016/j.epsl.2012.11.006>.

9. **Barry, P.H.**, Hilton, D.R., Fischer, T.P., de Moor, J.M., Mangasini, F, Ramirez, C.J., (2013) Helium and carbon isotope systematics of cold “mazuku” CO<sub>2</sub> vents and hydrothermal gases and fluids from Rungwe Volcanic Province, southern Tanzania, *Chemical Geology* 339, pp 141-156. doi: 10.1016/j.chemgeo.2012.07.003.

8. Karlstrom, K.E., Crossey, L.J., Hilton, D.R., and **Barry, P.H.** (2013) Mantle <sup>3</sup>He and CO<sub>2</sub> degassing in carbonic and geothermal springs of Colorado and implications for neotectonics of the Rocky Mountains, *Geology* 41, pp 495-498. doi: 10.1130/G34007.1.

7. Kulongoski, J.T., Hilton, D.R., **Barry, P.H.**, Esser, B., Hillemonds, D., and Belitz, K. (2013) Mantle-volatile weakening of the Big Bend Section of the San Andreas Fault, California: helium and carbon-dioxide systematics, *Chemical Geology* 339 pp 92-102. doi: <http://dx.doi.org/10.1016/j.chemgeo.2012.09.007>.

6. de Moor, J.M., Fischer, T.P., Sharp, Z.D., Hilton, D.R., **Barry, P.H.**, Mangasini, F., and Ramirez, C. (2013) Gas chemistry and nitrogen isotope compositions of cold mantle gases from Rungwe Volcanic Province, southern Tanzania, *Chemical Geology* 339, pp 20-32. doi: <http://dx.doi.org/10.1016/j.chemgeo.2012.08.004>.

5. **Barry, P.H.**, Hilton, D.R., Halldórsson S. A., Hahm, D. and Marti, K. (2012) High precision nitrogen isotope measurements in oceanic basalts using a static triple collection noble gas mass spectrometry. *Geology, Geophysics, and Geosystems (G-Cubed)*, (Technical Briefs) 13, Number 1. doi: 10.1029/2011GC003878, 2012.

4. Hilton, D.R., Halldórsson, S.A., **Barry, P.H.**, Fischer, T.P., de Moor, J.M., Ramirez, C.J., Mangasini, F. and Scarsi, P. (2011) Helium isotopes at Rungwe Volcanic Province, Tanzania, and the origin of East African plateaux. *Geophysical Research Letters*. 38, pp 21. doi: 10.1029/2011GL049589.

3. Füre, E., Hilton, D.R., Halldórsson, S.A., **Barry, P.H.**, Hahm, D., Fischer, T.P. and Grönvold, K. (2010) Apparent decoupling of the He and Ne isotope systematics of the Icelandic mantle: the role of He depletion, melt mixing, degassing fractionation and air interaction. *Geochim. Cosmochim. Acta*. 74, pp 3307-3332. doi: <http://dx.doi.org/10.1016/j.gca.2010.03.023>.

2. Hilton, D.R., Ramirez, C., Amador, R.A., Fischer, T.P., Füre, E, **Barry, P.H.**, and Shaw, A.M. (2010) Monitoring of temporal and spatial variations in fumarole helium and carbon dioxide characteristics at Poas and Turrialba volcanoes, Costa Rica (2001-2009). *Geochemical Journal* 44, pp 431-440. doi: <http://dx.doi.org/10.2343/geochemj.1.0085>.

1. **Barry, P.H.**, Hilton, D.R., Tryon, M.D., Brown, K.M., and Kulongoski, J.T. (2009) A New Syringe Pump Apparatus for the Retrieval and Temporal Analysis of Helium (SPARTAH) in groundwaters and geothermal fluids, *Geology, Geophysics, and Geosystems (G-Cubed)*, (Technical Briefs) 10, Number 5, doi: 10.1029/2009GC002422, 2009.

#### Conference Abstracts

100. Giuliani, A., Koornneef, J. Will, P. Busemann, H. **Barry, P.H.**, Maas, R., Greig, A., Davies, G.D. (2020) A preliminary assessment of the application of Sr, Nd, Pb, He and N isotope analysis to fluid inclusions in kimberlite olivine: A new approach to trace deep-mantle sources. EGU Abstract.

99. Byrne, D.J., **Barry, P.H.**, Broadley, M.W., Bekaert, D.V., Almayrac, M., Tye, R.L., Ballentine, C.J., Marty, B. (2020) Noble gas isotope composition of the Yellowstone mantle plume. *Goldschmidt Abstract. Geochim. Cosmochim. Acta* 75(20) Supplement 1.

98. Byrne, D.J., **Barry, P.H.**, M. Lawson, R.L. Tyne, C.J. Ballentine (2020) Determining hydrocarbon generation and migration using noble gases. *Goldschmidt Abstract. Geochim. Cosmochim. Acta* 75(20) Supplement 1.

97. Chiodi, A., **Barry, P.H.**, Lloyd, K and de Moor, M. (2020) Helium-Carbon Isotope Systematics of Fluids from Northern Argentina and Implications for Geothermal Resources. *Goldschmidt Abstract. Geochim. Cosmochim. Acta* 75(20) Supplement 1.

96. **Barry, P.H.**, M.W. Broadley (2020) Evidence of subducted Archean nitrogen in the Siberian Craton. *Goldschmidt Abstract. Geochim. Cosmochim. Acta* 75(20) Supplement 1.

95. Krantz, J.A., **Barry, P.H.**, Parman, S.W., (2019) Coupled subduction of N and Xe as a tracer of mantle degassing. *Goldschmidt Abstract. Geochim. Cosmochim. Acta* 75(19) Supplement 1.

94. Byrne, D.J., **Barry, P.H.**, Halldorsson, S.A., Stefánsson, A., Broadley, M.W., Ballentine, C.J., (2019) Tracing geothermal fluid interactions in Iceland using noble gases. Goldschmidt Abstract. Geochim. Cosmochim. Acta 75(19) Supplement 1.
93. Tyne, R.L., **Barry, P.H.**, Lawson, M., Ballentine, C.J., (2019) Tracing Injected CO<sub>2</sub> in the Olla Oil Field, Louisiana using Noble Gas Isotopes. Goldschmidt Abstract. Geochim. Cosmochim. Acta 75(19) Supplement 1.
92. McMahon, P.B., Vengosh, A. Davis, T.A., Landon, M.K., Tyne, R.L., Wright, M.T., Kulongoski, J.T., Hunt, A.G., **Barry, P.H.**, Ballentine, C.J., (2019) Radium in Groundwater Related to Oil and Gas Production, Southern San Joaquin Valley, California. Stakeholder Meeting, Sacramento, CA.
91. Halldórsson, S.A., Scarsi, P., Abebe, T., Evans, T., Kulongoski, J.T., Castillo, P.R., **Barry, P.H.**, Hilton, D.R., (2019) He-CO<sub>2</sub>-N<sub>2</sub> isotope and relative abundance characterization of geothermal fluids from the Ethiopian Rift. World Geothermal Congress, Reykjavik, Iceland.
90. **Barry, P.H.** (2019) Hot springs reveal deep Earth processes. Deep Carbon Observatory 2019 Meeting, Washington DC.
89. Labidi, J., **Barry, P.H.**, Bekaert, D.V., Broadley M.W., Marty, B., Giunta, T. Warr, O., Sherwood Lollar, B., Fischer T.P., Avice, G., Caracausi, A., Ballentine, C.J., Halldórsson, S.A., Stefánsson, A., Kurz, M., Kohl, I., Young E.D., (2019) Hydrothermal <sup>15</sup>N/<sup>15</sup>N abundances constrain the origins of mantle nitrogen. Presented at 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.
88. Tyne, R.L., **Barry, P.H.**, Lawson, M., Ballentine, C.J., (2019) Tracing the fate of Injected CO<sub>2</sub> using Noble Gas Isotopes. Presented at 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.
87. Karolyte, R., **Barry, P.H.**, Kulongoski, J.T., Tyne, R.L., Ballentine, C.J., (2019) Using noble gases to trace the migration of hydrocarbons into shallow aquifers: separating signal from noise with inverse modelling techniques. Presented at 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.
86. Lloyd, K.G., Fullerton, K.M., Schrenk, M., Yucel, M., Miller, H., de Moor, J.M., **Barry, P.H.**, Giovannelli, D., (2019). Microbial community coupling to deep subduction processes. Presented at 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.
85. **Barry, P.H.**, Patel, B.S., de Moor, J.M., M. Nakagawa, Giovannelli, D., Ramirez, C.J., Schrenk, M, Gazel, E., Seltzer, A.M., Hallorsson, S.A., Kulongoski, J.T., Turner, S., Ballentine, C.J., Fischer, T.P., Hilton, D.R., Virrueta, C., Blackmon, K., Lloyd, K.G., (2019). Helium and carbon isotopes in southern Costa Rica and western Panama. Presented at 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.
84. Karolytè R., **Barry, P.H.**, Kulongoski, J.T., Tyne, R.L., Cheng, A., Ballentine, C.J., (2019) Inverse modelling techniques to distinguish between different mechanisms of reservoir fluid migration to shallow aquifers. Goldschmidt Abstract. Geochim. Cosmochim. Acta 75(19) Supplement 1.
83. Broadley M.W., **Barry, P.H.**, Bekaert, D.V., Caracausi, A., Ballentine, C.J., Marty, B., (2019) Detection of primordial heavy noble gases in Yellowstone National Park. Goldschmidt Abstract. Geochim. Cosmochim. Acta 75(19) Supplement 1.
82. Ballentine C.J., **Barry, P.H.**, Byrne, D., Flude, S., Karolytè, R., Tyne, R.L., Cheng, A., Hilligond, D., (2019) Tracing Crustal Fluid Source, Migration and Residence Using Noble Gases. Goldschmidt Abstract. Geochim. Cosmochim. Acta 75(19) Supplement 1.

81. Buongiorno J., Fullerton, K., Rogers, T.J., Giovannelli, D., de MOOR, J.M., **Barry, P.H.**, Schrenk, M., Lloyd, K.G., Morrison, S., Hazen R., (2019) Interactions between microbial communities and their geologic environment at the Costa Rica active margin. Goldschmidt Abstract. Geochim. Cosmochim. Acta 75(19) Supplement 1.
80. **Barry, P.H.**, de Moor, J.M., Giovannelli, D., Schrenk, M., Hummer, D., Lopez, T., Pratt, C.A., Lloyd K.G., (2019) Calcite precipitation in the Costa Rican forearc reduces long-term carbon recycling into Earth's deep mantle. Goldschmidt Abstract. Geochim. Cosmochim. Acta 75(19) Supplement 1.
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74. de Moor, J. M., **Barry, P.H.**, Giovannelli, D., Lloyd, K., Lopez, T., M. Nakagawa, M., Pratt, K., Ramirez, C., Schrenk, M., (2018). A significant chemical and biological carbon sink in the Costa Rican Forearc: First insights from the Biology Meets Subduction project. Presented at 2018 Fall Meeting, AGU, Washington, DC, 10-14 Dec.
73. Labidi, J., **Barry, P.H.**, Marty, B., Fischer, T., Giunta, T., Sherwood Lollar, B., Young, E.D., (2018) Volcanic gases include slab- and air-derived nitrogen but no contributions from the mantle: a  $^{15}\text{N}/^{14}\text{N}$  perspective. Presented at 2018 Fall Meeting, AGU, Washington, DC, 10-14 Dec.
72. Byrne, D.J., **Barry, P.H.**, Lawson, M., Hillegonds D.J., Ballentine, C.J., (2018) Tracing fluid migration in the Haynesville basin using noble gas isotopes. Geochim. Cosmochim. Acta 75(18) Supplement 1.
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66. **Barry, P.H.**, Kulongoski, J.T., Tyne, R.L., Hillemonds D.J., Byrne D.J., McMahon, P.B., Landon, M.K., Ballentine, C.J., (2017) Tracing Enhanced oil recovery injection fluids using noble gases from the Lost Hills and Fruitvale oil fields, USA, DINGUE 2017 abstract.

65. Byrne, D.J., **Barry, P.H.**, Becker, S., Hillemonds, D.J., Ballentine D.J., (2017) Oil-Water Exchange, Degassing, and Cracking of Oil Traced by Noble Gases in the Eagle Ford Shale, DINGUE 2017 abstract.

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41. Fűri, E., **Barry, P.H.**, Taylor, L.A., Marty, B., (2015) Origin of nitrogen in lunar basalts. Goldschmidt 2015 Abstract. Geochim. Cosmochim. Acta 75(15) Supplement 1.
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29. **Barry, P.H.**, Hilton, D.R., Recycled and Solar Nitrogen Contributions to the Central Indian Ridge (CIR) Réunion-plume system. Goldschmidt 2014 Abstract. Geochim. Cosmochim. Acta 75(15) Supplement 1.
28. Taylor, L.A., Pernet-Fisher, J.F., Liu, Y., Guan, Y., Chen, Y., **Barry, P.H.**, Howarth, G.H. (2014) Critical Problems: Interpretations of OH contents in lunar apatites. Goldschmidt 2014 Abstract. Geochim. Cosmochim. Acta 75(15) Supplement 1.

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24. **Barry, P.H.**, Pernet-Fisher, J.F., Howarth, G.H., Day, J.M.D., Taylor, L.A. (2014) Highly-reduced, HSE-rich metallic-Fe Deposits in the Siberian Trap Basalts: An analog of extraterrestrial conditions? LPI Contributions.
23. Howarth, G.H., Pernet-Fisher, J.F., **Barry, P.H.**, Pewitt, M.L., Bodnar, R.J., McSween, H.Y., Taylor, L.A. (2014) Tupelo EL6 Chondrite: Lithophile-element abundances in sulfides and metals. LPI Contributions.
22. Pernet-Fisher, J.F., Howarth, G.H., Barry, P.H., Bodnar, R.J., Taylor, L.A. (2014) The extent of aqueous alteration within the Jbilet Winselwan CM2 Chondrite. LPI Contributions.
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19. **Barry, P.H.**, Hilton, D.R., Howarth, G.H., Pernet-Fisher, J.F., Day, J.M.D., Taylor, L.A. (2013) Helium isotope evidence for plume metasomatism of Siberian continental lithosphere. *Eos Trans. AGU*, 90 (54), Fall Meet. Suppl., Abstract.
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14. Pokhilenko, N. Taylor, L.A., Aleksey, M., Agashev, A., Pokhilenko, L., Baziotis, I.P., Carmody, L. **Barry, P.H.** (2012) Superplume under the Siberian Craton: Evidence from metasomatic signatures in kimberlitic xenoliths. *Eos Trans. AGU*, 90 (54), Fall Meet. Suppl., Abstract D151A-2340.
13. **Barry, P.H.**, Hilton, D.R., Fűri, E, Murton, B.J., Hemond, C. and Dymant, J. (2011) Stable Isotope (C-N) and Noble Gas (Ne-Ar) Evidence for Recycled Plume Components at the CIR *Geochim. Cosmochim. Acta* 75(15) Supplement 1.

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11. Halldórsson, S.A., Hilton, D.R., Scarsi, P., Abebe, T., Massi, K.M., **Barry, P.H.**, Fischer, T.P., de Moor, J.M., and Rudnick, R.L. (2010) He-Ne-Ar Isotope Studies of Mafic Volcanic Rocks and Mantle Xenoliths from the East African Rift System-Contrasting Isotope Signals in Different Rift Branches. *AGU Fall Meeting Abstracts 1*: 01.
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9. Becker, T.W., Crowley, J.W., Gérault, M., Höink, T., Schaeffer, A.J., **Barry, P.H.**, Frost, J., et al. (2010) Deep Water Cycle: Its Role in Earth's Thermal Evolution and Plate Tectonics. *AGU Fall Meeting Abstracts 1* (2010): 06.
8. **Barry, P.H.**, Hilton, D.R., Füre, E., Halldórsson, S.A. Fischer, T.P., and Grönvold, K. (2010) Abundance and Isotope Systematics of Carbon in Subglacial Basalts, Geothermal Gases and Fluids from Iceland's Rift Zones. *AGU Fall Meeting Abstracts 1*: 0006.
7. **Barry, P.H.**, Hilton, D.R., Fischer, T.P., de Moor, J.M., Mangasini F., and Ramírez., C. (2009) Helium and carbon isotope systematics of Rungwe geothermal gases and fluids; southern Tanzania. *Eos Trans. AGU*, 90 (52), Fall Meet. Suppl., Abstract V11G-02.
6. **Barry, P.H.**, Hilton, D.R., Sano, Y., Takahata, N., Murton, B.J., Füre, E., Hémond, C., and Dyment, J., (2009) Nitrogen Isotopes and Plume-Ridge Interaction: The Central Indian Ridge and the Reykjanes Ridge *Geochimica et Cosmochimica Acta* 73, no. 13, Supplement: pA93.
5. Hilton, D.R., Füre, E., Fischer, T.P., Ramírez, C., Tryon, M., **Barry, P.H.**, and Brown, K., et al. (2009) He-CO<sub>2</sub> Characteristics of Submarine and Subaerial Fluids of the Costa Rica Forearc. *Geochimica et Cosmochimica Acta Supplement* 73 (2009): 532.
4. Prade, K.C., Fischer, T.P., Sharp, Z.D., Hilton, D.R., Grönvold, K., Füre, E., Halldórsson, S.A., and **Barry, P.H.** (2009) Nitrogen Isotope Geochemistry as a Volatile Tracer of the Deep Mantle: Insights from Iceland. *AGU Fall Meeting Abstracts 1*: 1773.
3. de Moor, J.M., Fischer, T.P., King, P.L., Hilton, D.R., Sharp, Z.D., **Barry, P.H.**, Ramirez, C., and Mangasini., F. (2009) Geochemistry and Degassing Systematics of Silicate Magma at Ol Doinyo Lengai, Tanzania. *AGU Fall Meeting Abstracts 1*: 2069.
2. Fischer, T.P., Burnard, P., Marty, B., de Moor, J.M., Hilton, D.R., Shaw, A.M., **Barry, P.H.**, Ramirez, C., and Mangasini, F. (2009) Oldoinyo Lengai Gas Chemistry from 2005 to 2009: Insights to Carbonatite-Nephelinite Volcanism. *AGU Fall Meeting Abstracts 1*: 06.
1. Füre, E., Hilton, D.R., Dyment, J., Hémond, C., Murton, B., Day, J.M.D., **Barry, P.H.**, et al. (2009) International Research. *INTERRIDGE NEWS* 277: 1957-62.

### Fellowships, Grants and Funding

-NSF CHEM OCE: *Collaborative Research: Novel Constraints on Air-sea Gas Exchange and Deep Ocean Ventilation from High-precision Noble Gas Isotope Measurements in Seawater*, 2019-2022 (**Lead-PI; \$583,944**)

- WHOI Interdisciplinary Award *Detecting  $^3\text{He}/^4\text{He}$  Variations Caused by Volcanic Activity in Costa Rica*, 2019-2021 (**Lead-PI; \$99,989**)
- WHOI Independent Research and Development (IR&D) Award *Understanding Deep Volatile Cycling Using a New High Precision Nitrogen Isotope Technique*, 2019 (**Lead-PI; \$68,356**)
- Travel stipend awarded for receiving the Deep Carbon Observatory Emerging Leader Award (**\$1,500**)
- Deep Carbon Observatory (DCO): *Detecting accretionary volatile signatures in the mantle beneath Yellowstone*, 2019 (**Lead-PI; \$23,583**)
- USGS/University of Oxford Sub-Award *Mass Spectrometric analyses and Modeling of Noble Gas Isotopes to Identify the Sources and Pathways for Groundwater Contamination from Oil and Gas Field Development in California*, 2019-2021 (**Lead-PI; \$132,000**)
- Deep Carbon Observatory (DCO) Field Focus Site Award: *Biology Meets Subduction: A Collaborative and Multi-disciplinary Deep Carbon Field Initiative*, 2016-2019 (**Lead-PI; \$464,129**)
- EPSRC Global Challenges Research Fund: *Developing soil gas surveying techniques to guide helium resource recovery in Tanzania*, 2016-2017 (**Lead-PI; \$105,609**)
- USGS Award: *Understanding sources, pathways and the overall impact of oil and gas on California groundwaters: A unique noble gas isotope modeling approach*, 2016-2020 (**Lead-PI; \$624,793**)
- NSF EAR Postdoctoral Fellowship: *A Petrological and Nitrogen Isotope Study of Crustal Recycling Through Time*, 2012-2014 (**Lead-PI; \$170,000**)
- UCSD President's Dissertation Fellow, 2011-2012
- NSF EAPSI Fellow, 2008
- Research and Teaching Assistant Fellowship and Tuition Fee Stipend, UCSD, 2007-2011

#### Formal Presentations

- AGU Fall meeting (San Francisco) – research presentation, December 2019
- Invited Speaker - Deep Carbon 2019 Meeting, Washington DC, October 2019
- Goldschmidt Conference (Barcelona) – research presentation, August 2019
- DINGUE Conference (ETH) – research presentation, August 2019
- Invited speaker – DCO Deep Energy Community Meeting, La Clusaz, France, January, 2019
- Invited speaker - Geothermal Resources & Sustainable Development Workshop (Kenya), September 2018
- Goldschmidt Conference (Boston) – research presentation, August 2018
- AGU Fall meeting – research presentation, December 2017
- 3<sup>rd</sup> Deep Carbon Observatory Early Career Scientist Meeting, August 2017
- Goldschmidt Conference (Paris) – research presentation, August 2017
- DINGUE Conference (IPGP) – research presentation, August 2017
- Invited speaker – 68th GASG Colloquium, Natural Gas: Gas in Nature, July 2017
- Invited speaker – Woods Hole Oceanographic Institution, May 2017
- Keynote speaker – UK Doctoral Training Program, Solid Earth Stream Conference, April 2017
- Invited speaker – University of Oxford – Brown bag lunch seminar, April 2017
- Invited speaker – Third DCO International Science Meeting, March 2017
- Invited speaker – University of Edinburgh, School of GeoSciences, March 2017
- Invited speaker – Cornell University, Earth and Atmospheric Sciences Dept., March 2017
- Invited speaker – Carnegie Institution – Department of Terrestrial Magnetism, October 2016
- Invited speaker – Smithsonian – National Museum of Natural History, October 2016
- Goldschmidt Conference (Yokohama) – research presentation, June 2016
- DINGUE Conference (Nancy) – research presentation, April 2016
- Invited speaker – University of Edinburgh, School of GeoSciences, October, 2015
- Invited speaker – University of St. Andrews, Dept. of Earth and Environmental Science, October, 2015
- University of the Azores: 2<sup>nd</sup> Deep Carbon Observatory Early Career Scientist Meeting, September 2015
- Goldschmidt Conference (Prague) – research presentation, August 2015
- Invited speaker – University of North Carolina, Chapel Hill, February 2015
- Invited speaker – University of Oxford – Brown bag lunch seminar, February 2015
- Invited speaker – University of Bristol, School of Earth Sciences – ‘Hot Stuff’ Seminar, November 2014
- Goldschmidt Conference (Sacramento) - research presentation, June 2014
- AGU Fall meeting – research presentation, December 2013
- Goldschmidt Conference (Florence) - research presentation, August 2013

- DINGUE Conference (Florence) – research presentation, August 2013
- Lunar and Planetary Science Conference (Houston) – research presentation, March 2013
- Invited speaker – University of Tennessee, Klepser Seminar, September 2012
- Invited speaker – Scripps Inst. of Oceanography – Isotope Geochemistry Laboratory Seminar, April 2012
- International Conference on Gas Geochemistry (San Diego) – research presentation, December 2011
- Goldschmidt Conference (Prague) - research presentation, August 2011
- DINGUE Conference (Paris) – research presentation, August 2011
- Invited guest lecturer for SIO 251 - Whole Earth Geochemistry, June 2011
- Invited speaker at Caltech - Geology Club seminar series, May 2011
- CIDER workshop participant and presenter – July 2010
- AGU Fall meeting – research presentation, December 2009

## Supervising and Mentorship

### PostDocs:

- Dr. Alan Seltzer (WHOI PostDoctoral Scholar) – 2019-present
- Dr. David Bekart (WHOI PostDoctoral Scholar) – 2020-present

### Graduate Students:

- MS supervisor of Karim Mtili (University of Dar es Salaam) – 2018-present
- MS supervisor of Clarah Kimani (University of Dar es Salaam) – 2018-present
- PhD supervisor of Rebecca Tyne (University of Oxford) – 2016-Present
- MS supervisor of Yared Sinetebeb (Addis Ababa University) – 2018-2019
- PhD supervisor of David Byrne (University of Oxford) – 2014-2019

## Field Research Experience

- Chile 2020: Sampling volcanic gases
- Yellowstone 2019: Sampling volcanic gases
- Ethiopia 2019: Sampling hot springs
- Argentina 2019: Sampling fumaroles and seeps in the volcanic backarc
- Ethiopia 2018: Sampling hot springs
- Tanzania 2018: Sampling volcanic gases and high He seeps
- Yellowstone 2018: Sampling volcanic gases
- Panama 2018: Groundwater sampling in the volcanic forearc
- Costa Rica 2018: Lead PI on DCO funded ‘Biology Meets Subduction’ field expedition – part 2
- Orcutt, California 2018: Produced water, oil and gas sampling
- Iceland 2017: Sampling fluids, gases and lavas from Northern Rift Zone
- Sicily 2017: Sampling fluids, gases and lavas from Etna Volcano
- Nicaragua 2017: Sampling fluids, gases and lavas from Telica Volcano
- Costa Rica 2017: Lead PI on DCO funded ‘Biology Meets Subduction’ field expedition – part 1
- Tanzania 2016: Testing portable mass spectrometer on high He seeps
- Lost Hills, California 2016: Produced water, oil and gas sampling
- Papua New Guinea 2016: Volcanic gas sampling
- Bakersfield, California 2016: Groundwater and oil and gas sampling
- Tanzania 2016: High helium natural seep sampling
- West Texas & Louisiana 2016: Methane sample collection
- Tanzania 2015: High helium natural seep sampling
- South Texas 2015: Methane sample collection
- Northern Germany 2014: Methane sample collection
- Southern California 2014: Groundwater sampling in the Santa Barbara Basin
- Costa Rica 2014: Deployment of SPARTAH; collection of geothermal fluids and groundwaters
- Panama 2013: Groundwater sampling in the volcanic forearc
- Central California 2014: Groundwater sampling along the San Andreas Fault

- China 2011: Sampling of volcanic fluids and gases
- Costa Rica 2010: Sampling fluids and gases
- Tanzania 2009: Sampling lavas, xenoliths, geothermal fluids and gases
- Japan 2008: Sampling geothermal gases
- California: Deployment of SPARTAH; collection of geothermal fluids and groundwaters
- Mascarene islands 2007: Sampling of lavas and xenoliths
- Central Indian Ridge 2007: SIO Knox11 research cruise (R/V Revelle) - Dredging for glasses
- Iceland 2007: Test deployment of SPARTAH; Sampling of lavas, xenoliths and geothermal fluids
- Costa Rica & El Salvador 2007: Sampling geothermal fluids and gases; Mini-DOAS: SO<sub>2</sub> fluxes

### **Professional Activities**

#### **External PhD Examiner:**

- Dr. Jack Krantz; Brown University, December, 2019

#### **Editorial Board Member:**

- Chemical Geology

#### **Proposal Reviewer:**

- National Science Foundation

#### **Journal Reviewer:**

- Nature
- Nature Geoscience
- Geochemical Perspectives Letters
- Geology
- Earth and Planetary Science Letters
- Geochimica Cosmochimica et Acta
- Water Resources Research
- Chemical Geology
- Geology, Geophysics, and Geosystems
- Journal of Volcanology Geothermal Research
- Mineralogy and Petrology
- The Geological Society of London
- Journal of Geophysical Research: Solid Earth
- International Journal of Mass Spectrometry
- Solid Earth
- International Journal of Greenhouse Gas Control

#### **Professional Organizations:**

- American Geophysical Union (AGU) – Member
- European Association of Geochemistry (EAG) – Member
- Deep Carbon Observatory (DCO) – Member & ‘Deep Energy’ Representative

#### **Conference Session Convener:**

- Goldschmidt 2020 – 08e: Crustal Fluid Geochemistry in Energy-Related Systems: Empirical, Experimental, and Modelling Advances
- Goldschmidt 2020 – 05j: Volatiles in Earth’s Mantle: A Session in Honor of Dave Hilton
- Goldschmidt 2020 – 03c: Earth’s volatile cycles within the crust-mantle system
- Goldschmidt 2019 – 03g: Geochemical tracers of fluids in crustal systems
- Goldschmidt 2017 – 17f: Constraints on Past Carbon Cycle Dynamics and pCO<sub>2</sub>
- Goldschmidt 2016 – 5g: The Deep Nitrogen Cycle and the Evolution of Planetary Atmospheres

- Goldschmidt 2016 – 7a: Cycling of Volatile Elements between Earth’s Interior and Exterior Through Subduction Zones
- AGU 2016 – Volatiles within the Earth’s mantle and core

### Awards, Outreach and Service

- CONVERSE: Community Network for Volcanic Eruption Response, Research Coordination Network Working Group member, 2020
- SZ4D, Research Coordination Network, 'Magmatic Drivers of Eruption' Working Group member, 2020
- Deep Carbon Observatory 2019 Science Planning Committee, 2018-2019
- 2018 Recipient of the Deep Carbon Observatory Emerging Leader Award
- Facebook Live Event: ‘Sampling the Earth’s interior in Costa Rica’ at Wood Green School, Witney, UK
- Best Science Documentary – Goldschmidt Film Festival 2017 – hosted by Wild Orbit Films
- University of Oxford, Vice-Chancellor's Award for Public Engagement, 2017
- Deep Carbon Observatory Early Career Scientist workshop organizer, 2017
- Public dissemination of large helium discovery in Tanzania. The story was run (went viral) on over 200 news outlets including *the BBC, New York Times, NPR, Washington Post, CNN, Wired, Gizmodo, IFLScience* 2016
- NASA/STFC lunar sample outreach lecturer for pre-schoolers, Oxford, UK 2016
- Outreach lecturer at the Cardinal Newman School in Luton, UK 2016
- Deep Carbon Observatory Synthesis Planning Workshop representative for Deep Energy 2015
- Deep Carbon Observatory Early Career Scientist workshop participant, 2015
- Invited outreach lecturer at “San Diego Continuing Education” 2014
- GK12 outreach program participant 2012-2014
- Student representative for the Geoscience Research Division at SIO 2009-2012
- President of the Scripps Academic Club, 2008-2012
- Outreach lecturer at the Gillispie school, La Jolla, CA 2007