

## S. ADAM SOULE

Associate Scientist w/Tenure, Chief Scientist for Deep Submergence  
Geology and Geophysics Department  
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### EDUCATION

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- 1998-2003 University of Oregon (Eugene, OR)  
Ph.D., Dept. of Geological Sciences, Advisor: Kathy Cashman.
- 1993-1997 Carleton College (Northfield, MN)  
B.A., Geology Department, *Cum Laude*, Honors in Geology.

### PREVIOUS APPOINTMENTS

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- 2014 → Chief Scientist for Deep Submergence, WHOI.
- 2013 → Associate Scientist w/Tenure, Woods Hole Oceanographic Institution.
- 2009-2013 Associate Scientist, Woods Hole Oceanographic Institution.
- 2005-2009 Assistant Scientist, Woods Hole Oceanographic Institution.
- 2003-2005 Post-Doctoral scholar, Woods Hole Oceanographic Institution.

### HONORS AND AWARDS

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- 2018 Visiting Scholar — University of Tasmania
- 2012 Chercheur Invité (Invited research fellow) – Université de Bretagne Occidentale, Brest, France
- 2010 Ridge2000 Distinguished Lecturer
- 2003 Postdoctoral Scholar Fellowship, WHOI
- 1999,2001 Staples Fellowship, U. Oregon Dept. of Geosciences

### STUDENT SUPERVISION

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#### **PostDocs**

- 2018-2019 Kristen Fauria; *Transport and deposition of submarine volcanoclastics.*
- 2017-2018 Yang Liao; *Mechanics of magmatic mush.*
- 2013-2015 Thibaut Barreyre; *Mid-ocean ridge hydrothermal systems. Currently Researcher at University of Bergen.*
- 2011-2014 Dorsey Wanless; *Volatile studies of mid-ocean ridge basalts. Currently Asst. Professor at Boise State U.*
- 2010-2012 Eric Mittelstaedt; *Geochemical, geophysical, and volcanic expressions of Plume-ridge interaction in the North Galápagos Volcanic Province. Currently an Asst. Professor at U. Idaho.*

#### **Graduate Students**

- 2014-2019 Meghan Jones (advisor) MIT/WHOI JP; *Submarine volcanism at ridges, arcs, and hot-spots.*
- 2009-2012 Claire Pontbriand (co-advisor) Ph.D. candidate, MIT/WHOI JP; *Volcanic accretion at the ultraslow spreading Gakkel Ridge, Arctic Basin.*

- 2009-2011 Susan Schnur (w/ G. Fruh-Greene & J. Escartin) Masters, ETH Dept. of Geography, currently Ph.D. candidate at Oregon State University.  
*Automated fault extraction at mid-ocean ridges from multi-scalar bathymetry data.*
- 2008-2010 D. Samantha Nakata, Masters, WHOI/MIT JP; *Syn-emplacment degassing of CO<sub>2</sub> during the 2005-06 East Pacific Rise eruption.*
- 2008-2010 Alison Fundis (co-advisor) Masters, University of Florida; *Lava flow surface morphology and emplacement of the 2005-06 EPR eruption.*
- 2007-2012 Min Xu (committee member) Ph.D. candidate, MIT/WHOI JP; *3-D seismic studies of the N. East Pacific Rise.*
- 2006-2011 Chris Waters (co-advisor) Ph.D., WHOI/MIT JP; *High-resolution U-series dating of lavas and volcanic construction at the EPR.*

#### CRUISES/FIELD STUDIES PAST 5 YEARS

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- 2018 Chief Scientist on Cruise NA099 to the S. Flank of Kilauea Volcano (R/V Nautilus) to map the extent and volume of lava deltas produced during the 2018 eruption and landslides on the recently abandoned Pu'u 'O'o lava delta.
- 2018 Co-PI on Cruise AT40-02 to MAR 14°N (R/V Atlantis) using HOV Alvin and AUV Sentry cruise to locate and sample 'popping rocks' along the 14N Segment of the Mid-Atlantic Ridge.
- 2017 Chief Scientist on Cruise NA089 to Guaymas Basin (R/V Nautilus) to explore seafloor hydrothermal sites driven by magmatic intrusions into sediment at a sedimented spreading center in the Gulf of California using ROV Hercules.
- 2017 Co-PI on Cruise NA090 to Pescadero Basin (R/V Nautilus) to explore unique deep-water hydrothermal vents in the Pescadero Basin producing carbonate chimneys using ROV Hercules.
- 2016 Co-PI on Cruise AT36 to Offshore Cape Cod (R/V Atlantis) to mentor early-career researchers on the use of HOV Alvin and AUV Sentry.
- 2016 Co-PI on Cruise AT33-03 to MAR 14°N (R/V Atlantis) using HOV Alvin and AUV Sentry cruise to locate and sample 'popping rocks' along the 14N Segment of the Mid-Atlantic Ridge.
- 2015 Chief Scientist on Cruise AL150801 to Galápagos (M/V Alucia) using ship-based mapping, HOV dives, and AUV surveys to investigate seamount volcanism of the western Galápagos archipelago.
- 2015 Chief Scientist on Cruise RR1506 to Havre Volcano (R/V Reville) using ROV Jason and AUV Sentry cruise to map and sample the deposits of the 2012 explosive eruption of Havre Volcano in the Kermadec Arc.
- 2014 Participant on Cruise AT26-14 to Gulf of Mexico (R/V Atlantis) to evaluate the science capabilities of the HOV Alvin with an emphasis on mapping, navigation, and data processing and delivery.

*Reviewer of Journal Contributions for:* AGU Geophysics Monographs; American Mineralogist; Bulletin of Volcanology; Computers & Geoscience; Earth and Planetary Science Letters; Nature; EOS; Geology; Geochimica Cosmochimica Acta; Geophysical Research Letters; Geosphere; Geoscience Canada; Geochemistry, Geophysics, Geosystems; Journal of Geophysical Research; GSA Monographs; Journal of Volcanology and Geothermal Research.

*Reviewer of Proposals for:* National Science Foundation: OCE, EAR, OTIC, OPP; Interridge; NERC; NASA.

*Workshops organized:* From Mantle to Microbe at a hydrothermal spreading center (with A. Teske - UNC; I. Aiello - SJSU) sponsored by C-DEBI and NSF IODP, Feb. 2013.

Alvin New Users Workshop, sponsored by NSF, Sep. 2015.

Underwater Video (with V. Ferrini, D. Coleman) sponsored by NSF, July 2016.

*Committees:* IAVCEI Commission on Submarine Volcanism (2017 →) Deep Ocean Observing Systems StCom (2016 →)

UNOLS Deep Submergence Science Comm., ex officio (2014 →)

*Contributed to popular press for:* Discovery Channel, History Channel, Boston Globe, Discover Magazine, LiveScience website, WIRED Magazine (print & video), New York Times, Weather Channel, NPR Science Friday, AGU Podcast 'Third Pod from the Sun', Science News, Gizmodo, National Geographic.

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TOP PUBLICATIONS OF PAST 10 YEARS (\*denotes student first author, \*\*post-doc first author)

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\*Anderson, M., Wanless, V.D., Schwartz, D.M., McCully, E., Fornari, D.J., Jones, M.R., and **Soule, S.A.**, 2018, Submarine Deep-Water Lava Flows at the Base of the Western Galápagos Platform: *Geochemistry, Geophysics, Geosystems*, v. 19, p. 3945–3961.

\*Ikegami, F., McPhie, J., Carey, R., Mundana, R., **Soule, A.**, and Jutzeler, M., 2018, The Eruption of Submarine Rhyolite Lavas and Domes in the Deep Ocean – Havre 2012, Kermadec Arc: *Frontiers in Earth Science*, v. 6, p. 147, doi: 10.3389/feart.2018.00147.

M. V. Jakuba, C. L. Kaiser, C. R. German, **A. S. Soule** and S. R. Kelley, 2018, Toward an Autonomous Communications Relay for Deep-Water Scientific AUV Operations, *2018 IEEE/OES Autonomous Underwater Vehicle Workshop (AUV)*. 1-7. doi: 10.1109/AUV.2018.8729769.

\*Jones, M.R., Wanless, V.D., **Soule, S.A.**, Kurz, M.D., Mittelstaedt, E., Fornari, D.J., Curtice, J., Klein, F., Le Roux, V., and Brodsky, H., 2019, New constraints on mantle carbon from Mid-Atlantic Ridge popping rocks: *Earth and Planetary Science Letters*, v. 511, p. 67–75.

\*\*Liao, Y., **Soule, S.A.**, and Jones, M., 2018, On the mechanical effects of poroelastic crystal mush in classical magma chamber models: *Journal of Geophysical Research: Solid Earth*, v. 123, p. 9376–9406.

\*Mitchell, S.J., Houghton, B.F., Carey, R.J., Manga, M., Fauria, K.E., Jones, M.R., **Soule, S.A.**, Conway, C.E., Wei, Z., and Giachetti, T., 2019, Submarine giant pumice: a window into the shallow conduit dynamics of a recent silicic eruption: *Bulletin of Volcanology*, v. 81, p. 42.

- \*Péron, S., Moreira, M.A., Kurz, M.D., Curtice, J., Blusztajn, J.S., Putlitz, B., Wanless, V.D., Jones, M.R., **Soule, S.A.**, and Mittelstaedt, E., 2019, Noble gas systematics in new popping rocks from the Mid-Atlantic Ridge (14° N): Evidence for small-scale upper mantle heterogeneities: *Earth and Planetary Science Letters*, v. 519, p. 70–82.
- Soule, S.A.**, Heffron, E., Gee, L., Mayer, L., Raineault, A., German, C.R., Lim, D.S.S., Zoeller, M., Parcheta, C., 2019, Mapping the Lava Deltas of the 2018 Eruption of Kilauea Volcano, *Oceanography*, v. 32, p. 46–47, doi: 10.5670/oceanog.2019.supplement.01.
- Teske, A., McKay, L.J., Ravelo, A.C., Aiello, I., Mortera, C., Núñez-Useche, F., Canet, C., Chanton, J.P., Brunner, B., Hensen, C., Ramirez, G.A., Sibert, R.J., Turner, T., White, D., Chambers, C.R., Buckley, A., Joye, S.B., **Soule, S.A.**, Lizarralde, D., 2019, Characteristics and Evolution of sill-driven off-axis hydrothermalism in Guaymas Basin – the Ringvent site: *Nature Scientific Reports*, v. 9, p. 13847.
- \*Jones, M. R., **Soule, S. A.**, Gonnermann, H. M., Le Roux, V., & Clague, D. A. (2018). Magma ascent and lava flow emplacement rates during the 2011 Axial Seamount eruption based on CO<sub>2</sub> degassing. *Earth Plan. Sci. Lett.*, 494, 32–41.
- Manga, M., Fauria, K. E., Lin, C., Mitchell, S. J., Jones, M., Conway, C. E., Degruyter, W., Hosseini, B., Carey, R., Cahalan, R., Houghton, B.F., White, J.D.L., Jutzeler, M., **Soule, S.A.**, Tani, K. (2018). The pumice raft-forming 2012 Havre submarine eruption was effusive. *Earth Plan. Sci. Lett.*, 489, 49–58.
- \*Schwartz, D. M., **Soule, S. A.**, Wanless, V. D., & Jones, M. R. (2018a). Identification of Erosional Terraces on Seamounts: Implications for Interisland Connectivity and Subsidence in the Galápagos Archipelago. *Frontiers in Earth Science*, 6, 88.
- Carey, R., **Soule, S.A.**, Manga, M., White, J., McPhie, J., Wysoczanski, R., Jutzeler, M., Tani, K., Fornari, D., Caratori-Tontini, F., Houghton, B., Mitchell, S., Ikegami, F., Conway, C., Murch, A., Fauria, K., Jones, M., Cahalan, R., McKenzie, W. (2018) Dynamics and mass partitioning of the largest deep ocean silicic eruption of the past century. *Science Advances*.
- Michel A, Wankel S, Beaulieu S, **Soule SA**, Mullineaux L, Coleman D, Escobar-Briones E, Gaytán-Caballero A, McDermott, J, Mills S, Speth D, Zierenberg R. (2018) Biogeochemical Exploration of the Pescadero Basin Vents. *Oceanography*. 31(1):42–3.
- \*\*Parnell Turner RE, Mittelstaedt E, Kurz MD, Jones M, **Soule SA**, Klein F, Wanless VD, Fornari D. (2018) The Final Stages of Slip and Volcanism on an Oceanic Detachment Fault at 13° 48'N, Mid-Atlantic Ridge. *Geochemistry, Geophysics, Geosystems*.
- \*Schwartz DM, Wanless VD, Berg R, Jones M, Fornari DJ, **Soule SA**, et al. Petrogenesis of alkalic seamounts on the Galápagos Platform. *Deep Sea Research Part II*. 150:170–80.
- Soule SA**, Seewald JS, Wankel SD, Michel AP, Beinart RA, Escobar-Briones E, Morales-Dominguez E, Girguis PR, Coleman D, Raineault NA, Wagner JKS, Foulk A, Bagla A, Karson JA. (2018) Exploration of the Northern Guaymas Basin. *Oceanography*.
- Gardner, J. E., Jackson, B. A., Gonnermann, H., & **Soule, S.A.** (2016). Rapid ascent and emplacement of basaltic lava during the 2005–06 eruption of the East Pacific Rise at ca. 9° 51'N as inferred from CO<sub>2</sub> contents. *Earth Plan. Sci. Lett.*, 453, 152-160.

- Soule, S.A.**, Perfit, M.R., (2016) Axial Summit Troughs in *Encyclopedia of Marine Geosciences*, eds. Harff, J., Meschede, M., Peterson, S., Thiede, J., Springer Netherlands, Dordrecht, 33-36. ISBN 9789400762381.
- \*\*Wanless, V.D., Shaw, A.M., Behn, M.D., **Soule, S.A.**, Escartin, J., & Hamelin, C. (2015). Magmatic plumbing at Lucky Strike volcano based on olivine-hosted melt inclusion compositions. *Geochem., Geophys., Geosyst.*, 16(1), 126-147.
- Soule, S.A.** (2015) Mid-ocean ridge volcanism in *The Encyclopedia of Volcanoes*, eds. Sigurdsson, H., Houghton, B., Rymer, H., Stix, J., McNutt, S., Academic Press Ltd, London, pp. 395-404. ISBN 9780123859389.
- Escartín, J., **Soule, S.A.**, Cannat, M., Fornari, D.J., Düsünür, D., Garcia, R. (2014) Lucky Strike seamount: Implications for the emplacement and rifting of segment-centered volcanoes at slow spreading mid-ocean ridges, *Geochem. Geophys. Geosyst.*, doi: 10.1002/2014GC005477.
- Deschamps, A., Grigné, C., Le Saout, M., **Soule, S.A.**, Allemand, P., Van Vliet Lanoe, B., and Floc'h, F. (2014), Morphology and dynamics of inflated subaqueous basaltic lava flows, *Geochem. Geophys. Geosyst.*, 15, 2128–2150, doi:10.1002/2014GC005274.
- Cashman, K.V., **Soule, S.A.**, Deligne, N.I., Dietterich, H., Deardorff, N., Mackey, B. (2013) How lava flows - new insights from applications of lidar technologies to lava flow studies, *Geosphere*, doi: 10.1130/GES00706.1.
- \*\*Mittelstaedt, E., **Soule S.A.**, Harpp K.S., Fornari, D.J., McKee C., Tivey, M.A., Geist D., Kurz, M.D., Sinton C., Mello, C. (2012) Multiple expressions of plume-ridge interaction in the Galápagos: Volcanic lineaments and ridge jumps, *G-cubed*, 13, doi:// 10.1029/2012GC004093.
- \*Pontbriand, C., **Soule, S.A.**, Sohn, R., Humphris, S., Kunz, C., Singh, H., Nakamura, K., Jakobsson, M., Shank, T. (2012) Effusive and explosive volcanism on the ultraslow-spreading Gakkel Ridge, 85°E., *G-cubed*, doi:10.1029/2012GC004187, in press.
- Rubin, K.H., **Soule, S.A.**, Chadwick, W.W., Fornari, D.J., Embley, R.W., Baker, E., Perfit, M., Dziak, R., Clague, D.A. (2012) Active volcanism in the deep sea, *Oceanography*, 25, 142-157.
- Soule, S.A.**, Nakata, D.S., Fundis, A., Fornari, D.J. (2012) CO<sub>2</sub> variability in mid-ocean ridge basalts from syn-emplacement degassing: constraints on eruption dynamics, *Earth Plan. Sci. Lett.*, 327-328, 39-49.
- \*Barreyre, T., **Soule, S.A.**, Sohn, R.A. (2011) Settling velocity of MORB volcanoclasts and implications for dispersal during deep-sea eruptions. *J. Volc. Geotherm. Res.*, 205, 84-93.
- Resing, J.A., Rubin, K.H., Embley, R.W., Lupton, J.E., Baker, E.T., Dziak, R.P., Baumberger, T., Lilley, M.D., Huber, J.A., Shank, T.M., Butterfield, D.A., Clague, D.A., Keller, N.S., Merle, S.G., Buck, N.J., Michael, P.J., **Soule, S.A.**, Caress, D.W., Walker, S.L., Davis, R., Cowen, J.P., Reysenbach, A.-L., Thomas, H. (2011) Active submarine eruption of Boninite in the northeastern Lau Basin, *Nature Geoscience*, 4, 799-806.
- \*Fundis, A.T., **Soule, S.A.**, Fornari, D.J., Perfit, M.R. (2010) Paving the seafloor: volcanic emplacement processes during the 2005-2006 eruptions at the fast-spreading East Pacific Rise, 9°50'N. *G-cubed*, 11, doi:10.1029/2010GC003058.
- Lizarralde, D.L., **Soule, S.A.**, Seewald, J.F. (2010) Carbon release by off-axis magmatism in

a young sedimented spreading center, *Nature Geoscience*, 4, 50-54.

**Soule, S.A.**, Escartín, J., Fornari, D.J. (2009) A record of eruption and intrusion at a fast-spreading ridge axis: axial summit trough of the East Pacific Rise at 9°-10°N, *G-cubed*, 10, doi:10.1029/2008GC002354.