

# Curriculum Vitae

## Gray E. Bebout, Professor, Lehigh University

### Biographical Information

**Full Name:** Gray Edward Bebout

**Work Address:** Department of Earth and Environmental Sciences, 1 West Packer Avenue, Lehigh University, Bethlehem, Pennsylvania 18015 USA  
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### Educational History

Ph.D.	(Geology; 9/89)	University of California, Los Angeles Thesis: Geological and Geochemical Investigations of Fluid Flow and Mass Transfer during Subduction-Zone Metamorphism (Mark D. Barton, advisor)
M.A.	(Geology; 9/84)	University of Texas at Austin Thesis: Fluid Evolution and Transport during Metamorphism: Evidence from the Llano Uplift, Texas (William D. Carlson, advisor)
B.S.	(Geology; 9/81)	University of Texas at Austin

### Employment History/Professional Experience

2022 -	<b>Affiliated Research Scientist</b> , Institute for Planetary Materials, Okayama University (OU) at Misasa, Japan (my travel to and work at the IPM is currently supported each year by the OU International Joint Usage program — a <b>Memorandum of Understanding</b> has been in place for the last ~10 years, between and OU and the Lehigh Astrobiology Program, directed by G. Bebout)
2019 - 2024	<b>Department Chair</b> , Department of Earth and Environmental Sciences, Lehigh University (began July, 2019; ended June, 2024)
2017 - 2022	<b>Specially Appointed Professor</b> , Institute for Planetary Materials, Okayama University at Misasa, Japan (latest appointment: April, 2020 to March, 2022; my travel to and work at the IPM is currently supported each year by the OU International Joint Usage program)
2013 - 2016	<b>Visiting Collaborative Researcher</b> , Institute for Study of the Earth's Interior, Okayama University at Misasa, Japan (now the Institute for Planetary Materials)
2011 - 2013	<b>Visiting Foreign Professor</b> , Institute for Study of the Earth's Interior, Okayama University at Misasa
2006 - 2011	<b>COE21 Visiting Foreign Professor (Affiliated Faculty)</b> , Institute for Study of the Earth's Interior, Okayama University at Misasa, Japan
2006	<b>Visiting Foreign Professor</b> , Institute for Study of the Earth's Interior, Okayama University at Misasa, Japan (2.5 month visit; summer, 2006)

2003 - **Full Professor**, Department of Earth and Environmental Sciences, Lehigh University (as of September, 2003)

2000 **Visiting Foreign Professor**, Institute for Study of the Earth's Interior, Okayama University at Misasa, Japan (full-year, funded by the Japanese government)

1997 - 2003 **Associate Professor**, Department of Earth and Environmental Sciences, Lehigh University (as of September, 1997)

1991 - 1997 **Assistant Professor**, Department of Earth and Environmental Sciences, Lehigh University (as of December 1, 1991)

1989 - 1991 **Postdoctoral Fellow**, Geophysical Laboratory, Carnegie Institution of Washington (additional work at the Department of Terrestrial Magnetism)

## Honors/Awards

**Fellow of the Mineralogical Society of America** (professional society focused on study of minerals across geological/mineralogy/geochemistry disciplines) – awarded in November, 2018.

## Publications and Other Scholarly Work

[Lehigh University student and post-doc authors in **bold type**]

### Books Edited —

Bebout, G. E., Scholl, D. W., Kirby, S. H., and Platt, J. P., editors, 1996, *Subduction Top to Bottom*, American Geophysical Union Geophysical Monograph, v. 96.

### Chapters in Books —

Bebout, G. E., 2014, 4.20. Chemical and isotopic cycling in subduction zones, invited chapter, in Rudnick, R. L., ed., 2<sup>nd</sup> Ed. Volume 4, *Treatise on Geochemistry: The Crust*, Elsevier, pp. 703-747.

Bebout, G. E., 2012, Chapter 9. Metasomatism in subduction zones of subducted oceanic slabs, mantle wedges, and the slab-mantle interface, invited chapter, in Harlov, D., and Austrheim, H., eds., *Metasomatism and the Chemical Transformation of Rock, The Role of Fluids in Terrestrial and Extraterrestrial Processes*, Springer-Verlag.

Bebout, G. E., 2011, Chapter 3. Trace element and isotopic fluxes/subducted slab, invited chapter, in *Isotope Geochemistry: A Derivative of Treatise on Geochemistry* (eds. H. D. Holland, and K. K. Turekian), Elsevier (hard-copy publication of a special book containing a subset of the chapters from *Treatise on Geochemistry*; this paper was previously published only electronically on ScienceDirect), p. 39-86.

Grove, M., Bebout, G. E., Jacobson, C. E., Barth, A. P., Kimbrough, D. L., **King, R. L.**, Zou, H., Lovera, O. M., Mahoney, B. J., Gehrels, G. E., 2008, The Catalina Schist: evidence for mid-Cretaceous subduction erosion of southwestern North America, in Formation and Applications of the Sedimentary Record in Arc Collision Zones, *GSA Special Paper* 436, eds., Draut, A. E., Clift, P. D., and Scholl, D. W.

Bebout, G. E., 2007, Ch. 3.20. Trace element and isotopic fluxes/subducted slab, invited chapter, in *Treatise on Geochemistry*, Elsevier (eds. K. K. Turekian, H. D. Holland, and R. Rudnick), online only, p. 1-50.

**Sadofsky, S. J.**, and Bebout, G. E., 2006, Field and isotopic evidence for fluid mobility in the Franciscan Complex: forearc paleohydrogeology to depths of 30 kilometers, *in Phase Relations, High Pressure Terranes, P-T-ometry, and Plate Pushing, GSA International Special Paper Series*, eds. J. G. Liou and M. Cloos), p. 597-632, this paper previously appeared in *International Geology Reviews* in 2004.

Bebout, G. E., and **Sadofsky, S. J.**, 2004,  $\delta^{15}\text{N}$  analyses of ammonium-rich silicate minerals by sealed-tube extractions and dual inlet, viscous-flow mass spectrometry (*invited paper*), *in Handbook of Stable Isotope Techniques* (Pier de Groot, editor).

Bebout, G. E., 1996, Volatile transfer and recycling at convergent margins: mass-balance and insights from high-P/T metamorphic rocks, *in* Bebout, G. E., Scholl, D. W., Kirby, S. H., and Platt, J. P., editors, *Subduction Top to Bottom*, American Geophysical Union Geophysical Monograph, v. 96, p. 179-193.

Ryan, J., Morris, Bebout, G., and Leeman, B., 1996, Describing chemical fluxes in subduction zones: insights from “depth-profiling” studies of arc and forearc rocks, *in* Bebout, G. E., Scholl, D. W., Kirby, S. H., and Platt, J. P., editors, *Subduction Top to Bottom*, American Geophysical Union Geophysical Monograph, v. 96, p. 263-268.

Bebout, G. E., and Barton, M. D., 1993, Metasomatism during subduction: products and possible paths in the Catalina Schist, California, *in Recent Advances in the Geosciences*, Elsevier book with selected papers representing research presented at the 1993 European Union of Geosciences Meeting, Strasbourg, France (this paper also appeared in *Chemical Geology* in 1993; see reference below).

Barton, M. D., Battles, D., Bebout, G. E., Capo, R. C., Christensen, J. N., Davis, S. R., Hanson, R. B., Michelsen, C. J., and Trim, H. E., 1988, Mesozoic contact metamorphism in the western U. S., *in* Ernst, W. G. (ed.), *Metamorphism and Crustal Evolution, Western Conterminous United States*, Rubey Volume VII, Prentice-Hall, p. 110-178.

## Articles in Refereed Journals —

### Published

**Bustos-Moreno, J. F.**, Bebout, G. E., Romer, R., and Magnani, L., 2025, Nitrogen partitioning and isotope fractionation during crustal anatexis: New constraints from across-grade traverses and centimeter-scale leucosome-restite pairs, *Chemical Geology*.

Marshall, S., Gaschnig, R. M., Rader, S. T., Mirakian, M., and Bebout, G., 2025, All mixed up: Disentangling the effects of protolith heterogeneity and metamorphism on Mo isotope compositions of high-P/T metasedimentary rocks, *Geochimica et Cosmochimica Acta*.

Adams, J. C., Rader, S. T., Gaschnig, R. M., and Bebout, G. E., 2025, Behavior of thallium during HP/UHP subduction-zone devolatilization in Western Alps HP/UHP metasedimentary rocks: The role of phengite, *American Mineralogist*.

**Bustos-Moreno, J. F.**, Bebout, G. E., and Savov, I. P., 2024, Nitrogen (N) and its isotopes in serpentinized forearc wedges and implications for N cycling across subduction zones. *Geology*.

Förster, B., Aulbach, S., Bebout, G. E., Bianchini, G., Natali, C., and Braga, R., 2024, Iron-sulfur-carbon redox interactions in the continental subduction factory and their effect on volatile element storage in the mantle wedge. *Earth and Planetary Science Letters*.

Stegner, C., Gaschnig, R., Marshall, S., Rader, S., Bebout, G., and Penniston-Dorland, S., 2024, Molybdenum isotope behavior during subduction zone metamorphism. *Geochimica et Cosmochimica Acta*.

**Bustos-Moreno, J. F.**, Bebout, G. E., Chen, Y.-X., and Schertl, H.-P., 2023, Nitrogen behavior during fluid-rock interactions in a continental subduction zone: Results from the Dora-Maira Massif whiteschists, *Lithos*.

Codillo, E. A., Le Roux, V., Klein, B., Behn, M. D., Marschall, H., and Bebout, G. E., 2023, The ascent of mélanges: experimental constraints on mélange rock densities and solidus temperatures in subduction zones, *Earth and Planetary Science Letters*.

**Nikitczuk, M. P.**, Bebout, G. E., Geiger, C. A., Ota, T., Kunihiro, T., Mustard, J. F., Halldórsson, S. A., and Eizo Nakamura, 2022, Nitrogen incorporation in potassic and micro- and meso-porous minerals: Potential biogeochemical records and targets for Mars sampling, *Astrobiology*.

Scambelluri, M., Cannaò, E., Guerini, S., **Epstein, G.**, Bebout, G. E., Tartarotti, P., and Rotondo, F., 2022, Carbon mobility and exchange in a plate-interface subduction mélange, *Lithos*.

Bebout, G. E., Ota, T., Kunihiro, T., Carlson, W. D., and Nakamura, E., 2022, Lithium in garnet as a tracer of subduction zone metamorphic reactions: The record in UHP metapelites at Lago di Cignana, Italy, *Geosphere*.

**Nikitczuk, M. P.**, Bebout, G. E., Ota, T., Kunihiro, T., Mustard, J. F., Flemming, R. L., Tanaka, R., Hall-dórsson, S. A., and Nakamura, E., 2022, Nitrogenous altered volcanic glasses as targets for Mars sample return: Examples from Antarctica and Iceland, *Journal of Geophysical Research-Planets*.

**Epstein, G. S.**, Bebout, G. E., Christenson, B. W., Sumino, H., Wada, I., Werner, C., and Hilton, D. R., 2021, Cycling of CO<sub>2</sub> and N<sub>2</sub> along the Hikurangi subduction margin, New Zealand: An integrated geological, theoretical, and isotopic approach, *Geochemistry, Geophysics, and Geosystems*.

Halama, R., Bebout, G. E., and Bea, F., 2021, Nitrogen loss and isotopic fractionation during granulite-facies metamorphism in the lower crust (Ivrea Zone, NW Italy), *Chemical Geology (special issue in tribute to David Hilton)*.

Rader, S. T., Gaschnig, R. M., Owens, J. D., Bebout, G. E., Mirakian, M. J., and Newby, S. M., 2021, Thallium behavior during high-pressure metamorphism in the western Alps, Europe, *Chemical Geology*.

Muñoz-Montecinos, J., Angiboust, S., Garcia-Casco, A., Glodny, J., and Bebout, G. E., 2021, Episodic hydrofracturing and large-scale flushing along deep subduction interfaces: Implications for fluid transfer and carbon recycling, *Chemical Geology*.

**Epstein, G. S.**, Bebout, G. E., and Angiboust, S., 2020, Fluid and mass transfer along transient subduction interfaces in a deep paleo-accretionary wedge (W. Alps), *Chemical Geology*.

Halama, R., and Bebout, G., 2020, (invited) Earth's nitrogen and carbon cycles, in Introduction to reading terrestrial planet evolution in isotopes and element measurements, *International Space Science Institute*.

Bebout, G. E., 2020, 00140. Insights into subduction zone dynamics, *Encyclopedia of Geology*, 2<sup>nd</sup> Edition, Elsevier (invited).s

Cannaò, E., Scambelluri, M., Tiepolo, M., and Bebout, G. E., 2020, Into the deep and beyond: carbon and nitrogen subduction recycling in secondary peridotites, *Earth and Planetary Science Letters*.

Cannaò, E., Scambelluri, M., Bebout, G. E., Agostini, S., Pettke, T., and Godard, M., 2020, Ophicarbonate evolution from seafloor to subduction and implications for deep-Earth C cycling, *Chemical Geology*.

**Epstein, G. S.**, Bebout, G. E., Angiboust, S., and Agard, P., 2019, Scales of fluid-rock interaction and carbon mobility in the deeply underplated and HP-metamorphosed Schistes Lustrés, Western Alps, *Lithos*, 354-355, <https://doi.org/10.1016/j.lithos.2019.105229>.

House, B. M., Bebout, G. E., and Hilton, D. R., 2019, Carbon cycling at the Sunda margin, Indonesia: A regional study with global implications, *Geology*, <https://doi.org/10.1130/G45830.1>.

Barnes, J. D., Penniston-Dorland, S. C., Bebout, G. E., Hoover, W., Beaudoin, G. M., and Agard, P., 2019, Chlorine and lithium behavior in metasedimentary rocks during prograde metamorphism: a comparative study of exhumed subduction complexes (Catalina Schist and Schistes Lustrés), *Lithos*.

Nakamura, E., Kunihiro, T., Ota, T., Sakaguchi, C., Tanaka, R., Kitagawa, H., Kobayashi, K., Yamanaka, M., Shimaki, Y., Bebout, G. E., Miura, H., Yamamoto, T., Malkovets, V., Grokhovsky, V., Koroleva, O., and Litasov, K., 2019, Hypervelocity collision and water-rock interaction in space preserved in the Chelyabinsk ordinary chondrite, *Proceedings of the Japan Academy*.

Tartarotti, P., Guerini, S., Rotondo, F., Festa, A., Balestro, G., Bebout, G. E., Cannaò, E., **Epstein, G. S.**, and Scambelluri, M., 2019, Superposed sedimentary and tectonic block-in-matrix fabrics in a subducted serpentinite mélange (high-pressure Zermatt Saas ophiolite, Western Alps). *Geosciences*, 9, 358.

**Jaeckel, K.**, Bebout, G. E., and Angiboust, S., 2018, Deformation-enhanced fluid and mass transfer along western and central Alps paleo-subduction interfaces: Significance for carbon cycling models. *Geosphere*, v. 14(6), doi: 10.1130/GES01587.1.

Bebout, G. E., Scholl, D. W., Stern, R. J., Wallace, L. M., and Agard, P., 2017, Twenty years of subduction zone science: Subduction Top to Bottom 2 (ST2B-2), *GSA Today*, 28, doi: 10.1130/GSATG354A.1.

Bebout, G. E., Banerjee, N. R., Izawa, M. R., **Lazzeri, K., Ranieri, L. A.**, Kobayashi, K., and Nakamura, E., 2017, Nitrogen concentrations and isotopic compositions of seafloor-altered terrestrial basaltic glass: Implications for astrobiology, *Astrobiology*, 18(4), DOI: 10.1089/ast.2017.1708.

**Anderson, L. D.**, Bebout, G. E., Izawa, M. R. M., Bridge, N. J., and Banerjee, N. R., 2017, Chemical alteration and preservation of sedimentary/organic nitrogen isotopic signatures in a 2.7 Ga seafloor volcanic sequence, *International Journal of Astrobiology*, doi.org/10.1017/S1473550417000441.

**Lazzeri, K. E.**, Bebout, G. E., and Geiger, C., 2016, Nitrogen and carbon concentrations and isotopic compositions of the silica clathrate melanophlogite (Letter and Notable Paper), *American Mineralogist*, doi.org/10.2138/am-2017-5876.

Angiboust, S., Yamato, P., Hertgen, S., Hyppolito, T., Bebout, G. E., and Morales, L., 2016, Fluid pathways and high pressure metamorphism in a subducted continental slice (Mt. Emilius klippe, W. Alps), *Journal of Metamorphic Geology*, doi.org/10.1111/jmg.12241.

Sievers, N. E., **Tenore, J.**, Penniston-Dorland, S. C., and Bebout, G. E., 2016, Fingerprints of forearc element mobility in blueschist-facies metaconglomerates, Catalina Schist, California, *International Geology Reviews*, doi.org/10.1080/00206814.2016.1253038.

Halama, R., Bebout, G. E., Marschall, H., and John, T., 2016, Fluid-induced breakdown of white mica controls nitrogen transfer during fluid-rock interaction in subduction zones, *International Geology Reviews*, doi.org/10.1080/00206814.2016.1233834.

Bebout, G. E., 2016, Caesium: element and geochemistry, invited entry for *Encyclopedia of Geochemistry* (William D. White, editor), Earth Science Series, Springer.

Scambelluri, M., Bebout, G., Gilio, M., Belmonte, D., Campomenosi, N., **Collins, N. C.**, and Crispini, L., 2016, Carbonation of subduction interface ultramafic rocks and implications for the deep carbon cycling: Evidence from hybrid serpentinite-marble in the Voltri Massif, Italy, *Earth and Planetary Science Letters*, doi:10.1016/j.epsl.2016.02.034.

Bebout, G. E., **Lazzeri, K.**, and Geiger, C., 2015, Pathways for nitrogen cycling in Earth's crust and upper mantle: A review and new results for microporous beryl and cordierite, invited Centennial Article, *American Mineralogist*, 101, 7-24.

Bebout, G. E., and Penniston-Dorland, S. C., 2015, Fluid and mass transfer at subduction interfaces – The field metamorphic record, invited Review Article, *Lithos*, 240-243, 228-258.

**Collins, N. C.**, Bebout, G. E., Angiboust, S., Agard, P., Scambelluri, M., Crispini, L., and John, T., 2015, Subduction zone metamorphic pathway for deep carbon cycling: II. Evidence from HP/UHP metabasaltic rocks and ophiocarbonates, *Chemical Geology*, 412, 132-150.

Penniston-Dorland, S. C., Gorman, J. K., Bebout, G. E., Piccoli, P. M., and Walker, R. J., 2014, Reaction rind formation in the Catalina Schist: Deciphering a history of mechanical mixing and metasomatic alteration, *Chemical Geology*, 384, 47-61.

**Cook-Kollars, J. E.**, Bebout, G. E., **Collins, N. C.**, Angiboust, S., and Agard, P., 2014, Subduction-zone metamorphic pathway for deep carbon cycling: I. Evidence from HP/UHP metasedimentary rocks, Italian Alps, *Chemical Geology*, 348, 31-48.

Bebout, G. E., Fogel, M. L., and Cartigny, P., 2013, Nitrogen: Highly volatile yet surprisingly compatible, introductory paper for special issue of *ELEMENTS*, Geochemical Society publication (Nitrogen and its (BioGeoCosmo)Chemical Cycling), eds. Bebout, G. E., Fogel, M. L., Cartigny, P., v. 9, pp. 333-338.

Busigny, V., and Bebout, G. E., 2013, Mineralogy, residency, and isotopic behavior of nitrogen, for special issue of *ELEMENTS*, Geochemical Society publication (Nitrogen and its (BioGeoCosmo)Chemical Cycling), eds. Bebout, G. E., Fogel, M. L., Cartigny, P., v. 9, 353-358.

Bebout, G. E., Agard, P., Kobayashi, K., Moriguti, T., and Nakamura, E., 2013, Devolatilization history and trace element mobility in deeply subducted sedimentary rocks: SIMS evidence from Western Alps HP/UHP suites, *Chemical Geology*, 342, 1-20, <http://dx.doi.org/10.1016/j.chemgeo.2013.01.009>.

Godfrey, L. V., Poulton, S. W., Bebout, G. E., and Fralick, P., 2013, Stability of the nitrogen cycle during development of sulfidic water in the redox-stratified late Paleoproterozoic Ocean, *Geology*, doi:10.1130/G33930.1.

Evans, M. A., Bebout, G. E., and **Brown, C. H.**, 2012, Changing fluid conditions during folding: An example from the central Appalachians, *Tectonophysics*, doi: 10.1016/j.tecto.2012.03.002.

John, T., Gussone, N., Podladchikov, Y. Y., Bebout, G. E., Dohmen, R., Halama, R., Klemd, R., Magna, T., and Seitz, M., 2012, Pulsed long-distance fluid flow through subducting slabs feeds volcanic arcs, *Nature Geoscience*, doi: 10.1038/NGEO1482.

Halama, R., Bebout, G. E., John, T., and Scambelluri, M., 2012, Nitrogen recycling in subducted mantle rocks and implications for the global nitrogen cycle, *International Journal of Earth Sciences*, special issue reporting results of Collaborative Research Center (SFB 574; Volatiles and Fluid in Subduction Zones), doi: 10.1007/s00531-012-0782-3.

**Gonyo, A.**, Yu, Z., and Bebout, G., 2012, Late Holocene change in climate and atmospheric circulation inferred from geochemical records at Kepler Lake, south-central Alaska, *Journal of Paleolimnology*, 48, 55-67, doi: 10.1007/s10933-012-9603-8.

**Zelanko, P.**, Yu, Z., Bebout, G. E., and Kaufman, A. J., 2012, Multiple early Holocene climate oscillations at Silver Lake, New Jersey and their possible linkage with outburst floods, *Palaeogeography, Palaeoclimatology, Palaeoecology*, doi:10.1016/j.palaeo.2012.06.028.

Penniston-Dorland, S. C., Bebout, G. E., Pogge von Strandmann, A. E., Elliott, T., Sorensen, S. S., 2011, Lithium and its isotopes as tracers of forearc fluids and metasomatic processes: Evidence from the Catalina Schist, California, USA, *Geochimica et Cosmochimica Acta*, doi: 10.1016/j.gca.2011.10.038.

**Li, L.**, Yu, Z., Bebout, G. E., **Stretton, T.**, Eby, N., **Allen, A.**, and **Passaris, P.**, 2010, Tree-ring width and  $\delta^{13}\text{C}$  records of industrial stress and recovery in Pennsylvania and New Jersey forests: Implications for  $\text{CO}_2$  uptake by temperate forests, *Chemical Geology*, doi:10.1016/j.chemgeo.2010.02.026.

**Zhao, C.**, Yu, Z., **Li, L.**, and Bebout, G., 2010, Major shifts in multidecadal moisture variability in the Mid-Atlantic region during the last 240 years, *Geophysical Research Letters*, doi:10.1029/2010GL043133.

**Palya, A. P.**, Buick, I. S., and Bebout, G. E., 2010, Storage and mobility of nitrogen in the continental crust: Evidence from partially melted metasedimentary rocks at Mount Stafford, North-Central Australia, *Chemical Geology*, doi:10.1016/j.chemgeo.2010.12.009.

Halama, R., Bebout, G. E., John, T., Schenk, V., 2009, Nitrogen recycling in subducted oceanic lithosphere: The record in high- and ultrahigh-pressure metabasaltic rocks, *Geochimica et Cosmochimica Acta*, doi: 10.1016/j.gca.2009.12.003.

Svensen, H., Bebout, G., Kronz, A., **Li, L.**, Planke, S., Chevallier, L., and Jamtveit, B., 2008, Nitrogen geochemistry as a tracer for fluid flow in a sedimentary basin piercement structure, the Karoo Basin, South Africa, *Geochimica et Cosmochimica Acta*, 72, 4929-4947.

Buick, I., Grew, E. S., Armbruster, T., Medenbach, O., Yates, M. G., Bebout, G. E., and Clarke, G. L., 2008, Boromullite,  $\text{Al}_9\text{BSi}_2\text{O}_{19}$ , a new mineral from granulite-facies metapelites, Mount Stafford, central Australia, and a natural analogue of “boron-mullite,” *European Journal of Mineralogy*, 20, 935-950.

**Li, L.**, Yu, Z., Moeller, R. E., and Bebout, G. E., 2008, Complex trajectories of aquatic and terrestrial ecosystem shifts caused by multiple human-induced stresses, *Earth and Planetary Science Letters*, 272, 4338-4351.

Bebout, G. E., 2007, Metamorphic chemical geodynamics in subduction zones, synthesis paper for *Earth and Planetary Science Letters* (invited *EPSL* Frontiers article), 260, 373-393.

**Li, L.**, Bebout, G. E., and Idleman, B. D., 2007, Nitrogen concentration and isotopic compositions of altered oceanic crust obtained on ODP Legs 129 and 185: Insights into alteration-related nitrogen enrichment and the nitrogen subduction budget, *Geochimica et Cosmochimica Acta*, 71, 2344-2360.

**King, R. L.**, Bebout, G. E., Grove, M., Moriguti, T., and Nakamura, E., 2007, Boron and lead isotope signatures of subduction-zone melange formation: Hybridization and fractionation along the slab-mantle interface beneath volcanic arcs, *Chemical Geology*, 239, 305-322.

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**Rygel, A. C.**, Anastasio, D. J., and Bebout, G. E., 2006, Syntectonic fluid-rock interactions involving surficial waters in the Sevier thrust belt, Tendoy Mountains, Southwest Montana, *Geofluids*, 6, 1-14.

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**King, R. L.**, Bebout, G. E., Kobayashi, K., Nakamura, E., and van der Klauw, S. N. G. C., 2004, Ultrahigh-pressure metabasaltic garnets as probes into deep subduction zone chemical cycling, *Geochemistry, Geophysics, and Geosystems*, Q12J14, doi:10.1029/2004GC000746, Dec., 2004.

**Sadofsky, S. J.**, and Bebout, G. E., 2004, Field and isotopic evidence for fluid mobility in the Franciscan Complex: forearc paleohydrogeology to depths of 30 kilometers, *International Geology Reviews* (also appeared in a 2006 Geological Society of American special volume in honor of W. G. Ernst's career; editors J. G. Liou and M. Cloos), 46, 1053-1088.

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**Sadofsky, S. J.**, and Bebout, G. E., 2004, Nitrogen geochemistry of subducting sediments: new results from the Izu-Bonin-Mariana margin and insights regarding global N subduction, *Geochemistry, Geophysics, and Geosystems*, Q03I15, doi:10.1029/2003GC000543, March, 2004.

Bebout, G. E., and Nakamura, E., 2003, Record in metamorphic tourmalines of subduction zone devolatilization and boron cycling, *Geology*, 31, 407-410.

**Sadofsky, S. J.**, and Bebout, G. E., 2003, Record of forearc devolatilization in low-T, high-P/T metasedimentary suites: significance for models of convergent margin chemical cycling, *Geochemistry, Geophysics, and Geosystems*, “Trench to Subarc; Diagenetic and Metamorphic Mass Flux in Subduction Zones” theme, v. 4 (April 23, 2003).

Staudigel, H. S., and Bebout, G. E., 2002, A GERM and EarthRef.org perspective on MARGINS databases, invited for *MARGINS Newsletter*, v. 9, December, 2002.

Bebout, G. E., and Barton, M. D., 2002, Tectonic and metasomatic mixing in a high-temperature subduction-zone melange: insights into the geochemical evolution of the slab-mantle interface. *Chemical Geology*, 187, 79-106.

Bebout, G. E., Anastasio, D. J., and **Holl, J. E.**, 2001, Synorogenic crustal fluid infiltration in the Idaho-Montana thrust belt. *Geophysical Research Letters*, 28, 4295-4297.

**Sadofsky, S. J.**, and Bebout, G. E., 2001, Paleohydrogeology at 5- to 15-km depths of accretionary prisms: The Franciscan Complex, *Geophysical Research Letters*, 28, 2309-2312.

**Sadofsky, S. J.**, and Bebout, G. E., 2000, Ammonium partitioning and nitrogen-isotope fractionation among coexisting micas during high-temperature fluid-rock interactions: examples from the New England Appalachians, *Geochimica et Cosmochimica Acta*, 64, 2835-2849.

Bebout, G. E., Ryan, J. G., Leeman, W. P., and Bebout, A. E., 1999, Fractionation of trace elements during subduction-zone metamorphism: impact of convergent margin thermal evolution, *Earth and Planetary Science Letters*, 171, 63-81.

Bebout, G. E., Bradley, A. D., Cooper, D. C., and **Sadofsky, S. J.**, 1999, Nitrogen-isotope record of fluid-rock interactions in the Skiddaw Contact Aureole and granite, English Lake District, *American Mineralogist*, 84, 1495-1505.

**Davidson, S. G.**, Anastasio, D. J., Bebout, G. E., **Holl, J. E.**, and **Hedlund, C. A.**, 1998, Volume loss and metasomatism during cleavage formation in carbonate rocks, *Journal of Structural Geology*, 20, 707-726.

Bebout, G. E., 1997, Nitrogen isotope tracers of high-temperature fluid-rock interactions: case study of the Catalina Schist, California, *Earth and Planetary Science Letters*, 151, 77-90.

Bebout, G. E., 1995, The impact of subduction-zone metamorphism on mantle-ocean chemical cycling, *Chemical Geology*, 126, 191-218 (invited paper).

Grove, M., and Bebout, G. E., 1995, Cretaceous tectonic evolution of coastal southern California: insights from the Catalina Schist, *Tectonics*, 14, 1290-1308.

Bebout, G. E., and Barton, M. D., 1993, Metasomatism during subduction: products and possible paths in the Catalina Schist, California, *Chemical Geology*, 108, 61-92 (invited paper).

Bebout, G. E., Ryan, J. G., and Leeman, W. P., 1993, B-Be systematics in subduction-related metamorphic rocks: characterization of the subducted component, *Geochimica et Cosmochimica Acta*, 57, 2227-2237.

Bebout, G. E., and Fogel, M. L., 1992, Nitrogen-isotope compositions of metasedimentary rocks in the Catalina Schist, California: implications for metamorphic devolatilization history, *Geochimica et Cosmochimica Acta*, 56, 2839-2849.

Bebout, G. E., 1991, Geometry and mechanisms of fluid flow at 15 to 45 kilometer depths in an early Cretaceous accretionary complex, *Geophysical Research Letters*, 18, 923-926.

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Bebout, G. E., and Barton, M. D., 1989, Fluid flow and metasomatism in a subduction zone hydrothermal system: Catalina Schist Terrane, California, *Geology*, 17, 976-980.

Bebout, G. E., and Carlson, W. D., 1986, Fluid evolution and transport during metamorphism: evidence from the Llano Uplift, Texas, *Contributions to Mineralogy and Petrology*, 92, 518-529.

### **Extended Abstracts, Yearbook Articles, and Field-Trip Guidebooks**

Bebout, G. E., Idleman, B. D., **Li, L.**, and Hilkert, A., 2004, High-precision isotopic analysis of nanomole quantities of silicate nitrogen, extended abstract in *Water-Rock Interaction*, v. 1, edited by R. B. Wanty and R. R. Seal III, A. A. Balkema, Brookfield, Vt.

Bebout, G. E., Agard, P., **King, R. L.**, Kobayashi, K., and Nakamura, E., 2004, Mineral chemical records of prograde devolatilization (and exhumation) in W. Alps HP and UHP metasedimentary suites, extended abstract in *Water-Rock Interaction*, eds. R.B. Wanty, R.R. Seal III, A.A. Balkema, Brookfield, Vermont.

Bebout, G. E., and **Sadofsky, S. J.**, 1998, Characterizing and quantifying crust-ocean-mantle fluxes of volatiles at convergent margins, *Proceedings, GERM (Geochemical Earth Reference Model) Workshop, La Jolla, March 10-13, 1998*, p. 11-15.

Bebout, G. E., Grove, M., Sorensen, S. S., and Platt, J. P., 1994, The Catalina Schist—A 15 to 45 kilometer "slice" of an Early Cretaceous accretionary complex, *Field Trip Guidebook for SUBCON: Subduction from Top to Bottom Conference*, June 12-17, 1994, 56 p.

Bebout, G. E., 1991, Stable isotope and trace element indicators of devolatilization history in metashales and metasandstones, *Annual Report of the Director, Geophysical Laboratory, Carnegie Institution of Washington*, 1990-91, p. 34-41.

Bebout, G. E., Ryan, J. G., and Leeman, W. P., 1991, Boron and beryllium concentrations in subduction-related metamorphic rocks of the Catalina Schist: implications for subduction-zone recycling, *Annual Report of the Director, Geophysical Laboratory, Carnegie Institution of Washington*, 1990-91, p. 23-29.

Sorensen, S. S., Bebout, G. E., and Barton, M. D., 1991, The Catalina Schist: metamorphic and fluid-flow processes in a paleo-subduction zone, *Geological Society of America, Field Trip Guidebook, 1991 Annual Meeting, San Diego, CA*.

Bebout, G. E., and Fogel, M. L., 1990, Behavior of nitrogen during metamorphism: case study of the Catalina Schist subduction-zone metamorphic terrane, *Annual Report of the Director, Geophysical Laboratory, Carnegie Institution of Washington*, 1989-90, p. 19-26.

Bebout, G. E., and Fogel, M. L., 1990, Techniques for the extraction of nitrogen from silicate minerals and whole-rock samples for isotopic analysis, *Annual Report of the Director, Geophysical Laboratory, Carnegie Institution of Washington*, 1989-90, p. 123-128.

### Conference Proceedings, Prefaces/Advertising for Special Journal Issues

Barry, P. H., Halldórsson, S. A., Füri, E., Kulongoski, J., Bebout, G., and Porcelli, D., 2023, Earth's volatile cycles within the crust-mantle system: A volume in memory of Dave Hilton, *Chemical Geology* (a short article synthesizing, as a preface, the content of this volume, for which I was a co-editor).

Bebout, G. E., Scholl, D. W., Stern, R. J., Wallace, L. M., and Agard, P., 2022, Completion of the Subduction Top to Bottom 2 (ST2B-2) Themed Issue in *GEOSPHERE*. This is a brief article in *GSA Today* advertising this then-finalized Themed Issue containing 74 papers.

Bebout, G., Blichert-Toft, J., Carlson, R., Cooper, K., Evans, M., Kelley, K., Konter, J., Reif, C., Rouxel, A., Shaw, A., Shields, G., Staudigel, H., and Stegman, D., 2001, Report on GERM 3, La Jolla, March 6-9, 2001, *Geochemical News*, v. 108, p. 16-21 (workshop report).

### Invited Reviews

Bebout, G. E., 1996, Metamorphic petrology, *Geotimes* 41, 51-52 (invited synthesis of recent advancements).

### Some Working Papers (in preparation or in-revision)

Cooperdock, E. H. G., Bonilla, A. N., Grabiec, J. G., **Bustos-Moreno, J. F.**, Celestian, A. J., Mallik, A., and Bebout, G. E., **in revision**, (working title) Unveiling hosts for nitrogen transportation and storage in meta-serpentinites, *Geochimica et Cosmochimica Acta*.

Rader, S. T., Adams, C., Gaschnig, R. M., and Bebout, G. E., 2023, **in preparation**, Constraints on fluid-mineral partitioning of thallium during high-pressure metamorphism, target journal not yet determined.

Bebout, G. E., Werner, C., Christenson, B., Epstein, G., Wada, I., Sumino, H., and Hilton, D., **in preparation**, Integrated field, theoretical, and geochemical analysis of carbon flux at the Hikurangi subduction margin, New Zealand, target journal not yet determined.

Bebout, G. E., **Kraft, K. H., Pinho, J., and Epstein, G. S., in preparation**, Fate of subducting organic carbon: Evidence from HP/UHP metasedimentary suites and implications for isotopic compositions of arc volcanic gases, target journal not yet determined.

### Recent/Current Research Funding

**NSF PIRE Program** (Partnerships in International Research and Education; host institution Boise State University; \$260K to Lehigh University over five years (**this grant expired in May, 2023**); “PIRE: Ex-Terra Field Institute and Research Endeavor (E-FIRE)”)

**NSF EAR-Petrology and Geochemistry Program** (\$466K to Lehigh University over three years, collaborative with Bruce Christenson (GNS, New Zealand), Hirochika Sumino (University of Tokyo), and Ikuko Wada (University of Minnesota); “Collaborative Research: Integrated He-CO<sub>2</sub>-N<sub>2</sub> Isotope and Petrologic Study of Volatiles Cycling via the New Zealand Subduction System”). **This grant, in two separate accounts, expired in August, 2022, and March, 2023.**

**Support from the Institute for Planetary Materials, Okayama University**, Misasa, Japan (recently in the form of International Joint Use/Research grants, which cover travel and living expenses related to my [and my students'] visits to Misasa once or twice each year)

## Editorial Activities

2011 - 2022 Lead editor for large electronic-only publication on subduction-zone processes, as a follow-up to the 1996 American Geophysical Union Geophysical Monograph v. 96 (*Subduction Top to Bottom 2* or ST2B-2; co-editors Dave Scholl, Bob Stern, Laura Wallace, and Philippe Agard; publication window was 2016-2022. A total of 74 papers were published in a Themed Issue in the journal *Geosphere* of the Geological Society of America.

2021 - 2022 Co-editor of *Chemical Geology* Article Collection in tribute to the late Dave Hilton (Earth's Volatile Cycle within the Crust-Mantle System: A volume in memory of Dave Hilton; editors Peter Barry, Saemi Halldorsson, Justin Kulongoski, Gray Bebout, and Evelyn Furi).

2011 – 2013 Chief editor for special issue of *ELEMENTS* (journal of the Geochemical Society) on nitrogen (biogeocosmo)chemistry (co-editors Marilyn Fogel, University of California, Merced, and Pierre Cartigny, IPGP, Paris), published in October, 2013.

2005 - 2022 Associate Editor, *Lithos* (Elsevier journal)

2003 - 2005 Bebout, G. E., and Elliott, T., 2003-2005, Trench to Subarc: Diagenetic and Metamorphic Mass Flux in Subduction Zones, Special Section, *Geochemistry, Geophysics, and Geosystems* (*G-cubed*; 17 papers).

1999 - 2013 Member of Books Board, American Geophysical Union (oversaw book projects with significant components of solid-Earth petrology/geochemistry, evaluating proposals and external reviews, coordinating development after approval, and approving final products before publication)

2005 - 2009 Associate Editor, *Geochemistry, Geophysics, and Geosystems* (AGU journal)

1999 - Co-editor (with Tim Elliott, Bristol University) of subduction-zone-flux sections of GERM (Geochemical Earth Reference Model; <http://earthref.org/>)

1996 – 2006 Associate Editor, *American Mineralogist*

2002 - 2004 Guest editor, special section of *Geochemistry, Geophysics, and Geosystems* related to GERM/MARGINS-sponsored AGU special session at 2001 Fall AGU meeting (“Trench to Subarc; Diagenetic and Metamorphic Mass Flux in Subduction Zones”), co-editor Tim Elliott, Bristol University.

1995 - 1996 Chief Editor “*Subduction Top to Bottom*”, AGU Geophysical Monograph., v. 96 This volume is regarded as a “bestseller” among AGU books (resulting from SUBCON meeting in 1994), co-editors D Scholl, S. Kirby, and John Platt.

## Scholarly Presentations (last ten years)

### Invited lectures

May, 2025	Invited talk, Japan Geoscience Union (JpGU) Meeting; talk title: “Challenges to understanding carbon flux at subduction zones — Toward mass-balancing inputs and outputs at individual margins (and globally)” (meeting in Chiba, Japan)
May, 2024	Invited lecture, Carnegie Institution for Science, Earth and Planets Laboratory; talk title: “The Forest and Trees of Assessing Subduction-Zone Carbon Cycling”
July, 2022	Invited talk, Japan Geoscience Union (JpGU) Meeting; talk title: “Toward more complete (and realistic) assessment of deep carbon subduction: The devil (could be) in the details” (meeting in Chiba, Japan)
September, 2016	Invited Distinguished Professor, University of Science and Technology, Hefei, China (invited visit for two weeks, giving a total of four lectures, one of them a “Plenary Lecture” open to the full university community)

### Refereed Presentations (Abstracts for Conferences)

**Bustos-Moreno, J. F.**, Bebout, G. E., Weisenberger, T. B., and Barich, A., 2024, Origin and distribution of nitrogen in basaltic glasses and related alteration products: Insights from the island of Surtsey and Icelandic amygdalites, American Geophysical Union Fall Meeting, Washington, D.C.

Bonilla, A., Grabiec, J. G., Cooperdock, E. H. G., **Bustos-Moreno, J. F.**, Celestian, A., Mallik, A., and Bebout, G. E., 2024, Unveiling hosts for nitrogen transportation and storage in meta-serpentinites, American Geophysical Union Fall Meeting, Washington, D.C.

Bonilla, A., Grabiec, J. G., Cooperdock, E. H. G., **Bustos-Moreno, J. F.**, Celestian, A., Mallik, A., and Bebout, G. E., 2024, Unveiling hosts for nitrogen transportation and storage in meta-serpentinites, Geological Society of America Annual Meeting, Anaheim, California.

**Bustos-Moreno, J. F.**, Bebout, G. E., Romer, R., and Magnani, L., 2024, Insights into nitrogen dynamics during partial melting: case studies from the Anatectic Complex of Toledo, Tormes Dome, and Adamello Pluton migmatites, Goldschmidt Conference, Chicago, Illinois.

Gaschnig, R. M., Marshall, S. J., Stegner, C. J., Mirakian, M., Rader, S. T., Bebout, G. E., and Penniston-Dorland, S. C., 2024, Contrasting molybdenum isotope behavior in two paleo-subduction systems, Goldschmidt Conference, Chicago, Illinois.

**Bustos-Moreno, J. F.**, Bebout, G. E., and Savov, I. P., 2023, Nitrogen (N) in the serpentinized forearc wedge and its implications for the geologic-N cycle, American Geophysical Union Fall Meeting, San Francisco, California.

**Bustos-Moreno, J. F., Baumann, T.**, Bebout, G. E., and Angiboust, S., 2023, Arrested decarbonation in an ancient subduction zone: Isotopic and petrographic evidence from HP/UHP meta-ophiolitic breccias in the Western Alps, Goldschmidt Conference, Lyon, France.

Rader, S. T., Adams, C., Gaschnig, R. M., and Bebout, G. E., 2023, Constraints on fluid-mineral partitioning of thallium during high-pressure metamorphism, Goldschmidt Conference, Lyon, France.

**Epstein, G. S.**, Bebout, G. E., Christenson, B. W., Sumino, H., Wada, I., Werner, C. A., and Hilton, D. R., 2022, Thermodynamic and volcanic gas geochemical insights into volatile release during subduction along the Hikurangi margin, New Zealand, American Geophysical Union Fall Meeting, Chicago, Illinois.

**Bustos-Moreno, J. F.**, Bebout, G. E., Chen, Y.-X., and Schertl, H.-P., 2022, Nitrogen behavior during fluid-rock interactions in a continental subduction zone: Results from the Dora-Maira Massif whiteschists, International Eclogite Conference, Lyon, France.

Rader, S. T., Gaschnig, R. M., Penniston-Dorland, S. C., and Bebout, G. E., 2022, Thallium behavior within subduction zone metamorphism and related metasomatic processes, Goldschmidt Conference, Hawaii.

Codillo, E., Le Roux, V., Klein, B. Z., Behn, M. D., Marschall, H., and Bebout, G. E., 2021, Experimental constraints on the density sorting and mélange melting in subduction zones, American Geophysical Union Fall Meeting, New Orleans, Louisiana.

Bebout, G. E., Ota, T., Kunihiro, T., Carlson, W. D., and Nakamura, E., 2021, Lithium in garnet as a tracer of subduction zone metamorphic reactions: The record in UHP metapelites at Lago di Cignana, Italy, American Geophysical Union Fall Meeting, New Orleans, Louisiana.

Bebout, G. E., **Kraft, K. H.**, **Pinho, J.**, and **Epstein, G. S.**, 2021, Fate of subducting organic carbon: Evidence from HP/UHP metasedimentary suites and implications for isotopic compositions of arc volcanic gases, JpGU Meeting (virtual), July 2021.

**Epstein, G. S.**, Bebout, G. E., Christenson, B. W., Sumino, H., Wada, I., Werner, C. A., and Hilton, D. R., 2021, Stable isotope, noble gas, and forward modelling insights into the fate of volatiles subducted along the Hikurangi margin, New Zealand, Goldschmidt Conference, Lyon, France.

Marshall, S. J., Gaschnig, R. M., Stegner, C. J., Rader, S. T., and Bebout, G. E., 2021, Molybdenum isotope systematics in the high-P/T Schistes Lustres and at Lago di Cignana: Investigation of partitioning and isotopic fractionation during subduction zone metamorphism, Goldschmidt Conference, Lyon, France.

Stegner, C. J., Marshall, S. J., Gaschnig, R. M., Rader, S. T., and Bebout, G. E., 2021, Molybdenum behavior during subduction zone metamorphism in the Catalina Schist, Goldschmidt Conference, Lyon, France.

Le Roux, V., Codillo, E. A., Behn, M., Marschall, H., and Bebout, G. E., 2021, Experimental constraints on the physical properties of mélange rocks and their relationship to arc magmas, Goldschmidt Conference, Lyon, France.

**Nikitczuk, M. P.**, Bebout, G. E., Geiger, C., Ota, T., Kunihiro, T., Tanaka, R., Mustard, J. F., Nakamura, E., and Flemming, R. L., 2021, Nitrogenous Mars-analog potassic and micro- and mesoporous minerals: Relevant targets for Mars sample return, American Geophysical Union Fall Meeting, San Francisco, CA.

Bebout, G. E., Scholl, D. W., Stern, R. J., and Agard, P., 2020, Subduction Top to Bottom 2 (ST2B-2): A Major Publication Venture Celebrating 20 Years of Subduction Zone Science, American Geophysical Union Fall Meeting, San Francisco, CA.

**Marshall, S., Angiboust, S., Epstein, G. S.,** and Bebout, G. E., 2020, Carbon and oxygen isotope compositions of the Schistes Lustres: Closed vs. open system behavior and fluid sources in deeply underplated sediments, American Geophysical Union Fall Meeting, San Francisco, CA.

**Nikitczuk, M. P.,** Ota, T., Kunihiro, T., Tanaka, R., Flemming, R. L., Mustard, J. F., and Nakamura, E., 2020, Chemical alteration and nitrogenous biogeochemical signatures in altered volcanic glasses as astrobiologically relevant targets for Mars sample return, American Geophysical Union Fall Meeting, San Francisco, CA.

**Baumann, T.,** Angiboust, S., and Bebout, G. E., 2020, Abundance, textures, and O-C isotope compositions of carbonate in HP-metamorphosed pillow-basalt breccias in the Western Alps: Implications for deep-Earth carbon cycling, American Geophysical Union Fall Meeting, San Francisco, CA.

**Epstein, G. S.,** Bebout, G. E., Christenson, B. W., Sumino, H., Wada, I., Werner, C. A., and Hilton, D. R., 2020, Multidisciplinary assessment of volatile release beneath North Island, New Zealand: geological, geochemical, and thermodynamic forward modeling approach, American Geophysical Union Fall Meeting, San Francisco, CA.

Munoz-Montecinos, J., Angiboust, S., García-Casco, A., Glodny, J., and Bebout, G.E., 2020, From local dewatering to large-scale flushing during burial in the blueschist facies: Insights from a pervasively fractured metamorphic terrane. Metamorphic Studies Group Meeting (virtual), May, 2020.

**Epstein, G. S.,** Bebout, G. E., Christenson, B. W., Sumino, H., Wada, I., Werner, C. A., and Hilton, D. R., 2020, C-N-He-Ar cycling at the Hikurangi subduction margin, New Zealand, JpGU Meeting (virtual), July 2020.

**Epstein, G. S.,** Bebout, G. E., Christenson, B. W., Sumino, H., Wada, I., Werner, C. A., and Hilton, D. R., 2020, C-N-He-Ar cycling at the Hikurangi subduction margin, New Zealand, Goldschmidt Conference (virtual), Honolulu, July 2020.

Bebout, G. E., Scholl, D. W., Stern, R. J., Wallace, L. M., and Agard, P., 2019, Subduction Top to Bottom 2 (ST2B-2): The Concept and Progress on a Major Publication Venture, American Geophysical Union Fall Meeting, San Francisco, California, December, 2019, T41I-0229.

Gaschnig, R. M., Rader, S. T., Mirakian, M., and Bebout, G. E., 2019, Distribution and redistribution of Mo and Tl in high pressure-low temperature metamorphic rocks, American Geophysical Union Fall Meeting, San Francisco, California, December, 2019, V43-0142.

**Epstein, G. S.,** Bebout, G. E., Christenson, B. W., Sumino, H., Wada, I., and Hilton, D. R., 2019, Tracking volatiles cycling at the Hikurangi subduction margin, North Island, New Zealand: An integrated geologic, petrologic and isotopic approach, American Geophysical Union Fall Meeting, San Francisco, California, December, 2019, T32C-08.

Scholl, D. W., Bebout, G. E., Stern, R. J., Wallace, L. M., and Agard, P., 2019, Twenty years of subduction zone science: Subduction Top to Bottom 2 (ST2B-2), Geological Society of America Fall Meeting, Phoenix, Arizona, September, 2019.

**Epstein, G. S.,** Bebout, G. E., and Angiboust, S. A., 2019, Trace element and C, O, N isotope behavior during open-system fluid flow along transient paleo-subduction interfaces, Goldschmidt Conference, Barcelona, Spain, August, 2019.

Rader, S., Gaschnig, R., Owens, J., and Bebout, G., 2019, Thallium variations during high-pressure metamorphism, Goldschmidt Conference, Barcelona, Spain, August, 2019.

**Nikitczuk, M. P.**, Bebout, G. E., Ota, T., Kunihiro, T., Kobayashi, K., Geiger, C. A., and Nakamura, 2019, Nitrogenous altered basalt glasses and potassic and micro-porous mineral phases as tracers of Martian biogeochemical cycling, Astrobiology Science Conference (AbSciCon), Seattle, WA, June, 2019.

**Nikitczuk, M. P.**, Bebout, G. E., Ota, T., Kunihiro, T., Kobayashi, K., Tanaka, R., and Nakamura, E., 2018, Altered basaltic volcanics as targets for Mars sample return, Misasa VII — Sample-returns and Astrobiology, Yonago, Japan, December 19-21.

Bebout, G. E., **Nikitczuk, M. P.**, Ota, T., Kunihiro, T., Kobayashi, K., and Nakamura, E., 2018, Possible nitrogenous biosignatures in palagonitized glass and minerals present on the Mars surface, Misasa VII — Sample-returns and Astrobiology, Yonago, Japan, December 19-21.

Kunihiro, T., Nakamura, E., Ota, T., Sakaguchi, C., Tanaka, R., Kitagawa, H., Kobayashi, K., Yamanaka, M., Shimaki, Y., Bebout, G. E., Miura, H., Yamamoto, T., Malkovets, V., Grokhovsky, V., Koroleva, O., and Litasov, K., 2018, Continuity between asteroids and comets inferred from comprehensive geochemistry, Misasa VII — Sample-returns and Astrobiology, Yonago, Japan, December 19-21.

Scholl, D. W., Bebout, G. E., Stern, R. J., Wallace, L. M., and Agard, P., 2018, Twenty years of subduction zone science: Subduction Top to Bottom 2 (ST2B-2), American Geophysical Union Fall Meeting, Washington, D.C. (December, 2018), T21F-0267.

**Epstein, G.**, and Bebout, G. E., 2018, Reconciling records of forearc dynamics and fluid generation with estimates of carbon output in forearc springs and arc volcanic gases, American Geophysical Union Fall Meeting, Washington, D.C. (December, 2018), DI33B-0033.

Bebout, G. E., **Kraft, K.**, **Cook-Kollars, J.**, and **Epstein, G. S.**, 2018, Transfer of organic carbon through forearcs: Record in HP/UHP metamorphic rocks and bearing on estimates of the sources of arc volcanic gases, American Geophysical Union Fall Meeting, Washington, D.C. (December, 2018), DI33B-0046.

**Tintle, L.**, Bebout, G. E., McDermott, J., and Sahagian, D., 2018, Chemical controls on volcanic ash morphology: Magmatic heterogeneities or evolving energetics? American Geophysical Union Fall Meeting, Washington, D.C. (December, 2018), V51F-0154.

**Epstein, G. S.**, Bebout, G. E., Angiboust, S., and Agard, P., 2018, Fluid-rock interactions in deeply subducted and underplated oceanic sediments: Scales of fluid infiltration and carbon mobilization, Goldschmidt Conference, Boston, MA, August, 2018.

**Kraft, K.**, and Bebout, G. E., 2017, Fate of subducting organic carbon: Evidence from HP/UHP metasedimentary suites, American Geophysical Union Fall Meeting, New Orleans, Louisiana (December, 2017).

**Epstein, G.**, Bebout, G. E., Angiboust, S., and Agard, P., 2017, Pre-Alpine tectonic and geochemical history of the Schistes Lustrés: Stable isotope evolution of accreted and subducted marine sediments, American Geophysical Union Fall Meeting, New Orleans, Louisiana (December, 2017).

Bebout, G. E., and Scholl, D. W., 2017, Subduction Top to Bottom (ST2B) concept and online, *Geosphere* publication venue, Geological Society of American Annual Meeting, Seattle, Washington (October, 2017).

Hoover, W. F., Penniston-Dorland, S. C., Bebout, G. E., and Silverstone, J., 2017, Lithium mobility during dehydration, fact or fiction?: Insights from Li isotopes in Alpine metasedimentary rocks, Geological Society of American Annual Meeting, Seattle, Washington.

Halama, R., and Bebout, G. E., 2017, Tracking nitrogen transfer through the Earth's crustal reservoirs, GeoBremen, Bremen, Germany, September 24-29.

Halama, R., and Bebout, G. E., 2017, Nitrogen transfer in crustal rocks, Goldschmidt Conference, Paris, France (August, 2017).

Rotondo, F., Guerini, S., Tartarotti, P., Scambelluri, M., Cannàò, E., Bebout, G. E., and **Epstein, G.**, 2017, Oceanic and subduction ophiocarbonates in the Champorche Zermatt-Saas ophiolite (Aosta Valley, North-western Alps), PISA 2017, Pisa, Italy, September 3-6.

Halama, R., Bebout, G. E., and Bea, F., 2017, Nitrogen in deep crustal rocks from the Ivrea Zone (Southern Alps, Italy), Metamorphic Studies Group, Oxford, UK, March, 2017.

Bebout, G. E., Scholl, D. W., and Kirby, S. H., 2016, Subduction Top to Bottom: A brief history of an idea and publication concept, T41G-06, American Geophysical Union Fall Meeting, San Francisco, CA.

**Jaeckel, K. P.**, Bebout, G. E., and Angiboust, S., 2016, Carbon mobility at subduction interfaces via deformation-enhanced fluid infiltration: Evidence from the Swiss/Italian Alps, T31E-2954, American Geophysical Union Fall Meeting, San Francisco, CA.

House, B. M., Bebout, G. E., and Hilton, D. R., 2016, Ins and outs of a complex subduction zone: C cycling along the Sunda margin, Indonesia, V24A-06, American Geophysical Union Fall Meeting, San Francisco, CA.

Cannàò, E., Bebout, G. E., Agostini, S., and Scambelluri, M., 2016, Textural and geochemical evolution of ophiocarbonates from ocean to deep subduction, European Mineralogical Conference, Rimini, Italy, August, 2016.

Förster, B., Bebout, G. E., Bianchini, G., Natali, C., Aulbach, S., Braga R., and Scambelluri, M., 2016, Multi-stage carbonation and decarbonation in the mantle-wedge: Stable-isotope compositions of carbonate phases in ultramafic rocks of the Ulten Zone (Eastern Alps, Italy), European Mineralogical Conference, Rimini, Italy, August, 2016.

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+ 165 refereed abstracts published prior to 2015

#### **Chaired Sessions and Other Recent Professional Activities (since 2012 only)**

2025 Co-chaired session for Fall AGU Meeting, in New Orleans, Louisiana (**Subduction Top to Bottom**: Convergent margin processes surrounding the Caribbean plate and analogous global settings; co-chaired by Don Fisher, Kristin Morrell, and Paul Mann)

2024 Co-organized session for Fall AGU Meeting, in Washington, D.C. (**Subduction Top to Bottom**: Convergent Margin Processes Trench to Arc (Aleutians/Alaska and Beyond; co-organized by Kristin Morrell, Younhee Kim, Don Fisher, and Dave Scholl; **44 abstracts**)

2023 Co-chaired session for Fall AGU Meeting, in San Francisco, California (**Subduction Top to Bottom (ST2B)** — The Nature of the Subduction Interface, Earthquakes, and the Roles of Fluids; co-chaired by Ikuko Wada, Dave Scholl, and Don Fisher; **88 abstracts**)

2022 Co-chaired session for Fall AGU Meeting, in Chicago, Illinois (**Subduction Top to Bottom (ST2B)** — Origin and Evolution of Magmatic Arcs; co-chaired by Dave Scholl, Bob Stern, and Ikuko Wada; **32 abstracts**)

2021 Co-chaired session for Fall AGU Meeting, in New Orleans, Louisiana (**Subduction Top to Bottom 2 (ST2B-2)**: Focus on the Forearc; co-chaired by Dave Scholl, Bob Stern, and Ikuko Wada; **66 abstracts**)

2021 Co-chaired session for the JpGU meeting in Chiba, Japan (Volatiles in the Earth – from Surface to Deep Mantle; co-chaired with Takeshi Hanyu, Hirochika Sumino, and Yuji Sano)

2020 Co-chaired session for Fall AGU Meeting, in San Francisco, California (**Subduction Top to Bottom 2 (ST2B-2)**: A Major Publication Venture Celebrating 20 Years of Subduction Zone Science; co-chaired by Dave Scholl, Bob Stern, Laura Wallace, and Philippe Agard; **31 abstracts**)

2020 Co-chaired session for the JpGU meeting in Chiba, Japan (Volatiles in the Earth – from Surface to Deep Mantle; co-chaired with Takeshi Hanyu, Hirochika Sumino, and Yuji Sano)

2019 Co-chaired session for Fall AGU Meeting, in Washington, D.C. (**Subduction Top to Bottom-2**: Processes and Products, Modern and Ancient; co-chaired by Dave Scholl, Bob Stern, Laura Wallace, and Philippe Agard; **82 abstracts**)

2019	Co-chaired session, accepted for Annual GSA Meeting, in Phoenix, Arizona ( <b>Subduction Top to Bottom</b> , Modern and Ancient; co-chaired by Dave Scholl, Bob Stern, and Laura Wallace)
2018	Co-chaired session for Fall AGU Meeting, in Washington, D.C. ( <b>Subduction Top to Bottom-2</b> ; co-chaired by Dave Scholl, Bob Stern, Laura Wallace, and Philippe Agard; <b>87 abstracts</b> )
2017	Co-chaired session for Fall AGU Meeting, in New Orleans ( <b>Subduction Top to Bottom</b> , with a Caribbean Flavor; co-chaired by Dave Scholl, Bob Stern, and Philippe Agard; <b>73 abstracts</b> )
2017	Co-chaired session for Annual GSA Meeting, in Seattle ( <b>Subduction Top to Bottom</b> : Cascadia and Beyond; co-chaired by Dave Scholl, Bob Stern, Anne Trehearne, Joan Gomberg, and Tom Sisson; <b>19 abstracts</b> )
2016	Co-chaired session for Fall AGU Meeting, in San Francisco ( <b>Subduction Top to Bottom 2 (ST2B-2)</b> ; co-chaired by Dave Scholl, Bob Stern, Laura Wallace, and Philippe Agard; <b>136 abstracts</b> )
2017	Participant as Senior Scientist in GeoPRISMS/ExTerra/E-FIRE (PIRE/NSF-funded) field workshop in the Swiss and Italian Alps (July 24-August 19)
2014	Invited participant in ExTerra/GeoPRISMS lunch discussion at the Fall Meeting, American Geophysical Union, San Francisco, December 16, 2014
2013	Invitation to be a discussion leader for a Deep Carbon Observatory workshop on Tectonic Fluxes of Carbon (workshop leaders Jay Ague, Yale University, and Olivier Beyssac, CNRS IMPMC Paris), at Fall AGU Meeting, San Francisco, Dec. 8 (the DCO was funded by the Sloan Foundation)
2013	Co-author of white paper for ExTerra (lead author Sarah Penniston-Dorland, University of Maryland), a part of GeoPRISMS aimed at encouraging study of exhumed metamorphic rocks representing ancient subduction, December, 2013; see <a href="http://www.geoprisms.org/">http://www.geoprisms.org/</a> )
2013	Involvement as sponsor of white paper for GeoPRISMS Planning Workshop (for study of metamorphic rocks at the New Zealand Primary Site, April 15-17, 2013; see <a href="http://www.geoprisms.org/">http://www.geoprisms.org/</a> )
2012	Participation in preparation of white paper for ExTerra: Understanding Convergent Margin Processes Through Studies of Exhumed Terranes (this document includes a description of a planned field trip to Santa Catalina Island to examine exposures of exhumed high-P/T metamorphic rocks). ExTerra is a part of the GeoPRISMS initiative (see <a href="http://www.geoprisms.org/">http://www.geoprisms.org/</a> ).

## Notable Professional Service

2015 - 2024	Major editing task serving as chief editor for the Subduction Top to Bottom 2 Themed Issue (with 74 papers) in the journal <i>Geosphere</i> and spearheading the related special sessions at recent international meetings (the publication project was completed in 2022, but the sessions at meetings continue, most recently at the AGU meeting in New Orleans, December, 2025)
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2017	National Science Foundation, Review-Panel Member, Earth Sciences Division, Petrology and Geochemistry Program (for panel meeting in April, 2017)
2009 - 2017	External reviewer, ten tenure and promotion files for faculty at other universities or research entities (the latest two were for University of New Mexico in 2015 and Indiana University – Purdue University Indianapolis, in 2017)
2009	National Science Foundation, Review-Panel Member, Earth Sciences Division, Instrumentation and Facilities Program (ARI Program, Academic Research Infrastructure Program, October, 2009)
2001 - 2003	National Science Foundation, Review-Panel Member, Earth Sciences Division, Petrology and Geochemistry Program (began three-year term in March, 2001)
1999	National Science Foundation, Review-Panel Member, Earth Sciences Division, Petrology and Geochemistry Program, Fall, 1999 (one-time replacement for panel member)

## Teaching

Bebout teaches in the areas of mineralogy, petrology, and geochemistry, at all levels of the undergraduate program and at the graduate level. Following are the courses he recently offered.

EES 097 (Geology and Geopolitics of Critical Minerals; first offering in Fall, 2025)

EES 131 (Introduction to Rocks and Minerals; taught every spring, first offering in 1993)

EES 380 (The Practice of Science)

EES 471 (Stable Isotope Chemistry: Theory, Techniques, and Applications in the Earth and Environmental Sciences)

EES 293 Supervised Internship in Earth and Environmental Sciences

EES 393 Supervised Research in Earth and Environmental Sciences