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**BACKGROUND**

**Oct 2022-today:** *Associate Professor, Dept. Earth Sciences, Univ. College London*  
 March 2019-Sep 22: Lecturer (Asst. Professor), Dept. Earth Sciences, Univ. College London  
 Apr 2019-Apr 2020: Visiting Scientist, Dept. Earth Sciences, ETH Zürich  
 January 1-31, 2018: Part-time Lecturer, Graduate School of Science, University of Tokyo  
 Aug 2015-Feb 2019: Oberassistent (senior scientist) at Dept. Earth Sciences, ETH Zürich  
**August 2015-today:** *Research Affiliate, Earth-Life Science Institute, Tokyo Inst. Technology*  
 Apr 2015-Jul 2015: Project Assistant Professor, Earth-Life Science Institute, Tokyo Tech  
 Sep 2014-Mar 2015: Research Scientist, Earth-Life Science Institute, Tokyo Tech  
 Jan 2010-July 2014: PostDoc, Dept. Geology & Geophysics, SOEST, University of Hawaii  
 Sep 2009-Nov 2009: PostDoc, Dept. Earth Sciences, ETH Zürich  
 Jul 2005-Jun 2009: Ph.D. candidate, Inst. Geophysics, Dept. Earth Sciences, ETH Zürich  
*(advisors: Prof. Jeroen van Hunen and Prof. Paul Tackley)*  
 Okt 1999-Jun 2005: Diplom (analogous to BSc+MSc) in Geology at Ruhr-University Bochum  
*(advisors: Prof. Bernhard Stöckhert and Prof. Taras Gerya)*

**AWARDS**

- Swiss National Science Foundation Fellowship for Prospective Researchers (2009) awarded for one year of geodynamical and geochemical modeling at Univ. of Hawaii
- Editor's Citation for Excellence in Refereeing (2018), *Geochem.*, *Geophys.*, *Geosys.*

**SERVICE TO THE COMMUNITY AND PUBLIC**

**Associate Editor:** *AGU Monograph: "Mantle Convection and Surface Expressions"; American Mineralogist*

**Conference Organization:** *chair of Gordon Research Seminar "Interior of the Earth" (2013); organizing committee member "Mini-Workshop on Feedbacks Between Mantle Composition, Structure, and Evolution" (2020) & "Origin and Evolution of Plate Tectonics" workshop (2016); co-organizer "Mantle and Core" theme, Goldschmidt (2021)*

**Panel member:** *BGR (magmatism), DFG (review panel TRR)*

**Outstanding Student Poster Contest Coordinator:** *EGU Geodynamics section (2013-2016); "Origin and Evolution of Plate Tectonics" workshop (2016);*

**Session Convenor/Chair:** *AGU (2011-2014, 2016, 2020); EGU (2012, 2016, 2018-2019, 2021); AOGS (2018); EPSC (2019); SEDI (2020); Goldschmidt (2020)*

**PhD Committee Member:** *Juliane Dannberg (Univ. Potsdam, 2016), Antonio Manjón-Cabeza Córdoba (ETH Zurich, 2020), Jun Yan (ETH Zurich, 2021)*

**Seminar organization:** *Univ. Hawaii Geophys. Interest Group (2010-2011, 2014), Tokyo Tech ELSI Lunch Talk (2014-2015), ETH GFD seminar (2015-2018).*

**Student-Poster Judge:** *AGU (2010-2018, 2020), EGU (2012-2013, 2015-2016, 2018-2019), DEEP General Assembly (2018)*

**Reviewer for Funding Agencies:** *National Science Foundation, NERC, DFG, Marsden Fund, Netherlands Organisation for Scientific Research, ANR, ERC, Leverhulme Trust*

**Reviewer for Journals:** *Nature, Science, Nature Geosci., Science Advances, Nature Comms., G-cubed, Scientific Reports, GRL, JGR Solid Earth, JGR Planets, Tectonophysics, EPSL, GJI, PNAS, PEPS, Geology, Elements...*

**Outreach activity:** SOEST Open House (2011, 2013); public full-dome presentation (Planetarium Bochum; April 2015, May 2018), virtual public presentation (*Astronomical Society Urania Zurich*, NOV 2020)

## MENTORING OF STUDENTS

- main supervisor of PhD student *Ziqi Ma* (UCL, AUG 2022-...)
- main supervisor of MSc student *Kinzah Cordeiro* (UCL, 2022)
- main supervisor of MSci student *Matthew Jones* (UCL, 2021)
- main supervisor of PhD student *Mohamed Abdel-Maboud Khalil* (UCL, JAN 2021-...)
- main supervisor of PhD student *Matteo Desiderio* (UCL, OCT 2020-...)
- co-advisor of PhD student *Rob Spaargaren* (ETH Zurich, FEB 2019-...)
- main advisor of PhD student *Anna Gülcher* (ETH Zurich, NOV 2018-OCT 2022)
- co-advisor of PhD student *Kar Wai Cheng* (ETH, OCT 2018-...)
- main advisor of PhD student *David Gebhardt* (ETH Zurich, 2017-2018)
- main advisor of MSc student *Rob Spaargaren* (ETH Zurich, JAN-SEP 2018)
- co-advisor of PhD student *Daniela Bolrão* (ETH, 2016-...)
- main advisor of PhD student *Jun Yan* (ETH, 2016-2021)
- main advisor of PhD student *Antonio Manjón-Cabeza Córdoba* (ETH Zurich, 2016-2020)
- main on-site advisor of PhD student *Xiaogang Long* (Tongji Univ., visiting ETH: 2016-2018)
- main on-site advisor of MSc student *Thomas Duvernay* (IPG Paris, internship at ETH 2017)
- co-advisor of PhD students *Diogo Lourenço* and *Ilya Fomin* (ETH: both defended in 2017)
- co-advisor of MSc student *Yang Li* (BGI Bayreuth, 2015-2016)
- main advisor of undergraduate *Andrei Dmitrovskii* (ETH, 2019)
- main advisor of undergraduate *Matthew Motoki* (Univ. Hawaii, 2013-2014)

## TEACHING EXPERIENCE

### *Full modules/responsibility:*

- “The Earth”, Dept. Earth Sciences, UCL (2022)
- “Geodynamics and Global tectonics”, Dept. Earth Sciences, UCL (2021, 2022)
- “Numerical Modelling of Mantle Convection”, Dept. Earth Sciences, UCL (2021, 2022)
- “Geodynamics and Global tectonics”, Dept. Earth Sciences, UCL (2021)
- BSc-level course “Gravimetry” (spring 2016, 2017), Dept. Earth Sciences, ETH Zurich
- BSc-level course “Geophysics II” (spring 2018), Dept. Earth Sciences, ETH Zurich
- block course (8x2 hrs): “Introduction to Solid-Earth Fluid Dynamics”, Univ Tokyo (JAN 2018)
- Geophysics Field Course, *Gravimetry experiment*, Dept. Earth Sci., ETH (spring 2016-2018)
- “Science Communication at Intl. Conferences” (Geology 610) at Univ. Hawaii (spring 2014)

### *Contribution:*

- Geophysics Field Course, Dept. Earth Sciences, UCL (2019, 2020, 2021)
- “Geodynamics and Global tectonics”, Dept. Earth Sciences, UCL (2020)
- BSc “MATLAB” course (1 hour), Dept. Earth Sciences, UCL (2019)

- MSc-level course “Topics in Planetary Sciences” (2 hrs each), ETH Zurich (spring 2017, 2018)
- various Guest Lectures (2-3 hrs each) at Geography (2010), Geology&Geophysics (2012), and Mathematics (2013) Depts. of Univ. Hawaii; Dept. Earth Sciences, ETH Zurich (2015, 2017); Kapiolani Comm. College (APR 2011, OCT 2011); School of Pacific and Asian Studies (FEB 2014); Dept. Sciences de la Terre, ENS Lyon (OCT 2017)

## PEER-REVIEWED PUBLICATIONS

- Manjón-Cabeza Córdoba, A., and M. D. Ballmer (2022). The role of Edge-Driven Convection in the generation of volcanism – part 2: Interactions with Mantle Plumes, application to the Canary Islands, *Solid Earth*, in press
- Gülcher, A. J. P., G. Golabek, M. Thielmann, M. D. Ballmer, and P. J. Tackley (2022). Narrow, fast, and “cool” mantle plumes caused by strain-weakening rheology in Earth’s lower mantle, *Geochemistry Geophysics Geosystems*, in press
- Goes, S., C. Yu, M. D. Ballmer, J. Yan, and R. D. van der Hilst (2022). Chemical heterogeneity in the mantle transition zone, *Nature Reviews Earth & Environment*, 3, 533–550, doi:10.1038/s43017-022-00312-w
- Dalton, H., A. Giuliani, J. Hergt, D. Phillips, H. O’Brien, M. D. Ballmer, R. Maas, J. Woodhead (2022). Geodynamic and isotopic constraints on the genesis of kimberlites, lamproites and related magmas from the Finnish segment of the Karelian craton, *Geochemistry Geophysics Geosystems*, 23, 8, doi:10.1029/2021GC010324
- Waszek, L., B. Tauzin, N. C. Schmerr, M. D. Ballmer, and J.-C. Afonso (2021). A poorly mixed mantle transition zone and its thermal state inferred from seismic waves, *Nature Geoscience*, doi:10.1038/s41561-021-00850-w
- Hier-Majumder, S., M. D. Ballmer, M. Agius, C. Rychert, and N. Harmon (2021). Melt Leakage from the Hawaiian Plume above the Mantle Transition Zone, *Phys. Earth Planet. Interiors*, 321, 106813, doi:10.1016/j.pepi.2021.106813
- Sun, Y., S. Hier-Majumder, B. Tauzin, M. Walter, M. D. Ballmer, Y. Xu, and S. Kim (2021). Evidence of Volatile-Induced Melting in the Northeast Asian Upper Mantle, *J. Geophys. Res.—Solid Earth*, 126 (10), doi:10.1029/2021JB022167
- Gülcher, A. J. P., M. D. Ballmer, and P. J. Tackley (2021). Coupled dynamics and evolution of primordial and recycled heterogeneity in Earth’s lower mantle, *Solid Earth*, 12, 2087–2107, doi:10.5194/se-12-2087-2021
- Marquardt, H., M. D. Ballmer, S. Cottaar, and J. G. Konter (2021). Mantle Convection and Surface Expressions: Preface, *AGU Monograph*, 10.1002/9781119528609.fmatter
- Ballmer, M. D., and L. Noack. The Diversity of Exoplanets: From Interior Dynamics to Surface Processes (2021). *Elements*, doi:10.2138/gselements.17.4.245
- Samuel, H., M. D. Ballmer, S. Padovan, N. Tosi, A. Rivoldini, and A.-C. Plesa. The thermochemical evolution of Mars with a strongly stratified mantle, *J. Geophys. Res.—Planets*, doi:10.1029/2020JE006613
- Bolrão, D. P., M. D. Ballmer, A. Morison, A. B. Rozel, P. Sanan, S. Labrosse, and P. J. Tackley (2021). Timescales of chemical equilibrium between the convecting solid mantle and over- and underlying magma oceans, *Solid Earth*, 12, 421–437, doi:10.5194/se-12-421-2021
- Vilella, K., T. Bodin, C.-E. Boukaré, F. Deschamps, J. Badro, M. D. Ballmer, and Y. Li (2021): Constraints on the composition and temperature of LLSVPs from seismic properties of lower mantle minerals, *Earth and Planetary Science Letters*, 554, 116685, doi:10.1016/j.epsl.2020.116685

- Manjón-Cabeza Córdoba, A., and M. D. Ballmer (2021): The role of Edge-Driven Convection in the generation of volcanism– Part 1: a 2D systematic study. *Solid Earth*, 12, 613–632, doi:10.5194/se-12-613-2021
- Spaargaren, R., M. D. Ballmer, D. J. Bower, C. Dorn, and P. J. Tackley (2020): The influence of bulk composition on long-term interior-atmosphere evolution of terrestrial exoplanets, *Astronomy & Astrophysics*, 643, A44, doi:10.1051/0004-6361/202037632
- Lourenço, D., A. Rozel, M. D. Ballmer, and P. J. Tackley (2020): Plutonic-squishy lid: a new global tectonic regime generated by intrusive magmatism on Earth-like planets, *Geochemistry Geophysics Geosystems*, 21, doi:10.1029/2019GC008756
- Yan, J., M. D. Ballmer, and P. J. Tackley (2020): The evolution and distribution of recycled oceanic crust in the Earth’s mantle: Insight from geodynamic models, *Earth Planet. Sci. Lett.*, 537, 116171, doi:10.1016/j.epsl.2020.116171
- Gülcher, A. J. P., D. J. Gebhardt, M. D. Ballmer, and P. J. Tackley (2020): Variable dynamic styles of primordial heterogeneity preservation in the Earth’s lower mantle, *Earth Planet. Sci. Lett.*, 536, 116160, doi.org/10.1016/j.epsl.2020.116160
- Deng, H., M. D. Ballmer, C. Reinhardt, M. M. M. Meier, L. Mayer, J. Stadel, and F. Benitez (2019): Primordial Earth mantle heterogeneity caused by the Moon-forming Giant Impact, *The Astrophysical Journal*, 887 (2), 211, doi: 10.3847/1538-4357/ab50b9
- Long, X., M. D. Ballmer, A. Manjon Cabeza-Cordoba and C.-F. Li (2019): Mantle melting and intraplate volcanism due to self-buoyant hydrous upwellings from the stagnant slab that are conveyed by small-scale convection, *Geochemistry Geophysics Geosystems*, 20, doi:10.1029/2019GC008591
- Caracas, R., K. Hirose, R. Nomura, and M. D. Ballmer (2019): Melt-crystals density crossover in a deep magma ocean, *Earth and Planetary Science Letters*, 516, 202–211, doi:10.1016/j.epsl.2019.03.031
- Waszek, L., N. C. Schmerr, and M. D. Ballmer (2018): Global Observations of Reflectors in the Mid-Mantle and Implications for Mantle Structure and Dynamics, *Nature Communications*, 9, 385, doi:10.1038/s41467-017-02709-4
- Helfrich, G., M. D. Ballmer, and K. Hirose (2018): Core-exsolved SiO<sub>2</sub> dispersal in the Earth’s mantle, *J. Geophys. Research – Solid Earth*, 123, doi:10.1002/2017JB014865
- Ballmer, M. D. (2017): Small-scale convection in the Earth’s mantle. *Reference Module in Earth and Environmental Sciences*, doi:10.1016/B978-0-12-409548-9.09494-X
- Liao, J., Q. Wang, T. V. Gerya, and M. D. Ballmer (2017): Modeling craton destruction by hydration-induced weakening of the upper mantle, *Journal of Geophysical Research Solid Earth*, 122, 9, 7449–7466, doi:10.1002/2017JB014157
- Conrad, C. P., K. Selway, M. M. Hirschmann, M. D. Ballmer, and P. Wessel (2017): Constraints on Volumes and Patterns of Asthenospheric Melt from the Space-Time Distribution of Seamounts. *Geophys. Res. Lett.*, 44, 14, 7203–7210, doi:10.1002/2017GL074098
- Ballmer, M. D., D. Lourenço, K. Hirose, R. Caracas, and R. Nomura (2017): Reconciling Magma-Ocean Crystallization Models with the present-day Structure of the Earth’s mantle, *Geochemistry Geophysics Geosystems*, 18, doi:10.1002/2017GC006917
- Ballmer, M. D., C. Houser, J. W. Hernlund, R. Wentzcovitch, K. Hirose (2017): Persistence of Strong Silica-Enriched Domains in the Earth’s Lower Mantle. *Nature Geoscience*, 10, 236-240, doi:10.1038/ngeo2898
- Ballmer, M. D., L. Schumacher, V. Lekic, C. Thomas, and G. Ito (2016): Compositional layering within the Large Low Shear-wave Velocity Provinces in the lower mantle, *Geochem. Geophys. Geosys.*, 17, 5056-5077, doi:10.1002/2016GC006005

- Kato, C., K. Hirose, R. Nomura, M. D. Ballmer, A. Miyake, and Y. Ohishi (2016): Melting in the FeO–SiO<sub>2</sub> system to deep lower-mantle pressures: Implications for subducted Banded Iron Formations. *Earth and Planetary Science Letters*, 440, 56-61, doi:10.1016/j.epsl.2016.02.011
- Ballmer, M. D., N. C. Schmerr, T. Nakagawa, and J. Ritsema (2015): Compositional mantle layering revealed by slab stagnation at ~1,000 km depth, *Science Advances*, doi:10.1126/sciadv.1500815
- Ballmer, M. D., C. P. Conrad, E. I. Smith, R. Johnsen (2015): Intraplate volcanism at the edges of the Colorado Plateau sustained by a combination of edge-driven and shear-driven upwelling, *Geochemistry Geophysics Geosystems*, 16, doi:10.1002/2014GC005641.
- Motoki, M. H. and M. D. Ballmer (2015): Convective instability of Stagnant Slabs in the Mantle Transition Zone, *Geochem. Geophys. Geosys.*, 16, doi:10.1002/2014GC005608.
- Ballmer, M. D., G. Ito, and P. van Keken (2015): Hotspots, Large Igneous Provinces and Melting Anomalies. in: *Mantle Dynamics*, edited by G. Schubert and D. Bercovici, Elsevier, *Treatise of Geophysics 7.10*, 2<sup>nd</sup> edition, pp. 393-459
- Ballmer, M. D., G. Ito, and C. Cheng: Asymmetric Dynamical Behavior of Thermochemical Plumes and Implications for Hawaiian Lava Composition (2015). in: *Hawaiian Volcanism, From Source to Surface*, edited by R. Carey, M. Poland, V. Cayol and D. Weis; *AGU Monograph 208*, 36-57p., doi:10.1002/9781118872079.ch3
- Cheng, C., R. M. Allen, R. W. Porritt, and M. D. Ballmer (2015): Seismic constraints on a double-layered asymmetric whole-mantle plume beneath Hawaii, in: *Hawaiian Volcanism, From Source to Surface*, edited by R. Carey, M. Poland, V. Cayol and D. Weis; *AGU Monograph 208*, 19-34p., doi:10.1002/9781118872079.ch2
- Sakamaki, T., Suzuki, A., Ohtani, E., Terasaki, H., Urakawa, S., Katayama, Y., Funakoshi, K.-I., Wang, Y., Hernlund, J. W., Ballmer, M. D. (2013): Pondered melt at the boundary between the lithosphere and asthenosphere, *Nature Geosci.*, doi:10.1038/ngeo1982
- Ballmer, M. D., G. Ito, C. J. Wolfe, and S. C. Solomon (2013): Double layering of a thermochemical plume in the upper mantle beneath Hawaii, *Earth and Planetary Science Letters*, 376, 155-164, doi:10.1016/j.epsl.2013.06.022
- Bianco, T. A., G. Ito, J. van Hunen, J. J. Mahoney, and M. D. Ballmer (2013): Geochemical variations at ridge-centered hotspots caused by variable melting of a veined mantle plume, *Earth Planet. Sci. Lett.*, 371, pp: 191-202, doi: 10.1016/j.epsl.2013.03.050
- Ballmer, M. D., C. P. Conrad, E. I. Smith, and N. Harmon (2013): Non-hotspot volcano chains produced by migration of shear-driven upwelling toward the East Pacific Rise, *Geology*, 41, 479-482, doi:10.1130/G33804.1
- Cadio, C., M. D. Ballmer, I. Panet, M. Diament, and N. Ribe (2012): New constraints on the origin of the Hawaiian swell from wavelet analysis of the geoid to topography ratio, *Earth and Planetary Science Letters*, 359, 40-54, doi:10.1016/j.epsl.2012.10.006
- Ballmer, M. D., G. Ito, J. van Hunen, and P. J. Tackley (2011): Spatial and temporal variability in Hawaiian hotspot volcanism induced by small-scale convection, *Nature Geoscience*, 4, 7, 457-460, doi:10.1038/ngeo1187
- Bianco, T. A., G. Ito, J. van Hunen, M. D. Ballmer, and J. J. Mahoney (2011): Geochemical variations at intraplate hot spots caused by variable melting of a veined mantle plume, *Geochemistry Geophysics Geosystems*, 12, Q0AC13, doi:10.1029/2011GC003658.
- Ballmer, M. D., G. Ito, J. van Hunen, and P. J. Tackley (2010): Small-scale sublithospheric convection reconciles geochemistry and geochronology of ‘Superplume’ volcanism in

- the western and south Pacific, *Earth and Planetary Science Letters*, 290, 224-232, 10.1016/j.epsl.2009.12.025
- Ballmer, M. D., J. van Hunen, G. Ito, T. A. Bianco, and P. J. Tackley (2009): Intraplate volcanism with complex age-distance patterns – a case for small-scale sublithospheric convection, *Geochemistry Geophysics Geosystems*, 10, doi:10.1029/2009GC002386
- Bianco, T. A., G. Ito, J. van Hunen, M. D. Ballmer, and J. J. Mahoney (2008): Geochemical variation at the Hawaiian hot spot caused by upper mantle dynamics and melting of a heterogeneous plume, *Geochem. Geophys. Geosys.*, 9, doi: 10.1029/2008gc002111
- Ballmer, M. D., J. van Hunen, G. Ito, P. J. Tackley, and T. A. Bianco (2007): Non-hotspot volcano chains originating from small-scale sublithospheric convection, *Geophysical Research Letters*, 34, doi:10.1029/2007GL031636

### PhD THESIS

- Ballmer, M. D. (2009). Small scale convection - an alternative mechanism for oceanic intraplate volcanism, *Diss. ETH No. 18425*

### MANUSCRIPTS IN REVIEW

- Duvernay, T., J. O'Connor, M. D. Ballmer, M. D., N. Ribe, and W. Jokat. Plume pulsations linked to synchronous changes along the Hawaiian hotspot track, *Earth Planet. Science Lett.*
- Finlayson, V., M. D. Ballmer, J. G. Konter, M. G. Jackson, A. A. P. Koppers, and K. Konrad. Long-lived (>100 Myr) stable lower mantle geochemical structure sampled by the forked Rurutu-Arago mantle plume, *in prep.*
- Fei, H., M. D. Ballmer, U. Faul, N. Walte, and T. Katsura. Bridgmanite grain size variation accounts for the mid-mantle viscosity jump, *Nature*
- Pang, F., J. Liao, M. D. Ballmer and L. Li. Plume-ridge interactions: Ridge suction versus plate drag, *Solid Earth*, doi:10.5194/se-2022-20
- Spargaaren, R., H. S. Wang, S. J. Mojzsis, M. D. Ballmer, and P. J. Tackley. Plausible constraints on the range of bulk terrestrial exoplanet compositions in the Solar neighbourhood, *The Astrophysical Journal*

### INVITED PRESENTATIONS AT CONFERENCES AND WORKSHOPS

- Ballmer, M. D., A. J. P. Gülcher, J. Yan, R. Spaargaren, M. Desiderio, M. Ismail, L. Waszek, B. Tauzin (2022): Long-term thermo-chemical evolution of Earth's mantle, *Ada Lovelace Workshop*, Hévíz, Hungary
- Ballmer, M. D. (2022): Formation and Crystallization of the Basal Magma Ocean in the light of Geophysical Constraints, *10<sup>th</sup> ELSI Symposium*, Tokyo, Japan
- Ballmer, M. D., X. Long, J. Yan, L. Waszek, B. Tauzin, and A. Manjón-Cabeza Córdoba (2021): Compositional Stratification across the Mantle Transition Zone as sustained by Plume Ponding and Segregation, *AGU fall meeting*, New Orleans & online everywhere
- Ballmer, M. D. (2021): The distribution of primordial and recycled mantle heterogeneity through time: insight from geodynamic modeling, *Collège de France workshop "Global Scale Seismic Imaging and Dynamics of the Earth's Mantle"*, Paris
- Ballmer, M. D., J. Yan, A. J. P. Gülcher, D. J. Gebhardt (2019): Mantle heterogeneity in terrestrial planets: Formation, mixing, and segregation through time, *AGU fall meeting*, San Francisco

- Ballmer, M. D., T. Duvernay, J. M. O'Connor, N. M. Ribe (2018): Volcanic flux variations along the Hawaiian hotspot track: plume pulsations vs. plume-lithosphere interaction, *AGU fall meeting*, Washington DC
- Ballmer, M. D. (2018) [*keynote*]: Geodynamic mechanisms for the preservation of large-scale compositional heterogeneity in the Earth's mantle, *CGU-CIG Joint Assembly*, Niagara Falls, Canada
- Ballmer, M. D. (2018): Geodynamic mechanisms for the preservation of large-scale compositional heterogeneity in the Earth's mantle, *DEEP General Assembly*, Hurligtuten, Norway
- Ballmer, M. D. (2017): Large-scale compositional heterogeneity in the Earth's mantle, *AGU fall meeting*, New Orleans
- Ballmer, M. D. (2017): The preservation of large-scale heterogeneity in the Earth's Mantle, workshop on *Mantle Dynamics and Deep Earth Material Cycles*, München, Germany
- Ballmer, M. D. (2017): Persistence of large-scale heterogeneity in the Earth's Mantle, *Goldschmidt*, Paris
- Ballmer, M. D., T. Duvernay, and J. O'Connor (2017): Evolution of whole-mantle plumes: Consequences for hotspot volcanism, *Goldschmidt*, Paris, France
- Ballmer, M. D. (2017): Large-scale compositional heterogeneity in the Earth's mantle, *IAG-IASPEI joint assembly*, Kobe, Japan
- Ballmer, M. D. (2017): Magma-ocean crystallization and the preservation of ancient crust in the lowermost mantle, *From Crust to Core Summer Workshop*, Omishima, Japan
- Ballmer, M. D., D. Lourenço, K. Hirose, R. Caracas, and R. Nomura (2017): Reconciling Magma-Ocean Crystallization Models with the present-day Structure of the Earth's mantle (2017): *JpGU-AGU joint assembly*, Makuhari, Japan
- Ballmer, M. D., C. Houser, J. W. Hernlund, R. Wentzcovitch, K. Hirose: Persistence of Strong Silica-Enriched Domains in the Earth's Lower Mantle (2017): *JpGU-AGU joint assembly*, Makuhari, Japan
- Ballmer, M. D. (2017): Large-scale compositional heterogeneity in the Earth's mantle, *Big Transition Zone and beyond*, London
- Ballmer, M. D., V. Lekic, C. Thomas, L. Schumacher, and G. Ito (2016): Compositional layering within the large low shear-wave velocity provinces (LLSVPs) in the lower mantle, *EGU General Assembly*, Wien
- Ballmer, M. D., N. C. Schmerr, T. Nakagawa, J. Ritsema and M. Motoki (2015): Compositional mantle layering revealed by slab stagnation at ~1,000 km depth, *AGU fall meeting*
- Ballmer, M. D., V. Lekic, C. Thomas, L. Schumacher, and G. Ito (2015): Compositional layering within the large low shear-wave velocity provinces (LLSVPs) in the lower mantle, *AGU fall meeting*, San Francisco
- Ballmer, M. D., S. French, V. Lekic, and G. Ito (2014): Simultaneous generation of Superdomes and Superplumes in the deep Earth's mantle, *14<sup>th</sup> Symp. of SEDI*, Kanagawa, Japan
- Ballmer, M. D., C. P. Conrad, E. I. Smith, and N. Harmon (2013): Non-hotspot volcano chains produced by migration of shear-driven upwelling toward the East Pacific Rise, *AGU fall meeting*, San Francisco
- Ballmer, M. D., C. P. Conrad, N. Harmon, E. I. Smith, R. Johnsen (2013): Intraplate volcanism at the edges of the Colorado Plateau sustained by shear-driven upwelling, *EGU General Assembly*, Wien
- Ballmer, M. D., G. Ito, Wolfe, C. J., Solomon, S. C. (2012): Double layering of a thermochemical plume in the upper mantle beneath Hawaii, *EGU General Assembly*, Wien

- Ballmer, M. D., C. P. Conrad, N. Harmon, T. A. Bianco, E. I. Smith (2011): 3-D patterns and volumes of decompression melting fueled by asthenospheric flow: comparison and interaction of shear-driven upwelling with small-scale convection, *AGU fall meeting*
- Ballmer, M. D., G. Ito, Wolfe, C. J., Solomon, S. C., Laske, G. (2011): Double layering of thermochemical-plume material can reconcile upper-mantle seismic velocity structure beneath Hawaii, *AGU fall meeting*, San Francisco
- Ballmer, M. D., G. Ito, J. van Hunen, P. J. Tackley, T. A. Bianco (2011): The role of small-scale sublithospheric convection in generating and modulating oceanic intraplate volcanism, *EarthScope Inst. on the Lithosphere-Asthenosphere Boundary*, Portland
- Ballmer, M. D., G. Ito, J. van Hunen, P. J. Tackley, T. A. Bianco (2011): The role of small-scale sublithospheric convection in generating and modulating oceanic intraplate volcanism, *GORDON Research Seminar*, Mount Holyoke, USA
- Ballmer, M. D., G. Ito, J. van Hunen, P. J. Tackley (2010): Small-scale convection induces temporal and spatial variability in Hawaiian plume volcanism, *AGU fall meeting*
- Ballmer, M. D., G. Ito, J. van Hunen, P. J. Tackley (2009): Small-scale sublithospheric convection reconciles geochemistry and geochronology of 'Superplume' volcanism in the western and south Pacific, *AGU fall meeting*, San Francisco

## INVITED LECTURES AND SEMINARS

- Astronomical Society Urania Zurich (AGUZ), Zurich, Switzerland (NOV 2020)
- Dept. Earth Sciences, *Univ. Oxford*, Oxford, UK (MAR 2019)
- Kavli Inst. Theoretical Physics, *Univ. California Santa Barbara*, Goleta, USA (JUL 2018)
- Planetarium Bochum, Bochum, Germany (MAY 2018)
- Geodynamic Research Center, *Ehime University*, Matsuyama, Japan (JAN 2018)
- Japan Agency for Marine and Earth Sci. and Tech. (*JAMSTEC*), Yokosuka, Japan (JAN 2018)
- Dept. Earth and Planetary Sciences, *Univ. Tokyo*, Tokyo, Japan (JAN 2018)
- Dept. Sciences de la Terre, *ENS Lyon*, Lyon, France (OCT 2017)
- Dept. Geology & Geophysics, Yale, New Haven, USA (SEP 2017)
- Dept. Earth Sciences, *Univ. Cambridge*, Cambridge, UK (MAY 2017)
- Institut du Physique du Globe (IPG Paris), *Univ. Paris 7*, Paris, France (NOV 2016)
- Dept. Earth Sciences, *University College London*, London, UK (NOV 2016)
- Dept. Earth and Planetary Sciences, *Univ. Tokyo*, Tokyo, Japan (JUL 2016)
- Centre of Earth Evolution and Dynamics, Oslo, Norway (NOV 2015)
- Institut für Geophysik, *Univ. Frankfurt*, Frankfurt, Germany (NOV 2015)
- Bayerisches Geoinstitut, *Univ. Bayreuth*, Bayreuth, Germany (OCT 2015)
- Inst. Geophysics, *ETH Zurich*, Zurich, Switzerland (SEP 2015)
- Institut für Geophysik, *Westfälische Wilhelms Univ. Münster*, Münster, Germany (APR 2015)
- Planetarium Bochum, Bochum, Germany (APR 2015)
- Berkeley Seismological Laboratory, *Univ. California Berkeley*, Berkeley, USA (MAR 2014)
- SOEST, *Univ. of Hawaii*, Honolulu HI, USA (JAN 2014)
- Earth Life Science Institute, *Tokyo Inst. Technology*, Meguro, Tokyo, Japan (JAN 2014)
- FAST, *Univ. Paris-Sud*, Orsay, France (APR 2013)
- Dept. Sciences de la Terre, *Univ. Lyon 1*, Lyon, France (APR 2013)
- Kavli Inst. Theoretical Physics, *Univ. California Santa Barbara*, Goleta, USA (AUG 2012)
- Inst. Geophysics, *ETH Zurich*, Zurich, Switzerland (MAY 2012)
- Helmholtz Centre, *Geoforschungszentrum (GFZ) Potsdam*, Potsdam, Germany (APR 2012)
- Hawaiian Volcano Observatory, *US Geological Survey*, Volcano NP, USA (JUL 2011)



Dept. Terrestrial Magnetism, *Carnegie Inst. Washington*, Washington DC, USA (JUN 2011)  
SOEST, *Univ. of Hawaii*, Honolulu HI, USA (FEB 2009)  
Department of Earth Sciences, *Durham Univ.*, Durham, UK (SEP 2007)  
SOEST, *Univ. of Hawaii*, Honolulu HI, USA (JAN 2007)  
Inst. Geophysics, *ETH Zurich*, Zurich, Switzerland (DEC 2006)

## RESEARCH VISITS

Inst. Geophysics, *ETH Zurich* (APR 2019-APR 2020; OCT 2020-JUL 2021)  
Dept. Earth and Planetary Science, *Univ. Tokyo* (5 weeks in JAN/FEB 2018)  
Dept. Geology & Geophysics, SOEST, *Univ. Hawaii at Manoa* (6 weeks in FEB/March 2009)

## SEA AND FIELD EXPERIENCE

geologic mapping in Ahlsburg mountains, Dörringsen, Germany (1 week in 2000)  
geologic mapping in Ardennes mountains, Comblain-Fairon, Belgium (2 weeks in 2003)  
geologic mapping in the Alps (Asten/Laste, Penserjoch, Tatschspitze), Italy (4 weeks in 2004)  
R/V Kilo Moana cruise to Hawaiian N-arch (Mohole Project), central Pacific (1 week in 2010)

## OUTREACH AND FOCUS ARTICLES ON MY RESEARCH

Deschamps, F. (2017), Surviving Mantle Convection, *Nature Geoscience* (Focus), 10, 161  
Wright, M. (2015), Twin studies provide first explanations for boundary within Earth's mantle  
Witze, A. (2013), Under The Volcano, *Nature* (News), 504, 206-207  
Morton, M. C. (2013), East Pacific Rise volcanoes finally line up, *Earth Magazine*, June, 17-18  
Koppers, A. A. P. (2011), Mantle Plume Persevere, *Nature Geoscience* (Focus), 4, 12, 816-817

## h-INDEX /// i10-INDEX

Scopus: **h=19** /// **i10=27**; Google Scholar: **h=21** /// **i10=30** (measured on 4/10/2022)