Dr. Mark Albert Torres

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ACADEMIC APPOINTMENTS

RICE UNIVERSITY | Assistant Professor (2017 -)
Department of Earth, Environmental, & Planetary Sciences 6100 Main Street MS-126, Houston, TX 77005

CALTECH | Texaco Postdoctoral Fellow (2015-2017)
Division of Geological & Planetary Sciences | Supervisors: Dr. Michael Lamb and Dr. Woodward Fisher

EDUCATION

UNIVERSITY OF SOUTHERN CALIFORNIA | Ph.D. in Geochemistry (2015)

PITZER COLLEGE | B.A. in Geology with honors & Minor in Environmental Studies (2010)

HONORS AND AWARDS

2021 F.W. Clarke Medal Geochemical Society

EXTERNAL FUNDING

'22 NSF: Collaborative Research: EAR-Climate: Physical Controls on CO_2 Release from Shale Weathering
Funds to Rice: $258,177 | End Year: 2025 | Co-PI

'21 NSF: Collaborative Research: Boron in soil carbonates: developing a quantitative soil CO_2 proxy
Funds to Rice: $319,659 | End Year: 2024 | Co-PI

'20 NSF: Collaborative Research: EAGER: Using allies to expand your network: Implementing a psychological methodology to attract and retain underrepresented (UR) students in geoscience
Total Award: $253,432 | End Year: 2022 | Co-I

'20 NSF: Does Sediment Storage Set the Pace of the Terrestrial Organic Carbon Cycle?
Funds to Rice: $413,794 | End Year: 2023 | Sole PI

'19 ACS-PRF: Coupling Autogenic Sedimentation to the Geologic C Cycle Using New Theory and Data
Funds to Rice: $110,000 | End Year: 2022 (NCE:2023) | Sole PI

'19 Sloan: Novel Weathering Reactions & Sedimentary Forcings as Controls On Seawater Chemistry
Funds to Rice: $70,000 | End Year: 2021 | Sole PI

TEACHING

- Senior Honors Thesis (EEPS 401) | Fall 2022, Spring 2023
- Earth & Planetary Surface Environments (EEPS 321) | Fall 2020, 2021, 2022
- Advanced Topics: Basin Sedimentology & Stratigraphy (ESCI 546) | Spring 2020
- Isotope Geochemistry (EEPS 433/633) | Fall 2019
- Geochemistry of Earth's Surface (EEPS 415/615) | Fall 2018, Spring 2021, Spring 2023
- Global Biogeochemical Cycles (ESCI 340) | Spring 2018-2020
- Mountains, Climate & Global Carbon Cycling (ESCI 555) | Fall 2017

ADVISING

Postdoctoral Researchers: D. Johnson ('20-'22), E. Ramos ('21-)
Graduate students: M. Gammerman ('22-), H. Zhou ('20-), D. Jana ('20-), W. Larsen ('19-), Y. Hou ('18-), T. Cole (M.sc; '17-'20), J. Spector ('17), P. Kemeny (Caltech '16-'22)
Undergraduate students: S. Buchanan ('18), M. Hale ('18-'20), N. Osmani ('19), J. Alanis ('19), K. Russo ('21) G. Burke ('22), S. Suniga ('22), B. Singh ('22), M. Borle ('22), D. De Leon ('22), D. Veldkamp ('22)

INVITED PRESENTATIONS

'23 University of Pennsylvania, Dartmouth, University of California - Riverside, Smithsonian Tropical Research Institute
'22 University of Iceland, Institut de Physique du Globe Paris
'21 University of Texas - Arlington, Consortium of Universities for the Advancement of Hydrologic Science , Geological Society of America Conference, Goldschmidt Conference, University of New Hampshire, University of Chicago
'20 University of Cambridge, Earth2Earth , Luquillo Critical Zone Observatory Webinar, California Institute of Technology, University of Utah, Woods Hole Oceanographic Institution
'19 Geobiology Summer Course, Asian Sedimentary Consortium, Exxon-Mobil
'18 Goldschmidt Conference, Industry Rice Earth Science Symposium
'17 Texas A&M, University of Texas - Austin

UNIVERSITY SERVICE

- Scientia Organizer and Speaker (2023)
- "The End of Ice" Roundtable Discussion (2023)
- E4 Steering Committee (2023-)
- Planetary Science Faculty Search (2022)
- Undergraduate Curriculum Committee (2022-)
- Field Trip Committee Chair (2022-)
- Environmental Field Station Working Group (2021-)
- Department Ombud (2019-)
- Faculty Associate Duncan College (2018-)
- Weiss/Pan Postdoctoral fellowship committee (2016-)

PROFESSIONAL SERVICE

- PaleoCamp Instructor (2022)
- Associate Editor for the American Journal of Science (2022-)
- Goldschmidt Conference Organizing Committee (2022)
- USC Young Researchers Program Guest Lecturer (2021)
- Goldschmidt Conference Session Convener (2018)
- Department of Energy - Office of Biological and Environmental Research Proposal Review Panel (2018)
- AGU Conference Session Convener (2019, 2020)
- Reviewer: Science, Nature Geoscience, Proceedings of the National Academy of Sciences, AGU Advances, Science Advances, Geophysical Research Letters, Earth and Planetary Research Letters, Environmental Science & Technology, Water Resources Research, Geochimica et Cosmochimica Acta, American Journal of Science, Earth Surface Dynamics, Journal of Geophysical Research - Earth Surface, Geochemistry, Geophysics, Geosystems, NSF, NASA, +others

Publications

Link to Google Scholar

* = graduate mentee ** = postdoc mentee

Submitted / in press

[IR1] P. Kemeny*, G.K. Li, M. Douglas, J. Adkins, W. Berelson, N. Dalleska, M.P. Lamb, W. Larsen*, J. Magyar, N. Rollins, J.C. Rowland, I. Smith, M.A. Torres, S. Webb, A.J. West, and W.W. Fischer. Permafrost degradation in the Koyukuk River system and the timescale dependence of sulfur-carbon-climate feedbacks. in review at Global Biogeochemical Cycles.

[IR2] M.A. Torres. The Major Element Geochemistry of Surface Waters: Fluxes, Sources, and Controls. Invited book chapter in the Treatise of Geochemistry, in prep.

Published

[P1] Z. Li, Y.G. Zhang, M.A. Torres, and B.J.W. Mills. Neogene burial of organic carbon in the global ocean. Nature, 2023.

[P2] T. L. Cole*, M.A. Torres, and P. C Kemeny*. The hydrochemical signature of incongruent weathering in Iceland. Journal of Geophysical Research: Earth Surface, 2022.

[P3] Y. Hou* and M.A. Torres. Autogenic signals in sedimentary organic carbon records. Geophysical Research Letters, 2022.

[P4] K.E. Clark, V. Bravo, S. Giddings, K. Davis, G. Pawlak, M.A. Torres, A. Adelson, C. Cesar, X. Boza, and R. Collin. Land use and land cover shape river water quality at a continental caribbean land-ocean interface. Frontiers in Water - Environmental Water Quality, 2022.

[P5] A. Xu, T. Loch-Temzelides, C. Adiole, N. Botton, S.G. Dee, C.A. Masiello, M. Osborn, M.A. Torres, and D.S. Cohan. Race and ethnic minority, local pollution, and covid-19 deaths in texas. Scientific Reports, 12(1):1–9, 2022.

[P6] P.C. Kemeny* and M.A. Torres. Presentation and applications of mixing elements and dissolved isotopes in rivers (ME-ANDIR), a customizable MATLAB model for monte carlo inversion of dissolved river chemistry. American Journal of Science, 2021.

[P7] P.C. Kemeny*, M.A. Torres, M.P. Lamb, S.M. Webb, N. Dalleska, T.L. Cole*, Y. Hou*, J. Markse, J.F. Adkins, and W.W. Fischer. Organic sulfur fluxes and geomorphic control of sulfur isotope ratios in rivers. EPSL, 2021.

[P8] M.A. Torres and J.J. Baronas. Modulation of Riverine Concentration-Discharge Relationships by Changes in the Shape of the Water Transit Time Distribution. Global Biogeochemical Cycles, 2021.

[P9] P.C. Kemeny*, G.I Lopez, N.F. Dalleska, M.A. Torres, A.J. West, J. Hartmann, and J.F. Adkins. Sulfate sulfur isotopes and major ion chemistry reveal that pyrite oxidation counteracts CO_2 drawdown from silicate weathering in the Langtang-Narayani River system, Nepal Himalaya. Geochimica et Cosmochimica Acta, 2020.

[P10] M.A. Torres, P.C. Kemeny*, M.P Lamb, Cole* T.L., and W.W. Fischer. Long-term storage and age-biased export of fluvial organic carbon: field evidence from West Iceland. Geochemistry, Geophysics, Geosystems, 2020.

[P11] S.G. Dee, M.A. Torres, R. Martindale, A. Weiss, and K. DeLong. The future of reef ecosystems in the Gulf of Mexico: insights from coupled climate model simulations and ancient hot-house reefs. Frontiers in Marine Science, 2019.

[P12] C.A. Lee, H. Jiang, R. Dasgupta, and M.A. Torres. A Framework for Understanding Whole-Earth Carbon Cycling, page 313–357. Cambridge University Press, 2019.

[P13] M.A. Torres, S. Dong, A.J. West, and K.H. Nealson. The kinetics of siderophore-mediated olivine dissolution. Geobiology, 2019.

[P14] J.J. Baronas, M.A. Torres, A.J. West, O. Rouxel, B. Georg, J. Bouchez, J. Gaillardet, and D.E. Hammond. Ge and Si isotope signatures in rivers: A quantitative multi-proxy approach. Earth and Planetary Science Letters, 503:194–215, 2018.

[P15] M. A. Torres, G. Paris, Jess F. Adkins, and W. W. Fischer. Riverine evidence for isotopic mass balance in the Earth's early sulfur cycle. Nature Geoscience, 2018.

[P16] M.A. Torres, A.B. Limaye, V Ganti, M.P Lamb, A.J. West, and W.W. Fischer. Model predictions of long-lived storage of organic carbon in river deposits. Earth Surface Dynamics, 2017.

[P17] M.A. Torres, N. Moosdorf, J. Hartmann, Jess F. Adkins, and A. J. West. Glacial weathering, sulfide oxidation, and global carbon cycle feedbacks. Proceedings of the National Academy of Sciences, 2017.

[P18] M.A. Torres, J.J. Baronas, K.E. Clark, S.J Feakins, and A.J. West. Mixing as a driver of temporal variations in river hydrochemistry. Part 1: insights from conservative tracers in the Andes-Amazon. Water Resources Research, 2017.

[P19] J.J. Baronas, M.A. Torres, K.E. Clark, and A.J. West. Mixing as a driver of temporal variations in river hydrochemistry. Part 2: Major and trace element concentration dynamics in the Andes-Amazon. Water Resources Research, 2017.

[P20] M.A. Torres, A.J. West, K.E. Clark, G. Paris, J. Bouchez, C. Ponton, S.J. Feakins, Galy V., and J.F. Adkins. The acid and alkalinity budgets of weathering in the andes-amazon system: Insights into the erosional control of global biogeochemical cycles. Earth and Planetary Science Letters, 2016.

[P21] M.A. Torres, A.J. West, and K. E. Clark. Geomorphic regime modulates hydrologic control of chemical weathering in the Andes-Amazon. Geochimica et Cosmochimica Acta, 2015.

[P22] M.A. Torres, A.J. West, and G. Li. Sulphide oxidation and carbonate dissolution as a source of CO_2 over geological timescales. Nature, 2014.

[P23] K.E. Clark, M.A. Torres, A.J. West, R.G. Hilton, M. New, A.B. Horwath, J.B. Fisher, J.M. Rapp, A. Robles Caceres, and Y. Malhi. The hydrological regime of a forested tropical Andean catchment. Hydrology and Earth System Sciences, 2014.

[P24] M.A. Torres and R.R. Gaines. Paleoenvironmental and Paleoclimatic Interpretations of the Late Paleocene Goler Formation, Southern California, USA, Based On Paleosol Geochemistry. Journal of Sedimentary Research, 2013.

Conference Abstracts (since 2017)

[A1] H. Zhou*, M.A Torres, N.B Harris, G. Costin, and T. Terlier. Micro-scale geochemical analysis of molybdenum distribution in shales deposited under different redox conditions. In AGU, 2022.

[A2] M.A. Torres, Y. Hou*, D. Johnson**, Z. Li, K. Straub, and Y. Zhang. How do the internal dynamics of sedimentary systems affect organic carbon burial and environmental signal preservation? In AGU, 2022.

[A3] Y. Hou*, J.J. Baronas, P. Kemeny*, and M.A Torres. Glaciation, landscape, and chemical weathering: Interpreting sedimentary records from (non-)glacial lakes in iceland with a multi-proxy approach (OSPA winner). In AGU, 2022.

[A4] P. Kemeny*, G.K. Li, M. Douglas, J. Adkins, W. Berelson, N. Dalleska, M.P. Lamb, W. Larsen*, J. Magyar, N. Rollins, J.C. Rowland, I. Smith, M.A. Torres, S. Webb, A.J. West, and W.W. Fischer. Permafrost degradation in the Koyukuk River system and the timescale dependence of sulfur-carbon-climate feedbacks. In AGU, 2022.

[A5] E. Ramos**, Y. Hou*, S. Muñoz, W. Larsen*, D. Ibarra, and M.A. Torres. Silicate weathering intensity assessments obscured by congruent weathering of a mixed volcanic watershed: A case study of the Upper Deschutes Basin, Oregon, USA. In AGU, 2022.

[A6] D. Jana*, M.A. Torres, K. Thirumalai, and U. Jammalamadaka. Understanding the effects of post-depositional processes on foraminiferal paleotemperature proxies: Insights from x-ray microct scanning. In AGU, 2022.

[A7] M. Nutt, H. Zhou*, J. Scheingross, and M.A Torres. The role of tectonics in regulating co_2 release from shale weathering. In AGU, 2022.

[A8] Y. Hou*, P. Kemeny*, and M.A. Torres. Constraining Secondary Clay Formation with Ge/Si Ratios and Water Isotopes at Efri Haukadalsa River and Adjacent Catchments in Western Iceland. In AGU, 2021.

[A9] K. Russo*, Y. Hou*, W. Larsen*, R. Collin, K.E. Clark, V. Bravo, C. Cesar, X. Boza, and M.A. Torres. Effect of River-Seawater Mixing on Silica Concentrations in Almirante Bay, Panama. In AGU, 2021.

[A10] D. Jana*, M.A. Torres, K. Evans, U. Jammalamadaka, T. Terlier, and K. Thirumalai. Foraminifera as indicators of the effects of bottom-water circulation on marine sedimentary archives. In AGU, 2021.

[A11] H. Zhou*, M.A. Torres, G. Costin, T. Terlier, and N. Harris. Micro-scale analyses of traditional geochemical proxies for organic matter preservation in mudstones. In AGU, 2021.

[A12] W. Larsen*, M. Chapela Lara, C. Lopez-Lloreda, W.H. McDowell, and M.A. Torres. Preferential Flowpaths Drive Solute Dynamics in Tropical Catchments: Unmixing Sources with Isotopic and Solute-based Approaches. In AGU, 2021.

[A13] M.A. Torres, Z. Li, and Y. Zhang. Sedimentation rate scaling in the global ocean. In AGU, 2021.

[A14] M.A. Torres, M. Chapela Lara, K.E. Clark, R. Collin, Y. Hou*, P. Kemeny*, W. Larsen*, C. Lopez-Lloreda, W.H. McDowell, and K. Russo*. Invited: The evolution of earth's surface from the perspective of modern rivers. In GSA 2021.

[A15] M.A. Torres, P. Kemeny*, and D. Johnson**. Invited: The role of biogeochemical transients in Earth's habitability. In Goldschmidt Proceedings, 2021.

[A16] M.A. Torres, K.E. Clark, R. Collin, Y. Hou*, W. Larsen*, V. Bravo, C. Cesar, and X. Boza. Hydrochemical monitoring of rivers in the bocas del toro region of panama: insights into impacts on coastal environments. In AGU, 2020.

[A17] Y. Hou* and M.A. Torres. Autogenic signals in sedimentary organic carbon records. In AGU, 2020.

[A18] W. Larsen*, M. Chapela Lara, C. Lopez-Lloreda, W.H. McDowell, and M.A. Torres. Revisiting solute dynamics in the luquillo critical zone observatory using young water fractions. In AGU, 2020.

[A19] S. Preston, A. Xu, M. Osborn, S. Dee, T. Loch-Temzelides, M.A. Torres, C. Masiello, D. Cohan, C. Adiole, N. Botton, S. Breaux, M. Ding, B. Gelman, L. Guo, L. Lu, and Zhou J. The environmental impacts of covid-19 in texas: an integrative, multivariate geospatial analysis and mapping software. In AGU, 2020.

[A20] M.A. Torres, Y. Hou*, and T. Cole*. The Autogenic Carbon Cycle . In Gordon Geobiology, 2020.

[A21] Y. Hou* and M.A. Torres. Effects of stochastic sedimentation on organic carbon diagenesis and preservation. In AGU, 2019.

[A22] T. Cole*, P. Kemeny*, J. Nittrouer, and M.A. Torres. Elucidating terrestrial organic carbon burial mechanisms–insights from the western irish namurian basin, county clare, ireland. In AGU, 2019.

[A23] A Joshua West, Valier Galy, Gen Li, Mark Torres, Camilo Ponton, and Sarah J Feakins. Field constraints from the amazon basin reveal a rapid rate constant for oxidation of rock-derived organic carbon. In AGU, 2019.

[A24] Y. Zhang, L. Ziye, M.A. Torres, and B. Mills. Neogene burial of organic carbon in the global ocean. In AGU, 2019.

[A25] M.A. Torres, J. Baronas, T. Cole*, and N. Osmani*. Model-Data Comparison in River Hydrochemistry. In Goldschmidt Proceedings, 2019.

[A26] T. Cole*, P. Kemeny*, W.W. Fischer, M. Lamb, and M.A. Torres. Evaluating the Environmental and Lithological Controls on Silicate Weathering in Iceland. In AGU, 2018.

[A27] M.A. Torres, J. Baronas, A.J. West, and R.B. Georg. Invited: Using Isotopic Tracers to Decode Concentration-Discharge Relationships. In Goldschmidt Proceedings, 2018.

[A28] J. Gonzalez, M.A. Torres, M.T. Colucci, S.B. Jacobsen, and C.T. Lee. C, N, H, O, S and Trace Element Determinations in Organic-Rich Sediments and Some Igneous Rocks Types by Tandem LA-LIBS ICP-MS. In Goldschmidt Proceedings, 2018.

[A29] M.T. Colucci, S.B. Jacobsen, J. Gonzalez, M.A. Torres, , C.T. Lee, D. Savard, R. Neumann, and J.W. Boyce. Tandem LA-ICP-MS & LIBS; A New Micro-Analytical Technique for the Measurement of Every Element in the Periodic Table. In Goldschmidt Proceedings, 2018.

[A30] M.A. Torres, P.C. Kemeny*, W.W. Fischer, and M.P. Lamb. Radiocarbon constraints on the coupled growth of sediment and organic carbon reservoirs in fluvial systems. In Gordon Geobiology, 2018.

[A31] N. Moosdorf, M.A. Torres, J. Hartmann, Jess F. Adkins, and A. J. West. Global Carbon Cycle Feedbacks of Glacial Weathering. In Goldschmidt Proceedings, 2017.

[A32] M.A. Torres, P.C. Kemeny*, W.W. Fischer, and M.P. Lamb. Radiocarbon constraints on the coupled growth of sediment and organic carbon reservoirs in fluvial systems. In AGU, 2017.

[A33] P. Kemeny*, M.A. Torres, S. Webb, M. Lamb, J.F. Adkins, and W.W. Fischer. Organic Sulfur Fluxes and Isotope Mass Balance in Rivers. In Goldschmidt Proceedings, 2017.