Manuel Justin G. Custado

PhD Candidate, Department of Earth, Environmental, and Planetary Sciences
Brown University
Website: https://academic.link/justincus
Email: manuel_justin_custado@brown.edu; mjgcustado@gmail.com

EDUCATION

PhD Earth, Environmental, and Planetary Sciences, Brown University (2022 – 2027)
- *Thesis*: Geochemical insights on the hydrologic and carbon cycles: Isotopic constraints from lakes and river catchments
- *Committee*: Profs. Daniel Ibarra (advisor), Laurence Smith, Alberto Saal, Emily Cooperdock, Tim Herbert
- *Graduate affiliate*, Institute at Brown for Environment and Society (IBES)

MSc Environmental Science, University of the Philippines – Diliman (2017 – 2021)
- *Thesis*: Spatial and temporal assessment of the influence of runoff on Philippine coastal productivity using gridded datasets
- *Advisor*: Prof. Carlos Primo David

BSc Chemistry, University of the Philippines – Diliman (2011 – 2015)
- *Thesis*: Evaluation of preservation methods for dissolved nitrite and phosphate in seawater and freshwater samples
- *Advisor*: Prof. Maria Lourdes San Diego-McGlone

FELLOWSHIPS, GRANTS, AND AWARDS

- **IBES Research, Training, and Travel Award** (2023). *Constructing a hydrological balance model for the Bear Lake Watershed, Utah and Idaho using stable isotope data*. $5,000.
- **Best institute MSc graduate** (2021)

RESEARCH AND PROFESSIONAL APPOINTMENTS

Graduate researcher and teaching assistant, Department of Earth, Environmental, and Planetary Sciences, Brown University (Aug 2022 – present)
- Conducted research integrating fieldwork, geochemical analysis, and computational techniques to investigate carbon and water cycle processes
- Authored peer-reviewed research on isotope hydrology and climate science
- Mentored undergraduate researchers and assisted faculty in courses offered by the department

Hydrology consultant, World Bank (Jul 2021 – Jun 2022)
- Produced a report evaluating the Ranao (Agus) River Basin Master Plan in Mindanao, Philippines using the 2016 Philippine Integrated Water Resources Management (IWRM) guidelines

Research staff and data analyst, National Institute of Geological Sciences, University of the Philippines (May 2021 – Jun 2022)
- Analyzed hydrological geospatial datasets contributing to a peer-reviewed article published in *All Earth*

Research consultant, Philippine National Commission for UNESCO (Jan 2022 – May 2022)
- Synthesized financial data acquired from personal correspondence with different government agencies
- Produced and presented a preliminary report on the resource allocation of Philippine public institutions to the ocean sciences

University research associate, Marine Science Institute, University of the Philippines (Oct 2018 – Mar 2021)
- Conducted coastal and oceanographic surveys for water quality and nutrient analysis
- Designed analytical procedures to validate the accuracy of low-cost sensors to support the implementation of a government-funded project on the detection of harmful algal blooms

Analytical chemist, Bureau of Fisheries and Aquatic Resources, Philippine Government (Aug 2017 – Oct 2018)
- Analyzed the antibiotic residue content in aquatic animal samples for export
- Managed samples and records to support the maintenance of the laboratory's management system in accordance with ISO/IEC 17025

Analytical chemist, Analytical Services Laboratory, Ginebra San Miguel Inc. (Feb 2016 – Jul 2017)
- Participated in various quality assurance activities of the raw materials, storage tanks, and vessels used in liquor production
- Managed samples, protocols, and records to support the maintenance of the laboratory's management system in accordance with ISO/IEC 17025
- Audited quality assurance laboratories within the company

TEACHING AND MENTORSHIP

Graduate teaching assistant, Brown University (Aug 2024 – present)
- Courses: ENVS 1917: Ice, Coral, Dust, Pollen (Profs. Daniel Ibarra & Brian Lander); EEPS 1300: Terrestrial Biogeochemistry, Ecosystems and the Global Carbon Cycle (Prof. Daniel Ibarra); EEPS 1370: Environmental Geochemistry (Prof. Yongsong Huang); EEPS 1320: Introduction to Geographic Information Systems for Environmental Applications (Prof. Seda Seda Şalap-Ayça)

Undergraduate student research mentor, Brown University (2022 – present)
- Mentored (5) undergraduate students in various research activities involving field sampling, laboratory analysis, data analysis and visualization. Mentees include Annabelle Gao and Jonah Bernstein-Schalet (Summer 2023), Tee Gotsch (Summer 2024), Jenna Serotta (Summer 2025), and Claire Xu (Spring 2026). Serotta and Xu presented their research in university-wide and regional academic conferences.

Co-instructor, Brown Environmental Leadership Labs (summer field program), Brown University (2023 – 2025)
Co-instructor, Climate Science Youth Camp (summer field program), Department of Science and Technology – Philippines, (2022)

PUBLICATIONS (Google Scholar profile)

Published

Custado, M. J., Waldeck, A. R., Belanger, B., Wang, X.-K., Rugenstein, J. C. K., Cobb, K. M., Oster, J. L., Ibarra, D. E. (2026). Contrasting controls on $\delta^{18}O$-$\delta^{2}H$ and $\delta^{18}O$-$\delta^{17}O$ systematics in a balance-filled lake. *Geochemical Perspective Letters*.

Piccione, G., Kirby, M., Stephen, J., Dubey, A., Torres, A., Gibertoni, M., Contreras, A. R., Leeper, R., Daneschmand, A., **Custado, M. J.**, Ibarra, D. E. (2026). Paleohydrologic conditions in the Mojave Desert during the last deglaciation recorded by core-to-shore lacustrine record. *Quaternary Science Reviews*. 390(110171).

Custado, M. J., & Cooperdock, E. H. G. (2026). Where is Southeast Asian Climate Research Produced? A Bibliometric Analysis of Climate Science Literature, which has been submitted for possible publication in Earth and Space Science. *Earth and Space Sciences*, 13(4), e2025EA004882.

Butler, K. L., Munk, L., Boutt, D. F., Morris, N., Kennedy, J., Saha, P., Blake, M. R., **Custado, M. J.**, & Ibarra, D. E. (2025). The origin and enrichment of sedimentary basin lithium brines: A case study from the Upper Devonian Leduc Formation, Alberta Basin, Canada. *Economic Geology*, *120*(3), 649–662.

Custado, M. J., Gagnon, C. A., Belanger, B., Sekhon, N., Bernstein-Schalet, J., Kinsley, C. W., Sharp, W. D., Oster, J. L., & Ibarra, D. E. (2025). Constraining the Modern Hydrological Balance of Bear Lake, Utah-Idaho: Insights from Stable Isotopes (δ^{18} O and δ^{2} H). *Water Resources Research*, *61*(4), e2024WR038264.

David, C. P., **Custado, M. J.,** Sekhon, N., & Ibarra, D. E. (2022). Forecasting tropical ENSO-induced drought conditions using sea surface height in the Western Pacific. *All Earth*, *34*(1), 55–65.

Sekhon, N., David, C. P. C., Geronia, M. C. M., **Custado, M. J. G.,** & Ibarra, D. E. (2022). Investigating the response of hydrological processes to El Niño events using a 100-year dataset from the western Pacific Ocean. *Journal of Hydrology: Regional Studies*, *42*, 101174.

Custado, M. J., & David, C. P. C. (2021). Influence of runoff on coastal chlorophyll-a concentration in selected Philippine upwelling sites. *Philippine Science Letters*, *14*(1), 108–118.

Custado, M. J., & David, C. P. C. (2021). Assessing the spatial and temporal relationship between coastal runoff and chlorophyll-*a* in the Philippines using gridded datasets. *Journal of Coastal Research*, *37*(4), 726–736.

In review

Cheng, X., Rugenstein, J. C., Spaur, S., **Custado, M. J.**, Ibarra, D. E., Koning, D., Aby, S., Weitzman, J., Chamberlain, P. Pacific-driven hydroclimate in the Southwestern US during the Miocene Climatic Optimum recorded by clay oxygen isotopes. *Geology*.

Belanger, B., Höpker, S. N., Sharp, Z. D., Hartland, A., Ibarra, D. E., **Custado, M. J.,** Banarjee, P., Peshek, C., Oster, J. L. An evaluation of stable oxygen and carbon ($\delta^{18}O$, $\delta^{13}C$) and triple oxygen ($\Delta'^{17}O$) isotopes in $CaCO_3$ grown in cave analog experiments. *Geochemistry, Geophysics, Geosystems*.

In preparation

Sekhon, N., Geronia, M. C., Wolf, A., Belanger, B., Vega, M. G., **Custado, M. J.,** Gao, A., Kong-Johnson, C., Tabujara, S., Gatdula, J., dela Cruz, N. S., Waldeck, A., David, C. P., Ibarra, D. E. Event-based and seasonal hydroclimate processes drive cave meteorology and stable isotope geochemistry in tropical cave systems.

Custado, M. J., Tompkins, H. G. D., Serotta, J., Gotsch, T., Domingo, J. P. T., David, C. P. C, Ibarra, D. E. Ultramafic weathering in the tropics: Geochemistry and inverse modeling of rivers draining the Zambales Ophiolite Complex (ZOC), Philippines.

CONFERENCE PRESENTATIONS (*undergraduate mentees)

Custado, M. J., Tompkins, H. G. D., Serotta, J.*., Gotsch, T.*, Domingo, J. P. T., David, C. P. C., Ibarra, D. E. (2026). River geochemical signatures in the Zambales Ophiolite Complex, Philippines: Implications for Southeast Asian uplift, weathering, and the long-term carbon cycle. *Goldschmidt 2026*. [Talk]

Xu, C.*, **Custado, M. J.,** Rugenstein, J. C. K., Ibarra, D. E. (2026). Constraining triple oxygen isotope signatures of precipitation during the 2023-2024 strong El Niño in the Western US. *GSA Northeastern Section Meeting*.

Custado, M. J., Waldeck, A. R., Belanger, B., Wang, X.-K., Rugenstein, J. C. K., Cobb, K. M., Oster, J. L., Ibarra, D. E. (2025). Comparing Triple Oxygen ($\delta^{18}O$-$\delta^{17}O$) and $\delta^{18}O$-$\delta^{2}H$ Isotope Systematics Using a Lake Balance Approach: Insights from Bear Lake, Utah-Idaho. *AGU Fall Meeting*. [Talk]

Custado, M. J., & Cooperdock, E. H. G. (2025). Mapping Southeast Asian Climate Research Production: A Bibliometric Perspective. *AGU Fall Meeting*. [Poster]

Custado, M. J., Domingo, J. P. T., David, C. P. C.; Ibarra, D. E. (2024). Strontium isotope controls on mafic and ultramafic weathering: A case study in the Zambales Ophiolite Complex, Philippines, Southeast Asia. *AGU Fall Meeting*. [Poster]

Custado, M. J., Gagnon, C. A., Belanger, B., Sekhon, N., Bernstein-Schalet, J., Kinsley, C. W., Sharp, W. D., Oster, J. L., & Ibarra, D. E. (2024). Insights Into the Hydrological Balance of Bear Lake Utah-Idaho Through Stable Water Isotope Analysis. *GSA Connects*. [Talk]

Ibarra, D., Miller, S., **Custado, M. J.,** Kinsley, C. W., Belanger, B., Sekhon, N., Gagnon, C. A., Sharp, W. D., & Oster, J. (2024). Investigating Late Pleistocene Stable Isotope Systematics of Lakes in the Western United States. *GSA Connects*.

Blake, M., Butler, K. L., Munk, L., Boutt, D. F., Morris, N., Kennedy, J., Saha, P., Ibarra, D. E., **Custado, M. J.** (2024). Lithium Sources and Enrichment Mechanisms for the Lithium-Rich Oil Field Brines of Thedevonian Nisku, Leduc, and Swan Hills Formations. *GSA Connects*.

Ibarra, D., Sekhon, N., Kong-Johnson, C., Gao, A., Belanger, B., **Custado, M. J.,** Geraldes Vega, M., McGee, D., Mallick, S., & David, C. P. (2024). Developing an Understanding of Modern and Past Hydroclimate Variability in Philippines Karst Environments. *GSA Connects*.

Largo, R., **Custado, M. J.,** Ulate, I., Ibarra, D., Rugenstein, J. K. (2024). A Preliminary Analysis of the Precipitation Stable Isotope Signature of the Recent 2023-24 Super El Niño. *GSA Connects*.

Custado, M. J., Domingo, J. P. T., David, C. P., & Ibarra, D. E. (2023). Assessing Chemical Weathering Rates in the Zambales Ophiolite Complex, Southeast Asia. *AGU Fall Meeting*. [Poster]

Custado, M. J., Miller, S., Chang, N., Prausnitz-Weinbaum, M., Gagnon, C. A., Belanger, B., de Wet, C., Kinsley, C. W., Sharp, W. D., Oster, J. L., & Ibarra, D. E. (2024). Hydrological balance in the Bear Lake Watershed, Utah and Idaho using major-ion and stable isotope analysis. *GSA Rocky Mountains Section Meeting*. [Poster]

Sekhon, N., Kong-Johnson, C., Gao, A., Belanger, B., **Custado, M. J.,** Vega, M. G., McGee, D., Mallick, S., David, C. P., & Geronia, M. C. M. (2023). Developing an Understanding of Modern and Past Hydroclimate Variability Impacts on Tropical Island Nations: A Case Study from the Philippines. *AGU Fall Meeting*.

Sekhon, N., David, C. P., Geronia, M. C., **Custado, M. J.,** & Ibarra, D. (2021). Tropical drought and El Nino: Historic and future river discharge analysis of the Philippine archipelago. *AGU Fall Meeting*.

Custado, M. J., *et al.* (2019). Spatial assessment of nutrient levels and phytoplankton communities in Puerto Princesa Bay, Palawan, Philippines. *11th East HAB Symposium & 4th Phil HAB Conference*. [Talk]

Custado, M. J., Jacinto, G. S. (2019). Time-Series Assessment of Highly Impacted Coastal Areas Using Earth Imaging Data from the Online Platform, Planet.com. *15th National Symposium on Marine Science*. [Poster]

SELECTED TALKS

Southeast Asian Studies Initiative Symposium, Brown University
- Who conducts Southeast Asian climate research? A bibliometric analysis of climate science literature (Apr 2026)

Climate and Environment lunch talk series, Brown University
- Geochemical constraints on silicate weathering in the Zambales Ophiolite Complex, Philippines (upcoming, May 2026)
- Who conducts Southeast Asian research? An analysis of author affiliations and their implications on knowledge production (May 2025)
- Utilizing stable isotopes to assess the hydrological balance in the Bear Lake watershed, Utah-Idaho (Feb 2023)

LEADERSHIP AND SERVICE

Climate and environment group faculty representative, Department of Earth, Environmental, and Planetary Sciences, Brown University (2025 – 2026)
- Represented graduate students within the climate and environment group in department faculty meetings

Core member, Alliance of STEM Graduate Students and Workers, University of the Philippines Diliman (2021)

- Facilitated discussions with university administration and research assistants regarding issues of salary delays during pandemic lockdowns [Social media post]
- Coordinated campaigns with different media outlets regarding science worker issues [Philippine Star article] [Rappler article]

WORKSHOPS AND SHORT COURSES ATTENDED

- **Early Career Critical Zone Research Coordination Network (CZ RCN) Workshop**, HJ Andrews Experimental Forest, Oregon State University (Mar 2025)
- **Isotopes in Spatial Systems (SPATIAL)**, University of Utah (Jul 2024)
- **Hands-on GIS for Earth Scientists,** Utrecht University Summer School (Jul 2023)

KEY SCIENTIFIC SKILLS AND EXPERIENCE

Computational
- Proficient in Python programming language for (1) numerical modeling and computational work and (2) spatiotemporal analysis of large datasets
- Other software used: ArcGIS Pro, PHREEQC

Field
- Environmental sampling in freshwater and marine environments

Laboratory
- Experience in chemical laboratory management and analysis, including handling of different analytical instruments: Picarro CRDS, ICP-MS, ICP-OES, MC ICP-MS, HPLC, GC

Scientific writing and editing, data visualization
- Authored peer-reviewed publications and reviewed articles published in *GSA Bulletin* and *Theoretical and Applied Climatology*