

DAMANVEER S. GREWAL

Division of Geological and Planetary Sciences, California Institute of Technology,
1200 E California Blvd, Pasadena, CA 91125, USA

damanveer.grewal@asu.edu • damanveer.iitkgp@gmail.com • www.damanveergrewal.com

EDUCATION

- 2016-21 PhD (Experimental Cosmochemistry) – Rice University, Houston, USA
2007-12 Integrated BSc + MSc (Applied Geology) – Indian Institute of Technology (IIT), Kharagpur, India

PROFESSIONAL APPOINTMENTS

- 2024- Assistant Professor, School of Molecular Sciences (SMS), Arizona State University (ASU), Tempe, USA
2024- Assistant Professor, School of Earth and Space Exploration (SESE), Arizona State University (ASU), Tempe, USA
2022-23 Barr Foundation Postdoctoral Fellow, California Institute of Technology (Caltech), Pasadena, USA
2016-21 Research Assistant, Rice University, Houston, USA
2014-16 Chemistry Teacher, Lakshya Forum for Competitions Pvt. Ltd., Patiala, India
2012-14 Chemistry Teacher, iQuest Eduventures, Patiala, India
2010 Research Intern, Christian-Albrechts-Universität Zu Kiel, Germany

GRANTS, FELLOWSHIPS, AND AWARDS

- 2024 Travel grant Planet Formation for Planet Formation Workshop by Munich Institute of Astro- and Particle Physics (\$2000)
2023 Meteoritical Society Travel Award (\$640)
2022 Caltech Center for Comparative Planetary Evolution Research Grant (\$8,800)
2022 Caltech Center for Comparative Planetary Evolution and the Caltech Microanalysis Center Research Grant (\$21,000)
2022 Travel grant Planet Formation for Planet Formation Workshop by Munich Institute of Astro- and Particle Physics *declined*
2022 Outstanding Student Presentation Award, AGU 2021 (\$250)
2021 Barr Foundation Postdoctoral Fellowship, California Institute of Technology (\$136,500)
2021 Alexander von Humboldt Postdoctoral Fellowship (€73,680) *declined*
2021 SESE Exploration Postdoctoral Fellowship, Arizona State University (\$247,000) *declined*
2021 Outstanding Graduate Student Award, Rice University (\$2000)
2021 Goldschmidt Registration Grant
2020 Travel grant Planet Formation for Planet Formation Workshop by Munich Institute of Astro- and Particle Physics *cancelled due to COVID-19*
2019-21 Future Investigators in NASA Earth and Space Science and Technology (FINNEST) (\$90,000)
2019 Lodieska Stockbridge Vaughn Fellowship, Rice University (\$16,750)
2019 Torkild Rieber Award in Geology, Rice University (\$2000)
2019 Goldschmidt Travel Grant (\$1000)
2018 Goldschmidt Travel Grant (\$1800)
2015 Award for teaching excellence, Lakshya Forum for Competitions
2014 Best teacher, iQuest Eduventures
2013 Best teacher, iQuest Eduventures
2007-12 Innovation in Science Pursuit for Inspired Research, Department of Science and Technology, India

PEER-REVIEWED ARTICLES

(#designates supervised undergraduate/high school students)

15. **Grewal, D.S.**, Nie, N.X., Zhang, B., Izidoro, A., Asimow, P.D. (2024) Accretion of the earliest inner solar system planetesimals beyond the water snowline. *Nature Astronomy* doi: [10.1038/s41550-023-02172-w](https://doi.org/10.1038/s41550-023-02172-w)

DAMANVEER S. GREWAL

14. Suer, T.-A., Jackson, C., **Grewal, D.S.**, Dalou, C., Lichtenberg, T. (2023) The Distribution of Highly Volatile Elements During Rocky Planet Formation. *Frontiers in Earth Science* **11** doi: [10.3389/feart.2023.1159412](https://doi.org/10.3389/feart.2023.1159412)
13. **Grewal, D.S.**, Asimow, P.D. (2023) Origin of the superchondritic carbon/nitrogen ratio of the bulk silicate Earth – an outlook from iron meteorites. *Geochimica et Cosmochimica Acta* **344**: 146-159. doi: [10.1016/j.gca.2023.01.012](https://doi.org/10.1016/j.gca.2023.01.012)
12. **Grewal, D.S.**, Sun, T., #Aithala, S., #Hough T., Dasgupta, R., Yeung, L., Schauble, E. (2022) Limited nitrogen isotope fractionation during core-mantle differentiation in rocky protoplanets and planets. *Geochimica et Cosmochimica Acta* **338**: 347-364. doi: [10.1016/j.gca.2022.10.025](https://doi.org/10.1016/j.gca.2022.10.025)
11. **Grewal, D.S.**, Seales, J., Dasgupta, R. (2022) Internal or external magma oceans in the earliest protoplanets – perspectives from nitrogen and carbon fractionation. *Earth and Planetary Science Letters* **598**: 117847. doi: [10.1016/j.epsl.2022.117847](https://doi.org/10.1016/j.epsl.2022.117847)
10. **Grewal, D.S.** (2022) Origin of nitrogen isotopic variations in the rocky bodies of the Solar System. *The Astrophysical Journal* **937**: 123. doi: [10.3847/1538-4357/ac8eb4](https://doi.org/10.3847/1538-4357/ac8eb4)
9. **Grewal, D.S.**, Dasgupta, R., #Aithala, S. (2021) The effect of carbon concentration on its core-mantle partitioning behavior in inner Solar System rocky bodies. *Earth and Planetary Science Letters* **571**: 117090. doi: [10.1016/j.epsl.2021.117090](https://doi.org/10.1016/j.epsl.2021.117090)
8. **Grewal, D.S.**, Dasgupta, R., #Hough, T., #Farnell, A. (2021) Rates of protoplanetary accretion and differentiation set nitrogen budget of rocky planets. *Nature Geoscience* **14**: 369-376. doi: [10.1038/s41561-021-00733-0](https://doi.org/10.1038/s41561-021-00733-0)
7. **Grewal, D.S.**, Dasgupta, R., Marty, B. (2021) A very early origin of nitrogen in inner Solar System protoplanets. *Nature Astronomy* **5**: 356-364. doi: [10.1038/s41550-020-01283-y](https://doi.org/10.1038/s41550-020-01283-y)
6. **Grewal, D.S.**, Dasgupta, R., #Farnell, A. (2020) The speciation of carbon, nitrogen, and water in magma oceans and its effect on volatile partitioning between major reservoirs of the Solar System rocky bodies. *Geochimica et Cosmochimica Acta* **280**: 281-301. doi: [10.1016/j.gca.2020.04.023](https://doi.org/10.1016/j.gca.2020.04.023)
5. Dasgupta, R., **Grewal, D.S.** (2019). Origin and Early Differentiation of Carbon and Associated Life-Essential Volatile Elements on Earth. In Orcutt, B., Daniel, I., Dasgupta, R. (Eds.) *Deep Carbon: Past to Present* (Cambridge University Press). 4-39. doi: [10.1017/9781108677950.002](https://doi.org/10.1017/9781108677950.002)
4. Hakim, K., Spaargaren, R., **Grewal D.S.**, Rohrbach A., Brendt J., Dominik, C., van Westrenen, W. (2019) A laboratory approach to probe the mineralogy of carbon-rich rocky exoplanets. *Astrobiology* **9**: Number 7. doi: [10.1089/ast.2018.1930](https://doi.org/10.1089/ast.2018.1930)
3. **Grewal, D.S.**, Dasgupta, R., #Holmes, A.K., Costin, G., Li Y., Tsuno, K. (2019) The fate of nitrogen during core-mantle separation on Earth. *Geochimica et Cosmochimica Acta* **251**: 87-115. doi: [10.1016/j.gca.2019.02.009](https://doi.org/10.1016/j.gca.2019.02.009)
2. **Grewal, D.S.**, Dasgupta, R., Sun, C., Tsuno K., Costin, G. (2019) Delivery of Carbon, Nitrogen and Sulfur to the Silicate Earth. *Science Advances* **5**: eaau3669. doi: [10.1126/sciadv.aau3669](https://doi.org/10.1126/sciadv.aau3669)
1. Tsuno, K., **Grewal, D.S.**, Dasgupta, R. (2018). Core-mantle fractionation of carbon in Earth and Mars: The effects of sulfur. *Geochimica et Cosmochimica Acta* **238**: 477-495. doi: [10.1016/j.gca.2018.07.010](https://doi.org/10.1016/j.gca.2018.07.010)

In revision:

16. **Grewal, D.S.**, Miyazaki, Y., Nie, N.X. (202x) Limited contribution of the Moon-forming impactor to the present-day volatile inventory in the bulk silicate Earth.

INVITED SEMINARS AND COLLOQUIA

- Department of Earth and Planetary Sciences, Yale University (03/2024)
- School of Earth and Space Exploration, Arizona State University (02/2024)
- School of Earth Sciences, Zhejiang University, China (06/2023)

DAMANVEER S. GREWAL

- *Department of Earth and Planetary Sciences, Harvard University (03/2023)*
- *Department of Earth and Atmospheric Sciences, University of Houston (02/2023)*
- *School of Molecular Sciences, Arizona State University (01/2023)*
- *Department of the Geophysical Sciences, University of Chicago (01/2023)*
- *Department of Earth and Environmental Science at the University of Minnesota - Twin Cities (12/2022)*
- *Division of Geological and Planetary Sciences, California Institute of Technology (11/2022)*
- *Gordon Research Conference - Deep Carbon Science (06/2022) [Cancelled due to COVID-19]*
- *Bayerisches Geoinstitut (BGI), University of Bayreuth, Germany (06/2022)*
- *Department of Earth, Planetary and Space Science, University of California, Los Angeles (03/2022)*
- *Department of the Geophysical Sciences, University of Chicago (01/2022)*
- *School of Earth and Planetary Sciences, National Institute of Science Education and Research (NISER), India (01/2022)*
- *Geological Society of India, Regional Center – Indian Institute of Technology (IIT) Kharagpur (11/2021)*
- *Prebiotic Chemistry and Early Earth Environments Consortium Seminar Series (08/2021)*
- *Geodynamics Research Center, Ehime University (06/2021)*
- *Geochemistry group, University of Cambridge, UK (06/2021)*
- *Le Centre de Recherches Péetrographiques et Géochemiques (CRPG) Nancy, France (04/2021)*
- *Biogeochemistry group, University of California, Riverside (04/2020)*

PRESENTATIONS AT SCIENTIFIC MEETINGS AND CONFERENCES

(* designates presenting author, # designates supervised interns)

35. *Grewal, D.S. Origin of nitrogen and carbon in the rocky bodies of the Solar System – an outlook from iron meteorites. *2nd FORCE Winter Workshop, Arizona State University (01/2024) [ORAL] Invited*
34. *Grewal, D.S., Asimow, P.D. Origin of nitrogen and carbon in the rocky bodies of the Solar System – an outlook from iron meteorites. *American Geophysical Union Fall Meeting (12/2023) [ORAL] Invited*
33. *Grewal, D.S., Asimow, P.D. Origin of nitrogen and carbon in the rocky bodies of the Solar System – an outlook from iron meteorites. *Meteoritical Society (08/2023) [ORAL]*
32. *Grewal, D.S., Asimow, P.D. Origin of nitrogen and carbon in the rocky bodies of the Solar System – an outlook from iron meteorites. *Goldschmidt Conference (07/2023) [ORAL] Invited*
31. *Grewal, D.S., Dasgupta, R., #Aithala, S. The effect of carbon concentration on its core-mantle partitioning behavior in inner Solar System rocky bodies. *American Geophysical Union Fall Meeting (12/2021) [ORAL]*
30. *Grewal, D.S., Dasgupta, R., #Hough T., #Farnell, A. Rates of protoplanetary accretion and differentiation set nitrogen budget of rocky planets. *American Geophysical Union Fall Meeting (12/2021) [ORAL]*
29. *Grewal, D.S., Dasgupta, R., Marty, B. A very early origin of nitrogen in inner Solar System protoplanets. *Goldschmidt Conference (07/2021) [ORAL] Invited*
28. *Dasgupta, R., Grewal, D.S., #Hough T., #Farnell, A. (2021) Nitrogen depletion in the inner Solar System planets linked to the rates of protoplanetary accretion and differentiation. *Goldschmidt Conference (07/2021) [ORAL]*
27. *Grewal, D.S., Dasgupta, R., Marty, B. A very early origin of nitrogen in inner Solar System protoplanets. *Lunar and Planetary Science Conference (07/2021) [ORAL]*
26. *Grewal, D.S., Dasgupta, R., Marty, B. A very early origin of nitrogen in inner Solar System protoplanets. *Habitable Worlds Workshop (02/2021) [POSTER]*

DAMANVEER S. GREWAL

25. *Grewal, D.S., Dasgupta, R. Magma Ocean differentiation regime in the earliest formed rocky bodies - Internal or External? *Habitable Worlds Workshop* (02/2021) [POSTER]
24. *Grewal, D.S., Dasgupta, R., #Aithala, S. The effect of bulk carbon on its core-mantle partitioning behavior. *American Geophysical Union Fall Meeting* (12/2020) [ORAL]
23. Dasgupta, R., *Grewal, D.S. Magma Ocean differentiation regime in the earliest formed rocky bodies inferred from volatile abundances in iron meteorites. *American Geophysical Union Fall Meeting* (12/2020) [ORAL]
22. *Grewal, D.S., Dasgupta, R. The Effect of Differentiation via Internal Versus External Magma Oceans on the Carbon and Nitrogen Budgets of Rocky Planets. *Goldschmidt Conference* (06/2020) [ORAL]
21. *Grewal, D.S., #Hough T., Dasgupta, R., #Aithala, S. Protoplanetary Differentiation is the Primary Cause of Nitrogen Depletion in Bulk Silicate Reservoirs of Rocky Bodies. *Lunar and Planetary Science Conference* (03/2020) [ORAL] *Cancelled due to COVID-19*
20. *Grewal, D.S., Dasgupta, R., #Hough T. The core-mantle partitioning of carbon and nitrogen in carbon-undersaturated ultramafic systems. *American Geophysical Union Fall Meeting* (12/2019) [POSTER]
19. *Grewal, D.S., #Hough T., Dasgupta, R. The core-mantle partitioning of nitrogen in carbon-undersaturated ultramafic Systems. *Goldschmidt Conference* (08/2019) [ORAL]
18. *Dasgupta, R., Grewal, D.S., Tsuno K. Control of Accretion and Early Differentiation Process on the Diversity of Volatile Inventory of Rocky Solar System Objects. *Goldschmidt Conference* (08/2019) [ORAL]
17. *Dasgupta, R., Grewal, D.S., Tsuno K. Origin of Life-essential Volatile Elements in Rocky Planets – Insights from Accretion and Early Differentiation of Inner Solar System Objects. *Astrobiology Science Conference* (06/2019) [ORAL]
16. *Grewal, D.S., Dasgupta, R., #Holmes, A.K., Costin, G, Li Y., Tsuno K. The fate of nitrogen during core-mantle separation. *Lunar and Planetary Science Conference* (03/2019) [ORAL]
15. *Grewal, D.S., Dasgupta, R., #Farnell, A., #Hough T., Costin, G, Tsuno K, Li Y., Holmes, A.K. The compositions of the early atmospheres formed by magma ocean degassing. *Lunar and Planetary Science Conference* (03/2019) [POSTER]
14. Dasgupta, R., *Grewal, D.S., Sun, C., Tsuno, K., Costin, G. The Origin of Earth's Major Volatiles via Accretion of a Large Planetary Embryo. *Lunar and Planetary Science Conference* (03/2019) [POSTER]
13. *Grewal, D.S., Dasgupta, R., Farnell, A.#, Hough T.#, Costin, G, Tsuno K, Li Y., Holmes, A.K. Evolution of the C/N ratio of the Bulk Silicate Earth as a probe to understand the roles of volatile accretion and differentiation. *American Geophysical Union Fall Meeting* (12/2018) [POSTER]
12. *Dasgupta, R., Grewal, D.S. Origin and Early Differentiation of Carbon and Associated Life-Essential Volatile Elements on Earth. *American Geophysical Union Fall Meeting* (12/2018) [POSTER]
11. *Grewal, D.S., Dasgupta, R., #Holmes, A.K., Costin, G, Li Y., Tsuno K. The fate of nitrogen during core-mantle separation on Earth. *Goldschmidt Conference* (08/2018) [ORAL]
10. *Grewal, D.S., Dasgupta, R., Costin, G, Tsuno K, Li Y., #Holmes, A.K. Evolution of the C/N ratio of the Bulk Silicate Earth as a probe to understand the roles of volatile accretion and differentiation. *Gordon Research Conference* (06/2018) [POSTER]
9. *Grewal, D.S., Dasgupta, R., Sun, C., Tsuno K., Costin, G. Delivery of Carbon, Nitrogen and Sulfur to the Silicate Earth. *Carbon in the Solar System Workshop* (04/2018) [ORAL]
8. *Grewal, D.S., Dasgupta, R. The origin of volatiles on Earth. *Pre-IRESS Workshop, Rice University* (02/2018) [ORAL]
7. *Grewal, D.S., Dasgupta, R., Sun, C., Tsuno, K. Simultaneous alloy-silicate fractionation of carbon, nitrogen, and sulfur at high pressures and temperatures: Implications for establishing the volatile budget of the Earth. *American Geophysical Union Fall Meeting* (12/2017) [ORAL]
6. *Tsuno, K., Dasgupta, R., Grewal, D.S. The effects of sulfur on carbon partitioning and solubility in high pressure-temperature alloy-silicate systems: Implications for fractionation of carbon and sulfur during accretion and core formation of Earth and Mars. *American Geophysical Union Fall Meeting* (12/2017) [ORAL]

DAMANVEER S. GREWAL

5. *Grewal, D.S., Dasgupta, R., Sun, C., Tsuno, K., Costin, G. Delivery of Carbon, Nitrogen and Sulfur to the Silicate Earth by a Giant Impact. *Deep Carbon Observatory Extreme Physics and Chemistry Workshop, Arizona State University* (11/2017) [ORAL]
4. *Tsuno, K., Dasgupta, R., Grewal, D.S. The effects of sulfur on carbon partitioning and solubility in high pressure-temperature alloy-silicate systems. *Deep Carbon Observatory Extreme Physics and Chemistry Workshop, Arizona State University* (11/2017) [POSTER]
3. *Grewal, D.S., Dasgupta, R., Sun, C., Tsuno, K., Costin, G. Delivery of Carbon, Nitrogen and Sulfur to the Silicate Earth by a Giant Impact. *Graduate Interdisciplinary Earth Science Symposia, Rice University* (11/2017) [ORAL]
2. *Grewal, D.S., Dasgupta, R., Tsuno, K. Simultaneous alloy-silicate fractionation of carbon, nitrogen, and sulfur at high pressures and temperatures: Implications for establishing the volatile budget of the Earth. *Gordon Research Conference* (06/2017). [POSTER]
1. *Tsuno, K., Dasgupta, R., Grewal, D.S. The effects of sulfur on carbon partitioning and solubility in high pressure-temperature alloy-silicate systems. *Gordon Research Conference* (06/2017). [POSTER]

TEACHING

- 2024 Instructor for CHM 494/598-GLG 494/598 – Chemistry of Planet Formation and Evolution, ASU
2022 Guest Lecturer for Ge 141 – Isotope Cosmochemistry, California Institute of Technology
2020 Lecturer for ESCI 114 – Discoveries in Earth, Environmental and Planetary Sciences, Rice University
2019 Lecturer for ESCI 114 – Discoveries in Earth, Environmental and Planetary Sciences, Rice University
2018 Guest Lecturer for ESCI 412/612 – Advanced Petrology, Rice University
2012-16 Lectures on undergraduate level Physical, Organic and Inorganic Chemistry to more than 800 students for engineering, medical and science university entrance examinations
2012-16 Lectures on Physical, Organic, and Inorganic Chemistry for International and National Chemistry Olympiads

MENTORING

Current graduate advisees:

- 2024- Varun Manilal (PhD)

Past undergraduate advisees:

- 2022 Gabriel-Darius Mardaru (Harvard University)
2023 Mithil Rajput (Indian Institute of Technology, Kharagpur)
2022 Paras Choudhary (Indian Institute of Technology, Kharagpur)
2019-20 Sanath Aithala (University of Houston)
2019 Naod Araya (Rice University)
2018-19 Taylor Hough (Brown University)
2016-18 Alexandra K. Holmes (Rice University)

Past high school advisees:

- 2019-20 Melinda Zhou (Mayde Creek High School, Katy)
2019-20 Sanath Aithala (University of Houston)
2019 Ryan Anselm (Clemens High School, Sugarland)
2018-19 Alexandra Farnell (St. John's School, Houston)
2017 Rohil P. Bathija (Awty International School, Houston)

SELECTED POPULAR MEDIA COVERAGE

- Our *Nature Astronomy* (2024) was covered by [Phys.org](#), [Science Daily](#), [Astrobiology](#), [Earth](#), [MSN](#), [My Droll](#), and [Today Headline](#) amongst other news outlets.

DAMANVEER S. GREWAL

- *Our Nature Geoscience* (2021) was covered by [Universe Today](#), [CosmoQuest](#), [Science Daily](#), [Centauri Dreams](#), [Space Daily](#), [Newswise](#), [Phys.org](#), and [Scienmag](#), amongst other news outlets.
- *Our Nature Astronomy* (2021) was covered by [Many Worlds](#), [EOS](#), [TechExplorist](#), [Medium](#), [Science Daily](#), [Phys.org](#), [Sciencenewsnet](#), and [SciTechDaily](#), amongst other news outlets.
- Our *Science Advances* (2019) paper had one of the highest altimetric score of research published in geochemistry/planetary science ([1435](#); top 0.02% of all research papers ever tracked) with press release being covered by 161 news outlets across the globe including [CNN](#), [BBC](#), [The Guardian](#), [Daily Mail](#), [Spain's News](#), [Times of India](#), [China Daily](#), [Phys.org](#), [Universe Today](#), [Space Daily](#), [Sky News](#), [Space.com](#), [Yahoo News](#), [USA Today](#), [Vice](#), [Science Daily](#), [Gizmodo](#), [Sky & Telescope](#), [The Wire](#), and [Inverse](#).

SCIENCE ARTICLES

- **Grewal, D.S.**, Lv, M., Dorfman, S. Press Release - *Extreme Physics and Chemistry Community Workshop*, Arizona State University, USA. *Deep Carbon Observatory* (November 2017)

SYNERGISTIC ACTIVITIES

Academic

- 2023- Facility for Open Research in a Compressed Environment (FORCE) Internal Steering Committee
- 2023 Lead Panelist, Session: The behavior of nitrogen during Solar System formation, Nitrogen cycling across planetary scales – Life RCN Workshop, 2023
- 2023 External reviewer for French National Research Agency (ANR) – Planetary Science Program
- 2023 External reviewer for National Science Foundation (NSF) – Geophysics Program
- 2022-23 Co-organizer, Cosmochemistry Seminar, Caltech GPS
- 2022 Convener of the session “Accretion and differentiation of rocky planets from interdisciplinary perspectives” *American Geophysical Union Fall Meeting 2022*
- 2021 Co-organizer, CLEVER Planets Seminar Series
- 2020 Panelist, Session: Forming Habitable Worlds, Habitable Worlds Workshop, 2021
- 2017- Reviewer for *Astrophysics and Space Science* (x1), *Advances in Space Research* (x1), *Earth and Planetary Science Letters (EPSL)* (x4), *Geochemical Perspectives Letters (GPL)* (x1), *Geochimica et Cosmochimica Acta (GCA)* (x8), *Journal of Geophysical Research (JGR): Planets* (x1), *Nature Communications* (x2), *Nature Geoscience* (x1), and *Science Advances* (x2)

Non-academic

- 2021 Member of Unlearning Racism in Geosciences (URGE) Admissions and Hiring Policies Group, Rice University, Houston
- 2021 Member of URGE Policies for Working with Communities of Color Group, Rice University, Houston
- 2021 Volunteer Speaker for Department of Earth, Environmental and Planetary Sciences, O-Week Academic Fair, Rice University, Houston
- 2012-15 Volunteer teacher, Tibetan Village Children’s School, Suja (India)
- 2012-14 Volunteer student recruiter and teacher, Pehal Charitable Trust, Patiala (India)

PRACTICAL AND ANALYTICAL PROFICIENCY

Performing high *P-T* experiments using piston-cylinder and multi-anvil apparatus, performing high T experiments using vacuum furnace and gas mixing furnace, Electron Probe Micro Analyzer (EPMA), Secondary Ion Mass Spectrometry (SIMS), Fourier Transform Infrared Spectroscopy (FTIR), Raman Spectroscopy, Programming in MATLAB.

MEMBERSHIP WITH PROFESSIONAL SOCIETIES

- 2023- Meteoritical Society

DAMANVEER S. GREWAL

2018- Geochemical Society
2016- American Geophysical Union

Last updated: 01/2024