Expansion into Planetary Science & Heliophysics

Edwin Henneken, Jenny Koch and the ADS Team

ADS Users Group Meeting, 15-16 Nov. 2021

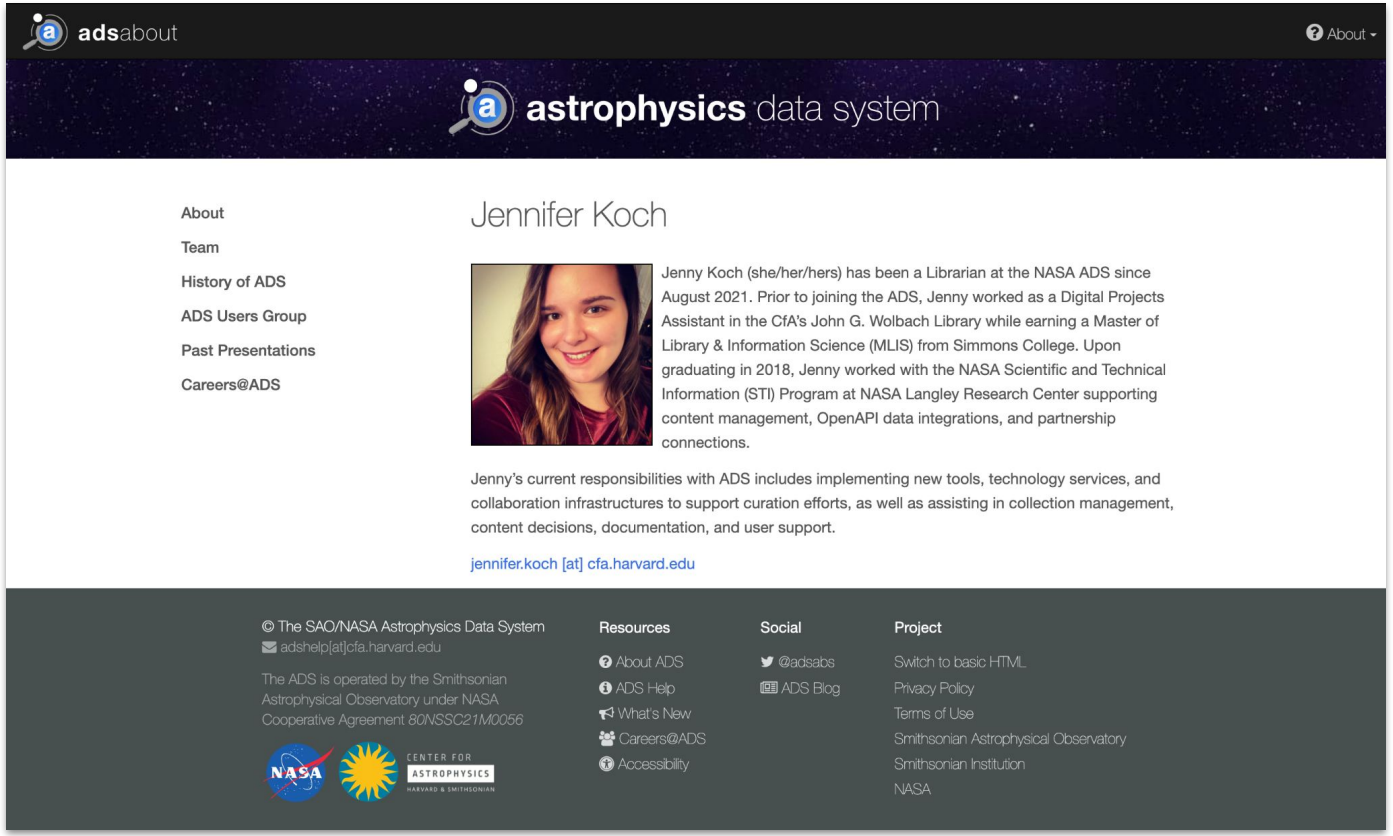
Expansion into Planetary Science & Heliophysics

- Summary of milestones and deliverables
- Increase of personnel and hiring effort
- Summary of current content coverage
- Linking to data from AGU journals

Summary of milestones and deliverables

2021	Hire curator	✔
	Complete census of literature for PS and HP	✔
	Ingest up to 80% of available refereed literature in PS and HP	✔
	Ingest 100% of available refereed literature in PS and HP	WIP
	Ingest up to 50% of available gray literature in PS and HP	WIP
2022	Improve citation processing for PS and HP content	
	Complete Content evaluation of PS and HP	

Expansion milestone: hire curator



Summary of current content coverage

Expansion into PS & HP: users can expect the ADS to have complete coverage of refereed literature and cited literature to be matched to existing ADS records at 90+% level. Users should also expect to be able to search the full article text of the refereed literature.

Coverage analysis methodology:

- For refereed literature:
  - compare ADS contents against Crossref* for completeness
  - Do we have full text?
- For cited literature:
  - Do we have complete reference data?
  - What are current match levels?
  - Analyze references that fail to be matched against ADS records

*Crossref is an official digital object identifier (DOI) Registration Agency of the International DOI Foundation. Crossref can be harvested for article metadata.

Summary of current content coverage: Refereed literature

(in addition to the main astronomy journals)

AGU	Elsevier	Springer	Other
JGR	Earth and Planetary Science Letters	Progress in Earth and Planetary Science	Annual Review of Earth and Planetary Sciences
Space Weather	Global and Planetary Change	Astrophysics and Space Science	Astrobiology
Geophysical Research Letters	Planetary and Space Science	Astrophysics and Space Science Proceedings	Nature Geoscience
Reviews of Geophysics	Physics of the Earth and Planetary Interiors	Earth Moon and Planets	Planetary Science Journal
	Geochimica et Cosmochimica Acta	Celestial Mechanics and Dynamical Astronomy	Annales Geophysicae
	Advances in Space Research	Solar Physics	Meteoritics and Planetary Science
	Icarus	Space Science Reviews	Nonlinear Processes in Geophysics
		Solar System Research	

Missing content: IEEE publications, ACS publications, publisher data from OSA
Poor quality of SPIE data (especially references) is a problem

Summary of current content coverage: Grey literature

WIP:

- Citation analysis
- Networking (e.g. Planetary Science & Heliophysics librarians & specialists)
- Finding repositories (esp. for theses)
- Reach out to publishers (e.g. data for books)

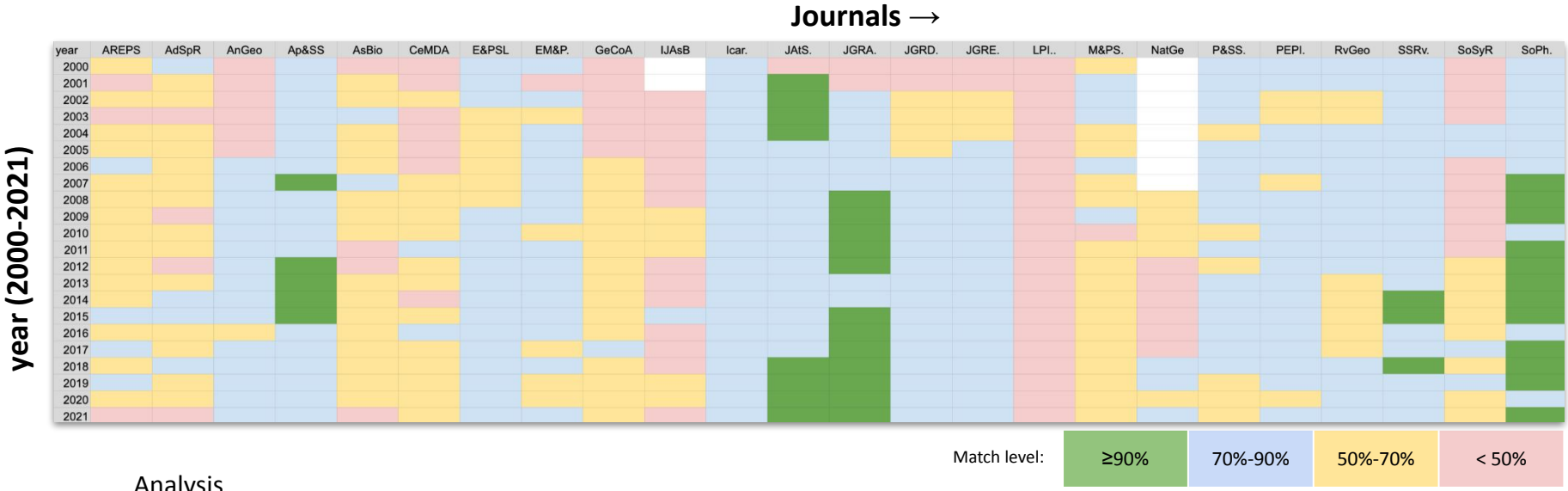
Mitigating the grey literature gap still needs a plan

Summary of current content coverage: Cited literature

- Reference data for all core PS/HP journals → wealth of data to analyze
- References not matched to ADS records:
  - Data problem (incomplete/incorrect information)
  - The reference is correct and corresponds to an existing ADS record, but the Classic reference resolver failed to make the match
  - The reference does not correspond to an existing ADS record

- ADS Core Collection: references are matched at the 90+% level
  - How well are we currently doing for PS/HP?

Summary of current content coverage: Cited literature



Analysis

- References with DOI: harvest metadata from Crossref (analysis and/or record creation)
- References without DOI in XML format: parse XML for data analysis

Mitigation

- Systematic discrepancies: ingest missing journals - relatively easy (except possibly ACS?)
- Incidental discrepancies: ingest missing articles based on DOI - needs a new solution

Summary of current content coverage

Reality check: request to match bibliography NASA Ames Space Sciences and Astrobiology Division (ARC/SSAD)

- Content Identification:
  - Matched items to existing bibcodes via ADS API services
  - Started with 862 items, refined to 797 (deduplicated)
    - Matched 156 items by DOI
    - Matched 397 items via Reference Service
    - Matched 192 items by Title
  - Totaled 731 matched items after further deduplication
- Content Curation:
  - New ADS Library of 731 matched ARC/SSAD items exists here.
  - Curated 102 new items to ADS; library exists here.
- ADS Blog summarizing work (Python; Jupyter Notebooks)

Linking to data from AGU journals

JAMES | Journal of Advances in Modeling Earth Systems

RESEARCH ARTICLE
10.1029/2020MS002202

Role of Surface Gravity Waves in Aquaplanet Ocean Climates

Joshua H. P. Studholme[1], Margarita Y. Markina[2,3], and Sergey K. Gulev[2,4]

[1]Yale University, New Haven, CT, USA, [2]Shirshov Institute of Oceanology, Russian Academy of Science, Moscow, Russia, [3]Present affiliation: University of Oxford, Oxford, UK, [4]Lomonosov Moscow State University, Moscow, Russia

J. H. P. Studholme and M. Yu. Markina share lead author status.

Key Points:

- Idealized oceanic climates forced by ranging atmospheric regimes following equator-to-pole thermal gradient perturbations are investigated
- Wind-forced surface gravity waves deepen the mixed layer, increase mixed layer vertical momentum diffusivity and dampen surface currents
- The consistency of the effects of waves on ocean dynamics and stratification across cooler/warmer aquaplanet climates is examined

Supporting Information:

Supporting Information may be found in the online version of this article.

Correspondence to:

J. H. P. St
joshua.st
margarit

Abstract We present a set of idealized numerical experiments of a solstitial aquaplanet ocean and examine the thermodynamic and dynamic implications of surface gravity waves (SGWs) upon its mean state. The aquaplanet's oceanic circulation is dominated by an equatorial zonal jet and four Ekman driven meridional overturning circulation (MOC) cells aligned with the westerly atmospheric jet streams and easterly trade winds in both hemispheres. Including SGW parameterization (representing modulations of air-sea momentum fluxes, Langmuir circulation, and Stokes-Coriolis force) increases mixed layer vertical momentum diffusivity by ~40% and dampens surface momentum fluxes by ~4%. The correspondingly dampened MOC impacts the oceanic density structure to 1 km depth by lessening the large-scale advective transports of heat and salt, freshening the equatorial latitudes (where evaporation minus precipitation [E − P] is negative) and increasing salinity in the subtropics (where E − P is positive) by ~1%. The midlatitude pycnocline in both hemispheres is deepened by the inclusion of SGWs. Including SGWs into the aquaplanet ocean model acts to increase mixed layer depth by ~10% (up to 20% in the wintertime in midlatitudes), decrease vertical shear in the upper 200 m and alter local midlatitude buoyancy frequency. Generally, the impacts of SGWs upon the aquaplanet ocean are found to be consistent across cooler and warmer climates. We suggest that the implications of these simulations could

Data Availability Statement

All data produced and analyzed in this study are archived and available in the following Dryad repositories:

Atmosphere and SGWs: https://doi.org/10.5061/dryad.j0zpc86dv

Ocean Spinup: https://doi.org/10.5061/dryad.2jm63xspj

Ocean 'no waves': https://doi.org/10.5061/dryad.0k6djhb0x

Ocean 'waves': https://doi.org/10.5061/dryad.1g1jwstw5

The code bases for the various models used here can be found at: Isca: https://github.com/ExeClim/Isca, NEMO: https://www.nemo-ocean.eu/, and WW3: https://github.com/NOAA-EMC/WW3.

Role of Surface Gravity Waves in Aquaplanet Ocean Climates

Show affiliations

Studholme, Joshua H. P. ; Markina, Margarita Y. ; Gulev, Sergey K.

We present a set of idealized numerical experiments of a solstitial aquaplanet ocean and examine the thermodynamic and dynamic implications of surface gravity waves (SGWs) upon its mean state. The aquaplanet's oceanic circulation is dominated by an equatorial zonal jet and four Ekman driven meridional overturning circulation (MOC) cells aligned with the westerly atmospheric jet streams and easterly trade winds in both hemispheres. Including SGW parameterization (representing modulations of air-sea momentum fluxes, Langmuir circulation, and Stokes-Coriolis force) increases mixed layer vertical momentum diffusivity by ~40% and dampens surface momentum fluxes by ~4%. The correspondingly dampened MOC impacts the oceanic density structure to 1 km depth by lessening the large-scale advective transports of heat and salt, freshening the equatorial latitudes (where evaporation minus precipitation [E – P] is negative) and increasing salinity in the subtropics (where E – P is positive) by ~1%. The midlatitude pycnocline in both hemispheres is deepened by the inclusion of SGWs. Including SGWs into the aquaplanet ocean model acts to increase mixed layer depth by ~10% (up to 20% in the wintertime in midlatitudes), decrease vertical shear in the upper 200 m and alter local midlatitude buoyancy frequency. Generally, the impacts of SGWs upon the aquaplanet ocean are found to be consistent across cooler and warmer climates. We suggest that the implications of these simulations could be relevant to understanding future projections of SGW climate, exoplanetary oceans, and the dynamics of the Southern Ocean mixed layer.

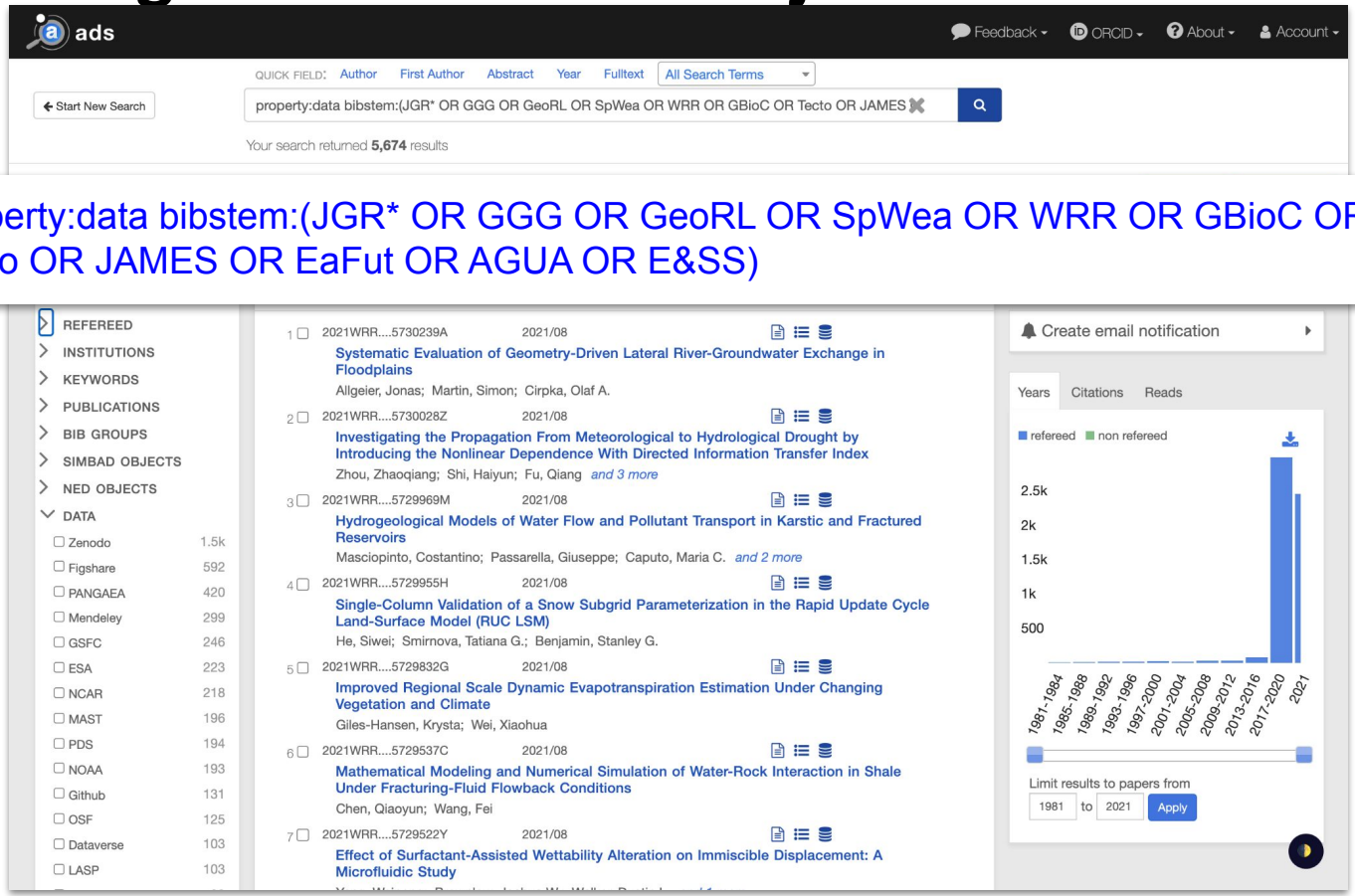
Publication: Journal of Advances in Modeling Earth Systems, Volume 13, Issue 6, article id. e02202

FULL TEXT SOURCES
My Institution
arXiv
Publisher

DATA PRODUCTS
DRYAD (4) Github (1)

Add paper to library

Linking to data from AGU journals



property:data bibstem:(JGR* OR GGG OR GeoRL OR SpWea OR WRR OR GBioC OR Tecto OR JAMES OR EaFut OR AGUA OR E&SS)

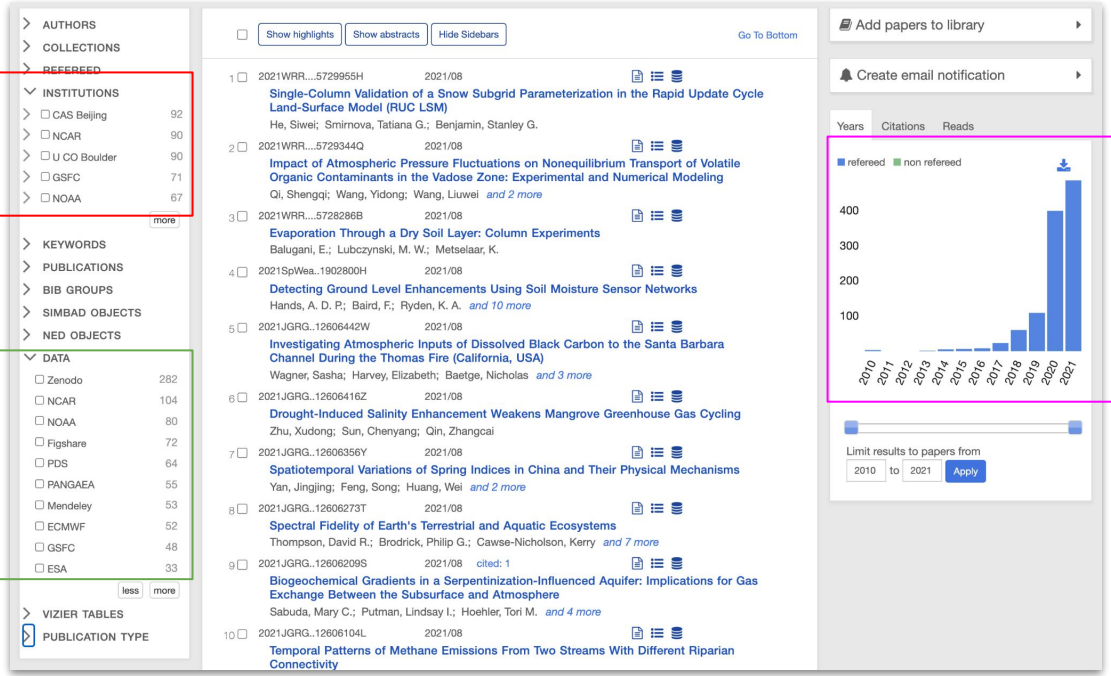
Linking to data from AGU journals

property:data bibstem:(JGR* OR GGG OR GeoRL OR SpWea OR WRR OR GBioC OR Tecto OR JAMES OR EaFut OR AGUA OR E&SS) **atmosphere year:2010-2021**

Use the ADS to explore the context in which data is used

Institutions facet

Data facet

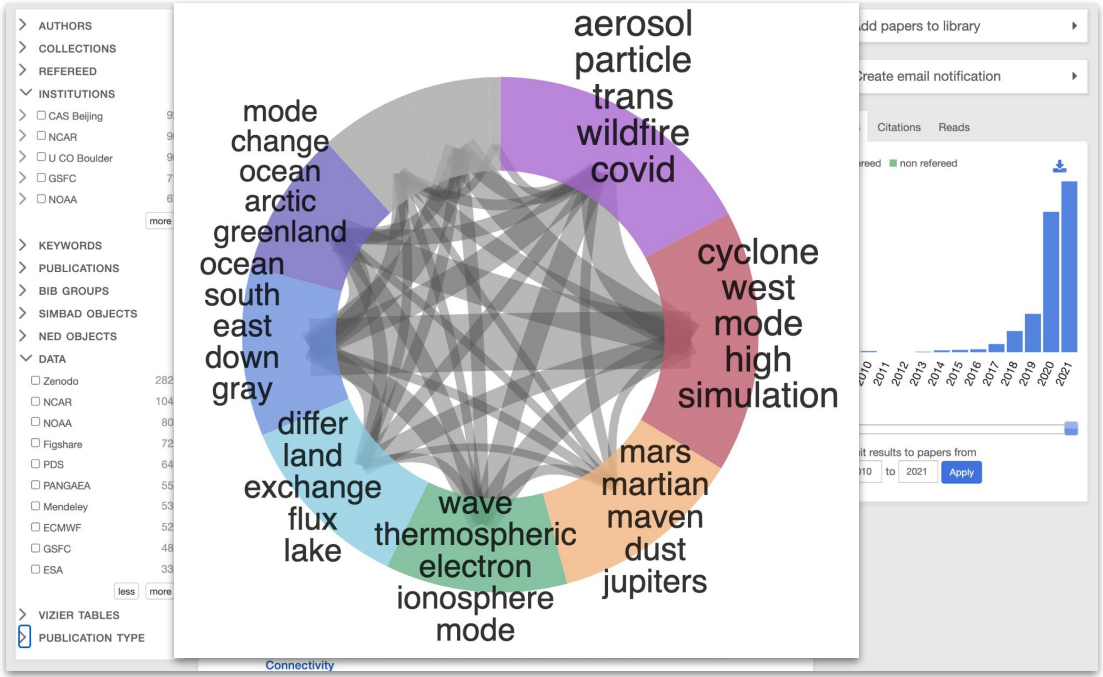


Publication year histogram

Linking to data from AGU journals

property:data bibstem:(JGR* OR GGG OR GeoRL OR SpWea OR WRR OR GBioC OR Tecto OR JAMES OR EaFut OR AGUA OR E&SS) **atmosphere year:2010-2021**

Use the ADS to explore the context in which data is used



Thank you!

Edwin Henneken and the ADS Team

ehenneken@cfa.harvard.edu

BACKUP SLIDES