Library Research for Atmospheric and Oceanic Sciences
(Including Climate Change)
July 21, 2020

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Jersey Shore

St. Augustine, Florida
GPO FDLP Webinars

August 27, 2020: Library Research for Energy, Mineral, and Uranium Resources

March 2020: Library Research for Water Resources [https://www.fdlp.gov/library-research-for-water-resources](https://www.fdlp.gov/library-research-for-water-resources)


USGS Library Materials for Water Resources Information [https://www.fdlp.gov/usgs-library-materials-for-water-resources-information](https://www.fdlp.gov/usgs-library-materials-for-water-resources-information)

USGS Library Materials for Earth’s Age [https://www.fdlp.gov/usgs-library-materials-for-earth-s-age](https://www.fdlp.gov/usgs-library-materials-for-earth-s-age)


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Schedule a Research Consultation: Monday – Friday

Meet Our Specialists – Emily Wild


Quick Bio

• Princeton University Library, 2018-Present
  Chemistry, Geosciences and Environmental Studies Librarian
  https://library.princeton.edu/staff/ewild
  ORCID: https://orcid.org/0000-0001-6157-7629

  - Denver, Colorado: 2008-2018 - Librarian (Physical Scientist): Water,
    Minerals, Energy & Hazards research services, instruction, and outreach
  - NH-VT & MA-RI: 1996-2008 Hydrologist: Water Use, Surface Water,
    Groundwater, Water Quality, Coastal Waters, Bibliographic Databases,
    NWIS Groundwater Database Administrator; Saltwater Intrusion Project
Wait, hydrologists know about the Ocean & Atmosphere? Yes!

Sources used while working in NH, VT, MA, RI, CO, NJ

NH: NOAA Office of Coastal Management:
https://coast.noaa.gov/states/new-hampshire.html

VT: Climate Change in Vermont
https://climatechange.vermont.gov/our-changing-climate/dashboard/more-annual-precipitation

MA: Woods Hole Oceanographic Institution
https://www.whoi.edu/ & USGS Woods Hole Coastal and Marine Science Center
https://www.usgs.gov/centers/whcmsc

RI: URI’s Graduate School of Oceanography (GSO) https://web.uri.edu/gso/ & NOAA Narragansett Lab:
https://www.fisheries.noaa.gov/about/narragansett-laboratory & EPA Lab
https://www.epa.gov/greeningepa/atlantic-coastal-environmental-sciences-division-acesd-laboratory

CO: NOAA Boulder Labs
https://www.boulder.noaa.gov/
National Center for Atmospheric Research (NCAR)
https://ncar.ucar.edu/who-we-are
University Corporation for Atmospheric Research (UCAR)
https://www.ucar.edu/

USGS Santa Cruz, CA
https://www.usgs.gov/centers/pcmsc
USGS St. Petersburg, FL
https://www.usgs.gov/centers/spcmsc

NWS Home > Climate > NWS Philadelphia/Mount Holly > Climate Resources
https://w2.weather.gov/climate/climate_resources.php?wfo=phi

• Climate Information Outside the Local Office Area
Climate Information Outside the Local Office Area
• Regional Climate Centers
• State Climate Offices
• National Centers for Environmental Information (NCEI)
• National Climate Information
National Temperature and Precipitation Summary for Selected Cities
• National Operational Hydrologic Remote Sensing Center
• NOAA’s Climate Page
• National Centers for Environmental Information (NCEI)
• Climate of the U.S.
• Climate Prediction Center
• Earth System Research Laboratory (ESRL)
• NOAA’s El Niño and La Niña Pages
• NOAA’s Drought Monitoring Page
• NOAA’s Storm Event Archives
• U.S. Hazards Outlook
• International Climate Information
World Meteorological Organization
• World Climate
• Global Climate Extremes
• Global Climate Change
• Global Climate Observing System
• Climate Data Online (CDO)
Atmospheric & Oceanic Information

- Climate in the News
- What is the difference between weather & climate?
- When/where was the first climate model created?
- What is Climate Change?
- Who is an Atmospheric Scientist? Oceanographer? Climate Scientist?
- Research at Princeton University
- Professional Societies, Organizations, Companies
- Federal Agencies: Atmosphere, Oceans, and Climate

https://eros.usgs.gov/image-gallery/earth-art
The new standards, which take effect in September 2021 and 2022, offer a broad outline that will allow school districts to craft instruction based on why the planet is warming and what can be done to mitigate it.


Recent News

A War Against Climate Science, Waged by Washington's Rank and File

Efforts to block research on climate change don't just come from the Trump political appointees on top. Lower managers in government are taking their cues, and running with them.


Be Aware of Greenwashing

https://www.ucsusa.org/climate/disinformation

Example:
https://scholar.google.com/scholar?as_ylo=2019&q=Greenwashing&hl=en&as_sdt=0,31

Climate Change Research Downplayed at the US Geological Survey

Published Jul 17, 2019

Trump administration officials delayed a USGS press release on climate change for months and then released a highly edited version that removed references to the study’s main findings.

What happened: Researchers from the US Geological Survey (USGS) wrote a press release on a new climate change study; however, Trump administration officials delayed the press release for several months and then released a highly edited version that removed references to the study's main findings. The study's main findings were that flooding and rising sea levels will have a severe economic impact on California by the end of the century due to climate change.

https://www.ucsusa.org/resources/attacks-on-science/climate-change-research-downplayed-us-geological-survey
Examples at Princeton University:
Writing Seminars Sessions

- Climate Science Fictions: Climate Supporters vs. Climate Deniers
  Journal of Higher Education: Princeton Climate Scientists Tried to Ignore a Campus Skeptic. Then He Went to the White House. 
  https://www.chronicle.com/article/Princeton-Climate-Scientists/246971

PAW articles: A White House Role: Physicist Happer *64 Takes Position as Senior Science, Technology Adviser
and https://paw.princeton.edu/inbox/response-my-critics

And the NPR story:
Meet The White House’s New Chief Climate Change Skeptic
https://www.npr.org/2019/03/01/698073442/heres-the-white-houses-top-climate-change-skeptic

September 12, 2019: Why a high-profile climate science opponent quit Trump’s White House
What is the difference between Climate & Weather?

**Weather** is defined as the state of the atmosphere at a given time and place, with respect to variables such as temperature, moisture, wind speed and direction, and barometric pressure.
Air Quality

https://www.airnow.gov/?city=Princeton&state=NJ&country=USA


https://www.airnow.gov/airnow-app/
What is the difference between Climate & Weather?

**Climate** is defined as the expected frequency of specific states of the atmosphere, ocean, and land including variables such as temperature (land, ocean, and atmosphere), salinity (oceans), soil moisture (land), wind speed and direction (atmosphere), current strength and direction (oceans). Climate encompasses the weather over different periods of time and also relates to mutual interactions between the components of the earth system (e.g., atmospheric composition, volcanic eruptions, changes in the earth's orbit around the sun, changes in the energy from the sun itself).
Atmosphere Layers

https://scied.ucar.edu/atmosphere-layers

Cumulus clouds have vertical growth. They are puffy white or light gray clouds that look like floating cotton balls. Cumulus clouds have sharp outlines and a flat base at a height of 1000m. They are generally about one kilometer wide which is about the size of your fist or larger when you hold up your hand at arm's length to look at the cloud. Cumulus clouds can be associated with fair or stormy weather. Watch for rain showers when the cloud’s tops look like cauliflower heads.
All Earth’s freshwater, liquid fresh water, and water in lakes and rivers

Spheres showing:

(1) All water (sphere over western U.S., 860 miles in diameter)
(2) Fresh liquid water in the ground, lakes, swamps, and rivers (sphere over Kentucky, 169.5 miles in diameter), and
(3) Fresh-water lakes and rivers (sphere over Georgia, 34.9 miles in diameter).

https://www.usgs.gov/media/images/all-earths-water-a-single-sphere
Cretaceous Western Interior Seaway. Colorado was covered by a shallow, temperate sea. [https://pubs.usgs.gov/pp/1561/report.pdf]
Busy Atlantic hurricane season predicted for 2020
Multiple climate factors indicate above-normal activity is most likely
https://www.noaa.gov/media-release/busy-atlantic-hurricane-season-predicted-for-2020

The Atmospheric Impact of the 1991 Mount Pinatubo Eruption
https://pubs.usgs.gov/pinatubo/
In the late 1960s, NOAA’s Geophysical Fluid Dynamics Laboratory in Princeton, New Jersey, developed the first-of-its-kind general circulation climate model that combined both oceanic and atmospheric processes. Scientists were now able to understand how the ocean and atmosphere interacted with each other to influence climate. The model also predicted how changes in the natural factors that control climate such as ocean and atmospheric currents and temperature could lead to climate change. The model still stands today as a breakthrough of enormous importance for climate science and weather forecasting. Earlier knowledge of the oceanic and atmospheric circulation, and their interactions, was based purely on theory and observation.

Climate models are computer-based simulations that use mathematical formulas to re-create the chemical and physical processes that drive Earth’s climate. This pioneering model included all the basic components of climatic factors (atmosphere, ocean, land, and sea ice), but covered only one-sixth of the earth’s surface, from the North Pole to the equator and 120 degrees of longitude east to west.

https://celebrating200years.noaa.gov/breakthroughs/climate_model/welcome.html#model

https://www.gfdl.noaa.gov/
https://www.gfdl.noaa.gov/bibliography/
https://aos.princeton.edu/
https://geosciences.princeton.edu/
https://recap.princeton.edu/
1967 Climate Model Paper

Thermal Equilibrium of the Atmosphere with a Given Distribution of Relative Humidity

https://journals.ametsoc.org/jas/article/24/3/241/17328/
Thermal-Equilibrium-of-the-Atmosphere-with-a-Given

REFERENCES


What is Climate Change?

Climate change describes a change in the average conditions — such as temperature and rainfall — in a region over a long period of time. NASA scientists have observed Earth’s surface is warming, and many of the warmest years on record have happened in the past 20 years. 

https://climatekids.nasa.gov/climate-change-meaning/

Alaska’s Muir glacier in August 1941 and August 2004. Significant changes occurred in the 63 years between these two photos. Credit: USGS

Who is an Atmospheric Scientist? Oceanographer? Climate Scientist?

https://www.thehistorymakers.org/biography/george-philander

Why Global Warming Is Controversial
https://science.sciencemag.org/content/294/5549/2105/tab-article-info

Our Affair with El Niño: How We Transformed an Enchanting Peruvian Current into a Global Climate Hazard & Is the Temperature Rising?: The Uncertain Science of Global Warming
https://press.princeton.edu/our-authors/philander-s-george

https://www.worldcat.org/search?q=bn%3A+0125532350&qt=advanced&dblist=638

https://science.sciencemag.org/content/288/5473/1997.abstract
Who is an Atmospheric Scientist? Oceanographer? Climate Scientist?


Position Classification Standards for White Collar Work

1300 – Physical Sciences Group

Example Job Searches:
Physical Scientist: https://www.usajobs.gov/Search/Results?jt=Physical%20Scientist

NOAA: https://www.usajobs.gov/Search/Results?jt=Physical%20Scientist&a=CM54&p=1

Pathways: https://www.usajobs.gov/Search/Results?k=Pathways

• Series Covered: 1301, General Physical Science
• 1306, Health Physics
• 1310, Physics
• 1313, Geophysics
• 1315, Hydrology
• 1320, Chemistry
• 1321, Metallurgy
• 1330, Astronomy and Space Science
• 1340, Meteorology
• 1350, Geology
• 1360, Oceanography
• 1370, Cartography
• 1372, Geodesy
• 1373, Land Surveying
• 1380, Forest Products Technology
• 1382, Food Technology
• 1384, Textile Technology
• 1386, Photographic Technology
Susceptible supply limits the role of climate in the COVID-19 pandemic
https://www.medrxiv.org/content/10.1101/2020.04.03.20052787v1

Local climate unlikely to drive the early COVID-19 pandemic

Why are big storms bringing so much more rain? Warming, yes, but also winds

PEI Faculty Seminar: "Climatic Influences on Tropical Cyclones and Their Severity"
Attribution of the Australian bushfire risk to anthropogenic climate change

Rapid attribution of the extreme rainfall in Texas from Tropical Storm Imelda

Human contribution to the record-breaking July 2019 heatwave in Western Europe

Siberian heatwave of 2020 almost impossible without climate change

Figure 1: Prolonged Siberian heat: January – June 2020 average temperatures compared to normal (1981-2010) over the Siberian region used in the study (box), and the location of the town of Verkhoyansk that experienced the record June daily temperature within the Arctic circle.
Professional Societies, Organizations, Companies

The American Geosciences Institute (AGI)
https://www.americangeosciences.org/about

Workforce: https://www.americangeosciences.org/workforce/

Geoscience COVID-19 Survey
https://www.americangeosciences.org/workforce/covid19

COVID-19 and Employment of Recent Geoscience Graduates

COVID-19 Impacts to Geoscience Business Operations

Impacts of the COVID-19 Pandemic on Ocean Science Activities

COVID-19 Impacts to Research Activities in Spring 2020
https://www.americangeosciences.org/geoscience-currents/covid-19-impacts-research-activities-spring-2020

Geoscience Information Society
http://www.geoinfo.org/
Listserv: http://www.geoinfo.org/e-mail-list/
Or email me: ewild@princeton.edu
And an AGI Member Society:
https://www.americangeosciences.org/member-societies
GSA Associated Society:
https://www.geosociety.org/GSA/About/Who_We_Are/Associated_Societies/GSA/About/Associated_Societies.aspx

Atmospheric Science Librarians International
http://www.aslionline.org/wp/
Listserv: http://www.aslionline.org/wp/about/asli-listserv/
AMS Society Conference Boston 2020
https://ams.confex.com/ams/2020Annual/meetingapp.cgi/Index/Recording~1/Program/1418

CSA Ocean Sciences Inc. (CSA)
https://www.csaocean.com/portfolio
COVID-19 and Employment of Recent Geoscience Graduates

Employment of recent geoscience graduates by graduation year

Employment of recent geoscience graduates by degree level

A Look at the Current Trends in Geoscience Workforce [https://www.youtube.com/watch?v=hlq81jwF1hg](https://www.youtube.com/watch?v=hlq81jwF1hg)
A Look at the Current Trends in Geoscience Workforce [https://www.youtube.com/watch?v=hlq81jwF1hg](https://www.youtube.com/watch?v=hlq81jwF1hg)
A Look at the Current Trends in Geoscience Workforce [https://www.youtube.com/watch?v=hlq81jwF1hg]
A Look at the Current Trends in Geoscience Workforce [https://www.youtube.com/watch?v=hlq81jwF1hg](https://www.youtube.com/watch?v=hlq81jwF1hg)
Global Warming - Global Change - Climate Change

New Orleans drop-off for electronics recycling

Dec 1 - On Saturday, December 3, consumers in the New Orleans area can drop off electronics damaged due to Katrina, at a one-day, free recycling event.


Environmental Topics

Find the most popular pages for each of EPA's top topics, or search the A-Z index for a more complete list.

- Air
- Bed Bugs
- Chemicals
- Climate Change
- Environmental Information by Location
- Green Livin
- Health
- Land, Waste, and Cleanup
- Lead
- Mold
- Pesticides
- Radon
- Water
- A-to-Z Index

Google Scholar title searches

“Climate Change” 1980-2020 = 138,000
https://scholar.google.com/scholar?as_q=%22Climate+Change%22+&as_epq=&as_oq=&as_eq=&as_occt=title&as_sauthors=&as_publication=&as_ylo=1980&as_yhi=2020&hl=en&as_sdt=0%2C31

“Global Change” 1980-2020 = 16,400
https://scholar.google.com/scholar?hl=en&as_sdt=0%2C31&as_ylo=1980&as_yhi=2020&q=allintitle%3A+%22Global+Change%22&btnG=

“Global Warming” 1980-2020 = 19,500
https://scholar.google.com/scholar?hl=en&as_sdt=0%2C31&as_ylo=1980&as_yhi=2020&q=allintitle%3A+%22Global+Warming%22&btnG=

“Climate Change” 1970-2010 = 61,100
https://scholar.google.com/scholar?as_q=%22Climate+Change%22+&as_epq=&as_oq=&as_eq=&as_occt=title&as_sauthors=&as_publication=&as_ylo=1970&as_yhi=2010&hl=en&as_sdt=0%2C31

“Global Change” 1970-2010 = 11,600
https://scholar.google.com/scholar?hl=en&as_sdt=0%2C31&as_ylo=1970&as_yhi=2010&q=allintitle%3A+%22Global+Change%22&btnG=

“Global Warming” 1970-2010 = 15,600
https://scholar.google.com/scholar?hl=en&as_sdt=0%2C31&as_ylo=1970&as_yhi=2010&q=allintitle%3A+%22Global+Warming%22&btnG=
The Intergovernmental Panel on Climate Change
https://www.ipcc.ch/

https://www.ipcc.ch/reports/

Methodology Report on Short-lived Climate Forcers

The Ocean and Cryosphere in a Changing Climate

Climate Change and Land

Global Warming of 1.5°C

Climate Change: The IPCC 1990 and 1992 Assessments

FAR Climate Change: The IPCC Response Strategies

https://www.globalchange.gov/

Call for Public Comment on the Draft Prospectus for the Fifth National Climate Assessment (NCA5)
All comments must be submitted by 11:59 PM ET on August 10, 2020.

Fourth National Climate Assessment Vol I + II
https://www.globalchange.gov/nca4

2nd State of the Carbon Cycle Report (SOCCR2)
https://www.globalchange.gov/content/about-soccr-2
Climate Change and Ecosystems

Climate Change Evidence & Causes

NCHRP Research Report 938

Incorporating the Costs and Benefits of Adaptation Measures in Preparation for Extreme Weather Events and Climate Change—Guidebook

National Academies

https://www.nap.edu/search/?term=%22Climate+Change%22
National Academies

https://www.nap.edu/search/?rpp=20&ft=1&term=Oceans

Understanding the Connections Between Coastal Waters and Ocean Ecosystem Services and Human Health: Workshop Summary (2014)


The Role of Research and Technology in the Changing Ocean Economy: Proceedings of a Workshop—in Brief (2020)
https://pubs.geoscienceworld.org/search-results?page=1&quicknav=1&q=%22Climate%20Change%22
Princeton University Library

https://library.princeton.edu/databases/subject/geosciences

https://library.princeton.edu/find/all/Climate%20Change
https://catalog.princeton.edu/catalog?search_field=all_fields&q=Climate+Change&utf8=%E2%9C%93

https://catalog.princeton.edu/?f%5Baccess_facet%5D%5B%5D=Online&q=Climate%20Change&search_field=all_fields
NOAA Library

https://library.noaa.gov/

https://photolib.noaa.gov/
Verification Metrics for National Center for Environmental Prediction (NCEP) Models

Bibliography
Earth As Art!

**Earth As Art 1:** [https://eros.usgs.gov/image-gallery/earth-art-1](https://eros.usgs.gov/image-gallery/earth-art-1)

**Earth As Art 2:** [https://eros.usgs.gov/image-gallery/earth-art-2](https://eros.usgs.gov/image-gallery/earth-art-2)

**Earth As Art 3:** [https://eros.usgs.gov/image-gallery/earth-art-3](https://eros.usgs.gov/image-gallery/earth-art-3)

**Earth As Art 4:** [https://eros.usgs.gov/image-gallery/earth-art-4](https://eros.usgs.gov/image-gallery/earth-art-4)

**Earth As Art 5:** [https://eros.usgs.gov/image-gallery/earth-art-5](https://eros.usgs.gov/image-gallery/earth-art-5)

**Earth As Art 6:** [https://eros.usgs.gov/image-gallery/earth-art-6](https://eros.usgs.gov/image-gallery/earth-art-6)
Abstract
Traditional commercial bibliographic databases and indexes provide some access to hydrology materials produced by the government; however, these sources do not provide comprehensive coverage of relevant hydrologic publications. This paper discusses bibliographic information available from the federal government and state geological surveys, water resources agencies, and depositories. In addition to information in these databases, the paper describes the scope, styles of citing, subject terminology, and the ways these information sources are currently being searched, formally and informally, by hydrologists. Information available from the federal and state agencies and from the state depositories might be missed by limiting searches to commercially distributed databases.

I hope to publish an update in 2020-2021
https://pubs.er.usgs.gov/publication/70023512
Thank You!

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Princeton University Library
http://library.princeton.edu

Princeton University Geosciences
http://geosciences.princeton.edu
Geophysical Fluid Dynamics Laboratory
https://www.gfdl.noaa.gov/

Princeton Environmental Institute
http://environment.princeton.edu

Princeton University Chemistry
https://chemistry.princeton.edu/

Andlinger Center for Energy and the Environment
https://acee.princeton.edu/