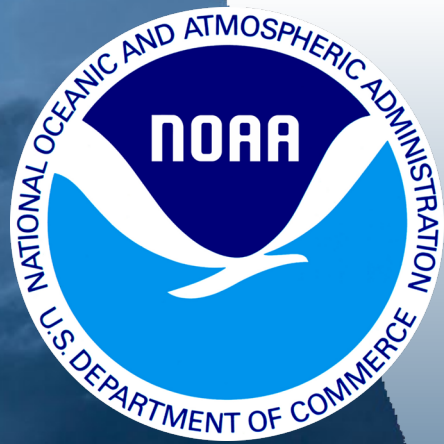


Hello from NCEI



*NESDIS NCEI's Role in Building a
Climate Ready Nation, Past
Successes In Climate Services, and
Future Directions*

National Centers for
Environmental Information

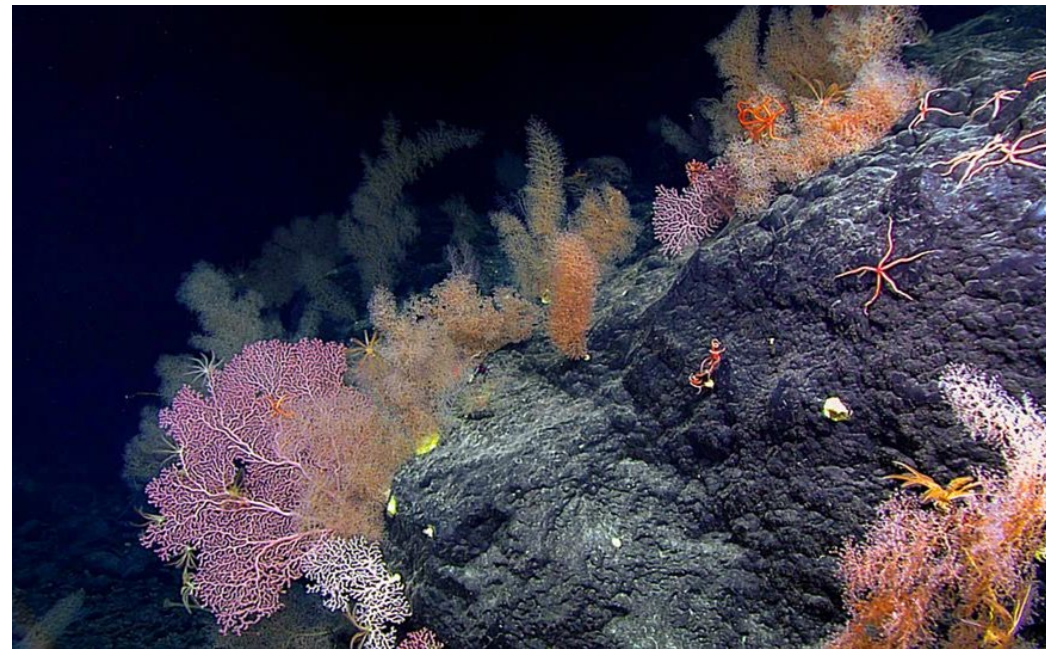
May 2023

Deke Arndt, NCEI Director

Responsible for hosting and sharing one of the most significant archives on Earth

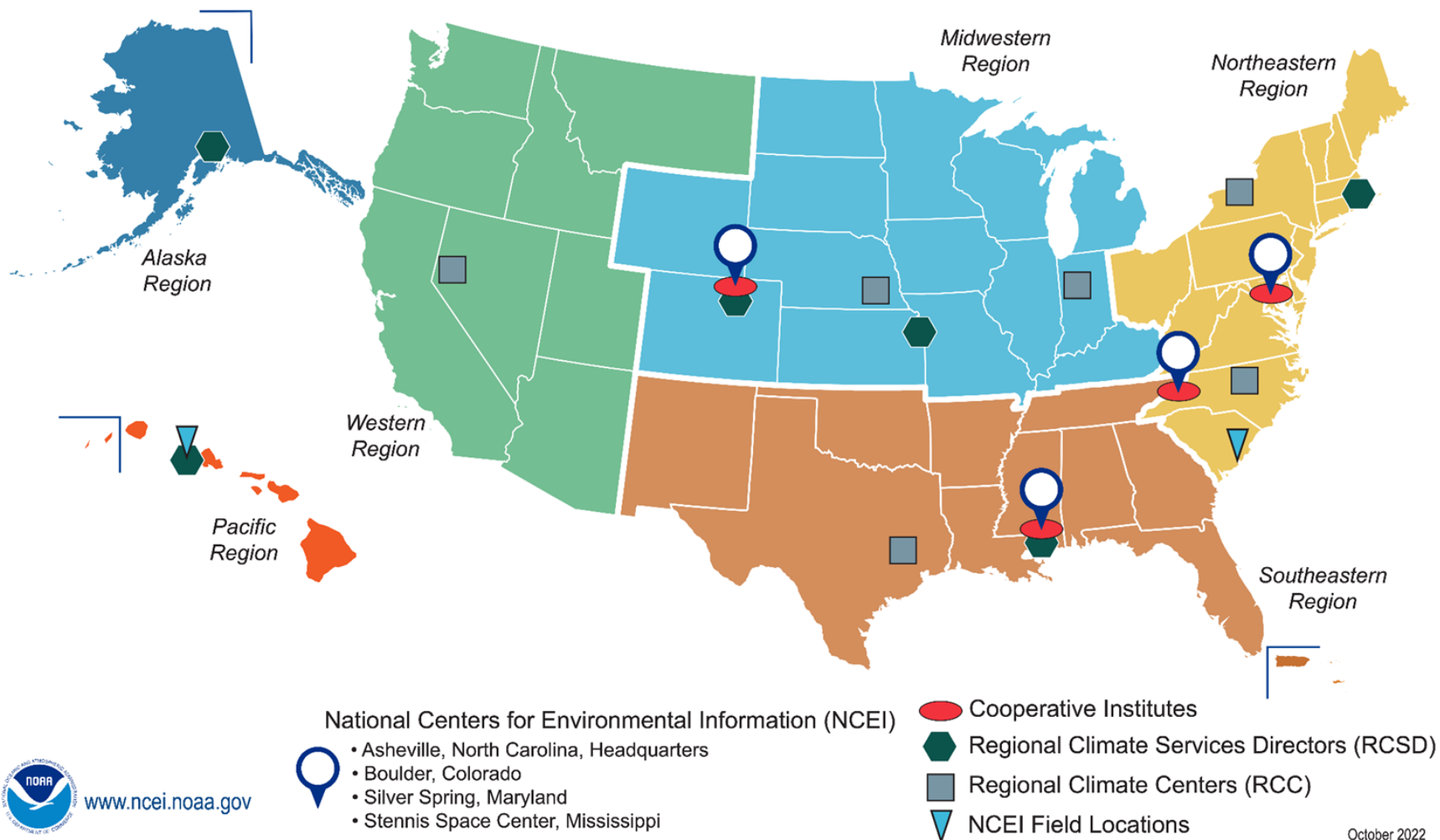
comprehensive oceanic, atmospheric, and geophysical data, and the people who build it

- From the depths of the ocean to the surface of the sun and from million-year-old sediment records to near real-time satellite images
- NCEI is the Nation's leading authority for environmental information



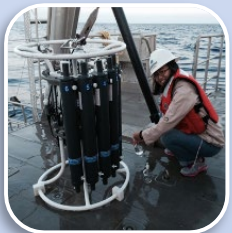
NCEI's Nationwide Presence

National Centers for Environmental Information (NCEI)



NOAA Data: High Impact, Global Reach

NOAA Observing Systems



Scientific Data Stewardship

Research-quality products for decision making

Climate & Weather

- Climate Assessments
- Climate Normals
- Billion \$ Disasters
- Drought Monitoring

Oceans & Coasts

- Tsunami Warning
- Coastal Digital Elevation Models
- Extended Continental Shelf
- World Ocean Database

Geophysics

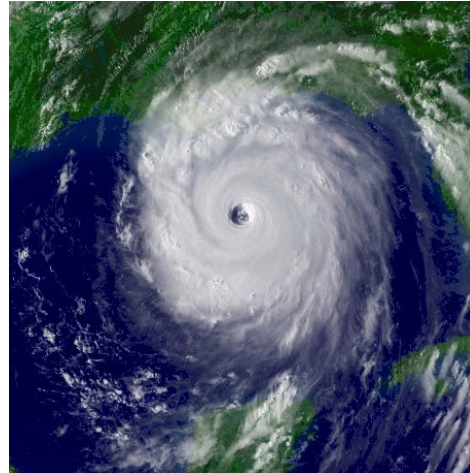
- Space Weather
- World Magnetic Model



Providing Climate Information to Inform the Future



Monthly U.S. & Global Climate Reports



U.S. Billion-Dollar Weather & Climate Disasters Report



U.S. Drought Monitor



Regional Snowfall Index



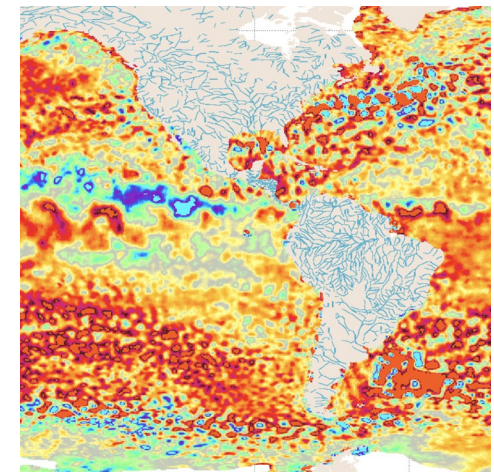
Tornado Climatology



Hourly Precipitation Data



Climate Extremes Index



Blended Sea Winds

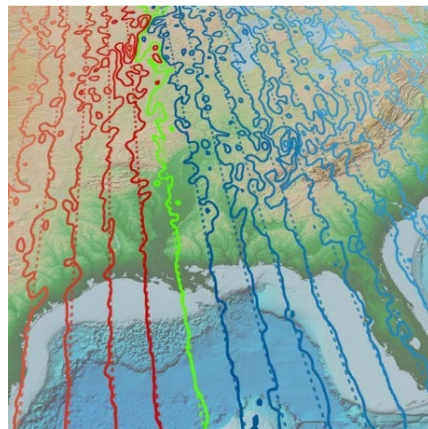


Coast, Oceans, and Geophysics

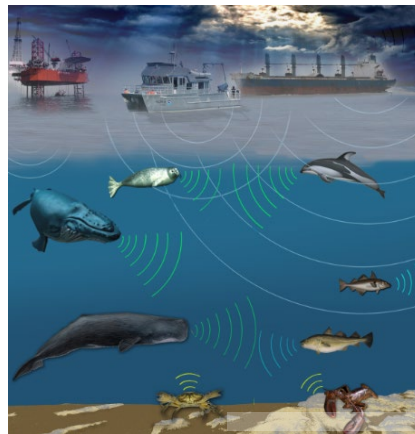
Providing data and information from the Sun to Earth's seafloor



Ocean Exploration
Digital Atlas



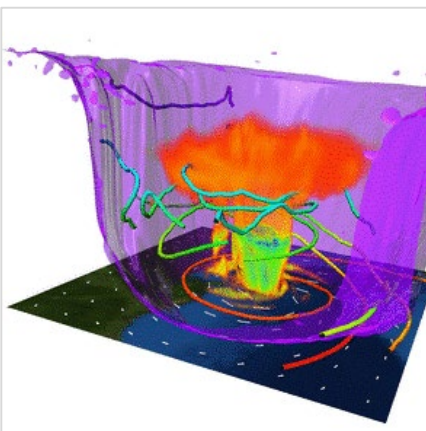
Enhanced Magnetic
Model



Passive Acoustics



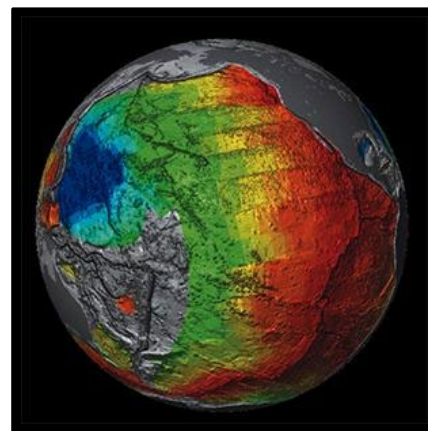
Gulf of Mexico Data
Atlas



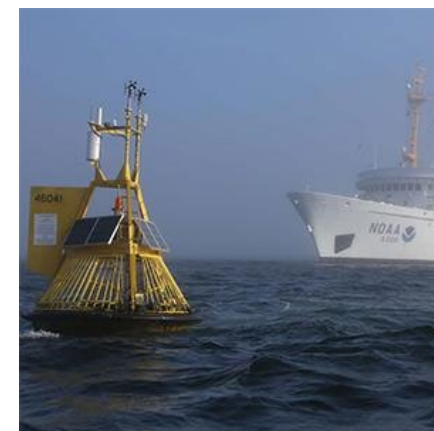
Model
Reanalysis



Deep Sea Corals Data
Portal



Bathymetry and
Global Relief



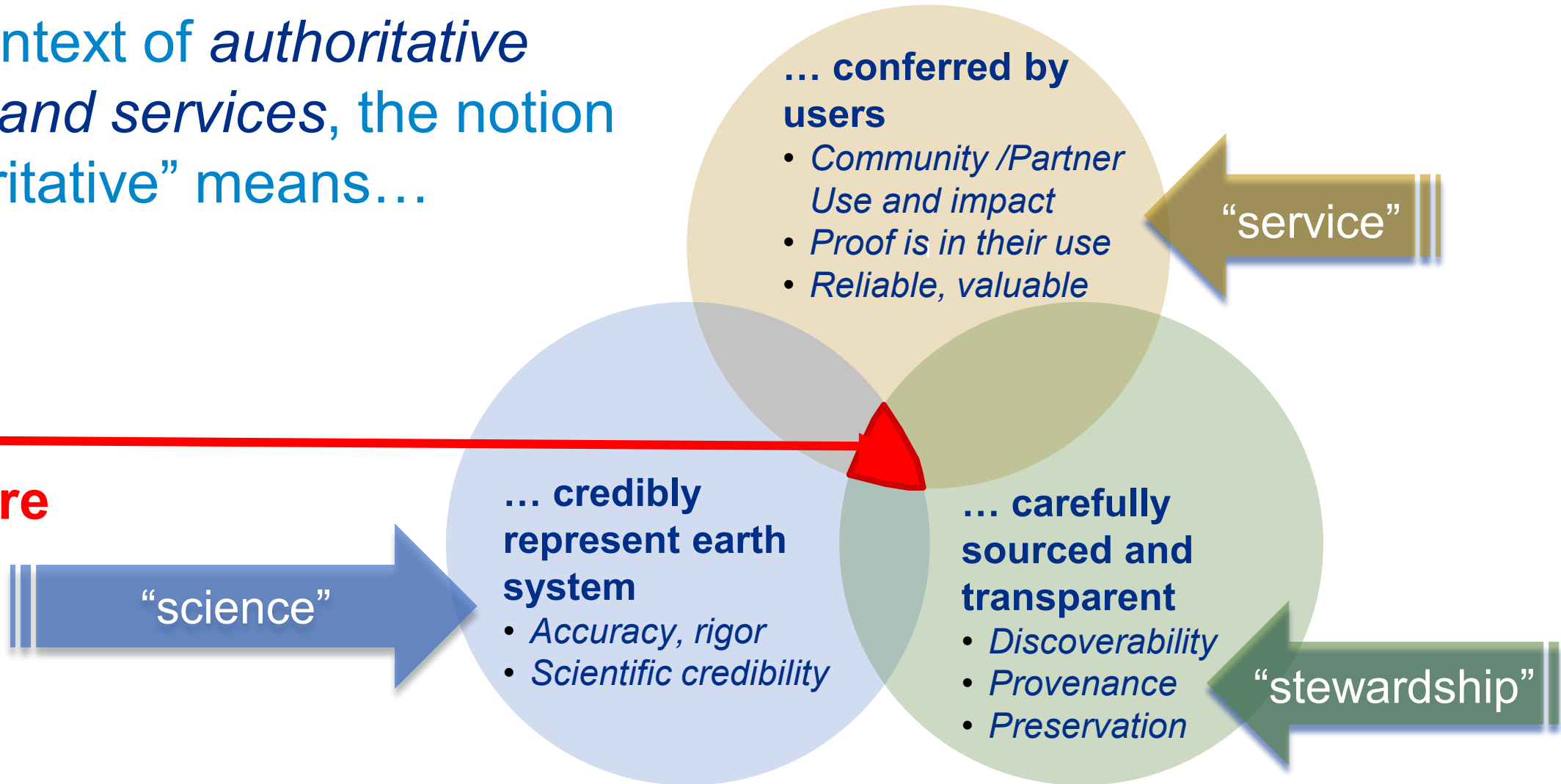
World Ocean
Database



Authoritative Climate Information and Services

“In the context of *authoritative products and services*, the notion of “authoritative” means...

NCEI:
Aim here



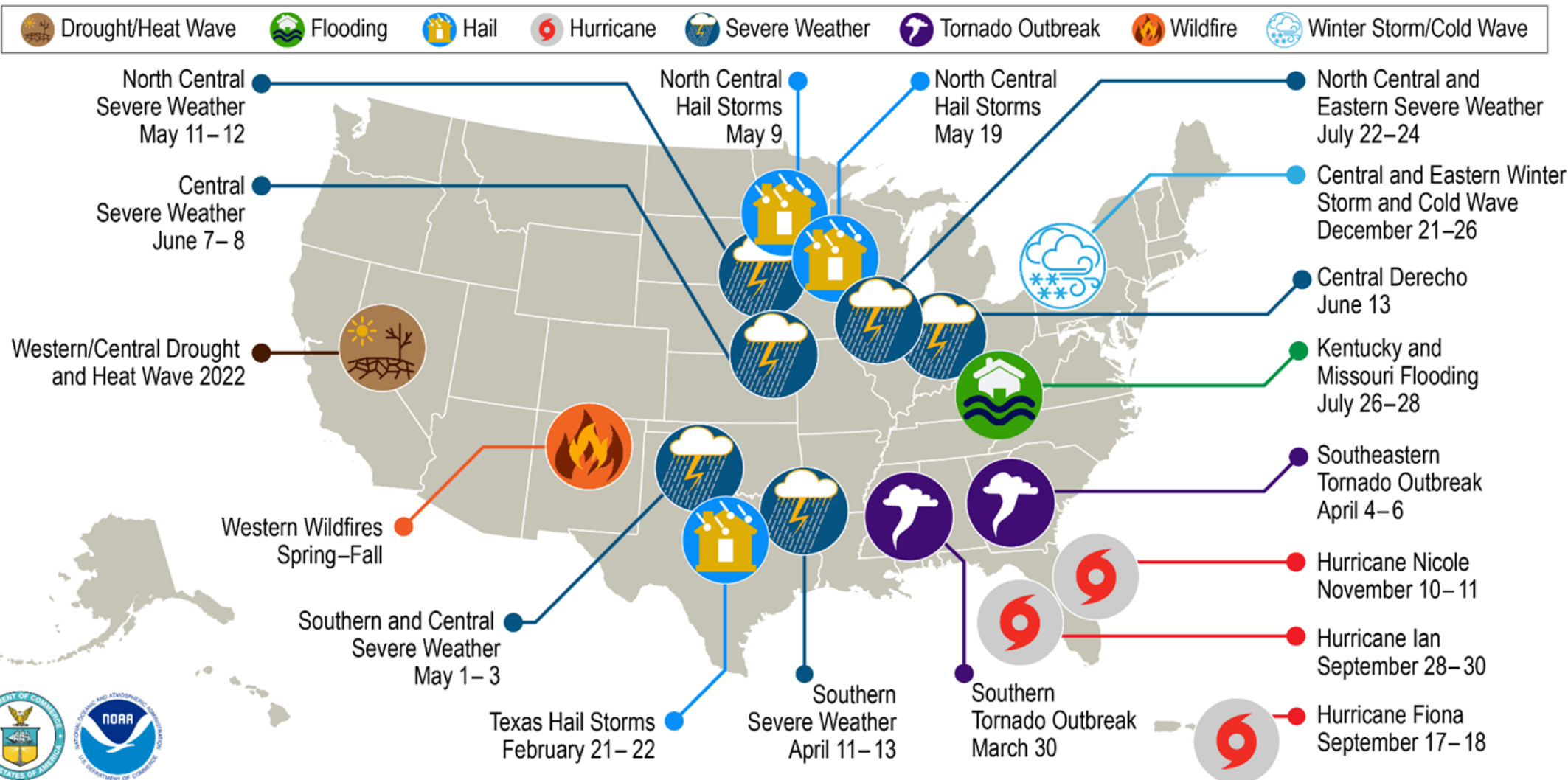
NCEI User Engagement

- Reaching end-users for 70 years
- Value added climate information and data
- Years of systematically documenting user engagements, uses, and needs
- We serve retrospective information users (mostly)
- Our job and products pick up where the real-time missions ends



Our Relationship with the Earth System

U.S. 2022 Billion-Dollar Weather and Climate Disasters

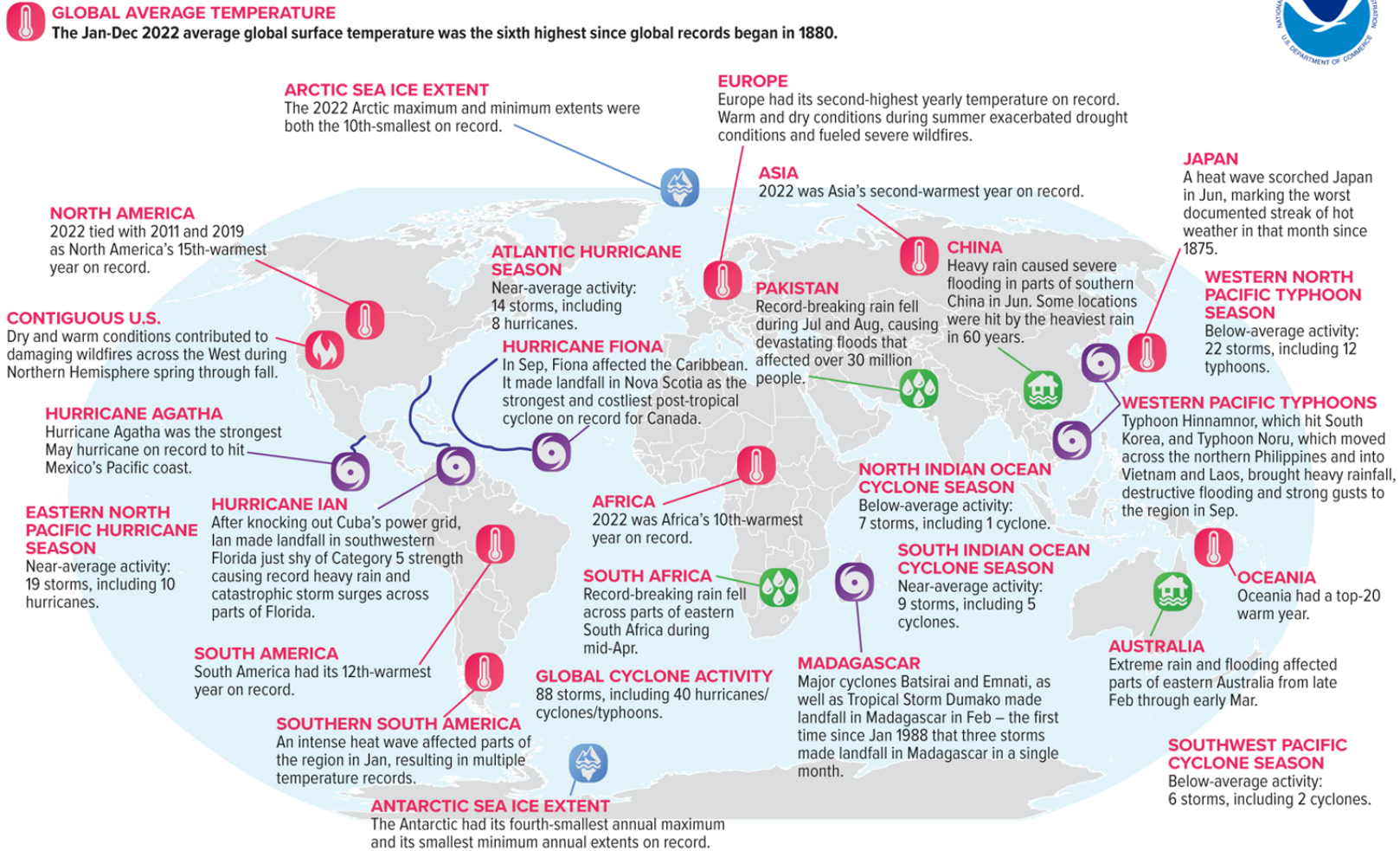


This map denotes the approximate location for each of the 18 separate billion-dollar weather and climate disasters that impacted the United States in 2022.



Global Hazard Reporting

Selected Significant Climate Anomalies and Events in 2022



Please note: Material provided in this map was compiled from NOAA's State of the Climate Reports. For more information please visit: <https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/>



Partners: CISESS-NC, NCEI, RCCs, State Climate Offices

51 concise summaries:

- historical perspectives on important features of each state's observed climate.
- Also show projected change in key climate metrics for two scenarios of future GHG emissions.

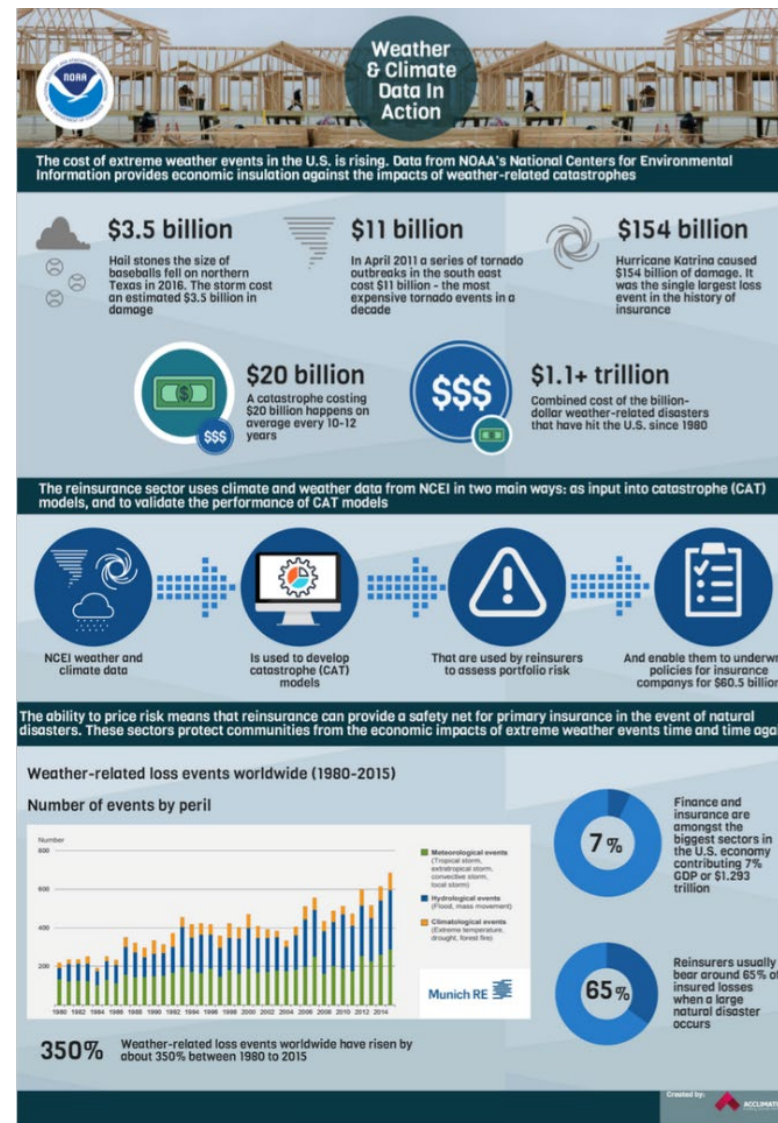
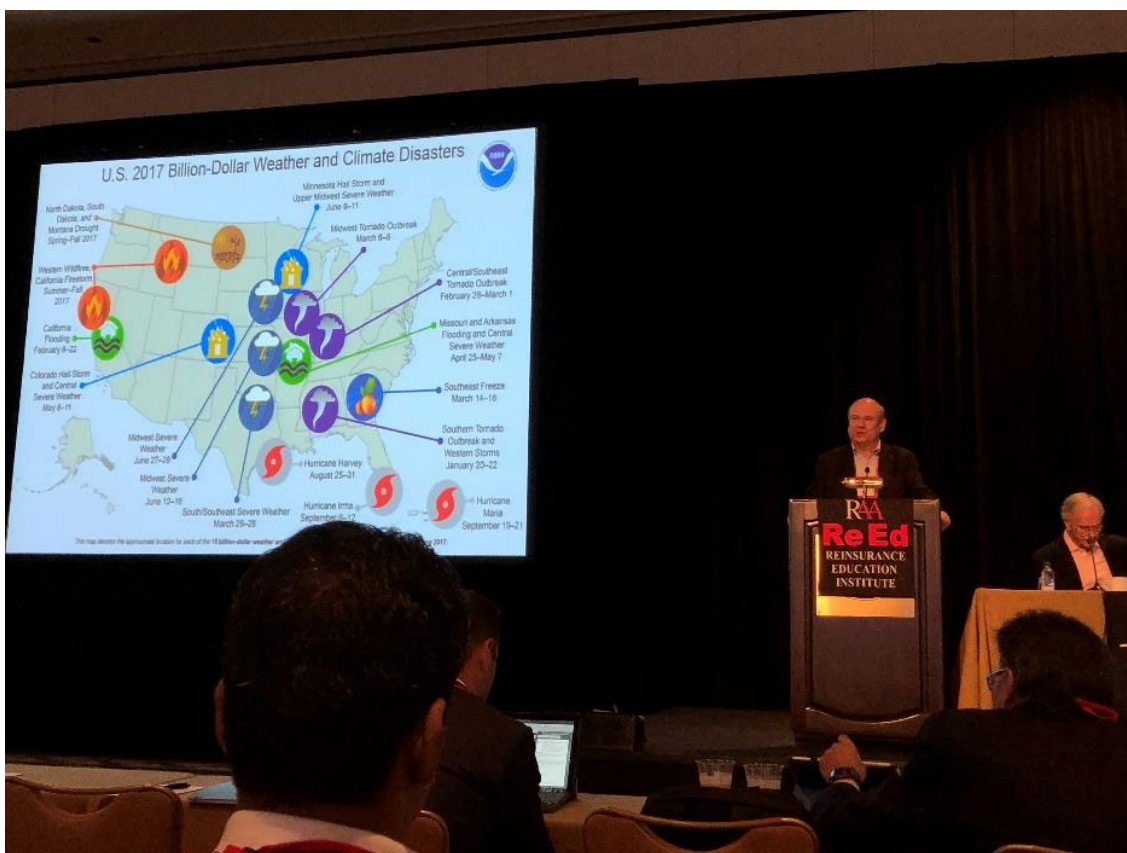
Available as web pages and 4-6 page PDFs.



Long-Term Engagement Success

What Success Looks Like

Decades of Continuous Engagement Meeting the Needs of the Reinsurance Sector



Partnering with NWS HQ

- Partnership for climate services
 - Key Example: This meeting jointly hosted by NWS and NCEI
 - Complementary activities at international, national, regional, state, and local levels
- A key part of the NCEI-NWS partnership revolves around stewardship & delivery of the climate records collected by NWS
 - COOP
 - ASOS
 - Upper Air
 - SRRS



Partnering with NWS Regions and Field

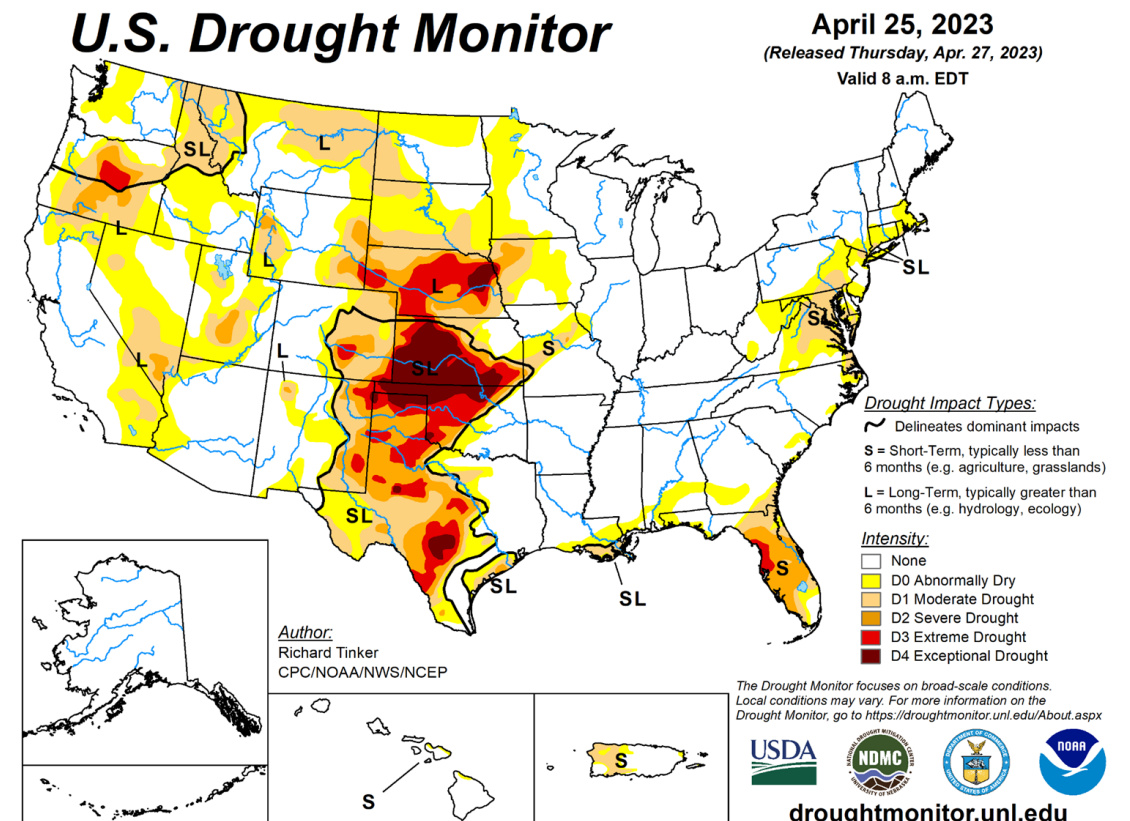
- NCEI Regional Climate Services Directors coordinate with NWS Regional Climate Services Program Managers (matching regions)
- NCEI supports Regional Climate Centers to strengthen regional data, products, and delivery (complementary regions)
 - Wxcoder operations
 - Datzilla
 - xmACIS
 - Threadex
 - NOWData

| Daily Data | Observed | Normal | Record Highest | Record Lowest |
|-----------------------|----------|--------|----------------|---------------|
| Max Temperature | M | 74 | 88 in 1935 | 51 in 1945 |
| Min Temperature | M | 49 | 66 in 2010 | 33 in 1963 |
| Avg Temperature | M | 61.5 | 73.5 in 2012 | 44.0 in 1897 |
| Precipitation | M | 0.14 | 0.93 in 1946 | 0.00 in 2022 |
| Snowfall | M | 0.0 | T in 2003 | 0.0 in 2022 |
| Snow Depth | M | - | 0 in 2022 | 0 in 2022 |
| HDD (base 65) | M | 5 | 21 in 1897 | 0 in 2022 |
| CDD (base 65) | M | 1 | 9 in 2012 | 0 in 2021 |
| Month-to-Date Summary | Observed | Normal | Record Highest | Record Lowest |
| Avg Max Temperature | 63.0 | 73.7 | 85.5 in 1942 | 54.0 in 1925 |
| Avg Min Temperature | 39.0 | 49.1 | 63.5 in 2012 | 34.0 in 1963 |
| Avg Temperature | 51.0 | 61.4 | 73.5 in 2012 | 45.8 in 1925 |
| Total Precipitation | 0.00 | 0.28 | 2.59 in 1897 | 0.00 in 2023 |
| Total Snowfall | 0.0 | 0.0 | T in 2003 | 0.0 in 2023 |
| Max Snow Depth | 0 | - | 0 in 2023 | 0 in 2023 |
| Total HDD (base 65) | 14 | 9 | 38 in 1925 | 0 in 2022 |
| Total CDD (base 65) | 0 | 2 | 18 in 2012 | 0 in 2023 |
| Year-to-Date Summary | Observed | Normal | Record Highest | Record Lowest |
| Avg Max Temperature | 60.9 | 58.0 | 61.9 in 2012 | 44.4 in 1892 |
| Avg Min Temperature | 38.4 | 35.6 | 39.7 in 2020 | 25.1 in 1892 |
| Avg Temperature | 49.6 | 46.8 | 50.4 in 2012 | 34.7 in 1892 |



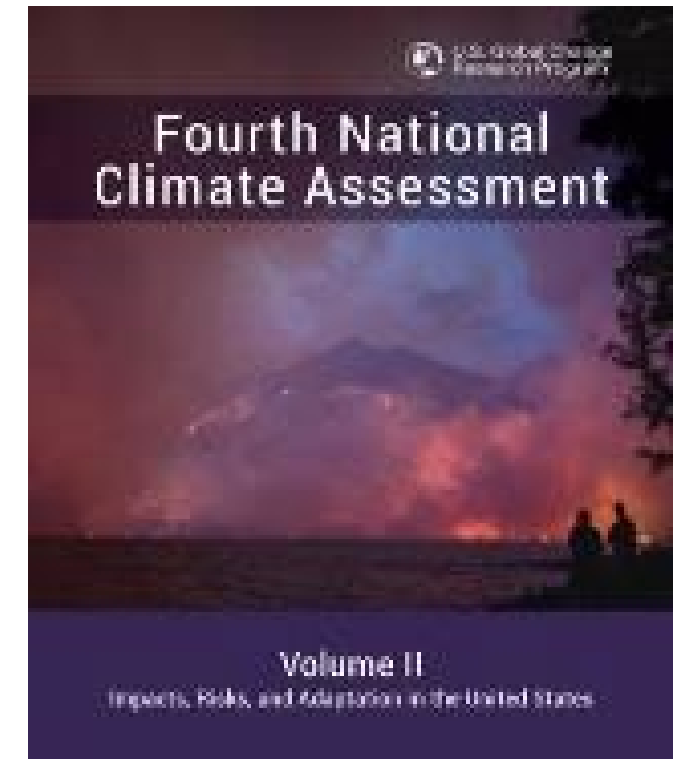
Partnering with NWS Climate Prediction Center

- Products
 - US and North American Drought Monitor co-authors
- Monitoring
 - Shared duties to monitor the climate of the planet
- Messaging
 - Shared webinars / telecons; support CPC's ENSO leadership



Partnering with OAR Climate Program Office

- National Climate Assessment
- Climate Indicators
- National Integrated Drought Information System
- Climate Change Attribution

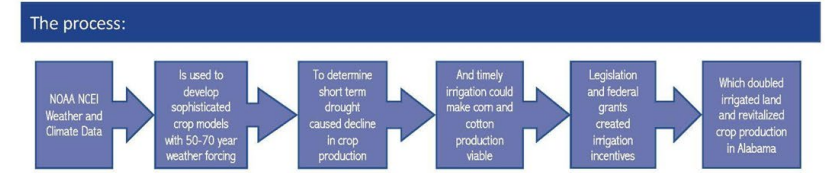
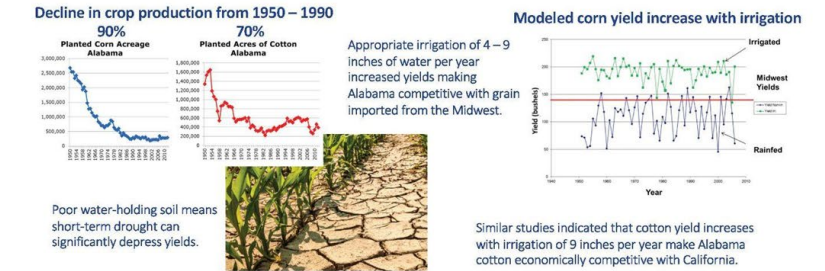


Partnering with States and AASC

- NCEI leverages partnerships to reach into the state and local levels
 - AASC
 - For delivery
 - Inclusion in state activities (ex. drought or water management plans)
 - For understanding of reach and value



Alabama Irrigation Initiative: A 20-year project to address the decline in crop production. NCEI climate and weather data were used to understand the problem and develop solutions.



Win, win, win results:

Alabama Irrigation Tax Credit signed into law.

Cost of legislation: \$1.9M

Increased revenue to state due to productivity increases

\$8-12M

Economic

- Unproductive agricultural lands revitalized
- Significant return on investment
- More distributed and robust national grain and fiber system may provide better security in the face of climate variability and change

Environmental

- Localized irrigation as needed has less impact on natural water resources
- Reduced nitrogen run-off
- Reduced transportation and cost impact for imported commodities

Societal

- Transforms communities into economically viable ones
- Lifts community's ability to provide life-enhancing services

50 M
Corn production increased 100% over 20 years.

25 M

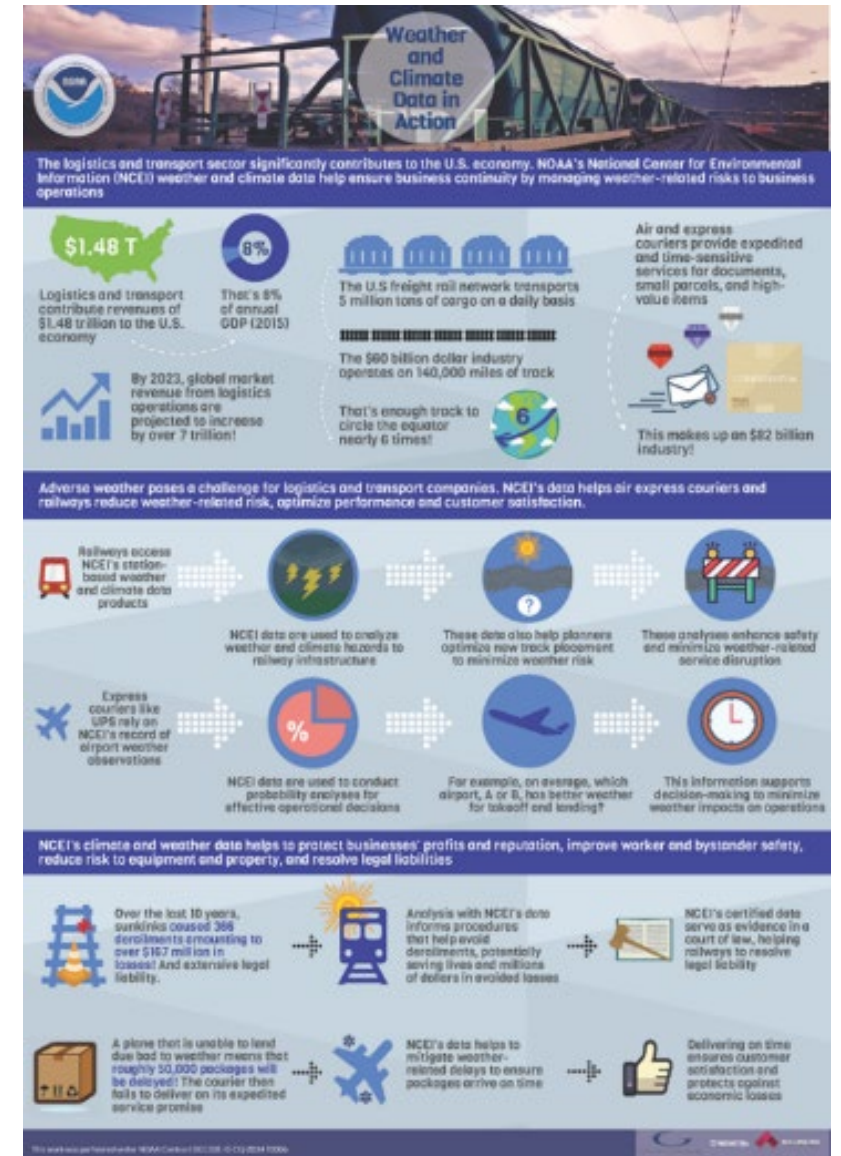
2000 2020

NOAA NCEI datasets can be used to identify problems, spur leaders to take action, and find solutions.



NCEI's Value To The Nation

- **From NCEI:** International Station Meteorological Climate Summary
- **Uses:** FedEx, UPS, and major railways land planes, set speed limits, and determine where to hub
- **Impact:** \$1.48T in revenues, brand image



NCEI's Value To The Nation

<https://www.ncei.noaa.gov/about/our-impact>

In-depth understanding of uses by

- Agriculture
- Coral Reef Management
- Aviation
- Finance/Reinsurance
- Retail & Manufacturing
- Drought & Livestock
- Logistics & Transportation
- Weather Service Providers
- Fisheries



NCEI's role in an increasingly climate-ready nation?

Perhaps New:

- Manage, serve and design tools built for forward-looking and direction-agnostic data
- “Climate and ...” data and analyses
- Extreme events and indirectly observed phenomena: data development and pertinent services
- AI-Ready formats; AI-informed work

Won't Change:

- Support partners and understand users
- Work “between the 20 yard lines”
- Relentlessly pursue “authoritative”
- Inform a nation that is more prosperous, more resilient, and more just



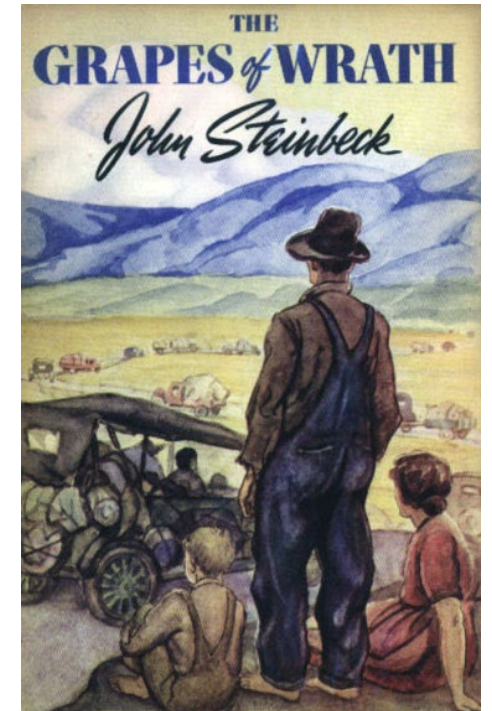
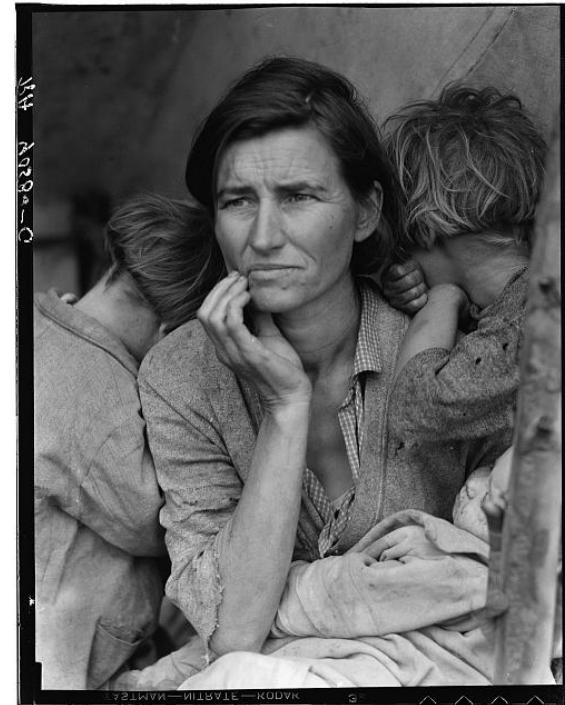
A Story

that has little to do with climate change,
little to do with today,
little to do with Asheville,
and also, everything to do with all three



I'm from Oklahoma ...

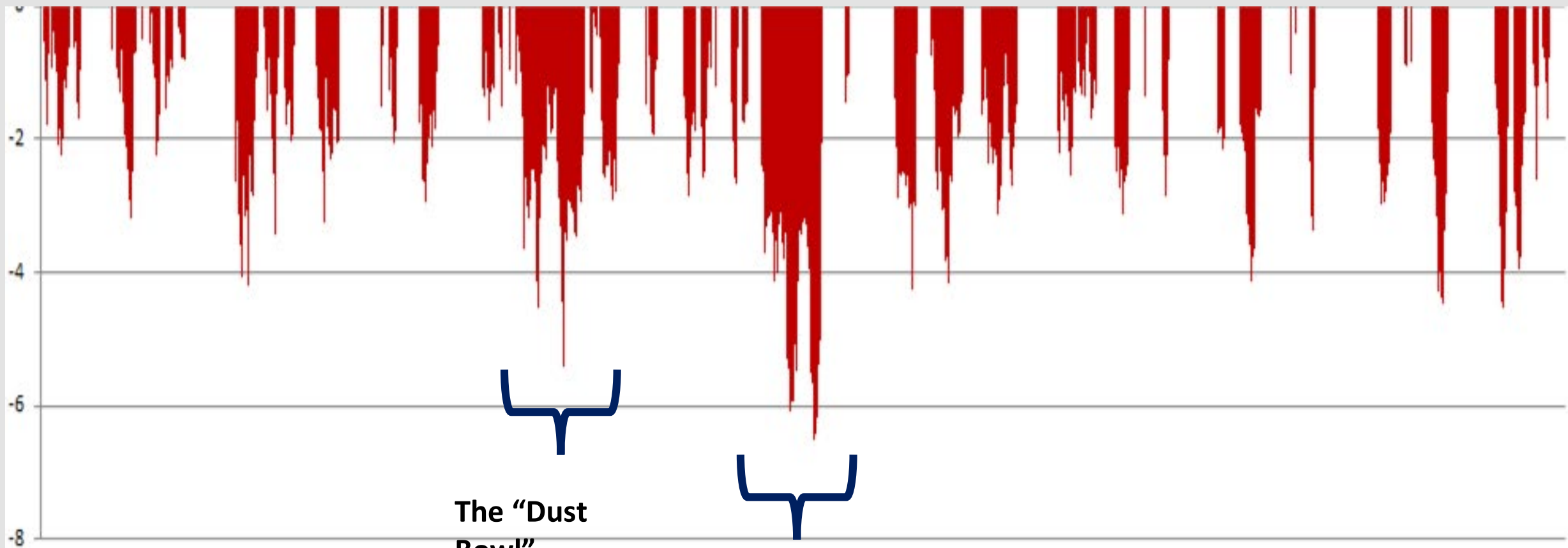
... you may know part of our climate history





The Drought Decade

Palmer Hydrologic Drought Index: OKCD2



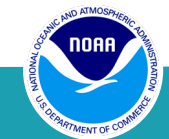
The "Dust
Bowl"

The
1950s

Learn More About NCEI



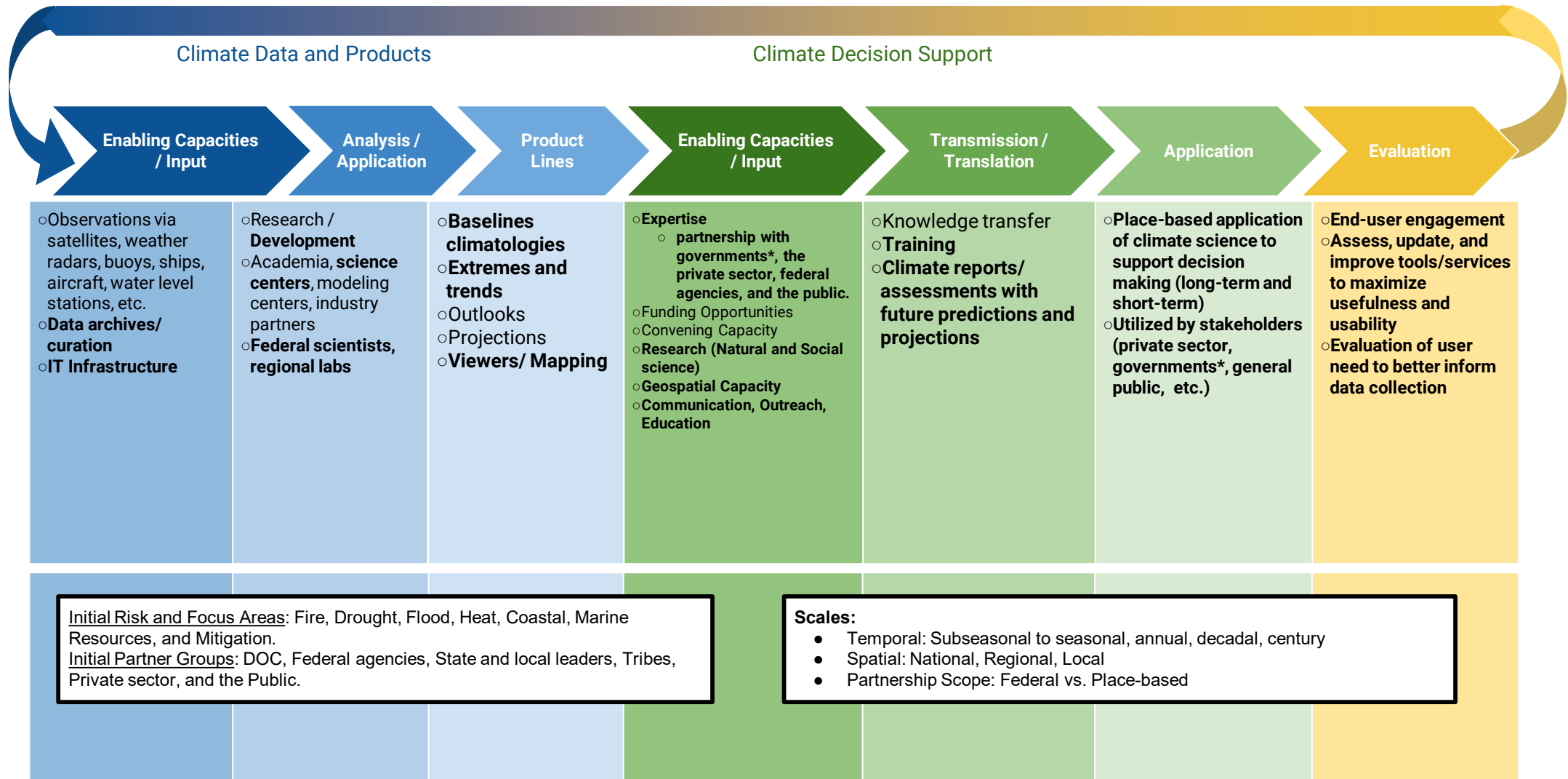
www.ncei.noaa.gov



Archived slides



Climate Ready Nation: A Spectrum of Expertise

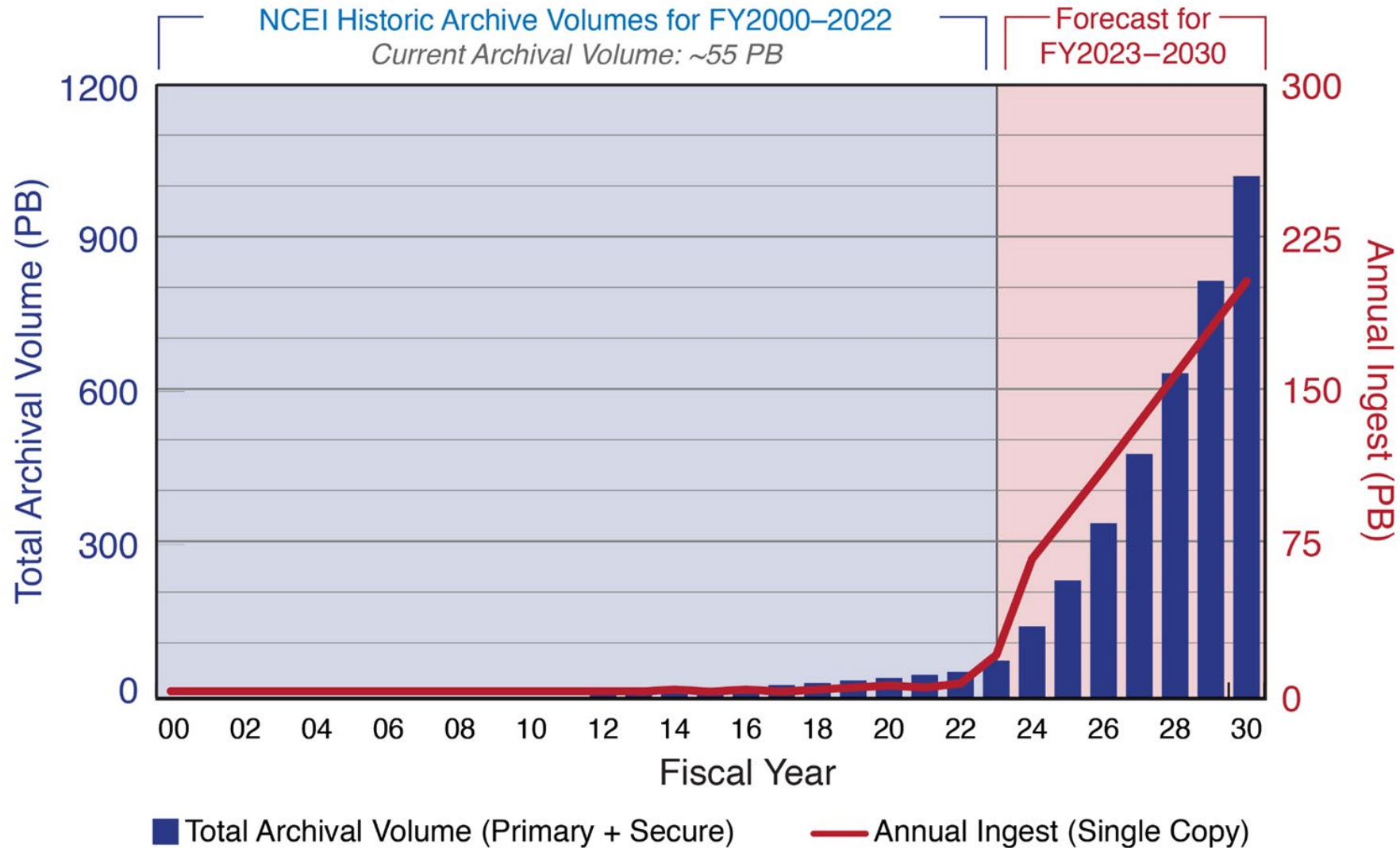


Bold - NCEI data, products, and expertise



NCEI Archival Volume History and Forecast

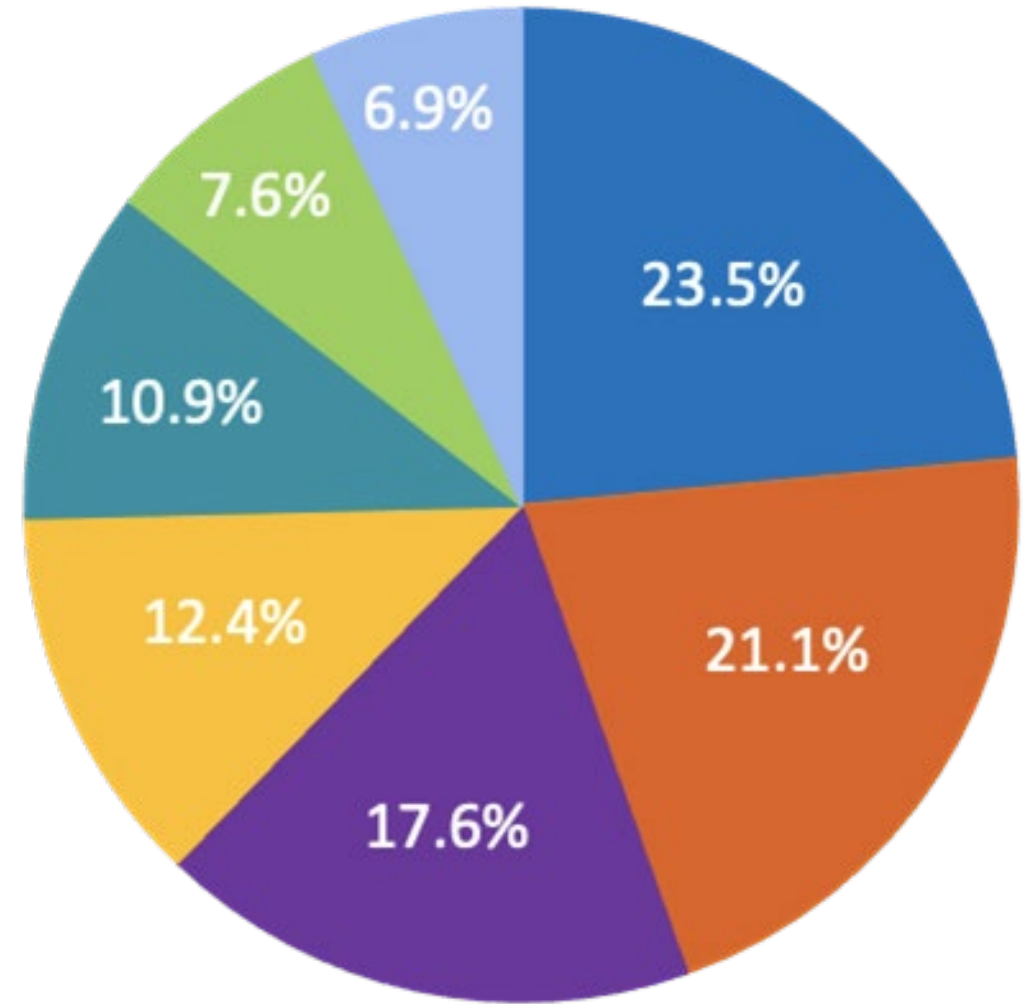
Increasing Data Volumes from Station, Model, Radar, UxS, Acoustics, 'Omics, and Satellite Sources



NCEI's Value to the Nation

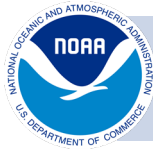
NCEI Stakeholders by Sector

- Science, Technology, and Engineering
- Ecosystems (Agriculture/Aquaculture)
- Transportation and Infrastructure
- Energy
- Insurance, Finance, and Legal
- Health and Emergency Management
- Higher Education





Department of Commerce



NOAA

National Oceanic & Atmospheric Administration

NOAA Line Offices

National Environmental Satellite Data and Information Service

National Marine Fisheries

National Ocean Service

Ocean and Atmospheric Research

National Weather Service

Office of Marine and Aviation Operations & NOAA Corps

National Environmental Satellite Data and Information Service (NESDIS) Line Offices

National Centers for Environmental Information

Office of Satellite and Product Operations

Center for Satellite Operations and Research

Office of Space Commerce

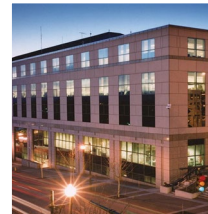
Joint Polar Satellite System Program Office

GOES-R Series Program Office

Office of Projects, Planning and Analysis

Office of Satellite Ground Services

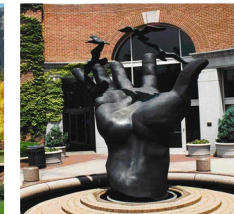
National Centers for Environmental Information (NCEI)



Asheville, NC
Headquarters



Boulder, CO



Silver Spring, MD



Stennis, MS



Continue our Productive Relationship with CISESS

Lean-ahead science:

e.g., Precipitation IDF curves, NCA model for transparency, integrate satellite information into climate products & services

Do-it-right science:

e.g., rapid response attribution, NCA Technical Support Unit

Service delivery & relationships:

e.g., listening sessions, SCONC/CAP relationship, climate monitoring improvements

Technical / Architectural acumen:

e.g., cloud and AI/ML leadership, invaluable to NCEI

Joint workforce development:

e.g., training, recruitment



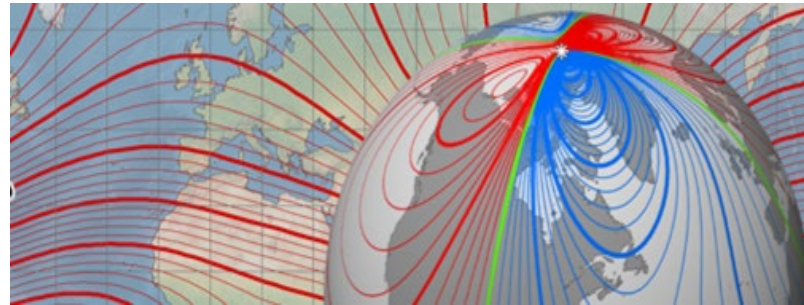
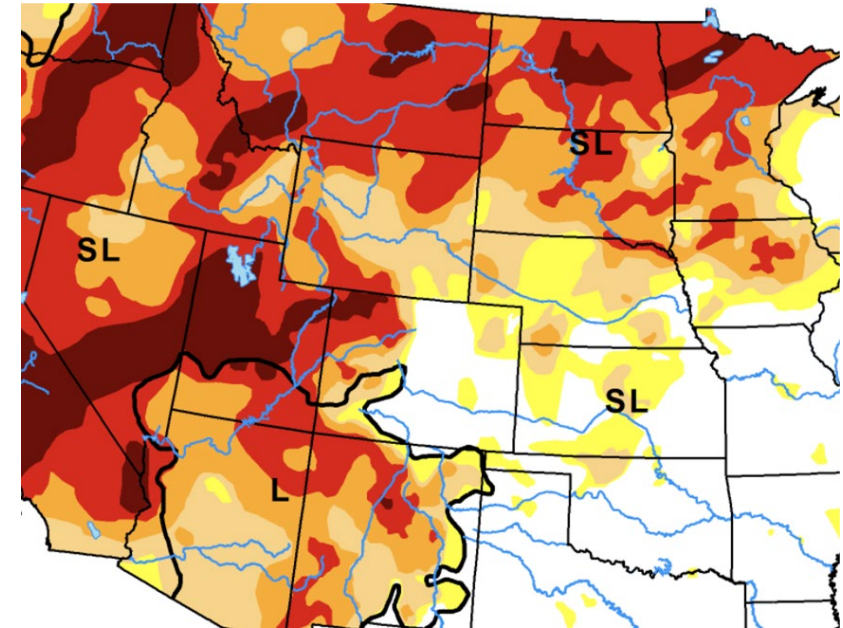
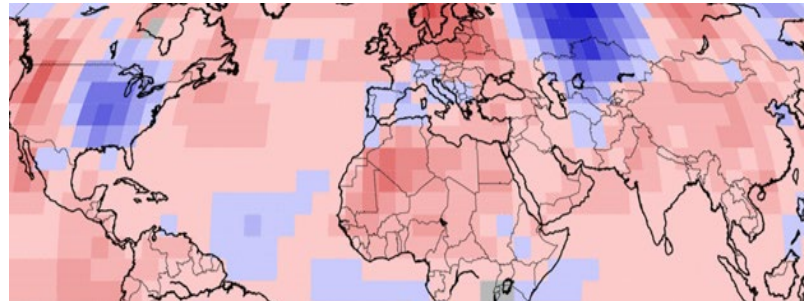
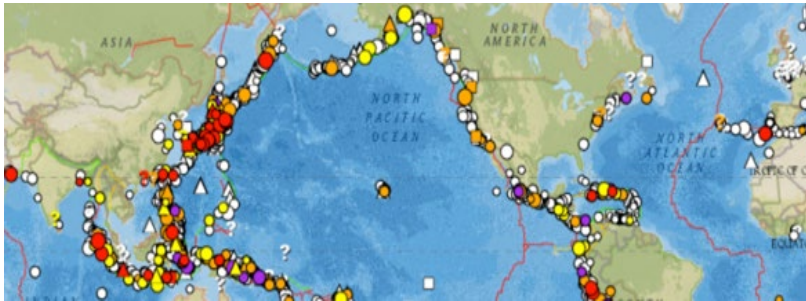
NCEI's Value to the Nation

Range of Products

- Time scale: Hourly to Decadal
- Geographic scale: Local to Global

Technical Expertise

- Aerosols to Coastal Inundation
- Drought Monitoring to Ocean Surface Winds
- Paleoclimatology to US/Global Climate Monitoring



Responsible for hosting and providing access to one of the most significant archives on Earth

with comprehensive oceanic, atmospheric, and geophysical data

- From the depths of the ocean to the surface of the sun and from million-year-old sediment records to near real-time satellite images
- NCEI is the Nation's leading authority for environmental information

