What are Climate Data Records?

Climate Data Records are created by merging data from surface, atmosphere, and space-based systems across decades. NOAA's Climate Data Record Program is initially focusing on data from satellites. By applying knowledge gathered over time about instruments' performance and sensor characteristics, the data are reprocessed to create consistent long-term records, allowing insight into changes in the Earth's environmental parameters, such as:

- Atmospheric and sea surface temperatures
- Snow and ice conditions
- Precipitation and clouds

Climate Data Records reveal Earth's short- and longer-term environmental changes and variations, allowing scientists and decision makers across society to better:

- Understand the climate system
- Assess the state of the climate on regional, national, and global scales
- Project future climate states
- Inform economic decisions impacted by future weather and climate

Uses of Climate Data and Information Records

Climate Information Records are created from the more fundamental Climate Data Records and provide focused information about specific environmental phenomena for a region, resource, or industry. Climate Information Records are created for applications of particular importance to science and society. Examples include:

- Hurricane trends
- Arctic sea ice coverage
- Drought patterns

This information allows businesses, resource managers, decision makers, and the public to better:

- Understand and responsibly adapt to climate changes and variability
- Develop strategies to minimize risks and mitigate possible impacts on society

Photo courtesy of NOAA

NOAA's National Climatic Data Center
Veach-Baley Federal Building
151 Patton Avenue
Asheville, North Carolina

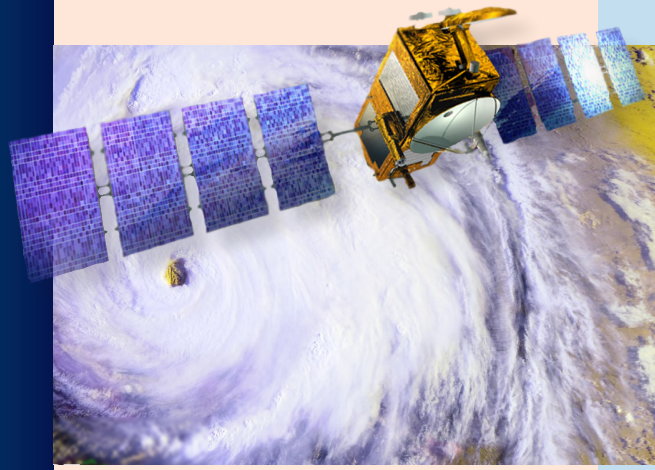
Climate Data Record Program
www.ncdc.noaa.gov/cdr

NOAA's Climate Data Record Program

AUTHORITATIVE CLIMATE RECORDS AND INFORMATION PRODUCTS

Our mission is to affordably provide authoritative climate records that allow our Nation to successfully adapt to a changing environment.

It is NOAA's vision that climate records extend from the start of the satellite era far into the future as trustworthy measures of climate change and variability.



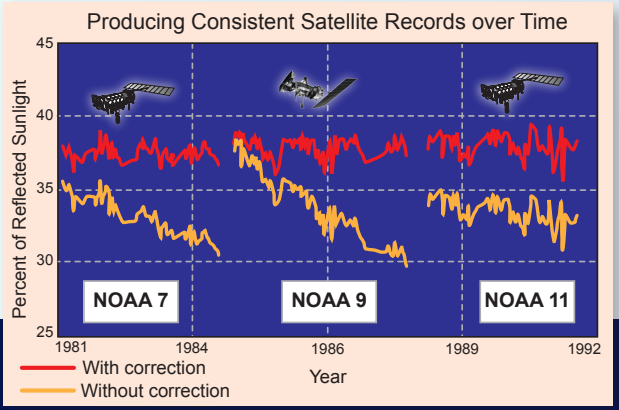
NOAA's Climate Data Record Program at the National Climatic Data Center is leading NOAA's generation of operational climate records for the atmosphere, oceans, and land.

NOAA's Climate Data Record Program

Leveraging the Nation's Investment in Climate Observations

The United States made significant investments in Earth-observing satellites over the past five decades. NOAA is developing the operational capability to reprocess this archived satellite data into long-term, consistent climate records that can be used by industry and scientists to understand and mitigate the impacts of climate variability and climate change.

NOAA is now delivering this capability to address critical climate questions. The answers benefit society by helping scientists, decision makers, and stakeholders develop strategies that will improve the Nation's resilience to climate change and variability, maintain our economic viability, and improve the security and well-being of the public.



Reflected sunlight measurements corrected using direct measurements made over a barren desert location (Source: Rao and Chen, Int. J. Remote Sens., 1995).

The Challenge of Using Data from Multiple Instruments for Climate

To accurately detect subtle climate changes, it is vital that the measurements from different instruments be merged together and analyzed using proven scientific techniques. As different and new satellites are added over time, their varying designs and changing qualities make combining past and current observations into consistent long-term records a major challenge.

Additionally, blending satellite with *in situ* data, while providing a more complete picture of the climate, is also challenging. Proper blending of data from *in situ* and satellite instruments must take into account both the strengths and the weaknesses of each instrument. NOAA's Climate Data Record Program addresses the challenges of using data from multiple instruments and provides authoritative and traceable long-term climate records.

Designed for Long-term Operations

Following the principles outlined by the U.S. National Research Council and other organizations, NOAA's Climate Data Records Program is:

- ***Systematic:*** Develops Climate Data Records using a consistent and well-defined set of improvement milestones.
- ***Comprehensive:*** Encompasses a wide variety of both current and potential Climate Data Records. It also fully addresses management and preservation of these records.
- ***Sustainable:*** Supports continuous record updates and can incorporate improved techniques as they become available.

Key components of the Program include competitive grants, contracts, and interagency coordination.

The NCDC Climate Data Record Program is primed to integrate other types of data in the future, in addition to satellite data. These types of observations include merged products combining satellite and ground-based observations, the inclusion of which will increase the ability of these data to address critical climate questions.

Producing Climate Data Records with Global Satellite Data

Satellite instruments are often affected by problems, such as changes in a sensor's sensitivity to light, over the lifetime of the satellite. These problems can impact our ability to accurately see changes in Earth's environment. The CDR Program applies proven and accepted scientific techniques to correct these problems, resulting in a more useful and reliable record of Earth's behavior.