



NOAA Regional Climate Centers Role in a National Climate Service



The Regional Climate Centers (RCC) deliver climate services at national, regional and state levels working with NOAA partners in the National Climatic Data Center, National Weather Service, the American Association of State Climatologists, and NOAA Research Institutes. This successful effort resulted in jointly developed products, services, and capabilities that enhance the delivery of climate information to the American public, and builds a solid foundation for a National Climate Service. As NOAA and Congress work to help society adapt to climate change, these collaborative efforts form a framework for the service, data stewardship, and applied research components of the National Climate Service.

NOAA Regional Climate Centers Vision

Since its inception more than two decades ago, the RCC program has provided climate services to federal, state, and local government agencies; commercial and non-commercial industries; students and researchers; and private individuals. This approach emphasizes:

- Providing services based on direct interaction with climate stakeholders
- Distributing accurate and unbiased climate data, data-products, and information
- Enhancing climate services and developing decision support tools through applied research
- Educating stakeholders on emerging regional climate issues

With NOAA, the RCCs envision a science-based National Climate Service that supports improved decisions to enhance industries, protect the environment, and promote public safety.

Climate Services

The RCCs have effectively provided regional climate services for more than two decades. During this time we have learned that effective and meaningful climate services must be defined very broadly to satisfy stakeholder needs. The services provided by a National Climate Service should satisfy the domain-specific needs of stakeholders in ways that can be directly assimilated into their business practices. Services should include:

- ◆ Two-way dialogs between climate scientists and users of climate information
- ◆ State-of-the-art systems to collect, archive, assess, and deliver climate information
- ◆ Timely access to climate data, products, and analyses derived from integrated data sources
- ◆ Climate outlooks and interpretive tools
- ◆ General and specific assessments of climate conditions at pertinent spatial and temporal scales
- ◆ Access to research results pertaining to basic and applied climate issues
- ◆ Decision support tools developed for domain-specific applications
- ◆ Educational products and services

Currently, the RCCs deliver the following information services that we hope to expand and enhance through development of a National Climate Service infrastructure.

- Direct contact with users provided by full-time User Service Climatologists
- Public access climate information web sites
- Climate services delivered via web interfaces and direct customer interaction
- Contractual agreements with public and private customers that includes consulting meteorologists and climatologists
- Regional expertise on climate patterns, trends, and variability



Service To NOAA And Other Federal Agencies

The RCCs have established themselves as a valuable resource within a variety of NOAA operational and planning activities. At the invitation of NOAA line offices we have supported or participated in the following activities.

- ◆ Weekly input to National Drought Monitor
- ◆ NIDIS management and working groups
- ◆ Site surveys for CRN and other observational networks
- ◆ NOAA and USDA representatives to WMO expert working groups
- ◆ USFS National Fire Assessments
- ◆ Interact with NOAA RISA Program
- ◆ NOAA Panels, Work Groups, Reviews, and Committees
- ◆ National Academy of Science Panels and AMS Committees
- ◆ Involved with NOAA Test Beds for Climate and Hydrometeorology
- ◆ Interact with NWS WFOs, Regions, and RFCs
- ◆ Develop and manage NWS climate information systems
- ◆ NOAA National Data Stewardship Team
- ◆ National Climate Extremes Committee
- ◆ Developed and operate WeatherCoder3 for the NWS
- ◆ Developed and operate Datzilla
- ◆ Provides climate information to national, regional, and local NOAA offices

Applied Research

The RCCs placement at major research universities provides a mechanism for a vibrant and internationally recognized applied climate research program as evidenced by the publication of numerous articles in peer-reviewed journals. RCC researchers have combined NOAA funding for climate services with external grants and institutional support to amplify their applied climate research programs. A sampling of RCC research topics includes:

- ◆ Climate and Hydrology
- ◆ Agriculture
- ◆ Drought
- ◆ Climate observation and instrumentation
- ◆ Climate change and variability
- ◆ Data quality control and assurance
- ◆ Complex terrain effects on climate
- ◆ Public health and climate
- ◆ Regional climate issues and problems
- ◆ Tropical storm climatologies
- ◆ Atmospheric teleconnections
- ◆ Environmental water quality
- ◆ Climate information technology systems
- ◆ Extreme climate events



Operational Support Development

The RCCs have been in the forefront of developing operational support systems. The Applied Climate Information System (ACIS) is the foundation for RCC data management and electronic information delivery and was developed to meet the needs of operational efficiency, redundant reliability, and flexibility to accommodate evolving information system configurations and needs. ACIS can be an effective operational component of GEOSS and is designed to provide data to web servers and services, automated data delivery systems, and on-demand data polling from remote users and user applications. Using a flexible and extensible design approach, ACIS is the core driver for the following RCC systems:

- ◆ xmACIS (serving the climate information needs of the NWS)
- ◆ NOWData (similar to xmACIS but developed for the general public)
- ◆ THREADEX (metropolitan area climate extremes for the NWS and media)
- ◆ agACIS (agricultural products for the USDA)
- ◆ Distributed and synchronized data archives
- ◆ XML-RPC services (automated climate information delivery for research and modeling communities)

Climate Data Stewardship

Observations are the cornerstone of climate information. The RCCs are dedicated to the provision of quality information and are actively involved in efforts to improve the data collected and disseminated by NOAA climate observation systems. We are involved in the design and implementation of reference climate observation networks such as the Climate Reference Network (CRN) and the modernized Historical Climate Network (HCN-M). We develop ingest and management systems that improve data quality using advanced quality control and assurance routines and apply these practices to national and regionally operated observation networks. Our data stewardship efforts include preservation of NOAA historical archives through participation in the Climate Database Modernization Program (Forts data, station record books, and daily and hourly data). Participation on the NOAA Data Stewardship Team resulted in RCC development of Datzilla, an error reporting and tracking system that currently involves more than 450 national, regional, and state cooperators to report and correct errors in NOAA climate datasets.

Future Directions

Climate issues continue to rise in visibility as an everyday concern of the American public. The RCCs are working with NOAA to ensure that user services, as embodied in the RCC program, are given a prominent place within the envisioned NCS. A central concept that will pervade NCS is a strong emphasis on regional, state, and local relevance, precisely the domain in

which the RCCs have excelled. A strong and responsive user services program, based on high quality climate information, will ensure that Congress' long-term investment in the RCC program pays a handsome dividend, and that the RCC's trust-based relationships with stakeholders will continue to provide a proven and popular service to the nation.



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