ACIS Applied Climate Information System

Climate Information System (ACIS) is a system architecture developed, maintained, and operated by the NOAA Regional Climate Centers (RCCs). It manages the complex flow of climate information from climate data collectors to end users of climate data information. ACIS is not designed to be a historical data archive. It is a system that delivers operational information derived from historical archives and near real-time climate data. ACIS includes an integrated metadata system for data and observation discovery; national, regional, and local datasets; is used as a data source for RCC websites and delivers climate data-products to supply information to partners and other end-users.

ACIS is developed and maintained by the RCC Program. It is designed to manage the complex flow of information from climate data collectors to end users. ACIS integrates historical climate information and near real-time data together under one umbrella system where they are fused into quality products to assess historical climate trends, enhance daily operational decisions, or assist with any number of climate dependent activities. ACIS information is delivered to end users as value-added products that are readily used in daily operations. These products are tailored to user needs, easily accessed, and delivered in a format specified by the user. The products can be pulled from web sites, automatically delivered to the user, or integrated directly into locally developed computer simulation or management models.

ACIS Benefits

Climate data management is time consuming and labor intensive. In the past, users of climate information struggled to administer local data archives to support their specific needs. This diverted time and resources from their primary tasks because local climate archives require maintenance, updating, and software modifications. Reliance on ACIS to provide needed climate information alleviates these data management tasks. This results in improved decision support and a reduction in the organizational resources devoted to data management activities. Beyond physical infrastructure, ACIS incorporates the collective knowledge of Regional Climatologists and information technology experts to address the needs of climate data users in a variety of sector-specific disciplines. ACIS is an evolving system that is continually updated with new sources of high-

quality climate data, new products to meet specific user demands, and state of the art technologies to deliver these products in efficient and cost effective ways.

Why is ACIS Unique?

Most climate data management systems focus on the storage of climate data and, at best, provide the ability to access data subsets or simple pre-defined summaries from single datasets. ACIS is unique because it focuses on producing customer-driven, value-added products that combine data from multiple data sources. Product quality is assured through rigorous definition of station and individual station element compatibility defined in a metadata database. Data and metadata archives, product access interfaces, and product generation capabilities exist at multiple RCCs. These capabilities are linked via the Internet to provide a seamless, robust and reliable product access system. Identical products can be generated and delivered to a user regardless of which RCC's system is accessed. Automated 'behind the scenes' switching between centers assures users of dependable and fast access to ACIS products.

ACIS System Components

ACIS is a fully functional system with a flexible design. ACIS is continually evolving to incorporate additional data sources, generate new and improved data products, take advantage of emerging computing technologies, and respond to the needs of its users.

Metadata

Metadata can be simply defined as *data describing other data*. ACIS metadata is managed using a relational database system that is queried extensively during the process of data discovery, data entry and extraction, and product generation. The metadata determines the availability of stations and station data elements required by a selected product, guides conversion of data collected in different units, and evaluates the quality of data records based on individual data value flags.

Climate Data

Climate data available in ACIS consist of in-situ observations collected from a variety of federal, regional, state, and local networks. Both archive-quality historical data (e.g. the Global Historical Climate Network (GHCN)) and near real-time data ingested from operational data transmission streams are available. All data are automatically synchronized between the RCCs

and where necessary NCDC to ensure that the highest quality data reside in ACIS. Gridded data have recently been added to ACIS to meet user demand. Available gridded data sets include regionally downscaled climate model output from NARCCAP and daily and monthly gridded data based on the PRISM method as well as two additional daily observation grids based on alternative methodologies. Users of any of these gridded data sets have the full benefit of the ACIS extreme value and data statistical aggregation routines (monthly, seasonal, and annual summaries) used to develop products for station data in addition to gridded data mapping capabilities.

Data Ingest

Ingest processes collect real-time data from Internet and satellite sources multiple times per day to assure ACIS data are as up-to-date as possible. Ingest modules provide preliminary quality control of these values. Additionally, the RCCs developed and operate the primary data ingest software for the National Weather Service Cooperative Observer Program (COOP). These data, which are the backbone for daily climate observations in the U.S., undergo more extensive quality control before inclusion into ACIS often in less than a hour after being reported by the observer.

Products

All output delivered by ACIS is classified as a product. A product can be a tabular data listing, a simple or complicated statistical analysis, a station metadata summary, results of an application model analysis, or a graphical display. ACIS includes a wide array of standard products that adhere to rigid standards for data quality, use of certified statistical analysis routines, compliance to rules for interpreting data flags, and commonly accepted output formatting options. New products submitted for inclusion to ACIS must undergo a review process that ensures compliance with these quality standards.

User Interface

ACIS offers several distinct user interfaces that include standard or custom web pages and a scripting interface using standards-based web services calls to directly access ACIS. Most users find the browser interfaces sufficient to meet their needs. Thus, numerous browser interfaces have been developed many of which are highlighted in the examples tab. The web services interface provides a more direct and efficient level of access

to ACIS that provides more options for user specification and development of products than the web interfaces. A user wishing to summarize rainfall records for all stations in a specific state or hydrologic region might use this interface to produce input files for a modeling application. Direct access to ACIS through this advanced programming interface (API) is the most efficient method to obtain data when operational needs require frequently updated climate information.