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MARCH 4, 2022

Operations and Services
Climate Services, NWSPD 10-10

CLIMATE DATA SERVICES

NOTICE: This publication is available at: https://www.weather.gov/directives/.

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SUMMARY OF REVISIONS: This directive supersedes National Weather Service Instruction 10-1003, "*Climate Data Services*", dated March 4, 2022. This is an administrative update only to fix broken links in Uniform Resources Locators (URLs). No content changes were made with this update, and the effective date was not affected.

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February 17, 2022

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Date

Climate Data Services

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1 Introduction

This instruction describes how the National Oceanic and Atmospheric Administration's (NOAA's) National Weather Service (NWS) Weather Forecast Offices (WFOs) and Weather Service Offices (WSOs), from here referred to in the collective WFO, should respond to requests for climate data for surface in-situ sites. Data definitions are as follows:

1.1 Climate Data Sources

Climate data is available from numerous sources and can be broken down into automated networks and manual networks. Not all networks, or sites within a network, are approved for inclusion in NWS climate products. Approved networks and/or sites will be noted in their individual description below. Networks and/or sites that are approved for use in NWS climate products are those that have undergone data quality control (QC) by both the NWS and the National Centers for Environmental Information (NCEI) (https://www.ncei.noaa.gov) and are being archived by NCEI.

1. Automated Observing Sites

a. Automated Surface Observing System (ASOS). The ASOS network consists of automated sites that were designed for the aviation community. Since these are generally located at airports that historically have had manual observations with long histories, they are the primary source for NWS climate products. More information on ASOS can be found at https://www.weather.gov/asos.

b. Automated Weather Observing System (AWOS). The Federal Aviation

Administration (FAA) has updated all FAA-owned AWOS' to the designation of AWOS-C. This version of AWOS provides observations similar to the ASOS. Other versions of AWOS, including the AWOS A, AWOS I, AWOS II, AWOS III, and AWOS IV, may still be active at non-Federal observing stations. Due to the non-Federal designation of these sites the maintenance and calibration records may or may not be readily available which would make them not suitable for use in NWS climate products. Further FAA information can be found in the FAA Order JO 7900.5E, Section 4.2 (https://www.faa.gov/documentLibrary/media/Order/JO_7900.5E_with_Change_1.pdf). Only Federal sites with an AWOS-C designation or above are suitable for NWS climate products. If NWS climate products are produced for any non-Federal AWOS sites that maintain an AWOS-III or above, then it is the responsibility of the WFO to closely monitor those sites for any degradation in observation quality. The climate products may continue unless degradations in the quality of the data is seen.

c. U.S. Climate Reference Network (USCRN). The USCRN is a systematic and sustained network of climate monitoring stations with sites across the conterminous U.S., Alaska, and Hawaii. These stations use high-quality instruments to measure temperature, precipitation, wind speed, soil conditions, and more. The network is maintained by the NOAA/ARL Atmospheric Turbulence and Diffusion Division (ATDD) and managed by the NCEI (https://www.ncei.noaa.gov/access/crn/). Although the network produces high quality data, it is not recommended for NWS climate products since these are not maintained by the NWS or located at sites that have traditionally had NWS climate products.

2. Manual Observing Sites

a. NWS Cooperative Observer Program (COOP). The mission of the COOP is two-fold: (l) to provide observational data (usually consisting of daily maximum and minimum temperatures and 24-hour precipitation totals) necessary to define the climate of the United States and to help measure extreme weather events, climate variability, and long-term climate change; and (2) to provide observational data in near real time to support forecast, warning, and other public service programs of the NWS and entities outside of the NWS. Data from this network is approved for various NWS products that require mainly daily temperature and precipitation data. Also, as this network provides snow measurements it is also appropriate to use specific sites for supplementing daily climate products that use ASOS or AWOS data. This network can also be used as backup for daily temperature and precipitation for ASOS stations. Any COOP station used for backup or augmentation must be documented as such in the current COOP metadata system as described in NWS Instruction (NWSI) 10-1307 - *Cooperative Program Management and Operations* (https://www.weather.gov/media/directives/010_pdfs/pd01013007curr.pdf). More information on COOP can be found at https://www.weather.gov/coop.

b. Snow Paid Observer Program. The NWS collects snow data from a network of observers at select Primary Local Climatological Data (PLCD) sites which are generally located at airport locations. This data can be used to supplement the automated systems installed at these sites. Information for this program can be found in NWSI 10-1305, *Observational Quality Control – General* (https://www.weather.gov/media/directives/010_pdfs/pd01013005curr.pdf),

section 4.5.

c. Community Collaborative Rain, Hail, Snow (CoCoRaHS) Network. The CoCoRaHS network is a volunteer network of precipitation observations. Although not recommended for NWS daily climate products, data from this network may be used for extreme measurements since this data is archived at NCEI. It is the responsibility of the WFO to ensure the quality of the data from any specific site before using it.

Policy for data other than climate source data described above is covered in NWSI 1-1201 - *Obtaining Environmental Data from External Parties* (https://www.weather.gov/media/directives/001_pdfs/pd00112001curr.pdf), which describes policy for the NWS process for the acquisition, use, and transmission of such data sets.

1.2 Climate Data Types

See NWSI 10-1004, *Climate Records* (https://www.weather.gov/media/directives/010_pdfs/pd01010004curr.pdf) for a list of climate data elements for each type.

1. Observational data (hourly, daily, and monthly).

2. Long term means, extremes, and other statistics (including normals).

1.3 Climate Data Assurance Categories

1. Preliminary – data before final NCEI QC.

2. Final – Data that has been through final NCEI QC procedures. NCEI has several QC steps. Data is final only after the final QC step is completed and has been added to the NCEI archive.

Please note: Do not use the terms “Official” or “Unofficial” when referring to climate data assurance categories. It is perceived by users of the data that anything made public from the NWS is official.

1.4 Climate Data Status

1. Certified (https://www.ncei.noaa.gov/services/certification) (authenticated for legal use; e.g., litigation, etc.) – Certification is performed by NCEI. NCEI may certify final or preliminary data at their discretion. NCEI certification only attests that exact duplicates of climatic records on file at NCEI have been provided to those that request such data.

2. Non-Certified (any data not authenticated by NCEI).

2 Public Availability of Climate Data from Weather Forecast Offices (WFO)

WFOs may receive and respond to data requests from multiple sources (e.g., NWS Internet web sites [Section 2.5], e-mail, facsimile, telephone, hard copy [by mail or user visit], etc.). Unless

referral is warranted according to Section 3, WFO data availability is subject to the following conditions:

2.1 Preliminary versus Final Climate Data

WFOs will indicate their climate data are "preliminary" with the following disclaimer, which will be provided prominently with climate information supplied by direct contact from WFOs to users (i.e., at the top of any NWS Web page; with hard copy, facsimile, or e-mail given to users; or stated orally (as necessary) on the telephone or in person to users):

"These data are preliminary and have not undergone final QC by the National Centers for Environmental Information (NCEI). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCEI website - https://www.ncei.noaa.gov/.".

2.2 NCEI Publications

WFOs will **not** provide NCEI data publications or products for which NCEI charges a fee for cost recovery. WFOs will refer inquiries for these publications to NCEI. NCEI indicates which publications/products are free and which have a charge at the following Web page: https://www.ncdc.noaa.gov/data-access/quick-links.

2.3 Astronomical Data

WFOs will indicate, when queried, that astronomical data are computed by using accepted algorithms that are theoretically accurate to within a minute for locations between +/- 72 degrees latitude, and within 10 minutes outside of those latitudes. For data at specific locations, please refer to the NOAA Solar Calculator at https://gml.noaa.gov/grad/solcalc/.

The following disclaimer will be provided prominently where astronomical information is provided by direct contact from WFOs to users (i.e., on any NWS Web page providing the information; with hard copy, facsimile, or e-mail given to users; or stated orally on the telephone or in person to users):

"The U.S. Naval Observatory (USNO) computes astronomical data. Therefore, the NWS does not record, certify, or authenticate astronomical data. Computed times of sunrise, sunset, moonrise, moonset; and twilight, moon phases and other astronomical data are available from USNO's Astronomical Applications Department (https://www.usno.navy.mil/USNO/astronomical-applications).".

2.4 Database Use

The Regional Climate Centers' (RCCs) (https://www.ncei.noaa.gov/regional/regional-climate-centers) Applied Climate Information System (ACIS) (http://www.rcc-acis.org) (see Appendix A) provides data to the NWS through an interface, called xmACIS2, to satisfy NWS needs for supplying climate information to the public. WFOs are encouraged to use xmACIS2 in lieu of datasets from other systems when responding to data user requests. The xmACIS2 is automatically updated and synchronized between NCEI and the RCCs with the most recent data available (including near real-time preliminary data and archived final data). Therefore, xmACIS2 includes the most complete and up-to-date data available to all of NOAA and its data delivery partners. The xmACIS2 is nationally maintained and has replaced locally developed,

uncoordinated, and inconsistent datasets.

Use of datasets from other systems perpetuates the inconsistencies of the past. WFOs are required to work with NCEI and the RCCs to ensure the xmACIS2 database is the best, most up-to-date, consistent dataset available. The WFO should correct historical data errors found in xmACIS2 through Datzilla (https://datzilla.srcc.tamu.edu/) submissions. More information on Datzilla can be seen in Appendix C of this document.

2.5 Internet Climate Data Provision

The NWS climate Web pages are found at https://www.weather.gov/wrh/climate. WFOs will provide data by using the standard NWS climate Web page formats.

2.5.1 NWS Climate Home Page

Users may access any WFO's climate Web pages using links on the map at the NWS national climate home page (https://www.weather.gov/wrh/climate/) (Figure 1) or alternatively at any selected WFO home page from the top menu under "Climate and Past Weather".

Figure 1: NWS national climate home page. (https://www.weather.gov/wrh/climate/).

2.5.2 WFO Climate Web Page

Figure 2 shows an example of a nationally standardized WFO climate Web page. Data will be contained under the following tabs: "NOWData" (Figure 3), "Observed Weather" (Figure 2 showing the selection of the "Observed Weather" tab), "Climate Prediction and Variability", "Local Data/Records", and "Climate Resources". The "Climate Resources and Variability" tab provides links to the Climate Prediction Center (CPC) and other climate forecast resources. Astronomical data and other nationally maintained links are found under the "Climate Resources" tab.

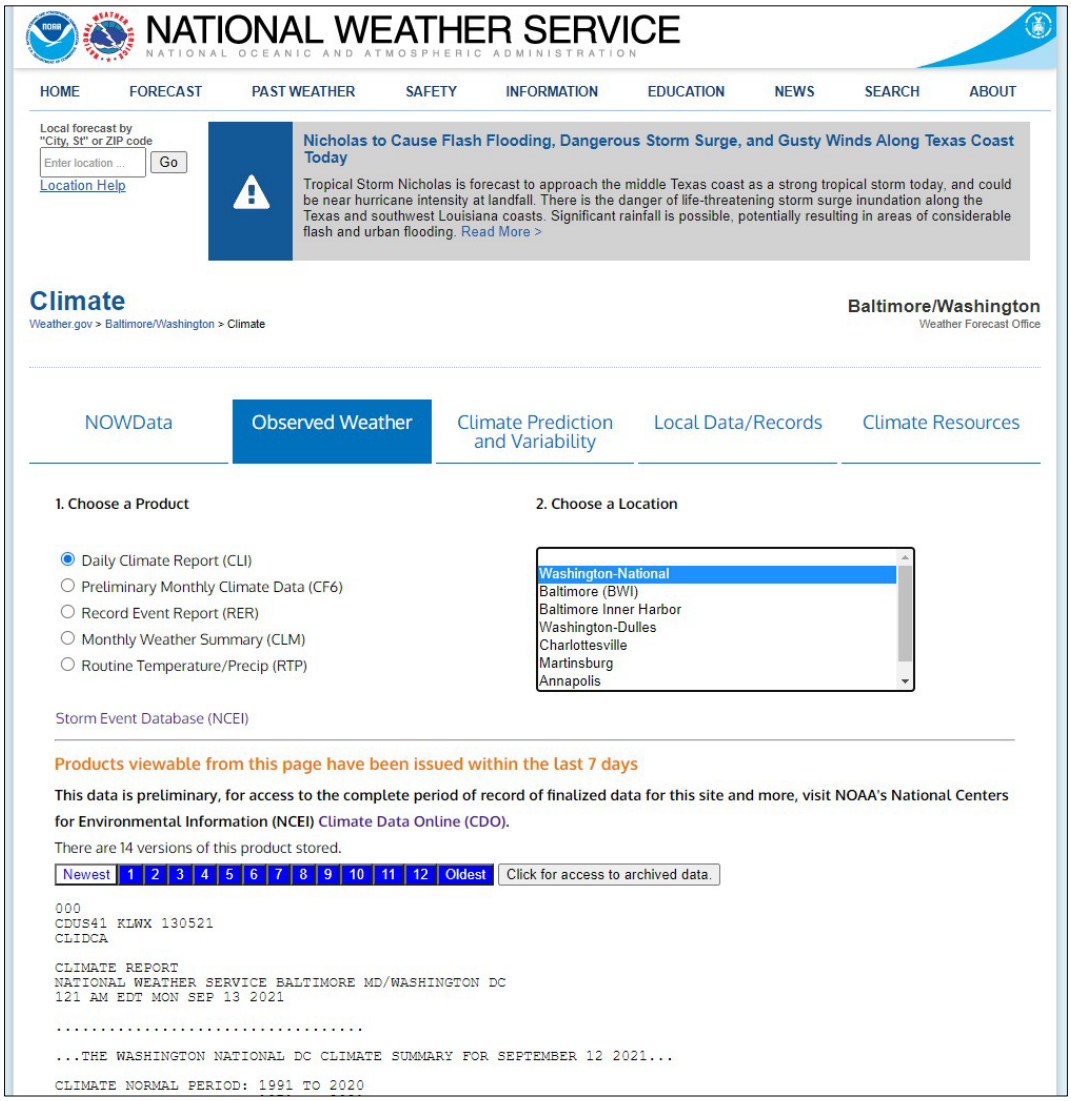

Figure 2: Example of a WFO climate Web page with the "Observed Weather" tab selected. This tab provides ASOS preliminary data.

At a minimum, WFOs will post under the "Observed Weather" tab the top four products listed (CLI, CF6, RER, CLM - under the column labeled "1. Choose a Product") for all ASOS LCD locations in their area of responsibility. In addition to these, the CLS, CLQ and CLA products will also be listed if these products are produced by the WFO. See NWSI 10-1004, *Climate*

Records for details on these products. WFOs may add additional locations for these products. The Regional Climate Services Program Managers (CSPMs), through consensus, will determine the amount of archiving for any product. WFOs may also post any other information under "Local/Data Records." Changes to the "Observed Weather" and "Local Data/Records" tabs are made through the NIDS Climate Configuration Management System (CMS) located at https://cms.nids.noaa.gov/. The CMS can only be accessed while on an NWS network or, if not on an NWS network, through NOAA Network Operations Center WebVPN Service at https://portal.noc.noaa.gov/sa.

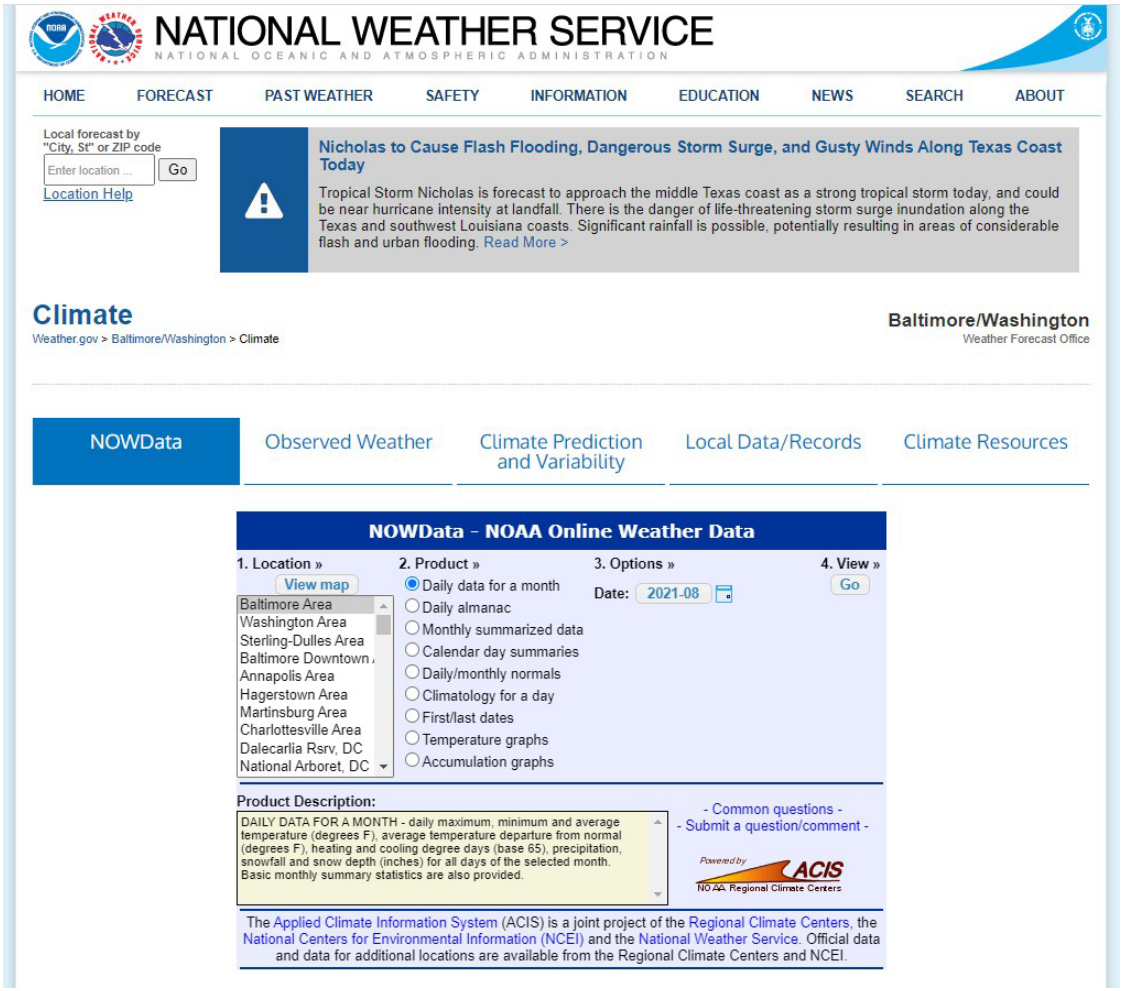

Figure 3: Example of a WFO web page with the "NOWData" tab selected. This tab provides ASOS preliminary data and COOP preliminary data.

WFOs select the locations for the NOWData (see Appendix B) products. WFOs are encouraged to include all COOPs that have 30-year climate averages computed and/or are sending data daily via phone or the Web.

3 Referral of Requests

1. WFOs will refer data requests to NCEI for the following situations:

- Any request requiring certification of data.
- Any request related to a requirement to fulfill a law, mandate, or ordinance for a federal, state, or local government.
- Any requirement for data to be used in litigation. Additionally, if the litigation appears to involve the federal government, notify the Forensic Services Program Manager (FSPM) at NWS Headquarters (NWSH/Analyze, Forecast and Support Office (AFSO)/AFS24) and the appropriate regional headquarters (RH) personnel immediately. The FSPM is responsible for liaising with the Department of Commerce (DOC) and NOAA General Counsel (GC) and will work with them on any NWS requirements or responsibilities. For more information, see NWSI 10-2005, *Handling and Releasing Accident-related Weather Information* (https://www.weather.gov/media/directives/010_pdfs/pd01020005curr.pdf).
- Any request for copies of original ("raw") observation forms.
- Any international climate requests.

These requests will be made in accordance with the following instructions:

- 10-2003, *Records Retention* (https://www.weather.gov/media/directives/010_pdfs/pd01020003curr.pdf).
- 10-1603, *Operational Readiness and Significant Event Reporting* (https://www.weather.gov/media/directives/010_pdfs/pd01016003curr.pdf).
- 10-2005, *Handling and Releasing Accident-Related Weather Information* (https://www.weather.gov/media/directives/010_pdfs/pd01020005curr.pdf).
- 10-2006, *The Accident Investigation/Litigation Process* (https://www.weather.gov/media/directives/010_pdfs/pd01020006curr.pdf).

2. For requests other than item "1," WFOs should refer requests for the following situations to NCEI, RCC, State Climatologists, or the NWS Web link listing commercial weather vendors serving the U.S.(*) (https://www.weather.gov/IM/more), as appropriate:

3. WFOs will explain the data is considered preliminary and describe the process for requesting certified copies from NCEI.

(*) WFOs will not recommend a specific commercial vendor to a user.

In many cases, NCEI or the RCCs may be best able to handle larger scale analysis at the state, regional, or national levels (e.g., for drought or other widespread trends).

NCEI's Climate Monitoring Web site is a good resource for state, regional and national analyses (https://www.ncei.noaa.gov/access/monitoring/products/).

APPENDIX A - xmACIS2 (Applied Climate Information System, Version 2)

xmACIS2 is a Web-based interface that provides interactive access to climatological summary products. The products are based on data from the RCC's constantly-updated climate database, Applied Climate Information System (ACIS). To access the system, use the address: http://xmacis.rcc-acis.org/.

The custom station lists in xmACIS2 can be modified upon request. Stations can be added to or removed from the station lists. Requests for changes should be sent to the regional CSPM and are usually incorporated into xmACIS2 near the beginning of each month. Note that stations with no data in the ACIS database will not appear on the xmACIS2 web page. Only stations that provide daily summary data will be available through xmACIS2.

The xmACIS2 web page consists of two frames. The frame on the left is used to select program options. When the "Submit" button is selected, the results appear in the right frame. A more complete "xmACIS User's Guide" is available in .PDF format at http://xmacis.rcc-acis.org/static/xmACIS_Users_Guide.pdf.

Questions regarding ACIS data availability should be routed through the regional CSPM. The regions can filter these requests and work with the appropriate RCC for resolution. Data that have been key-entered at local offices can be added to the xmACIS2 database by submitting a ticket through Datzilla so the data can become part of the official archive at NCEI. Ideas for future enhancements to the xmACIS2 suite of products should also be routed through the CSPM.

Questions regarding xmACIS2 capabilities and problem reports can be sent to xmacis@nrcc.cornell.edu.

xmACIS2 is for National Weather Service internal use only. The URLs should **not** be given out to anyone outside of NWS. The RCCs have developed NOWData for general public access to the ACIS database.

APPENDIX B - NOWData (NOAA's Online Weather Data)

What is NOWData?
NOAA's Online Weather Data (NOWData) is a data query system providing basic climate statistics to the public, using the NOAA RCC ACIS. Through NOWData, climate statistics are available, on a preliminary basis, for surface observing stations from across the conterminous U.S., Alaska, Hawaii, Puerto Rico, the Virgin Islands, and Guam. Daily and monthly data for temperature, precipitation, snowfall, and heating/cooling/growing degree days are available for the current and previous years. Climate normals are available for the current 30-year normals period and extreme values are available for the full period of record for each station. Data from the 19th Century to yesterday can be found in NOWData.

How to access NOWData?
Click the area of interest on the map at https://www.weather.gov/wrh/climate to access a local NWS WFO climate page, and then select the NOWData tab at the upper right.

NOWData may also be accessed directly from any local NWS WFO homepage by selecting "Local" under Climate from the list on the left and then the NOWData tab at the upper right of the local climate page.

At the NOWData interface, select a location and one of the available products. Then make additional selections from any menus that appear and select "Go." The product will be displayed on a separate screen.

Why NOWData?
The most common question asked of NWS personnel is "What was the weather like on…?" NOWData provides that answer and much more:

- Unprecedented, user-friendly access to climate information for the general public.
- Convenient "one-stop" tool for everyone.
- Supports NOAA's commitment to provide climate data to the public.

Who is responsible for NOWData?
NOWData was developed by NOAA as a joint project between NWS, NCEI and the RCCs.

Where to get additional information?
NOWData information is considered preliminary and subject to revision. Final and certified climatic data can be accessed at NCEI (https://www.ncei.noaa.gov/). NOWData is designed to provide statistical climate information. Users interested in lengthy data histories for a station should contact NCEI or the RCCs.

APPENDIX C - Datzilla

Datzilla is a Web-based (https://datzilla.srcc.tamu.edu/) system used to report and track errors in NOAA datasets and data products and is an important part of ensuring their accuracy and fidelity. Datzilla was developed at the Southern Regional Climate Center as a derivative modification of the open-source Bugzilla software bug reporting system. It was modified to account for differences in the reporting of software development errors and the type of errors reported against NOAA data systems. The system has more than 1,100 enrolled users, primarily consisting of NWS WFO personnel, State Climatologists, and Regional Climate Center staff. Thousands of tickets have been entered against NOAA data systems consisting of tens of thousands of data corrections and additions to existing datasets.

Users gain access to the Datzilla system by requesting an account at the Datzilla Web site (https://datzilla.srcc.tamu.edu/) and clicking the "Request a Datzilla Account" link. Once access is granted, a user can report a suspected error in NOAA datasets or products by selecting the option to enter a new error report at the Datzilla home page. Fields are available for selecting the appropriate Source system {e.g., 10. xmACIS/SC-ACIS, 21. NCEI In-Situ (Surface Data), 40. NCEI In-Situ Station History} and for describing the error found. This should include the data/product affected, the problem area, and a summary describing the error. Each ticket is reviewed by the Datzilla gatekeeper at NCEI and is typically followed up through the ticketing system if additional information is required. Notification regarding the resolution of each submitted ticket is provided.