ηClimDiv
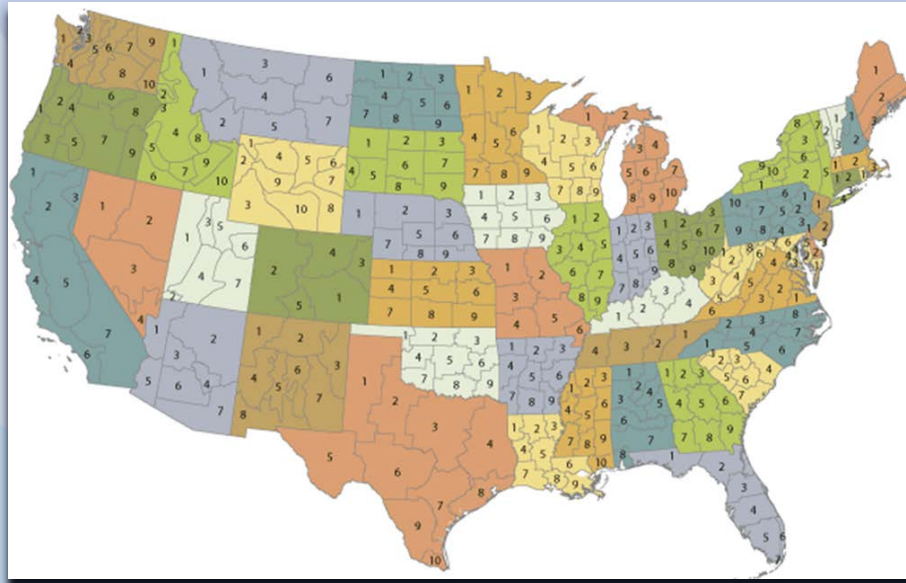

An Overview of NCDC's New Climate Division Dataset

Presenters: Chris Fenimore and Karin Gleason

Climate Monitoring Branch

March 19, 2014

ηClimDiv Overview

- What is ηClimDiv?

- How does ηClimDiv compare with the DRD divisional dataset?

- What data/products/tools are affected?

- Where do I go for additional information?

- Questions…

What is ηClimDiv?

- ηClimDiv is NCDC's new divisional dataset which is derived from a gridded instance (5km x 5km) of GHCN-Daily temperature and precipitation (called "ηClimGrid")

Networks include:

- COOP
- WBAN
- SNOTEL
- RAWS (temp only)
- BUOY (13 stns)
- CIMIS (28 stns)
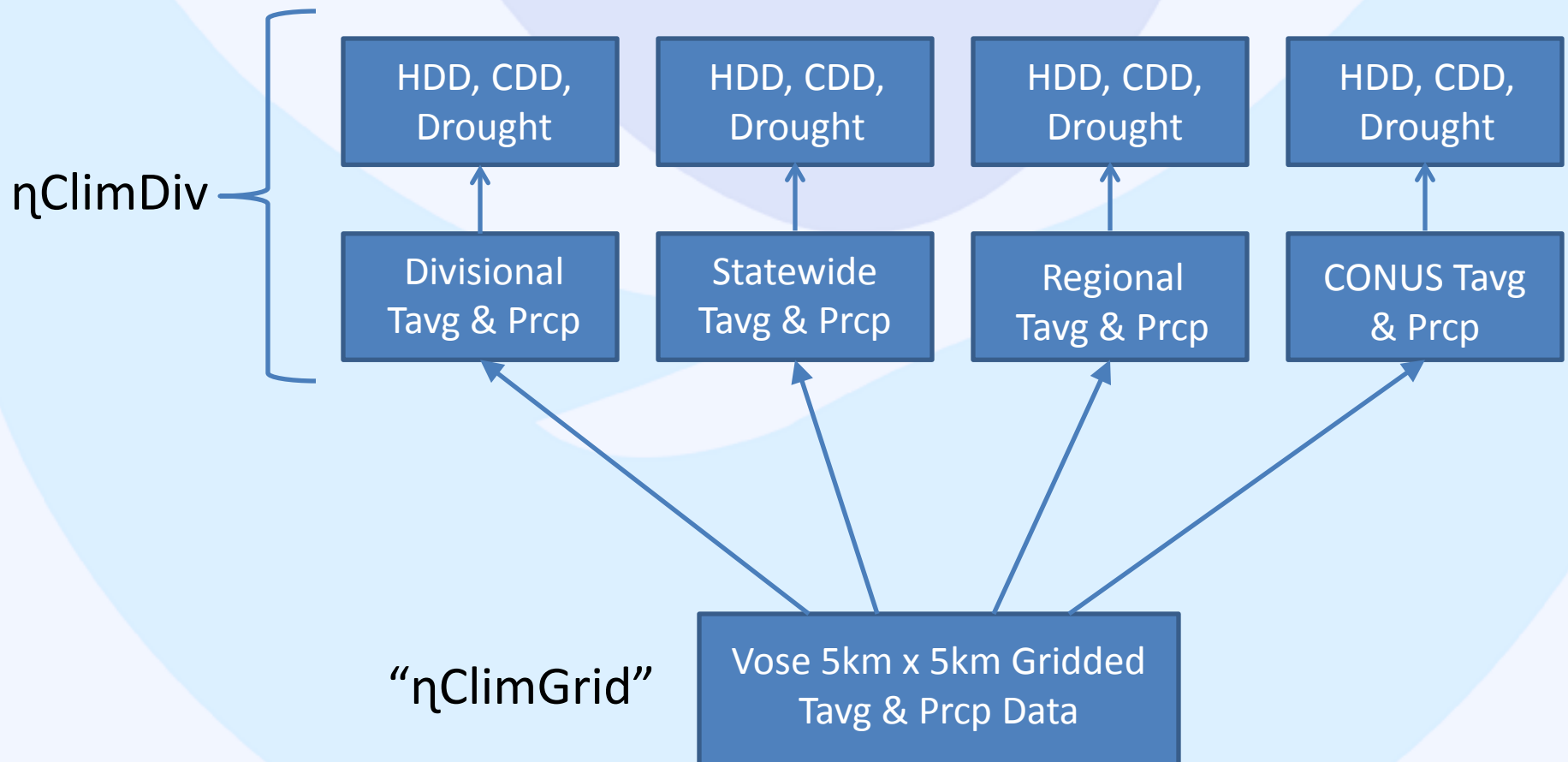- CANADA
- MEXICO
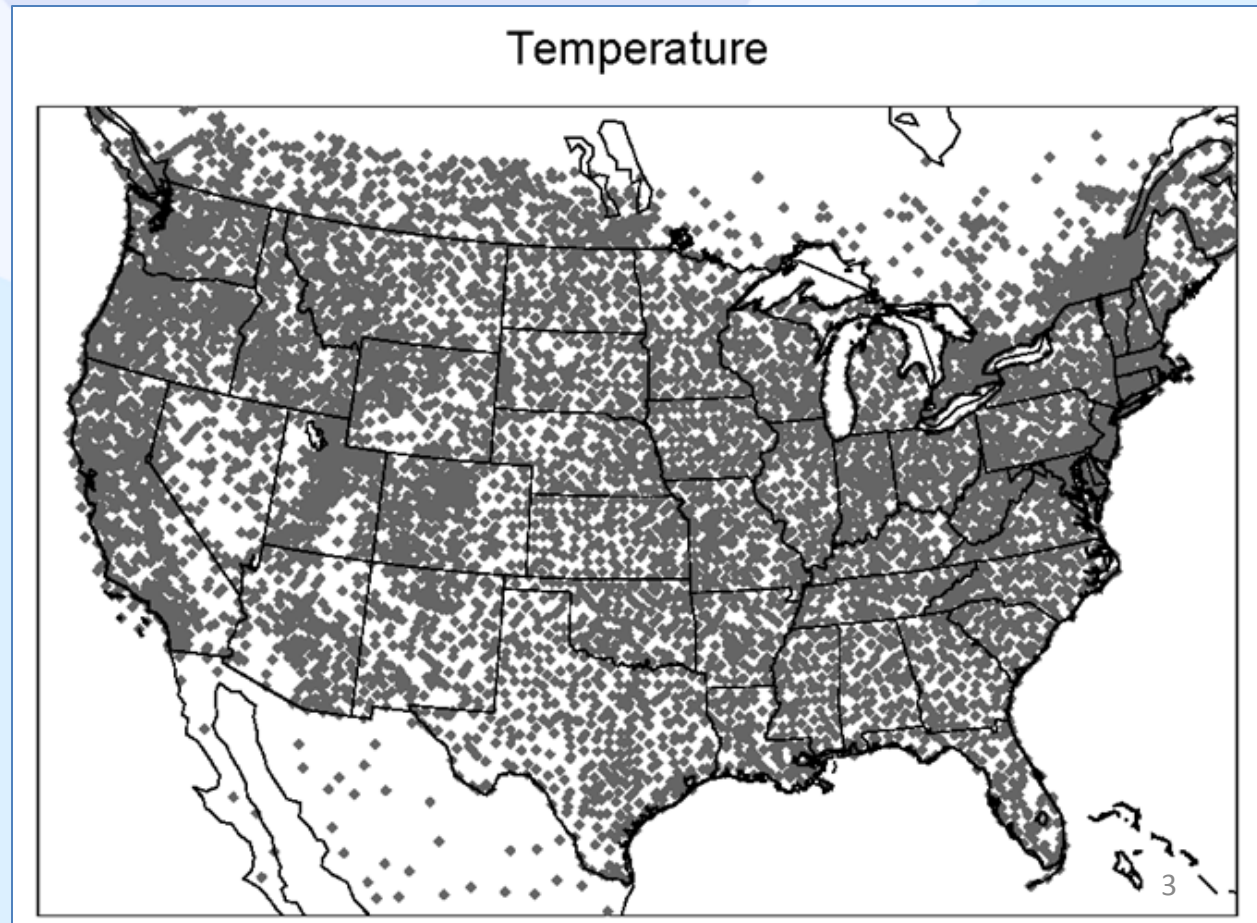
Temperature

What is ηClimDiv?

- ηClimDiv is a monthly divisional dataset which also contains statewide, regional and CONUS data from 1895 to present for the following elements:
    - Temperature (Tavg, for now → Tmax and Tmin coming soon)
    - Precipitation
    - HDD/CDD
    - Drought (PDSI, PMDI, PHDI, Z-Index, SPI)

- As with the DRD divisional dataset, ηClimDiv data will be processed/updated as part of CMB's routine monthly processing.

- ηClimDiv data will be updated once a month
    - Data within the last 2 calendar years are subject to change
    - POR refreshes will occur with version changes (less frequent)

What is ηClimDiv?

Dataset name history: GrDD   →   Version 2   →   ηClimDiv

ηClimDiv

| HDD, CDD, Drought | HDD, CDD, Drought | HDD, CDD, Drought | HDD, CDD, Drought |

| Divisional Tavg & Prcp | Statewide Tavg & Prcp | Regional Tavg & Prcp | CONUS Tavg & Prcp |

"ηClimGrid"

Vose 5km x 5km Gridded Tavg & Prcp Data

How does ηClimDiv compare with the DRD divisional dataset?

- ηClimDiv based on GHCN-Daily data
- New methodologies
  - 5km x 5km grid
  - More stations from pre 1930s era
  - Modern array of quality control algorithms (similar to USHCN)
- ηClimDiv is wetter and colder in mountainous divisions
- Division-level trends in temperature display greater spatial consistency in ηClimDiv
- CONUS temperature trends in ηClimDiv are comparable to those seen in USHCN
- Errors in ηClimDiv are likely less than 0.5°C for temperature and less than 20 mm for precipitation at the beginning of the record, falling rapidly thereafter.

How does ηClimDiv compare with the DRD divisional dataset?

- ηClimDiv more homogenous from 1895-present:
  DRD Climate Division Dataset:

  1895-1930
    - Statewide values were computed directly from stations within each state.
    - Divisional values computed from regression techniques against statewide values

  1931-Present
    - Averages of station anomalies within each CD
    - State and Regional (multi-state) values were computed from areally weighted divisions

  ηClimDiv Dataset:
    - Same 5km x 5km gridding technique used for entire POR

How does ηClimDiv compare with the DRD divisional dataset?

Email received by NCDC in early March acknowledged interest in the divisional dataset transition and asked…

"…if this release will serve to correct the longstanding and very large errors in the present dataset?"

Example provided:

Location & Element	Date	DRD Value	"Actual" Value
Indiana Temperature	August 1927	78.8°F	66.7°F
Illinois Temperature	February 1913	35.4°F	25.3°F
Nebraska Temperature	December 1908	37.7°F	27.7°F
Nebraska Precipitation	July 1922	1.35"	4.54"

Answer:

How does ηClimDiv compare with the DRD divisional dataset?

Email received by NCDC in early March acknowledged interest in the divisional dataset transition and asked…

> *"…if this release will serve to correct the longstanding and very large errors in the present dataset?"*

Example provided:

Location & Element	Date	DRD Value	"Actual" Value	ηClimDiv Value
Indiana Temperature	August 1927	78.8°F	66.7°F	66.3°F
Illinois Temperature	February 1913	35.4°F	25.3°F	25.1°F
Nebraska Temperature	December 1908	37.7°F	27.7°F	26.7°F
Nebraska Precipitation	July 1922	1.35"	4.54"	4.51"

Answer: Yes, this new dataset will indeed correct these values!

What data/products/tools are affected?

- All division-based products including statewide, regional and CONUS analyses for:
  - temperature
  - precipitation
  - hdd/cdd
  - drought products
- ηClimDiv has become the official CONUS temperature dataset (replacing USHCN)
- Monitoring maps
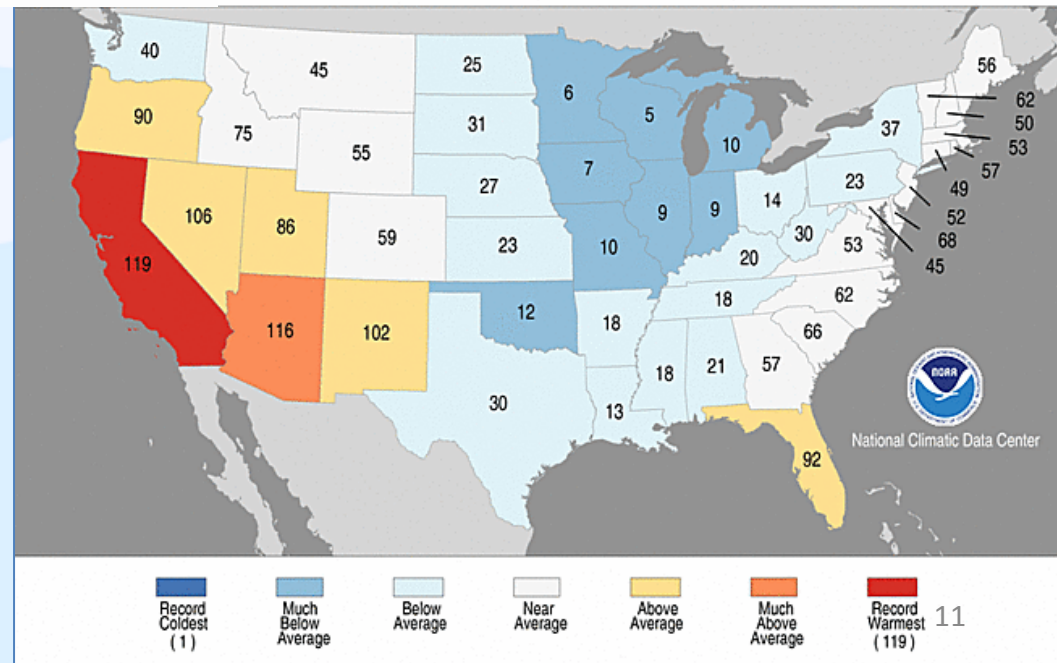 - all CMB static division-based monitoring maps now have a new look and feel
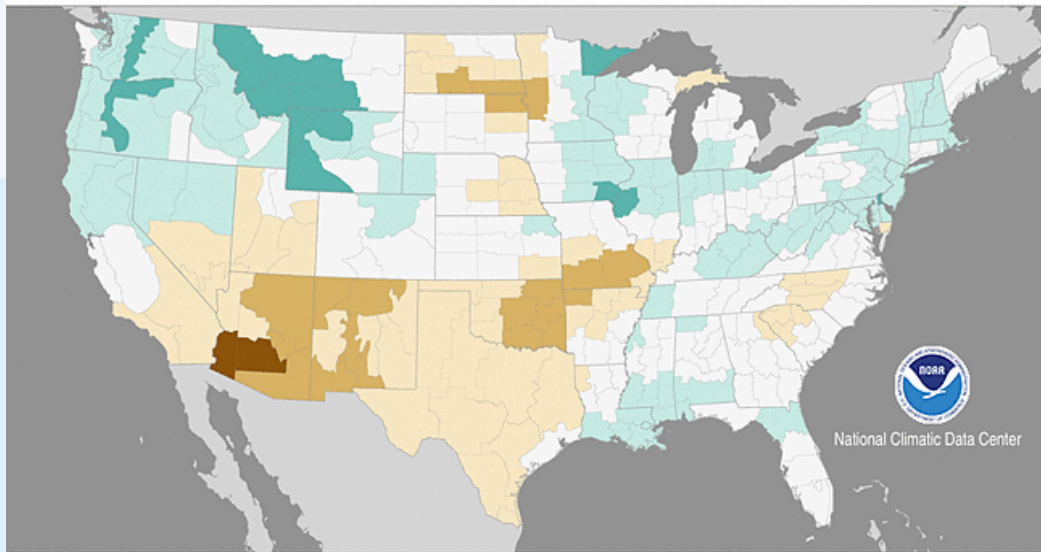
New monitoring maps

What data/products/tools are affected?

- U.S. State of the Climate Reports
  - All divisional, statewide, regional and CONUS data/ranks are impacted → including percent area products
  - Drought indices and products (all Palmers, Drought Termination & Amelioration, Drought coverage area, percent wet/dry/warm/cold)

- U.S. Climate at a Glance (USCAG)
  - All divisional, statewide, regional and CONUS data/ ranks are impacted (temp, precip, hdd/cdd, drought). City data values remain stable
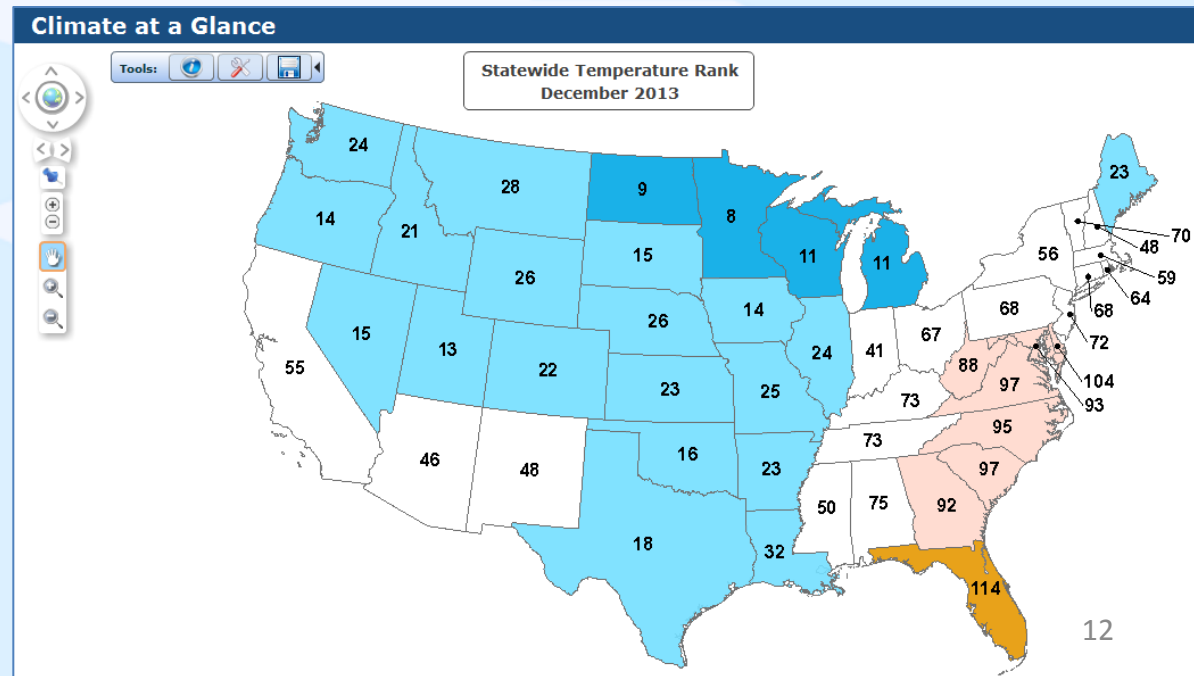
What data/products/tools are affected?

- National Temperature Index (NTI)
  - Added ηClimDiv CONUS temperature anomalies to USCRN and USHCN

Continguous U.S. November - January Average Temperature Anomaly
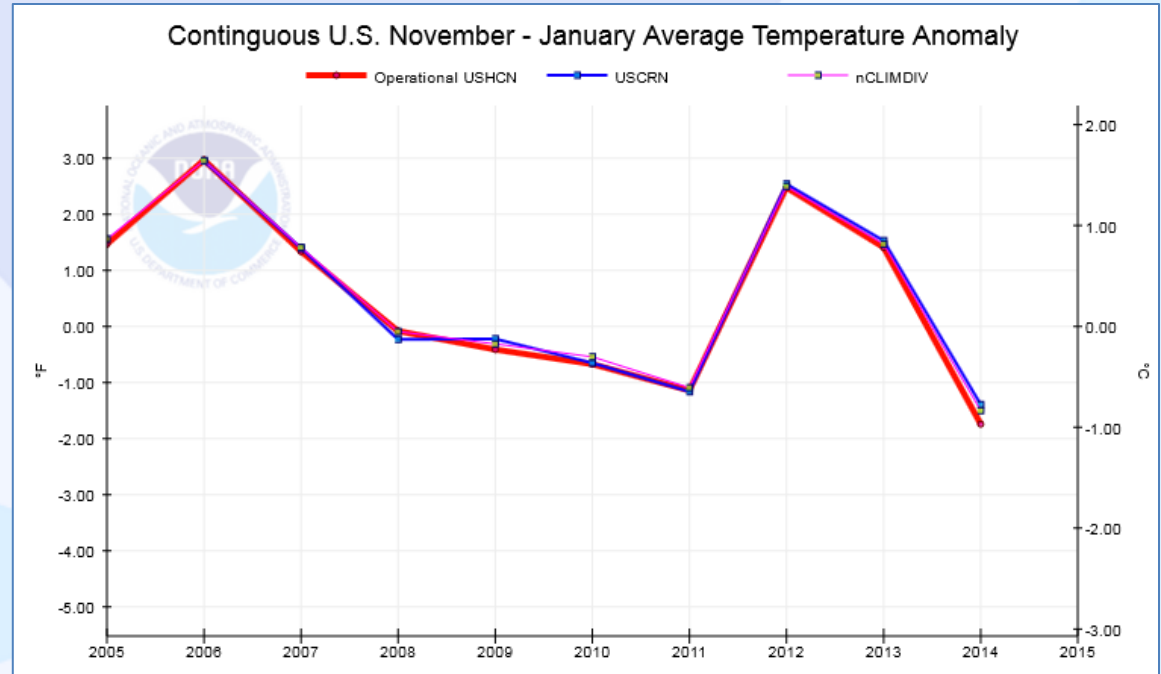
- U.S. Climate Extremes Index (USCEI)
  - PDSI values changed
  - Monthly Tmax and Tmin indicators will remain USHCN for now, but will likely transition once we begin to use Tmax/Tmin in monthly monitoring reports
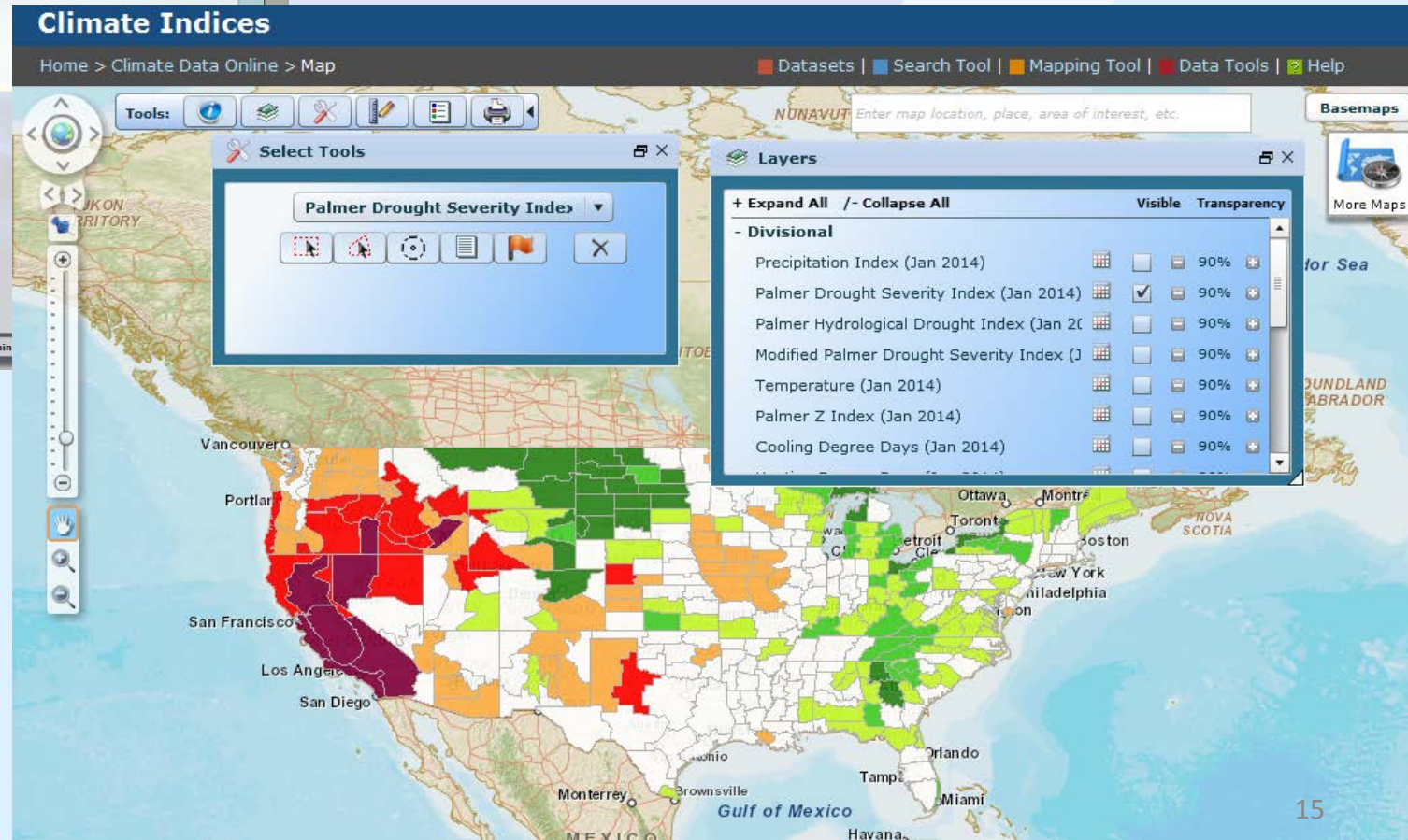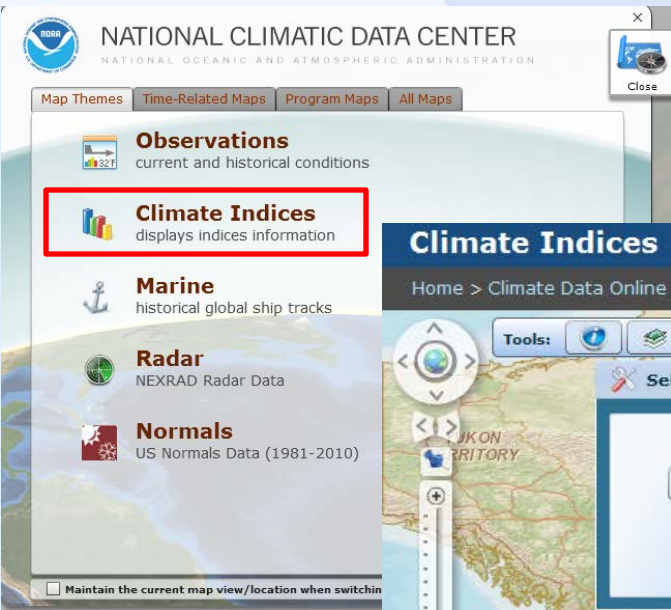
What data/products/tools are affected?

- REDTI
- MSI (Moisture Stress Index) – Crop Moisture Index (CMI)
- Weekly Divisional Products (Temp, Prcp, Drought)
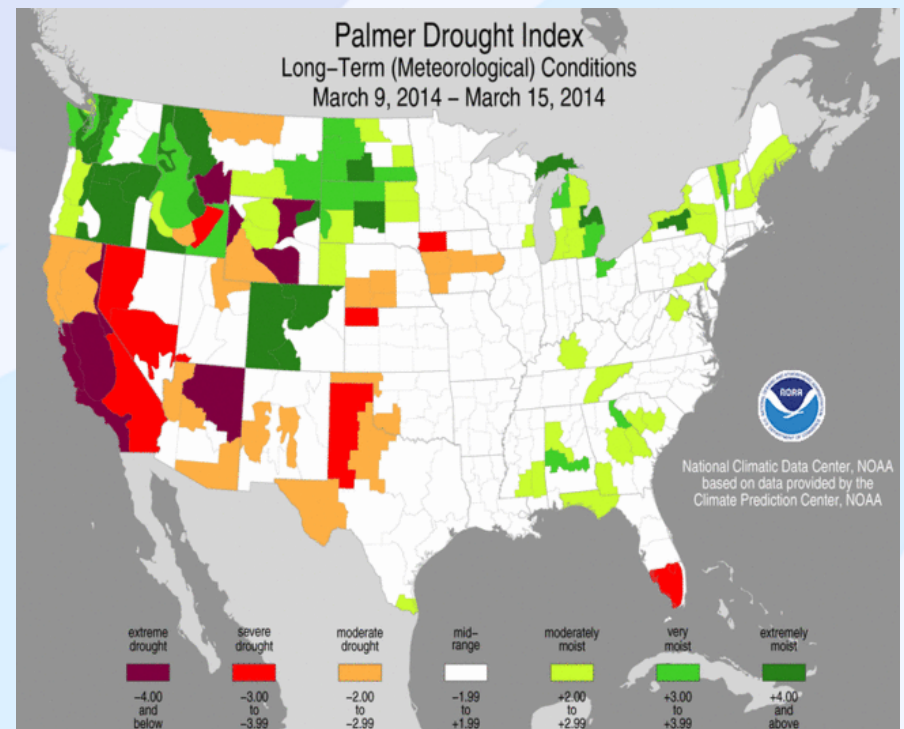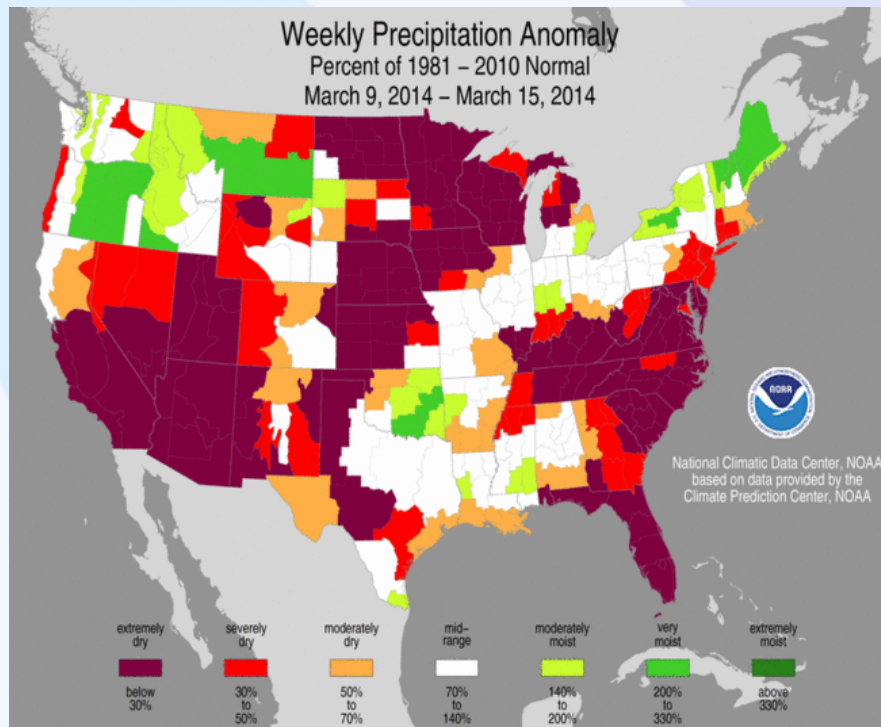
What data/products/tools are affected?

CDO Mapping Tool – Climate Indices

What data/products/tools are affected?

Retrieve data for:

Nation | Region | State | Division

Select Nation: U.S.

* Divisional data is only available for the U.S.

Select Period Start: 01 2014
Select Period End: 01 2014

○ Text Output: Space Delimited
○ Interactive Graphs All Drought
○ Static Graphs Temperature
Show All Months

Reset | Submit

Indices Output
PCP - Precipitation Index
TMP - Temperature Index
PDSI - Palmer Drought Severity Index
PHDI - Palmer Hydrological Drought Index
ZNDX - Palmer Z-Index
PMDI - Modified Palmer Drought Severity Index
CDD - Cooling Degree Days
HDD - Heating Degree Days
SPnn - Standard Precipitation Index

CDO Applications – Climate Indices

http://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp

StateCode	Division	YearMonth	PCP	TMP	PDSI	PHDI	ZNDX	PMDI	CDD	HDD	SP01	SP02	SP03	SP06	SP09	SP12	SP24
31	01	200001	4.30	36.60	-2.40	-2.40	-0.15	-2.40	0.	893.	-0.03	-0.77	-0.38	-1.08	-1.01	-1.20	-1.00
31	01	200002	2.67	43.00	-2.83	-2.83	-2.03	-2.83	0.	630.	-0.92	-0.73	-1.24	-0.91	-1.32	-1.60	-1.38
31	01	200003	4.57	50.10	-2.94	-2.94	-1.21	-2.94	6.	484.	-0.34	-0.90	-0.81	-0.85	-1.47	-1.35	-1.34
31	01	200004	6.26	53.40	-1.93	-1.93	2.12	-1.00	0.	354.	1.03	0.33	-0.28	-0.48	-1.06	-1.02	-1.47
31	01	200005	3.17	65.60	-2.28	-2.28	-1.64	-1.97	89.	67.	-0.61	0.33	-0.08	-0.90	-0.77	-1.10	-1.50
31	01	200006	3.99	70.30	-2.27	-2.27	-0.68	-2.17	170.	8.	-0.42	-0.78	-0.02	-0.72	-0.76	-1.29	-1.60
31	01	200007	4.01	72.30	-2.49	-2.49	-1.37	-2.49	229.	0.	-0.67	-0.80	-1.02	-0.92	-0.97	-1.32	-1.63
31	01	200008	3.47	71.20	-2.74	-2.74	-1.52	-2.74	198.	0.	-0.65	-0.95	-1.07	-0.87	-1.32	-1.20	-1.56
31	01	200009	4.19	64.80	-2.51	-2.51	-0.14	-2.51	64.	61.	0.25	-0.41	-0.76	-0.57	-1.03	-1.02	-1.33
31	01	200010	0.06	56.80	-3.32	-3.32	-3.21	-3.32	11.	259.	-2.13	-1.05	-1.47	-1.76	-1.50	-1.49	-1.58
31	01	200011	4.85	44.60	-2.88	-2.88	0.29	-2.70	0.	612.	0.72	-0.86	-0.49	-1.22	-1.08	-1.47	-1.35
31	01	200012	2.73	31.80	-3.02	-3.02	-1.30	-3.02	0.	1035.	-0.88	-0.19	-1.30	-1.43	-1.18	-1.47	-1.67
31	01	200101	3.62	35.40	-2.95	-2.95	-0.74	-2.95	0.	927.	-0.39	-0.93	-0.47	-1.25	-1.62	-1.54	-1.81

What data/products/tools are affected?

- CIRS FTP site:
    - DRD divisional data will be updated with final quality controlled data through December 2013.
    - Location of DRD data on CIRS FTP site has changed (on purpose):
    ftp://ftp.ncdc.noaa.gov/pub/data/cirs/ (former divisional directory)
    ftp://ftp.ncdc.noaa.gov/pub/data/cirs/drd/ (post-transition DRD data)
    ftp://ftp.ncdc.noaa.gov/pub/data/cirs/climdiv/ (new data directory)
    - File names have changed:
      drd964x.tmp.txt   → climdiv-tmpcdv-v1.0.0-YYYYMMDD
      drd964x.tmpst.txt → climdiv-tmpcst-v1.0.0-YYYYMMDD
    - DRD data will eventually go away as no future data will be added. At that time, customers may access historical climate division data via archive request.

What data/products/tools are affected?

- Station inventories:
  - Inventories for Tmax, Tmin and Prcp are available in 2 ways:
    - POR File: 1895 – present for all months and stations
    - Most recent 2 calendar years

    ftp://ftp.ncdc.noaa.gov/pub/data/cirs/climdiv/

    climdiv-prcp-inv-v1.0.0-YYYYMMDD
    climdiv-prcp-inv-recent-v1.0.0-YYYYMMDD
    climdiv-tmax-inv-v1.0.0-YYYYMMDD
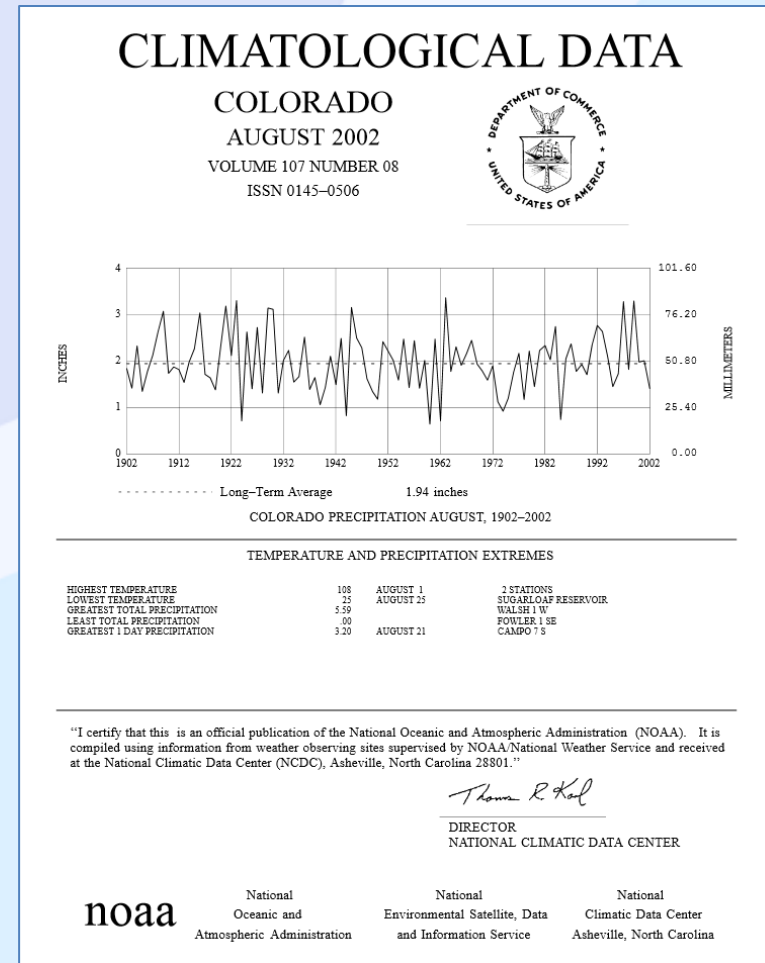   climdiv-tmax-inv-recent-v1.0.0-YYYYMMDD
    climdiv-tmin-inv-v1.0.0-YYYYMMDD
    climdiv-tmin-inv-recent-v1.0.0-YYYYMMDD

    climdiv-inv-readme.txt (inventory readme file)

What data/products/tools are affected?

- Climatological Data (CD) Publication:
  - There will be a disconnect between divisional values published in the CD pub and what CMB produces and puts in the monthly reports and on the CIRS ftp site
    - IAB will continue to produce the publication with the current set of NWS-designated Open and Published COOP and First Order Sites
    - IAB will include a reference note in the January 2014 CD Pub to acknowledge this difference.

CLIMATOLOGICAL DATA
COLORADO
AUGUST 2002
VOLUME 107 NUMBER 08
ISSN 0145–0506

COLORADO PRECIPITATION AUGUST, 1902–2002

Long–Term Average   1.94 inches

TEMPERATURE AND PRECIPITATION EXTREMES

HIGHEST TEMPERATURE	108	AUGUST 1	2 STATIONS
LOWEST TEMPERATURE	25	AUGUST 25	SUGARLOAF RESERVOIR
GREATEST TOTAL PRECIPITATION	5.59		WALSH 1 W
LEAST TOTAL PRECIPITATION	.00		FOWLER 1 SE
GREATEST 1 DAY PRECIPITATION	3.20	AUGUST 21	CAMPO 7 S

"I certify that this is an official publication of the National Oceanic and Atmospheric Administration (NOAA). It is compiled using information from weather observing sites supervised by NOAA/National Weather Service and received at the National Climatic Data Center (NCDC), Asheville, North Carolina 28801."

Thomas R. Karl

DIRECTOR
NATIONAL CLIMATIC DATA CENTER

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Where do I go for additional information?

Climate Division reference page:
    http://www.ncdc.noaa.gov/monitoring-references/maps/us-climate-divisions.php

Visualization Toolkit:
    http://www.ncdc.noaa.gov/temp-and-precip/divisional-comparison/

CIRS ftp site technical status file:
    ftp://ftp.ncdc.noaa.gov/pub/data/cirs/div-dataset-transition-readme.txt

ηClimDiv data ascii files on ftp:
    ftp://ftp.ncdc.noaa.gov/pub/data/cirs/climdiv

Where do I go for additional information?

CONUS temperature transition comparison:
> http://www.ncdc.noaa.gov/sotc/national/2014/1/supplemental/page-6/

Russ Vose et al. ηClimDiv paper:
http://journals.ametsoc.org/doi/abs/10.1175/JAMC-D-13-0248.1

Fenimore et al. conference paper:
ftp://ftp.ncdc.noaa.gov/pub/data/cmb/GrDD-Transition.pdf

NTI:
http://www.ncdc.noaa.gov/national-temperature-index/background/nti

Thank You!!!

Questions?