

Applied Climatology and the Role of NOAAs Regional Climate Centers -

Partners in the emerging National Climate Services

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OneNOAA Science Seminars



The face(s) of the NOAA RCC Program

High Plains

Dr. Dennis Todey
<http://www.hprcc.unl.edu/>



Midwestern

Mr. Steve Hilberg
<http://mrcc.sws.uiuc.edu/>



Northeast

Dr. Art DeGaetano
<http://www.nrcc.cornell.edu>



Southeast

Dr. Peter Robinson
<http://www.sercc.com/>



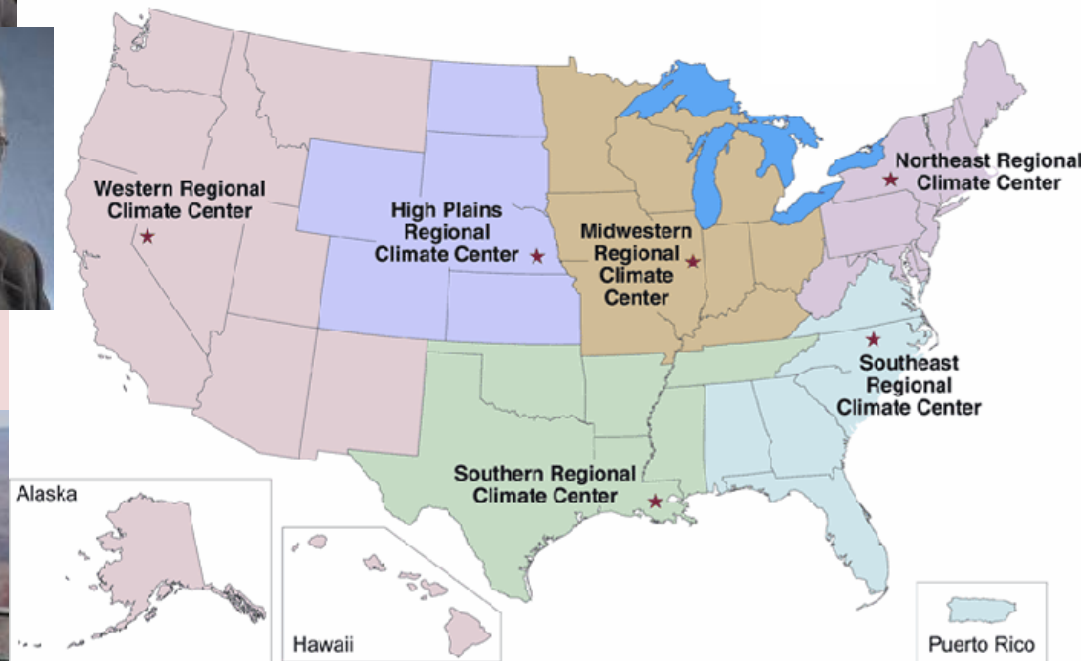
Southern

Dr. Kevin Robbins
<http://www.srcc.lsu.edu>



Western

Dr. Tim Brown
Dr. Kelly Redmond
<http://www.wrcc.dri.edu/>



OneNOAA Science S



A Brief History

- 1978 National Climate Program Act
- 1981-86 Demo Projects (NRCC WRCC MRCC)
- 1986 Congressionally Directed Funds
- 1990 Six RCCs Nat. Climate Prog. Office
- 1991-97 National Weather Service
- 1997 National Climatic Data Center
- 2006 Nationally Competed (transfer of SERCC)

What are RCCs?

Regional **hubs** for user-centric climate services, interdisciplinary climate research, applications and education that provide a regional focus to addressing societal needs.

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Evolving RCC Functions

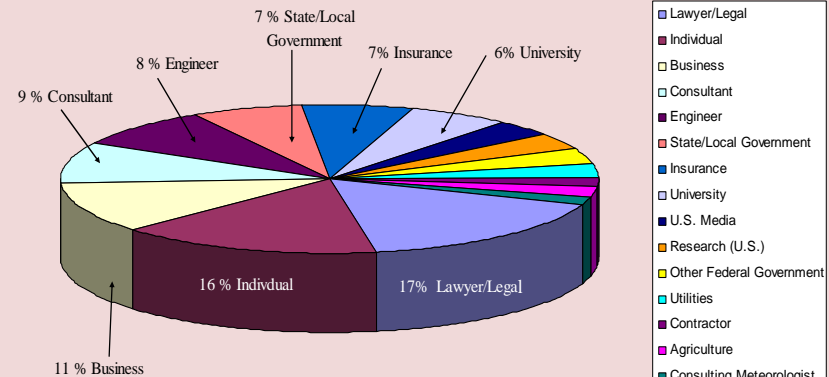
- Contractual obligations
 - Data systems, user service and monitoring
- Near-real time data delivery system,
 - Web-based information resources.
- Infrastructure capabilities grow from user and partner interests and needs (e.g. Northrop Grumman)
- Efficiency and robustness
 - Program versus individual centers
- Leverage infrastructure for decision support and applied research

User Service

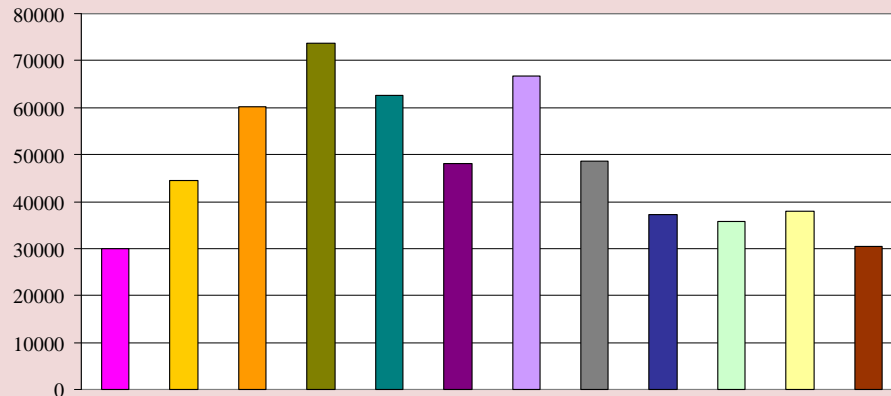
- Conduct outreach to regional and local decision makers on the use of climate products.

- Building design (snow loads, soil freezing),
- Flood management,
- Irrigation,
- Pest management
- Coastal erosion
- Water management
- Agriculture
- Climate change
- Energy
- Environment
- Risk management
- Transportation
- Natural hazards

Regional Climate Centers' Customers



Regional Climate Centers Customers Served On-line



Monthly Services July 2006 - June 2007

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Partnering with NWS

- **xmACIS** (*NWS Field Office Use*)
- **Applied Climate Information System**
- **Data query tool for NWS local climate research/local product development, and to answer customer climate record inquiries**
- **Complete historical climate database with near real-time update**

xmACIS

Routine: Monthly Frequencies

Station: Hooker*

Variable: Max Temperature

Start Year: 1975

End Year: 2004

Comparison: Greater Than or Equal To

Threshold: 90

Submit Help

HOOKER (344298)
Monthly Frequencies
Number of Days with Maximum Temperature >= 90.0 degrees F
Years: 1975-2004

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1975	0	0	0	0	6	16	26	25	11	8	0	0	92
1976	0	0	0	0	0	17	24	26	7	2	0	0	76
1977	0	0	0	0	3	26	29	20	8	0	0	0	86
1978	0	0	0	1	5	18	29	25	17	4	0	0	99
1979	0	0	0	1	0	17	23	25	18	12	0	0	96
1980	0	0	0	0	2	19	31	26	17	1	1	0	97
1981	0	0	0	5	0	23	27	18	10	1	0	0	84
1982	0	0	0	0	0	8	24	27	11	0	0	0	70
1983	0	0	0	0	2	8	31	31	18	2	0	0	92
1984	0	0	0	0	5	20	23	25	-	1	0	0	74
1985	0	0	0	0	3	13	25	23	12	0	0	0	76
1986	0	0	0	2	3	16	25	14	9	0	0	0	69
1987	0	0	0	3	1	10	25	17	5	1	0	0	62
1988	0	0	0	0	3	15	23	26	5	0	0	0	72
1989	0	0	2	7	8	3	17	15	8	6	0	0	66
1990	0	0	0	0	3	22	21	21	16	0	0	0	83
1991	0	0	0	0	3	13	23	23	5	5	0	0	72
1992	0	0	0	0	2	8	19	9	7	3	0	0	48
1993	0	0	0	0	1	11	23	22	7	3	0	0	67
1994	0	0	0	1	1	23	20	21	4	1	0	0	71
1995	0	0	0	1	0	11	22	27	10	0	0	0	71
1996	0	0	0	1	12	18	17	10	2	0	0	0	60
1997	0	0	0	0	2	11	11	-	-	4	0	0	28
1998	0	0	0	2	14	22	28	21	22	2	0	0	111
1999	0	0	0	0	4	14	26	25	10	2	0	0	81
2000	0	0	0	2	11	17	26	30	22	2	0	0	110
2001	0	0	0	1	4	17	30	28	20	3	0	0	103
2002	0	0	0	5	13	26	25	22	11	0	0	0	102
2003	0	0	0	2	7	8	30	26	2	5	0	0	80
2004	0	0	0	0	0	20	16	20	9	11	0	0	76
Average	0.0	0.0	0.1	1.1	4.6	15.5	24.1	22.0	10.9	2.3	0.0	0.0	80.6

Powered by **LACIS**
NOAA Regional Climate Centers

Local forecast by "City, St" or Zip Code

City, St Go

- Regional Climate Centers
- High Plains RCC
 - Midwest RCC
 - Northeast RCC
 - Southeast RCC
 - Southern RCC
 - Western RCC

- ACIS Products
- ACIS Maps
 - HPRCC CLIMOD
 - NRCC CLIMOD
 - SRCC CLIMOD

- Other RCC Products
- MRCC MICIS
 - SERCC CIRRUS

- Climate Partners
- State Climatologists
 - RCCs
 - NCDC
 - NWS

- Climate Links
- NWS Climate Pages
 - NOAA Climate Page

NOWData - NOAA Online Weather Data

1. Product »
 Daily data for a month
 Daily almanac
 Monthly avgs/totals
 Monthly occurrences
 Monthly extremes
 Daily extremes
 Daily/monthly normals
 Record extremes
 First/last dates

2. Location »
 Amity 4 NE, MO
 Bethany, MO
 Boonville, MO
 Brookfield, MO
 Brunswick, MO
 Butler, MO
 Carrollton, MO
 Chillicothe, MO
 Clinton, MO
 Coloma, MO

3. Variable »
 Max Temperature
 Min Temperature
 Avg Temperature
 Precipitation
 Snowfall
 Snow Depth
 Heating Degree Days
 Cooling Degree Days
 Growing Degree Days

4. Year »
 Current year
 Last year
 1971-2000

5. View »

Product Description:
 MONTHLY AVERAGES/TOTALS - calculates averages or totals, as appropriate, for the selected variable for each month of the year. This product is available for the current year, the previous year, or an average of the years 1971 through 2000. Additional stations and years of data are available from the Regional Climate Centers.

Questions, comments

Powered by **LACIS**
NOAA Regional Climate Centers

Some of the ACIS products are based on preliminary data. Official data and/or additional years/stations are available from the Regional Climate Centers and the National Climatic Data Center.

The **Applied Climate Information System (ACIS)** is a joint project of the **Regional Climate Centers**, the **National Climatic Data Center** and the **National Weather Service**.

• NOWData (Public Use)

<http://www.weather.gov/climate/xmacis.php?wfo=btv>

- **Self-service tool**
- **Subset of xmACIS**
- **Free, limited access**
- **Current year and Normals**
- **Portal for ACIS and NCDC information**



Partnering with Federal Agencies


- **AgACIS** (*Custom NRCS data and products*)

Climate Data for White Salmon Program Delivery Point


1. Product <ul style="list-style-type: none"><input type="radio"/> Daily data for a month<input type="radio"/> Daily almanac<input checked="" type="radio"/> Monthly avgs/totals<input type="radio"/> Monthly occurrences<input type="radio"/> Monthly extremes<input type="radio"/> Daily extremes<input type="radio"/> Daily/monthly normals<input type="radio"/> Record extremes<input type="radio"/> TAPS<input type="radio"/> FROST<input type="radio"/> GROWTH<input type="radio"/> WETS	2. Location <ul style="list-style-type: none">THE DALLES MUNI APSATUS PASS 2 SSWAPPLETONGLENWOOD NO 2MOUNT ADAMS RS	3. Variable <ul style="list-style-type: none"><input checked="" type="radio"/> Max Temperature<input type="radio"/> Min Temperature<input type="radio"/> Avg Temperature<input type="radio"/> Precipitation<input type="radio"/> Snowfall<input type="radio"/> Snow Depth<input type="radio"/> GDD (Base 50)	4. Year <ul style="list-style-type: none"><input checked="" type="radio"/> Current year<input type="radio"/> Last year<input type="radio"/> 1971-2000<input type="radio"/> Select year: <input type="text" value="2005"/>	5. View <input type="button" value="Go"/>
--	--	---	---	---

Product Description:
MONTHLY AVERAGES/TOTALS - calculates averages or totals, as appropriate, for the selected variable for each month of the year. This product is available for the current year, the previous year, an average of the years 1971 through 2000, or any other year in the period of record. Additional stations are available from the Regional


[Questions, comments](#)

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NOAA Regional Climate Centers

Partnering with RISAs



Experimental Surface Water Monitor for the Continental U.S.



[Home](#)
[Info](#)
[Links](#)
[Contacts](#)
[Disclaimer](#)

Current Conditions

VIC Plots
MULTI-MODEL Plots
Drought Indices
Data

Forecasts

VIC ESP Plots


Archive (1915-present)

SM & SWE Plots
Note: Popup blocking prevents Archive access

Related

Obs Western SWE at-a-glance

1/8 Degree Western US Moisture Maps



Powered by
NOAA Regional Climate Centers

CURRENT percentiles for soil moisture, SWE and runoff with respect to the climatological period 1915-2003. These update daily by 11-12 pm PST, and have a lag of 1-2 days. **Roll the mouse over links below (or click) to see different maps.** Note: SM & SWE maps are for daily values, whereas RO maps are for cumulative values. [SEE FORECASTS](#). [SW Monitor description: \(Wood, 2008\)](#)

	Soil Moisture	SWE	Cumulative Runoff <i>new!</i>
Current Plots	VIC-CPC [cmpr]	curr	1mo 2mo 3mo 6mo
	VIC-DM [cmpr]		9mo 12mo 18mo 24mo
			36mo 48mo 60mo WY
Recent Changes	1 wk 2 wk 1 mo	1 wk 2 wk 1 mo	-

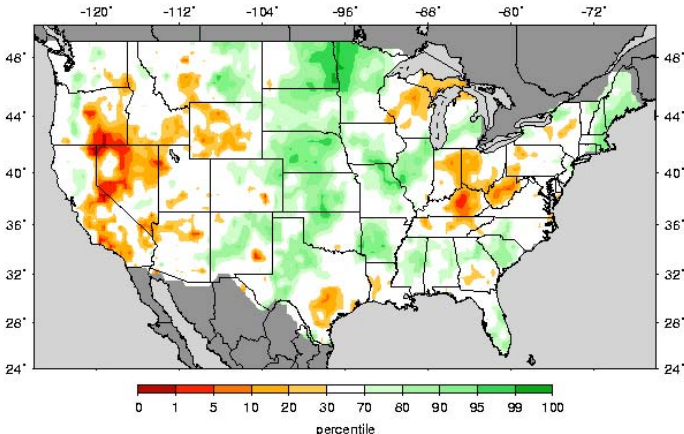
Regional Maps

SM: [West](#) [East](#)
[Central](#) [Washington State](#)
[Page](#)

Useful Links

-- [DM/7-Day](#)
[Streamflow mashup](#)
-- [DM Unified Blend / Change](#)

Soil Moisture Percentiles (wrt/ 1915-2003)
20081015



<http://www.hydro.washington.edu/forecast/monitor/index.shtml>

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Partnering with NWS/NCDC/Private Industry

- ThreadEx (*Open Use*)
 - Consistent daily temperature and precipitation extremes



<http://threadex.rcc-acis.org/>

Threaded Climate Extremes for Burlington Area, VT

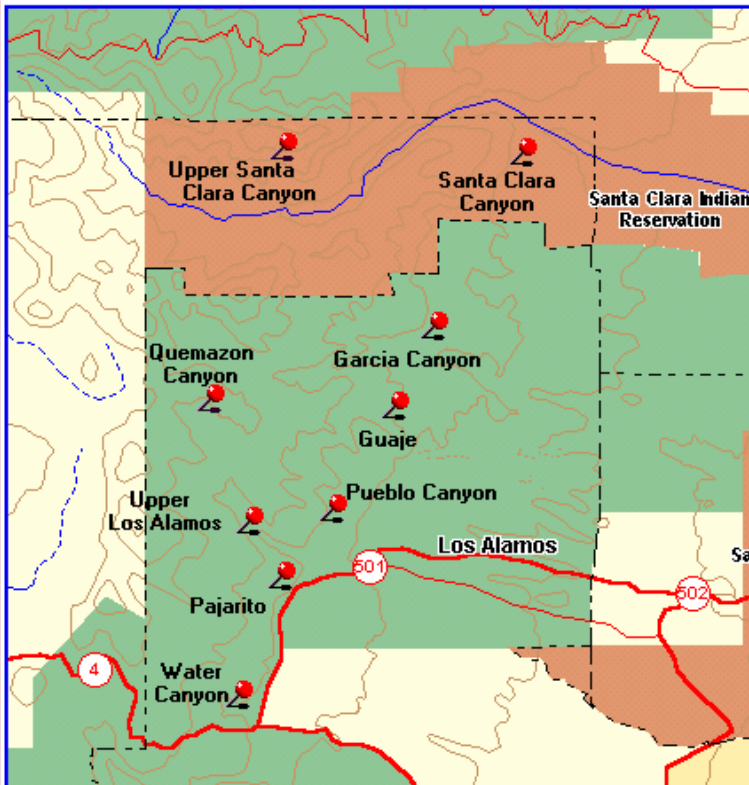
Period of record: 1883 - 2007

Date	Highest Maximum Temperatures (degrees F)		
	Top Record	2nd Record	3rd Record
1/1	56 in 1966	50 in 1979	48 in 2005+
1/2	59 in 1890	51 in 2000	51 in 1979
1/3	55 in 2000	52 in 1950	52 in 1913+
1/4	63 in 1950	57 in 1897	53 in 2000
1/5	57 in 1950	56 in 2007	55 in 1993
1/6	62 in 2007	56 in 1890	52 in 1946
1/7	54 in 1946	51 in 1915	49 in 1932+
1/8	51 in 1930	50 in 1937	48 in 1935
1/9	57 in 1937	55 in 1978	48 in 1965
1/10	49 in 1939	47 in 1983	45 in 1935
1/11	56 in 1980	52 in 1975	51 in 1983+
1/12	55 in 1980	54 in 1885	45 in 1932
1/13	60 in 1932	55 in 2005	55 in 1995

Likely to be a several different sites



Partnering in Data



Fire Season Stations in AZ from the Western RCC

<http://www.wrcc.dri.edu/fpa/>

Regional Data Network from the High Plains RCC

High Plains Regional Climate Center
University of Nebraska - Lincoln

Home Climate Data Climate Products Publications About HPRCC

Automated Weather Data Network

Select a station by placing the mouse cursor over a square and clicking.
Alternatively, use the table below to find a station.

Location:

<http://www.hprcc.unl.edu/awdn/>

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Partnering with NWS/NCDC

- WxCoder III (COOP Use)
 - Internet observation entry system <http://acis.dri.edu/wxcoder/>

In cooperation with the National Weather Service, Regional Climate Centers, and National Climatic Data Center

WxCODER

WxCoder » Home » My Observations » Enter Wed, Jul 02, 2008 01:41PM EDT | [Site Map](#) | [Contact NWS](#) | [Help](#) | [Sign Out](#)

Progress

1. Enter data
2. Confirm
3. Done

On-Screen Help
Click on a question mark on this page to display helpful information.

Observation for
ITHACA CORNELL UNIVERSITY

Date and time of observation
July / 2 / 2008 at 7 AM : 00

Type of observation **daily (24 hr values/totals)**

Air Temperature

Max temperature x °F [help](#)
Min temperature x °F [help](#)
At observation x °F [help](#)

Precipitation

Precipitation x.xx in [help](#)
Snowfall x.x in [help](#)
Snow depth x in [help](#)
Snow core x.x in [help](#)

Precipitation Time of Occurrence

What is this?
Choose Observed Estimated

AM												PM											
12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11

Start 12 AM End 12 AM [Add](#) | [Clear All](#)

Weather

Present weather **Select-** [help](#)
Calendar day weather

Supervising WFO
Binghamton, NY

Site ID
ITHING (SHEP)

Site Number
30-4174-10 (COOP)

Time of observation
07:00

Lat/Lon

Elevation
ft

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<http://acis.dri.edu/wxcoder/>



Serving as Centers of Data

- **Historical climate data essential but not sufficient**
 - Past to present to future
 - Expand thinking beyond climate ecological, social and economic data
- **Data encompass more than observations**
 - Quality, quantity, scale, uncertainty
- **Climate to weather and back again**
 - Decisions do not obey arbitrary time bounds
- **Decision Support instead of raw values**

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Enhanced Consistency

CLIMOD product: Daily Data

State Climate Office

2007 01 01	53	36	44.5	0.08
2007 01 02	39	31	35	0.00
2007 01 03	49	35	42	0.00
2007 01 04	57	44	50.5	0.02
2007 01 05	57	50	53.5	0.95
2007 01 06	56	41	48.5	0.29
2007 01 07	43	32	37.5	0.13
2007 01 08	44	30	37	0.15
2007 01 09	34	28	31	0.05
2007 01 10	29	22	25.5	T

NWS LCD

DY MAX MIN AVG WTR

=====

1	53	36	45	0.08
2	39	31	35	0.00
3	49	35	42	0.00
4	57	44	51	0.03
5	57	50	54	0.95
6	56	41	49	0.28
7	43	32	38	0.13
8	44	30	37	0.15
9	34	28	31	0.05
10	29	21	25	0.02

Month: January 2007

Day Max Min Avg Precip

1	53	36	45	0.00
2	39	31	35	0.00
3	49	35	42	0.00
4	57	44	51	0.03
5	57	50	54	0.95
6	56	41	49	0.28
7	43	32	38	0.13
8	44	30	37	0.15
9	34	28	31	0.05
10	29	21	25	0.02

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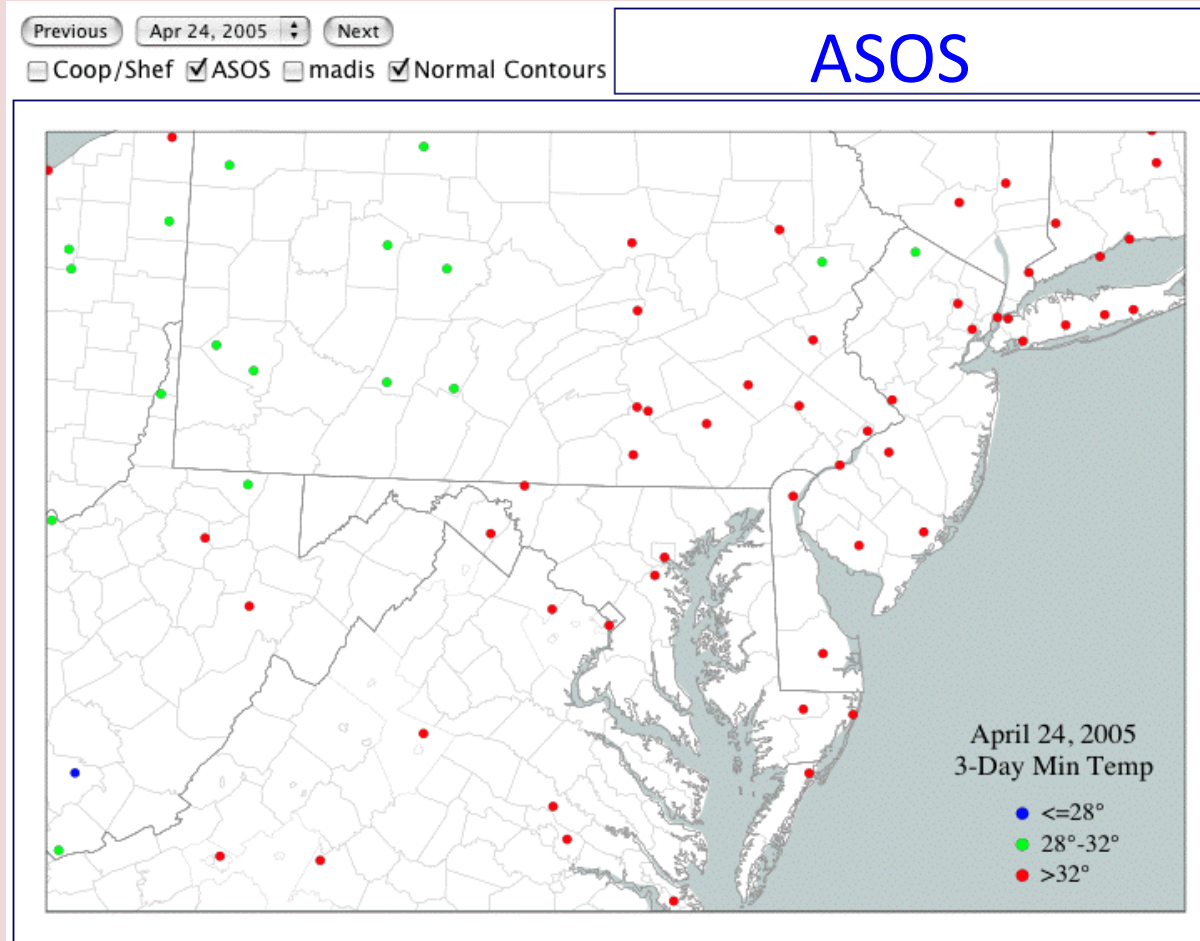
Partnering with NWS/NCDC

- **Datzilla** (*Partner Use*)
 - Data discrepancy reporting
 - 400 registered NOAA users



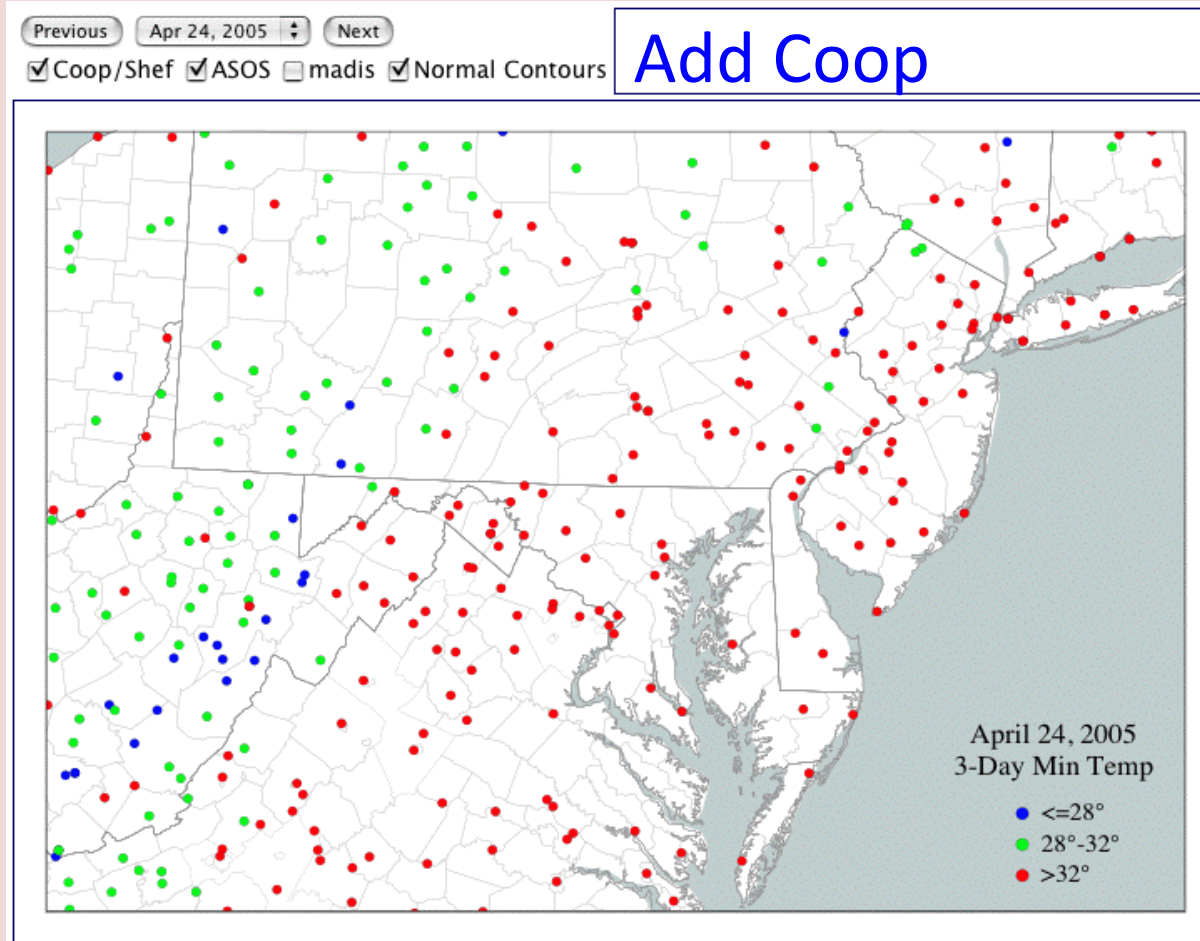
The screenshot shows the Datzilla website interface. At the top left is the NOAA logo. In the center, the word "Datzilla" is written in a large, purple, serif font, with the text "Datzilla is based on [Bugzilla](#) Version 2.18" below it. To the right are three circular logos: NCDC (National Climatic Data Center), National Weather Service, and NOAA Regional Climate Centers. Below the NOAA logo is the heading "Datzilla Main Page" and the text "Datzilla is the NOAA data-product error reporting and tracking system." Underneath, it says "Begin by selecting an option, below:" followed by three blue underlined links: "Search existing error reports", "Enter a new error report", and "Summary reports and charts". Below these is another blue underlined link: "Log in to an existing Datzilla account". Further down is a form with the text "Enter an error # or some search terms:" followed by a text input field and a "Show" button. To the right of the form is a cartoon illustration of a platypus with the text "Am I an outlier or an extreme on the tail of an observed distribution?". At the bottom, there is a yellow box containing navigation links: "Actions: [Datzilla Home](#) | [New](#) | [Search](#) | [Find](#) error # | [Reports](#) | [Log In](#)" and "Quick Help: [Request a Login Account](#) | [Report an Error](#) | [Query Errors](#) | [Extended Guidelines](#) | [Datzilla Overview](#)".

Enhanced Integration of Networks



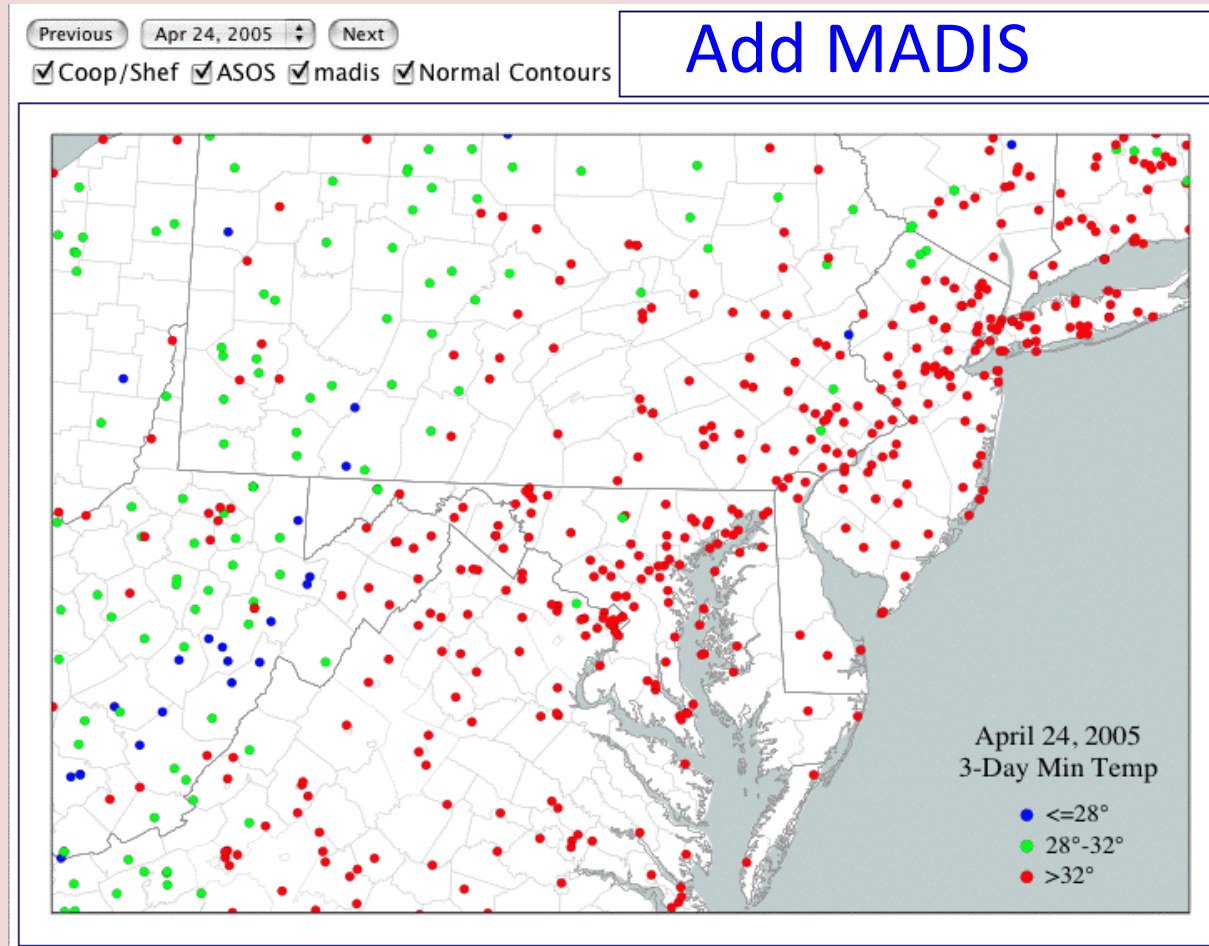
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Enhanced Integration of Networks



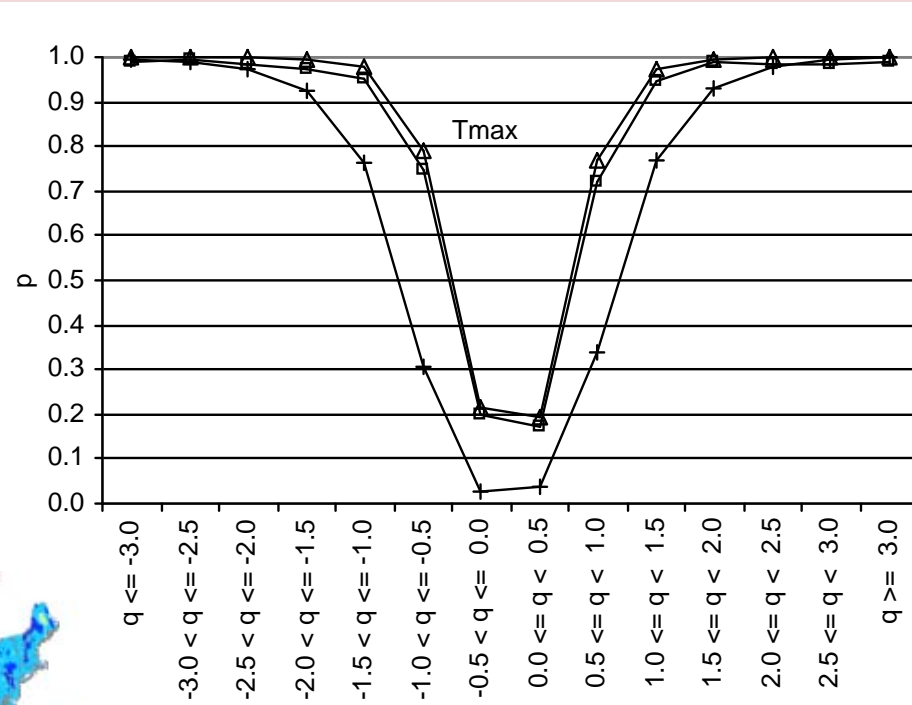
OneNOAA Science Seminars

Enhanced Integration of Networks



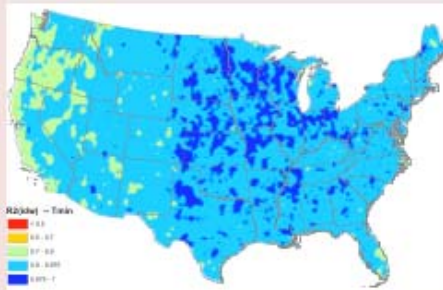
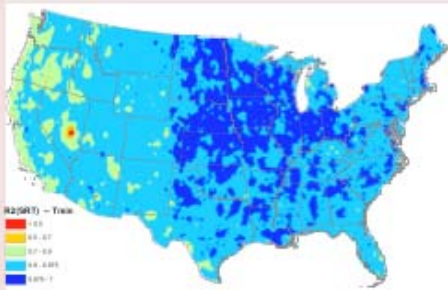
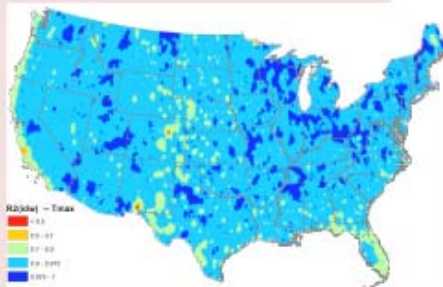
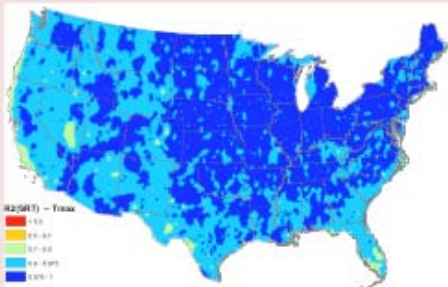
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Enhanced Data Quality



HPRCC SRT

IDW

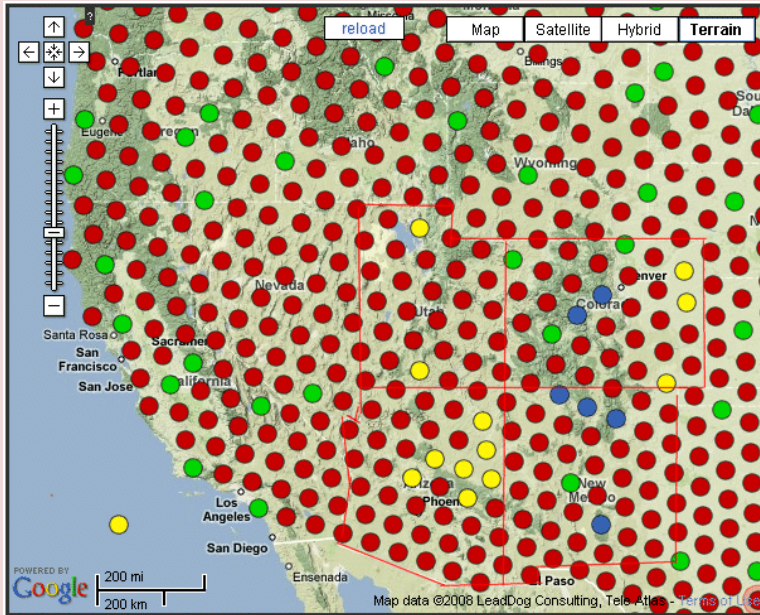
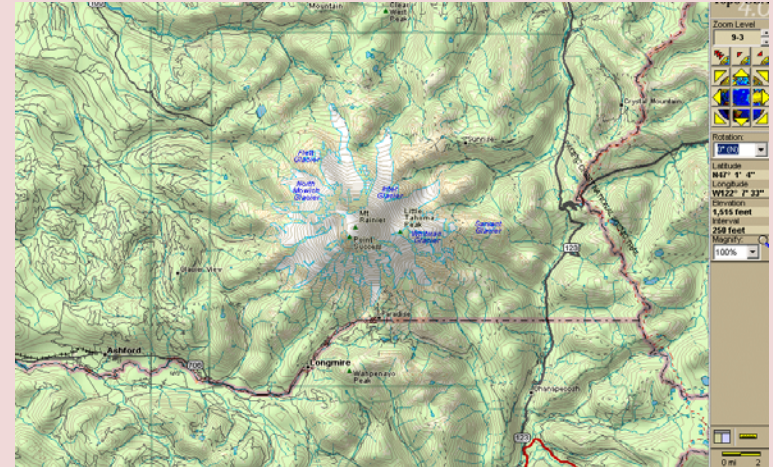


TMax

TMin

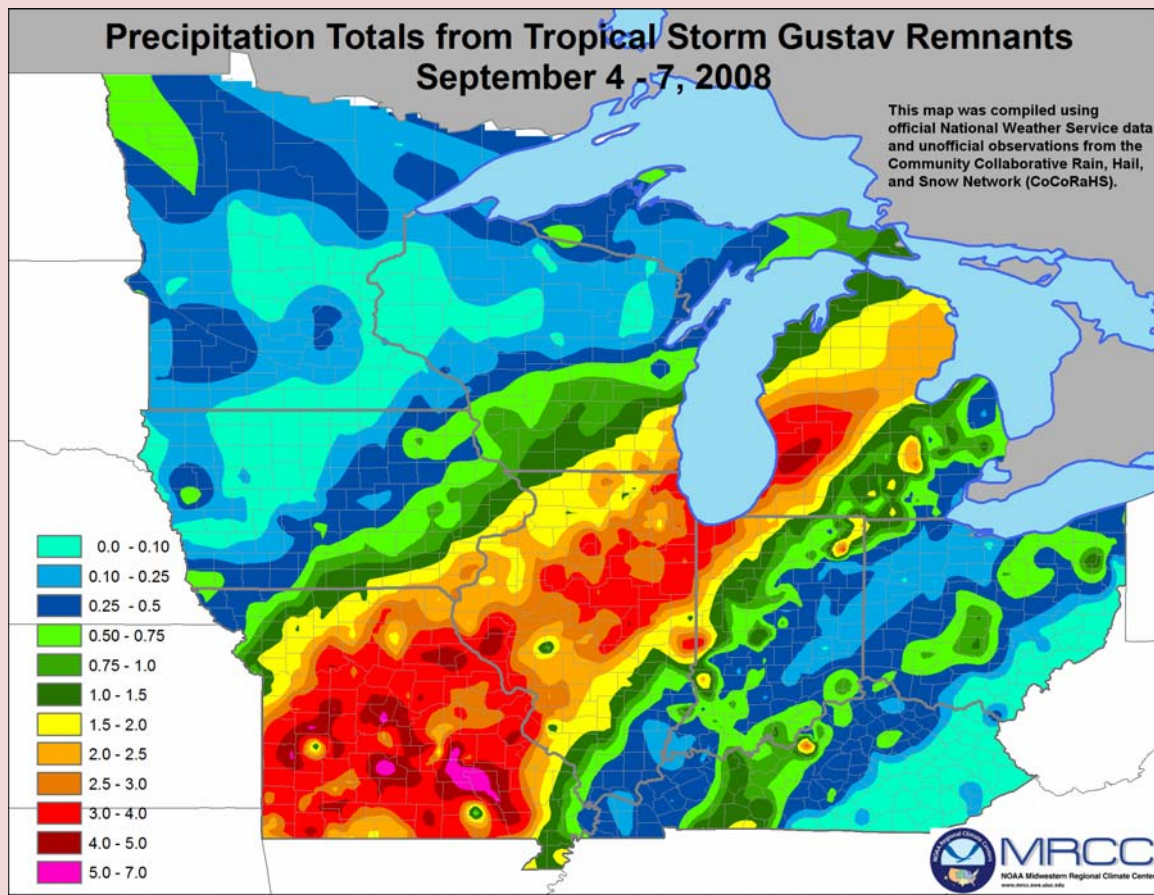
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Partnering in support of HCN-M



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Partnering with State Climatologists



Hybrid Coop-
CoCoRaHS
Precip Map

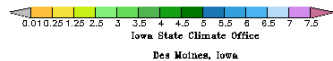
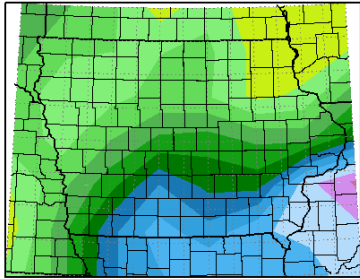
OneNOAA Science Seminars

Partnering with State Climatologists

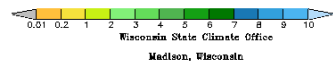
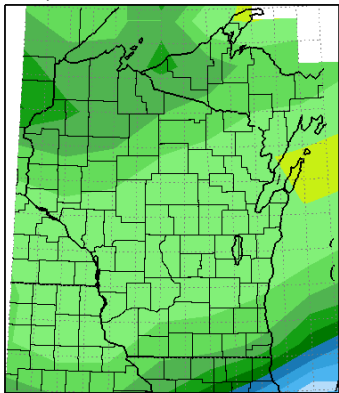
- Infrastructure
- Data
- Stakeholders
- Local expertise

NCDC/AASC Grant
 State Climatologists working
 with RCCs to explore
 Reference Climate Networks -
 CRN & HCN-M

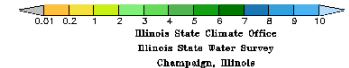
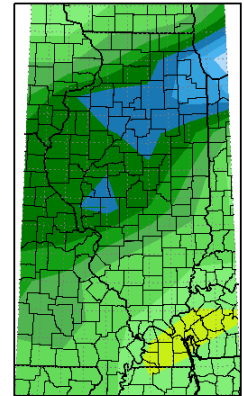
Total Precipitation in Inches
 September 12, 2008 to October 12, 2008



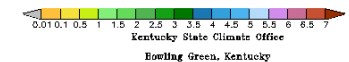
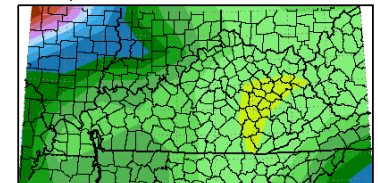
Total Precipitation in Inches
 September 12, 2008 to October 12, 2008



Total Precipitation in Inches
 September 12, 2008 to October 12, 2008

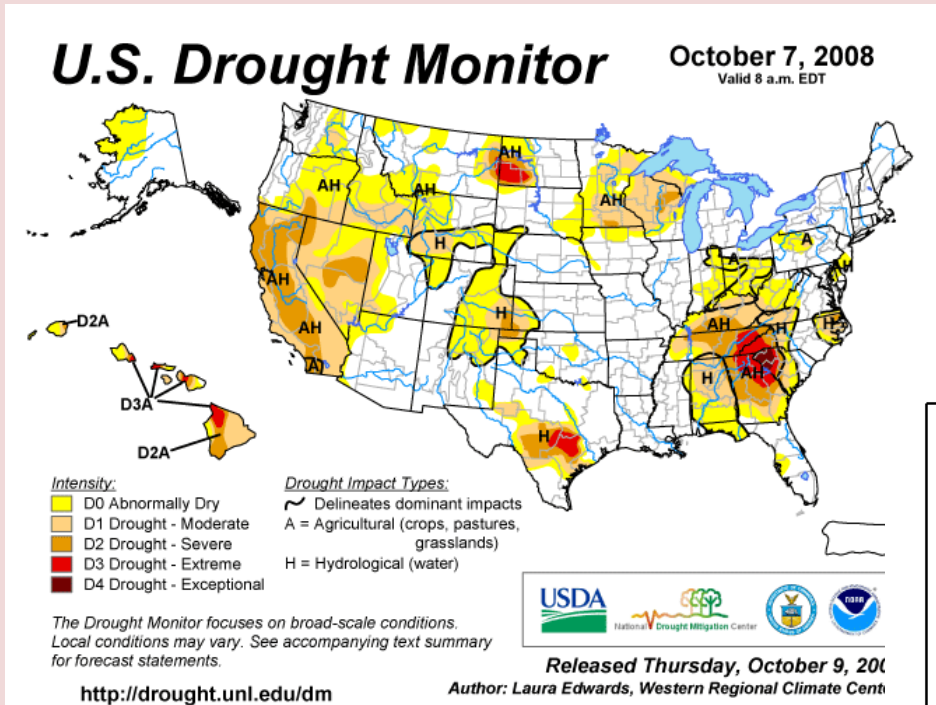


Total Precipitation in Inches
 September 12, 2008 to October 12, 2008

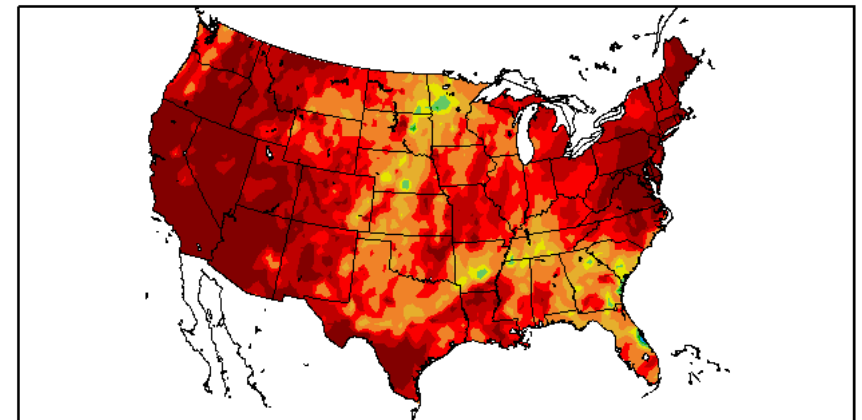


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Partners with NIDIS



Precipitation (in)
10/6/2008 - 10/12/2008



Generated 10/13/2008 at HPRCC using provisional data.

NOAA Regional Climate Centers

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“Getting information off the Internet is like taking a drink from a fire hydrant.”

- *Mitchell Kapor, founder of Lotus Development Corp.*



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On the forefront of climate to decision making

- **Build upon acquired stakeholder trust**
 - Trust the team not a particular player
- **Shared information, tools and solutions**
 - Funding will continue to be at a premium
- **Proactive, evolutionary approaches**
 - Grounded in tried and true methods
- **Understand changing hazards, consequences, adaptations and assets**
 - challenges *and* opportunities

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Map Navigation Tools

Metadata

GIS Tools

DYNAMIC DROUGHT INDEX FOR BASINS IN NORTH AND SOUTH CAROLINA

Home | Drought Indices | Help | Contact Us

Steps: 1. Select time scale, 2. Select drought index, 3. Select display type, 4. Map, 5. Graph, 6. Table

Result: Map

Station List: Hide Tools, Hide Layers, Hide Legend

Status: Feature selected X: 505,951 m Y: 3,035,002 m

Selected variables:

- Monthly time scale
- Raw values
- > 100 % Monthly PDS
- Map
- > July 2002
- > Standard Classes for Palmer Drought Index
- > 11 classes
- > Same class intervals

Legend:

- 7.77 < to -4.00 (Extreme drought)
- 4.00 < to -3.00 (Severe drought)
- 3.00 < to -2.00 (Moderate drought)
- 2.00 < to -1.00 (Mild drought)
- 1.00 < to -0.50 (Incipient drought)
- 0.50 < to 0.50 (Near normal)
- 0.50 < to 1.00 (Incipient wet spell)
- 1.00 < to 2.00 (Slightly wet)
- 2.00 < to 3.00 (Moderately wet)
- 3.00 < to 4.00 (Very wet)
- 4.00 < to 5.00 (Extremely wet)
- No Data

Weather Station List - Microsoft Internet Explorer

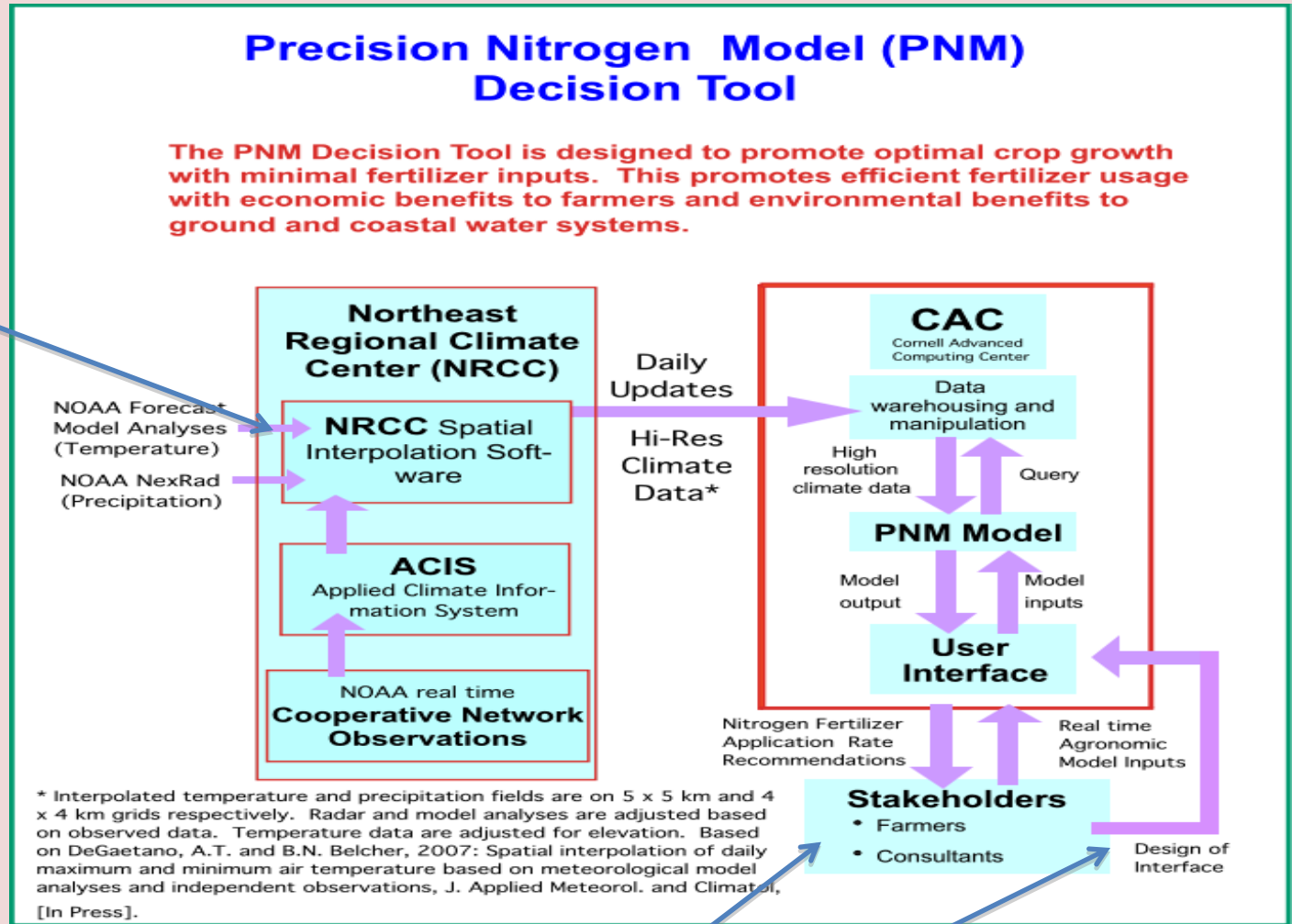
Feature (AOI)	Feature Name	Station Used	Station Name
0	Catawba-Waterlee	310300	Asheville Wso Ap
		310301	Asheville
		310506	Banner Elk
		310724	Bent Creek
		310843	Black Mountain 2 W
		310901	Blowing Rock 1 NW
		311624	Celo 2 S
		311690	Charlotte Douglas, An

Blend index value: -4.85

Region	03	South Atlantic-Gulf Region
Subregion	0305	Edisto-Santee
Accounting unit	030501	Santee
Cataloging unit	03050103	Lower Catawba, North Carolina, South Carolina

A "Dynamic" Tool Example

Potential for expansion to go from climate to weather and back again!



Potential utility for climate change impact assessment on ground and estuary water quality

Adapt-N Results - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://adapt-n.eas.cornell.edu/crops/

mozilla.org mozillaZine mozdev.org

Adapt-N Sidedress Nitrogen Rate Recommendations for Corn

Powered by
LACIS
Northeast Regional
Climate Center

Date: 05/29/2008	Latitude: 42.47	Longitude: 76.45
Soil/Field Information		
Soil Texture: medium: (silt loams)	Drainage: naturally well-drained or tile-drained	Field Slope: less than 3%
Soil Management: tillage (plow till, chisel till, disk till)	Preplant Soil Test: no test in last 3 years	
Crop Information		
Maturity Class: Grains: late-maturing (100-110 days)	Planting Date: 05/01/2008	Planting Density 25,000 plants/acre
GDD to maturity = 2400		
Nitrogen Inputs:		
Organic Sources		
Sod	Sod Kill Date	Sod Management
26-50% legume	03/31/2006	plowdown
Manure	Manure Input	Manure Management
Mineral Fertilizer		
starter: monoammonium phosphate	Date	Depth of Incorporation
additional: not used	05/01/2008	2 inches

Sidedress Nitrogen Recommendation: 110 lbs N/Acre

Additional Information

- [Growing Season Daily Average Temperature](#)
- [Growing Season Rainfall](#)
- [Cumulative Nitrogen Losses from the Root Zone](#)
- [Cumulative Nitrogen Uptake by the Crop](#)
- [Cumulative Nitrogen \(N\) Mineralization \(all organic N sources\)](#)
- [Nitrogen in the top 8 inches of the Root Zone](#)

<http://adapt-n.eas.cornell.edu/crops/>

Done

Start Eudora Microsoft PowerPoint - [...] Adapt-N: Results - Mo... 11:46 AM

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Partnering in Applied Research

RCC-AASC -NCDC

Trend Identification in Twentieth-Century U.S. Snowfall: The Challenges Kenneth E. Kunkel, Michael A. Palecki, Kenneth G. Hubbard, David A. Robinson, Kelly T. Redmond, and David R. Easterling *Journal of Atmospheric and Oceanic Technology*

RCC-RCC

SERVICES: A Modern Applied Climate Information System Kenneth G. Hubbard, Arthur T. DeGaetano, and Kevin D. Robbins *Bulletin of the American Meteorological Society*

RCC-RISA

Winter Orographic Precipitation Ratios in the Sierra Nevada—Large-Scale Atmospheric Circulations and Hydrologic Consequences Michael Dettinger, Kelly Redmond, and Daniel Cayan *Journal of Hydrometeorology*

HPRCC

Quality Control of Weather Data during Extreme Events Jinsheng You and Kenneth G. Hubbard *Journal of Atmospheric and Oceanic Technology*

NRCC

Spatial Interpolation of Daily Maximum and Minimum Air Temperature Based on Meteorological Model Analyses and Independent Observations Arthur T. DeGaetano and Brian N. Belcher *Journal Applied Meteorology and Climatology*

WRCC

Methodology and Results of Calculating Central California Surface Temperature Trends: Evidence of Human-Induced Climate Change? John R. Christy, William B. Norris, Kelly Redmond, and Kevin P. Gallo *J. Climate*

MRCC

Storm Precipitation in the United States. Part I: Meteorological Characteristics Michael A. Palecki, James R. Angel, and Steven E. Hollinger *Journal of Applied Meteorology*

SRCC

Hurricane Ivan's Impact Along the Northern Gulf of Mexico B. Keim et al. EOS, Trans American Geophysical Union.

SERCC

Atmospheric Circulation and Inland Flooding in Twentieth Century North Carolina, USA: Implications for Climate Change Impacts? P. Robinson, Natural Hazards

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The Tag



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A preliminary: Applications as forecasts

An implicit assumption that has pervaded much of applied climatology

Past is Prologue

Past statistics = Future statistics

The decision that uses the information is about the future

Therefore, past values often de facto forecasts

Not explicitly recognized as such

Past is considered reliable guide to the future

Climate stationarity is implicit in this assumption

Huge societal investments (\$B, \$\$B, \$\$\$B)

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What is changing?

Many of the underlying issues remain the same,
but what is changing is the **context**.

- 1) Changes in climate (the physical system)
- 2) Changes in the understanding of climate
- 3) Changes in needs for climate information

Old, familiar needs

New needs, new applications, more sophisticated applications

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RCC Core Characteristics

- Regional climate expertise-climate has a strong regional character; RCC scientists can address not only what is happening but why
- Provision of climate information to broad user community-not focused on a narrow range of users
- Focus on understanding of interactions between climate and society/natural environment
- Interpretation of climate data and observations
- National in scope
- Mission pursued continuously for ~20 years
- Limited resources

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Examples of Climate Information

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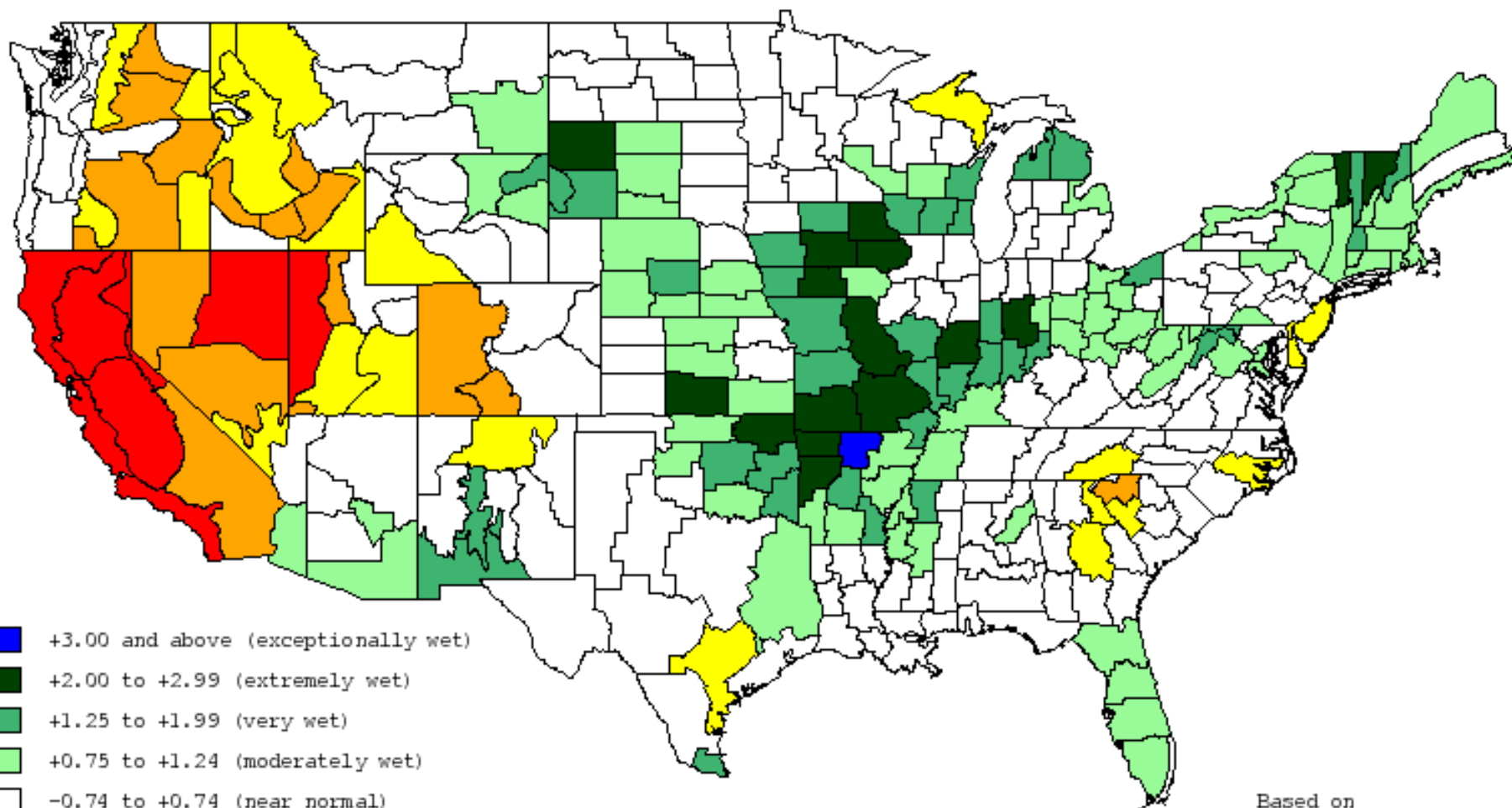


National Map of Standardized Precipitation Index

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6-month Standardized Precipitation Index through the end of August 2008



- +3.00 and above (exceptionally wet)
- +2.00 to +2.99 (extremely wet)
- +1.25 to +1.99 (very wet)
- +0.75 to +1.24 (moderately wet)
- -0.74 to +0.74 (near normal)
- -1.24 to -0.75 (moderately dry)
- -1.99 to -1.25 (very dry)
- -2.99 to -2.00 (extremely dry)
- -3.00 and below (exceptionally dry)

Based on
Divisional Precipitation Data
1895 to present
Provisional data provided by
NOAA/NWS/CPC & NOAA/NESDIS/NCDC
Western Regional Climate Center
Desert Research Institute
Reno, Nevada

Operational Soil Moisture Monitoring in Midwest

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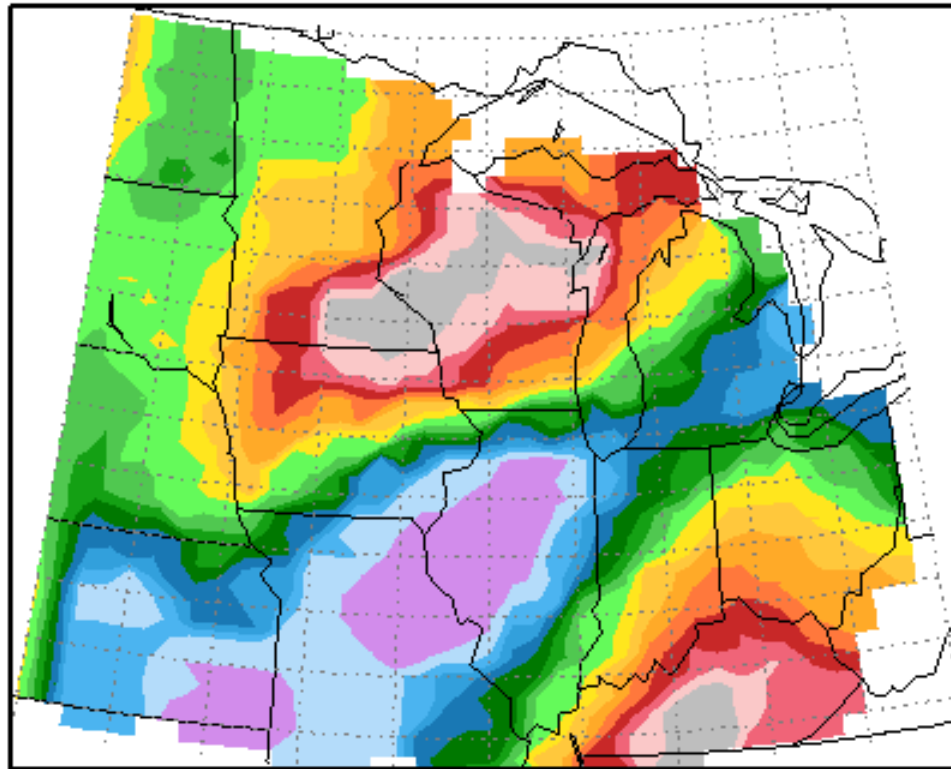
Relevance and Challenge

- Soil moisture conditions are single most important factor affecting Midwestern crop yields
- There is no uniform soil moisture monitoring network
- Operational soil moisture model was developed in 1989 and used since then to provide daily-updated maps and tables of soil moisture status
- Uses daily precipitation and temperature data from NWS cooperative observer network
- Kunkel, K.E., 1990: Operational soil moisture estimation for the Midwestern United States. *J. Appl. Meteor.*, **29**, 1158-1166.

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Current Soil Moisture Deviation (inches), Depth = 0-72
9-29-2008



Midwestern Regional Climate Center
Illinois State Water Survey
Champaign, Illinois

OneNOAA Science Seminar



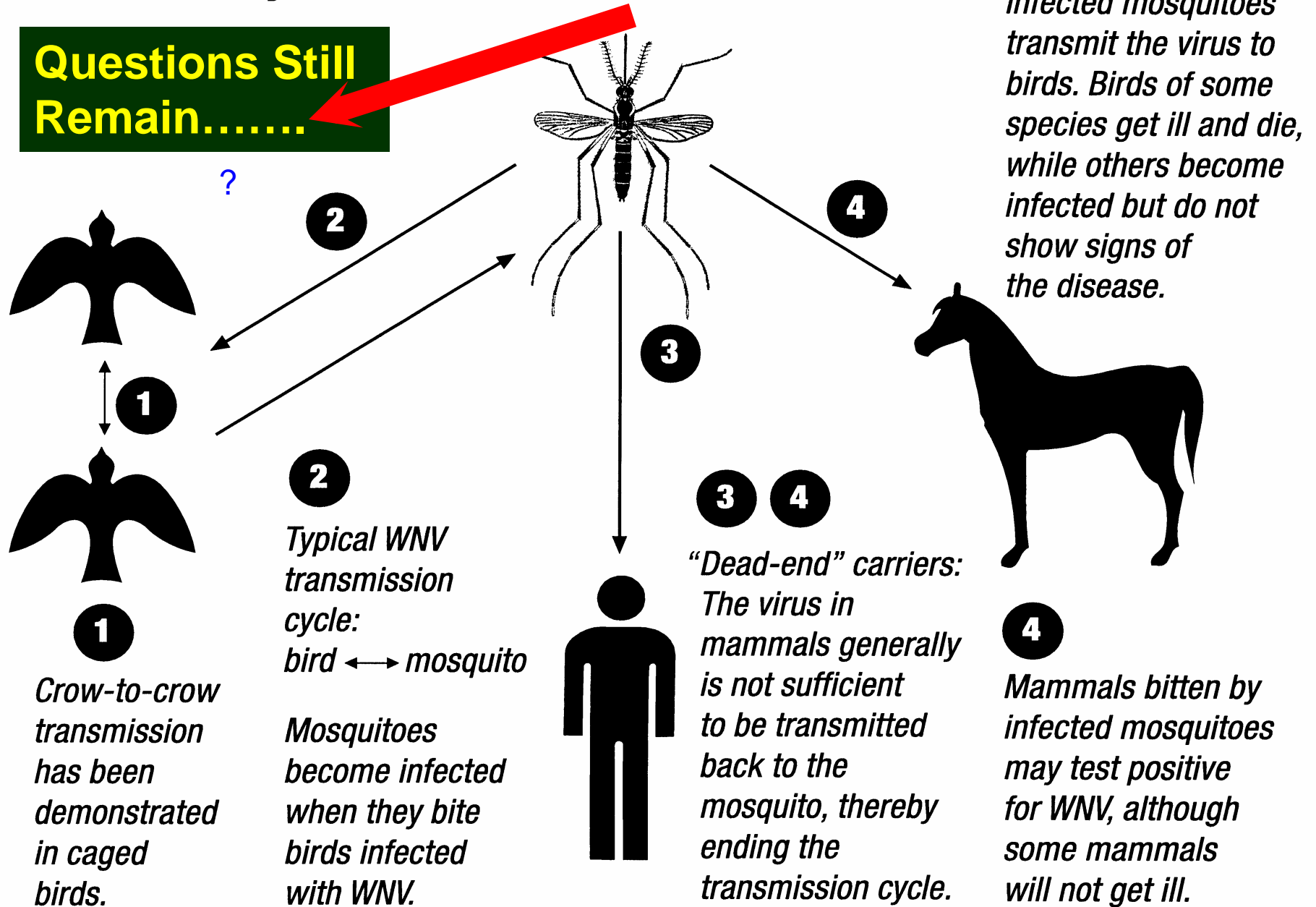
Estimating Risk of West Nile Virus Infection in Illinois

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Transmission Cycle of the West Nile Virus

Questions Still Remain.....



Infected mosquitoes transmit the virus to birds. Birds of some species get ill and die, while others become infected but do not show signs of the disease.

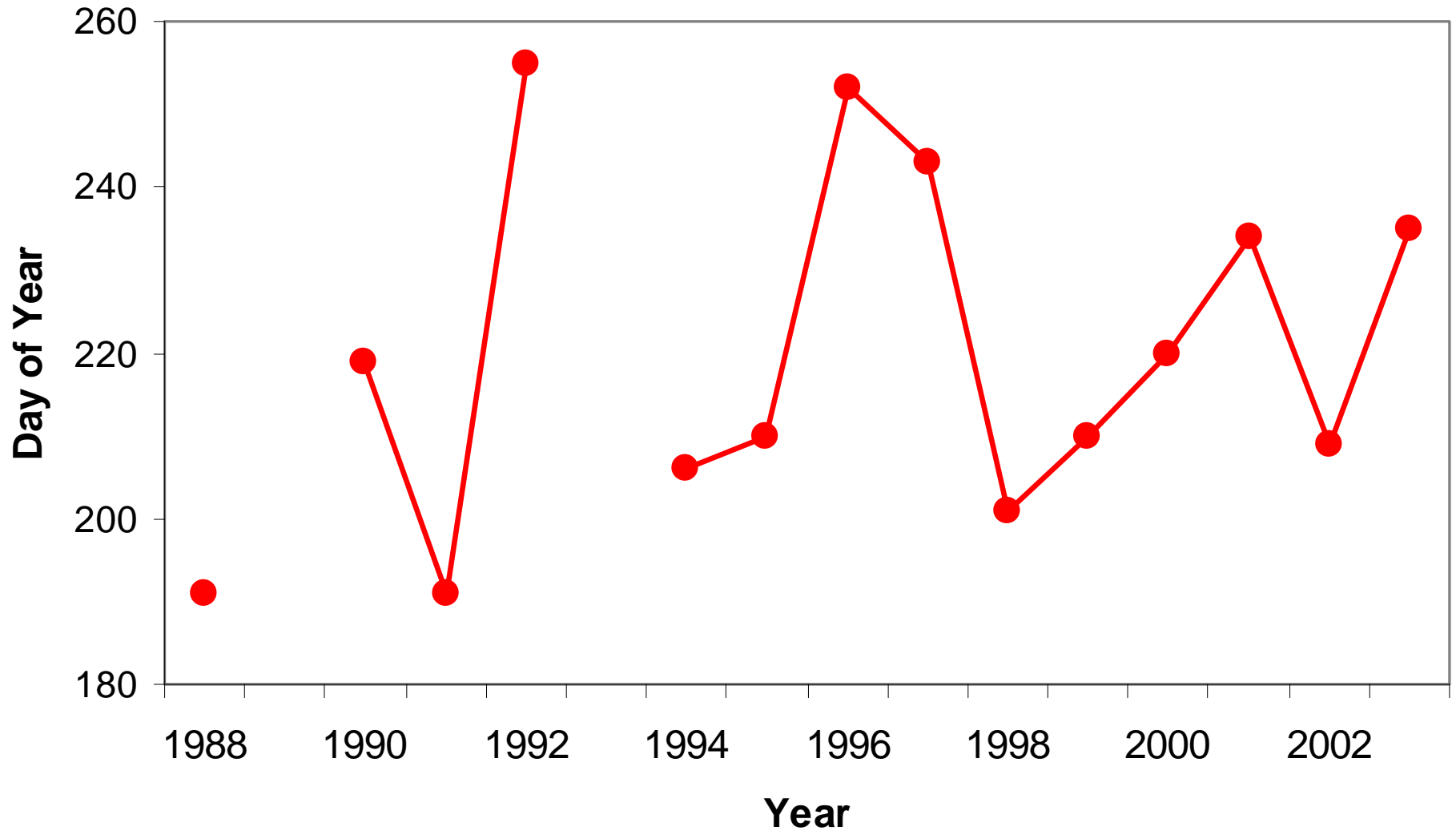
Culex Pipiens

- In Illinois (and probably much of northern U.S.), the white-spotted (*Culex restuans*) and the northern house (*Culex pipiens*) mosquitoes appear to be primary vectors for maintaining the transmission cycle
- The white-spotted mosquito, an early season species, bites birds but not mammals
- The northern house mosquito, a late season species, will bite both birds and mammals

Crossover behavior

- What is of interest is the time when the mosquito population “crosses over” from an abundance of white-spotted to an abundance of northern house species.
- The observations indicate considerable interannual variability in the crossover date
- The following graph shows that it ranges from early July (day of year 190) to mid-September (day of year 255)

Restuans-Piapiens Crossover in Champaign-Urbana, IL



—●— Crossover

Crossover-Climate Indices

- We investigated whether climate indices could be developed to predict crossover date.
- Two simple linear models were found to have predictive value (explaining more than 60% of the variance):

Degree day model using a base of 63°F

T_{\max} exceedance model using a threshold of
81°F

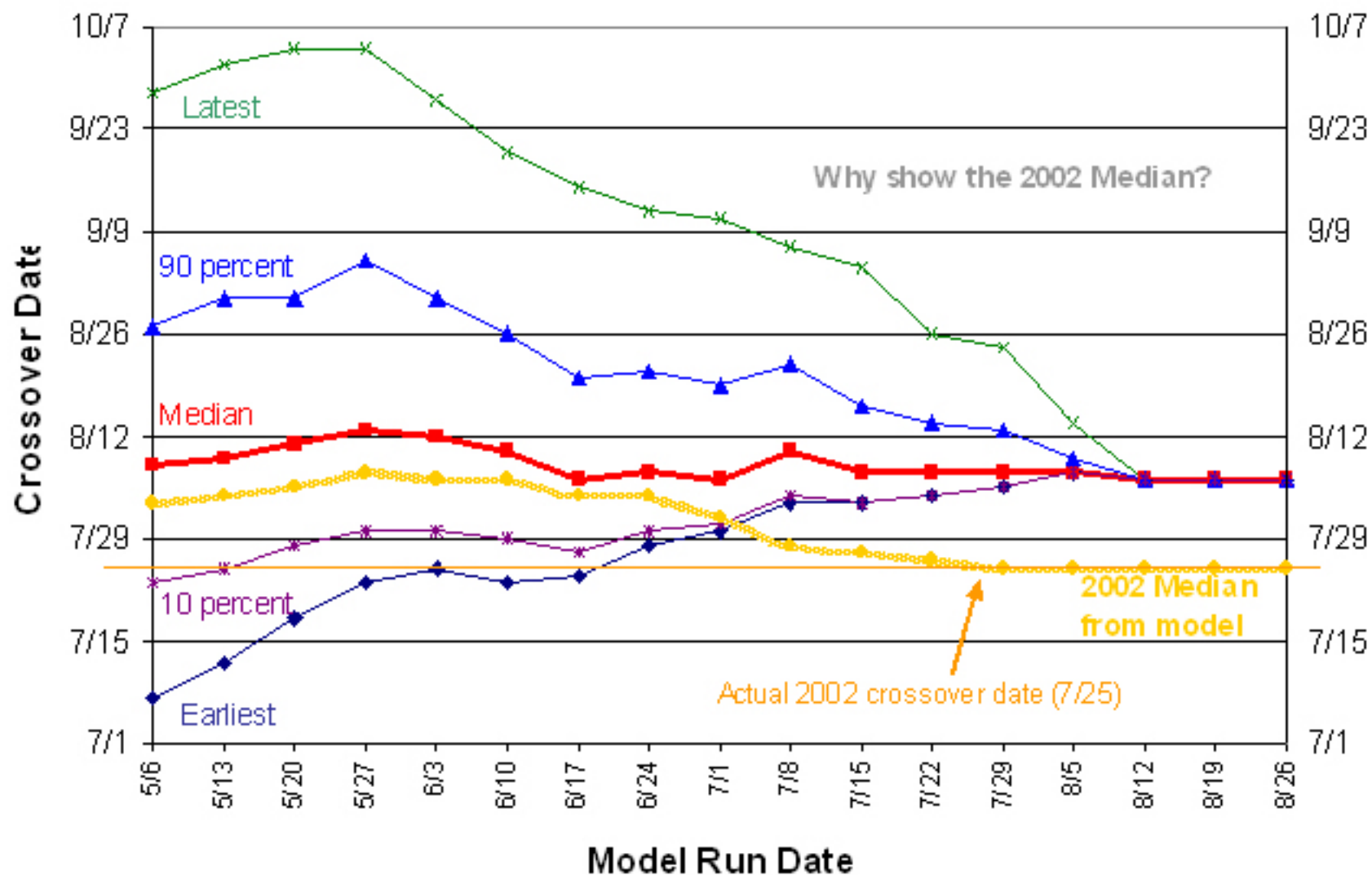
Application

- A method for producing probabilistic forecasts of crossover date was developed for use during the warm season.
- This method uses historical climate data essentially as scenarios of future conditions.
- A single forecast uses observed data up to current date and then appends data from one year of the historical record to produce a scenario of a complete year's worth of data.
- Repeat for all years from 1900 to last year
- Results disseminated on Midwestern Regional Climate Center web site

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81F Max Temp Model



RCC Central Mission

- Provision of relevant and useful climate information
- Focused on regional climate-sensitive activities
- Based on an understanding of the relationship between climate and physical and socio-economic conditions.

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RCCs: A Unique Institution

- Network is national in extent – 50 states covered
- Approximate alignment with key regional climate features and sensitivities
- Scientific expertise on regional characteristics
- Repository of regional climate datasets
- Uniquely positioned to monitor and interpret regional climate anomalies
- Regional presence, credibility and trust

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Future of the Regional Climate Center Program

- Historical rationale and mission still very relevant and applicable
- Climate change as a new and challenging dimension – especially adaptation
- Leveraging of resources with regional players on regional problems
- Facilitation of a continuous public dialogue on critical climate issues
 - It's not just climate: Joint identification of solution paths to address unprecedented complex multi-stressor issues
- A growth area: Ecological services and environmental constraints

A near-term leadership opportunity:

Harnessing a quarter century of experience and expertise to help shape a suite of climate services adequate for 21st Century needs

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QUESTIONS?

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