

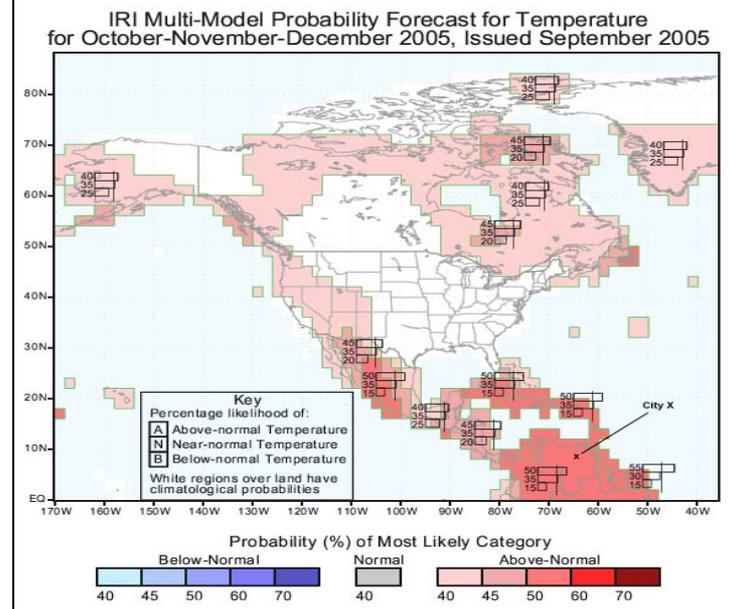
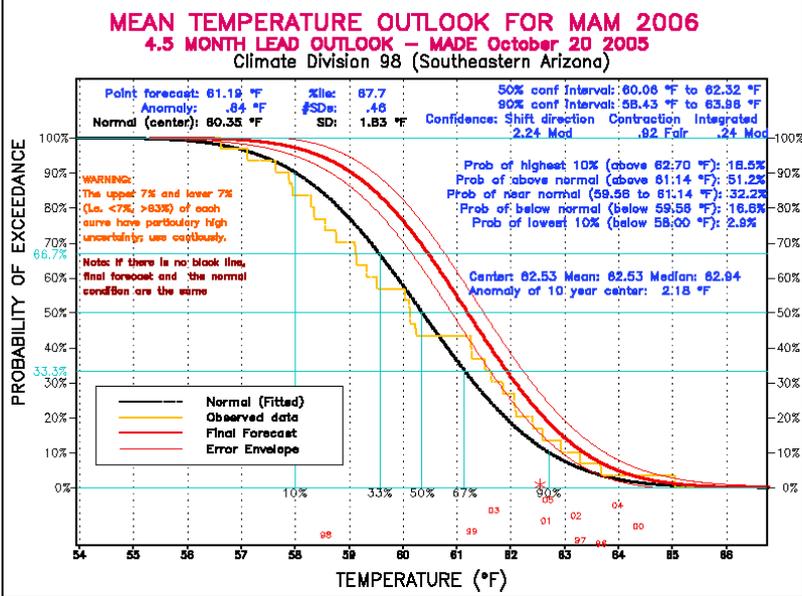
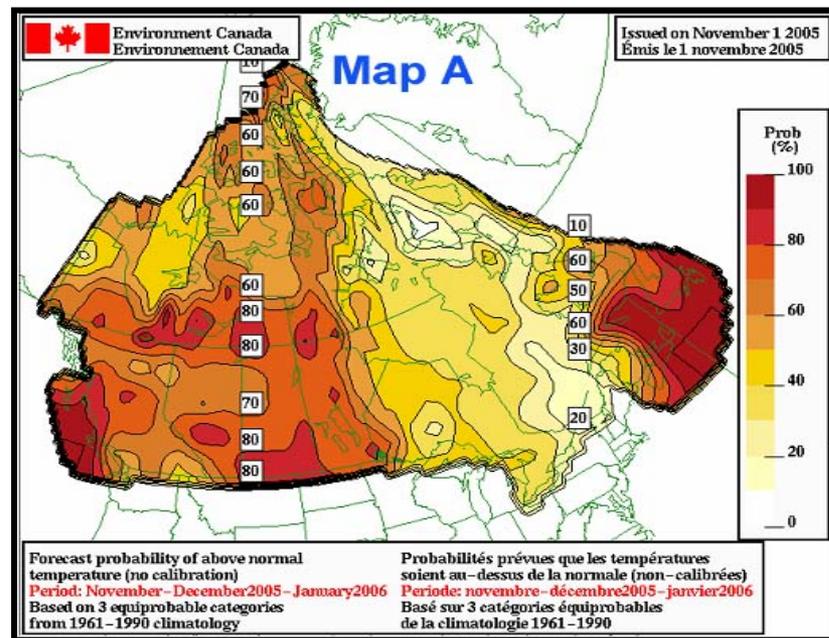
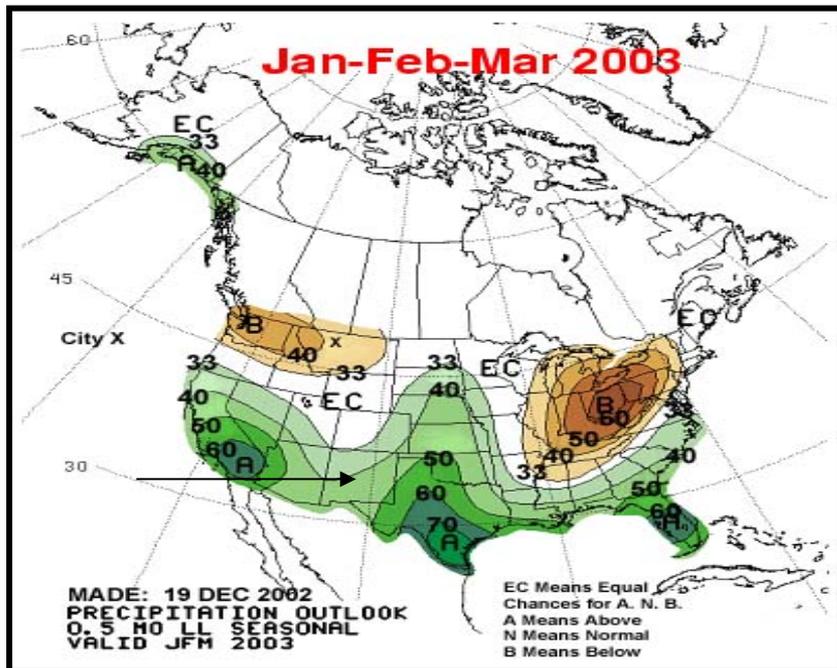
CLIMAS-CPC

Collaborative Development of an Interactive Web Tool for 3-Month Outlooks

**Holly Hartmann, Ed O'Lenic, Damian
Hammond, Sarah Marquardt, Michael Charles,
David Unger, Sundarajan Srinivasan**
- **Climate Prediction Center** -
- **University of Arizona** -



Field-testing Forecast Formats: POE Most Problematic

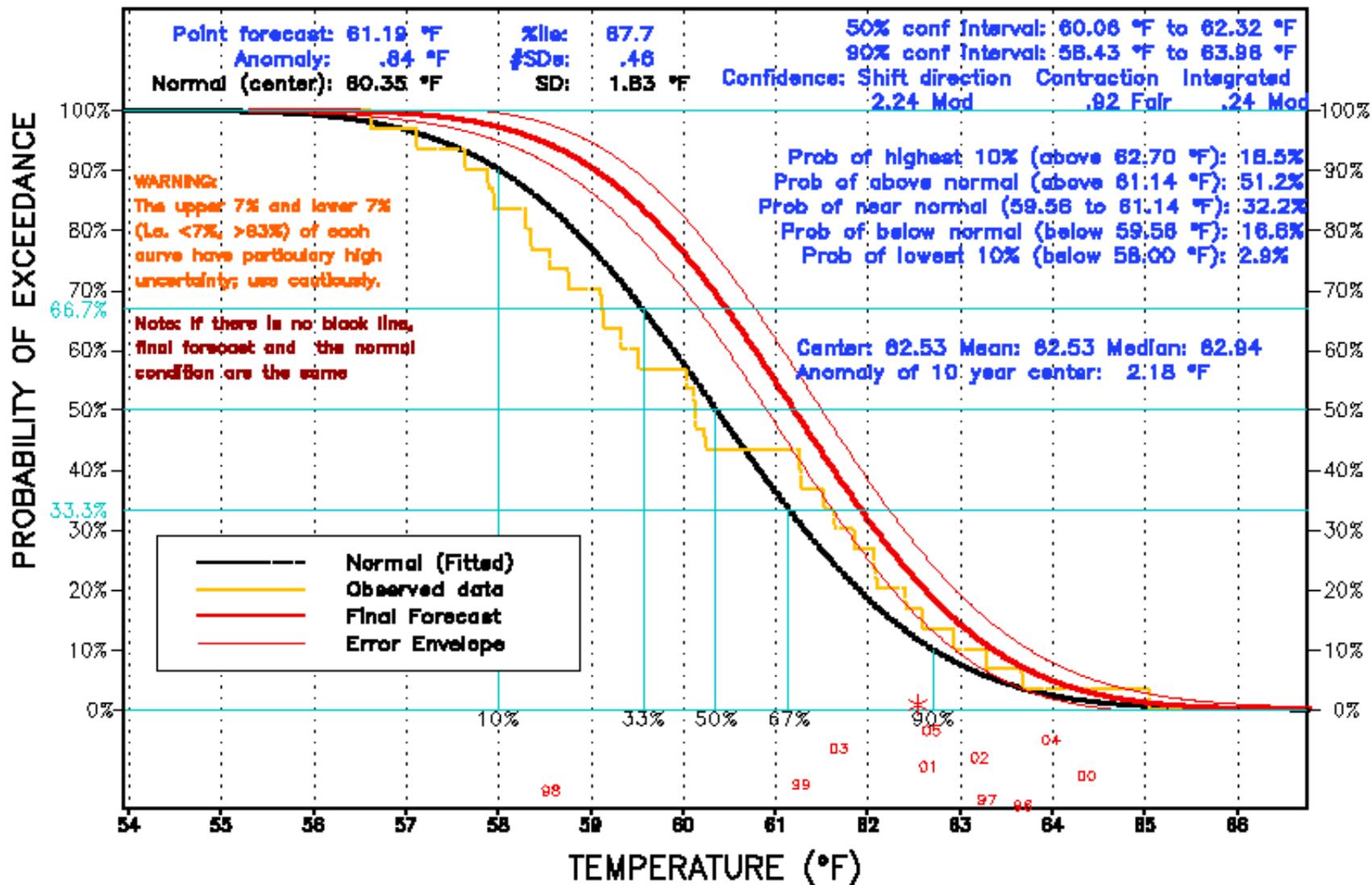


POE: Comprehensive, Complex, "Not meant for me"

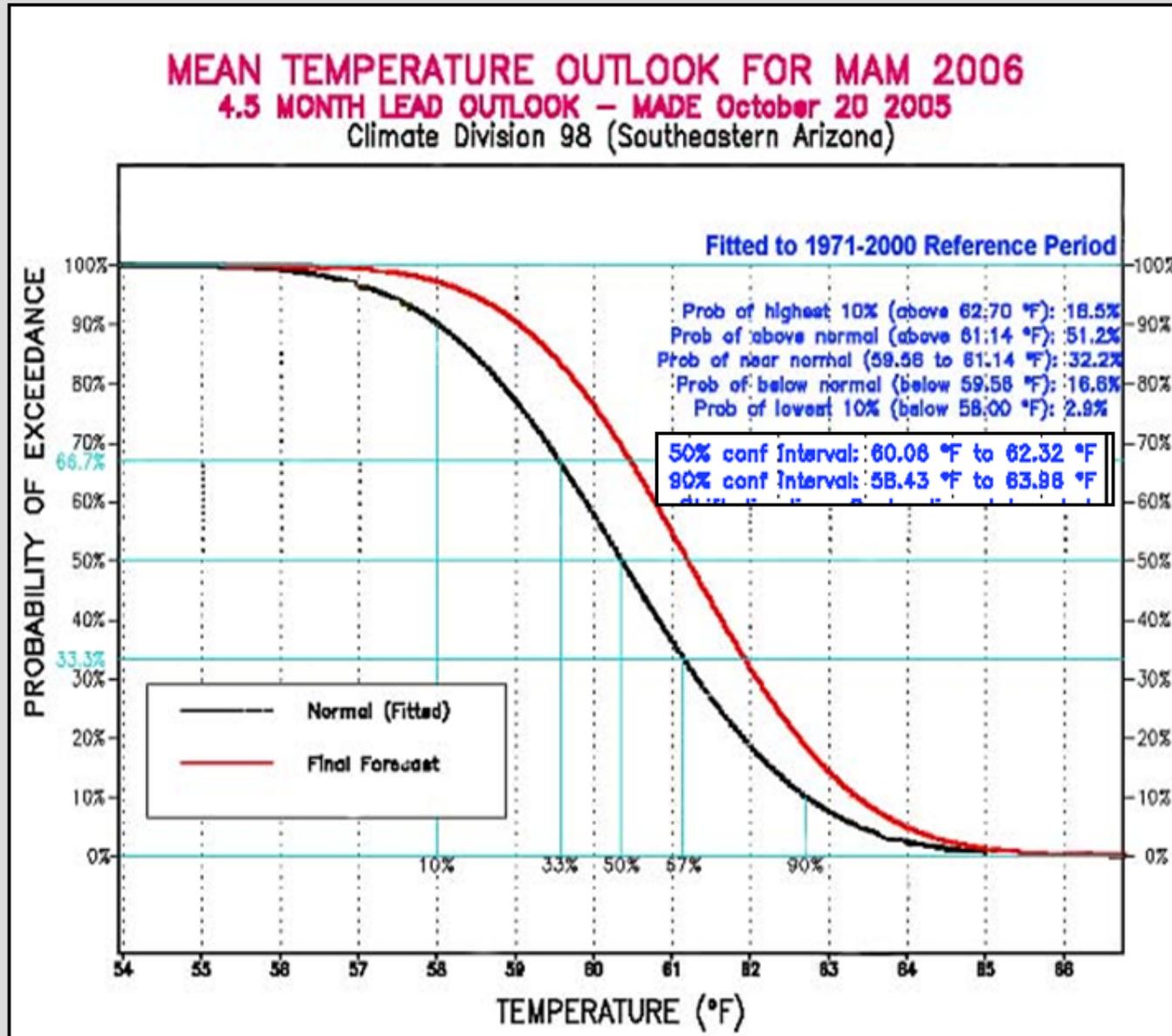
MEAN TEMPERATURE OUTLOOK FOR MAM 2006

4.5 MONTH LEAD OUTLOOK – MADE October 20 2005

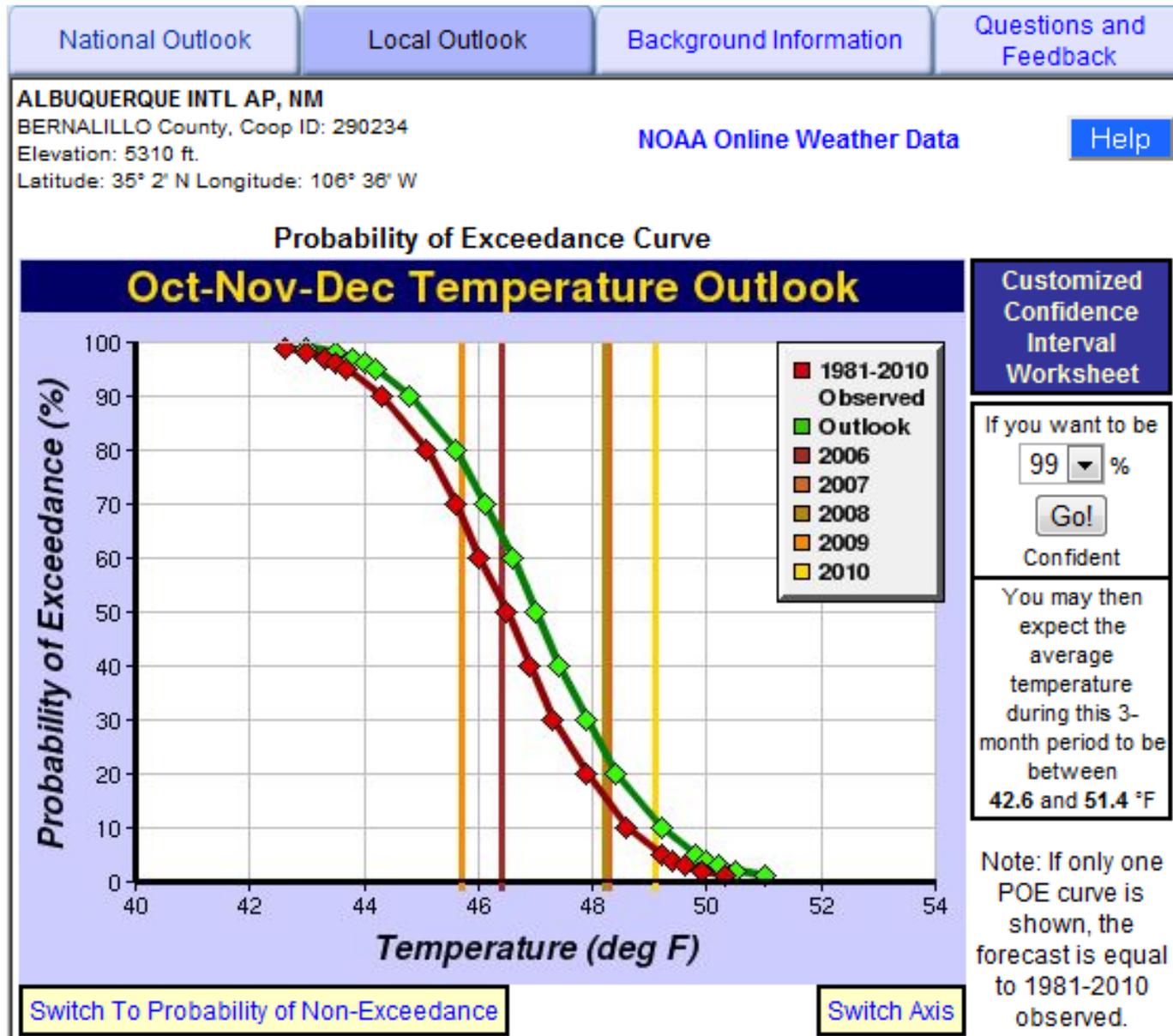
Climate Division 98 (Southeastern Arizona)



Simplified POE: More Approachable, Mostly Correctly



Simplified POE: Pseudo-Interactive, Limited by Policy



CLIMAS-CPC Climate Test Bed: Interactive Products

Develop & Transfer vs. Collaborative Development

- Dynamic process initiation by users
- Application software
- Data and database issues
- Security access for non-NWS collaborators
- Collaborative process and software

CLIMAS-CPC Climate Test Bed: Interactive Products

Develop & Transfer vs. Collaborative Development

- Dynamic process initiation by users
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Collaborative Process

- Project planning
- Timeline and scope
- Project Wiki
- Issue and task tracking
- Version control for code
- High level design
- Code reviews

Mockup Design Based on Prior Feedback

1 Graph Setup: Click the buttons or icons to create the type of graph you prefer.

● Choose X- and Y-axis

X-axis probability
 temperature
 precipitation

Y-axis probability
 temperature
 precipitation

NOTE: See slide caption below for an additional component for changing the region.

Note: the choices in the Y-axis box vary dynamically depending on the X-axis choice. If T or P are chosen, only "probability" shows; if "probability" is chosen, only T and P show. Do not use drop down menu (people dislike them). The preference would be to have dynamic lists, with no radio buttons, where people click on their choice and the available choices are bolded & unavailable choices are dimmed.

● Choose type of graph (Click on your choice)

PDF: probability density

PoE: probability of exceedance

PoNE: probability of non-exceedance

Note: the graph icons and text are dynamic, depending on the choice in #1. If Prob is the Y-axis, then all three icons are rotated.

1

2 Selection of Information: Click the button to choose details about a reference period and the forecast

PAST CLIMATE

Standard Reference Period (Climatology: 1971-2000)

observations
 curve fit to observations
 uncertainty envelope of fit

Custom Reference Period to

observations
 curve fit to observations
 uncertainty envelope of fit

Note: It would be best if the boxes for the Past and Forecast could be on the same level, rather than the Forecast being below.

Note: choices in Custom box are dimmed until data are correctly set.

Note: The radio buttons (in white) or make each line active

FORECAST CLIMATE

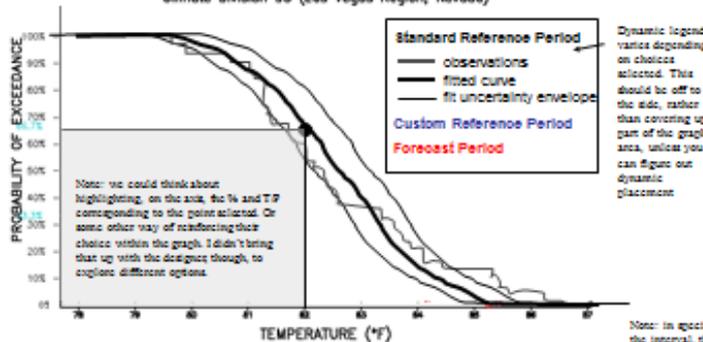
Forecast Period

2-category forecast
 3-category (tercile) forecast
 smooth curve: continuous forecast
 uncertainty envelope for forecast

Note: Each item, when selected over, produces a tool tip that answers the question, "What is this", with a link to more information, e.g., how it's computed.

2

MEAN TEMPERATURE OUTLOOK FOR JAS 2005-06 1.5 MONTH LEAD OUTLOOK - MADE May 17 2005 Climate Division 95 (Las Vegas Region, Nevada)



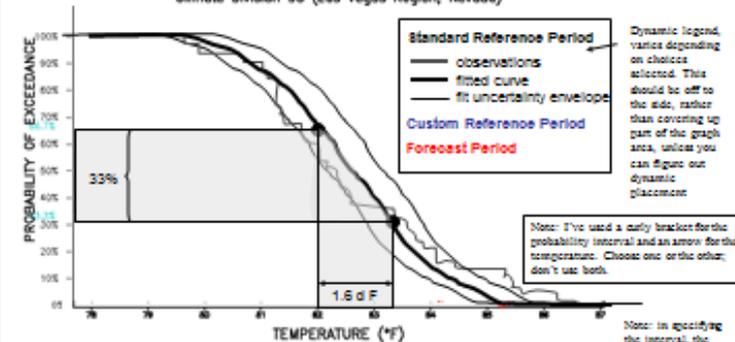
Note: we could think about highlighting, on the axis, the % and T/P corresponding to the point selected. Or some other way of reinforcing that choice within the graph. I didn't bring that up with the designer though, to explore different options.

Note: This is just an example using an old heading. It would show a current heading.

Note: in specifying the interval, the T/P choice is dynamically linked to previous choice for graph setup.

4 Slide the dots along the graph to modify the selected threshold. Or specify the threshold here: % T/P

MEAN TEMPERATURE OUTLOOK FOR JAS 2005-06 1.5 MONTH LEAD OUTLOOK - MADE May 17 2005 Climate Division 95 (Las Vegas Region, Nevada)



Note: This is just an example using an old heading. It would show a current heading.

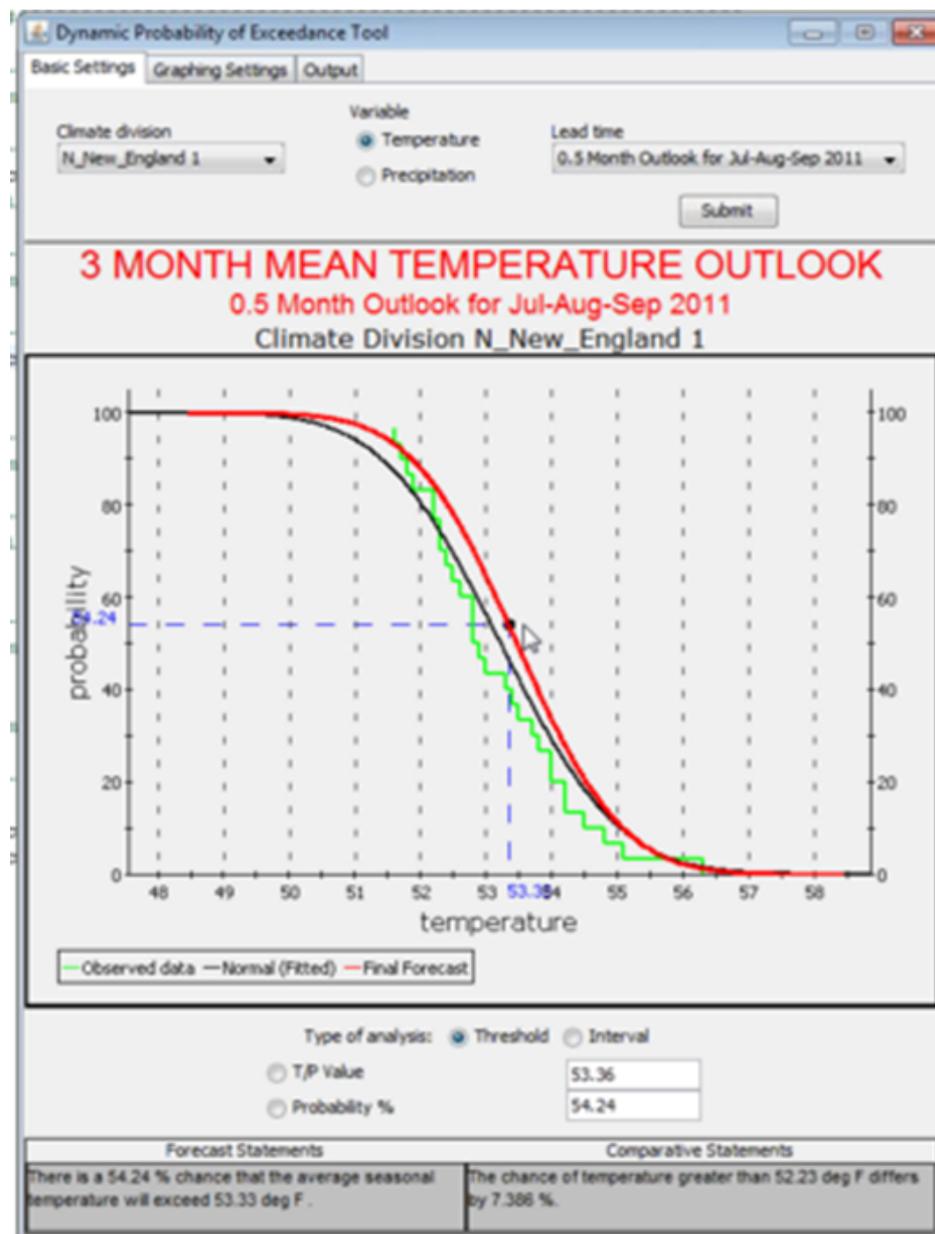
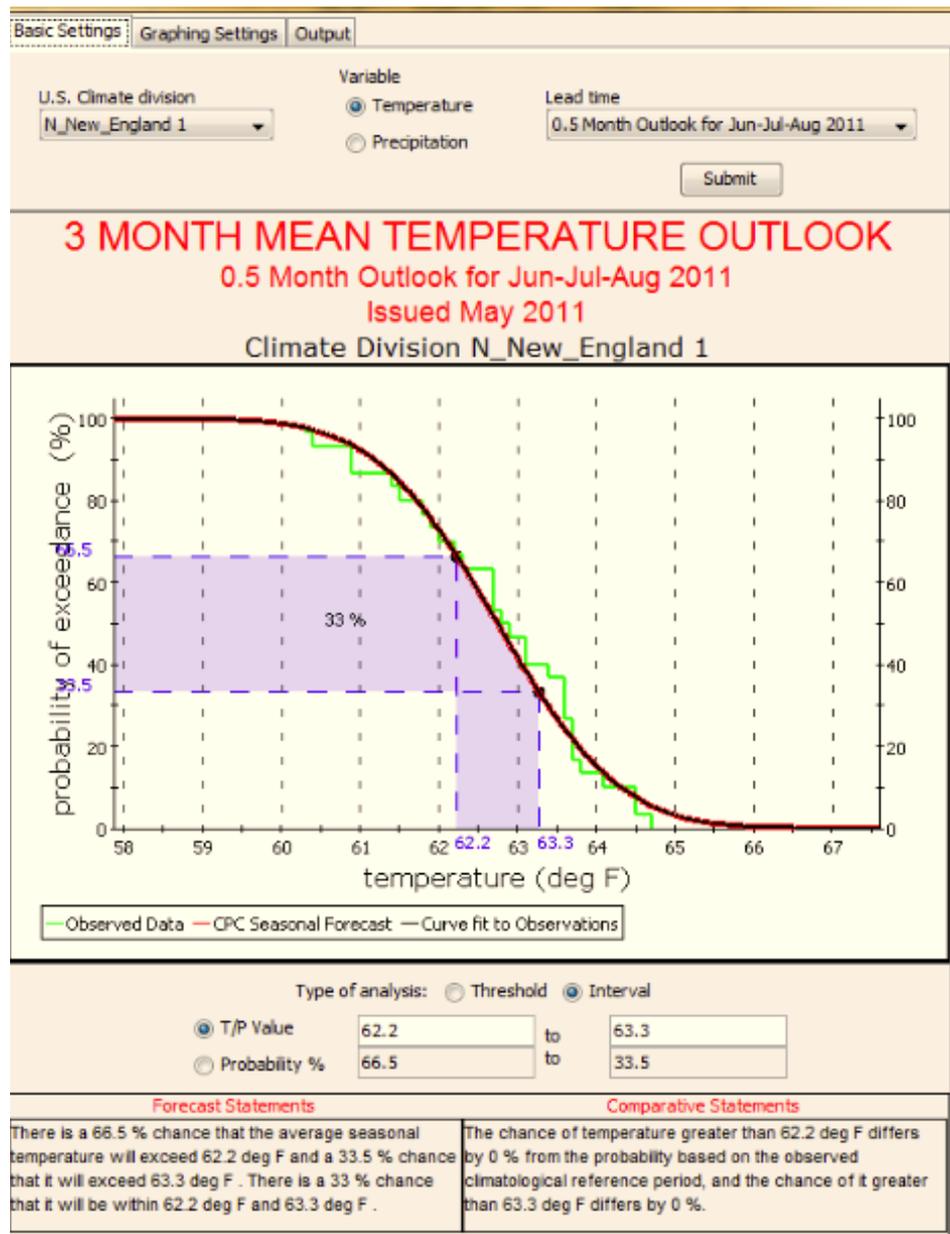
Note: I've used a curly bracket for the probability interval and an arrow for the temperature. Choose one or the other; don't use both.

Note: in specifying the interval, the T/P choice is dynamically linked to previous choice for graph setup.

4 Slide the dots along the graph to modify the selected interval. Or specify the interval here: to % T/P

3

Initial Implementation



Usability Assessment

Usability Assessment Process

- NOT focus groups, NOT satisfaction surveys
- Qualitative testing of 5-7 people
- 1-on-1 meetings, ~ 1 hour
- Script: Accomplish typical tasks.
- Response: Track activity. Follow mouse!
- “Speak Aloud Protocol”

Design Insights

- Individual design preferences not reliable
- Design Principles: Quick-scan text, avoid long scrolls

Design Adjustment

Save Your Results

1 Choose your U.S. climate division

S_New_Mexico_102 View Map

2 Choose your variable

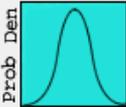
Temperature

Precipitation

3 Choose your lead time

1.5 Month Outlook for Feb-Mar-Apr 2011

4 Choose the type of graph



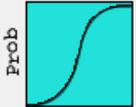
PDF:

probability density



PoE:

probability of exceedance



PoNE:

probability of non-exceedance

5 Choose climate info

Past Climate

Standard Reference Period (Climatology): 1981-2010

Historically Observed Data

Curve fit to Observed Data

Forecast Climate

CPC Seasonal Forecast

6 Customize your graph

Interval analysis lets you focus on information between two values

- Select the probability (%) interval:
- Select the variable (Temp, Precip) interval:
- 3-category (tercile) forecast. Similar to the linked products [\(link1\)](#) [\(link2\)](#)

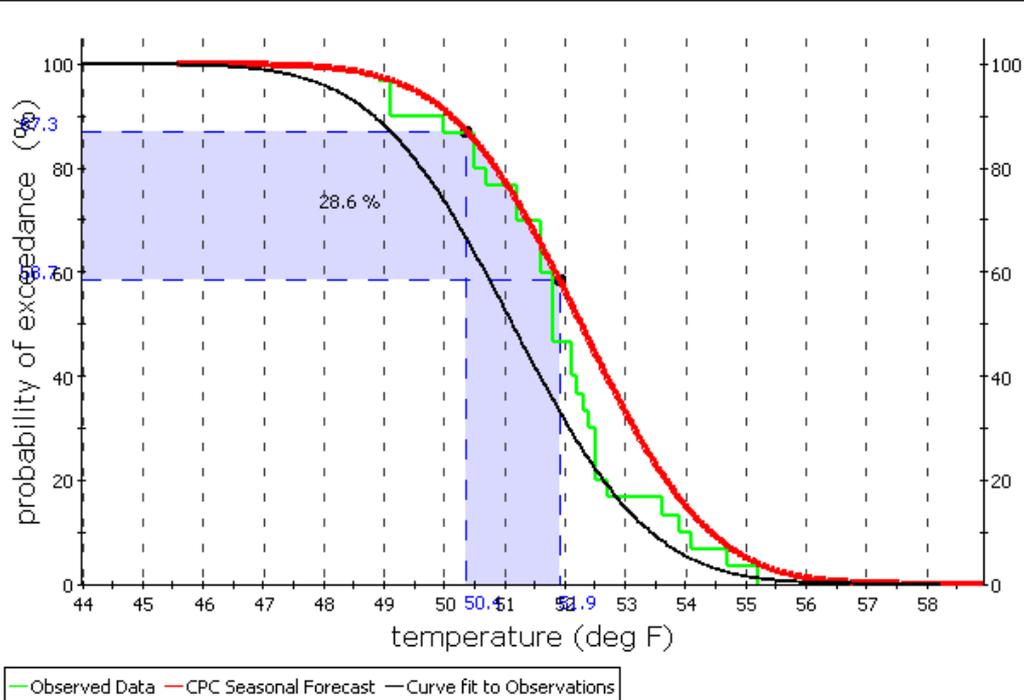
Threshold analysis lets you focus on information above or below a single value

3 MONTH MEAN TEMPERATURE OUTLOOK

1.5 Month Outlook for Feb-Mar-Apr 2011

Issued Dec 2010

Climate Division S_New_Mexico_102



— Observed Data
— CPC Seasonal Forecast
— Curve fit to Observations

Forecast Statements

There is a 87.3 % chance that the average seasonal temperature will exceed 50.4 deg F (the bottom third of observations from the climatological reference period, i.e. the below average category) and a 58.7 % chance that it will exceed 51.9 deg F (the middle third of observations from the climatological reference period, i.e. the near average category). There is a 28.6 % chance that it will be within 50.4 deg F and 51.9 deg F.

Comparative Statements

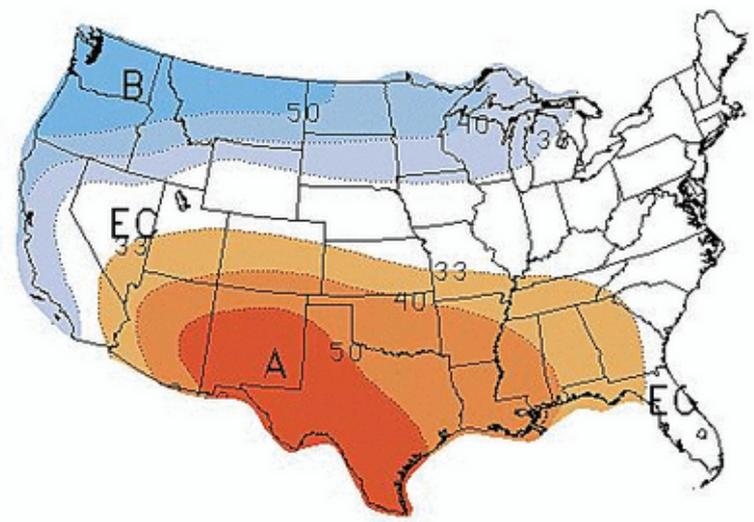
The chance of temperature greater than 50.4 deg F (the bottom third of the observations from the climatological reference period, i.e. the below average category) differs by 20.6 % from the probability based on the observed climatological reference period, and the chance of it greater than 51.9 deg F (the middle third of the observations from the climatological reference period, i.e. the near average category) differs by 25.4 %.

1 Choose your U.S. climate division

dec_2010_2_temp_FMA_2011_large.gif (450x375) ...

fetestest.hwr.arizona.edu/fet/forecasts/temp/seasonal/2011/large/dec_2

February - April 2011
Temperature



Curve fit to Observed Data

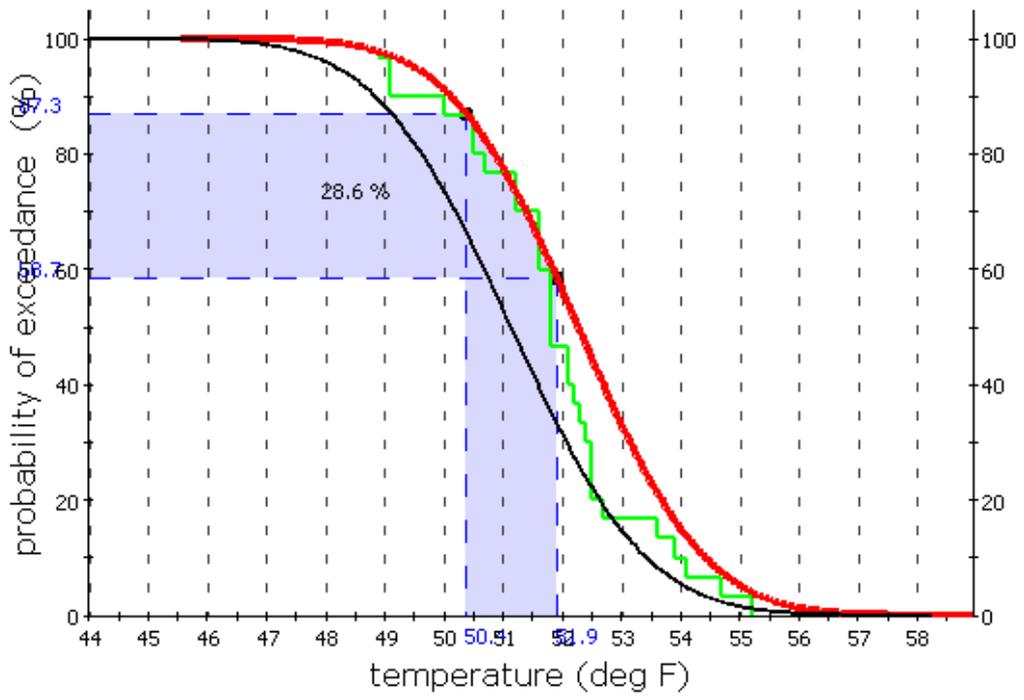
Submit

3 MONTH MEAN TEMPERATURE OUTLOOK

1.5 Month Outlook for Feb-Mar-Apr 2011

Issued Dec 2010

Climate Division S_New_Mexico 102



— Observed Data — CPC Seasonal Forecast — Curve fit to Observations

6 Customize your graph

- Interval analysis* lets you focus on information between two values
 - Select the probability (%) interval:
 - Select the variable (Temp, Precip) interval:
 - 3-category (tercile) forecast. Similar to the linked products [\(link1\)](#) [\(link2\)](#)
 - Threshold analysis* lets you focus on information above or below a single value

Forecast Statements

There is a 87.3 % chance that the average seasonal temperature will exceed 50.4 deg F (the bottom third of observations from the climatological reference period, i.e. the below average category) and a 58.7 % chance that it will exceed 51.9 deg F (the middle third of observations from the climatological reference period, i.e. the near average category). There is a 28.6 % chance that it will be within 50.4 deg F and 51.9 deg F.

Comparative Statements

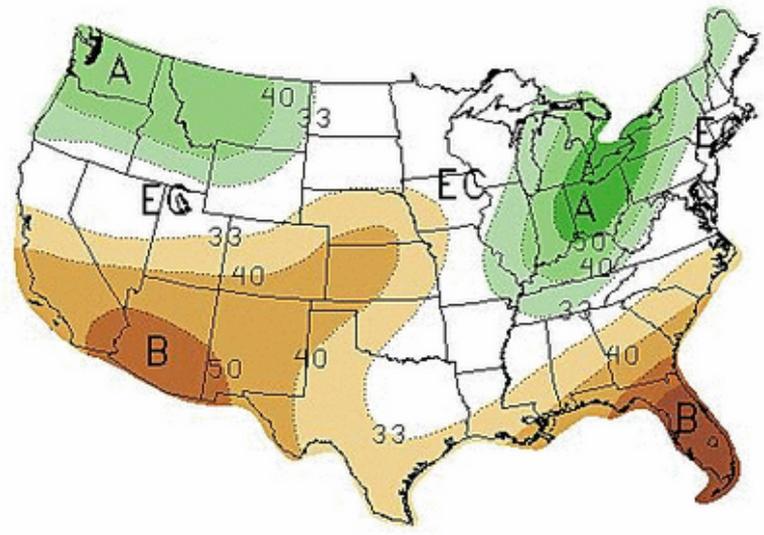
The chance of temperature greater than 50.4 deg F (the bottom third of the observations from the climatological reference period, i.e. the below average category) differs by 20.6 % from the probability based on the observed climatological reference period, and the chance of it greater than 51.9 deg F (the middle third of the observations from the climatological reference period, i.e. the near average category) differs by 25.4 %.

1 Choose your U.S. climate division

dec_2010_2_precip_FMA_2011_large.gif (450x375) ...

fettest.hwr.arizona.edu/fet/forecasts/precip/seasonal/2011/large/dec_21

February - April 2011
Precipitation



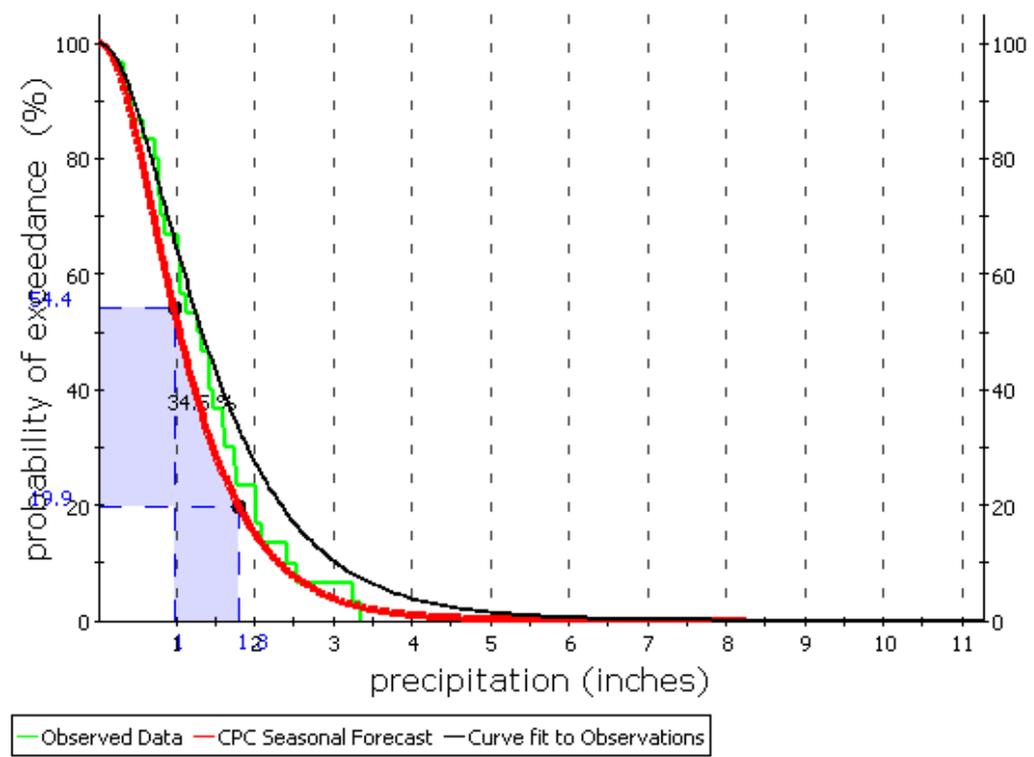
Submit

3 MONTH MEAN PRECIPITATION OUTLOOK

1.5 Month Outlook for Feb-Mar-Apr 2011

Issued Dec 2010

Climate Division S_New_Mexico 102



6 Customize your graph

- Interval analysis** lets you focus on information between two values
 - Select the probability (%) interval:
 - Select the variable (Temp, Precip) interval:
 - 3-category (tercile) forecast. Similar to the linked products [\(link1\)](#) [\(link2\)](#)
- Threshold analysis** lets you focus on information above or below a single value

Forecast Statements

There is a 54.4 % chance that the total seasonal precipitation will exceed 1 inches (the bottom third of observations from the climatological reference period, i.e. the below median category) and a 19.9 % chance that it will exceed 1.8 inches (the middle third of observations from the climatological reference period, i.e. the near median category). There is a 34.5 % chance that it will be within 1 inches and 1.8 inches .

Comparative Statements

The chance of precipitation greater than 1 inches (the bottom third of the observations from the climatological reference period, i.e. the below median category) differs by -12.3 % from the probability based on the observed climatological reference period, and the chance of it greater than 1.8 inches (the middle third of the observations from the climatological reference period, i.e. the near median category) differs by -13.5 %.

3 MONTH MEAN PRECIPITATION OUTLOOK

1.5 Month Outlook for Feb-Mar-Apr 2011

Issued Dec 2010

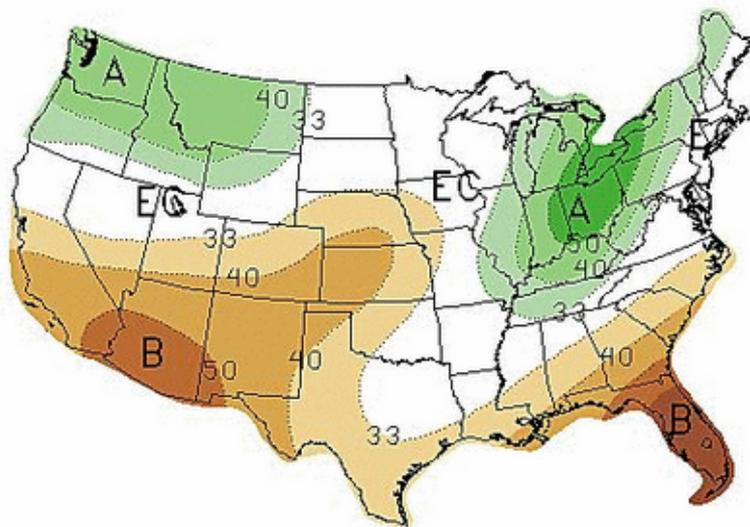
Climate Division S_New_Mexico 102

1 Choose your U.S. climate division

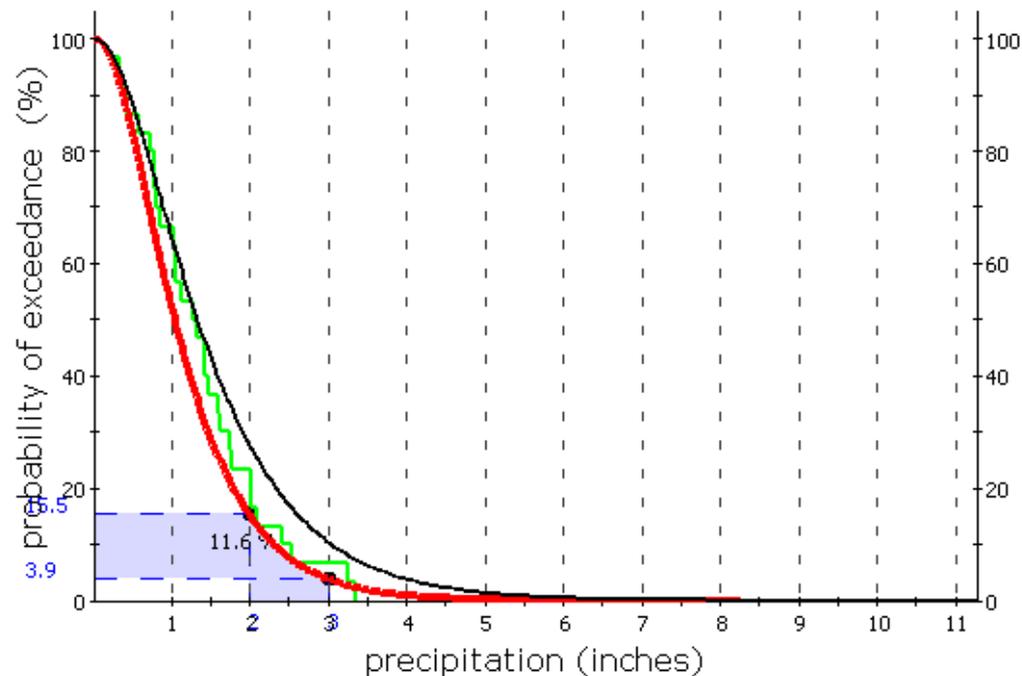
dec_2010_2_precip_FMA_2011_large.gif (450x375) ...

fettest.hwr.arizona.edu/fet/forecasts/precip/seasonal/2011/large/dec_2

February - April 2011
Precipitation



Submit



6 Customize your graph

- Interval analysis lets you focus on information between two values

Select the probability (%) interval:

Select the variable (Temp, Precip) interval:

2 to 3

3-category (tercile) forecast. Similar to the linked products [\(link1\)](#) [\(link2\)](#)

- Threshold analysis lets you focus on information above or below a single value

Forecast Statements

There is a 15.5 % chance that the total seasonal precipitation will exceed 2 inches and a 3.9 % chance that it will exceed 3 inches . There is a 11.6 % chance that it will be within 2 inches and 3 inches .

Comparative Statements

The chance of precipitation greater than 2 inches differs by -12.5 % from the probability based on the observed climatological reference period, and the chance of it greater than 3 inches differs by -6.6 %.

1 Choose your U.S. climate division

S_New_Mexico 102 [View Map](#)

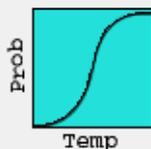
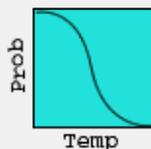
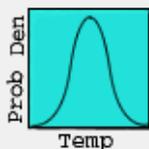
2 Choose your variable

- Temperature
- Precipitation

3 Choose your lead time

1.5 Month Outlook for Feb-Mar-Apr 2011

4 Choose the type of graph



- PDF:**
- probability density
- PoE:**
- probability of exceedance
- PoNE:**
- probability of non-exceedance

5 Choose climate info

Past Climate

Forecast Climate

Standard Reference Period
(Climatology): 1981-2010

- Historically Observed Data
- CPC Seasonal Forecast
- Curve fit to Observed Data

Submit

6 Customize your graph

- Interval analysis lets you focus on information between two values
 - Select the probability (%) interval:
 - Select the variable (Temp, Precip) interval:

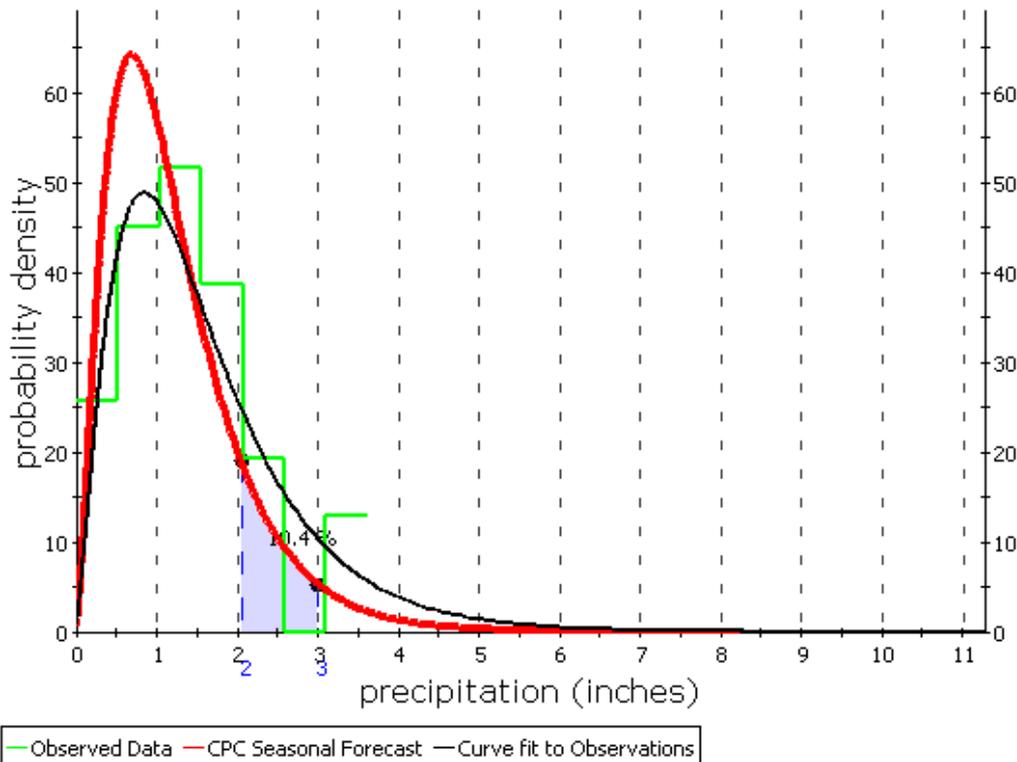
to
 - 3-category (tercile) forecast. Similar to the linked products [\(link 1\)](#) [\(link 2\)](#)

3 MONTH MEAN PRECIPITATION OUTLOOK

1.5 Month Outlook for Feb-Mar-Apr 2011

Issued Dec 2010

Climate Division S_New_Mexico 102



Forecast Statements

There is a 85.7 % chance that the total seasonal precipitation will be less than 2 inches , a 10.4 % chance it will be within 2 and 3 inches , and a 3.9 % chance it will be greater than 3 inches .

Comparative Statements

The chance of precipitation less than 2 inches differs by 12.1 % from the probability based on the observed climatological reference period, the chance of it between 2 and 3 inches differs by -5.6 %, and the chance of it greater than 3 inches differs by -6.6 %.

1 Choose your U.S. climate division

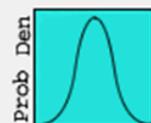
S_New_Mexico 102

[View Map](#)**2 Choose your variable**

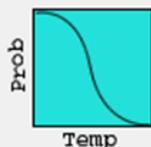
- Temperature
- Precipitation

3 Choose your lead time

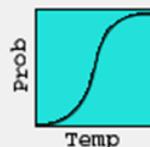
1.5 Month Outlook for Feb-Mar-Apr 2011

4 Choose the type of graph**PDF:**

- probability density

**PoE:**

- probability of exceedance

**PoNE:**

- probability of non-exceedance

5 Choose climate info**Past Climate**Standard Reference Period
(Climatology): 1981-2010

- Historically Observed Data
- Curve fit to Observed Data

Forecast Climate

- CPC Seasonal Forecast

6 Customize your graph

- Interval analysis lets you focus on information between two values
- Threshold analysis lets you focus on information above or below a single value

- Select the probability (%) threshold:

- Select the variable (Temp, Precip) threshold:

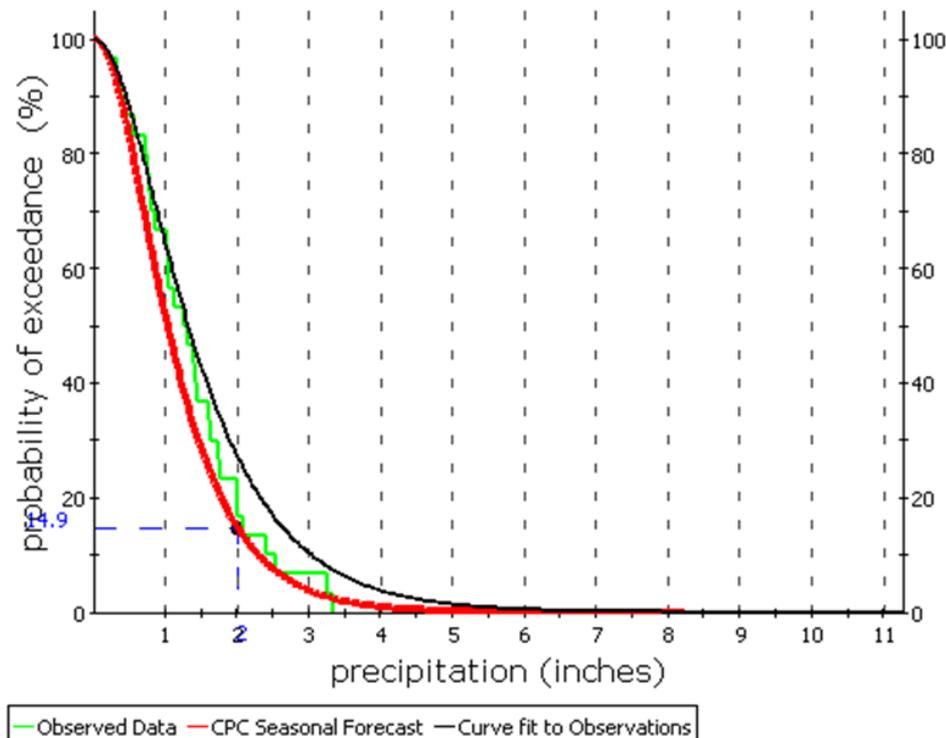
- 2-category (above and below median) forecast. Similar to the linked product [link](#)

3 MONTH MEAN PRECIPITATION OUTLOOK

1.5 Month Outlook for Feb-Mar-Apr 2011

Issued Dec 2010

Climate Division S_New_Mexico 102

**Forecast Statements**

There is a 14.9 % chance that the total seasonal precipitation will exceed 2 inches .

Comparative Statements

The chance of precipitation greater than 2 inches differs by -12.3 % from the probability based on the observed climatological reference period.

1 Choose your U.S. climate division

S_New_Mexico 102

[View Map](#)

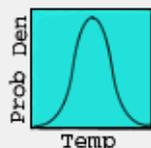
2 Choose your variable

- Temperature
- Precipitation

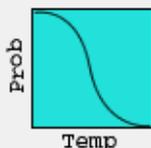
3 Choose your lead time

1.5 Month Outlook for Feb-Mar-Apr 2011

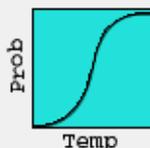
4 Choose the type of graph



PDF:
 probability density



PoE:
 probability of exceedance



PoNE:
 probability of non-exceedance

5 Choose climate info

Past Climate

Standard Reference Period (Climatology): 1981-2010

- Historically Observed Data
- Curve fit to Observed Data

Forecast Climate

- CPC Seasonal Forecast

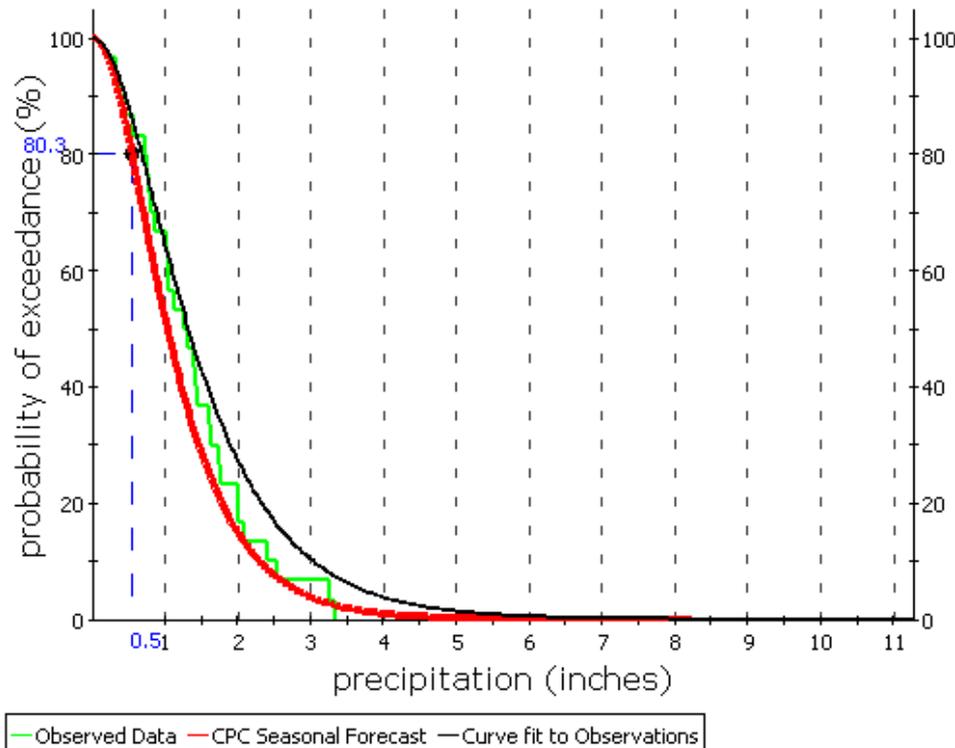
Submit

3 MONTH MEAN PRECIPITATION OUTLOOK

1.5 Month Outlook for Feb-Mar-Apr 2011

Issued Dec 2010

Climate Division S_New_Mexico 102



6 Customize your graph

- Interval analysis lets you focus on information between two values
- Threshold analysis lets you focus on information above or below a single value

Select the probability (%) threshold:

80.3

Select the variable (Temp, Precip) threshold:

Select the 2-category (above and below median) forecast. Similar to the linked product [\(link\)](#)

Forecast Statements

There is a 80.3 % chance that the total seasonal precipitation will exceed 0.5 inches .

Comparative Statements

The chance of precipitation greater than 0.5 inches differs by -6.1 % from the probability based on the observed climatological reference period.

1 Choose your U.S. climate division

S_New_Mexico 102

[View Map](#)

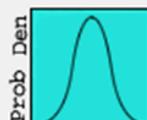
2 Choose your variable

- Temperature
- Precipitation

3 Choose your lead time

1.5 Month Outlook for Feb-Mar-Apr 2011

4 Choose the type of graph



Temp

PDF:

- probability density



Temp

PoE:

- probability of exceedance



Temp

PoNE:

- probability of non-exceedance

5 Choose climate info

Past Climate

Standard Reference Period
(Climatology): 1981-2010

- Historically Observed Data
- Curve fit to Observed Data

Forecast Climate

- CPC Seasonal Forecast

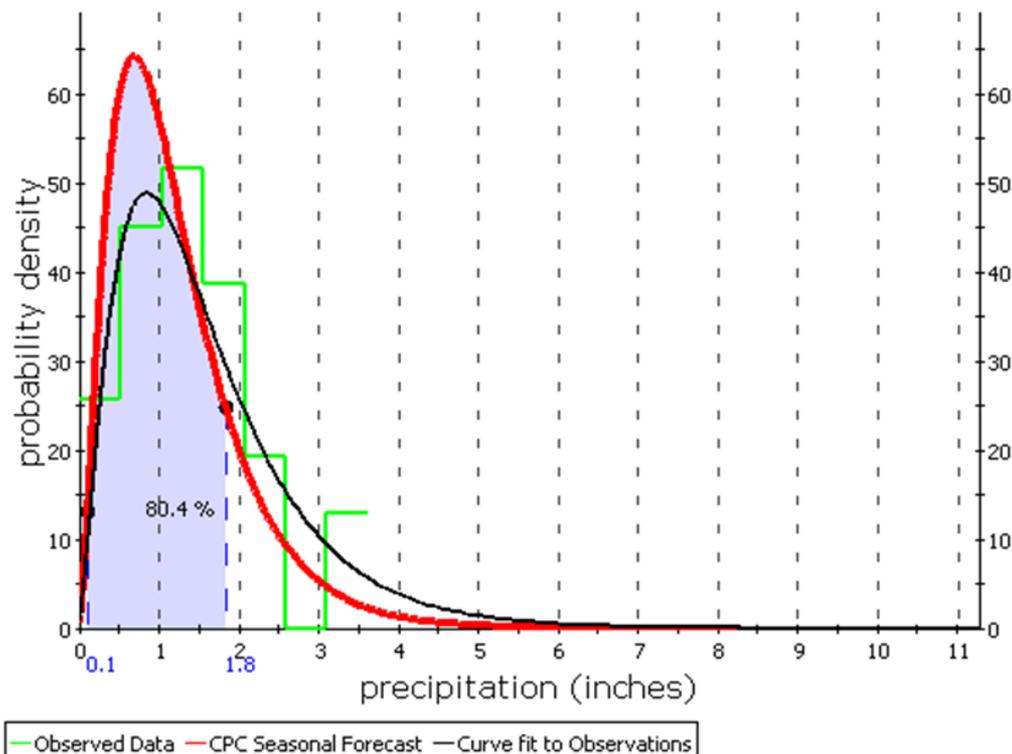
Submit

3 MONTH MEAN PRECIPITATION OUTLOOK

1.5 Month Outlook for Feb-Mar-Apr 2011

Issued Dec 2010

Climate Division S_New_Mexico 102



6 Customize your graph

- Interval analysis lets you focus on information between two values

- Select the probability (%) interval:
- Select the variable (Temp, Precip) interval:

0.1

to

1.8

- 3-category (tercile) forecast. Similar to the linked products [\(link1\)](#) [\(link2\)](#)

Forecast Statements

There is a 0.6 % chance that the total seasonal precipitation will be less than 0.1 inches , a 80.4 % chance it will be within 0.1 and 1.8 inches , and a 18.9 % chance it will be greater than 1.8 inches .

Comparative Statements

The chance of precipitation less than 0.1 inches differs by 0.1 % from the probability based on the observed climatological reference period, the chance of it between 0.1 and 1.8 inches differs by 13.2 % , and the chance of it greater than 1.8 inches differs by -13.3 % .

Dynamic POE Web Tool: High-Level Design

Version 0.1
www.ua-alic.com
/DynamicPOE

