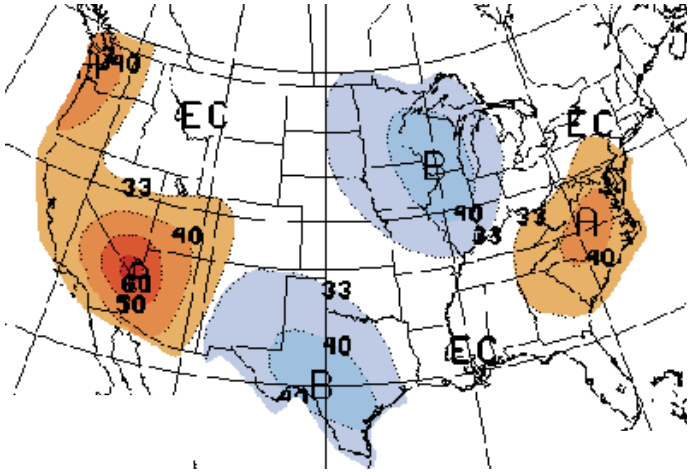
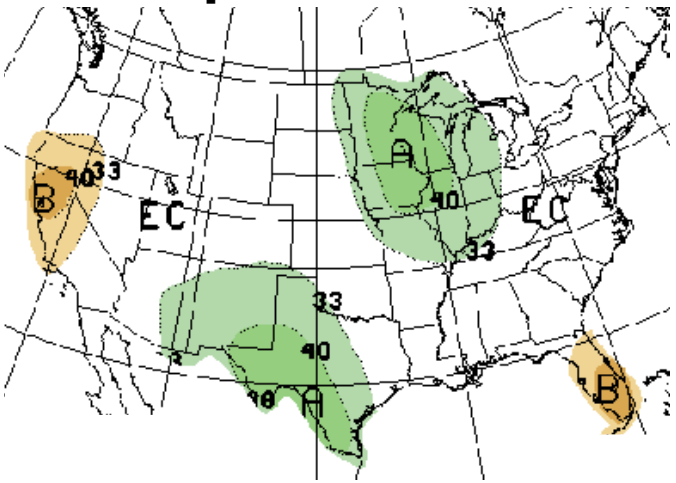
Climate Forecasts and Forecast Uncertainty

Temperature AMJ 2005



Precipitation AMJ 2005



Holly C. Hartmann and Gregg Garfin

Climate Assessment for the Southwest

University of Arizona

hollyoregon@juno.com gmgarfin@email.arizona.edu

Supported by:

NOAA GAPP

NOAA CLIMAS

HyDIS: NASA/Raytheon Synergy

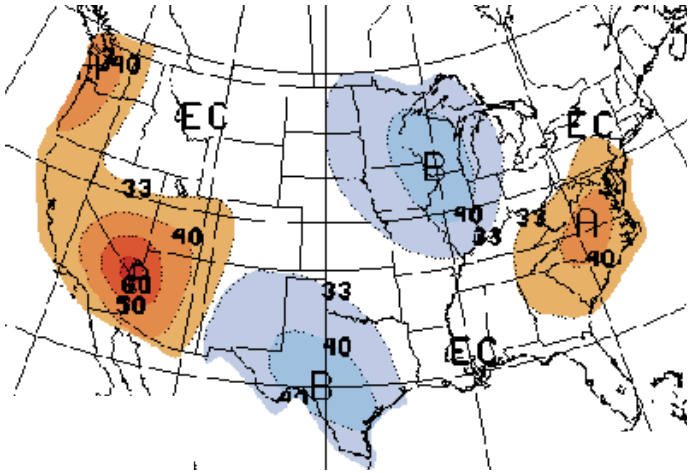
NSF SAHRA

NASA EOSDIS

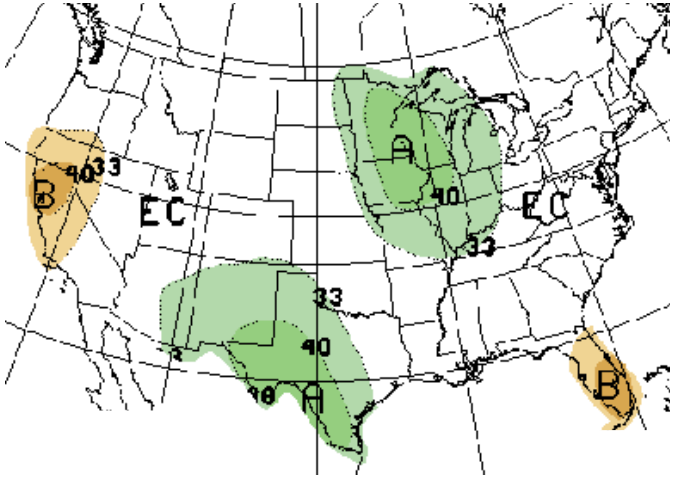
Outline

- Forecast skill
- Forecast Evaluation Tool:
  - Orientation
  - Analogue tool
    - Probability of exceedance
  - Forecast skill evaluation
    - Number of forecasts made
    - Bubble plots

Temperature AMJ 2005



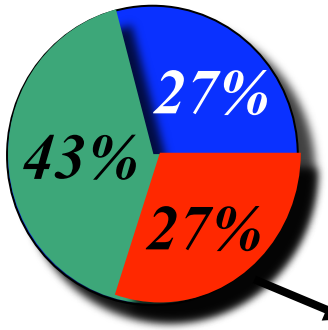
Precipitation AMJ 2005

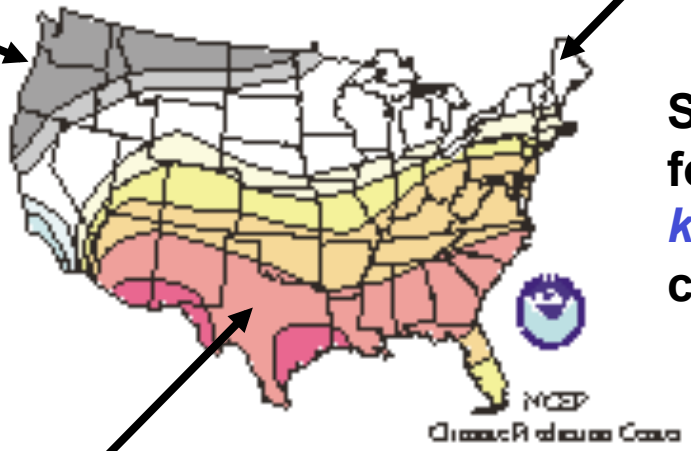


Three-category (tercile) forecasts
Probability of
•above-normal
•near-normal
•below-normal
Temperature and Precipitation

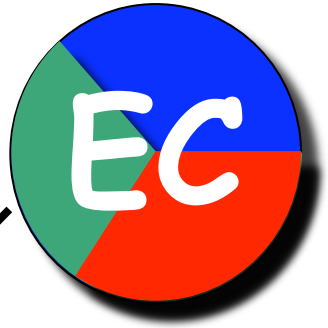
What do the Climate Outlooks Mean?

"Near-Normal"

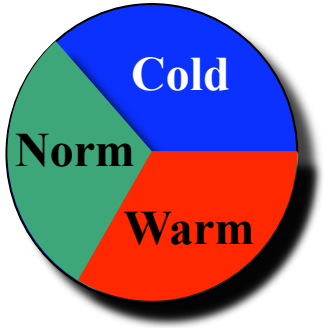




Unknown

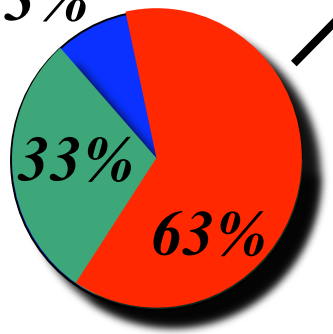


Legend



Sometimes forecasters *don't know* what the chances are…

3%



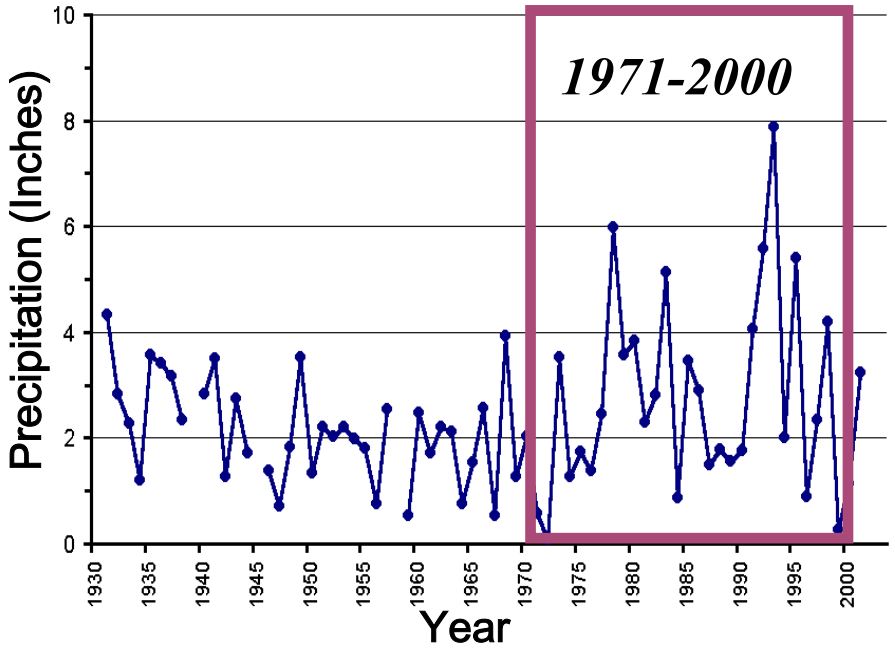
"+30% Chance of Warm"

EC - ~~EQUAL CHANCES~~
THE PROBABILITY OF THE MOST LIKELY CATEGORY CANNOT BE DETERMINED

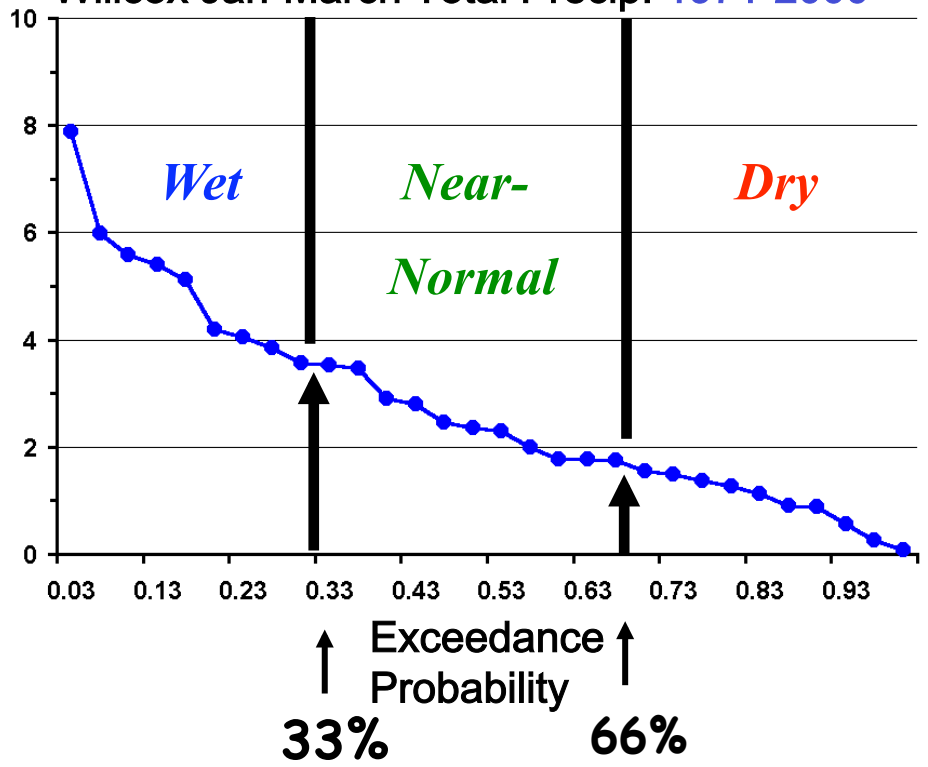
= Unknown Chances!!!

Wet, Dry, Normal – Compared to What?

Willcox Jan-March Total Precipitation 1930-2001



Willcox Jan-March Total Precip. 1971-2000

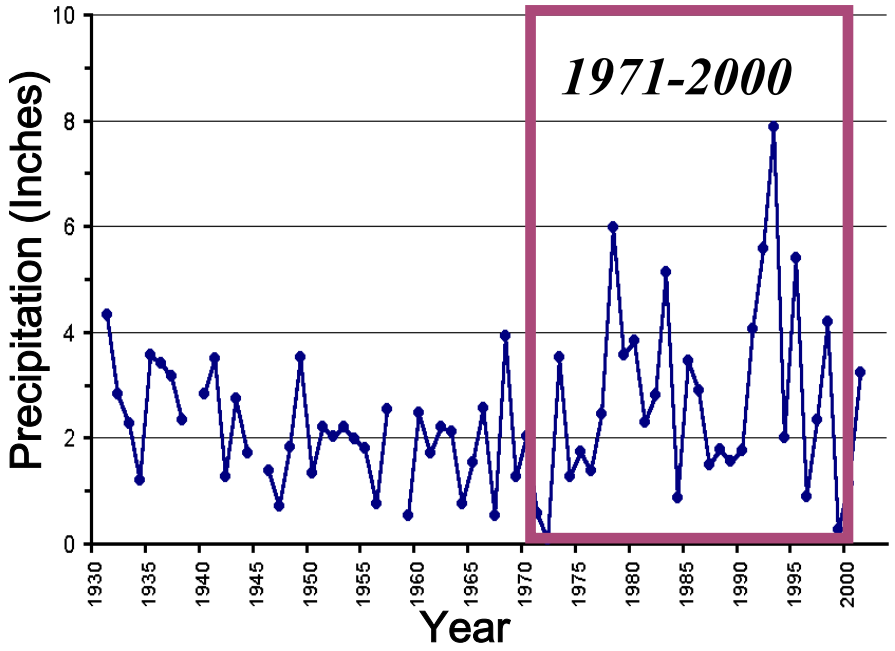


Normal chances are based only on 30 years of data.

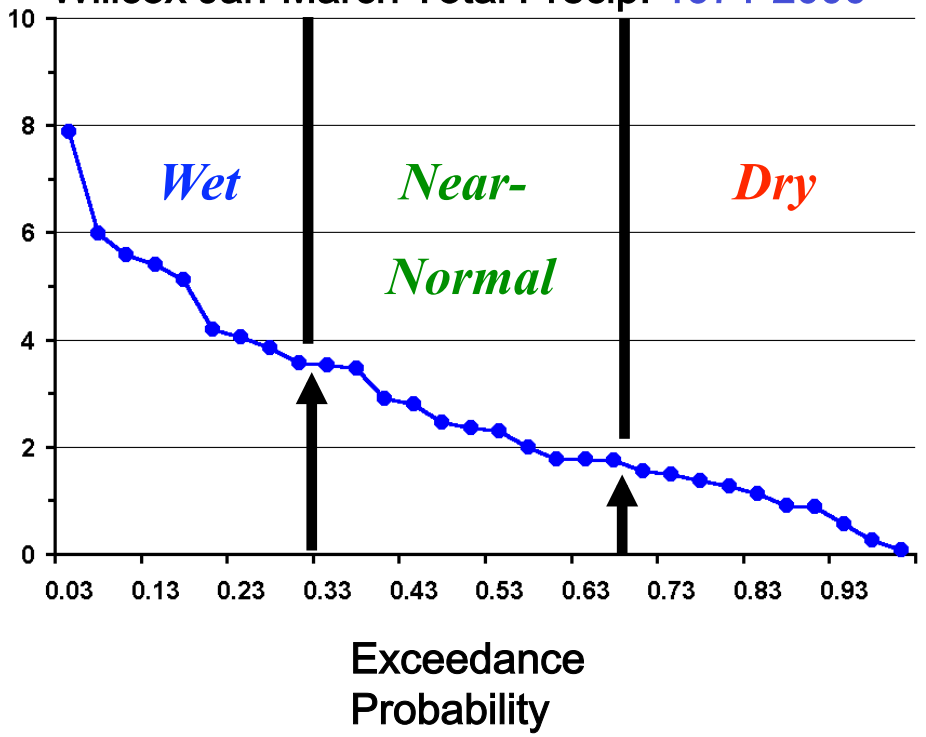
The data are ranked and divided into three categories of equal probability, with roughly 10 years in each category.

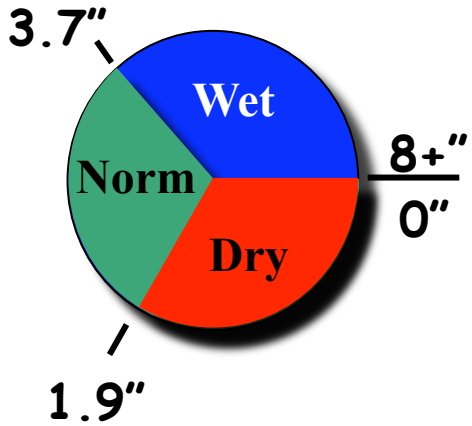
Wet, Dry, Normal – Compared to What?

Willcox Jan-March Total Precipitation 1930-2001



Willcox Jan-March Total Precip. 1971-2000

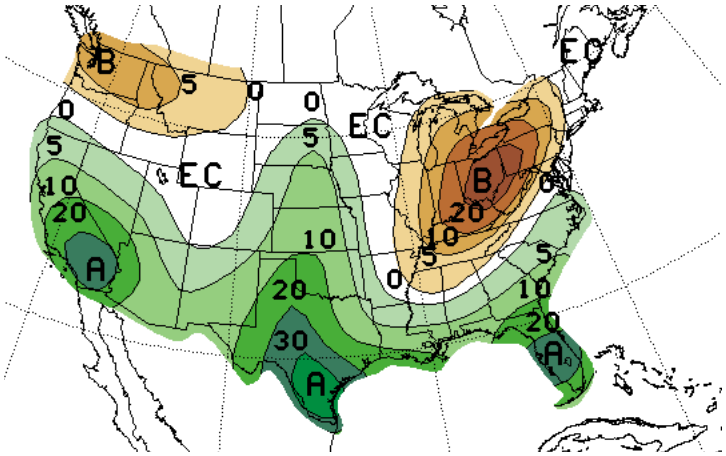


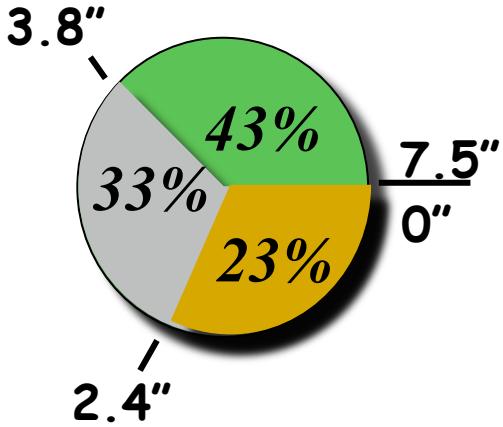


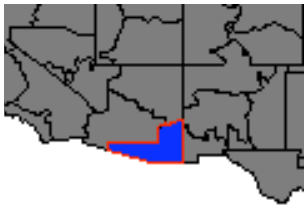
10 years had more than 3.7 inches
10 years had less than 1.9 inches
10 years were in the middle

Precipitation Outlooks

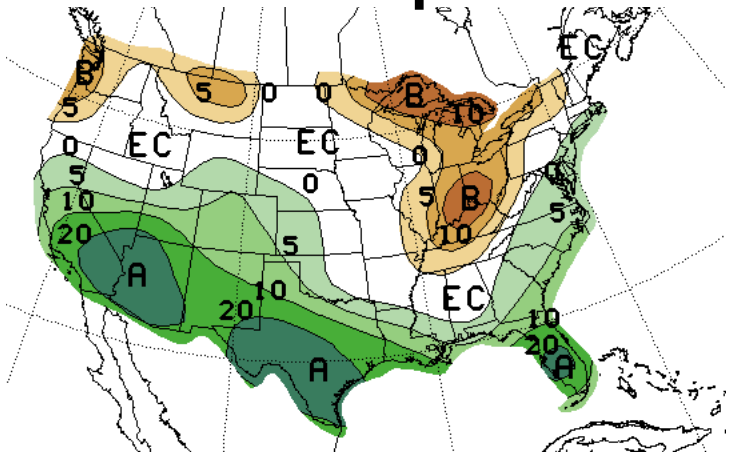
Jan-Feb-Mar 2003

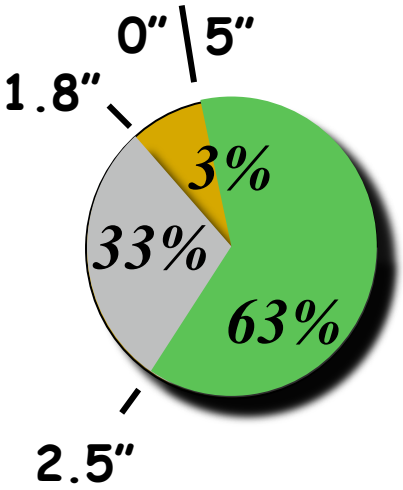


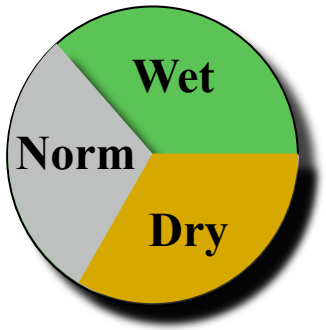




Feb-Mar-Apr 2003



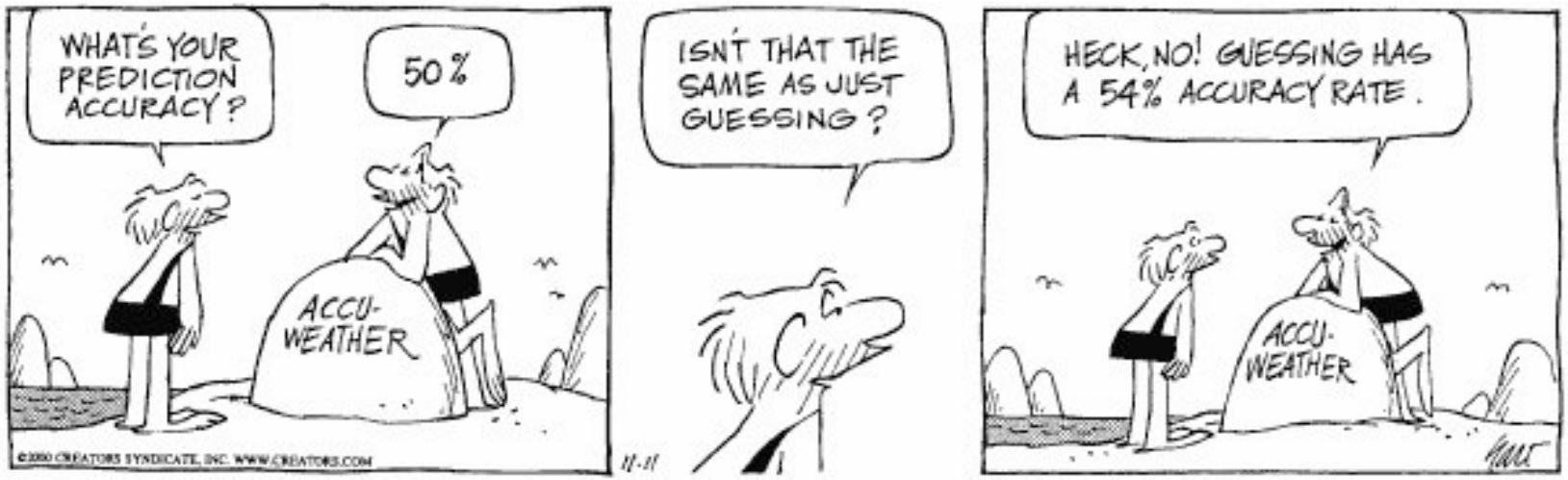




Issued Dec 19, 2002

How Good are Seasonal Climate Forecasts?

Common Perception



How Good? Compared to What?

$$\text{Skill Score} = \frac{\text{Forecast - Baseline}}{\text{Perfect - Baseline}}$$

Skill: (0.50 – 0.54)/(1.00-0.54) = -8.6%

~worse than guessing~

Types of Forecast Evaluation Measures

Categorical Scores

- ***Probability of Detection, False Alarm Rate***

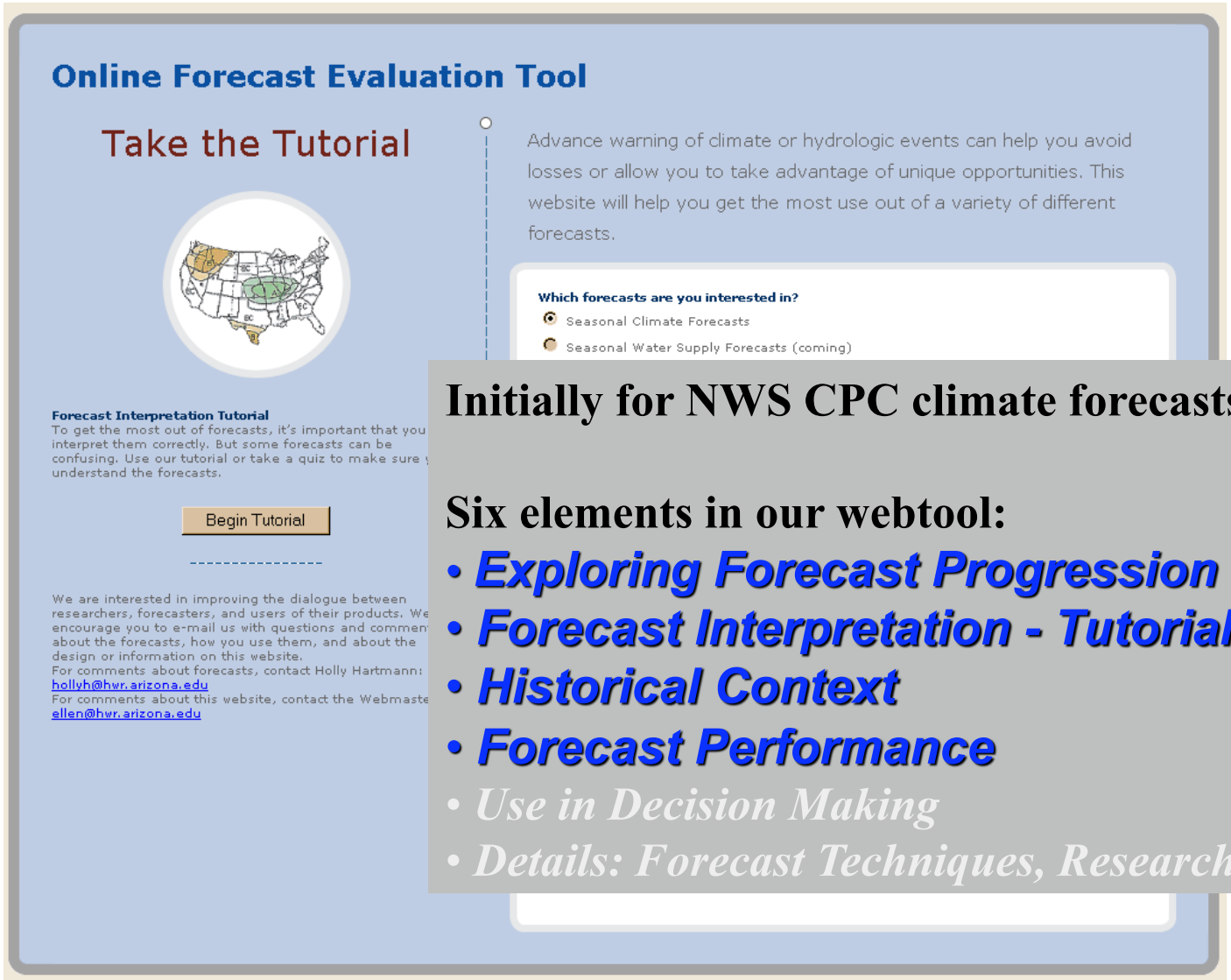
Probabilistic Scores

- ***Brier Score: for "2-category" forecasts***
- ***Ranked Probability Score: for "multi-category" forecasts***

Distributions-oriented Measures

- **more complex, but more informative**

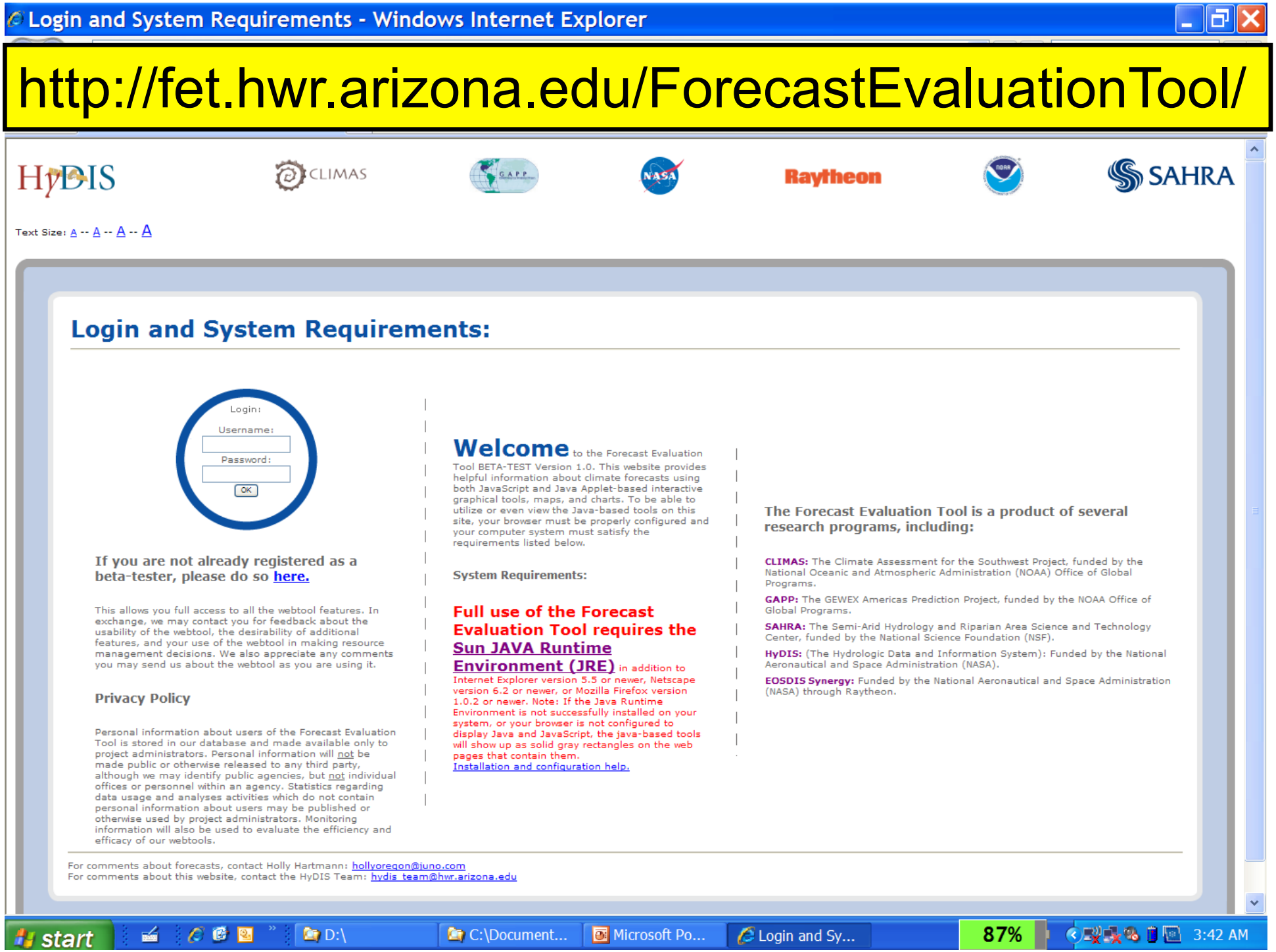
http://fet.hwr.arizona.edu/ForecastEvaluationTool/



Initially for NWS CPC climate forecasts

Six elements in our webtool:

- ***Exploring Forecast Progression***
- ***Forecast Interpretation - Tutorials***
- ***Historical Context***
- ***Forecast Performance***
- *Use in Decision Making*
- *Details: Forecast Techniques, Research*


Login and System Requirements - Windows Internet Explorer
http://fet.hwr.arizona.edu/ForecastEvaluationTool/
HyDIS
CLIMAS
GAPP
NASA
Raytheon
SAHRA
Text Size: A -- A -- A -- A
Login and System Requirements:
Login:
Username:
Password:
OK
If you are not already registered as a beta-tester, please do so here.
This allows you full access to all the webtool features. In exchange, we may contact you for feedback about the usability of the webtool, the desirability of additional features, and your use of the webtool in making resource management decisions. We also appreciate any comments you may send us about the webtool as you are using it.
Privacy Policy
Personal information about users of the Forecast Evaluation Tool is stored in our database and made available only to project administrators. Personal information will not be made public or otherwise released to any third party, although we may identify public agencies, but not individual offices or personnel within an agency. Statistics regarding data usage and analyses activities which do not contain personal information about users may be published or otherwise used by project administrators. Monitoring information will also be used to evaluate the efficiency and efficacy of our webtools.
Welcome to the Forecast Evaluation Tool BETA-TEST Version 1.0. This website provides helpful information about climate forecasts using both JavaScript and Java Applet-based interactive graphical tools, maps, and charts. To be able to utilize or even view the Java-based tools on this site, your browser must be properly configured and your computer system must satisfy the requirements listed below.
System Requirements:
Full use of the Forecast Evaluation Tool requires the Sun JAVA Runtime Environment (JRE) in addition to Internet Explorer version 5.5 or newer, Netscape version 6.2 or newer, or Mozilla Firefox version 1.0.2 or newer. Note: If the Java Runtime Environment is not successfully installed on your system, or your browser is not configured to display Java and JavaScript, the java-based tools will show up as solid gray rectangles on the web pages that contain them.
Installation and configuration help.
The Forecast Evaluation Tool is a product of several research programs, including:
CLIMAS: The Climate Assessment for the Southwest Project, funded by the National Oceanic and Atmospheric Administration (NOAA) Office of Global Programs.
GAPP: The GEWEX Americas Prediction Project, funded by the NOAA Office of Global Programs.
SAHRA: The Semi-Arid Hydrology and Riparian Area Science and Technology Center, funded by the National Science Foundation (NSF).
HyDIS: (The Hydrologic Data and Information System): Funded by the National Aeronautical and Space Administration (NASA).
EOSDIS Synergy: Funded by the National Aeronautical and Space Administration (NASA) through Raytheon.
For comments about forecasts, contact Holly Hartmann: hollyoregon@juno.com
For comments about this website, contact the HyDIS Team: hydis_team@hwr.arizona.edu
start
D:\
C:\Document...
Microsoft Po...
Login and Sy...
87%
3:42 AM

Climate Forecast Evaluation Tool Home Page - Windows Internet Explorer

http://fet.hwr.arizona.edu/ForecastEvaluationTool/homepage

File Edit View Favorites Tools Help

Climate Forecast Evaluation Tool H...

HyDIS CLIMAS GAPP NASA Raytheon SAHRA

HOME | Text Size: A -- A -- A -- A

Online Forecast Evaluation Tool

Take the Tutorial

Forecast Interpretation Tutorial
To get the most out of forecasts, it's important that you interpret them correctly. But some forecasts can be confusing. Use our tutorial or take a quiz to make sure you understand the forecasts.

Begin Tutorial

We are interested in improving the dialogue between researchers, forecasters, and users of their products. We encourage you to e-mail us with questions and comments about the forecasts, how you use them, and about the design or information on this website.
For comments about forecasts, contact Holly Hartmann: hollyoregon@juno.com
For comments about this website, contact the HyDIS Team: hydis_team@hwr.arizona.edu

Advance warning of climate or hydrologic events can help you avoid losses or allow you to take advantage of unique opportunities. This website will help you get the most use out of a variety of different forecasts.

Which forecasts are you interested in?

- (•) Seasonal Climate Forecasts
- ( ) Seasonal Water Supply Forecasts (coming)
- ( ) Seasonal Snow Forecasts (coming)

What aspect of the forecasts are you interested in?

- (•) **Explore the Forecasts**
  Take a look at some of the forecasts. You select the seasons and lead times that are important to you.
- ( ) **How do the forecasts relate to my specific situation?**
  See how a forecast for your location compares to recent conditions and historic data. Use examples from the past to see what the future might bring.
- ( ) **Forecast Performance**
  Forecasts are far from perfect. Researchers have a lot more to learn about how our atmosphere and watersheds work. Although past performance does not guarantee future results, it is important to know how well forecasts have worked for your particular situation.
- ( ) **Using Forecasts in Making Decisions (coming)**
  How can you make use of probabilistic forecasts? This section shows examples of how different decision makers have used different forecasts.
- ( ) **Forecast Details (coming)**
  Find out how forecasts are made and what researchers are doing to improve the forecasts.

Get Forecast Info

start D:\ C:\Document... Microsoft Po... Climate Forec... 86% 3:43 AM

Historical Context for Forecasts

1. Make selction(s) from menu(s) below.
2. Click on an area on the map.
3. If you would like to see a probability plot for a specific time period, select the period on the graph.

1 Which Climate Variable are you interested in?

Precipitation ○ 1 Month ◉ **3 Month (Seasonal)**

Temperature ○ 1 Month ○ **3 Month (Seasonal)**

How many months of the recent past do you want to see?

12 24

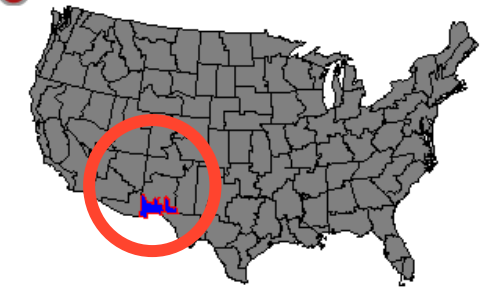
How many months into the future do you want to see?

12 24

2 Choose (Click) target area on the map.

Historical Context for Forecasts

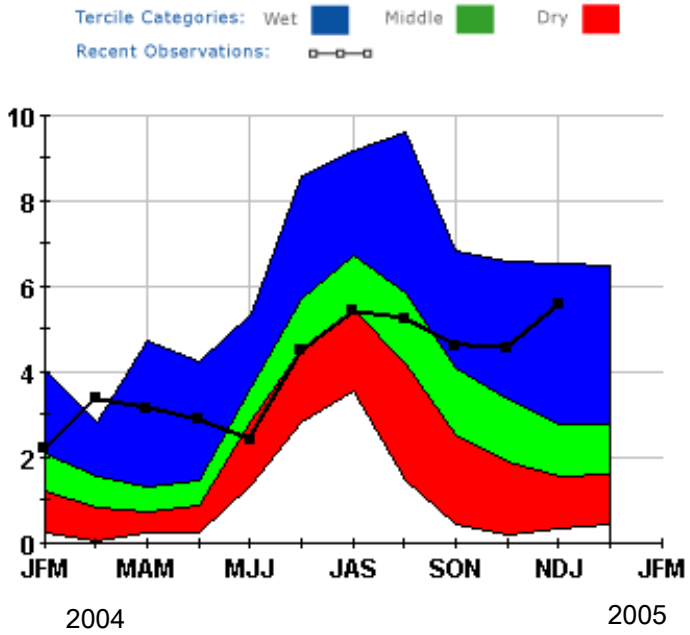
2 Choose (Click) target area on the map.



Historic Conditions

Precipitation / Southern New Mexico (102)

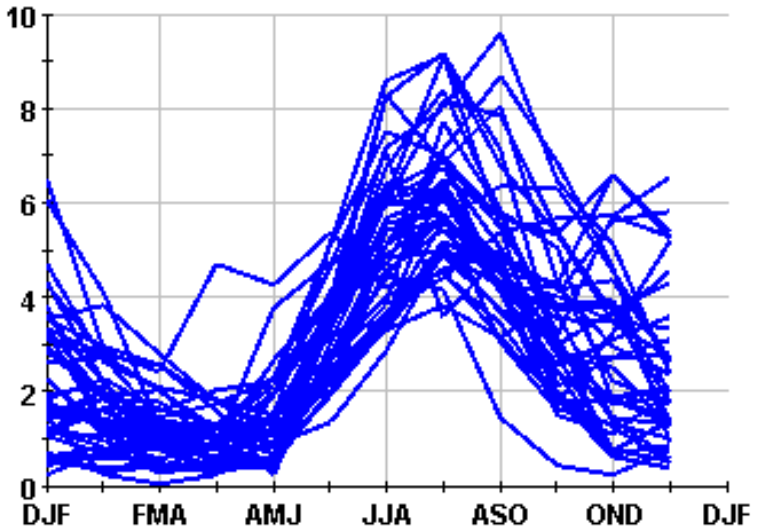
This plot shows 3 month (seasonal) **Precipitation** for the last **12 Months** compared to the historic tercile categories from 1971-2000.



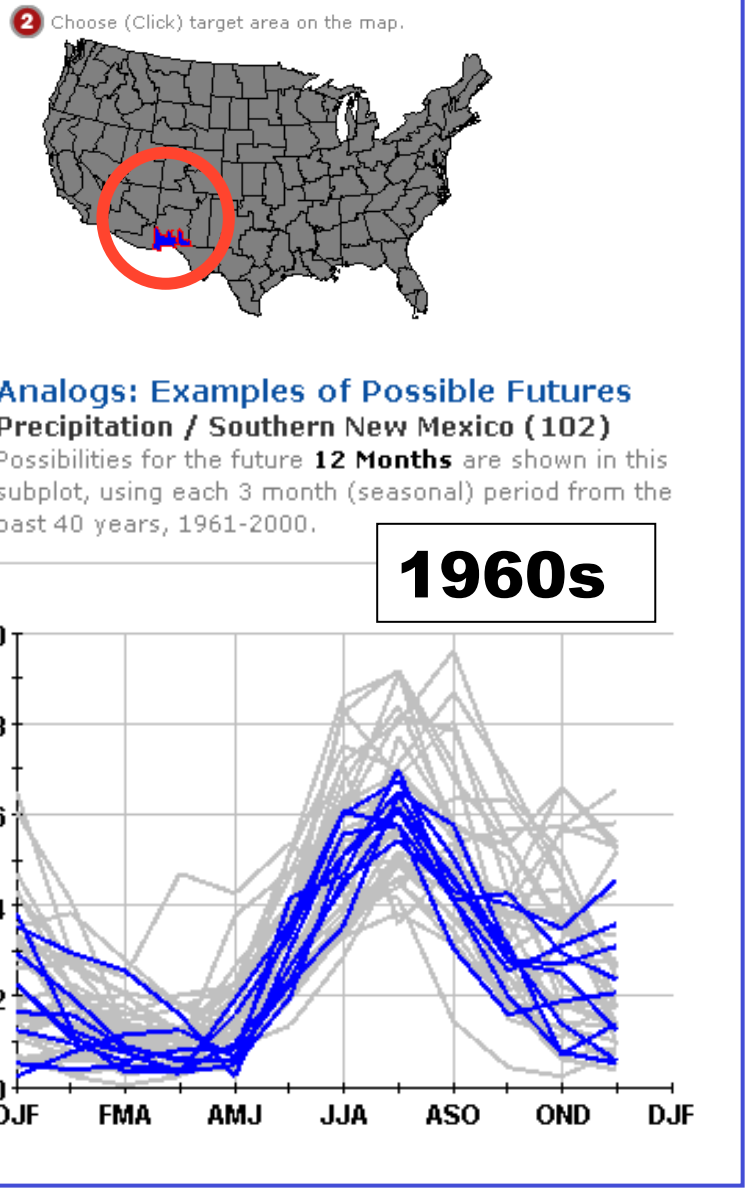
Analogs: Examples of Possible Futures

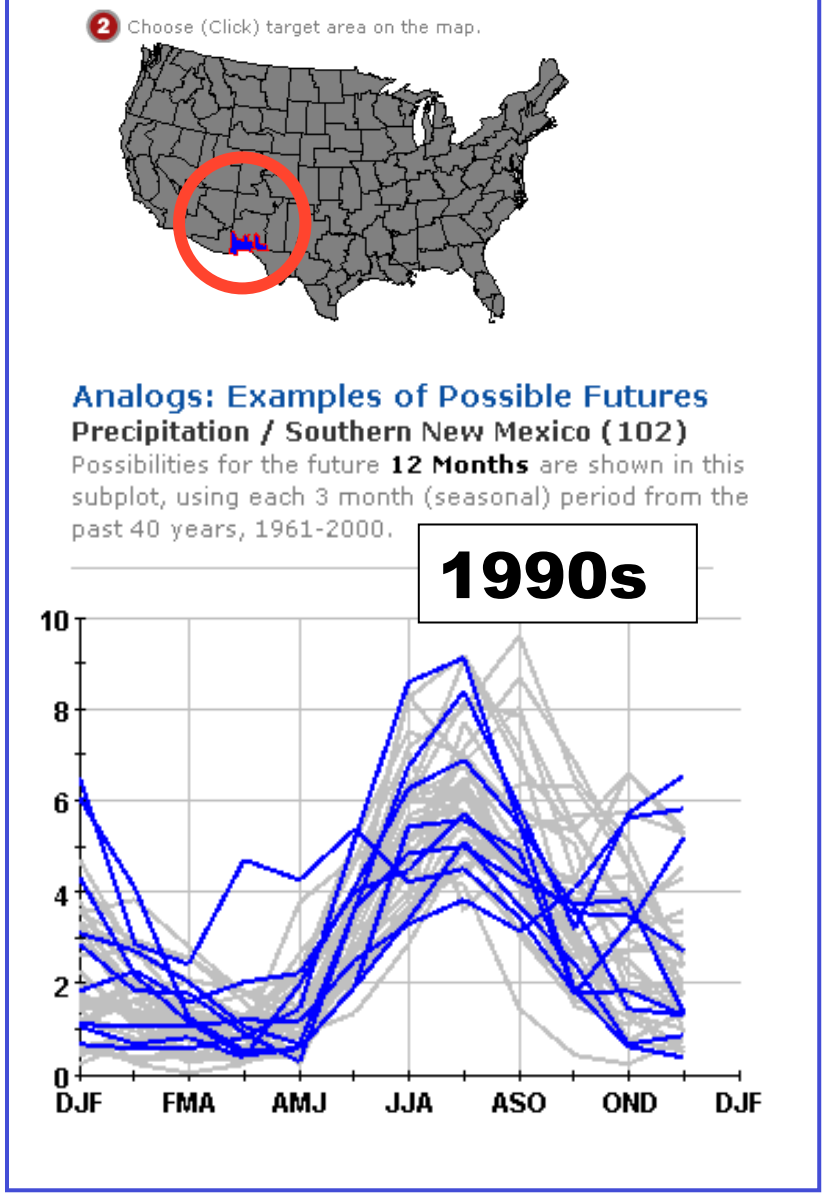
Precipitation / Southern New Mexico (102)

Possibilities for the future **12 Months** are shown in this subplot, using each 3 month (seasonal) period from the past 40 years, 1961-2000.

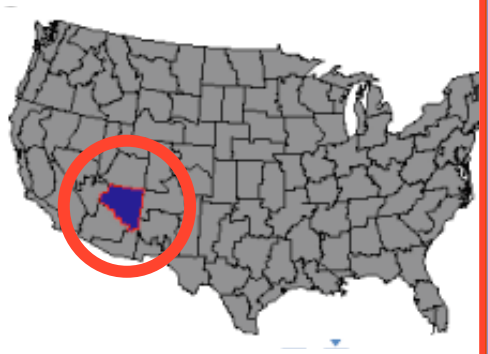


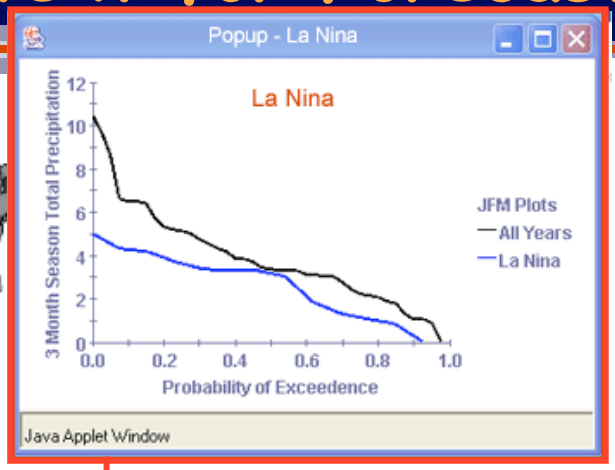
Historical Context for Forecasts: Analogs

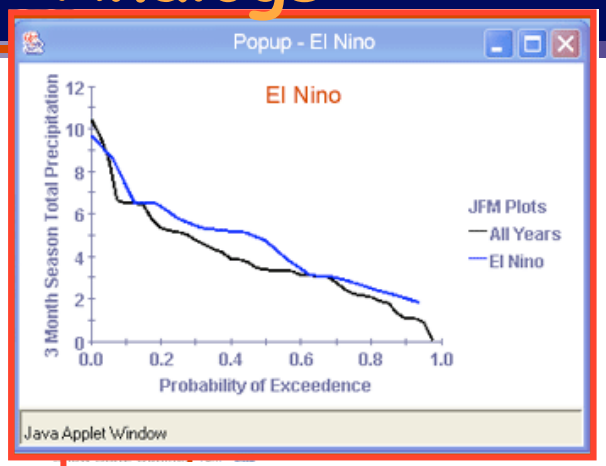




Historical Context for Forecasts: Analogs



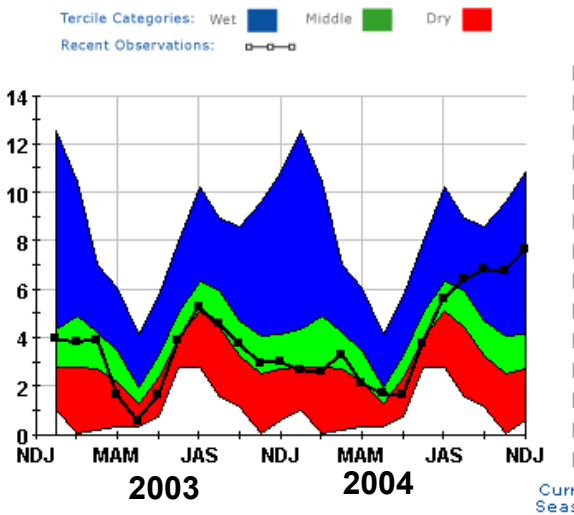




Historic Conditions

Precipitation / NorthEast Arizona (97)

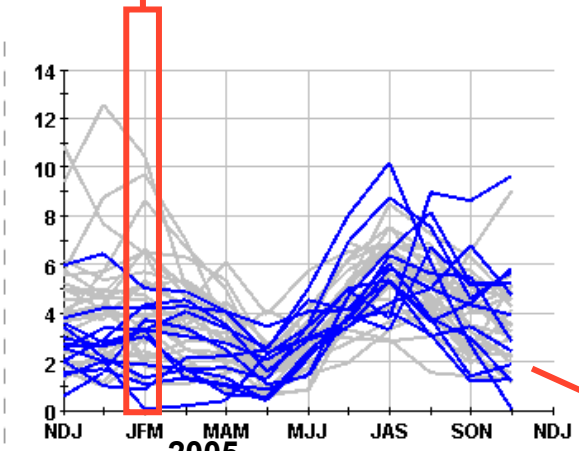
This plot shows 3 month (seasonal) **Precipitation** for the last **24 Months** compared to the historic tercile categories from 1971-2000.



Analogs: Examples of Possible Futures

Precipitation / NorthEast Arizona (97)

Possibilities for the future **12 Months** are shown in this subplot, using each 3 month (seasonal) period from the past 40 years, 1961-2000.



Current Season: NDJ 2004-05

4 Probability of Exceedance Graph

To view graph:
Use the slider below to select the season from the chart above. Select a season by moving shaded area and clicking on it.

N D J F M A M J J A S O N

3 Analog Selector

Select/deselect a year by clicking on it.

Select All Clear All

1961	1971	1981	1991
1962	1972	1982	1992
1963	1973	1983	1993
1964	1974	1984	1994
1965	1975	1985	1995
1966	1976	1986	1996
1967	1977	1987	1997
1968	1978	1988	1998
1969	1979	1989	1999
1970	1980	1990	2000

Patterns

El Nino Only
La Nina Only
Neither El Nino nor La Nina
High Pacific Decadal Oscillations
Mid Pacific Decadal Oscillations
Low Pacific Decadal Oscillations

FET: Historical Analysis and Analogs - Windows Internet Explorer

http://fet.hwr.arizona.edu/ForecastEvaluationTool/pastAsPrologueServlet

File Edit View Favorites Tools Help

FET: Historical Analysis and Analogs

1 Which Climate Variable are you interested in?

Precipitation 1 Month **3 Month (Seasonal)**

Temperature 1 Month **3 Month (Seasonal)**

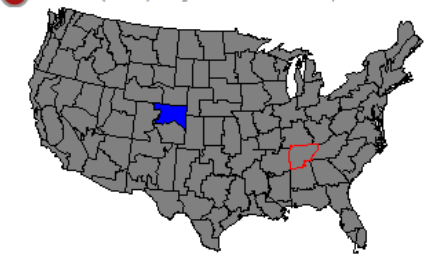
How many months of the recent past do you want to see?

12 24

How many months into the future do you want to see?

12 24

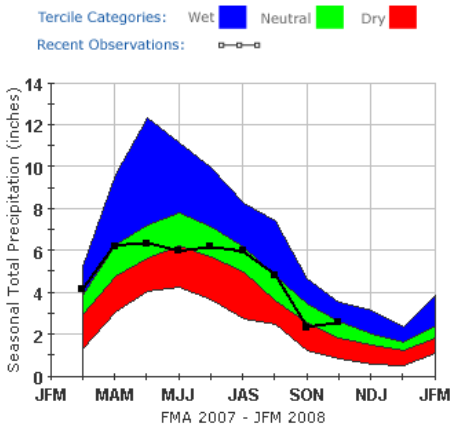
2 Choose (Click) target area on the map.



Historic Conditions

Precipitation / NorthEast Colorado (46)

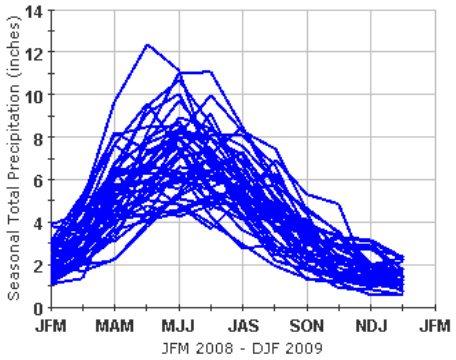
This plot shows 3 month (seasonal) **Precipitation** for the last **12 Months** compared to the historic tercile categories from 1971-2000.



Analogs: Examples of Possible Futures

Precipitation / NorthEast Colorado (46)

Possibilities for the future **12 Months** are shown in this subplot, using each 3 month (seasonal) period from the past 40 years, 1961-2000.



Current Season: JFM 2008

3 Analog Selector

Select/deselect a year by clicking on it.

Select All Clear All

1961	1971	1981	1991
1962	1972	1982	1992
1963	1973	1983	1993
1964	1974	1984	1994
1965	1975	1985	1995
1966	1976	1986	1996
1967	1977	1987	1997
1968	1978	1988	1998
1969	1979	1989	1999
1970	1980	1990	2000

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To view graph:
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J F M A M J J A S O N D J F

For comments about forecasts, contact Holly Hartmann: hollyoregon@juno.com
For comments or suggestions about this website, contact the HyDIS Team: hydis_team@hwr.arizona.edu

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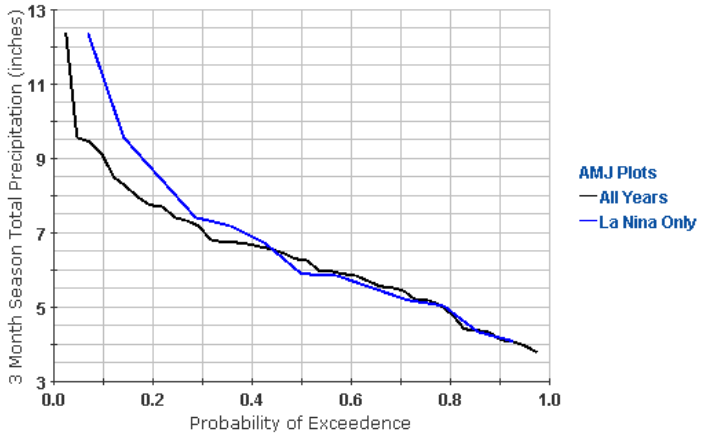
Probability of Exceedence Chart

NorthEast Colorado (46)



Java Applet Window

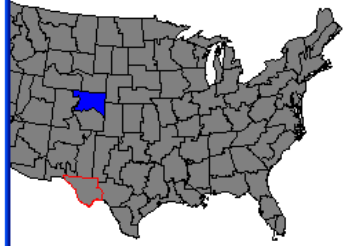
Internet Explorer

logueServlet

Google

Page Tools

(Click) target area on the map.



Examples of Possible Futures

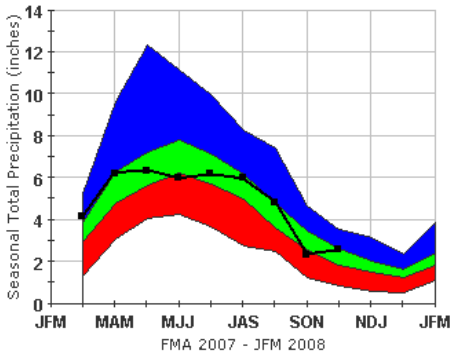
ion / NorthEast Colorado (46)

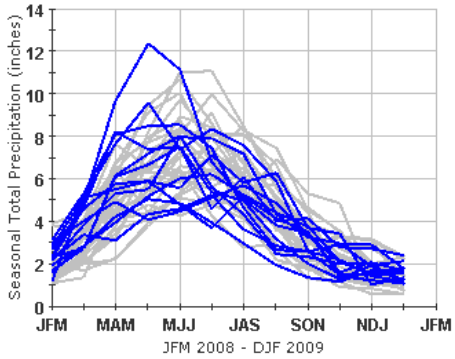
for the future **12 Months** are shown in this subplot, using each 3 month (seasonal) period from the past 40 years, 1961-2000.

last **12 Months** compared to the historic tercile categories from 1971-2000.

Tercile Categories: Wet Neutral Dry

Recent Observations:





Current Season: JFM 2008

4 Probability of Exceedance Graph

To view graph:
Use the slider below to select the season from the chart above. Select a season by moving shaded area and clicking on it.

J F M A M J J A S O N D J F

3 Analog Selector

Select/deselect a year by clicking on it.

Select All		Clear All	
1961	1971	1981	1991
1962	1972	1982	1992
1963	1973	1983	1993
1964	1974	1984	1994
1965	1975	1985	1995
1966	1976	1986	1996
1967	1977	1987	1997
1968	1978	1988	1998
1969	1979	1989	1999
1970	1980	1990	2000

Patterns

El Nino Only

La Nina Only

Neither El Nino nor La Nina

High Pacific Decadal Oscillations

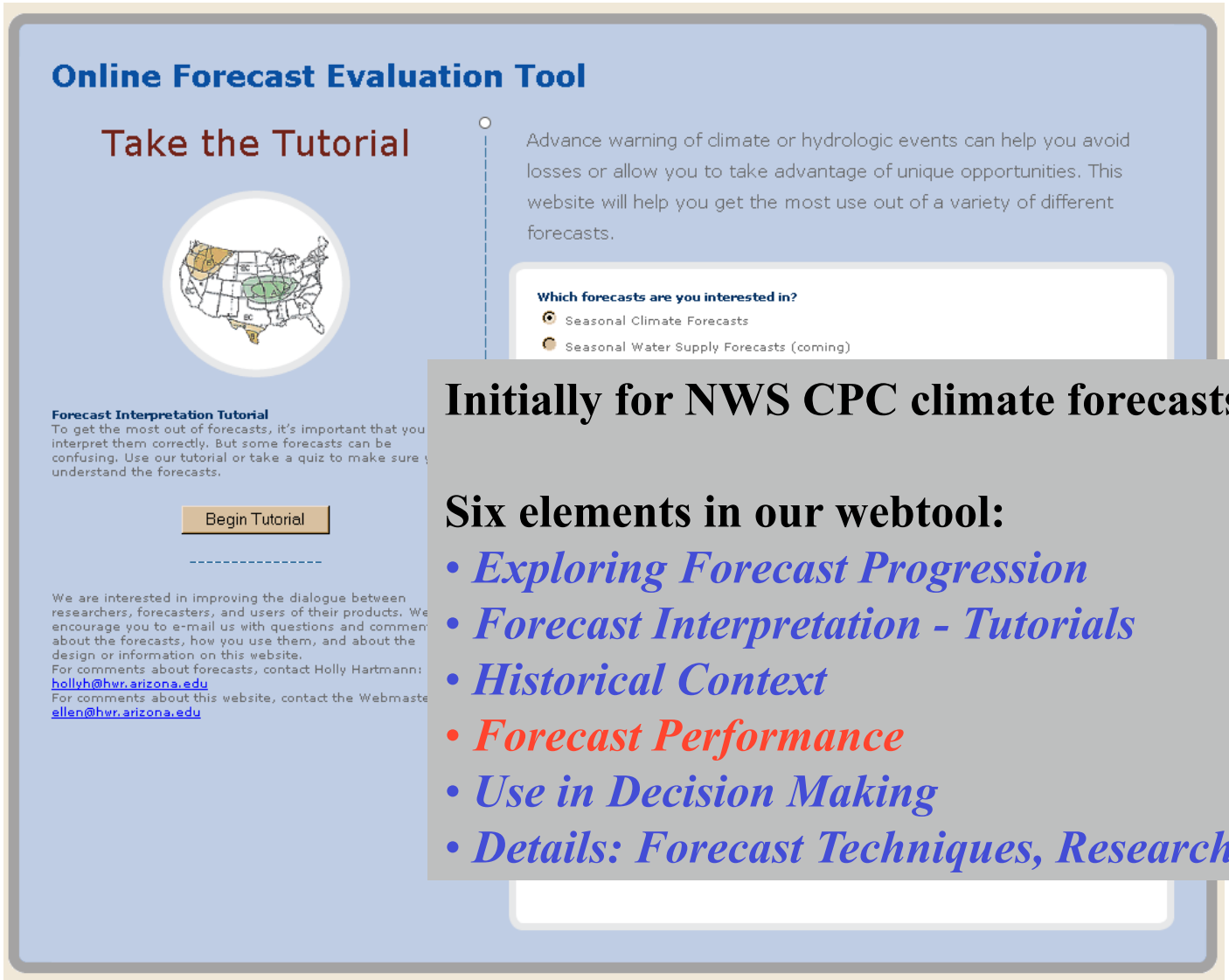
Mid Pacific Decadal Oscillations

Low Pacific Decadal Oscillations

For comments about forecasts, contact Holly Hartmann: hollyoregon@juno.com
For comments or suggestions about this website, contact the HyDIS Team: hydis_team@hwr.arizona.edu

start 4 Mic... 2 Wi... 4 Int... Micros... 2008-0... 74% 2:45 PM

http://fet.hwr.arizona.edu/ForecastEvaluationTool/



Initially for NWS CPC climate forecasts

Six elements in our webtool:

- ***Exploring Forecast Progression***
- ***Forecast Interpretation - Tutorials***
- ***Historical Context***
- ***Forecast Performance***
- ***Use in Decision Making***
- ***Details: Forecast Techniques, Research***

Forecast Performance Evaluation

2 **A. Which specific forecasts are you interested in?**

- (•) Precipitation
- ( ) Temperature

B. Which forecast Seasons?

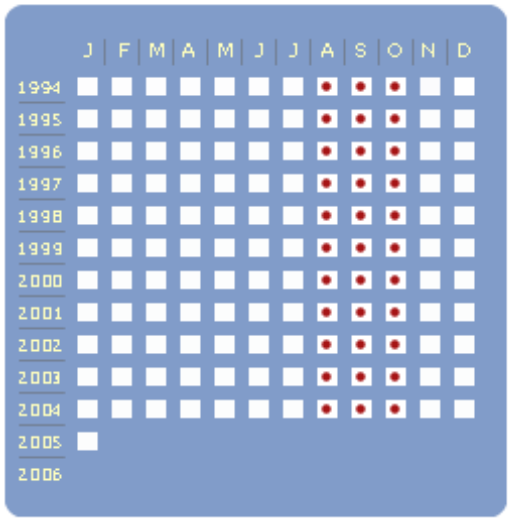
Select season(s) by moving shaded area...and click
Seasons must be selected contiguously

A M J J A S O N D J F M A M Select All / clear

DJF JFM FMA

C. Which forecast times (when issued)?

Select month(s) by clicking on month(s).



3 Which forecast qualities are important to you?
Select at least one:

- [x] **Frequency of Forecasts:**

  How often has a forecast actually been made?
  This criteria shows the frequency that non-CL or non-EC forecasts have been indicated.

- [x] **Probability of Detection:**

  How well has the forecast system been able to warn about upcoming conditions? This criteria tracks how often the forecasts say the right category (e.g.,warm or cold) is most likely, compared to how often that category has actually occurred.

  [x] Above (warm or wet) [x] Below (cold or dry)

- [x] **False Alarm Rate:**

  How well can you trust what the forecast says? This criteria tracks how often the category given the greatest probability has turned out "wrong", compared to the how many times that category has been forecast.

  [x] Above (warm or wet) [x] Below (cold or dry)

- [x] **Brier Score:**

  This criteria considers the strength of the probability given to a specific category (e.g., warm or cold). Forecasts made with high probability are penalized heavily if they are wrong, but forecasts with low probability aren't expected to be correct as often.

  [x] Above (warm or wet) [x] Below (cold or dry)

- [x] **Ranked Probability Score:**

  This criteria is similar to the Brier Score, but it looks at all categories at once. Forecasts are given worse scores for assigning higher probability to categories far away from what actually occurs.

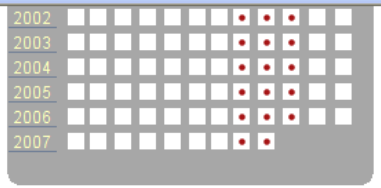
Submit

FET: Forecast Performance - Windows Internet Explorer

http://fet.hwr.arizona.edu/ForecastEvaluationTool/newFetServerServlet

File Edit View Favorites Tools Help

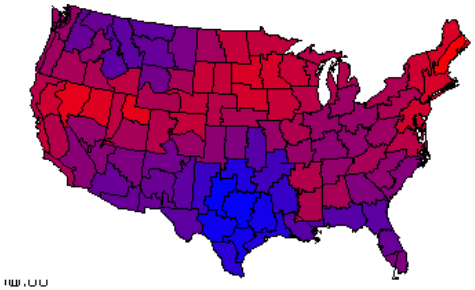
FET: Forecast Performance



go to the map that you are
interested in and click on the region you
are interested in. Then Click Submit.

Frequency of Forecasts Results:

How often has a forecast actually been made?
This criteria shows the frequency that non-CL or non-EC forecasts have been indicated.
The legend shows the Frequency of Forecasts as a percentage.



Show Data Behind the Map

Precipitation
Made in: ASO
For: NDJ, JFM

Probability of Detection Results

This pair of maps
shows the Probability of Detection for wet (left) and dry (right) conditions. The Probability of Detection tracks how often the forecasts say the right category (e.g., wet or dry) is most likely, compared to how often that category has actually occurred. It indicates how well the forecast system has been able to warn about upcoming conditions. The legend shows the Probability of Detection

start 4 Micros... 2 Windo... FET: Forec... Microsoft P... 85% 2:27 PM

FET: Forecast Performance - Windows Internet Explorer

http://fet.hwr.arizona.edu/ForecastEvaluationTool/newFetServerServlet

File Edit View Favorites Tools Help

FET: Forecast Performance

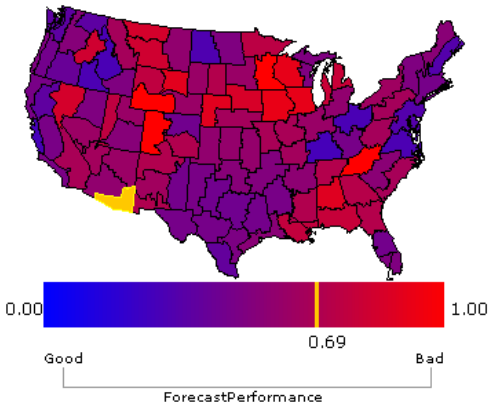
ForecastPerformance ForecastPerformance

Show Data Behind the Map

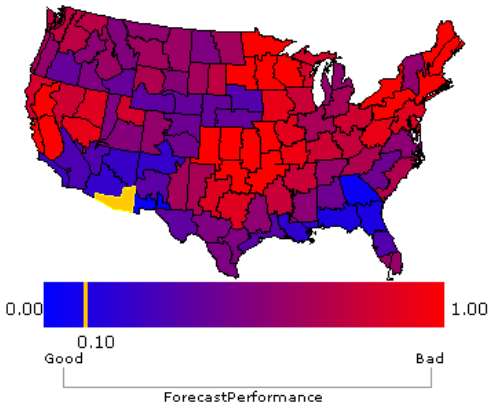
5 False Alarm Rate Results

This pair of maps
shows the False Alarm Rate for wet (left) and dry (right) conditions. The False Alarm Rate tracks how often the category given the greatest probability has turned out "wrong", compared to how many times that category has been forecast. It indicates how well you can trust what the forecast say. The legend shows the False Alarm Rate as a percentage.

WET



DRY



Show Data Behind the Map

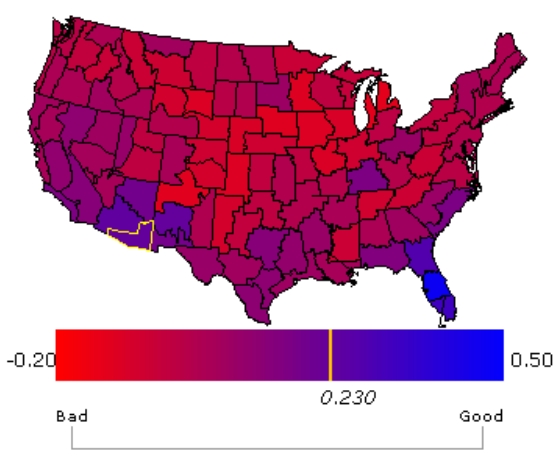
Precipitation
Made in: ASO
For: NDJ, JFM

For comments about forecasts, contact Holly Hartmann: hollyoregon@juno.com
For comments or suggestions about this website, contact the HyDIS Team: hydis_team@hwr.arizona.edu

start 3 Microso... 2 Window... FET: Foreca... Microsoft Po... 81% 2:34 PM

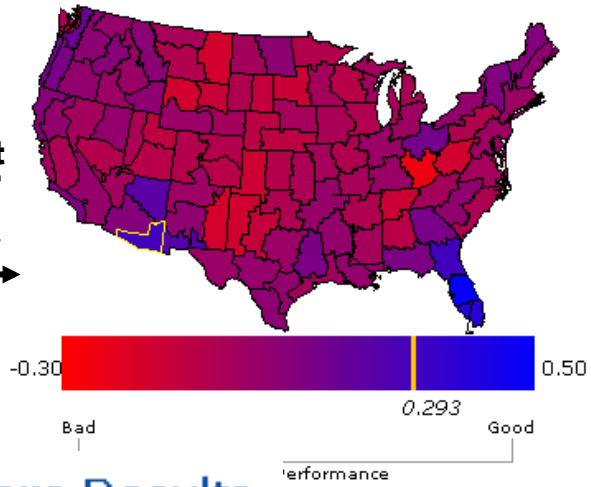
Forecast Performance Evaluation

Brier Skill Score Results

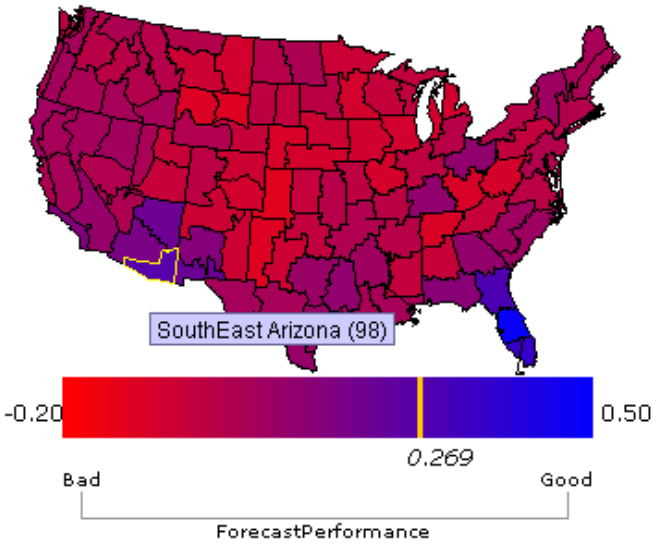


wet

dry

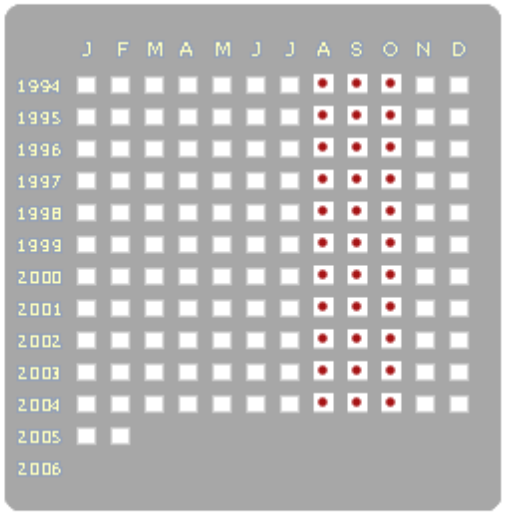


Ranked Probability Skill Score Results



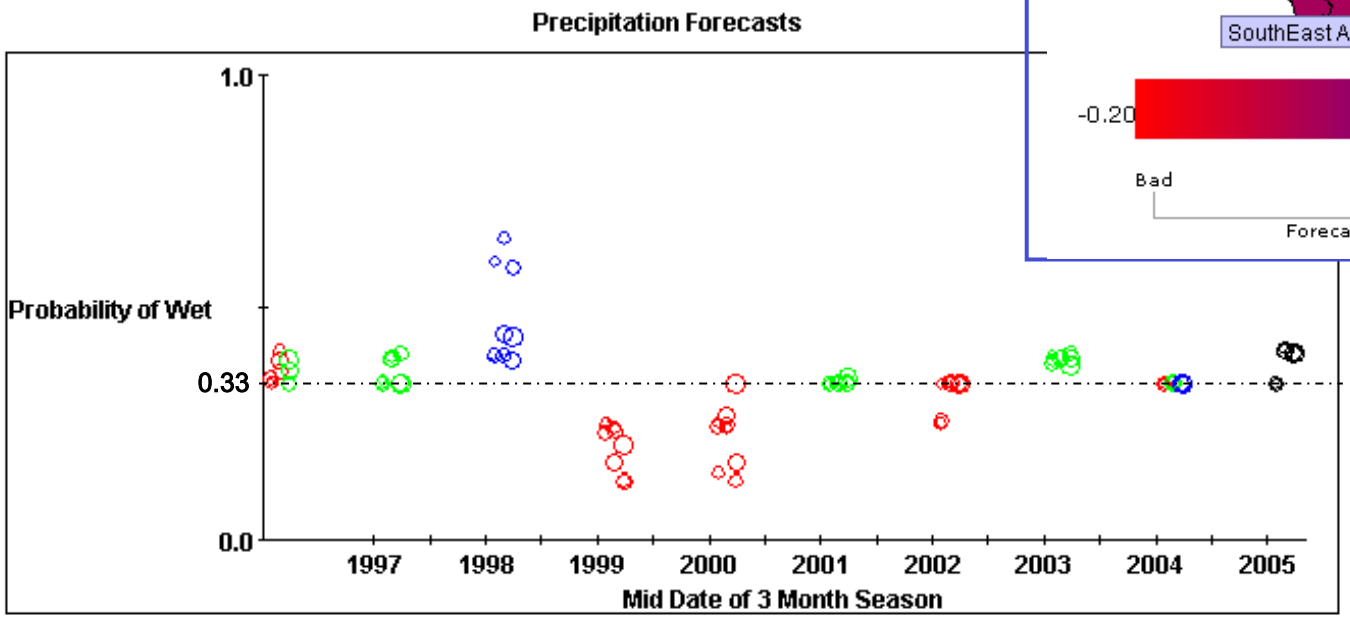
You Chose:

- CPC Forecasts
- Precipitation forecasts
- Covering seasons DJF - FMA
- Issued in:

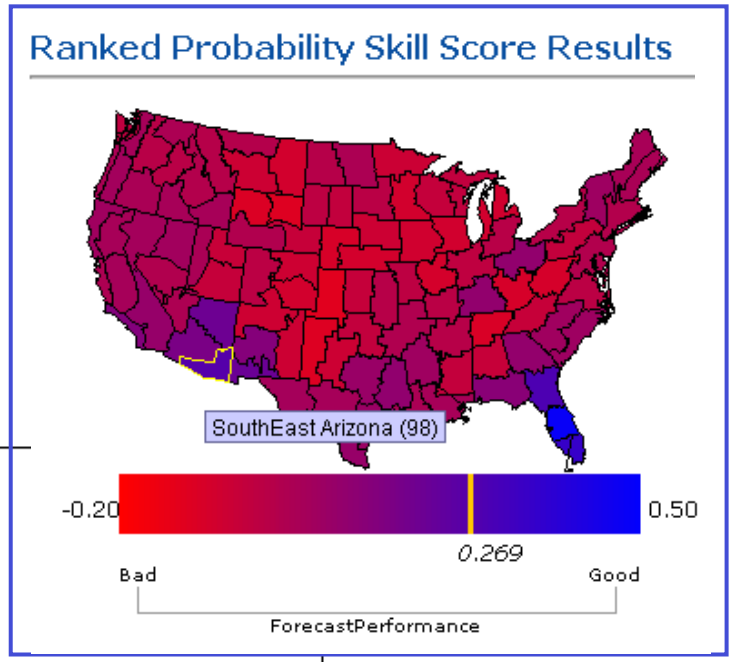


Forecast Performance Evaluation

How to interpret the Forecast Confidence Bubble Plots



- CPC Forecasts
- Precipitation forecasts
- Covering seasons DJF - FMA
- Issued in: ASO

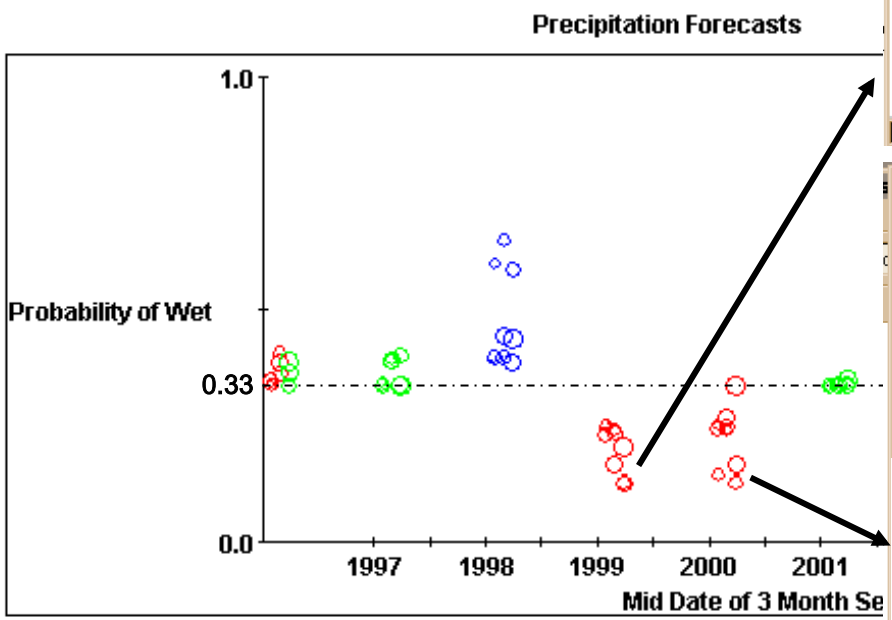


Categories: Above (Wet) Neutral Below (Dry) No Observations Yet

Bubbles: Smallest o = Shortest Lead Time (1/2 months) Largest ◯ = Longest Lead Time (12.5 months)

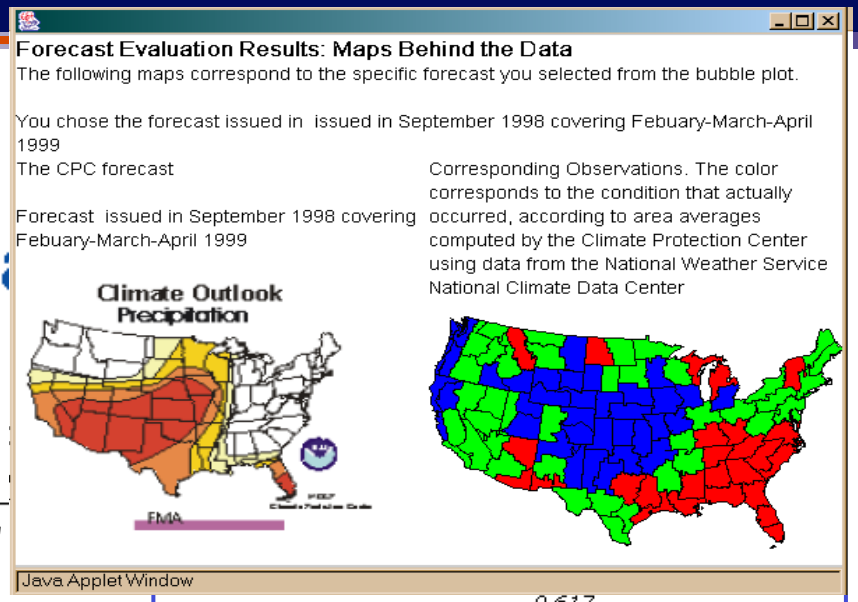
Forecast Performance Evaluation

How to interpret the Foreca Confidence Bubble Plots

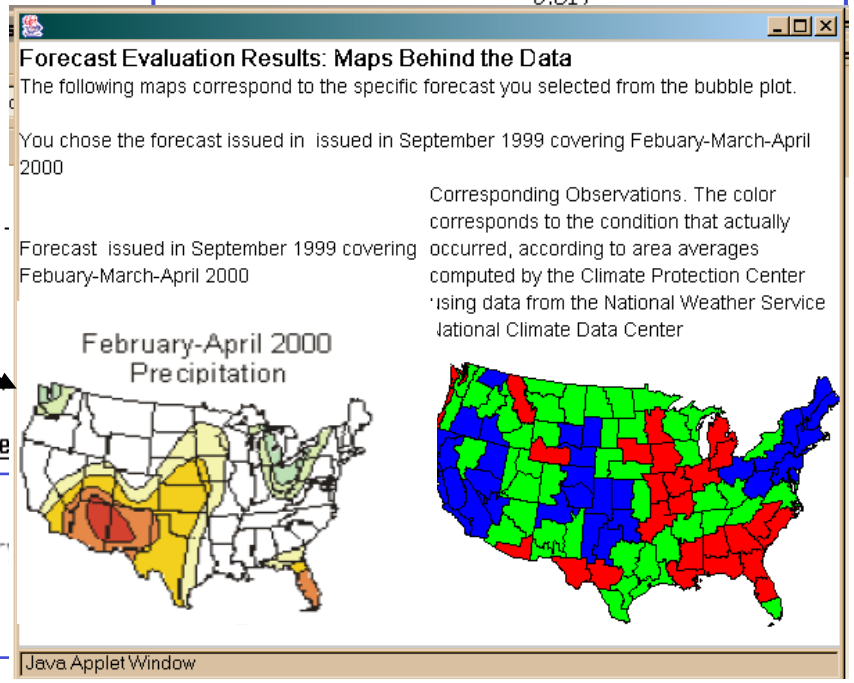


Categories: Above (Wet) Neutral Below (Dr

Bubbles: Smallest o = Shortest Lead Time (1/2 months)



0.617



FET: Forecast Performance - Windows Internet Explorer

http://fet.hwr.arizona.edu/ForecastEvaluationTool/newFetServerServlet

File Edit View Favorites Tools Help

FET: Forecast Performance

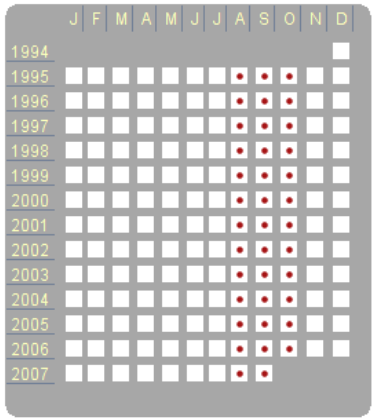
HyDIS CLIMAS GAPP NASA Raytheon NOAA SAHRA

HOME | Text Size: A -- A -- A -- A --

Climate Forecast Performance Evaluation Results

1 You Chose:

- CPC Forecasts
- Precipitation forecasts
- for NWS CPC seasonal climate outlooks (contiguous states)
- Covering seasons NDJ - JFM (including 1-month forecasts)
- Issued in:



Precipitation
Made in: ASO
For: NDJ, JFM

2 Note: For all maps:

To see the numerical score for any region, move the mouse cursor over the region and the score will be shown on the map legend.

To see the data that were used in the evaluations, go to the map that you are interested in and click on the region you are interested in. Then Click Submit.

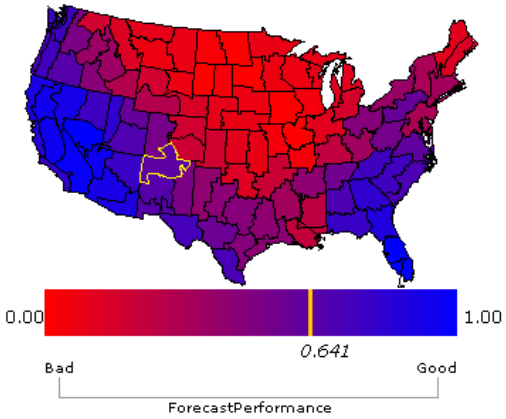
3 Frequency of Forecasts Results:
How often has a forecast actually been made?
This criteria shows the frequency that non-CL or non-EC forecasts have been indicated.
The legend shows the Frequency of Forecasts as a percentage.

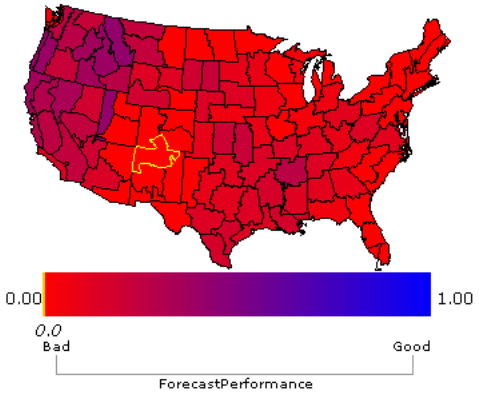
start 4 Micros... 2 Windo... FET: Forec... Microsoft P... 86% 2:26 PM

Forecasts issued JFM, covering JJAS

Temperature: Warm **Precipitation: Dry**

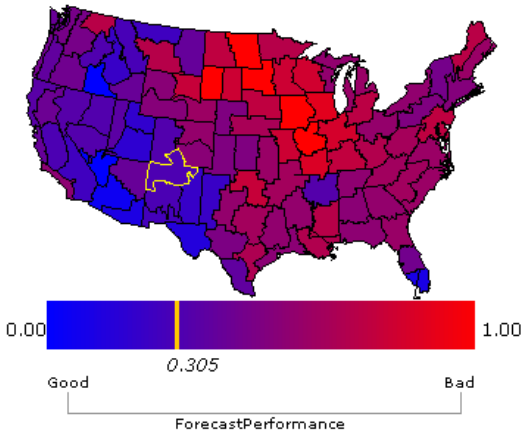
Probability of Detection

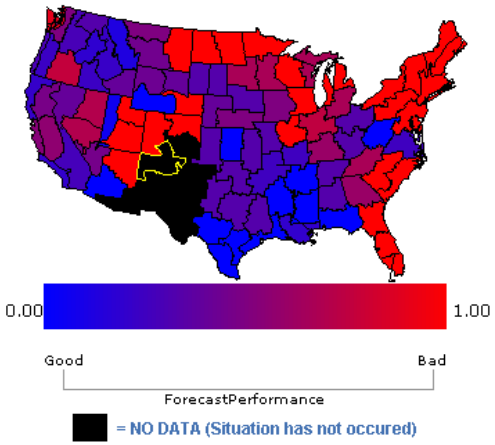




Will forecasts warn me of an impending 'critical' event?

False Alarm Rate

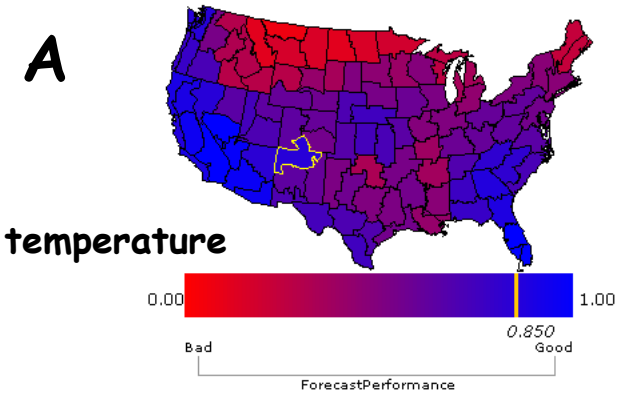


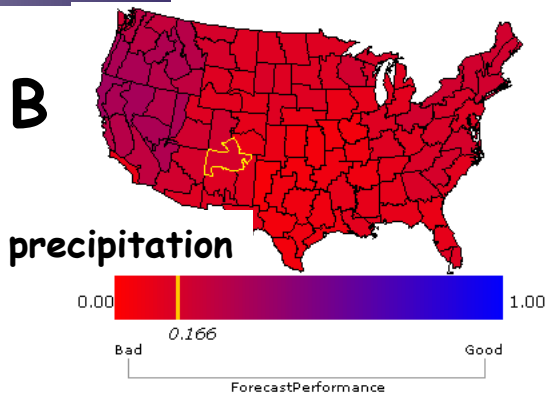


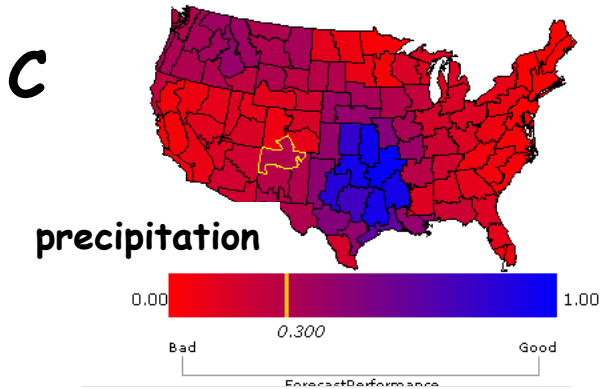
Given a 'critical' forecast, can I trust it?

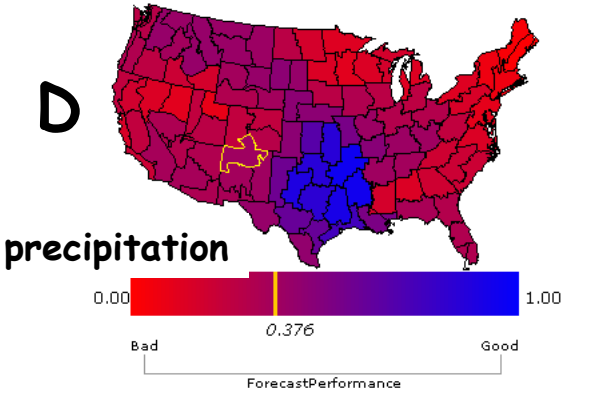
Montana temperature

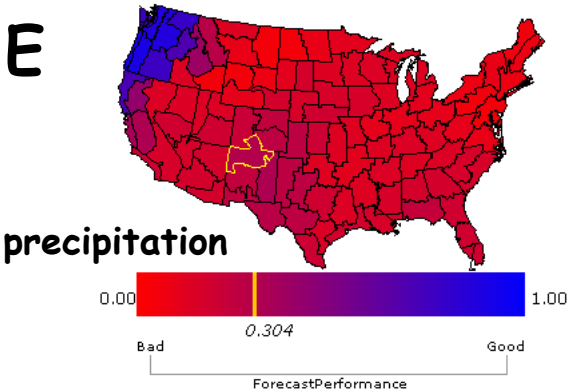
Frequency of Actual Forecasts

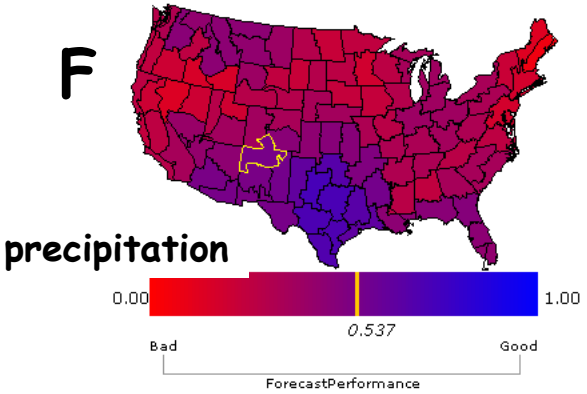












#	Forecast Issued	Forecast Coverage
A	JFM	JJAS
B	JFM	JJAS
C	JFM	ONDJ
D	ASO	ONDJ
E	JFM	AMJJ
F	ASO	DJFMAM

3. If you would like to see a probability plot for a specific time period, select the period on the graph.

1 Which Climate Variable are you interested in?

Precipitation ○ 1 Month ○ **3 Month (Seasonal)**

Temperature ○ 1 Month ◉ **3 Month (Seasonal)**

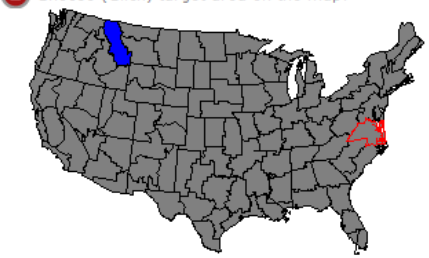
How many months of the recent past do you want to see?

12 24

How many months into the future do you want to see?

12 24

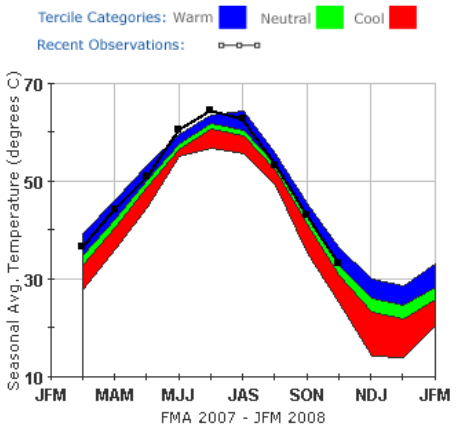
2 Choose (Click) target area on the map.



Historic Conditions

Temperature / Western Montana (21)

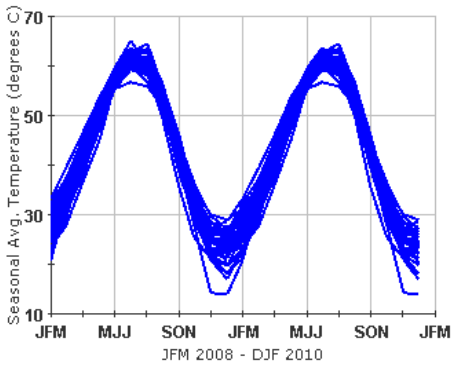
This plot shows 3 month (seasonal) **Temperature** for the last **12 Months** compared to the historic tercile categories from 1971-2000.



Analogs: Examples of Possible Futures

Temperature / Western Montana (21)

Possibilities for the future **24 Months** are shown in this subplot, using each 3 month (seasonal) period from the past 40 years, 1961-2000.



Current Season: JFM 2008

4 Probability of Exceedance Graph

To view graph:
Use the slider below to select the season from the chart above. Select a season by moving shaded area and clicking on it.

J F M A M J J A S O N D J F

3 Analog Selector

Select/deselect a year by clicking on it.

Select All Clear All

1961	1971	1981	1991
1962	1972	1982	1992
1963	1973	1983	1993
1964	1974	1984	1994
1965	1975	1985	1995
1966	1976	1986	1996
1967	1977	1987	1997
1968	1978	1988	1998
1969	1979	1989	1999
1970	1980	1990	2000

Patterns

El Nino Only
La Nina Only
Neither El Nino nor La Nina
High Pacific Decadal Oscillations
Mid Pacific Decadal Oscillations
Low Pacific Decadal Oscillations

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FET: Historical Analysis and Analogs - Windows Internet Explorer

http://fet.hwr.arizona.edu/ForecastEvaluationTool/pastAsPrologueServlet

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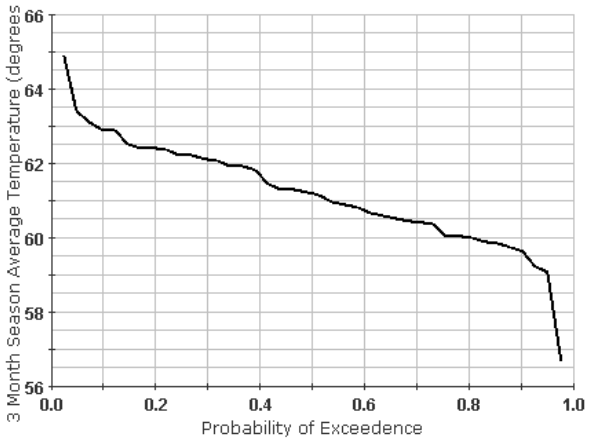
Page Tools

Probability of Exceedence Chart

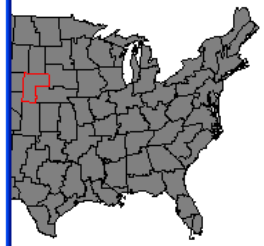
Western Montana (21)



Java Applet Window

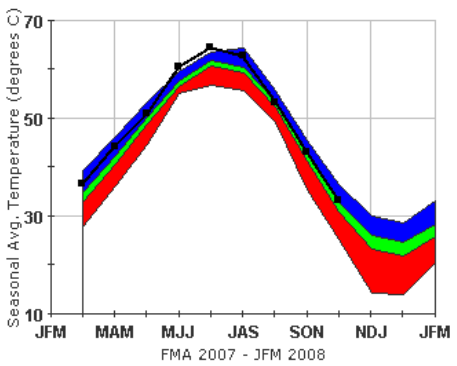
period, select the period on the graph.

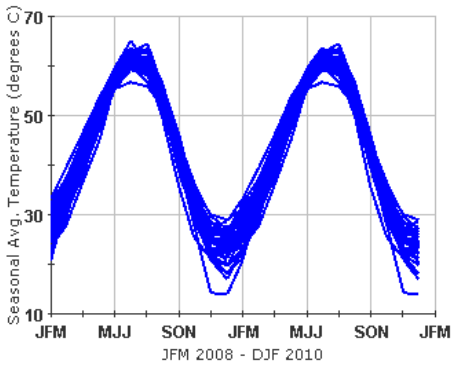
get area on the map.



les of Possible Futures
stern Montana (21)
ture **24 Months** are shown in this
month (seasonal) period from the
000.

Recent Observations:





Current Season: JFM 2008

4 Probability of Exceedance Graph

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Use the slider below to select the season from the chart above. Select a season by moving shaded area and clicking on it.

J F M A M J J A S O N D J F

3 Analog Selector

Select/deselect a year by clicking on it.

Select All Clear All

1961	1971	1981	1991
1962	1972	1982	1992
1963	1973	1983	1993
1964	1974	1984	1994
1965	1975	1985	1995
1966	1976	1986	1996
1967	1977	1987	1997
1968	1978	1988	1998
1969	1979	1989	1999
1970	1980	1990	2000

Patterns

El Nino Only
La Nina Only
Neither El Nino nor La Nina
High Pacific Decadal Oscillations
Mid Pacific Decadal Oscillations
Low Pacific Decadal Oscillations

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For comments or suggestions about this website, contact the HyDIS Team: hydis_team@hwr.arizona.edu

start 2 Windows... Microsoft Po... FET: Historic... Probability of... 80% 3:54 AM

FET: Historical Analysis and Analogs - Windows Internet Explorer

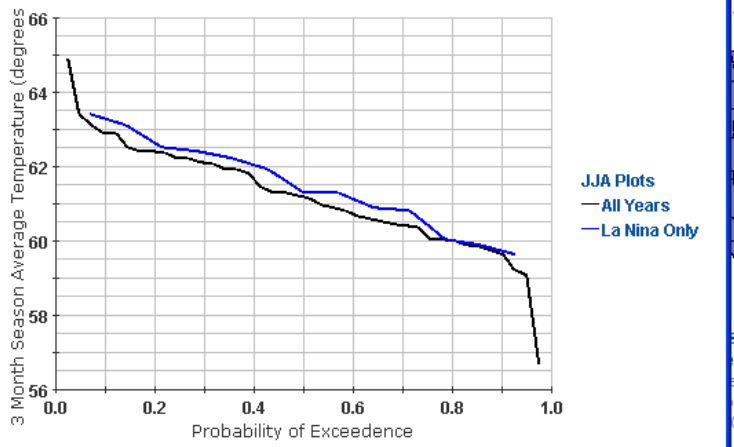
http://fet.hwr.arizona.edu/ForecastEvaluationTool/pastAsPrologueServlet

File Edit View Favorites Tools Help

Page Tools

Probability of Exceedence Chart

Western Montana (21)

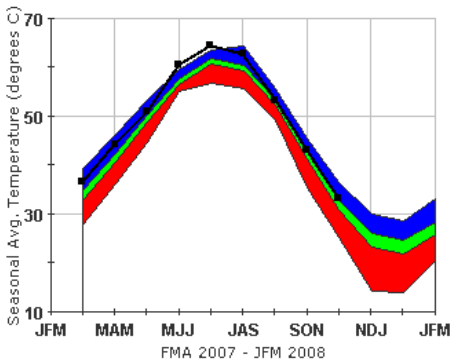


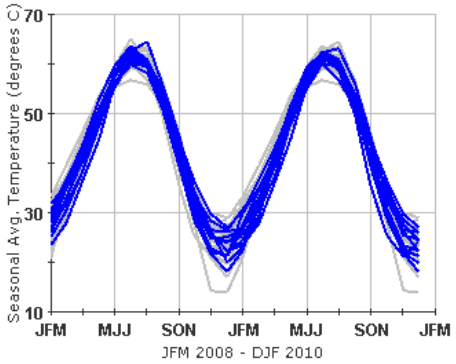
Java Applet Window

...eriod, select the period on the graph.

...t area on the map.

...s of Possible Futures
...rn Montana (21)
...e **24 Months** are shown in this
...nth (seasonal) period from the
...0.





Current Season: JFM 2008

3 Analog Selector

Select/deselect a year by clicking on it.

Select All Clear All

1961	1971	1981	1991
1962	1972	1982	1992
1963	1973	1983	1993
1964	1974	1984	1994
1965	1975	1985	1995
1966	1976	1986	1996
1967	1977	1987	1997
1968	1978	1988	1998
1969	1979	1989	1999
1970	1980	1990	2000

Patterns

El Nino Only
La Nina Only
Neither El Nino nor La Nina
High Pacific Decadal Oscillations
Mid Pacific Decadal Oscillations
Low Pacific Decadal Oscillations

4 Probability of Exceedance Graph

To view graph:
Use the slider below to select the season from the chart above. Select a season by moving shaded area and clicking on it.

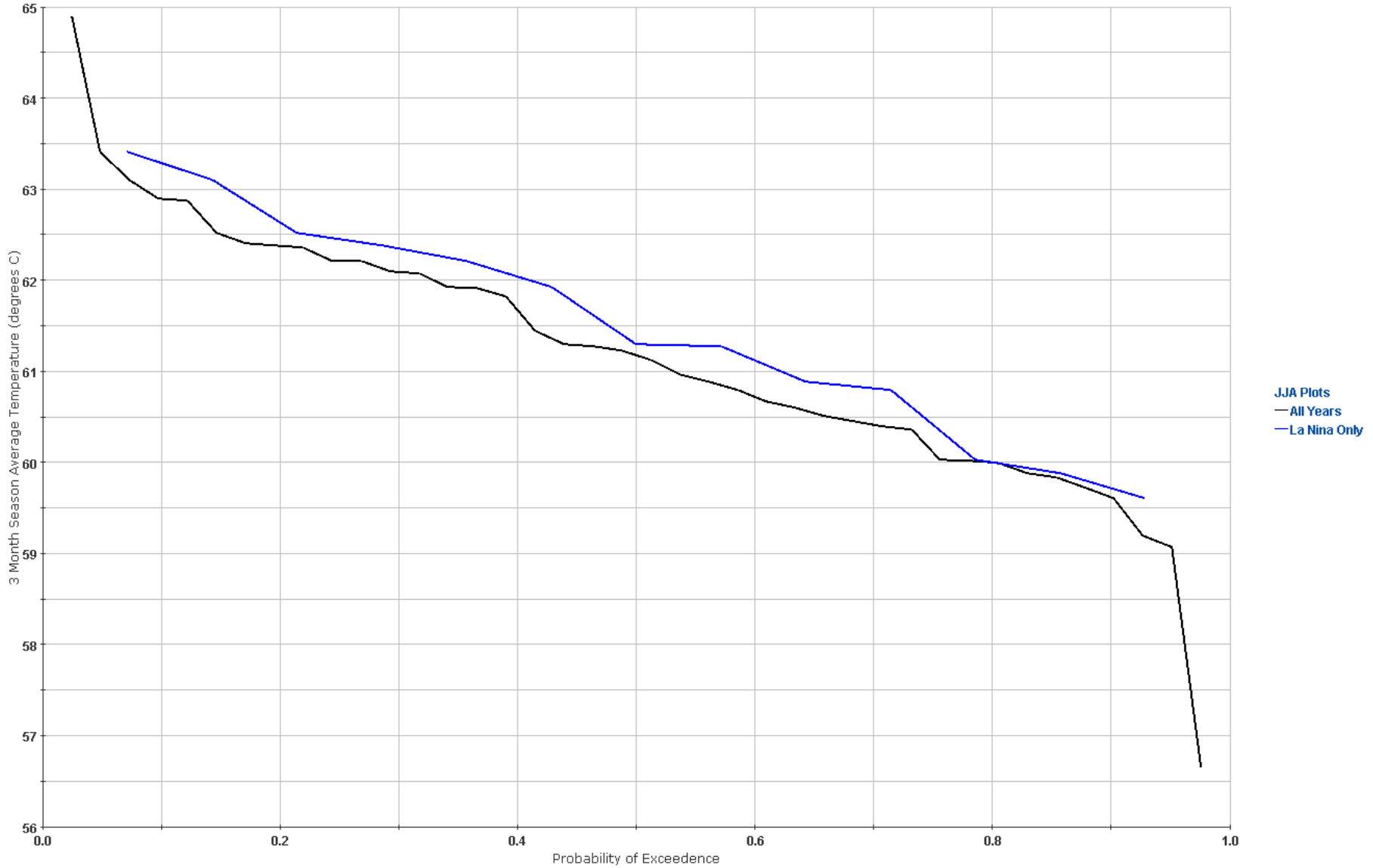
J F M A M J J A S O N D J F

For comments about forecasts, contact Holly Hartmann: hollyoregon@juno.com
For comments or suggestions about this website, contact the HyDIS Team: hydis_team@hwr.arizona.edu

start 2 Windows... Microsoft Po... 3 Internet ... 3:55 AM

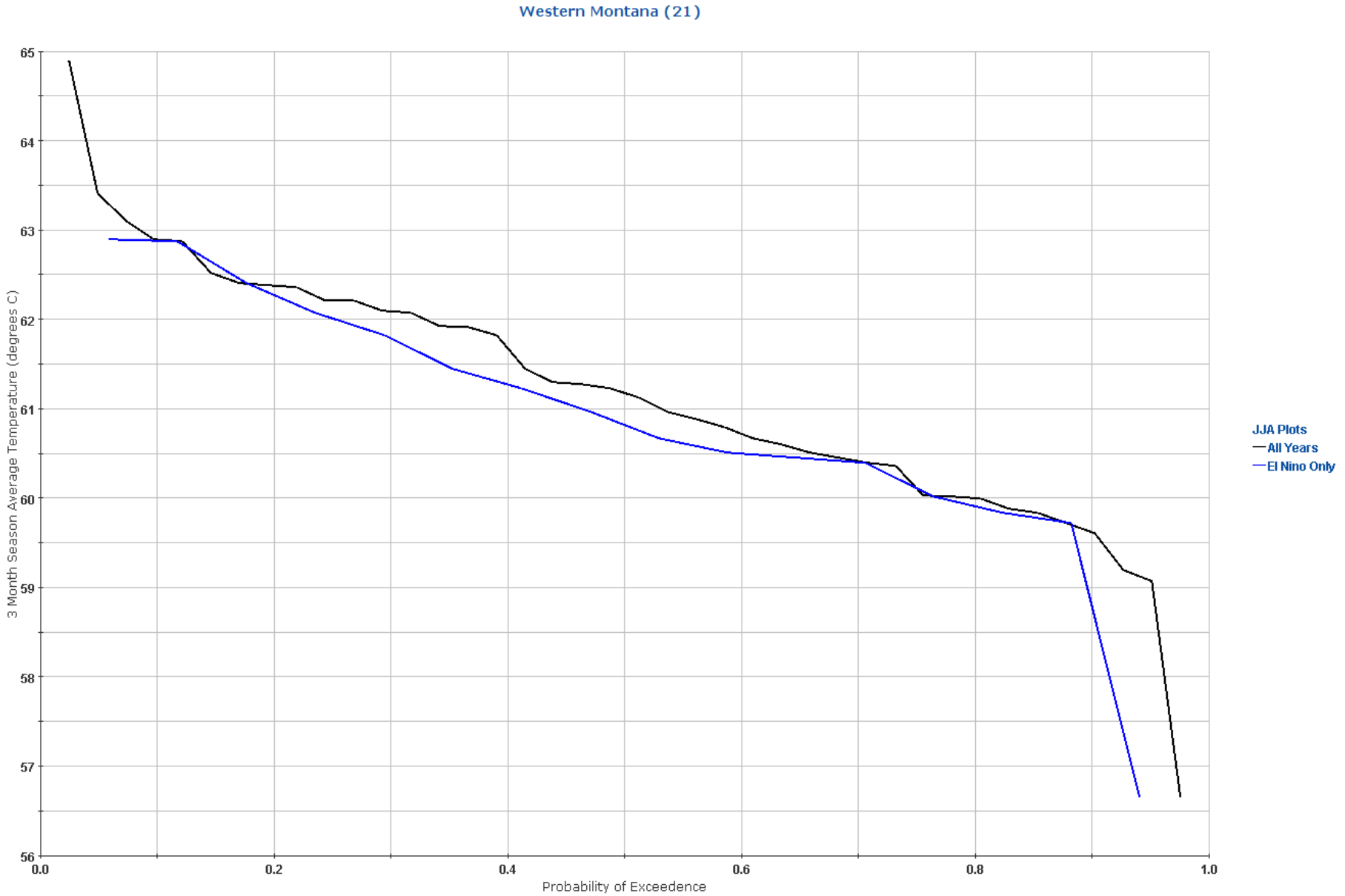
Probability of Exceedence Chart

Western Montana (21)



Java Applet Window

Probability of Exceedence Chart



Java Applet Window

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