How to Analyze Data

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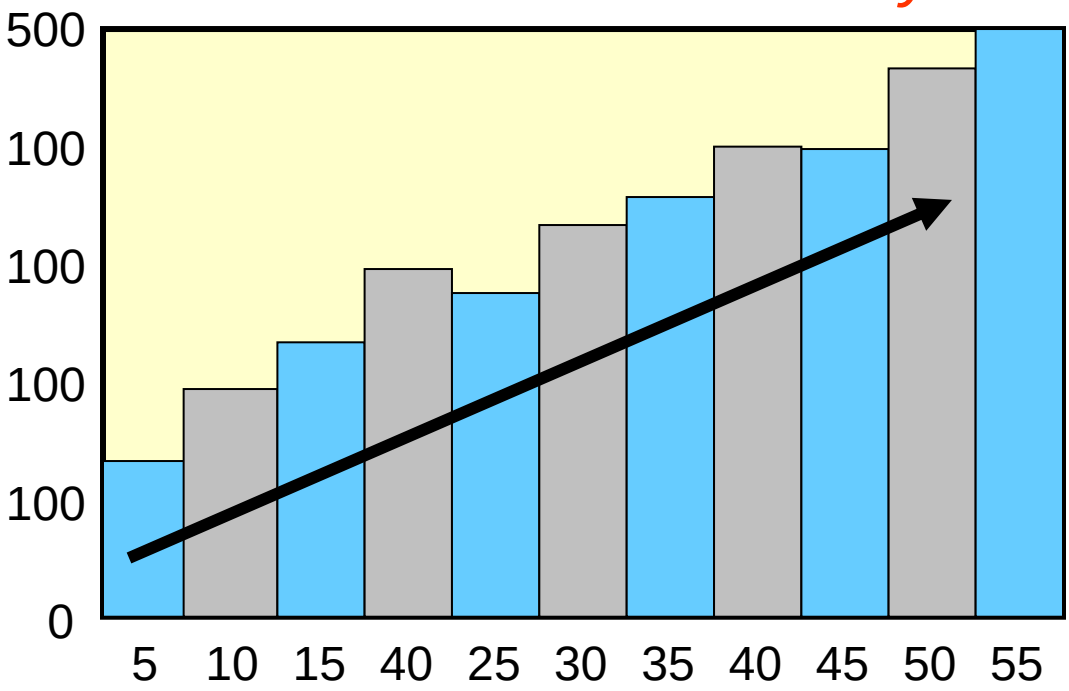
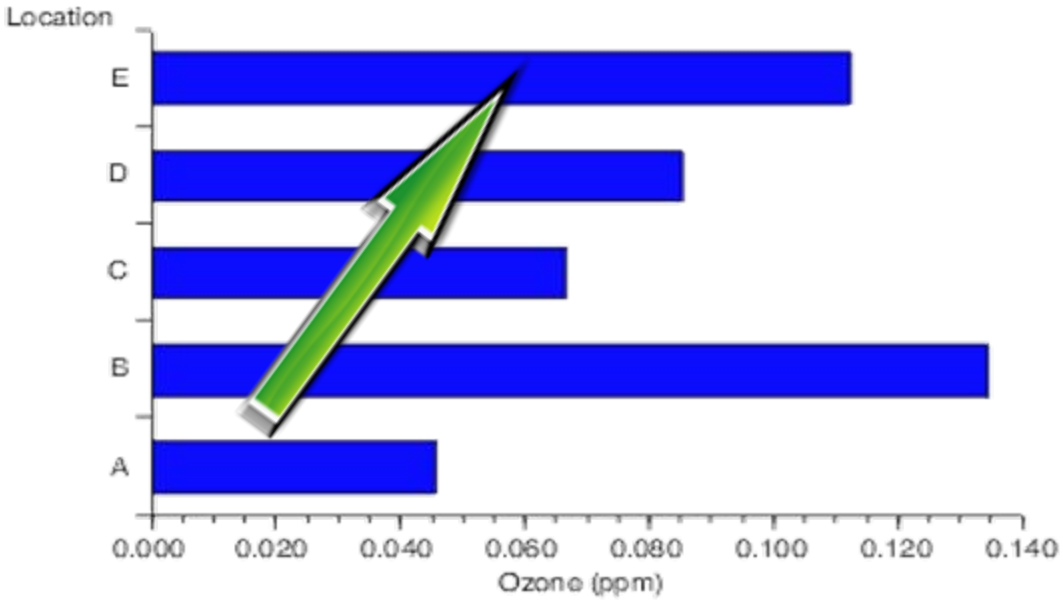
Look for TRENDS in the data.

A trend is defined as: *1. to have or take a general direction 2. to show a tendency*



BAR GRAPH

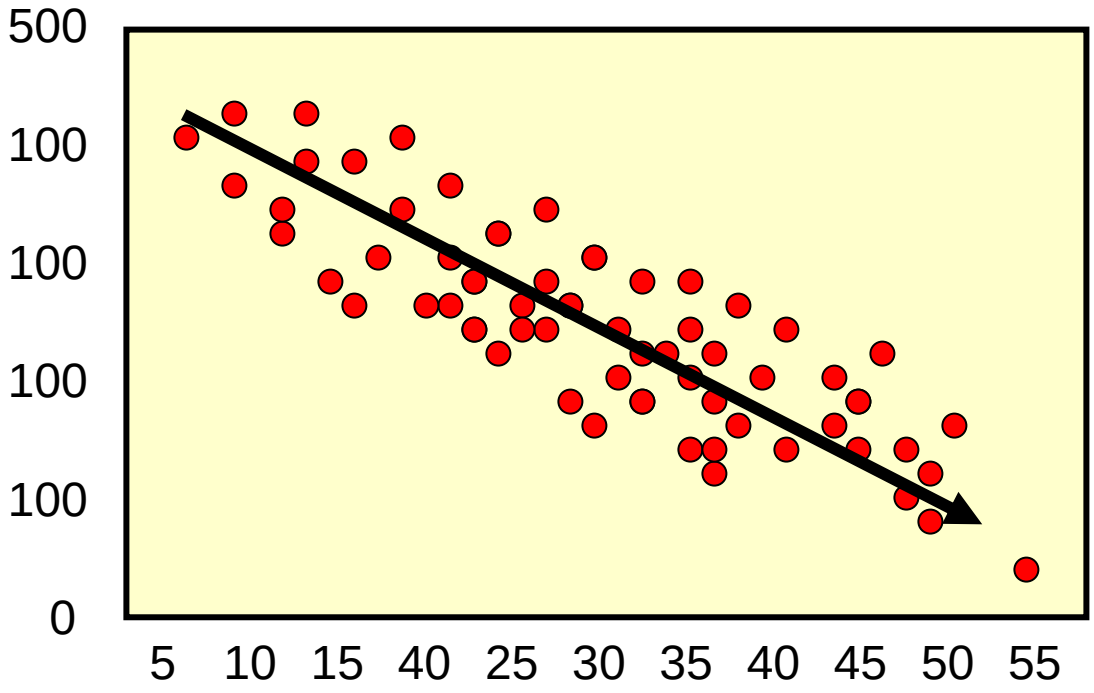
Both of these bar graphs shows a definite upward *trend* in the data. The general direction is obviously increasing.



HORIZONTAL BAR GRAPH

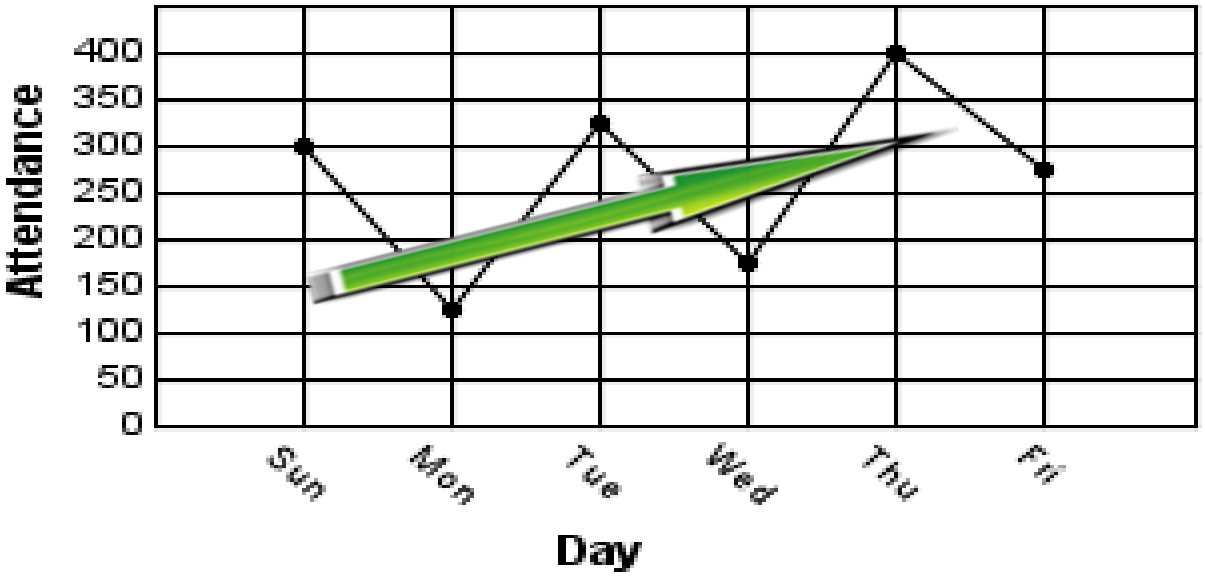
This scatter diagram also shows a *trend* in the data. These data points are grouped together and are their direction is decreasing noticeably.

SCATTER DIAGRAM



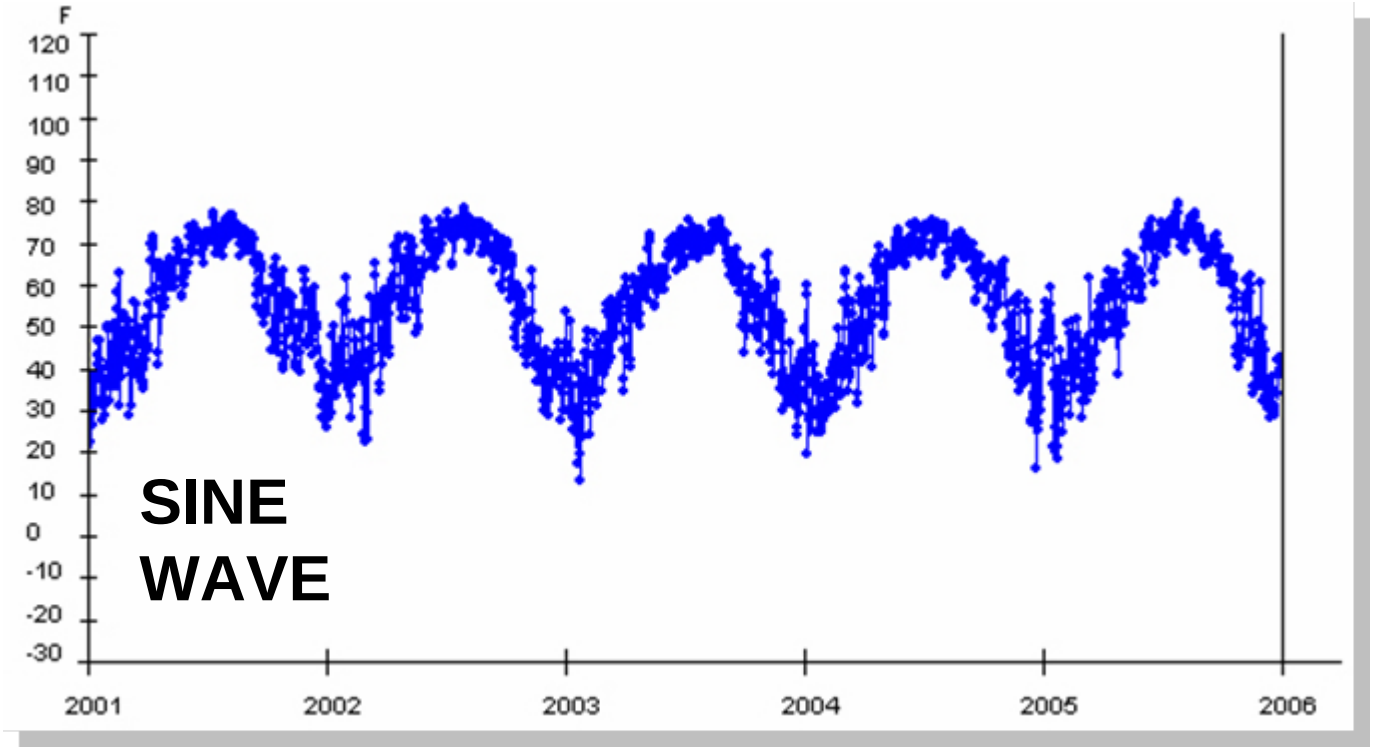
Line Graphs, sometimes called time series are used to present data over a period of time. In this line graph you can see the overall increase in the *trend*.

LINE GRAPH



Look for PATTERNS in the data.

A pattern is defined as: *1. A regular or repetitive form 2. A regular order or arrangement*

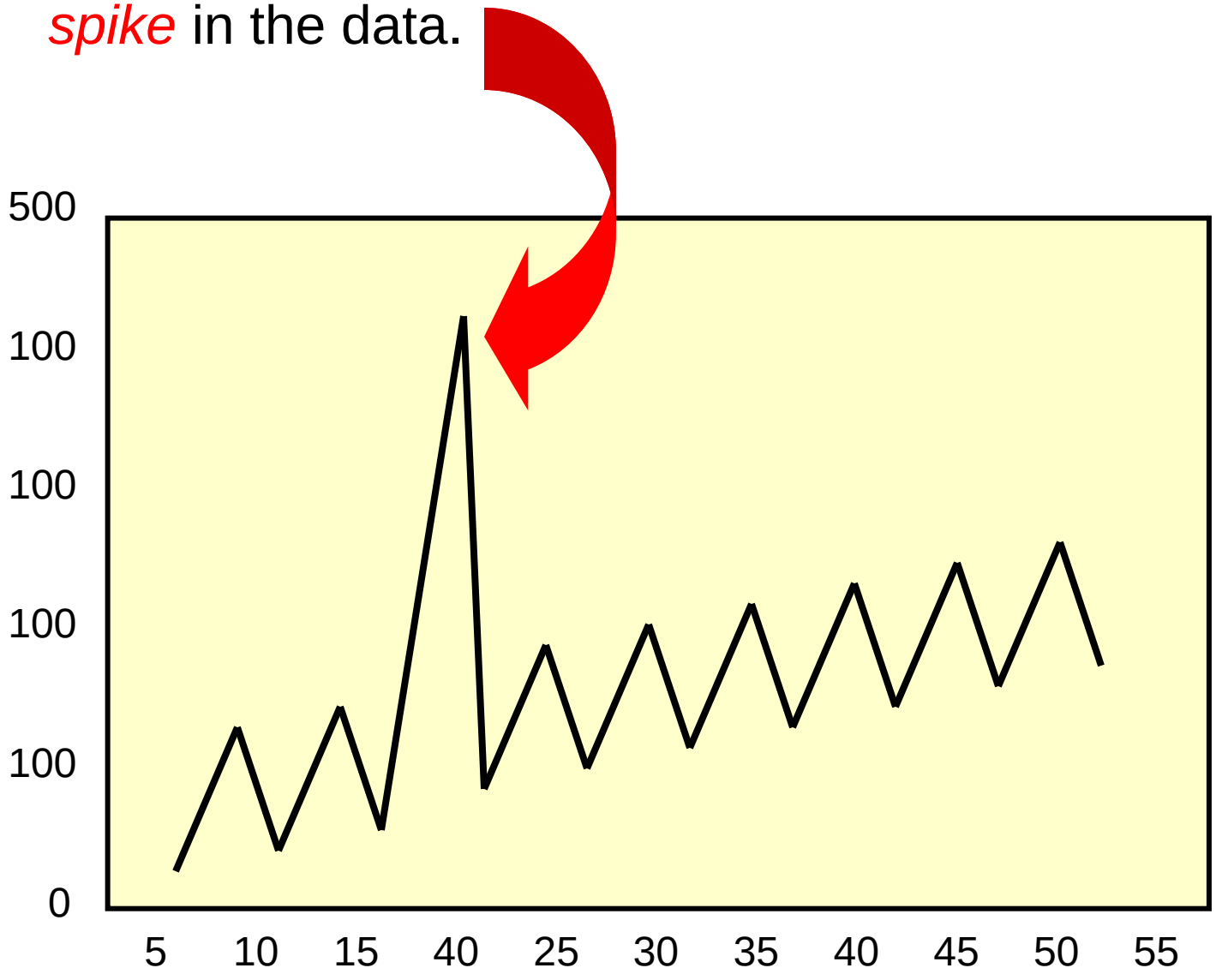


This sine wave shows a *pattern* that is very regular and repetitive. There is nothing irregular about the graph that would indicate any *anomaly* in the data.

Look for ANOMALIES in the data.

An anomaly is defined as: *1. Departure from the general rule 2. Irregular 3. Something abnormal*

This would be an *anomaly* in the data because it is irregular or is abnormal looking from the rest of the data. The example shown here is sometimes referred to as a *spike* in the data.



Stem-and-Leaf Plot

Game Scores

Stem	Leaves
19	6 2
20	8 2
21	6 5 2
22	1 4 6 3
23	2
24	0
25	
26	
27	0

Bulk of data

Anomaly

A Stem-and-Leaf Plot is an organized way to present data. These plots are ideal for showing where the bulk of the data is and also anomalies.

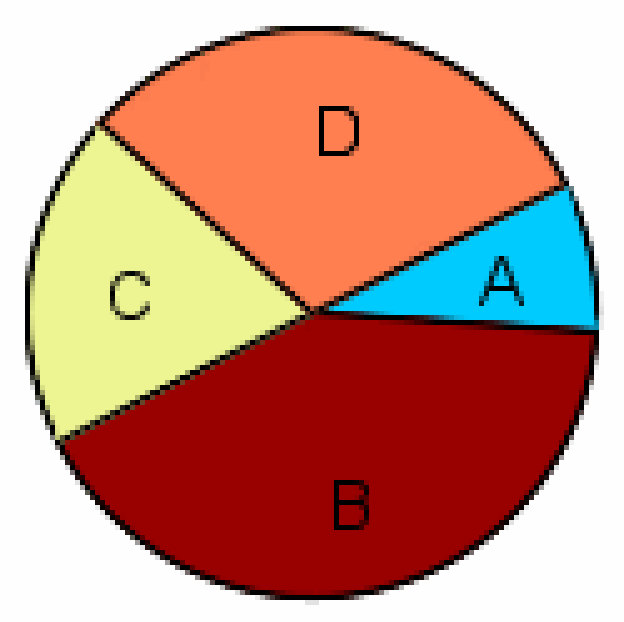
How to read the plot:

Connect the stem to the leaf.

Example: 196…192...221...232…240...270

Pie Chart

What Students Drank for Breakfast



A **Milk 43%**

B **Water 29%**

C **Orange Juice 20%**

D **Soda 8%**

- Pie Charts are used to represent data in percent values. This is useful when you are trying to show how each item compares as a whole. Which is why adding up all of the items in a pie chart should be 100%.
- Example: 43% + 29% + 20% + 8% = 100%

The 3 M's

- **Mean:** The average of a set of data points.
- **Median**: The middle number when the data is put in order.
- **Mode**: The number that appears the most in the set of data.

Example:

3,6,1,8,1,2,1 ← 7 Data Points

1st: put the numbers in order

1,1,1,2,3,6,8

2nd: figure out what the average is by adding up all the numbers and dividing by the total amount of data points. (MEAN)

(1+1+1+2+3+6+8)/7 = 3.1

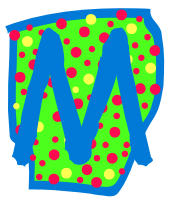
3rd: Find the number that is in the middle. (MEDIAN)

1,1,1,2,3,6,8 = 2

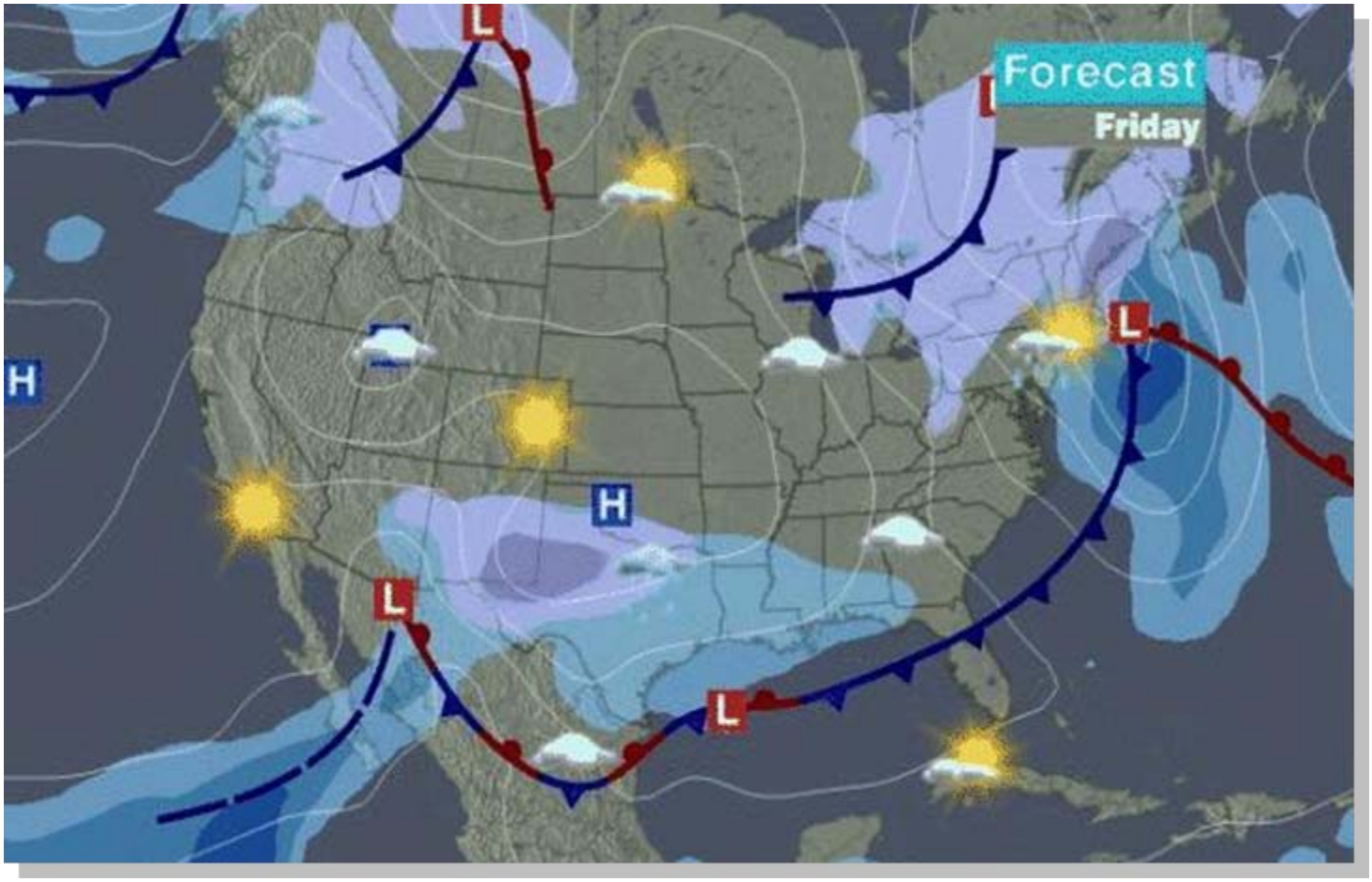
4th: Find the number that appears the most. (MODE)

1,1,1,2,3,6,8 = 1



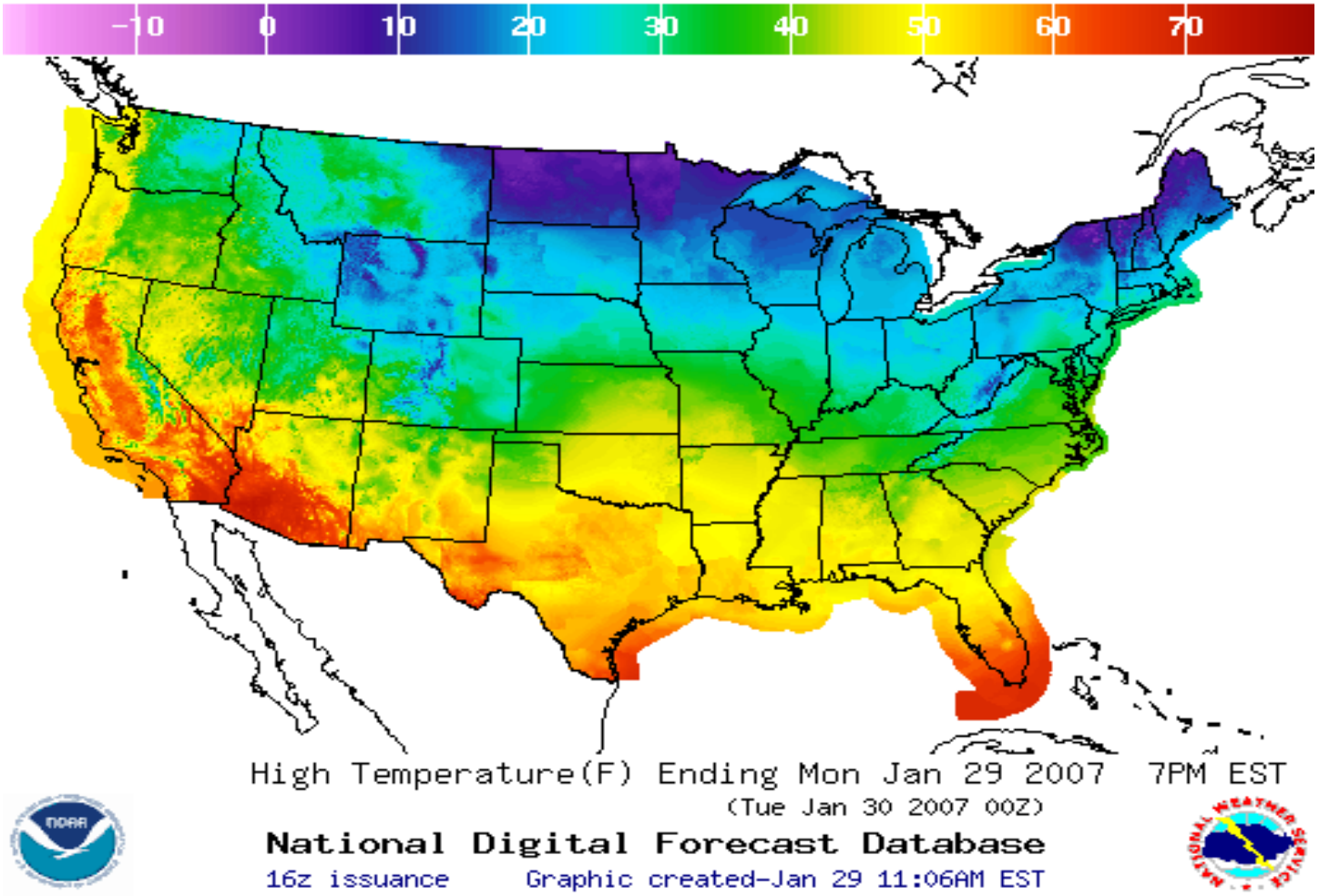



Look at WEATHER MAPS for detailed information about the weather.



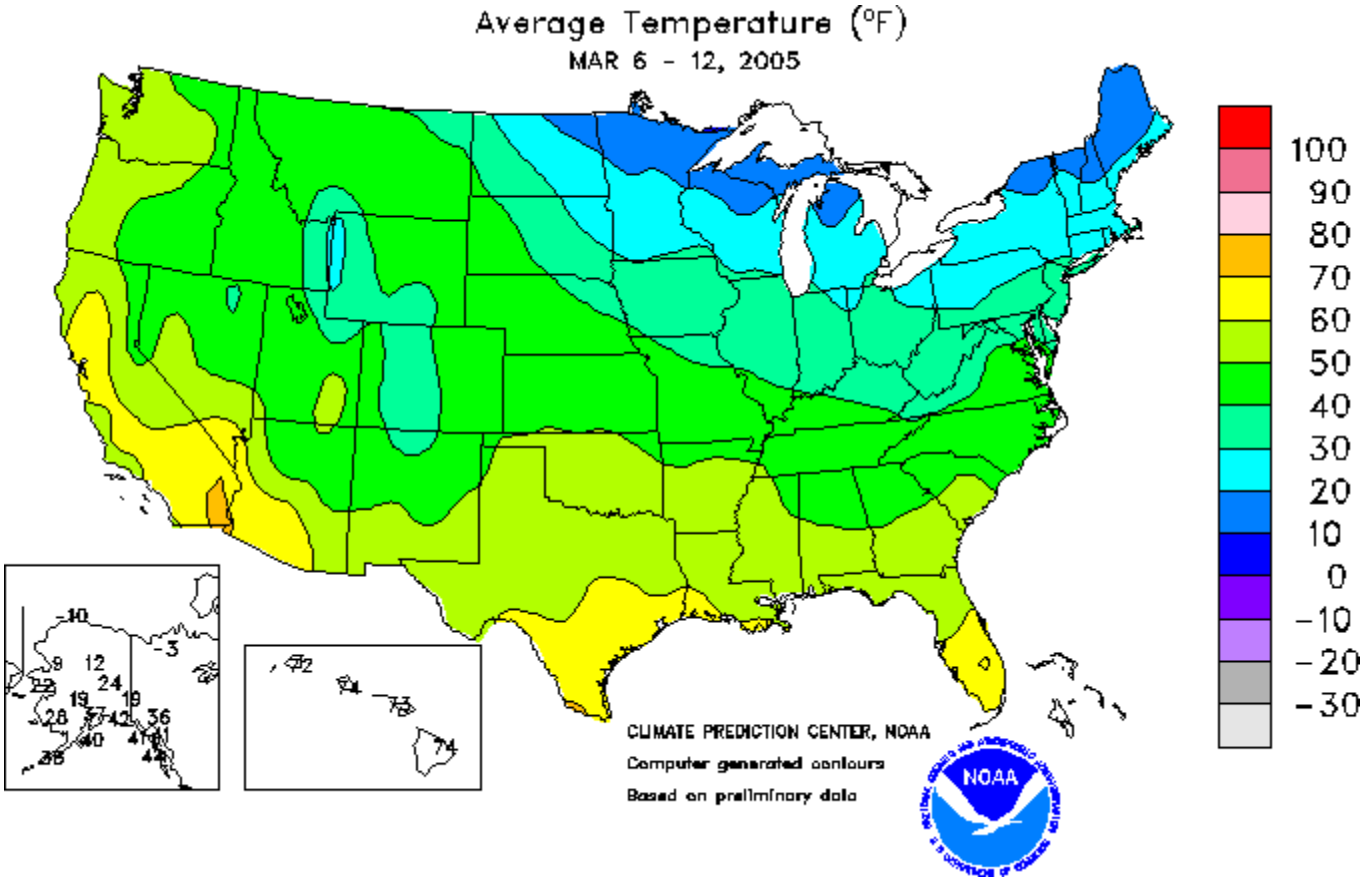
Weather maps can give us massive amounts of information about any type of weather data we are looking for. They can show satellite images of the Earth, sea surface temperatures, precipitation, snow and ice, wind speeds, and even the amount of cloud cover. The map shown here is a weather forecast for the entire United States.

This is a weather map of the high temperatures for Mon Jan 29 2007



- As you can see, there is a legend (A key to what the symbols or pictures in a map mean) at the top of the map. This legend assigns a Florida? different color for every 5 degrees of temperature change. Can you tell what the MEAN high temperature will be like in southern

Climate Maps, show what the weather has been like in the past.



- We use climate maps to see what has happened in the past so that we can better predict what the weather will be like in the future. Can you locate the legend and point to the areas that had an average (mean) temperature of 45 degrees Fahrenheit?

Normals

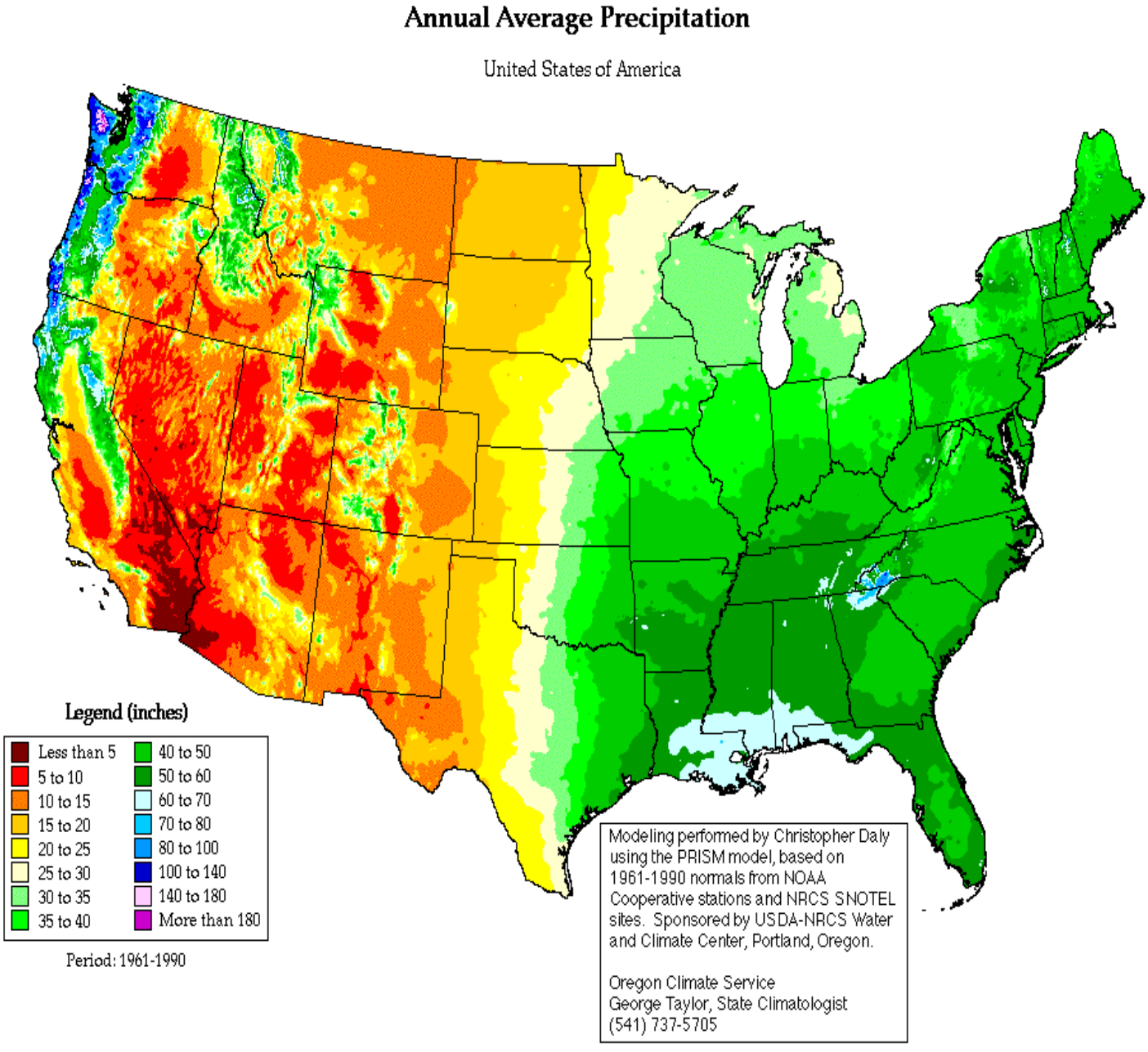
- A **Normal** is the average value of meteorological data over a period of time. (Temperature and Precipitation).

- The NCDC currently has two types of Normals:
  - ✓ ***Traditional Normals***: is data averaged over the most recent 30-year period.
  - ✓ ***Dynamic Normals***: is data averaged for a period that is most appropriate for the users application.

  Both of these Normals are calculated using retrospective data.

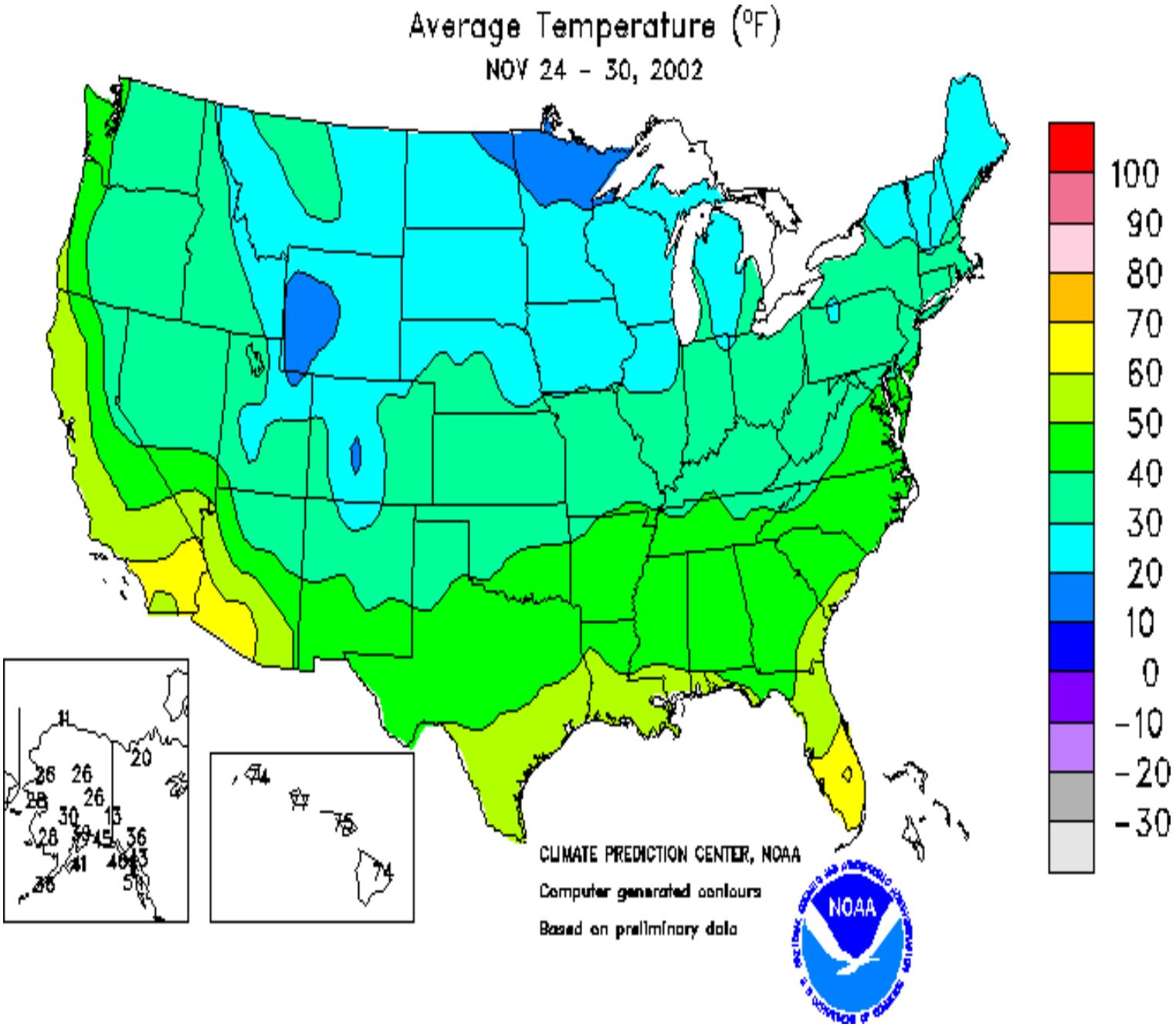
  Many people use Normals to predict future climate. But for a changing climate, this can lead to some problems.

Traditional Normals



- This Traditional Normals map shows the annual average precipitation for the U.S. over a time span of 30 years. (1961-1990)

Dynamic Normals



- As you can see, this Dynamic Normal map shows the average precipitation for a certain period of time. (Nov.24-30 2002)

Optimal Normals

- This is a Normal that has not yet been used yet but will address two fundamentals limitations of the existing Normals suite.
- It will provide guidance on the number of years required to estimate a normal for a specific area.
- It will also blend historical data with long-term climate projections to estimate future climate conditions.