A CLIMATIC GUIDE FOR NORTH CENTRAL OKLAHOMA

Robert M. Brown
Department of Applied Science
Brookhaven National Laboratory
Upton, NY 11973

June 1991

UNDER CONTRACT NO. DE-AC02-76CH00016 WITH
THE UNITED STATES DEPARTMENT OF ENERGY

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED
North Central Oklahoma

Table of Content

Introduction. .......................... Page 1-4

1. General map. .......................................................... 5
   Specific locations. ....................................................... 6
   Latitude, longitude, elevation. ........................................ 6

2. Insolation. ............................................................... 7-12
   Monthly average values. ................................................ 13
   Annual daily values. ..................................................... 14
   Map of ave. annual values. ............................................ 15
   Duration of sunshine. ................................................... 16
   Heating degree days-based on 65 F. .................................. 17
   Cooling degree days-based on 65 F. ................................. 17

3. Temperature. ............................................................. 18
   Data listing. ............................................................. 19-31
     Average max. mean and min. ......................................... 19
     Plots of location temperatures. ...................................... 32
     Average plot of all locations. ....................................... 33
     Map of ave. annual temperatures. .................................... 33

4. Precipitation. ......................................................... 34
   Data listing. ............................................................. 35-51
     Plots of location precipitation. ..................................... 52
     Average plot of all locations. ....................................... 53
     Map of ave. annual precipitation. ................................... 53

5. Cloudiness. .............................................................. 54
   Plots of Ok. City and Tulsa. ......................................... 54

6. Thunderstorm days. .................................................... 55
   Data listing. ............................................................. 56
     Plot of location thunderstorms. ...................................... 57
     Average plot of all locations. ....................................... 58
     Map of ave. annual thunderstorms. ................................... 58

7. Snowfall. ................................................................. 59
   Data listing. ............................................................. 60
     Plot of location snowfalls. ............................................ 61
     Average plots of all locations. ...................................... 62
     Map of ave. annual snowfalls. ....................................... 62

8. Wind. ................................................................. 63
   Annual wind direction frequencies. ................................... 63
   January wind directions. .............................................. 64
   July wind directions. .................................................. 65
   Annual wind speed frequencies. ....................................... 66

9. Fog. ................................................................. 67
   Annual fog days. ....................................................... 67

10. Drought. ............................................................... 68
    Percentage months of drought. ...................................... 68

11. Moisture content. .................................................... 69

References ................................................................. 70
A Climatic Guide for North Central Oklahoma

Introduction

This guide provides some climatological data pertaining to central and north central Oklahoma. The information was derived from standard reference material to reflect what general surface meteorological characteristics exist in that region. It is intended to assist those individuals involved in the implementation of the first ARM site in that locale. A similar guide already exists for the region involved in Kansas entitled, "One Regional ARM Guide for Climatic Evaluation". The Oklahoma-Kansas area was selected as the first site from the process reported in the "Identification, Recommendation and Justification of Potential Locales for ARM Sites".

Oklahoma, like Kansas, has extreme climatic variations, is centrally located, is compatible with other programs, has good airfields and accommodations to plan and operate an ARM site for continuous use and for special field campaigns.

The map on page 5 shows the area in Oklahoma that will be involved in the first ARM measurements. It gives the names of the cities, towns and the counties and their boundaries. Seventeen (17) meteorological reporting locations in Oklahoma were used in this guide to provide the results presented. The map on page 6 shows their locations, latitudes, longitudes and elevations.

1. General Features.

Most of Oklahoma has rolling plains which slope upward from east to west. There are hilly sections associated with the Wichita Mountains in the southwest, the Arbuckle Mountains in the south-central, the Ozarks in the northeast and the Ouachita Mountains in the southeast. The lowest part of the State (300 ft.) occurs in the southeastern corner while the highest (5000 ft.) is in the northwestern Panhandle. The State lies in the drainage basin of the Mississippi River where the Arkansas drains the northern sections and the Red River drains the south. There are a number of man made lakes to control flooding and to provide recreational areas; the largest are Texoma on the Red River and the Eufaula Reservoir on the Canadian River.

The climate is continental with warm air moving northward from the Gulf of Mexico, cold air moving southward from Canada and downslope winds moving eastward from the Rocky Mountains. This combination of air movement throughout Oklahoma and Kansas causes some of the most severe weather in the world. Summers are long and occasionally very hot whereas winters are shorter and cold but less so than more northern Plain States. Long periods of extreme cold are rare. Humidity and cloudiness are generally greater and precipitation heavier in the south and eastern sections as compared to the north and western sections of the State. Droughts do occur during hot summers accompanied by moderately high winds. The drought of the early to mid 1930's is an example of this condition.

Excessively heavy rains can occur. Amounts of 10 inches or more have been recorded in a 24-hour period in several areas of
the State. Thunderstorms are frequent and are often the cause of damaging tornadoes and hail. A "low level jet stream", identified in earlier experimental studies (Bonner, 1968), flows from the southeast corner of New Mexico through parts of Texas, Oklahoma, Kansas and into Missouri and Iowa. It has a speed of from 11 to 14 meters/sec. at an altitude of from 700 to 900 meters above the surface. The location of this jet stream coincides with some of the most severe weather recorded in those states and is a possible area for further investigation.

2. Insolation.
All of the solar radiation data available in past climatological records show a near linear increase of amounts from the northeast to the southwest in Oklahoma. The maps on pages 7 to 12 show the average monthly isopleths of solar radiation during the year and the map on page 13 shows the average annual isopleths. These maps show the definite increase from northeast to southwest. The map on page 14 shows the average annual solar radiation through the 17 locations studied. As noted, there is some interpolation on many of these maps so some caution is required in their analysis. The values range from over 350 to 450 Langleys/day. Oklahoma and Kansas, as shown on the map on page 15, has between 2800 to 3300 hours of duration of sunshine. Only New Mexico, Arizona and southern California have more sunshine hours.

Annual values of heating and cooling degree days are shown on pages 16 and 17. They are provided in this guide as an indication of the air conditioning and heatings loads to be expected in that region.

3. Temperature.
The table on page 18 gives the numerical listing of the temperatures in north central Oklahoma. The average temperatures of the various locations is given at the bottom of that page. The plots of the temperatures are shown on pages 19 through 31. The average temperatures of the locations is shown on page 32. The map on page 33 shows the average mean temperature isotherms in that region. There is a definite decrease in surface temperature from the southeastern to the northwestern sections, however, the summer average maximum temperature in northern central Oklahoma can be the highest in the State as given in the Oklahoma chapter of "The Climate of the States".

4. Precipitation.
The locations studied in this guide show a bimodal characteristic in annual precipitation amounts. A maximum occurs in May and another in September. This is shown in each of the plots from page 35 to 51. It is also evident in the plot of their averages shown on page 52. The map on page 53 shows the characteristic decrease of precipitation in Oklahoma from east to west of from 38 to 23 inches per year. The pattern and amounts agree well with those given for Kansas.
5. Cloudiness.
Clear skies are more frequent in the western part of the State than in the east, where clear and cloudy conditions are about equal. Sunshine records indicate an annual average of near 70% of possible sunshine in Oklahoma City as compared to 60% for Tulsa. Summer has the greatest period of sunshine and winter the least. The plots on page 54 show the clear, partly cloudy and cloudy monthly values for Oklahoma City and Tulsa.

6. Thunderstorms.
Oklahoma, like Kansas, experiences between 45 and 60 thunderstorm events each year. The plot on page 56 shows the thunderstorm days for six (6) locations in north central Oklahoma. As can be seen, most of them occur between April and October, peaking in May and June. There is a slight increase in August. The average plot of the 6 locations is shown on page 57. The map on page 58 shows the near linear decrease of thunderstorm activity from the northeast to the southwestern sections. It is well known that thunderstorms in the Oklahoma and Kansas region can be severe at times and that tornadoes and hail can do considerable damage. The guide on Kansas shows a plot of the risk of hail activity with elevation which applies to Oklahoma as well. A map showing the incidence and paths of tornadoes is also given in that guide and will not be repeated in this one. In "The Climate of the States" 1600 tornadoes were reported in the 100 year period 1875 to 1975 or about 16 tornadoes per year for the Oklahoma-Kansas region.

7. Snowfall.
The annual amount of snowfall in Oklahoma tends to increase from the southeast toward the northwest sections as shown on page 62. The average annual snowfall has been approximately 2 inches in the southeast to over 20 inches in the western sections of the Panhandle. Strong winds with heavy snowfalls can cause deep drifting which restricts visibility and traffic.

8. Wind direction and speed.
The annual percentage frequencies of wind directions are shown on page 63. The map shows a predominance of south and north winds. The map on page 64 gives the average directions during January which indicate an almost even north or south frequency while the map on page 65 indicates more southerly winds than northerly winds during July.
The average annual wind speeds shown on page 66 indicate an almost symmetrical distribution throughout the year. The north-south wind direction sectors dominate somewhat however. As can be noted, wind speeds average over 5 meters/sec most of the time.
The map on page 67 shows the mean annual number of days with fog in the Oklahoma-Kansas region. As can be seen from the map, from 10 to 25 days a year can be expected to decrease visibility and have an effect on other atmospheric measurements.

10. Drought.
The map on page 68 provides some information on the severity of extreme drought conditions in the Oklahoma-Kansas region. It can be seen that a maximum occurs in the western sections of Kansas. A drought condition will have a profound effect on the type of vegetation measurements from overhead satellite recordings, a note to be remembered.

11. Moisture content.
The Oklahoma-Kansas region has, on the average, about as much moisture available from the surface to 325 mbar as the eastern central United States. The map on page 69 shows this feature.
Average Daily Global Solar Radiation on a Horizontal Surface (MJ/m²)

ANNUAL

[Map of the United States showing average daily global solar radiation in MJ/m², with major cities labeled.]
Annual Mean Daily Insolation for the United States
1950-1964

1. Mutual
2. Alva
3. Cherokee
4. Helena
5. Jefferson
6. Enid
7. Hennessey
8. Kingfisher
9. Marshall
10. Newkirk
11. Ponca City
12. Perry
13. Guthrie
14. Oklahoma City
15. Ralston
16. Pawnee
17. Tulsa
* Lamont
Mean annual total duration of sunshine, in hundreds of hours, based on black-bulb sunshine recorders at 125 stations, 1931-1960, and 50 for fewer years. (After U.S. Weather Bureau National Atlas map.)
Temperature—Mutual Ok.

![](Image)

- Ave. Max
- Mean
- Ave. Min
Temperature—Alva Ok.

Temperature (F)

Month

Jan    Feb    Mar    Apr    May    Jun    Jul    Aug    Sep    Oct    Nov    Dec

Ave. Max.    Mean    Ave. Min.
Temperature—Cherokee Ok.
Temperature—Jefferson Ok.
Temperature—Enid Ok.

Ave. Max.  Mean  Ave. Min.
Temperature – Newkirk Ok.
Temperature—Perry Ok.

- Ave. Max.
- Mean
- Ave. Min.
Temperature—Gutherie Ok.

Temperature (°F)

Month
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Ave. Max. Mean Ave. Min.
Temperature—Oklahoma City Ok.
Temperature—Tulsa Ok.

- Ave. Max.
- Mean
- Ave. Min.
Average Temperature
North Central Oklahoma

Average Temperature

- Ave. Max.
- Mean
- Ave. Min.
<table>
<thead>
<tr>
<th>Location</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual</td>
<td>0.51</td>
<td>0.95</td>
<td>1.58</td>
<td>2.45</td>
<td>4.32</td>
<td>3.17</td>
<td>2.56</td>
<td>2.20</td>
<td>2.48</td>
<td>1.52</td>
<td>1.15</td>
<td>0.66</td>
<td>23.52</td>
</tr>
<tr>
<td>Alva</td>
<td>0.56</td>
<td>0.87</td>
<td>1.62</td>
<td>2.43</td>
<td>4.06</td>
<td>3.80</td>
<td>2.59</td>
<td>2.89</td>
<td>2.47</td>
<td>1.57</td>
<td>1.20</td>
<td>0.81</td>
<td>24.87</td>
</tr>
<tr>
<td>Cherokee</td>
<td>0.69</td>
<td>0.92</td>
<td>1.93</td>
<td>2.55</td>
<td>3.85</td>
<td>3.99</td>
<td>2.76</td>
<td>2.58</td>
<td>2.67</td>
<td>1.82</td>
<td>1.28</td>
<td>0.87</td>
<td>25.91</td>
</tr>
<tr>
<td>Helena</td>
<td>0.71</td>
<td>1.00</td>
<td>1.92</td>
<td>2.57</td>
<td>4.34</td>
<td>3.95</td>
<td>3.08</td>
<td>2.61</td>
<td>2.87</td>
<td>2.12</td>
<td>1.54</td>
<td>0.94</td>
<td>28.05</td>
</tr>
<tr>
<td>Jefferson</td>
<td>0.70</td>
<td>0.97</td>
<td>1.93</td>
<td>2.77</td>
<td>3.92</td>
<td>3.98</td>
<td>3.92</td>
<td>3.25</td>
<td>3.13</td>
<td>2.55</td>
<td>1.92</td>
<td>1.03</td>
<td>30.07</td>
</tr>
<tr>
<td>Enid</td>
<td>0.91</td>
<td>1.16</td>
<td>1.89</td>
<td>2.78</td>
<td>5.01</td>
<td>4.12</td>
<td>3.18</td>
<td>3.36</td>
<td>3.21</td>
<td>2.80</td>
<td>1.78</td>
<td>1.03</td>
<td>31.23</td>
</tr>
<tr>
<td>Hennessey</td>
<td>0.71</td>
<td>1.16</td>
<td>1.86</td>
<td>2.38</td>
<td>5.32</td>
<td>3.90</td>
<td>2.51</td>
<td>2.69</td>
<td>3.39</td>
<td>2.11</td>
<td>1.63</td>
<td>0.99</td>
<td>28.65</td>
</tr>
<tr>
<td>Kingfisher</td>
<td>0.83</td>
<td>1.13</td>
<td>1.76</td>
<td>2.42</td>
<td>4.94</td>
<td>3.76</td>
<td>2.57</td>
<td>2.39</td>
<td>3.60</td>
<td>2.44</td>
<td>1.53</td>
<td>1.13</td>
<td>28.50</td>
</tr>
<tr>
<td>Marshall</td>
<td>0.76</td>
<td>1.16</td>
<td>1.99</td>
<td>2.38</td>
<td>5.25</td>
<td>4.00</td>
<td>2.59</td>
<td>2.75</td>
<td>3.51</td>
<td>2.60</td>
<td>1.63</td>
<td>1.14</td>
<td>29.76</td>
</tr>
<tr>
<td>Newkirk</td>
<td>0.80</td>
<td>1.10</td>
<td>1.98</td>
<td>2.95</td>
<td>4.72</td>
<td>4.59</td>
<td>3.55</td>
<td>3.50</td>
<td>3.54</td>
<td>2.77</td>
<td>1.94</td>
<td>1.22</td>
<td>32.72</td>
</tr>
<tr>
<td>Ponca City</td>
<td>0.91</td>
<td>1.22</td>
<td>2.10</td>
<td>2.90</td>
<td>4.49</td>
<td>4.17</td>
<td>4.10</td>
<td>3.36</td>
<td>3.84</td>
<td>2.60</td>
<td>2.05</td>
<td>1.27</td>
<td>33.01</td>
</tr>
<tr>
<td>Perry</td>
<td>0.87</td>
<td>1.32</td>
<td>2.36</td>
<td>2.70</td>
<td>5.28</td>
<td>4.13</td>
<td>3.53</td>
<td>3.33</td>
<td>3.74</td>
<td>2.63</td>
<td>1.80</td>
<td>1.20</td>
<td>32.89</td>
</tr>
<tr>
<td>Guthrie</td>
<td>0.91</td>
<td>1.26</td>
<td>2.01</td>
<td>2.60</td>
<td>5.42</td>
<td>3.96</td>
<td>2.84</td>
<td>2.38</td>
<td>3.98</td>
<td>2.66</td>
<td>1.80</td>
<td>1.20</td>
<td>31.02</td>
</tr>
<tr>
<td>Ok. City</td>
<td>0.96</td>
<td>1.29</td>
<td>2.07</td>
<td>2.91</td>
<td>5.50</td>
<td>3.87</td>
<td>3.04</td>
<td>2.40</td>
<td>3.41</td>
<td>2.71</td>
<td>1.53</td>
<td>1.20</td>
<td>30.89</td>
</tr>
<tr>
<td>Ralston</td>
<td>1.00</td>
<td>1.30</td>
<td>2.52</td>
<td>2.97</td>
<td>4.72</td>
<td>4.39</td>
<td>3.49</td>
<td>2.92</td>
<td>3.86</td>
<td>2.69</td>
<td>1.95</td>
<td>1.36</td>
<td>33.17</td>
</tr>
<tr>
<td>Pawnee</td>
<td>1.01</td>
<td>1.31</td>
<td>2.48</td>
<td>2.97</td>
<td>4.84</td>
<td>4.02</td>
<td>3.13</td>
<td>3.01</td>
<td>4.37</td>
<td>2.72</td>
<td>1.88</td>
<td>1.25</td>
<td>32.99</td>
</tr>
<tr>
<td>Tulsa</td>
<td>1.35</td>
<td>1.74</td>
<td>3.14</td>
<td>4.15</td>
<td>5.14</td>
<td>4.57</td>
<td>3.51</td>
<td>3.01</td>
<td>4.37</td>
<td>3.41</td>
<td>2.56</td>
<td>1.82</td>
<td>38.77</td>
</tr>
<tr>
<td>Average</td>
<td>0.83</td>
<td>1.17</td>
<td>2.07</td>
<td>2.76</td>
<td>4.77</td>
<td>4.02</td>
<td>3.11</td>
<td>2.86</td>
<td>3.44</td>
<td>2.45</td>
<td>1.72</td>
<td>1.12</td>
<td>30.35</td>
</tr>
</tbody>
</table>
Precipitation—Mutual Ok.

![Graph showing precipitation over months]
Precipitation—Marshall Ok.
North Central Oklahoma

[Graph showing precipitation levels from January to December with the highest in May and the lowest in December.]
Precipitation—Newkirk Ok.
Precipitation—Ponca City Ok.
Precipitation—Perry Ok.
Precipitation—Guthrie Ok.

![Graph showing precipitation over months]

- X-axis: Months (Jan to Dec)
- Y-axis: Precipitation (inches)

May has the highest precipitation, followed by August. Precipitation is lowest in December.
Precipitation—Oklahoma City Ok.
Precipitation—Pawnee Ok.
Precipitation – Tulsa Ok.
Average Precipitation
North Central Oklahoma

Month
Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

Precipitation (inches)
0  1  2  3  4  5  6
AVERAGE ANNUAL PRECIPITATION

Location | Annual Precip. (in.)
--- | ---
1. Mutual | 23.52
2. Alva | 24.87
3. Cherokee | 25.91
4. Helena | 28.05
5. Jefferson | 30.07
6. Enid | 31.23
7. Hennessey | 28.65
8. Kingfisher | 28.50
9. Marshall | 29.76
10. Newkirk | 32.72
11. Ponca City | 33.01
12. Perry | 32.89
13. Guthrie | 31.02
14. Oklahoma City | 30.89
15. Ralston | 33.17
16. Pawnee | 32.99
17. Tulsa | 38.77

* Lamont
## North Central Oklahoma Data

<table>
<thead>
<tr>
<th>Location</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ponca City</td>
<td>0.6</td>
<td>1.0</td>
<td>2.4</td>
<td>5.4</td>
<td>8.7</td>
<td>9.8</td>
<td>8.1</td>
<td>8.0</td>
<td>4.4</td>
<td>3.5</td>
<td>0.8</td>
<td>0.5</td>
<td>53.0</td>
</tr>
<tr>
<td>Tulsa</td>
<td>1.0</td>
<td>2.0</td>
<td>3.0</td>
<td>6.0</td>
<td>10.0</td>
<td>11.0</td>
<td>7.0</td>
<td>7.0</td>
<td>5.0</td>
<td>4.0</td>
<td>1.0</td>
<td>1.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Enid</td>
<td>0.3</td>
<td>0.9</td>
<td>2.0</td>
<td>5.4</td>
<td>8.9</td>
<td>9.8</td>
<td>7.1</td>
<td>6.9</td>
<td>4.7</td>
<td>3.2</td>
<td>0.5</td>
<td>0.5</td>
<td>50.2</td>
</tr>
<tr>
<td>Seminole</td>
<td>0.7</td>
<td>1.3</td>
<td>2.8</td>
<td>5.2</td>
<td>9.4</td>
<td>7.2</td>
<td>7.2</td>
<td>4.5</td>
<td>2.6</td>
<td>2.1</td>
<td>0.6</td>
<td>0.6</td>
<td>44.2</td>
</tr>
<tr>
<td>Ok City</td>
<td>1.0</td>
<td>1.0</td>
<td>3.0</td>
<td>5.0</td>
<td>7.0</td>
<td>8.0</td>
<td>5.0</td>
<td>6.0</td>
<td>4.0</td>
<td>3.0</td>
<td>1.0</td>
<td>1.0</td>
<td>45.0</td>
</tr>
<tr>
<td>Alva</td>
<td>0.3</td>
<td>0.9</td>
<td>2.0</td>
<td>5.4</td>
<td>8.9</td>
<td>9.8</td>
<td>7.1</td>
<td>6.9</td>
<td>4.7</td>
<td>3.2</td>
<td>0.5</td>
<td>0.5</td>
<td>50.2</td>
</tr>
<tr>
<td>Averages</td>
<td>0.6</td>
<td>1.2</td>
<td>2.5</td>
<td>5.4</td>
<td>8.8</td>
<td>9.3</td>
<td>6.9</td>
<td>6.6</td>
<td>4.2</td>
<td>3.2</td>
<td>0.7</td>
<td>0.7</td>
<td>50.1</td>
</tr>
</tbody>
</table>
Thunderstorm Days
North Central Oklahoma

- Ponca City
- Tulsa
- Enid
- Seminole
- Ok. City
- Alva
Average Thunderstorm Days
North Central Oklahoma

Number Thunderstorm Days

Month
Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec
AVERAGE ANNUAL THUNDERSTORM DAYS

<table>
<thead>
<tr>
<th>Location</th>
<th>Thunderstorm Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual</td>
<td>50.2</td>
</tr>
<tr>
<td>Alva</td>
<td>50.2</td>
</tr>
<tr>
<td>Cherokee</td>
<td></td>
</tr>
<tr>
<td>Helena</td>
<td></td>
</tr>
<tr>
<td>Jefferson</td>
<td></td>
</tr>
<tr>
<td>Enid</td>
<td></td>
</tr>
<tr>
<td>Hennessey</td>
<td></td>
</tr>
<tr>
<td>Kingfisher</td>
<td></td>
</tr>
<tr>
<td>Marshall</td>
<td></td>
</tr>
<tr>
<td>Newkirk</td>
<td></td>
</tr>
<tr>
<td>Ponca City</td>
<td>53.0</td>
</tr>
<tr>
<td>Perry</td>
<td></td>
</tr>
<tr>
<td>Gutherie</td>
<td></td>
</tr>
<tr>
<td>Oklahoma City</td>
<td>45.0</td>
</tr>
<tr>
<td>Ralston</td>
<td></td>
</tr>
<tr>
<td>Pawnee</td>
<td></td>
</tr>
<tr>
<td>Tulsa</td>
<td></td>
</tr>
<tr>
<td>Lamont</td>
<td>58.0</td>
</tr>
<tr>
<td>Seminole</td>
<td>44.2</td>
</tr>
</tbody>
</table>

58
<table>
<thead>
<tr>
<th>Location</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ponca City</td>
<td>3.6</td>
<td>2.4</td>
<td>2.1</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.9</td>
<td>1.4</td>
<td>10.6</td>
</tr>
<tr>
<td>Tulsa</td>
<td>3.6</td>
<td>2.1</td>
<td>1.3</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.3</td>
<td>1.4</td>
<td>8.8</td>
</tr>
<tr>
<td>Enid</td>
<td>3.7</td>
<td>3.3</td>
<td>1.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.6</td>
<td>1.1</td>
<td>10.4</td>
</tr>
<tr>
<td>Seminole</td>
<td>2.0</td>
<td>1.8</td>
<td>1.0</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.4</td>
<td>1.0</td>
<td>6.3</td>
</tr>
<tr>
<td>Ok. City</td>
<td>3.5</td>
<td>2.3</td>
<td>1.8</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.3</td>
<td>1.7</td>
<td>9.7</td>
</tr>
<tr>
<td>Alva</td>
<td>3.5</td>
<td>4.8</td>
<td>3.2</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.1</td>
<td>3.3</td>
<td>16.1</td>
</tr>
<tr>
<td>Averages</td>
<td>3.3</td>
<td>2.8</td>
<td>1.9</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.6</td>
<td>1.7</td>
<td>10.3</td>
</tr>
</tbody>
</table>
AVERAGE ANNUAL SNOWFALL

<table>
<thead>
<tr>
<th>Location</th>
<th>Snowfall (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual</td>
<td>16.1</td>
</tr>
<tr>
<td>Alva</td>
<td></td>
</tr>
<tr>
<td>Cherokee</td>
<td></td>
</tr>
<tr>
<td>Helena</td>
<td></td>
</tr>
<tr>
<td>Jefferson</td>
<td></td>
</tr>
<tr>
<td>Enid</td>
<td>10.4</td>
</tr>
<tr>
<td>Hennessey</td>
<td></td>
</tr>
<tr>
<td>Kingfisher</td>
<td></td>
</tr>
<tr>
<td>Marshall</td>
<td></td>
</tr>
<tr>
<td>Newkirk</td>
<td></td>
</tr>
<tr>
<td>Ponca City</td>
<td>10.6</td>
</tr>
<tr>
<td>Perry</td>
<td></td>
</tr>
<tr>
<td>Gutherie</td>
<td></td>
</tr>
<tr>
<td>Oklahoma City</td>
<td>9.7</td>
</tr>
<tr>
<td>Ralston</td>
<td></td>
</tr>
<tr>
<td>Pawnee</td>
<td></td>
</tr>
<tr>
<td>Tulsa</td>
<td>8.8</td>
</tr>
<tr>
<td>* Lamont</td>
<td></td>
</tr>
<tr>
<td>Seminole</td>
<td>6.3</td>
</tr>
</tbody>
</table>
Average percentage frequencies of wind direction in January, 1951-1960. (From Slusser, 1965)
Average percentage frequencies of wind directions in: A. January, and B. July, 1951-1960. Areas of sectors are proportional to hourly frequencies. (From SLUSSER, 1965.)
Mean annual moisture content of atmosphere up to 325 mbar over 50 stations, 1946–1956, in millimeters of condensed water, or decigrams per square centimeter of earth's surface. (After Reitan, 1960a.)
References


END

DATE FILMED
5/25/93