

Table of Contents

Page

Chapter 1. An Introduction to the Climate of Illinois	1
Why Create an Atlas about the Climate of Illinois?	2
Who Is the Atlas Audience?	4
What Does the Atlas Contain?	5
Why Does Illinois Know So Much about Its Climate?	6
What Conditions Control the Climate of Illinois?	8
What Have Historical Climates of Illinois Been Like?	11
Chapter 2. Temperature and Humidity	15
Air Temperature	15
Humidity	16
Temperature Trends in Illinois	17
Temperatures Indices	19
Temperature Extremes	28
Temperature Records	33
Chapter 3. Precipitation in Illinois	41
Annual and Seasonal Precipitation	42
Temporal Trends in Precipitation	46
Monthly Precipitation: Averages and Extremes	48
Days with Precipitation	54
Precipitation Structure	60
Heavy Precipitation Events	61
Dry Periods	63
Snow	65
Record Annual and Seasonal Precipitation Amounts	76
Chapter 4. Energy Budget, Clouds, and Winds	89
Radiation	90
Clouds and Sky Cover	92
Evaporation and Transpiration	100
Soil Moisture	103
Soil Temperature	106
Winds	107
References	116

Table of Contents (continued)

	<i>Page</i>
Chapter 5. Special Local–Regional Climate Conditions in Illinois	119
Urban Climates	119
Lake Influences on Climate	137
Hill Effects	145
Effects of Jet Aircraft on Clouds	146
Chapter 6. Atmospheric Quality	153
Impairments to Visibility	154
Atmospheric Concentrations of Air Pollutants	159
Atmospheric Deposition	162
References	178
Chapter 7. Climate Extremes and Storms	179
Droughts	179
Heavy Rainstorms	181
Thunderstorms and Lightning	196
Tornadoes	200
Hail	205
Winter Storms	211
Windstorms	219
Chapter 8. Outstanding Weather and Climate Events of the 20 th Century	233
The Tri-State Tornado on March 18, 1925	233
Devastating Hailstorms on June 19–20, 1964	233
Winter Storm on January 26–27, 1967	235
Windstorm on March 27, 1961	236
A Pair of Major Rainstorms on June 27–28, 1957, and July 17–18, 1996	238
The Record 1993 Flood-producing Regime	240
Record Heat Waves in July 1936, 1954, and 1995	241
Droughts of the 1930s and 1988	242
Cold Air Outbreaks on February 9–12, 1899, and February 2–5, 1996	243
Record Warm Winters: 1931–1932 and 2001–2002	244
Chapter 9. Synoptic Climatology of Illinois	247
The Hydrologic Cycle	247
Average Distribution of Various Fronts	249
High- and Low-Pressure Systems	250
Patterns and Frequency of Different Air Masses	252

Table of Contents (concluded)

	<i>Page</i>
Chapter 10. Frequently Asked Questions about the Climate of Illinois	257
How Will Global Climate Change Affect Illinois?	257
Can the Climate Be Predicted Months or Seasons in Advance?	259
Will Damaging Climate Conditions Increase in the Future?	261
How Does El Niño Affect Illinois' Climate?	265
How Is the Climate of Illinois Measured?	267
What Are Typical Weather Days in Illinois?	272
References	275
 Bibliography	 277
 Glossary	 285
 Appendix A. Instrumentation, Climate Statistics, and Terminology	 293
Special Weather-Sensing Instruments Developed by ISWS Scientists	293
Climate Statistics and Terminology	296
 Appendix B. Climate Data for Selected Stations	 299