

# Climates of NYS

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## Definitions

### Weather and Climate

- **Weather** – the state of the atmosphere at one point in time. The elements of weather are temperature, air pressure, wind and moisture.
- **Climate** – the average of all weather over a very long period (<50 yrs.) of time.

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## Climate Regions of NYS

SOURCE: Adapted from Figure 24 Chapter 7, Geography of New York State, 1998, by the State of New York, Department of Environmental Conservation

[Print the Climates of New York, Climate Controls, Climate Map Sets from the home page.](#)

## Characteristics of NYS's Climates

1. **Humid Continental** climate with the exception of the SE portion (NYC and LI) where it is Humid Subtropical.
2. **Generally cool to hot summers and warm to very cold winters.**
3. Regional temperature and precipitation is influenced by relative location.
4. **No dry season**; snow in winter.
5. Predominant wind direction is from the **West**.
6. **Greatest storm hazard is heavy snow**; thunderstorms in summer. Hurricanes and tornados are rare.
7. **Microclimates** develop in valleys and urban areas.

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## Climate Controls

The development of a climate is influenced by the following factors:

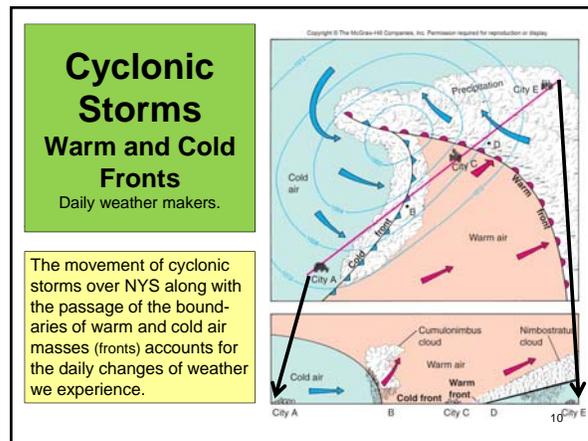
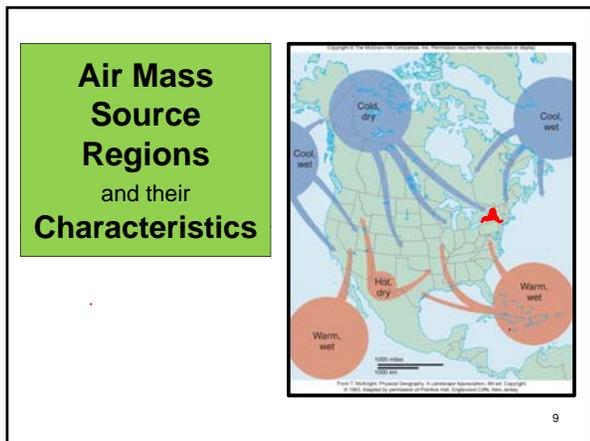
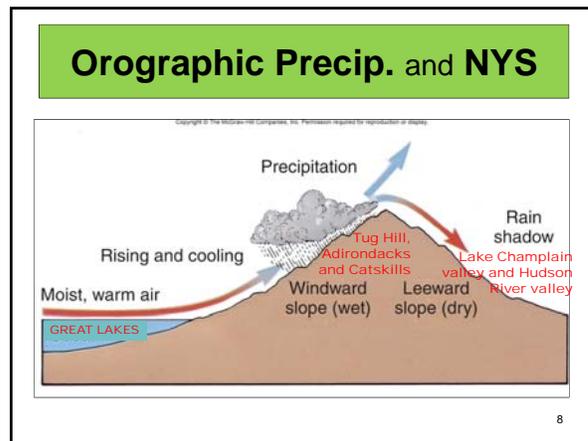
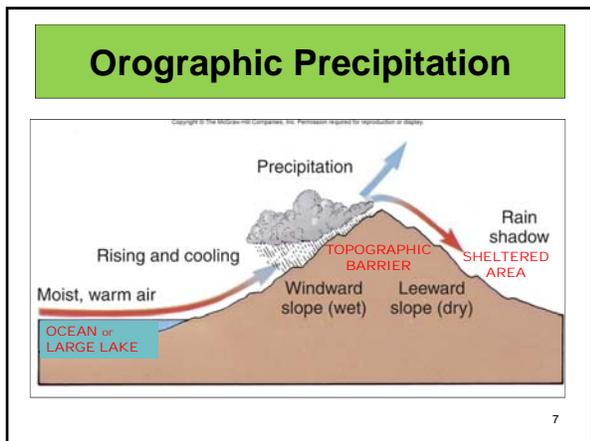
- Latitude** – amount of solar energy received
- Surface** (land or water) – heat exchange
- Ocean Currents** – temperature; flow direction
- Wind** – direction; characteristics
- Topographic Barriers** – orientation; height
- Elevation** – lapse rate (1°F for each 300 ft change in elevation)
- Air Masses** – source region; characteristics

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## Storm Tracks

Predominant general wind direction is from west to east.

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- ### Microclimates
- **Microclimates develop locally due to changes in an area's physical characteristics.**
  - **Rural areas** – local conditions change as an area goes from forest to large farmstead to suburb
  - **Urban areas** – artificial conditions
    - Concrete and asphalt surfaces (warmer)
    - Limited soil and vegetation (less humid)
    - Tall buildings (shadows and wind channels)
  - **Temperature inversions**
    - Frequently occurs in valleys (esp. the N-S valleys)
    - Warm air rises until it meets air of equal temperature
    - Warm air "cap" prevents the exchange of air and keeps the air (along with any pollutants) within the valley
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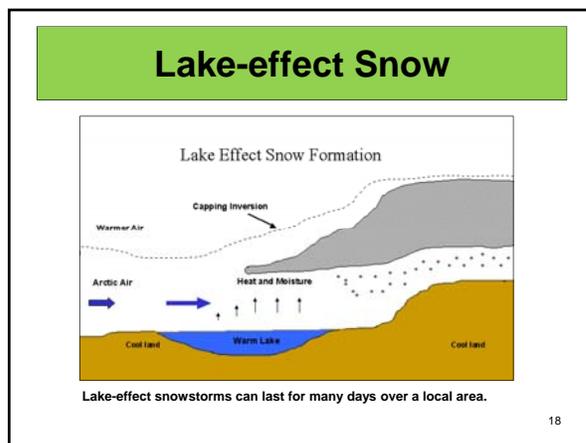
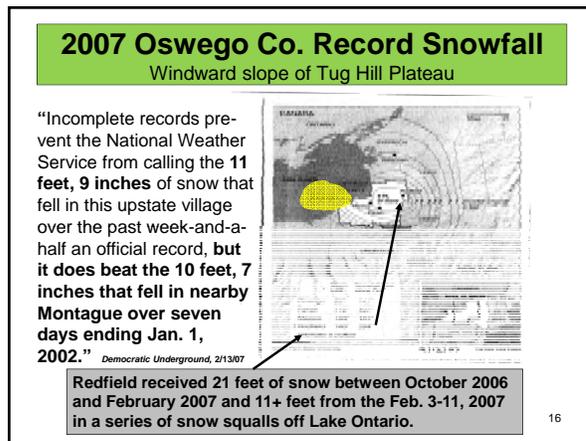
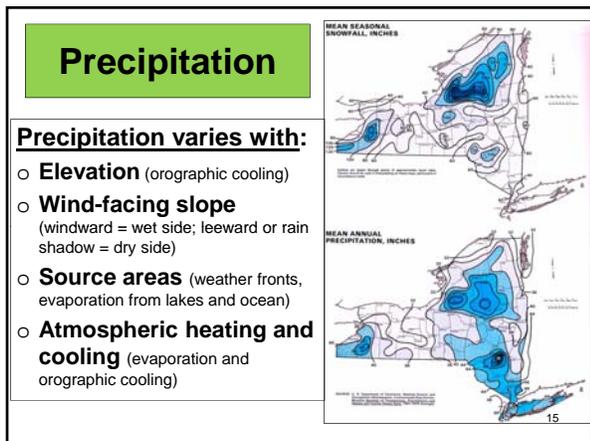
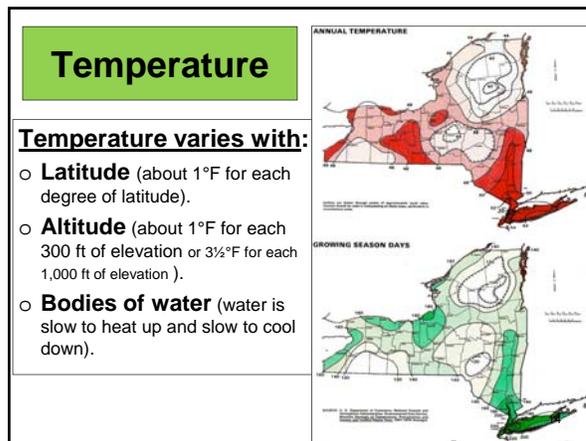
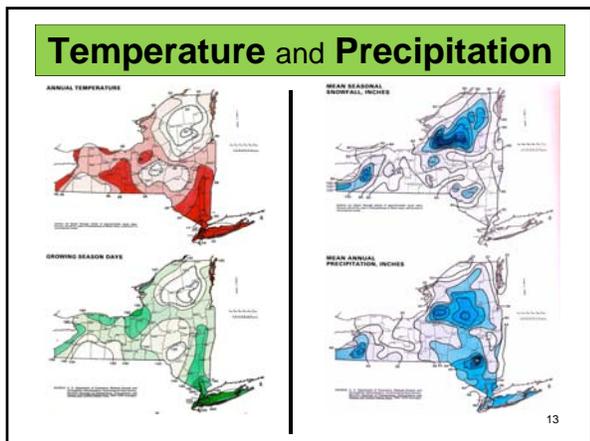


**The Office of the NYS Climatologist is based in the Dept. of Earth and Atmospheric Sciences at Cornell University.**

**It partners with the National Climatic Data Center (NCDC) and the National Weather Service (NWS) at NOAA.**

Web address: <http://nyasc.eas.cornell.edu/>

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## Air Quality Map

**EXTRA CREDIT Exercise 8 Air Quality of New York State** is ready for download.

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## Air Quality Issues

- Air quality is relevant to issues of human and environmental health.
- Sources of air pollution originate within and outside NYS.
- Air pollution includes:
  - **gaseous emissions:** CO<sub>2</sub>, NO<sub>2</sub>, ozone, methane
  - **particulates:** dust, soot (urban, agriculture, mining)
  - **acid precipitation:** sulfur dioxide + moisture = sulfuric acid

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## Acid Precipitation

- The average pH of precipitation (rain, snow and fog) in NYS ranges from 4 to 4.5 (pH scale of 0-14 with 7 being neutral). This is about 30x more acidic than normal (5.5).
- Acid rain affects aquatic species (alters lake habitats, reproductive cycles); forests (changes ecosystems), and increases corrosion of metals and carbonate-based building stone.
- Dry particulates reduce visibility (create haze).

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## Acid Precipitation Diagram

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## Cause of Acid Precipitation in NYS

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## NYS Division of Air Resources

- The DEC monitors air quality in its nine regions.
- With US EPA it regulates the emission of pollutants.
- This includes urban areas, agricultural practices, manufacturing, and mining activities.
- Issues an Air Quality Report annually.
- **Exercise 8** (extra credit) explores air quality.

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