

# Front Range Weather

by Michael Urban

Greeley, CO

4659 ft.

40.4 N Lat./104.7 W Long.

## General Weather Information:

- a. **Weather** is caused by differences in heating of the Earth's surface.
- b. Weather consists of such things as temperature, humidity, precipitation, wind, pressure, clouds, and many others.
- c. Because warm air is less dense than cold air, warm air rises over cold air; this fact sets the stage for pressure systems, clouds, and wind.
- d. Low pressure is associated with rising air; high pressure with sinking air.
- e. **Wind** blows from high to low pressure.
- f. Earth's rotation causes rising and sinking air to spin:
  1. Rising (low pressure) = counterclockwise rotation
  2. Sinking (high pressure) = clockwise rotation
- g. **Water** covers 71% of the Earth's surface.
- h. There is almost always water vapor (gas phase) present in the air.
- i. **Temperature** in the atmosphere decreases with height.
- j. As air rises, it is cooled and water vapor changes into a liquid.
- k. **Clouds** form if enough water vapor is present in rising air; precipitation occurs with saturation.
- l. There are three main types (based on shape) of clouds:
  1. Cumulus = puffy, like cotton balls
  2. Stratus = layered, blanket-like
  3. Cirrus = thin, wispy
- m. Clouds are classified by their shape and the height at which they are found (low, middle, and high)
- n. Weather moves primarily from west to east in the United States because we are in the belt of "prevailing westerlies" (30-60 North Latitude).

- o. The **jet stream** (“stream” of fast-moving air aloft) separates cold air (to the north) from warmer air (to the south).
- p. The position of the jet stream (latitudinally) and its shape (ridges and troughs) determine the major weather systems that affect the United States.
- q. Ridges indicate high pressure systems (sinking air; inhibited cloud formation); troughs indicate low pressure systems (rising air; likely cloud formation).
- r. **Fronts** are associated with low pressure systems; there are four main types:
  - 1. Cold front = brings cold air in behind it
  - 2. Warm front = brings warm air in behind it
  - 3. Stationary front = separation between warm/cold air
  - 4. Occluded front = cold front overtakes a warm front and lifts it

#### Colorado-specific Weather:

- a. Strong winds aloft produce **Chinook** “snow eater” winds.
- b. Chinook winds are indicated by **lenticular** clouds.
- c. The Front Range of Colorado is located in a **rain shadow**; this type of area is characteristically arid (dry).
- d. The Front Range receives snow/rain with **upslope (easterly) winds**; typically occurs when high pressure is to our immediate north, or low pressure to our south.
- e. **Smog** occurs over Denver when there is a temperature inversion (warm air above colder air) and calm winds.

#### Cloud Images:

<http://www.weatherstock.com/cloudcat3.html>

<http://www.carlwozniak.com/Clouds/CloudPix.html>

<http://physics.uwstout.edu/wx/U4/img012.htm>