

Unit 9: Severe Weather

Lecture 1

Objectives:

E4.3f - Describe how mountains, frontal wedging (including dry lines) convection, and convergence form clouds and precipitation.

E4.3g - Explain the process of adiabatic cooling and adiabatic temperature changes to the formation of clouds.

States of Water?

- Three states of water :
 - 1)Liquid
 - 2)Solid
 - 3)Gas
- Evaporation – Change from a liquid to a gas
- Condensation – Change from a gas to a liquid.

Evaporation



Humidity

- Specific Humidity- Actual amount of water in the air.
- Relative Humidity- compares actual amount with the maximum the air can hold at a given Temperature.

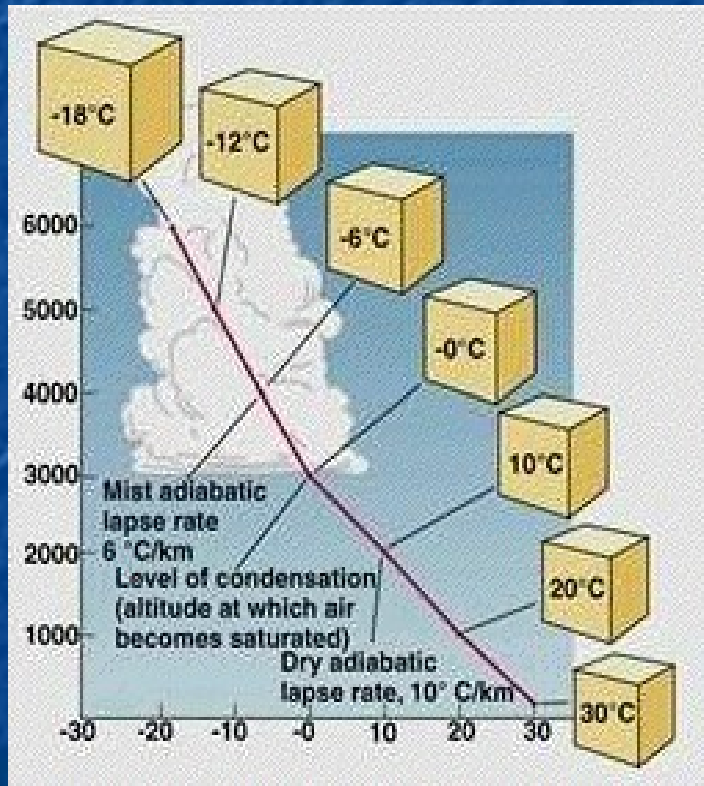
Condensation and Dew Point

- Dew Point – The temperature at which saturation occurs.
- For water to condense, the air must be cooled below the dew point. Air may lose heat by:
 - 1) Contacting a colder surface.
 - 2) Radiating Heat
 - 3) mixing with cold air
 - 4) expanding when it rises.

Normal Lapse Rate

- The higher you go up in the atmosphere the colder it gets.
- The Normal Lapse Rate 1 degree C per 160 meters.

Dry and Moist Adiabatic Rates



- Dry Adiabatic Rate (1 degree C per 100 meters) (Dry)
- When the air is saturated, it cools off slower (.6 degree C per 100 meters) (wet)
- Remember the Normal Lapse Rate is 1 degree C per 100 meters (Average)

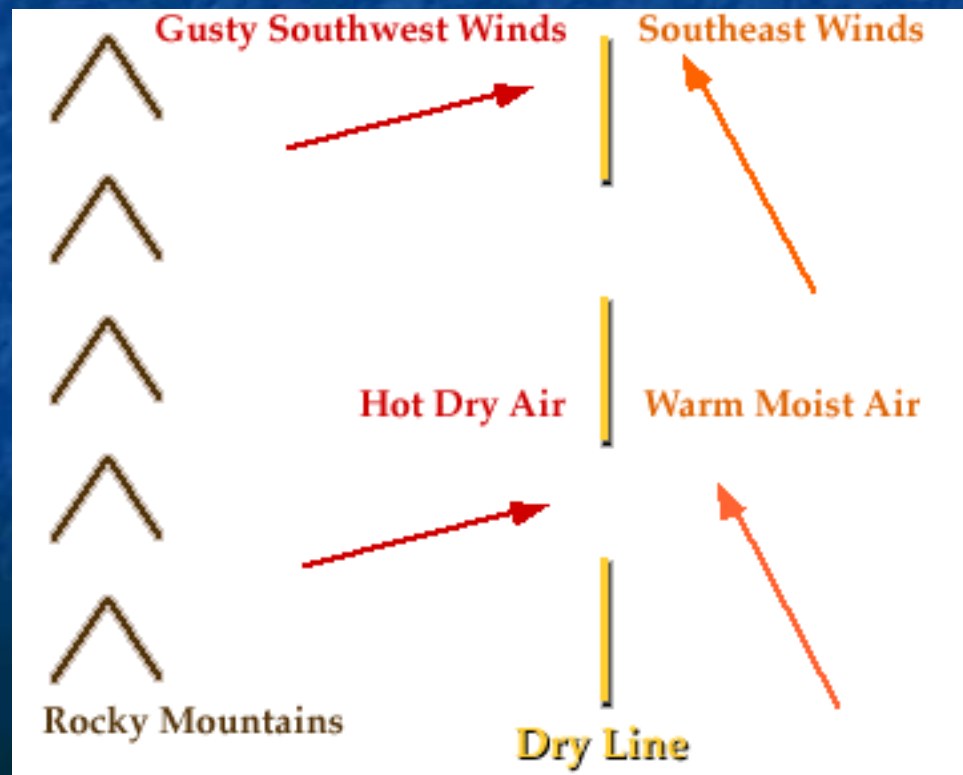
Precipitation



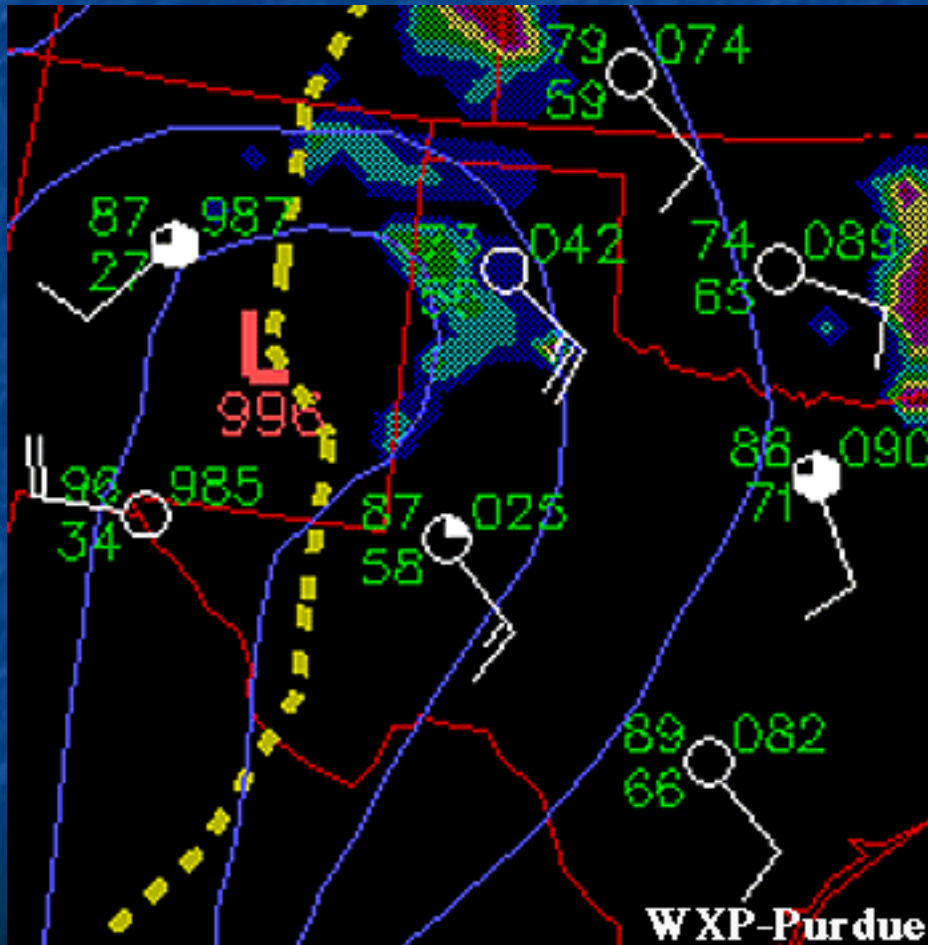
- Several Forms of Precipitation:
 - 1) Rain
 - 2) Sleet
 - 3) Hail
 - 4) Snow
- Condensation Nuclei

Dry lines

- A dry line is a boundary that separates a moist air mass from a dry air mass.



Dry lines



- Drier air behind dry lines lifts the moist air ahead of it, triggering the development of thunderstorms along and ahead of the dry line (similar to cold fronts).

Cloud Formation

