Introduction to Climate

What is climate?

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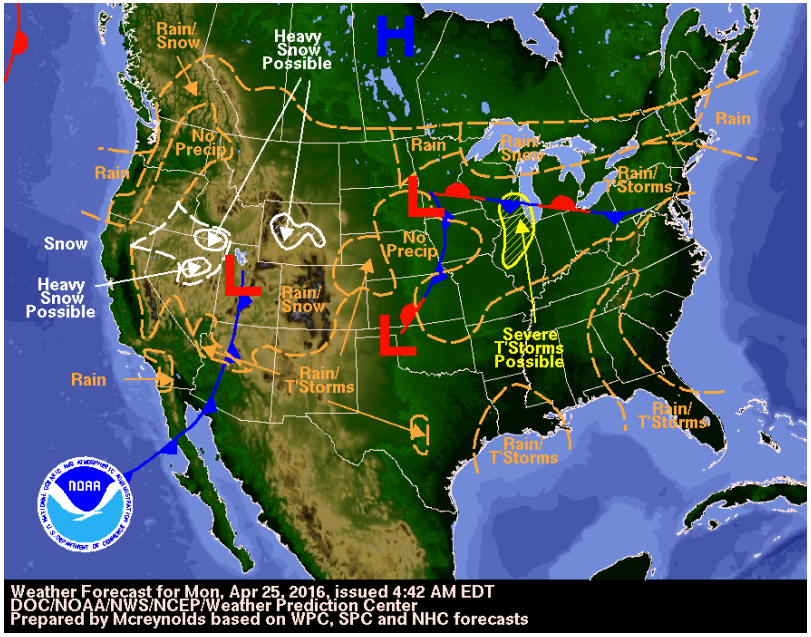
Definition

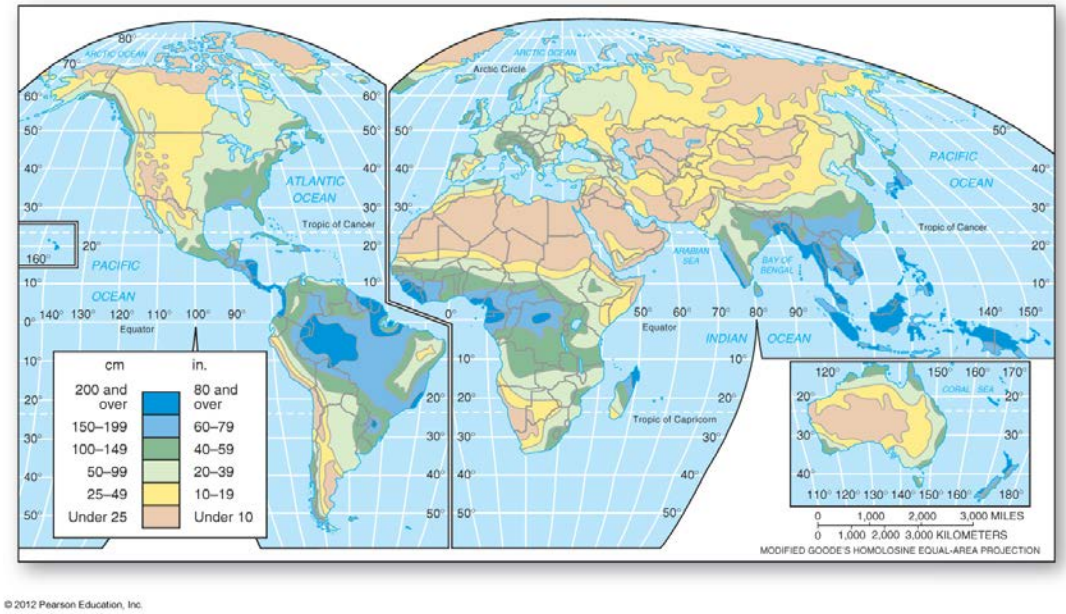
There are many definitions, but in general:

Climate is the long term average, or normal, of weather in an area. Climate normals are typically calculated for 30-years.

Weather vs. Climate

Weather is the condition of the atmosphere and surface at any given time.





So, climate is just the long term expression of weather!

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Weather vs. Climate

- Weather affects short term:
  - What to wear today?
  - Should I bring an umbrella?
  - What will the conditions be like tomorrow?
  - Is it safe to go out on the water or offshore?
  - Are there hurricane, flooding, or tornado threats for today?

- Climate is all about the long term:
  - Should I raise my house to prevent floods?
  - What crops will grow well in this location?
  - What kind of clothes should I buy and keep?
  - What kind of house should I build or buy?

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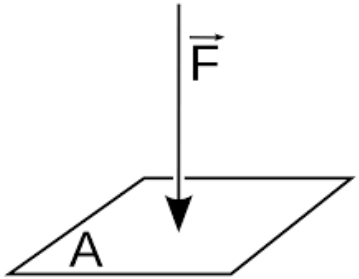
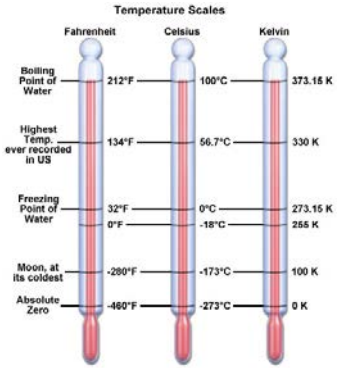
Observing Variables

- We study weather and climate through several main observations:
  - Pressure
  - Temperature
  - Moisture
  - Wind
  - Solar Radiation
  - Precipitation





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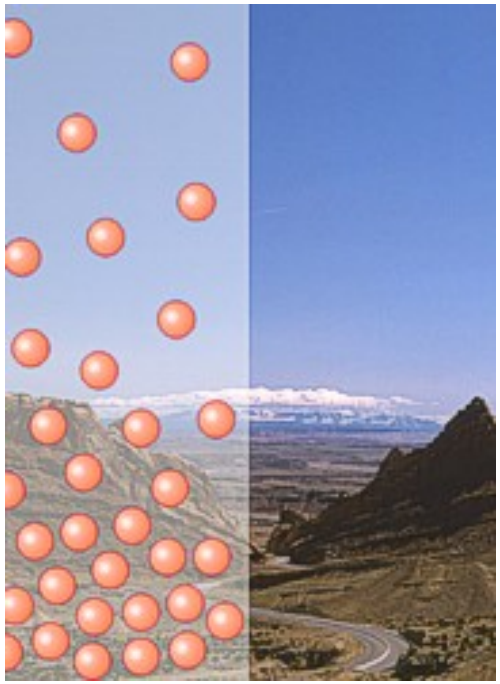
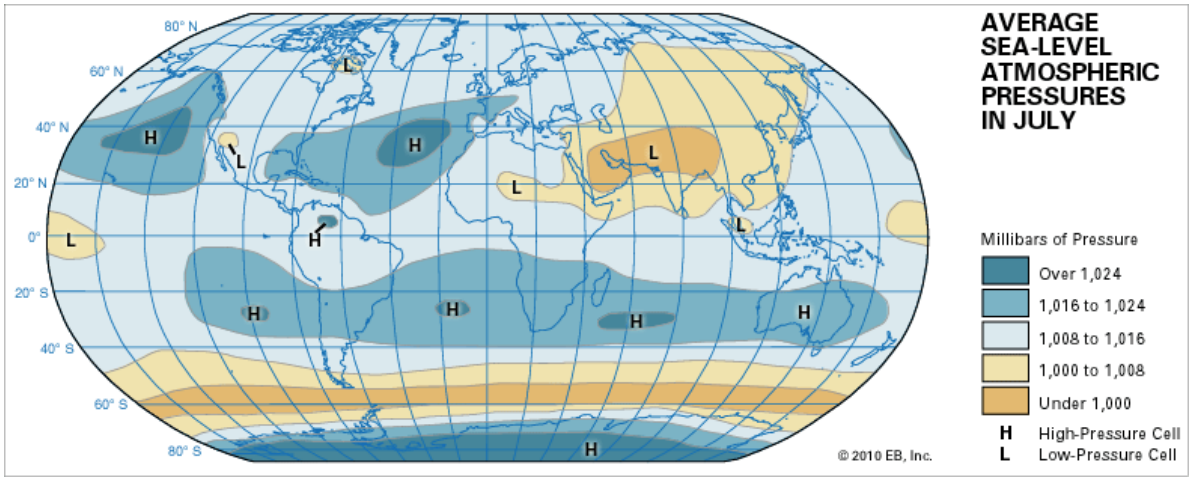
Pressure

Atmospheric pressure represents the weight of air molecules pressing on a surface.





In general,
higher pressure = fairer weather,
lower pressure = stormier weather

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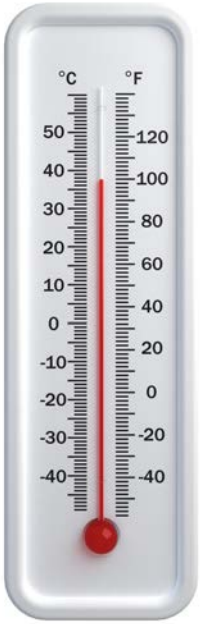
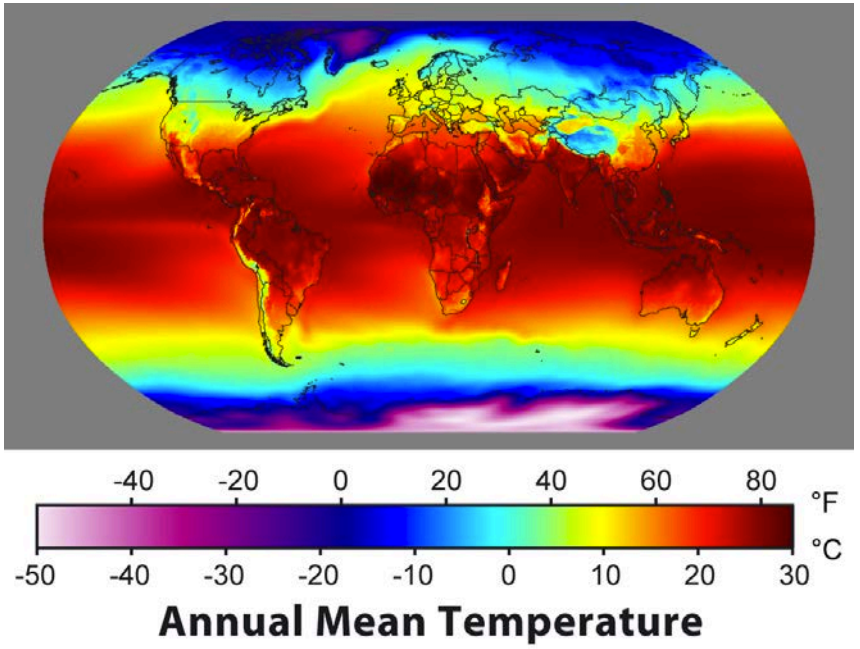
Temperature

Temperature is a measure of the energy content of air in terms of the movement of molecules (it is not heat).





Temperature can affect pressure and moisture in the atmosphere and vice versa.

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Moisture

Moisture in the atmosphere is measured by dewpoint and relative humidity.

Dewpoint is the temperature at which air becomes saturated and water condenses on a surface.

Relative humidity is the ratio of water in the air to the amount of saturated air.

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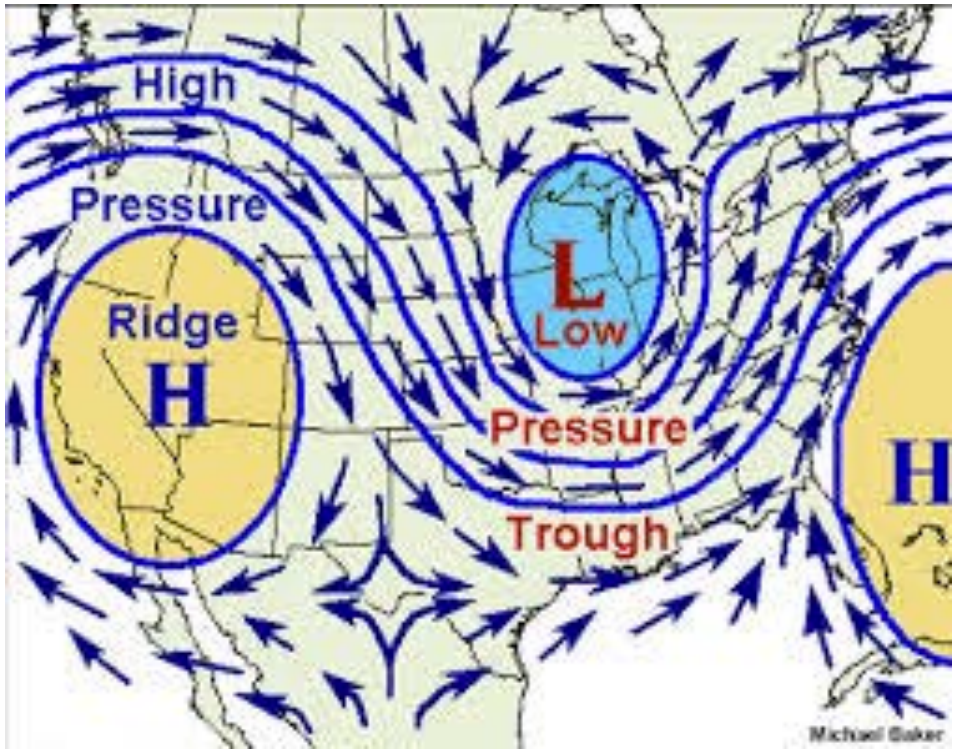
Wind



www.meted.ucar.edu

Wind is air in motion relative to the Earth's surface, and results from pressure differentials.

Think of wind in terms of a pump: it moves from areas of high to low pressure.

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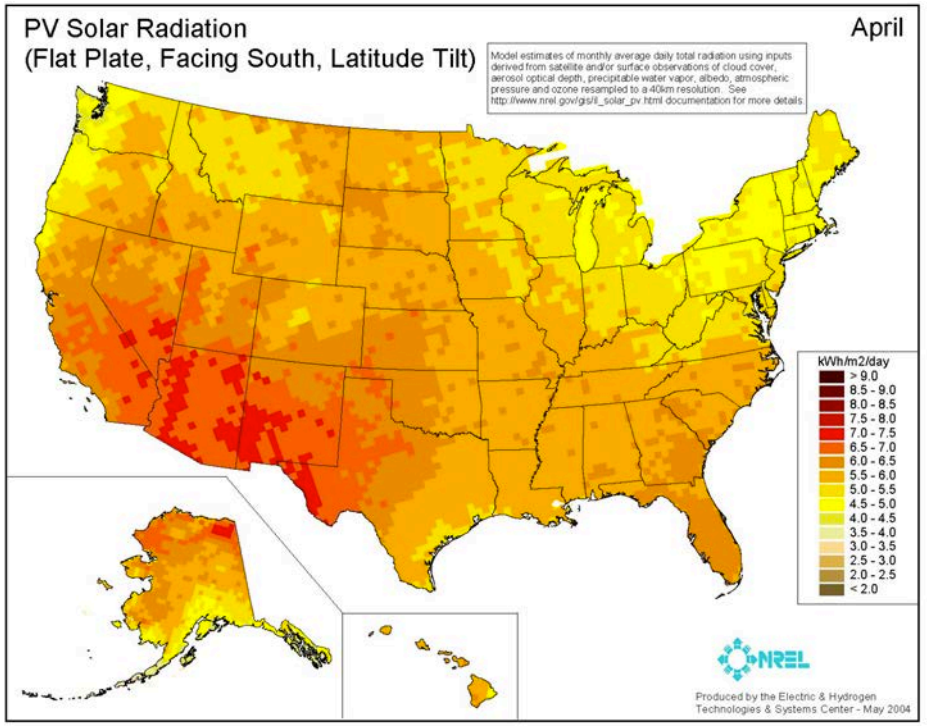
Solar Radiation

Incoming shortwave radiation from the Sun.

It either is absorbed by a surface or reflected. If reflected it, some is trapped by gases in the atmosphere.



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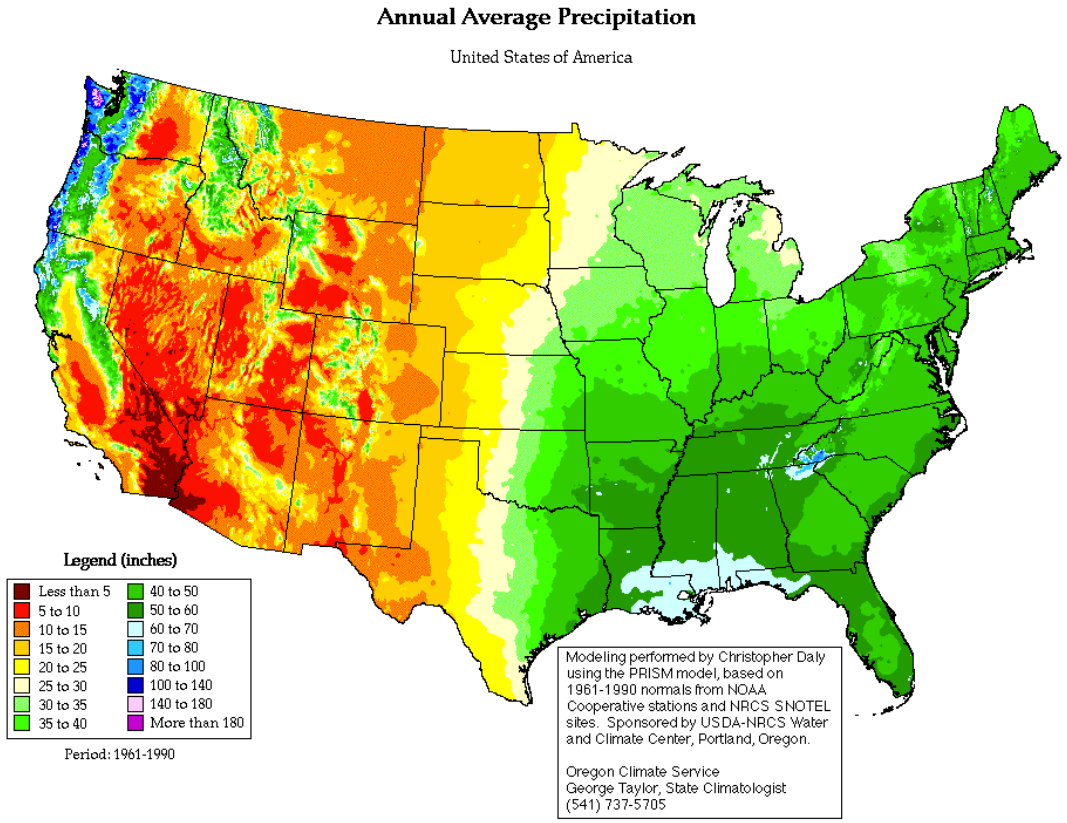
Precipitation



Water in the form of snow, rain, sleet, ice, hail, etc.

Result of certain temperature and pressure conditions in the atmosphere.

Influenced also by geography.

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