Scale

Phenomena occur at multiple scales

Space and Time related

Scale of measurement influences what we learn from observation

Scale-dependence

Levels of Organization

criteria for observation

Community   Biosphere

Interactions  Region

Population   Landscape

Organism   Ecosystem
Scale and level (approach) are different!

Approach determines criteria for observation:
• which measurements matter
• which entities are of interest

Northern pitcher plant
Sarrecenia purpurea
An ecosystem *in* a leaf

Scale and level are different

Net Radiation

Dec

Data: NCEP/NCAR Reanalysis Project, 1959-1997 Climatologies
Animation: Department of Geography, University of Oregon, March 2000
Inter-Tropical Convergence Zone

- Subtropical and polar air masses meet, creating a moist temperate climate.
- Dry descending air absorbs moisture, forming deserts.
- Rising air at the equator is associated with a moist tropical climate.
- There are three air circulation cells on each side of the equator.

Global Latitudinal Circulation Patterns

- Hadley Cell
- Ferrel Cell
- Polar Cell
Coriolis effect - Earth’s rotation interacts with Circulation cells to make wind patterns (which drive Ocean circulation as well)

Coriolis effect: Winds in the Northern Hemisphere deflected to the right of their direction of travel.

Coriolis effect: Winds in the Southern Hemisphere deflected to the left.

Precipitation
Spot the moving ITCZ

Dec
Spot the moving ITCZ
Where in the heck are we?

Gothic, CO (38.9 N, 107.0 W) 2750 m
Mountain ranges in Europe and Asia generally run east to west.

Mountain ranges in North and South America generally run north to south.

Isolated mountain ranges are often islands of distinctive climate.
In regions having the ranges indicated within the red dashed lines, other factors—such as seasonality of drought, fire, and grazing—strongly affect which biome is present.