

Geography 310
Lecture 9
Global Circulation

Needs: 3 GIF

A. Upper Air - Surface Linkage

1. upper atmosphere influences surface weather and climate
2. upper air (14,000+ ft.) consists of strong west winds in mid-latitudes
- GIF1 3. upper flow contains large meandering "Rossby waves", and the "jet stream" (high speed wind cores)
 - a. RW&JS interact w/surface & surface affect upper levels (feedback)
 - b. RW&JS found above the Polar front in area of greatest temperature gradient--intensity related to gradient
 - c. topographic effects--mountain ranges affect wave position
 - d. oceans--water temperatures affect wave position
4. upper air effects on surface weather and climate
 - a. RW guide large scale motion of air masses
 - b. RW guide MLCs and favor their formation in areas of upper level divergence (found in certain parts of the wave downwind from a trough axis)
 - c. downwind from a ridge axis highs are favored (in area of upper level convergence)
 - d. waves migrate north and weaken in summer, migrate south and strengthen in winter

B. General Circulation (stress seasonal migration)

- GIF2 1. Hadley Cell--equatorial low, trade winds, STH
 - a. ITC-convergence (rain)
 - b. STH--divergence (clear)
 - c. results in transfer of heat poleward
2. Midlatitude circulation (STH to SPL , westerlies)
 - a. Polar front
 - b. westerlies
 - c. Jet stream
 - d. Rossby waves
 - e. traveling Lows and Highs
 - f. great day-to-day diversity
 - g. RW can get "locked in", creating persistent unseasonable weather patterns (California Drought)
3. High latitude circulation--spirals outward from Polar High
 - a. weak in arctic, well organized over Antarctica
4. Regional variations
- GIF3 a. Asian monsoon b. N. Amer. monsoon

