

# Deserts

1. Deserts
  - a. Dry places that have a dry climate
  - b. Dry climate – one in which the yearly precipitation is less than the evaporation loss
  - c. Dry regions cover 30% of the Earth's surface
  - d. Concentrated in sub-tropics, mid-latitudes, and polar regions
2. Meteorology Principles
  - a. Warm, less dense air rises
  - b. Rising air cools
  - c. Moisture carrying capacity of air decreases
  - d. Precipitation occurs
  - e. Cold, dense air sinks (moisture depleted)
  - f. Sinking air warms
  - g. Moisture carrying capacity increases
  - h. Warm air can hold more moisture than cold air**
3. Types of Deserts
  - a. Low-Latitude Deserts
    - i. Along the equator is a Low pressure system, air rises
    - ii. Along the Tropics of Cancer and Capricorn are High Pressure systems (Subtropical high-pressure belt, air falls)
    - iii. As air mass warms it can hold more moisture – any available water evaporates
  - b. Cold-Water Coasts
    - i. Cold dry air from ocean moves over warm dry land
    - ii. Land warms air mass
    - iii. As air mass warms it can hold more moisture – any available water evaporates
  - c. Rain Shadows – Orographic Uplift
    - i. Warm, humid air masses move off of ocean
    - ii. As the mass approaches a mountain it begins to rise
    - iii. Rising air cools
    - iv. Moisture carrying capacity decreases – precipitation occurs on the windward side
    - v. Cold, dry air mass moves over mountains and descends on the leeward side
    - vi. Descending air warms and picks up moisture
    - vii. Dry region is a Rain Shadow – the process is orographic uplift
4. Desert Locations
5. Weathering in Arid Climates
  - a. Mechanical Weathering is dominant
  - b. Lack of moisture and organic acids limit chemical weathering
  - c. Chemical weathering does occur, but it takes longer
6. Water and Deserts
  - a. Ephemeral streams are present in desert areas

- b. Deserts lack vegetation
  - c. Rainfall is infrequent, but intense when it occurs
  - d. Runoff is high – get flash floods
  - e. One storm can do an enormous amount of erosion (triggering mass wasting and transporting sediment)
  - f. Water does the majority of erosional work in the deserts**
7. Wind Transport of Sediment
- a. Similar to stream transport – both air and water are fluids
  - b. Wind systems have both a bed load and suspended load
  - c. Bed Load
    - i. Primarily sands, gravels and larger particles
    - ii. Particles move by saltation (sands), creep (rolling or sliding – particles larger than sand)
    - iii. Causes abrasion – mechanical weathering
  - d. Suspended Load
    - i. Primarily silt with some clay
  - e. Wind has a capacity and competence
8. Wind Erosion
- a. Insignificant in erosional processes
  - b. Two mechanisms
    - i. Deflation
      - 1. Loose particles of sand and dust are lifted from the surface**
    - ii. Abrasion
      - 1. Sandblasting of particles**
  - c. Desert Pavement – deflation occurs leaving behind coarse particles too large to carry