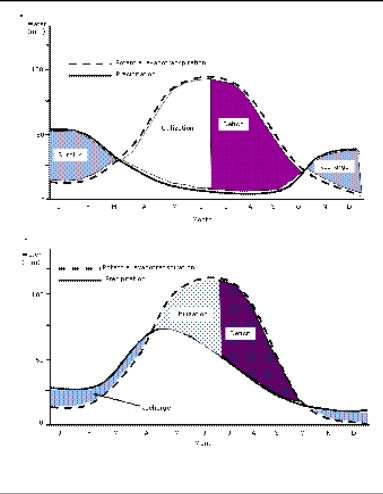


Arid and semi arid climates are defined by low rainfall totals. Arid climates have under 10" (250mm) of rainfall and semi arid climates have between 250mm and 20" (500 mm). Above 500mm is classed as humid.

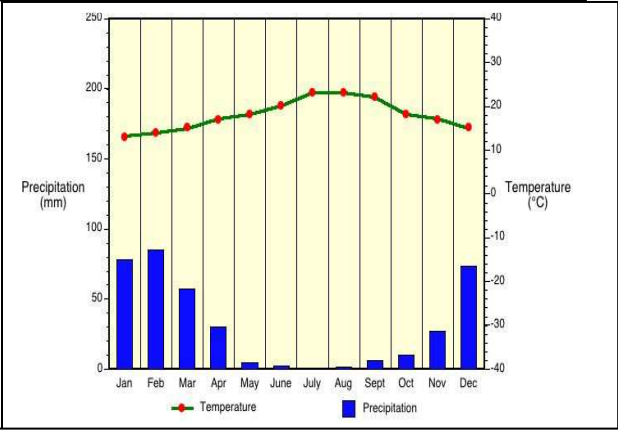
As important is the amount of evapotranspiration. The key measure is Potential Evapotranspiration (PE) since there is often a water deficit. Precipitation (P) < PE. Arid climates have a P/PE ratio of 0.4, semi arid 0.4 -0.8. Phoenix in Arizona has 191mm of P, 1157mm of PE and a ratio of 0.167.

Diurnal temperature ranges are very high, and rain is low, erratic and unpredictable. Rainfall is usually in the form of heavy showers.



The water budget is key. In the top one the winter rainfall causes a water surplus after the soil is recharged. In summer there is a deficit.

In the second one, despite the summer rainfall the high levels of PE cause a deficit and there is never a surplus in the budget.



Climate graph for Los Angeles in southern California.

- A moderate temperature range from 25 C in summer to a mild 15 C in winter
- For greater ranges are seen from day to night (high diurnal temperature ranges)
- The rainfall total is low under 400 mm which classifies the climate as semi arid
- Drought conditions in summer due to high pressure
- A winter maximum of rainfall with around 80 mm in February due to a mild westerly wind belt and depressions
- Winter rainfall comes in periodic storms

### PLANTS / FLORA

- **Xerophytes** (drought resistance)
  - Succulents** – store and conserve water in fleshy stems eg Joshua tree
  - Reduced transpiration** a. waxy stem and leaves b. fewer and sunken stomata c. Spines instead of leaves
  - Widely spread roots** to absorb more moisture, and deeper roots to reach the water table (phreatophytes)
- **Pyrophytes** (fire resistance)
  - Fire** is common especially in semi arid areas
  - Thick bark** to protect the soft parts of the plant
  - Most of the mass of the plant below the surface** where it is protected
  - Old growth is killed off** to stimulate new growth
  - Seeds require fire** before they germinate
- **Perennials**
  - Dormant** in the dry season and allows leaves to fall off
  - Slow growing** to preserve energy
  - Bulbs** in the ground to stay dormant
  - Sharp spines and nasty taste** to repel herbivores
- **Annuals**
  - Short life cycle** to fit in with the short wet season
  - Many small seeds** produce, wind blow
  - Seeds stay dormant** until the wet season when they germinate

### ANIMALS / FAUNA

- **Burrowing** is one technique used by animals such as snakes, lizards and rodents. This keeps them away from the intense heat of the day and gives them an environment with higher humidity. Some animals plug the entrance to keep out hot air. The desert tortoise of the Mojave desert spends 95% of its life underground
- **A nocturnal lifestyle** is common, resting in the shade during the day, coming out to feed or hunt at night when temperatures are lower and humidity is higher
- Some antelopes and birds migrate to wetter areas in droughts or the dry season to seek water and food
- Some animals **hibernate** during the hot dry season, slowing down their metabolic rate to wait for the wetter season or a rain storm when they come on to feed
- Rabbits and other animals have **well ventilated fur** to keep cool, they may **orientate** their bodies away from the sun, and they have **large ears with many blood vessels** near the surface to allow them to lose heat easily. Some may use their damp mouths to aid cooling by evaporation
- Animals may have **pale coloured bodies** to absorb less heat, the ability to drink large amounts of water, or get their required moisture by eating plants