

Wind and Deserts

Wind: flow of air, similar to water flow (but lower viscosity and density)
agent of erosion, transport and deposition
important in desert environment

Prevailing winds: due to **solar heating** and Earth's rotation (**Coriolis** force)

Movement of sand particles: 1) sliding on surface; 2) saltation (jumping)

Ripples form in sand at right angles to wind direction; low wind speed gives small ripples, high speed, large ripples

Deflation: removal of fine sediment, leaving coarse gravel (due to lack of vegetation); surface is called "desert pavement"

Sandblasted pebbles: **ventifacts**; streamlined parallel ridges: **yardangs**

Dune: sand deposition due to loss of wind velocity

Types: (1) **Barchan** (crescent-shaped, points to downwind; constant wind direction, limited supply)

(2) **Transverse** (long, wavy ridges, right angles to wind direction; abundant supply)

(3) **Blowout** (reverse of Barchan; destabilization of a section of transverse)

(4) **Linear** (long ridge in same general direction as wind; moderate supply, but shifting wind direction—eg, from SE to NE)

Wind-blown dust yields deposits of **loess** (may cover 10% of land surface); loess in China blown from Gobi desert; loess in Mississippi Valley from blowing of glacial outwash

Deserts: occur mainly due to low rainfall; **hot deserts** between 30 degrees N and S of equator (Sahara, Kalahari, Saudi Arabian, Australian) caused by high atmospheric pressure

Mid-latitude deserts (Mojave, Great Basin) occur in rain shadows caused by prevailing winds over mountains, or are far inland (Gobi) where winds have long lost moisture

Polar deserts (Victoria Land, Antarctica); air cannot hold much moisture because too cold

Desert colors derived from iron oxides produced during weathering (**desert varnish**)

Major agent of erosion, even in a desert, is **water**; lack of vegetation + downpour = flood

Sand accumulation: alluvial sediments (because sediments don't get to ocean); dunes (noted before)—but most surface in deserts is rock, not sand (20%)

Temporary lakes (dominated by evaporation): **Playas** (evaporite deposits)

Stream valleys are steep walled (called **washes** in US or **wadis** in Near East)

Eroded bedrock surface: **pediment** (broad, gently sloping); some resistant layers may lead to **mesa** formation (tablelands)