

Coronado National Memorial Geologic History Definition of Terms:

Alluvial Fan: deposit of sediment fanning out at the base of a mountain. Rivers/streams carrying material down the mountain lose energy as the slope decreases drastically, resulting in the deposition of large material which can no longer be carried by the flowing water.

Calcium carbonate: Chemical formula CaCO_3 . A mineral secreted by many marine organisms as a skeleton/shell/test. It is created by combining Ca ions (dissolved from other minerals or recycled from decaying organic material) with dissolved CO_2 (aka carbonic acid, or H_2CO_3 but dissolved CO_2 is probably an easier way to think about it). When these CaCO_3 secreting organisms die, their bodies fall to the ocean floor where the organic parts decay, leaving the inorganic, CaCO_3 remains. Over time, these remains collect, forming limestone as they are subjected to burial and the associated high pressures which cause them to form solid rock (often containing fossils).

Craton: The portion of continental plate (generally large and more or less central) that maintains long term stability, existing since Precambrian times.

Dewatering: Dewatering occurs when hydrous crustal minerals (minerals that contain H_2O) descend deeply into the mantle and are subjected to extreme temperatures and pressures. The minerals are metamorphosed into denser species, releasing the H_2O which rises upwards into the overlying mantle. This injection of water lowers the melting temperature of the surrounding mantle rocks, causing parts of them to melt. The newly melted, water-bearing and comparatively less dense magma rises through the mantle and crust, exiting the earth and forming volcanoes inland of the subducting crust. Dewatering is associated with subduction zones, and is responsible for many volcanic chains stretching inland and parallel to the subduction zone.

Farallon Plate: An ancient oceanic plate adjacent to the Pacific plate, now completely subducted beneath the North American continent.

Fault types: See below (probably easier to visualize with picture than an explanation). (Transform fault = strike-slip fault)

Simple fault types

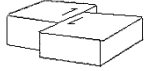
Normal fault



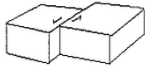
Reverse fault



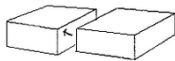
Right-lateral strike-slip fault



Left-lateral strike-slip fault

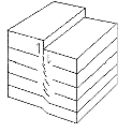


Oblique-slip fault

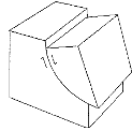


Complex Fault Types

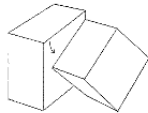
Fault displacement decreases with depth and fault terminates in a fold



Fault surface is curved, resulting in block tilting



One block is rotated with respect to another



High angle subduction: Subduction occurs along convergent plate boundaries (where two plates collide), where one plate sinks beneath the other (the sinking plate is always oceanic due to a greater density, although the upper plate can be oceanic or continental). The angle of subduction is measured from the horizontal, with a high angle subduction being closer to vertical and normal or low angle subduction being closer to horizontal. With a high angle subduction, the oceanic lithosphere is drawn deeper into the earth within a given horizontal distance. This results in greater dewatering within the same horizontal distance, creating the more violent volcanic eruptions associated with high angle subductions.

Orogeny: process in which section of the earth's crust is folded and deformed by lateral compression to form a mountain range.

Parasitic fold: fold that has been folded (i.e. fold within fold)

Thrust fault: fault along which one block is thrust upwards relative to the other (as opposed to a normal fault, where one block is dropped downwards relative to the other). More unusual than normal faulting, and generally associated with a significant amount of compression/crustal shortening. Thrust faulting pushes older sediments above younger sediments.

Unconformity: temporal break in the represented geologic record, either due to a non-depositional period (no geologic record is created) or a period of erosion (the geologic record is erased).