

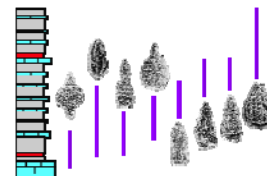
# Glossary of Franciscan Geology Terms



**Ammonite:** an extinct cephalopod that had a carbonate shell that was often similar in shape to the present-day chambered nautilus. Other present-day cephalopods include octopus and squid. Fossilized ammonites are very useful for biostratigraphic dating of rocks.



**Biostratigraphy:** the differentiation of rock units through the study of the fossils they contain, thus allowing the rocks units to be dated relative to each other. Biostratigraphy is based on the evolution of species through time.



**Bonds:** electrostatic forces holding together groups of atoms, as in the sheets of a sheet silicate mineral.

**Carbonate Compensation Depth (CCD):** the ocean depth below which the all calcium carbonate dissolves in the water before it becomes incorporated in the seafloor sediment.

**Carnelian:** a translucent orange-red form of chalcedony.



**Chalcedony:** a cryptocrystalline variety of quartz.

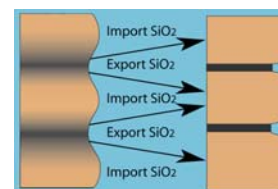
**Conchoidal fracture:** a smooth, undulating, circular fracture pattern, similar in appearance to a clam shell, produced when a brittle rock is broken.



**Cryptocrystalline:** containing crystals too small to be recognized with an ordinary microscope.

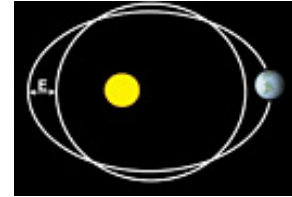
**Diagenesis:** the chemical and physical changes to sediments as they are buried and compacted into sedimentary rock.

**Diagenetic enhancement:** the transfer of mobile components in sediments, such as silica or carbonate, from zones of lower concentrations to zones of higher concentrations during the process of diagenesis. This enhances or exaggerates differences in original composition and makes bedding of the rocks more obvious.

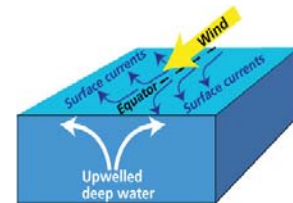


**Dike:** a tabular body of igneous rock that cuts across the structure of adjacent rocks.

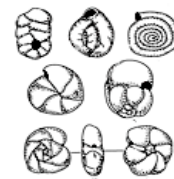
**Earth's orbital cycles:** cyclic changes in the Earth's orbital parameters that can affect climate and oceanography. Primary cycles are the approximate 100,000 year eccentricity cycle (how round or oval the orbit is), 42,000 year obliquity cycle (the amount the axis of rotation is tilted) and the approximate 21,000 year precession cycle (the place in the orbital cycle in which one pole or the other is pointed towards the sun).



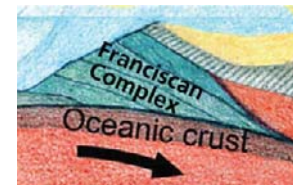
**Equatorial upwelling zone:** an area of ocean near the equator where winds create currents that divert surface water away to the north and south, allowing cold, deep, nutrient-rich waters to rise to the surface and replace the diverted surface waters.



**Foraminifera:** a group of single-celled organisms characterized by a shell or test of one to many chambers that often resemble the shell of a tiny snail. Foraminifers that float in the water have calcite tests, whereas those that live on the seafloor may have shells composed of tiny sedimentary particles glued together. Foraminifers are useful for biostratigraphic dating of rocks.



**Franciscan Complex:** the name given to a complex set of disrupted and deformed oceanic rocks found near San Francisco, California. The complex is composed of pieces broken off a subducting oceanic plate and accreted to the western margin of North America.



**Graded bedding:** a type of bedding in which each layer displays a gradual change in particle size. In turbidites, beds usually grade upwards from coarse to fine particles.



**Greenstone:** dark green metamorphosed basalt altered during interaction with hot, mineral-rich seawater. Chlorite and other green minerals resulting from the alteration account for the green color.



**Hot spot:** the surface expression of a rising plume of hot mantle material. Hawaii and Yellowstone are examples.

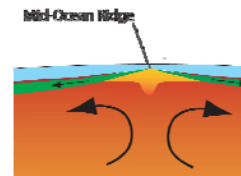
**Hydration:** the chemical combination of water with another substance.

**Hydrating:** the process of hydration

**Microfossils:** a fossil too small to be studied without the aid of a microscope. Microfossils include Radiolaria, Foraminifera and many other tiny organisms with parts that preserve as fossils.



**Mid-ocean ridge:** a major elevated linear feature of the seafloor where two tectonic plates are being pulled apart and new ocean crust is formed. It is a type of divergent plate boundary.



**Nutrients:** elements or compounds needed to nourish and sustain organisms, promoting their growth and abundance when plentiful or inhibit their abundance when scarce.

**Ocean trench:** a long, narrow, deep trough in the seafloor which marks the line along which a tectonic plate bends down into a subduction zone. Ocean trenches form the deepest parts of the ocean floor.



**Oxidize:** to unite oxygen with a substance (in this case a mineral).

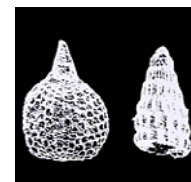
**Phenocryst:** a large crystal surrounded by a finer matrix in an igneous rock.

**Pluton:** a large body of igneous rock which crystallizes from magma that cools beneath the surface of the earth.

**Porphyry:** an igneous rock that contains conspicuous large crystals (phenocrysts) in a groundmass or matrix of fine-grained crystals.



**Radiolaria:** microscopic or near microscopic single-celled marine zooplankton with ornate skeletons made of silica.



**Radiometric dates:** the age of rocks determined by measuring the ratio of certain radioactive elements in them, relative to the amount of decay products from those radioactive elements. The age can be determined by multiplying the ratio by a known decay constant.

**Reduce:** to remove oxygen from a substance (in this case a mineral).

**Ribbon chert:** a form of bedded chert that has many thin, continuous chert beds separated by small shale partings, resulting in an outcrop that looks like a series of chert ribbons.



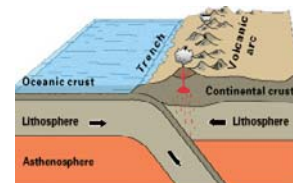
**Sill:** a tabular igneous intrusion that parallels the bedding of the surrounding rock.

**Slickensides:** slick, striated rock surfaces created by shearing along a fault or plane of movement in the rock.



**Stratigraphy:** the scientific description, correlation, and classification of strata in sedimentary rocks.

**Subduction zone:** the zone between a sinking oceanic plate and an overriding plate. It is a type of convergent plate boundary.



**Tabular:** a feature having two dimensions much longer or larger than the third, like a tabletop or tablet. See **dike** and **sill**.

**Tests:** hard outer coverings or shells of some invertebrate organisms, such as Foraminifera or Radiolaria.

**Trace fossils:** a fossilized track, trail, burrow, or tube resulting from the life activities of an animal.



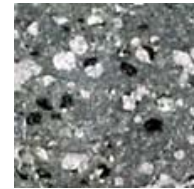
**Turbidite:** sediment deposited from a turbidity current. Turbidite beds are characterized by moderately sorted sediments in graded beds, ranging from cobbles to coarse sand at their bases to fine sand and silt at their tops.



**Turbidity current:** a bottom-flowing, density-driven current containing suspended sediment, which flows down an underwater slope. Turbidity currents are often triggered by earthquakes or large storms.



**Vesicles:** small spherical cavities in a volcanic rock produced by air or gas bubbles in the molten rock. Vesicles may sometimes become filled with quartz, calcite or other minerals.



**Volcanic glass:** a product of rapid cooling of magma. It shows no definite crystalline structure. Obsidian is a dark-colored variety.

**Upwelling:** the upward flow of cold, nutrient-rich, deep ocean waters to the surface that results from wind-driven surface currents which move water away from a coast, or cause water to diverge from an area like the **equatorial upwelling zone**.

