

The three fundamental kinds of rock:

Igneous rocks: rocks that form via the cooling and crystallization of molten mineral material (magma).

These include

Volcanic rocks, which form when magma rises to the Earth surface and thus cools quickly to make rocks with microscopic crystals.

Plutonic rocks, which form when magma only rises to a position within Earth's crust and thus cools slowly to make rocks with crystals of a size visible to the naked eye.

Sedimentary rocks: rocks that form via compaction and cementation of sediments that are deposited onto the solid Earth surface from water, wind, and ice.

These form from

Siliciclastic sediments, which form via the mechanical breakdown of pre-existing rocks, largely silicate-bearing igneous and metamorphic rocks, to yield particles ranging in size from clay to silt to sand to gravel.

Biochemical sediments that consist largely of the tests, shells, and skeletons of organisms, which generate those mineralized parts from solutes in seawater or lake water.

Chemical sediments that form via direct precipitation from seawater or lakewater that is supersaturated with respect to the minerals precipitated.

Metamorphic rocks: rocks so transformed by recrystallization caused by increased temperature and pressure that their original nature as an igneous or sedimentary rock can no longer be discerned

These include rocks altered by

Regional metamorphism, which is metamorphism of vast volumes of rock at depth within large proportions of a continent, so that exhumation exposes "regions" of metamorphic rock

Contact metamorphism, which results from heating by magmas and thus is found at the "contact" between a body of igneous rock and the surrounding rock into which it intruded or onto which it was extruded.

Rocks, Part III

Geologists recognize three fundamental kinds of rocks, as outlined at left. However, the boundaries between these seemingly distinct groups can be blurry, as the diagram below suggests. For example, as sedimentary rocks become more intensely lithified, they progress toward weakly metamorphosed rocks, and we commonly speak of "meta-sedimentary rocks". In high-temperature metamorphism, rocks approach melting, and migmatites are rocks at that boundary between metamorphic and igneous. Among igneous rocks, wind-blown volcanic

ashes and volcanic breccias are rocks that approach and interlayer with sedimentary rocks that likewise are deposited by wind or by flowing slurries of rock and water.

At the center of this diagram are skarns. These are limestones (sedimentary rocks) metamorphosed by silicate-rich fluids expelled from magmas forming plutonic igneous rocks. They thus represent an intersection of igneous fluids and metamorphic processes with sedimentary rocks to form fascinating rocks with unusual minerals.

The continuity of the three kinds of rocks:

