

GLOSSARY

AA lava	typically 2-5m thick; 3.5mph; width typically more than 100 yards; more viscous than Pahoehoe lava
active volcano	500 (as counted by International Association of Volcanology); an active volcano has erupted in historic time (within last 3000 years in Mediterranean; 200 years in Hawaii); 1350 (as counted by Smithsonian Institutions); a volcano that has erupted in the last 10,000 years;
Andesite	the fine-grained volcanic extrusive equivalent of Diorite (intrusive). Andesites are the intermediate members of the calc-alkaline volcanic suite and are associated with Basalts (from Gabbro) and Rhyolites (from Granite) in island arcs and orogenic regions.
Ash flow	a turbulent blend of unsorted pyroclastic material (mostly fine-grained) mixed with high-temperature gases ejected explosively from a fissure or crater
Asthenosphere	the weak zone inside the Earth directly below the lithosphere, from 15 to 2000 km below the surface. Seismic velocities are distinctly lower in the asthenosphere than in adjacent parts of the Earth's interior. The material in the asthenosphere is therefore believed to be soft and yielding to plastic flow.
Atoll	a ring of low coral islands surrounding a lagoon. Atolls grow as an extinct volcano is subsiding
Backarc basin	the area behind a subduction-related volcanic arc where folds and faults form. Most oceanic backarcs are extending.
Basalt	a fine-grained, dark, mafic igneous rock composed largely of plagioclase feldspar and pyroxene: the extrusive equivalent of Gabbro
Batholith	a large body of intrusive igneous rock consisting of several plutons joined at depth and occupying many thousands of square kilometers. They are generally composed of granite material and are associated with mountain belts.
Breccia	volcanic breccia: a pyroclastic rock in which all fragments are more than 2 mm in diameter
Caldera	(Spanish for Cauldron) a large, more or less circular depression or basin associated with a volcanic vent. Its diameter is many times greater than that of the included vents. Calderas result from subsidence or collapse and may or may not be related to explosive eruptions
Cinder	a fragment of volcanic ejecta from 0.5 to 2.5cm in diameter
Cinder cone	a steep, cone-shaped hill composed of loose volcanic fragments erupted from a central vent
Clastic	pertaining to fragments (such as ash, cinder, lapilli) produced by the mechanical breakdown of rock
Composite volcano	a large steep-sided volcanic cone built by extrusion of ash, lava and shallow intrusions. Synonymous with stratovolcano
Crater	an abrupt circular depression formed by extrusion of volcanic material; bowl-shaped pit at the summit of most volcanoes, and at the impact site of a meteorite
Dacite	volcanic equivalent of Granodiorite
Debris flow	the rapid downslope movement of debris (rock, soil, and mud)
Dike	a tabular intrusive rock that cuts across strata or other structural features of the surrounding rock

Diorite	a plutonic rock with composition intermediate between Granite and Gabbro; the intrusive equivalent of Andesite
Ejecta	rock fragments, glass, and other material thrown out of an impact crater or a volcano
Extrusive rock	a rock formed from a mass of magma that flowed out on the surface of the Earth. Example: basalt
Felsic	the minerals feldspar and quartz or an igneous rock or metamorphic rock made predominantly of feldspar and quartz; poor in iron and magnesium. Light-colored Contrast with mafic.
Fissure	an open fracture in a rock
Fissure eruption	extrusion of lava along a fissure
Flood basalt	an extensive flow of basalt erupted chiefly along fissures. Synonymous with plateau basalt.
Forearc	at a convergent plate margin, the region between the trench and volcanic arc.
Fumarole	small volcanic vent that emits gas and steam from which minerals precipitate onto surrounding surfaces; the temperature in a fumarole typically ranges between 200-900 deg C
Gabbro	a dark-colored, coarse-grained rock composed of Ca-plagioclase, pyroxene, and possibly olivine, but no quartz. The intrusive equivalent of Basalt.
Geyser	a thermal spring that intermittently erupts steam and boiling water
Glass	a state of matter in which a substance displays many properties of a solid but lack crystal structure. An amorphous igneous rock formed from a rapidly cooling magma
Granite	a coarse-grained igneous rock composed of K-feldspar, plagioclase, and quartz, with small amounts of mafic minerals. The intrusive equivalent of Rhyolite.
Granodiorite	a plutonic rock similar to granite in composition, except that plagioclase feldspar is present in greater abundance than orthoclase feldspar; the intrusive equivalent of Dacite.
Greenstone	a field term applied to any low-grade metamorphosed mafic igneous rock (for example, basalt or gabbro). Chlorite accounts for their greenish cast.
Guyot	a seamount with a flat top
Hot Spot	the expression at the Earth's surface of a mantle plume, or column of hot, buoyant rock rising in the mantle beneath a lithospheric plate
Hydrothermal deposit	a mineral deposit formed by hot water. The high temperature commonly is associated with emplacement of a magma.
Igneous rock	rock formed by cooling and solidification of molten silicate minerals (magma). Igneous rocks include volcanic and plutonic rocks.
Ignimbrite	(welded tuff); fragmental flows having some of the characteristics of lava and some of air-fall pyroclastic material (ash particles were hot enough to fuse together)
Intrusion	injection of a magma into a preexisting rock
Intrusive rock	igneous rock that, while it was fluid, penetrated into or between other rocks and solidified. It can later be exposed at the Earth's surface after erosion of the overlying rock.

Island arc	a chain of volcanic islands. Island arcs are generally convex toward the open ocean. Example: the Aleutian Islands.
Laccolith	a concordant igneous intrusion that has arched up the strata into which it was injected, so that it forms a pod-shaped or lens-shaped body with a generally horizontal floor.
Lahar	(Mt. Pinatubo, Nevado del Ruiz) Indonesian word for mud flow of unconsolidated volcanic ash, dust, breccia, and boulders that occurs when pyroclastic or lava deposits mix with rain or the water of a lake, river or melting glacier;
Lapilli	Italian word for little stone. Pyroclastic fragments about 1 cm in diameter.
Large igneous province	(LIP) area of extensive flood basalts thought to be generate over a mantle plume
Lava	magma that reaches the Earth's surface
Lava dome	bulbous lava flow or viscous plug of lava piled near its vent. Most are made of rhyolite
Lithosphere	the relatively rigid outer zone of the Earth, which includes the continental crust, the oceanic crust, and the part of the upper mantle lying above the weaker asthenosphere
Maar	a wide, low-relief crater formed by explosion, generally filled with water
Mafic	a mineral or rock rich in iron and magnesium silicates such as olivine and pyroxene
Magma	molten rock, generally a silicate melt with suspended crystals and dissolved gases
Magma chamber	a magma-filled cavity within the lithosphere
Magmatic differentiation	a general term for the processes by which magmas differentiate. It includes fractional crystallization, magma mixing, and assimilation.
Mantle plume	A buoyant mass of hot mantle material that rises to the base of the lithosphere. Mantle plumes commonly produce volcanic activity and structural deformation lithospheric plates near as well as away from its boundaries.
Mare	(pl. maria) any of the relatively smooth, low, dark areas of the Moon. The lunar maria were formed by extrusion of lava.
Midocean ridge	broad fractured swell in the ocean basins. New oceanic crust is formed at this type of divergent plate boundary. Synonymous with oceanic ridge.
Mofette	relatively cold (only about 100 deg C) "fumaroles" that exhale primarily CO ₂
Mud flow	a flowing mixture of mud and water (also lahar)
Nuee ardente	original (French) name for pyroclastic flow
Obsidian	a glassy igneous rock with felsic composition (e.g. that of rhyolite)
Olivine	an important silicate mineral with magnesium and iron [(Mg,Fe) ₂ SiO ₄]
Ophiolite	a sequence of rock characterized by ultramafic rocks at the base and (in ascending order) gabbro, sheeted dikes, pillow lavas, and deep-sea sediments. The typical sequence of rocks constituting the oceanic crust.

Pahoehoe lava	lava with smooth, glassy, and ropy surface; can be up to 14mph fast; typically 30 cm thick; hotter than AA lava;
Partial melting	a process in which heating melts some of the minerals in a mass of rock while the rest remains solid. Partial melt occurs because the minerals that compose the rock melt at different temperature.
Pegmatite	a vein of extremely coarse-grained granite, often containing economic amounts of rare elements
Peridotite	a dark-colored ultramafic igneous rock of coarse-grained texture, composed of olivine, pyroxene, but with essentially no feldspar and no quartz
Phreatic eruption	explosive eruption when magma comes into contact with ground water
Pillow lava	rock formation that resembles a pile of sandbags; an ellipsoidal mass of igneous rock formed by extrusion of lava underwater
Pluton	a deep-seated major intrusive body of coarse-grained igneous rock, generally of granitic composition.
Porphyric texture	the texture of igneous rocks in which some crystals are distinctly larger than others
Pumice	a rock consisting of frothy natural glass; density is so low (pore content so high) that it floats in water
Pyroclastic flow	a glowing cloud of volcanic ash, fragments of volcanic rock, and gases that moves rapidly downhill away from the eruptive center during a volcanic eruption
Pyroclast	fragment of volcanic material ejected during an eruption. Such materials are also know as tephra or ejectamenta and may be expelled as solid fragments or in the molten state, chilling in the air and producing vitreous material. (e.g. Mt. Unzen, Mt. Pinatubo)
Rhyolite	Rhyolites are the volcanic equivalent of granites. Rhyolitic and andesitic are characteristic of island arcs and orogenic regions. Many lavas of rhyolitic composition occur in the glassy state (e.g. Obsidian).
Rift system	a system of faults resulting from extension
Seamount	an isolated, conical mound rising more that 1000m above the ocean floor. Seamounts are submerged shield volcanoes
Shield volcano	a large volcano shaped like a flattened dome and built up almost entirely of numerous flows of fluid basaltic lava. The slopes of shield volcanoes seldom exceed 10 degrees, so that in profile the resemble a shield or broad dome
Sill	a tabular body of intrusive rock injected horizontally between layers of the enclosing rock
Solfatara	a relatively low-temperature fumarole (150-400 deg C) that exhales a significant amount of sulfur gases
Spatter cone	a low-steep-sided volcanic cone built by accumulation of splashed and spatters of lava (usually basaltic) around a fissure or vent
Stratovolcano	see composite volcano
Tephra	a general term for pyroclastic material ejected from a volcano. It includes ash, dust, bombs, and other types of fragments.
Tsunami	a seismic sea wave; a long, low wave in the ocean caused by an earthquake, faulting, or a landslide on the sea floor. A Tsunami is also created by the collapse of a caldera on small oceanic islands. Its velocity can reach 800 km/h. Tsunamis are commonly and incorrectly called tidal waves.

Tuff	a rock composed of volcanic ash and dust, formed by deposition and consolidation of ash flows
Ultramafic rock	an igneous rock composed mostly of mafic minerals, containing less than 10% feldspar. Includes peridotite, amphibolite, dunite and pyroxenite
Vein	a tabular rock body deposited in a fracture. Many ore minerals were deposited in veins when hot fluids flowed through fractures
Vesicle	a small hole formed in a volcanic rock by a gas bubble that became trapped as the lava solidified
Volcanism	the process by which magma and gases are transferred from the Earth's interior to the surface
Volcanic ash	volcanic fragments the size of dust particles
Volcanic bomb	a hard fragment of lava that was liquid or plastic at the time of ejection and acquired its form and surface markings during flight through the air. Volcanic bombs range from a few centimeters to several meters in diameter.
Volcanic neck	the solidified magma that originally filled the vent or neck of an ancient volcano and has subsequently been exposed by erosion