
Glossary

Minerals

Actinolite Calcium-rich Mg-Fe silicate mineral of the amphibole group.

Agate Banded form of microcrystalline silica, SiO_2 , infilling voids in volcanic rocks.

Albite Sodium-rich feldspar in the plagioclase range, with composition $\text{NaAlSi}_3\text{O}_8$.

Alkali-feldspars Range of feldspar minerals rich in potassium. Amphiboles Group of common rock-forming Mg-Fe silicate minerals widespread in igneous and metamorphic rocks.

Andesine Feldspar in the plagioclase range XAlSi_3O_8 , where X is equivalent to 60% Na 40% Ca.

Anhydrite Evaporite mineral, CaSO_4 , often found in association with gypsum.

Apatite Calcium-rich phosphate mineral, $\text{Ca}_5(\text{PO}_4)_3(\text{OH}, \text{F}, \text{Cl})$ found in igneous rocks.

Arsenopyrite Arsenic sulphide mineral, FeAsS , found in veins. Augite Mineral in the pyroxene group, $(\text{Ca}, \text{Mg}, \text{Fe}, \text{Al})_2(\text{Al}, \text{Si})_2\text{O}_6$, common in basic and ultrabasic igneous rocks.

Biotite Complex Fe-Mg layer lattice mineral, the iron rich form of mica, brown in colour, common in acid igneous rocks and metamorphic rocks.

Calcite Common form of calcium carbonate, CaCO_3 , major constituent of limestones, also found in altered basic igneous rocks and in mineral veins.

Carbonate Major constituent of limestone, the most common forms being calcite or aragonite, CaCO_3 , and dolomite $\text{CaMg}(\text{CO}_3)_2$.

Chlorite Group of mainly green minerals with similar properties to the micas, occurring as alteration products of iron and magnesium minerals in basic igneous rocks, and also in sedimentary deposits.

Corundum Aluminium oxide mineral, Al_2O_3 , occurring particularly in metamorphosed shales; gemstone varieties include ruby and sapphire.

Feldspars Group of very important rock-forming silicates, the major constituent of igneous and metamorphic rocks, and common as detrital clasts in sedimentary rocks.

Ferromagnesian Describing silicate minerals rich in iron and/or magnesium, Fe-Mg, such as olivine, augite, biotite and hornblende.

Garnet Group of cubic Fe-Mg minerals found in igneous and metamorphosed rocks or as detrital grains in sedimentary rocks.

Gypsum White to pink evaporite mineral, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, commonly forming nodules and horizons within sedimentary sequences of tropical shallow marine origin.

Haematite Ore mineral of iron, Fe_2O_3 , found in veins, as an accessory mineral in igneous rocks and sedimentary rocks and widely as a secondary alteration mineral.

Hornblende Black or green-black complex sodium and potassium Fe-Mg silicate mineral in the amphibole group, common in igneous and metamorphic rocks.

Jasper Red, haematite-rich variety of quartz.

Labradorite Feldspar in the plagioclase range, $XAlSi_3O_8$, where X is equivalent to 40% Na 60% Ca.

Limonite Mixture of hydrated iron oxides and iron hydroxides, the common weathering product of all minerals containing iron.

Malachite Copper carbonate, $CaCO_3$, a green secondary mineral found in oxidised copper deposits and as an alteration product of copper sulphide ore minerals.

Mica Group of layer-lattice minerals consisting of sheets of silicates which produce a fine lamellar cleavage, occurring mainly in igneous and metamorphic rocks.

Nepheline Silicate mineral, $NaAlSiO_4$, found in some igneous rocks which do not contain free quartz.

Oligoclase Feldspar in the plagioclase range, $XAlSi_3O_8$, where X is equivalent to 80% Na 20% Ca.

Olivine Group of rock-forming silicates with the general formula N_2SiO_4 , where N is most commonly Fe, Mg or Mn; common in basic and ultrabasic rocks.

Orthoclase Potassium-rich feldspar, $KAlSi_3O_8$, with monoclinic crystal form; common in igneous rocks.

Plagioclase Feldspars forming a triclinic solid-solution sequence from pure sodium feldspar, $NaAlSi_3O_8$ to pure calcium feldspar, $CaAl_2Si_2O_8$; the commonest rock-forming mineral group.

Pyrite Bright yellow iron sulphide mineral, FeS_2 , occurring as an accessory mineral in igneous rocks, in mineral veins and in sedimentary rocks deposited in a reducing environment.

Pyroxenes Group of rock-forming silicate minerals, with the general formula ZSi_2O_6 , where Z is most commonly Mg, Fe, Ca or Al; common in basic and ultrabasic igneous rocks.

Quartz Crystalline silica, SiO_2 , found in acid igneous rocks, metamorphic rocks and mineral veins; also the main constituent of chert and much the commonest detrital component of sandstones.

Riebeckite Sodium and iron rich amphibole, unusual for its blue colour. Sanidine High temperature form of potassium or potassium-sodium feldspar.

Satinspar Fibrous form of calcite or gypsum.

Sericite Intermediate between the micas and the clay minerals, usually an alteration product of other silicate minerals; common in weathered and slightly metamorphosed rocks. Silica Oxide of silicon, SiO_2 .

Sillimanite High grade metamorphic fibrous mineral, Al_2SiO_5 , found in pelites.

Zircon Accessory mineral, $ZrSiO_4$, found in acid igneous rocks and in detrital sedimentary deposits derived therefrom.

Rocks and deposits

Agglomerate Pyroclastic rock consisting of fragments greater than 2 cm in size.

Alluvium Detrital material transported and deposited by rivers, usually clay, silt, sand and gravel.

Andesite Fine-grained intermediate igneous rock characterised by the presence of oligoclase or andesine as the feldspar; occurs as extensive lava flows often associated with subduction-related volcanicity, or may form small intrusive bodies.

Arenite (-aceous) Any detrital sedimentary rock consisting of particles in the sand size range.

Argillite (-aceous) Any detrital sedimentary rock consisting of particles of silt size or less.

Arkose Arenaceous rock containing an abundance of detrital feldspar grains.

Basalt Fine-grained basic igneous rock containing calcium-rich plagioclase feldspar and pyroxene (usually augite), and often also olivine, hornblende and magnetite in significant amounts; occurs as lava flows and in small intrusions where cooling has been rapid.

Bentonite Assemblage of clay minerals formed by the alteration of glassy volcanic ash.

Boulder clay Deposit of boulders, cobbles and pebbles supported in a clay matrix, formed beneath a glacier or ice-cap.

Breccia Detrital sedimentary rock containing angular fragments greater than 2 mm in size, either laid down in water or sub-aerially; angularity indicates that fragments have not been transported very far.

Cementstone Fine-grained carbonate-rich sedimentary rock, formed by precipitation in shallow fresh water or brackish lagoons.

Chert Finely crystalline silica, SiO_2 , occurring as bands or nodules in sedimentary sequences.

Conglomerate Detrital sedimentary rock containing rounded fragments greater than 2 mm in size, usually deposited in water, the roundness of the fragments resulting from erosion during transportation.

Cornstone Concretionary limestone, generally formed under arid conditions, taken to be a fossil soil.

Dacite Fine-grained acid volcanic rock containing 20-40% quartz, calcium-rich feldspar, hornblende and biotite; the volcanic equivalent of granodiorite.

Dolerite Medium-grained basic igneous rock compositionally equivalent to basalt; usually occurs in larger intrusions where cooling has been relatively slow.

Dolomite Limestone with more than 15% magnesium carbonate, Mg CO_3 .

Fault breccia Rock composed of the angular fragments produced along a fault during tectonic movement, commonly cemented or mineralised.

Felsite Pale-coloured, fine-grained acid or intermediate igneous rock, usually forming dykes.

Gabbro Coarse-grained basic igneous rock compositionally equivalent to basalt and dolerite, forms in large intrusions where cooling has been very slow.

Granite Coarse-grained acid igneous rock with quartz, sodium- and potassium-rich feldspars and micas; occurs in large intrusions where cooling has been very slow.

Granodiorite Coarse-grained intermediate igneous rock compositionally equivalent to andesite and dacite with calcium-rich feldspar, hornblende and biotite; occurs in large intrusions where cooling has been very slow.

Greywacke Matrix-rich sandstone with a mixed, angular clast assemblage including a high proportion of rock fragments.

Grit Coarse-grained sandstone with angular to sub-angular clasts.

Hornfels Fine to medium-grained rock produced by partial recrystallisation during thermal metamorphism.

Hyaloclastite Coarse-grained volcanoclastic rock containing a high proportion of glassy material.

Jedburgh-type basalt Variety of basalt containing an abundance of feldspar microphenocrysts (< 2 mm in size) and a few olivine microphenocrysts in a groundmass of labradorite, augite and iron ore.

Keratophyre Trachyte or rhyolite containing feldspar rich in sodium and potassium.

Lamprophyre Medium-grained basic and intermediate igneous rock with pyroxene, amphibole and /or biotite phenocrysts in a groundmass which also contains orthoclase and /or plagioclase.

Limestone Sedimentary rock consisting essentially of carbonates, the two most important being calcite and dolomite; material may be detrital, organic (e.g. secreted by animals) or chemically derived; usually indicates deposition in a warm climate.

Markle-type basalt Variety of basalt containing abundant feldspar macrophenocrysts (> 2 mm in size) and olivine macro- and microphenocrysts in a ground mass of labradorite, augite and iron-ore.

Marl Mud stone rich in carbonate.

Microdiorite Medium-grained intermediate igneous rock, compositionally equivalent to andesite, with andesine plagioclase feldspar, some sodium or potassium feldspar and biotite, hornblende and augite, with minor amounts of quartz.

Oil-shale Argillaceous rock containing kerogen which yields petroleum-type hydrocarbons on distillation.

Pelite Metamorphosed argillaceous rock.

Phonolite A form of trachyte containing abundant nepheline.

Porphyrite Medium-grained acid or intermediate igneous rock containing phenocrysts usually of plagioclase feldspar.

Pyroclastic Describes a rock consisting of fragmental volcanic material blown into the air by an explosive volcanic eruption.

Rhyolite Fine-grained, often glassy, acid igneous rock containing quartz, alkali feldspar and commonly mica; occurs as lava or minor intrusion.

Schist Metamorphic rock with a strong fabric produced by the parallel alignment of constituent minerals such as mica and amphibole.

Seatearth Fossil soil, commonly underlying a coal seam.

Shale Detrital sedimentary rock consisting predominantly of clay minerals and characterised by a marked bedding plane fissility.

Spilite Basaltic rock containing albite as the plagioclase feldspar and chlorite replacing augite and olivine; generally found as submarine lava which reacted with sodium in the sea water.

Talus Accumulation of rock fragments formed as a result of weathering of cliffs.

Teschenite Medium-grained alkali gabbro containing analcime as well as the normal gabbroic minerals.

Tholeiite Type of basalt containing calcium plagioclase and pigeonite, a pyroxene that forms on rapid cooling, with interstitial glass or quartz-alkali feldspar intergrowths.

Trachyte Fine-grained intermediate igneous rock dominated by lath-like plagioclase crystals, characteristically aligned during the flow of the original viscous lava.

Tufa Any deposit of calcium carbonate chemically deposited from solution.

Tuff Consolidated finer-grained fragments (ash) erupted from a volcano; the fragments may be crystals, rock fragments or glass shards.

Miscellaneous geological terms

Acid Describes igneous rock containing more than 10% quartz and having a chemical composition of more than 66% silica, SiO₂.

Alkali(-ne) Describes igneous rock in which the feldspar is mainly sodium and/or potassium rich (as against **calc-alkaline**).

Amygdale (-oidal) Vesicle in lava infilled with another mineral e.g. quartz, calcite or zeolite.

Anticline Fold, generally but not necessarily, convex-upwards, with the oldest strata in the core.

Antiform Convex-upwards fold with no available information on the direction of younging in the folded sequence.

Aquifer Water-bearing rock, commonly sandstone.

Arthropod Segmented invertebrate with an external shell or skeleton, shed periodically to allow growth.

Axial plane That plane passing through all points on a fold hinge, throughout the fold's development, and bisecting the angle between the fold limbs.

Axial plane cleavage Cleavage, usually slaty, developed parallel to the axial plane of a fold.

Basic Describes igneous rock containing no free quartz and having a chemical composition of between 45 and 55% silica, SiO₂.

Bedding plane Planar surface parallel to the depositional interface in a sedimentary sequence.

Benthos Animals living on the sediment of the sea floor.

Biostratigraphical zonal scheme Series of divisions of the age of rocks based on the fossil content of the rocks.

Biozone Rock deposited during a time range defined by a characteristic fossil assemblage.

Bivalve Marine or freshwater invertebrate that secretes an exterior calcitic shell of two valves, usually the same size.

Brachiopod Marine invertebrate that secretes an exterior calcitic or phosphatic shell of two valves, usually of different sizes.

Brush mark Type of sole mark with the appearance of the sediment having been brushed e.g. by seaweed.

Bryozoa Aquatic colonial invertebrates, commonly fan-shaped with a net-like structure.

Calc-alkali(-ne) Describes igneous rock in which the feldspar is mainly calcium rich (as against **alkaline**).

Calcareous Rich in carbonates.

Caldera Very large volcanic crater.

Clast Detrital rock or mineral fragment.

Cleavage Parting imposed on a rock during tectonism, either by alignment of recrystallised minerals or by physical microdeformation.

Convoluted Describes irregular folds produced in soft sediments by slumping.

Country rock Rock intruded by an igneous intrusion.

Crag and tail Glacial feature where resistant rock (crag) has obstructed glacier movement and protected the rocks behind (tail).

Crinoid Marine echinoderm with calcite-plated skeleton surrounded by soft tissue, consisting of a stem and five free arms.

Cross-lamination Inclined bedding with a relationship to the direction of current flow during deposition, cut across by subsequent bedding laminae deposited during different flow conditions.

Denudation General reduction of the land surface by processes of weathering, erosion and transportation.

Detrital Relates to particles that have been part of a pre-existing rock.

Devitrification Secondary formation of crystals within a glassy igneous rock.

Dip slope Inclined land surface following the dip of a bed in the underlying sedimentary or igneous sequence.

Distal Describes sedimentary lithologies deposited a long way from the source of the sediment.

Dolomitization Alteration of calcium carbonate, CaCO_3 , into calcium magnesium carbonate, $\text{CaMg}(\text{CO}_3)_2$.

Downthrow Direction in and /or distance by which a rock unit is moved down across a fault.

Drumlin Mound of boulder clay elongated in the direction of ice-flow.

Dyke Sheet-like, often vertical, igneous intrusion.

Dyke swarm Large number of dykes with a parallel or radial pattern.

Englacial Within a glacier.

Erosion Wearing down of the land surface by mechanical action, for example, by river, sea, wind or ice.

Esker Long, winding ridges of sand and gravel deposited by a subglacial stream or one issuing from a retreating glacier.
Euhedral Well-formed crystal shape.

Eurypterid Large freshwater arthropod similar to scorpions; front limbs usually have pincers.

Fades General aspect of a suite of sedimentary rocks, from which its environment of deposition may be determined.

Fault Fracture in a rock along which there has been movement. Ferruginous Iron rich.

Fissile Breaks along closely-spaced bedding planes.

Flame structure Feature produced when a layer of sediment is disrupted and forces its way upwards into an overlying layer of sediment, usually through loading, giving the appearance of flames.

Flow structure Parallel structure produced by flow of crystals in a magma.

Flute mark (cast) Asymmetrical groove eroded in a sediment surface by turbidity currents which was then filled with sediment and subsequently exhumed as a positive feature.

Fluvioglacial Relating to glacial streams.

Fluxion cleavage Parting imposed on an igneous rock by the alignment of crystals during flow of the partially crystallised magma.

Fold axis (= hinge) Line joining the highest points within the axial plane of the same horizon in an antiform or the lowest points in a synform.

Gastropod Marine or freshwater invertebrate that secretes a coiled, spiral shell.

Glacier Compacted ice mass, fed by snow falls, that moves under its own weight.

Goniatite Early marine cephalopod with an external coiled shell containing chambers.

Graded bedding Unit of sedimentary rock which shows evidence of sorting with coarsest material at the base and finest material at the top.

Graptolite Colonial marine invertebrate, now extinct; which consisted of branches with the individuals living in 'cups' along the branches.

Groove mark (cast) Groove eroded in a sediment surface either by current flow or by an object being dragged along by the current, which was then filled with sediment, and subsequently exhumed as a positive feature.

Hade Angle which a fault plane makes with the vertical plane.

Hinge zone That part of a fold in the vicinity of the axial plane. Iapetus Ocean Former ocean between Scotland and England and the continental masses to which they were attached; it developed and closed during the early Palaeozoic era.

Imbricate thrust One of a series of such thrusts whose dip decreases with depth towards a common basal sole thrust.

Inlier Area of older rocks completely surrounded by younger rocks.

Intermediate Describes igneous rock containing less than 10% quartz and having a chemical composition of between 55 and 66% silica, SiO₂.

Interstitial Occurring in small spaces between grains or crystals of a rock, e.g. pore-water or cement in a sediment.

Intraformational Rocks or structural features that occur between sets of defined strata, implying a temporary change in conditions of deposition.

Island arc Chain of volcanic islands associated with oceanic subduction.

Isoclinal fold Fold in which the two limbs are approximately parallel.

Kettlehole Depression in glacial deposits formed when buried block of ice melts.

Laccolith Lens-shaped igneous intrusion.

Leucocratic Describes igneous rocks containing mainly light coloured minerals e.g. quartz, feldspar, white micas.

Lithic Made of rock, as in a fragment or clast within a greywacke or conglomerate.

Magma Molten rock derived from great depth within the Earth's crust or mantle, that solidifies to form an igneous rock, either as an extrusive lava or an intrusion.

Magma chamber Reservoir deep in the Earth's crust which feeds magma to volcanoes and igneous intrusions.

Metamorphism The alteration of rocks within the earth's crust by heat and/or pressure.

Moraine Material transported by ice and then deposited as the ice melts or topographic feature formed of such material.

Monocline Asymmetric fold with one limb dipping steeply and the other dipping gently.

Mullion Linear structure produced by the compression of competent beds.

Nautiloid Marine cephalopod with a chambered external shell which may be straight, curved or coiled.

Orogeny Episode of mountain building

Ossicle An individual discoidal plate forming part of the stem of a crinoid.

Ostracod Small freshwater or marine arthropod with two valves enclosing the soft parts, and from which jointed appendages project.

Outlier Area of younger rocks completely surrounded by older rocks.

Palaeocurrent Ancient current from which sediment was deposited; its direction and flow-rate may be determined from sedimentary structures.

Pelagic Mode of life of animals which live permanently in the upper waters of the ocean e.g. fish, jellyfish.

Pericline Fold in which variation in hinge plunge produces either a basin or a dome or an alternation of both.

Phenocryst Relatively large, usually well-formed crystal set in a groundmass of smaller crystals.

Plug Volcanic vent blocked with solidified lava.

Plunge Direction and /or amount of downwards slope of a fold axis relative to the horizontal.

Pluton Large intrusion originally formed deep in the Earth's crust.

Precipitate Mineral or salt that crystallizes from a solution e.g. sea water.

Prod mark Type of sole mark where an object e.g. a shell or bone has left imprints in the sediment of the sea floor as it was carried along by the current.

Proximal Describes sedimentary lithologies deposited near to the source of the sediment.

Radiolaria Single celled marine planktonic protistan, secreting a lacy siliceous shell.

Radiometric dating Method for providing an age of a rock, using radioactive decay rates.

Regression Fall in sea level.

Roche moutonnée Glacially smoothed rock with a gradual slope on ice advance side and a steep, rough slope on the other side plucked by the ice.

Scoria(-cious) Lava packed with vesicles.

Seismic Relating to earthquakes.

Sill Sub-horizontal sheet-like igneous intrusion, often parallel to bedding.

Sinistral Left lateral movement across a wrench fault (opposite Dextral).

Slickensides Grooves produced by the fault movement of two rock surfaces against each other.

Sole mark Marking preserved on the base of a greywacke bed e.g flute mark and groove mark.

Strata Layers of sedimentary rock.

Striations Small grooves on rock surfaces caused by glacial action

Strike Direction of a horizontal line drawn on an inclined plane surface

Strike fault Fault trending parallel to the regional strike of a layered sequence.

Strike-slip shear Lateral movement parallel to the regional strike along a strike fault.

Subduction Where two continental or oceanic crustal plates move towards one another, the more dense plate sinks and moves below the other and consequently melts; the line of subduction is usually marked by a deep ocean trench and a linear volcanic belt often forms parallel to the margin of the overriding plate.

Subhedral Poorly- formed crystal shape.

Syncline Usually convex-downwards fold with the youngest strata in the core.

Tectonic Relating to a structural or orogenic event or process.

Thermal metamorphism Alteration of rocks by the action of heat alone, usually from an igneous intrusion.

Thin section Slice of rock 0.03 mm thick mounted on glass for study of the optical properties of minerals through a petrological microscope.

Thrust Gently or moderately dipping fault with a reverse sense of movement emplacing older rocks above younger.

Trace fossil Feature resulting from biological activity in sediment e.g. footprints, burrows, trails.

Transportation Movement of rock particles by the agency of wind, river, sea, ice and gravity.

Turbidity current Slurry of sediment that behaves as a fluid when it flows down a slope in marine or fresh water; initially erosional, then as current slackens, it becomes depositional.

Unconformity Depositional surface above an angular break in bedding attitude; the beds above are approximately parallel to the depositional surface whereas the strata beneath may be at any attitude or even intensely folded.

Vent Volcanic pipe from which lava and ash are ejected; subsequently filled by solidified lava or volcanic agglomerate.

Vesicle(-cular) Cavity in lava formed by gas bubbles.

Vug Small, spherical cavity in a rock.

Weathering Break down of rocks by external processes such as wind, rain, temperature changes, plant action.

Welded texture Texture in pyroclastic rocks produced by heat.

Xenolith Inclusion of a fragment of older rock within an igneous rock.

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[References](#)