

Igneous Rocks of South-West England

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Glossary

This glossary contains simple explanations of the more important technical terms used in Chapters 1 and 2 and in the 'Introduction, Highlights' and 'Conclusions' sections of Chapters 3 to 6. The particular context of the igneous rocks of south-west England is reflected in these explanations. Stratigraphical terms are omitted as they are placed in context within the figures and tables. With reference to igneous rocks the following grain sizes generally apply: coarse-grained – strictly over 5 mm (in practice, often over 3 mm); medium-grained – 1–5 (3) mm; fine-grained – under 1 mm.

Bold-face indicates a further glossary entry.

Acid: light-coloured **igneous rocks** relatively enriched in silica (SiO_2 , nominally over 65%); also known as **felsic** and **silicic**.

Actinolite: non-aluminous amphibole; see **ferromagnesian** minerals.

Adinole: see **metasomatism**.

Agglomerate: a **volcaniclastic rock** composed of large, often angular, rock and mineral fragments.

Albite: sodic plagioclase **feldspar**.

Alkali feldspar: see **feldspar**.

Allochthon: rock unit not in its place of formation.

Allotriomorphic: in igneous rocks, textural term referring to the majority of minerals having poor crystal shape.

Amphiboles: see **ferromagnesian** minerals.

Anatexis: partial melting, especially in the context of progressive melting of sediments to form **granite**.

Andesine: sodic/calcic plagioclase **feldspar**.

Andesite: a fine-grained, **intermediate igneous**

rock consisting mainly of plagioclase **feldspar** and **ferromagnesian** minerals; usually a lava.

Aplite: fine-grained, often light-coloured intrusive rock usually of **acid** composition; found in veins and narrow **dykes**.

Aphyric: non-**porphyritic**.

Argillite: a general term for fine-grained clay-rich **clastic** sedimentary rocks.

Augite: a **pyroxene**; see **ferromagnesian** minerals.

Aureole: the envelope of **metamorphic rocks** adjacent to an **igneous** intrusion.

Autochthon: rock unit at its place of formation.

Basalt: a fine-grained, **basic igneous rock** consisting largely of the minerals: plagioclase **feldspar** and **ferromagnesian** minerals, especially **pyroxenes** and olivine; usually a lava or a **dyke**.

Basic: dark-coloured **igneous rocks** relatively enriched in MgO, FeO, CaO, etc. – the 'bases' of early chemistry; SiO_2 relatively low (nominally 45–52%).

Basification: the **metasomatic** process by which a rock is enriched in the **basic** components without melting.

Biotite: a brown mica; see **ferromagnesian** minerals.

Breccia: a **volcaniclastic** or sedimentary or fault-related rock composed of very large, angular rock fragments.

Calc-flinta: **metamorphosed** calcareous mudstone.

Clast: a fragment.

Clinopyroxene: see **pyroxenes**.

Compatible elements: elements which prefer the solid to the **magma** during crystallization and melting.

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- Diapir:** a body, e.g. of **igneous rock/magma**, that has risen in consequence of its lower density and/or greater plasticity; often cylindrical and steep sided.
- Diorite:** a coarse-grained, relatively lime-rich, **intermediate igneous rock**, consisting largely of plagioclase **feldspar** and various **ferromagnesian** minerals; often in large intrusions (batholiths/plutons).
- Dolerite:** a medium-grained, **basic igneous rock**, consisting largely of plagioclase **feldspar** and the **ferromagnesian** minerals: **pyroxene** and **olivine**; found in **dykes** or **sills**.
- Dunite:** an **ultrabasic igneous rock** consisting largely of the **ferromagnesian** mineral, **olivine**.
- Dyke:** a sheet-like body of **igneous rock** which cross-cuts the structure of the rocks it intrudes; often steeply inclined.
- Elvan:** a Cornish term for **quartz-feldspar porphyry**; usually a **dyke**.
- Facies:** an assemblage of rocks and/or minerals and/or fossils which is characteristic of a particular environment and/or process.
- Feldspathization:** a **metasomatic** process by which the (alkali) **feldspar** content of the rock is increased.
- Feldspars:** a series of aluminosilicate minerals between calcium/sodium-rich plagioclase and potassium/sodium-rich alkali feldspar, e.g. orthoclase and microcline; the most abundant minerals in the Earth's crust.
- Felsic:** **igneous rocks** (usually) which are rich in **feldspars** and **quartz**.
- Ferromagnesian:** silicate minerals enriched in iron and/or magnesium (and/or lime, etc.) e.g. **olivine**, **pyroxenes** (augite, hypersthene), **amphiboles** (hornblende, actinolite, tremolite), **micas** (biotite, muscovite).
- Flaser:** an intensely laminated shearing texture in **metamorphosed igneous rocks**.
- Fluidization:** the mobilization that results from the passage of a fluid (usually a gas) through a granular solid.
- Flysch:** an assemblage (**facies**) of **clastic sedimentary rocks** characterized by **turbidites**.
- Gabbro:** a coarse-grained, **basic igneous rock** consisting largely of plagioclase **feldspar** and the **ferromagnesian** minerals: **pyroxene** and **olivine**; usually occurs in large intrusions (batholiths/plutons).
- Gneiss:** a coarse-grained, often banded **metamorphic rock**.
- Graben:** a fault-bounded rift or trough.
- Granite:** a coarse-grained, **acid igneous rock** consisting largely of alkali **feldspar** and **quartz**; usually in large intrusions (batholiths/plutons).
- Granitization:** the **metasomatic** process by which rock is converted to **granite** without melting.
- Granodiorite:** a coarse-grained **acid igneous rock** intermediate between **granite** and **diorite**.
- Granulite:** a granular **metamorphic rock**.
- Greenschists:** general term for foliated, green coloured, **metamorphic** rocks of low grade **basic** or **ultrabasic** composition.
- Greenstone:** general term for massive **basic igneous rocks** that have been (partly) **metamorphosed**.
- Greisen:** a rock, often a **granite**, that now consists of **quartz** and **mica** because its **feldspars** have been broken down by **hydrothermal** activity.
- Greywacke:** a poorly sorted, **clastic** sedimentary rock composed of fragments of rocks and crystals set in a clay-rich matrix.
- Harzburgite:** a coarse-grained, **ultrabasic igneous rock** consisting largely of the **ferromagnesian** minerals **olivine** and **orthopyroxene**.
- Hornblende:** a **ferromagnesian** mineral.
- Hornfels:** a hard, massive **metamorphic rock** formed by the thermal effects of hot **magma**.
- Hyaloclastites:** **volcaniclastic rocks** composed largely of glassy fragments.
- Hydrothermal alteration:** mineralogical and chemical changes in rocks brought about by the penetration of hot, aqueous fluids.
- Hypidiomorphic:** in igneous rocks, textural term referring to a mixture of well and poorly shaped crystals.
- Idiomorphic:** in igneous rocks, textural term referring to the majority of minerals having good crystal shape.
- Igneous rocks:** formed by the consolidation (usually crystallization) of a **magma**.
- Incompatible elements:** those elements which prefer magma to the solid during crystallization and melting.
- Intermediate:** **igneous rocks** intermediate in composition between **acid** and **basic**.
- Initial ratio:** the **isotopic** ratio of a rock before radioactive decay.
- Isotopes:** forms of a chemical element that differ only in the number of neutrons within their atomic nuclei.
- I-type granite:** formed by the partial melting of

Glossary

- an **igneous** source rock.
- Kaolinization**: the process by which **feldspars** are broken down to kaolinite by waters of **magmatic** and/or **meteoric** origin.
- Keratophyre**: **metamorphosed trachyte**.
- Lamprophyre**: a group of **igneous rocks** of very varied composition, but often rich in potassic minerals; usually in **dykes**.
- Lherzolite**: a coarse-grained **ultrabasic igneous rock** consisting largely of the **ferromagnesian** minerals olivine and **pyroxene**.
- LIL**: the large-ion-lithophile group of elements – Cs, Ba, Rb, Th, U, K, La, Ce, Sr and Nd.
- Magma**: molten rock; referred to as lava when erupted at the Earth's surface.
- Mafic**: see **basic** and **ferromagnesian**.
- Metamorphic rocks**: rocks whose texture and mineralogy have been changed in the solid by heat and/or pressure (i.e. without melting).
- Metasomatism**: the fluid-assisted modification of bulk-rock chemistry that may often occur during metamorphism e.g. 1. sodic metasomatism to form **adinole**, an **albite**-rich **hornfels** at **dolerite** margins, and 2. widespread potassic metasomatism in the contact **aureoles** of **granite** intrusions.
- Meteoric water**: water derived directly from the atmosphere.
- Micas**: a group of **ferromagnesian** minerals.
- Microcline**: a potassium-rich **feldspar**.
- Migmatite**: a mixed rock, i.e. with both **igneous** and **metamorphic** components.
- Minette**: a **lamprophyre** rich in the **ferromagnesian** mineral biotite mica.
- Moho**: the **Mohorovičić** seismic discontinuity between the Earth's crust and mantle.
- MORB**: mid-ocean ridge **basalt**.
- Muscovite**: a mica; see **ferromagnesian** minerals.
- Nappe**: a rock unit which has been displaced laterally by Earth movements.
- Obduction**: the thrusting of (part of) one lithospheric plate over another, e.g. during plate convergence.
- Oligoclase**: a sodic plagioclase **feldspar**.
- Olistostrome**: a rock unit that has gravity glided from its original setting.
- Olivine**: a **ferromagnesian** mineral.
- Ophiolite**: a genetic association of mainly **basic** and **ultrabasic igneous rocks** thought to represent ancient oceanic crust.
- Ophitic**: an **igneous** texture where well-formed plagioclase crystals are enclosed within the **ferromagnesian** mineral pyroxene; characteristic of **dolerites**.
- Orthoclase**: a potassic **feldspar**.
- Orthopyroxene**: see **pyroxene**.
- Palingenesis**: the 're-birth', i.e. re-intrusion, of a **granite** after **anatexis**.
- Parautochthonous**: close to its place of formation.
- Pegmatites**: exceptionally coarse-grained **acid** (common) or **basic igneous rocks**.
- Pelite**: a general term for fine-grained, clay-rich, **clastic** sedimentary rocks; often applied to **metamorphosed** mudstones.
- Peridotite**: a coarse-grained, **ultrabasic igneous rock** consisting largely of the **ferromagnesian** minerals **pyroxene** and olivine.
- Perthite**: potassium **feldspar** crystals containing veins and pods of **albite**.
- Phyllite**: a **metamorphic rock** rich in the **ferromagnesian** mineral mica that is texturally intermediate between **slate** and **schist**.
- ...-phyric**: denotes the type(s) of the larger crystals in a **porphyritic igneous rock**.
- Picrite**: a fine-grained **ultrabasic igneous rock** rich in the **ferromagnesian** mineral olivine; usually a lava, or cumulate associated with small intrusions.
- Plagioclase**: a **feldspar**.
- Porphyroclastic**: where fragments of large crystals remain within a fine-grained, sheared matrix.
- Porphyritic**: **igneous rocks** in which the large crystals (megacrysts, phenocrysts) occur in a matrix of finer crystals and/or glass.
- Pneumatolytic**: strictly, implies a gas phase; see **hydrothermal alteration**.
- Pyroclastics**: rocks composed largely of fragments of **igneous rocks** formed during volcanic eruptions.
- Pyroxene**: a **ferromagnesian** mineral; orthopyroxenes being Ca-poor, whereas clinopyroxenes are Ca-rich.
- Quartz**: a mineral composed entirely of silica (SiO_2).
- REE**: the fifteen rare-earth elements or lanthanides of Period 6 of the Periodic Table e.g. La, Ce, Pr, Nd, Sm.
- Rhyolite**: a fine-grained to glassy **acid igneous rock**; usually a lava.
- Rudaceous**: applied to very coarse-grained, **clastic** sedimentary rocks (e.g. conglomerate).
- Schist**: a **metamorphic rock** with well-developed platy and/or linear fabric.
- Serpentinite**: a **metamorphosed ultrabasic igneous rock** that now consists largely of the **ferromagnesian** mineral serpentine.

Glossary

- Sial:** that part of the Earth rich in silica and alumina, i.e. the continental crust.
- Sill:** a sheet-like body of **igneous rock** which in general does not cross-cut the structure of the rocks which it intrudes; often gently inclined.
- Sima:** the Earth's oceanic crust and (upper) mantle, i.e. rich in silica and magnesium.
- Spilite:** low-grade **metamorphosed basalt**.
- Slate:** clay-rich **clastic** sediments (usually) that have developed a pronounced parting (cleavage) under Earth pressures; usually of low **metamorphic** grade.
- Stoping:** the breaking off and envelopment of blocks of country rock (**xenoliths**) by intruding **magma**.
- S-type:** **granite** derived from partial melting (**anatexis**) of originally sedimentary rocks.
- Subduction:** the sinking of (part of) one lithospheric plate under another at a convergent plate boundary.
- Syenite:** a coarse-grained **intermediate igneous rock** consisting largely of alkali **feldspar** and various **ferromagnesian** minerals.
- Tholeiite:** **basalt** relatively deficient in alkalis.
- Tourmalinization:** the **metasomatic** process which gives rise to tourmaline as a replacement for **feldspars** and **micas** in **granite**, etc.
- Trachybasalt:** **basalt** enriched in alkalis and containing both plagioclase and alkali **feldspar**.
- Trachyte:** a fine-grained, **intermediate igneous rock** consisting largely of alkali **feldspar** and various **ferromagnesian** minerals; often a lava with a pronounced flow alignment.
- Transition elements:** some elements within Periods 4 and 5 of the Periodic Table, e.g. Sc, Ti, V, Cr, Mn, Fe, Co, Ni; characteristic of **ferromagnesian** and oxide minerals.
- Tremolite:** a non-aluminous amphibole; see **ferromagnesian** minerals.
- Troctolite:** a coarse-grained **basic igneous rock** consisting largely of plagioclase **feldspar** and the **ferromagnesian** mineral olivine.
- Tuff:** consolidated volcanic ash.
- Turbidite:** **clastic** sedimentary rock containing structures formed during its deposition from subaqueous turbidity currents; often of **greywacke** composition.
- Ultrabasic:** dark-coloured, coarse-grained **igneous** rocks consisting entirely of **ferromagnesian** minerals.
- Ultramafic:** see **ultrabasic**.
- Vesicles:** gas bubble cavities within consolidated lavas.
- Volcaniclastic rocks:** sedimentary rocks composed largely of volcanic rock fragments.
- Xenoliths(crysts):** exotic rock (crystal) fragments incorporated within **magma** (and the resultant **igneous rock**).
- Zeolites:** a group of low-temperature, hydrous, Ca, Na, K-bearing, aluminosilicate minerals.

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