Glossary

This glossary provides brief explanations of the technical terms used in the introductions to the chapters and in the 'conclusions' sections of the site reports. These explanations are not rigorous scientific definitions but are intended to help the general reader. Detailed stratigraphical terms are omitted as they are given context within the tables and figures.

Aalenian Stage: a chronostratigraphical subdivision of the Jurassic System, comprising the rocks deposited during the Aalenian Age. The first stage of the Middle Jurassic Series, it is dated to approximately 178–173.5 Ma (Harland *et al.,* 1990) and is preceded by the Lower Jurassic Toarcian Stage.

Abrasion: the process of wearing away parts of fossils or rocks by sediment-laden water or air. The process produces an increasingly smoothed and rounded outline shape.

Adit: a horizontal tunnel, for access or drainage, mined into a hillside.

Aerobic: an environment is which air (oxygen) is present, or a depositional environment with more than 1 ml of dissolved oxygen per litre of water. *See also* anaerobic and dysaerobic.

Age: a geological time unit (cf. chronostratigraphy), usually taken to be the smallest standard division of geological time.

Ahermatypic: not hermatypic, i.e. not reef-building.

Algae (sing. alga): a large and diverse division of the plant kingdom, consisting of mainly aquatic organisms. Simple plants that have no true stems, roots or leaves, they contain chlorophyll and therefore can photosynthesize. They range from microscopic single cells to very large multi-cellular structures.

Allochthonous: descriptive of fossils or rocks that lived or formed elsewhere to their current position.

Alluvial: a term applied to the environments, action and products of rivers or streams. Alluvial deposits are composed of clastic material deposited on the river floodplain.

Alluvial fan: a cone-shaped deposit made up of water-laid deposits, and also some material transported by mud flows.

Ammonite: any ammonoid of the order Ammonitida (subclass Ammonidea, class Cephalopoda (*see* cephalopod), phylum Mollusca (*see* mollusc). Typically characterized by a coiled, chambered shell, with complex lines between the chamber walls and the outer wall of the shell (sutures), they are an extinct relative of the modern-day squid and cuttlefish.

Ammonoid: any extinct cephalopod belonging to the subclass Anunonoidea; they are important zone fossils for the Palaeozoic and Mesozoic eras.

Anaerobic: an environment in which air (oxygen) is absent, or a depositional environment with 0–0.1 ml of dissolved oxygen per litre of water. *See also* aerobic and dysaerobic.

Annelid: any member of the phylum Annelida, a major invertebrate group comprising segmented worms such as modern earthworms and leeches. In the fossil record they are usually preserved as trace fossils because they have almost no hard parts.

Anoxic: literally 'without oxygen'; often used to describe an anaerobic environment.

Anticline: an arch-shaped upfold of rocks produced by tectonic activity with younger strata on the outermost part of the arch and older rock in the core (cf. syncline).

Aptychus (pl. **aptychi**): a calcitic plate associated with Mesozoic ammonites that normally occurs in pairs. Aptychi are shaped like bivalves and have an ornamented outer surface. They are believed to be the lower jaws of ammonoids.

Aragonite: a form of calcium carbonate, distinguished from calcite by a different crystal structure. The shells of some molluscs are composed largely of aragonite.

Archipelago: a group of islands.

Arenite (adj. **arenaceous**): a general term for a detrital, clastic sedimentary rock made of sand-sized particles.

Argillite (adj. **argillaceous**): a general term for a fine-grained, clay-rich, clastic sedimentary rock.

Arthropod: any member of the phylum Arthropoda; the largest and most diverse phylum of the animal kingdom. These invertebrate animals are characterized by a segmented body and paired antennae, wings or legs. Examples include insects, crustaceans and arachnids.

Ash (volcanic): an unconsolidated deposit consisting of pyroclastic material (glass shards, crystals, etc.) less than 2 mm in size. In consolidated rocks the term is often used to denote the size of individual volcaniclastic fragments (e.g coarse-ash and fine-ash grains).

Asteroidea (asteroids): a class of the phylum Echinodermata *(see* echinoderm). Commonly known as 'starfish' they are characterized by their star shape and five 'arms'.

Authigenic: descriptive of materials, such as minerals or cement, that formed in place in the sediment or rock of which they are a part, during, or soon after, its deposition.

Autochthonous: descriptive of fossils or rocks that lived or formed in their current positions.

Basalt: a fine-grained, usually dark-coloured, basic, volcanic (extrusive) igneous rock. It usually occurs as a lava or dyke.

Basement : the oldest rocks recognized in a given area; a complex of metamorphic and/or igneous rocks that underlies all the sedimentary formations.

Basin: an area of subsidence, or depression, usually of considerable size, in which sediments accumulate and/or volcanic strata may be laid down.

Batholith: a large, irregular mass of igneous rock emplaced deep in the Earth's crust.

Bed: in lithostratigraphy, a subdivision of either a member or a formation; the smallest unit within the scheme of formal lithostratigraphical classification. Also used informally to indicate a stratum within a sedimentary rock succession.

Bedding plane: a planar feature in sedimentary rocks representing an original surface of deposition. Conspicuous bedding planes may indicate a short interruption in, or change in character of sediment deposition.

'Beef' calcite: a fibrous form of calcite that frequently has the appearance of a series of small-scale 'nested' cones stacked one inside the other.

Belemnite: any member of the proposed extinct marine subclass, or order, Belemnoidea (class Cephalopoda *(see* cephalopod), phylum Mollusca *(see* mollusc)). Characterized by a bullet-shaped internal shell of calcium carbonate, surrounded by soft body parts, they are similar to a modern-day squid, and became extinct in the Eocene Epoch.

Benthos (adj. **benthic**): aquatic organisms living on or in the sea floor.

Bioclast (adj. **bioclastic**): a sediment grain consisting of comminuted fossil remains.

Bio-erosion: the erosion of consolidated material or a lithic substrate by the action of living organisms.

Biofacies: a facies defined by its characteristic fossil assemblage, and reflecting a specific set of environmental conditions.

Biogenic: produced by living organisms or biological processes.

Biohorizon: a bed or series of beds characterized by a particular fossil assemblage and within which no further stratigraphical refinement, on the basis of that contained fossil fauna, can be made.

Biomicrite: a limestone containing bioclasts in a carbonate mud matrix.

Biosparite: a limestone containing bioclasts in a cementing matrix of crystalline calcite.

Biostratigraphy: the stratigraphical subdivision, classification and correlation of sedimentary rocks based on their fossil content.

Biota: the flora and fauna of a particular place; or the faunal and floral assemblage of a bed or other stratigraphical unit.

Bioturbation: the physical disturbance of unconsolidated sediment, such as by burrowing and feeding, caused by the organisms living on or in it. These disturbances are often preserved as trace fossils in ancient sediments.

Biozone: in biostratigraphy, a restricted unit of sedimentary rock defined by its fossil content, most usefully by species of narrowly defined temporal, but wide spatial, range, and named after one or more abundant or characteristic species.

Bitumen (adj. **bituminous**): a group of naturally occurring hydrocarbons that are organic-soluble.

Bivalve: any member of the order Bivalvia (phylum Mollusca (*see* mollusc)). These marine invertebrates are characterized by bodies enclosed in two, hinged, often mirror-image, shells (valves). Modern examples include cockles and mussels.

Bolide: a meteorite, typically one that explodes.

Boreal: referring to the north or a cold climate.

Brachiopod: any member of the phylum Brachiopoda. These marine invertebrates are superficially similar to bivalves but with a different anatomy and two hinged shells that are typically dissimilar.

Brackish: descriptive of water with a salinity intermediate between fresh and marine.

Breccia: a rock composed of angular broken fragments greater than 2 mm in diameter; can be pyroclastic, sedimentary or fault-related.

Bryozoan: any member of the phylum Bryozoa. These very small, moss-like aquatic organisms often form permanent colonies, linked by their box-like skeletons of calcium carbonate.

Byssate: descriptive of bivalves that are attached to the substrate or some other object by strands of byssus.

Calcarenite: a limestone composed mainly of sand-sized calcium carbonate grains.

Calcareous: containing large quantities, or composed, of calcium carbonate.

Calci-: prefix indicating containing/composed of calcium carbonate.

Calcilutite: a limestone composed mainly of mud-sized calcium carbonate grains.

Calcite: the most common, rock-forming crystalline form of calcium carbonate; the main constituent of limestone and the shells of many molluscs, brachiopods, echinoderms and other invertebrates.

Calcium carbonate ($CaCO_3$): a colourless or white crystal compound, which occurs naturally as limestone, marble and chalk. *See also* calcite.

Calcrete: *see* caliche.

Caliche: a soil horizon rich in nodular carbonate that forms in seasonally arid environments.

Carbonaceous: containing carbon.

Carbonate: a mineral salt of carbonic acid, usually referring to the common sedimentary form calcium carbonate in limestones and invertebrate shells, but also encompassing other minerals, notably dolomite.

Cement: the mineral 'glue' that holds particles together in sedimentary rocks.

Cementstone: argillaceous limestone and dolostone.

Cephalopod: any member of the class Cephalopoda, the most advanced class of the phylum Mollusca *(see* mollusc). These marine organisms include the modern-day squid, octopus, and cuttlefish, and the extinct belemnites and ammonites.

Chalk: poorly lithified, porous, white limestone.

Chert: microcrystalline silica (quartz and chalcedony), which may be of organic or inorganic origin. It occurs as layers or modules in sedimentary rocks (mainly chalk and limestone). An example is flint.

Chronostratigraphy: the subdivision and correlation of rock units on the basis of relative age. The hierarchy of principal chronostratigraphical units to which layers of sedimentary rock are allocated through the study and interpretation of their stratigraphy is erathem, system, series and stage, which are related, respectively to the geological time units of era, period, epoch and age. Rocks of the Jurassic System (a chronostratigraphical unit) were laid down in the Jurassic Period (a geological time unit).

Chronozone: a fine division of geological time based on some recognizable feature preserved in contemporaneous sedimentary strata.

Clade: a group of organisms that share a common ancestor.

Class: a category used in the taxonomic classification of organisms, which consists of one or several related orders. Similar classes are grouped into a phylum.

Clast: **(adj. clastic**): a sedimentary particle — a fragment of a pre-existing rock or fossil (bioclast).

Clay: an extremely fine-grained sediment (grain-size less than 0.004 mm) composed of so-called 'clay minerals'.

Coccolith: one of the interlocking calcite plates which form the sphere-shaped skeleton (coccosphere) of the coccolithophores (marine, microscopic, single-celled algae).

Comminuted: finely divided.

Concretion: a rounded or irregular mass of mineral matter concentrated around a nucleus and formed during diagenesis in a sedimentary rock.

Conduit: a dissolutional void, generally greater than 100 mm in diameter, in limestone; larger than a fissure, and including cave passages.

Conglomerate: a sedimentary rock consisting of rounded pebbles (cf. breccia).

Contemporaneous: formed or occurring at the same time.

Contiguous: touching, in contact.

Coquina: a sedimentary deposit largely made of shells or their fragments.

Coral: any member of the class Anthozoa (phylum Coelenterata). These aquatic animals typically have a calcium carbonate external skeleton. They may live as individuals or in large colonies.

Cornstone: a concretionary limestone deposit typically developed in sandstones, characteristic of arid terrestrial environments (synonymous with calcrete).

Correlation: the tracing and identification of a stratigraphical unit away from its type area by comparing lithologies and/or fauna.

Crinoid: any member of the class Crinoidea (phylum Echinodermata (*see* echinoderm)). These marine invertebrates have a flowering plant-like structure and are often called 'sea lilies' or 'feather stars'. They may be sessile (with a stem) or free-floating.

Cross-stratification: subsidiary bedding surfaces oblique to the upper and lower bounding surfaces of a particular stratum and representing ripples or dunes formed in the sediment by water currents (or wind). Large-scale features are named 'cross-bedding', small-scale features are known as 'cross-lamination'.

Crustacean: any member of the class Crustacea (phylum Arthropoda (*see* arthropod)). These animals have typically have two pairs of antennae, a pair of mandibles and often many other appendages, and are mainly aquatic. Examples include lobsters, shrimps, barnacles and wood lice.

Cryptic: descriptive of reef organisms, mainly invertebrates, that live under corals, shells and rocks.

Decapod: a crustacean with ten limbs for walking, such as the shrimp.

Decollement: the dislocation surface, commonly in soft strata, upon which rocks have slid and become folded or faulted, leaving the rocks below the surface relatively undeformed.

Depocentre: the centre of (greatest) deposition.

Dessication crack: a crack formed when wet sediment dries out.

Diachronous: descriptive of a lithological unit, or contiguous rock body, that was deposited at different times in different locations and therefore differs in age from place to place.

Diagenesis: **(adj. diagenetic**): the post-depositional changes in mineralogy and texture of sediments and organisms that combine to produce rocks and fossils. The term excludes metamorphic alteration.

Dinoflagellate: mostly members of the class Dinophyceae. These planktonic organisms are microscopic, single-celled and possess two flagella (tails) used in movement. Some cause 'red tides' and some are bioluminescent.

Dip: the angle between a bedding surface and the horizontal.

Disconformity (adj. disconformable): a break in continuity of deposition, (unconformity), where the beds above and below are parallel and therefore show no angular discordance.

Dissolution: the natural process of dissolving a solid; specifically in karst processes, the dissolving of carbonate rock to create a liquid solution of calcium and bicarbonate ions in water; also known as 'solution'.

Distal: far from the source.

Dogger: a traditional term for a type of large concretion; also the name formerly used for the Middle Jurassic Series in continental Europe.

Dolomite ($CaMg(CO_3)_2$): a white or colourless mineral with a structure similar to calcite but with some calcium replaced by magnesium.

Downthrow: the amount of downward displacement of rock along a fault.

Druse (drusy): a cavity (vug) in an igneous rock or mineral vein into which well-formed crystals of the rock or mineral vein project; or the crystals themselves.

Dyke: a band of igneous rock that has 'intruded' or 'cut through' pre-existing rocks. *See also* neptunian dyke.

Dysaerobic: a depositional environment with 0.1–1.0 ml of dissolved oxygen per litre of water. *See also* aerobic and anaerobic.

Echinoderm: any member of the phylum Echinodermata. These marine invertebrates are characterized by a five-fold symmetry, an internal skeleton of calcite plates and a complex water vascular system. Examples include echinoids (sea-urchins), crinoids, and starfish (*see* asteroidea).

Echinoid: a member of the class Echinoidea (phylum Echinodermata (*see* echinoderm)). More commonly known as the 'sea-urchin', these organisms are characterized by a rigid, globular or disc-shaped shell.

Endemism: a situation in which a species or other taxonomic group is restricted to a particular geographical region, due to factors such as isolation, or a response to soil or climatic conditions.

Endogenic (endogenetic): in geomorphology, the forces operating below the Earth's crust that are involved in the formation of surface features.

Endolithic: descriptive of organisms, such as algae or fungi, that live in minute burrows within sediments, rocks or shells.

Epeiric sea: a shallow sea that extends far into the interior of a continent; and also a shallow sea area that cover the continental shelf and is partially enclosed.

Epeirogeny (adj. **epeirogenic**): broad and generally large-scale, vertical movements of the Earth's crust, which do not involve much alteration in the structure of the rock.

Epibenthos (adj. **epibenthic**): organisms living on the surface of the seabed or bed of a lake.

Epibyssate: descriptive of organisms that use the byssus (*see* byssate) to anchor themselves to rock or seaweed.

Epifauna: a collective term for the benthic organisms that live or lived on the substrate of the sea floor, or attached to some solid object.

Epoch: a geological time unit (cf. chronostratigraphy), of shorter duration than a period and itself divisible into ages (e.g. the Late Triassic Epoch.

Era: a major geological time unit (cf. chronostratigraphy), which is divided into periods (e.g. the Palaeozoic Era).

Erosion: the wearing away of the land's surface by mechanical processes such as the flow of water, ice or wind.

Erosion surface: a land or rock surface shaped by the processes of erosion.

Eurytopic: able to tolerate a wide range of several factors.

Eustatic: concerning worldwide (as distinct from local) changes in sea level that are caused by a major geological event such as tectonic activity or an ice-age.

Evaporite: a sediment or mineral grown from a saline solution by evaporation of water, which may be marine or continental in origin.

Event stratigraphy: the correlation of sedimentary rocks by recognition of marker beds or event horizons which are considered to be isochronous.

Exogenous (exogenic): descriptive of processes originating at or near the surface of the Earth, such as erosion, and of rocks and landforms that owe their origin to such processes.

Extrusive: descriptive of igneous rocks that have been extruded onto the Earth's surface, rather than being intruded beneath the surface (intrusive).

Facies: the sum total of a rock's lithological and gross faunal/floral characteristics that together reflect the particular environment in which it formed.

Family: a category used in the taxonomic classification of organisms, which consists of one or several related genera. Similar families are grouped into an order.

Fault: an approximately planar fracture surface in rock along which there has been some movement of one side relative to the other.

Fauna: animals — often referring to the characteristic animal assemblage of a region/time period.

Ferruginous: containing iron or iron-rich minerals.

Fissile: descriptive of a sedimentary rock that contains very thin bedding or cleavage laminae along which the rock splits into thin sheets.

Fissure: a fracture surface or crack within a rock along which a clear separation can be seen. Often filled with material, frequently mineral-bearing.

Flaggy: descriptive of a sedimentary rock that contains bedding between 0.01 m and 0.1 m thick, along which the rock can be split into thick sheets (flagstones).

Flora: plants — often referring to the characteristic plant assemblage of a region/time period.

Flowstone: a deposit of calcium carbonate formed by flowing water on the wall or floor of a cave.

Fluvial: relating to a river or river system.

Fold: a bend in rock strata produced by earth movements.

Foraminifera: a mainly marine order of the subclass Sarcodina in the phylum Protozoa, consisting of single-celled aquatic animals that have a calcareous protective external shell, often with an elaborate form. Usually microscopic in size but some are larger.

Foreset: the steeply dipping surface of cross-bedded strata.

Formation: a succession of contiguous rock strata that is distinctive enough in its lithology from the surrounding rocks to be mapped as a unit; the fundamental unit of lithostratigraphy.

Fossil: the preserved remains of an animal or plant. *See also* trace fossil.

Friable: descriptive of a rock that is crumbly or easily broken.

Gastropod: any member of the class Gastropoda (phylum Mollusca (*see* mollusc)). These ancient invertebrates are characterized by a well-developed head, a flattened foot, and spirally shaped shells of aragonitic calcium carbonate. Examples include snails, slugs, limpets and conches.

GCR: Geological Conservation Review, in which nationally important geological and geomorphological sites were assessed and selected with a view to their long-term conservation as SSSIs.

Genotype: the type species of a genus.

Genus (pl: **genera**): a category used in the taxonomic classification of organisms, which consists of one or several related species. Similar genera are grouped together into a family.

Geochronology: the measurement of absolute geological time and its division into episodes, in years, or millions of years (Ma), before the present time.

Geopetal: a sedimentary fabric that records the way up at the time of deposition. Commonly found in cavity fills within limestones.

Graben: a linear block of crust downthrown between two parallel faults to form a rift or trough-shaped valley.

Granite: a pale-coloured, coarse-grained, typically plutonic (intrusive) igneous rock, with a high SiO_2 content. Commonly found in batholiths and veins.

Greensand: a sedimentary rock that contains a green mineral called glauconite.

Grike (gryke): a fissure between dints in a limestone pavement, formed by dissolutional enlargement of a joint.

Group: in lithostratigraphy, a grouping of two or more formations with significant unifying lithological and/or genetic features.

GSSP (Global boundary Stratotype Section and Point): an internationally recognized chronostratigraphical boundary established following strict procedures of the International Union of Geological Sciences Subcommission on Stratigraphy.

Gymnosperm: a member of a major division of the plant kingdom, consisting of woody plants with alternation of generations and seeds not protected in an ovary. Examples include seed ferns and conifers.

Half-graben: an elongate trough bounded by a normal fault on one side only. *See also* graben.

Halokinesis: the mobilizaton and flow of subsurface salt, and the subsequent emplacment and resulting structure of salt bodies.

Hardground: a bedding surface of rock formed by cementation of sediment soon after deposition whilst it was at or close to the sediment–water interface (the sea floor).

Hemera (pl. hemerae): an interval of geological time characterized by the maximum abundance of a named fossil.

Hermatypic: descriptive of corals that contain zooxanthellae (unicellular dinoflagellates) and are reef forming.

Hettangian Stage: a chronostratigraphical subdivision of the Jurassic System, comprising the rocks deposited during the Hettangian Age. The first stage of the Lower Jurassic Series, it is dated to approximately 199.6–196.5 Ma (Pálfy *et al.,* 2000c), and is preceded up the Upper Triassic Rhaetian Stage and followed by the Sinermurian Stage.

Highstand: a phase of high sea level.

Holothurian: a member of the class Holothuroidea, of the phylum Echinodermata (*see* echinoderm). Commonly known as 'sea cucumbers', these organisms typically have a non-rigid calcitic skeleton, composed of small sderites or spicules.

Holotype: the single specimen (the so-called 'type specimen') selected to epitomize a particular named species.

Horizon: an informal term denoting a thin bed or plane within a succession of strata. *See also* biohorizon.

Horst: an upfaulted block of crustal rocks, often on either side of a graben.

Ichthyosaur: an extinct marine reptile well adapted for swimming; it had a streamlined fish-shaped body, paddle-shaped limbs, and ranged from 1 m to 10 m in length.

Igneous rock: a rock that has formed from the cooling of molten magma, either following volcanic activity or intrusive processes. It consists of interlocking crystals, the size of which depends on the rate of cooling of the magma.

Imbrication: a sedimentary fabric displaying typically elongate fragments that are aligned in a preferred angle to the bedding.

Index fossil (index species): a particular fossil (or species) that gives its name to a biozone.

Induration: the process of compaction and cementation during which a soft sediment becomes a rock.

Infauna: a collective term for the organisms that live or lived below the sea floor, especially in burrows in soft sediments but also including some rock-boring organisms.

Inner: an outcrop of older rocks surrounded, on a geological map, by younger rocks commonly exposed by erosion (cf. outlier).

Intertidal: littoral; the zone between high- and low-water marks on a shoreline.

Intraclast: a fragment of rock derived from coeval parent material rather than an 'older' (extraformational) source.

Intrusion: **(adj. intrusive**): an igneous rock that has formed as a body intruded into other rocks below the Earth's surface.

Ironshot: descriptive of a rock that contains small granules or ooids of iron or iron ore (often haematite and limonite).

Ironstone: **an iron-rich sedimentary rock. Isochronous**: occurring at the same time.

Joint: a fracture in a rock that exhibits no displacement across it (unlike a fault). May be caused by shrinkage of igneous rocks as they cool in the solid state, or, in sedimentary rocks, by regional extension or compression caused by earth movements.

Jurassic Period: a geological time division ranging from about 142 Ma to 200 Ma; it precedes the Cretaceous Period and succeeds the Triassic Period.

Jurassic System: a chronostratigraphical unit comprising all the rocks deposited during the Jurassic Period.

Karst: descriptive of a distinctive terrain developed upon a soluble rock, typically limestone; characterized by caves, sinkholes and dry valleys.

Lacustrine: relating to, formed within in, or produced by, lakes.

Lagoon: an area of shallow, generally salt, water more-or-less cut off from the sea by a narrow bar of sediment.

Lamina (pl. **laminae, laminations**): the finest layer within a sedimentary rock, typically less than 10 mm thick.

Laminated: descriptive of a bed with a fabric composed of laminae.

Laterite (adj. **lateritic**): red subsoil, rich in hydrous oxides of iron and/or aluminium and commonly with kaolinite and silica that develops as a residual product of weathering in tropical and subtropical climates.

Lectotype: a specimen chosen from available syntypes to be the designated type of the species.

Lenticle: a lens-shaped stratum or body of rock.

Lias: a lithostratigraphical group of mainly Early Jurassic age.

Limestone: sedimentary rock composed of calcium carbonate, often partly derived from the shells of organisms.

Lineation: any linear feature that appears on the bedding or other surface of a rock. May be formed during deformation.

Lithic: relating to a rock clast found within a sedimentary rock.

Lithification: the conversion of sediment into rock.

Lithoclast: a mechanically deposited rock fragment, normally greater than 2 mm in diameter, derived from any older, (pre-existing) lithified rock.

Lithofacies: a facies defined by sedimentary rock type (using, for example, colour, texture and mineral composition).

Lithology: descriptive of the constitution of a sediment or other rock, including composition, texture, colour and hardness.

Lithosphere: the outer layer of the solid Earth, including the crust and upper part of the mantle, which forms tectonic plates above the asthenosphere.

Lithostratigraphy: the organization and division of strata into mainly mappable rock units and their correlation, based entirely upon their lithological characteristics. Units are named according to their perceived rank in a formal hierarchy, namely supergroup, group, formation, member and bed.

Littoral: descriptive of the zone between high-and low-water marks on a shoreline.

Log: a written or graphical record of a borehole or rock section.

Lower Jurassic Series: a chronostratigraphical division of the Jurassic System, comprising the rocks deposited during the Early Jurassic Epoch. The first series of the Jurassic System, it is dated to approximately 199.6–178 Ma (Pálfy *et* ed., 2000c), and is followed by the Middle Jurassic Series. It is divided into the Hettangian, Sinemurian, Pliensbachian and Toarcian stages.

Lowstand: a phase of low sea level.

Macrofossil: a fossil that is easily seen by the naked eye.

Macrophyte: a plant that can be seen by the naked eye, typical of aquatic regions.

Marker band (bed): a bed or layer within a rock succession with distinctive, easily recognizable characteristics that allow it to be traced for long distances or to serve as a reference or datum, and thereby enabling correlation.

Marl: a fine-grained calcium carbonate-rich mud or clay.

Mass extinction: a heightened rate of extinction as recorded in the fossil record by the termination of a significant number of species lineages over a relatively short period of time (in geological terms), reflecting a biotic crisis that may have a variety of causes, such as a change in sea level or climate.

Mass flow: the transport, down slope under the force of gravity, of large, coherent masses of sediment, tephra or rock; commonly assisted by the incorporation of water, ice or air.

Massif: a very large topographic or structural feature.

Massive: descriptive of a bed or layer of sedimentary rock with an apparently uniform structure and lacking bedding fabric or lamination.

Matrix: the fine-grained sediment or crystalline cement that infills the spaces between larger grains.

Megaspore: a fossil plant spore greater than 0.22 mm in diameter, for which the parent plant is often unknown.

Member: in lithostratigraphy, a subdivision of a formation.

Mesozoic Era: a geological time division ranging from 65 to 247 million years ago. It comprises the Triassic, Jurassic and Cretaceous periods.

Metamorphic rock: a rock that has been altered by the action of heat and/or pressure, without melting.

Metamorphism (adj. **metamorphic**): the process of radical alteration of the mineralogical and/or physical nature of rocks as a result of pressure and/or temperature.

Metasediment: a sedimentary rock that has undergone metamorphism.

Micrite: a microcrystalline calcite; typically a lime mud.

Microfauna: a microscopic animal.

Microfossil: a microscopic fossil.

Miospore: a general term for any fossil plant spore smaller than 0.2 mm.

Mollusc: any member of the phylum Mollusca, which comprises about 5000 species. These invertebrates are characterized by a fleshy soft body and, usually, a hard shell. They may be marine, freshwater or terrestrial, and examples include gastropods (snails, limpets), bivalves (oysters, mussels), and cephalopods.

Monoclhie: a stratigraphical unit that dips from the horizontal in one direction only, not as part of an anticline or syncline.

Morphospecies: a group of biological organisms that differs in some morphological respect from all other groups.

Mucilage: a layer or mass of organic matter, commonly coating the shells of marine organisms and some grains such as ooids.

Mud: a mixture of clay and silt.

Mudrock (mudstone): a fine-grained sedimentary rock; lithified mud.

Nannofossil: an extremely small marine (usually algal) fossil, smaller in size than a microfossil, such as a coccolith.

Nautiloid: a member of the subclass Nautiloidea of the class Cephalopoda (*see* cephalopod). These marine invertebrates possess a multi-chambered external shell of calcium carbonate that may be straight or coiled. Only one genus, the *Nautilus,* survives today.

Nekton (adj. **nektonic**): those organisms that actively swim in water.

Neotype: a specimen designated as the type specimen of a species or subspecies when the holotype and all paratypes and syntypes have been lost or destroyed.

Neptunia' n dyke: a sheet-like body of sand or other sediment that cuts through bedded sediment in a manner analogous to an igneous dyke. Formed by the upward or downward injection of liquefied sand through a fissure, often as a result of earthquake activity.

Neritic: relating to the sub-littoral zone, between the continental shelf and low-water mark.

Nodule: a small concretion, generally roughly spherical or ellipsoidal.

Non-sequence: a relatively minor break in the accumulation of sediment and therefore a gap in the sedimentary rock record.

Obdurate: hardened.

Obrution: sudden burial.

Onlap: associated with unconformities, beds that successively overlap each other.

Oncolite (adj. **oncolitic**): a spherical or sub-spherical particle, up to 5 cm in diameter, which is produced by the accretion of sedimentary material on to a mobile grain through the action of algae.

Ontogeny: the growth and development through the life of an individual organism.

Ooid (oolith): a spherical or subspherical carbonate-coated, sedimentary particle, less than 2 mm in diameter.

Oolite: a rock, usually limestone, made up largely of ooids produced by accretion of carbonate around a nucleus.

Order: a category used in the taxonomic classification of organisms, which consists of one or several related families. Similar orders are grouped together in a class.

Orogeny: a process of mountain building during which the rocks and sediments of a particular area of a continent are deformed and uplifted to form mountain belts.

Ossicle: a small bone, or piece of bone-like, calcitic or chitinous material found in various skeletal parts of animals.

Ostracod: any member of the subclass Ostracoda (class Crustacea (*see* crustacean), phylum Arthropoda (*see* arthropod)). These small invertebrates are mostly less than 1 mm in size and consist of two calcareous valves ('shells'). They can be found in a wide range of aquatic environments, both in fresh-and salt-water.

Outlier: an outcrop of younger rocks surrounded, on a geological map, by older rocks (cf. inner).

Overstep: a relationship in which a younger series of sedimentary strata rests upon a progressively older series of strata, the older and younger series of strata being separated by a plane of unconformity.

Palaeo-: 'ancient'.

Palaeontology: the study of fossil fauna and flora including their evolution and reconstruction of pre-existing environments.

Palaeozoic Era: a geological time division; the first major division of geological time characterized by abundant life. It precedes the Mesozoic Era.

Palaeosol: an ancient or 'fossilized' soil.

Palyno-:prefix indicating 'pollen' or 'spores'.

Palynology: the study of pollen, spores and certain other, generally plant, microfossils.

Palynomorph: any of the microscopic, acid-resistant, organic-walled bodies found in palynological preparations and studied in palynology.

Pangaea: a supercontinent formed by ocean floor subduction, plate collision and assembly of all continents in late Permian times.

Paper shale: a shale that easily separates on weathering into thin layers or laminae resembling sheets of paper. Often very carbonaceous.

Parastratotype: a supplementary stratotype used to illustrate the diversity or heterogeneity of the defined stratigraphical unit or some critical feature not evident or exposed in the stratotype.

Paratype: a specimen, other than the holotype, on which the original description of a species or subspecies is based.

Patch reef: an isolated reef development, commonly located on a carbonate platform, but away from the platform edge.

Pelagic: of, or relating to, the open sea; particularly the organisms that swim or float within the water column.

Pelmicrite: a limestone consisting of a variable proportion of peloids and carbonate mud (micrite).

Peloid: a sand-sized to granule-sized grain of finely crystalline carbonate of many possible origins, including pellets.

Penecontemporaneous: formed or existing at almost the same time.

Pericline: a dome-shaped anticline.

Periglacial: a zone or environment peripheral to glaciers, so that it is very cold but is not covered by ice sheets; it is characterized by the frozen ground known as 'permafrost'.

Period: a geological time unit (cf. chronostratigraphy); of shorter duration than an era and itself divisible into epochs.

Petrology: the study of the composition, occurrence and origin of rocks.

Phosphate: phosphourus salt, a mineral frequently associated with the preservation of bones and shells.

Phosphatic: descriptive of a rock containing large quantities of phosphate.

Phosphatize: the process of becoming enriched with phosphate.

Photic zone: the part of a water body in which there is enough sunlight for photosynthesis to occur.

Photosynthesis: the process whereby green plants trap light in chlorophyll and use it to synthesize carbohydrates from carbon dioxide and water.

Phylum (pl. **phyla**): a category used in the taxonomic classification of organisms, which consists of one or several related classes. The phyla are grouped together into two kingdoms, the Plantae (plants) and the Animalia (animals).

Phylogeny: the line, or lines, of direct descent in a given group of organisms.

Pisoid (pisolith): a large ooid with a diameter of more than 2 mm.

Planation: the process of erosion that causes the erosion surface to become flat or level.

Plankton (adj. **planktonic**): minute aquatic organisms that drift with water movement.

Plesiosaur: a predatory marine reptile of the Mesozoic Era, which had a long neck and a relatively small head, and swam with flipper-shaped limbs.

Pliensbachian Stage: a chronostratigraphical subdivision of the Jurassic System, comprising the rocks deposited during the Pliensbachian Age. The third stage of the Lower Jurassic Series, it is dated to approximately 191.5183.6 Ma (Pálfy *et al.*, 2000c) and is preceded by the Sinemurian Stage and followed by the Toarcian Stage.

Pluton (adj. **plutonic**): an intrusion of igneous rock emplaced at depth in the Earth's crust.

Poikilotopic: a sedimentary rock fabric in which coarse crystals of cement enclose a number of smaller, detrital grains.

Pollen: the microspores of angiosperms and certain groups of gymnosperm.

Polymictic: descriptive of a conglomerate that contains clasts of many different rock types.

Pseudoplankton (adj **pseudoplanktonic)**: organisms that are attached to floating material or mobile swimmers.

Province: the geographical region occupied by a particular assemblage of organisms in response to certain environmental factors such as climate and water temperature.

Proximal: near to the source.

Pterosaur: a flying reptile of the Jurassic and Cretaceous periods characterized by a membranous wing supported by an elongate fourth finger.

Pyroclastic: descriptive of unconsolidated deposits (tephra) and rocks that form directly by explosive ejection from a volcano.

Quartz: a rock-forming mineral composed entirely of silica (SiO_2); one of the most common minerals of the Earth's crust.

Quartzose: containing quartz as a principal constituent.

Radiolarian (pl. **radiolaria**): a group of marine, single-celled plankton, which secrete siliceous skeletons that are often preserved as fossils in deep-sea sediments.

Radiometric dating: methods of dating certain rocks or minerals using the relative abundances of radioactive and stable isotopes of certain elements, together with known rates of decay of radioactive elements. Radiocarbon dating can extend back to only 50 000 years, but other elements (potassium, lead, uranium) can be used to obtain dates of the order of tens to thousands of millions of years.

Red-beds: a collective term applied to continental sedimentary successions that are predominantly red in colour due to the presence of iron oxides and hydroxides formed in a highly oxidizing environment.

Reef: a rigid and wave-resistant carbonate buildup produced by the lime secreting activities of marine invertebrates such as corals that lived in shallow, warm shelf seas.

Regolith: a layer of unconsolidated, weathered, broken rock debris that lies below the soil and above the bedrock below.

Regression: the withdrawal of the sea from the land due to a fall in relative sea level.

Reworking: the natural excavation and transportation of sediment or fossil material that is then re-deposited elsewhere.

Rhaetian Stage: a chronostratigraphical division of the Triassic System, comprising the rocks deposited during the Rhaetian Age. The last stage of the Late Triassic Series, it is dated to approximately 204–199.6 Ma and is followed by

the Hettangian Stage.

Rift: a depressed area of continental crust produced by tensile stretching of the crust and down-faulting along parallel faults.

Rudite (adj: rudaceous): a coarse-grained sedimentary rock, either consolidated as in a conglomerate, or unconsolidated as in a till.

Sand: sediment particles typically between 0.625 mm and 2 mm in diameter.

Sandstone: a sedimentary rock composed of lithified sand grains between 0.625 mm and 2 mm in diameter.

Scaphopod: any member of the class Scaphopoda (phylum Mollusca (*see* mollusc)). These marine invertebrates burrow into sediment and secrete and occupy hollow calcareous tubes open at both ends.

Scar: a steep, rocky eminence or cliff where bare rock is prominently exposed.

Scarp: a steep or cliff-like slope, rising above the surrounding land. Typically produced by the outcrop of a relatively hard unit of rock.

Schist: a coarse-grained metamorphic rock that displays a strong foliation (schistosity) that is often defined by mica alignment.

Sclerite: an exoskeletal element in the form of plates or spines, often mineralized.

Scree: an accumulation of rock fragments formed by the mechanical weathering of outcrops. The rock debris generally forms cones or slopes beneath cliffs.

Sediment: granular material such as sand or mud derived from the weathering and erosion of pre-existing rocks, biological activity (e.g. shells and organic matter), or chemical precipitation (e.g. evaporites).

Sedimentary rock: a rock composed of sediments, deposited by water, wind or ice.

Sedimentology: the study of sediments and sedimentary rocks, including their deposition, structure and composition.

Seismic stratigraphy: the study of stratigraphy and depositional facies through seismic data.

Seismite: a deposit displaying soft-sediment deformation inferred to be of seismic origin.

Sequence stratigraphy: the study of stratigraphy through the use of repetitive, related units bounded by surfaces of erosion or non-deposition.

Series: a chronostratigraphical division comprising all the rocks formed during an epoch; it can be divided into stages.

Serpulid: a member of the family Serpulidae (phylum Annelida (*see* annelid)). These small marine worms build tubes that become mineralized with calcium carbonate.

Shale: a mudrock that splits easily into layers.

Silcrete: a conglomerate consisting of sand and gravel cemented into a hard mass by silica.

Siliciclastic: a sediment or sedimentary rock comprising a high proportion of silica-rich grains or clasts.

Sill: a tabular body of igneous rock that is more-or-less concordant with the bedding or foliation of the host rocks.

Silt: a fine-grained sediment intermediate in grain size between day and sand.

Siltstone: a rock made of silt.

Sinemurian Stage: a chronostratigraphical subdivision of the Jurassic System, comprising the rocks deposited during the Sinemurian Age. The second stage of the Lower Jurassic Series, it is dated to approximately 196.5–191.5 Ma (Pálfy *et al.,* 2000c) and is preceded by the Hettangian Stage and followed by the Pliensbachian Stage.

Sorting: the ordered distribution of grain sizes. A well-sorted rock has a narrow range of grain sizes. A poorly sorted rock has a wide range of grain sizes.

Sparite (sparry calcite): a limestone in which the sparite cement is more abundant than the micrite matrix.

Species: a category used in the taxonomic classification of organisms. Similar species are grouped together in a genus.

Spicule: a small needle or spine.

Sponge: any member of the phylum Porifera; primitive multi-cellular aquatic animals which secrete a skeleton of either silica, calcium carbonate or an organic material.

SSSI: Site of Special Scientific Interest; the designation of an area of land for statutory protection under the Wildlife and Countryside Act 1981.

Stage: a chronostratigraphical division comprising all the rocks formed during an age, and usually taken to be the smallest standard unit.

Steinkern: an internal mould caused by the preservation of the internal features of skeletal remains.

Stenohaline: descriptive of organisms with a narrow tolerance range in water salinity.

Stratigraphy: the study of the temporal and spatial relationships within a rock succession.

Stratotype:a sequence of sedimentary rocks at a particular locality chosen as the standard against which other sequences can be compared. Stratotypes are established for lithostratigraphical and biostratigraphical units, both regionally and internationally.

Stratum (pl. **strata**): a bed or single layer in a succession of rock.

Strike: the trend of a geological surface (e.g. a bedding plane) measured at right angles to the direction of maximum slope or dip.

Strike-slip: a tectonic break in strata in which the predominant displacement is lateral rather than vertical.

Stromatolite: a laminated, mounded structure composed of limestone built by cyano-bacteria. They are known in rocks throughout the geological record; today, they develop in warm, shallow tropical seas.

Subboreal: pertaining to a Jurassic faunal province covering areas including southern England, northern France, northern Germany, parts of Poland and Russia west of the Urals.

Sub-littoral: *see* neritic.

Subduction: the process of one crustal plate descending into the mantle beneath another during plate convergence and collision, with the release of energy in the form of earthquakes and often accompanied by volcanicity.

Subsidence: a sinking of a local or regional portion of the Earth's surface with respect to its surroundings.

Supratidal: above the tides.

Syncline: a downfold of rock produced by tectonic deformation; the youngest rocks occur in its core.

Syn-: prefix indicating 'the same as' or 'resembling'.

Syntype: any one of a series of specimens which characterize a species when there are no designated holotypes and paratypes.

System: a chronostratigraphical division comprising all the rocks formed during a period; can be divided into stages.

Taphonomy: in palaeontology, the study of the changes, including transportation, that affect organisms after death, including the physical and chemical interactions that take place between burial of the organism and its subsequent discovery as a fossil.

Taxon (pl. **taxa**): any group of organisms that has been scientifically designated as belonging to a specific taxonomic group.

Taxonomy: the study of the rules of classification of living and extinct organisms.

Tectonic inversion: a change in the relative elevation of a block of crust (e.g. a basin becomes a basement high or vice versa), brought about by the reversal of movement direction along structures such as faults, due to a change in regional forces.

Tectonism (adj. tectonic): deformation of the Earth's crust and the consequent structural effects (e.g. faults and folds).

Tempestite: a storm deposit — material deposited during a single storm, often on a continental shelf where the tidal range is small and the prevailing winds are strong.

Terrigenous: deposited or formed on land, or derived from the land.

Tethys: an E–W-extending major ocean, which separated the southern supercontinent of Gondwanaland from Laurasia in Mesozoic times; subducted to form the Alpine–Himalaya mountain belt.

Thermal (contact) metamorphism: the metamorphism or recrystalization of rocks surrounding an igneous intrusion due to the heat supplied by the intrusion.

Throw: the amount of vertical displacement between the rocks on either side of a fault.

Thrust fault: a fault characterized by movement or rocks under lateral compression along a low-angle fault plane.

Toarcian Stage: a chronostratigraphical subdivision of the Jurassic System, comprising the rocks deposited during the Toarcian Age. The last stage of the Lower Jurassic Series, it is dated to approximately 183.6–178 Ma (Pálfy *et al.*, 2000c) and is preceded by the Pliensbachian Stage and followed by the Middle Jurassic Aalenian Stage.

Topotype: a specimen of a particular species that comes from the same locality as the type specimen of that species.

Trace fossil (ichnofossil): a biogenic sedimentary structure produced by activity of an organism within a substrate; examples include burrows and footprints.

Transcurrent fault (strike-slip fault): a fault in which the major displacement is horizontal and parallel to the strike of a vertical or sub-vertical fault plane. Localized zones of deformation due to pressures and tensions across the fault occur at bends in the fault and can give rise to conditions of transtension. The latter process may cause the formation of rhombic-shaped basins, graben, or marginal basins that may be the focus of rift-related volcanic activity.

Transgression: the encroachment of the sea on the land due to a rise in relative sea level.

Trough cross-bedding: cross-bedding in which the lower bounding surfaces are curved surfaces of erosion, due to local scour and subsequent deposition.

Truncation: the cutting or breaking off of the top of a geological structure or landform.

Tsunamite: a sediment or rock formed and deposited by a tsunami, often incorrectly termed a 'tidal wave'.

Tuff: cemented and lithified volcanic ash, comprising rock and crystal fragments from an explosive eruption.

Type locality/area: the place where the type section (or stratotype) for a stratigraphical unit is located, or from where the type specimen of a fossil came.

Type section: *see* stratotype.

Type specimen: a single specimen designated as typifying a named species or subspecies. *See also* holotype and paratype.

Unconformity: the surface that separates two sedimentary sequences of different ages; it represents a gap in the geological record when there was erosion, and/or tectonism and/or no deposition. There is often an angular discordance between the two sequences.

Uplift: a structurally high area in the crust, produced by movements that raise or upthrust the rocks, as in a dome or arch.

Upthrow: the amount of upward displacement of rock along a fault.

Vagile: descriptive of a plant or animal that is free to move about.

Volcanic rock: an extrusive igneous rock formed by a volcanic eruption.

Volcaniclastic: generally applied to a clastic rock containing mainly material derived from volcanic activity, but without regard for its origin or environment of deposition (includes pyroclastic rocks and sedimentary rocks containing volcanic debris).

Vug (adj. **vuggy**): a cavity in a rock, which may contain a lining of crystalline minerals.

Wadi: a gorge-like valley formed in arid or semiarid environments.

Weathering: the breaking down of rocks through the effects of exposure to the weather; the term does not infer any transportation of the weathered rock material.

Winnowing: the selective sorting or removal of fine-grained particles by the action of water currents or wind, leaving coarser-grained material behind.

Zone: a stratigraphical unit in many categories of stratigraphical classification. In chronostratigraphy, a division smaller than a stage, defined by its base in a type section.

Zonule: a small subdivision of a biozone or subbiozone.

References