



Callovian (CLV)

Block Description

Visit <https://jncc.gov.uk/gcr-site-list>, for more information on GCR blocks and sites
For Mesozoic-Tertiary Stratigraphy GCR block descriptions and GCR site lists,
visit <https://jncc.gov.uk/gcr-blocks-mesozoic-tertiary-stratigraphy>

Introduction

The GCR sites selected for this GCR Block represent the British geological record of Earth history from about 161 to 157 million years ago (Ma). This interval is the last Age of the Mid Jurassic Epoch, which spans from 178 to 157 Ma. Rocks that formed during the Callovian Age constitute the Callovian Stage, part of the Middle Jurassic Series, which is in turn part of the Jurassic System. In the past, the Callovian Stage was included in the Upper Jurassic Series because the base of the Callovian approximately co-incides with the end of the carbonate sedimentation that characterises much of the Middle Jurassic strata; however the Jurassic strata of Germany are now used as the basis of subdivision of the Jurassic System, such that current practice takes the base of the Upper Jurassic Series as the base of the Oxfordian Stage.

Outcrop pattern

On maps showing the solid geology of England, Middle Jurassic rocks crop out in an almost continuous strip from the Dorset coast to the North Yorkshire coast. In Scotland, Middle Jurassic rocks crop out in scattered patches in the islands to the north-west as well as in northern Scotland.

Palaeoenvironment and palaeogeography

During Early Jurassic times Britain was largely covered by shelf sea, however towards the end of the Epoch there was a significant fall in sea level accompanied by crustal upwarping and vulcanicity in the central North Sea Basin. Consequently, Middle Jurassic rocks reflect a variety of depositional environments including shallow marine, fluvial, deltaic, saltmarsh and coastal lagoon. In addition, limestone and clastic sedimentation (mudstone, siltstone and sandstone) was often widespread.

GCR site selection

For the purposes of site evaluation and selection, the GCR sites can be grouped into five themes or 'networks', reflecting depositional setting, which was largely controlled by deep-seated structural features. The networks are:

- Wessex Basin
- Cleveland Basin (North Yorkshire sites)
- East Midlands shelf
- Worcester Basin and Shelf (Cotswolds sites)
- Moray Firth and Hebrides basins.

Although the relatively common invertebrate fossils do not have a separate selection category in the GCR in their own right, the scientific importance of many stratigraphy sites lies in their fossil content. Therefore, some of the GCR sites are selected specifically for their fossil fauna, which facilitates stratal correlation and enables the interpretation of the environments in which the animals lived. Moreover, some sites have international significance because they have yielded fossils that are the 'type' material for a taxonomic group.

Palaeontology, fauna and flora

The traditional means of subdividing the Jurassic System is by means of ammonites, abundant and diverse nektonic cephalopod molluscs that, because of their rapid evolution, prove to be almost ideal 'zone fossils', enabling the correlation and division of the rocks into relative ages by way of a distinct fossil 'signature'.

The many different depositional environments that developed in Britain during Mid Jurassic times mean that the fossil record is rich and varied. Invertebrate faunas included simple and compound corals, calcareous sponges and bryozoa, abundant bivalve molluscs, such as

oysters, smooth terebratulid and ribbed rhynchonellid brachiopods, gastropods (snails), asteroids (starfish), echinoids (sea urchins) and crinoids (sea lilies). The brachiopods occurred in an abundance that was never repeated on such a scale in later geological times. Microscopic organisms included foraminifera, ostracods and phytoplankton (dinoflagellates and coccolithophorid algae).

Lobster- and shrimp-like crustaceans often produced burrows within sediments, preserved as trace fossils.

Belemnites, relatives of the ammonites, were abundant and along with fish were probably the main food of the aquatic reptiles, which were the largest vertebrate animals in the sea. These included ichthyosaurs, plesiosaurs, pliosaurs, crocodiles and turtles. The fish included both holostean and teleostean bony fishes, and sharks and rays.

On land, dinosaurs had already become established in Mid Jurassic times; primitive mammals formed a minor but important part of the fauna. Land plants of particular prominence were the gymnosperms, notably conifers, cycads, ginkgoes, ferns and horsetails. Insect life included dragonflies.

In contrast to the manner in which most invertebrate fossils are represented in the GCR, fossils of vertebrates, arthropods (except trilobites) and terrestrial plants do have their own dedicated selection categories, owing to the relative rarity of the fossil material.

See Arthropoda (APD); Jurassic - Cretaceous Reptilia (JUR-CRE-RP); Mesozoic Mammalia (MES-MAM); Mesozoic Palaeobotany (MES-PALBOT); Mesozoic - Tertiary Fish/Amphibia (MZ-TR-FI-A); Palaeoentomology (PALENT).