

**More information & further reading:**

[www.rspb.org.uk](http://www.rspb.org.uk)

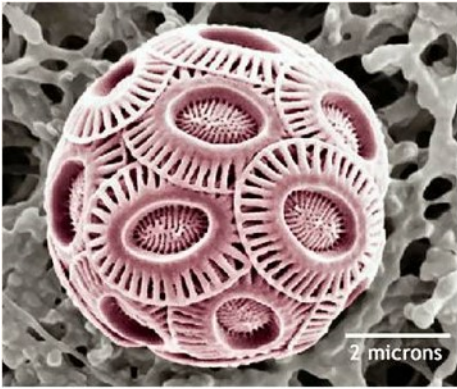
[www.yorksgeolsoc.org.uk](http://www.yorksgeolsoc.org.uk)

Myerscough, R. 2006. The Chalk of Flamborough Head. *In* Yorkshire Rocks and Landscapes, A Field Guide. Ed. Scrutton C., & Powell J., Yorkshire Geological Society, 192-199.

# The geology of RSPB Bempton Cliffs

Produced for the RSPB by the Yorkshire  
Geological Society

**Chalk** is composed of calcium carbonate (lime) comprising the remains of tiny marine organisms called **coccolithophores**. These are phytoplankton that thrived in the extreme conditions experienced during the latter part of the Cretaceous period (65 to 100 million years ago (Ma)) and known to geologists as a “Greenhouse climate”. Chalk forms the impressive cliffs which rise to over 100m above sea level.



*(1 micron = a thousandth of a millimetre)*

### **Follow the geology**

Start at Bartlett Nab viewpoint. The Chalk in the cliffs below is of Cretaceous age (about 80Ma) but across the expanse of Filey Bay (to the north) you will be able to see Filey Brigg. This reef-like promontory is composed of Upper Jurassic lime-rich sandstones (125 Ma). If visibility is good you may be able to make out Castle Hill, Scarborough where rocks of Middle Jurassic age (150Ma) occur.

At Mosey Downgate note the vertical slit that cuts into the cliff. This is probably the site of a “geo” or blow hole produced when compressed air is forced by the power of the sea along weaknesses in the chalk. In exceptional cases sea water can be forced along and

up these conduits to appear at the top of the cliffs. Since its formation, the top of this particular geo has collapsed to expose the now eroded inlet.

Grandstand viewpoint affords a second chance to look back in time across Filey Bay and up the Yorkshire coast. If you are really fortunate it is possible to see the south side of Robin Hoods Bay (Lower Jurassic mudstones – 190ma).

Spend some time looking at the chalk which forms almost vertical cliffs but has ledges utilised by sea-birds as nesting sites. These ledges are formed by softer clay-rich bands called “marls” which weather back, and by layers of flint which are harder and protrude. Note also that the chalk is layered by horizontal planes of weakness called “bedding planes” and cut by vertical, sometimes diagonal, weaknesses called “joints”. These weaknesses provide the means by which chalk (and other types of limestone) is eroded by the sea.

Before leaving Grandstand compare the height of the cliffs here with those at the end of Flamborough Head (to the right) and note the capping of till which forms a different, more concave, cliff profile from that of the near-vertical chalk.

As you walk towards New Roll-up you will pass the site of another possible geo and, looking inland back towards the Seabird Centre, note the ridge of land more or less parallel to the path. This is formed of glacial drift deposits (clay, gravel) deposited by ice about 20,000 to 35,000 years ago.

At New Roll-up you may spot the Elephant! Look at the sea arch to your right known as Staple Newk.

Continue on past Staple Newk and just before a gate look for two or three boulders of grey to black rock on the cliff side of the fence. These are of an igneous rock called dolerite the nearest occurrence being the Cleveland Dyke in the North Yorkshire Moors. They have been transported here by ice and deposited on its retreat. The slabs of rock used as steps at the gate are also of dolerite which is very hard wearing.

Return to the Seabird Centre noting the ridges of glacial material more or less parallel to the coast.