Cliffs of Moher Geology

The rocks that make up the Cliffs of Moher were formed over 300 million years ago during the Upper Carboniferous period. Bands of Namurian sandstone, siltstone and shale are exposed in a spectacular fashion and here one can study an example of a sedimentary basin normally only visible under the sea.

At that time a large landmass was located to the southwest of the ancient marine basin. Heavy rainfall on the land created great floods that washed sand and mud into ancient rivers that flowed northeastwards to the sea. The sand, silt and mud carried by these large rivers were dumped into the sea at the mouth of great delta (similar to the mouth of the Mississippi River as we know it today). Over the millions of years that followed, the sediments were compacted into solid rock and were pushed northwards due to movements in the earth's plates. It is these sedimentary rock layers of sandstones, siltstone, mudstone and shale that make up the Cliffs of Moher today.

The rock layers are rich in fossil formations and geologists consider the area one of the world's foremost natural laboratories for the study of deltaic deposition through deep water systems. Each rock layer in the Cliffs of Moher is a representation of a specific event in the life of the ancient delta as it migrated into the sea. Individual layers of rocks vary from centimetres to metres in thickness but together they form a natural feature that stands over 200 metres above the ocean that the highest point. Just as the pages of a book tell us a part of a bigger story, each layer of rock tells something about the local environment that existed over 300 million years ago what these rocks were formed.

There are two types of trace fossils in the Cliffs of Moher flagstones. The squiggly trails, called scolicia, are feeding trails left by some unidentified marine creature and are

commonly referred to as worming. It could have been a worm, a snail or a crustacean. A second less obvious type of trace fossil is the small, circular burrow mark. These burrows are preserved as casts of the feeding (or escape) burrow left by an unidentified marine creature. Other flagstones are marked with fossilized wave ripple marks. Just like the ripple marks we often see on the beach or in shallow sea water, these ripple marks formed in the sands and silts on the ancient sea floor. The attractive patterns left by the fossils have led to a demand for Moher or Liscannor flagstone and during the 19th century a thriving quarrying industry sprung up in this area. The paving throughout the visitor centre and on the cliff edge viewing platforms, walls and pathways has been done with local Liscannor or Moher slate flags.

Today the Cliffs are undergoing coastal erosion. Waves constantly crash against the foot of the cliffs, and this incessant wave action erodes the cliff base, causing sections of the upper cliff face to collapse into the sea under their own weight. A variety of coastal landforms can be seen both from the top of the cliffs and from offshore. Sea caves are formed along the foot of the cliffs and over time these develop into Sea Stacks and Sea Stumps. Wind, rain and ice all contribute to the erosion of the cliff face.

The great sea stack (Branaunmore) at the foot of the Cliffs of Moher, below O'Brien's Tower stands 67 metres high. This column of rock was once part of the cliffs but coastal erosion slowly removed the layers of rock joining it to the mainland. Further west, along the cliffs, a number of sea caves have formed at the foot of the cliffs. One of these featured famously in the 2009 movie – Harry Potter & the Half Blood Prince. A large sea arch can also be seen at Hag's Head below the Napoleonic signal tower and multiple smaller sea arches can be seen from sea level.

The Cliffs of Moher form part of the Burren and Cliffs of Moher Geopark which was awarded membership of the UNESCO supported Global Geoparks Network in 2011.