

Explain how chemical weathering has shaped a surface landscape in a Karst region.

The limestone pavement of the Burren, Co.Clare is a surface landscape that covers an area of 360 kilometre squared.

A limestone pavement is a vast area of exposed limestone from which soil cover has been removed over a period of time. The soil once there was glacial till, which was deposited by moving glaciers. However, through deforestation, the soil became easily removed by rain and rivers as there was no longer tree roots anchoring it in place.

Limestone is a pervious rock, meaning that the water passing over it can be absorbed by it. However, the water goes through the joints, across the bedding planes that separate the strata, and not through the rock itself.

The bare limestone pavement is now criss-crossed with clint and grikes due to the chemical weathering of carbonation. As rainwater passes through the atmosphere, it absorbs carbon dioxide, forming a weak carbonic acid. The weak acid reacts with the calcium carbonate within the rock to form a soluble calcium bicarbonate. The limestone is therefore slowly dissolved through the process of carbonation as the calcium bicarbonate is washed away by rainwater and rivers.

When the limestone lay underneath soil, the process of carbonation was strengthened, as when the rainwater passed through the soil, it absorbed humic acid from the rotting vegetation. This made the rainwater even more acidic.

The joints of the rock became widened to form grikes by the acidic water; they are seen as deep fissures in the pavement. Some grikes have been enlarged so much they are now two metres deep. They also contain soil that has been washed into them by rain over time. They now provide a sheltered environment for some rare plants such as Bernot rose and Maidenhead fern to grow within them.

The clints are large slabs of limestone that lay between the grikes. They can be up to a few square metres in area. Clints also become weathered by carbonation, however, it is at a much slower rate. Water often gather on their surface and forms tiny holes called Karrens. Rain water also often runs over the clints edges to form furrows called fluting.

When roofs of underground caverns collapse, the limestone pavement on top sinks into the ground forming an enclosed depression. They can often be a few kilometres wide and over a hundred metres deep.