

With the aid of diagram(s), explain how chemical weathering has shaped the limestone pavement in a karst region.

(30 marks)

Limestone is chemically weathered by a process of carbonation. As rainwater absorbs carbon dioxide as it passes through the atmosphere it becomes a weak carbonic acid. The water and carbon dioxide combine to form a weak carbonic acid. This weak carbonic acid acts on the fissures in the limestone. Carbonic acid reacts with the Calcium Carbonate in the limestone, which is then carried away in solution as Calcium Bicarbonate after chemical weathering has taken place. Rainwater, which annually exceeds 1200mm in the Burren uplands, seeps downwards through the limestones joints and bedding planes. As it seeps, it seeks out weaknesses in the heavily jointed and permeable (pervious) limestone bedrock. The fissures in the limestone become enlarged and over time the limestone is dissolved.

A limestone pavement is a large flat area of exposed limestone rock that has had its soil cover removed. Limestone is a well-jointed rock and as rainwater (weak carbonic acid) settles in the joints in the rock it may dissolve the rock. These areas are gradually deepened and widened to form a series of grikes (gaps) that may be up to 30cm wide and 2 meters deep. Clints are the flat sections of a limestone pavement which have not been eroded as easily. Pock marks on the flat slabs of rock, where the weak acidic water has pooled and carbonation has taken place, are called Karren. The rainwater running down the side of the clint dissolves it further forming furrows along the edge. This is called fluting. Dolines are bowl-shaped, enclosed hollows which form as a result of the carbonation of joints and fissures. As the joints are enlarged, the overlying soil subsides to form a depression called a doline. They may also form as a result of the roof of a cave collapsing. All of these features are contained within the one surface feature I have discussed which is a limestone pavement.

