

Erosion: People and Nature

Introduction

Today we are going to take a closer look at how we can get sedimentary rocks from the weathering and erosion of other rocks. These will be key in understanding and interpreting the formation of different sedimentary rocks we will be looking at the next few times.

Rocks are continually made and broken down in a process known as the **rock cycle**. The preceding chapter discusses the process of weathering. Weathering is the breaking down of rocks into sediment through physical and chemical processes. This chapter discusses erosion.

What is erosion?

Erosion is the process of moving sediment from one place to another by physical processes. Sediment is formed from the breaking down of rocks in a process known as weathering. Erosion involves the transportation and deposition of weathered material. Erosion is caused by geomorphic agents of the environment. These agents include wind, water and ice.

Reducing erosion

There are many different ways to reduce the human impact on erosion processes. Many new farming techniques have been developed to help protect soil from erosion. Replanting native vegetation in areas that have been cleared is another way to ensure that the land is protected from erosion processes. Monitoring livestock grazing and rotating crops will also help reduce the human impact on erosion.

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Types of erosion

Wave erosion

Wave erosion is driven by both wind and water. As waves continually crash on the shoreline, rocks are broken down. Pieces of rocks that have already been broken down are removed by the receding waves. The rate at which a shoreline erodes depends on whether the shoreline is made of cliffs, rocks or sand. It also depends on whether the shoreline is made of cliffs, rocks or sand. It also depends on what types of rocks are along the shoreline. Sand erodes much faster than cliffs. For this reason, sea walls are often built to slow the erosion of sand to another beach. Cliffs can be eroded irregularly depending on the power of the waves, fluctuation in tides and the composition of rocks. The Twelve Apostles in Victoria are an example of sea cliffs that have been eroded by waves.

River erosion

River erosion occurs as water continually moves down a mountain to the sea. The two main factors of river erosion include the flow of water and the transportation of sediment. Sediment from the upper river is carried downstream with the flow of water. The transported sediment further erodes the river bottom. Larger pieces of sediment are deposited at various points along the river, which can change the course of the water flow. Smaller pieces of sediment are carried to the river mouth and deposited there.

Mountain rivers are usually smaller with a fast flow. Valley rivers are usually wider with a slow flow. The rate of flow depends on gravity and the drag of sediment. Valley rivers usually spread out and often have flood plains. Valley rivers can also change course and shape because of the deposition of sediments and the further erosion of the river bed.

Wind erosion

Wind is a very important erosion agent in regions that have an arid climate. Arid regions, such as deserts, often have very little plant cover. The soil and landforms are usually dry. Wind does not have much power as an erosion agent. Wind becomes a powerful erosion agent when it picks up small pieces of sand particles. These particles wear away the landforms, causing erosion. This process is known as **wind abrasion**.

Glacial erosion

Glaciers move very slowly. Even though glaciers move too slowly for the human eye to notice, they are much more powerful than rivers. Glaciers erode the land underneath and alongside the glacial path. Large boulders, along with finer sediments, can be transported over long distances. The eroded material transported and deposited by glaciers is known as **moraine**.

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Erosion caused by humans

Many human activities either cause or enhance the process of erosion. This is known as **accelerated erosion**. Natural erosion is an important process in the continual formation of our Earth. The interference by human activity, however, can speed up the erosion process. This can create problems for the natural environment.

Deforestation occurs when large areas of natural land are cleared for human uses such as agriculture, houses or mining. When areas of land are cleared of the natural habitat, the ground is exposed to the elements of weather. Land clearing is vulnerable to both weathering and erosion. When plants are not there to protect the landforms and hold the soil together, wind and rain can wash away large amounts of sediment and soil. Landslides often occur in areas that have been cleared of natural vegetation. Areas where livestock graze can become severely degraded (broken down) and vulnerable to wind and rain erosion.

Mining is another human cause of erosion. Mining strips away layers of natural land, exposing the layers underneath. Natural vegetation has been removed so that there are no plants holding the soil together. Miners break apart rocks to obtain minerals such as gold, silver and uranium. The minerals are transported to another location. The other parts of the rock are left near the mine, often in unnatural piles.

Pollution is a major cause of erosion and weathering. Air and land pollution find ways to infiltrate the water systems. All water is constantly cycled through the global environment by the hydrological cycle. As human pollution increases, so does the acidity of the water. **Acid rain** is a term used to describe rain that is polluted and often kills natural plants and animals. This leaves soil vulnerable to erosion processes. Acid rain is also responsible for breaking down rocks and minerals through weathering processes.