

Module 8: Weathering, Erosion, and Groundwater

Topic 1 Content: Types of Physical Weathering Notes

Introduction

Types of Physical Weathering

- Ice/Frost Wedging
- Plant Weathering
- Animal Weathering
- Water Abrasion
- Wind Abrasion
- Temperature Changes
- Exfoliation

Introduction



Physical weathering, also known as mechanical weathering, is the process of breaking objects into smaller pieces through physical contact. This can happen in a variety of ways. Click each of the tabs to investigate the different types of physical weathering.

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Ice/Frost Wedging

Types of Physical Weathering

Ice/Frost Wedging

Ice/Frost Wedging



Have you ever put a bottle of water in the freezer? As the water freezes, it expands and pushes on all sides of the water bottle. Frost wedging occurs in areas where temperatures drop and rise repeatedly. It happens when cracks in a rock become filled with water. The water freezes as temperatures drop. When the water freezes, its volume expands, enlarging the crack. Over time, the crack will slowly become larger as freezing and thawing occurs.

Plant Weathering

Animal Weathering

Water Abrasion

Wind Abrasion

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Plant Weathering



There is a good reason why homeowners spray weed-killer on small plants that grow in the cracks of the driveway. In addition to being ugly, the weeds can cause the cracks to get even bigger over time. Also known as root pry, plants can physically weather rock as the roots slowly grow into small cracks and crevices. As the plants grow, the roots pry open the cracks.

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Animal Weathering



Animals can come into contact with rocks and cause them to break. Animals that burrow or build a home in soil can push smaller rock fragments to the surface. These smaller rocks are now exposed to weathering. This same process happens when animals are searching for food by scratching, pecking, or digging.

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Water Abrasion



Water abrasion occurs when rocks are ground down by fine particles. Abrasion is similar to the small scale breaking that occurs when you use sandpaper to smooth a section of wood. The small particles are picked up by the flowing water and scrape past any exposed rocks. The end result is very smooth rocks that are round in shape.

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Wind Abrasion



Much like water abrasion, wind abrasion grinds down rocks with fine particles. Wind abrasion is similar to sandblasting. The small particles are picked up by wind and scrape past the exposed rocks. If you have ever been to the beach on a windy day, then you have probably felt wind abrasion as the sand struck your skin. Wind abrasion can create some amazing geologic features, such as the arch that you see in the image.

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Temperature Changes



Temperatures in some areas of the world can change greatly between seasons. Other areas can exhibit large swings in temperature daily. During the winter time in Virginia, temperatures can drop below freezing during the night and then rise above freezing during the day. Solid rocks will expand during the day and contract at night. This repeated cycle stresses the rock and leads to breakage.

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Exfoliation



The process of exfoliation occurs when intrusive igneous rocks break off in sheets. The intrusion rises to the surface through uplift. Once the intrusion reaches the surface, tremendous pressure is taken off of the rock and it cracks, or exfoliates, in response. The outer rock layers will separate like the peels of an onion. You can see the exfoliation of Half Dome in Yosemite National Park.

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