

Weathering and Erosion

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Printed: July 2, 2014

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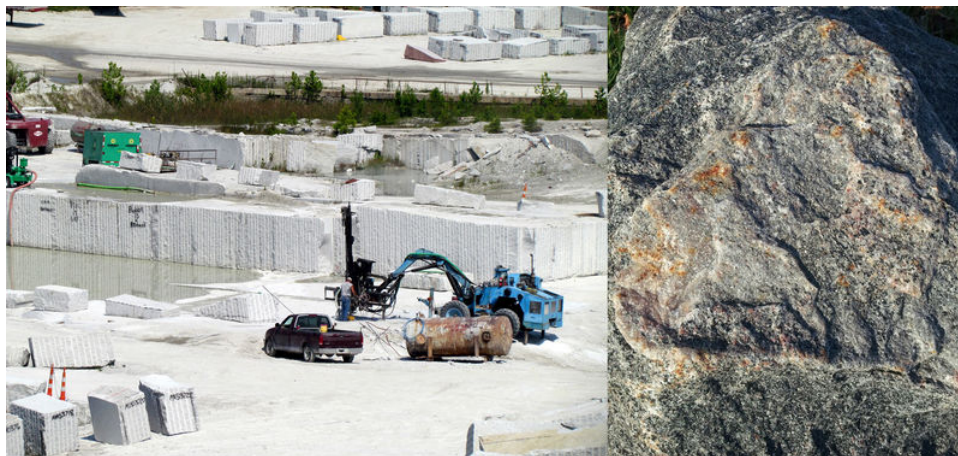
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CHAPTER

1

Weathering and Erosion

- Weathering breaks rocks apart or alters them.
- Erosion moves the pieces of broken rock.



Why are these rocks different?

The rock seen on the left is being mined in a quarry. What are the features of the rock? The rock seen on the right is exposed in an outcrop. How do the features of these rocks differ? The rock in the quarry is being exposed to the elements for the first time. It is not weathered. The rock in the outcrop has been weathering for many thousands of years. Can you identify the weathering features?

Weathering

Weathering changes solid rock into pieces. These pieces are called sediments. Sediments are described in the chapter *Earth's Materials and Crust*. Sediments are different sizes of rock particles. Boulders are sediments; so is gravel. At the other end, silt and clay are also sediments. Weathering may also cause the minerals at the Earth's surface to change form. The new minerals that form are stable at the Earth's surface. There are two types of weathering, mechanical and chemical. These are discussed in the next two concepts.

Weathering Takes Time

No one can watch for millions of years as mountains are built. And no one can watch as those same mountains gradually are worn away. But imagine a new sidewalk or road. The new road is smooth and even. Over hundreds of years, it will completely disappear. What happens to that road over one or two years? What changes would you see (**Figure 1.1**)? What forces of weathering wear down that road, or rocks or mountains over time?

- Animations of different types of weathering processes can be found here: <http://www.geography.ndo.co.uk/animationsweathering.htm#> .

**FIGURE 1.1**

One bad winter can cause a road to weather. The potholes in this road will need to be fixed.

Erosion

Erosion moves sediments after they have formed. The sediments are transported away from the place where they form. There are several agents of erosion. Flowing water moves and deposits sediments. Water erodes far more material than any other erosional agent. Wind is important as an agent of erosion. This is especially true in arid climates. Ice, in glaciers, can erode enormous quantities of sediments. Gravity as a force of erosion pulls material downhill.

Many types of landforms are created by the erosion of sediments. Some are described later in this chapter.

Deposition

Sediments are deposited in an environment of deposition. This can be a sand dune, beach, lake, river bend, or a great number of other locations. Scientists can figure out the environment of deposition of a sedimentary rock by looking at the size of sediments and the sedimentary features in the rock.

Many types of landforms are created by the deposition of sediments. Some are described later in this chapter.

Changing Landscapes

Plate tectonics forces work to build huge mountains and other landscapes. Conversely, the forces of weathering gradually wear down those rocks and landscapes. Together with erosion, tall mountains turn into hills and even plains. The Appalachian Mountains along the east coast of North America were once as tall as the Himalayas.

Vocabulary

- **erosion:** Transport of weathered materials and sediments by water, wind, ice, or gravity.
- **weathering:** Chemical or physical breakdown of rocks, soils, or minerals at Earth's surface.

Summary

- Weathering breaks down Earth's materials into smaller pieces.
- Erosion transports those pieces to other locations.
- Weathering and erosion modify Earth's surface landscapes over time.

Practice

Use the resource below to answer the questions that follow.

- **Weathering and Erosion Revision** at <http://www.youtube.com/watch?v=HjVSiuj7Lxk> (11:02)

**MEDIA**

Click image to the left for more content.

1. What is erosion?
2. What does erosion require?
3. What happens to water when it freezes? What can this do to rocks?
4. List other causes of erosion.
5. What are lichen? How do they aid weathering?
6. How fast does erosion occur? Why does erosion have such a big effect on landscapes?
7. What do waves do to rock? How does that contribute to erosion?
8. What are sea stacks?
9. As rocks continue to be pounded by waves on a beach what happens to them?
10. How can trees affect erosion?
11. What is weathering? What are the things that cause weathering?
12. What do weathering and erosion work together to do?

Review

1. What is weathering?
2. How is weathering different from erosion?
3. Why does weathering take so much time?
4. What are some of the agents of erosion?

References

1. Warren Flick. Weathering leads to potholes in roads. CC BY 2.0