Earth’s Changing Surface–Weathering, Erosion, Deposition

Dana Desonie, Ph.D.

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Chapter 1. Earth’s Changing Surface–Weathering, Erosion, Deposition

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 different sizes of rock particles. Large boulders are sediments; so is gravel. On the smaller 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 1.2)? What forces of weathering wear down that road, or rocks or mountains over time?

• Here’s one way that weathering causes potholes:
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. Here’s a few famous landforms created by many types of erosion.

**Check out this link for a wrap-up summary of weathering and erosion.

Deposition

Sediments are deposited in an environment of deposition. Deposition occurs when sediment that is being eroded (carried away) is dropped off or deposited. This can be a sand dune, beach, lake, river bend, or others. 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.

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. Check out this link to see how weathering, erosion, and deposition are connected.
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.

Explore More

Use the resource below to answer the questions that follow.

- **Weathering and Erosion Revision** at http://bit.ly/QysgGk  (11:02)

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