

Fact Sheet

Weathering

When they reach the Earth's surface, rock types which have been formed and transformed at depth are subject to decomposition or WEATHERING PROCESSES. At the surface of the Earth rocks are affected by the flowing and washing of water, and by rain, solar radiation, frost, wind and organisms. These external (exogenic) forces effects on the Earth's crust involve weathering. Weathering can be divided into physical, chemical and biological mechanisms, even if weathering is often the result of the various mechanisms' combined effects.

Physical weathering can consist of frost shattering, which is common in cold regions and mountainous areas. Water that has crept into cracks and pores expands when it turns to ice, producing a pressure that makes the cracks expand and forces the rock apart. Where differences in temperature are extremely large over a 24-hour period (for example, more than 50 degrees) thermal shock, or exfoliation, can occur. The differences in temperature produce tensions in the rock that finally result in the rock cracking up and fragmenting. Physical weathering also includes the erosion that moving particles contained in ice, water and air can cause to the bedrock.

The basis of all chemical weathering is water. How bedrock is affected by chemical weathering primarily depends on the minerals from which it is composed. Quartz and muscovite, for example, are highly resistant to chemical weathering, while olivine and calcite are easily weathered.

Biological weathering almost always takes place in combination with physical and chemical weathering. Roots can grow down in cracks, from large roots to the finest roots, thereby forming wedges and prising the rock apart. Biological activity also results in carbon dioxide, ammonium, nitrate, phosphate and sulphate ions that exacerbate chemical weathering of rocks and minerals in soil.

