

Groundwater and Precipitation

The ultimate source of all water on land is the oceans. Evaporation of seawater cycles water into the atmosphere in the form of invisible water vapor and visible clouds. Winds and weather systems move this atmospheric moisture all over Earth, with much of it concentrated over the continents. Precipitation brings atmospheric moisture back to Earth's surface. Some of this precipitation falls directly into the oceans and some falls on land.

Infiltration is the process by which precipitation that has fallen on land trickles into the ground and becomes groundwater. Only a small portion of precipitation becomes runoff and is returned directly to the oceans through streams and rivers. Groundwater slowly moves through the ground, eventually returns to the surface through springs and seepage into wetlands and streams, and then flows back to the oceans.

Reading Check Identify the ultimate source of all water on land.

Groundwater Storage

Puddles of water that are left after it rains quickly disappear, partly by infiltrating the ground. On sandy soils, rain soaks into the ground almost immediately. Where does that water go? The water seeps into small openings within the ground. Although Earth's crust appears solid, it is composed of soil, sediment, and rock that contain countless small openings, called pore spaces.

Pore spaces make up large portions of some of these materials. The amount of pore space in a material is its porosity. The greater the porosity, the easier water can flow through the material. Subsurface materials have porosities ranging from 2 percent to more than 50 percent. For example, the porosity of well-sorted sand is 30 percent; however, in poorly sorted sediment, smaller particles occupy some of the pore spaces and reduce the overall porosity of the sediment, as shown in **Figure 10.1**. Similarly, the cement that binds the grains of sedimentary rocks together reduces the rocks' porosity. Because of the enormous volume of sediment and rock beneath Earth's surface, enormous quantities of groundwater are stored in the pore spaces.

Figure 10.1 Porosity depends on the size and variety of particles in a material. **Compare** the porosities shown in each sample.

