TABLE 15-1 Water on Earth

Location	Volume (km^3)	Percentage of Total
Oceans	1,327,500,000	97.20
Icecaps and glaciers	29,315,000	2.15
Groundwater	8,442,580	0.625
Freshwater and saline lakes and inland seas	230,325	0.017
Atmosphere at sea level	12,982	0.001
Average in stream channels	1,255	0.0001

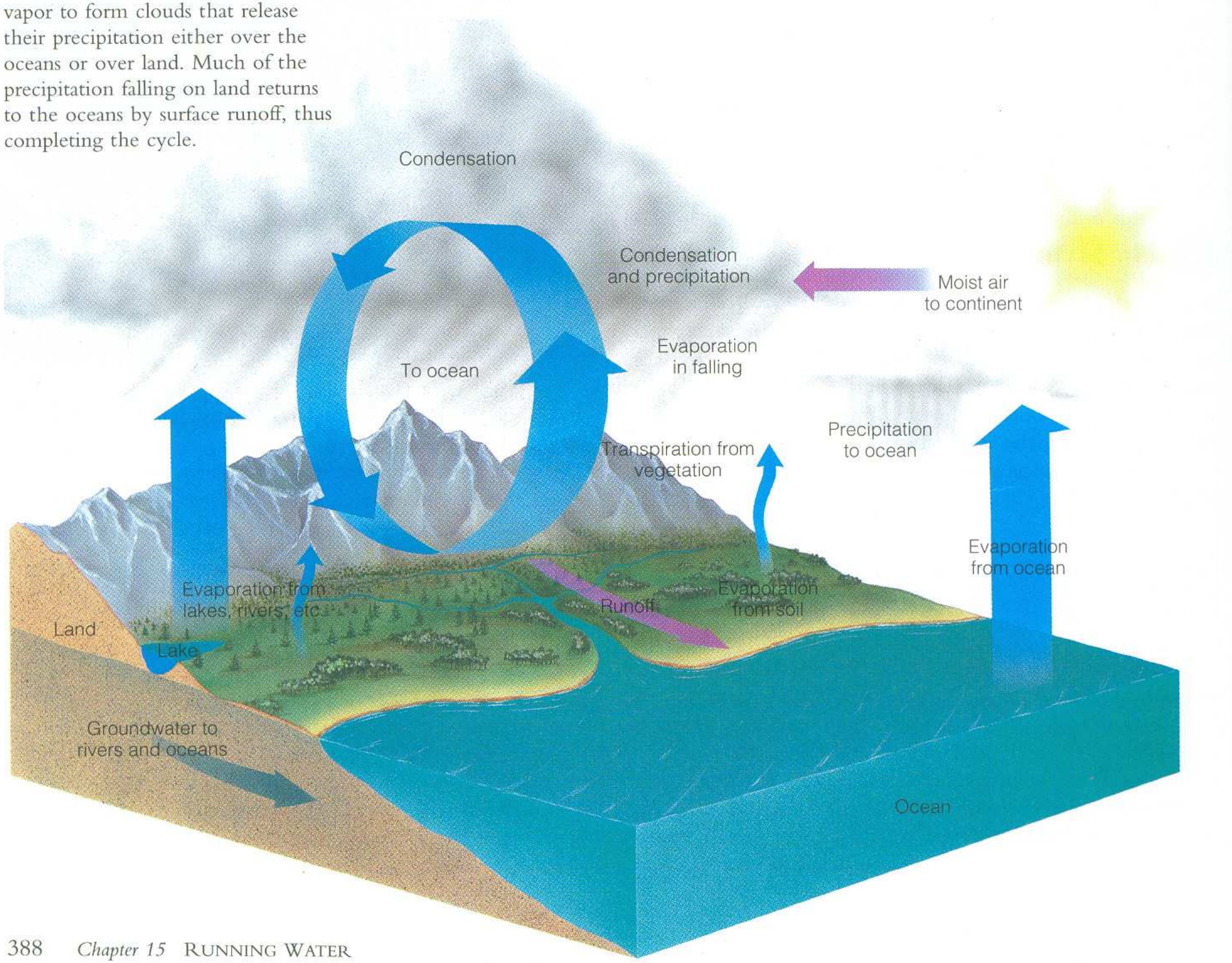
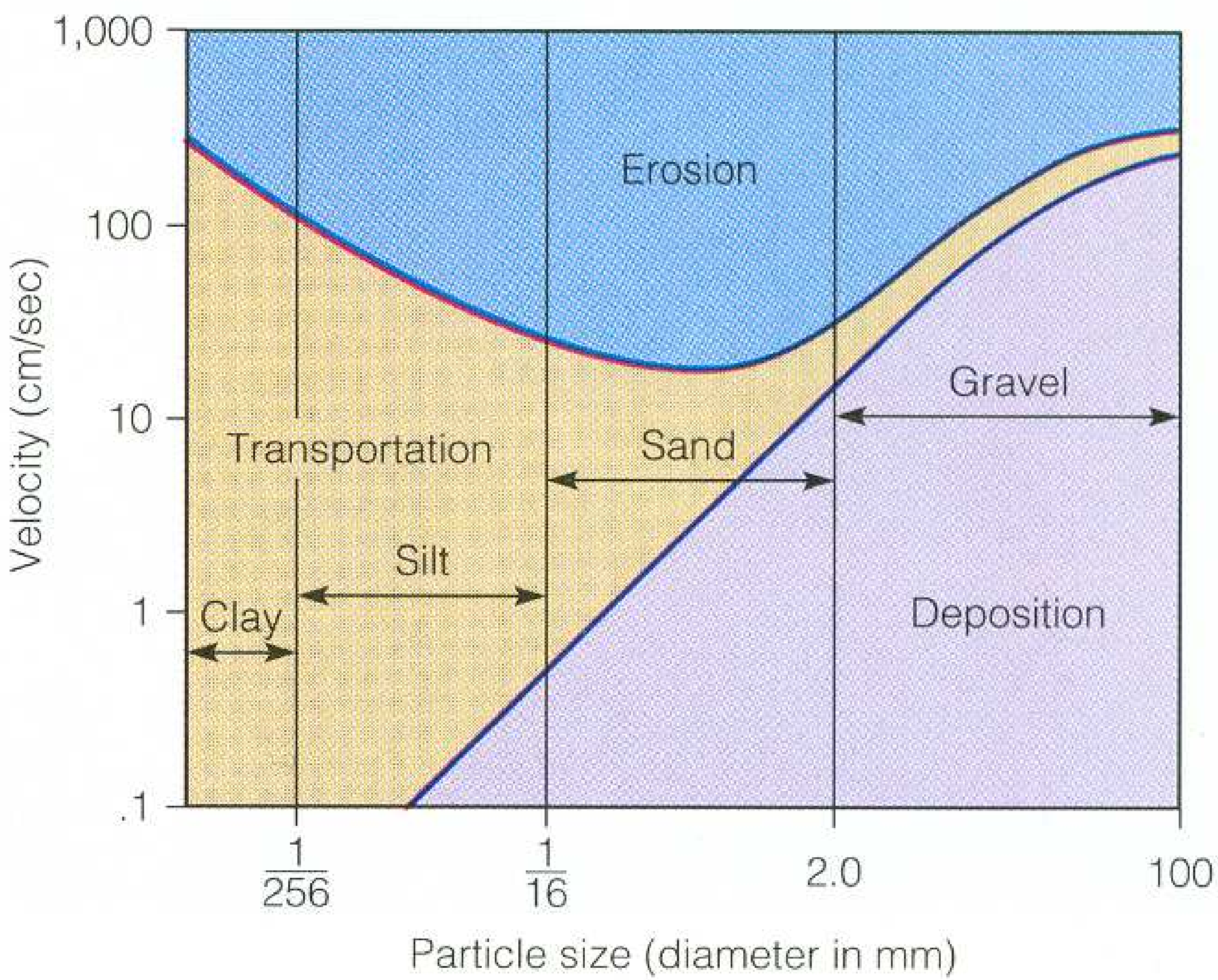


FIGURE 15-5 During the hydrologic cycle, water evaporates from the oceans and rises as water vapor to form clouds that release their precipitation either over the oceans or over land. Much of the precipitation falling on land returns to the oceans by surface runoff, thus completing the cycle.

FIGURE 15-15 Sediment erosion, transport, and deposition by running water are related to particle size and flow velocity.



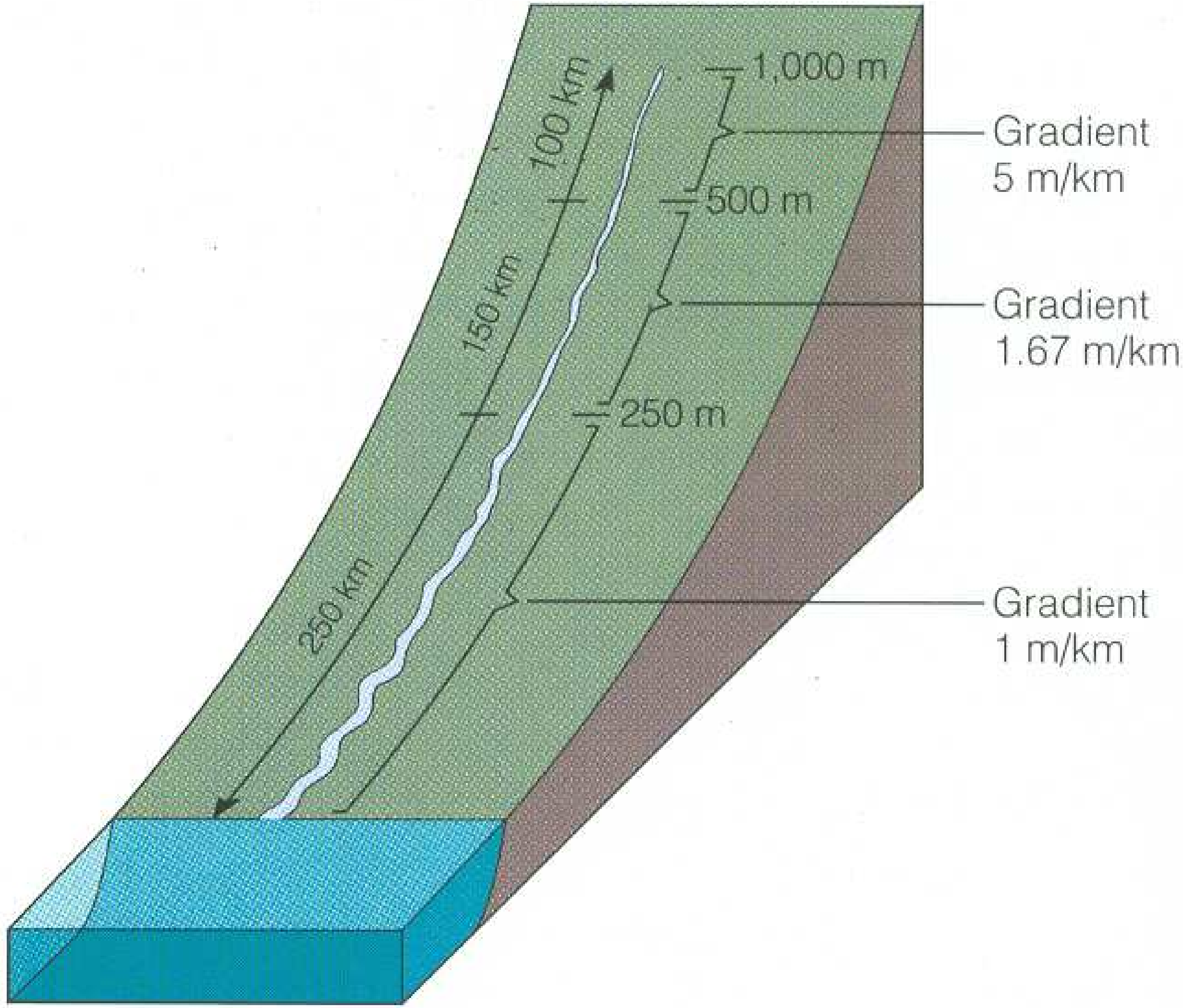


FIGURE 15-7 The average gradient of this stream is 2 m/km. Gradient can be calculated for any segment of a stream as shown in this example. Notice that the gradient is steepest in the headwaters area and decreases in a downstream direction.

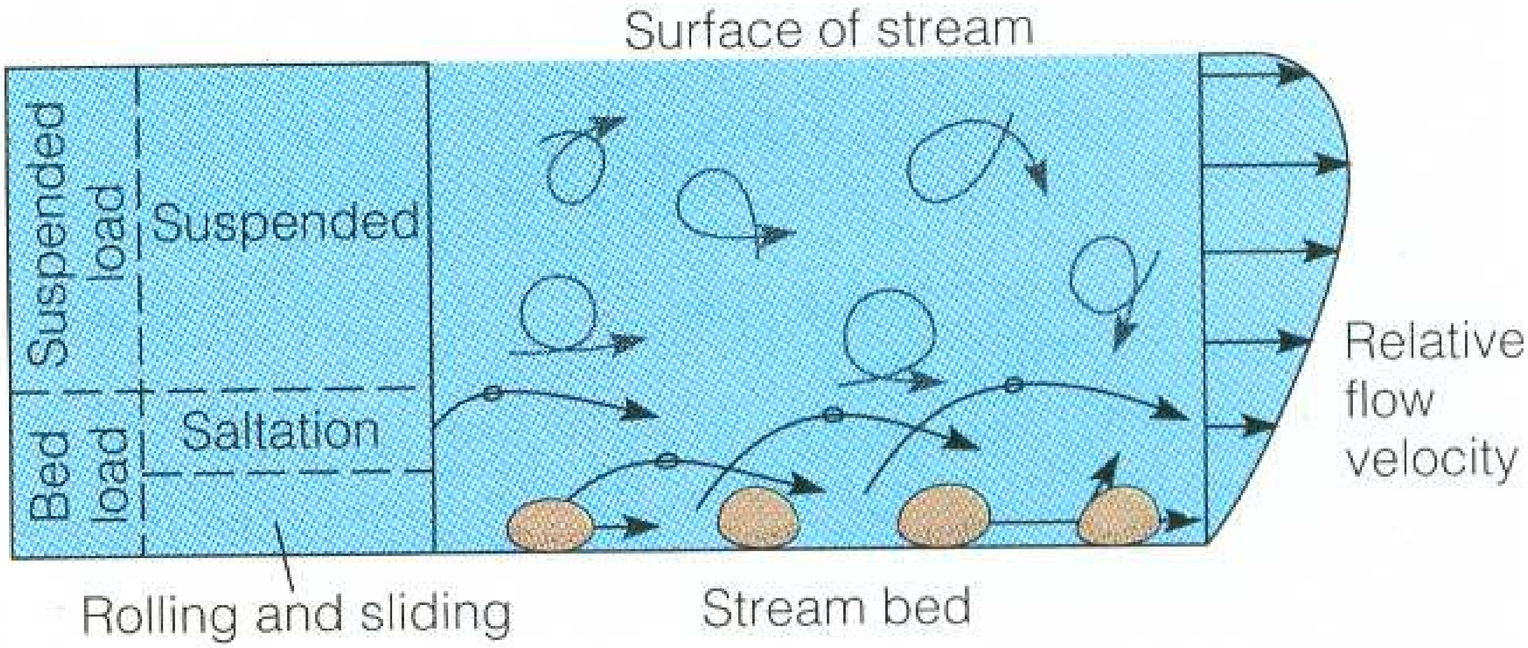


FIGURE 15-14 Methods of sediment transport by running water. The arrows in the velocity profile at the right are proportional to flow velocity, indicating that the water flows fastest near the surface and slowest along the stream bed.

➢ **FIGURE 15-10** In a sinuous (meandering) channel, flow velocity varies from one side of the channel to the other. As the water flows around curves, it flows fastest near the outer bank. The dashed line in this illustration follows the path of maximum flow velocity.

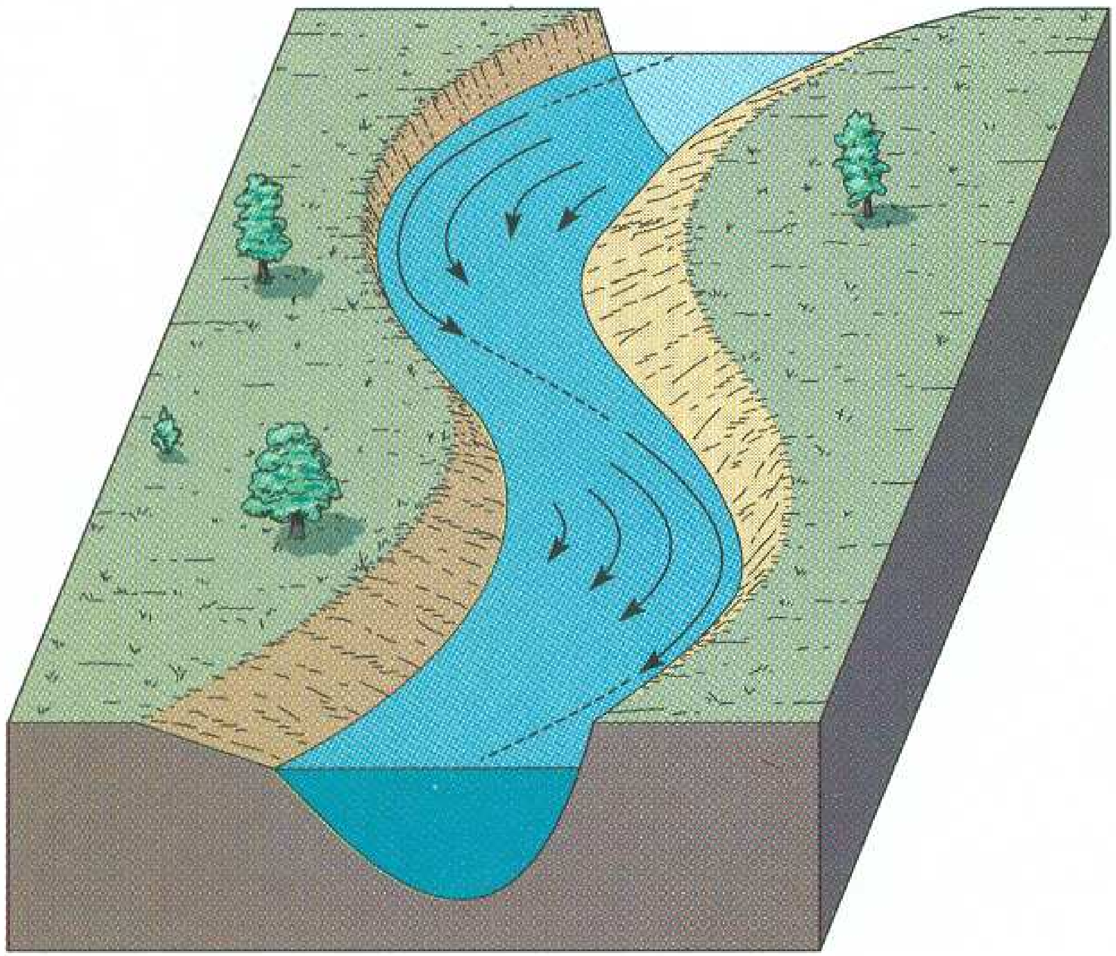
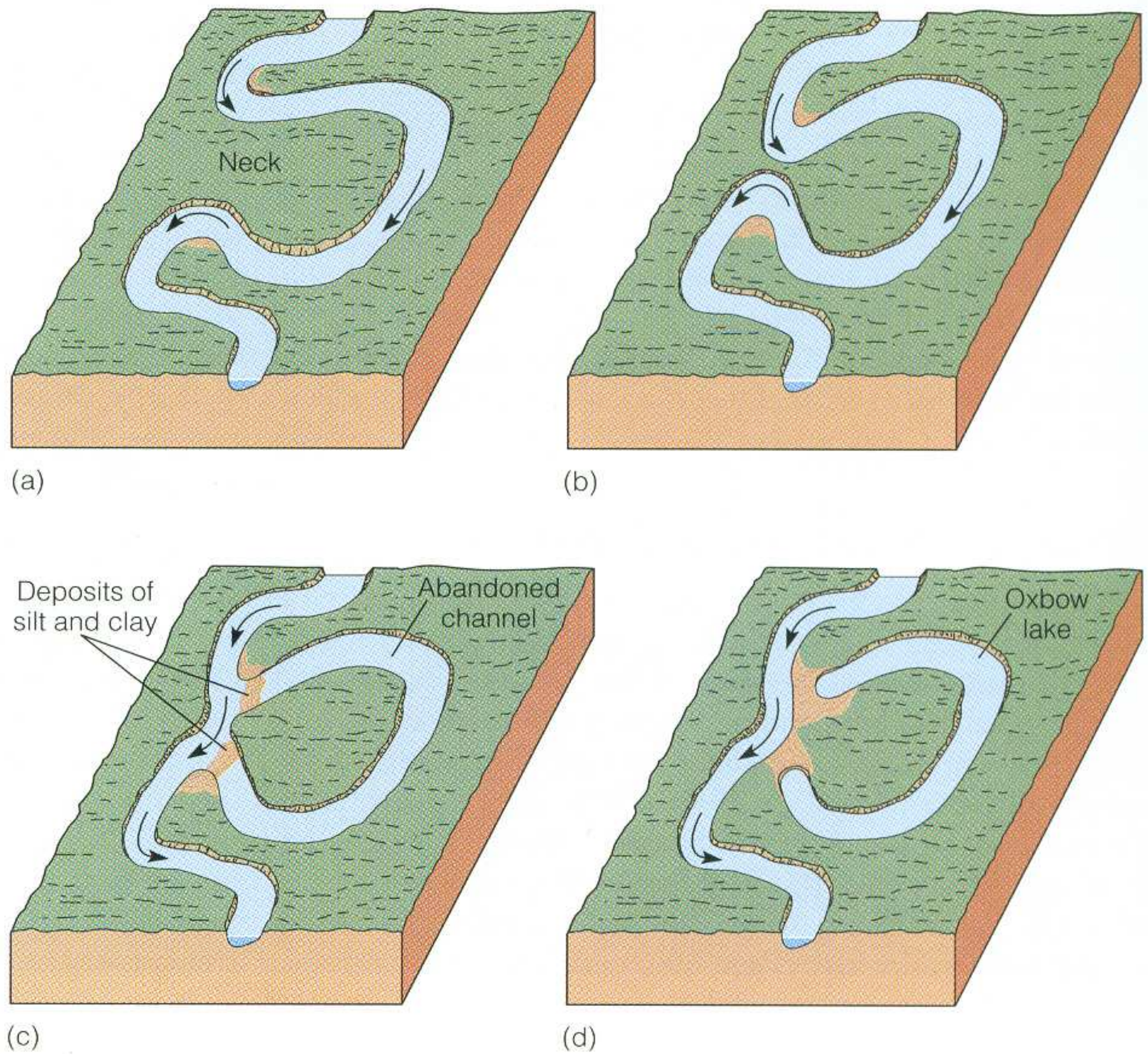
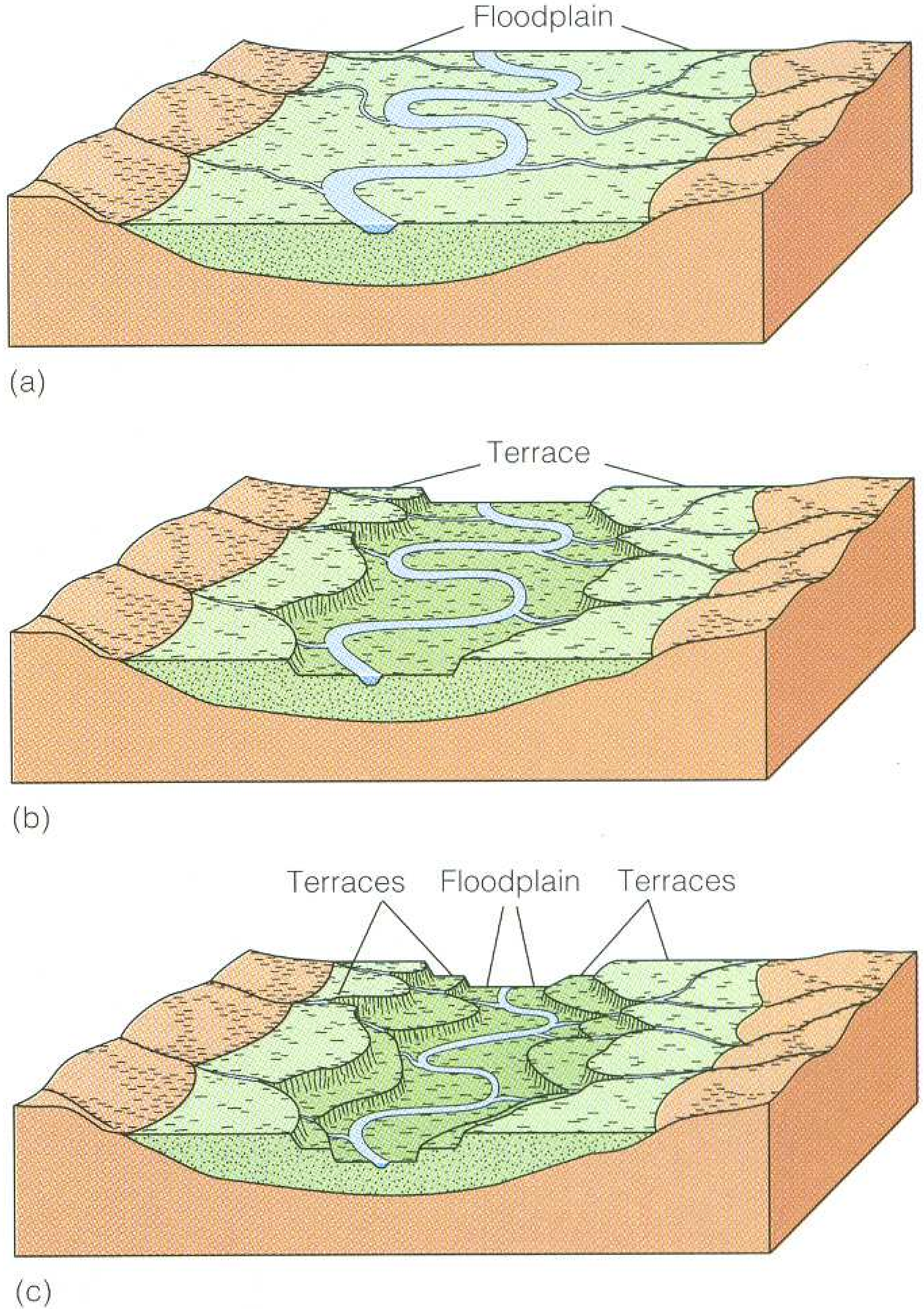
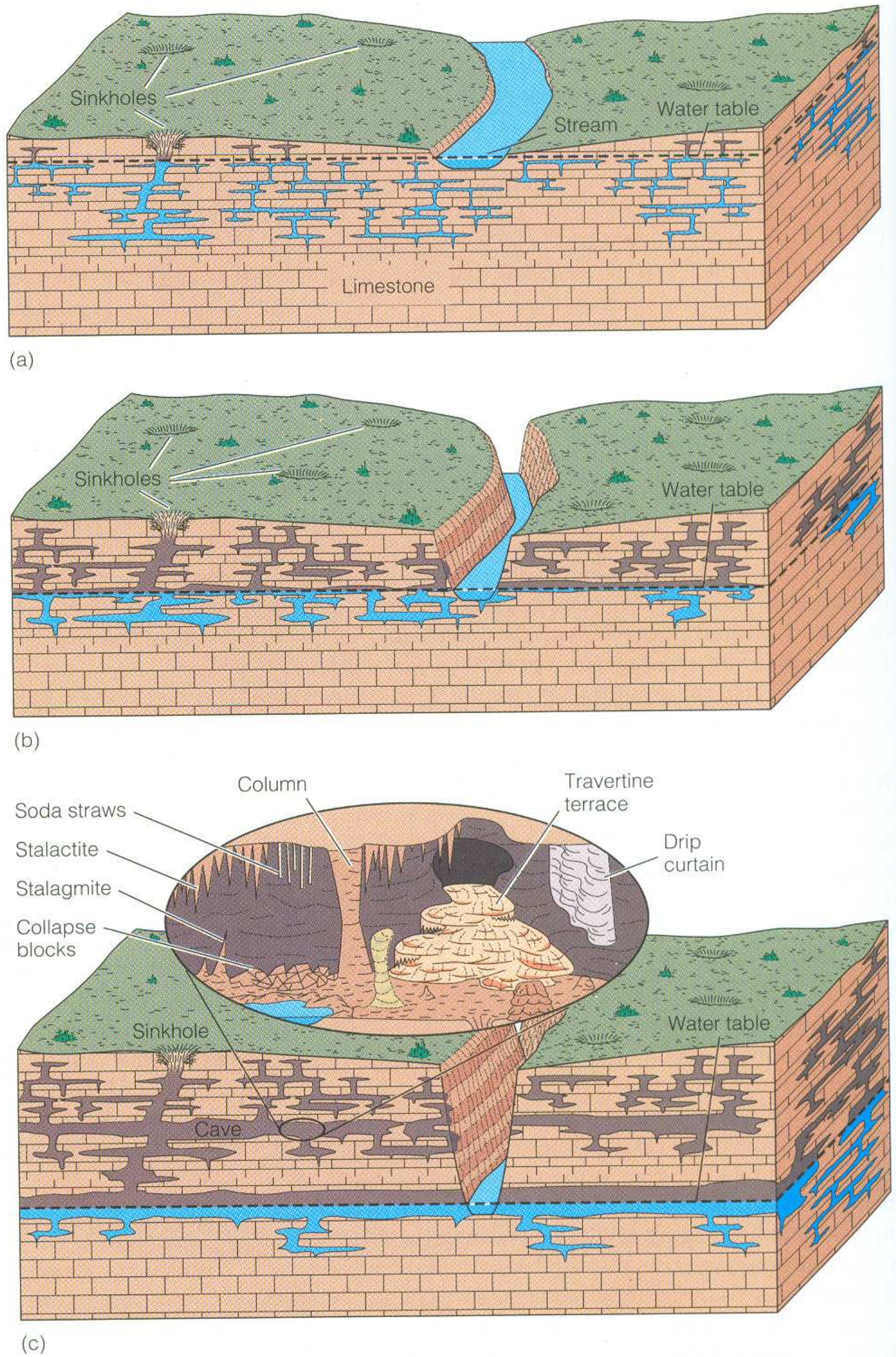


FIGURE 15-20 Four stages in the origin of an oxbow lake. In (*a*) and (*b*), the meander neck becomes narrower. (*c*) The meander neck is cut off, and part of the channel is abandoned. (*d*) When it is completely isolated from the main channel, the abandoned meander is an oxbow lake.




Floodplain
(a)
Terrace
(b)
Terraces
Floodplain
Terraces
(c)



▶ **FIGURE 16-17** The formation of caves. (*a*) As groundwater percolates through the zone of aeration and flows through the zone of saturation, it dissolves the carbonate rocks and gradually forms a system of passageways. (*b*) Groundwater moves along the surface of the water table, forming a system of horizontal passageways through which dissolved rock is carried to the surface streams, thus enlarging the passageways. (*c*) As the surface streams erode deeper valleys, the water table drops, and the abandoned channelways form an interconnecting system of caves and caverns.

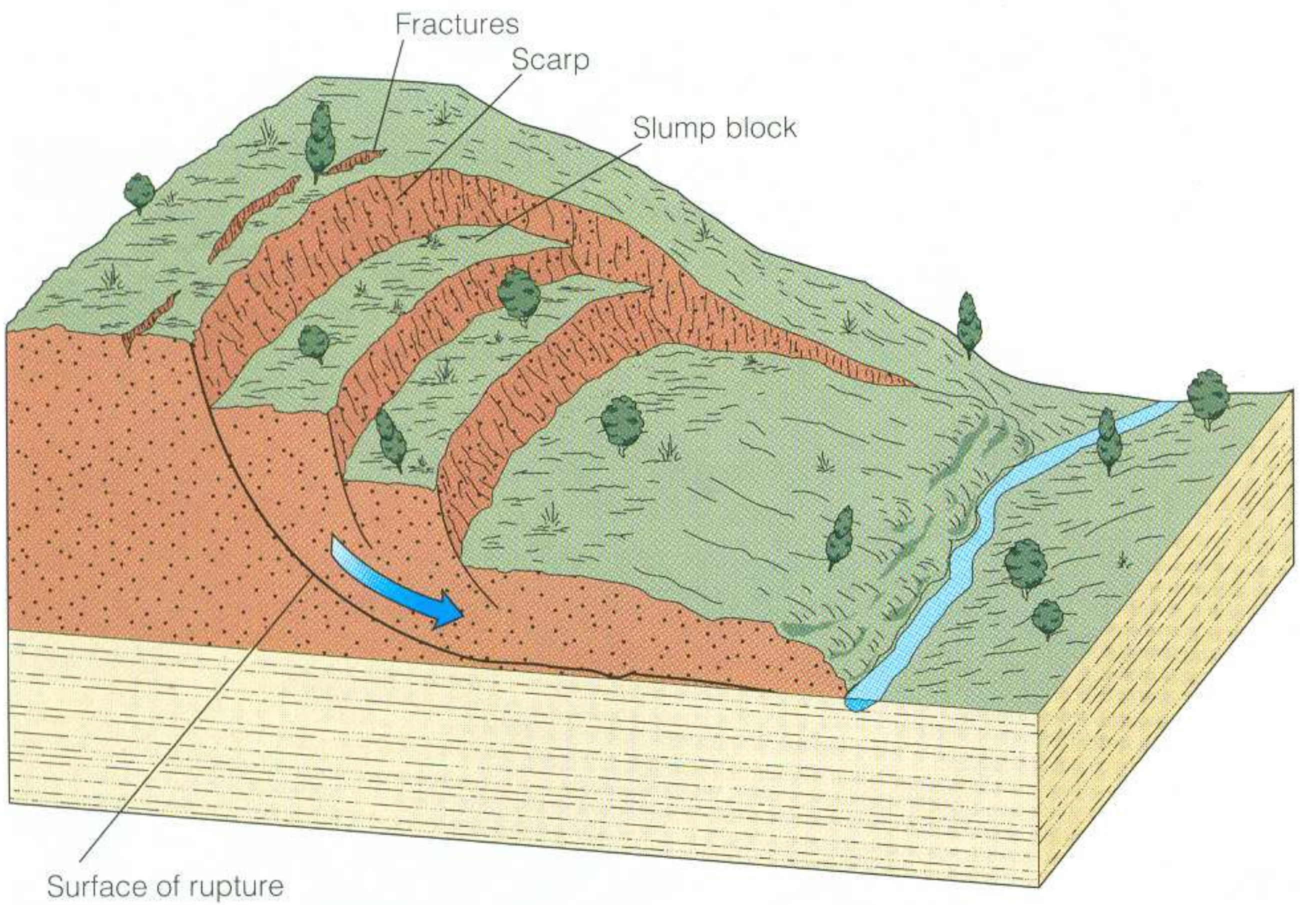
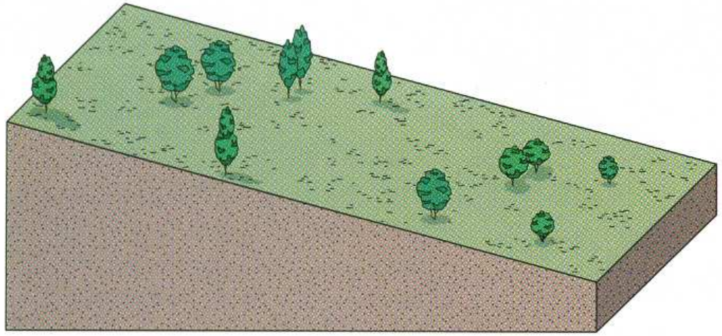
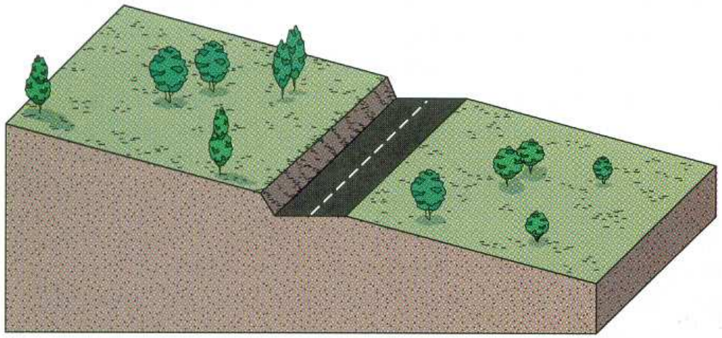
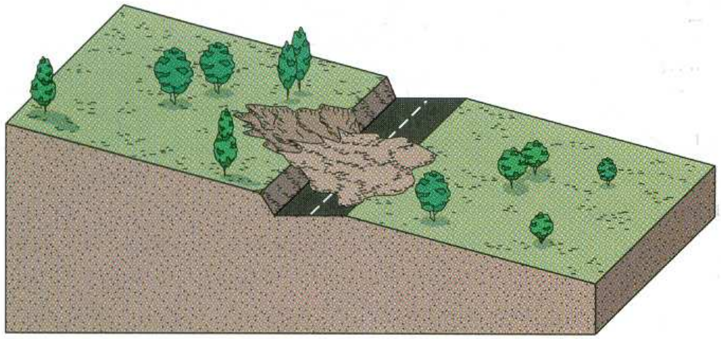
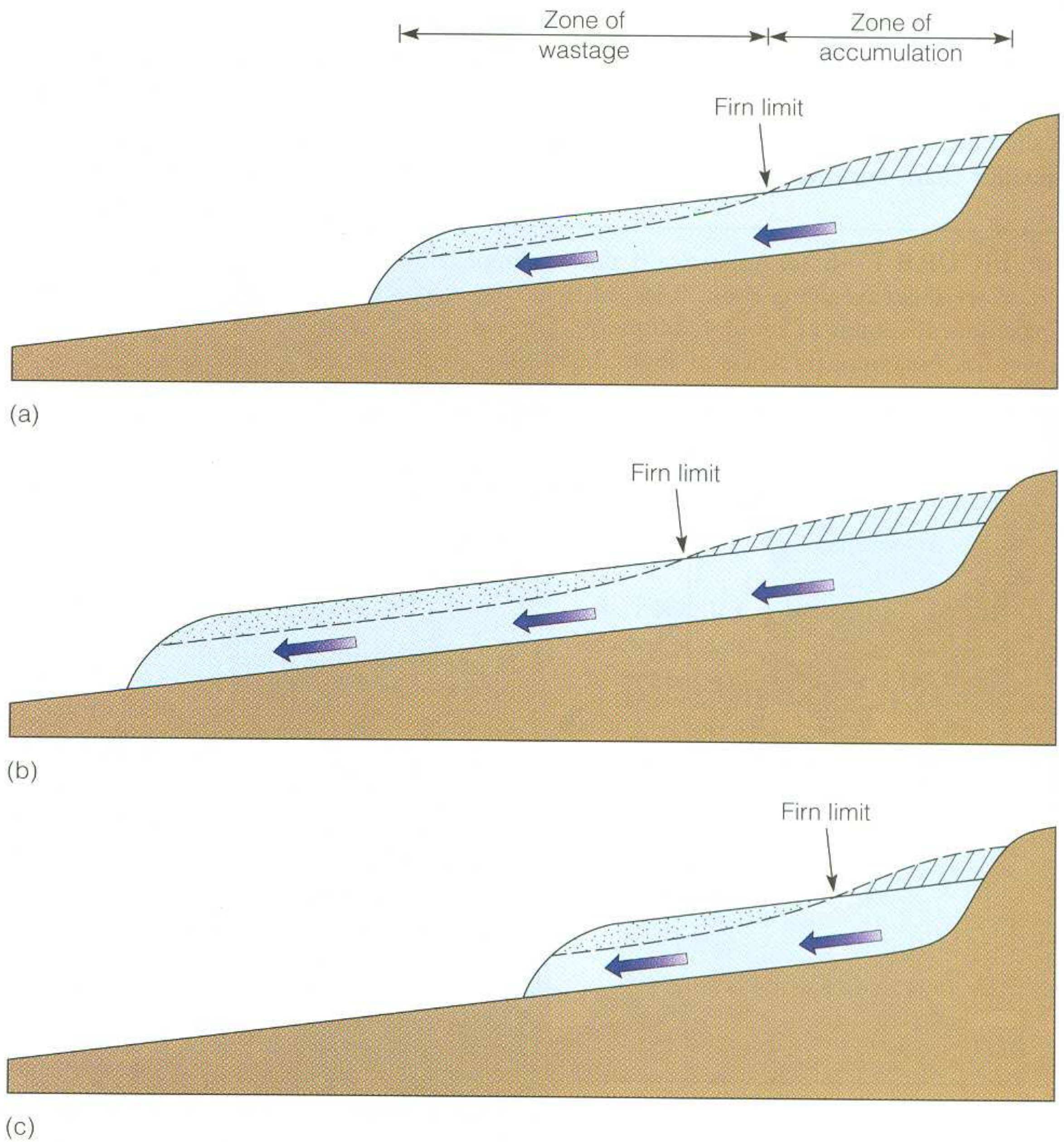


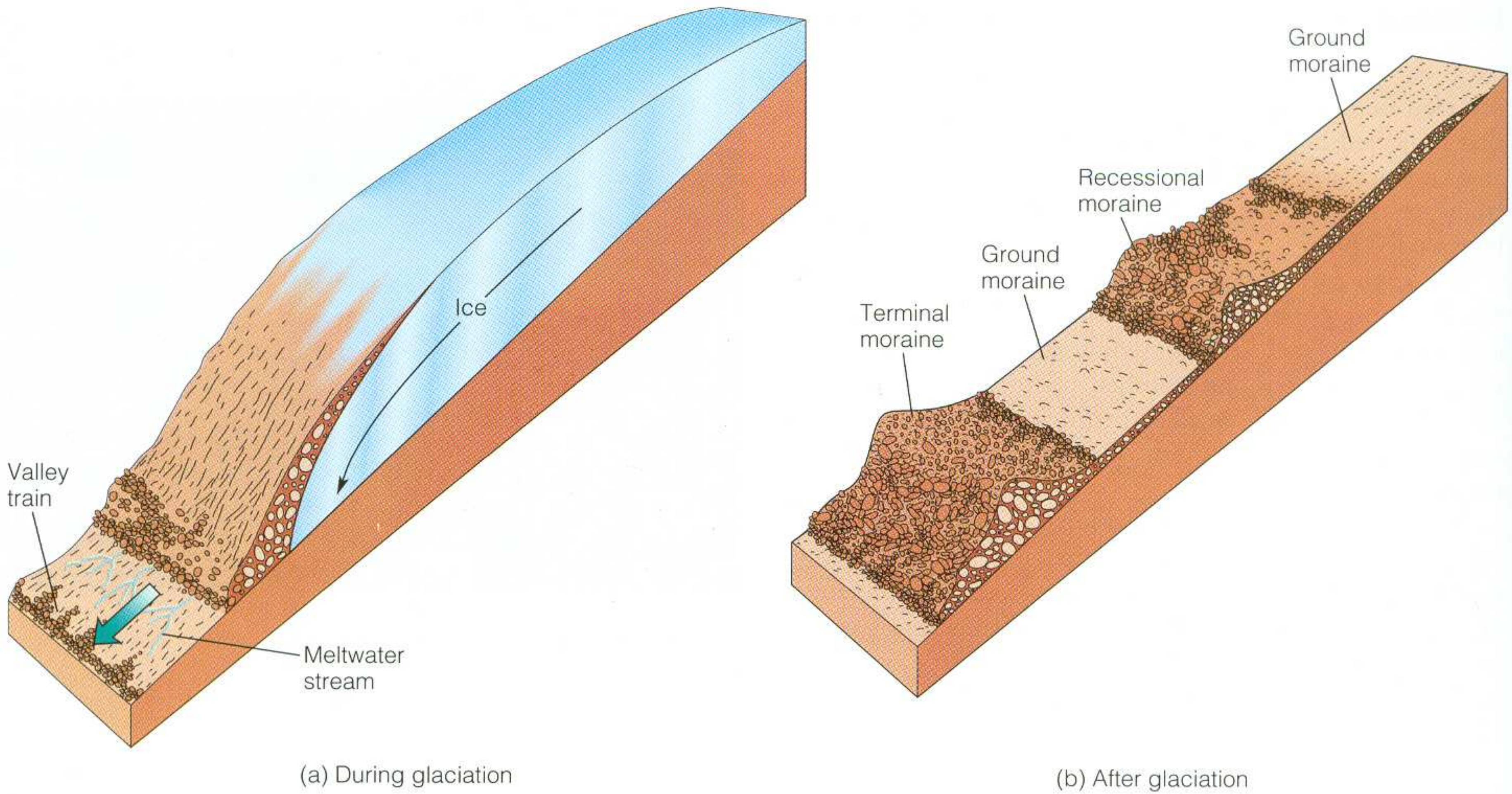
FIGURE 14-10 In a slump, material moves downward along the curved surface of a rupture, causing the slump block to rotate backward. Most slumps involve unconsolidated or weakly consolidated material and are typically caused by erosion along the slope's base.


(a)

(b)

(c)

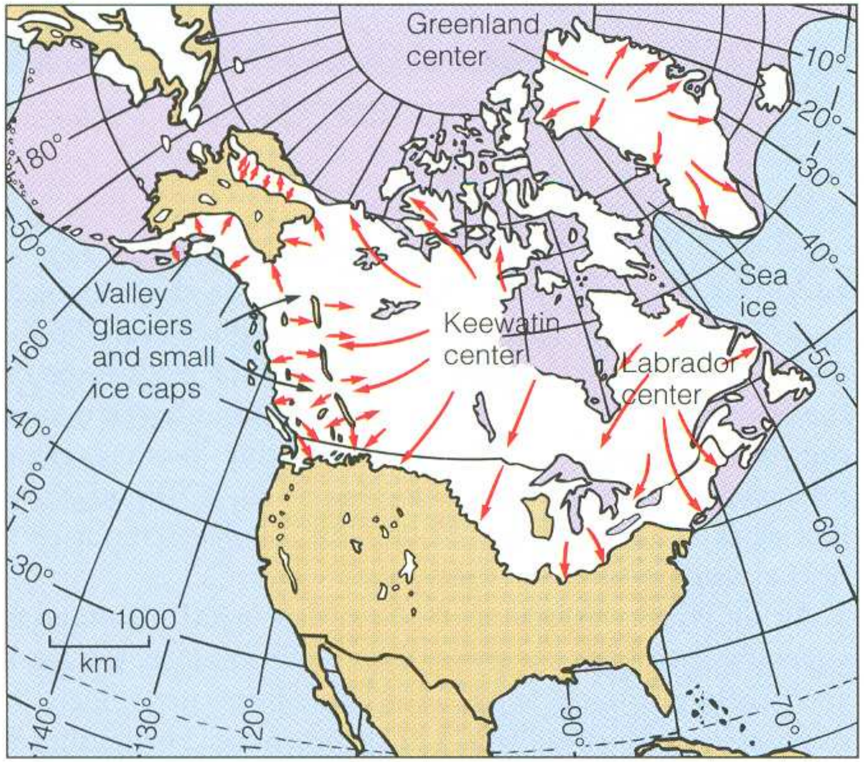
ated with hillside road cuts and building construction can be avoided or greatly minimized by better understanding of the factors involved.



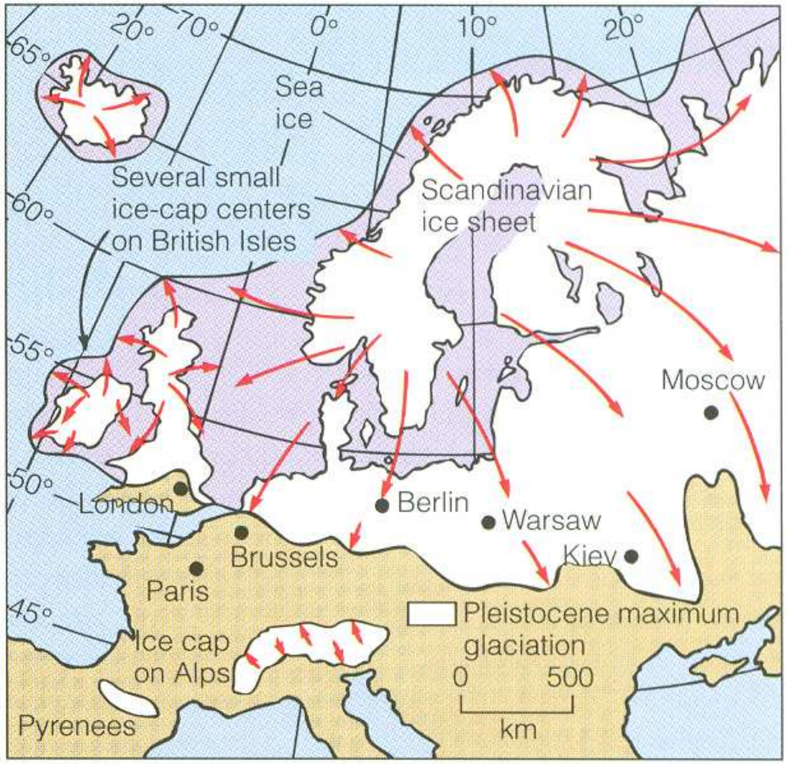
➢ **FIGURE 17-8** Response of a hypothetical glacier to changes in its budget. (*a*) If the losses in the zone of wastage, shown by stippling, equal additions in the zone of accumulation, shown by crosshatching, the terminus of the glacier remains stationary. (*b*) Gains exceed losses, and the glacier's terminus advances. (*c*) Losses exceed gains, and the glacier's terminus retreats, although the glacier continues to flow.



➤ FIGURE 17-24 (*a*) The origin of an end moraine. (*b*) End moraines are described as terminal moraines or recessional moraines depending on their relative positions with respect to the glacier that produced them.



(a)



(b)

▶ **FIGURE 17-32** Centers of ice accumulation, the maximum extent of Pleistocene glaciation, and directions of ice movement in (*a*) North America and (*b*) Europe.

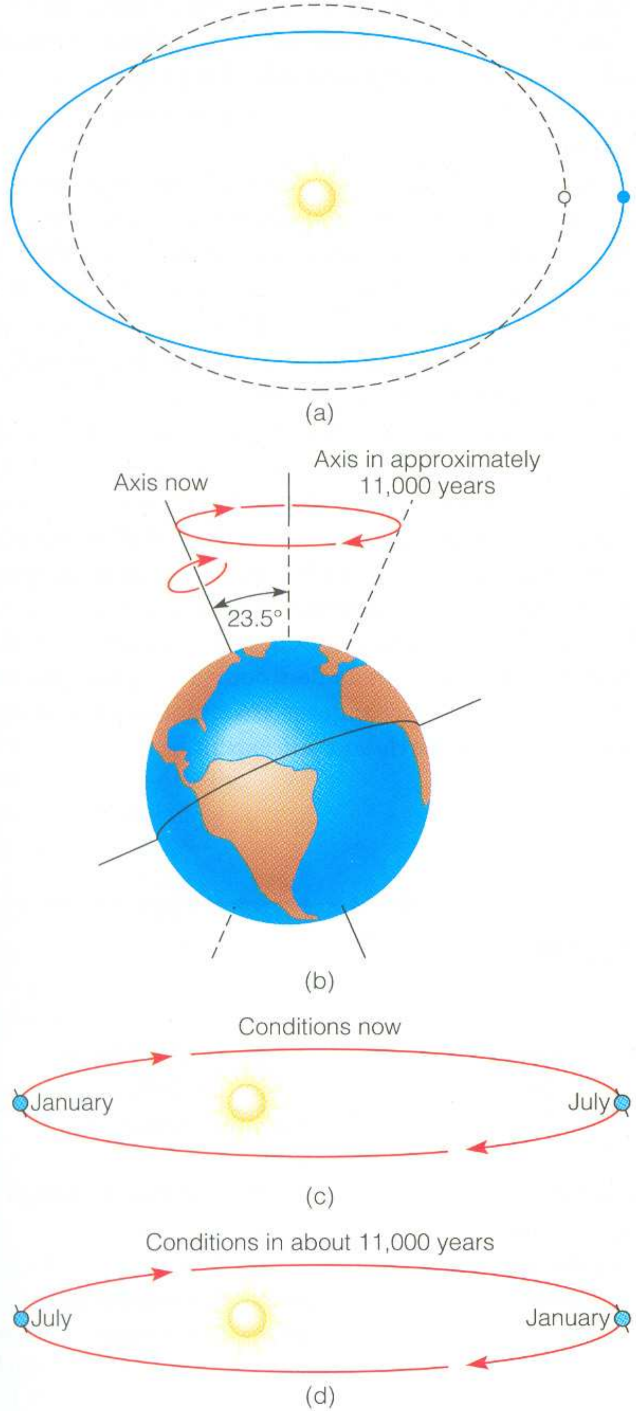

(a)
Axis now
Axis in approximately
11,000 years
23.5°
(b)
Conditions now
January
July
(c)
Conditions in about 11,000 years
July
January
(d)

FIGURE 1 Location of glacial Lake Missoula and the channeled scablands of eastern Washington.

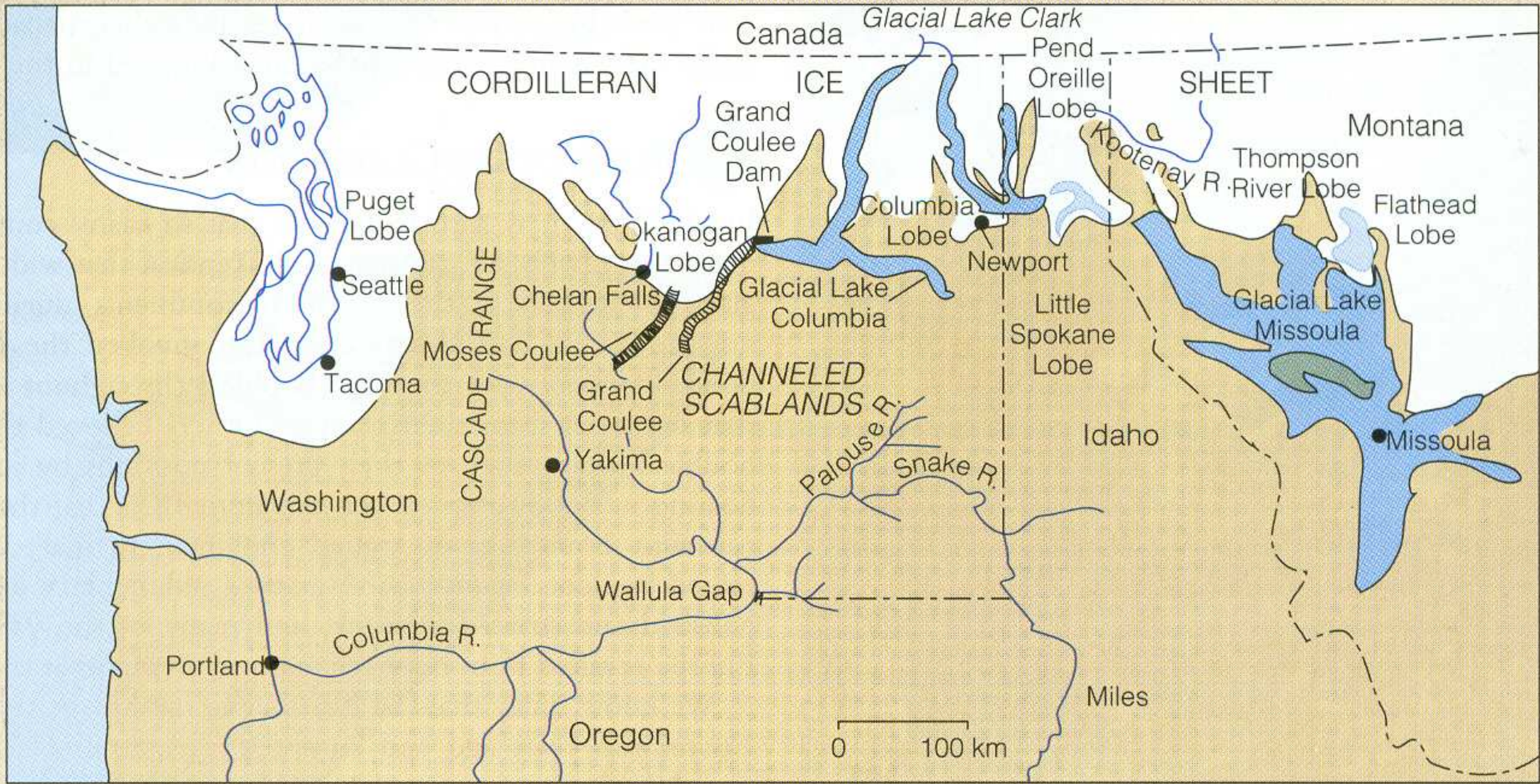
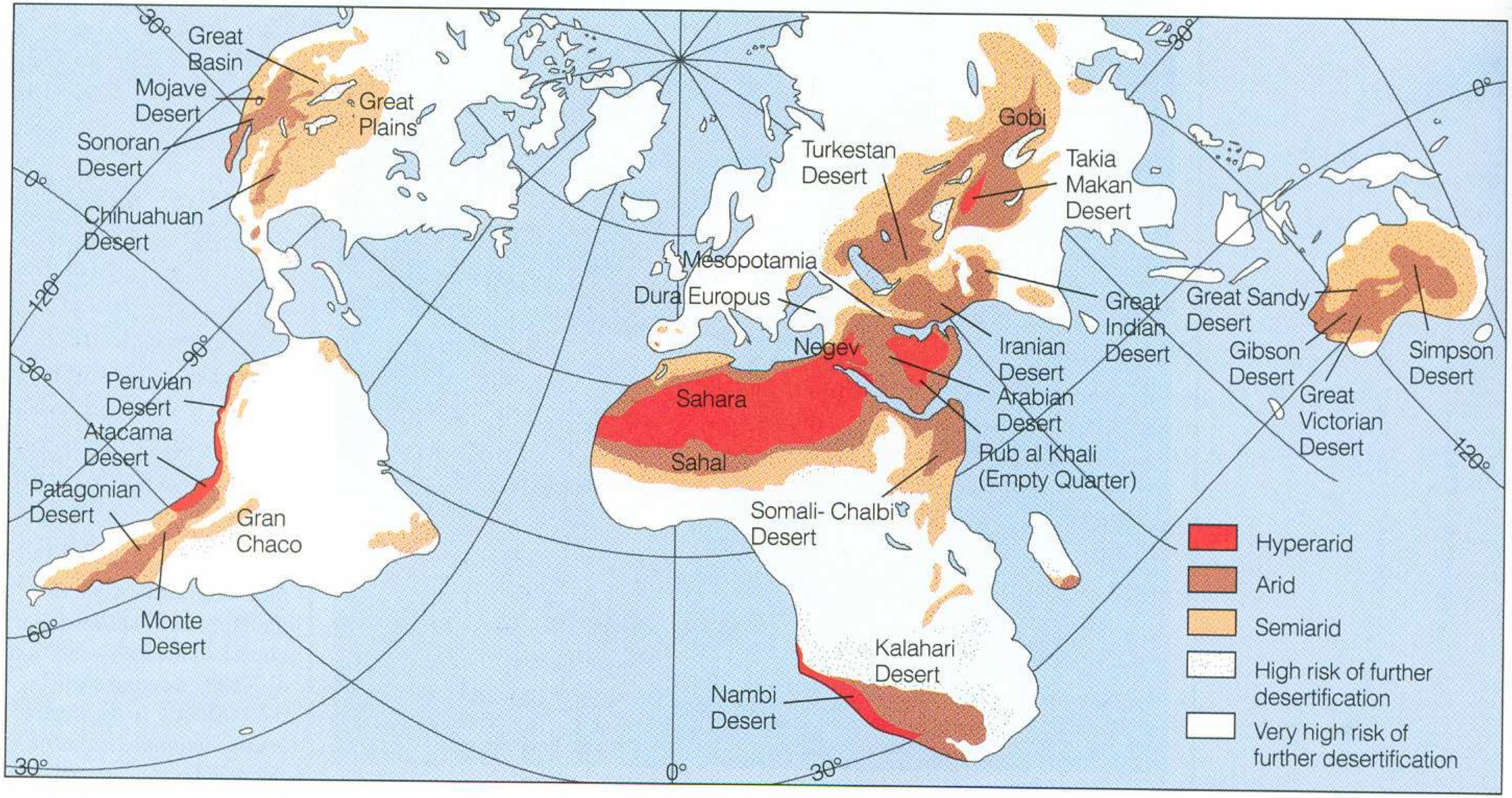


FIGURE 18-1 Desert areas of the world and areas threatened by desertification.



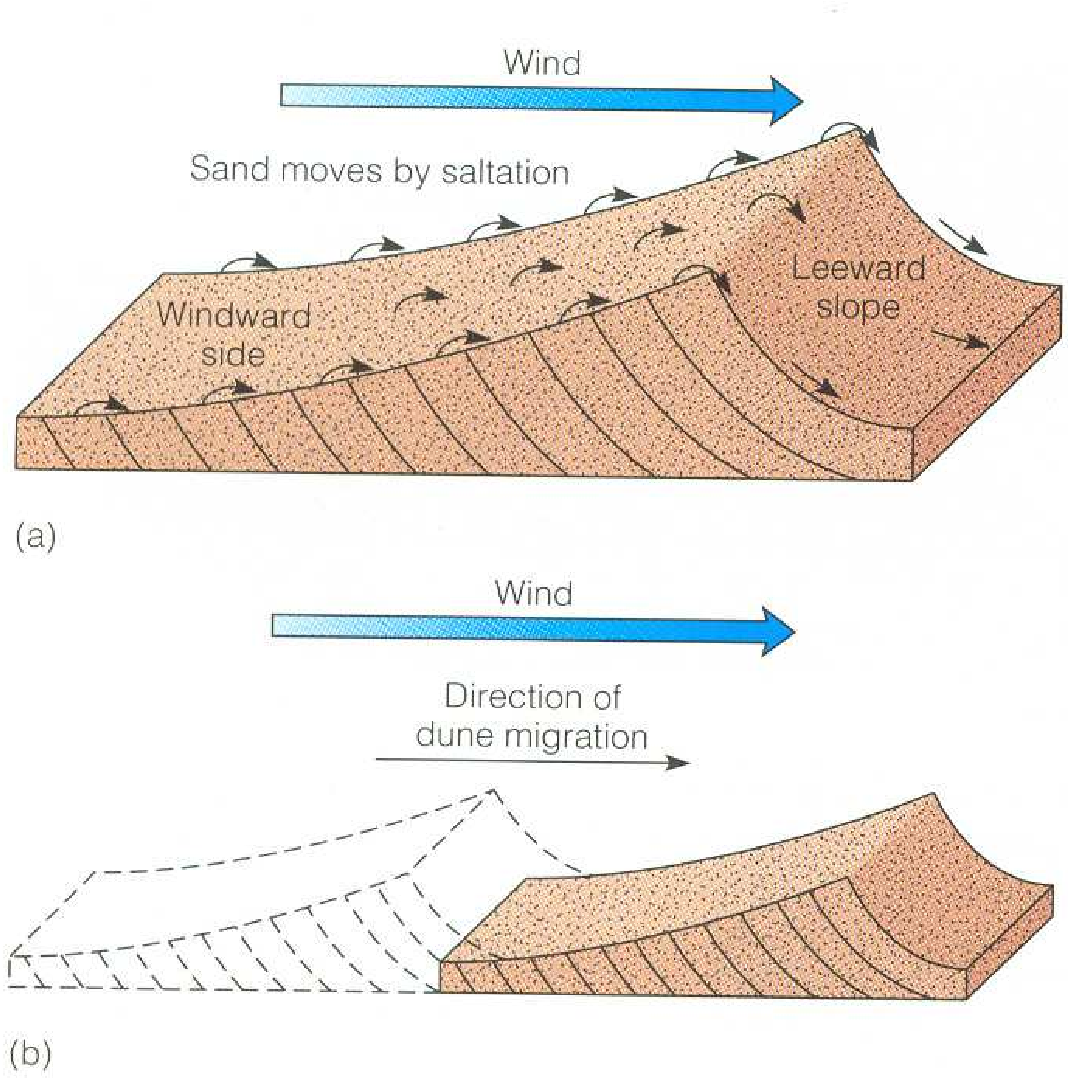
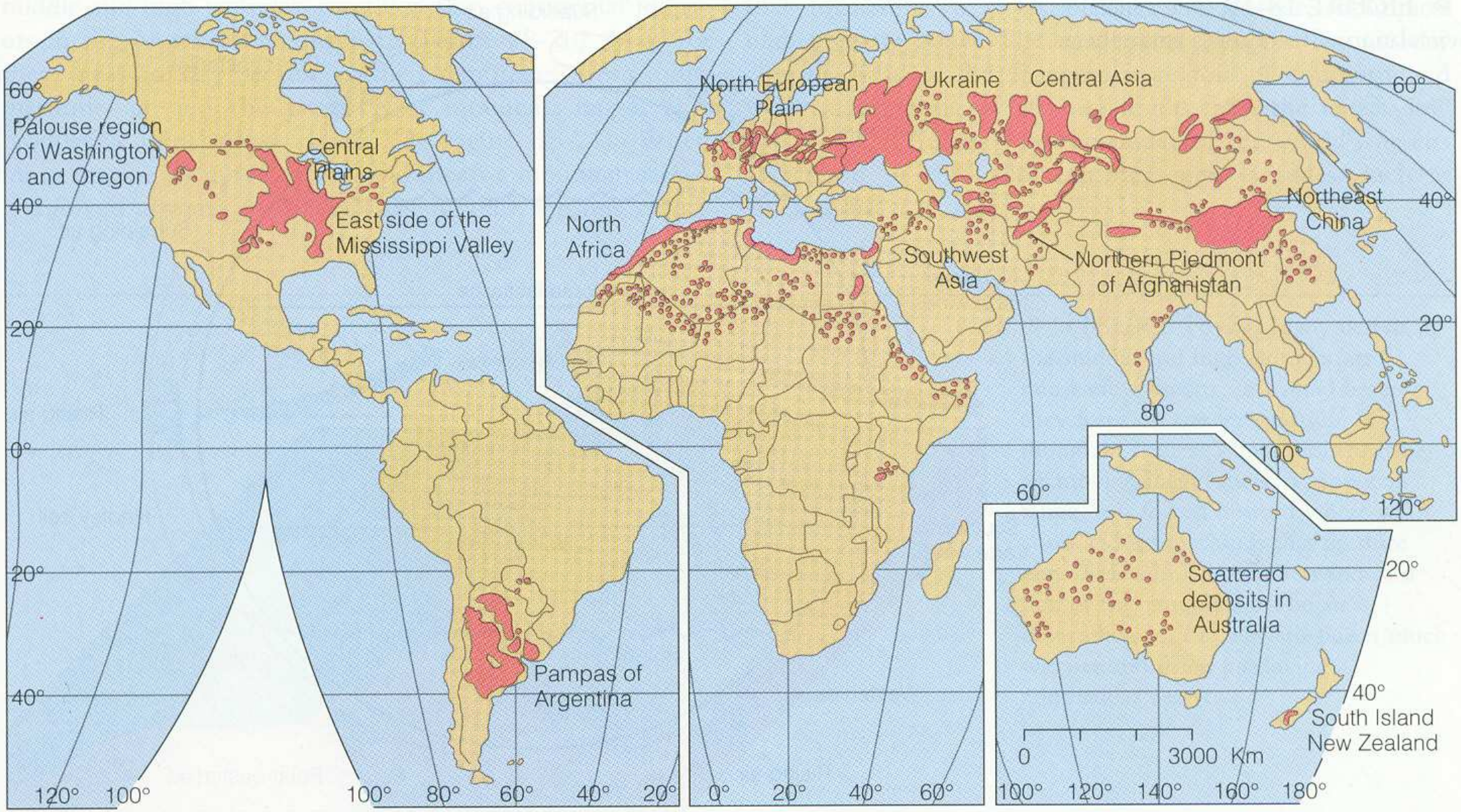
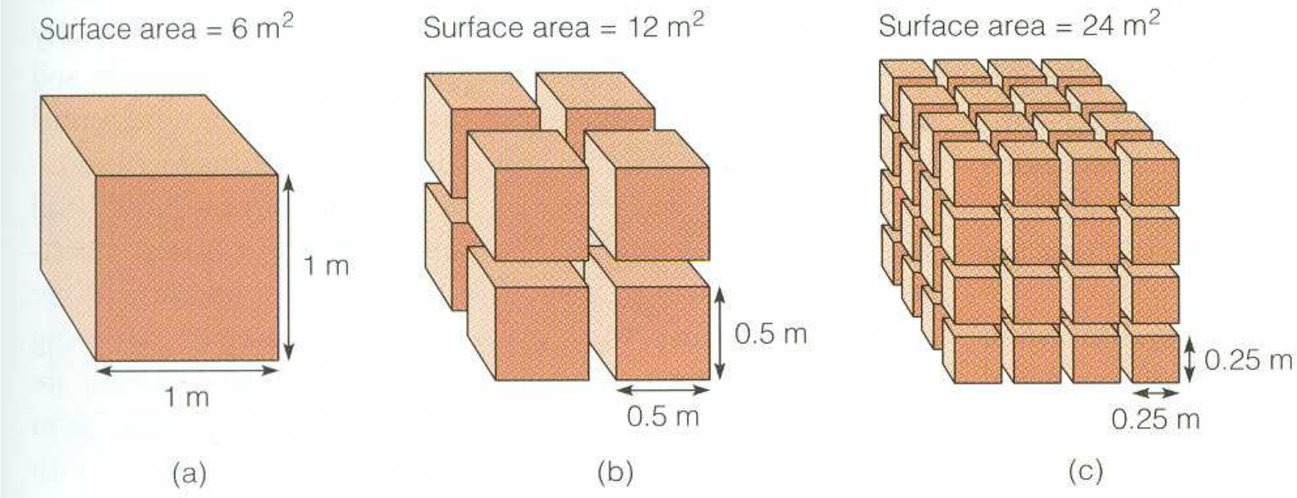


FIGURE 18-10 (*a*) Profile view of a sand dune. (*b*) Dunes migrate when sand moves up the windward side and slides down the leeward slope. Such movement of the sand grains produces a series of inclined beds that slope in the direction of wind movement.

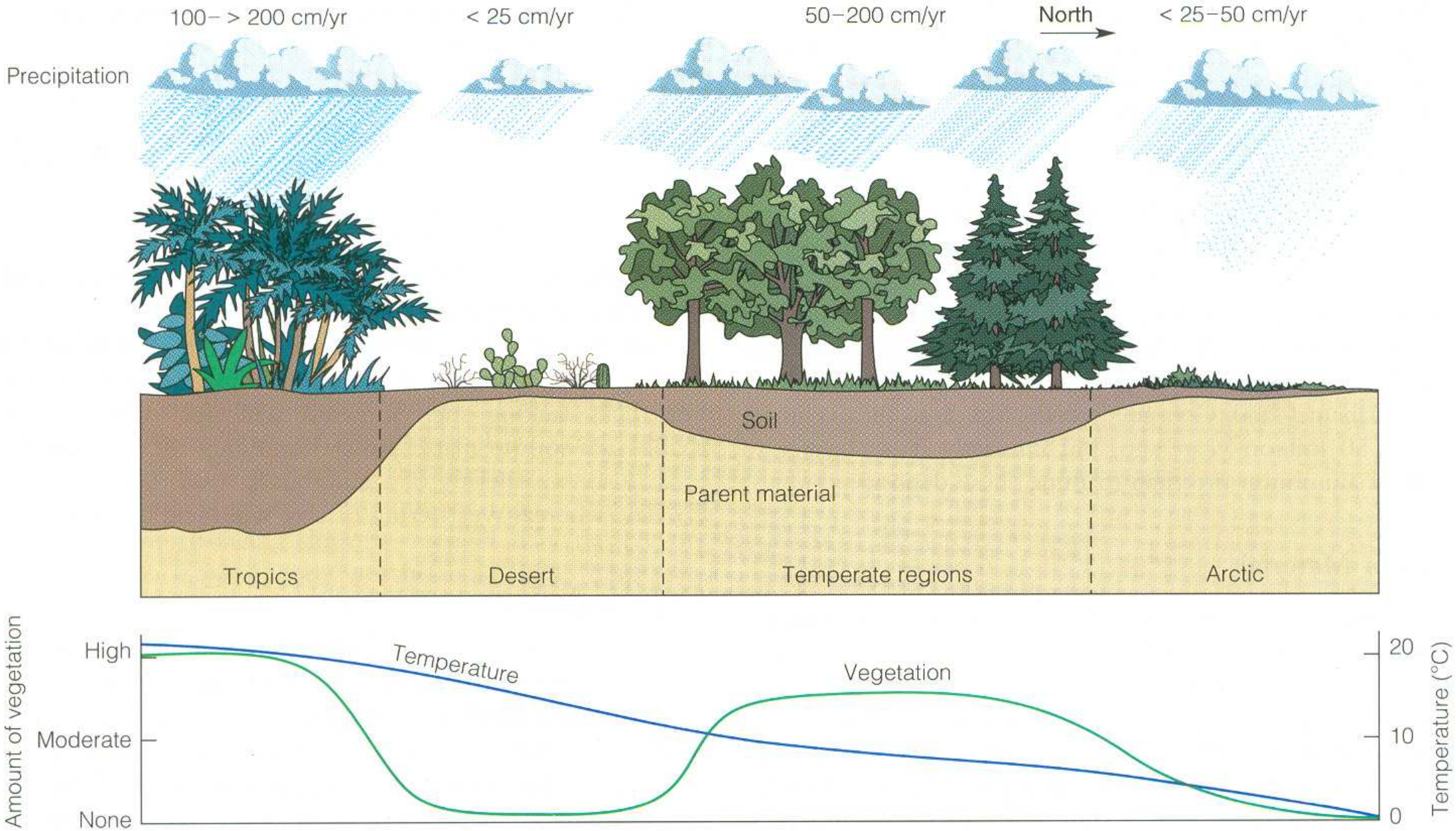
FIGURE 18-18 The distribution of the Earth's major loess-covered areas.

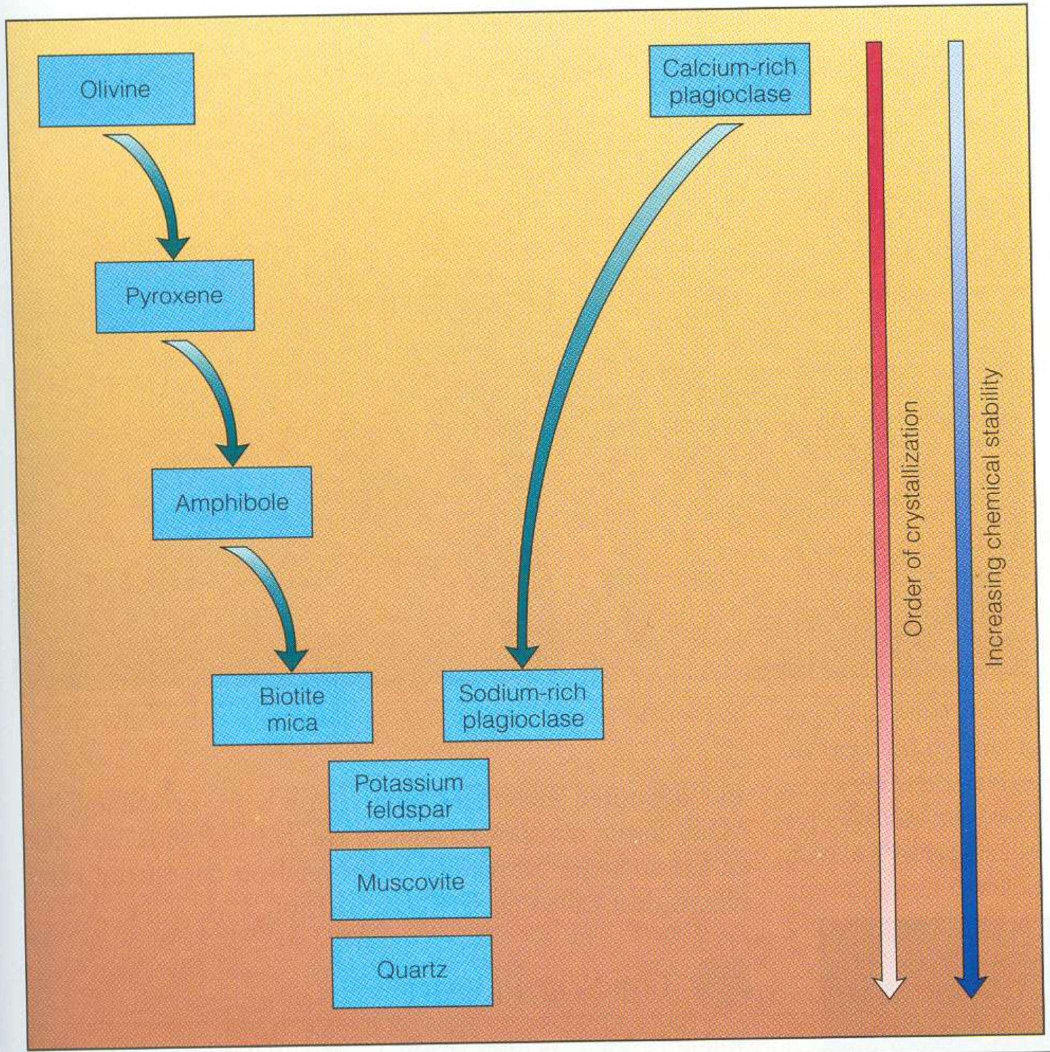




▶ **FIGURE 5-13** Particle size and chemical weathering. As a rock is reduced into smaller and smaller particles, its surface area increases but its volume remains the same. In (*a*) the surface area is 6 m^2, in (*b*) it is 12 m^2, and in (*c*) 24 m^2, but the volume remains the same at 1 m^3. Small particles have more surface area in proportion to their volume than do large particles.

▶ FIGURE 5-20 Schematic representation showing soil formation as a function of the relationships between climate and vegetation, which alter parent material over time. Soil-forming processes operate most vigorously where precipitation and temperatures are high.





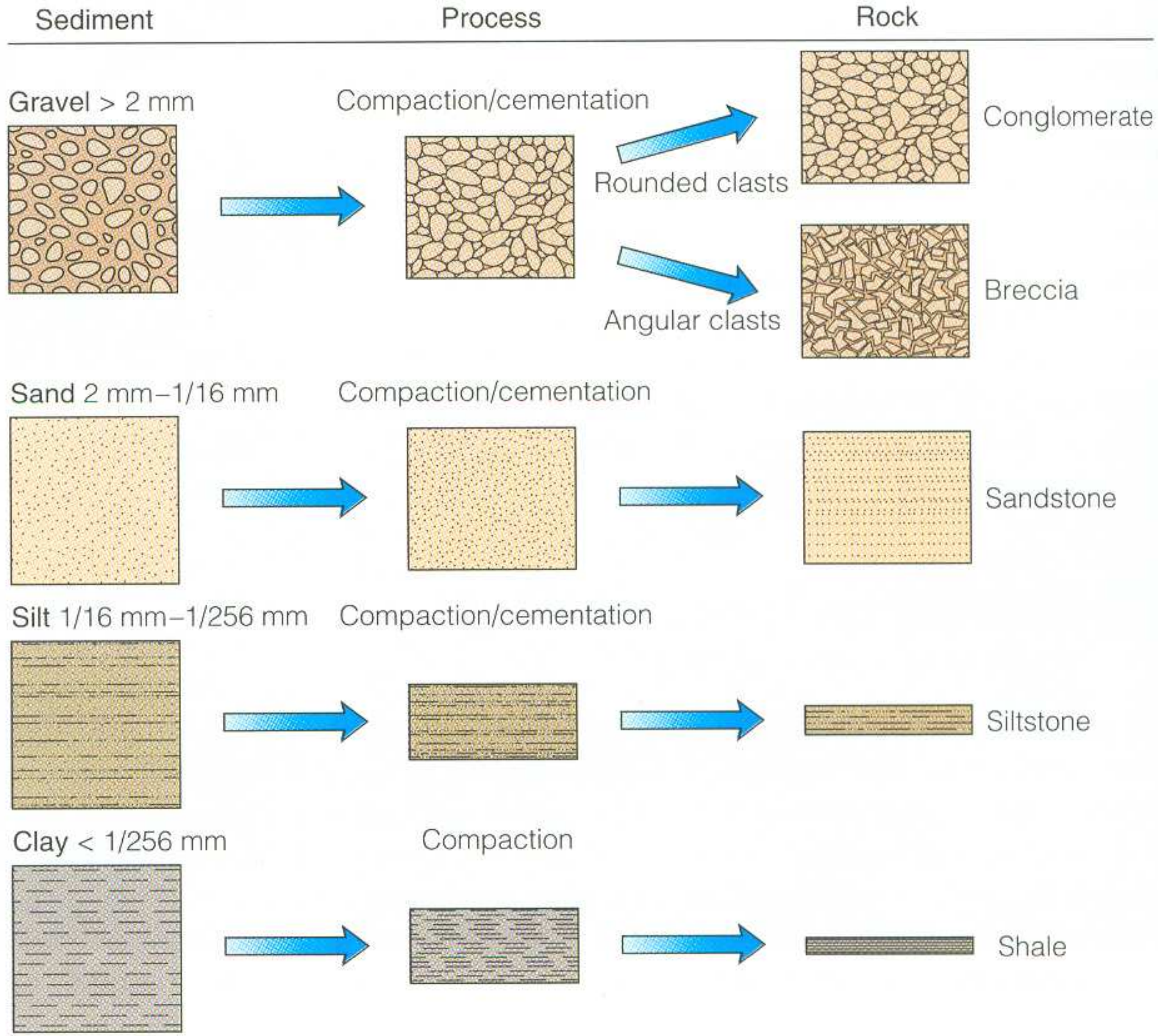
▶ **FIGURE 5-15** Bowen's reaction series and chemical stability. The minerals forming first in this series are most out of equilibrium with their conditions of formation and are most chemically unstable.

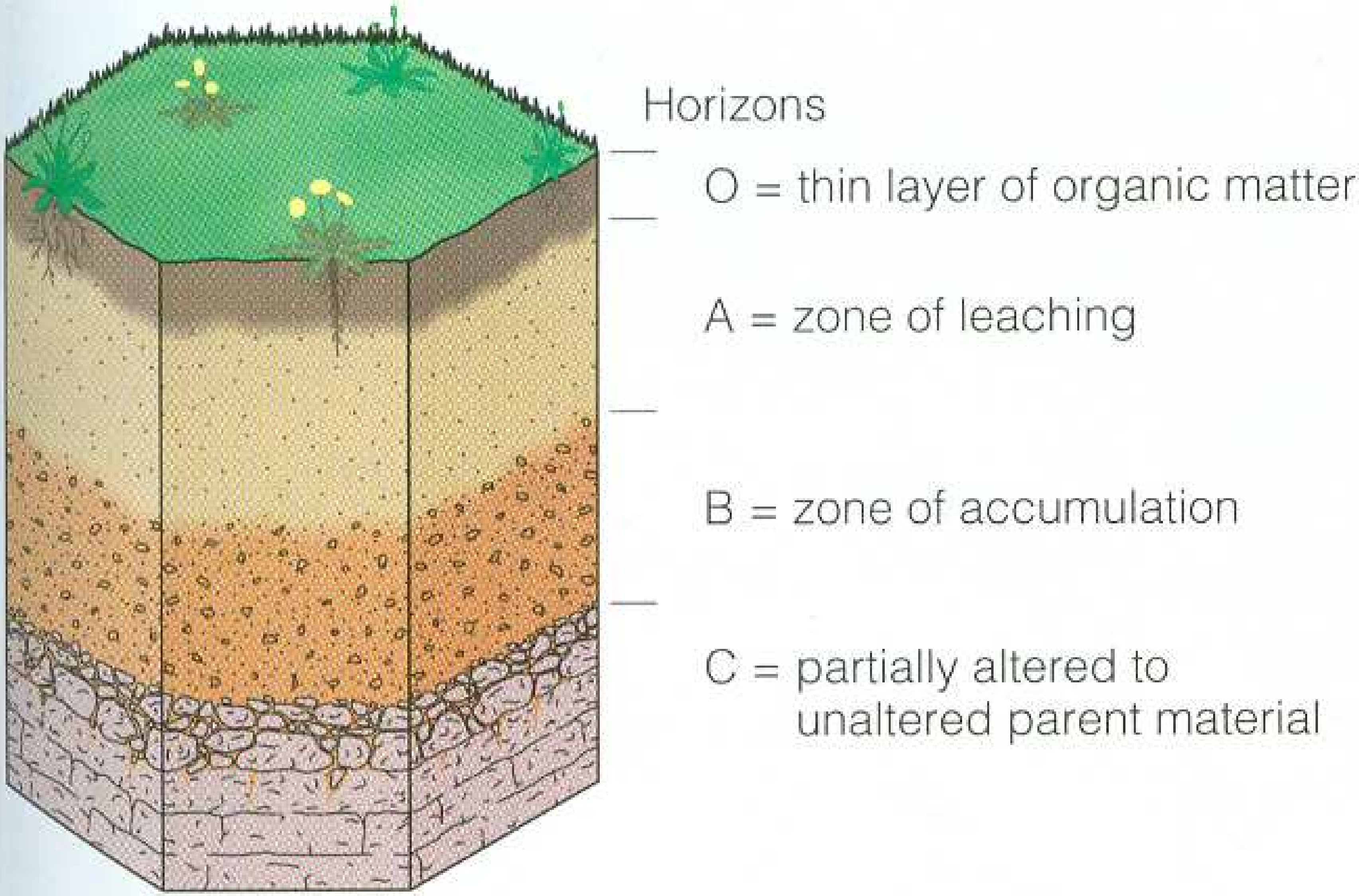
TABLE 6-1 Classification of Sedimentary Particles

Size	Sediment Name	
>2 mm	Gravel	
$\frac{1}{16}$–2 mm	Sand	
$\frac{1}{256}$–$\frac{1}{16}$ mm	Silt	Mud*
$<\frac{1}{256}$ mm	Clay	Mud*

*Mixtures of silt and clay are generally referred to as mud.

▶ FIGURE 6-6 Lithification of detrital sediments by compaction and cementation to form sedimentary rocks.





▶ **FIGURE 5-19** The soil horizons in a fully developed or mature soil.