MAGMATİK KAYAÇLAR

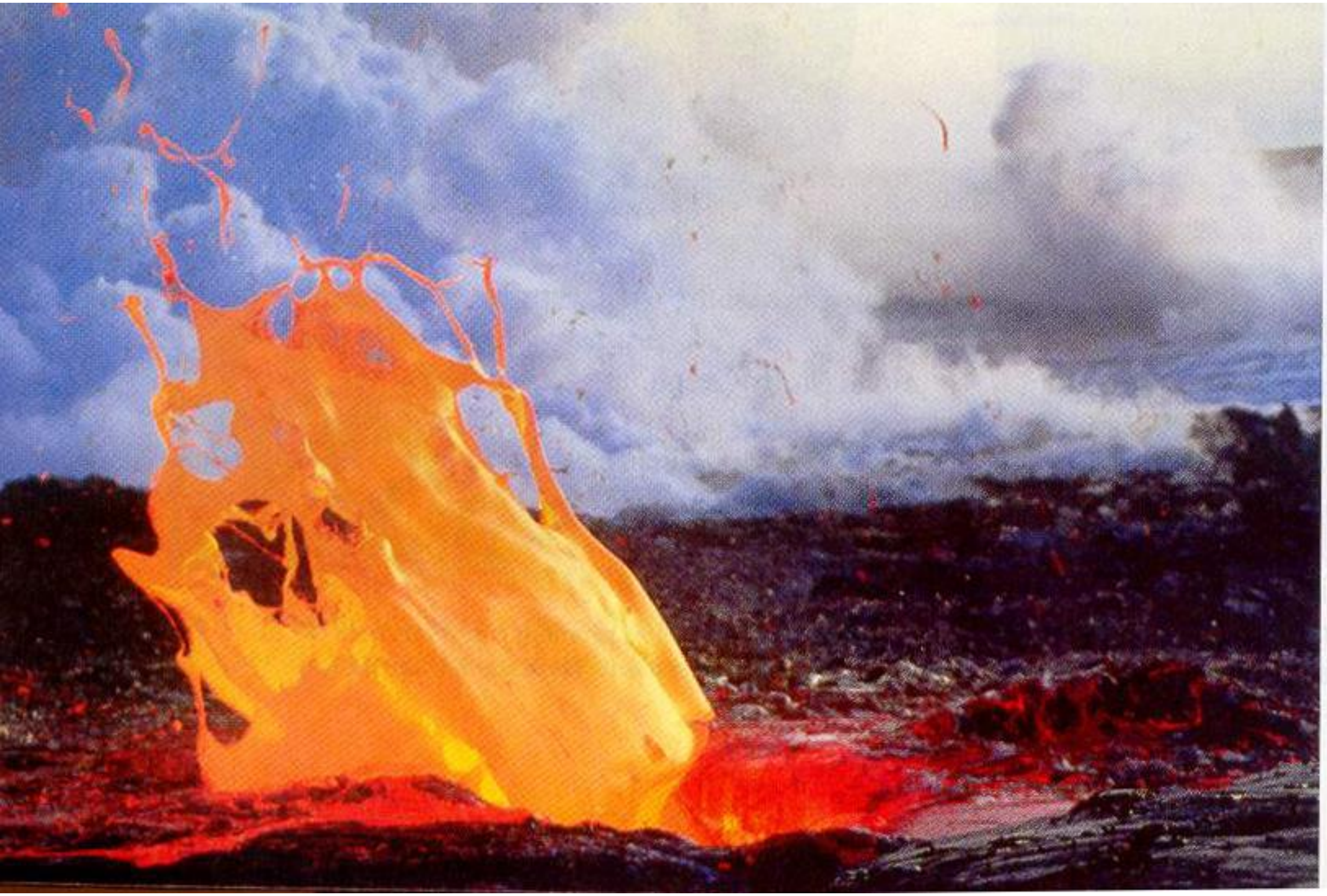


Figure 3.19 Fluid basaltic lava moving down the slopes of Hawaii's Kilauea Volcano toward the sea. (Photo by Brad Lewis/Liaison International)

Figure 3.1 Recent eruption of Hawaii's Kilauea Volcano. (Photo by Douglas Peebles/Westlight)

A.

B.

Figure 3.2 A. Close-up of interlocking crystals in a coarse-grained igneous rock. The largest crystals are about 1 centimeter in length. **B.** Photomicrograph of interlocking crystals in a coarse-grained igneous rock. (Photos by E.J. Tarbuck)

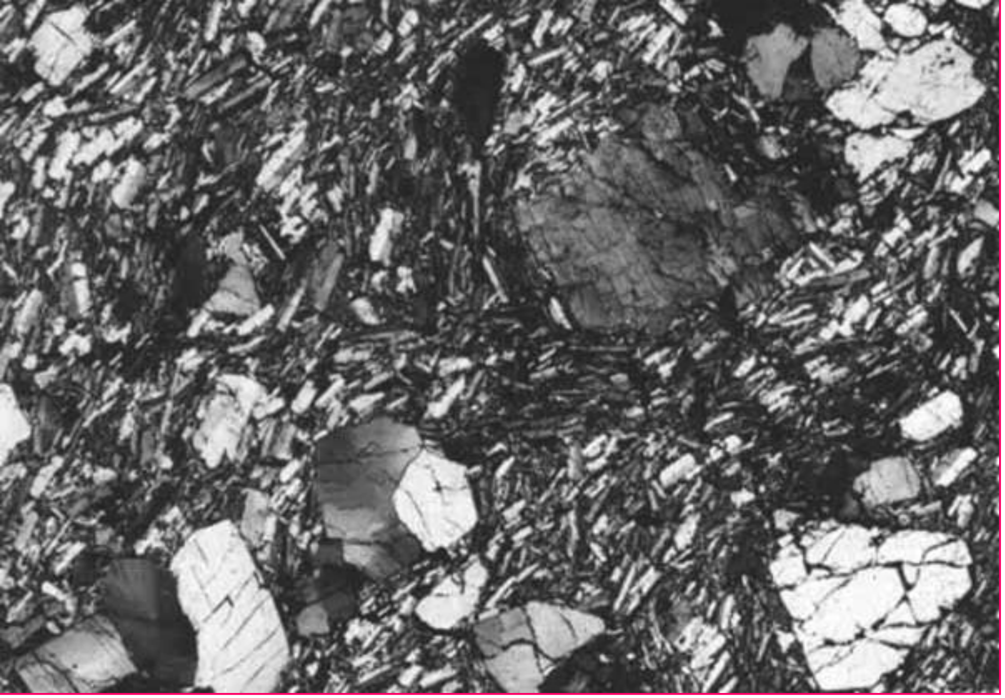


Figure 3-12. a. plajioklas fenokristallerinin lav akintisi nedeniyle yonelim gosterdigi trakitik doku. (P). Trakit, Germany. Width 1 mm. From MacKenzie *et al*. (1982). © John Winter and Prentice Hall.

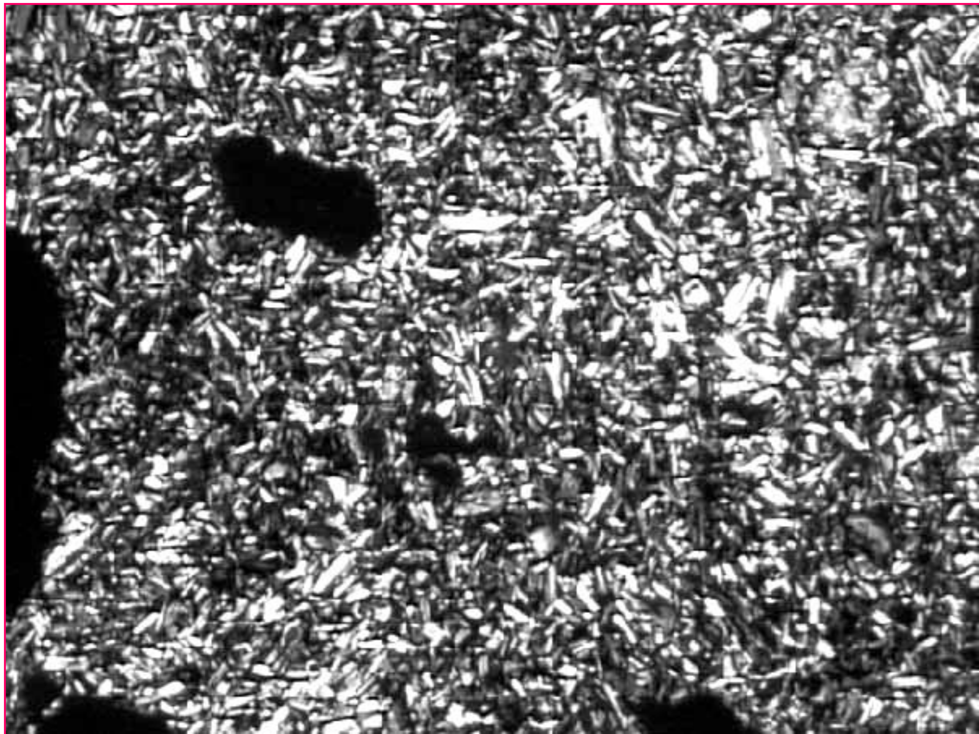
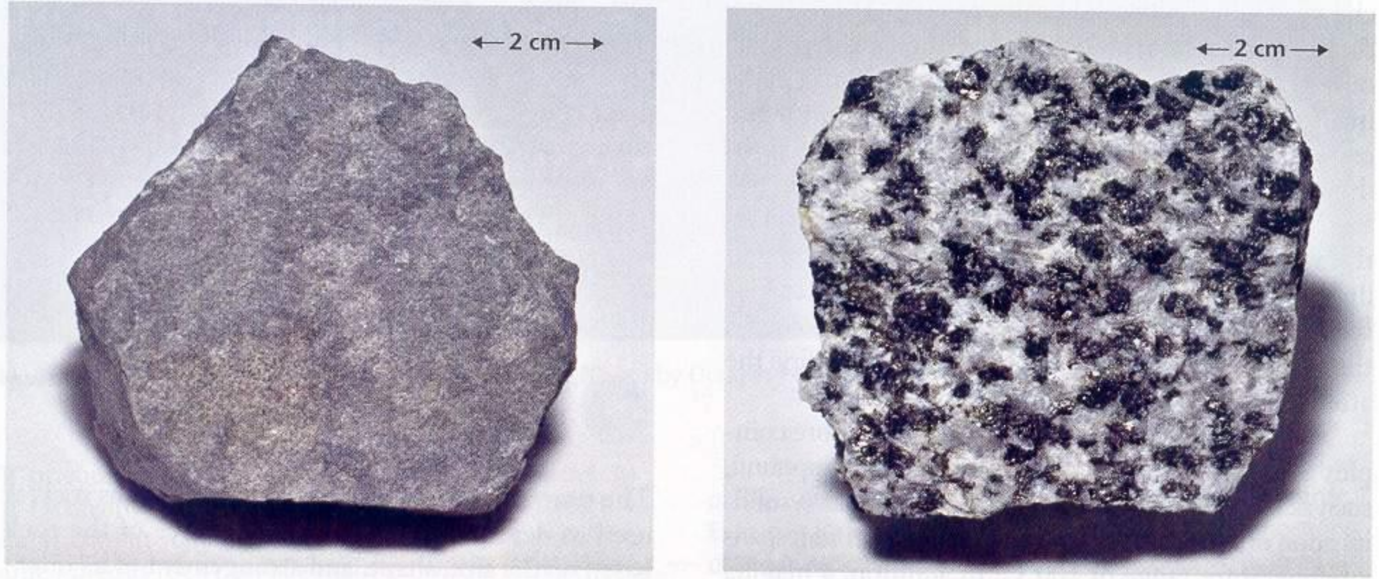
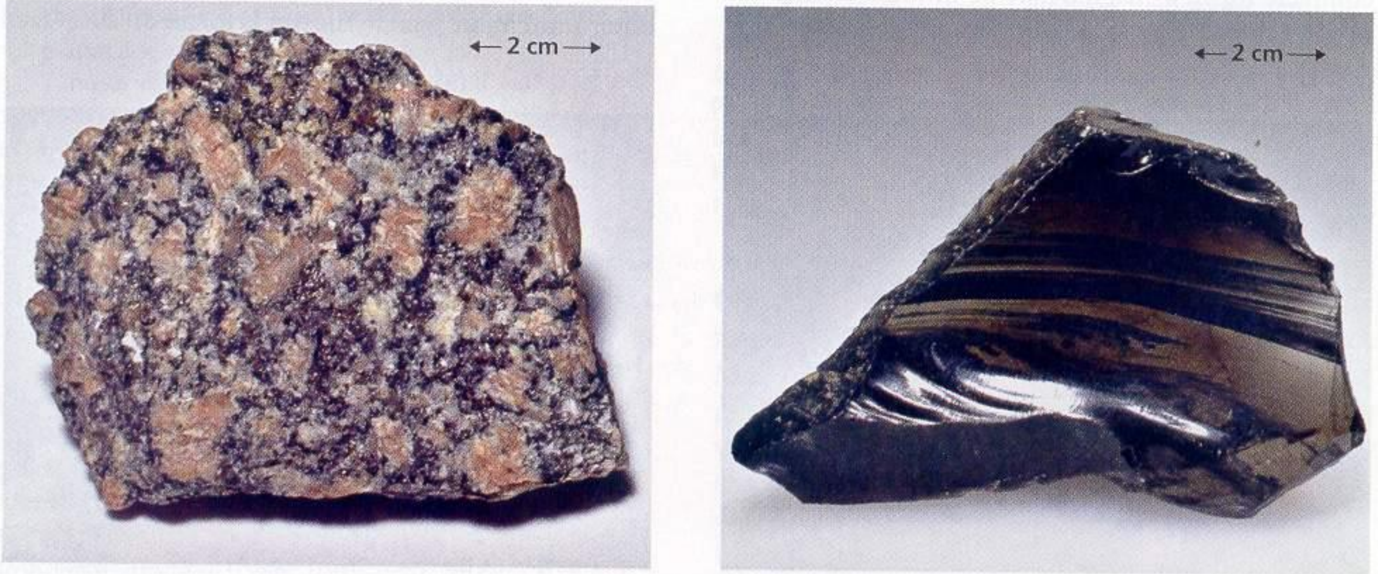


Figure 3-12. b. Mikrofenokristallerin gelisiguzel dagildigi pilotaksitik doku. Basaltik andesit, Mt. McLaughlin, OR. Width 7 mm. © John Winter and Prentice Hall.



A. Aphanitic

B. Phaneritic



C. Porphyritic

D. Glassy

Figure 3.3 Igneous rock textures. **A.** Aphanitic (fine-grained). **B.** Phaneritic (coarse-grained). **C.** Porphyritic (large crystals embedded in a matrix). **D.** Glassy (cooled too rapidly to form crystals). (Photos by E.J. Tarbuck)

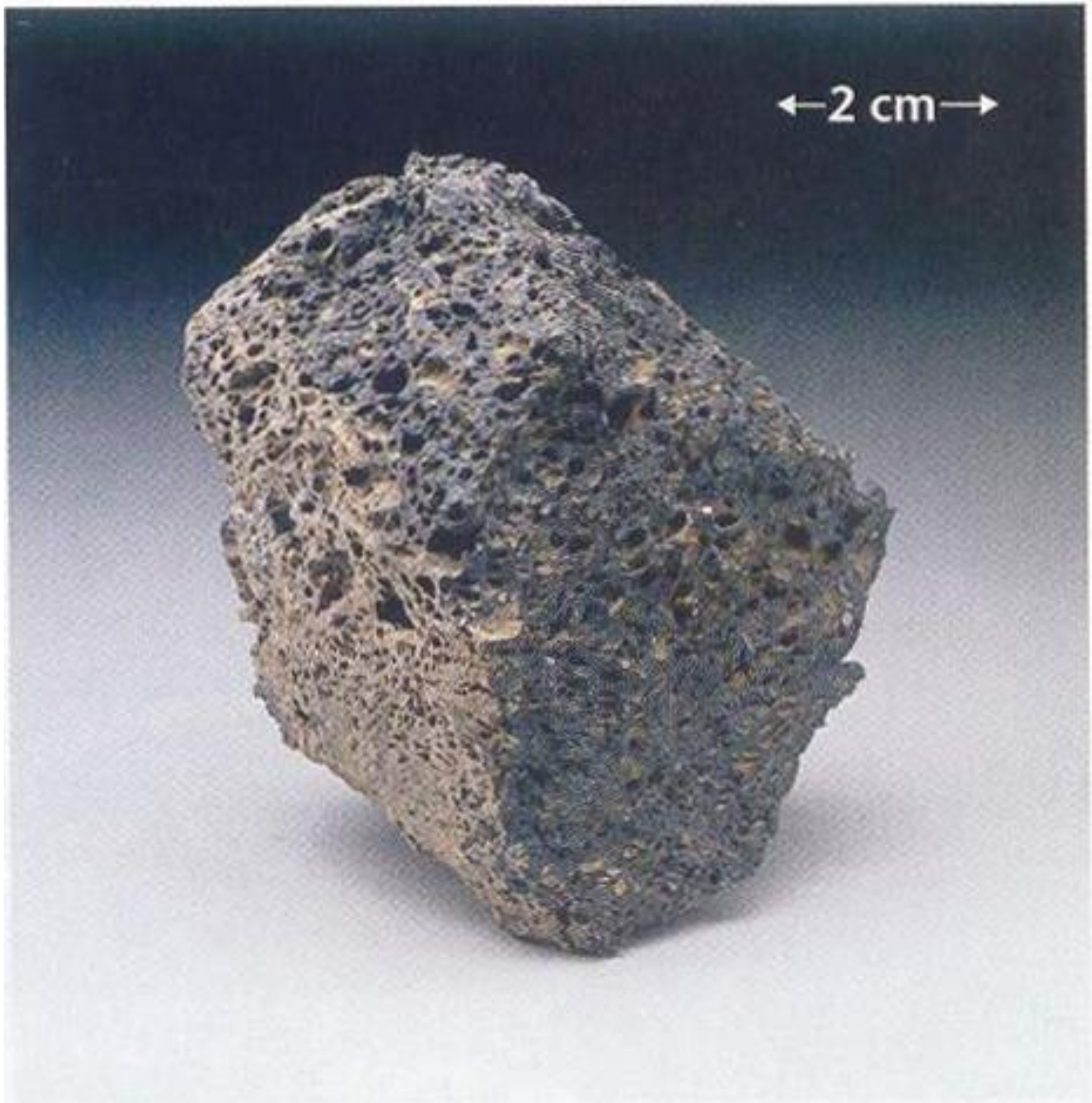


Figure 3.4 Scoria is a volcanic rock that exhibits a vesicular texture. Vesicles are small holes left by escaping gas bubbles. (Photo by E.J. Tarbuck)

Figure 3.5 This obsidian flow was extruded from a vent along the south wall of Newberry Caldera, Oregon. Note the road for scale. (Photo by E.J. Tarbuck)

Figure 3.6 Pyroclastic texture. This volcanic rock consists of angular rock fragments embedded in a light-colored matrix of ash. (Photo by E.J. Tarbuck)

Figure 4.4 Eruption of Mount Augustine, Cook Inlet, Alaska, 1986. (Photo by Steve Kaufman/DRK)

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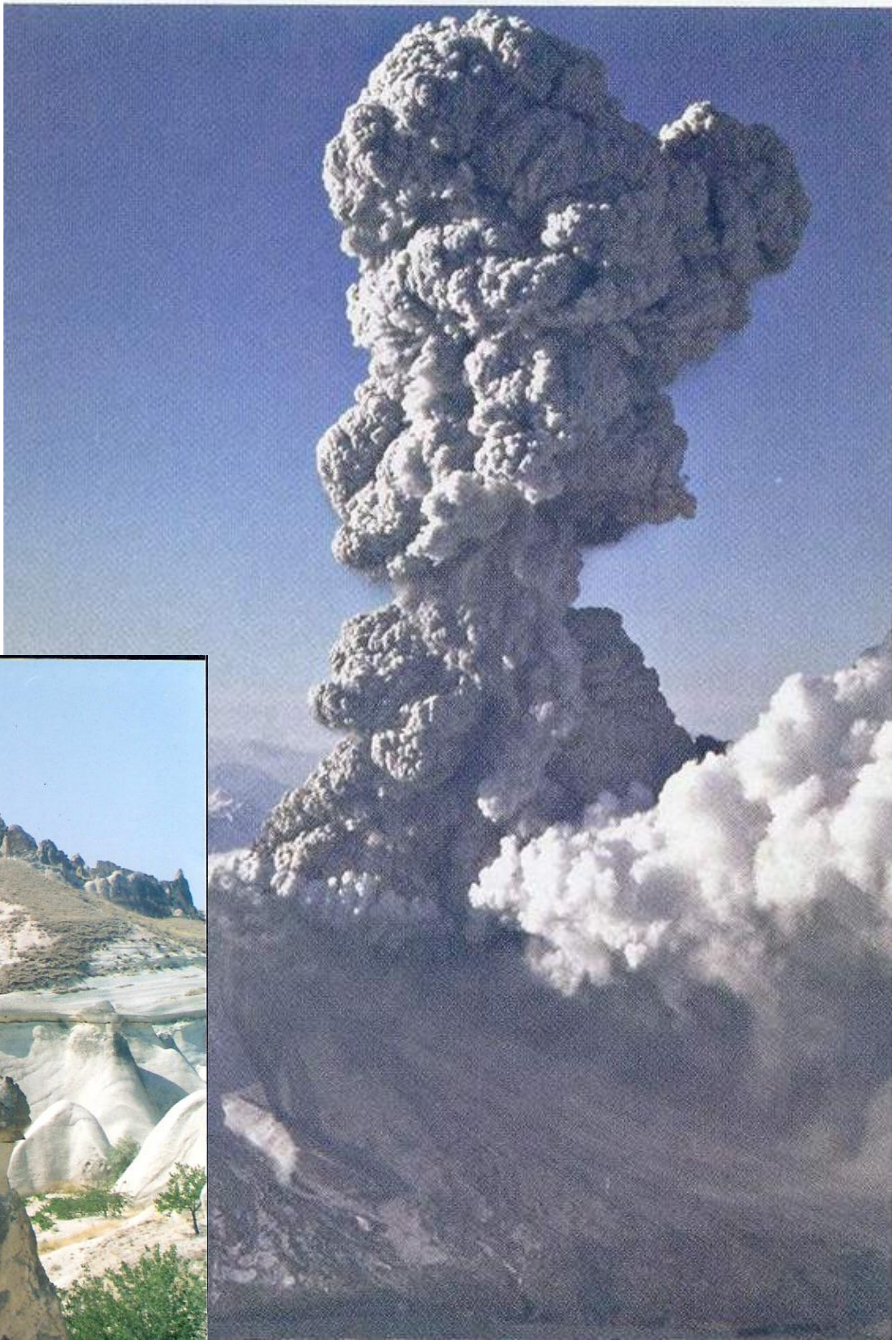


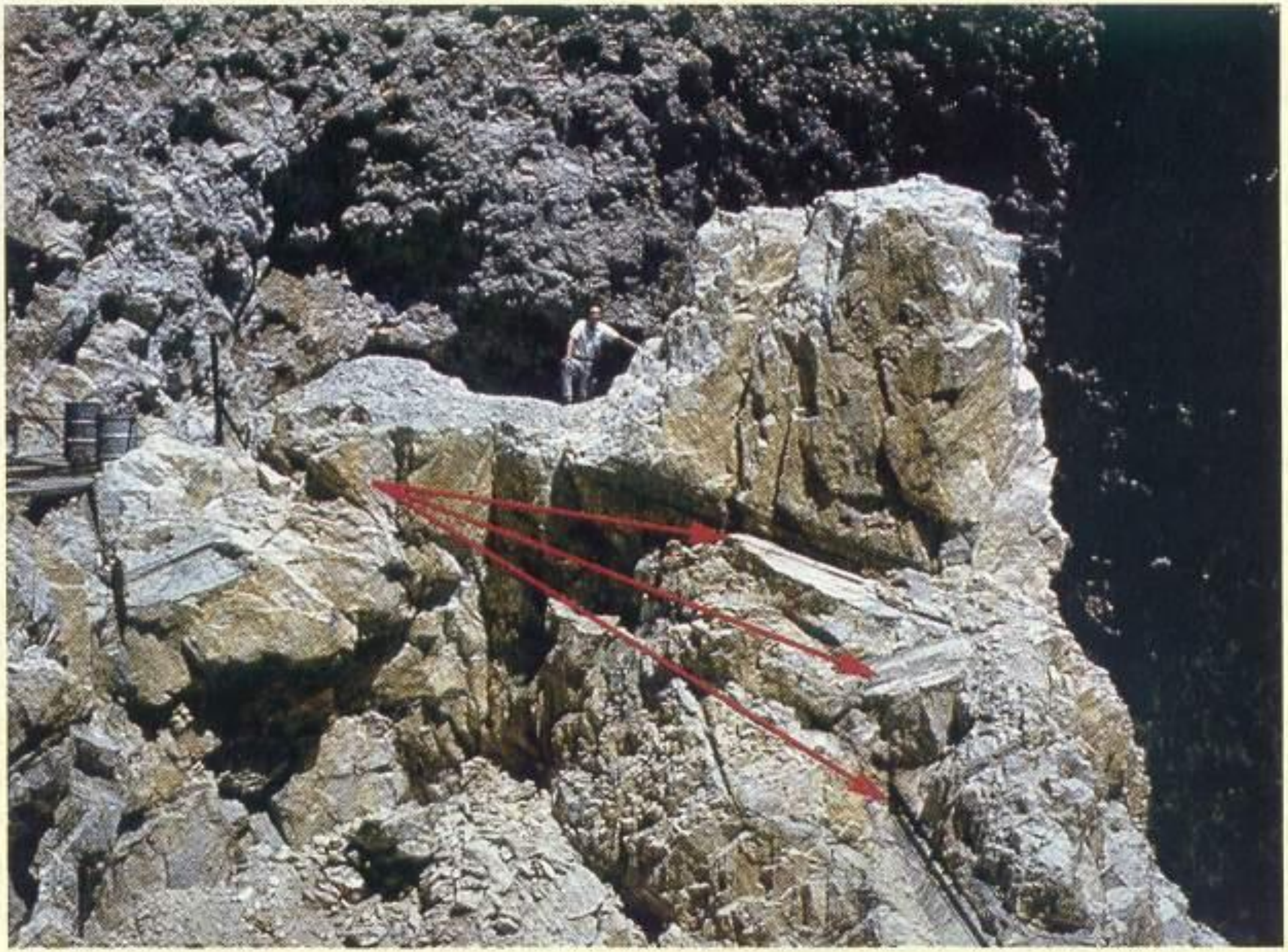


Figure 3.A This pegmatite in the Black Hills of South Dakota was mined for its large crystals of spodumene, an important source of lithium. Arrows are pointing to impressions left by crystals. (Photo by James Kirchner)

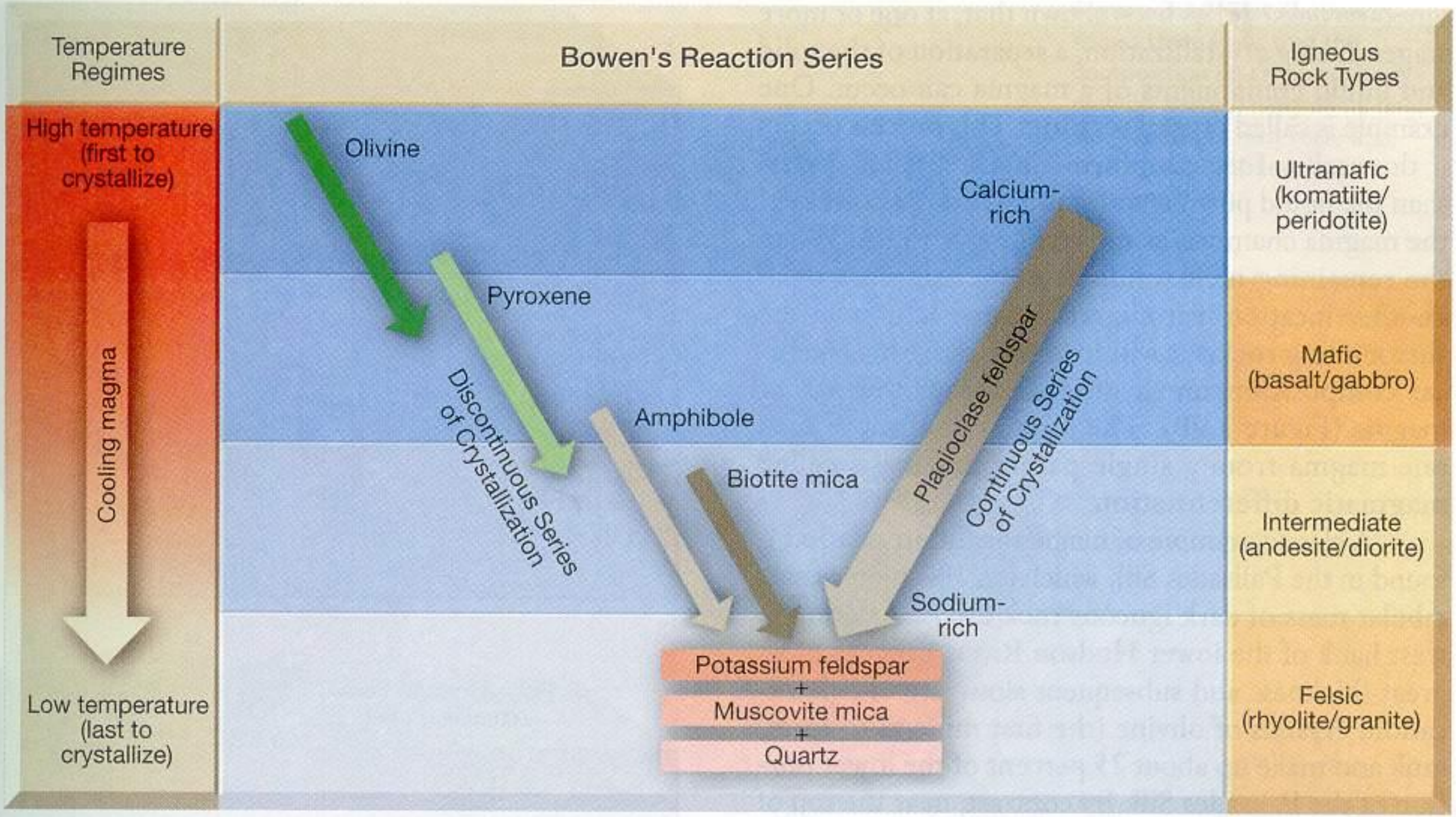


Figure 3.8 Bowen's reaction series shows the sequence in which minerals crystallize from a magma. Compare this figure to the mineral composition of the rock groups in Table 3.1 Note that each rock group consists of minerals that crystallize in the same temperature range.

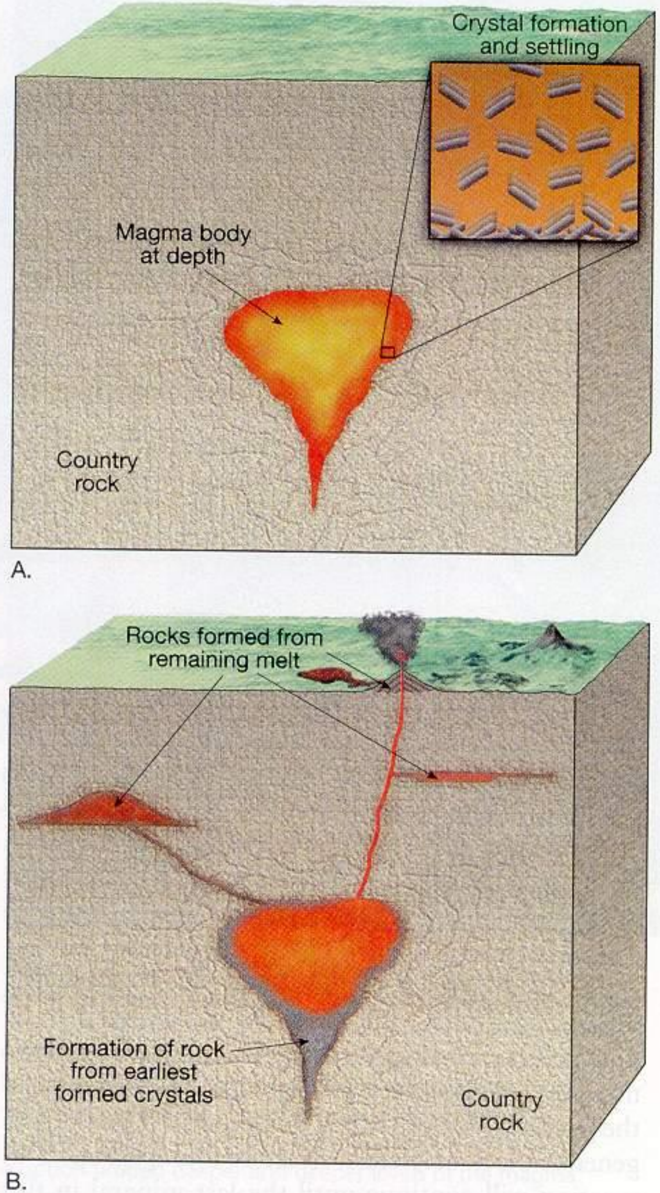


Figure 3.9 Separation of minerals by crystal settling. **A.** Illustration of how the earliest-formed minerals can be separated from a magma by settling. **B.** The remaining melt could migrate to a number of different locations and, upon further crystallization, generate rocks having a composition much different from that of the parent magma.

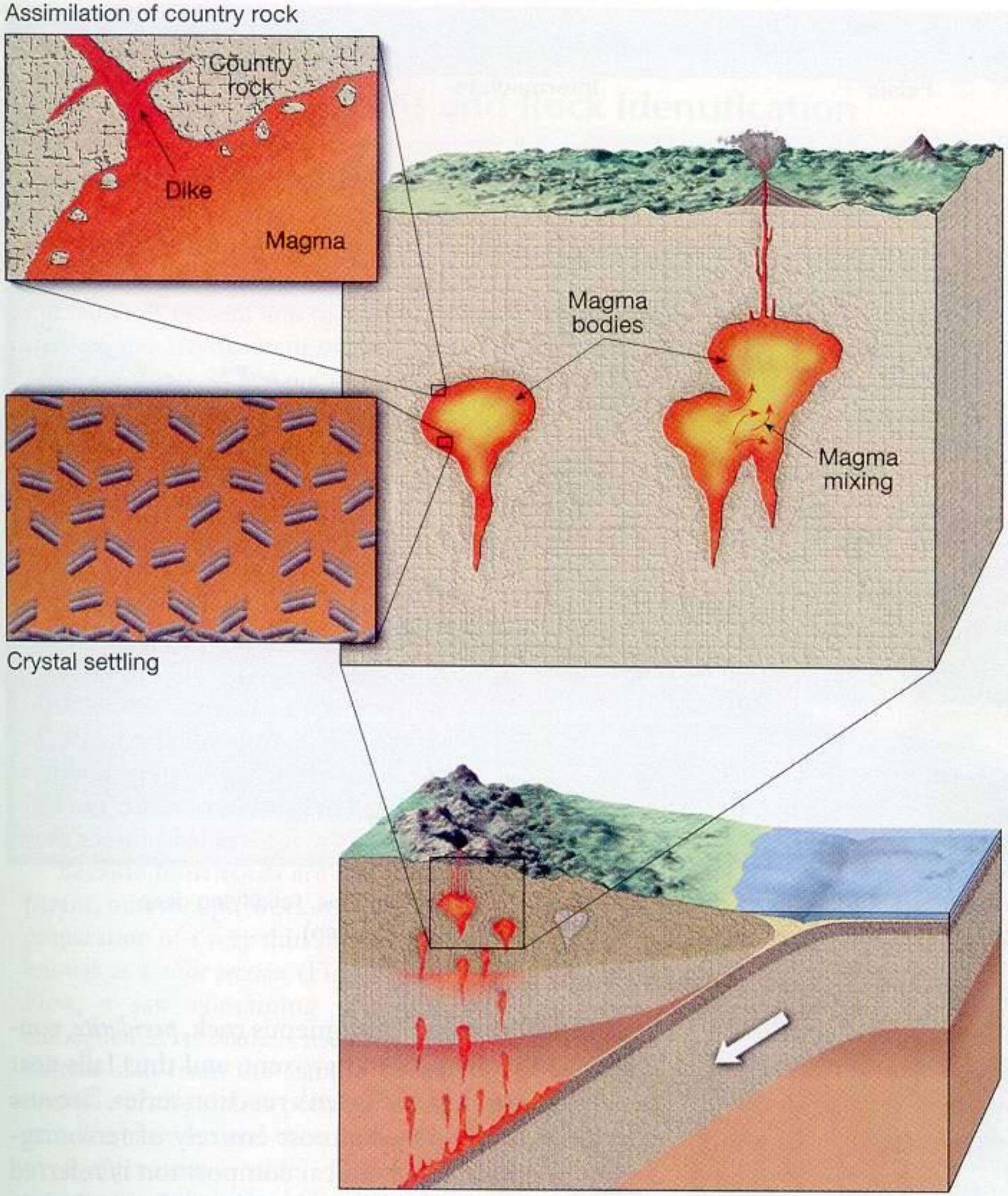


Figure 3.10 This illustration shows three ways that the composition of a magma body may be altered: magma mixing; assimilation of host rock; and crystal settling (magmatic differentiation).

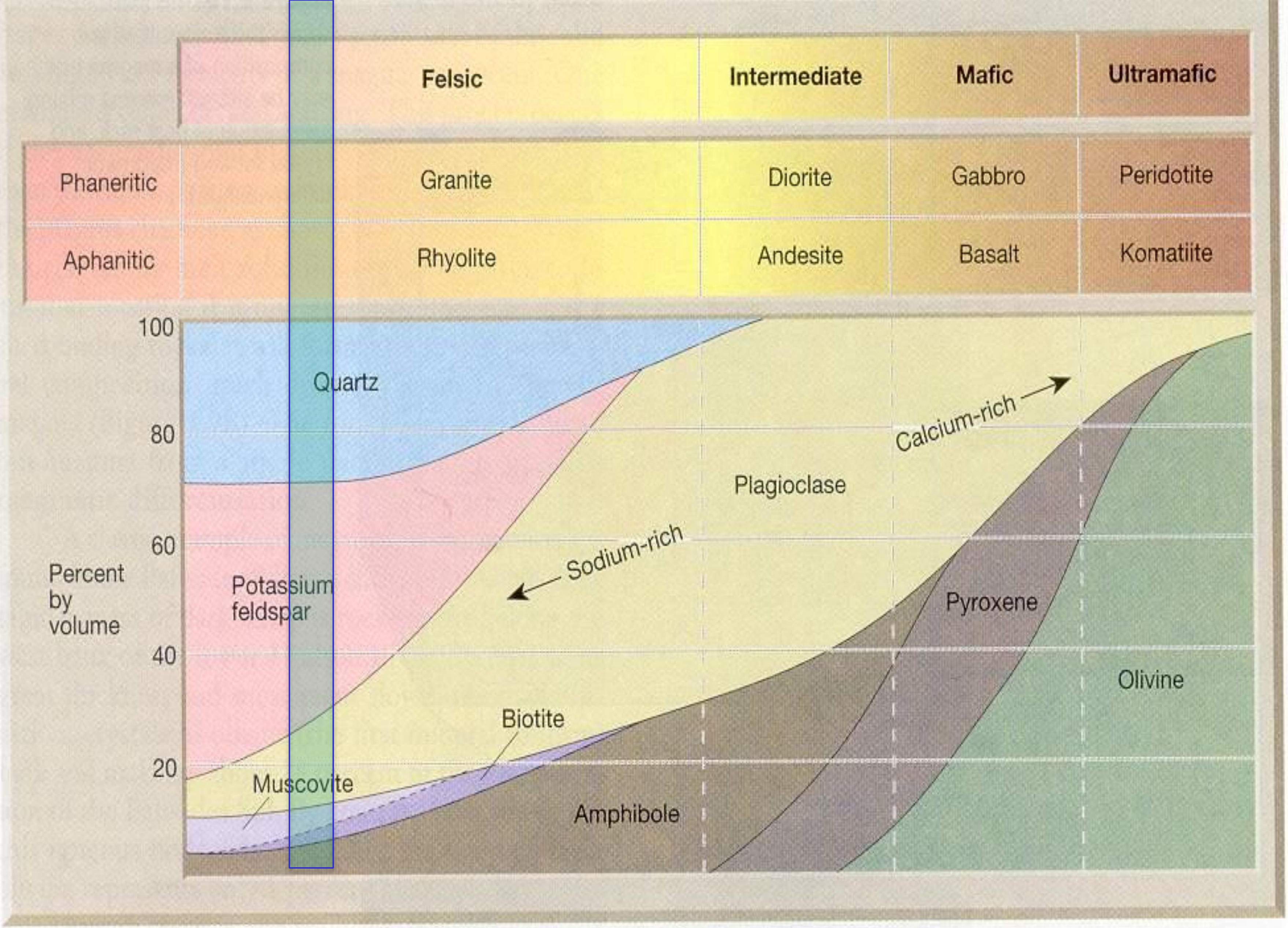


Figure 3.11 Mineralogy of the common igneous rocks. Phaneritic (coarse-grained) rocks are plutonic, solidifying deep underground. Aphanitic (fine-grained) rocks are volcanic, or solidify near Earth's surface. (After Dietrich)

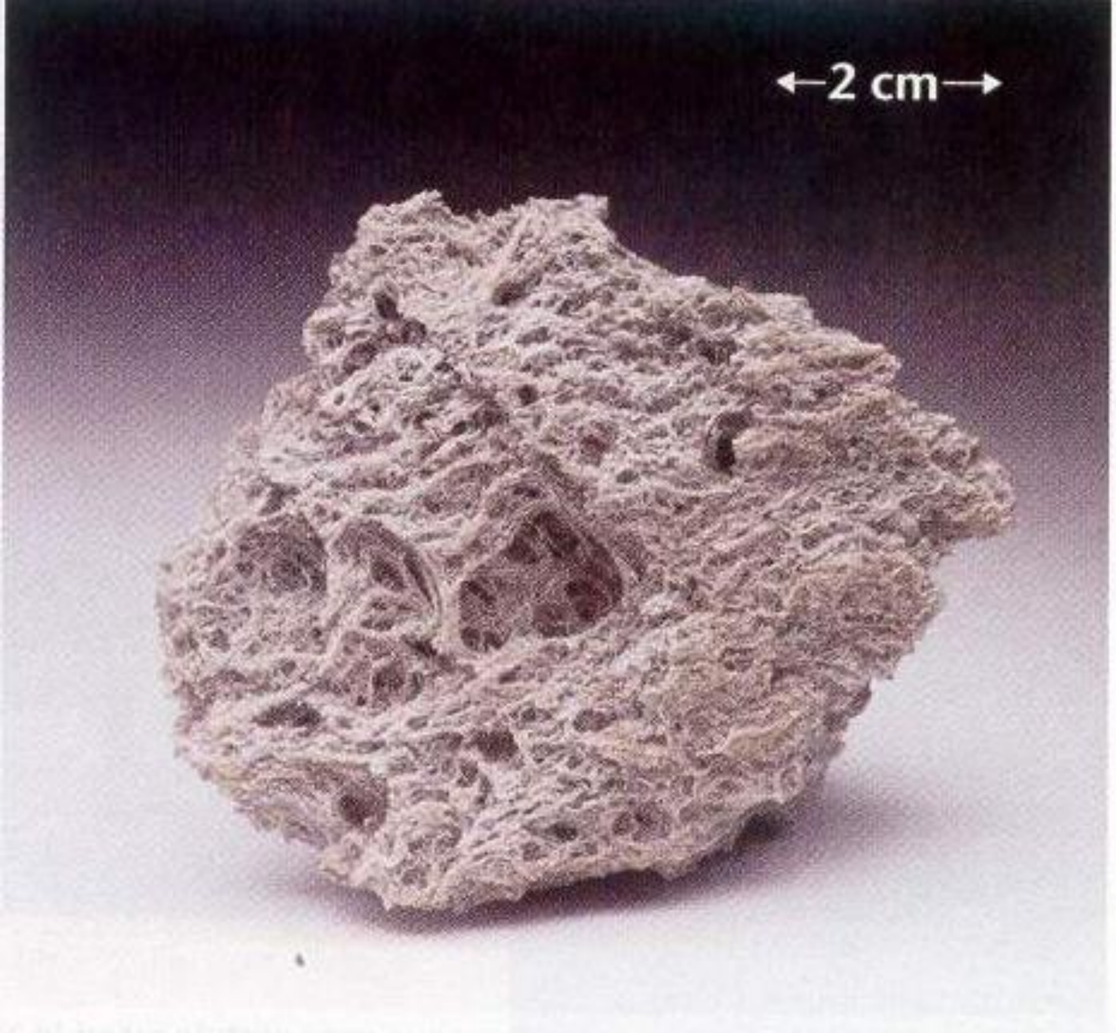


Figure 3.15 Pumice, a glassy rock containing numerous vesicles. (Photo by E. J. Tarbuck)

A. Obsidian flow.

B. Hand sample of obsidian.

Figure 3.14 Obsidian is a dark-colored, glassy rock formed from silica-rich lava. (Photos by E. J. Tarbuck)

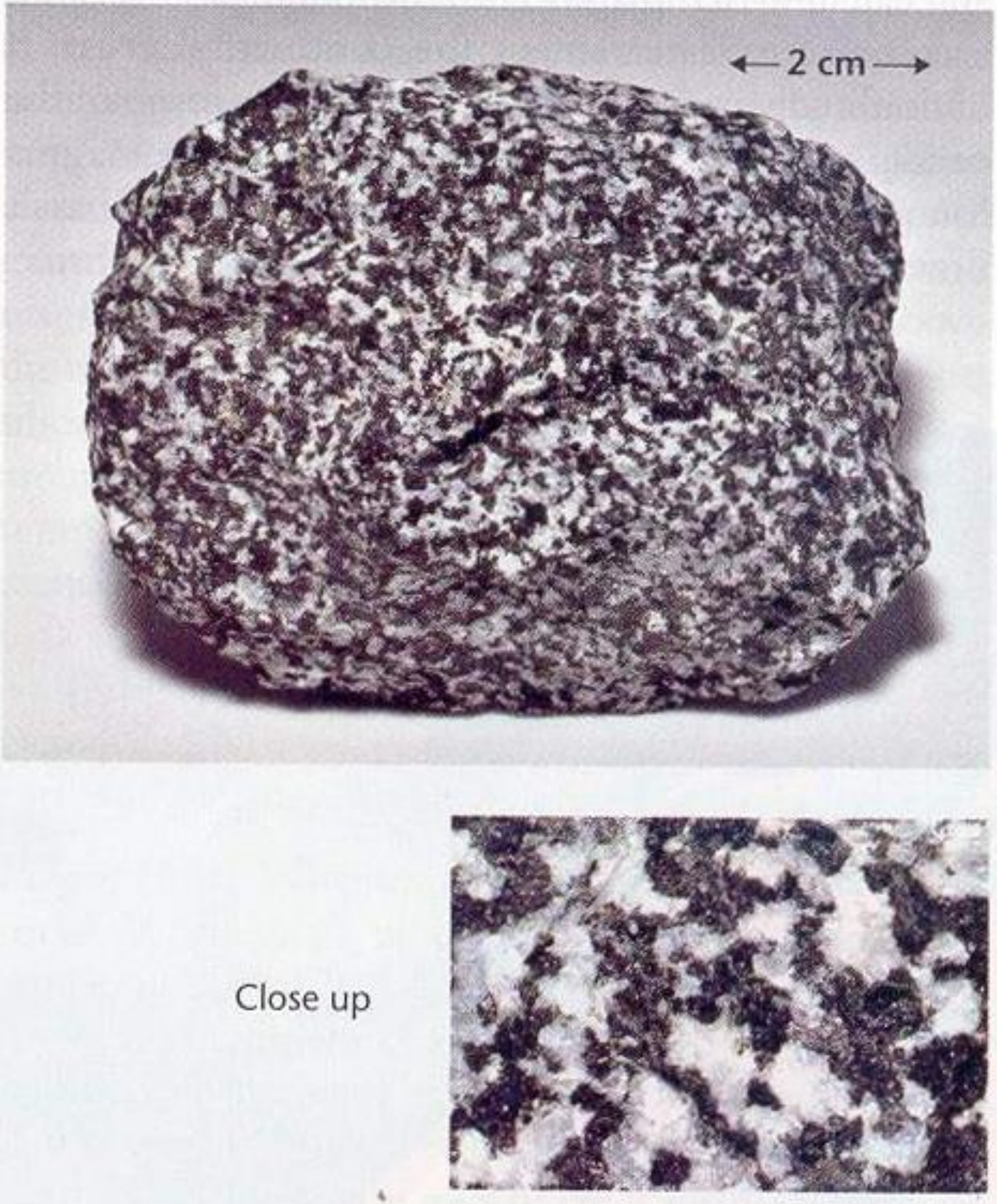
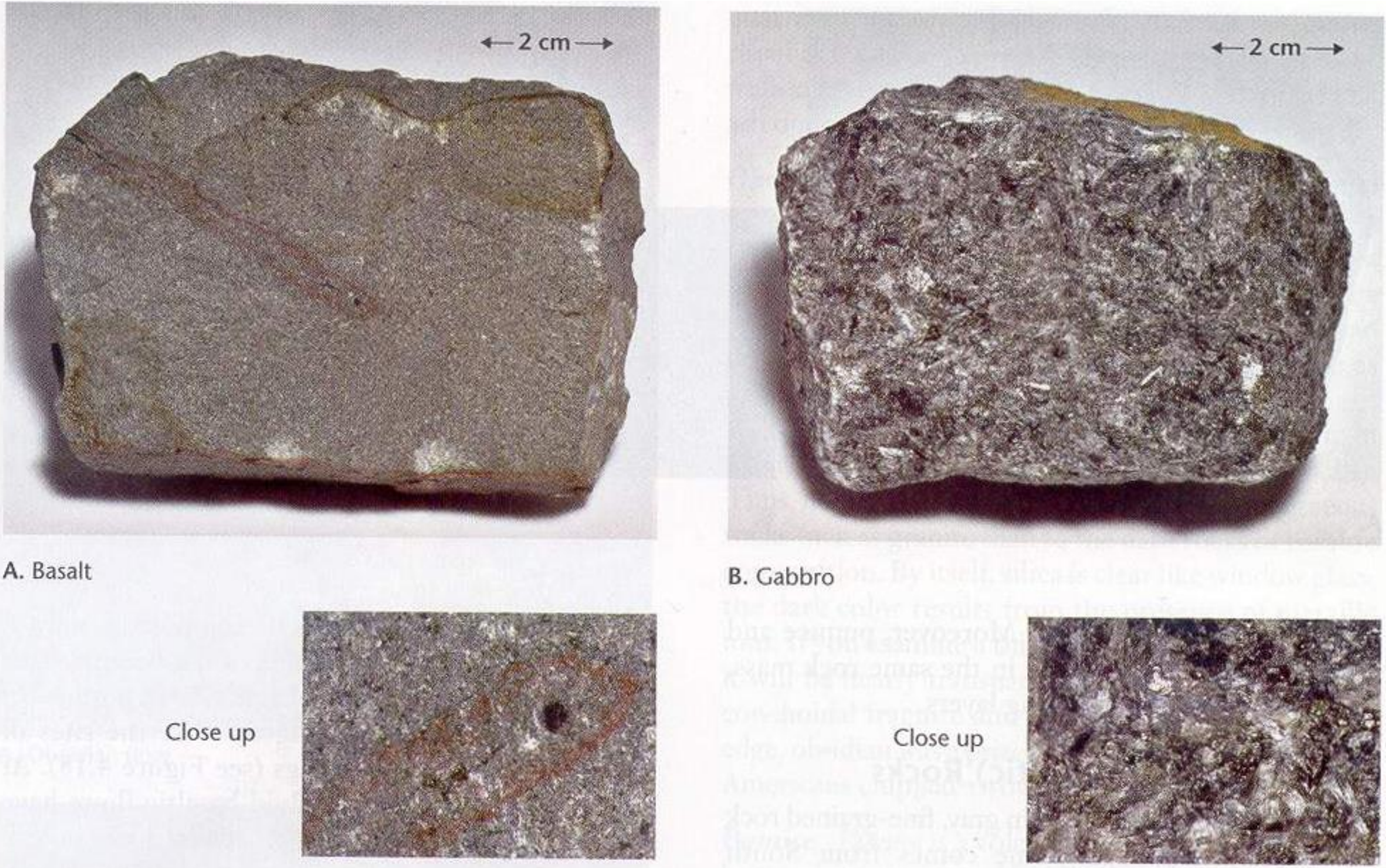


Figure 3.17 Diorite is a phaneritic igneous rock of intermediate composition. (Photo by E.J. Tarbuck)



A. Basalt

B. Gabbro

Figure 3.18 These dark-colored mafic rocks are composed primarily of pyroxene and calcium-rich plagioclase. **A.** Basalt is aphanitic and a very common extrusive rock. **B.** Gabbro, the phaneritic equivalent of basalt, is less abundant. (Photos by E.J. Tarbuck)

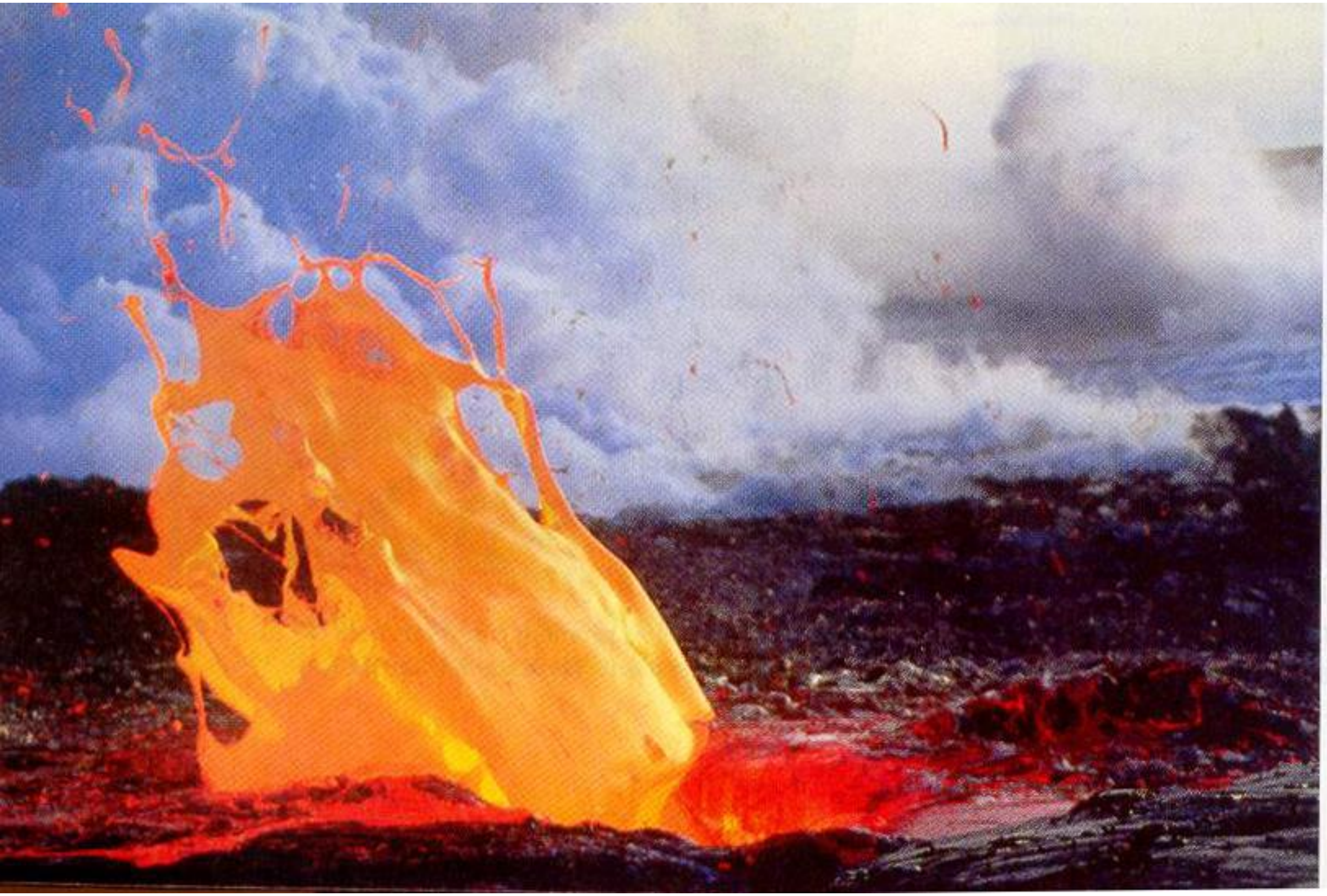


Figure 3.19 Fluid basaltic lava moving down the slopes of Hawaii's Kilauea Volcano toward the sea. (Photo by Brad Lewis/Liaison International)

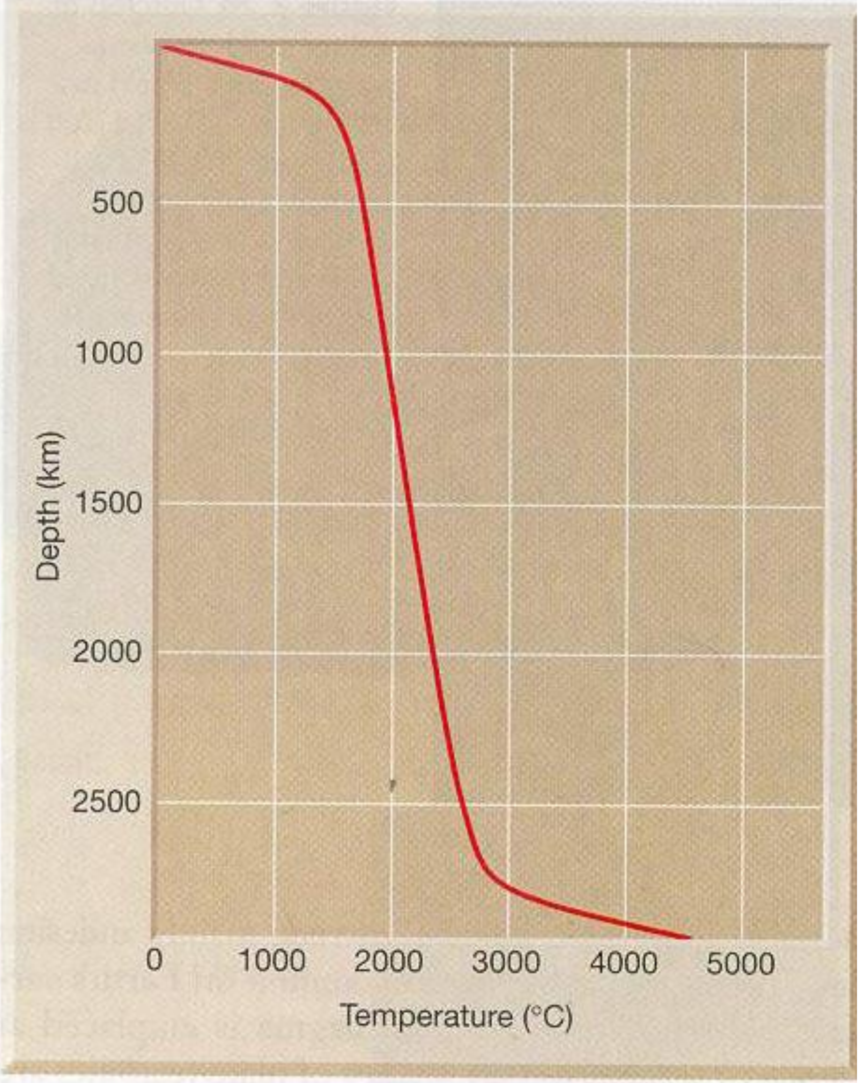


Figure 3.21 This graph illustrates the estimated temperature distribution for the crust and mantle. Notice that temperature increases significantly from the surface to the base of the lithosphere and that the temperature gradient (rate of change) is much less in the mantle. Because the temperature difference between the top and bottom of the mantle is relatively small, geologists conclude that slow convective flow (hot material rising, and cool mantle sinking) must occur in the mantle.

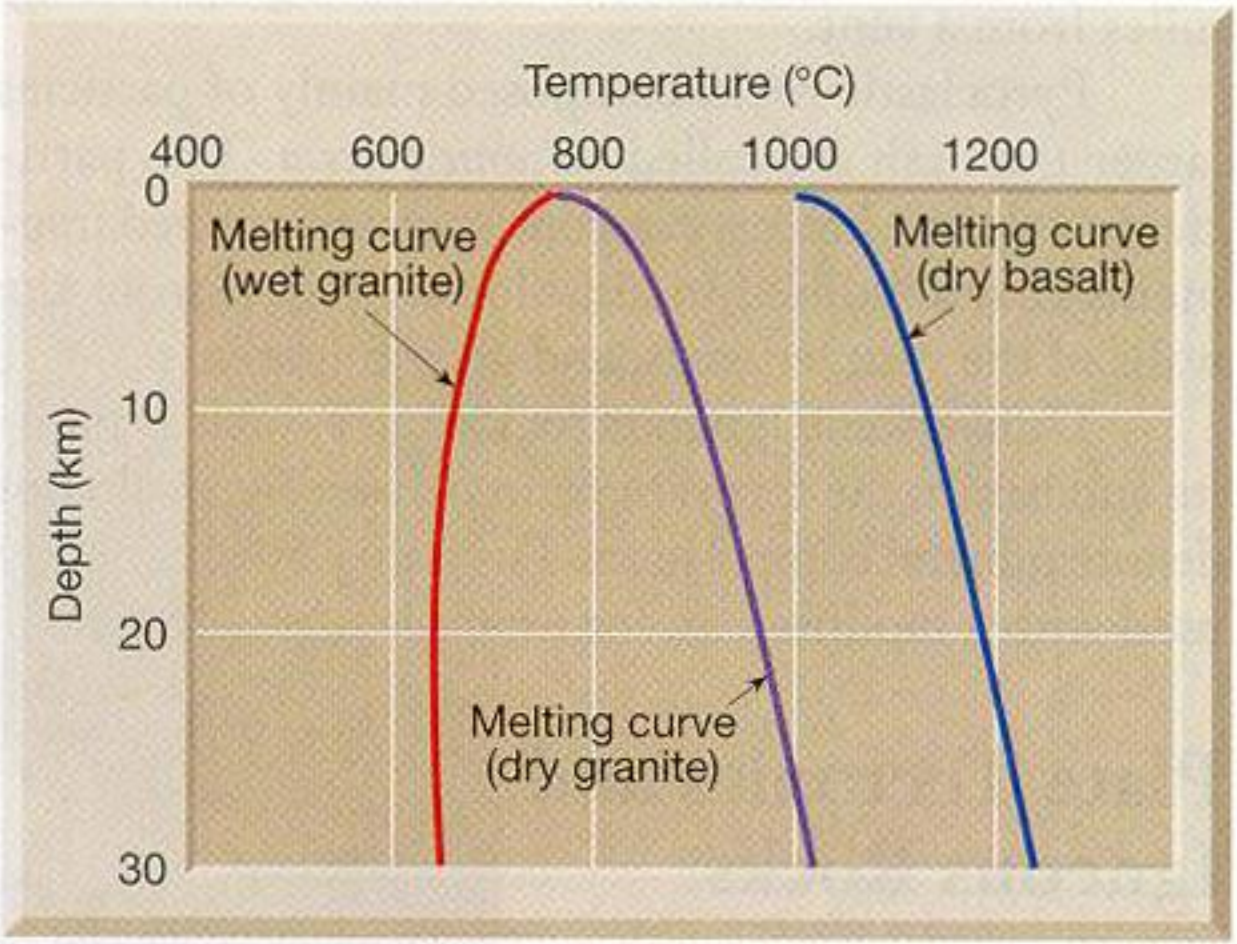


Figure 3.22 Idealized melting temperature curves. These curves portray the minimum temperatures required to melt rock within Earth's crust. Notice that dry granite and dry basalt melt at higher temperatures with increasing depth. By contrast, the melting temperature of wet granite actually decreases as the confining pressure increases.

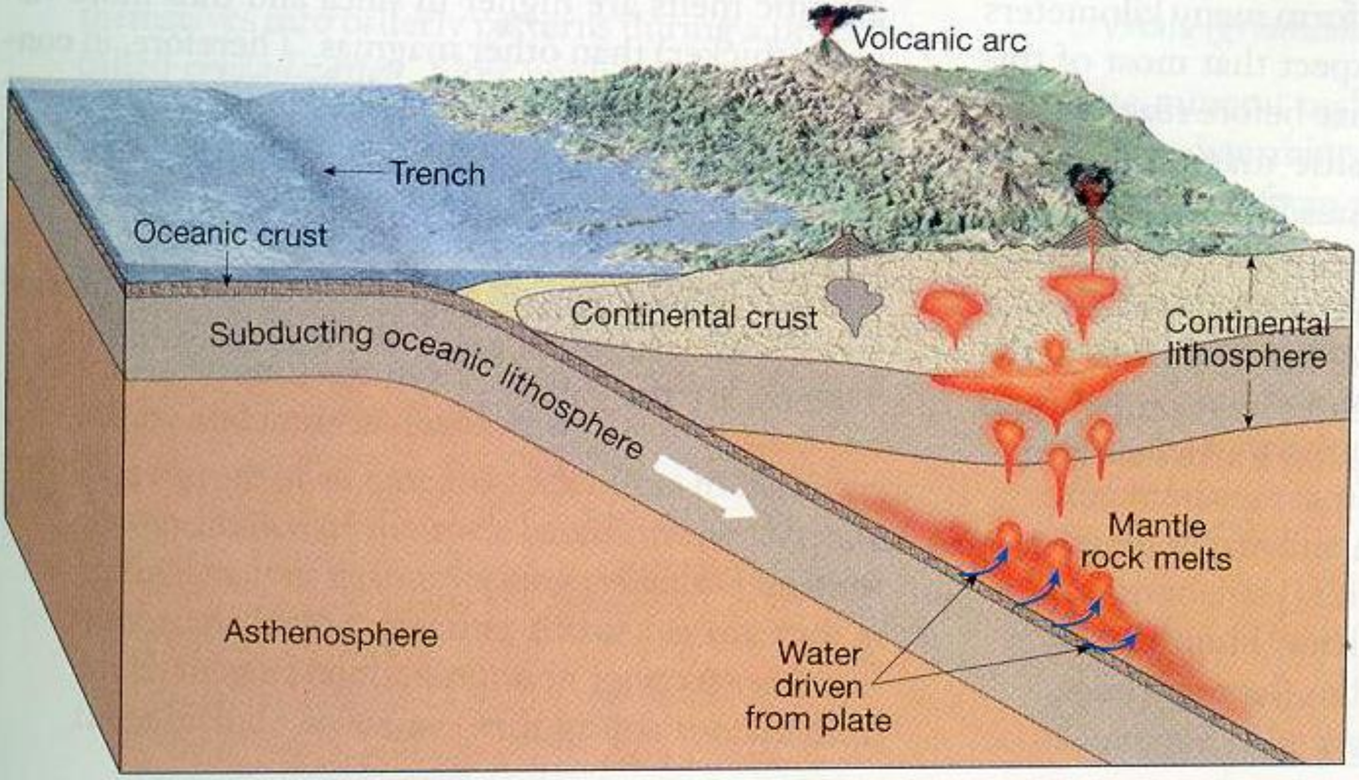


Figure 3.24 As an oceanic plate descends into the mantle, water and other volatiles are driven from the subducting crustal rocks. These volatiles lower the melting temperature of mantle rock sufficiently to generate melt.

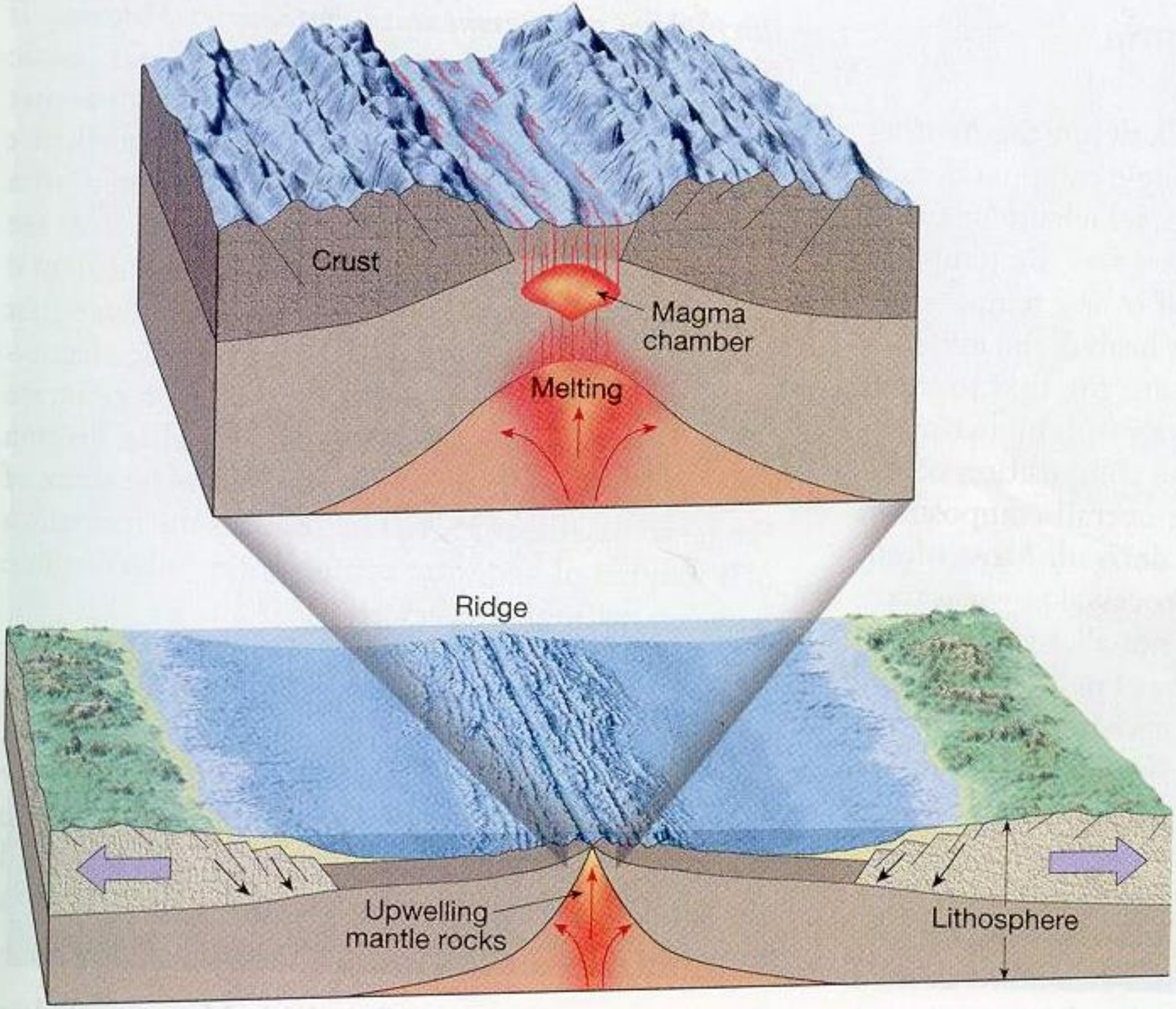


Figure 3.23 As hot mantle rock ascends, it continually moves into zones of lower pressure. This drop in confining pressure can trigger melting, even without additional heat.