

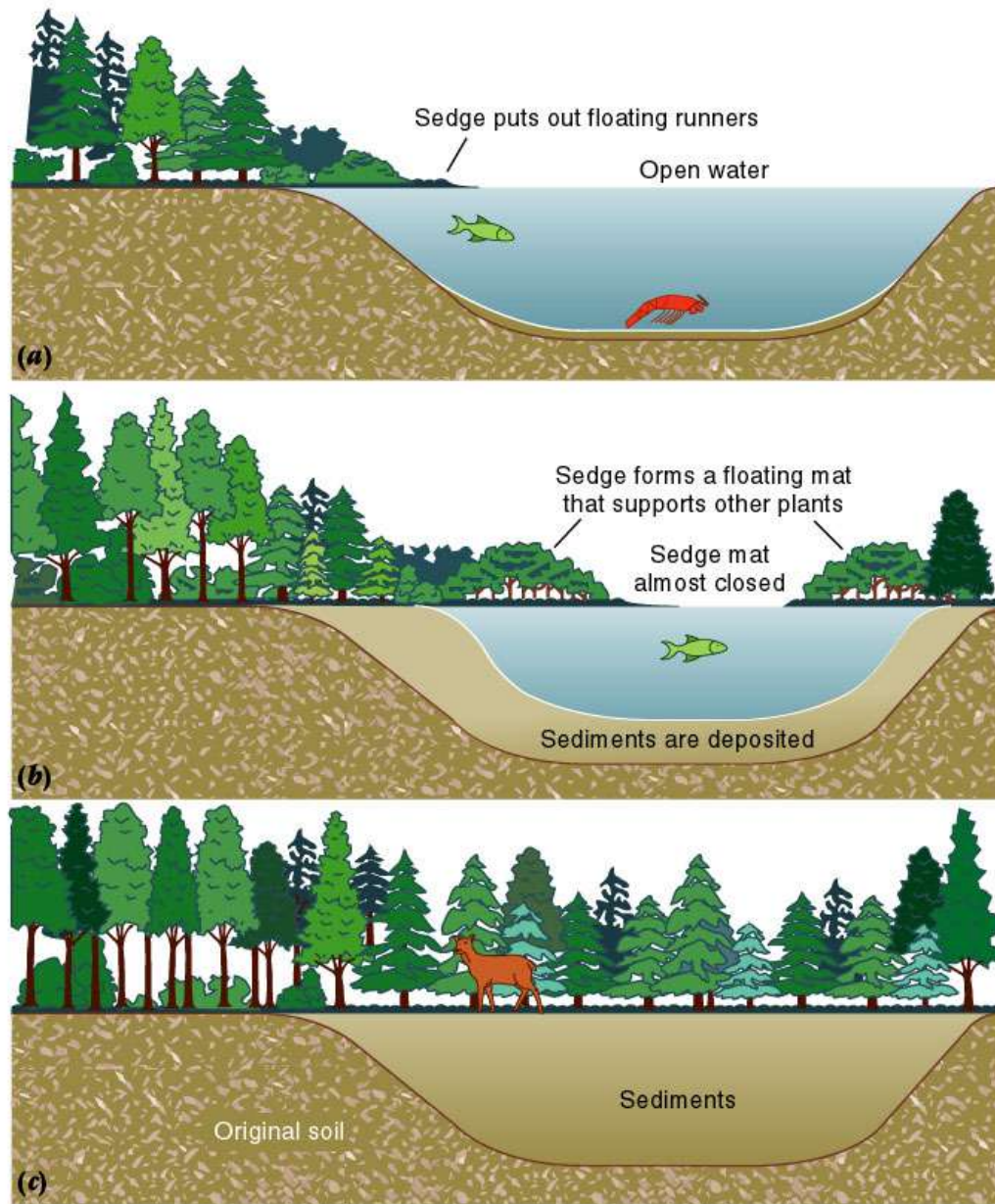
Origin and Distribution of Communities

Ecological Succession Defined:

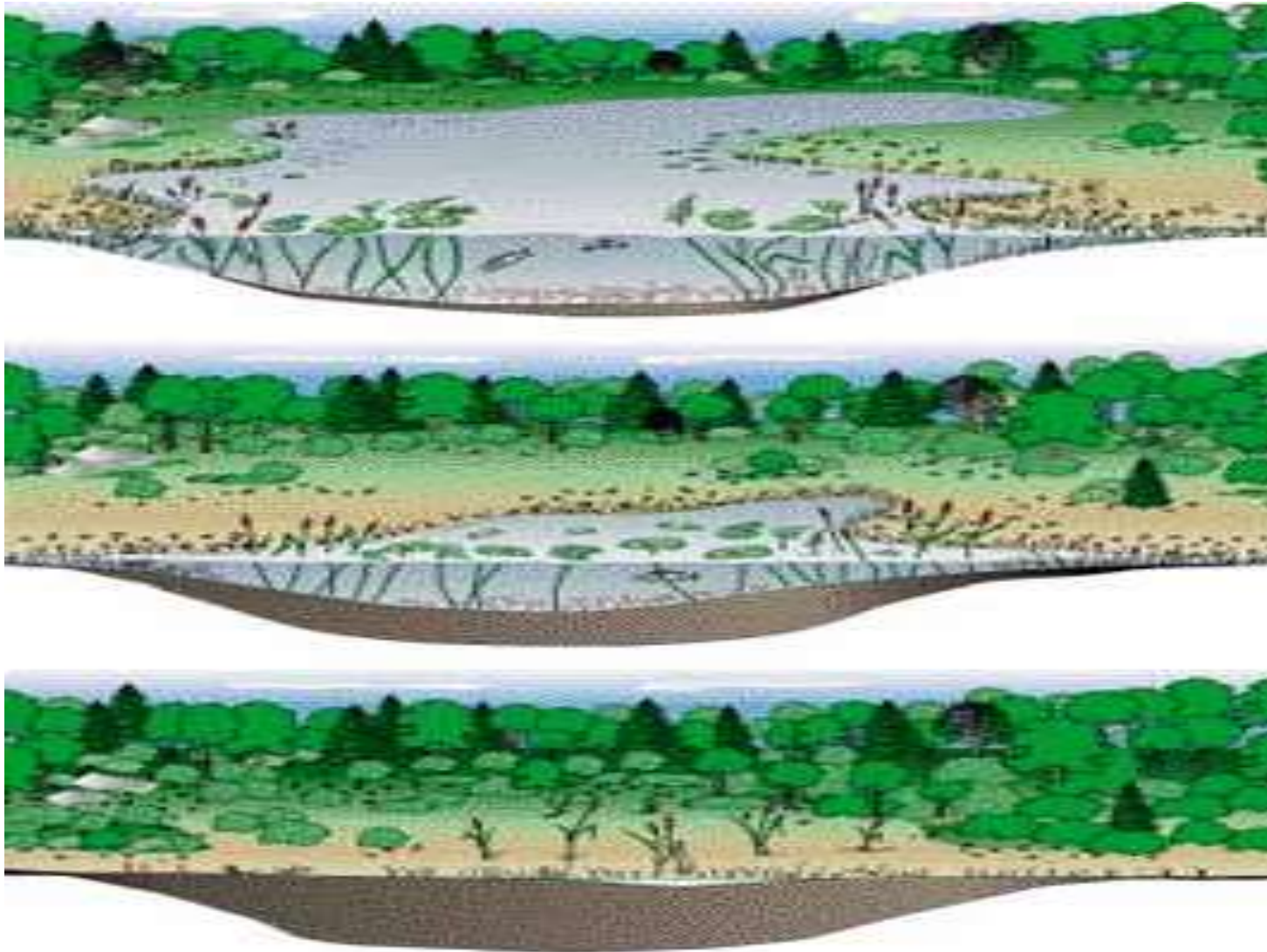
- **The sequential change in the relative abundances of the dominant species in a biological community following a disturbance.**
- **Primary succession: beginning from a abiotic environment following a cataclysmic disturbance.**
- **Secondary succession: beginning from a major disturbance, but all forms of life are not destroyed.**

- Ecological succession: transition between biotic communities
 - Primary- no previous biotic community
 - Secondary- previously occupied by a community
 - Aquatic- transition from pond or lake to terrestrial community

Fig 10.7 Diagram of bog succession.



Aquatic Succession



Stages of Succession

- Early: plants typically small with short lifecycles (annuals...), rapid seed dispersal, environmental stabilizers.
- Middle: plants typically longer lived, slower seed dispersal, and in woodland systems: larger.
- Late: plants and animal species are those associated with older, more mature ecosystem.
- “Climax”?

Primary Succession

- Mosses invade an area and provide a place for soil to accumulate.
- Larger plants germinate in the new soil layer resulting in additional soil formation.
- Eventually shrubs and trees will invade the area.

Dramatic examples: Hawaiian Island lava flows

- Relies on adjacent ecosystems
- Rain of organic material, seeds, and spores accumulates in cracks
- Some pockets moist enough to support scattered `ohi`a seedlings and a few hardy ferns and shrubs
- Accumulation leaves, bark... converted by soil organisms into a thin but rich organic soil
- A forest can develop in wet regions in less than 150 years



- Ecosystems can show resilience during a disturbance

Fire



Fire and Succession

- Fire climax ecosystems: maintained by fire; e.g., grasslands, pine and redwood forests
- What significance does this have for humans and where they live?

Disturbance

- Removes organisms, favors tolerant spp.
- Reduces populations
- Creates opportunities for other species to colonize

Resilience Mechanisms After A Forest Fire

- Nutrient release to soil
- Re-growth by remnant roots and seeds
- Invasions from neighboring ecosystems
- Rapid restoration of energy flow and nutrient cycling

Climate

- The condition in an area over an extended period of time
- Climate is affected by many factors
 - Latitude
 - Bodies of water
 - Mountains
 - Precipitation
 - Soil available

The tilt of the Earth's axis

- Causes the changes of the seasons in the northern and southern hemispheres

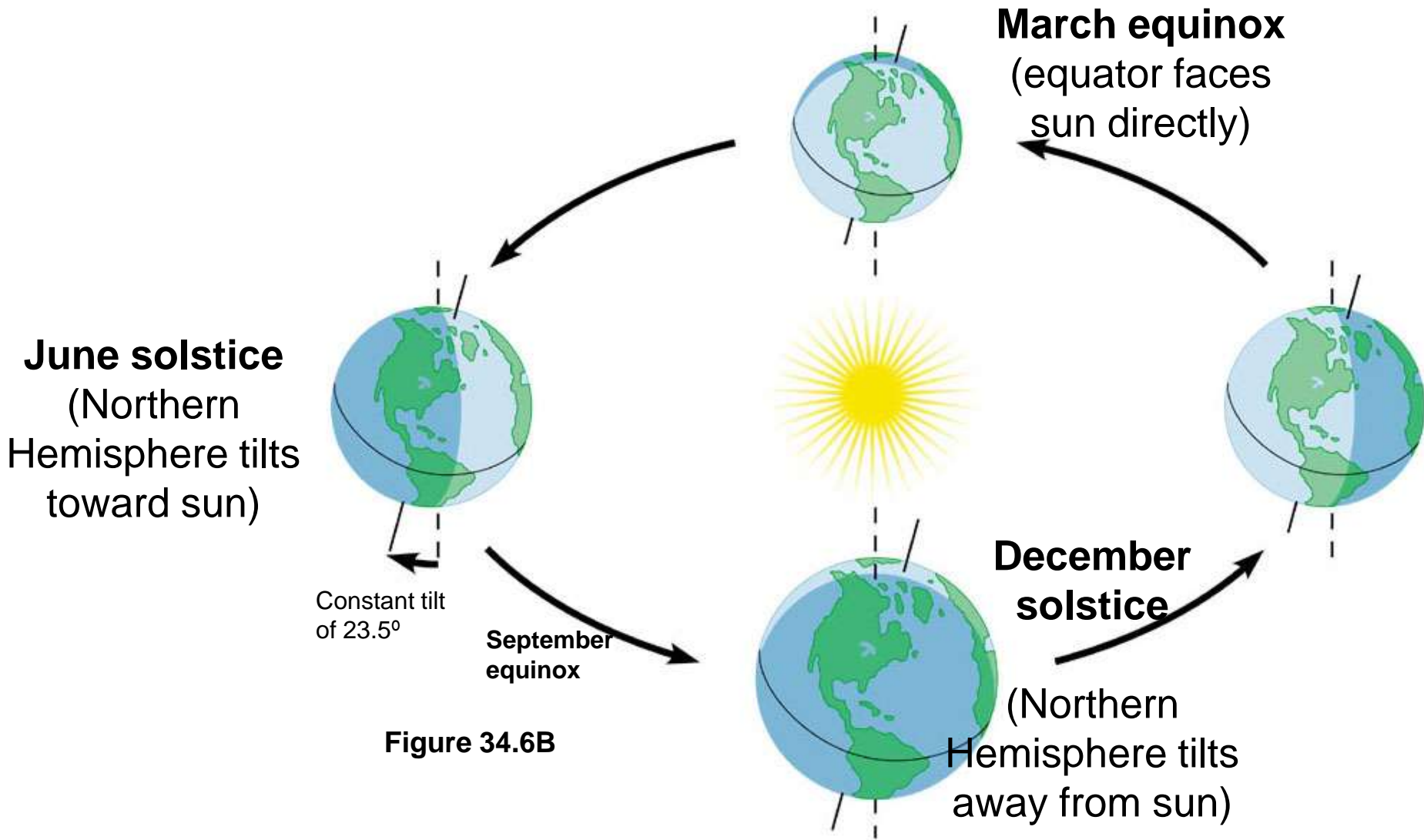


Figure 34.6B

The uneven heating of the Earth

- Also sets up patterns of precipitation and prevailing winds
- Sea breezes, land breezes, mountain breezes

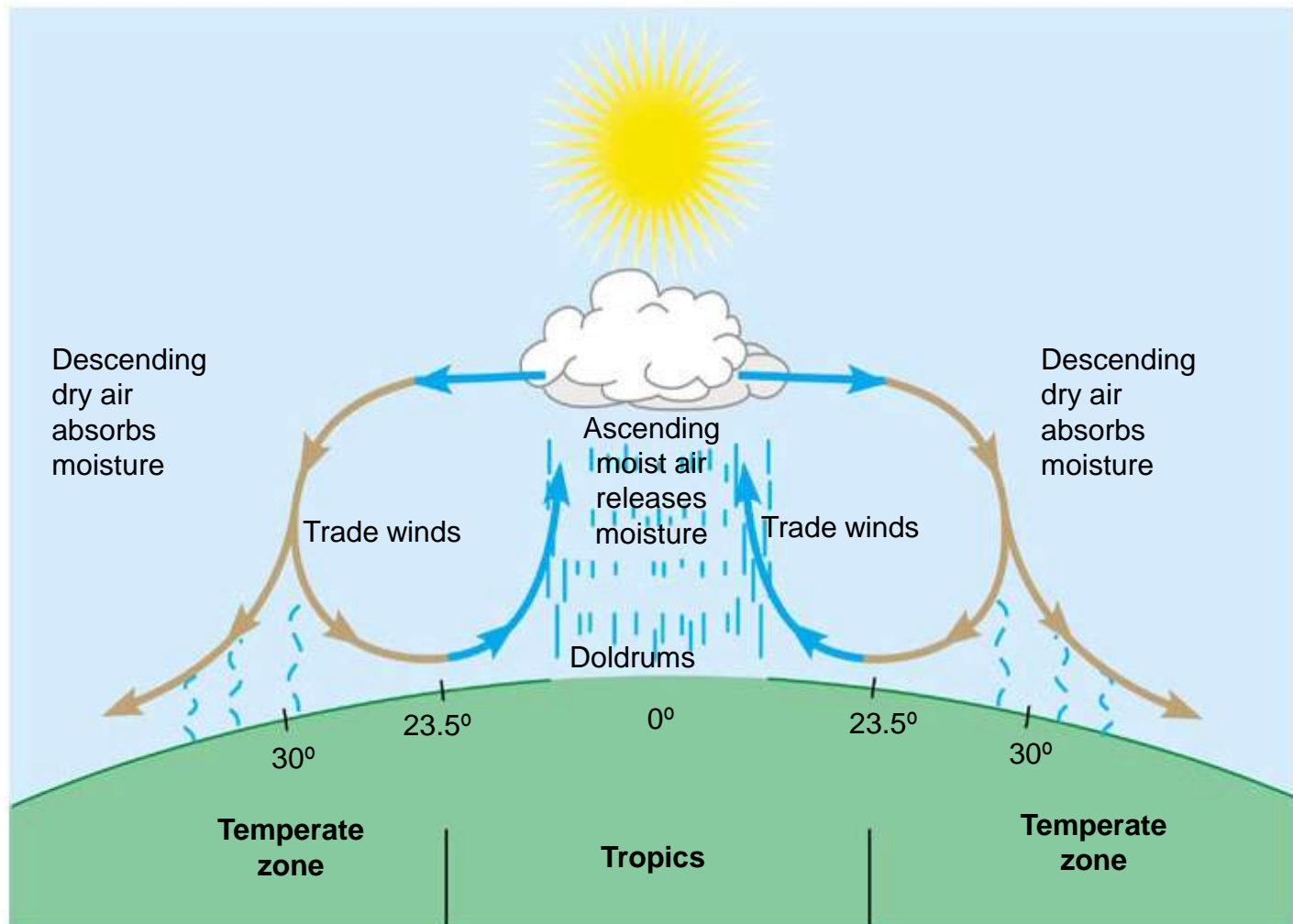


Figure 34.6C, D

– Ocean currents

- Influence coastal climate

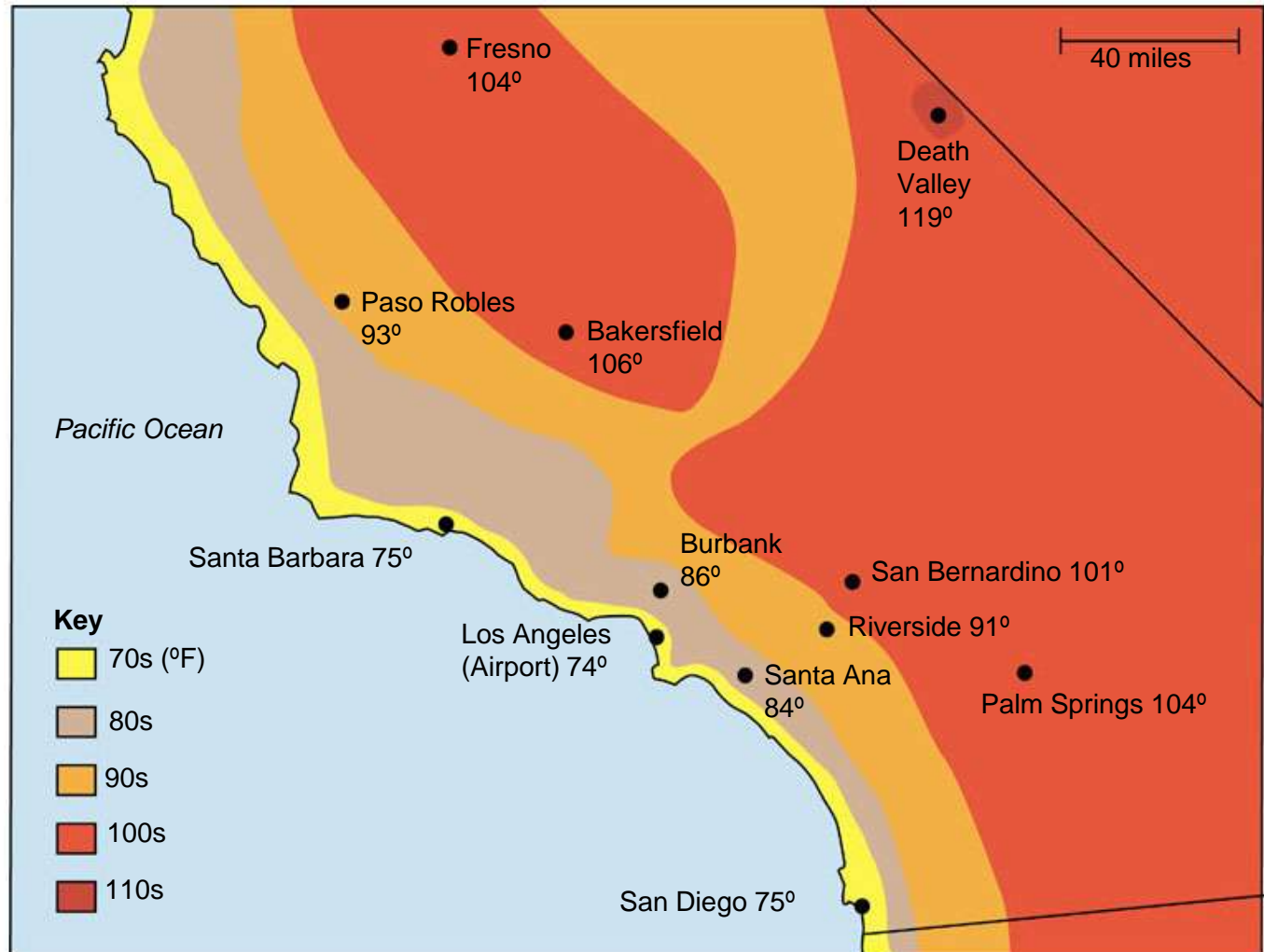


Fig. 64.25

– Landforms such as mountains affect climate

- Affect rainfall
- Affect temperature

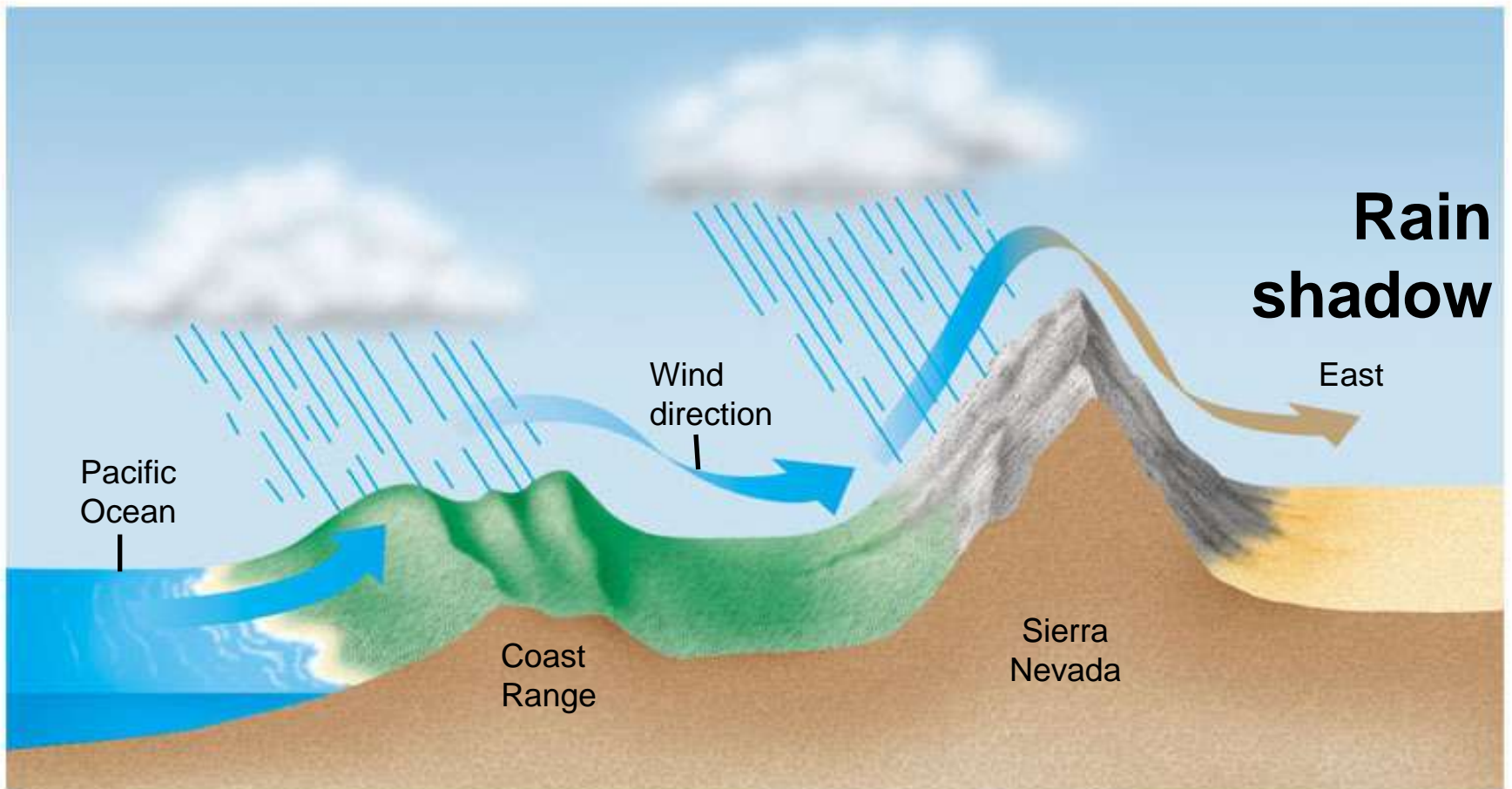
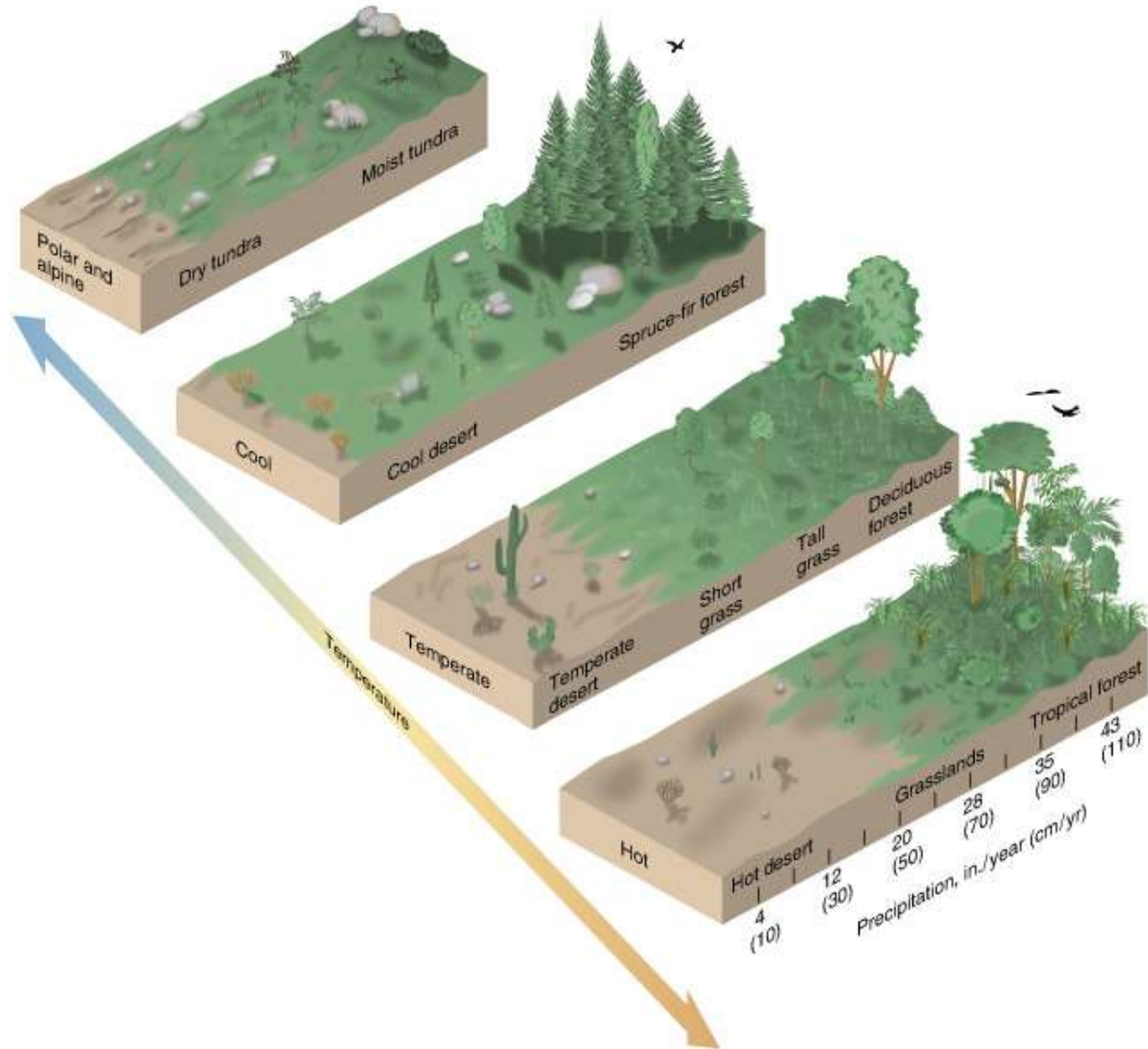
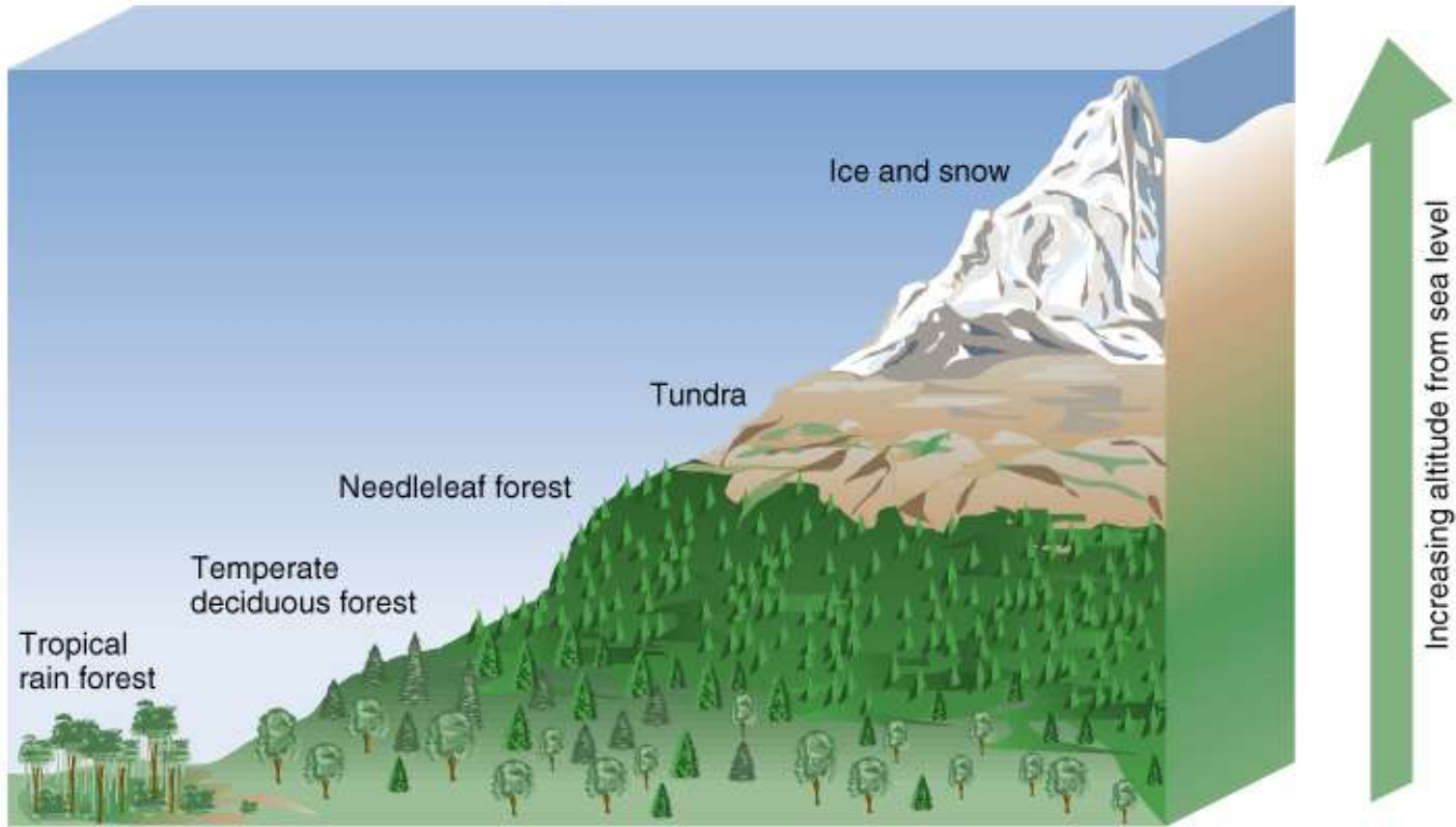


Figure 34.6F

Biomes: The Impact of Temperature and Precipitation



Biomes: The Impact of Latitude and Altitude



Tropical rain forest



Temperate deciduous forest



Needleleaf forest



Tundra



Ice and snow

Increasing latitude from the equator

Biomes

- A distinct geographic region of the world characterized by dominant plant and animal forms and maintained by similar climates
- Climate is the main factor in the biome that is present

TERRESTRIAL BIOMES

- Terrestrial biomes reflect regional variations in climate
 - Temperature and rainfall
 - Mainly determine the terrestrial biomes
 - If the climate is similar the same biome can occur in different place across the Earth!!!
 - Different organisms will fill the same niche (job—trophic level) in each Biome

– Major terrestrial biomes

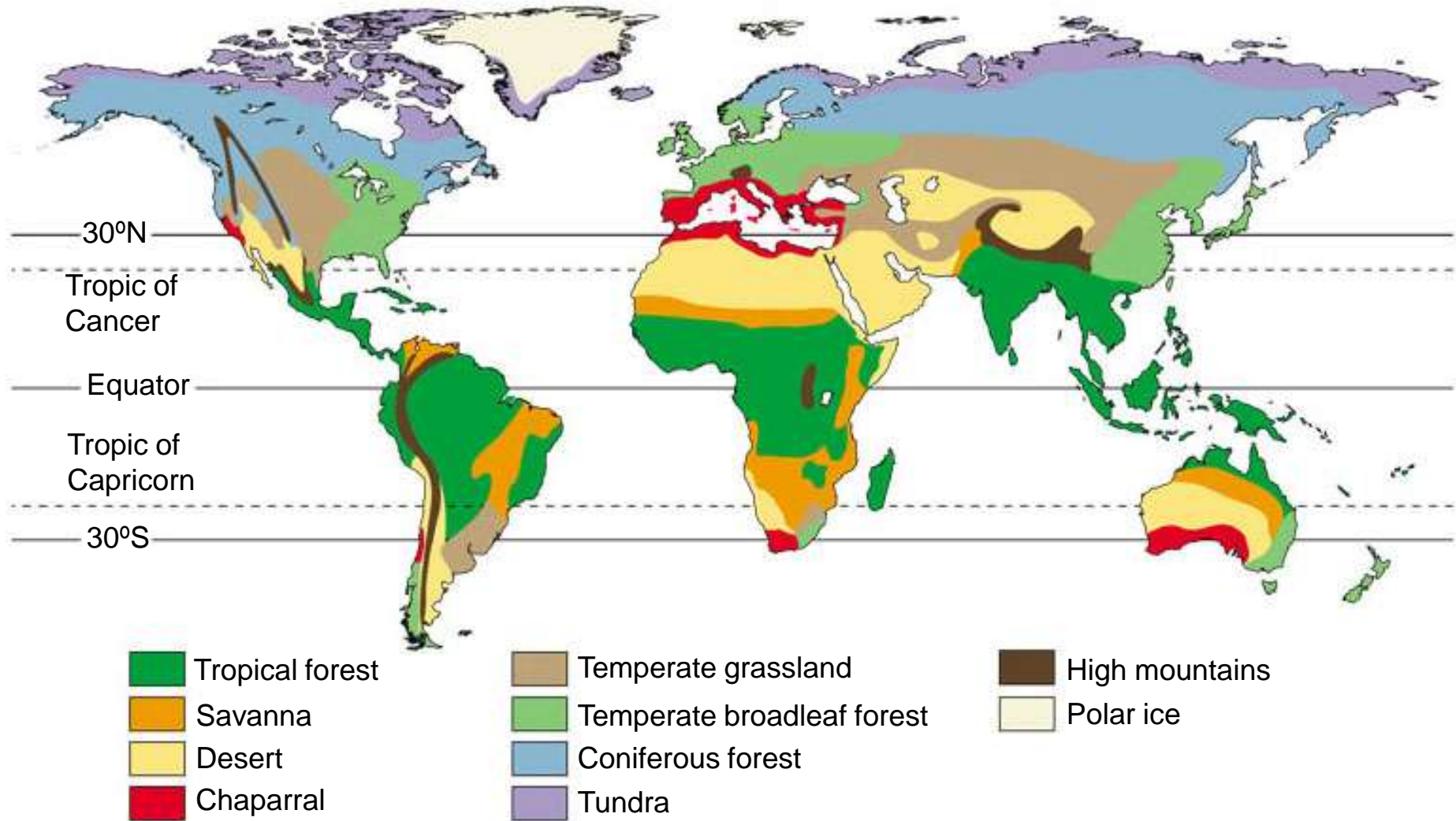


Figure 34.9

•Tundra

- Long, bitter-cold winters characterize the
- Arctic tundra
 - Is a treeless biome characterized by extreme cold, wind, and permafrost
 - Taiga is south of the tundra and are coniferous forest



Figure 34.17

Alpine

- mountains
- Alpine biomes the mountain regions
- altitude of about 10,000 feet or more
- below the snow line of a mountain
- summer temperatures range from 10 to 15° C
- winter the temperatures are below freezing

- Coniferous forests are dominated by a few species of trees

- The northern coniferous forest, or taiga

- Is found where there are short summers, and long, snowy winters



Figure 34.16

Taiga

- Needleleaf forest
- cold
- animals in the taiga hibernate in the winter, some fly south if they can
- The taiga is located near the top of the world, just below the tundra biome

- Broadleaf trees dominate temperate forests
 - Temperate broadleaf forests grow throughout midlatitude regions
 - Where there is sufficient moisture to support the growth of large trees

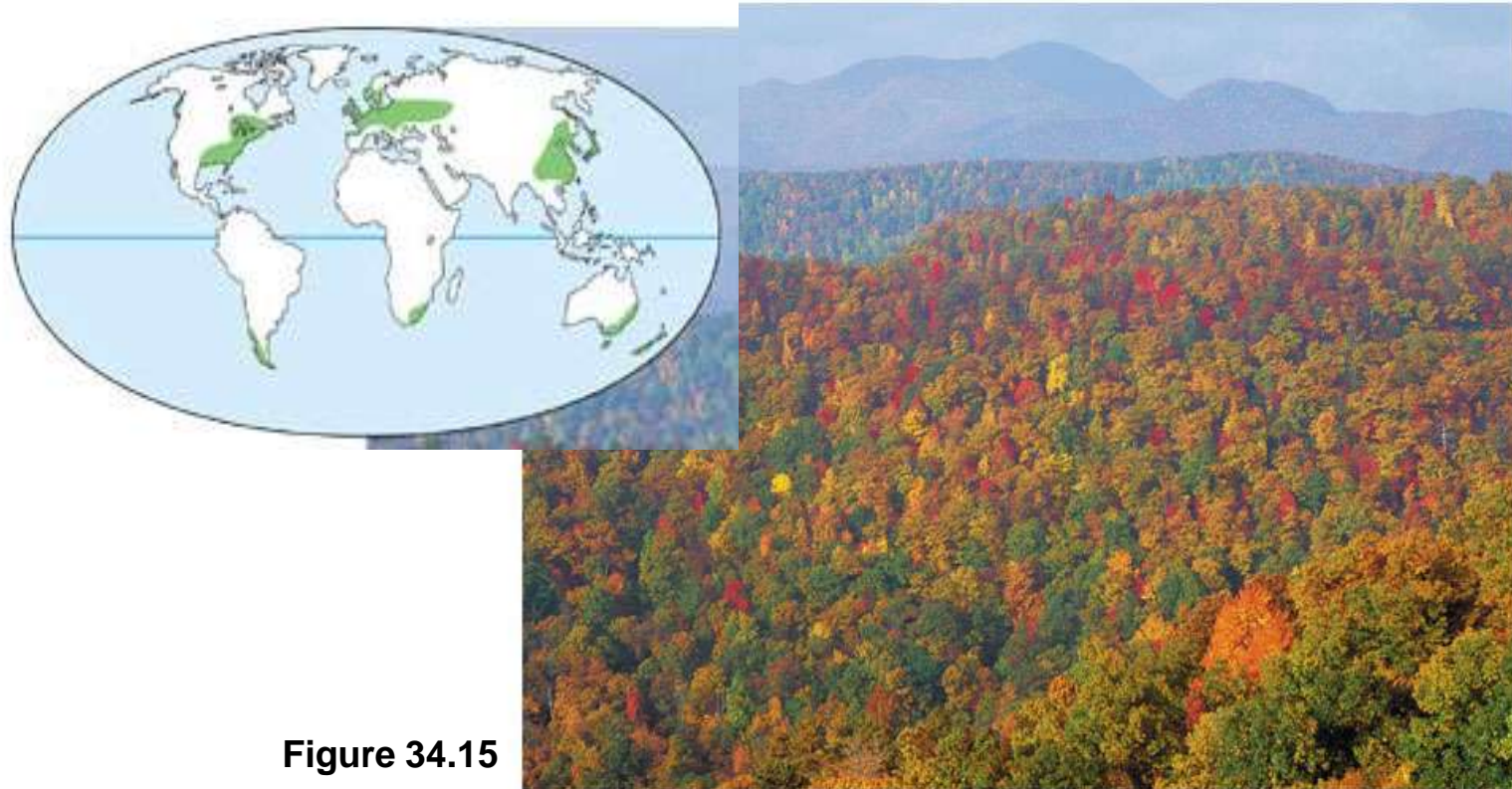


Figure 34.15

- Tropical forests cluster near the equator
 - Tropical rain forests
 - Are the most diverse ecosystem



Figure 34.10

- Temperate grasslands include the North American prairie

- Temperate grasslands

- Are found where winters are cold



Figure 34.14

- Savannas are grasslands with scattered trees
 - Savannas
 - Are dry and warm

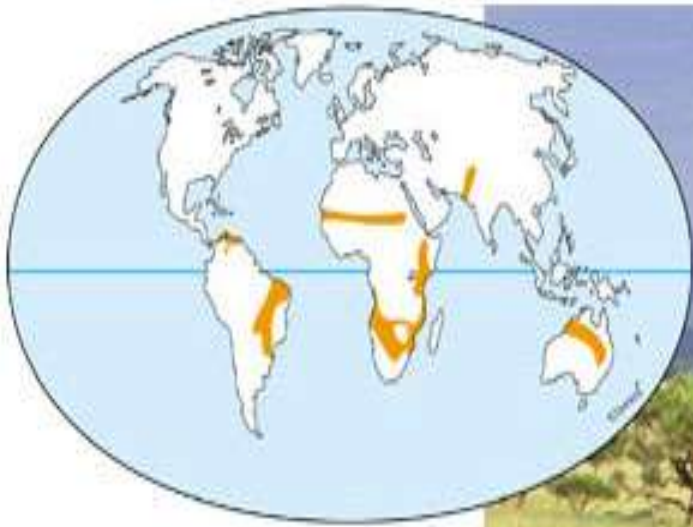


Figure 34.11

- savanna is a rolling grassland scattered with shrubs and isolated trees
- between a tropical rainforest and desert biome.
- Savannas are also known as tropical grasslands.
- found in a wide band on either side of the equator on the edges of tropical rainforests.
- Savannas have warm temperature year round.
- two very different seasons in a savanna;
 - a very long dry season (winter)
 - a very wet season (summer)
- African savannas have large herds of grazing and browsing hoofed animals.

- Deserts are defined by their dryness
 - Deserts
 - Are the driest biomes

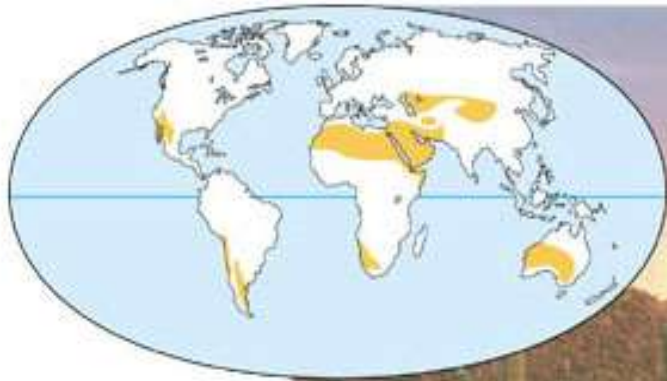


Figure 34.12

• Spiny shrubs dominate the chaparral

– The chaparral

- Is a shrubland with cool, rainy winters and dry, hot summers

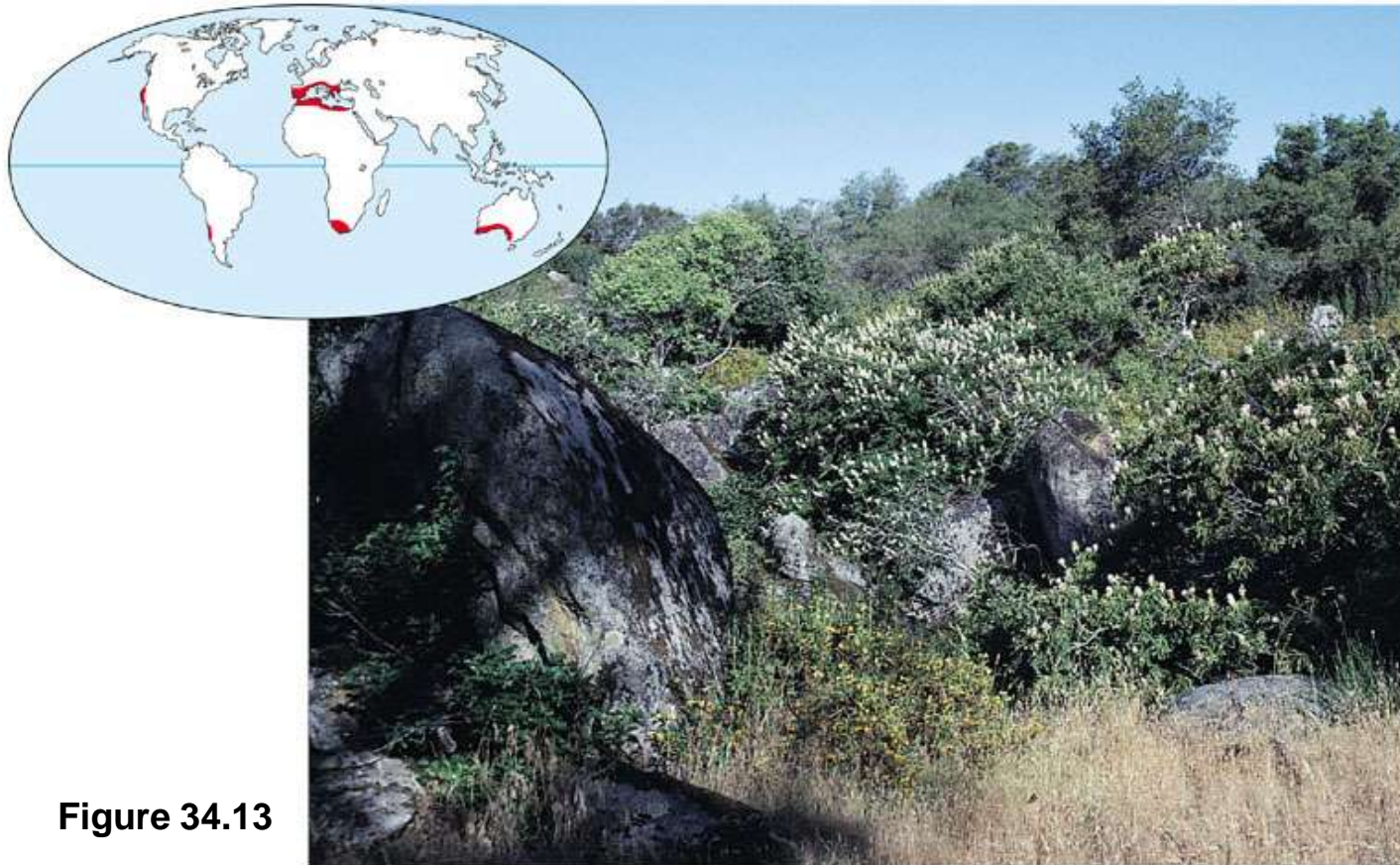


Figure 34.13

- Chaparral is characterized as being very hot and dry.
 - winter is very mild and is usually about 10 °C.
 - Summer hot and dry and reach 40 °C
 - fires and droughts are very common.
- plants and animals are adapted to these conditions.
 - animals are all mainly grassland and desert types adapted to hot, dry weather.
 - coyotes, jack rabbits, mule deer, alligator lizards, horned toads, praying mantis, honey bee and ladybugs.
 - plants have small, hard leaves which hold moisture.
 - poison oak, scrub oak, Yucca Wiple and other shrubs, trees and cacti.

AQUATIC BIOMES

- Oceans occupy most of Earth's surface
 - Several characteristics shape ocean communities
 - Light, distance from shore, and the availability of nutrients

- The intertidal zone, an oceanic zone
 - Is where the ocean meets the land

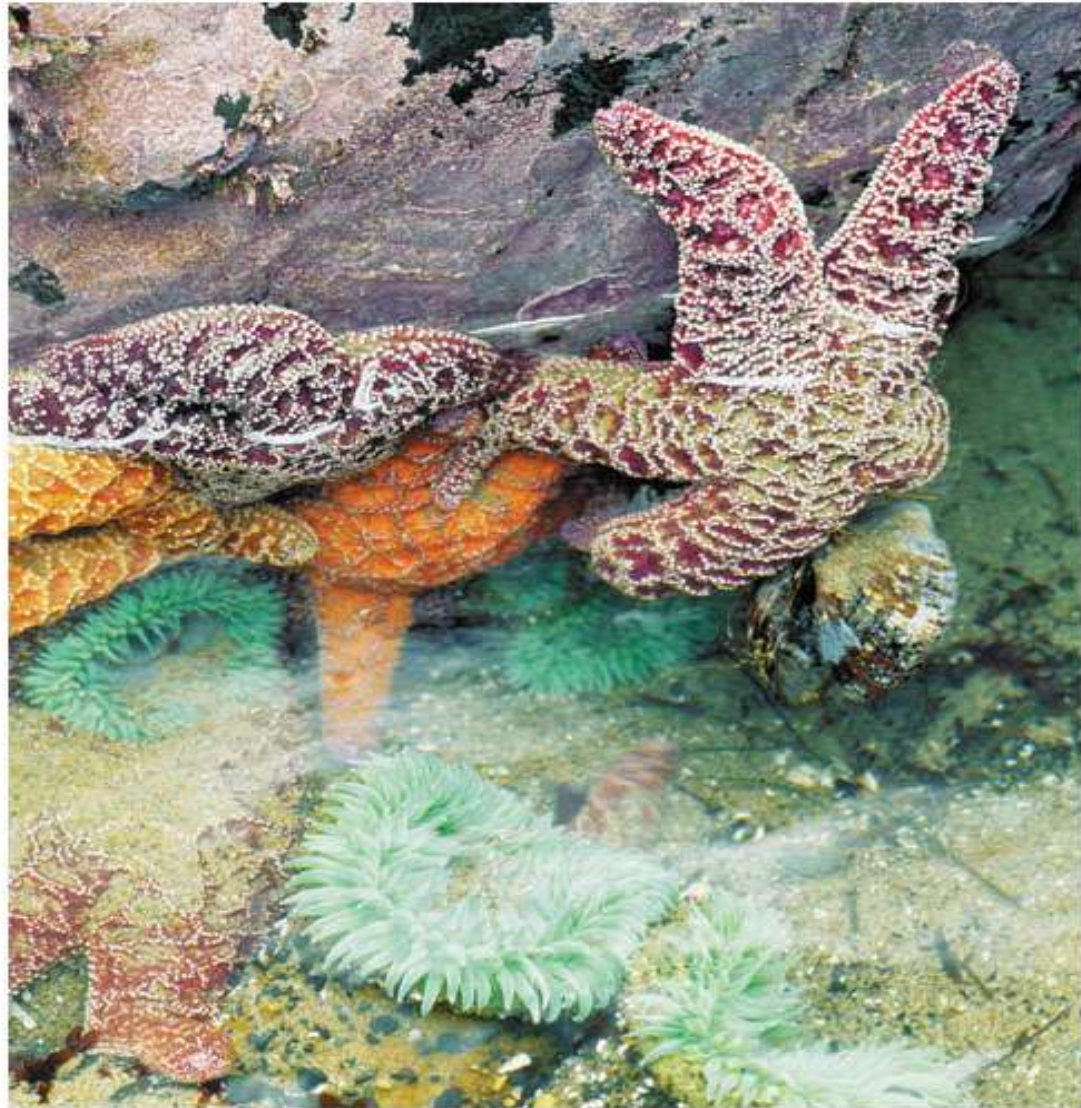


Figure 34.7A

– Oceanic zones also include

- The pelagic (open water) and benthic (bottom/floor) zones

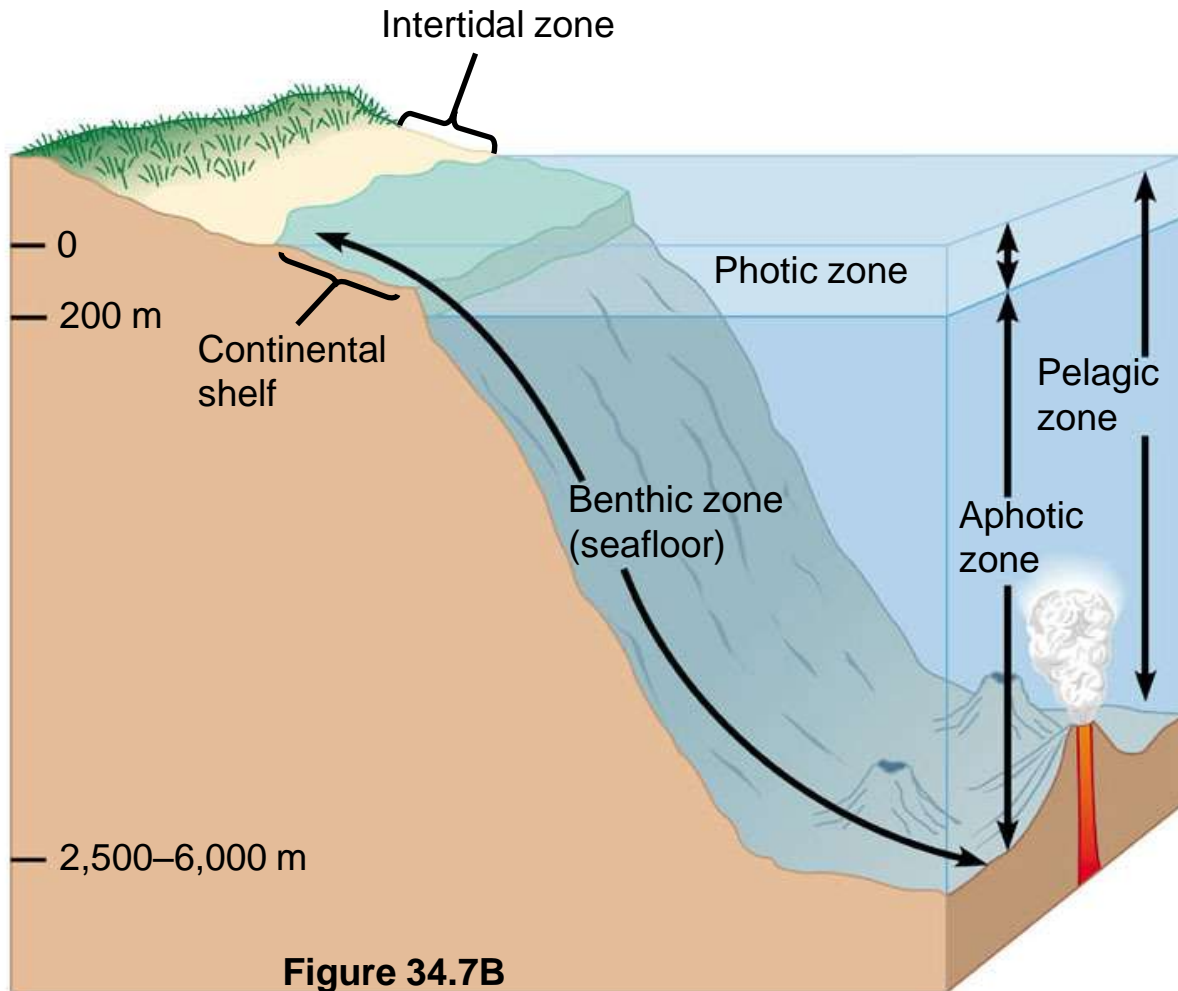


Figure 34.7B



– Coral reefs

- Are found in warm waters above continental shelves



Figure 34.7C

– Estuaries

- Are productive areas where rivers flow into the ocean



Figure 34.7D

- Freshwater biomes include lakes, ponds, rivers, streams, and wetlands
 - Factors that shape lake and pond communities include
 - Light, temperature, and the availability of nutrients and dissolved oxygen



- Abiotic factors change from the source of a river to its mouth
 - And communities vary accordingly



Figure 34.8A

- Wetlands include
 - Marshes and swamp



Figure 34.8B