• **Ecology** is the scientific study of the interactions between organisms and the environment.
• **Biotic factors**: living factors
• **Abiotic factors**: nonliving factors
Fig. 52-14
(a) 4.5°C warming over next century
(b) 6.5°C warming over next century

Fig. 52-15
Aquatic biomes

Fig. 52-16a
(a) Zonation in a lake
Littoral zone
Limnetic zone
Photic zone
Pelagic zone
Benthic zone
Aphotic zone

Fig. 52-16b
(b) Marine zonation
Intertidal zone
Neritic zone
Oceanic zone
Continental shelf
0
200 m
2,000–6,000 m
Abyssal zone

Fig. 52-17a
Thermocline (躍溫層)

Fig. 52-18a
An oligotrophic lake in Grand Teton National Park, Wyoming

Turnover (翻轉)
A eutrophic lake in the Okavango Delta, Botswana

Fig. 52-18b

Okefenokee National Wetland Reserve in Georgia

Fig. 52-18c

A headwater stream in the Great Smoky Mountains

Fig. 52-18d

The Mississippi River far from its headwaters

Fig. 52-18e

An estuary in a low coastal plain of Georgia

Fig. 52-18f

Rocky intertidal zone on the Oregon coast

Fig. 52-18g
Oceanic Pelagic Zone
Open ocean off the island of Hawaii

Coral Reef
A coral reef in the Red Sea

A deep-sea hydrothermal vent community

Terrestrial Biome

Tropical forest
Temperate broadleaf forest
Northern coniferous forest
Arctic and alpine tundra

Desert
Temperate grassland
Tropical forest

Climograph
Annual mean temperature (°C)
Annual mean precipitation (cm)

Ecotone

Canopy
A tropical rain forest in Borneo

Tropical Forest
Fig. 52-21a A desert in the southwestern United States
Desert

Fig. 52-21b A savanna in Kenya
Savanna (莽原)

Fig. 52-21c An area of chaparral in California
Chaparral (夏旱灌叢)

Fig. 52-21d Sheyenne National Grassland in North Dakota
Temperate Grassland

Fig. 52-21e Rocky Mountain National Park in Colorado
Northern Coniferous Forest

Fig. 52-21f Great Smoky Mountains National Park in North Carolina
Temperate Broadleaf Forest
Denali National Park, Alaska, in autumn

Tundra

Fig. 52-21h

Mean height (cm)

Fig. 52-21i

Sierra Nevada
Great Basin Plateau

Seed collection sites

Altitude (m)