

Chapter 40a

An Introduction to Ecology and the Biosphere

VOCABULARY TERMS:

1. biogeography
2. fixed action pattern
3. sign stimulus
4. Kinesis
5. taxis
6. imprinting
7. migration

You Must Know:

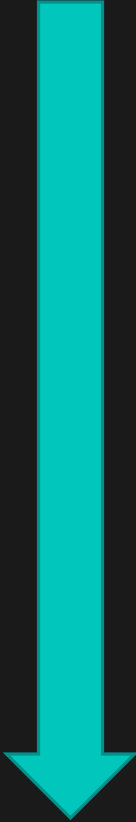
- The role of abiotic factors in the formation of biomes.
- Features of freshwater and marine biomes.
- Major terrestrial biomes and their characteristics.



Ecology:

- The scientific study of the interactions between organisms and the environment
- The ecological study of species involves biotic and abiotic influences.
 - Biotic = living (organisms – behaviors & interactions between organisms)
 - Abiotic = nonliving (temp, water, salinity, sunlight, soil)

Heirarchy

- 
- Organisms
 - Population: group of individuals of same species living in a particular geographic area
 - Community: group of populations of different species in an area
 - Ecosystem: community of organisms + physical factors
 - Landscape: mosaic of connected ecosystems
 - Biosphere: global ecosystem

Global ecology



Landscape ecology



Ecosystem ecology



Community ecology



Population ecology



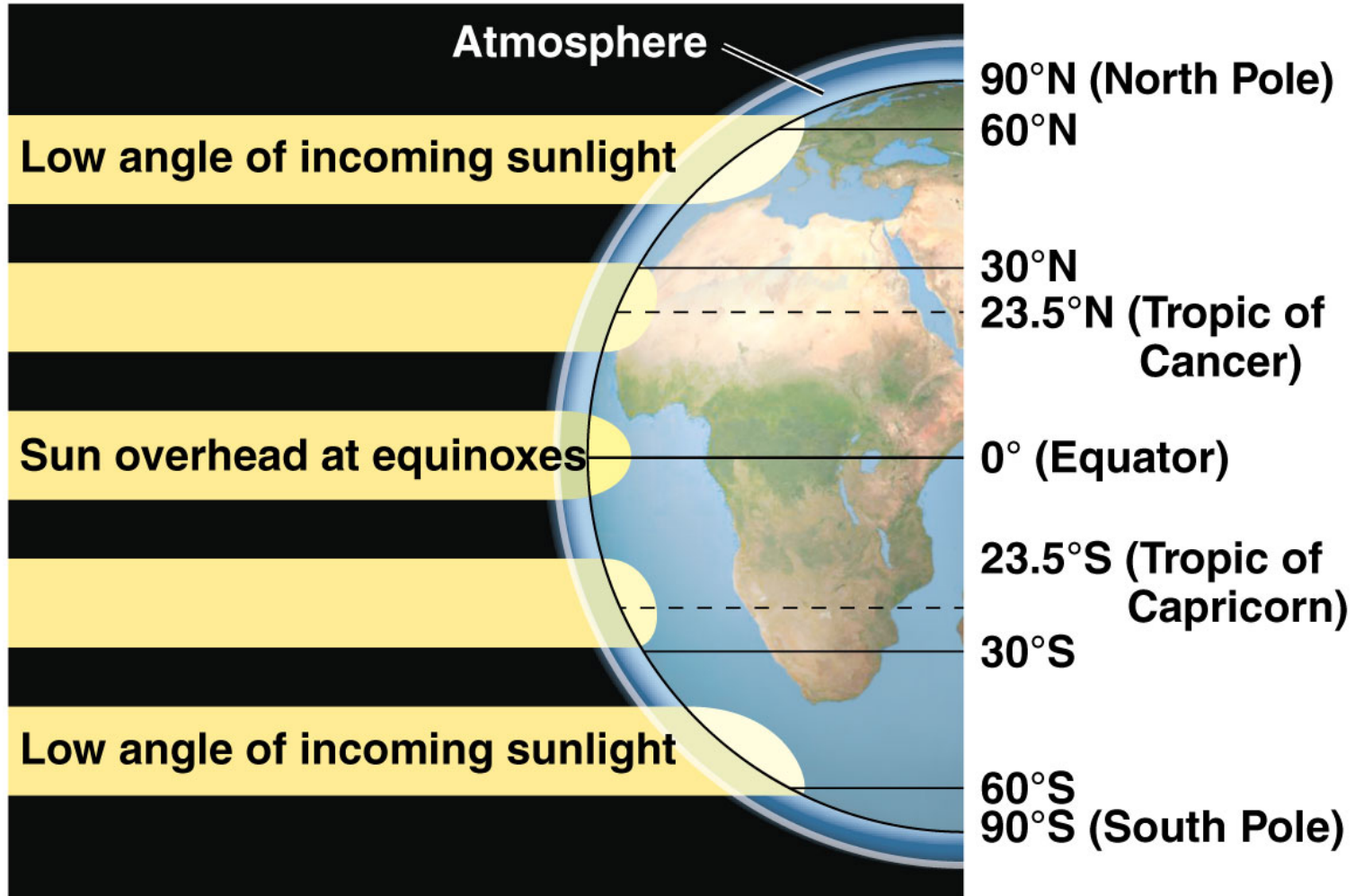
Organismal ecology



Climate:

- Long-term prevailing weather conditions in a particular area
- Climate = temperature + precipitation + sunlight + wind
- Macroclimate vs. microclimate:
 - Macro: work at seasonal, regional or local level
 - Micro: small-scale environmental variation (eg. under a log)
- Climate change: some species may not survive shifting ranges

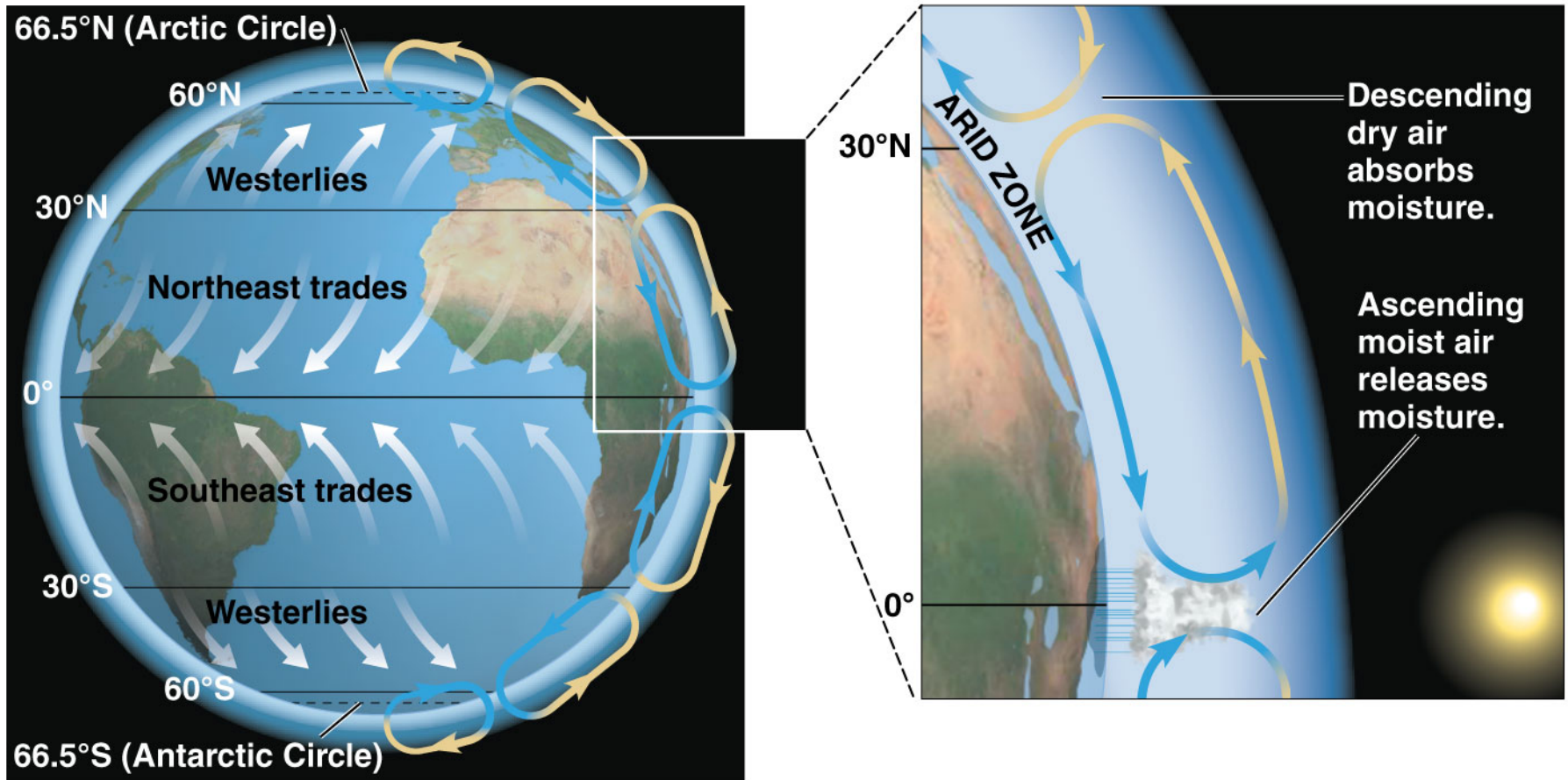
Global Climate Patterns: Sunlight intensity



Latitudinal variation in sunlight intensity

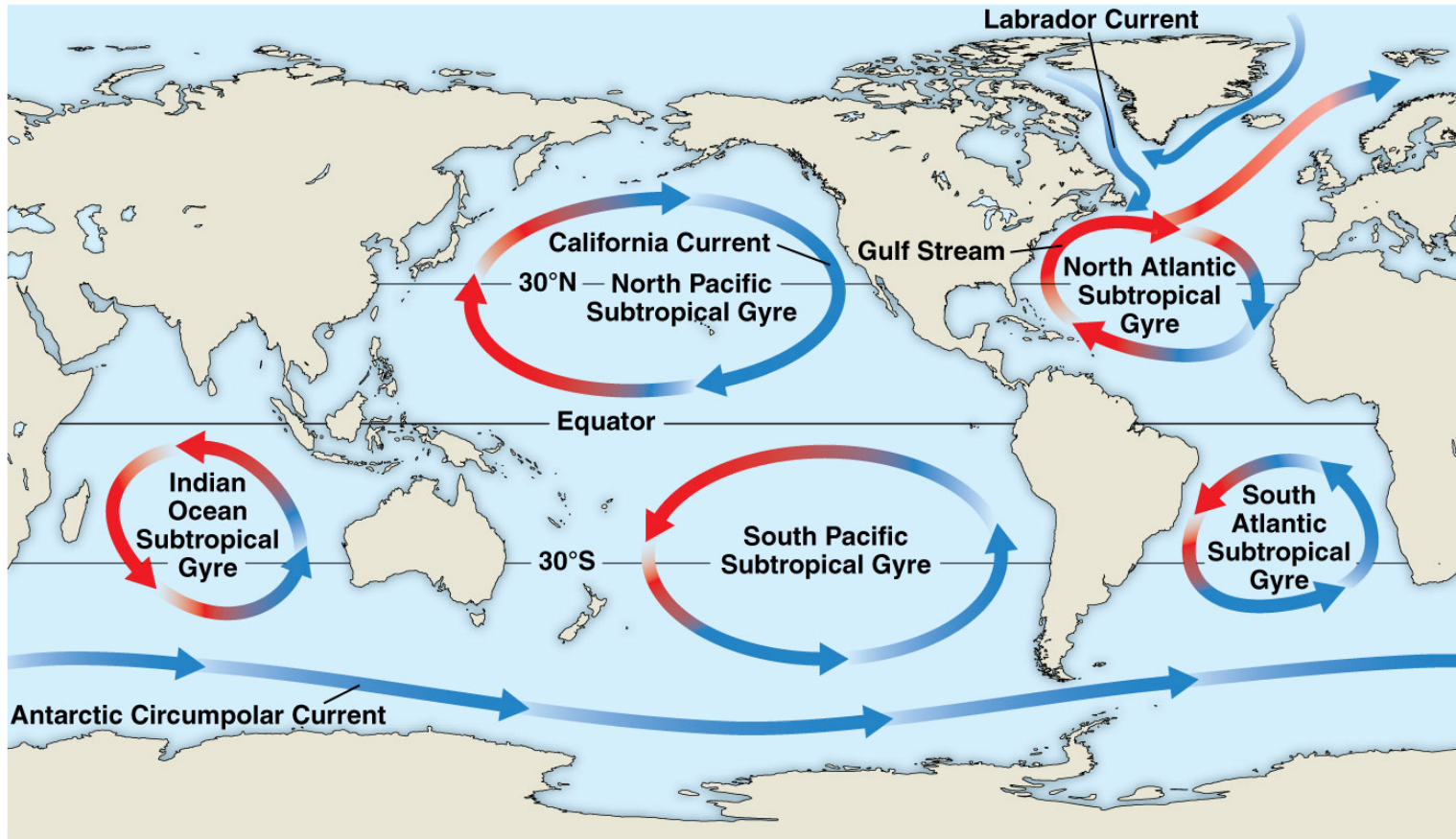
Global Climate Patterns:

Air Circulation & Precipitation Patterns



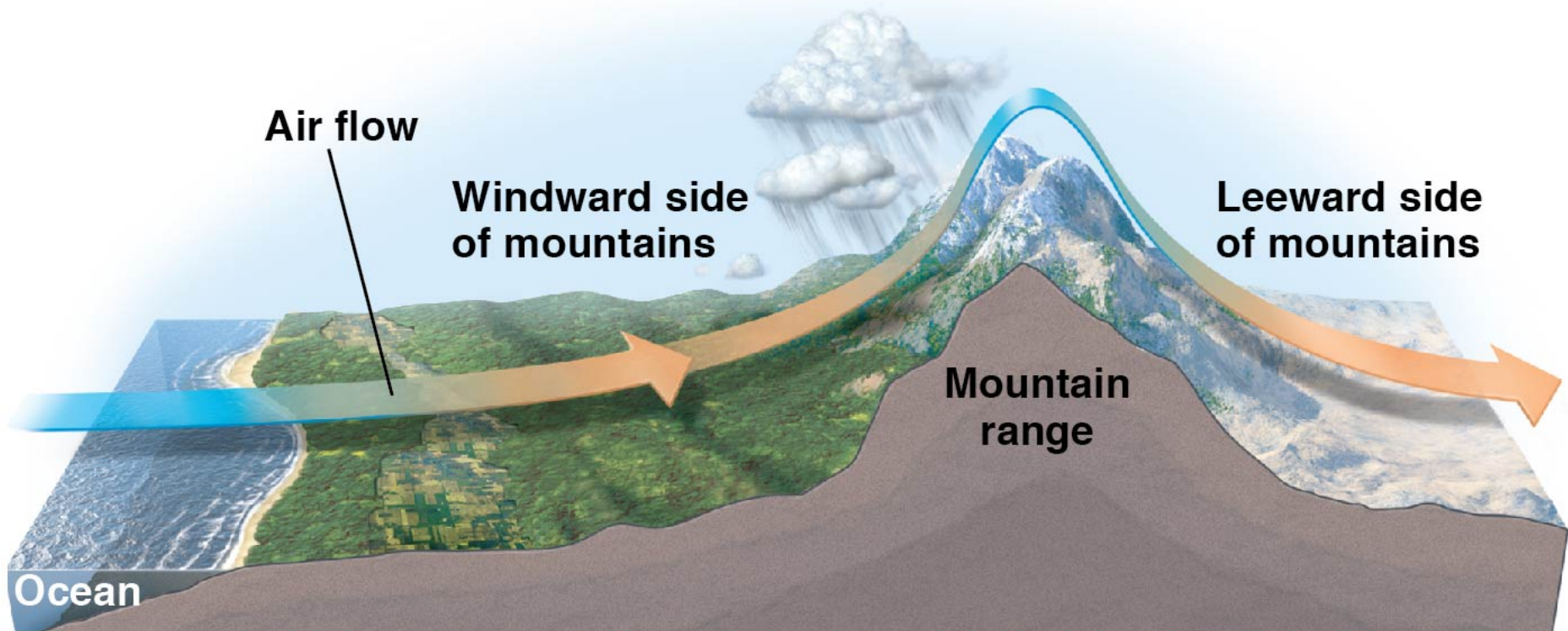
Global air circulation and precipitation patterns

Global Climate Patterns: *Ocean Currents*



Global Climate Patterns:

Mountains affect rainfall

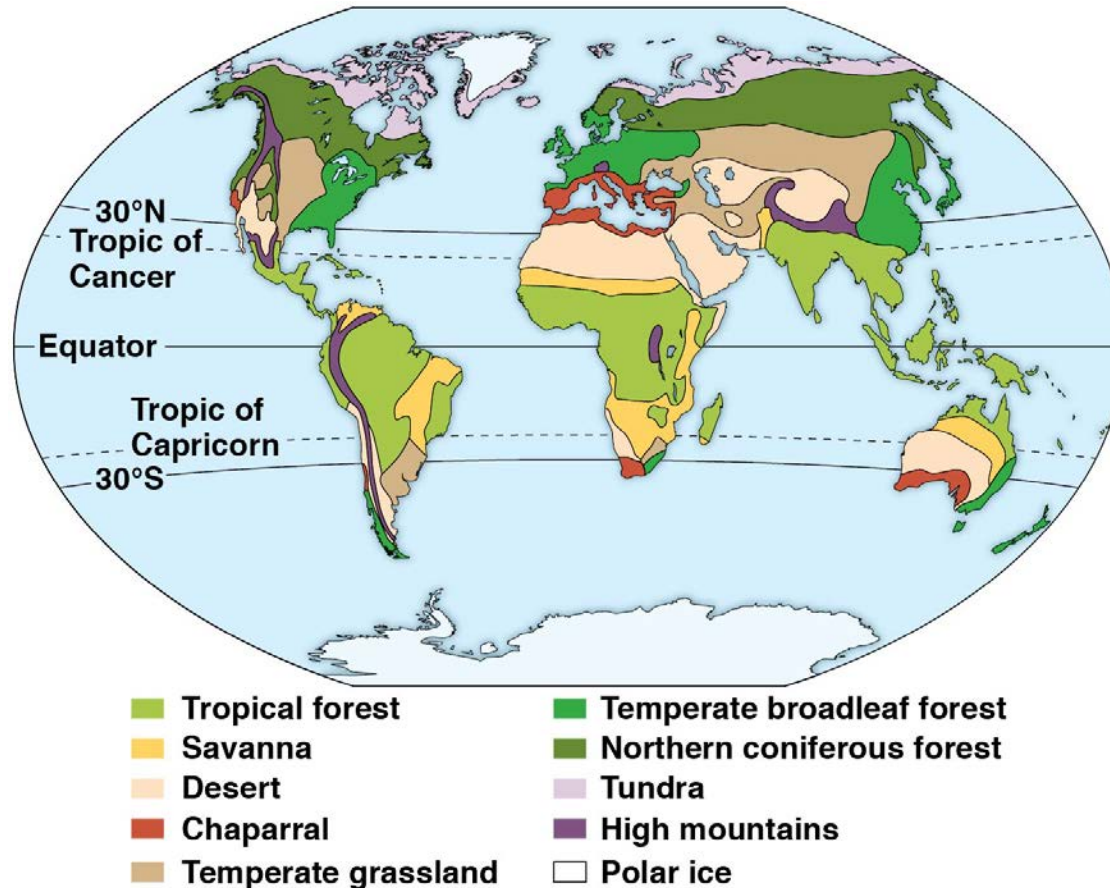


*Which side of the canyon has more plants?
Why?*



Black Canyon of the Gunnison River

Biomes: major types of ecosystems that occupy very broad geographic regions



Climate, latitude, and elevation determine biomes

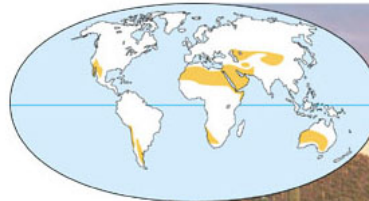
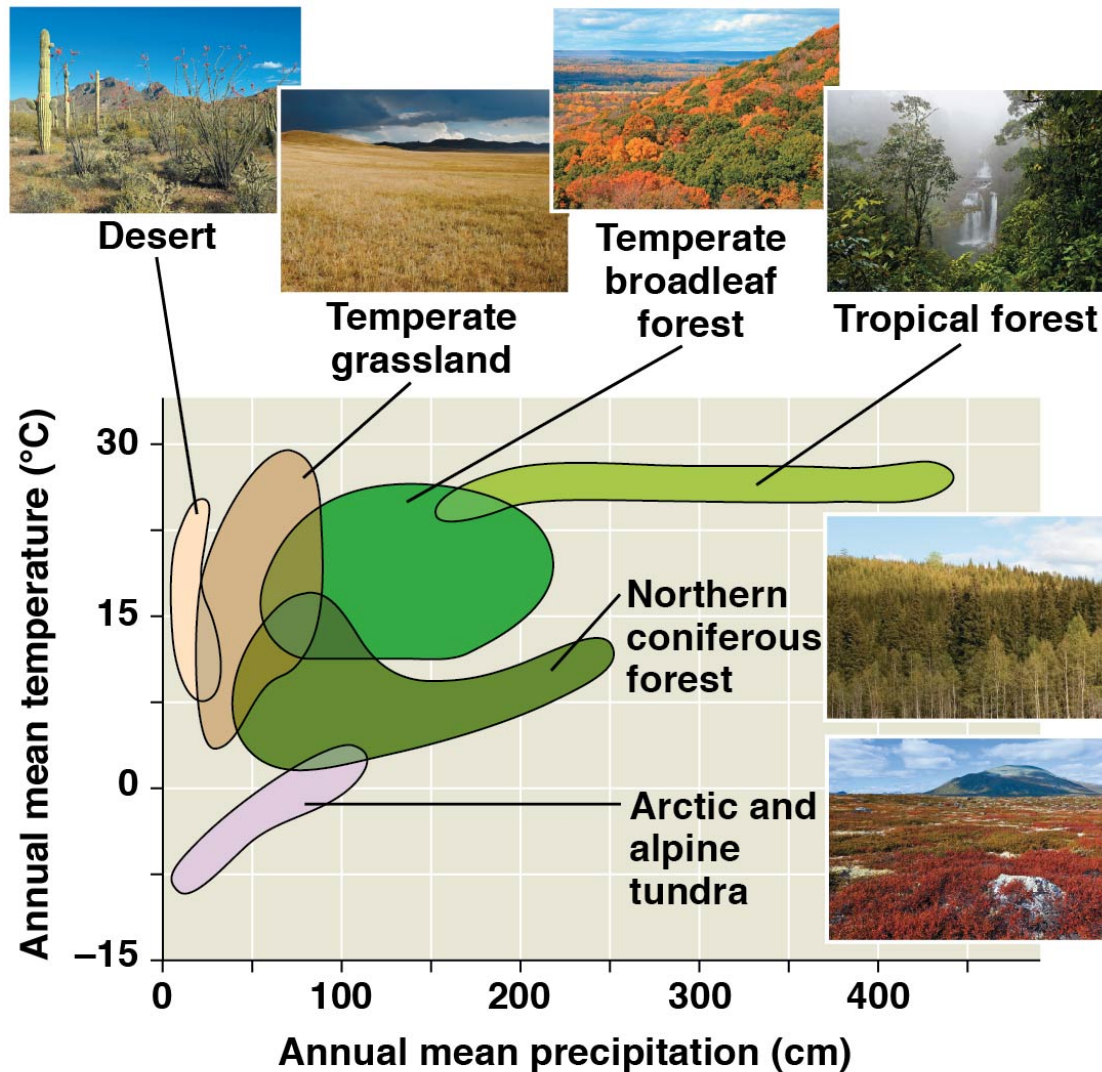


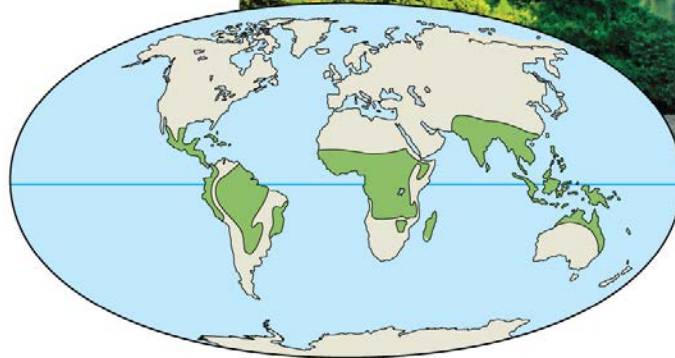
Figure 34.12

Figure 34.7C

Climograph: plot of annual mean temperature & precipitation in a particular region



Tropical Forest

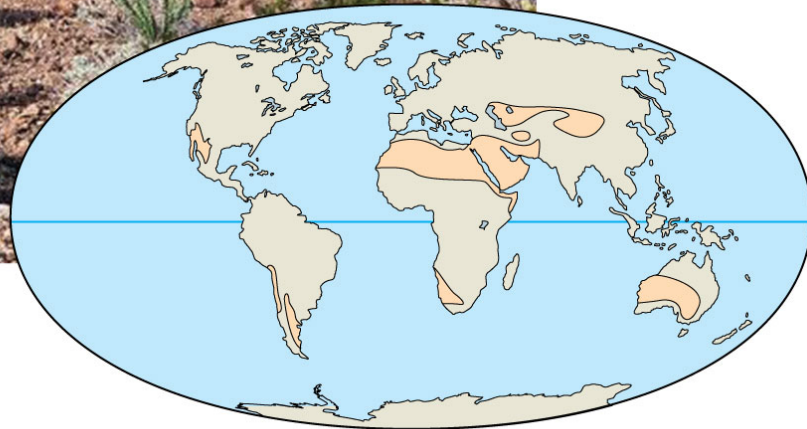


A tropical rain forest in Borneo

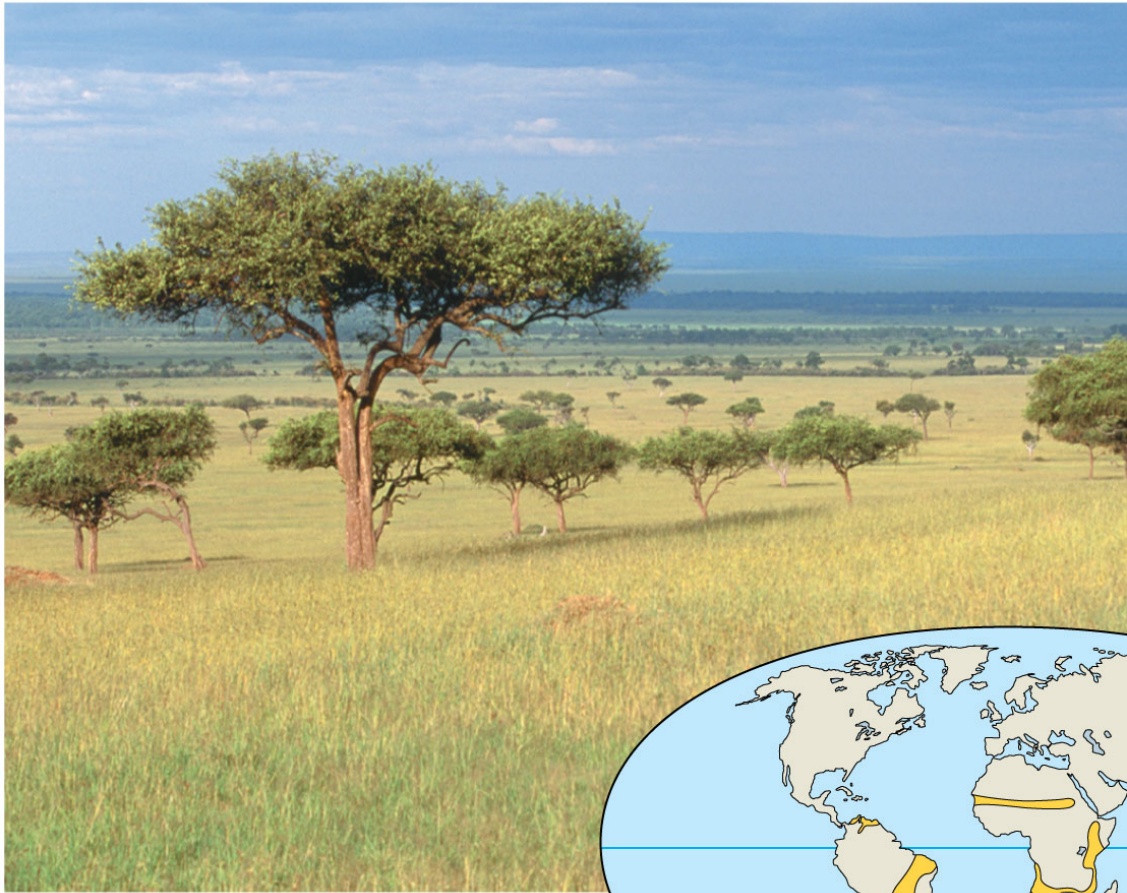
Desert



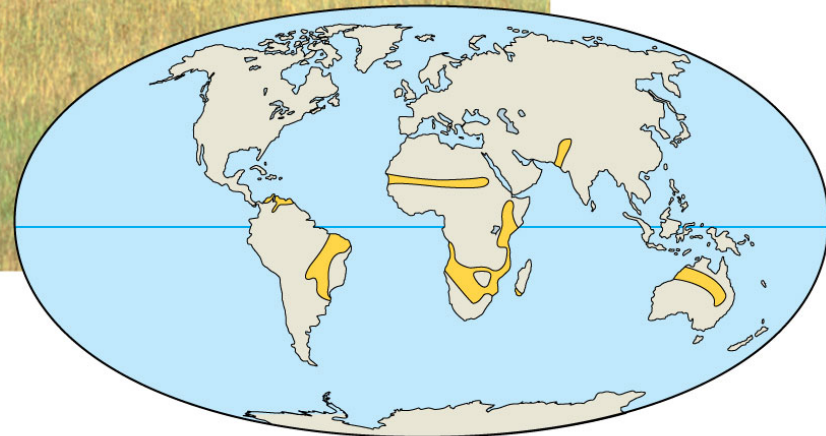
A desert in the southwestern United States



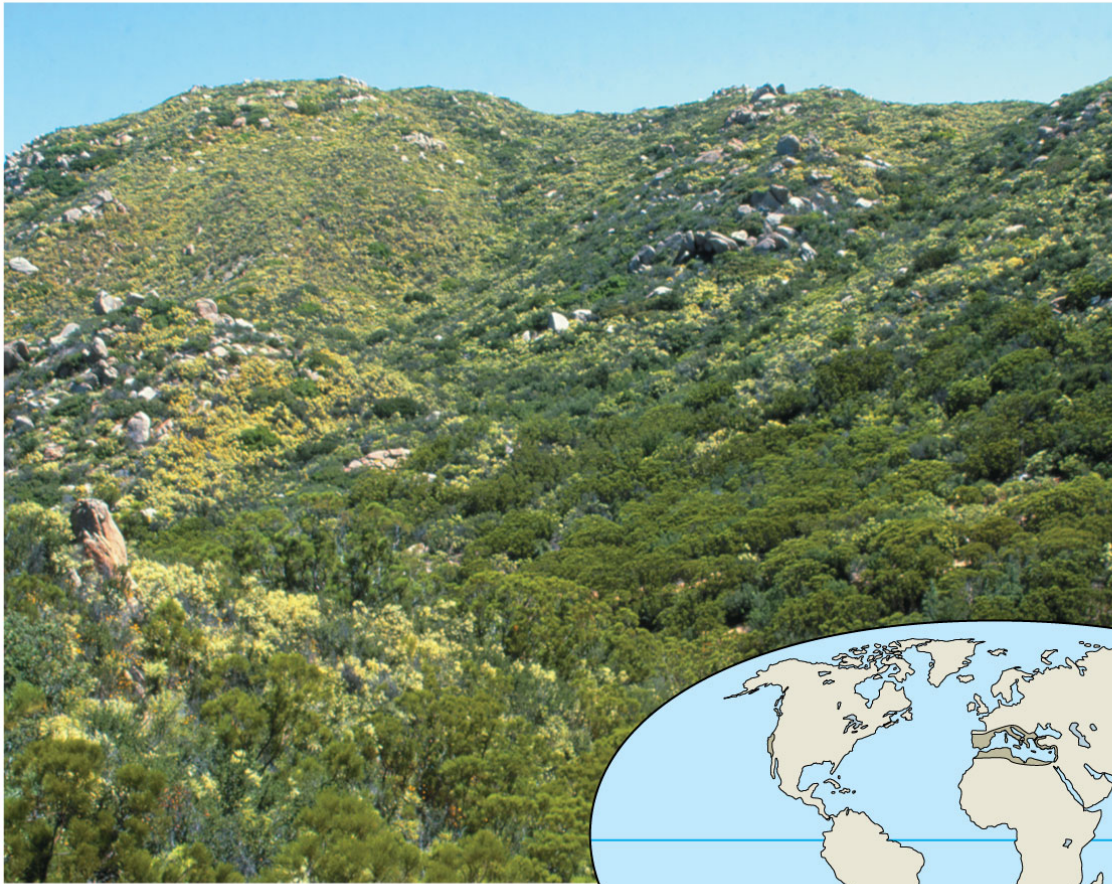
Savanna



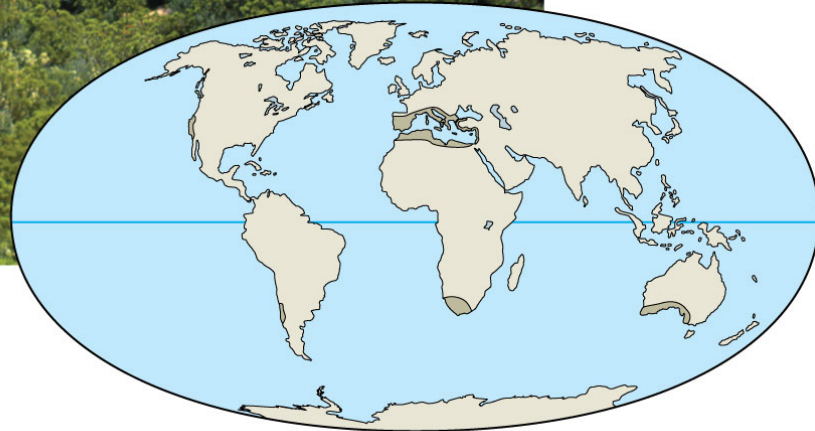
A savanna in Kenya



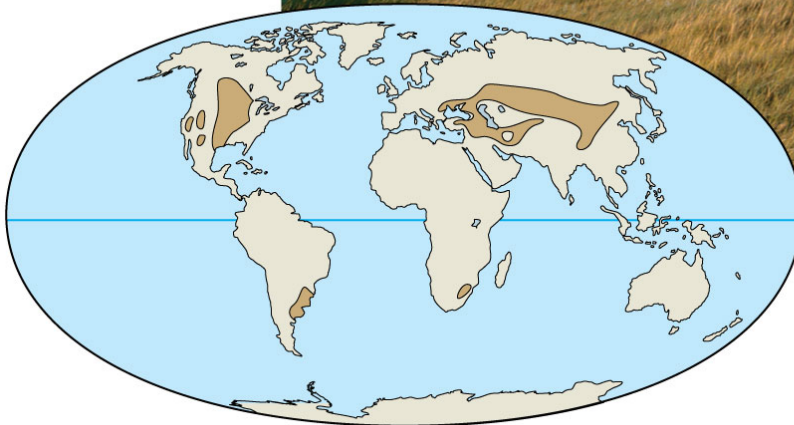
Chaparral



**An area of chaparral
in California**



Temperate Grassland

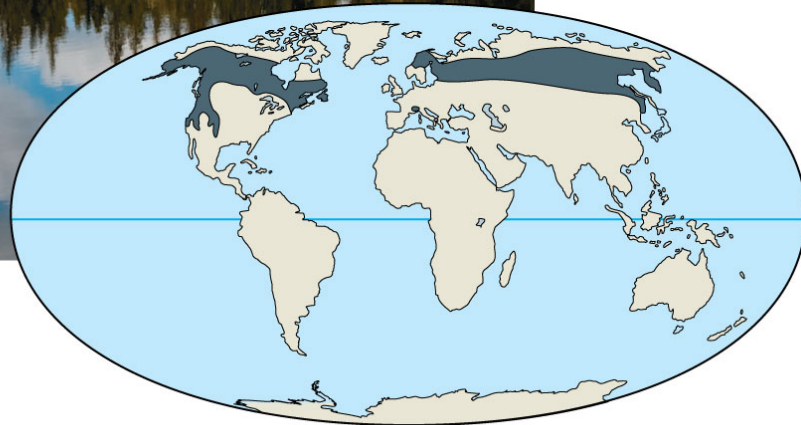


**Grasslands National Park,
Saskatchewan**

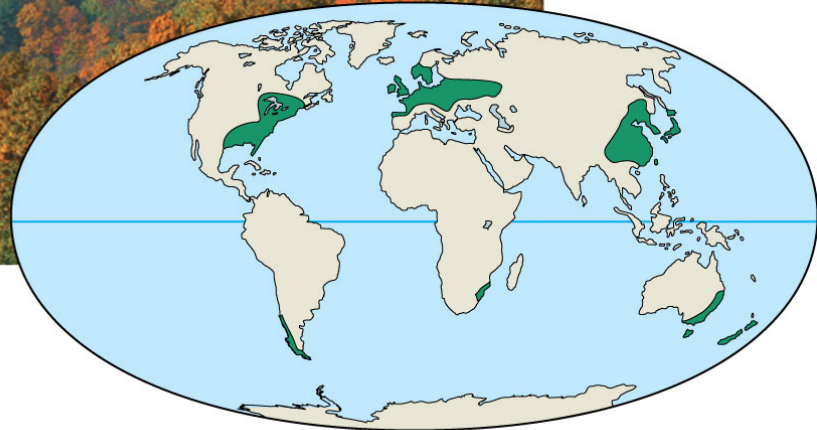
Northern Coniferous Forest



A forest in Norway



Temperate Broadleaf Forest



**Great Smoky Mountains
National Park in
North Carolina, in autumn**

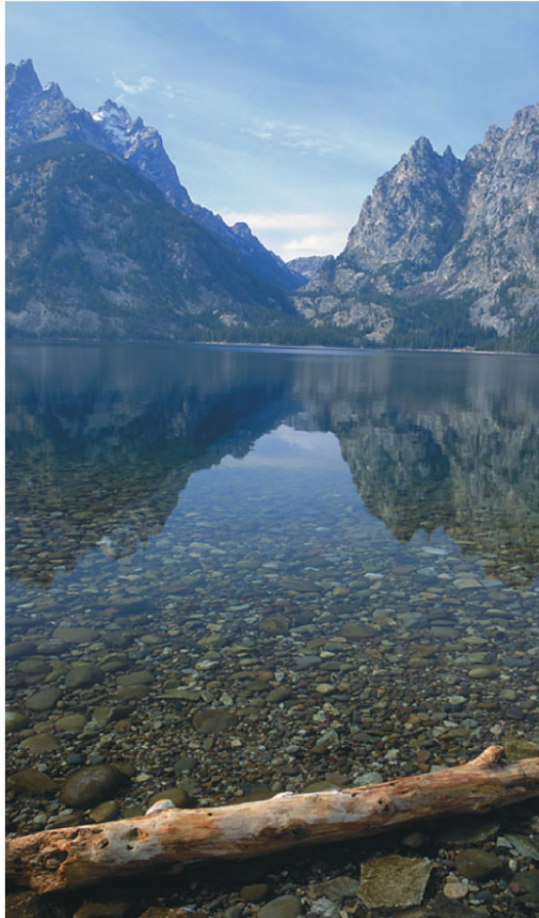
Tundra



**Denali National Park, Alaska,
in autumn**



Lakes



An oligotrophic lake in Grand Teton National Park, Wyoming

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A eutrophic lake in the Okavango Delta, Botswana

Wetlands



A basin wetland in the United Kingdom

Streams & Rivers



A headwater stream in the Great Smoky Mountains

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The Loire river (in France) far from its headwaters

Estuaries



An estuary in the southeastern United States

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Intertidal Zones



Oceanic Pelagic Zone (Open Water)

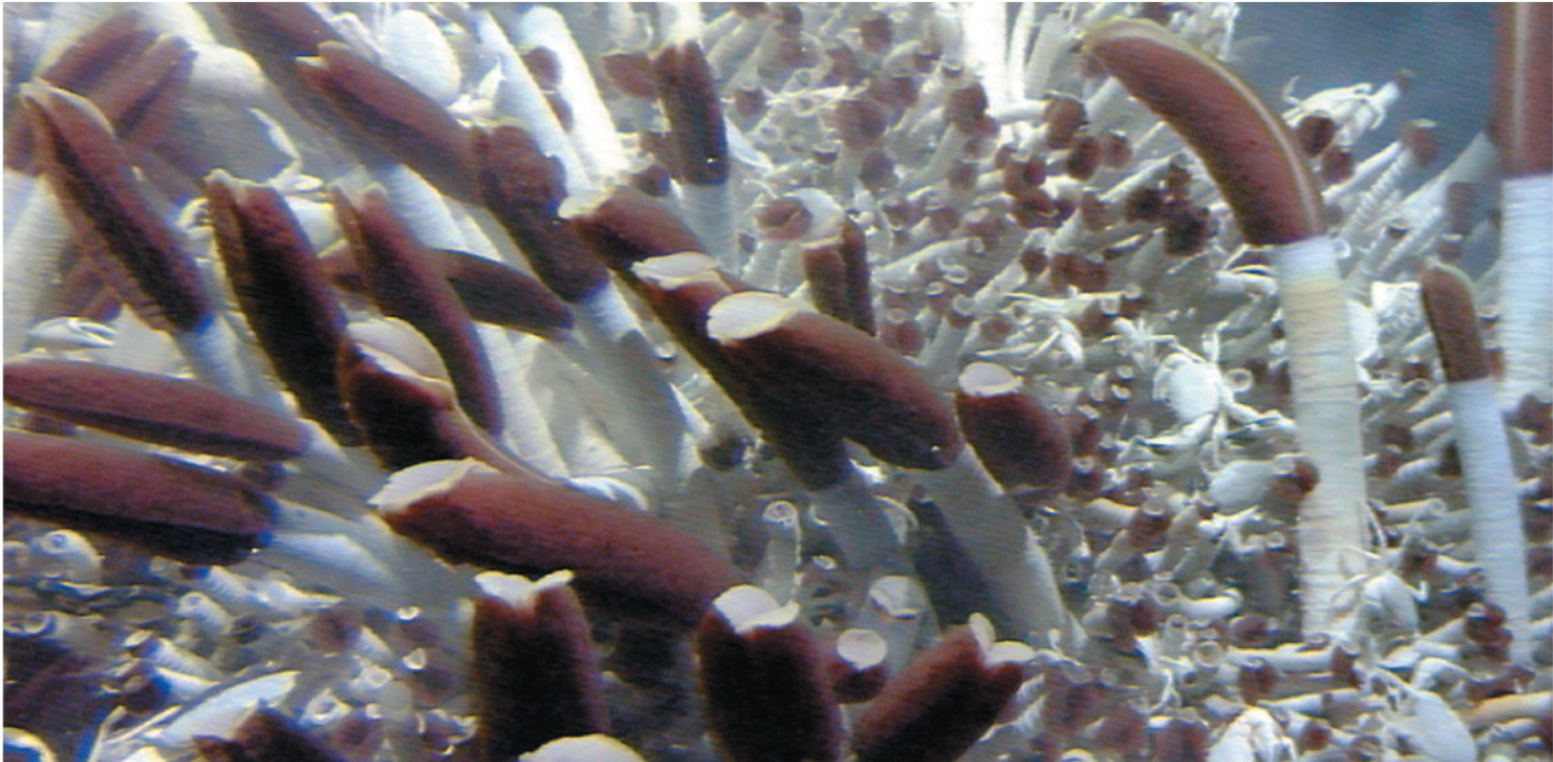


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Coral Reefs



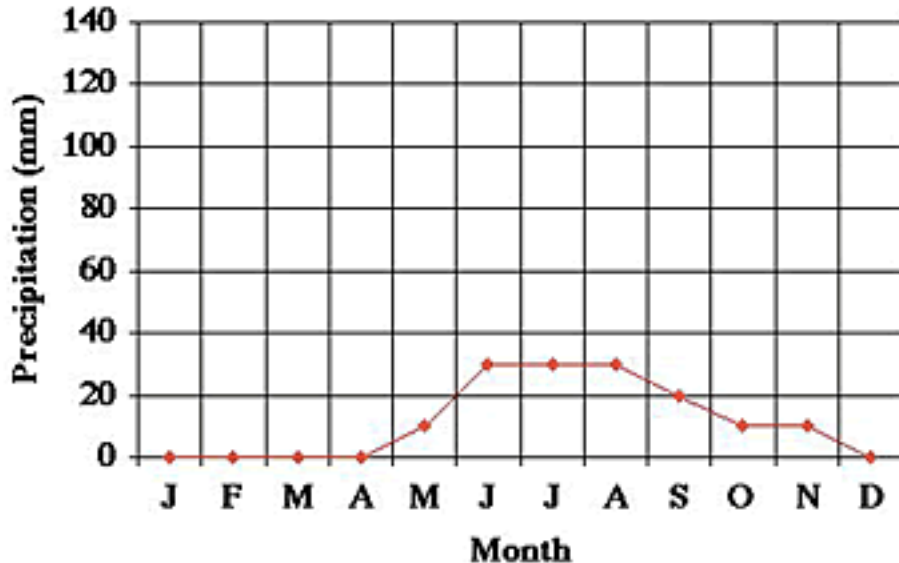
Marine Benthic Zone



A deep-sea hydrothermal vent community

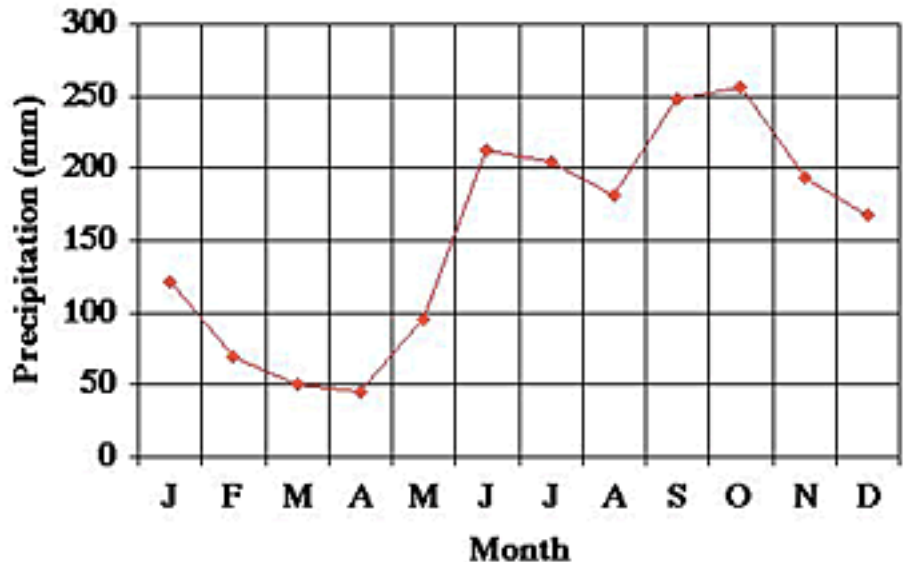
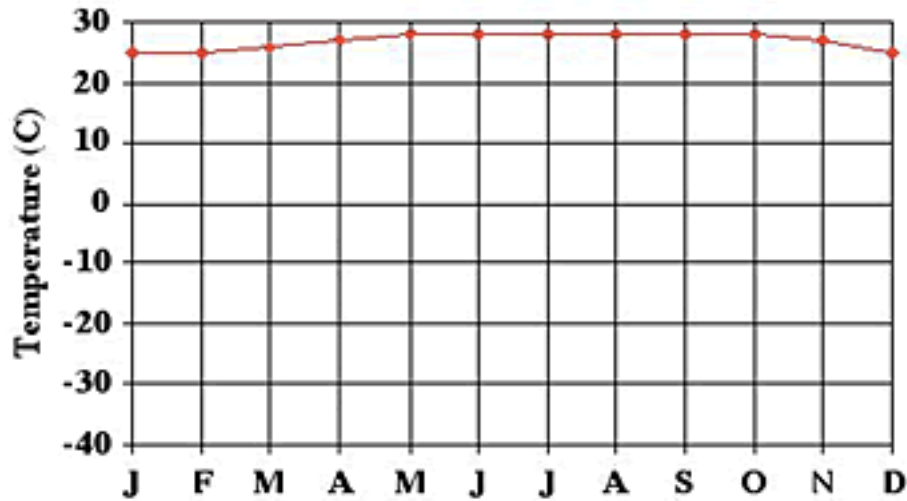
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Which biome do these graphs represent?



**Yakutsk, Russia
(Tundra)**

Which biome do these graphs represent?



**Campa Pita, Belize
(Rainforest)**

Biogeography:

- Geographic distribution of species
- Factors:
 - Dispersal – movement away from area of origin
 - Behavior – habitat selection
 - Biotic factors – other species, food resources, competition, pollinators, predators
 - Abiotic factors – temp, water, oxygen, salinity, sunlight, rocks & soil

What factors may have influenced the distribution of this species?

