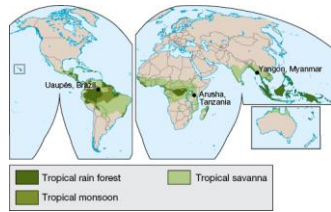


Tropical Climates

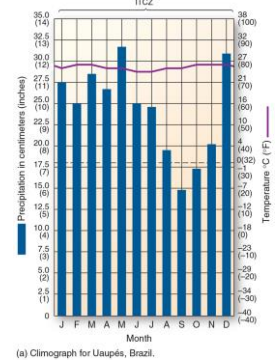


- Consistently warm temperatures throughout the year
- Affected by seasonal shifts in the ITCZ
- Warm ocean temperatures
- Unstable maritime air masses

7

Tropical Rain Forest

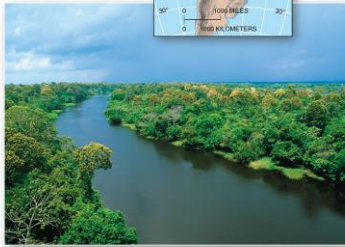
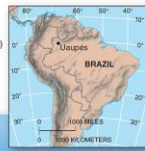
- Influenced all year by ITCZ
- Climate is consistently moist and warm
- Rainy all year
- Convictional thunderstorms triggered by local heating and trade wind convergence



8

Tropical Rain Forest

Station: Uaupés, Brazil
 Lat/Long: 0° 06' S 67° 02' W
 Avg. Ann. Temp.: 25°C (77°F)
 Total Ann. Precip.: 291.7 cm (114.8 in.)
 Elevation: 86 m (282.2 ft)
 Population: 10,000
 Ann. Temp. Range: 2°C (3.6°F)
 Ann. Hr of Sunshine: 2018

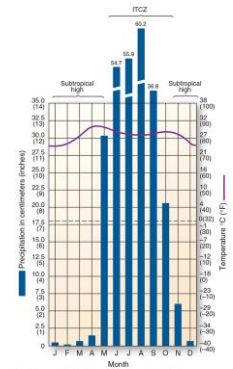


(b) The rain forest along a tributary of the Rio Negro, Amazonas state, Brazil.

9

Tropical Monsoon Climates

- Principally along coastal areas
- Rainfall from 6-12 months of the year brought by the ITCZ
- Dry season dominated by subtropical highs that last one or more months



10

Tropical Monsoon Climate

Station: Yangon, Myanmar
 Lat/Long: 16° 47' N 96° 10' E
 Avg. Ann. Temp.: 27.3°C (81.1°F)
 Total Ann. Precip.: 268.8 cm (105.8 in.)
 Elevation: 23 m (75 ft)
 Population: 6,000,000
 Ann. Temp. Range: 5.5°C (9.9°F)
 *Formerly Rangoon, Burma

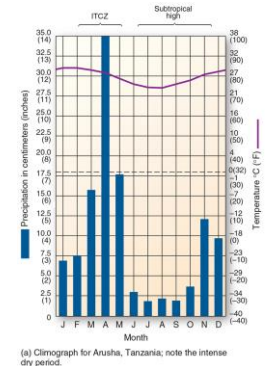


(b) Mixed monsoonal forest and scrub characteristic of the region in eastern India.

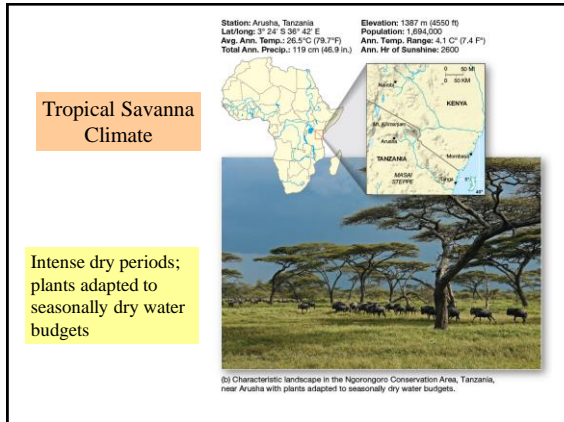
11

Tropical Savanna Climates

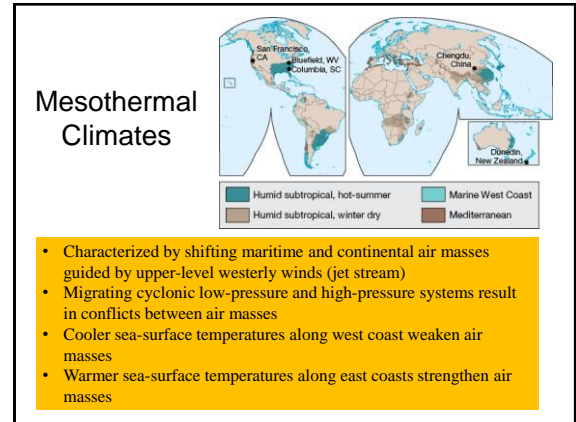
- ITCZ dominates during summers and characterized by wetter conditions
- Dry conditions occur when ITCZ shifts away and high pressure dominates



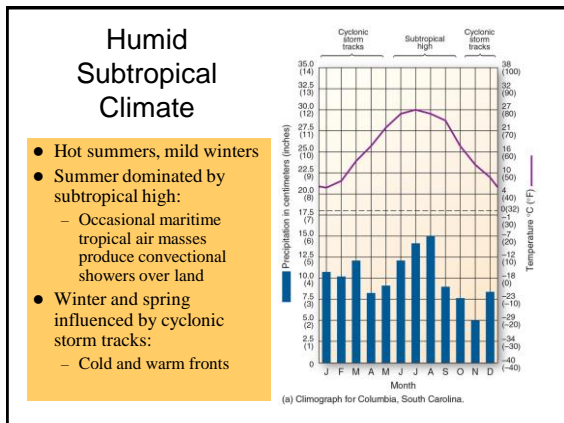
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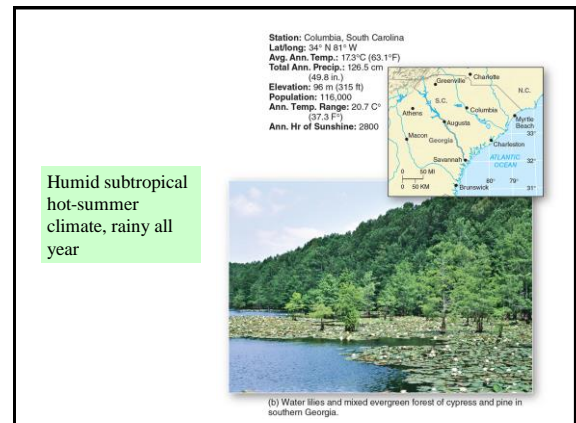
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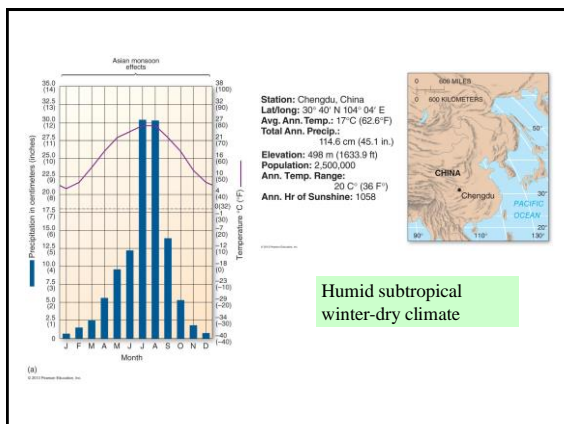
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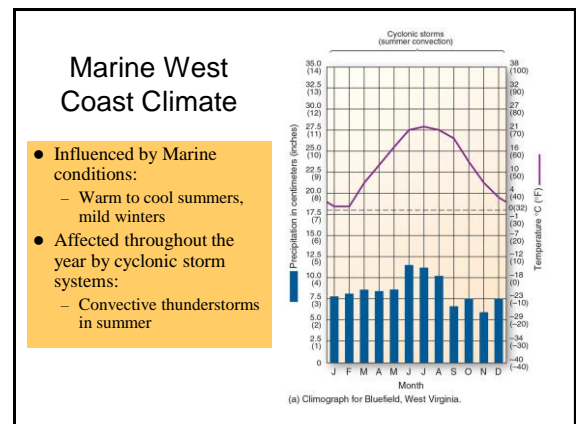
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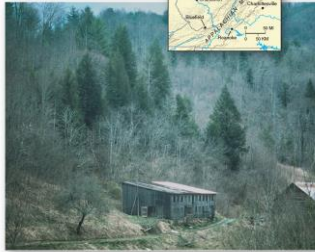
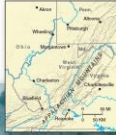
17



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Marine West Coast Climate

Station: Bluefield, West Virginia
 Latitude: 37° 16' N 81° 13' W
 Avg. Ann. Temp.: 12°C (53.6°F)
 Total Ann. Precip.: 131.9 cm (40.1 in.)
 Elevation: 780 m (2559 ft)
 Population: 11,000
 Ann. Temp. Range: 21°C (37.8°F)



(b) Characteristic mixed forest in Appalachia in winter.

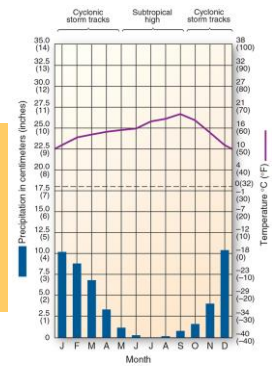
Mixed forest:

- Two or more predominant kinds of trees
- Transition between coniferous (e.g. pine) and broad-leaved (e.g. maple, oak) deciduous forest

19

Mediterranean Climate

- Dry summers brought on by subtropical highs
- Mild winters controlled by cyclonic storm tracks:
 - Most precipitation occurs during winter



(a) Climograph for San Francisco, California, with a cool, dry summer.

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Mediterranean Climate

Station: San Francisco, California
 Latitude: 37° 37' N 122° 23' W
 Avg. Ann. Temp.: 14.6°C (57.2°F)
 Total Ann. Precip.: 55.9 cm (22.3 in.)
 Elevation: 5 m (16.4 ft)
 Population: 777,000
 Ann. Temp. Range: 14.4°C (20.5°F)
 Ann. Hr. of Sunshine: 2975

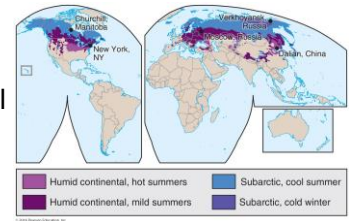


(b) Central California Mediterranean landscape of oak savanna.

Dry summers dominated by subtropical high; Wetter winters affected by cyclonic storm tracks

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Microthermal Climates

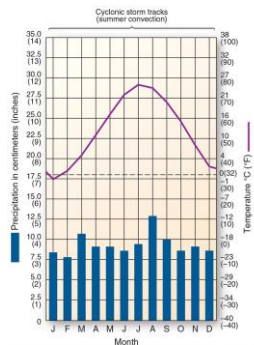


- Characterized by increased seasonality and greater temperature ranges
 - Summers are mild to hot and winters are cold to very cold
- Upper-level westerly winds and undulating Rossby waves bring warmer air northward and colder air southward via cyclonic activity
- Winter season dominated by intense continental polar air masses that develop within continental interiors

22

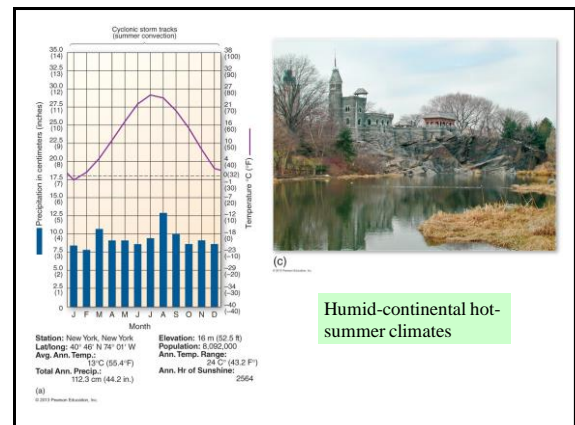
Humid Continental Climate

- Hot to warm summers, cold winters
- Affected throughout the year by cyclonic storm tracks
- Influenced by maritime tropical air masses
- Winters are characterized by conflicts between maritime tropical and continental polar air masses



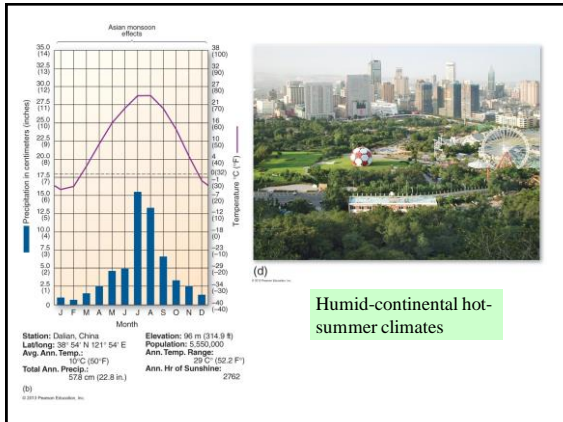
(a) Climograph for New York City (humid continental hot-summer, most all year).

23

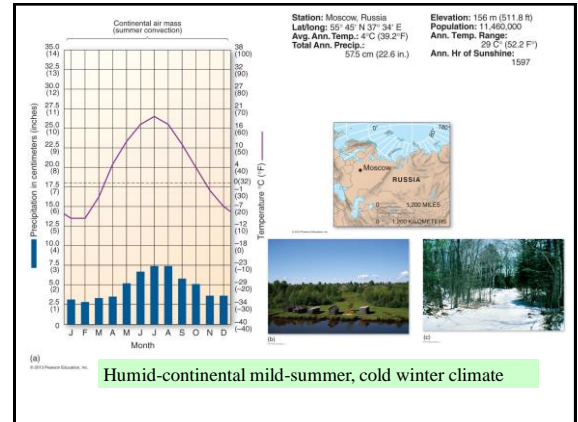


Humid-continental hot-summer climates

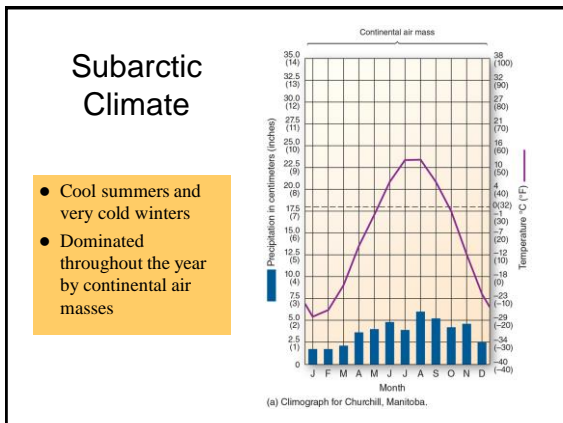
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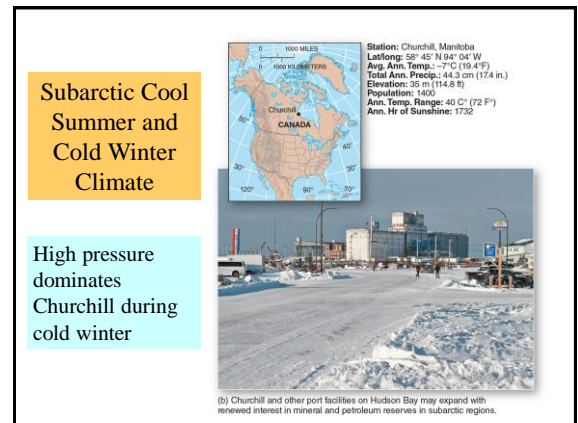
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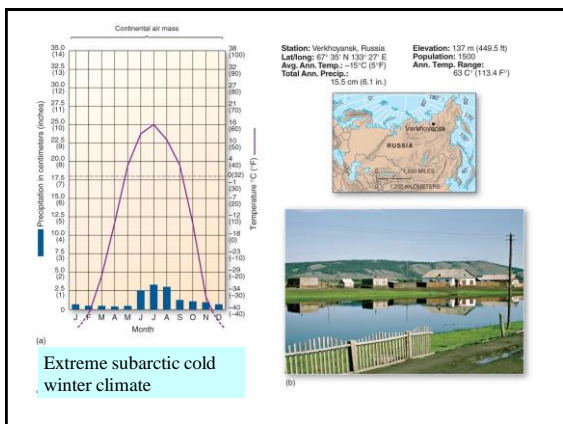
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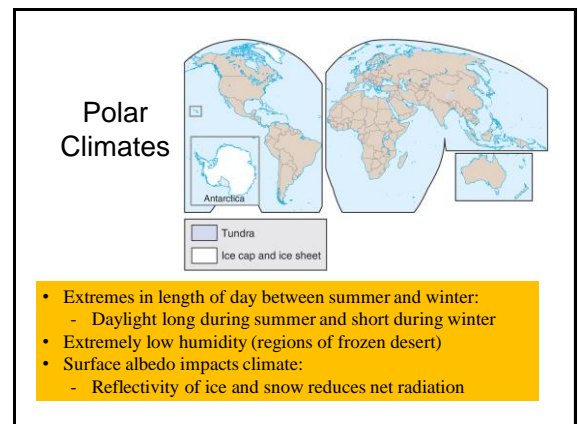
27



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Polar Tundra

- Occur at high latitudes and high elevations
- Permafrost and ground ice conditions common
- Land under continuous snow cover 8-10 months:
 - Never warms above 10 °C
- Small plants during spring and short summer



(a) Late September in East Greenland, with fall colors and musk oxen.



(b) An abandoned whaling station at Grytten; last used 1964.

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Polar Tundra



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Polar Marine Climate



- More moderate than polar continental
- No month averages below -7 °C

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Earth's Ice Sheets



(a)

Antarctic Sound



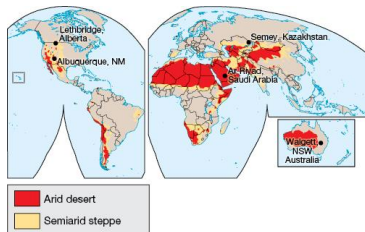
(b)

West Greenland

- Perpetually frozen
- All months below freezing

34

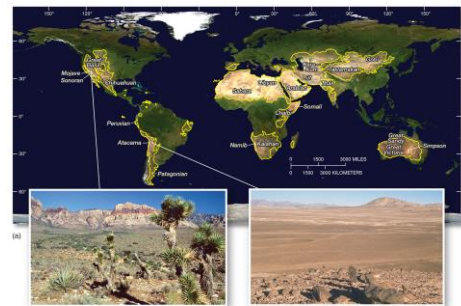
Four Principle Locations For Dry Climates



1. Subtropical high-pressure belts dominated by dry, subsiding air
2. Rain shadow effect on the leeward side of mountains
3. Continental interiors far from moisture-bearing air masses
4. Western continental margins with cool, stabilizing ocean currents (mild moist winters and hot, dry summers)

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Desert Climates Mostly Occur Within Subtropical High Pressure Belts



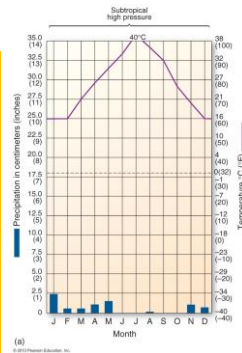
(b) Mojave Desert

(c) Alacama Desert

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Desert Climates

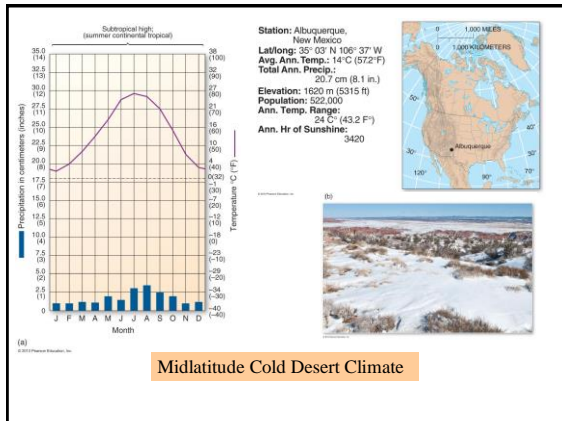
- Arid deserts:
 - Dominated by subtropical high pressure
 - Tropical and subtropical regions are hot
 - Mid-latitudes are cold
- Semiarid steppes (flat grassland):
 - Tropical, subtropical hot climates dominated by high pressure
 - Mid-latitude cold climates (poleward of 30° latitude) are dominated by continental air masses



Tropical, Subtropical Hot Desert Climates

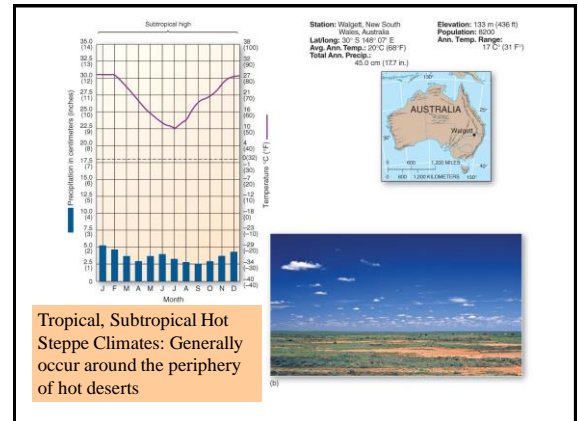
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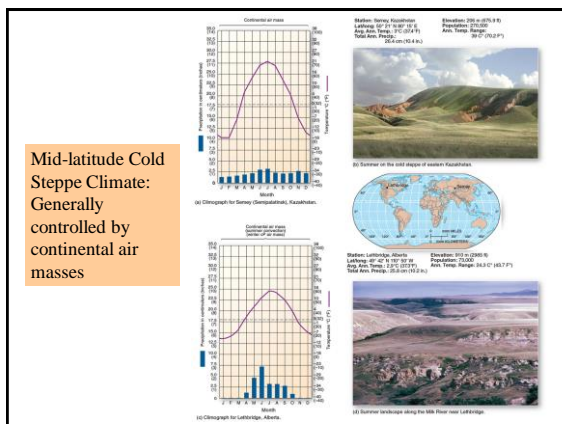
Midlatitude Cold Desert Climate

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Tropical, Subtropical Hot Steppe Climates: Generally occur around the periphery of hot deserts

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Mid-latitude Cold Steppe Climate: Generally controlled by continental air masses

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