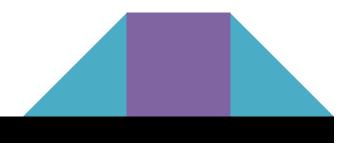
Global Climate Systems

Physical Geography Lecture - GEOG B1

Available on: www.cherylnail.com

Climate

Climate - collective pattern of weather over many years.* **Climatology** - the study of climate and its variability ** Similarities among local climates allow for grouping into climatic regions. ***



Classifying Earth's Climates *

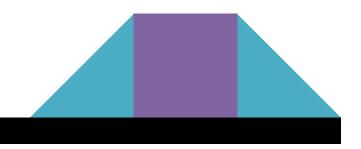
Classification - the ordering or grouping of data or phenomena into general categories

Empirical classification - climate classification based on data measured and collected.

Genetic classification - climate classification based on causative factors

(e.g.: interaction of air masses)

Boundaries? **

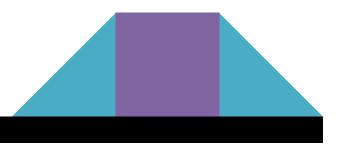


Earth's Climates

Six Climate Categories * Fig. 10.2

Tropical climates - tropical latitudes / winterless Mesothermal climates - midlatitudes / mild winters Microthermal climates - mid- and high-latitudes / cold winters Polar climates - high latitude and polar regions HIghland climate - high elevations at all latitudes Dry climates - permanent moisture deficits at all latitudes Interactions of several components created our climate

p. 260-261, GIA 10



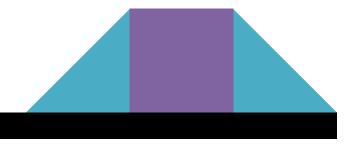
Tropical Rain Forests

Constantly moist and warm

Fig 10.3

Temp range is about 2 C° (3.6 F°) Daily convective thunderstorms * Precipitation follows migrating ITCZ High rainfall sustains lush forests ** Dense surface vegetation near rivers due to more available light





Tropical Monsoon Climates

Rainfall brought by ITCZ - falls 6-12 months per year Dry season occurs when the ITCZ moves away * Lie along coastal areas within the tropical rainforest realm Vegetation typically consists of evergreen trees grading into thorn forests on drier margins near adjoining savannas Fig. 10.4



Tropical Savanna Climates

Poleward of tropical rain forest climates

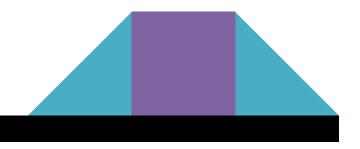
p. 264-Map

Fig. 10.5

Can have two temperature maximums because the sun is overhead twice Summers wetter than winters

When ITCZ is farthest away, high pressure dominates and conditions are dry Grasslands with scattered trees

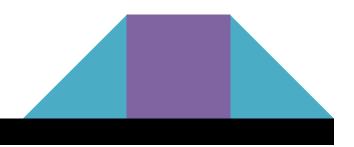
Highly variable precipitation



Humid Subtropical - Hot Summer

Either moist all year OR have a pronounced winter-dry period Influenced by mT air masses off eastern coasts during summer cP air masses interact and generate storms in fall, winter, and spring Dramatic thunderstorms

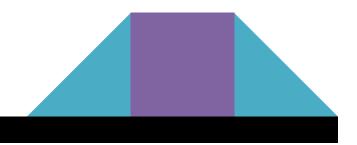
P. 267-Map Fig. 10.6 and 10.7 *



Humid Subtropical Winter-Dry

Extend poleward from tropical savanna climates Summers get 10 times more precipitation Seasonal flooding Related to the winter-dry seasonal pulse of monsoons Dramatic thunderstorms

p. 267-Map Fig. 10.8 *

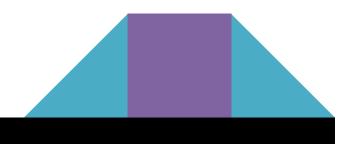


Marine West Coast

Middle- to high-latitude west coasts Moist all year

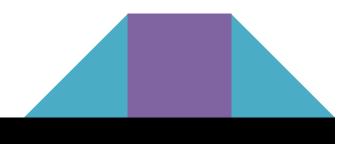
p. 267-Map Fig. 10.2

Mild winters and cool summers mP air masses (cool, moist, unstable) dominate - unpredictable weather Mild climates, especially for their latitudes 30-60 days of coastal fog



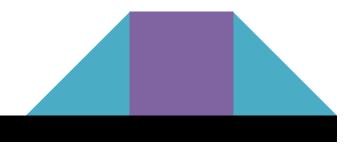
Mediterranean Dry-Summer

Hot, dry summer / wet winterFig. 10.2and 10.1170% of annual precipitation drops during winterSubtropical high-pressure air masses block moisture in summerCool offshore currents produce stability in air masses along west coasts *Summer water balance deficits - winter precipitation recharges, but not enoughAreas with large scale irrigation for agriculture



Humid Continental Hot-Summer

Warm summers Fig. 10.2 mT air masses influence precipitation - may be consistent, or have winter-dry period (Fig. 10.12) * mT and cP conflict - frequent weather activity In U.S., before European settlement - area covered in vast forests, giving way to tall-grass prairies **



Humid Continental Mild-Summer

Located farther toward poles

Fig. 10.2

Slightly cooler Precipitation is less than hot-summer areas, but snowfall is notably heavier and important for soil-moisture recharge Dry-winter only in Asia Agriculture important *

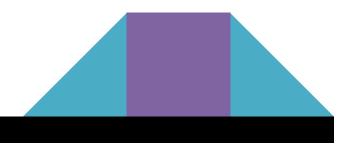


Fig. 10.14

Subarctic

Cool summers * Very cold winters ** Receive 25 cm (10 in) or more of precipitation - covered in snow forests *** Short growing season during long summer days Precipitation and potential evapotranspiration are low - soils are moist and partially or totally frozen beneath (permafrost)



Tundra

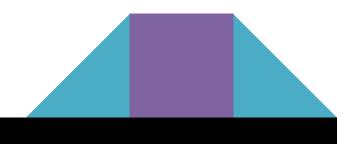
Tundra refers to the characteristic vegetation of high latitudes and high elevationsSnow cover for 8-10 monthsp. 276-MapFig.

10.17

Temperatures never warm above 10°C (50°F)

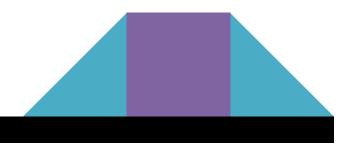
Occur only in Northern Hemisphere, except at high elevations in mountains of Southern Hemisphere

In spring, many plants appear and persist through the short summer * Most of area experiences permafrost and ground ice conditions



Ice-Cap and Ice Sheet

Ice sheets are continuous layers of ice covering extensive continental regions * Ice caps are smaller than ice sheets, but still cover land All months average below freezing ** Dominated by dry, frigid air masses Fig. 10.18 p. 276-Map



Polar Marine

More moderate than other polar climates in winter No months below -7°C (20°F) Ocean temperatures range between 0°-4°C (32°-39F) and help to moderate the climate

Average precipitation is 150 cm (59 in) and it can snow any time *

Fig. 10.19

Characteristics of Dry Climates

Subdivided into deserts and steppes - deserts have a greater moisture deficit.

Steppe - a regional term referring to huge semiarid grasslands - too dry to support forests, but too moist for a desert *

15°-30° - subtropical high-pressure cells dominate

Deserts extend to western edges of continents **

These climates exist in higher latitudes due to orographic lifting over mountains creating a rain shadow

Fig. 10.20 ***

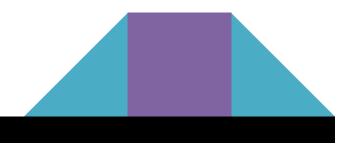
Tropical, Subtropical Hot Desert

True tropical and subtropical deserts are mostly on the west side of continents Rain is from localized summer convectional showers Some regions have almost no rain Fig. 10.20 and Fig. 10.21 *



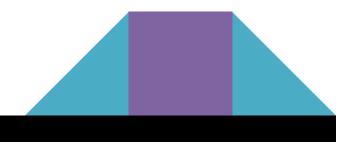
Midlatitude Cold Desert

Fig. 10.22 Small areas * Precipitation low - 15 cm (6 in) Lower temperatures and lower moisture demand



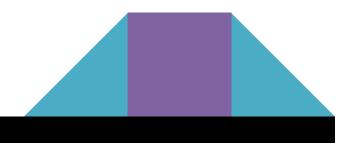
Tropical, Subtropical Hot Steppe

Exist at periphery of hot deserts p. 279-Map Shifting subtropical high-pressure cells create a distinct summer-dry and winterwet pattern Average precipitation is below 60 ccm (23.6 in) Can only support short grasses Fig. 10.23



Midlatitude Cold Steppe

Occur poleward of about 30° latitude Not generally found in the Southern Hemisphere Rain is highly variable and undependable Fig. 10.24 *



Climate Regions & Climate Change

Boundaries of climates are changing worldwide.

Tropical climates are expanding, so subtropical high-pressure areas and dry conditions are also expanding.

Warming temperatures are making areas more prone to drought.

Storm systems are being pushed further into the midlatitudes.

Ecosystem Evidence:

More trees are growing in tundra climate regions Animal ranges are expanding to higher latitudes.

