

## CHAPTER 11 – Lectures 25 & 26

### Midlatitude and High Latitude Climates

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**I. Midlatitude Climates:** These climates almost fully occupy the land areas of the mid-latitude zone and a large proportion of the subtropical latitude zone. There are six Mid-latitude climates, two of which are extremely dry and three of which are extremely moist. Temperature cycles are also quite varied.

**II. The Dry Subtropical Climate:** This is a poleward extension of the dry tropical climate caused by somewhat similar air mass patterns. The lower latitude portions have a distinct cool season, and the higher latitude portions, a cold season.

*A. The Subtropical Desert Environment* - This is a very dry environment. Both plants and animals of deserts are adapted to the dry environment. Many annual plants remain dormant as seeds during long dry periods, then spring to life, flower and bloom very quickly when rain falls. Certain invertebrate animals adopt the same life pattern.

**III. The Moist Subtropical Climate:** A flow of moist maritime tropical air (mT) dominates this climate. Most rainfall is convective and falls in the summer. Winter precipitation is also plentiful, provided by incursions of cP air masses.

*A. The Moist Subtropical Forest Environment* - In most years the abundant rainfall provides sufficient soil water for crops without the need for irrigation. In this climate area of North America, much of the natural vegetation consists of broadleaf deciduous forest. Over a large part of southern China and the south island of Japan, the native vegetation was formerly a broadleaf forest of the evergreen type, called the broadleaf evergreen forest.

1. *Agricultural Resources of the Moist Subtropical Forest Environment* - The area of Southeast Asia produces different groups of crops than North America. The differences are partly historical and cultural, but also reflect the stronger monsoon effect in Asia.

**IV. The Mediterranean Climate:** Unique because the winter is wet and mild, while the summer is very dry. During the summer, the subtropical high moves poleward and dry continental tropical (cT) air dominates, producing the dry summer season. In winter, the moist mP air mass invades with cyclonic storms that generate ample rainfall.

*A. The Mediterranean Climate Environment* - This climate is very well suited for human habitation. Mild winters and abundant sunshine are much more pleasant than the severe winters of the midlatitude continental interiors of Eurasia and North America. Soil fertility of valley areas is very high, although vegetation must adapt to summer droughts.

1. Agriculture in the Mediterranean Environment Cereals, such as wheat, barley and oats are grown in this environment, as are citrus fruits, olives, grapes, nuts. Irrigation is essential for high productivity, but heavy irrigation of lowland soils poses some hazards: salt accumulation and waterlogging.

**V. The Marine West-Coast Climate:** Occupies midlatitude west coasts. This region receives the prevailing westerlies, and cyclonic storms involving cool, moist mP air masses. Where mountains exist, high annual precipitation is common due to orographic lifting of the moist air.

*A. The Marine West-Coast Environment* - Lowland soils show a loss of nutrients because of abundant precipitation. Where fertilizers are in use, soils are successfully cultivated. Forest is the native vegetation of this environment.

1. *Agriculture and Water Resource* - Crop farming, dairying, orchards, and forests are the major resources from these regions. Water resources are great.

**VI. The Dry Midlatitude Climate:** Almost limited exclusively to interior regions of North America and Eurasia, in the rainshadow of mountain ranges on the west or south. In the winter, cP air masses block out maritime air masses. In summer, dry continental air dominates the climate. Summer rainfall is mostly convectional and is caused by invasions of mT air masses. Summers are warm to hot, but winters are cold to very cold.

*A. The Dry Midlatitude Environment* - The arid subtype of the dry midlatitude climate is restricted to the driest of midlatitude continental interiors. This cold desert environment supports only desert vegetation, or in North America, a cover of sagebrush and associated low woody shrubs.

1. *Agricultural Resources of the Short-Grass Prairie* Wheat is the single most important crop produced in unirrigated areas of this environment. Precipitation is the key to success in this venture as annual amounts of precipitation are quite variable. Semiarid steppes form the great sheep and cattle ranges of the world.

*B. Drought and the Dust Bowl* - The 1930s Great Plains of the United States and Canada suffered a great disaster. A several year drought, along with improper farming techniques exposed the soil to deflation. Many centimeters of soil were removed from the landscape during huge dust storms.

**VII. The Moist Continental Climate:** Located in the midlatitudes of central and eastern parts of North America and Eurasia. This climate lies along the polar-front zone. Seasonal temperature contrasts are strong, and day to day weather is highly variable. Cold winters are dominated by continental polar (cP) and continental arctic (cA) air masses from Subarctic source regions.

A. *The Moist Continental Forest and Prairie Environment* - Supports forests as the native vegetation. Soils beneath these forests show the effects of the moist environment through leaching of soil nutrients and other soil components and a strong tendency to soil acidity. Moving into the dry continental interior, the forest grades into tall-grass prairie.

1. *Agricultural Resources of the Moist Continental Climate* - This climate has an enormous potential for food production because of moist summer soils, and warm summer growing seasons. Many different types of crops are grown on these soils, including corn, wheat, rye, oats, barley, beet sugar, soybeans, and rice.

**VIII. High Latitude Climates:** These exist almost entirely in the northern hemisphere. They occupy the northern subarctic and arctic latitude zones and extend as far south as the forty-seventh parallel. These climates coincide with the westerly wind belt and the arctic front zone is an area of interaction between mP, cP, and cA air masses creating cyclonic activity.

A. *The Boreal Forest Climate* - This is a continental climate with a severe winter and a short, cool summer. This is the source region for cP air masses, while cA air masses commonly invade the region. The annual range of temperature is greater than that of any other climate and is greatest in Siberia. Precipitation increases substantially in the summer when maritime air masses penetrate the region.

1. *The Boreal Forest Environment* - The land surface of much of the region was formed during the last ice age. The dominant upland vegetation is boreal forest, consisting of needleleaf trees. In the taiga of northern Siberia scattered black spruce grow in an environment covered with a surface layer of lichens and mosses.

B. *The Tundra Climate* This climate occupies arctic coastal fringes and is dominated by cP, mP, and cA air masses. While the winters are long and severe temperatures are moderated enough by ocean water to avoid the extremes found in the continental interior. There is a very short mild season.

1. *The Arctic Tundra Environment* - Tundra describes both an environmental region and a major class of vegetation. Vegetation of the tundra consists of a cover of scattered grasses, sedges, and lichens, along with shrubs and willow. The number of species in the tundra environment is small, but the abundance of individuals is high. Caribou and musk-oxen are the main herbivores of the tundra environment; wolves, wolverines, arctic foxes, and polar bear are the main predators.

2. *Arctic Permafrost* - This permanently frozen soil prevails in the tundra region and a wide bordering area of boreal forest climate. It exists in two forms: continuous and discontinuous.

a. Continuous Extends without gaps or interruptions under all surfaces

features, coincides largely with the tundra climate, but also includes a large part of the boreal forest climate in Siberia.

b. Discontinuous Occurs in patches separated by frost-free zones under lakes and rivers. Much of the boreal forest climate zone of North America and Eurasia are of this type.

**IX. The Ice-Sheet Climate:** Coincides with the source regions of A and AA air masses, and is situated on the high ice sheets of Greenland and Antarctica and over polar sea ice of the Arctic Ocean. Mean annual temperature is much lower than any other climate, with no monthly mean above freezing. Precipitation, which occurs mainly as snow, is also low but accumulates because of the continuous cold.

*A. The Ice-Sheet Environment* - Because of the low monthly mean temperatures, the environment is devoid of vegetation and soil. The few species of animals found here are mainly associated with the marine habitat.