Climate Zones

An Alaskan Inuit trudges on snowshoes through the frozen wasteland above the Arctic Circle. Nearby, a polar bear hunts seals in the icy-cold Arctic Ocean. Thousands of kilometers farther south, tourists wander through the steamy rain forests of Hawaii. Exotic tropical birds call to each other from the dense treetops. Why do Alaska and Hawaii have such different climates?

The Earth's climates can be divided into general climate zones according to average temperatures. These climate zones can be broken down into subzones. Even the subzones have further subdivisions. In fact, scientists even classify very localized climates as microclimates. A microclimate can be as small as your own backyard!

The three major climate zones on the Earth are the polar, temperate, and tropical zones. Temperatures in these three climate zones are determined mainly by the location, or latitude, of the zone. Use the graphic to find the locations of the three major climate zones. In what climate zone is Alaska located? Hawaii? In what climate zone do you live?

Polar Zones

In each hemisphere, the polar zone extends from the pole (90') to about 60* latitude. Polar climates have the coldest average temperatures. Within the polar zones, the average yearly temperature remains below freezing (below O degrees C). Polar climates have no summer. Even during the warmest months of the year, the average temperature does not rise above 10*C. There is little precipitation in the polar zones.

Polar zones are also known as high-latitude or arctic climates. The polar zones include the icecaps of Greenland in the Northern Hemisphere and Antarctica in the Southern Hemisphere. These icecaps remain frozen throughout the year. However, there are some places in the polar zones where the snow melts during the warmest part of the year. The northern coasts of Canada and Alaska and the southern tip of South America are examples of these places.

Temperate Zones

In each hemisphere, the temperate zone is found between 60' and 300 latitude. In the areas of the temperate zones farther from the equator, snow is common in the winter. In the areas of the temperate zones closer to the equator, rain normally falls all year round. But the average amount of precipitation is about the same throughout the temperate zones. Average temperatures in the temperate zones vary greatly. They range from about 5'C to more than 20'C. These temperatures fall between those of the polar and the tropical zones.

Temperate zones, or middle-latitude climates cover a huge portion of the Earth. So the temperate zones can include the cool rain forests of Washington State as well as the hot rain forests of southern China, with many different climates in between. Most of the United States

is in the temperate zone.

Deserts in the temperate zones are usually located inland, far away from the oceans. The winds that blow across these inland deserts carry little moisture. Inland deserts are found in Australia (the Great Sandy Desert) and Central Asia (the Gobi Desert).

Many people mistakenly believe that temperate deserts are always hot. Certainly this is true of most deserts during the day. But at night, the temperature in the desert can drop to below freezing! How is this possible? The low humidity and cloudless skies allow a tremendous amount of radiant energy to reach the ground and heat it during the day. But these same conditions also allow the heat to escape rapidly at night, causing the temperature to drop dramatically. As a result, temperatures in the desert can range from 20*C at 2 o'clock in the afternoon to O degrees C at 2 o'clock in the morning. 538

another common misunderstanding people have about desert is that they are barren and lifeless. However, several kinds of plants and animals are able to live in the desert. For example, in the Sonoran Desert of the southwestern United States and Mexico, plants such as sagebrush and giant saguaro cacti grow. Animals such as lizards, snakes, and cougars also live in this desert.

Tropical Zones

The tropical zones, which extend from 30' north and south latitude to the equator (0 degrees) have high temperatures and high humidity. Precipitation in the tropical zones is usually very heavy during part of the year. Tropical zones are also known as low latitude climates.

Tropical climates have the warmest average yearly temperatures. There is no winter in tropical climates. In a tropical climate, the average temperature during the coldest month of the year does not fall below 18 degrees C.

In the tropical zones, many deserts are located on the western coasts of continents. This is because the prevailing winds in the tropical zones (the northeast and southeast trades) blow from east to west. High mountains along the western coast of a continent block these prevailing winds from reaching the coast. Rain falls on the eastern (windward) side of the mountains. Areas on the western (leeward) side of the mountains do not receive much rainfall and thus become deserts. These deserts are often cold deserts due to the presence of cold ocean currents along the western coasts of the continents. For example, the Atacama Desert in parts of Chile and Peru is a cold desert located on the western coast of South America.

Marine and Continental Climates

Within each of the three major climate zones there are marine climates and continental climates. Areas near an ocean or other large body of water have a marine climate. Areas located within a large land mass have a continental climate. Areas with a marine climate receive more precipitation than areas with a continental climate. Can you explain why?

Temperatures in areas with a marine climate do not vary greatly. Areas with a marine climate have warm (not hot) summers and mild winters. This is because their nearness to a large body of water has a moderating effect on the air temperature. A continental climate is drier than a marine climate. Why? There is usually a great range in average temperatures during the year. Areas with a continental climate have hot summers and cold winters. Most of the world's deserts that are located just north and south of the equator have a continental climate.

Focus Questions

1. Name the world's three climate zones. What are they based upon?
2. Which climate zone has no summer and has very little precipitation?
3. Which of the climate zones has the greatest variation in temperature?
4. Which of the zones does most of the United States fall in?
5. Where are temperate zone deserts usually located? What causes these deserts?
6. What are the main characteristics of the tropical zones?
7. How is it possible for there to be deserts in tropical zones? Name one.
8. Why do areas with a marine climate receive more precipitation?
9. Explain the difference between windward and leeward.