



Is It REALLY Summer Every Day and Winter Every Night?

The high mountains of Hawai‘i have what is called a “tropical alpine environment.” High mountains in other countries within the tropics, such as Peru, New Guinea, and Venezuela have some things in common with the Hawaiian Islands. One of the interesting similarities is there is a greater temperature change between day and night than there is between summer and winter. This means that the plants and animals living here are adapted to extreme daily fluctuations.

This feature led one scientist to say that in these environments, it is “summer every day and winter every night.” But you shouldn’t take his word for it. See for yourself!

Instructions

Find out if day-night temperature differences really are greater than summer-winter temperature differences on the upper slopes of Haleakalā.

- 1) Download your data from the Western Regional Climate Center at <www.wrcc.dri.edu/>.
 - Select “Western U.S. Climate Historical Summaries.” Scroll down to the colored map and select Hawai‘i.
 - Select “Haleakalā Ranger Station.”
 - Click and print the table on the right side, “Period of Record Monthly Climate Summary.”
 - Scroll down the left side, find “Period of Record General Climate Summary Tables” and select “Temperature.” Click on the table and print it.
 - To see the extreme temperatures in chart form, select “Daily Extremes and Averages.” Click on the graph and print it.
- 2) Using the Monthly Climate Summary, find the annual average maximum and minimum temperatures on the far right side of the page. Circle those numbers on the table.

What is the difference between these temperatures? _____

This gives you the difference between the average day and night temperatures.

- 3) Using the same table, look at “Average Max. Temperature” and find the highest and lowest numbers. Circle those numbers on the table.

In which month is the highest average maximum temperature? _____

In which month is the lowest average maximum temperature? _____

What is the difference between these two numbers? _____

This gives you the difference in the daytime temperatures between winter and summer.



- 4) Do you think it is fair to say that, at the upper elevations of Haleakalā, it is “summer every day and winter every night”? Why or why not?

- 5) The climate summary information you are using from the Internet is based on readings from a station at approximately 2134 meters (7000 feet) at the lower edge of the alpine/aeolian zone. How would you expect day-night temperature differences in the summit area (the upper reaches of the alpine/aeolian zone) to compare to temperatures from the lower elevation? Explain your answer.

- 6) Using the General Climate Summary table look under the column “Daily Extremes.” Here you can see the hottest and coldest temperatures that have occurred at the Haleakala Ranger Station over the last 50 years.

Now look at the graph “Daily Temperature Averages and Extremes” for a picture of how much the extreme temperatures differ from the averages. Explain how considering the extreme temperatures rather than simply average temperatures helps one understand the severe climate that the plants and animals of the alpine/aeolian region have to live in.

- 7) How do you think plants and animals are adapted to living in an environment marked by dramatic fluctuations between daytime and nighttime temperatures? Explain.