**PAESTA Podcast Series -- You Asked, We Answered!**

**Episode 42 – What are the differences between weather and climate?**

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Hello, my name is Vipul Kapoor and I will be hosting this podcast. Today, we will discuss the differences between weather and climate. Our main focus will be the primary differences. Then we will go in depth on how each are studied and how they affect the world. To put it simply, the main difference between weather and climate is the measurement of time. [1] Weather affects a given area and contributes to shaping the Earth's features, while climate helps scientists to determine how the Earth will change—and has changed—over a long period of time. [2] Now, as we all know, weather is always changing. A period of time in which we measure weather can be as little as 5 minutes to as long as weeks. Throughout this time, there are many changes in weather. In the span of just 10 days, weather goes through big changes. From thunderstorms to heavy rain to heat waves. [3] These are conditions in the atmosphere at a given time and place; however, they only last for a short period of time.

It is very important to understand that weather and climate are not the same. We define climate as the long-term trends of the weather, while weather is just what's happening now. [4] Weather and climate each have separate elements used by scientists all over the world. [5] The main elements for weather are temperature and climate, while the main elements for climate are latitude, wind, ocean currents, proximity to coastlines, and altitude. [6] Everyday Americans like you and me tend to care and know more about the weather rather than the climate. After all, we use the weather forecasts to determine our plans and even what to wear. A big difference between weather and climate are how they are predicted. Weather forecasts try to answer questions such as, how much will it rain tomorrow, or, how cold will it be tomorrow. [7] The forecasts are based on models, incorporating observations of air pressure, humidity, temperature, and wind to give the best estimates of future weather conditions. These forecasts tend to be short-term. On the other hand, climate predictions take a much longer-term view. Climate predictions attempt to answer questions like, how much warmer will the Earth be 50 years from now? or how much will the sea level rise in the next 10 years? Such predictions are made using global climate models.

Now, although we do not pay much attention to climate, it is still a very important topic to study. Studying climate is crucial as it affects people around the world. Studying climate gives us information about rising global temperatures and how they raise sea levels, or how long term changes in precipitation have detrimental effects on water supply and crop yields. [8] Climate can also have a big effect on humans and other animals. Change in climate can cause deserts to expand into rangelands and National Parks and Forests to be altered, leaving animals in an unknown environment. These changes can also cause some animals to go extinct.

The difference in essence comes down to climate is what you expect, while weather is what you get. When compared to weather, climate is fairly easy to model. Experts can model physical principles of average temperature and rainfall in a fair amount of detail. On the other hand, weather changes quickly and chaotically, but still exists within a range of expected values. Climate and weather both differ around the planet, and are principally controlled by the energy from the sun. [9]

Climatology is the study of climate characteristics in addition to the more complex behavior of the atmosphere which is heavily influenced by the land, oceans, and chemical reactions. [10] Scientists then investigate records to identify and find patterns of normal and extreme conditions, as well as to predict whether storm activity is likely to increase. Overall, understanding climate helps us to describe the long-term average weather conditions over a time period. These conditions explained can range anywhere from temperature to precipitation to humidity.

To recap what we learned in this podcast, weather and climate are similar and different at the same time. Weather is the study of now while climate is how the weather will be in a long-term view. We also learned about why we should learn and care more about studying climate, as it provides crucial information about how the Earth will change in the future and how it affects our everyday lives. There are tons of resources available to help aid anyone about weather and climate and why they are so important to understand and study. I hope this information was helpful and fun to learn/ Thank you for listening, this is Vipul Kapoor signing off, stay tuned until next time!

*(This audio file was recorded by Vipul Kapoor on November 11th, 2016)*

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