

## **Historical Precipitation Patterns**

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Hi, I'm Darryl Thomas, talking to you, live at Penn State University-Brandywine campus. Today, I want to talk to you about how our precipitation patterns have changed over time and the potential causes of it. I also want to talk about how the precipitation patterns will change in the future, and how that could affect the future of our planet.

First of all, this could've all started about 3 million years ago or so. Throughout the amount of time, the global sea levels have increased by about 20 feet, because of the historic effects of the previous ice age. Scientists are concerned that the temperature increase could be the potential causes of why the ice is still melting. Peter Clark, who is a Paleo-climatologist of Oregon State University, says that the Carbon Dioxide is increasing, in correlation with the temperatures around the world. Now, If that's the case, then maybe the Carbon Dioxide might be the reason why the ice is melting. If that's even the case then, maybe people living on the coast, should lookout for high water. I say that because they are at high risk of drowning in the future<sup>1</sup>.

With that said, knowing that water evaporates into the atmosphere and falls down on the earth brings me to why the precipitation patterns are changing. Now, the story of our pattern changes goes way back to about 15,000 years ago, when the Earth had all of the sudden emerged. Ever since then, the greenhouse gases increased, which are still currently increasing and intensifying the precipitation patterns all around the world. Speaking of which, let's talk about Africa's climate change as an example. Africa, was once a dry desert and then one day the rain

came down so intensely that Africa turned into a grassland. Recently, scientists have noticed that the greenhouse gases could be probable factors to greater amounts of rainfall in Africa. In other words, this could really effect Africa's climate in the future<sup>2</sup>.

Speaking of chemicals and greenhouse gases in the air, there was a flood took place in China 2 summers ago. The probable causes of that could have been years of industrialization. Thank you, China and pretty our entire planet for the air pollution. NO, because over the past 40, 50 years or so, the climate's gotten worse, mostly because of it. As a matter of fact let's back up what I'm saying for a moment. Jiwen Fan, who is an atmospheric scientist, noticed that the valley underneath the mountains, held all the polluted air, but the top of the mountains of China just so happened to get the worst of the rain. She suspects that maybe the black carbon might be the reason why china got the deadly rainfall<sup>3</sup>. Therefore, the 2013 flooding pretty much proves that air pollution can really have a dramatic effect on the weather and climate. This could hold deadly changes to our environment in the future.

Recently, a new study has recorded how Arctic warming leads to more cloud cover and warm and moist air, which is, by the way, no wonder why the climate has been extreme over the years. The Atmospheric Infrared Sounder researchers just analyzed the temperature changes within the years between 2003 and 2013. Throughout that decade, the average air temperatures, above the Arctic Ocean, has increased by about three degrees Fahrenheit; the sea surface temperatures increased by double<sup>4</sup>.

As we know, the climate is increasingly changing across the globe. However, there are 3 different predictions for our pattern change. One could be that the wet regions get even more rain, which is called the wet-get-wetter pattern. Another example

could be that the warmer areas become prone to receive more precipitation which is called the warmer–get–wetter pattern<sup>5</sup>. Or, the dryer places could just remain high and dry, which is called the dry-get-dryer pattern<sup>6</sup>. From a global climate standpoint, the predictions are that seasonal rainfall averages are supposed to increase as the years progress<sup>7</sup>.

Based on the greenhouse gas emissions scenario, the Surface Air Temperature is increasing because of the increase of carbon dioxide and the gashouse gases. Also too, if the changes of tropical precipitation are correlated with the spatial changes in Sea Surface Temperatures, then that could mean only one thing; That if the Sea Surface temperatures increase then the intensity of the precipitation will also increase<sup>8</sup>.

Now I was trying to figure out the changes in precipitation patterns throughout the year. So, I looked on "Climate.gov" and found a statistics map of the United States. The map had a series of years and months from January 2000 through August 2015. I chose 2014 as an example. Now, I noticed that January 2014 was the driest time of the year. That was because the precipitation totals were no more than two inches, on average. Over the course of that year, up until April that is, I noticed the precipitation estimates increase. During the warm season, which is April through October, I noticed the precipitations averages tend to range between four and possibly over eight inches total. June 2014, for the record, just so happened to be the wettest month on average. Finally, the amount averages in precipitation somewhat decrease as the months become cooler<sup>9</sup>. Therefore, I found out that the summertime is usually the wettest time of the year, as well as being the most humid time of the year for the northwestern hemisphere.

NASA, called the National Aeronautics and Space Administration released a video animation about the changes in precipitation patterns across the US this year, 2015.

I also watched it to watch the accumulation change over time. So far, especially for the East Coast, which just so happens to become increasingly drenched.

Unfortunately, the animation only showed from the beginning of the year until July 16, 2015. I also noticed that the southwestern part of the East Coast is, obviously, the wettest part of the United States with up to almost 70 inches of total rainfall on average, as of this past summer, July 2015. Luckily, the increased precipitation patterns have finally relieved the Northwestern portion of the West Coast from their drought<sup>10</sup>.

I also looked up National Weather Advanced Hydrologic Prediction Service for yearly- precipitation averages. I noticed that the precipitation averages have inconsistently changed over the past eight years, which are between 2007 and 2014. What I mean by that is that, one year, 2007, was one of the driest years in the east coast and 2011, which was the wettest year for the east coast. I also noticed that East Coast Region of the United States has particularly had the most amount of the precipitation on average<sup>11</sup>.

I also looked at a chart the shows the precipitation averages, regarding the 48 continental states from 1900 to 2014. And I noticed that the precipitation pattern of averages are inconsistent, meaning that within the 115 years, some of which are at most 5 inches below the normal average but many of which are at most 5 inches above normal average. The total annual precipitation has increased throughout the country at about an inch per decade on average<sup>12</sup>. Looking at the chart, I found out that the continental United States in the 1990s had the most consistent amount of precipitation. That is because the averages never went under average at all.

To wrap up this talk today, I think this increase in precipitation patterns are results from the air pollution and the climate change. Now, because of which, I predict that about 75 years from now, the coastal areas, will gradually wash away. It's

scary that some of the coastal areas are actually sinking right now. This is because every year, as told you guys earlier that the sea levels are rising, because of the how the ice is melting from the arctic's. Worst yet, this could also be because of the increased intensity of precipitation around the world. Poor Seattle because they get precipitation every year and every so often that they might even sink in the future because these patterns are increasing. As for right now, I can only expect the precipitation patterns to intensify and increase in the future. So I want to conclude this podcast by saying thank you for listening to this podcast today. I'm Darryl Thomas, and have a good day.

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