

How does Arizona's drought compare to traditional views about climate change?



Introduction:

The purpose of this experiment is to show the concerns about global warming, from both elders and citizens of Southern Arizona, and how it compares to the realities relating to Arizona's own drought. I will be focusing on information mainly based in Tucson and Southeast of Arizona, which is considered Division 7.

Methodology:

I interviewed 10 members from my community about climate change and how it affects Southern Arizona. The most common responses were that mass production of carbon dioxide (CO2) into our atmosphere had caused:

- Decrease in precipitation
- Increase in temperature
- Increase chance of drought

I gathered information from sources to see if there was a correlation between these 3 factors.

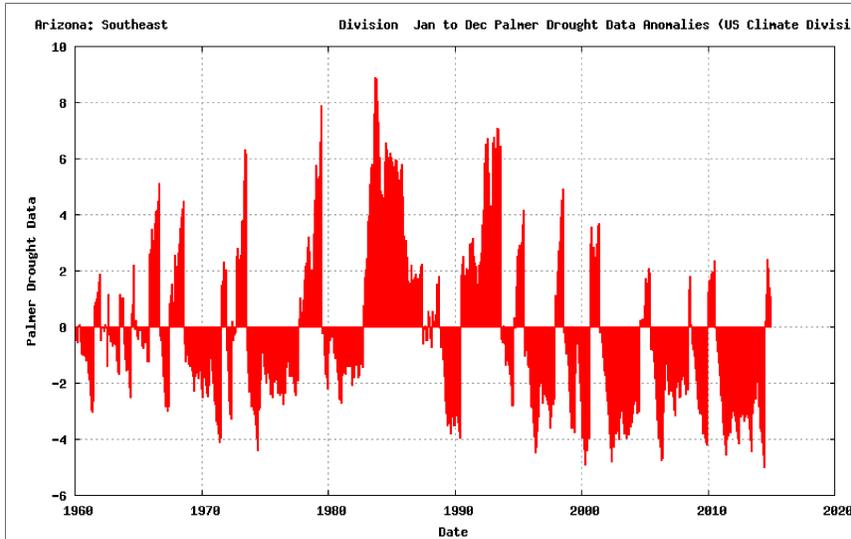


Figure 1: Increasing frequency and duration of extreme drought events (values less than negative 4) between 1990 and 2015 indicate Southeast Arizona soil is not receiving enough precipitation.

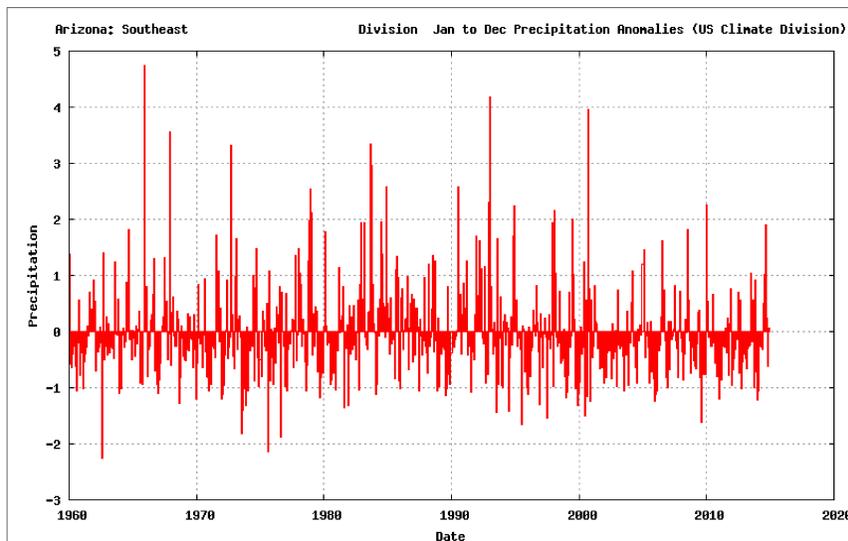


Figure 2: A major decrease in the positive rainfall anomalies between 2000 and 2015 coincides with the drought events seen in figure 1.

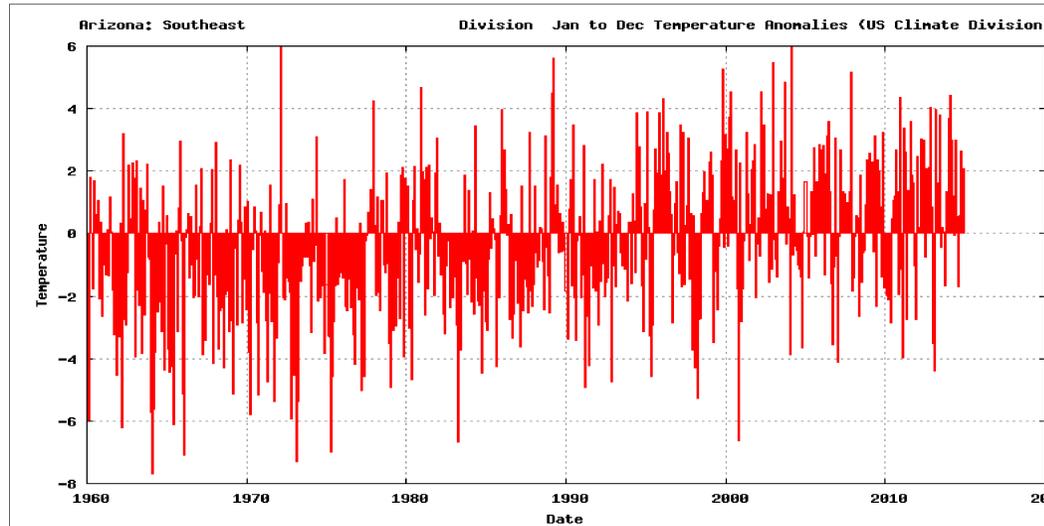
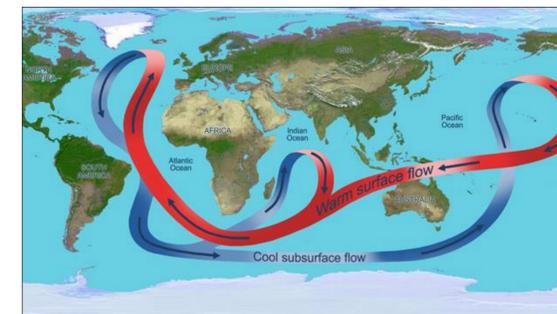


Figure 3: In the graph to the top right, temperatures in the positive numbers show that the average temperatures each year have been warmer than expected and now becoming more common.

Analysis:

- Palmer Drought Data anomalies (**Figure 1**), Precipitation anomalies (**Figure 2**), and temperature anomalies (**Figure 3**), from 1960 to 2014 indicate a change in weather pattern behavior.
- The **anomalies** of each factor indicate **what's expected vs what's occurring**.
- There has been an increase in temperature over the last 20 years, and a subsequent decrease in precipitation, causing soil to dry up.



Conclusion:

What we can derive from this data is that citizens are clearly observing the effects of climate change. They seem to know that it's a domino effect which means if one factor changes in weather, it can affect multiple factors on a larger scale. One major factor is the production of green house gases (GHG). Rising temperatures in the ocean caused by GHG's have had an impact on cloud behavior. A subsequent change the air pressure streams from over the ocean to above the U.S. is the reason many areas in the US, including southern Arizona don't receive enough rain annually. This is a major issue as water usage has been simultaneously increasing.

Acknowledgement:

- NASEP
- AISES
- Joshua Gosney for mentoring
- Ace Charrette

References:

- <http://www.esrl.noaa.gov/>
- <http://iridl.ldeo.columbia.edu/>
- <http://droughtmonitor.unl.edu/>

- "With the less rainfall there is, the more droughts there will be because there's not enough water to replenish the plants and the soil" – Family member
- "The Earth is heating up and does not have enough time to cool itself down overnight, it has to find different ways to cool itself down from the heat" – Citizen of Tucson