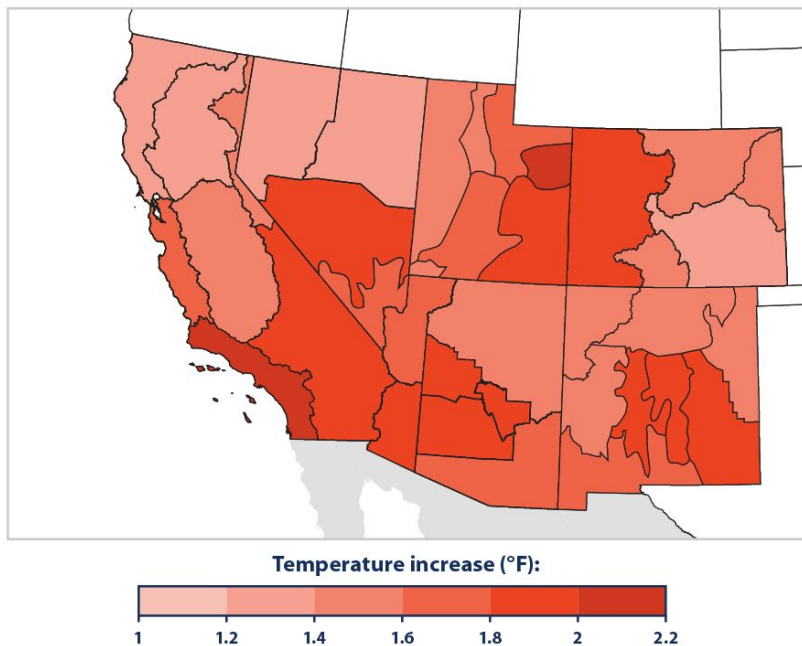


Phoenix Surface Temperature Analysis (2010 - 2021)

Aneri Patel

**Average Temperatures in the Southwestern United States,
2000–2020 Versus Long-Term Average**



Data source: NOAA (National Oceanic and Atmospheric Administration). 2021. Climate at a glance. Accessed March 2021. www.ncdc.noaa.gov/cag.

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climate-indicators.

- New 30-year (1990–2020) temperature averages show temperatures have gotten warmer nearly everywhere in the country. But the warming has been most pronounced in the Southwest, with average temperatures generally rising between 0.5–1°F.
- The updated averages also show large decreases in precipitation across the Southwest during the past 10 years, with many areas seeing average precipitation diminish by more than 10%.

REGION OF INTEREST - PHOENIX

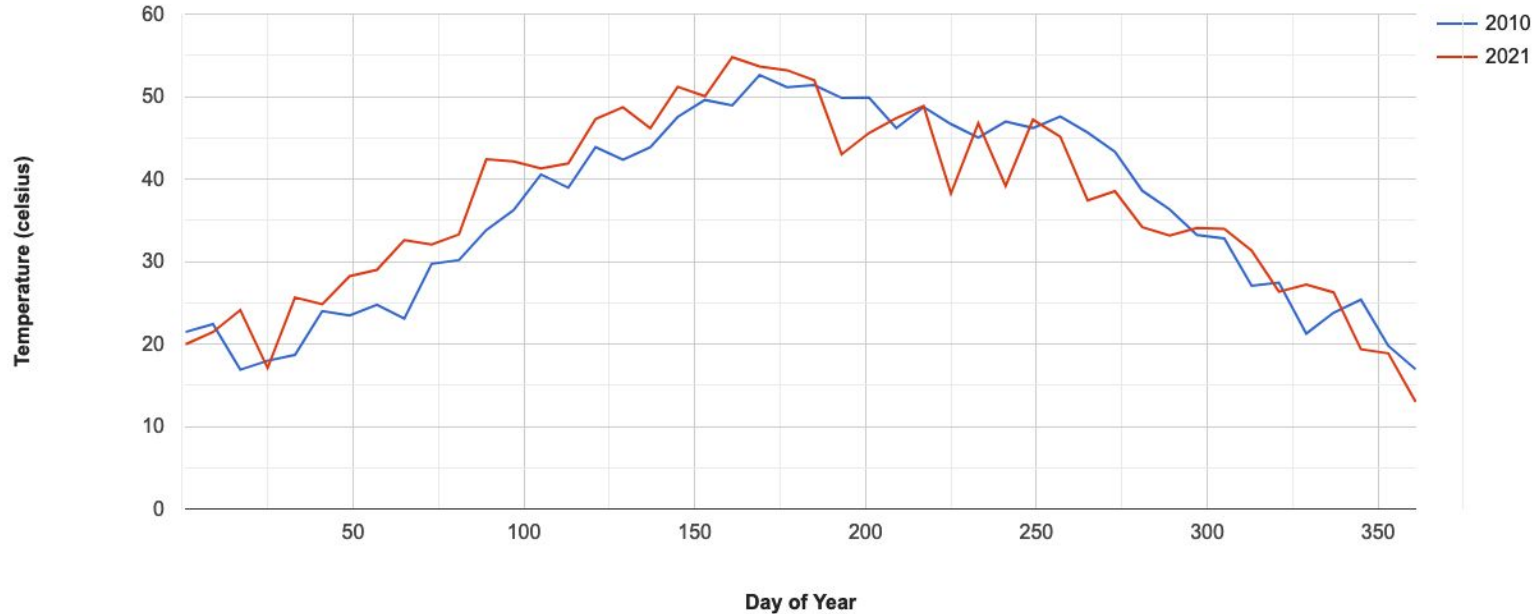


ROI Area km2
1345.3410282114353

Phoenix has launched two revolutionary initiatives:

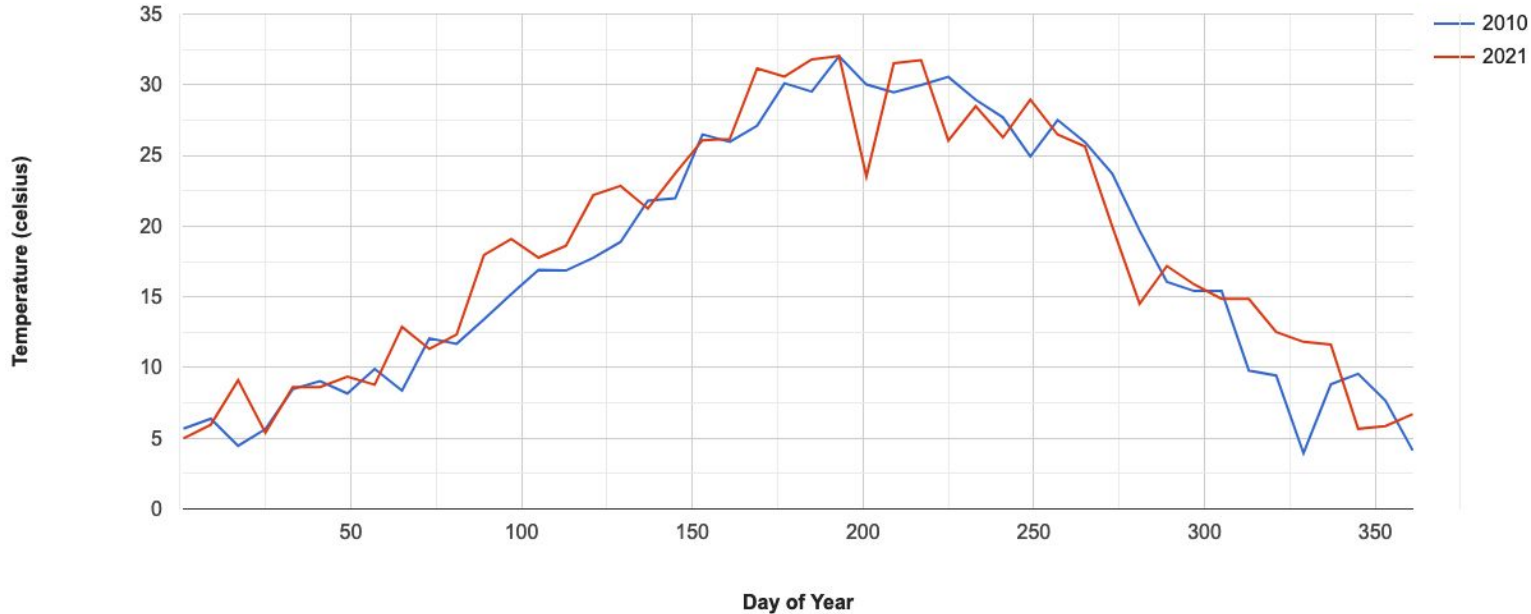
- **HeatReady** – the nation's first program of its kind—treats heat readiness like hurricane readiness and heat waves like temperature tsunamis. It will alert residents with text notifications and offer emergency cooling centers.
- **Nature's Cooling Systems** - is redesigning those low-income neighborhoods hit hardest by heat to remove some of the sting.

DAILY DAY TIME TEMPERATURE (2010 AND 2021)



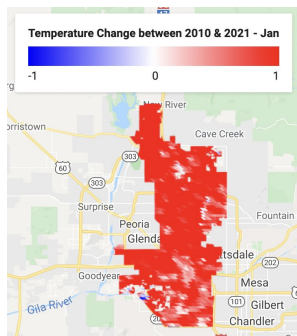
Day-time temperature in the first half of 2021 was consistently higher than the day-time temperature in 2010. However, most of the second half of 2021 was cooler than that of 2010.

DAILY NIGHT TIME TEMPERATURE (2010 AND 2021)

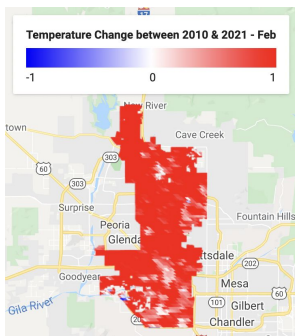


Daily night-time temperatures in 2021 are mostly higher than those in 2010. There are some nights with low temperatures on the nights of ~200, 225, 260, 340th days of 2021. This is due to cloud cover as the ground temperature (as tallied with weather sites) was normal.

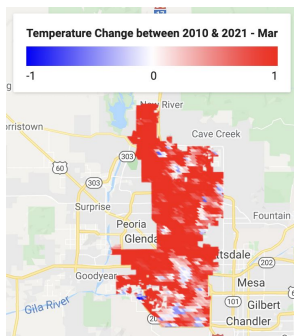
Difference in Monthly Day Time Temperature between 2010 and 2021 (Celsius)



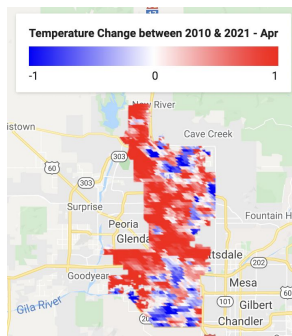
January



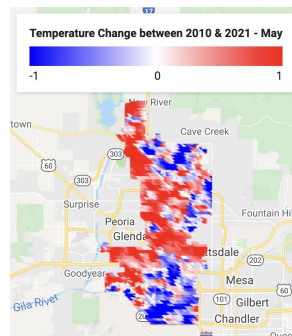
February



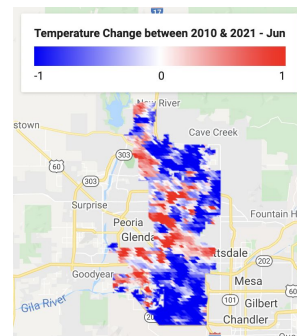
March



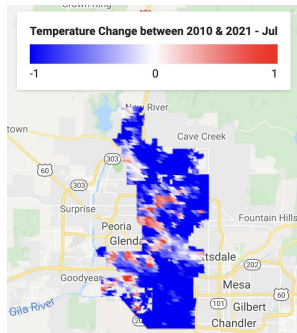
April



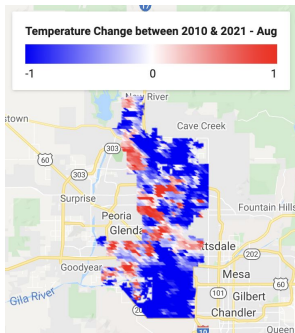
May



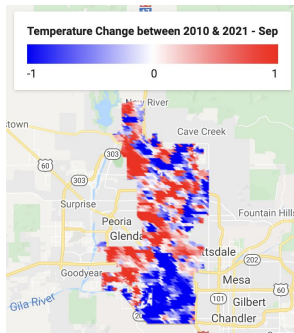
June



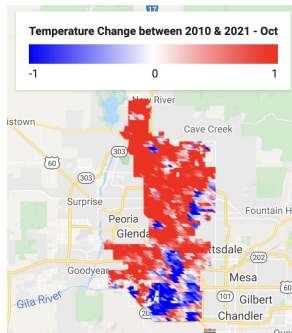
July



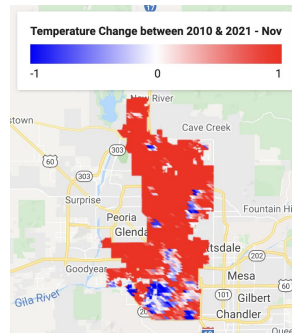
August



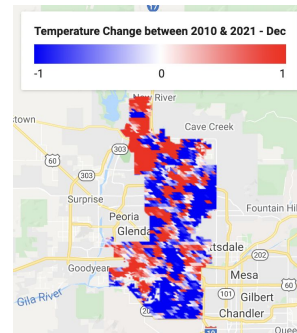
September



October

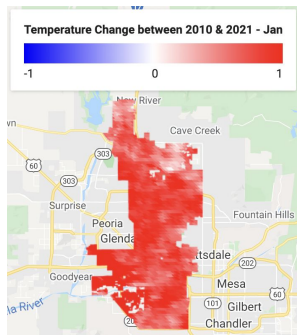


November

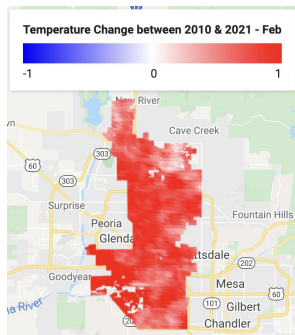


December

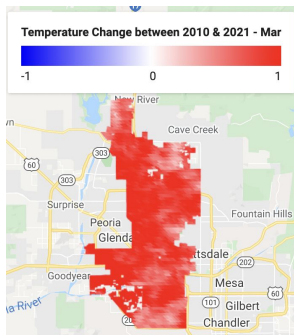
Difference in Monthly Night Time Temperature between 2010 and 2021 (Celsius)



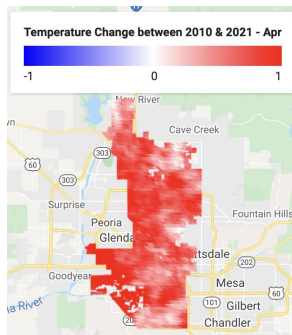
January



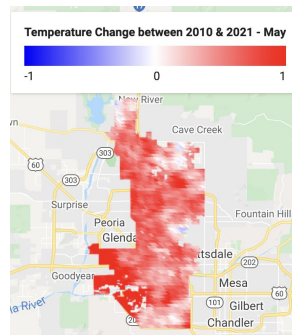
February



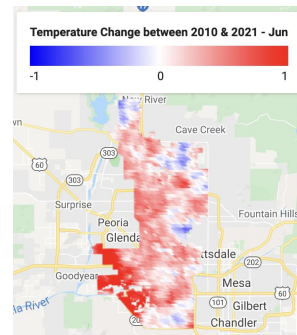
March



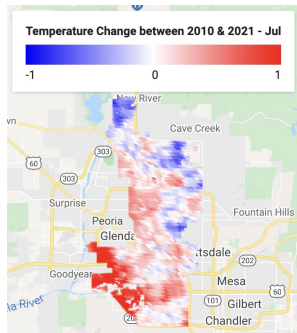
April



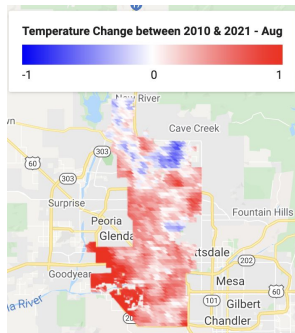
May



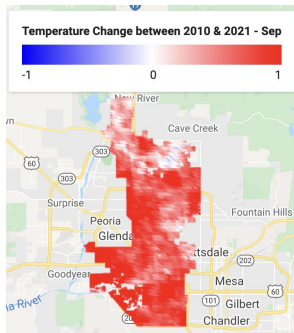
June



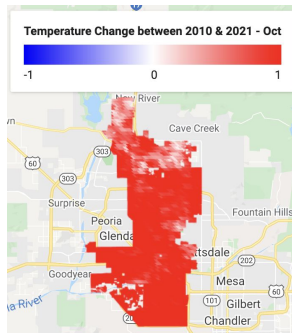
July



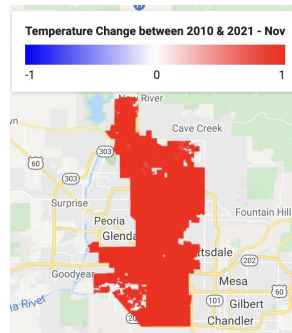
August



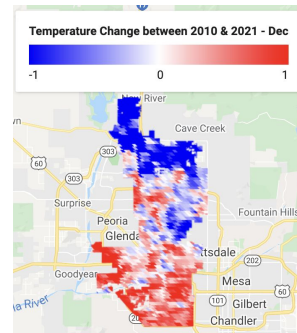
September



October

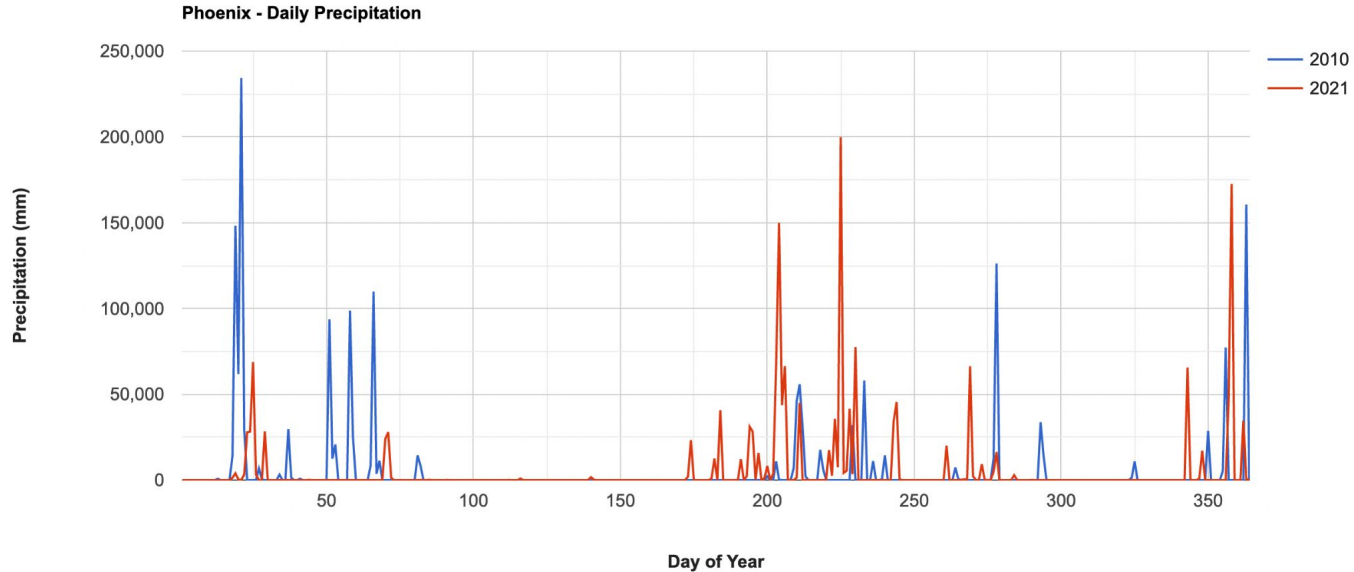


November



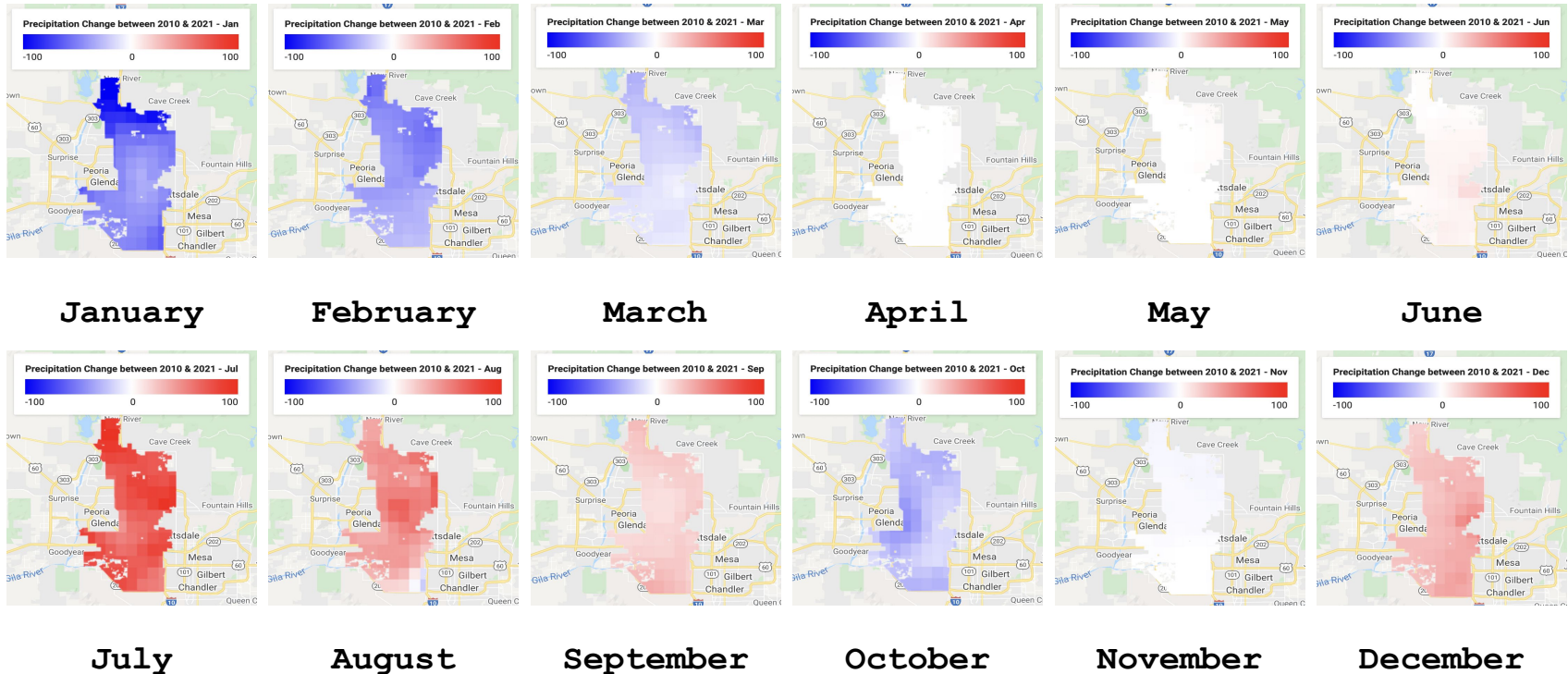
December

Daily Precipitation Trends - 2010 & 2021



- Precipitation in the second half of 2021 was significantly greater than that in the second half of 2010.
- Precipitation in the first half of 2021 was significantly lower than that in the first half of 2010.
- This might justify why day time temperatures in the second half of 2021 are usually lower than those in 2010.

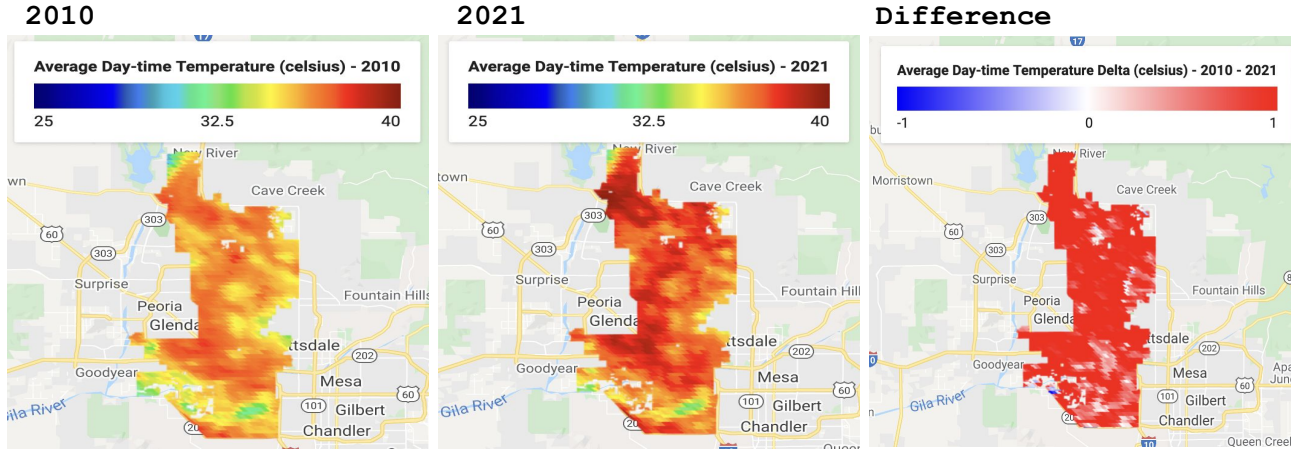
Difference in Monthly Precipitation between 2010 and 2021 (mm)



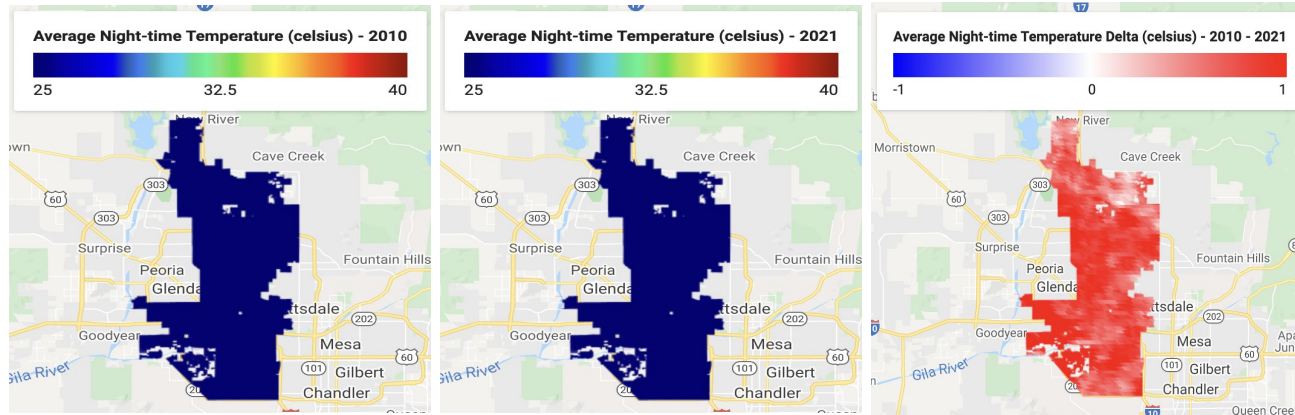
Increased precipitation in 2021 – July, August and December can account for lower night time temperatures in these months of 2021 when compared to 2010.

Annual 2010 and 2021 Temperature Differences

Day-time :

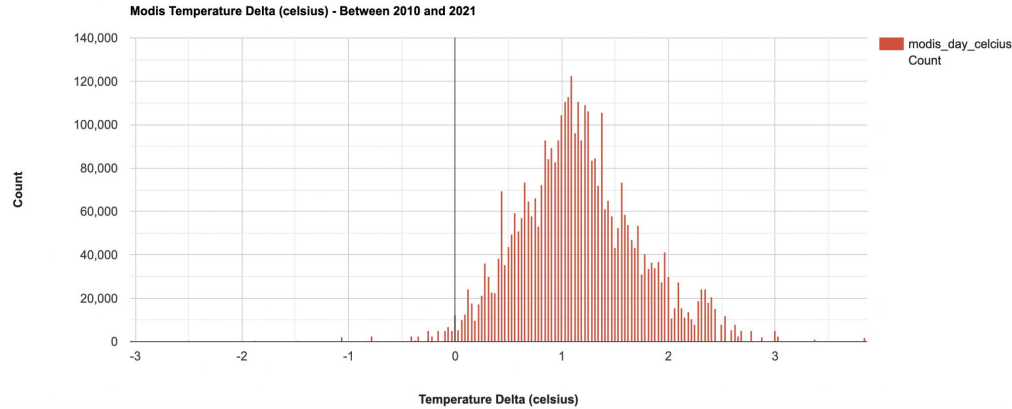


Night-time :

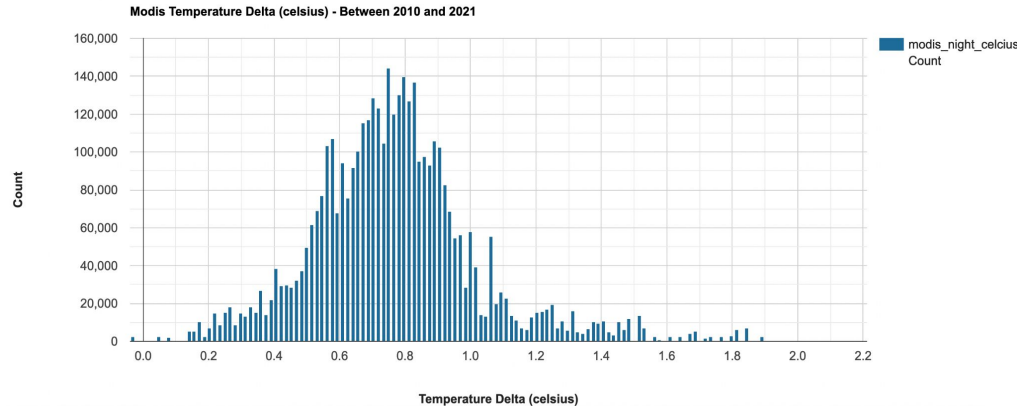


Annual 2010 and 2021 Temperature Differences

Day-time:

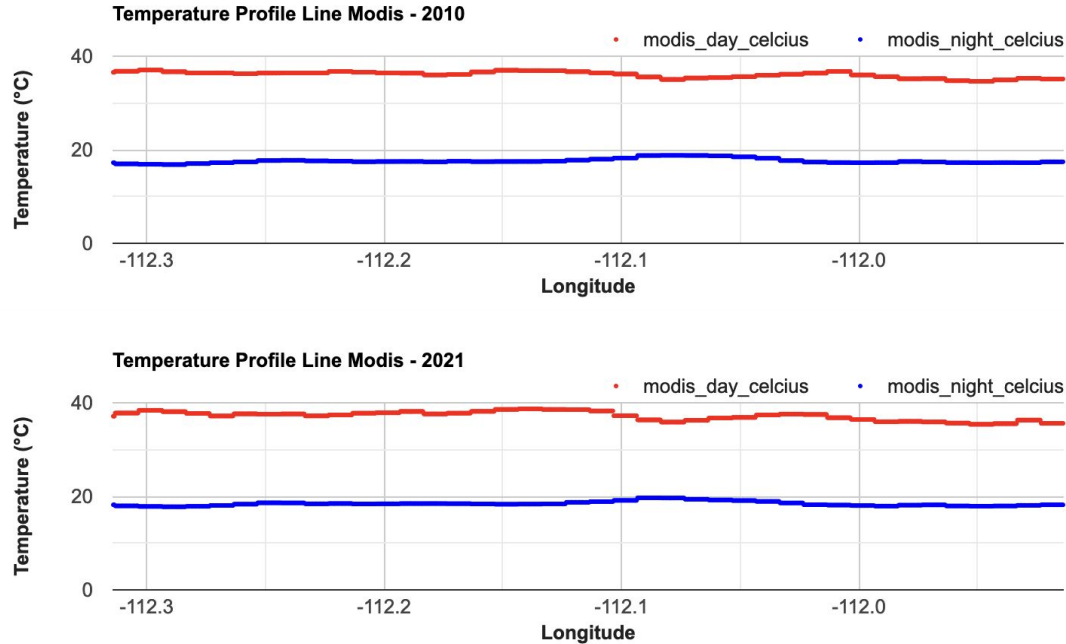


Night-time:



Scale of increase in 2021 annual average day-time temperatures $[-3,4]$ is greater than that of night-time temperatures $(-1,2.2]$.

Profile Lines - 2010 & 2021



Both night and day time temperatures were generally lower (by $\sim 1^{\circ}\text{C}$) in 2010 when compared to 2021 along all longitudes.