

Questions Asked:

1. Which eclipse is more common?
 - a. How many solar/lunar eclipses occur on average every year?
2. Is there a monthly trend for when solar/lunar eclipses occur?
 - a. Is it different for solar vs lunar eclipses?
 - b. If so why are they more/less common during certain months?
3. What months are total eclipses more common?
 - a. Does it differ for solar/lunar eclipses?

1. Which eclipse is more common? How many solar/lunar eclipses per year on average?

There seem to be 166 more lunar eclipses than solar eclipses. After further investigation, it was found that on average solar and lunar eclipses had around 2 eclipses a year. There was no significant difference with solar eclipses ($\sim 2.3796/\text{yr}$) and lunar eclipses ($\sim 2.4128/\text{yr}$). But since this is over a 5 millennium period, the small difference can be seen affecting the total number of eclipses, that is that there have been more lunar than solar eclipses over this time frame 2000 BCE to 3000 CE.

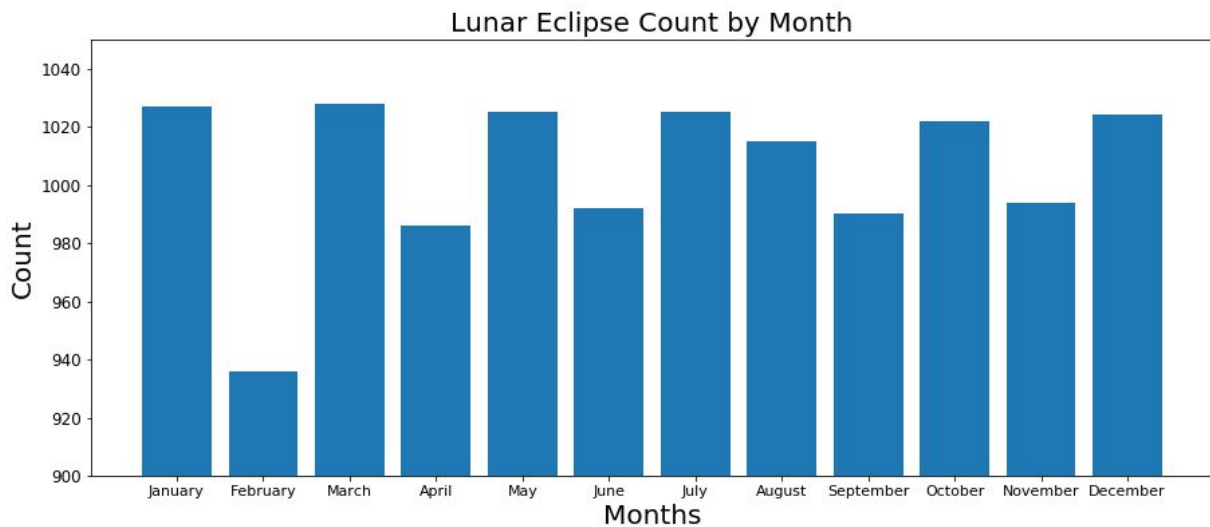
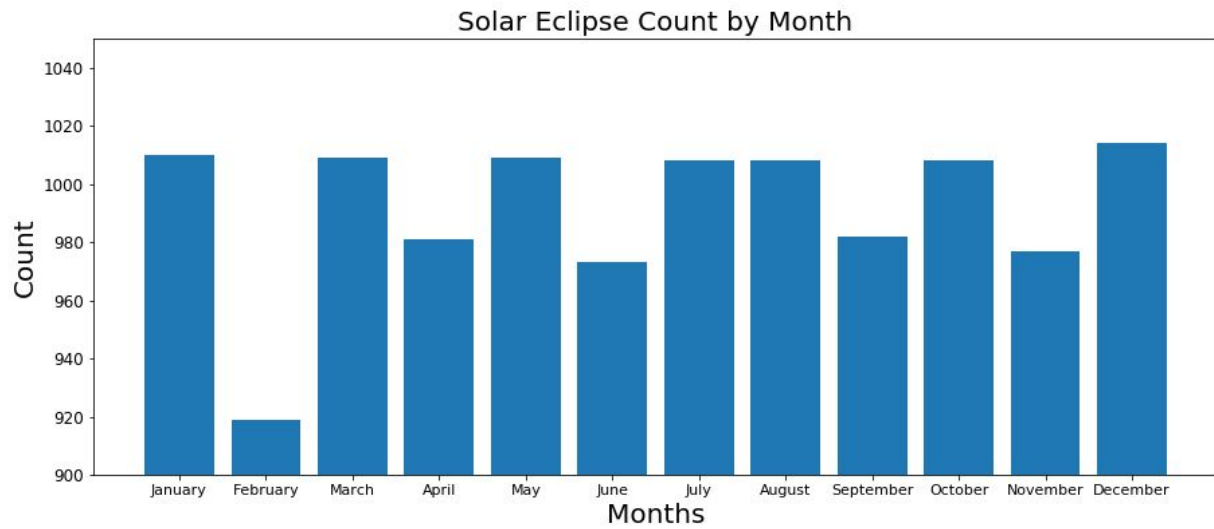
2. Is there a monthly trend for when solar/lunar eclipses occur?

- a. Is it different for solar vs lunar eclipses?

Solar and lunar eclipses seem to have relatively the same trend with every month as observed using data analysis plots.

- b. If so why are they more/less common during certain months?

The trend seems directly correlated to how many days are in the month. More days in a month means more probability of an eclipse occurring during that month. That is why February seems to have the lowest number of eclipses since the month has the least number of days regardless of whether it is a leap year.



2.3 What months are total eclipses more common?

Since there are many types of eclipses, I want to focus on one type of eclipse. I will be focusing on a total eclipse for both lunar and solar eclipses. A total solar eclipse is characterized by the moon completely covering the sun in the sky. A total lunar eclipse is when the Earth's shadow completely covers the moon.

After analysis, I first found that there have been a few hundred more total lunar eclipses than solar eclipses in the past 5 millennia. This implies that total lunar eclipses are more common.

- a. Does the trend differ between lunar and solar eclipses?

Total lunar eclipses seemed to follow the monthly trend that was seen earlier, where the number of eclipses was directly related to the number of days.

Total solar eclipses, however, seem to veer off this trend greatly. They seem to be more common during the second half of the year during the season's Fall and Winter (September - January).

This will be an area of further study using statistical testing to test whether month plays a role in the probability of a solar eclipse occurring.

