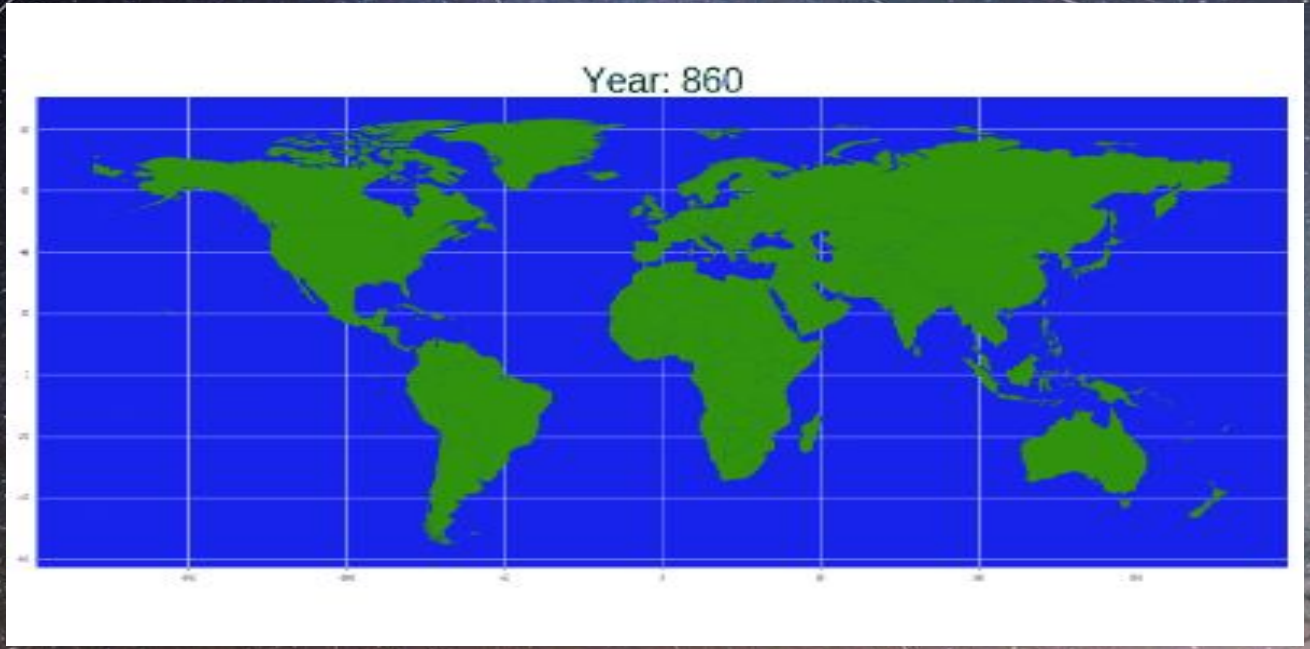
Shooting for the Stars

By: Quinn Dizon and Kate Hayes



The Data

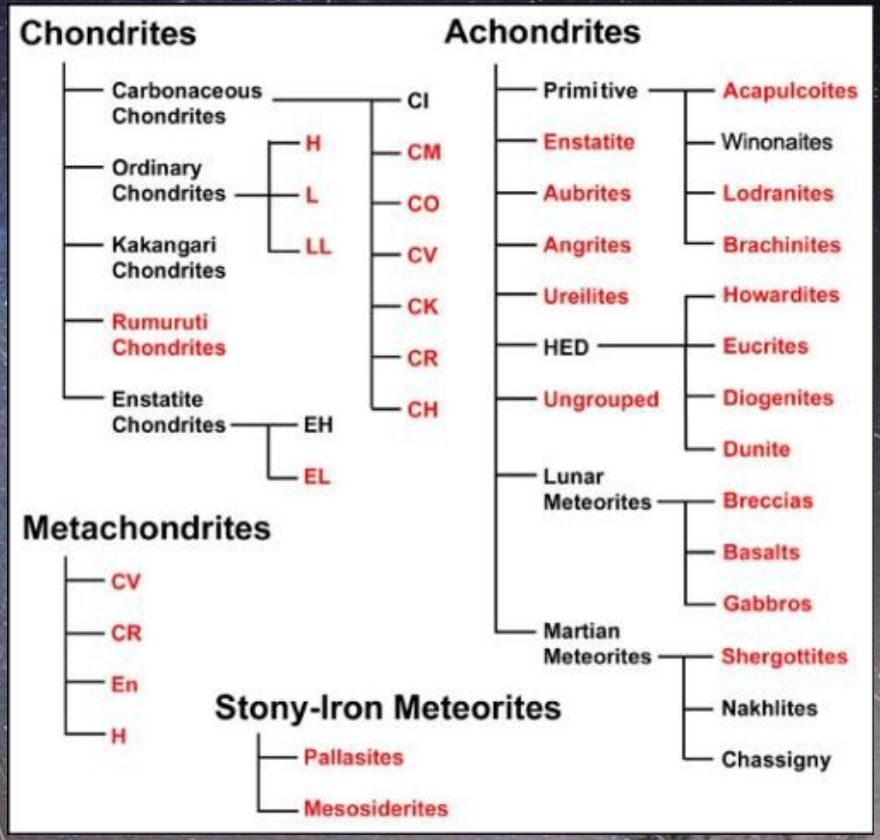
Primary data From NASA's open data portal:

- https://data.nasa.gov/Space-Science/Meteorite-Landings/gh4g-9sfh

Supplemental data - populations for the locations meteorites landed:

- http://worldpopulationreview.com/countries/countries-by-density/
- https://photius.com/rankings/world2050_rank.html

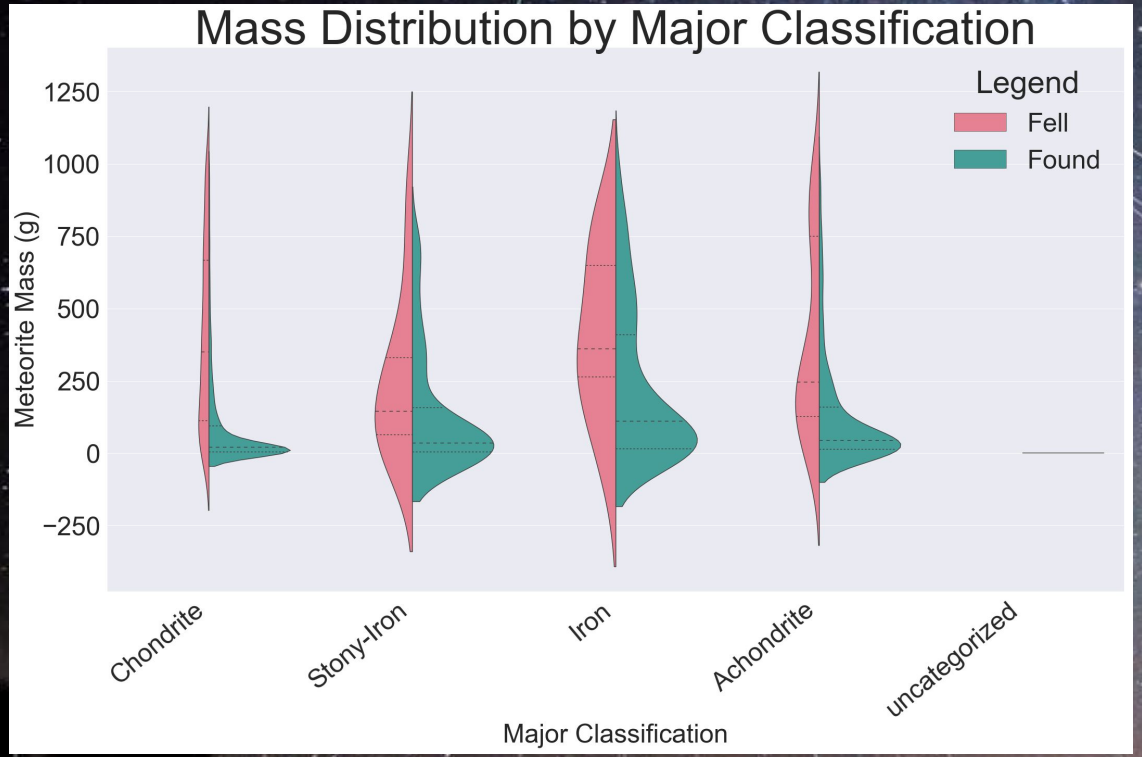
Different classifications



Is the difference in mass between differing major classifications statistically significant?

Sample 1	Sample 2	alpha 10 %	alpha 5 %	alpha 1 %
Achondrite	Iron	Accept Ha	Accept Ha	Accept Ha
Achondrite	Stony-Iron	Accept Ha	Accept Ha	Accept Ha
Chondrite	Achondrite	Fail to Reject	Fail to Reject	Fail to Reject
Chondrite	Iron	Accept Ha	Accept Ha	Accept Ha
Chondrite	Stony-Iron	Accept Ha	Accept Ha	Accept Ha
Iron	Stony-Iron	Accept Ha	Accept Ha	Accept Ha

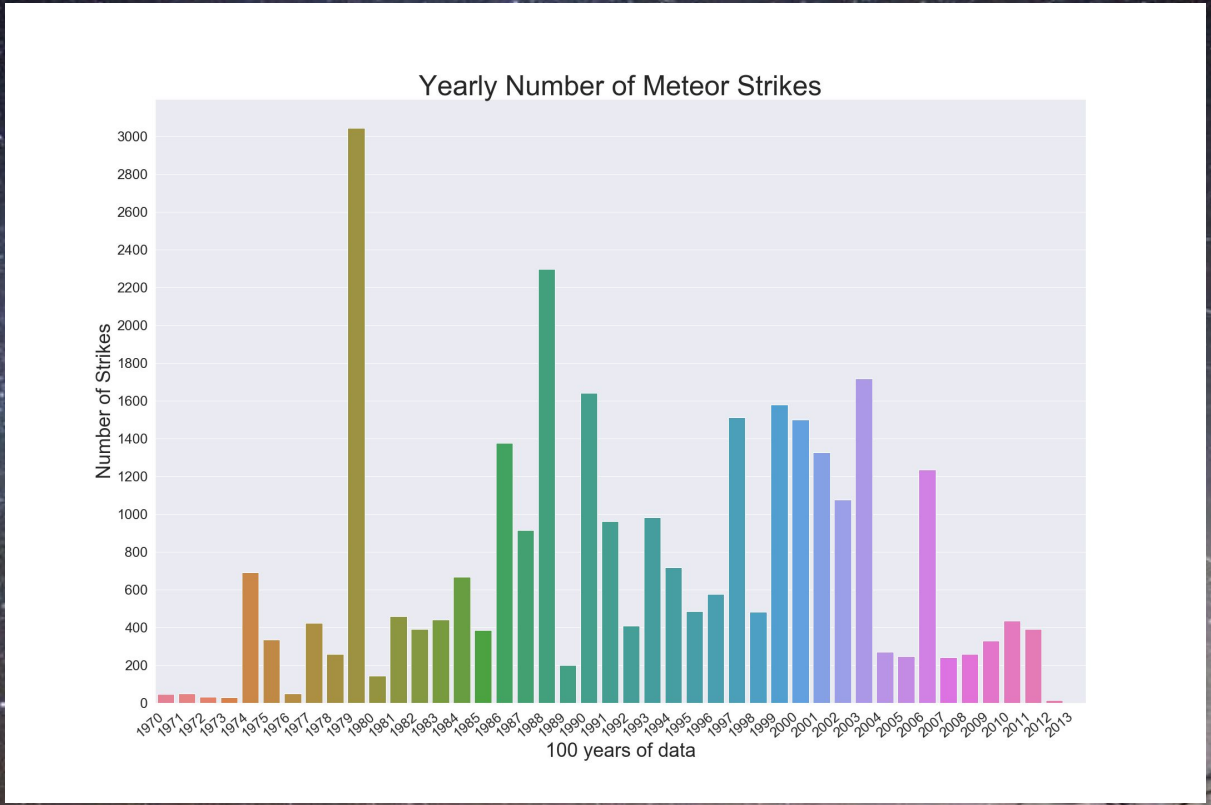
Are different classifications more likely to be seen falling?



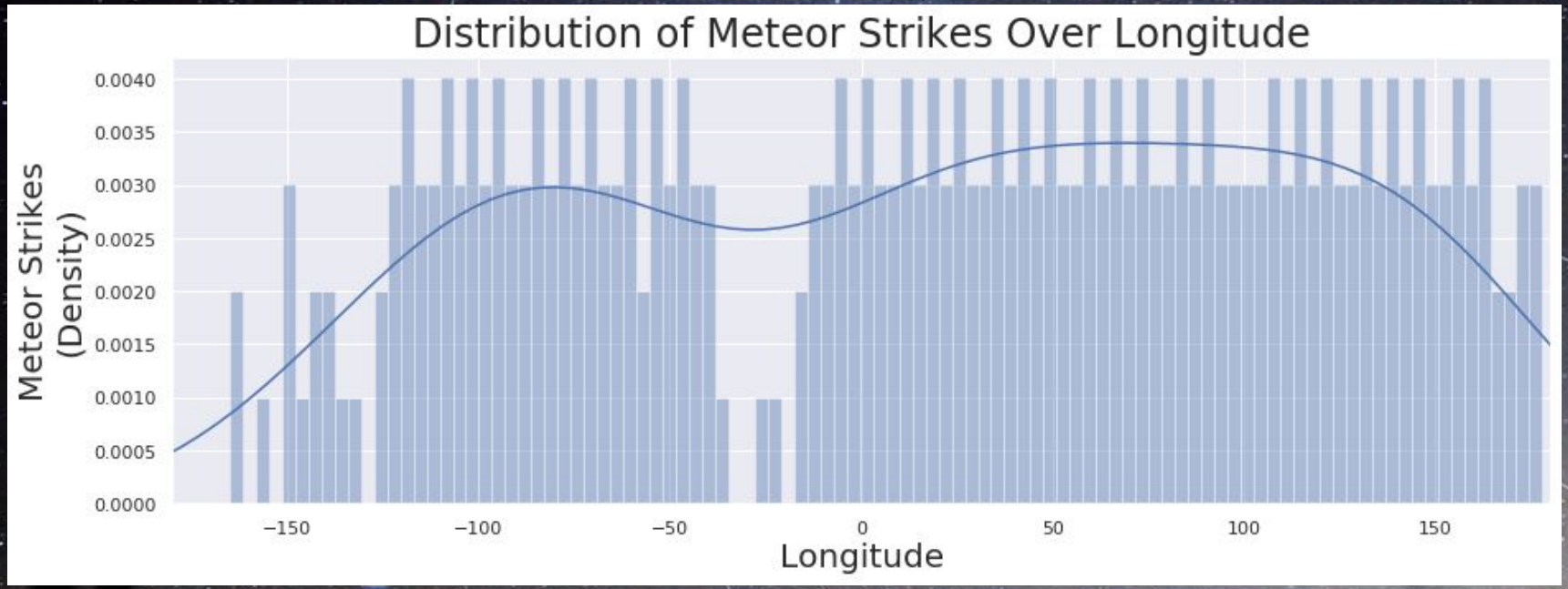
- There was no statistical significance between the masses of meteorites that were observed falling and those that were found and classified as meteors later
- Outliers larger than 1 kg were eliminated to more easily see the distribution

Has the amount of meteorite sightings changed over time?

- Proportion testing reveals a dramatic increase in the number of reported falling meteorites over time.
- Likely due to improved technology, more active amateur communities

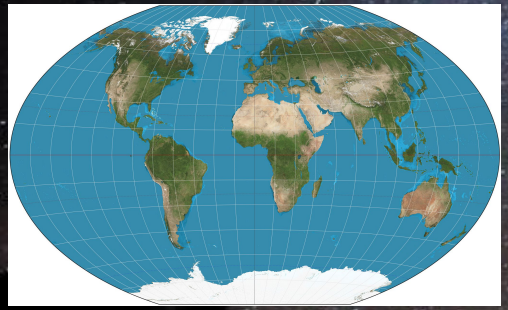


Distribution of Meteor Findings Across the Globe



Do meteorites land with equal frequency across the global landmass

- Data is probably skewed due to the proportional amount of landmass to ocean in the different earth quadrants
- Comparing landmasses only with the subregion. No results were statistically significant

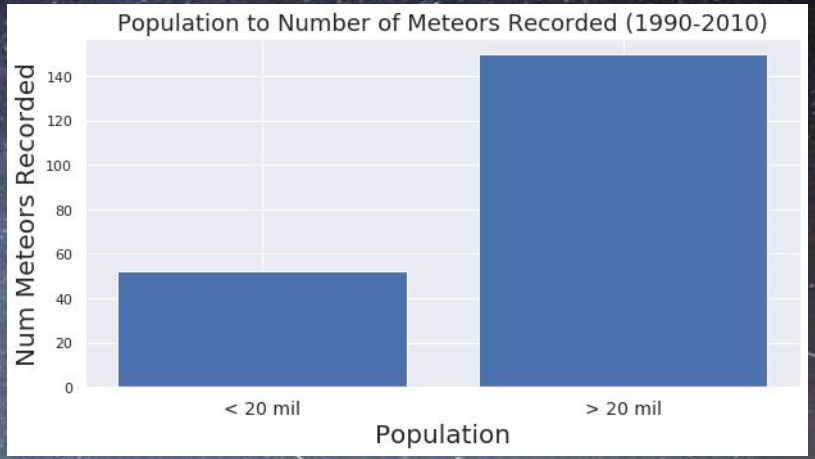


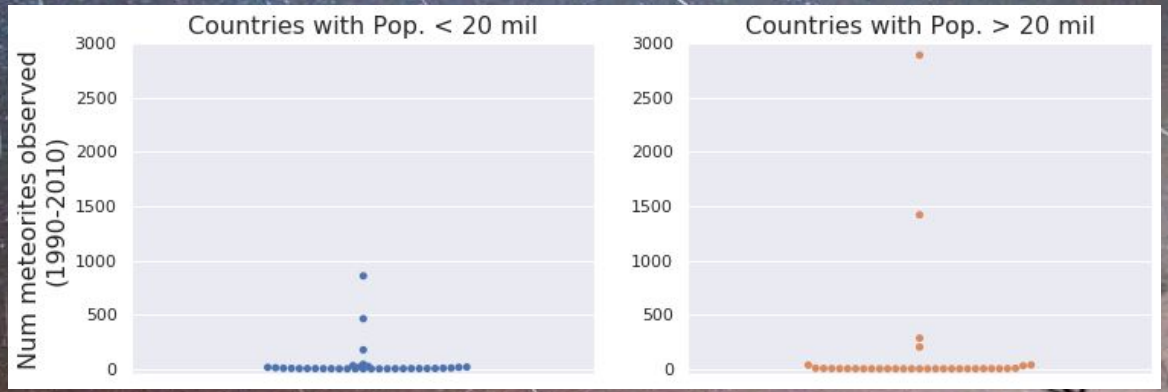
Quadrant 1	Quadrant 2	alpha 10%	alpha 5%	alpha 1%
NE	NW	Accept Ha	Accept Ha	Fail to Reject
NE	SW	Fail to Reject	Fail to Reject	Fail to Reject
NE	SE	Fail to Reject	Fail to Reject	Fail to Reject
NW	SW	Fail to Reject	Fail to Reject	Fail to Reject
NW	SE	Accept Ha	Accept Ha	Accept Ha
SW	SE	Fail to Reject	Fail to Reject	Fail to Reject

Region 1	Region 2	alpha 10%	alpha 5%	alpha 1%
Latin America & Caribbean	North America	Fail to Reject	Fail to Reject	Fail to Reject
Latin America & Caribbean	Europe & Central Asia	Fail to Reject	Fail to Reject	Fail to Reject
Latin America & Caribbean	Middle East & North Africa	Fail to Reject	Fail to Reject	Fail to Reject
Latin America & Caribbean	South Asia	Fail to Reject	Fail to Reject	Fail to Reject
Latin America & Caribbean	East Asia & Pacific	Fail to Reject	Fail to Reject	Fail to Reject
Latin America & Caribbean	Sub-Saharan Africa	Fail to Reject	Fail to Reject	Fail to Reject

Does a country's population impact how many meteorites are reported?

- Recorded meteor observations between 1990 - 2010
- Though it may appear that larger countries see more, our tests fail to prove there is a statistically significant difference.



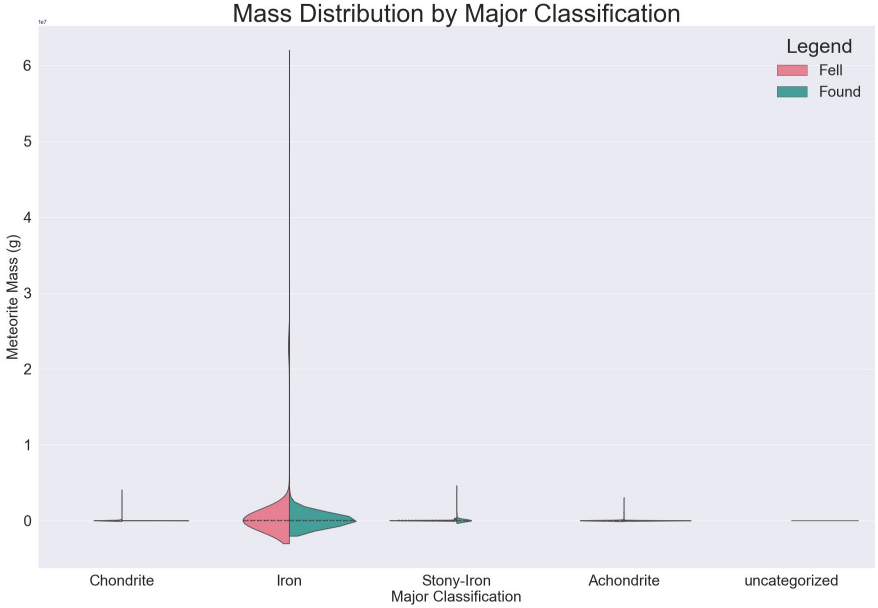


Possible Next Steps

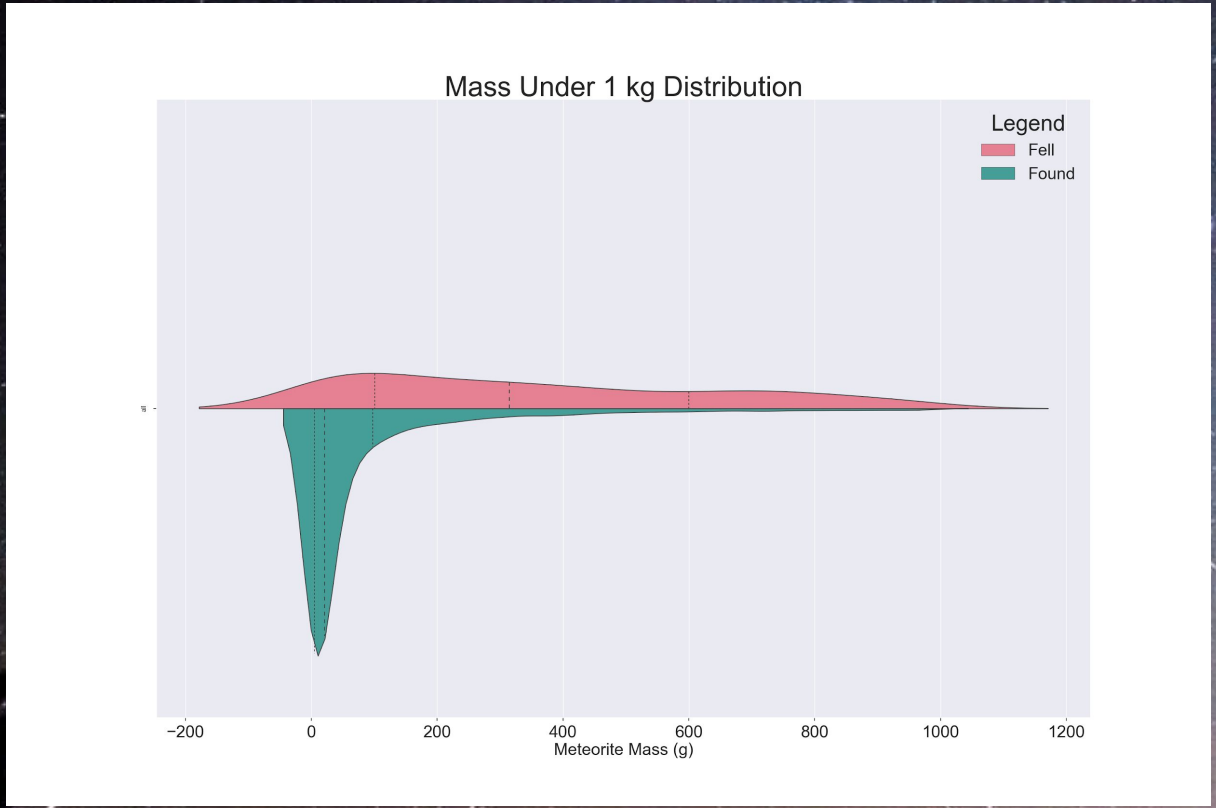
- Bring in other socioeconomic factors into the population analysis
- Timing of sightings related to annual showers


Questions?

Extra Plots


Mass Distribution by Major Classification
Legend
Fell
Found
Meteorite Mass (g)
6
5
4
3
2
1
0
Chondrite
Iron
Stony-Iron
Achondrite
uncategorized
Major Classification

Extra Plots


Mass Under 1 kg Distribution
Legend
Fell
Found
−200
0
200
400
600
800
1000
1200
Meteorite Mass (g)