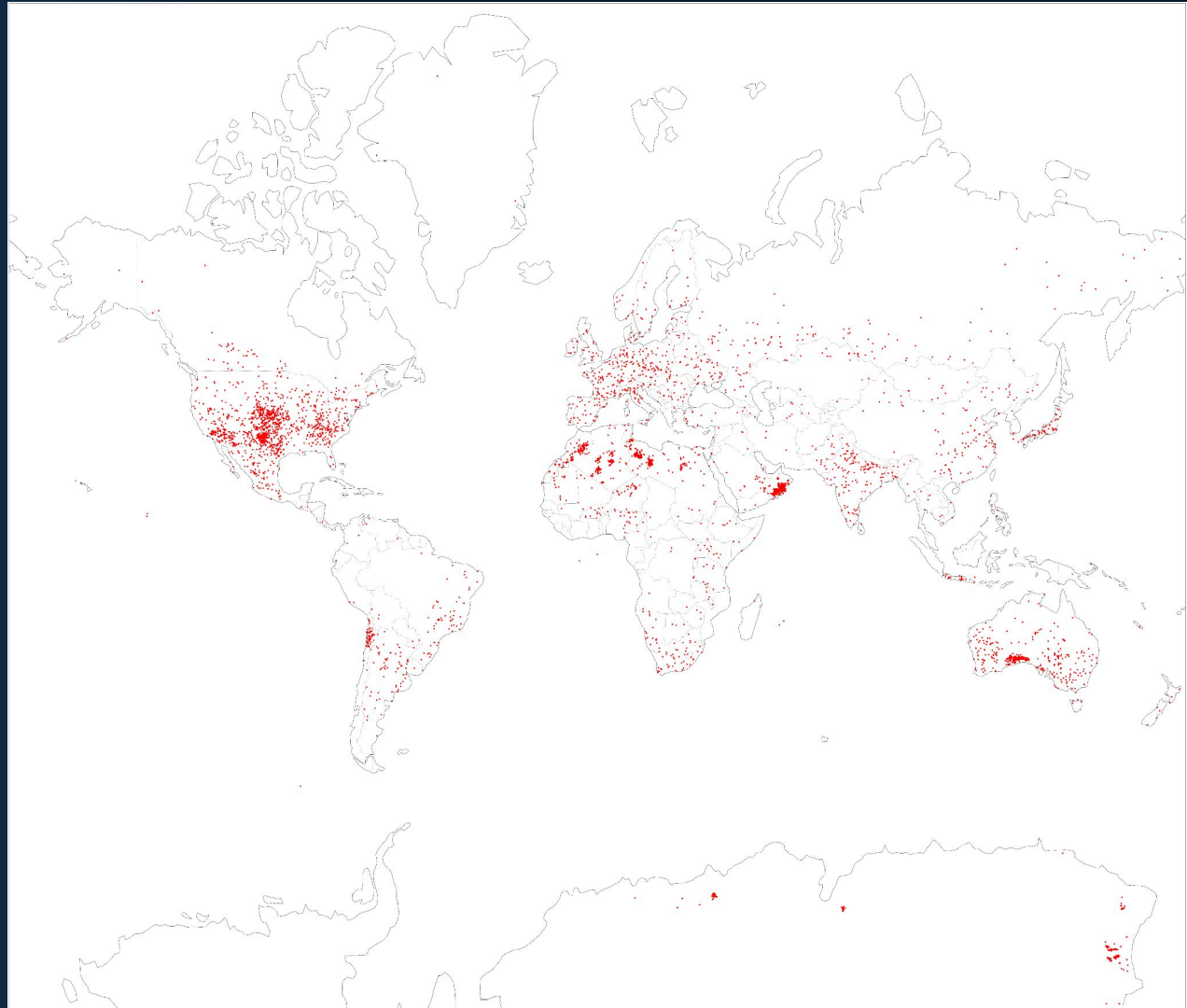
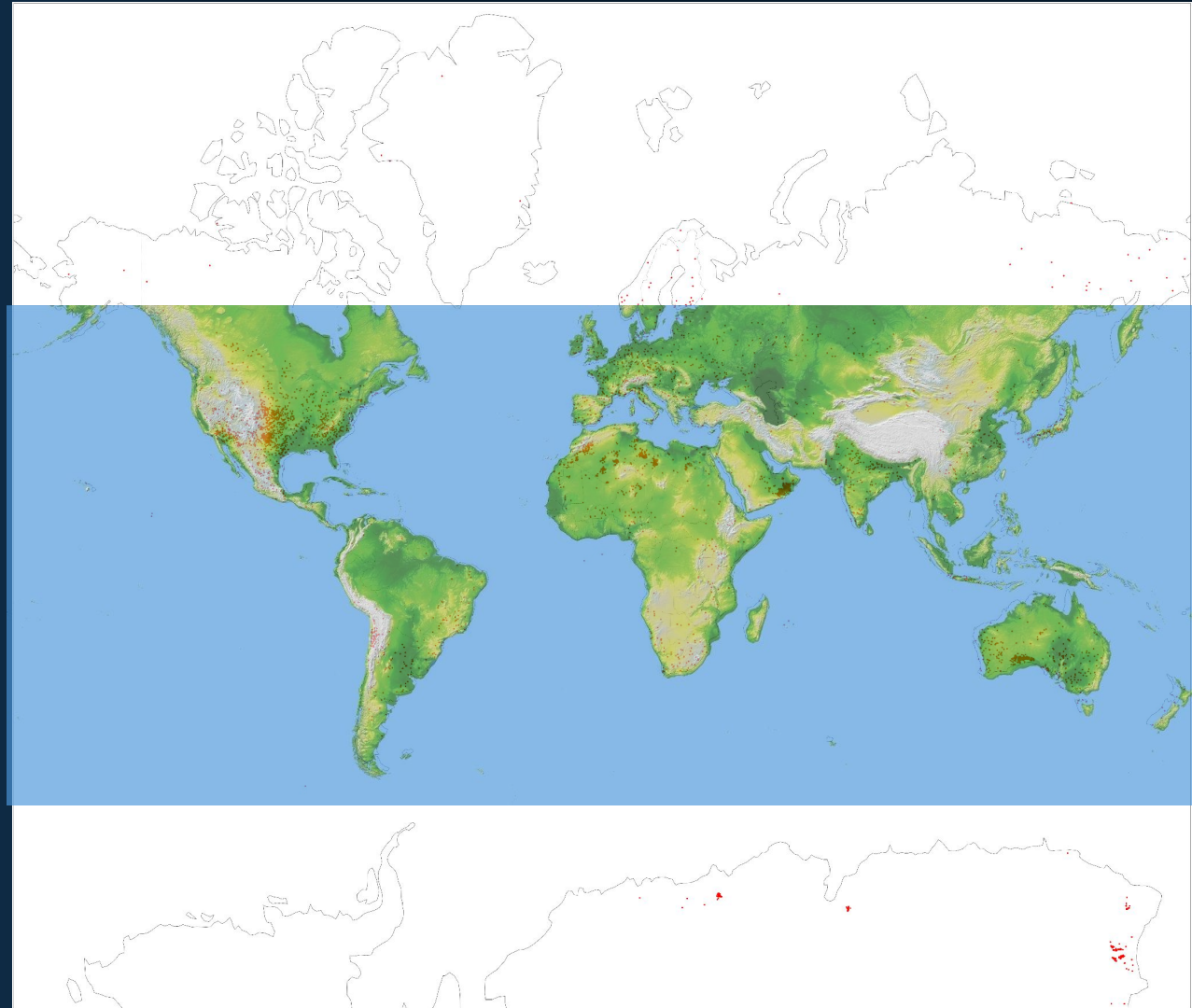
Team 9: Study of geographic hotspots for meteorite falls and mass variations

Meteorite Landings



Height above sea level



Motivation

- Meteorites that land on Earth provide valuable insights into the materials that shaped planets in the distant past.
- Studying meteorites allows us to explore the early history of our solar system, including the ages and compositions of different planetary building blocks [1].
- Additionally, meteorite hunters such as Roberto Vargas of Bristol find meteorites that are worth over $100,000. He has a personal collection of 500+ meteorites [2]. Our data-driven results could be helpful to the collectors to find more meteorites.

[1] https://science.nasa.gov/solar-system/meteors-meteorites/facts/

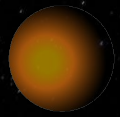
[2] https://www.youtube.com/watch?v=IDvkbsTcuVE

Dataset Overview

- The dataset contains the name, ID, name type, class, mass (g), fall year, latitude, longitude, and GeoLocation of meteorites.
- The size of the dataset is 45716 rows x 10 columns
- This comprehensive data set from NASA contains information on all of the known meteorite landings.
- Source:
- https://urldefense.com/v3/__https://catalog.data.gov/dataset/meteorite-landings__;!!Mih3wA!Hd08YAuxPfMw9Aq0REGhTCUVq6oSV1ykEDkGUO6aRpEaztgLmKBRgzVr0BWbfUpxhU-q8FohTTRuQnJQI65-$

	name	id	nametype	recclass	mass (g)	fall	year	reclat	reclong	GeoLocation
0	Aachen	1	Valid	L5	21.0	Fell	1880.0	50.77500	6.08333	(50.775, 6.08333)
1	Aarhus	2	Valid	H6	720.0	Fell	1951.0	56.18333	10.23333	(56.18333, 10.23333)

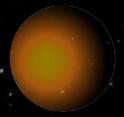
Let's Talk about Meteorite Classes



Most common classes

&

Least common classes

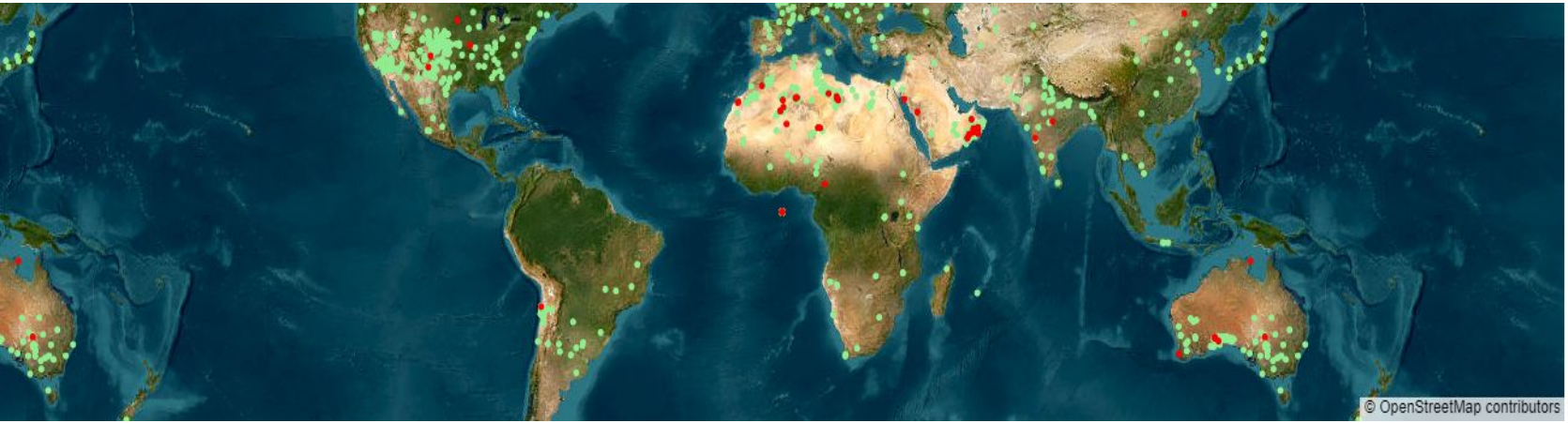


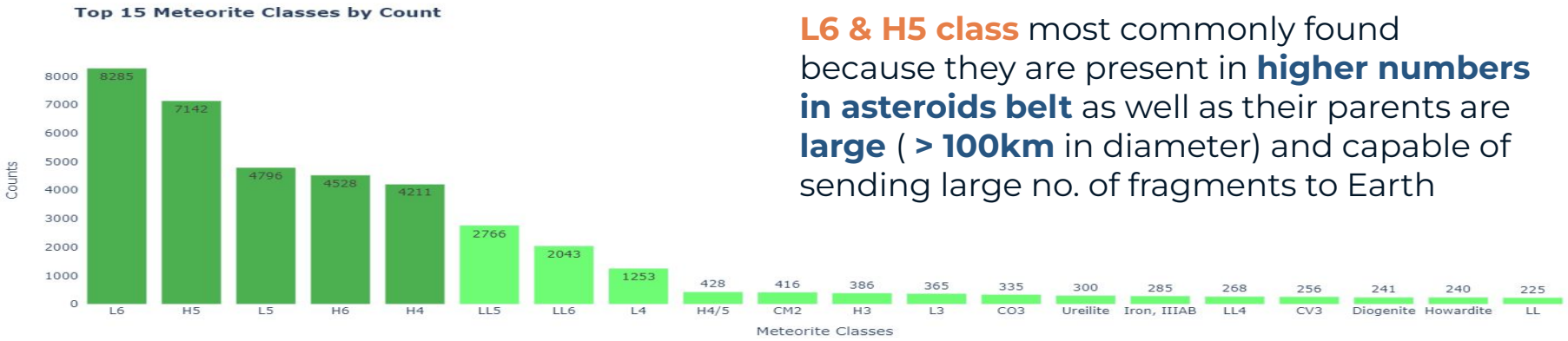
Classes

based on

Average Mass

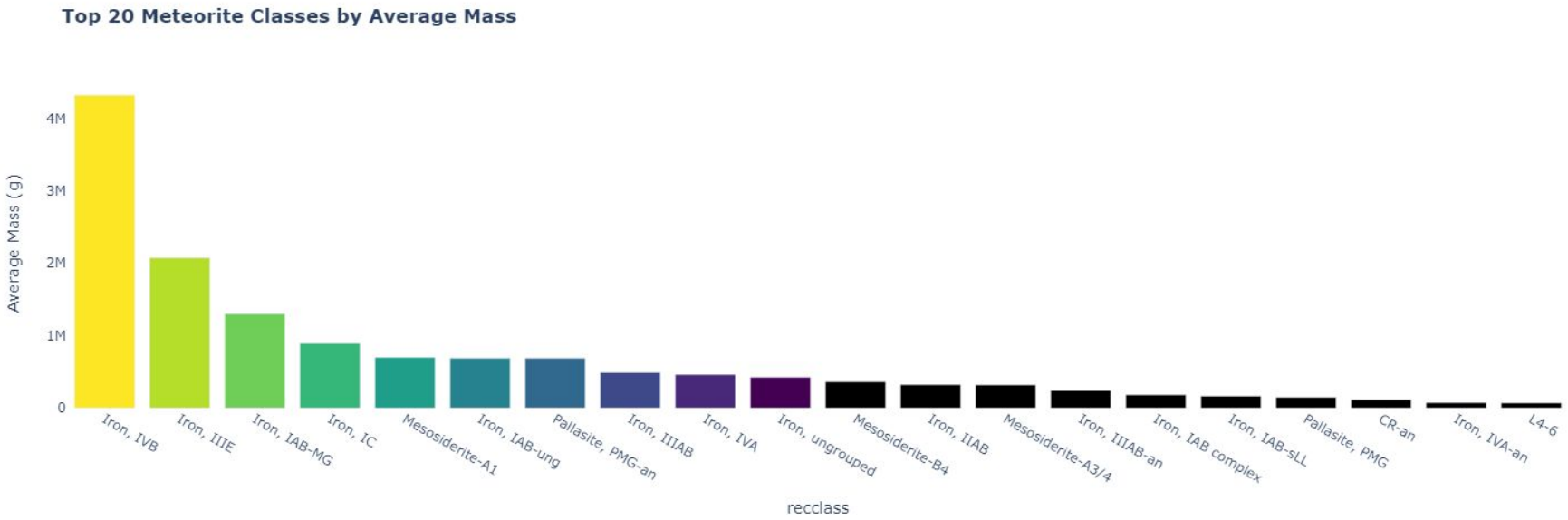
Most common classes & Least common classes





L6 & H5 class most commonly found because they are present in **higher numbers in asteroids belt** as well as their parents are **large** (**> 100km** in diameter) and capable of sending large no. of fragments to Earth

Classes based on Average Mass



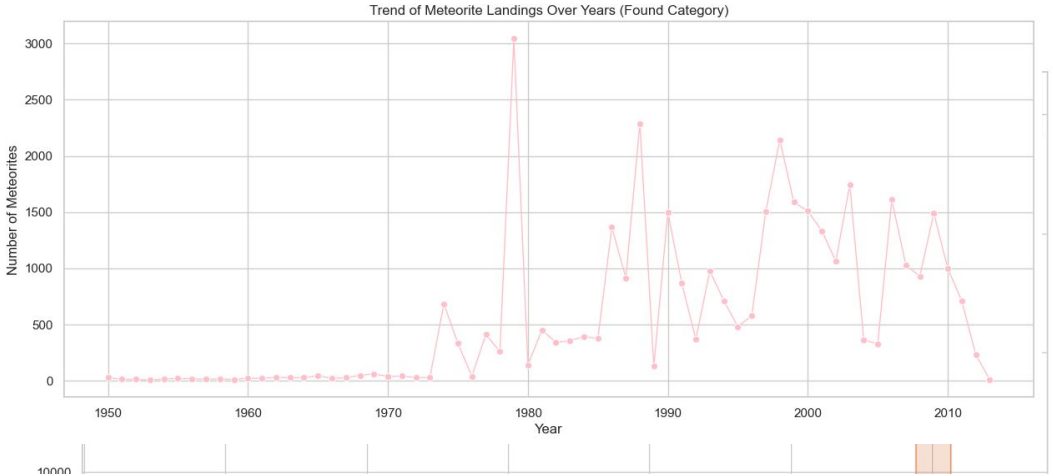
1.) "**Iron, IVB**" with very high average mass is because of it's composition of iron, which is **very dense** and heavy metal
2.) High density is equivalent to large mass for their size
3.) Others are mostly **stony meteorite** with **lesser density**

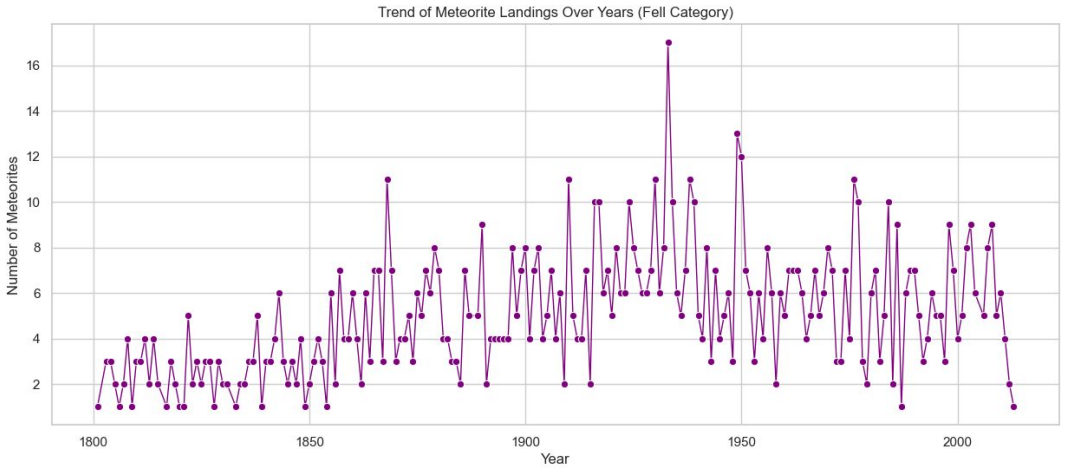
Relationship between year and fall

Fell vs Found

- A fell meteor is a meteor is one which we saw falling in the atmosphere and did not find
- A found meteorite is one which was found on the ground.

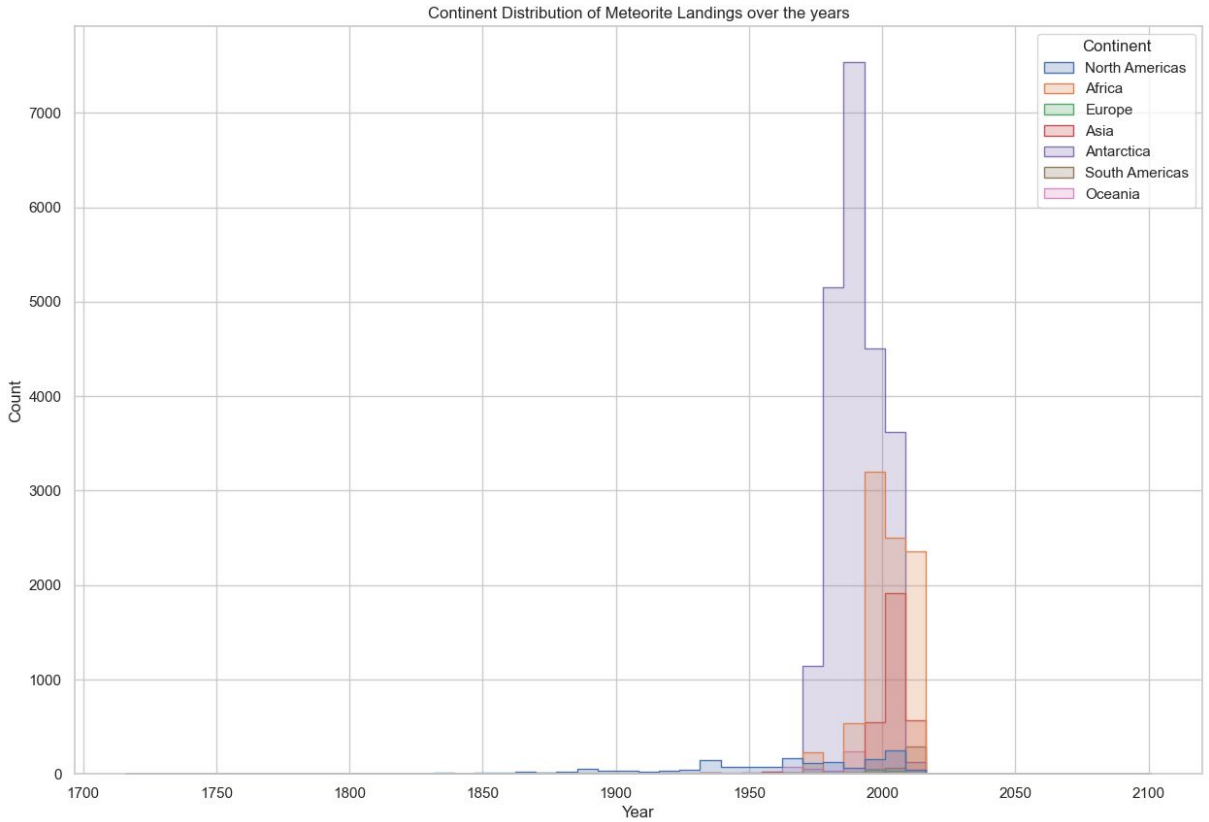
Yearly Distribution of Meteorite Landings





The **increase** in **'Found'** meteorites over recent year could be due to **improved detection methods**, increased exploration, or greater scientific interest in recent years.

Continent Distribution of Meteorite Landings over the years

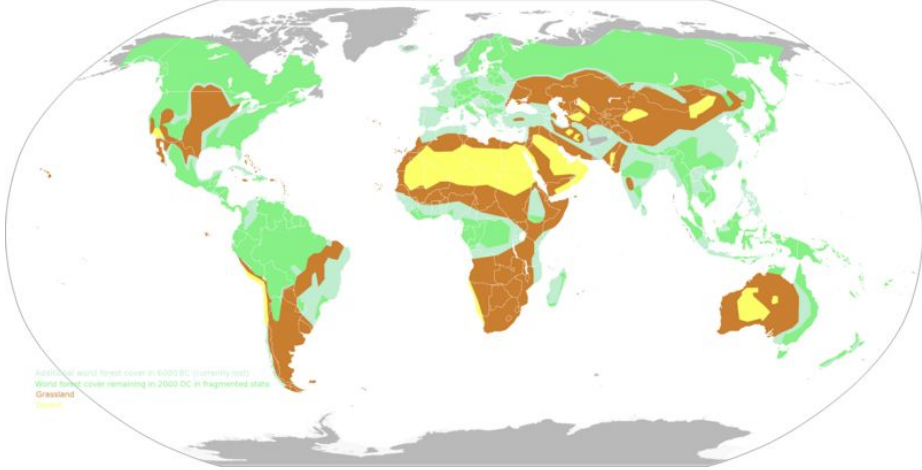


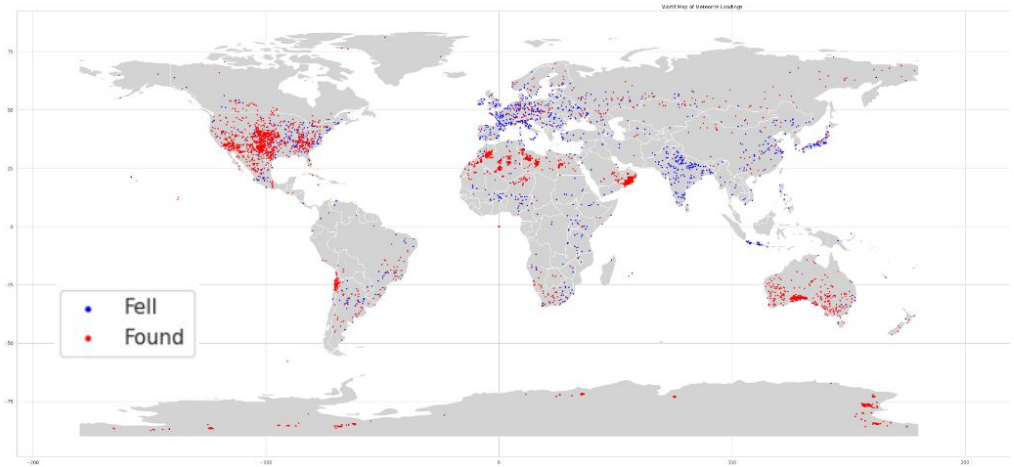
The finding of meteorites landing starts in **North America** firstly and remains a stable low number over the years, which could be due to the leading detection method of US and early interest in meteorite research.

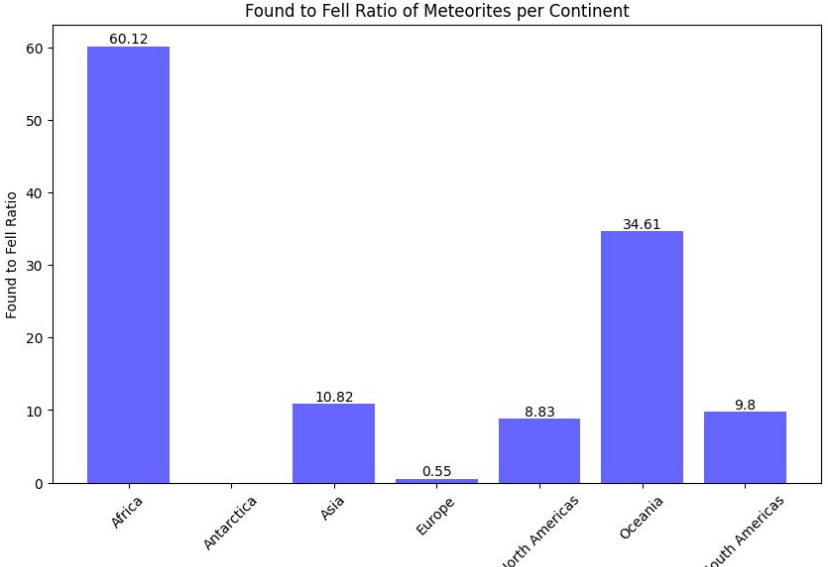
The most finding of meteorites landing are in **Antarctica** may be due to Ice Flows and Accumulation Zones, preservation by cold and dry conditions, concentrated Search Efforts.

The **sparkings** of the number of meteorites Landings are concentrated from **1990 to 2000**, which is due to the leap in detection technology and it decreases in the later year since most meteorites are already found.

Fell vs Found:
the reasons for these differences could include the **climatic conditions** of the continents, **geographical features**, population distribution, **history of scientific research** and meteorite search activities, as well as the **local level of interest** in meteorite events.







Dear Meteorite Hunters

The key takeaway of our project, don’t hunt for meteorites in the ocean

Thank you!

Mass Variation

	mass (g)
count	4.558500e+04
mean	1.327808e+04
std	5.749889e+05
min	0.000000e+00
25%	7.200000e+00
50%	3.260000e+01
75%	2.026000e+02
max	6.000000e+07