

Natural Disasters vs. Geographical Impact



By: Ashley, Shileola, Daniel & Jessamyn



**Severe climate change
may bring more
extreme weather
patterns - increased
counts of typhoons,
floods, wildfires, etc.**

- 01 - Defining Natural disaster
- 02 - Analysis/Statistics
- 04 - Conclusions



O1 - Natural Disaster defined



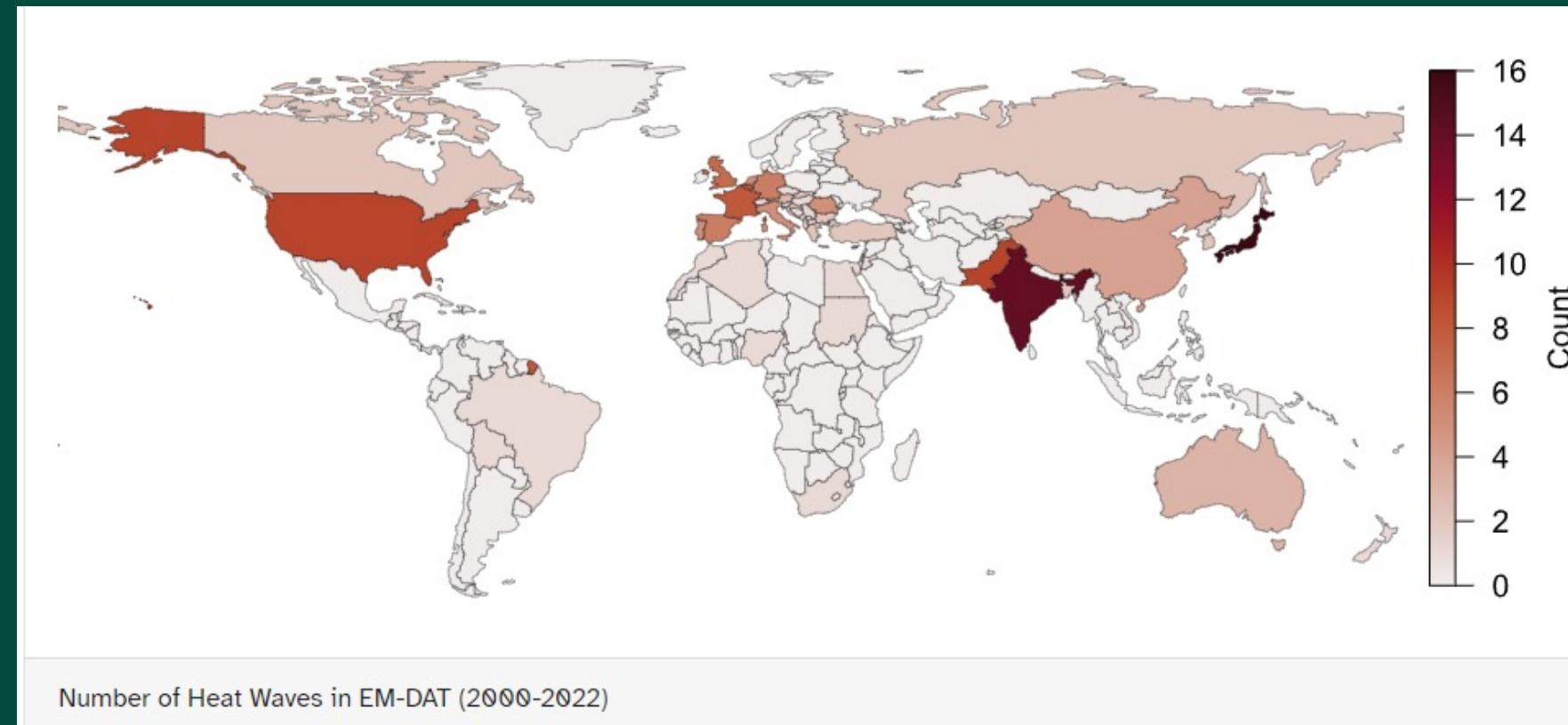
“A situation or event which overwhelms local capacity, necessitating a request to the national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction, and human suffering.”

EM-DAT Definition of Disaster

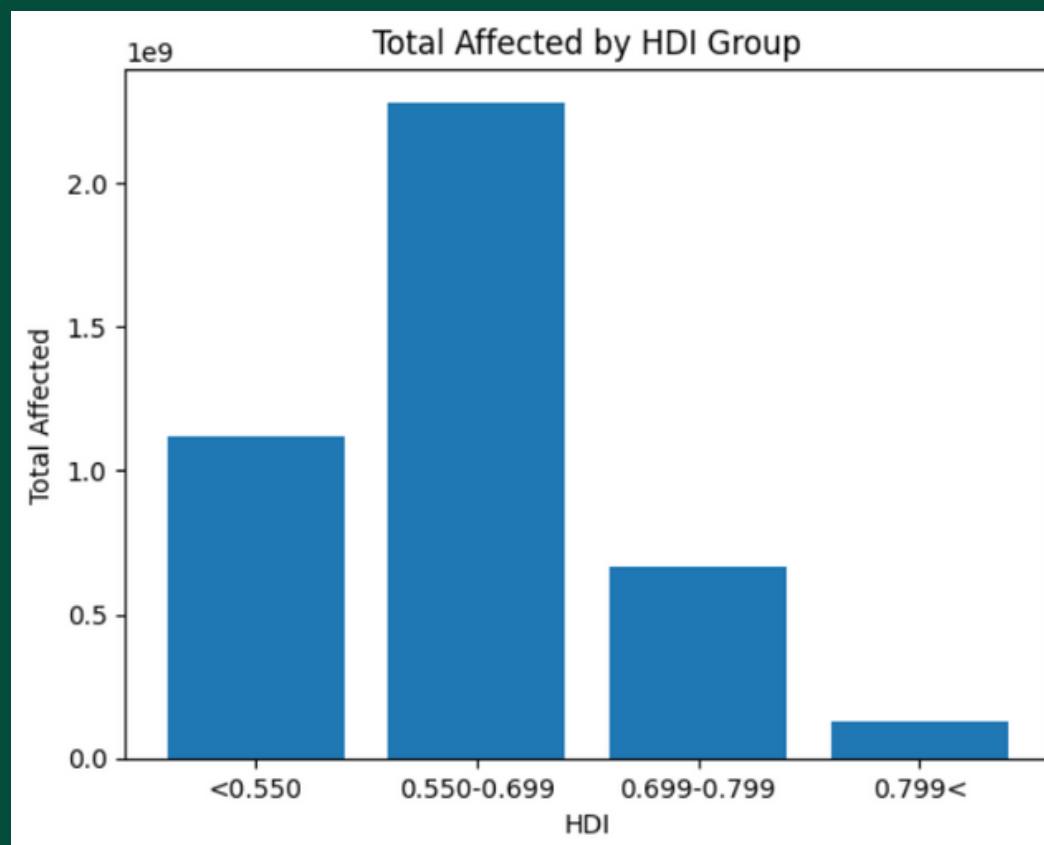
The EM-DAT is an internal disaster database maintained and distributed by the Center for Research on the Epidemiology of Disasters (CRED) based in Belgium. The EM-DAT records disasters and their impacts on a country level.

EM-DAT Definition of Disaster

Biases and Limitations

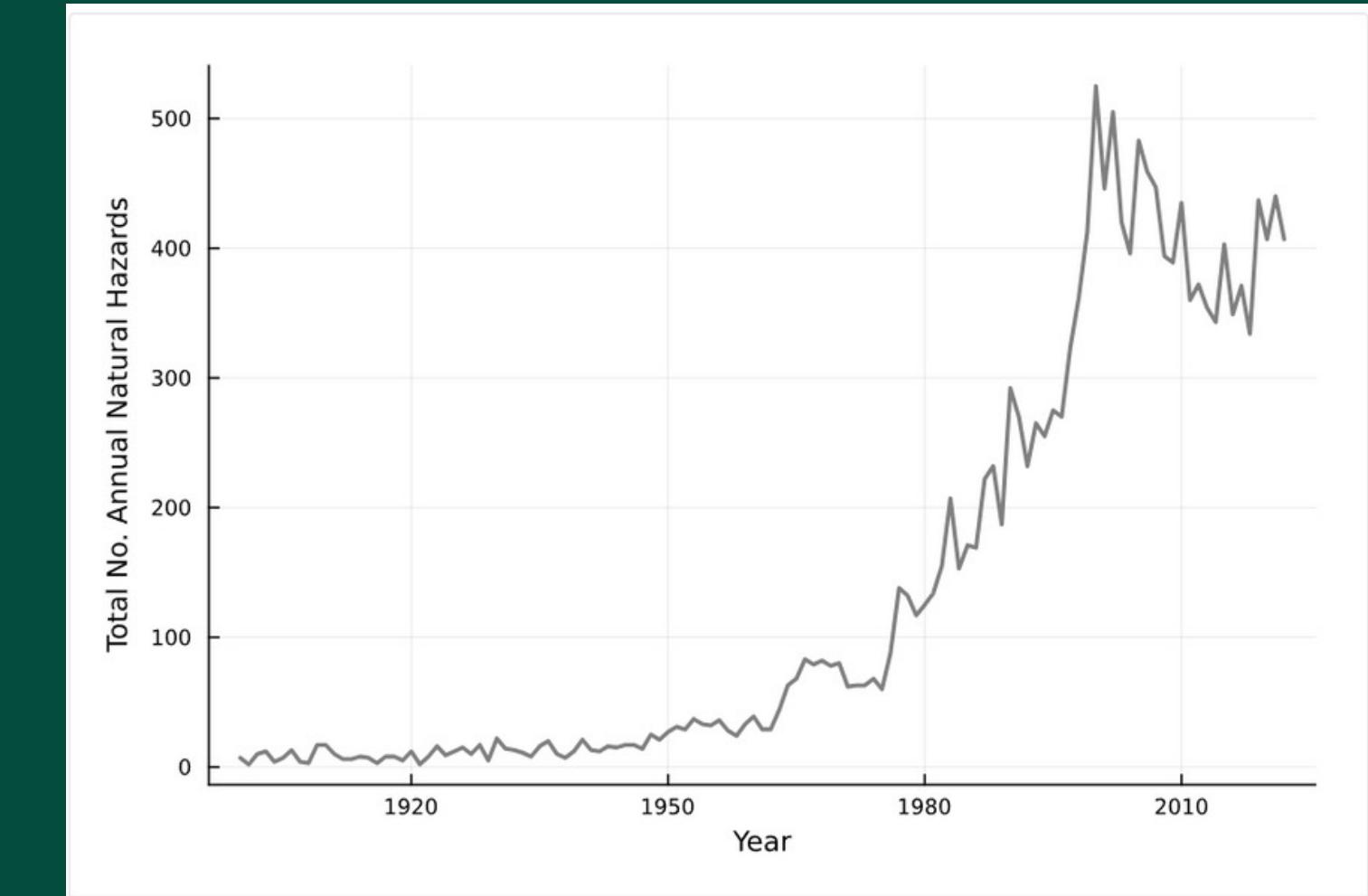


Geographic biased underreporting

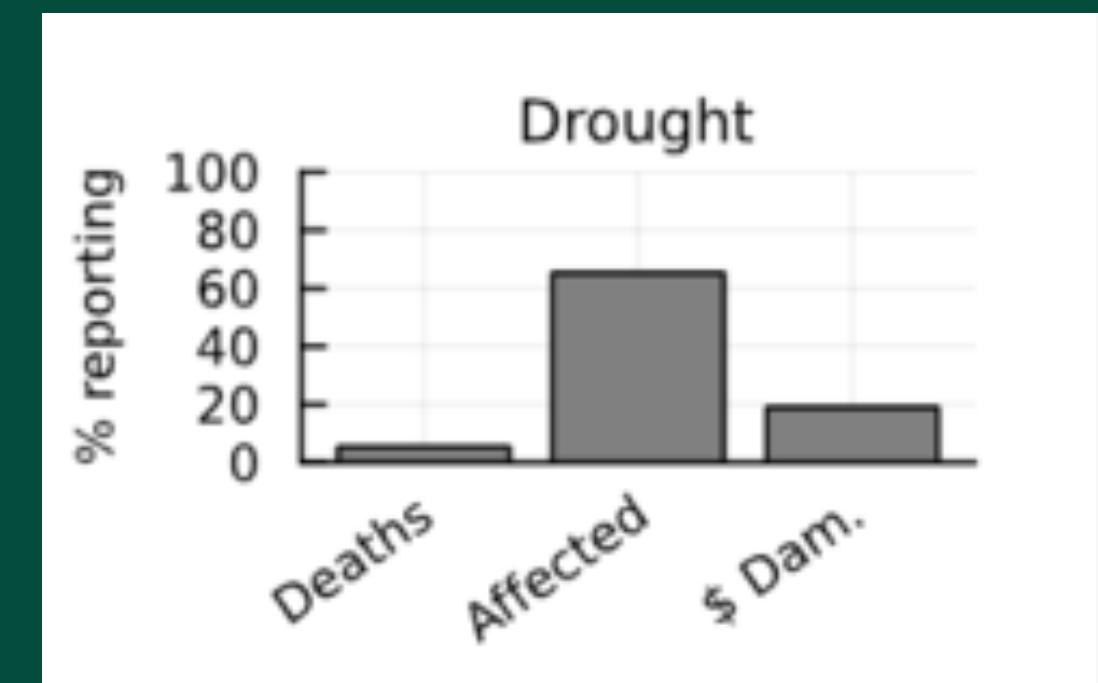


Total Affected = Homes Damaged, biased against the poorest countries

Some disasters have incomplete reporting



Database incomplete before 2000



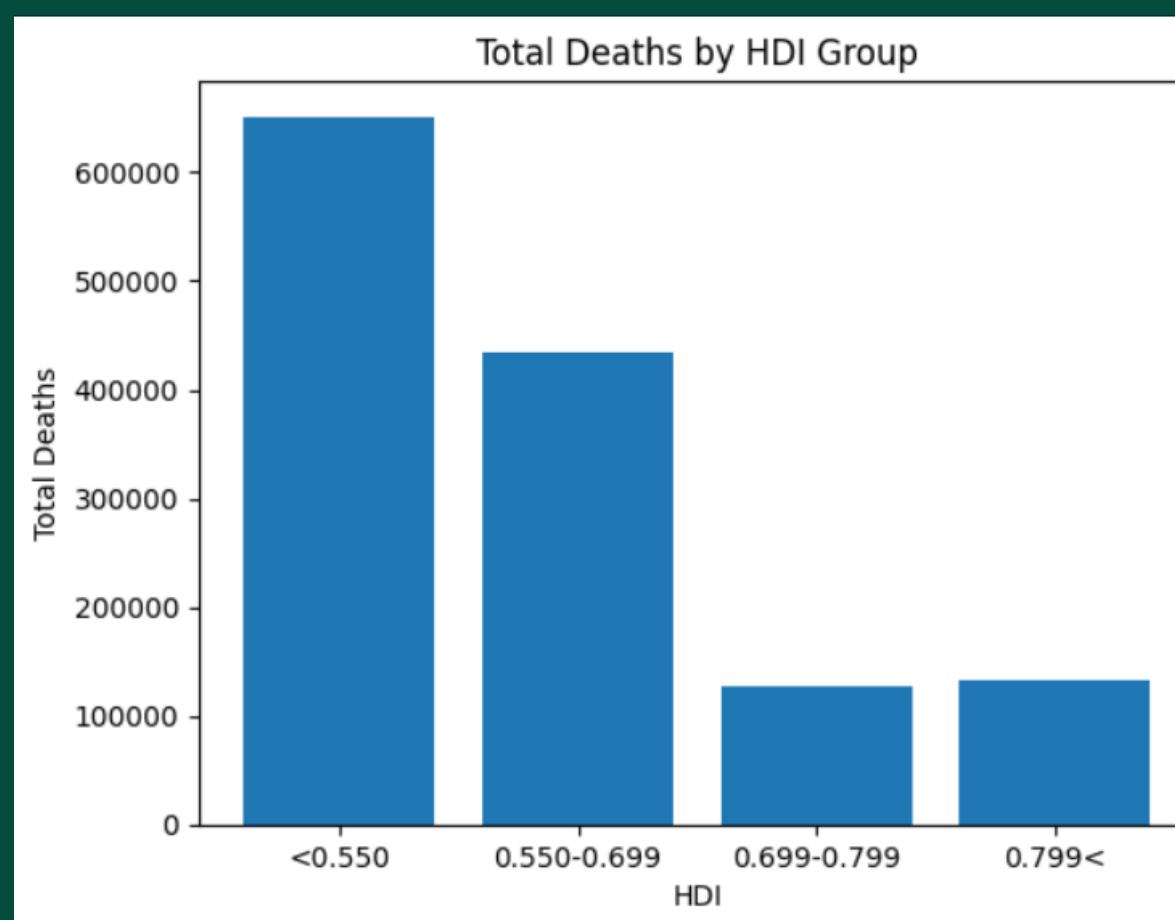


O₂ - Analysis

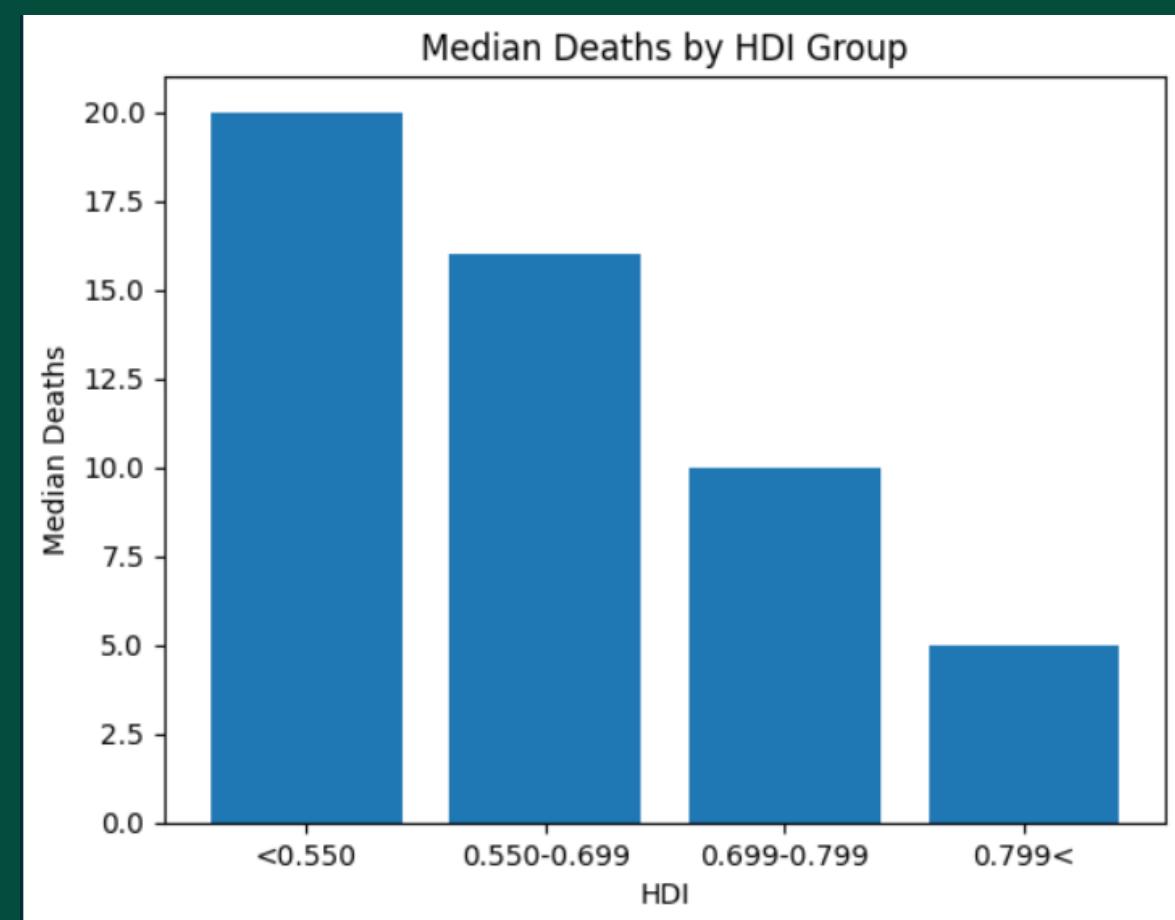
Disaster Severity and HDI

- HDI is the largest factor in disaster severity across multiple axes.
- Lower HDI countries are more vulnerable to disasters on account of both quantity and severity.

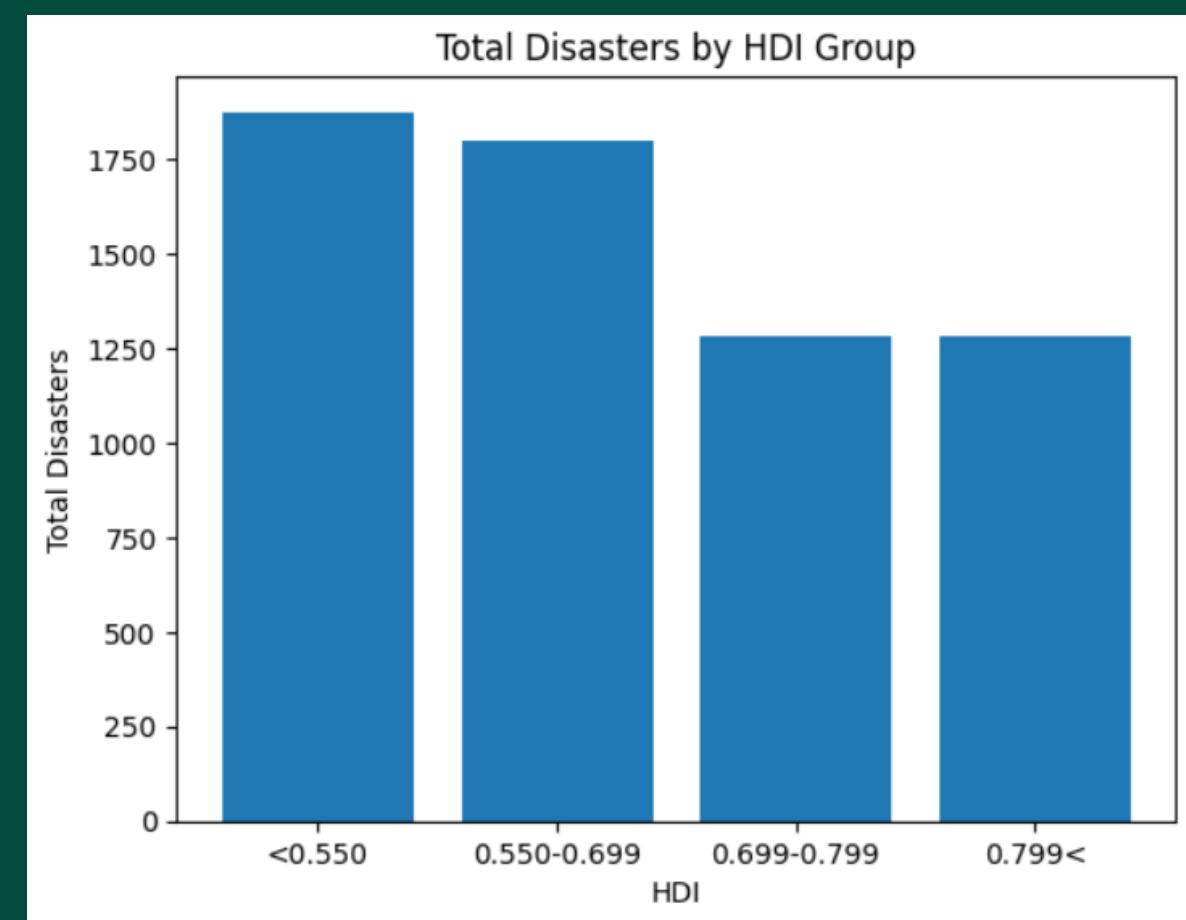
Human Development Index (HDI) takes into account life expectancy, education, and gross national income per capita.



People are more at risk to natural disasters in low HDI countries



The median disaster is 2-4x more severe in low HDI countries.

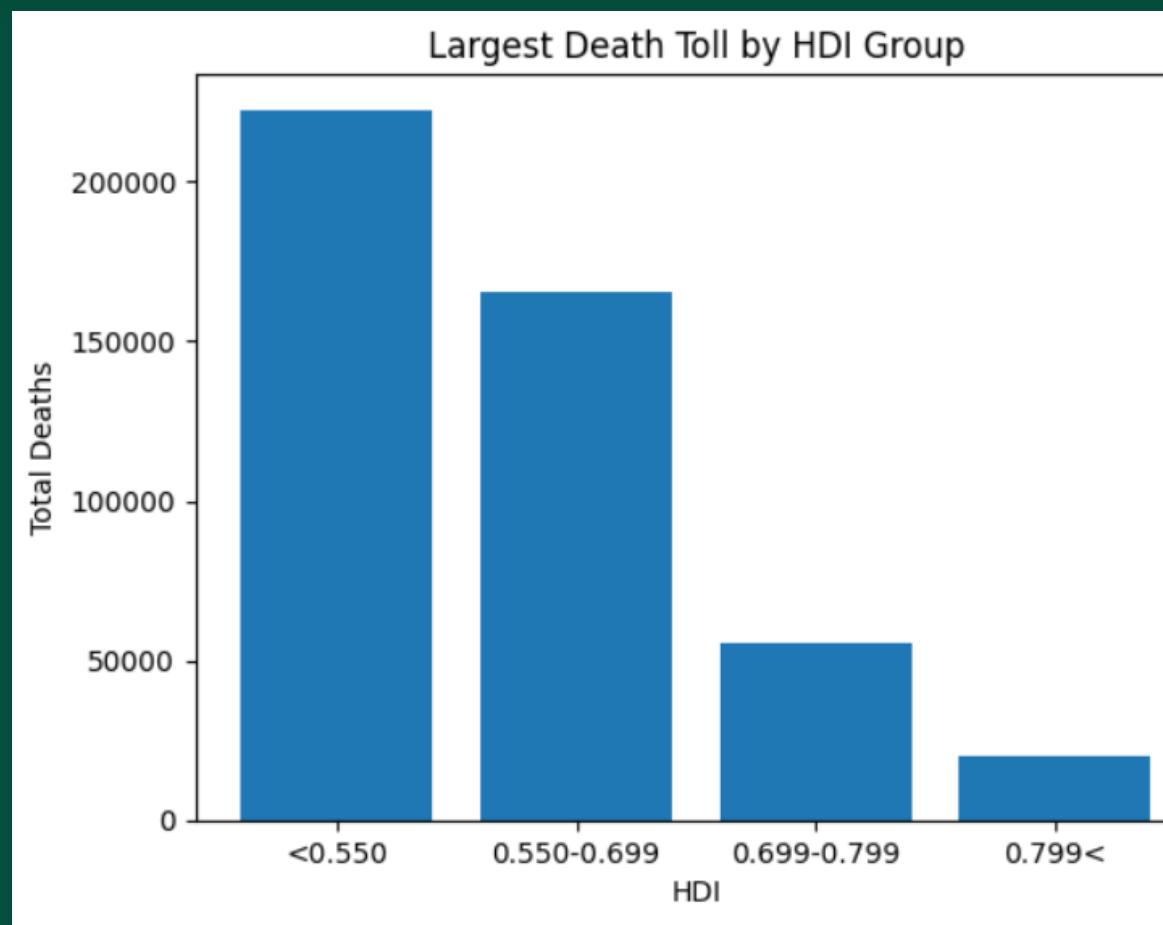


Disasters are more common in low HDI countries.

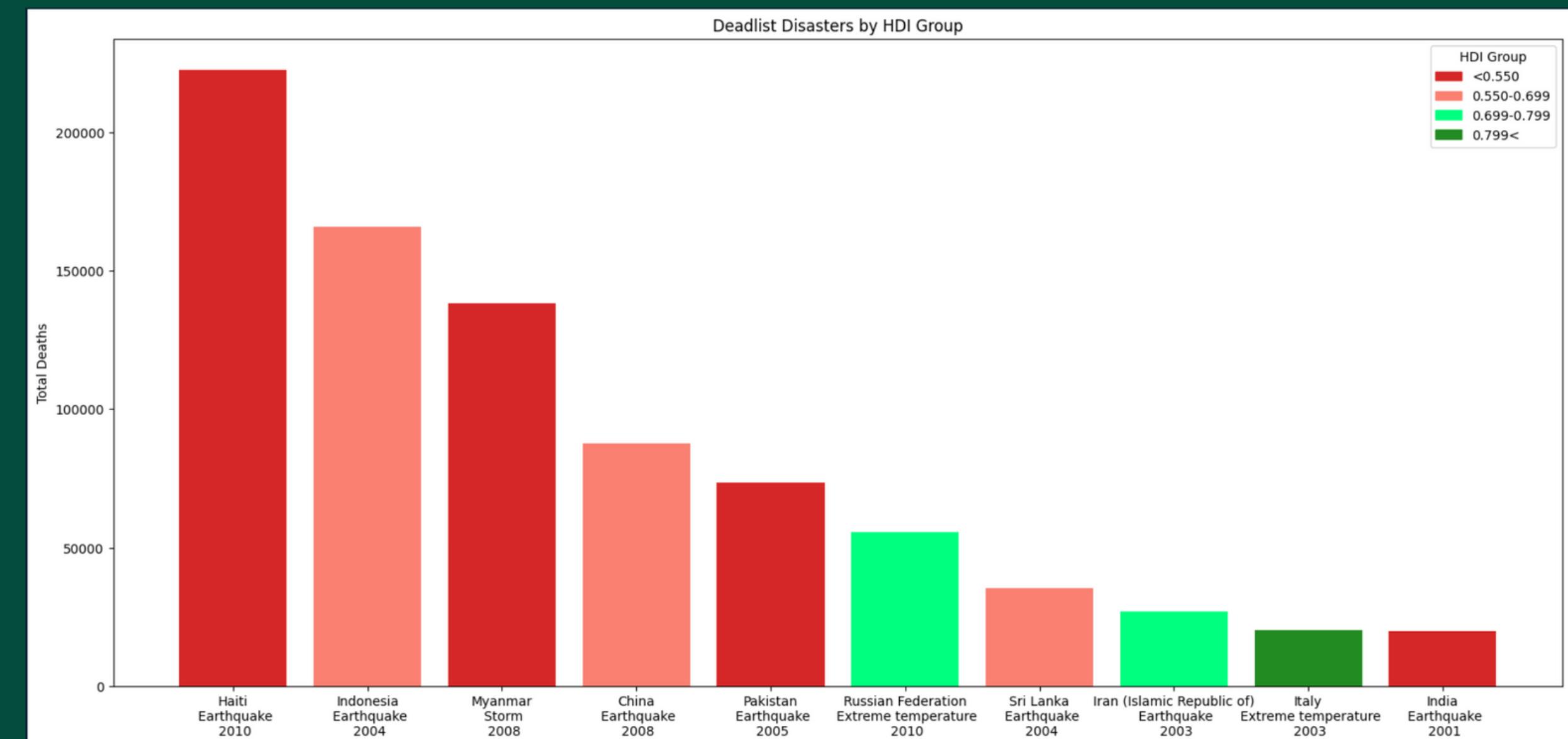
Disaster Severity and HDI (cont.)

- It is clear that lower HDI countries need more support to mitigate the effects from natural disasters.
- Lower HDI countries do not have the resources to mitigate the severity of disasters that higher HDI countries have.

High HDI countries are able to mitigate the most severe disasters from occurring.



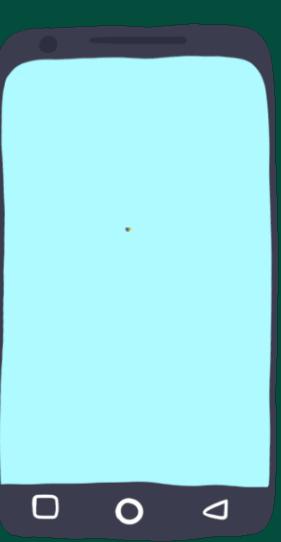
Grouping the deadliest disasters by HDI group shows how countries with a lower HDI are significantly more vulnerable to mass casualties.





Spatial Distribution

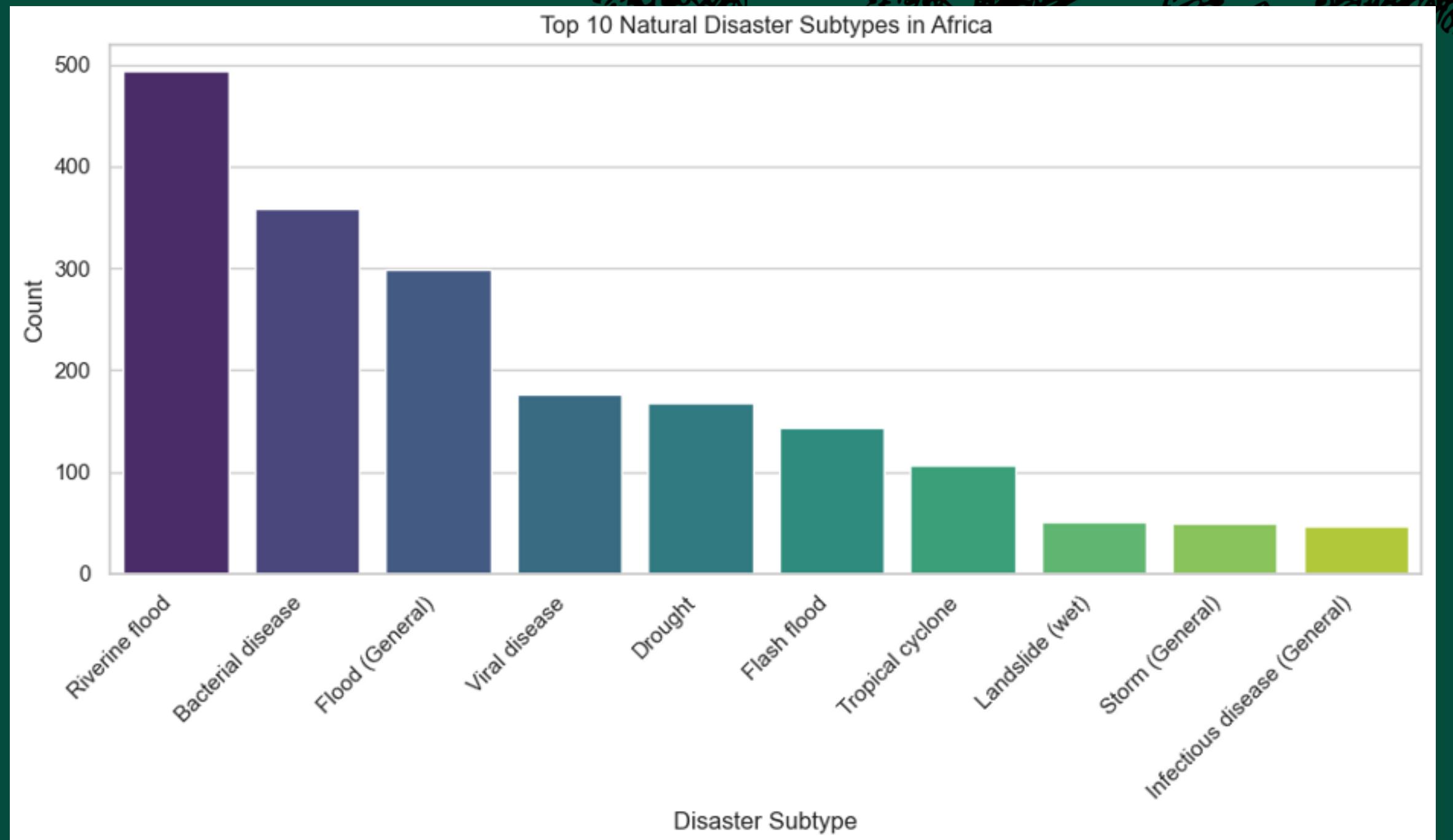
The spatial distribution analysis of natural disasters entails a comprehensive exploration of the intricate geographical patterns and arrangements of diverse catastrophic events occurring across the Earth's vast surface.



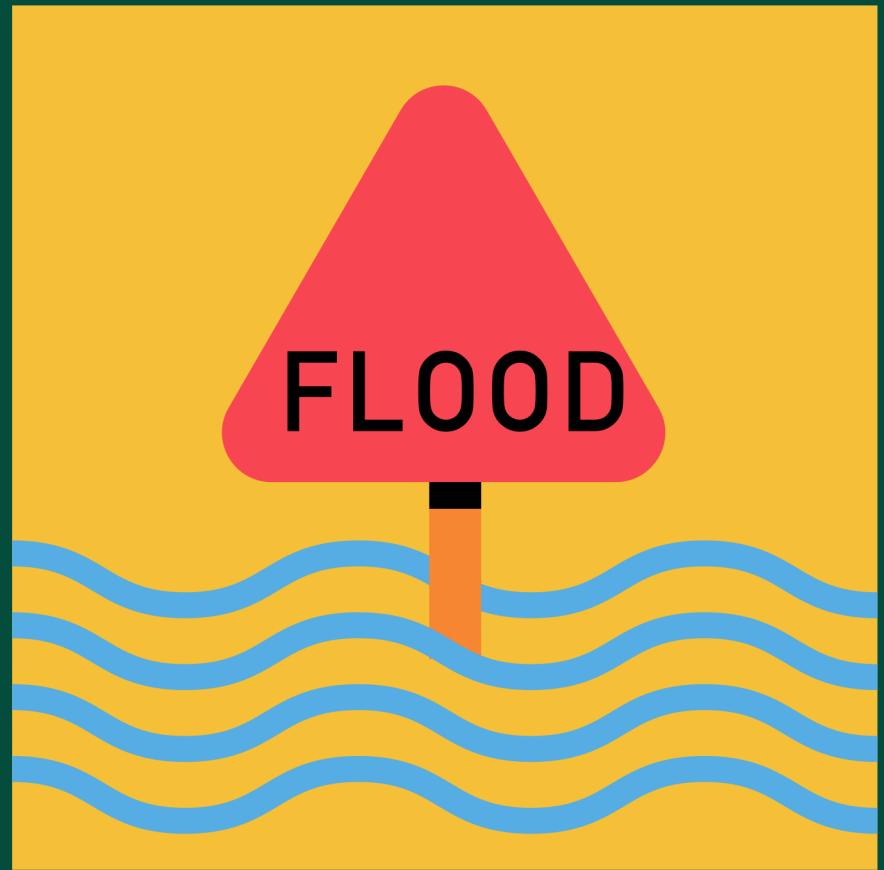
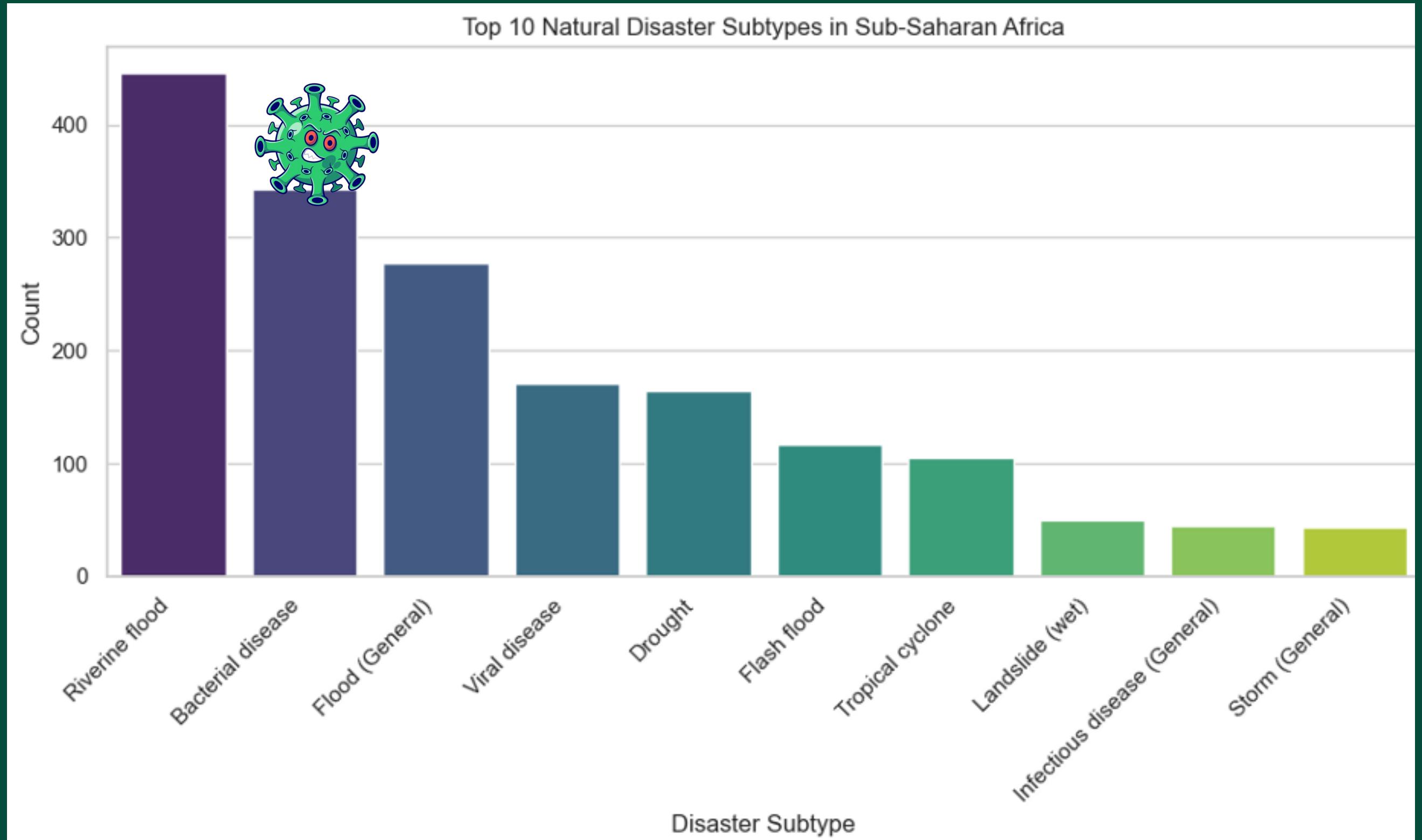
This multifaceted investigation involves not only discerning where these natural disasters are more prone to happen but also delving into the nuances of their frequency and intensity across various regions, thereby creating patterns and trends.



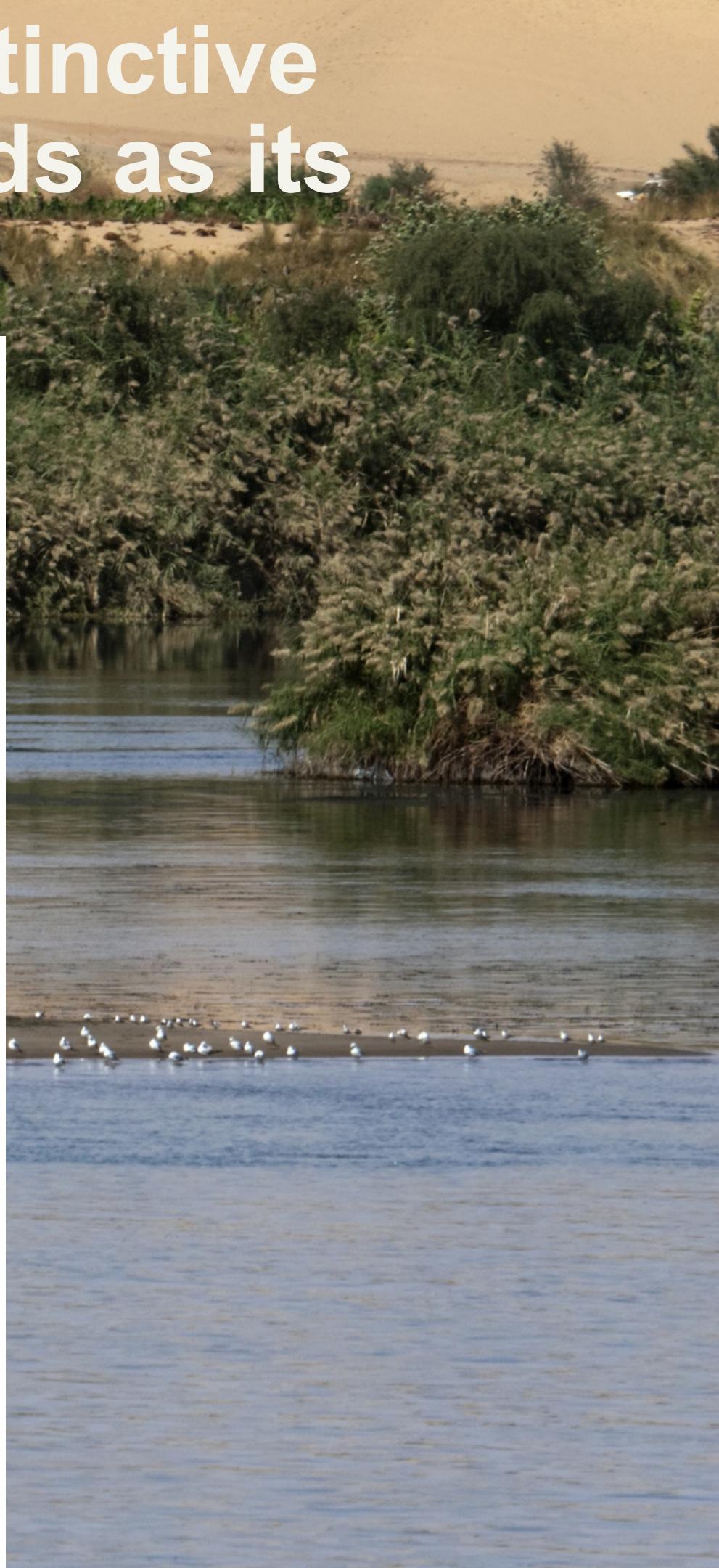
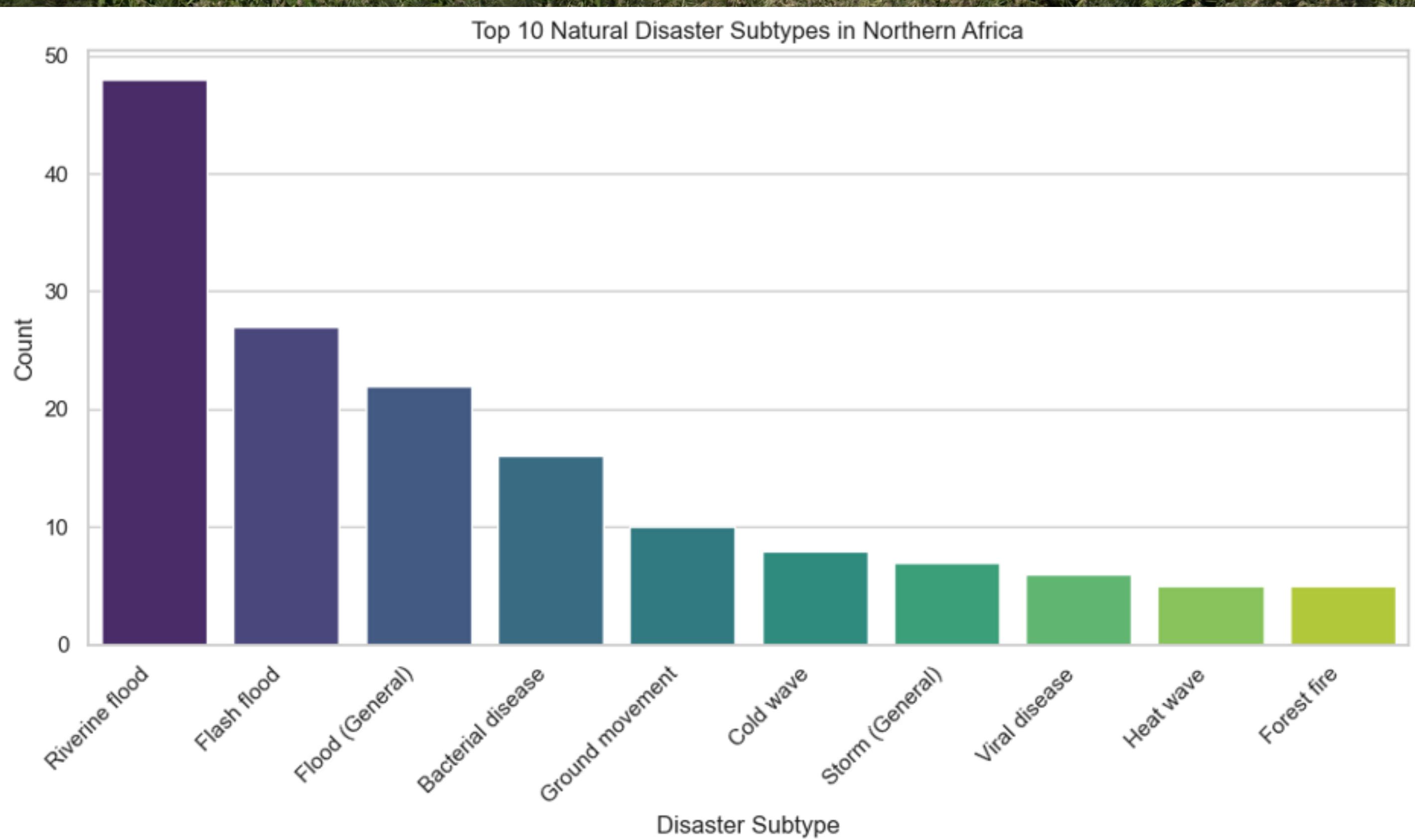
In the course of my spatial distribution inquiry, I analyzed distinct continents, and the prevailing natural disasters endemic to each region. The African continent, for instance, exhibits a inclination for riverine floods and bacterial diseases.



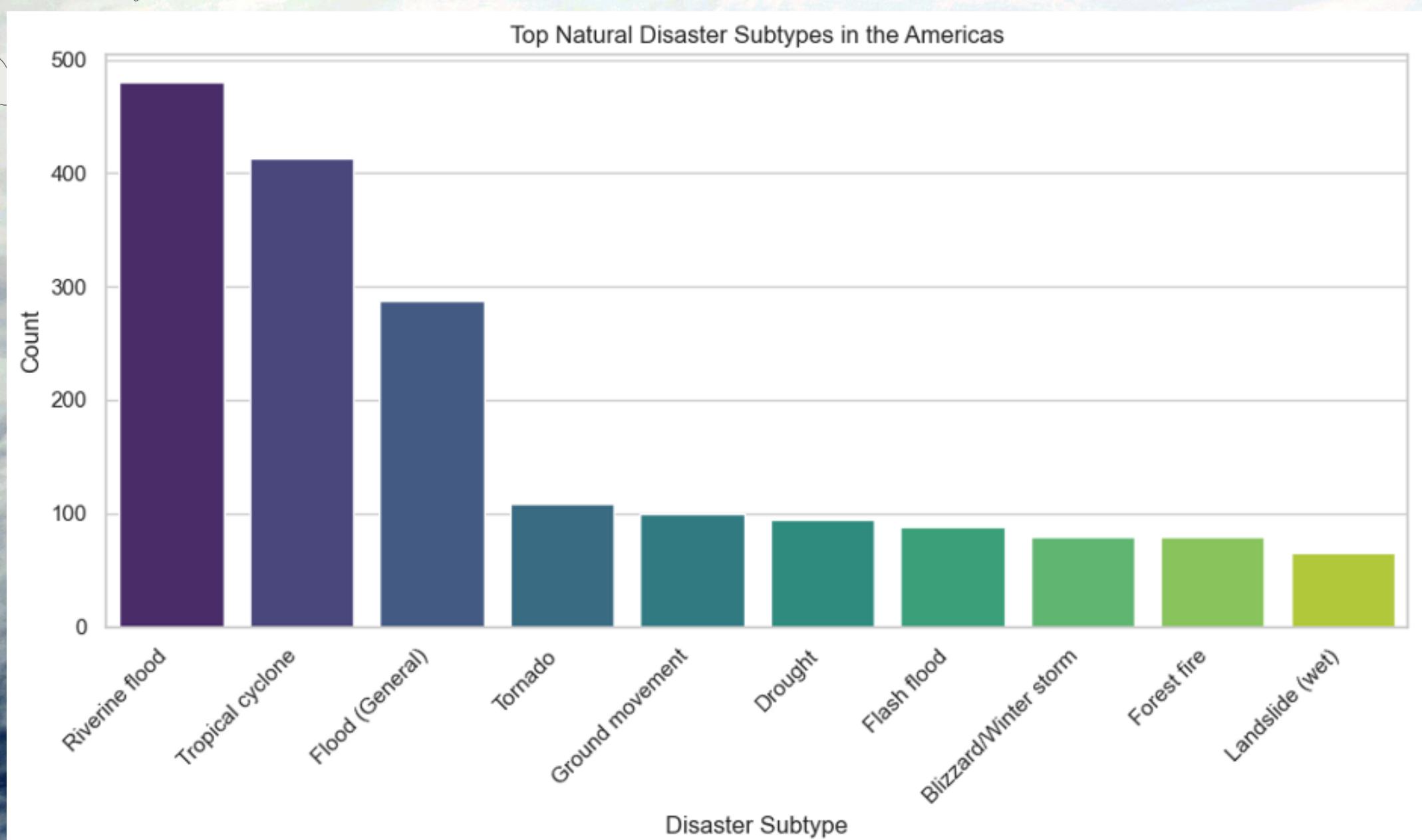
However, upon further detail into its subregions, a new divergence emerges. Sub-Saharan Africa maintains the prevalence of riverine floods and bacterial diseases.



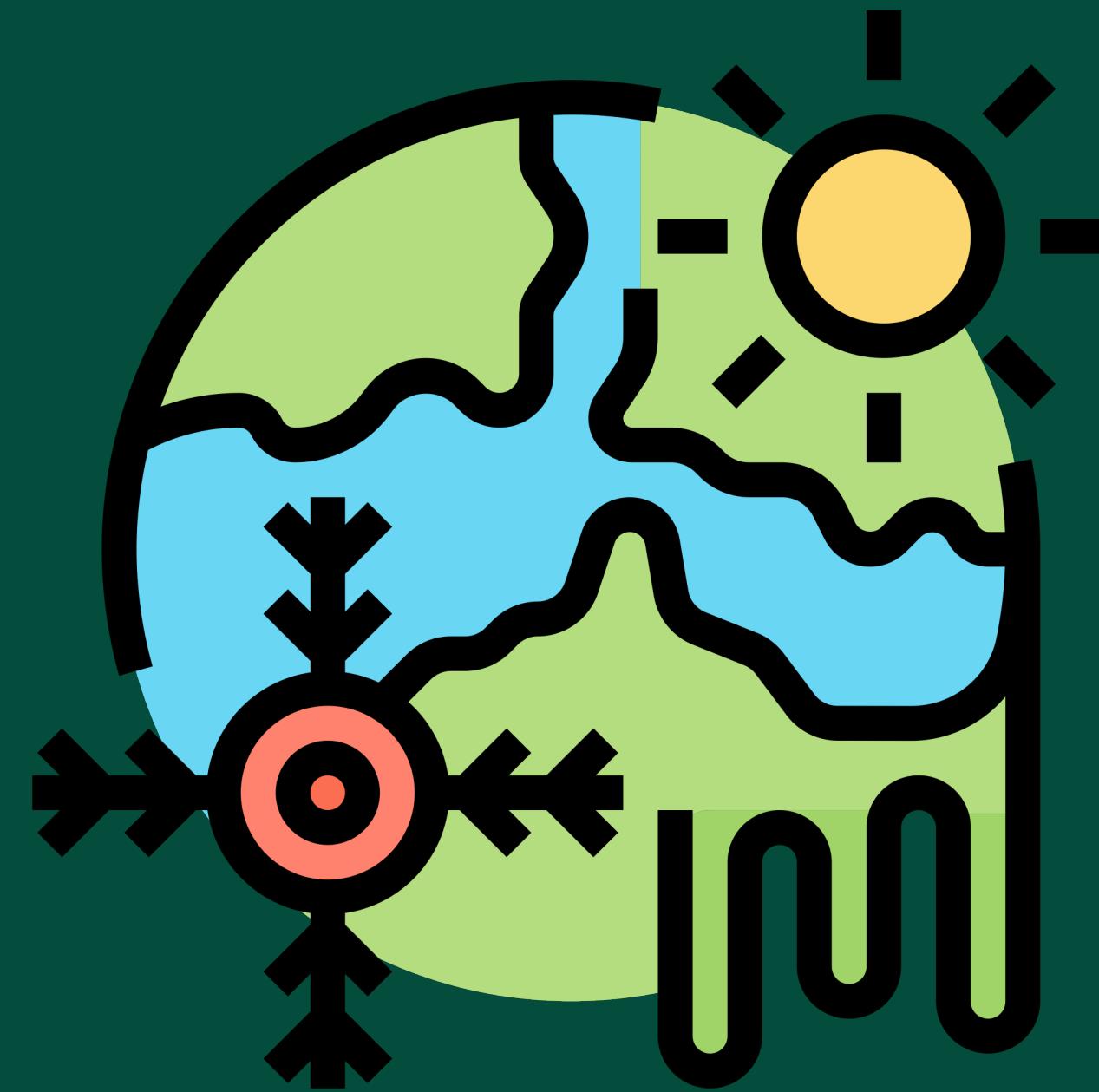
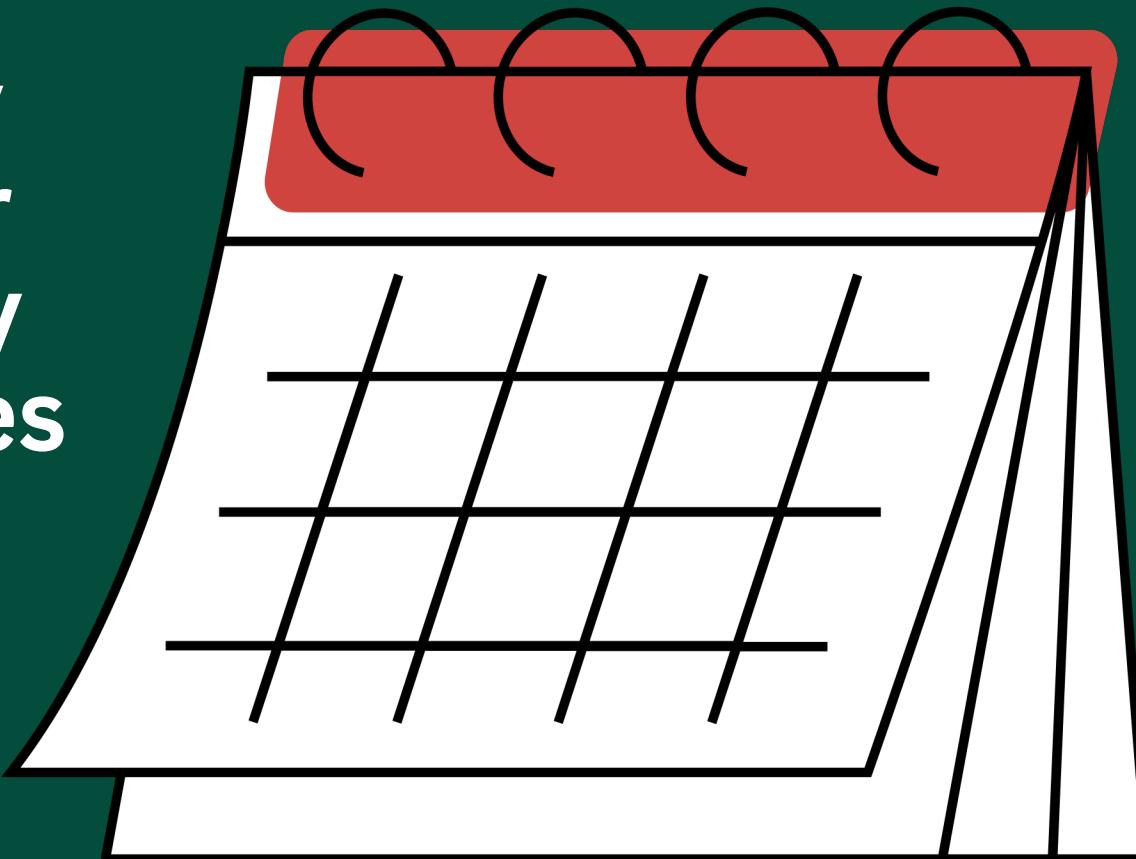
While Northern Africa contends with a distinctive emphasis on flash floods and riverine floods as its foremost natural disasters.



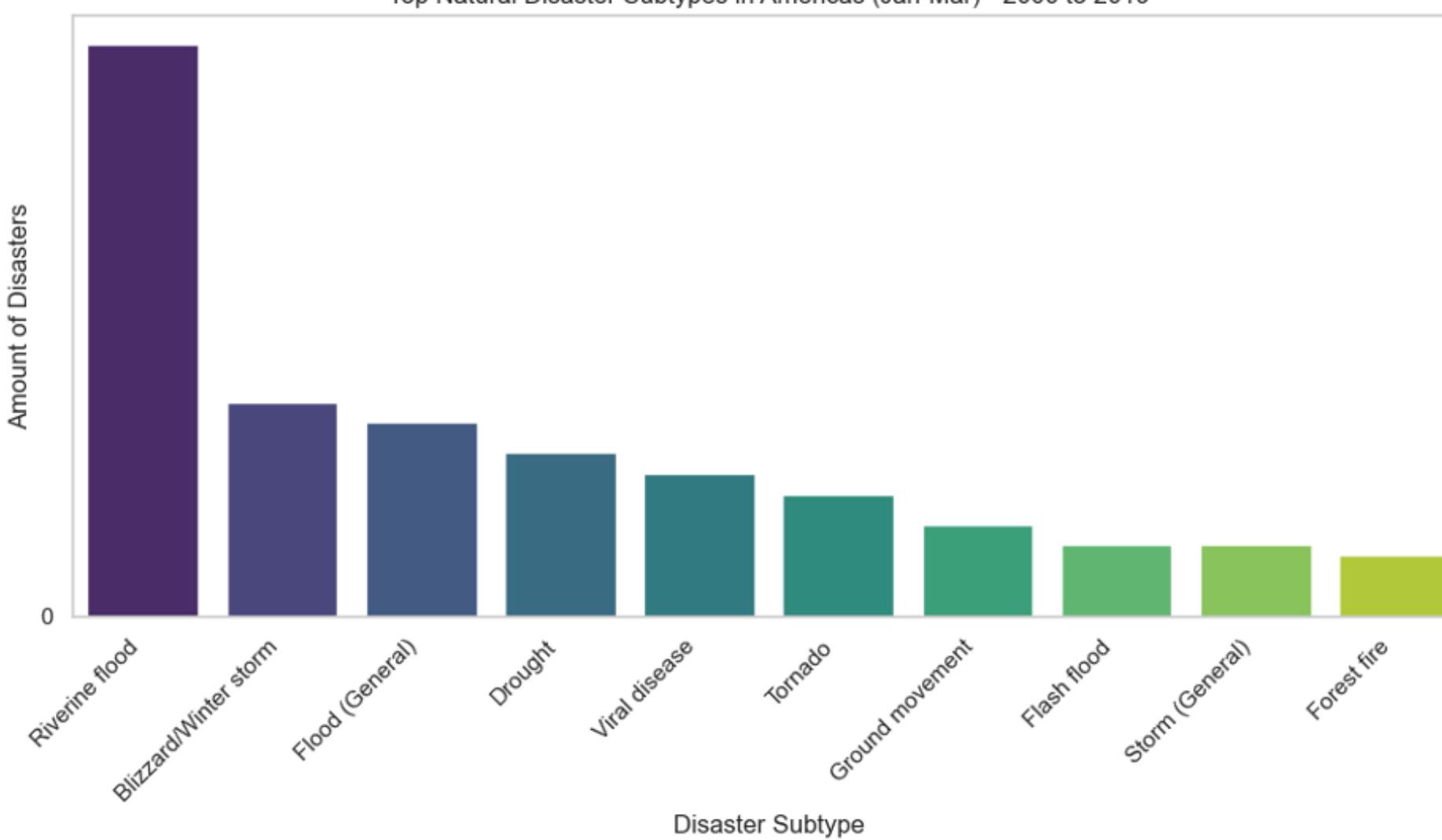
Shifting focus to the Americas, the spatial distribution unfolds with riverine floods and tropical cyclones (hurricanes) reigning supreme. The introduction of tornados and winter storms further enriches the natural disaster landscape in this region.



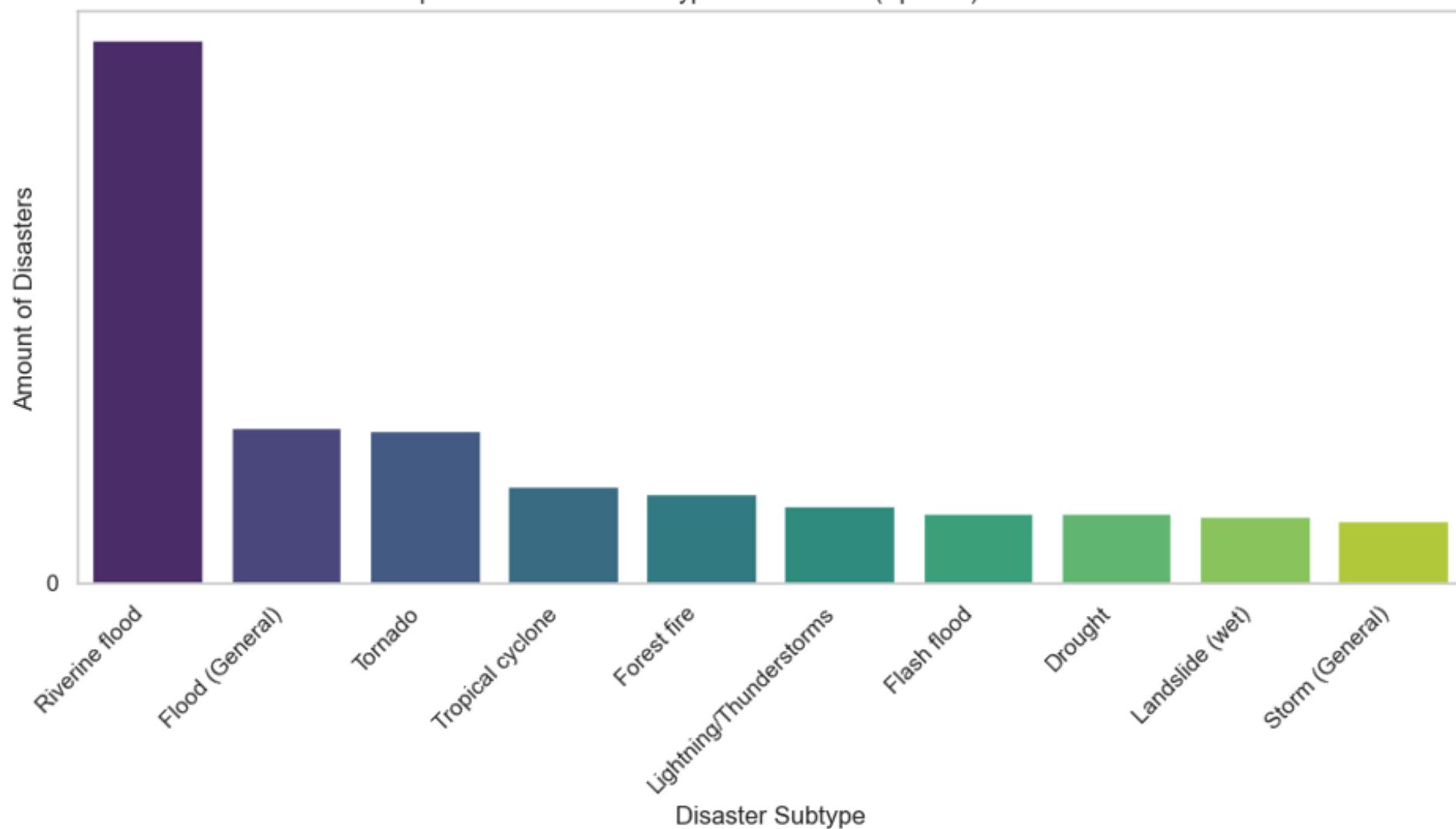
When examining the temporal aspect within a monthly timeframe, a discernible trend materializes. The earlier months of the year are predominantly characterized by floods and winter storms, whereas the summer witnesses the ascendance of tropical cyclones, aligning with the advent of hurricane season.



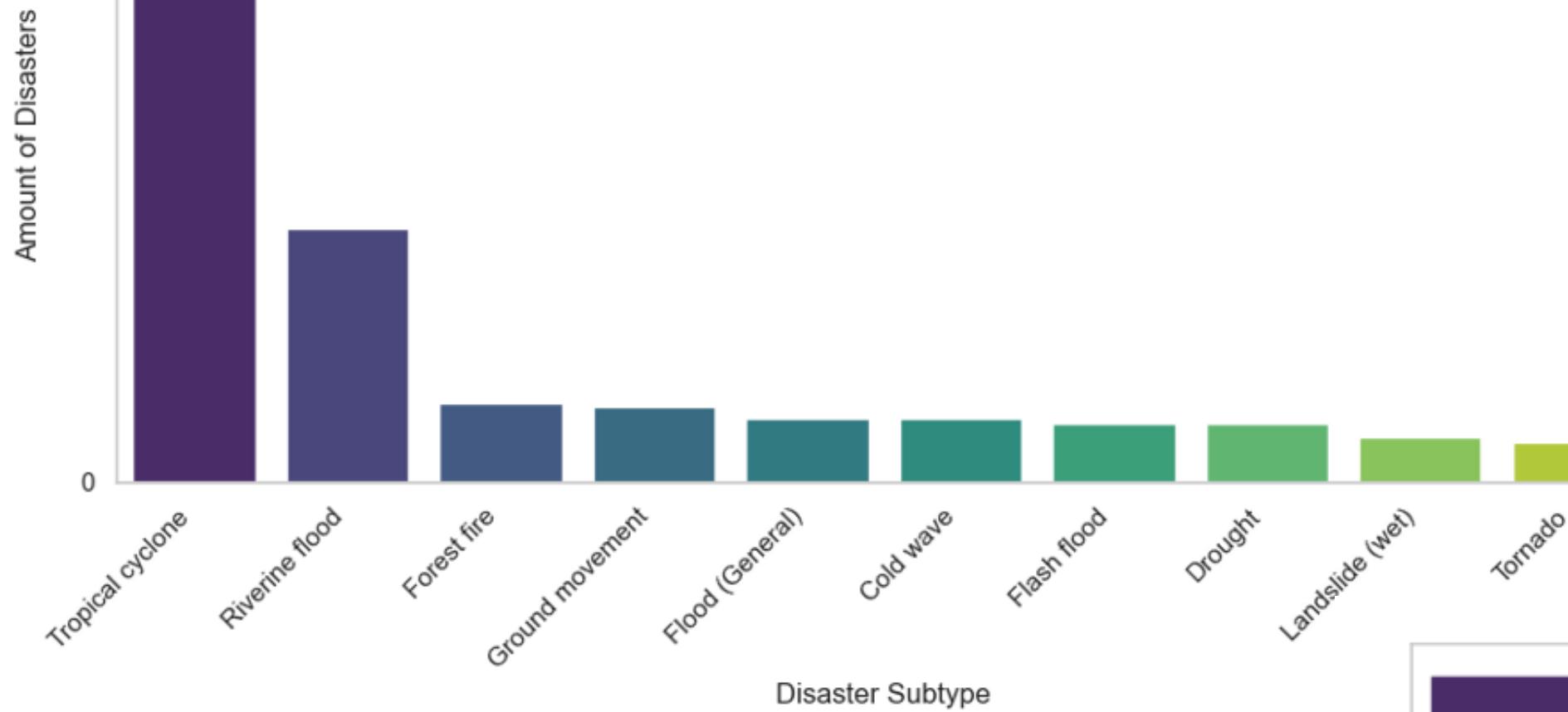
Top Natural Disaster Subtypes in Americas (Jan-Mar) - 2000 to 2019



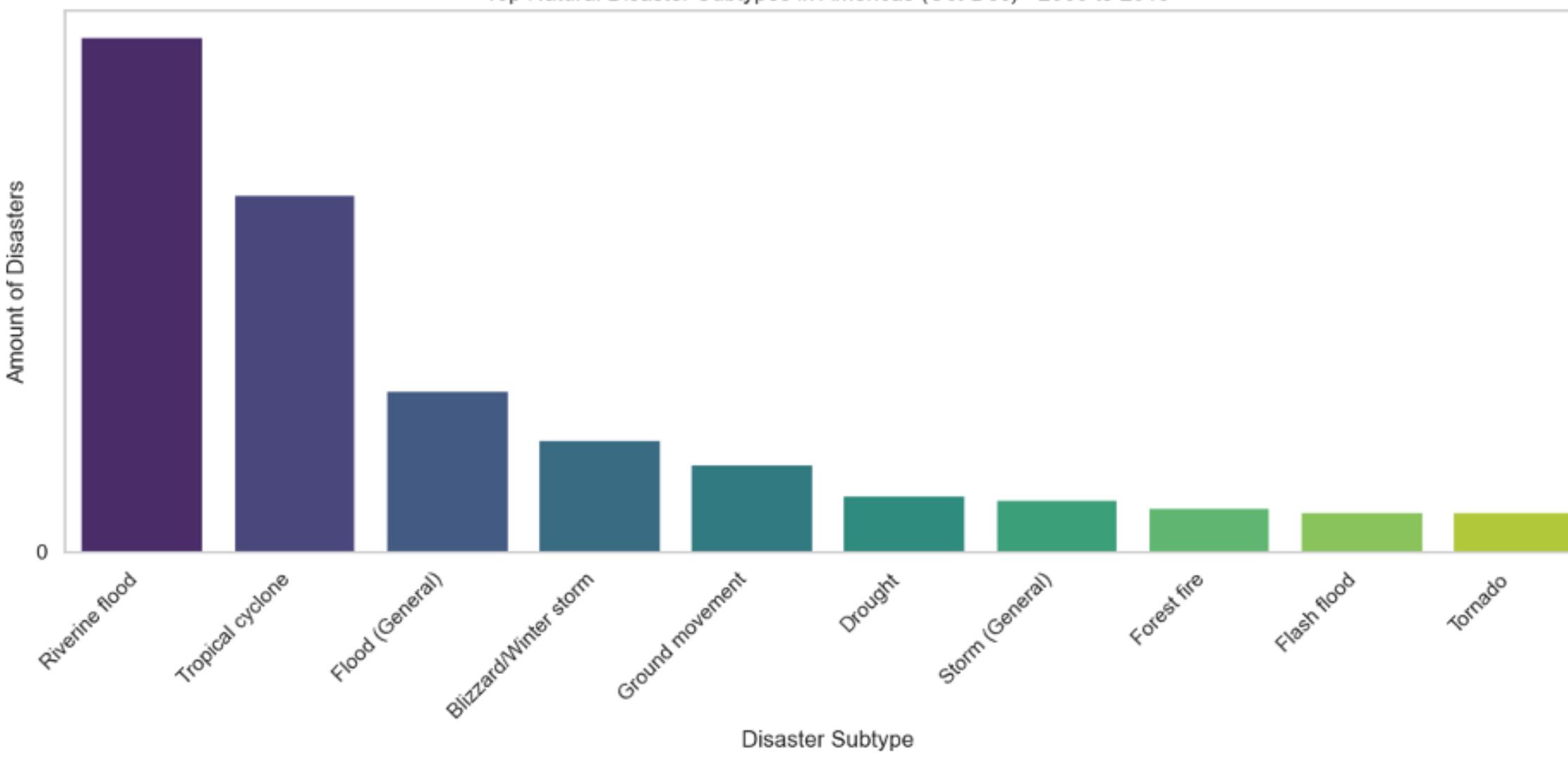
Top Natural Disaster Subtypes in Americas (Apr-Jun) - 2000 to 2019



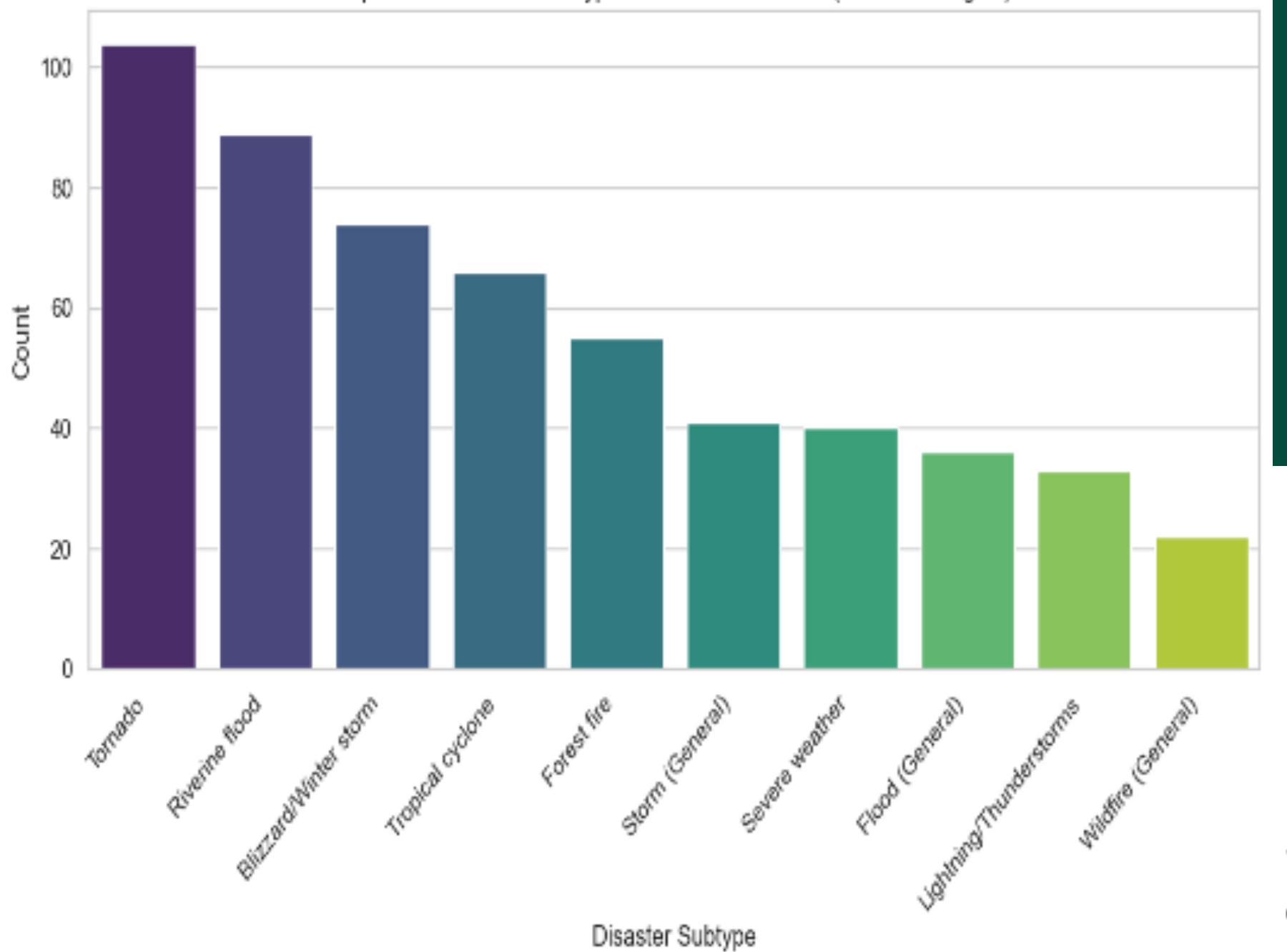
Top Natural Disaster Subtypes in Americas (Jul-Sep) - 2000 to 2019



Top Natural Disaster Subtypes in Americas (Oct-Dec) - 2000 to 2019

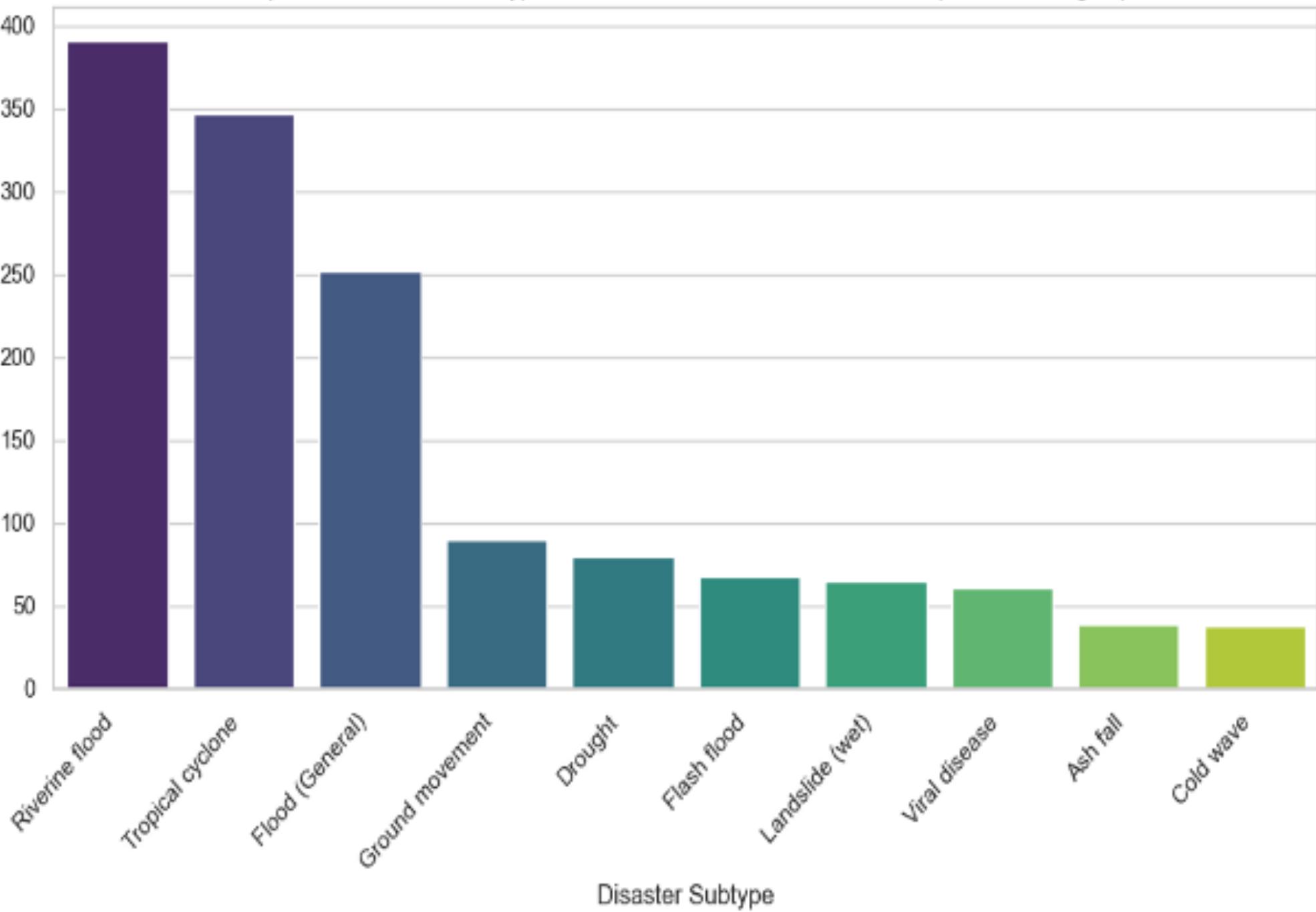


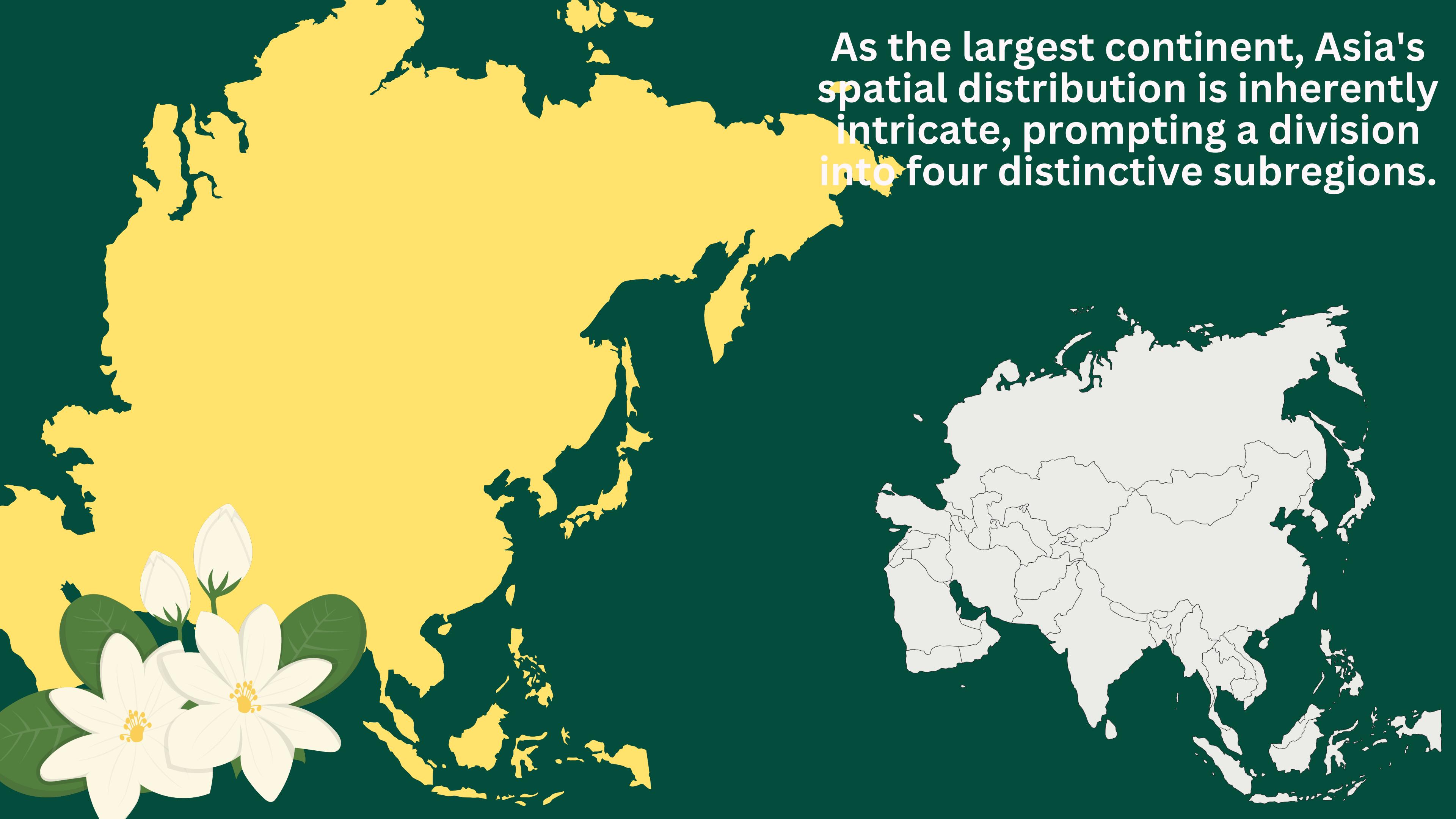
Top Natural Disaster Subtypes in Northern America (Americas Region)



Upon further subregional dissection of the Americas, the distinctions become pronounced. Northern America contends with tornados and winter storms among its top three natural disasters, in stark contrast to Latin America and the Caribbean, where floods and hurricanes take precedence.

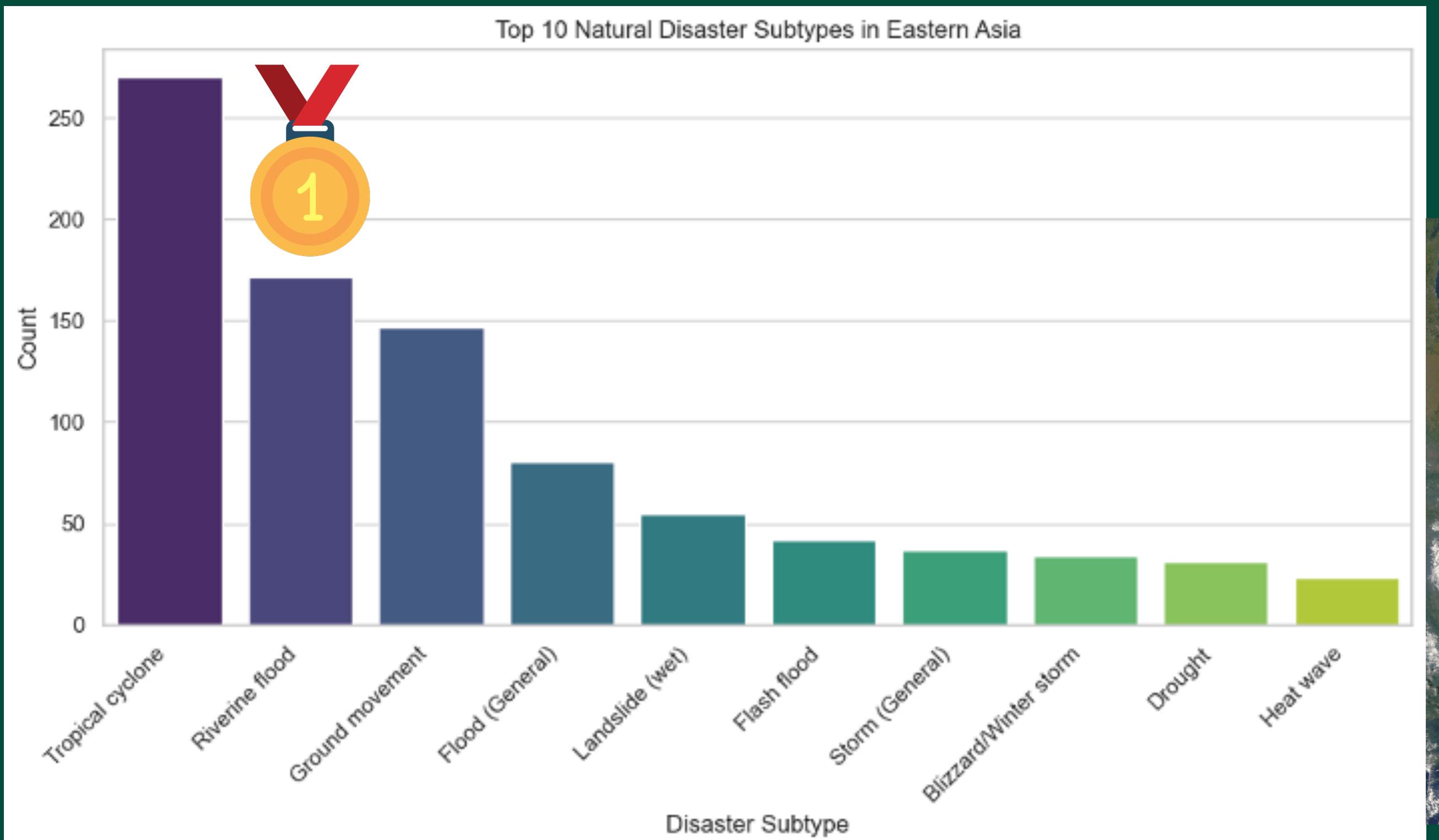
Top Natural Disaster Subtypes in Latin America and the Caribbean (Americas Region)



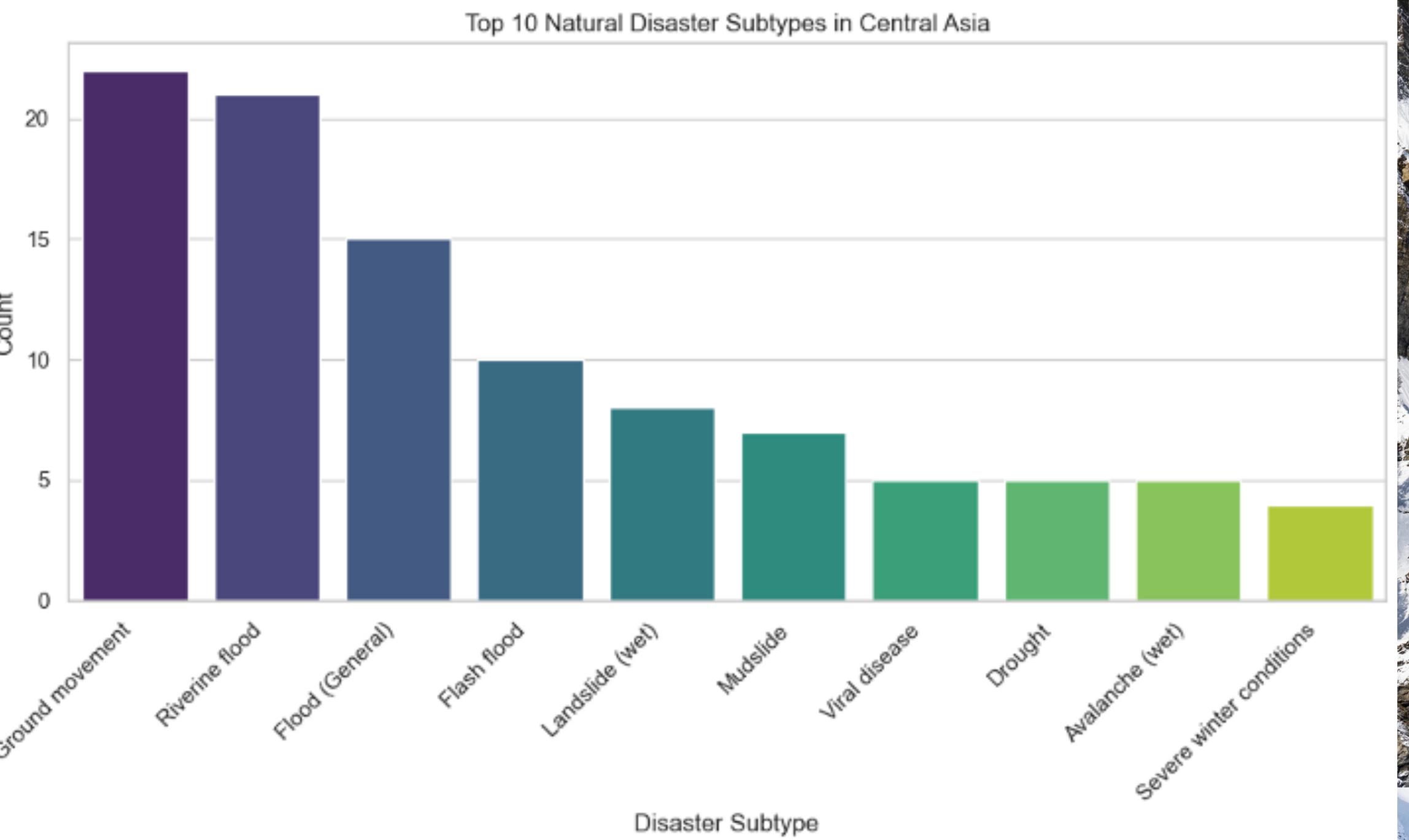


As the largest continent, Asia's spatial distribution is inherently intricate, prompting a division into four distinctive subregions.

Eastern Asia, encompassing nations like the Philippines and Japan, exhibits a prevalence of tropical cyclones and ground movements within its top three natural disasters

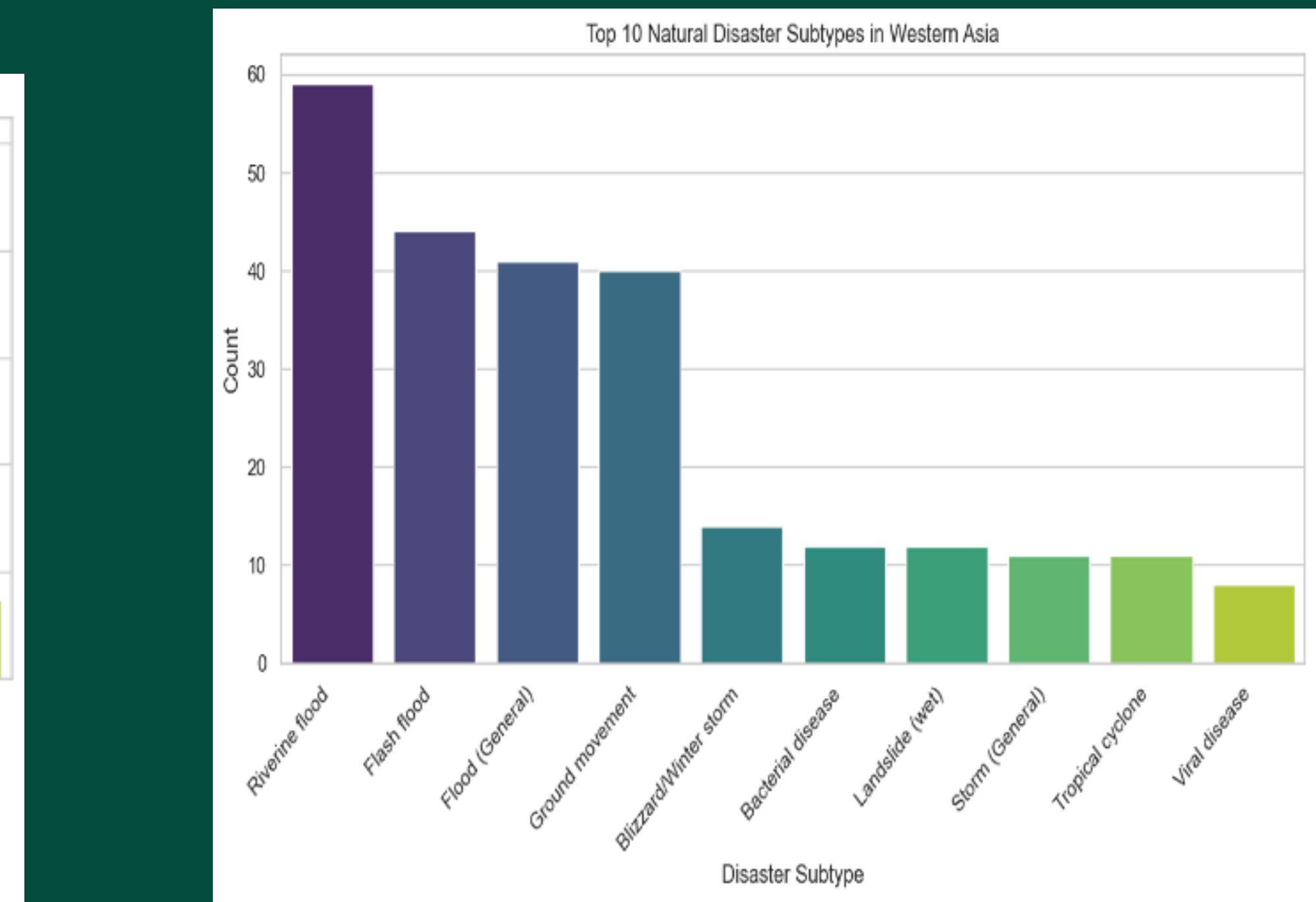
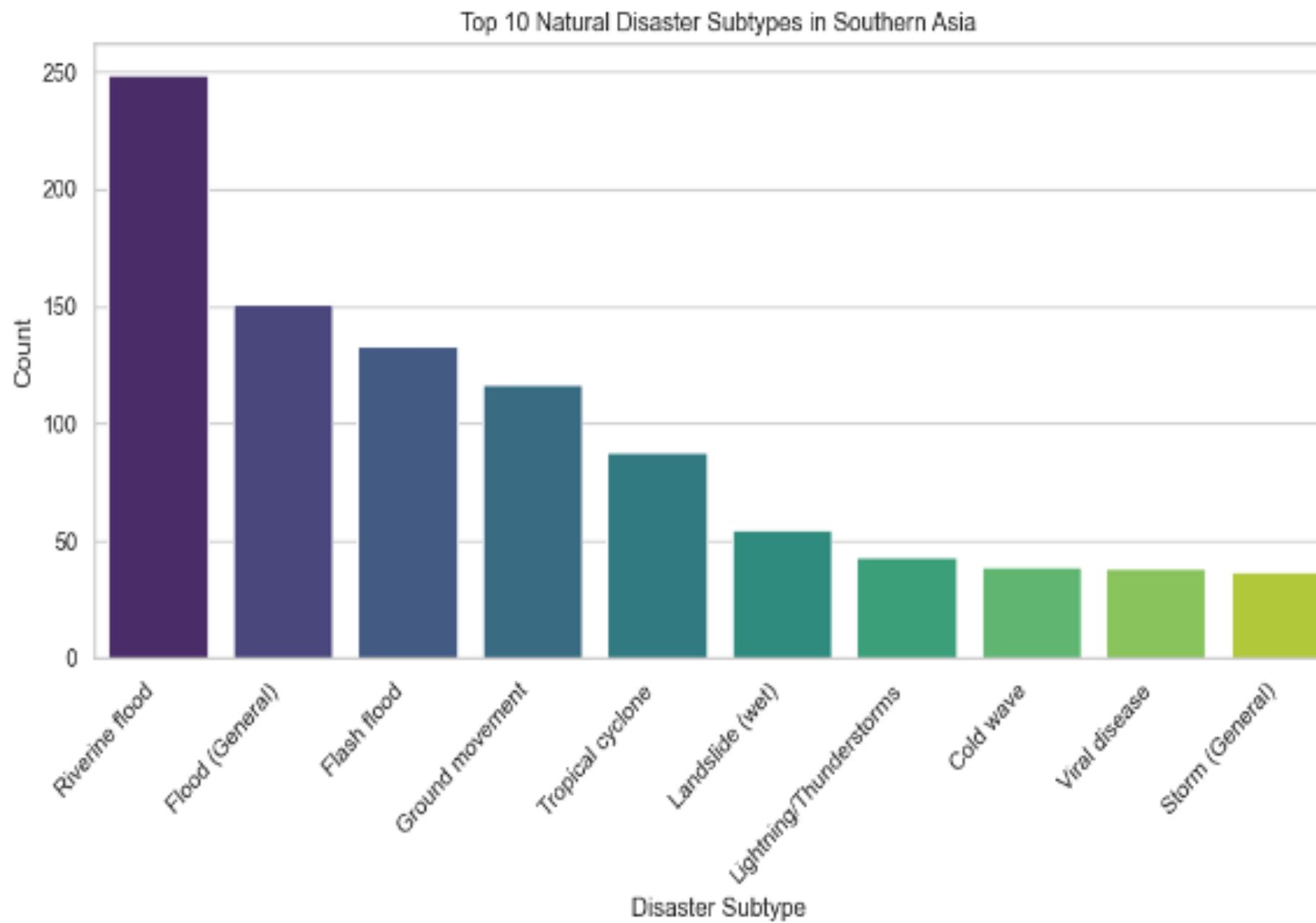


Central Asia, characterized by a distinctive emphasis on ground movements, introduces avalanches into its roster of top-ten natural disasters.

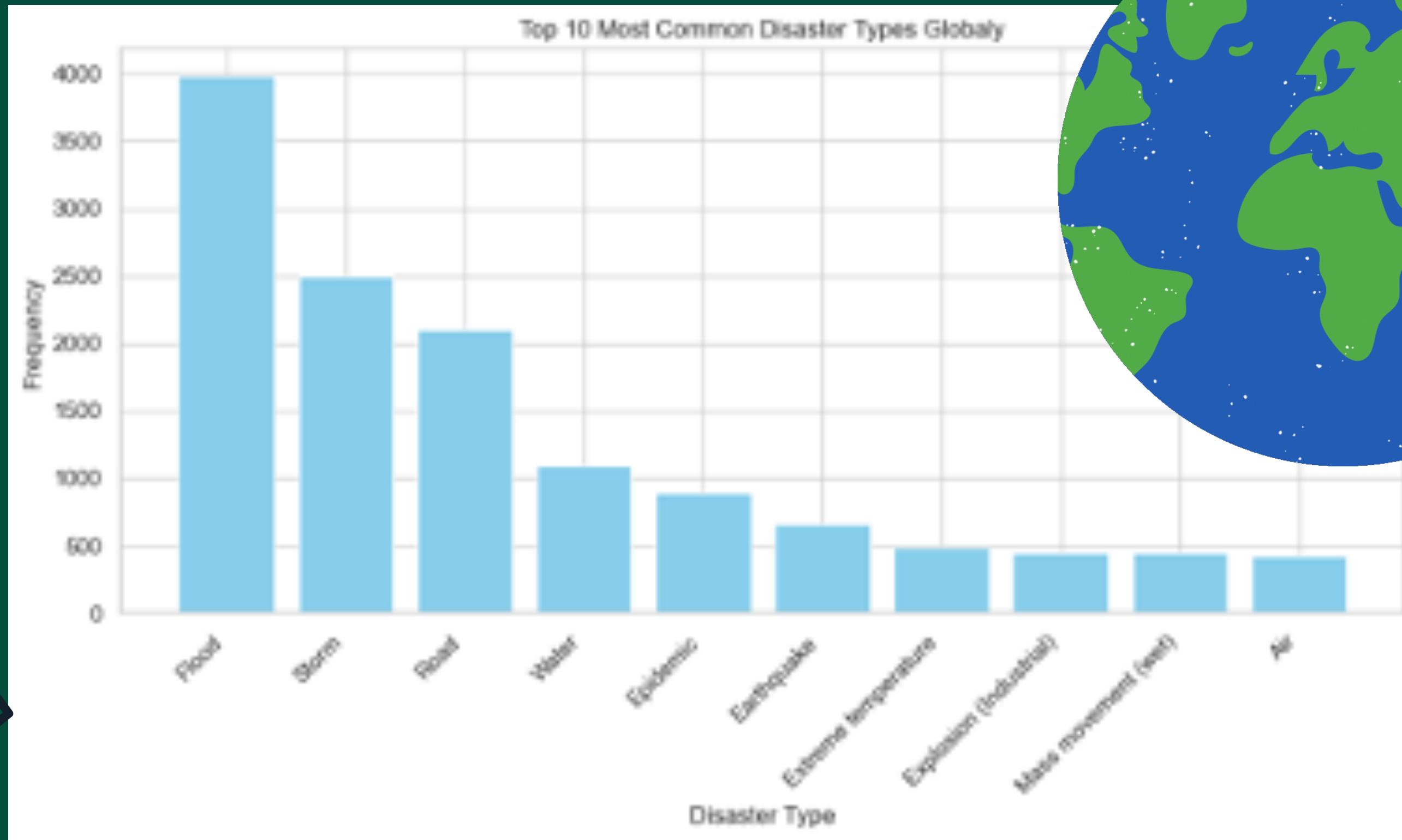




Southern Asia manifests a striking dominance of flood-related disasters in its top three, a trend mirrored in Western Asia. This in-depth analysis serves to underscore the vast and varied spatial distribution of natural disasters across the Asian continent.



On a global scale, the analysis highlights that the most prevalent disaster types are floods and storms, providing valuable insights into the challenges posed by these events and facilitating proactive measures for disaster preparedness and mitigation.



Impact of Natural Disasters on

Total deaths, Number Injured and Total Affected

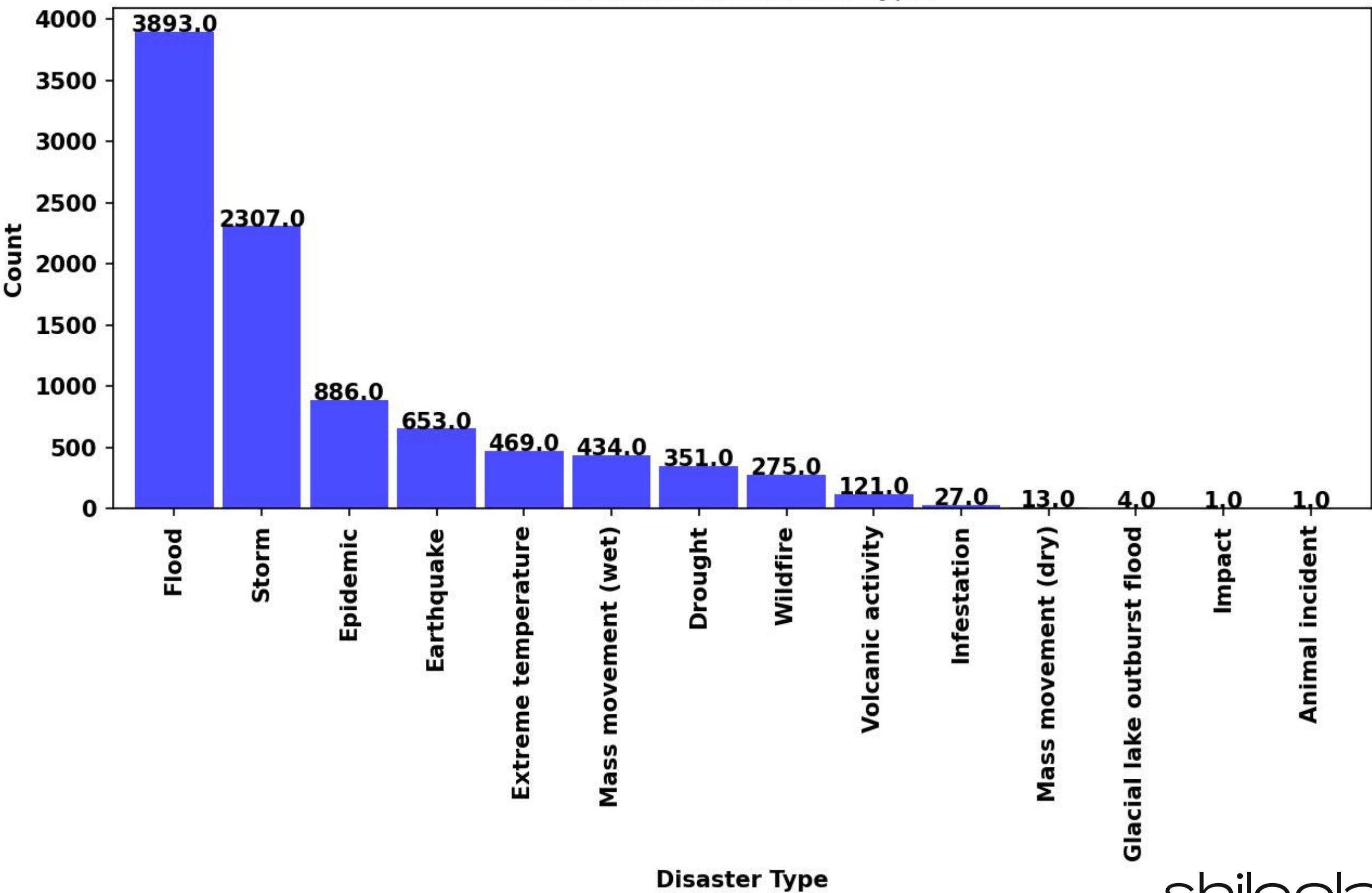
Most natural disasters are beyond human control and its impacts are often disastrous, as such there is a need to be aware of such impacts in making informed decisions on resource allocation towards relief provision and aid.

The knowledge of this also helps enlighten individuals on the gravity of risks associated with disasters, therefore ensuring proper preparedness in times of occurrence.



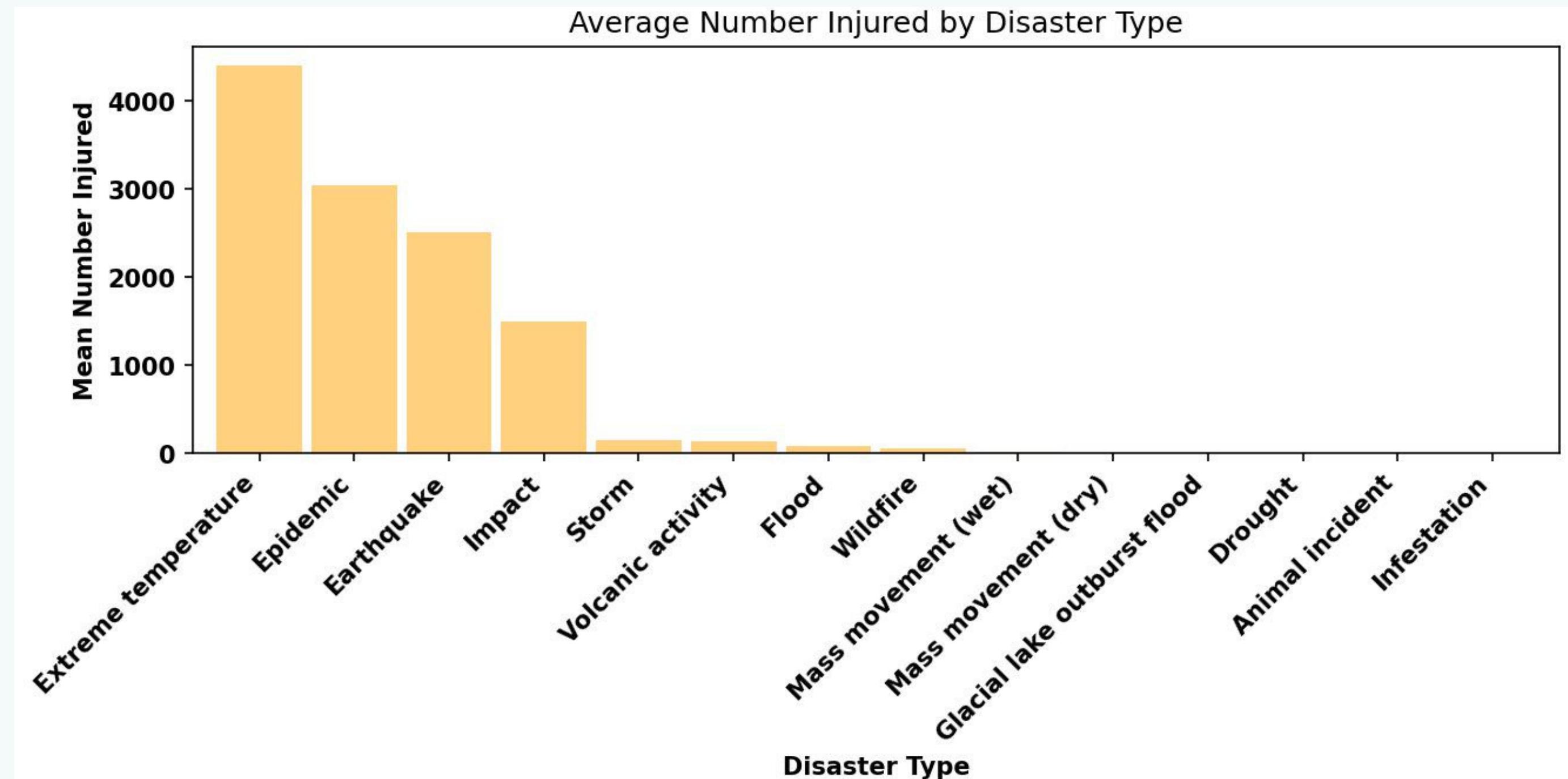
Frequency of Disaster Types

Distribution of Disaster Types



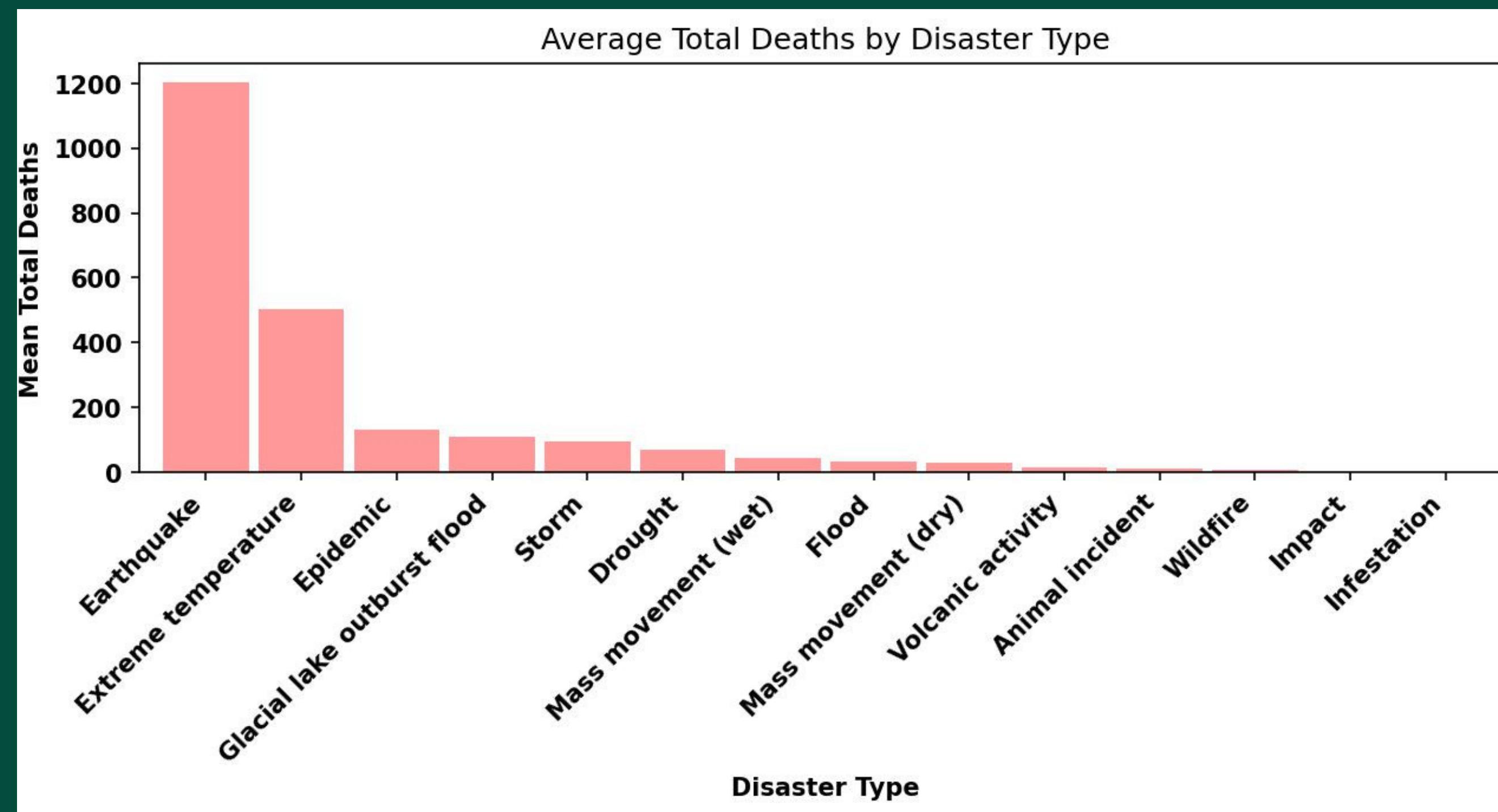
Impact on Number Injured

Based on findings, Extreme temperature resulted in more hospitalizations (4401)



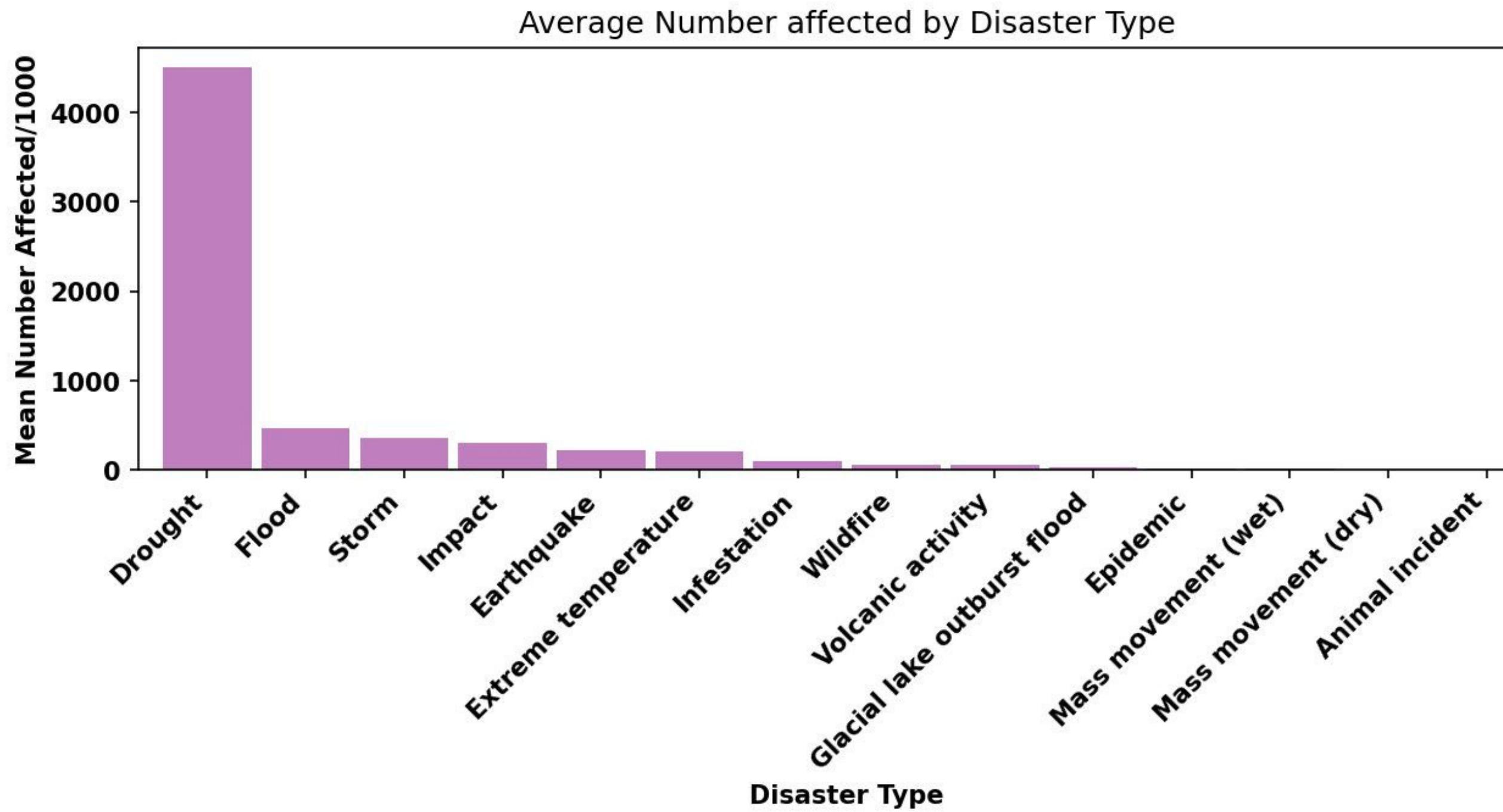
Impact on Total Deaths

More deaths occurred as a result of Earthquakes(1202) this goes to show that different disaster types have different impacts based on metrics used.

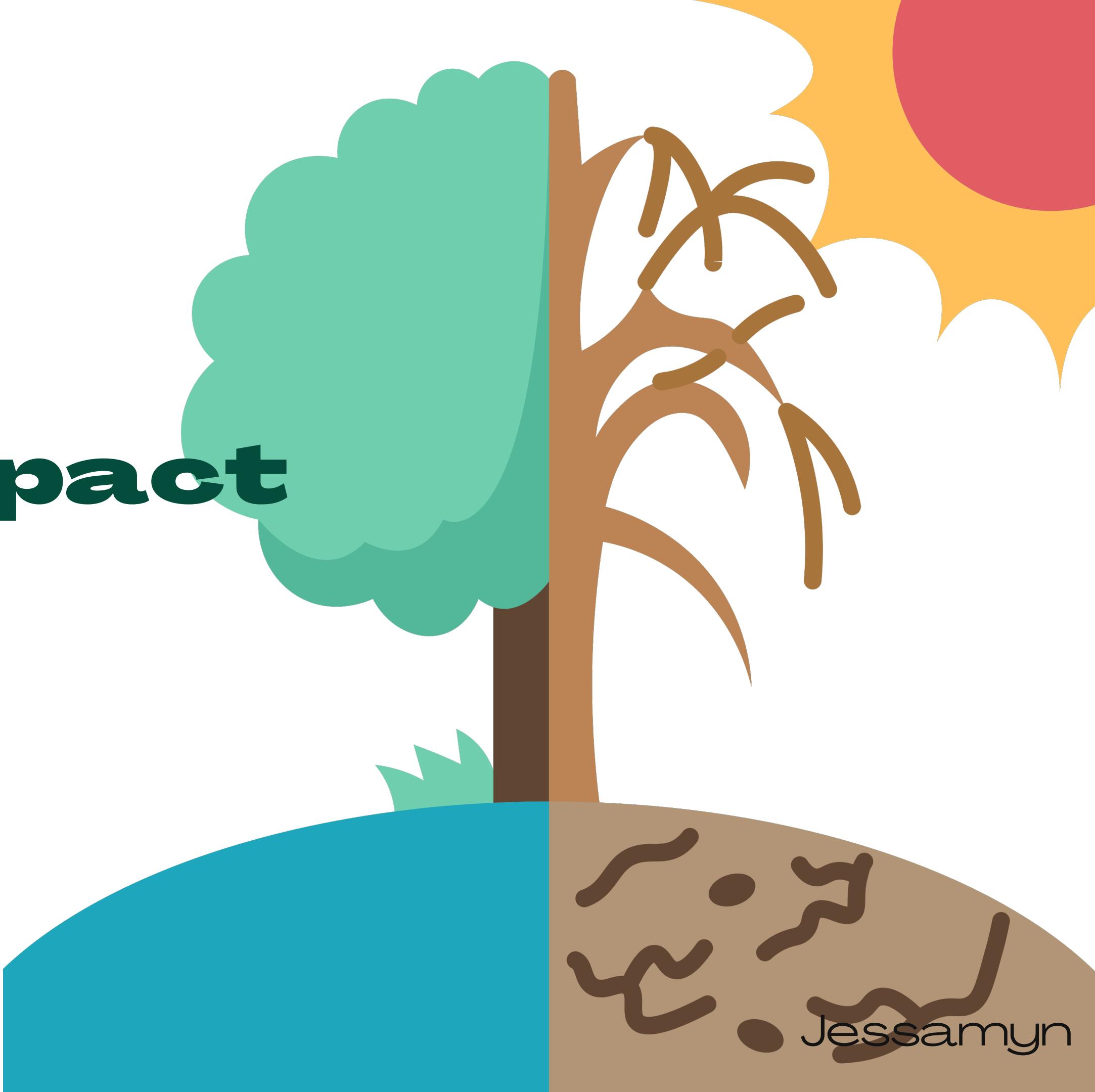


Wide Range Impact

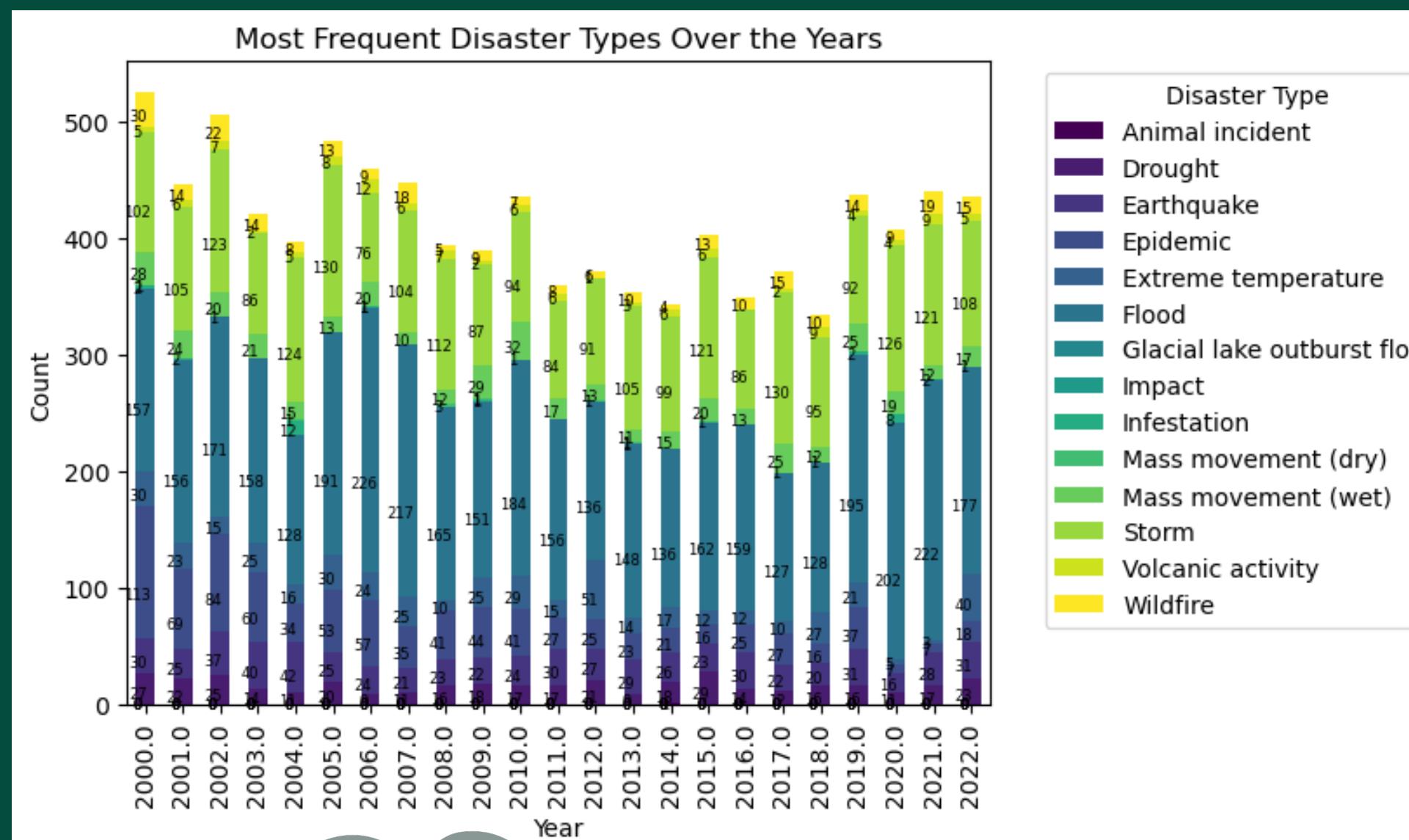
this looks at the impact using total injured, affected and homeless people. Results show droughts have the highest impact across these variables (45,000,000).



Climate Change Impact

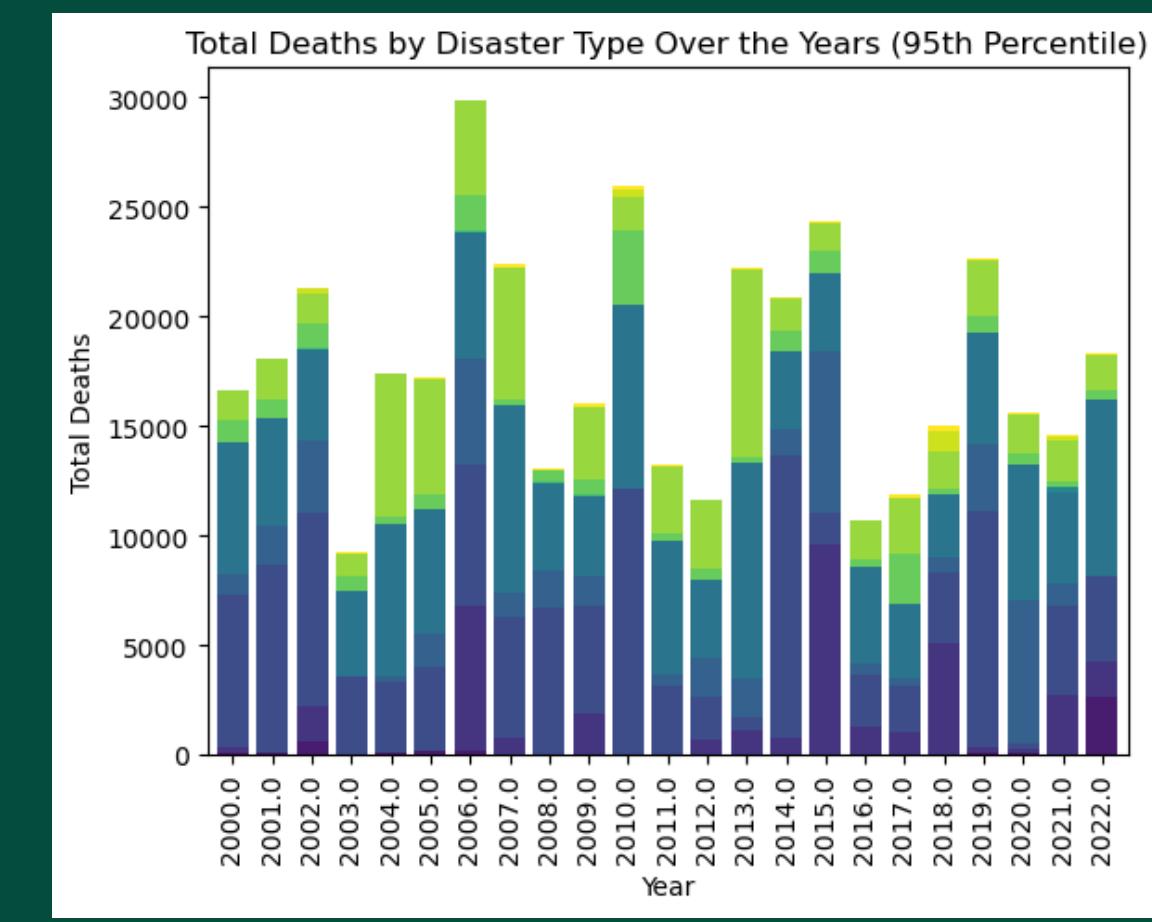
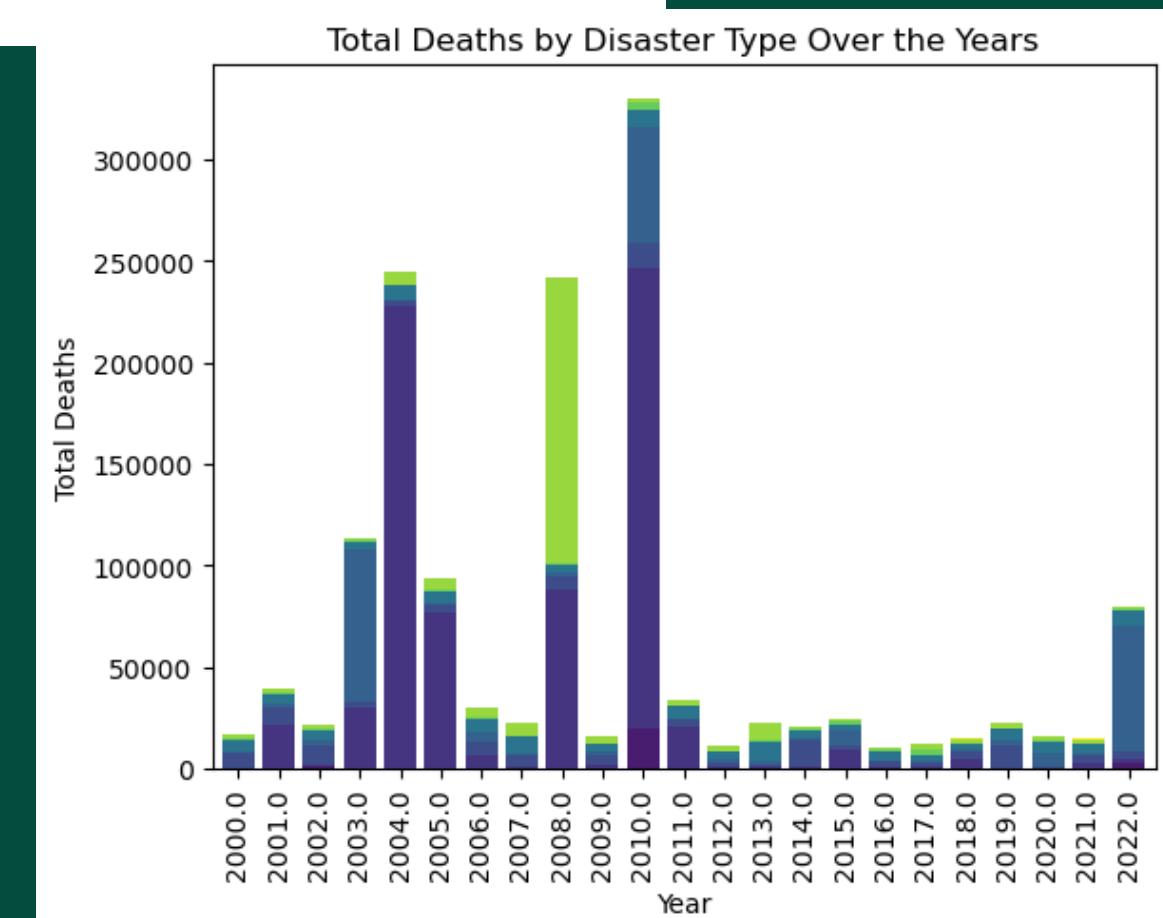
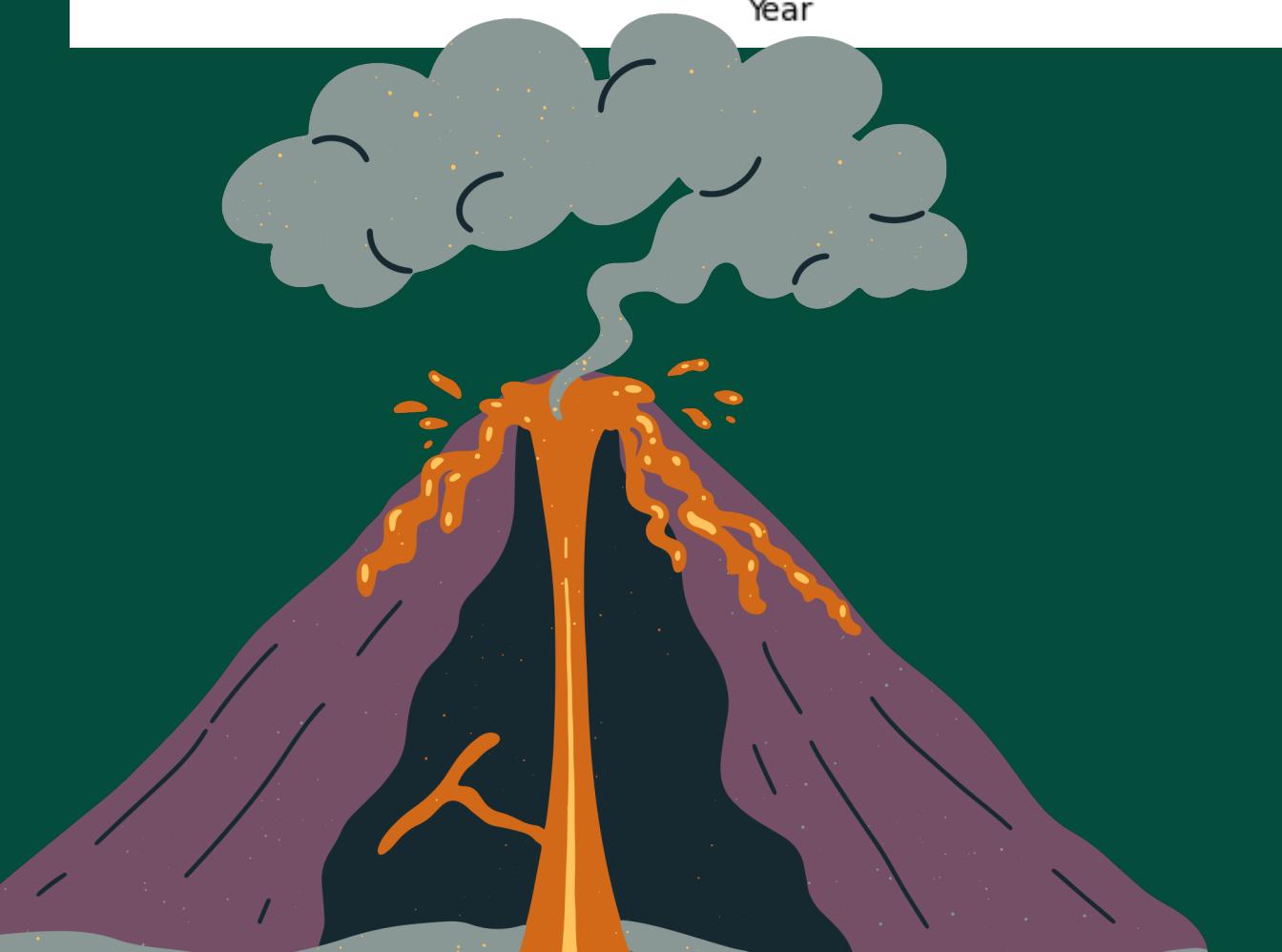


Jessamyn



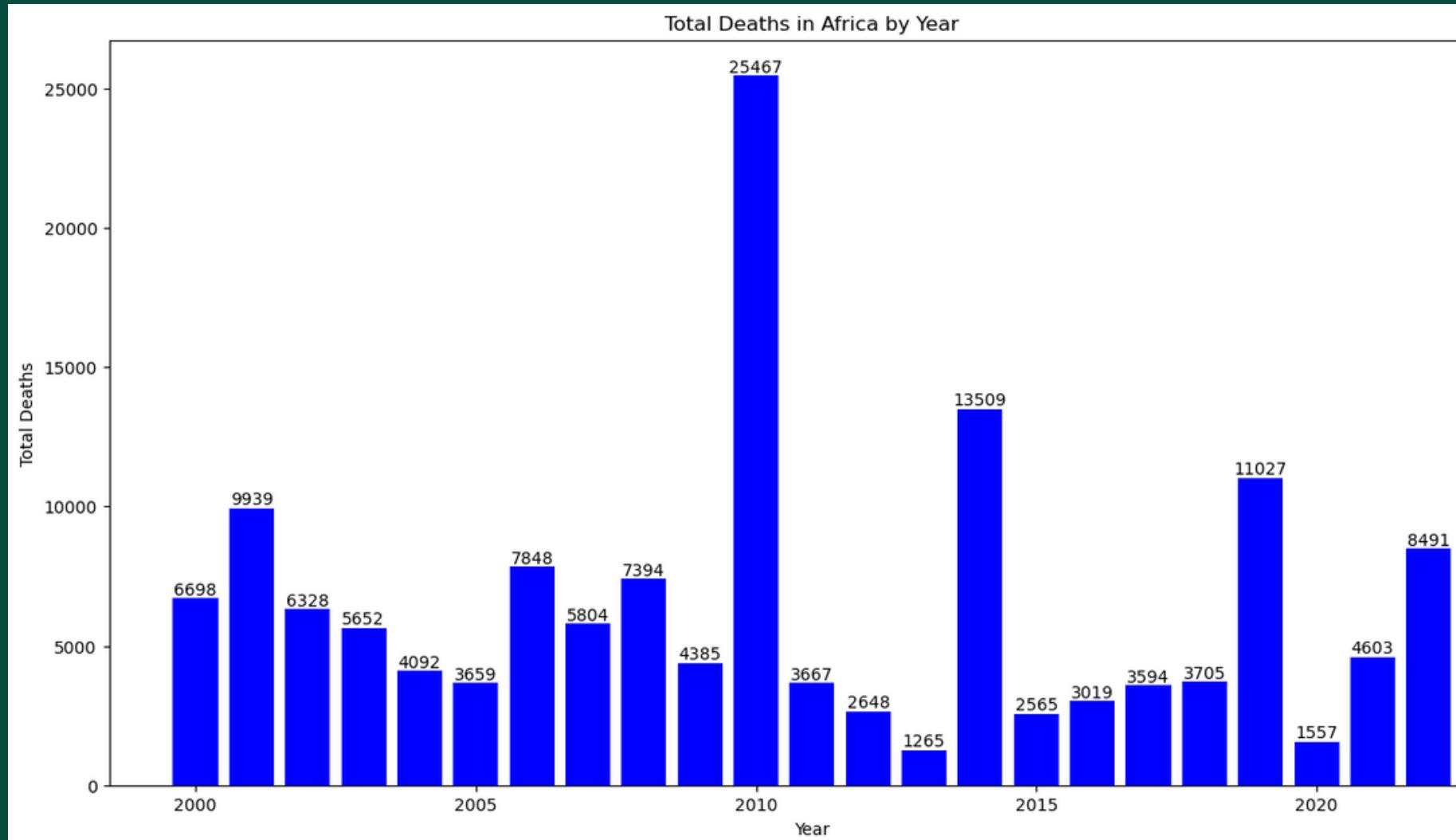
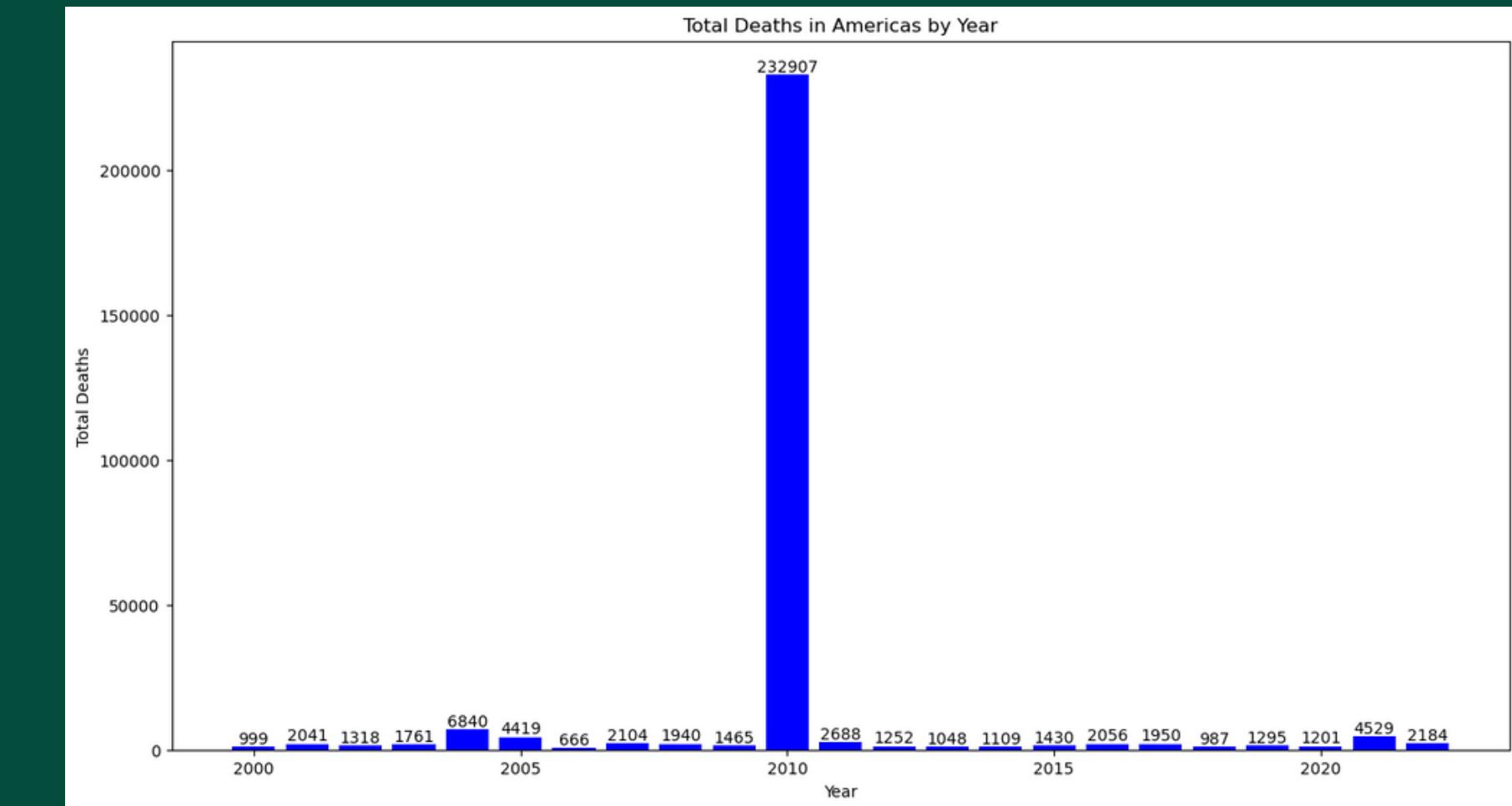
Natural Disaster Frequency shows no significant increase in count from the years 2000-2022 suggests a period of relative stability.

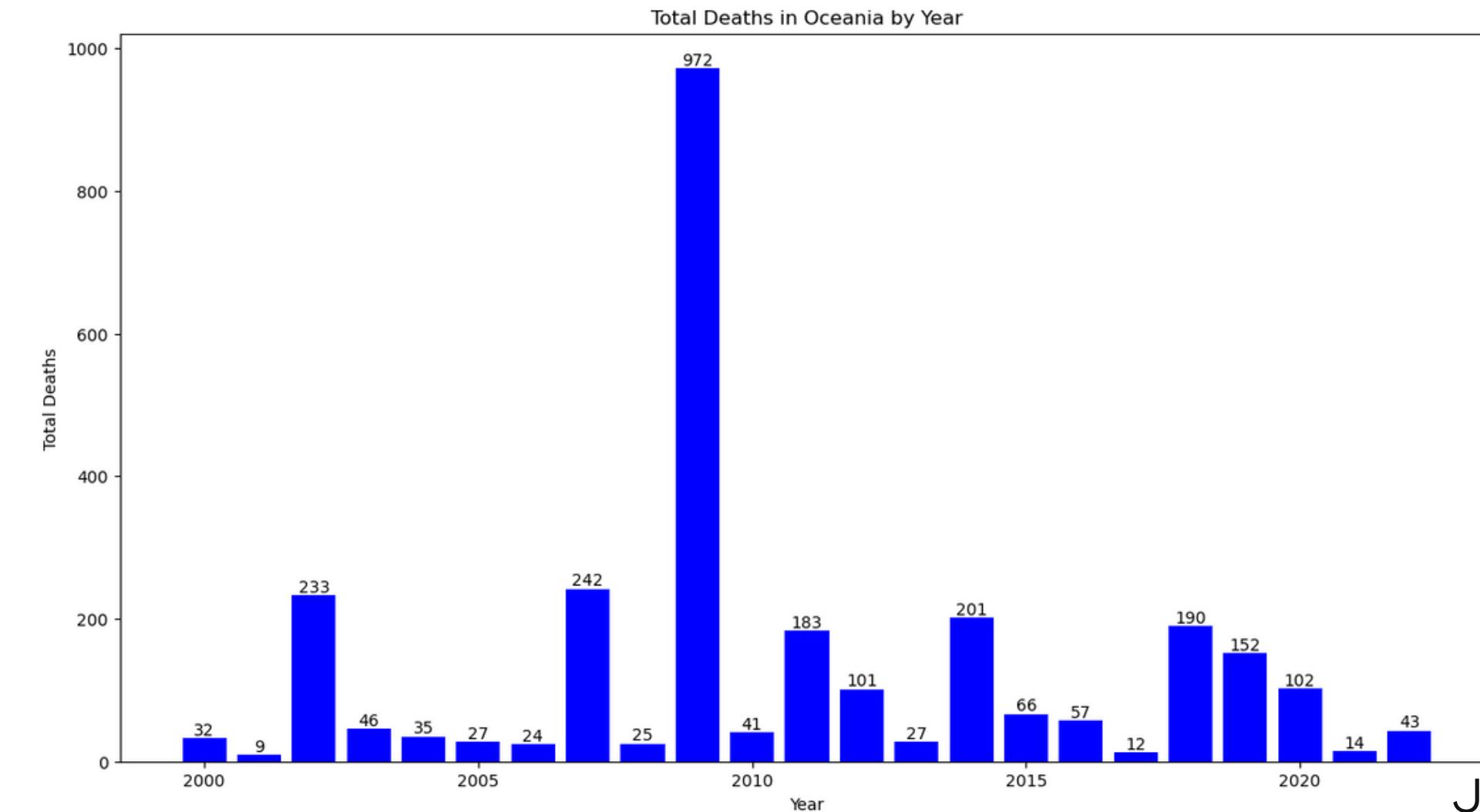
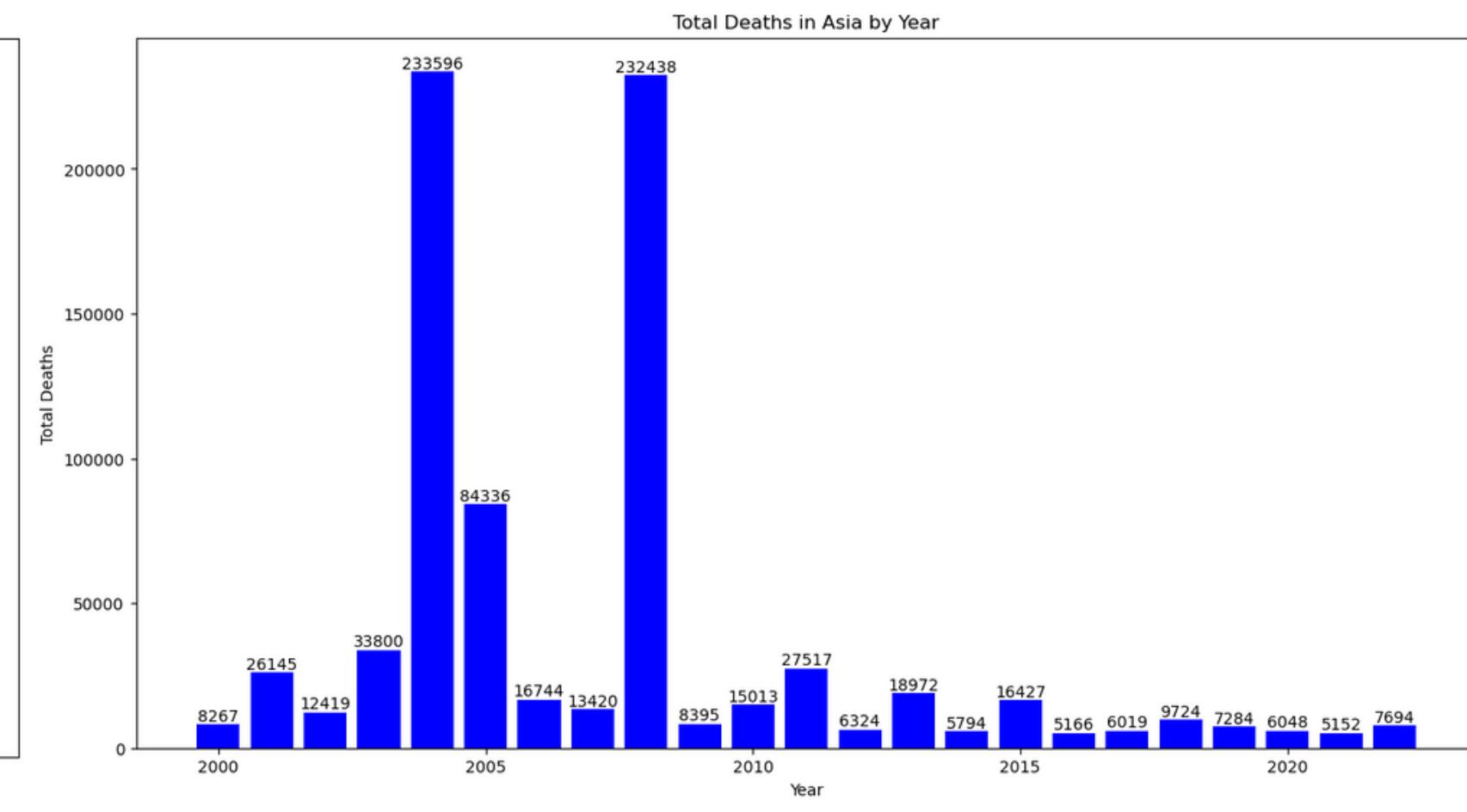
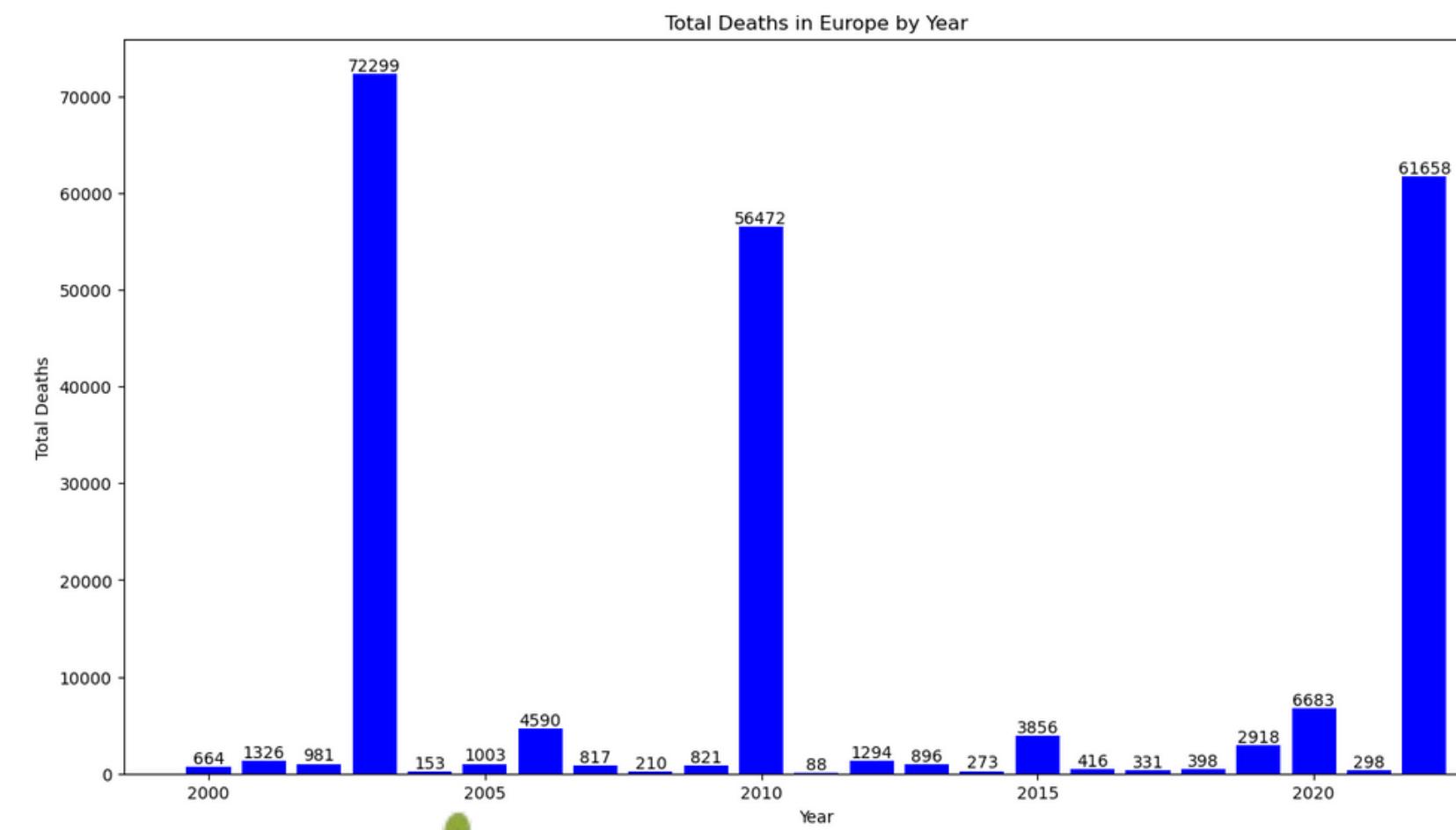
- Larger disasters introduced extreme values/outliers into the dataset. These extreme events significantly deviate from the typical patterns observed in the data, leading to a skewed distribution.
 - The graph on the right showcases total deaths by disaster type with a 95th percentile



Climate change impact cont...

The impact of these disasters on human lives is not consistent, and certain years experience higher mortality rates compared to others.





Conclusions

Ash - Economic: Countries with lower Human Development scores suffer from more severe natural disasters because their populations are more vulnerable and they lack proper resources.

Jess - Total number of deaths each year shows significant variability, indicating a fluctuating pattern in response to the occurrence of natural disasters. This suggests that the impact of these disasters on human lives is not consistent, and certain years experience higher mortality rates compared to others.

Shile- The impact of disaster types vary across different impact metrics as such a particular disaster type cannot be generally termed more impactful than the other. Although the result of the impact of infestation consistently ranks lowest when looking at total deaths and number injured this can be attributed to the fact that infestations by animals/insects rarely have a direct impact on deaths and hospitalizations. Also the results from the impact of droughts on total deaths might be skewed as the data set used does not take note of mortality as a result of drought

Daniel - The spatial distribution analysis of natural disasters offers a comprehensive examination of the geographical patterns of catastrophic events on Earth. This study not only pinpoints the regions where these disasters are more likely to occur but also delves into their frequency and intensity, uncovering distinct patterns across different areas.

Thanks

