

# Spatial Analysis of Undocumented Migrant Deaths along US-Mexico Border

## INTRODUCTION

Migration has always been an issue of interest in the study of geography. Immigration at the US-Mexico border has always been one of the toughest challenges facing the administration. Huge numbers of deaths have also made this issue a humanitarian crisis. There are some "Push" and "Pull" factors, which are very important to understand this ongoing issue.

In the case of Mexico to US migration, The **PUSH** factors are:

- Poverty
- High crime rates, drug trafficking
- Climate factors (Drought and Storms)
- Political and gang violence [1]

And the **PULL** factors are:

- Better healthcare and quality education,
- Large existing communities of Mexican immigrants,
- Family reunification
- Work opportunity in the labor market
- US's dependency on low wage migrant worker [2]

In this research, the deaths alongside the US-Mexico border area has been mapped to understand the movement patterns of thousands of illegal migrants who died in the process.

## DATA & METHODOLOGY

Secondary data were collected from "Arizona OpenGIS Initiative for Deceased Migrants". [3]

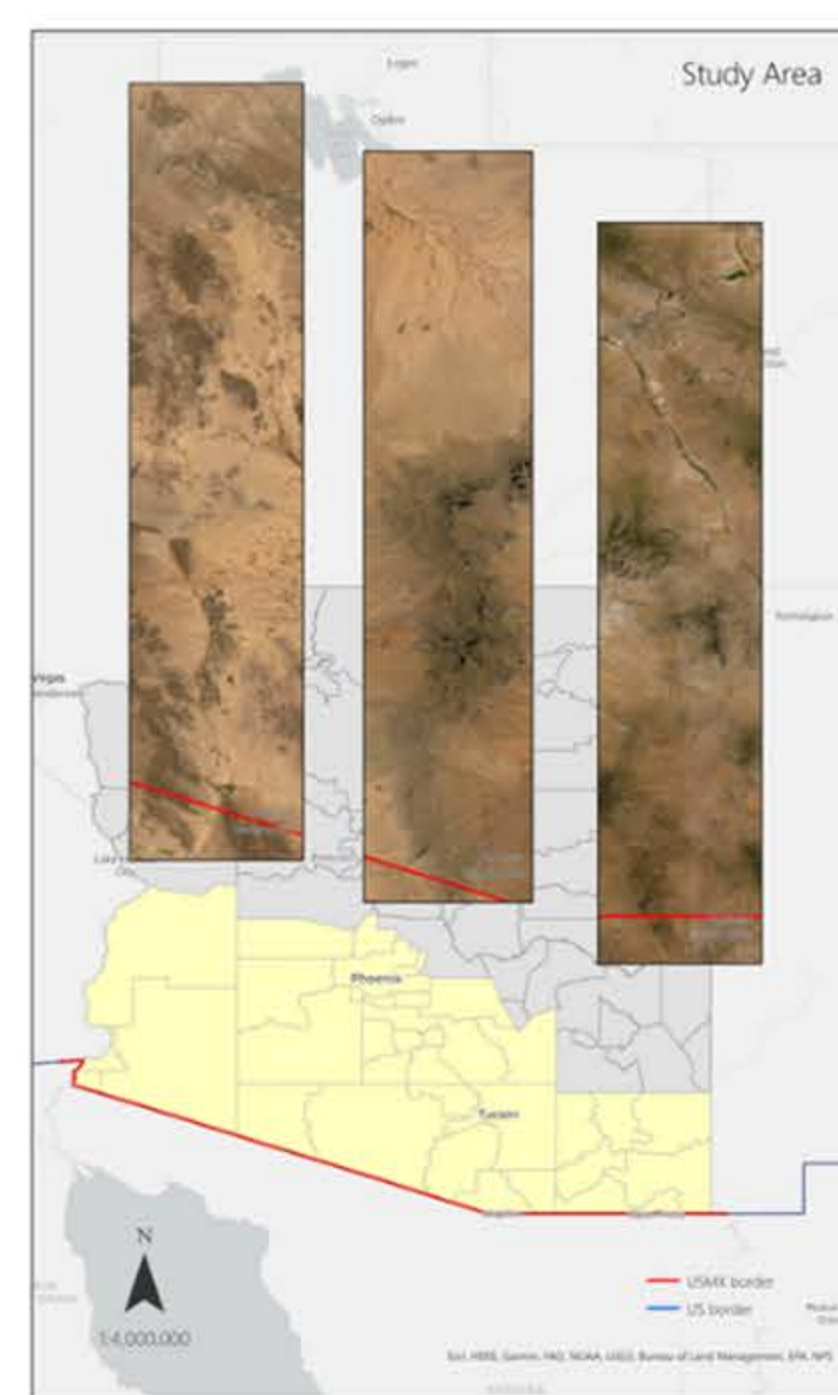
These data contained information about Geographic Information about the death-count of the migrants in the US-Mexico border area from 1981 to 2021. These data were analyzed and compared with different distances from the US-Mexico border to locate the patterns with the demographic.

The reporting time of the deaths were compared to find the effect of weather condition in desert area to see if they affect the number of deaths.

With the death location history, the death density were mapped to look at the effect of terrains (desert, mountains, valleys, rivers etc.)

## STUDY AREA

This study focuses on US-Mexico border which is located in the southern region of the State of Arizona in US. The physical features of this area includes Sonoran Desert, Mountains and valleys. These area is known for its desert climate. According to Arizona State Climate Office, The southwestern desert is hot, with winter daytime temperatures in the lower 60s and summer daytime temperatures between 105F and 115F. Nighttime temperatures on the desert drop slightly below freezing in the winter, while elsewhere in the state, winter nights frequently drop into the 20s. [4]



## RESULTS

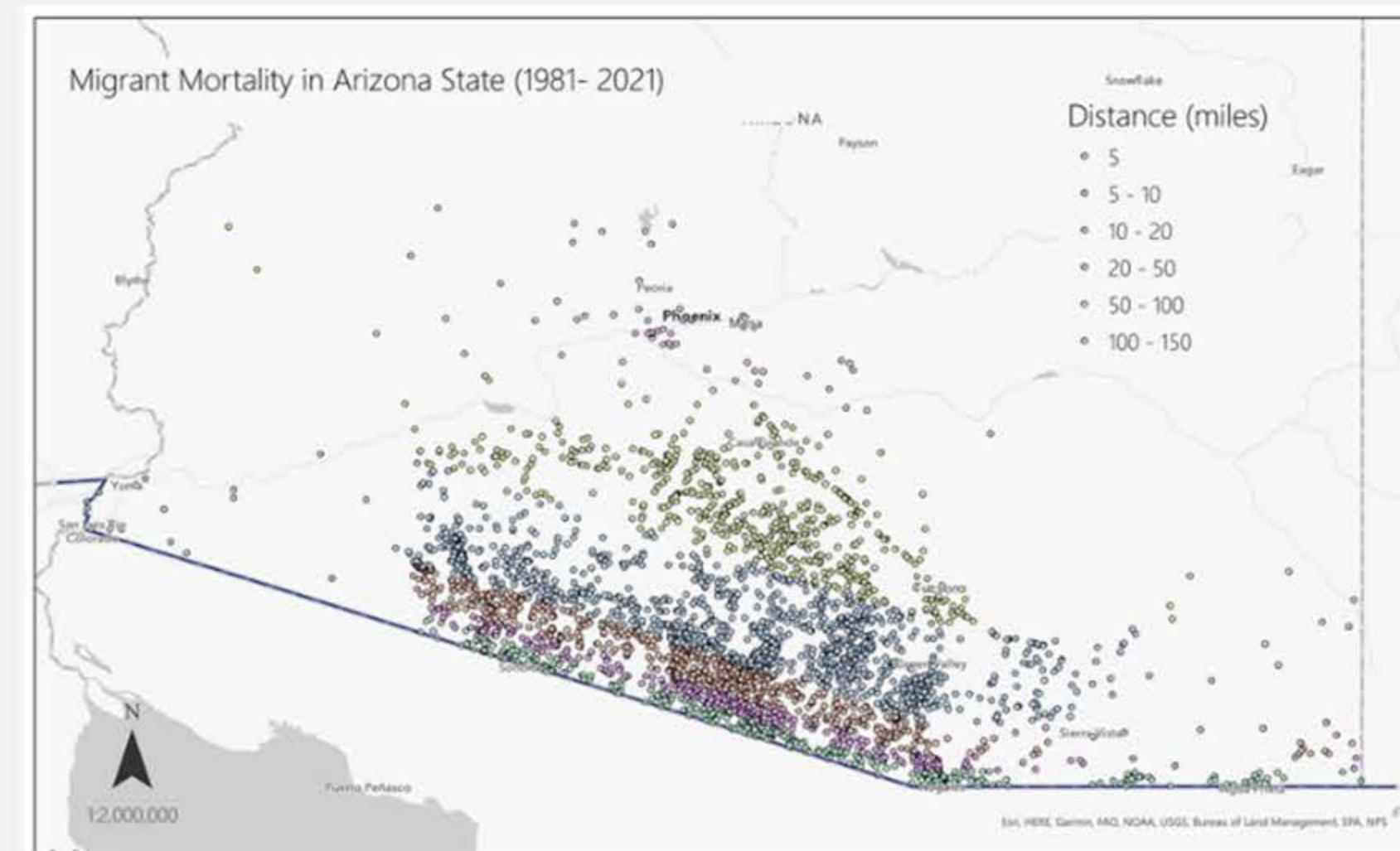


Figure 1: Death counts in different distances from the US-Mexico border

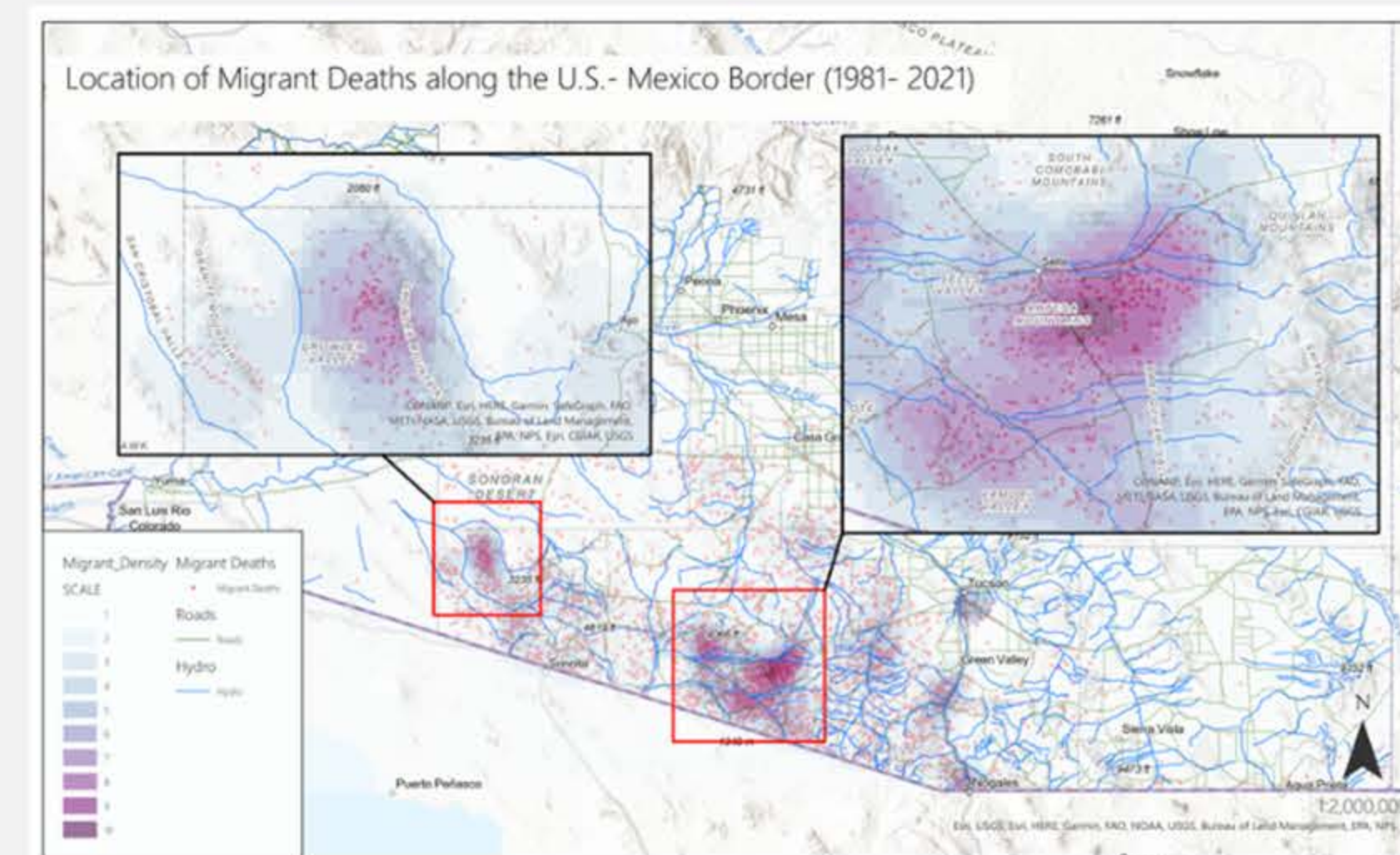


Figure 2: Kernel density map and the death count concentration on area map

In Figure 1, the changes in the count of deaths based on the increasing distance interval from the border are shown with different colors. From the data it can be seen that the greatest number of death are in the range of 20-50 miles distance from borders, specifically 1448.

In Figure 2, a kernel density map has been developed to see the which area has the most concentration of deaths. From the terrain maps it can be noticed that the concentration of deaths (in dark color) are in the regions which are out of the roads, near the valleys which are among the mountains and far from waterbodies. As this migrants were travelling illegally, it is assumed that they have been travelling while avoiding the local border patrol. That is the reason why, these people were travelling through inhospitable terrains risking their lives and eventually died.

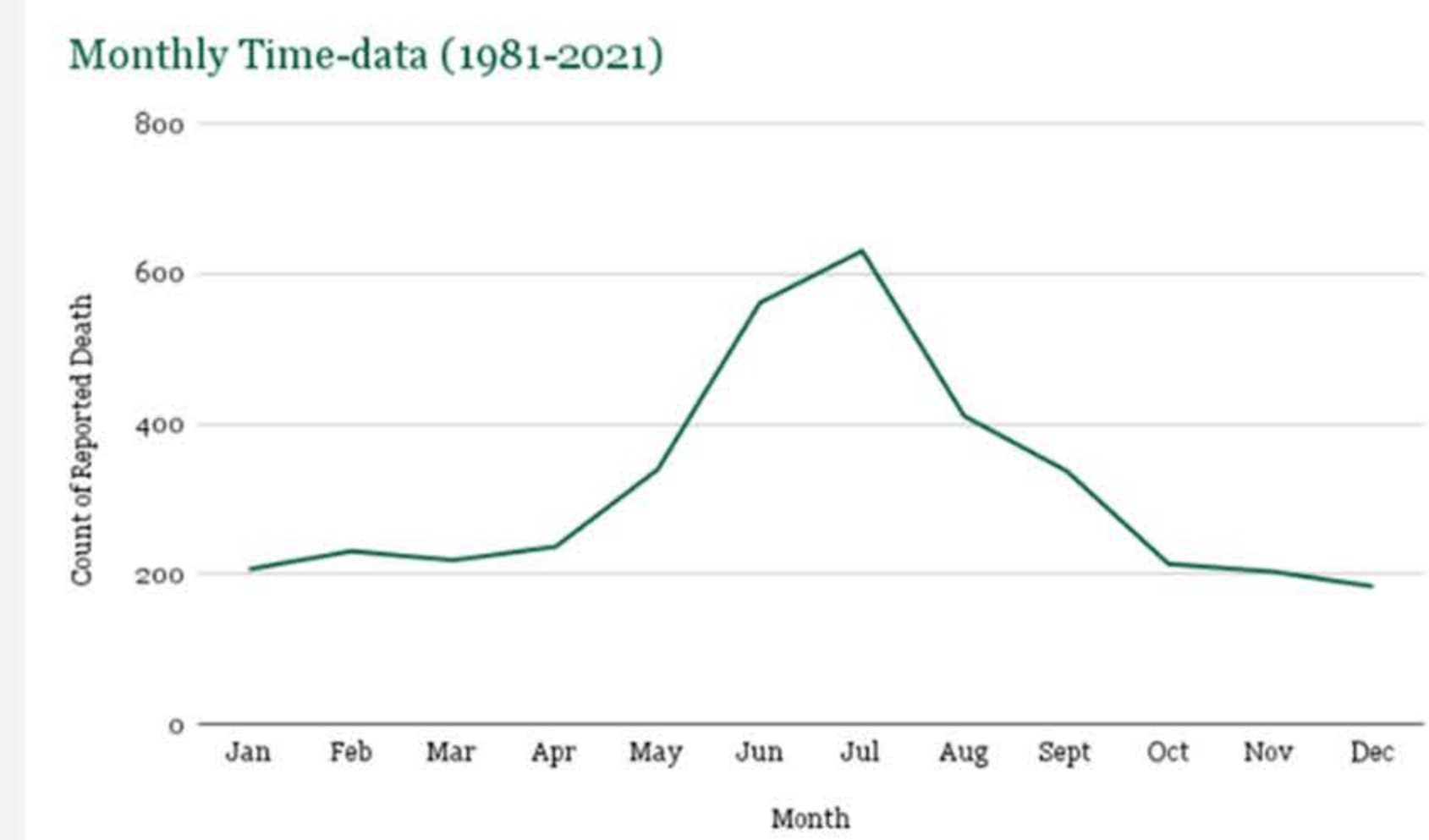


Figure 3: Line chart for total death counts based on months.

This data show a trend of high number of deaths in the research area during the Summer seasons. This particular area has a desert climate and according to the Office of Medical examiner (OME), for most of the cases the reason of death is Hyperthermia or Heat related dehydration. As these people have been travelling through remote areas, most of them has been travelling through the desert. Also, as Southern Arizona the temperatures in the summertime are regularly in the triple digits Fahrenheit [5] and the lack of water turns these trips into deathtraps.

Here, Figure 3 shows the line chart of the summed count of deaths basing on each months. Which shows a significant rise in the number of deaths during the summer. Also, Figure 4 shows the count of deaths in each month from 2002 to 2021. These line also show the similar trend of summer season having the largest death counts.

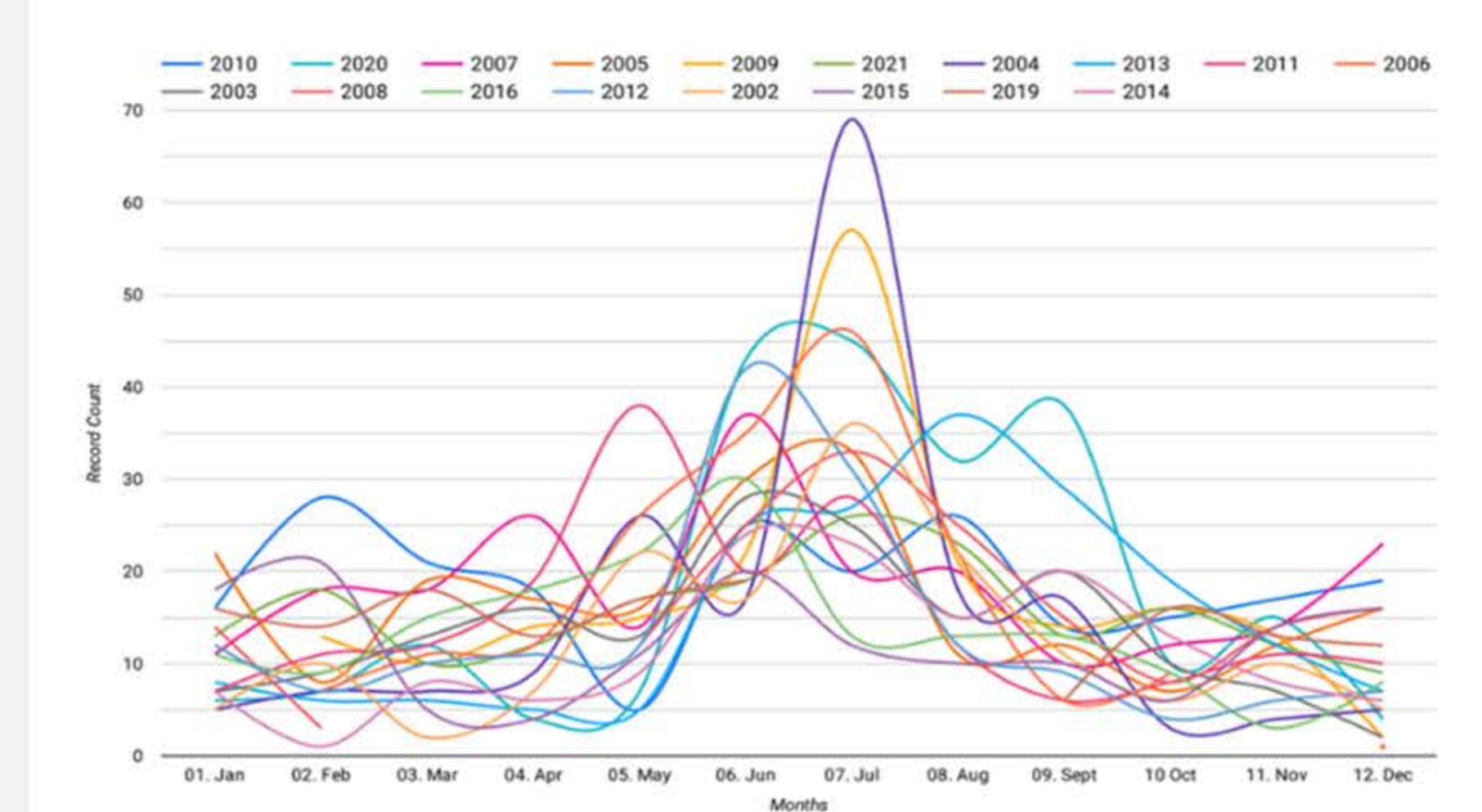


Figure 4: Line chart for death counts in 18 years



## DISCUSSION

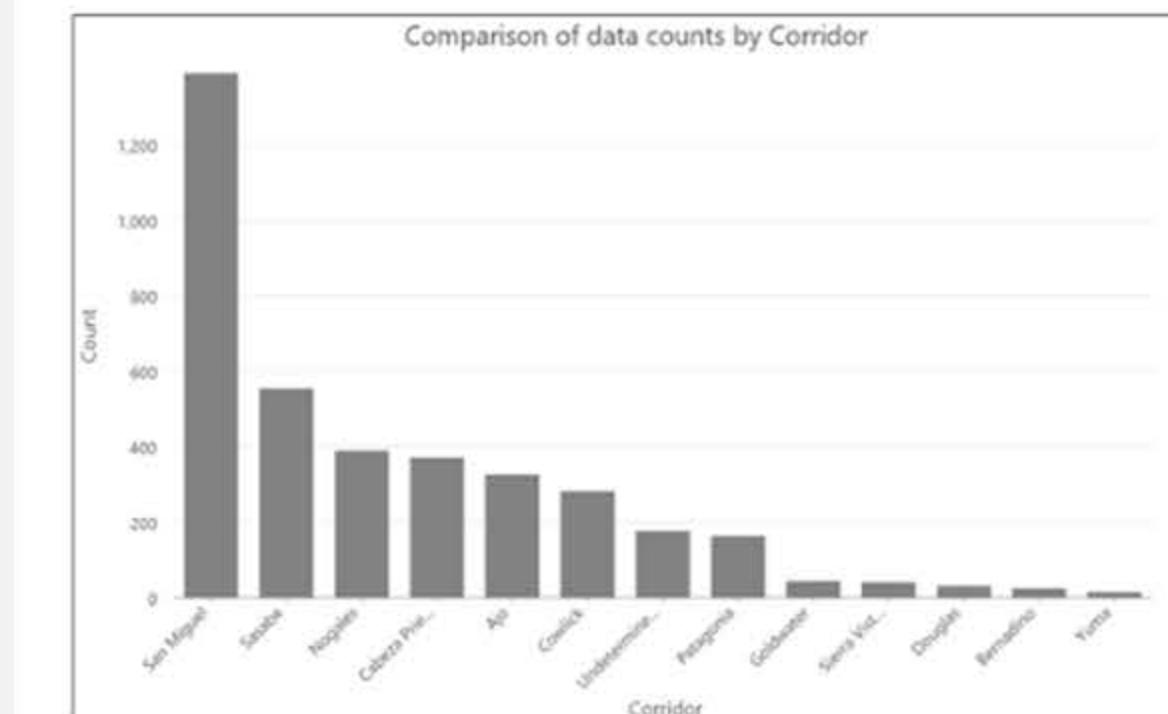


Figure 5: Death counts in different corridors of Arizona

While analyzing the data, it shows that most of the deaths are concentrated in some areas. Particularly, San Miguel corridor has a large number of death compared to the other corridors (Figure 5).

From the DEM (Figure 6) of this area, it can be noticed that San Miguel corridor is located in between two large mountain area and relatively flatter than the other corridors. This can be the reason, why so many immigrants chose this area for their journey to travel into the U.S. However, it does not mean that this corridor is safer. Therefore, there are still opportunity for further research in this region.



Figure 6: Digital Elevation Map (DEM) of the corridors

## CONCLUSION

By analyzing the data available and the by mapping the data, we can say that there are relation of death counts with the temperature, and remote desert locations. Illegal immigrants are travelling by foot through hostile environmental condition, which shows their desperate. These unfortunate deaths can be limited by taking necessary steps from the administration and in future these human crisis can be avoidable.

## REFERENCE

1. *Why do so many Mexican immigrants come to the United States?* | Immigrant Connect. (n.d.). Retrieved November 8, 2021, from <https://immigrantconnect.medill.northwestern.edu/blog/2017/03/16/why-do-so-many-mexican-immigrants-come-to-the-united-states/>
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3. *Arizona OpenGIS for Deceased Migrants*. (n.d.). Retrieved November 8, 2021, from <https://humaneborders.info/>
4. *Climate - Arizona State Climate Office*. (n.d.). Retrieved November 8, 2021, from <https://azclimate.asu.edu/climate/>
5. *Arizona: Naming the dead from the desert - BBC News*. (n.d.). Retrieved November 8, 2021, from <https://www.bbc.com/news/magazine-21029783>

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