

### Introduction and Purpose

Global climate change, together with changes in land use, has significant potential to impact urban centers, especially in relation to extreme rainfall events (IPCC, 2011). In this context, the objective of this research is to analyze the spatial distribution of extreme rain events in the municipality of Diadema - SP, aiming to characterize their relationship with the records of occurrences attended by the Civil Defense.

It is expected that by crossing the different databases, it will be possible to identify the most vulnerable and most resilient regions of the municipality, in addition to diagnosing the contribution of the expansion of the rainfall monitoring network



Figure 1 - Example of an extreme rain event in Diadema on March 3, 2017. Source: Repórter Diário (2017)

### Methods

The daily data used refer to two rainfall stations of the Department of Water and Energy of the State of São Paulo (DAEE) operated in Diadema from 1971 to 2016 (Figure 2), and the stations of the Natural Disaster Monitoring Center (CEMADEN) which starts operating from 2013.

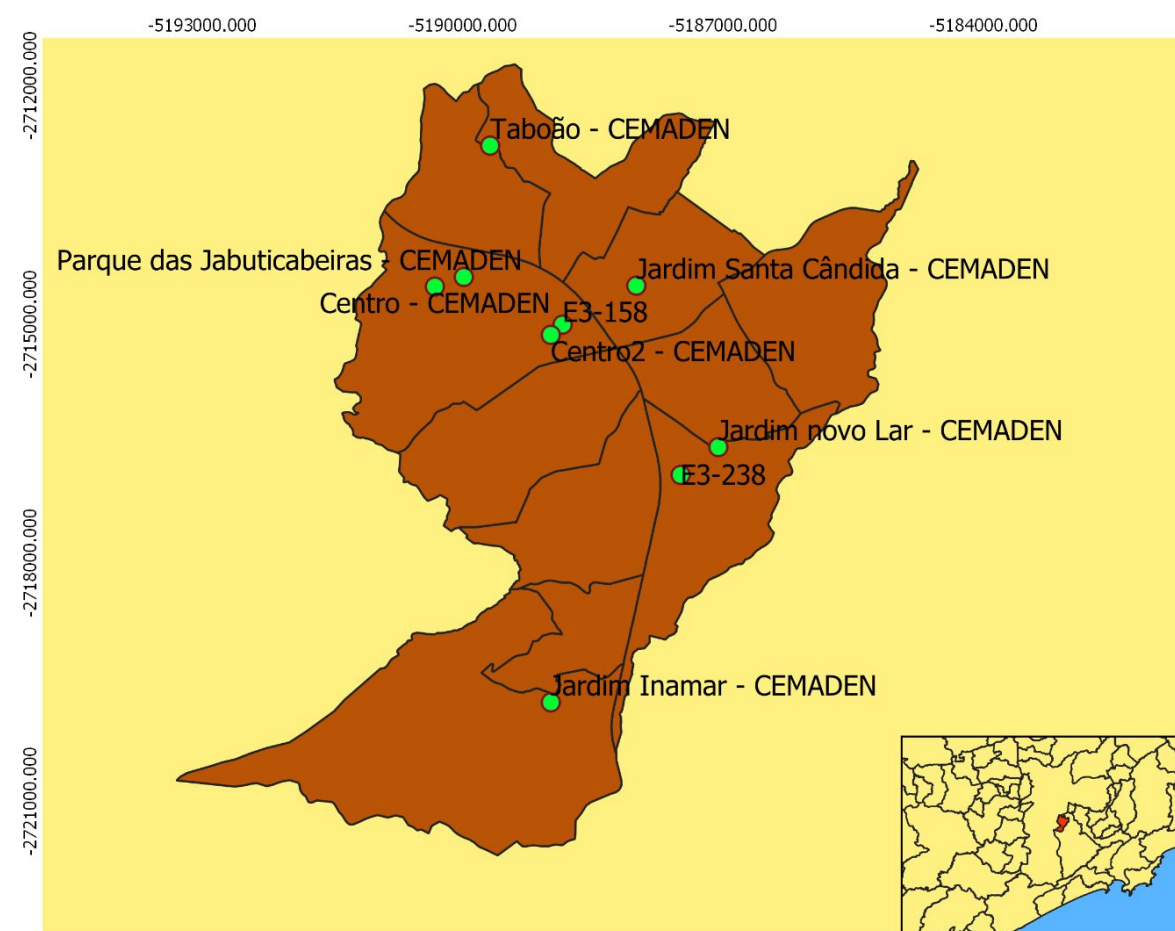


Figure 2 - Location of the municipality of Diadema and DAEE (1971 - 2016) and CEMADEN (2013 - 2019) rainfall stations

An extreme event was considered to be one whose **daily rain exceeded 80mm** (Marengo *et al.*, 2020; Silva Dias, 2012).

- The data used in the spatial distribution of extreme events include: Data from rainfall stations, news reporting impacts of rain in the municipality and records of occurrences from the Civil Defense

### Results

- There was a significant increase in the number of extreme events (> 80 mm) between the 70s and the last decade (Figure 3).
- The increase in the monitoring network proved to be important to identify extreme events in other regions of the city that occurred more frequently

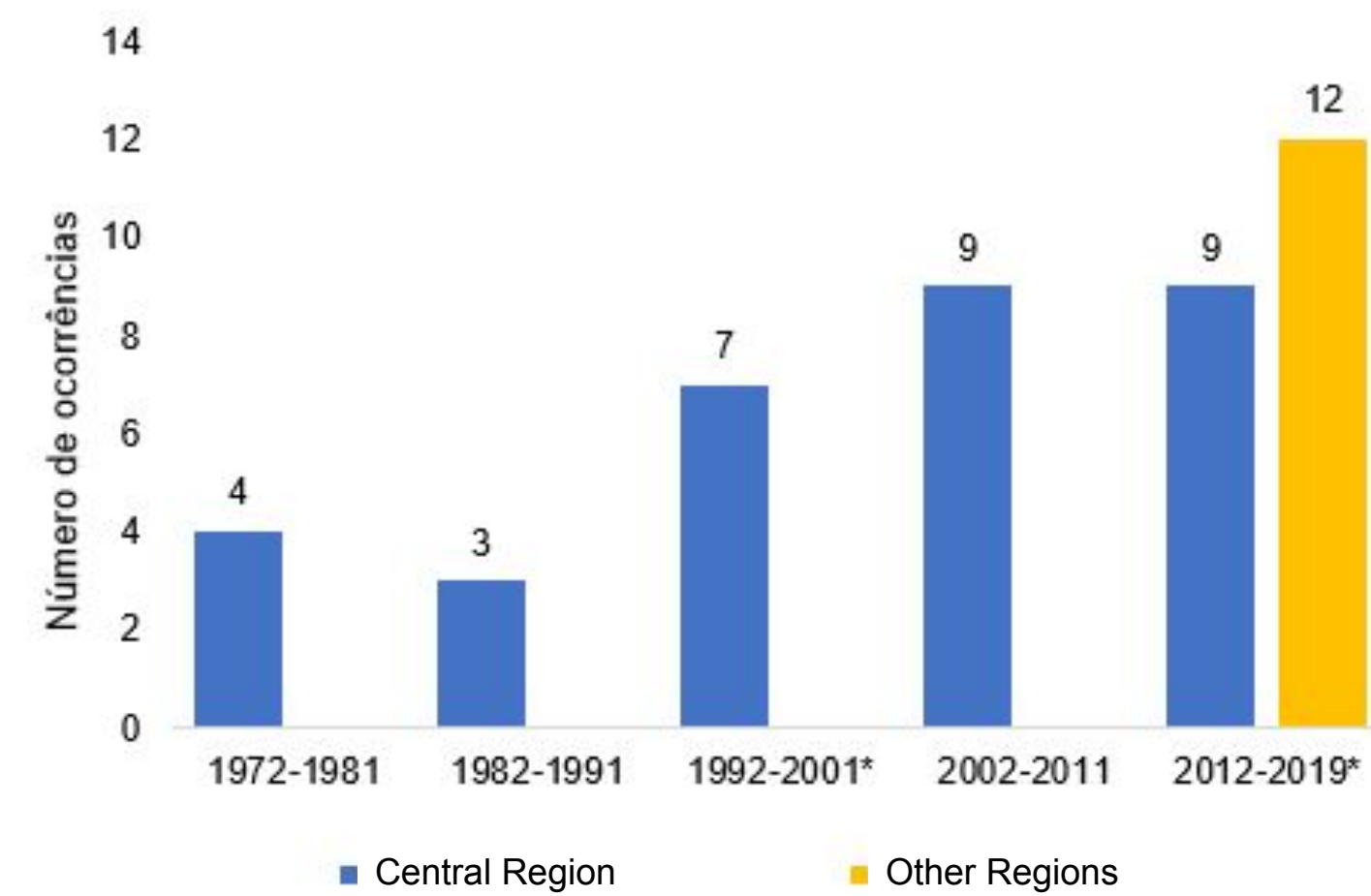


Figure 3 - Number of extreme events in the central region (blue) and in the other regions of Diadema (yellow)

- With the spatial distribution of extreme events, news and civil defense occurrences (Figure 4), it was identified that the downtown district is the most impacted by extreme rainfall, however, the districts with the highest number of civil defense assistances are from northeast, east and south, which is indicative of the greater vulnerability of these regions

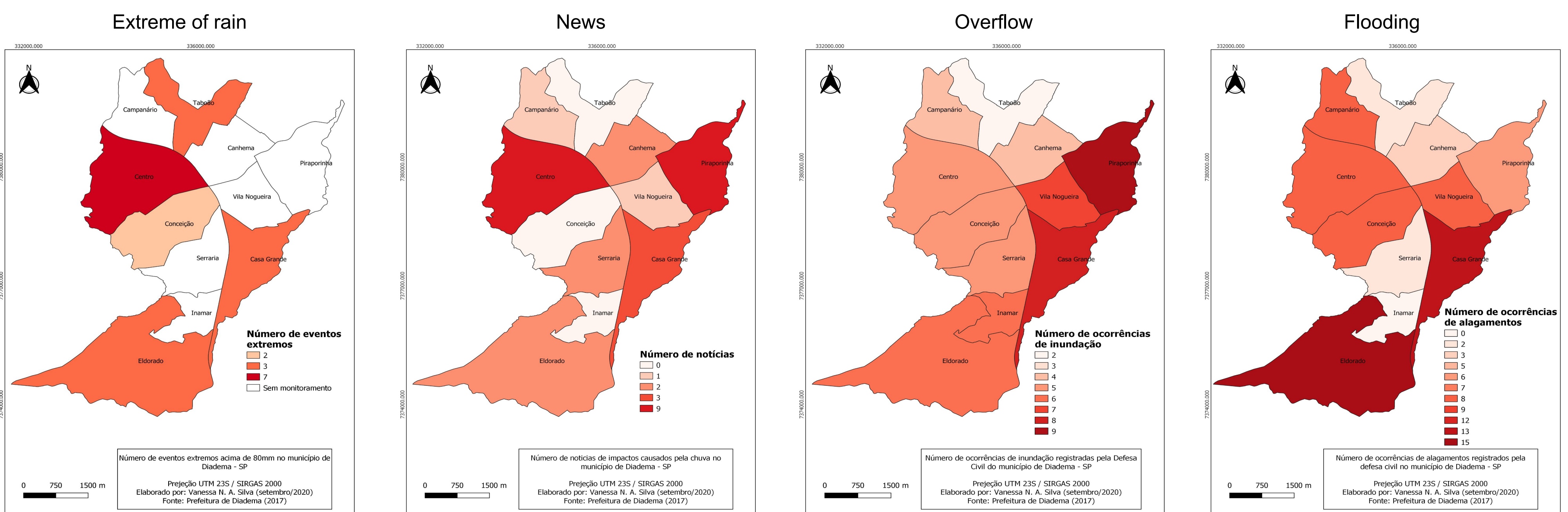


Figure 4 - Spatial distribution of extreme events, news and occurrences of overflow and flooding of municipal civil defense

### Conclusion

Based on the results and analysis, it can be concluded that:

- There is an evident increase in the number of extreme rain events in Diadema;
- The integrated analysis of the data allowed a better accounting of extreme events and their spatial distribution
- The areas of greatest vulnerability to heavy rains were identified: northeast, east and south regions;
- The areas of greatest resilience in the city were identified: central region.

### Bibliographic References

- SILVA DIAS, M. A. F. et al. Changes in extreme daily rainfall for São Paulo, Brazil. Climatic Change, São Paulo, p. 705-722, 20 maio 2012.
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- MARENGO, J. A. et al. Trends in extreme rainfall and hydrogeometeorological disasters in the Metropolitan Area of São Paulo: a review. Annals of The New York Academy of Sciences, p. 1-16, 13 fev. 2020.