How are Precipitation Dynamics Changing in the Houston Area Under a Warming Climate?

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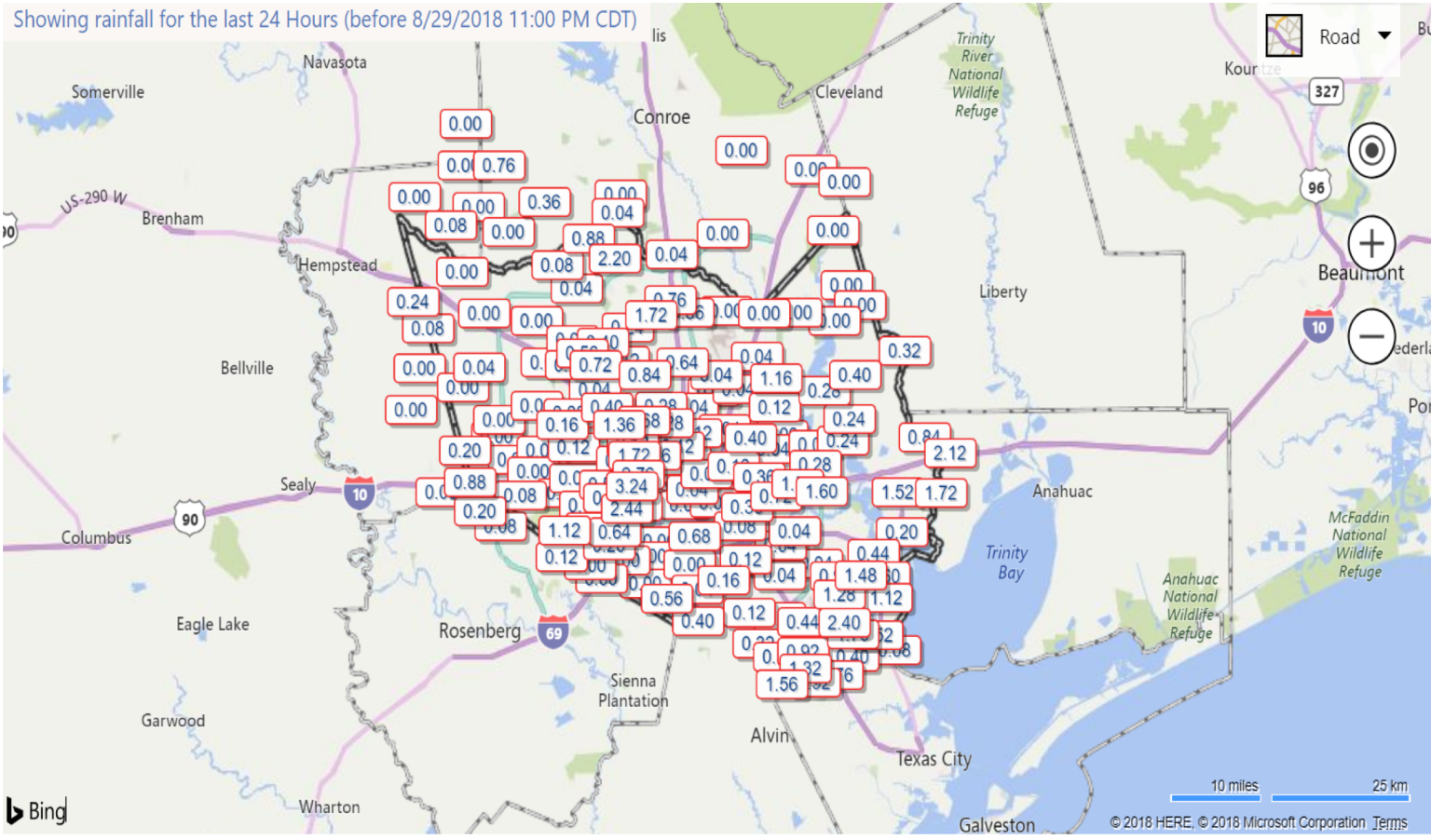
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Background

- Hurricane Harvey flooded a third of Houston, caused 125 billion dollars of damages, and affected 13 million people
- Harvey broke records for the amount of precipitation in one storm. The 1 in 1000 year flood event delivered 51.88 inches of rain.
- Weight of the water depressed the crust under Harris county two centimeters (Amadeo 3-77).
- These large storms bring several inches of rain at a time, overwhelming Houston's infrastructure. Coupled with more intense storms, development of neighborhoods in floodplains and floodways, such as Meyerland, East Houston, and now West Houston continue to endanger people and their property.
- Studying precipitation patterns can help the Houston metropolitan area make smarter decisions about housing and infrastructure as well as save lives.

Methodology

- Data downloaded from the Harris County Flood Warning System (HCFWS). One Excel spreadsheet per each of 100+ sites per year
- Using a segmented random sample,10 sites are selected from 100+.
- Calculate annual and seasonal precipitation amounts over the 20-year time
- period of our study for the 10 sites.
- Select the highest 10% of the events at the 10 sites and calculate intensity (amount/time), duration, and spatial distribution.
- Extrapolate future climate patterns from conducted analysis.

Results

- Study two decades worth of variables: rainfall, duration, and spatial distribution. Models will be made illustrating trends found in each of these variables against time.
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Conclusions

- Rainfall is becoming scarcer over the year, instead of several inches of rain per month over the length of a year, an increasing amount of the rain budget is concentrated into infrequent, large storms (Singh 45-66).
- These large storms bring several inches of rain at a time, overwhelming Houston's infrastructure. Coupled with increasingly intense storms, development of neighborhoods in floodplains and floodways, such as Meyerland, East Houston, and now West Houston continues to endanger people and their property.

Acknowledgements

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