

A Temporal Analysis of the Correlation Between Precipitation and Inundation in the Amazon River Delta

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Abstract

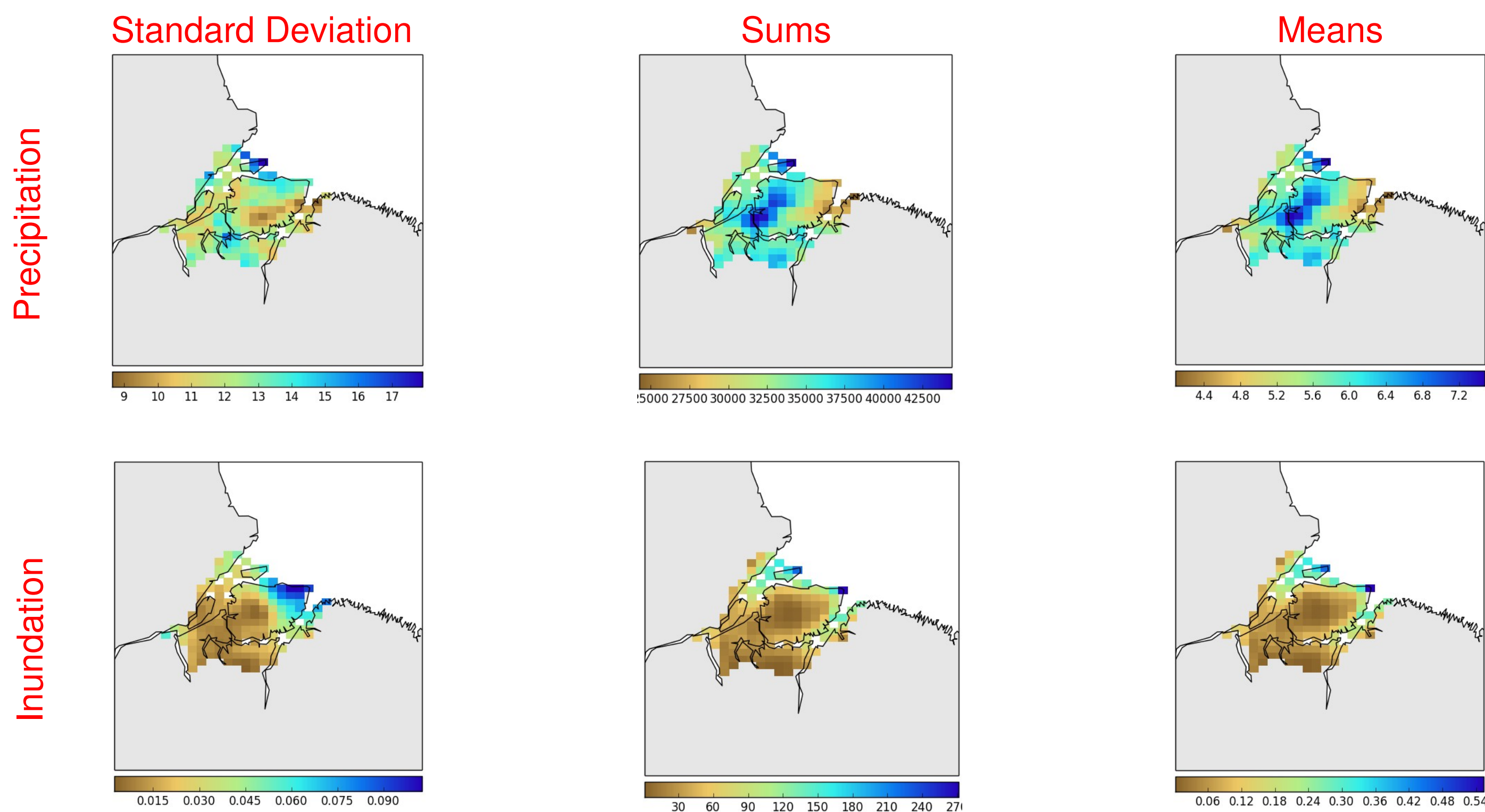
This project's goal is to find a correlation between precipitation and inundation in the Amazon River. Initially, we found a moderate correlation based on 16 years of inundation and precipitation data. By applying a gaussian rolling window to our analysis, we received a fairly strong correlation. We also found where inundation is more likely to be high by plotting the correlations by location on our river delta.

What We Are Looking At



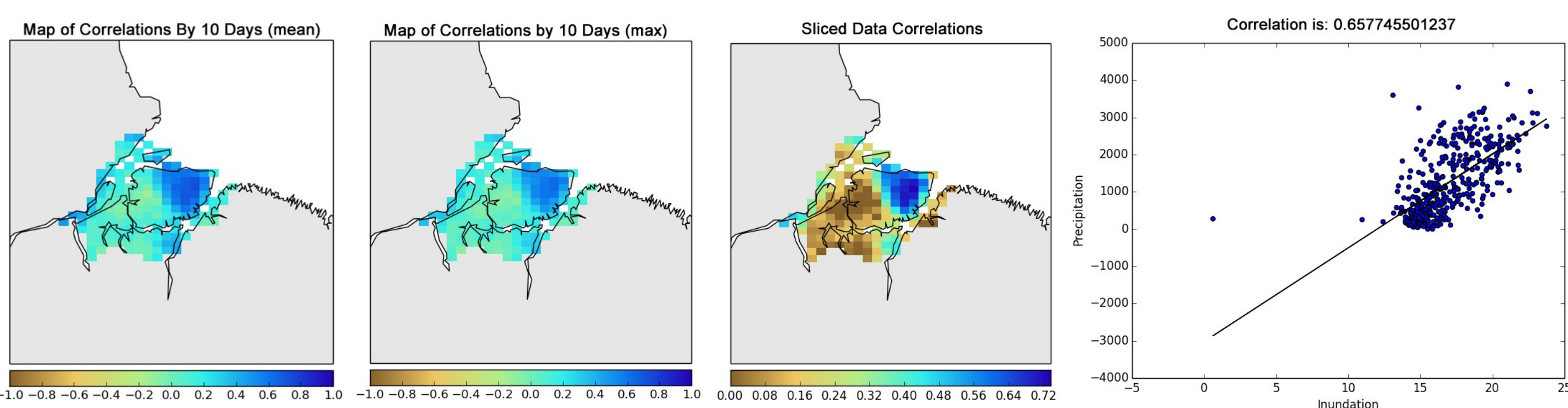
River Snapshot

The simplest way to analyze the data is to take statistics of our river data in order to determine any outlying trends by graphing the mean, sum, standard deviation of the inundation at every segment of the river delta. This analysis gives us an idea of how volatile our data is.



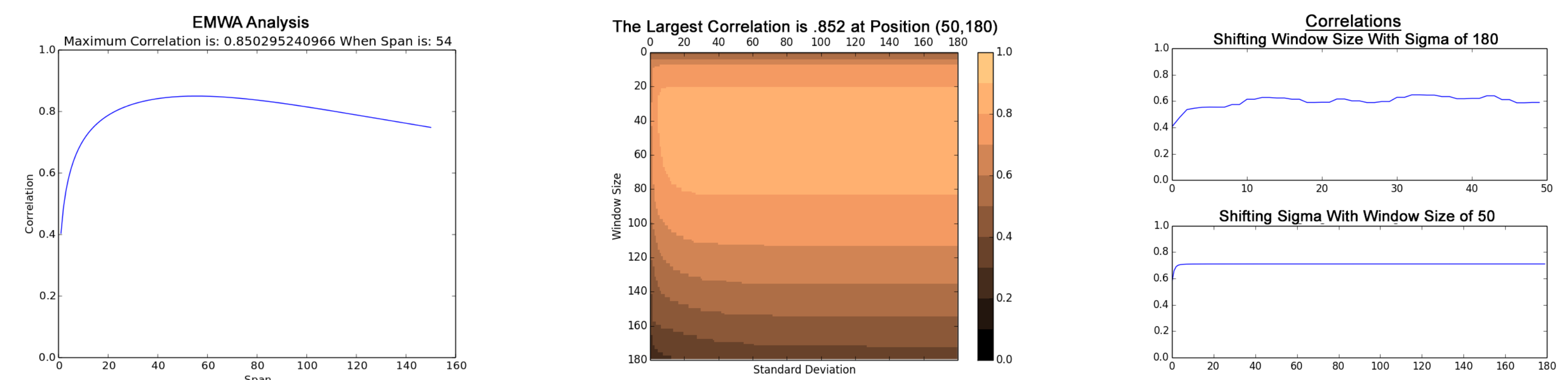
Correlations

While the ~.65 correlation is acceptable, it is surprisingly low. The simple 10 day correlations based on mean and max were also sub optimal. As a result we decided to move on to other more advanced methods.



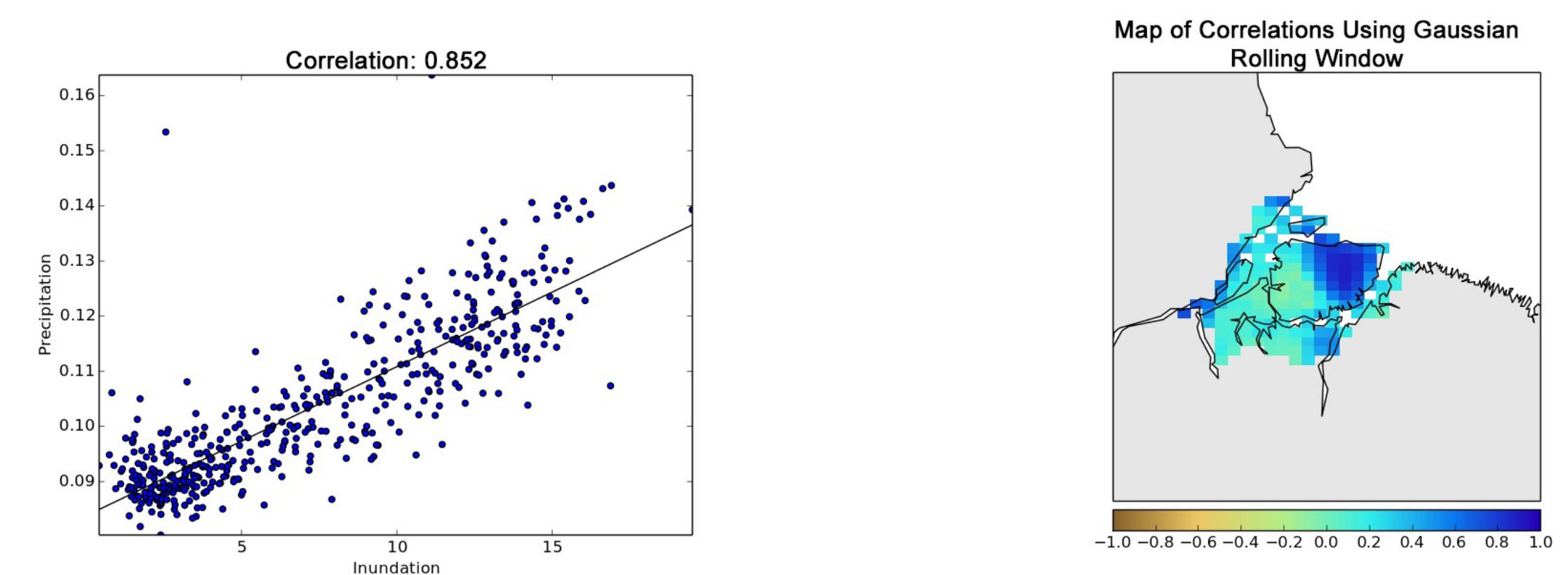
Sigma and Window Size Variation

In order to determine what was missing in our analysis, we decided to favor certain days over others by utilizing both a moving average and a gaussian rolling window function. We did this based on the assumption that water would first accumulate in the soil before inundation would occur hence creating a delay between precipitation and inundation.



Application

Once we implemented the gaussian rolling window, we received a significantly higher overall correlation of ~.85 and much more distinct correlations across the map.



Conclusion

The results indicate that by applying a rolling average where we weigh certain days in our dataset more than others, we obtain much higher correlations than by using other unweighted methods.

Acknowledgements

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