



# Validation of Precipitation Output from CARICOOS Weather Model (WRF-NMM)



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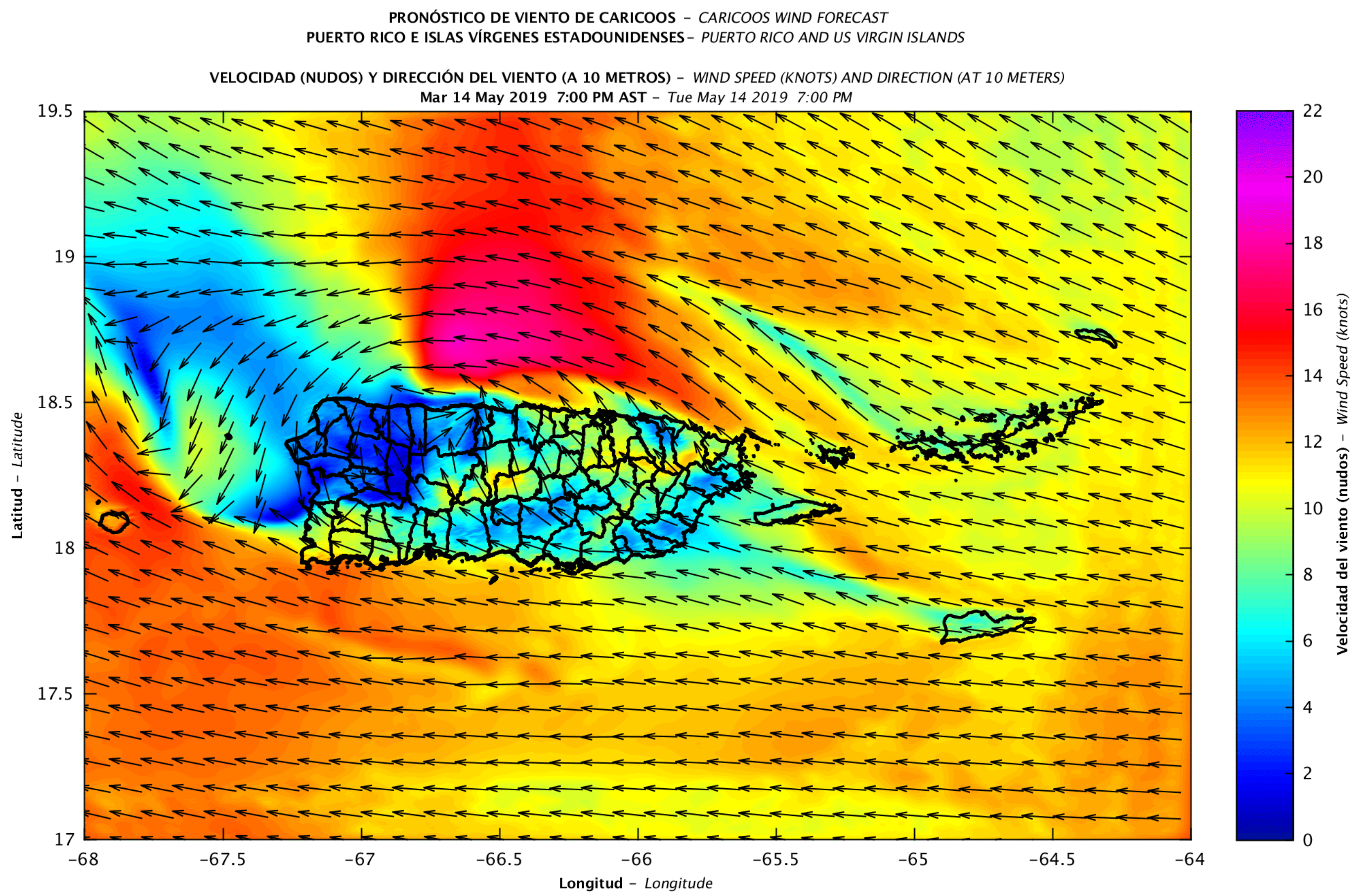
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## Introduction

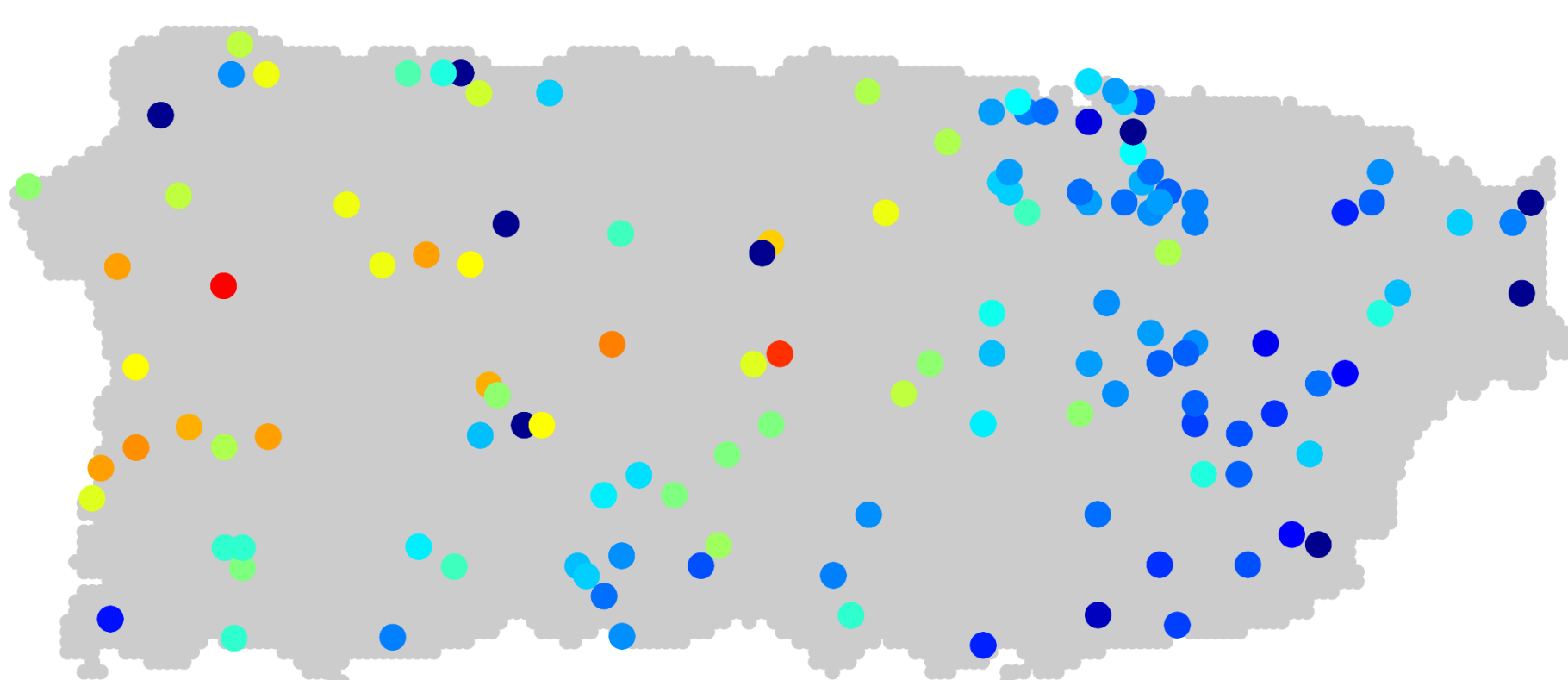
The WRF weather model serves as a future source of data for predicting effects caused by changes in the weather. One such effect is the deterioration of coastal water quality caused by precipitation runoff potentially carrying bacteria contamination. Forecasted precipitation from CARICOOS WRF-NMM could serve as a predictor for beach water quality. This effort aims at validating WRF-NMM's precipitation output in order to assess the feasibility of using it to predict beach water quality.

## Methodology

- Gather precipitation data from several weather stations around Puerto Rico.
- Gather WRF precipitation prediction output at locations closest to the weather stations
- Filter out all unusable data like outliers or computational errors
- Subsample data from weather stations in order to achieve comparable time stamps
- Compute validation statistics using Matlab tools.

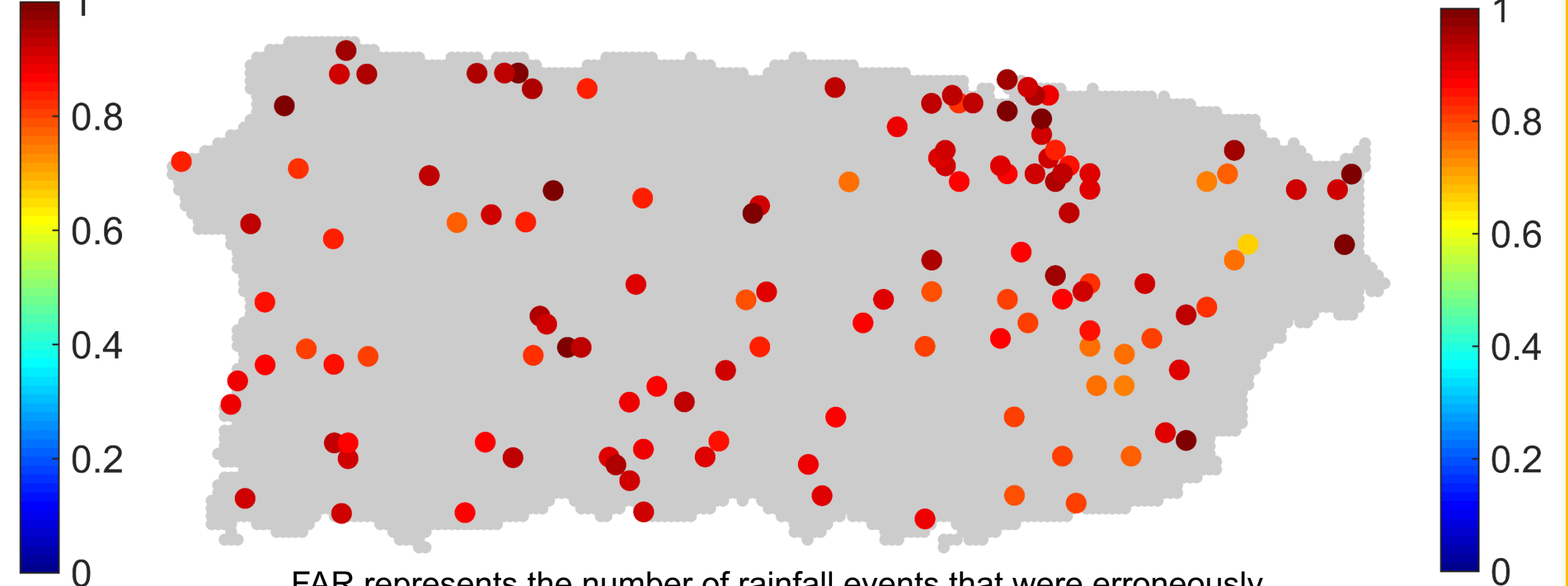


## Sensitivity



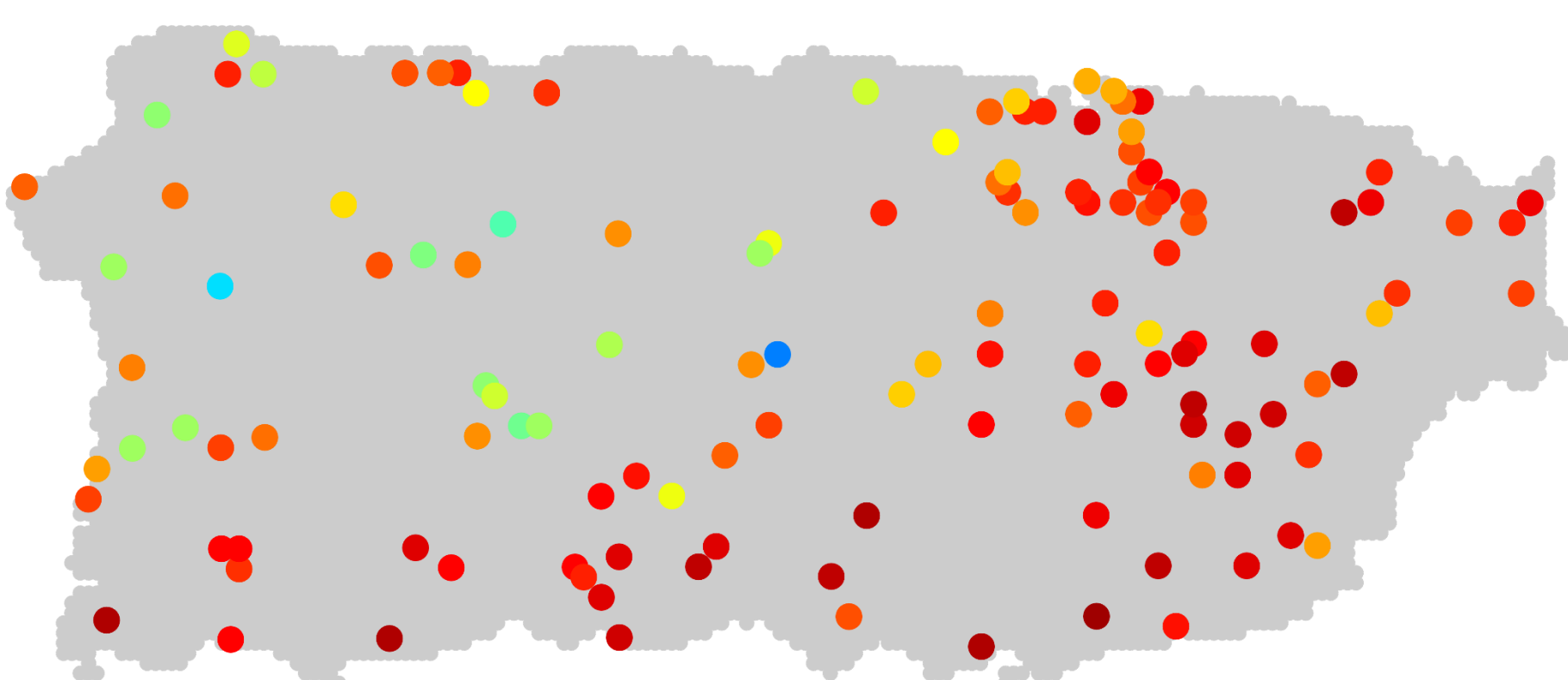
Sensitivity represents the ability of the model to successfully predict rainfall events.

## False Alarm Rate



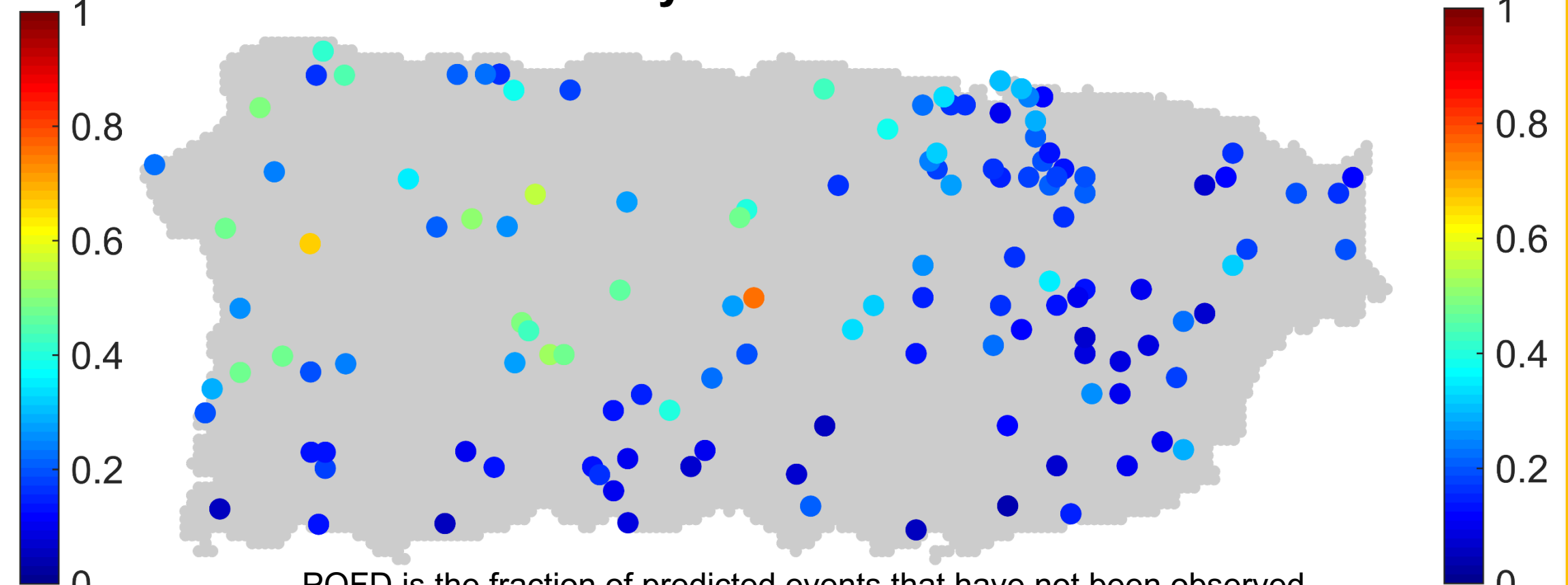
FAR represents the number of rainfall events that were erroneously predicted.

## Specificity



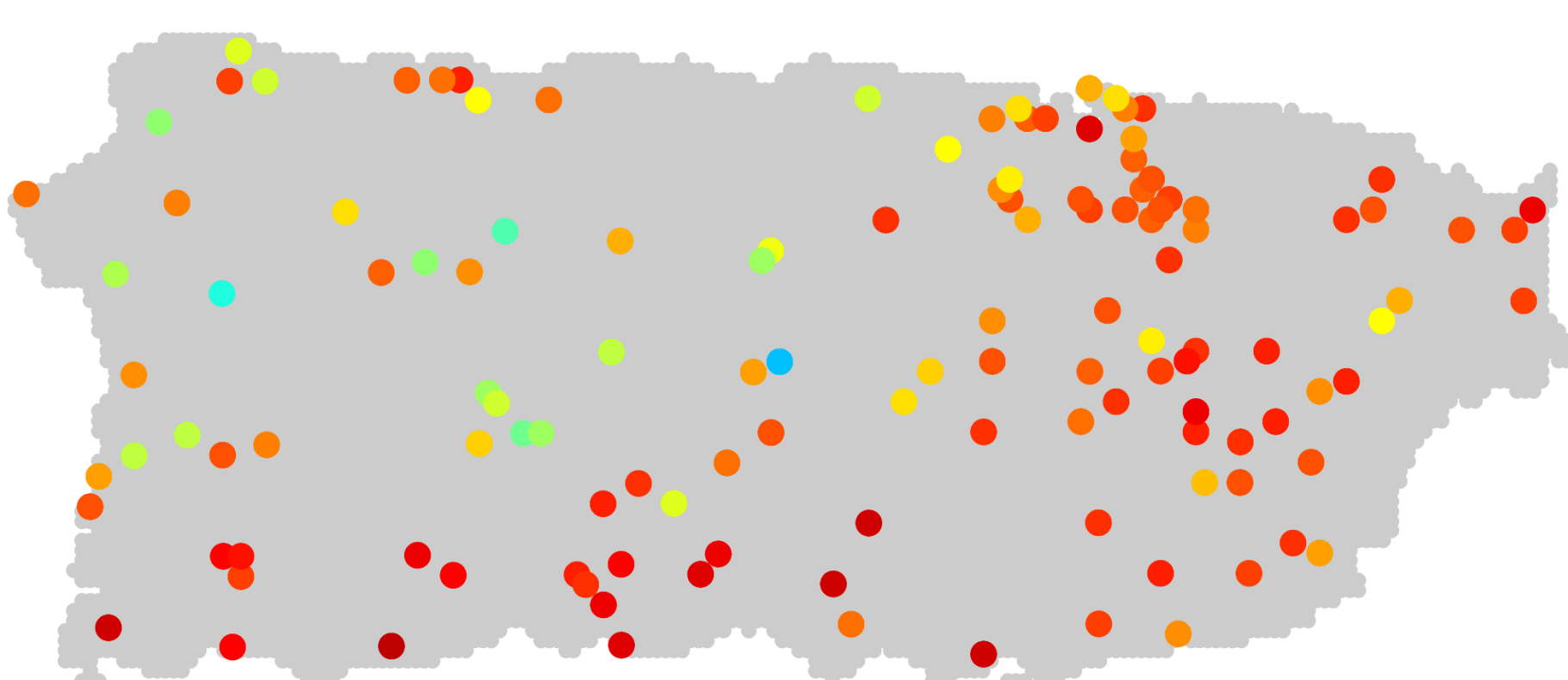
Specificity represents the ability of the model to successfully predict no-rain events.

## Probability of False Detection



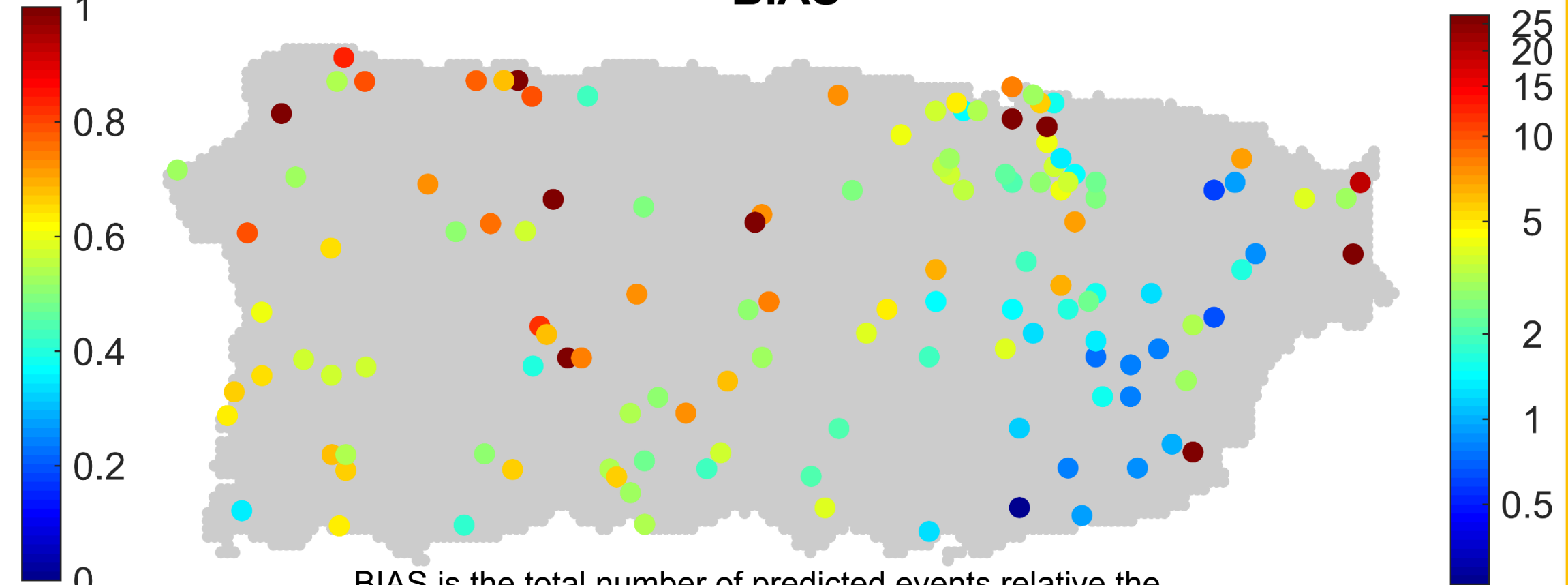
POFD is the fraction of predicted events that have not been observed relative to the total number of unobserved events.

## Accuracy



Accuracy represents the overall ability of the model to predict all rain and no-rain events.

## BIAS



BIAS is the total number of predicted events relative the total number of observed events.

## Conclusions and Future Work

The WRF-NMM model performs better in the west part of the island, which suggests that it is doing a better job at predicting convective precipitation than other types of weather patterns. At the moment, CARICOOS is migrating towards WRF-ARW, which should perform better in terms of precipitation forecasts. A more favorable validation will have to be achieved in order to use WRF's precipitation output as a predictor of beach water quality

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