



EGUsphere, referee comment RC1
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Comment on egusphere-2022-975

Anonymous Referee #1

Referee comment on "Probabilistic and machine learning methods for uncertainty quantification in power outage prediction due to extreme events" by Prateek Arora and Luis Ceferino, EGUsphere, <https://doi.org/10.5194/egusphere-2022-975-RC1>, 2022

Review for "Probabilistic and Machine Learning Methods for Uncertainty Quantification in Power Outage Prediction due to Extreme Events"

This is a comprehensive work that compares different machine learning methods. I find the methods and presentations are solid and the authors did nice job in summarizing the substantial works they have finished. However, I do find some critical information is missing. Namely, they need a comparison of performances for all ML models with the separate testing data because it will show whether their models have overfitting issues and how their performances for new data never encountered. The author also needs more illustrations of how their model input data is obtained and possible associated uncertainties. Based on those, I suggest a major revision for this version. Please see detailed suggestions below.

Line 34, "including hurricane", is it wind field or else? Please clarify.

Uncertainty in the poweroutage.us data.

Line 105 to 111, what are the possible uncertainties in interpolate all covariates into the city scale? Which interpolation method is used? Please be specific.

Line 113: number of outages, is it the same as customers without power?

Line 125: Uncertainty in wind speed estimates since the sizes of cities vary.

Line 147: Which rescaling technique is used for this one?

Line 175: Please fix the citation.

Table 2: how to interpret the difference between R2DEV and R2ψ?

Why is random forest used only for the fraction of customers without power? Is the number of power outages not fit the RF algorithm?

Figure 5: what are R2 and other error statistics in the holdout test? It will be helpful to report them in the same figure.

Do you have any prediction vs observation plot for the RF model like Figure 5?

Section 8.2, there is a heavy discussion on how winds control the power outage from the models. However, how precipitation is related to power outages is not shown, as it is the second most important variable in the RF model. You have demonstrated some nonlinear relationships between wind speed and power outage fraction. Therefore, it is worthwhile to show precipitation's relationship to outage fraction or show precipitation and wind jointly with outage prediction in a separate pdp plot. That may explain some nonlinear relationships in Figure 7b.

Section 9, the author mentioned beta regression may have better performance. But no

comparison is made with the previous method. I suggest shortening the arguments after line 454 because there is no evidence in the paper supporting them.
Line 469 to 470, unlike linear models, RF does not have the assumption of non-collinearity.