

Comments on: Space-time wind speed forecasting for improved power system dispatch

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First, I congratulate Zhu, Genton, Gu and Xie on their research in this paper and on the very interesting results obtained in this paper. The authors provide the methodology for obtaining accurate forecasts of wind generation from the wind speed and direction forecasts. It is very important to design statistical methodologies for estimating wind speed and direction with precision. Good estimates of these variables are the fundamental basis for accurately predicting the wind generation in the day-ahead Electricity Markets for both wind power producers and the Electricity System Operator. In Spain, if the producer makes an offer for the next day that cannot be generated, he receives a penalty by the System Operator. What is worse, the problem of lacking electricity is solved by buying it from a foreign Electricity Market if it cannot be solved with coal, hydroelectric or nuclear energy. Therefore, given the need to control energy financial markets, forecasting wind power generation has become an important subject of research. Consequently, the strategies for increasing profits should be based on improvements in prediction models and acknowledged market mechanisms; this would consequently lead to some reductions in deviation penalties. However, it is still a challenge these days to introduce wind power in the electricity market, because wind is not constant. The positive part is that wind power helps to reduce air pollution and generates employment.

Nevertheless, there are points in the article I would like to comment on. My first comment is related to the phrase on page 2, lines 10 and 11 of the Manuscript, in which the authors claim that their method is valid for estimating potential wind power production before constructing a wind farm. As the authors say, this would be very

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useful for establishing the location of new wind farms. However, as wind speed and direction are so variable, nobody can guarantee what the long-term wind speed will be, and therefore “the potential wind power production” will be approximate since the wind speed prediction will be also approximate.

There is another point that concerns me, and it is related with the missing data. Often the time series related to wind power generation are affected by a large number of missing values, zeros and outliers. This is in general due to the poor quality of the sensors in the generators. Obtaining precise wind power forecasts is a difficult task if observations are not obtained regularly over time.

The authors affirmed that “missing data were imputed by linear interpolation” (page 7 of the Manuscript, line 13). This is a sensitive point in this article, because linear interpolation is fine if the number of consecutive observations which must be interpolated is relatively small. Otherwise, it is necessary to use more sophisticated imputation methods, as for example, the one proposed by [Sorjamaa \(2010\)](#) for imputing missing values in wind generation series. See also [Van Buuren \(2013\)](#) for a full illustration of the imputation methods for missing values.

The results shown in Table 1 are very promising for all months in the RRSTD model and the Vansycle site, in the sense that MAE is always smaller than the other two estimates (AR and RRSTD) for RRSTD. However, this is not the case when comparing these estimators in Goodnoe Hills. Is there any reason that can explain these differences?

Another point that has surprised me is that the RRSTD model always has the best results for all the values in Table 5, except for the values associated to dates 3-Oct, 31-Oct, 17-Nov and 20-Nov of the same table, which shows the best results for the AR model. Is there an explanation?

In conclusion, I would like to congratulate the authors again for their excellent work and encourage them to continue with this interesting research.

References

- Sorjamaa A (2010) Methodologies for time series prediction and missing values imputation. PhD Dissertation, Aalto University School of Science and Technology, Espoo, Finland
- Van Buuren S (2013) Flexible imputation of missing data. Chapman & Hall/CRC, London