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Interactive comment on "A simple methodology to detect and quantify wind power ramps" *by* Bedassa R. Cheneka et al.

Bedassa R. Cheneka et al.

b.r.cheneka@tudelft.nl

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Thank you for your detailed comments. Following your comments and feedback we have added some additional results and explanation to improve the quality of the paper. The most important changes to the paper include:

- We have made an analysis of the seasonal and diurnal variation of the ramps for the offshore data.
- We have analysed an additional data-set (Swedish onshore wind farm data)

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which allows us to show how it can be used when the installed capacity of the fleet changes during the time series being analysed.

- We have compared our method with with the min-max ramp identification method of Bianco et al. 2016.

We have responded to the referee comments by including our answers below the original comments. Our answers are preceded with the following labels:

RC = referee's comments
AC = authors' comments

General comments

RC: This manuscript presents a simple methodology for detecting wind power ramps using a wavelet transform. The narrative is written in a concise manner, with a proper literature review and a fair discussion of other ramp detection methods. There are, however,issues regarding how ramps are defined and the whether the training data is sufficient to justify the conclusions reached. The manuscript suffers from a lack of further (or deeper) analysis into ramps of more interest–those of shorter duration.

AC: We have significantly increased the depth of the analysis to consider diurnal and seasonal variation at the offshore site, the analysis of additional data from an onshore site and a comparison with another ramp detection method.

RC: More specifically, the following issues should be addressed prior to acceptance for publication:

RC: 1. The authors use terms such as "rapid", "significant", "relatively short time", "shortduration", and "longer duration" without quantifying what these terms mean in providing context for their ambiguous use of the term "ramp."

AC: Thank you for your feedback. We agree that these terms are subjective. We have now classified short, medium and long duration ramps with specific timescales and based this on published work elsewhere. The classification is described in the first section and used in the extended analysis later in the paper.
RC: 2. It is unclear what definition, if any, the Belgian transmission system operator uses to identify a ramp event.

AC: We are not aware that the Belgian TSO uses a specific classification. In this work, the intention was merely to use the Belgian data as one example, but that this could be applied to other data-sets. As mentioned in the reply above, we have now attempted to classify ramps in terms of time periods of relevance to system operators in general based on published work elsewhere.

RC: 3. Are the 10-day training periods sufficient? Are these periods representative of ramp event distributions and the weather responsible for ramps in this part of the world? It is somewhat unclear what is meant by "one calendar year of values"–I assume these were the data used to generate the distributions in Figure 7.

AC: We have now analysed sensitivity of the method to the length of the training period.

RC: 4. I am not sure what the value of the longer-duration ramp events (median value 8.5 hours) would be for a generation facility of this size. Of greater interest to most utilities are ramp events that occur on truly short time sales, such as those analyzed in the cited papers (e.g. a 20% or more change in output over a period of an hour). There certainly appears to be a high frequency of these events as illustrated

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in Figure 7, but little discussion. How predictable would these be with this method? Would there be false alarms?

AC: As mentioned above, we have tried to provide some context in terms of the relevance of different ramp durations based on other published work. We think there may also be some confusion by the reviewer as nowhere do we suggest that we are predicting ramps. The paper is only concerned with identifying ramps from observed data.

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