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

Anonymous Referee #1

Received and published: 28 May 2020

Review of: wes-2020-64

Title: "A simple methodology to detect and quantify wind power ramps" Author(s): Bedassa R. Cheneka, Simon J. Watson, and Sukanta Basu

General Comments:

Ramp events are rapid changes of wind power production over short period of times and grid operators have to be prepared to switch between renewable and other forms of energy during these rapid changes in wind power availability. The definition of ramp events is not unique and this manuscript describes a methodology that uses a wavelet transform to discriminate ramp events above stochastic wind variations. The subject of the study is suitable to Wind Energy Science. Overall the manuscript reads well and

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the methodology is adequately described.

Figures are OK, although some improvements have to be performed, as suggested in the specific comments below.

This Referee thinks that since other procedures, also referenced in the manuscript, have been introduced in other studies the authors could explain better what are the benefits of this methodology versus the others and maybe even compare the results of ramp identification when using other methodologies against this one. For instance, the Min-Max method introduced in Bianco et al. 2016 is easily reproducible and it could be employed with many different ramp definitions on the 10 days data-set used in this manuscript, marking positively all the times when any ramp is identified, and comparing with the output of the wavelet transform method introduced here.

Also, the authors claim that the disadvantages of other methods are that they rely on specific thresholds, but it seems that this procedure also rely on some decision on thresholds (i.e. the authors decide to go with a 10% rejection level, instead of a 5%, 2% or 1%). This threshold could be dependent on the data-set, as I imagine that aggregating over more turbines would smooth out the wind power time series.

Finally, since the data-set used in Section 6 is longer (2 years) that the one used in the previous sections to introduce the methodology (10 days), this section could be expanded to include more quantitative statistical results, maybe also looking at daily, or seasonal distribution of ramp events, for instance.

Specific Comments:

Fig. 1: You need to stretch the x-axis of the bottom panel to match the length of the upper panel's one, as it is difficult now to see how the large values of W in the lower panel correspond to the up- or down-ramps visible in the upper panel.

Page 3, lines 83-84 and page 4, lines 85-86: Referring to Fig. 2 you mention "top left plot" and "bottom right plot", which makes me thing there are 4 panels in your figure,

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but I can only see a left and right panel.

Fig. 2: Please introduce what P and P' are in the figure caption.

Fig. 3: Change label to explain that left panels are for 10% and 5% rejection levels, and right panels for 2% and 1%. Also, introduce what is R on the left-y-axis.

Fig. 4: "the colour scale is blue (ramp-up events), red (ramp-down events)". Isn't it the opposite of what you are saying?

Fig. 5: Could you try to keep consistency with previous figures in colors identifying up- and down-ramp events?

Page 9, Lines 146-147: "though the correlation is stronger for the ramp-up events than the ramp-down events". Can you provide statistical values for this statement?

Section 6: I think in general this section could be expanded to include more quantitative statistical results as well as analysis of daily and seasonal distribution of up- and down-ramp events, for instance.

Fig. 7: How are the durations binned?

Technical Corrections:

Page 2, line 40: Replace "was used detect ramps" with "was used to detect ramps"

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