Interactive comment on "Detection and characterization of extreme wind speed ramps" *by* Ásta Hannesdóttir and Mark Kelly

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In the paper "Detection and characterization of extreme wind speed ramps" the authors present a method for characterizing wind speed ramps. The method uses 3 steps: comparison of filtered and unfiltered 10 min standard deviations (SDs) to find interesting 30 min event windows, wavelet transform to find the interesting events in these windows and a ramp function fit to estimate and characterize the actual ramping events. The method is applied to multiple years of data from three locations. The method is interesting and generally well presented; however, please consider the following comments.

Introduction:

1) It would be good to specify even clearer if the aim of the presented methodology is to: a) Forecast ramp events (the time when they are expected to start and how long they are expected to last), or b) Summarize/specify ramp behavior of measured (historical) data

Figure 2:

2) It would be clearer to move this figure after Section 3.1; I would prefer that all figures are mentioned in the text before they appear in the paper.

Intro/Section 3:

3) A general question: Why is a (relatively) complex 3-step ramp event characterization method needed? Could one just calculate differences from the data, i.e., study variables such as $y\_delta = y\_t - y\_t\text{-lag}$? Considering different lags (e.g., 1 s, 1 min, 10 min, 1 hour), one could study the probability distributions of such y_delta variables (PDFs, SDs, percentiles, etc.) to characterize wind speed variability (ramping). What does the proposed methodology offer compared to such very simple calculations?

Intro/Section 3.1:

4) Are there any other comparable "ramp event identification" methods in the literature? How does the proposed method, and especially the comparison of filtered and unfiltered 10 min SDs compare to them?

Section 3.1:

5) Are the 10 min SDs calculated using a sliding 10 min window, or using pre-defined 10 min windows (e.g., 00:00-00:10, 00:10-00:20, and so on)?

6) Some of the selections, e.g., taking 10 min means, using L = 2000m and taking 0.1% of the highest values seem a bit arbitrary. Has some validation been carried out that the selection of high variance events really chooses the important ramp events? Maybe comparison to possible other "ramp event identification" methods?

Section 3.1/References:

7) Reference "Hannesdóttir et al., 2018": When clicking the DOI link, I get to paper "Extreme fluctuations of wind speed for a coastal/offshore climate: statistics and impact on wind turbine loads"; whereas in the Reference list it reads: "Extreme wind fluctuations: joint statistics, extreme turbulence, and impact on wind turbine loads". Is this the correct reference? (the title of the reference should be fixed anyway)

Figure 4:

8) What does the proposed method do if there are two interesting ramp events in the same 1800 s window?

Figure 7:

9) Maybe it would be better to show frequencies instead of counts in Figure 7? As now the counts don't seem very comparable due to different measurement periods.

Section 3.4/Discussion:

10) Are the most interesting ramp events such where both wind speed and direction change quickly? It seems that now only wind speed is used when finding the interesting ramp events (and wind direction change is then simply calculated for these already selected events). But could a combination of wind speed and direction be considered in the ramp event detection method to find the most interesting events considering both wind speed and direction change?