

Interactive comment on “Moving Lomb-Scargle Periodogram: A way to identify time-varying periodicities in unequally spaced time series of OH* temperatures” by Christoph Kalicinsky et al.

Anonymous Referee #2

Received and published: 23 November 2019

General comments:

This manuscript describes an analysis technique to provide spectral and temporal information based on time series with unequal spacing. It is based on a windowed Lomb-Scargle periodogram analysis. The technique is kind of the analogue of a wavelet transform for unequally spaced data. It is of importance for data analysis in many different fields. The technique is certainly not only applicable to OH rotational temperature time series and I suggest removing this emphasis from the paper (particularly from the first sentence of the abstract). The paper also leaves it open, whether this technique is frequently applied in other fields. If this is a well-established technique and the main

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point of the paper is that it is applied to OH temperature measurements for the first time, this should be explicitly stated. Conversely, if this is not a routine technique, this should be mentioned as well. The paper is well and carefully written, in my opinion. I ask the authors to consider the general comments above and the specific comments below and recommend accepting the paper subject to minor revisions.

Specific comments:

Line 1: "We present an approach to analyse time series of OH temperatures with unequal spacing"

The approach is applicable to all kinds of unequally spaced time series, right? Why narrow its applicability down to OH rotational temperatures?

Line 17: "are useful at all."

Do you mean "are not useful at all" or "are useful" ?

Lines 24 and 26: "wavelet transformation" -> "wavelet transform"

Line 37: "The power is defined as"

This is "spectral power", right? Perhaps "power" can be specified further.

Lines 80 and following: Is this sample time series equally spaced? This should perhaps be mentioned.

Line 86: "amplitudes themselves" -> "amplitudes themselves"

Line 101: "independent frequencies"

I suggest providing a brief qualitative statement as to what "independent frequencies" means in this context. Most readers will perhaps guess the correct meaning, but it would be good to define the term.

Line 107: "From this maximum peak heights" -> "this .. height" or "these .. heights" ?

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Line 108: "Consequently, the FAP is then 1-CDF."

This cannot be derived from the information provided in this paper, right? I suggest giving a reference for this.

Line 155: I suggest to replace "line" by "straight line"

Same line: only the numerical values of the slope and intersect are given. I suggest providing the units as well.

Equation (6): please provide the units of the quantities.

Line 162: "Since the peak width"

I suggest mentioning explicitly that "width" refers to the "spectral width"

Line 174: "levels .. has" -> "levels .. have"

Line 191: "deviation to" -> "deviation from"

Fig 5: The black lines in panels b, c, e, f are difficult to see in some panels -> perhaps white lines? If yes, then this should also be changed in the rest of the figures.

Line 213: "As the variation of the amplitude occurs on a smaller time scale than the chosen time interval for the analysis the maximum value reached is about 0.9 K."

I read this sentence several times, but I don't really understand the argument. Can it be expressed in a better way?

Figures 5f, 6f, and 8b: A brief comment on the signatures at shorter periods would be appropriate? They are not significant, but they stick out. Are these some kind of harmonics?

Section 4.2: Perhaps you can mention briefly, why the 1989 was chosen?

Line 268: "wavelet transformation" -> "wavelet transform"

Figure 8b: around day 85 there appears a "vertical structure". What is it caused by?

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Probably gaps in the data. I suggest adding a brief comment to the paper.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-332, 2019.

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