From Reviewer #2," *I am eager to try the supplemental code over my own data."* I have updated the manuscript with a declaration of data availability (with a DOI), and listed the URL from which data and complete code can be downloaded. *"Some clarification will be necessary in parts of the manuscript."* I have made some attempt to identify some ambiguous references and clarify these, expecting that the discussion forum will raise additional needed clarifications. *"Also, very important comment on possibility to use this computationally efficient approach in dataloggers programming for online flux computation is needed in more detailed discussion."*. While this is a research interest that will be pursued, no attempt has been made to date to implement such computational approaches in a data logger programming language. Nonetheless, it should be straightforward to program the most relevant aspects of these techniques in languages that are pre-compiled with methods such as the FFT (for example, Campbell Scientific loggers using CRBasic). The authors will attempt to address this in the discussion forum, as it is not a task that has actually been completed to date.

Atmos. Meas. Tech. Discussion doi:10.5194/amt-2017-123

GENERAL COMMENTS:

The authors gratefully acknowledge the reviewer's comments, which have led to substantial changes in the manuscript, which was initially revised in May 2017, and again recently in response to additional review. Overall, I have attempted to improve clarity of writing; specifically, the hypotheses and goals of the manuscript have been clarified, and the methods are more clearly delineated with appropriate and up to date citations. The brief conclusion has been changed to be more appropriate, in particular to describe additional results which have been included in response to additional reviewer requests. The most significant of these was expanding on actual implementation of despiking via convolution, using a phase space criteria for quantitative spike identification. I have also attempted to clarify those parts of the analysis which are novel in implementation, within the context of previous work in programmatic algorithms.

Specific comments are addressed in the supplementary notes, attached.

SPECIFIC COMMENTS:

P1L9: "20 Hz+" I suggest changing to "10+ Hz" since there are articles published on successful SR application over data collected at 10 Hz frequency. Similarly, it is mentioned 10+ Hz in the introduction section.

Changed as requested. Further clarifications later in the text as to different sampling frequencies and the corresponding cost in data storage and computational efficiency.

P1L13: Please add, "computational" before the word "efficiency"

Added as requested.

P1L14: *Please, be more specific, i.e. avoid saying "Programming techniques such as these", it is still not clear in the abstract what you are referring to...*

This section has been re-written to be more concrete and an appropriate summary.

P1L19: Please add word "possible" between "determinations" and "using".

Added as requested.

P2L50: Please clarify. It is said in this line that the convolution is used for structure functions computation, while later is said the convolution is used to despike the data. It seems that the convolution is used for both and should be explained.

Added clarification here as requested.

P2L51: Replace "simplifying" with "to simplify"

Replaced as requested.

P2L53: Please, start the Methods differently... it is always better for the reader to be more specific.

Changed with the intent to be more specific for the reader.

P2L59: Add, "the method" before "implementation"

Added as requested.

P4L105: Please change the word "approach" to "program" or "program run" for clarity.
Changed as requested.

P4L111-113: Please rewrite for the clarity.
Changed as requested.

P4L114: Please replace "identical" by "from the same 20 Hz dataset".
Replaced as requested.

P4L131 and L133: Should "N-1" be actually "N-r"?
Yes, thank you for catching this error in the text.

P4L133: Should "T(t)" be "T(i)" in accordance to Eq.1. and for clarity?
No, this sentence refers to the time series rather than the discrete samples, but I agree it was unclear due to proximity of the terms. It has been changed for clarity.

P5L137: "sweeps and ejections" of what? It should be clarified adding more description of the surface renewal method background.
Added as requested.

P5L138: Please add "ramps in the temperature signal caused by" between "geometry of" and "coherent structures"
Added as requested.

P5L140 and L141: Please change to be clearer that the detection of the structure functions in the scalar signals improved.
Added discussion of the improved detection and concurrent increase in statistical robustness with larger sample sizes (higher frequency measurement)

P5L144: Explain under which conditions.
Added as requested. Other reviewers noted the ambiguity of this statement so a short discussion of flux direction and atmospheric stability was added.

P5L146: Please replace "to" by "for" if I understand well. In addition, explain why are the periods of 8 hours collected, and not continuously for two months. What challenges did you find? Was it only data collection for the unstable conditions?
This language was too abbreviated in the text, and has been updated to reflect that I am describing several different experiments. The description now indicates that this data was used to test the methods with different performance criteria- i.e. data of different sizes, experiment durations, and captured at different frequencies.

P5L147-L150: Please explain how this analysis is useful. Are fluxes better to be calculated for 3 minute periods?
The introduction and discussion have been expanded to indicate why short duration fluxes are under consideration.

P5L163: What "total data size" means? It works with the same efficiency over 20Hz and 100Hz dataset? Please clarify.
I have attempted to clarify this characterization of "total data size".

P5L169-170: Is this the result of the authors' own research? If not, please give a reference.
I have gone back through my results and observations and changed this statement. I believe that my original intent was to indicate the relationship between friction velocity, vertical flux rate, and ramps times, and mis-stated these observations as being related to stability. I have changed the text and added a short explanation of the rationale, which is not a novel observation (i.e. higher velocity means faster exchange rates).

P6L174: "again the largest factor in the difference between two methods" is making this phrase unclear. Please change to clarify
Changed for clarity.

TECHNICAL CORRECTIONS:
P1L10: One extra space seems to be typed in between the words "demonstrate" and "that"
P1L26: I think "manifests" is necessary instead of "manifest"
P2L60: "on" instead of "one"
P3L95: "an" instead of "a" before "application"
P4L111: Please use different word instead of "conditioning" if possible (i.e. "despiking")
P4L135: Please replace "product of" instead "product by"?
P5L165 and 166: are empty.
Avoid "@" in Figure titles.
These technical corrections are appreciated and have been addressed.

P4L135: Please replace "sense" by "importance in the flux measurement" or similar. Also, replace "generate" by "are"
The language has been changed for clarity. In particular, the word "sense" was used to indicate vector direction.

P5L158: Please replace "difference vectors" by "the vectors of the differences". In addition, change "for each sample lag" by "for the corresponding sample lag"
This has been changed for clarity as suggested.