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Interactive comment on "Flux calculation of short turbulent events – comparison of three methods" *by* Carsten Schaller et al.

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We thank the reviewer for his constructive comments and for the reference to the paper by Saito and Asanuma (2008). We will include a reference to this publication into the revised paper.

1. The aim of our paper was to analyze fluxes with a high temporal resolution, and the potential of systematic biases in eddy-covariance fluxes linked to short-term pulse emissions that violate the stationarity assumption. Therefore we do not want to discuss in the paper also the aspect to the separation of Reynolds turbulence and mesoscale motion with wavelet tools. This topic was discussed by one of the coauthors in several papers (Thomas and Foken, 2005; Thomas and Foken, 2007a; Thomas and Foken, 2007b; Zhang et al., 2007).

The wavelet method offers the possibility to calculate (within a 1-minute-window in our case) the flux with a spectral analysis over all wavelet scales from10 ms to 8.12 min (Mexican hat) and 32.47 min (Morlet). This equals to the equivalent Fourier period of 33 and 34 min for Mexican hat and Morlet, respectively. Therefore it agrees with the typical time window of the eddy-covariance method of 30 minutes. Both methods do not detect fluxes with periods larger 30 (34) Minutes. A possible correction method is the ogive-technique (Desjardins et al., 1989; Oncley et al., 1990). The investigations of one of the authors (Charuchittipan et al., 2014; Foken et al., 2006) have shown that flux contributions of periods > 30 minutes are very small and only relevant in the transition time from day to night and reverse, when all fluxes are very low. Fluxes by mesoscale circulations, which may be relevant for the energy balance closure problem (Foken, 2008) cannot be discussed in relation to this paper. Of course, some fluxes for periods < 1 second are missing due to the sampling time, the path length of the sensors and the separation of the sensors; however, it is straightforward to correct these very small losses with the usual tools in eddy-covariance software (Moore, 1986). As mentioned in the text, this correction was not used for the comparison because it is identical for all methods.

2. The problem you mentioned was intensively discussed in the last 15 years (Finnigan et al., 2003). Now there is a general agreement in the eddy-covariance community to use only block averaging (Aubinet et al., 2012). Because of this recommendation we do not want to compare different averaging method in this paper.

3. The authors agree that such a figure could be a nice illustration of our results, but we believe this would not be in agreement with the theoretical basics of the methods. The eddy-covariance method needs measuring times of 10–30 minutes (Aubinet et al., 2012) and for conditional sampling the requirement $\langle w \rangle = 0$ cannot be realized in the identical way for different averaging periods. We believe that the comparison of all three methods for 30 min measuring intervals, where all three methods fulfil their theoretical requirements, should be the most appropriate presentation.

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