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

Anonymous Referee #1

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Review of article: Flux calculation of short turbulent events – comparison of three methods Carsten Schaller, Mathias Göckede, and Thomas Foken.

The authors have presented and compared three different methods of flux calculations, namely eddy-covariance, conditional sampling and wavelet analysis. The discussion is very logical, and the presentation is nice. The results are also useful for practical purposes. Thus the paper fits very well within the scope of AMT.

Since the paper is very well written, I do not have any specific recommendations regarding grammar/structure etc., I just have a few general comments as follows:

1. The 2008 paper "Eddy Covariance Calculation Revisited with Wavelet Cospectra" by Makoto Saito and Jun Asanuma discussed the use of wavelets to determine the correct cospectral gap to separate mesoscale motions from turbulence motions, while

eddy covariance was used on the separated turbulence part. As this paper points out that Smedman (1988) and Mahrt (2001) suggested that the turbulent motions must be analyzed separately from the mesoscale motions. So when the wavelet method presented in the current paper analyzes events for 1 min period, does it run into the danger of capturing those very low frequency motions that should not be there in the turbulence flux calculation? Or should there be some correction for this separation even when applying the wavelet methods? If this fact limits the timescale for which the wavelet methods can be applied, what is the averaging time from which onwards the wavelet method is still more advantageous but does not capture mesoscale motions?

2. How do the methods compare to each other when say linear or more advanced methods of detrending are necessary before Reynold's decomposition to calculate the traditional eddy covariance fluxes?

3. Can You provide figures when the correlation between the methods are plotted against the averaging time (varying say from 1 min to 30 min)? That could give some more clear idea about the advantages or disadvantages of these methods.

Citations: Saito, Makoto, and Jun Asanuma. "Eddy covariance calculation revisited with wavelet cospectra." Sola 4 (2008): 49-52. Smedman, Ann-Sofi. "Observations of a multi-level turbulence structure in a very stable atmospheric boundary layer." Boundary-Layer Meteorology 44.3 (1988): 231-253. Mahrt, L., et al. "Dependence of turbulent and mesoscale velocity variances on scale and stability." Journal of Applied Meteorology 40.3 (2001): 628-641.