Public reviewer comments

This manuscript proposes a methodology to improve the derivation of boundary-layer statistics from lidar observations. To do so, they propose to use the information derived from the observations but normalized by the boundary layer height before time-averaging. Although the subject is interesting, some modifications are needed before the manuscript is in the form for the definitive publication.

Introduction:
The introduction is well written, however a statement of the main objectives of the paper and the introduction of the outline are lacking. Thank you for the observation. We have added "This work presents a new approach (outlined in Section 2) to analyze lidar profile observations over time when the height of the CBL is changing over that time. The approach is simple: change the vertical coordinate from height to normalized height before computing the statistics over temporal windows. This paper demonstrates this approach using output from a large eddy simulation model (Section 3), wherein we can use a single column to approximate the lidar observations and spatial statistics to serve as truth." at line 55.

Approach:
I suggest to repeat the same analysis, as shown in the paper, but for a certain amount of different locations sampled in the LES (instead of relying on outputs at only one given location) and then compute statistically the mean rmse of the difference between the computation over the regular grid and the one over the normalized grid to statistically demonstrate the improvement. The fact that the results rely on only one high-frequency time-serie is not completely convincing. Thank you for your suggestion. We conducted this analysis for five separate dates and calculated the average RMSE across those five individual dates. The results of which are included in a table at the end of this discussion. We see that the normalized method has the smaller RMSE than the regular method on average across the five dates.

Results:
I propose to reduce slightly the number of figures. This can easily be done by combining Figures 2 and 3: you could just show the time-height variance for the slab and then only show the difference between the regular and slab and between the normalized and slab. Similarly for figures 4 and 5 and Figures 6 and 7. Thank you for your suggestion. We have removed the difference plots altogether, as we think our message comes through with the comparison plots alone.

Minor comments:
l 69: please change 'derived three different ways' to 'derived through three different ways'
Changed "ways" to "methods."
l 92: 'Results' should be a section and not a subsection Corrected

Moment	Average over 5 days 75% zi	
Moment	Regular	Normalized
Variance q'	**0.087**	0.089
Skewness q'	0.661	**0.515**
Kurtosis q'	**1.297**	1.329
Variance w'	0.168	0.168
Skewness w'	0.539	**0.523**
Kurtosis w'	2.024	**1.950**
Wvmr flux	0.0534	**0.0528**
Thl flux	0.0176	**0.0165**
	90% zi	
Variance q'	0.209	**0.199**
Skewness q'	0.766	**0.675**
Kurtosis q'	3.703	**3.537**
Variance w'	0.122	**0.117**
Skewness w'	0.563	**0.537**
Kurtosis w'	2.469	**2.375**
Wvmr flux	0.0725	**0.0716**
Thl flux	0.0295	**0.0286**
	zi	
Variance q'	0.358	**0.357**
Skewness q'	1.164	**1.053**
Kurtosis q'	13.431	**13.110**
Variance w'	0.108	**0.102**
Skewness w'	0.636	0.640
Kurtosis w'	2.541	**2.501**
Wvmr flux	0.075	**0.074**
Thl flux	0.037	0.037