Response to comment by Anonymous Referee #1

Please find our response to Anonymous Referee #1 in blue italic font below their comments.

Referee comment:

The paper addresses the quantification of the error, induced by the motion of a floating lidar and explains the logic behind the low error values obtained, with such a lidar, from a field trial.

Both the 'simulator' and the 'analytical' methods reveal that the pitch motion (tilt motion // in the wind direction) is the predominant one and capable to produce a systematic bias error. The developped analytic model is of significant value and can be applied to PW-lidars too.

The main conclusion of the paper is that the expected motion-induced wind speed error, for the wave motions recorded during an (older) field campaign, is lower than the uncertainty of the ref. wind sensors (cup).

A general comment for the paper (or suggestion for future work), is that both models are extremely difficult to be verified by offshore field campaigns. The expected errors are small and some influencing factors, like: i) the separating distance fixed-MM/lidar to floating lidar, ii) the fixed-MM blockage effect and iii) the different probe volumes (fixed lidar is usually 10m higher than the floating one), can be sources of deviations. Instead, a campaign similar to the mentioned Hellevang and Reuder (2013) would be ideal to verify the models accuracy.

We thank Anonymous Referee #1 for their review of our discussion paper. We agree with the comment that an experimental verification of our findings by means of an offshore trial is practically impossible for the reasons mentioned. The alternative of using a forced-motion experiment as in Hellevang and Reuder (2013) appears more realistic. Still, while in such a set-up the motion can be controlled, environmental conditions like the vertical profile of wind speeds and directions will change uncontrollably. This would introduce variability into the measurements and the resulting uncertainty might be too high for a conclusive comparison of measurements and the analytical solution which assumes steady conditions over a long time. The simulations though might be verified after adapting them to more variable conditions.