Review of: Kaas and Emeis, The five main influencing factors on lidar errors in complex terrain (revised).

General

The revised version of the paper is excellent. Both the structure and the language have been lifted to a level that do justice to the technical content. The addition of the discussion section has in particular added the insight that was missing from the previous version.

I have only a couple of smaller suggestions (and these should be the last!):

- The authors have incorporated my comments concerning the (lack of) accuracy of cup anemometers in complex terrain. I would suggest that they go one step further and give us some numbers since this really puts all the lidar/mast comparisons in a somewhat different light. E.g the Windsensor cup anemometer (high quality and widely used) has class numbers of 1.32A and 3.71B. A typical standard uncertainty (68% confidence level) on a mast would therefore be 1.4% @ 10 m/s in flat terrain (class A) and 2.4% @ 10 m/s in complex terrain class B. Double these numbers for the more typically used 95% confidence limit!
- The development of section 2.3 Lidar error correction could be even better (but I do understand it now). In particular I would suggest that the authors develop firstly the equations for the ideal homogeneous case (same flow at both sensing positions). Actually this equation first appears in a box in figure 3. I think it would help the general understanding to develop this first then demonstrate how this gives the wrong answer when the flow is no longer truly homogeneous.

More detailed comments follow:

P2, L40 (suggestion) 'to test lidars at these sites to assess their applicability' -> 'to examine the accuracy of lidars at such sites'

P3, L93 '…FCR over-corrects for the lidar error' – its probably within the measurement uncertainty.

P6, L183-189. Are you suggesting using the raw lidar data to check the flow model that you will then use to correct the lidar? Maybe this is getting dangerously circular??

P10, L283 'The flow inclination'…….'therefore introduces an error component' – this reads as if it's the flow inclination itself that gives the error. I'm sure the authors don't believe this! Please re-word so that its clear it's the change in inclination angle – here developing the homogeneous case first would help the understanding (my main comment #2).

P11 Figure 3 – see my main comment #2. The equation in the box just pops out of nowhere!

P12, l313 – you need $\beta = -\alpha$, not $\alpha = \beta$! Else the numerator of eq(6) becomes zero!

P12 generally – maybe just take the symmetric case for ε_s as well (you get $\Delta u/u_L$ if I understood this correctly).

P21 Discussion – maybe one important point that you miss here is that both error components have the same sign (is this ever not true?).