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Atmospheric Measurement Techniques Discussions

Interactive comment on "A two-year intercomparison of CW focusing wind lidar and tall mast wind measurements at Cabauw" *by* Steven Knoop et al.

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The referee has raised the issue of thermal expansion of the transceiver that could lead to deviations in the position of the focus, and therefore lead to a seasonal dependent bias in the ZephIR wind speed measurements. Fig. 1 shows the analysis for the two summers and winters of our measurement campaign, where panel (c) indeed indicate a summer-winter difference of about 0.1-0.2 m/s for the highest levels. Fig. 2 shows the analysis for different air temperature classes (on 10-min. basis). All panels do seem to show a trend in temperature. Panel (c) shows a bias difference of about 0.3 m/s between the most extreme temperature classes. Although these difference are still

small, they are significant compared to the other effects described on our manuscript. Therefore we will include these new results in the final manuscript. We once again thank the referee for bringing up this effect.

Whether or not this seasonal or temperature dependent bias is due to thermal expansion of the transceiver cannot be proven here. We have no means to directly measure the focus position. We note that the wind speed distributions between summer and winter are very different, with much higher wind speeds in winter (even within the 4-16 m/s range). If the absolute wind speed error of the ZephIR would somehow increase with wind speed, this would also result in a difference in summer and winter bias, and therefore also in an (apparent) temperature trend.

The referee states that the effect of errors in the focusing height due to thermal expansion of the transceiver is well known. Unfortunately, we were not able to find publications that experimentally demonstrate the effect of thermal expansion of the transceiver, leading to larger biases, or show a seasonal or temperature dependent bias in the wind lidar wind speed data. We would be very grateful if the referee could provide some references.

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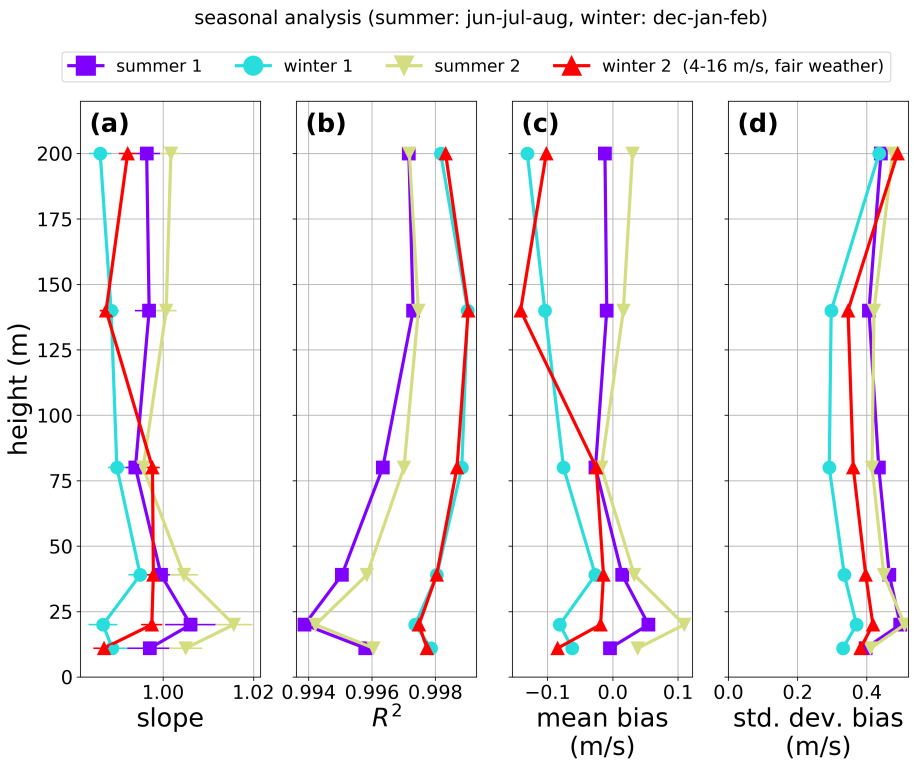

Fig. 1. Profiles of linear regression analysis results and biases in the wind speed, for the two summers and winters (wind speed in the 4-16m/s range and only fair weather conditions).

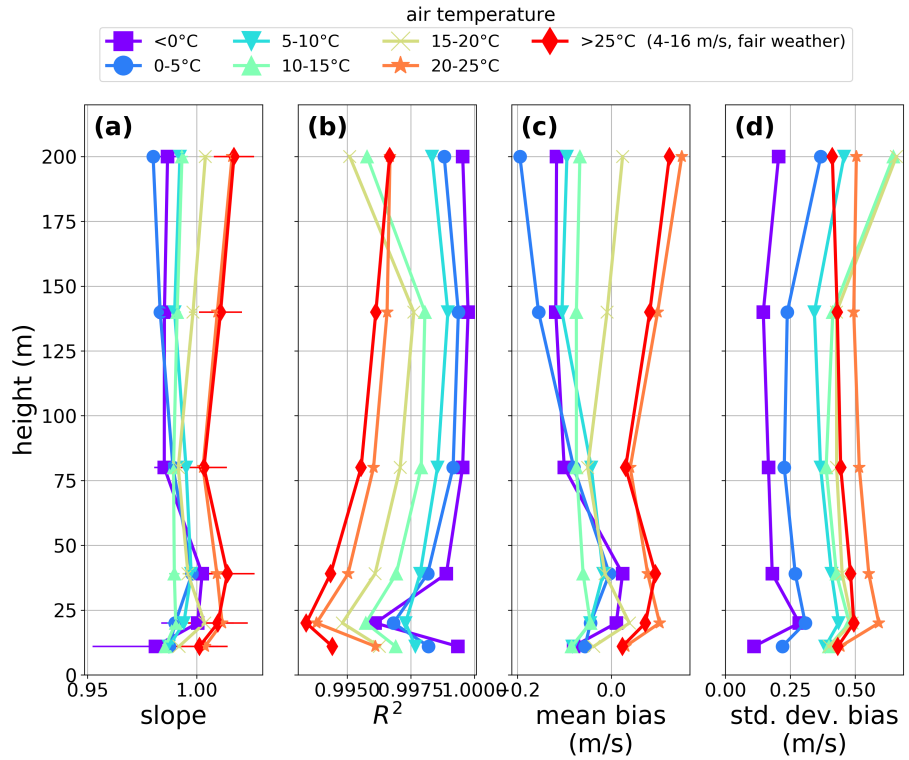

Fig. 2. Profiles of linear regression analysis results and biases in the wind speed, for the different air temperature classes (wind speed in the 4-16m/s range and only fair weather conditions).