

Atmos. Meas. Tech. Discuss., referee comment RC2
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Comment on amt-2021-381

Anonymous Referee #2

Referee comment on "On the derivation of zonal and meridional wind components from Aeolus horizontal line-of-sight wind" by Isabell Krisch et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-381-RC2>, 2021

This is a very informative paper that gives guidance to users how to better understand and exploit Aeolus wind observations. Three different methods are presented for deriving wind directions from Aeolus L2B products. The first two methods perform well in deriving zonal wind at mid and low latitudes, but give meridional winds only with mostly large errors. A third method is introduced that combines ascending and descending orbits. This method performs well also for meridional winds. The analysis was performed carefully, and the results are convincing. The paper fits well in the scope of AMT and is recommended for publication with minor comments.

Minor comments:

Sect. 3.1:

For Method #1 it should be clarified that this method assumes that the wind direction and the LOS direction are always "accidentally" the same.

For testing a simple method to derive wind vectors, this assumption makes absolutely sense, but you should mention that strictly speaking this is not a physically well-reasoned assumption.

I.182: Why did you select 20hr of miss-time? Is there a reason?

I.186: Interpolation in time is also linear?

Fig.4: Please clarify: This figure combines data from all latitudes?

Why do the lon. dist. curves in Fig.4 not show steps, similar to the time diff. curves?

Would the statistics look quite different if only a limited latitude range is considered?

I.199: What are "Rayleigh clear measurement locations"?

Do you mean cloud-free, or locations where Rayleigh wind observations of Aeolus show only small errors?

Sect.6: Error estimation is only performed for the month of January.

As the error depends on the angle between the real wind and the Aeolus LOS, do you think that error estimates will be significantly different for other months/seasons?

Typos and other:

I.18: demonstrate -> demonstrates

I.70: Is "time-of-flight principle" the right expression here?

How about: return time of emitted light pulses?

I.125, Eq.(11) -- shouldn't line 1 of Eq.(11) read:

$$v3^* = -0.5 * ((w_HLOS,asc)/\cos(\Theta_asc) + (w_HLOS,dsc)/\cos(\Theta_dsc))$$

which also affects line 2 of Eq.(11), but in the end cancels out in line 3 of Eq.(11) because $\cos(\Theta_asc) = \cos(\Theta_dsc)$ is used?

I.340/341: To avoid confusion, please provide a link directly to Aeolus L2B data

https://aeolus-ds.eo.esa.int/oads/access/collection/L2B_Wind_Products/tree