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Comment on amt-2021-424

Anonymous Referee #1

Referee comment on "Development of an *in situ* Acoustic Anemometer to Measure Wind in the Stratosphere for SENSOR" by Liang Song et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-424-RC1, 2022

This manuscript focuses on the description of the development of a sonic anemometer designed to perform measurements in the stratosphere (with a sampling rate of 10Hz) on board of high altitude research balloons. A claim is made in the abstract that "Developing this anemometer was necessary, as there is no existing commercial off-the-shelf product, to the authors' knowledge, capable of obtaining in situ wind measurements on a high-altitude balloon or other similar floating platform in the stratosphere". Clearly, the latter statement appears to be not accurate, as later on in the text the authors cite an article by Maruca et al. (appeared in AMT in 2017 : https://amt.copernicus.org/articles/10/1595/2017/) describing an experiment in which an off-the-shelf anemometer with minimal modifications was employed to perform three-dimensional velocity measurements of the wind in the stratosphere, with a sampling rate of 200Hz. The run performed by Maruca et al. produced data used to conduct a spectral analysis of the stratospheric wind, presented in the same AMT article. Previously, Banfield et al. developed and tested a homemade acoustic anemometer which operated up to an altitude of 33km, returning as well high resolution wind velocity measurements. In my opinion, the outcome of these 2016 and 2017 articles allows to say that operating a sonic anemometer in the stratosphere is by itself no news, which is the major problem I have with the present manuscript.

Indeed, main conclusions here are that the acoustic anemometer developed by the authors "obtained continuous wind velocity data at the floating altitudes of 24-25km" and "...preliminary spectral analysis demonstrate that the acoustic anemometer employed in this study can sense rapid changes in wind and is useful for researching small-scale wind fluctuations in the stratosphere", indeed similarly to what was done by Maruca et al.

in 2017.

I consider very valuable the efforts made by the authors to develop a new acoustic instrument able to perform velocity wind measurements in the stratosphere, I really think this is needed and I strongly encourage them to pursue with further developments of their instrument. However, in order for a probe to be worthy of becoming the subject of a scientific article, such instrument should either make it possible sets of observations which were not possible in before, or the measurements collected in runs of the newly developed probe must be used to produce original analyses and results. The latter should address one or more science cases that need do be described and thoroughly discussed in the draft proposed for publication. For these reasons, I cannot suggest the present manuscript

for the publication in AMT.

- Banfield, D., Schindel, D.W., Tarr, S. and Dissly, R.W.: A Martian acoustic anemometer, J Acoust. Soc. Am., 140(2), 1420, DOI: 10.1121/1.4960737, 2016.

- Maruca, B.A., Marino, R., Sundkvist, D., Godbole, N.H., Constantin, S., Carbone, V. and Zimmerman, H.: Overview of and first observations from the TILDAE High-Altitude Balloon Mission, Atmospheric Measurement Techniques, 10(4), 1595-1607, DOI: 10.5194/amt-10-1595-2017, 2017.