

# ***Interactive comment on “Controlled weather balloon ascents and descents for atmospheric research and climate monitoring” by A. Kräuchi et al.***

**A. Kräuchi et al.**

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Answer to anonymous referee # 2:

Manuscript: Controlled weather balloon ascents and descents for atmospheric research and climate monitoring by A. Kräuchi, R. Philipona, G. Romanens, D.F. Hurst, E.G. Hall, A.F. Jordan

p. 12561, around lines 26-27: Please add a short paragraph (or a few sentences) that explains why descent data are necessary. It would be nice to describe the original motivations by Mastenbrook and by Hergesell. Also, how about the potential advantage

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to obtain two vertical profiles at slightly different location and time in a single balloon launch?

Answer: One sentence added in the manuscript

p. 12563, lines 16-26: Please provide typical temperature-difference values of cooled/heated balloon skin and of the balloon wake with respect to the ambient air temperature.

Answer: Change made in the manuscript

p. 12564, lines 10-11: "GRUAN" was defined in Introduction.

Answer: Change made in the manuscript

p. 12564, line 16: collects → is collected

Answer: Change made in the manuscript

p. 12566, lines 1-12: I think that there have been several historical changes in the details since Mastenbrook. A short summary would be useful.

Answer: The only significant changes from Mastenbrook's valve to what is used today are the materials, the diameter of the valve and of course the pressure sensor and its circuitry. All valves for the NOAA FPH have used heated Nichrome wire to cut a string that holds the He-restraining "plug" or "cap" in place. We have added some text describing this.

p. 12566, lines 15-17: If more helium escapes, the buoyancy would be reduced and the descent rate would be increased. Please add more explanation why the descent rate is actually decreased.

Answer: We agree, our explanation was oversimplified so we have added some text to be more descriptive.

p. 12566, around lines 21: Please explain why a parachute is attached. Is it for this

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potential failure?

Answer: Yes, the parachute is employed as a safeguard in case the balloon bursts. This has been added to the text.

p. 12567, line 13: "then": please give a typical period of time until the descent rate becomes stable.

Answer: Change made in the manuscript

p. 12568, line 16: I do not understand what is the Doppler velocity here. Please explain it or give an equation (e.g., in the caption of Figure 10).

Answer: The Doppler velocity is the instantaneous velocity measured by the GPS system. Hence, any movement of the radiosonde is shown (like the pendulum motion) not just the average velocity in a certain direction. A sentence has been added in the manuscript.

p. 12569, around line 7: There is also a possibility of the direct influence of warmed radiosonde package. The sensor may measure the wake of the payload package.

Answer: Change made in the manuscript

p. 12570, lines 3-28: Please give typical temperature-difference values from Figures 14 and 15, and compare them with, e.g., the uncertainty of the SRS-C34 temperature measurements. The SRS-C34 uncertainty information may be taken from Nash et al. (2011). In this way, we can make the judgement that the differences are "small." Nash, J., T. Oakley, H. Vömel, and W. Li (2011), WMO Intercomparison of high quality radiosonde observing systems, Yangjiang, China, 12 July - 3 August 2010, World Meteorological Organization Instruments and Observing Methods, Report IOM-107, WMO/TD-No. 1580. [Available at <https://www.wmo.int/pages/prog/www/IMOP/publications-IOM-series.html>]

Answer: Sentence added in the manuscript. Reference added

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Figure 6, caption: "IBRU" should be defined here, or in the text, not in the caption of Fig. 7.

Answer: Changes made in text and figure captions

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/8/C5385/2016/amtd-8-C5385-2016-supplement.pdf>

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Interactive comment on Atmos. Meas. Tech. Discuss., 8, 12559, 2015.

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