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Atmospheric Measurement Techniques Discussions

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

A. Kräuchi et al.

rolf.philipona@meteoswiss.ch

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Answer to anonymous referee # 1:

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

Page 2, line 29/30: point out importance of in situ measurements, but for completeness mention also the role of remote sensing

Answer: Change made in the manuscript

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Interactive Discussion

Discussion Paper

Page 6, lines 22-26: What is the approximate weight that adds to the payload ? Is there a limitation to the weight of the payload ? What is the maximum payload weight that has been tested with the valve system ?

Answer: The valve and battery/sensor box weigh 175 and 100 g, respectively. This information has been added to the text. We also added that we have successfully flown a 5 kg payload with the valve. Since the weight of the payload is limited more by the balloon size and the type and amount of fill gas than by the valve, we can't really determine a limit for the payload weight. To this end we added "Heavier payloads likely require larger balloons that often have larger necks that don't snugly fit the 9 cm OD pipe."

Page 7, lines 22-25: The double balloon technique with IBRU has been tested in a moderate climate zone. What problems may occur under extreme conditions (e.g. high humidity in the tropics, low stratospheric temperature in polar regions) ?

Answer: : The IBRU and the tungsten wire that burns the tether string is inside a styrofoam box. But the burning has also been tested outside. The hot wire which burns the tether string reaches temperatures of over 1000 °C (red-hot).

Page 7, line 28-29: What is the optimum distance for the two balloons ?

Answer: The ideal is if they are only 2 to 3 meters apart.

Page 8, lines 11-21: What is the effect of the two-balloon set-up on the wind retrieval ? Can Lagrangian movement still be assumed with two tied balloons ?

Answer: The trajectory of a one balloon or a two balloon set-up is quite similar. Hence, a two balloon set-up stabilizes the payload, but does not really change the trajectory of the flight.

Page 11, line 4/5: "measurements of temperature and water vapor" add "in the UTLS"

Answer: Change made in manuscript

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Page 11, Conclusion: It should be mentioned that the proposed techniques are not intended for the daily standard radiosondes but rather for research sondes. To underline the importance of the concept, other potential in situ instrumentation for controlled ballooning should be named in addition to the described FP hygrometers and radiation sensors.

Answer: Changes added in the first paragraph of “Conclusions”

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