Geosci. Instrum. Method. Data Syst. Discuss.,
https://doi.org/10.5194/gi-2019-7-RC1, 2019

Geoscientific Instrumentation Methods and Data Systems Discussions

Interactive comment on "A Tethered And Navigated Air Blimp (TANAB) for observing themicroclimate over a complex terrain" *by* Manoj K. Nambiar et al.

Anonymous Referee #1

Received and published: 5 June 2019

Review of "A Tethered And Navigated Air Blimp (TANAB) for observing themicroclimate over a complex terrain"

This paper is not suitable for publication in its present form due to two significant shortfalls.

1. Lack of suitable literature review outside of the authors' own papers and standard atmospheric boundary-layer (ABL) references. Specifically the wealth of literature on near-surface micro-meteorological observations from tethered systems is missing, be they via kite, tethered balloon or kite-balloon. BL Profile data have been collected in this manner for over a century, and even the more exacting challenge of measuring

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Discussion paper

ABL turbulence has a history starting in the 1970's. More recently, sonic anemometers (rather than say Gill anenometers) on tethered systems were first made in the 1990's, and in the last 5 years remotely pilot aircraft systems (RPAS) have become the standard platforms for ABL turbulence, and this has been reported in dozens of publications.

2. Lack of instrumental rigour. Both the sonic anemometer data and the remote sensed surface temperatures are not suitably calibrated. A could not find any mention of the means to convert the anemometer wind measurements of [u,v,w] into the reference of the earth: this requires a very significant effort in both analysis of the platform movement (via Inertial Navigation Unit (IMU), not solely from three axis tilt) and calibration of the resulting variances and co-variances. The wind tunnel data are not suitable for this analysis as both units (I assume) were static. Similarly, the over-complex calibration of the FLIR camera's land Surface Temperature (LST) using Plank's Law is inappropriate. These cameras are bolometers, and give an output with a response related to the overall incoming thermal radiation according to Stefan–Boltzmann law, which is far simpler and with fewer coefficients. It is then a matter of calibrating the camera against a known temperature with a known emissivity: using a certificated thermometer in a large lake for instance.

Minor but significant points: when regressing it is best to pivot the data to reduce error.

With such fundamental concerns over the methodology, I am unable to comment on the results.

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