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# ***Interactive comment on “The Midlatitude Continental Convective Clouds Experiment (MC3E) sounding network: operations, processing and analysis” by M. P. Jensen et al.***

## **Anonymous Referee #3**

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**SYNOPSIS:** This paper reports on a sounding campaign conducted in conjunction with the Midlatitude Continental Convective Clouds Experiment (MC3E) in 2011. A total of 1362 soundings were launched over a 46-day period from a network of six stations centered at the ARM program’s Southern Great Plains site at Lamont, OK. There are three technical sections of the paper. Section 2 describes the sounding and ground systems used in the campaign used and summarizes the launch program and data collected. Section 3 describes the radiosonde data processing, the prime focus of which is the corrections made to the relative humidity data from the Vaisala RS92-SGP radiosondes used in MC3E. Section 4 examines the impacts of these RH corrections

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and the characteristics of surface parcels on two indices of convective instability, CAPE and CIN, and the the LCL, LFC and EL values that go into CAPE and CIN. The authors conclude that both the humidity corrections and the characterization of surface parcels significantly impact these indices, although the latter sensitivity is greater.

GENERAL COMMENTS: This paper makes a modest contribution to the technical issues regarding the measurement of relative humidity, but considering the unique nature of this large sounding data set, a much more significant contribution could have been made with a bit more effort. Indeed, as stated in the Introduction, a major motivation for the sounding array was to provide large-scale forcing fields for traditional budget analyses and constrained variational budget analyses. While clearly these end analyses were not the purpose of this work, the limited focus on the treatment of the moisture data leaves wide open questions of how the sounding data might contribute to characterizing the large-scale forcing fields for which it was developed. Even allowing for the narrow context of the examination of the convective indices presented in the paper, the authors fail to provide any insight into how the differences they do find might impact large-scale budgets. In short, are these differences that make a difference? And if so, how?

#### SPECIFIC COMMENTS:

p. 9279, first paragraph: A WRF model simulation was used to determine the optimal configuration of the sounding array, and the statement is made that leveraging of the operational wind profiler network reduces the biases and RMS errors over the VAD network compared other configurations. What is meant by the wind profiler leveraging, and more importantly, what, if anything, does the choice of the network configuration have to do with the results presented later in the paper? Reading this paragraph suggested that a far more ambitious analysis was going to be presented than the paper actually had.

p. 9280, first paragraph, line 11-13: Here it is stated that humidity corrections in the

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Vaisala ver. 3.64 software were turned off and applied during post-processing. However, Section 3.2 says the humidity corrections were made with the ARM SONDEAD-JUST algorithm which incorporates the corrections in Miloshevich et al. (2009). Does this mean that the ver. 3.64 software applies the same corrections as SONDEAD-JUST? If so, then this should be stated.

p. 9281, first paragraph: It is stated here that GPS retrievals of precipitable water vapor (PWV) were used at the five non-central stations in the network, but in the end these were not used for scaling. This statement was somewhat confusing coming as it does in a paragraph about scaling.

Figures: Although the figures are well drafted, the labeling is far too small.

SUMMARY: This paper is of some technical value, though limited. It does document a potentially important set of data for other more scientifically interesting studies, so on that limited basis I would not discourage publication. If that is the case, however, the authors should discuss the significance of their main result. In addition, revisions should be made to address the specific comments above.

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Interactive comment on Atmos. Meas. Tech. Discuss., 7, 9275, 2014.

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