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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Application of the Aventech AIMMS20AQ airborne probe for turbulence measurements during the Convective Storm Initiation Project" *by* K. M. Beswick et al.

Anonymous Referee #1

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This paper details measurements made using a relatively new turbulence probe on a light aircraft, and then describes how the measurements are used to obtain estimates of the mesoscale variability of winds associated with developing convection over heterogeneous terrain.

I think that the paper contains some useful information, but suffers something of an identity crisis: it is not clear to me whether the key purpose of the paper is to (1) describe and evaluate the performance of a new aircraft measurement system to obtain the wind vector, or (2) detail some preliminary measurements of mesoscale convergence associated with developing deep convection? In my view, by trying to do both,

the paper does neither very well.

For (1), what is required is proof that the system is accurately measuring winds. The only quantitative comparisons with other measuring systems were with a wind profiler several km away (and over heterogeneous terrain that might as well be in outer space!) that appears to suggest that there are major problems with the measurements. For example, what is the reader to make about the fact that few of the comparisons between the profiler and the aircraft agree to within the error bounds (Table 4)? Side-by-side intercomparisons would be a minimum required for the measurement community to take real interest. In addition, the in-flight calibrations are just stated without actually stating what the calibration standard is, or the measurement accuracy determined from the calibration.

For (2), there would need to be a better description of the science goals of the program, some detail of the case studies and the convection that developed, and a general motivation for why the aircraft measurements are useful. These are lacking in the manuscript as it stands.

My recommendation is that the authors need to do some work and determine to what extent the paper can really achieve aim (1) above. My feeling is that there is sufficient scientific literature on this topic that to constitute a useful contribution, any new paper with a detailed description of a wind measuring system has to bring some new concepts to the table (e.g. either new flight tests, new calibration procedures, better ways to determine aircraft motion etc.). I would recommend that they focus upon the science issues, i.e. (2) above , and in doing so they can introduce the AIMMS20AQ and describe its limitations and its accuracy as a necessary precursor to using it for scientific purposes.

I would therefore urge that the authors revise their manuscript significantly before considering resubmission of a manuscript

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