

Interactive comment on “Vertical Velocity Variance Measurements from Wind Profiling Radars” by Katherine McCaffrey et al.

Katherine McCaffrey et al.

katherine.mccaffrey@noaa.gov

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We thank both referees for their very thorough and insightful comments on our manuscript. We have addressed the general, specific, and technical comments, and believe that the changes we've made are a great improvement to the clarity of communicating the work that we have done. (1) Referee's Comments (2) Author's Response (3) Change to Manuscript

We also have attached the revised manuscript as a supplement, with revisions denoted in blue text.

Interactive comment on “Vertical Velocity Variance Measurements from Wind Profiling Radars” by Katherine McCaffrey et al. S. Jacoby-Koaly (Referee) sjacobyk@univ-ag.fr
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Discussion paper



General comments This article presents a solid and well organized study of the measurement of large-scale and small-scale vertical velocity variances by wind profiling radars (WPR) during XPIA campaign by statistical comparison with in situ sonic anemometers measurements. The final purpose is clearly indicated: to identify the best WPR configuration and post-processing methods to measure accurate variances at different scales. (1) The title not adequately describes an important part of the work devoted to the analysis of sonic anemometers data. Authors should amend the title to include reference to sonic anemometers. (2) We've changed it, as requested: (3) Title: "A Comparison of Vertical Velocity Variance Measurements from Wind Profiling Radars and Sonic Anemometers" (1) The results are properly illustrated in sections 4 to 8 but some figure descriptions in sections 4 and 5 are too long, detailed or redundant, which makes the text more cumbersome. Authors need to find a way to better synthesize the comparative results (maybe using tables). (2) In several places, we've taken out some confusing sentences, and re-phrased things. (3) See blue text throughout sections 4-8 Despite some improvements suggested above, I recommend publication of this paper after minor revision.

Specific comments (1) Lines 32-33: Better rephrase this point in the text. (2) This should clarify: (3) line 32: "In the complete energy spectrum, the total variance is made of contributions from the entire range of scales, from large to small. Furthermore, variances are observed at separate scales by different instruments' measurement frequencies and volume sizes." (1) Lines 37-39, 44- 45: More references are required in the introductory part to support some statements. (2) We've reworded and moved the reference at 37-39, since it is all part of Angevine 1994, and cited the references from lines [...] on dissipation rates (3) line 34-40: "In general..." line 45: "Hocking..." (1) Lines 167-168: Add a few words here to better explain your choice. (2) This should clarify: (3) line 166: "If a non-atmospheric signal produces a high, outlier noise level, the spectral width will be detrimentally narrowed, and therefore, we decided to use the mean noise level with SPP for measurements of Doppler spectral widths because it will give more consistent results." (1) Line 203, Equation 8: Define w_r' , R_0 , Θ . (2)

Fixed. (3) line 38: “vertical velocity, w_r ,” line 204: “(where w_r is the fluctuation relative to the 30-min mean velocity),” line 216: “where ν is the half-width to the half-power point in the antenna pattern, θ is the beam angle from the vertical, R_0 is the lowest range gate, and du/dz is the vertical mean wind shear.” (1) Did authors try to get statistical comparative results at discrete levels? In other words, do all height levels follow the same trend? (2) There is a slight difference, but for this study, we focus on the overall effectiveness of the instrument. We’ve added a short paragraph to this point: (3) line 299: “For the three variables. . .”

Technical corrections (1) Line 280: 0.729 instead of 0.724 (2) Fixed. (3) line 283

Interactive comment on “Vertical Velocity Variance Measurements from Wind Profiling Radars” by Katherine McCaffrey et al. S. Emeis (Referee) stefan.emeis@kit.edu
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This is an important study which gives confidence in remotely measured vertical velocity variances. The study is well written and should be published more or less as is. Maybe, the Conclusions could be formulated a bit better. The Conclusions should not just repeat the most important numbers from the results section (which already have been highlighted in the abstract as well). The authors should try to formulate the main results in new words, maybe in form of a few bullet points. The conclusions should illustrate the impact of the outcome of the presented research. Especially, the last paragraph of the Conclusions could be extended. Presently, it just reports the well-known fact that the range of the 449 MHz wind profiler is larger than the one of the 915 MHz instrument. (2) We’ve added further discussion of the implications of these improved measures, at the end of the last paragraph. (3) line 517: “The evolution. . .” (1) The results section (see lines 418ff) gives more information on the different abilities of the two wind profilers. The results from lines 418ff should be commented on in the Conclusions as well. (2) There is a new paragraph that summarizes these results. (3)

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line 504: “In an analysis. . .”

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/amt-2016-299/amt-2016-299-AC1-supplement.pdf>

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-299, 2016.

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