Comment on gmd-2021-128

Anonymous Referee #2

Referee comment on "Verification of boundary layer wind patterns in COSMO-REA2 using clear-air radar echoes" by Sebastian Buschow and Petra Friederichs, Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-128-RC2, 2021

In this study, the authors investigate the use of the composite clear-sky radar reflectivity data from German radar network to verify the low-level divergence structures derived from a regional NWP model reanalysis product. Using a two-dimensional wavelet transform, this study shows that divergences derived from the NWP model reanalysis product and radar composite reflectivities can be quantitatively compared in terms of their spatial scale, horizontal pattern, and direction. A long-term validation shows close agreement. The manuscript is well written and should be interesting to the meteorological community. I suggest that the manuscript is accepted after major revisions.

I have only one major comment about this study. Given that multi-Doppler wind retrieval techniques exist (Bousquet et al. 2008, and Beck et al. 2014 cited in this manuscript by the authors), why the authors did not retrieve two-dimensional or three- dimensional wind fields first, then compare the retrieved winds, or divergence product from multiple radars and compare with the regional analysis COSMO-REA2? Please explain why.

Abstract: It's not good to use acronyms COSMO-REA2 and RADOLAN without explanation first. You may put these acronyms into a list and put it as an appendix?

Page 3, line 66-67: Why not use the same large data-base of radial velocities to retrieve winds, then derive divergence structures and do comparison with the model reanalysis COSMO-REA2?

Page 4, line 106-107: What are TerrSysMP and COMSO? Please explain.

Page 5, line 118: Please explain what is the "modified Tiedtke mass-flux scheme? You

may need to add a reference here?

Page 6, Figure 2: Please explain units used in the color bars? What do these numbers for the color bars represent?

Page 11, Figure 4: is missed out from the manuscript.

Page 12, Figure 5: If DJF, MAM, JJA, SON represent seasons, please use English.

Page 15, figure 8: Please add units for both x- and y- ordinates.

Page 15, line 288-289: Rewording "The remaining three cases are all relatively small in scale with both data-sets agreeing that 2009-07-29…".

Page 18, Figure 10: Please add "hours" for the x- ordinate.

Page 20, line 374: Should "20.000 individual…" be "20,000 individual…"?

Page 23, Figure B1: What are the units for these x- or y- ordinates? Please explain the correlation numbers in the up-left corner of each image in the caption. Why (b) misses those correlation numbers?