

Interactive comment on “Impact of model improvements on 80-m wind speeds during the second Wind Forecast Improvement Project (WFIP2)” by Laura Bianco et al.

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This paper describes the results of model improvements to the High Resolution Rapid Refresh (HRRR) model developed using observations and improved parameterization schemes developed during the second Wind Forecast Improvement Project (WFIP2). Overall, the paper is very well organized with results presented in a clear and concise manner. The breakdown of model performance (e.g., improvement) by regime is especially noteworthy. This was an enjoyable paper to review and will be of great value to the observational and modeling communities.

General comments:

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The manuscript refers to papers that are not yet available (e.g., Olsen et al. 2019a; McCaffrey et al. 2019). That made it problematic in reviewing the specifics regarding the differences between the HRRR CTL and EXP configurations (although the narrative does include parenthetical examples of the parameterizations/schemes that were modified). Although the other WFIP2 papers include a map of the instrument deployment/HRRR nests, if space were not an issue that would be helpful (readers, at times, are sometimes limited to printed versions). There are several examples of text in the narrative that are figure captions. Some more speculation as to why (from a meteorological perspective) model performance categorized by regime differed by season (e.g. spring versus fall for gap flows and HRRR physics) would be of interest and value.

Specific comments:

Page 1 (Abstract), line 25: use of the word “versus” perhaps should be consistent by just using “and.” Page 1, line 34: “...also looking for the causes of model weaknesses” is a sentence fragment. Page 2, line 6: “hub-height” needs to be defined here (80 m given the other references). Page 4, line 11: more specificity on the spin-up problems with the HRRRNEST? Page 4, line 24: how “close” was the model layer to 80 m? Page 5, lines 6 - 7: “Initialization times. ...the Z00 and Z12 values.” This is a figure caption. Page 6, lines 9 - 10: “Figure 3 displays. . .” Figure caption. Page 6, Figure 3: any difference (in relative magnitude) if %MAE was used? That is, larger errors during nocturnal period may have been due to higher wind speeds? Page 6, Figure 4: do higher elevations feature, on average, higher wind speeds? Perhaps a plot (or part of a plot) could show the diurnal average of the wind speeds for individual stations. Page 6, Figure 4: one station (ykm at 330 m) seems to have an unusually high bias. Any explanation for this? Page 7, lines 7 - 8: “In this analysis. . .” This is interesting. “decoupling” (assuming a well-mixed PBL over the region not sure of this) of some sites at different times? Page 7, lines 21 - 26, sentence beginning “The upper panels display. . .” Figure caption. Page 7, lines 26 - 29: this is the only text describing Figure 5. Page 8, bottom lines, Figure 8: caption appears to be incomplete. It does not

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mention this is for the combined impact. Page 10, line 9: "In truth, this figure does not tell the entire story." Literary flourish? Page 11, line 7: "...different atmospheric characteristics." In what way? On what scale. (At the bottom of this paragraph [lines 14 - 16] there is a mention of stability and wind profiles. Is this what is meant?)

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