

## ***Interactive comment on “Influence of Geographic Coordinate System on Weather Simulations of Atmospheric Emissions” by Yanni Cao et al.***

### **Anonymous Referee #1**

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General comments: The article introduces the impact of different geographical coordinate systems to run the WRF mesoscale atmospheric model. The paper shows that an error, although small, is introduced purely through using different coordinate systems. This result is not intuitive, and its publication is commendable.

I agree with the comments made by the editor, and I would suggest to rephrase the title from its current "Influence of Geographic Coordinate System on Weather Simulations of Atmospheric Emissions" into "Analysis of errors Introduced by Geographic Coordinate Systems on Weather Numeric Prediction Modeling"

Specific comments: The paper is well explained and structured, and its publication is commendable. I feel that all sections are appropriate and needed, and the text is appropriate. However, some of the figures require improvements.

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Virtually all figures have too small fonts. The figures have to be regenerated, and the fonts must be kept at a minimum of size 9. It is also not needed to add longitudes and latitudes at such a fine resolution, and it is best to reduce them for improved clarity. I suggest to either reproduce the figures using larger fonts, or perhaps increase their sizes in the paper. There are a lot of whitespaces that can be omitted at the advantage of larger figures.

Figure 13 and 14 are not clear. Figure 13 shows the difference in wind speed between HR and HR\_RESHIFT, and therefore the association with the high pressure (Figure 14) is not obvious. The difference in the HR and HR\_RESHIFT generates a wave-like pattern, but this is not necessarily due to the high pressure, since it represents a change in coordinates. The discussion should include a detailed explanation of why and how a high pressure system, which has a wave-like pattern, generates such differences only due to the different coordinate systems. Are the authors suggesting that the different coordinate system can better understand the state of the atmosphere, and therefore correlate to the high pressure system?

Figure 17 and 18 must be top aligned. The fonts for the points A and H should be the same as for the rest of the figures. The points are too large and bold, and the axis too small.

I am intrigued as to why the errors for the nested grids tend to be symmetric around 0. I suspect that it is because WRF tries to conserve energy across the nested grids, and consequently the errors for each grid must sum up to zero.

I have some problems understanding figure 22 and 23. Why are the data on the left figure for both 5/14 and 5/15?

The graph in Figure 1 should include a reference to Monaghan et al in the caption.

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Interactive comment on Geosci. Model Dev. Discuss., doi:10.5194/gmd-2016-253, 2016.

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