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Interactive comment on "A scale-dependent blending scheme for WRFDA: impact on regional weather forecasting" *by* H. Wang et al.

Anonymous Referee #2

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1. General Comments

Review of the manuscript A scale-dependent blending scheme for WRFDA: impact on regional weather forecast- ing by H. Wang, X.-Y. Huang, D. Xu and J. Liu

In this manuscript, on the base of Yang's preliminary implementation, the authors describe a scale dependent blending technique of re-introducing large-scale features from global analyses and forecasts into regional model, which is supposed to resolve the problem of the obvious large-scale forecast error in regional WRFDA system running in full cycle mode. The results of a 2-week period full cycle assimilation and forecast experiments indicate that the blending scheme does show the merit of improving large-scale weather features while keeping the well-developed small-scale signals active in the WRFDA analyses and regional model, and the blending scheme led to reduced

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analysis and forecast error and better precipitation forecast quality. The results shown in the manuscript are exciting as it provides a practical method to resolve the problem relating to the large scale error due to the inherent deficiency of regional model, especially for the operational regional numerical forecast running in full cycle mode. Therefore, I recommend the manuscript to be published.

2. Specific Comments

* The choice of cut-off length scale determines the amount of information extracted or retained from the host/regional model respectively. As mentioned in page 2463, line 14-15, 'response functions to various cut-off length scales are examined to aid in selecting cut-off length scales', there is on further discussion about the selection of cut-off length scale in the manuscript. It's correct that the response function only reveals the performance of the filter to a certain cut-off length scale, which aids, but can not provide an objective criteria. Actually the selection of 1200 and 600km in the manuscript still looks as an empirical choice. The authors need to emphasize the issue.

* It's mentioned that "The filtered fields become smoother when the cut-off length scale becomes larger (Fig. 2b and c). Those filtered fields represent the large-scale information that is kept in blended fields (Fig. 2g and h) using Eq. (6c) "(page 2462 line 10-11). And " The differences showed in Fig. 2e and f represent the small-scale information that is kept in blended fields (Fig. 2g and h)."(page 2462 line 14-15) . But we can identify the similar noise-alike(relating to topography) distribution of 500hPa geo-potential height from both the filtered (Fig.2b-c) and the residual (Fig2e-f). If possible, please give some explanations about it.

3. Technical Comments

*Page 2459, line 11: equation (3) not correct

*Page 2461, line 24: should be 'perturbation potential temperature'

*Page 2464, line 20: why 'next WRF cycle'?

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*Page 2473, Fig.1: I think the labels of GFS and WRF are confusing. In caption of figure1, it is only about the 'amplitude response' ,whatever it is for GFS or WRF. I understand the authors are trying to express after blending, most of large-scale part is from GFS and the residuals are from WRF. If so, the caption needs more revision.

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