Comment on npg-2022-7

Anonymous Referee #2

Referee comment on "Adaptive Smoothing of the Ensemble Mean of Climate Model Output for Improved Projections of Future Rainfall" by Stephen Jewson et al., Nonlin. Processes Geophys. Discuss., https://doi.org/10.5194/npg-2022-7-RC2, 2022

The manuscript "Adaptive Smoothing of the Ensemble Mean of Climate Model Output for Improved Projections of Future Rainfall" provides a simple but intuitive smoothing procedure for ensemble mean of future projections. The manuscript reads well, it fits very well the scope of the NPG journal, and presents a quite well detailed discussion of the results. I have no significant remarks on its quality, I would only suggest some improvements and clarifications before being accepted for publication.

- The main differences in the smoothing procedures are mainly located along mountains, especially when adaptive methods are employed. How these differences can be related to the choice of alpha and/or to the number of grid points used for smoothing (n)? Is there any advantage in using the Gaussian filtering with respect to the exponential one? When dealing with kernel functions a widely employed smoothing function is the so-called Epanechnikov kernel, i.e., a parabolic function of $d_{i,j}(k,l)$ in this case. Did the authors explore the possibility of using this function?It is optimal in a mean-square sense, so it would be useful for this purposes.
- How the fit parameters are related to the spatial scale of filtering? Does exist a relation between alpha and the scale as a function of the grid resolution? What is the horizon of applicability of this procedure as a function of the grid resolution?Is there any drawback depending on increasing/decreasing spatial resolution?
- Could the authors argue with more details on the choice of the weighting function $w_{i,j}$ in Eqs. (3)-(4)? In particular, why they choose to have 0.1 at the edge of the circle?Does this affect the results?

Minor spelling/improvements

- Page 4, line 96: "that" should be "then.
- Page 14, line 341: why n=37 is used? What is the benefit of increasing/decreasing n?

- Figs. 4-7: I would suggest the change the colorbar range for panels (a), (c)-(f) as well as to restrict the longitudinal range to the explored ones by map (i.e., avoiding white areas outside in longitude)