

General Comment :

This paper presents a new technique in estimating model error covariance inflation factor which is necessary to arrest the divergence of the filter. This paper relies on estimating the inflation factor from an objective function inspired from the domain of generalized cross validation (GCV) techniques widely used in the field of machine-learning. The author also shows that this method, in comparison to a no-inflation based method and a spatio-temporal uniform inflation based scheme, improves the root-mean-squared error and enhances the influence of observations on the analysis when applied to the Lorenz 96 model. The author also performs a series of sensitivity experiments to claim the superiority of his method. The computational cost involved in the new method is shown to be marginally larger than the existing methods.

However, since this method is imported from a different field, it will be nice to present a little more detailed overview of the new method including its properties for the benefit of the data assimilation community at large. It will be good to highlight the limitations of this method, if any, as well.

It is understandable that English is not the native language of the author. However through multiple iterations the paper has come to a much better shape and needs some minor language corrections. I recommend publications after minor changes.

Specific Comment :

- 1) The author claims that the GCV has many favorable properties but didn't mention any except the rotation-invariant property. It will be nice to put down some of the properties and how it an advantage to the field of data assimilation.
- 2) P6 L6 : It will be nice to elaborate on the claims made by the author since this technique is new to the data assimilation community.
- 3) In Fig 1, there are two “N”. One stands for the number of time-steps and the other for “NO”. It will be good to remove this confusion.
- 4) P18 L7-9: The author claims that a 30-member ensemble is necessary to estimate statistically robust result. However, this study is true only for Lorenz-96 model and should not be generalized for other systems. A system in which the errors grow in multiple directions (> 30) will need more ensembles to produce statistically robust results.

Technical Comment :

- 1) P4 L8 : “may be missed in...” may be changed to “may not have been captured by ...”.
- 2) P4 L12 : “by inflation factor ...” may be changed to “by an inflation factor...”.
- 3) P4 L16 : “It also seems ...”. This sentence is not clear and should be restructured.
- 4) P4 L20 : “the inflation factor can be...” may be changed to “the inflation factor is...”.
- 5) P8 L17 : “(observation minus forecast residual)” may be changed to “(observation minus forecast residual in observation space)”.
- 6) P13 L15: “...was well defined...” should be changed to “... is well defined...”.
- 7) P13 L22: “ The variety of the analysis RMSE ...”. It is not clear what the author wants to convey.