Interactive comment on "Enhancing temporal correlations in EOF expansions for the reconstruction of missing data using DINEOF" by A. Alvera-Azcárate et al.

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Thank you for your comments about the paper. We have answered here your two main points:

I do have two questions. Based on the temporal smoothing, I would expect to see more significant autocorrelation in the results than without smoothing, which would suggest that this should not be used without some caution. Assuming AR(n) noise, the value for n would therefore be dependent not only on the number of EOFs retained but also on the filter used. I am curious if you

saw this in your Black Sea test.

Once the filter is applied to the data we can expect them to be more strongly correlated in time. This is a desired feature, and the reason why we apply the filter in DINEOF. Regarding the noise of the reconstruction, figures 5 or 6 of the manuscript, for example, show that the values of the spikes in the temporal EOFs that we want to filter out are not correlated in time.

The problem of filtering out AR(n) noise from the data could also be tackled with the filter approach, but here we focus on the reconstruction (ie filling) for which we impose some continuity (time-correlation) constraint on the reconstruction. Eliminating known correlated AR(n) noise from the filled images could be performed afterwards if judged necessary and if sufficient knowledge about the noise compared to the scales of interest is there. In its present version DINEOF cannot distinguish such noise from signals.

The second question is related to filter selection. There are many different routes one could use to arrive at a particular filter choice.

We agree that the choice of the filter can have an impact on the results obtained. However, in the case we present here, the cut-off frequency is of 1.1 days, which is very small with respect to the time step of the data set (1 day). The use of another filter with the same cut-off frequency is expected to lead to similar results. The filter used was chosen because it is derived from a continuous formulation, which allows to apply it easily to irregular time-step data sets. We could, however, give the choice of the filter to the end user of DINEOF, by implementing an external routine that will calculate the filter based on the data prior to the DINEOF reconstruction.

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