Nonlin. Processes Geophys. Discuss.,
https://doi.org/10.5194/npg-2020-7-RC1, 2020

Nonlinear Processes in Geophysics
Discussions
Open Access
EGU

Interactive comment on "Applications of matrix factorization methods to climate data" *by* Dylan Harries and Terence J. O'Kane

Anonymous Referee #1

Received and published: 12 June 2020

This paper is a cross between a review and evaluation: it compares the theoretic underpinnings of several established methods for dimension reduction and offers example applications to illustrate the differences. Though the techniques are not new, the work does offer interesting perspectives, and the paper is mostly well-written and well illustrated. A few suggestions are summarized here:

1) it is helpful to use a table to succinctly summarize the key differences among the techniques. Some of the algorithmic details are unnecessarily elaborated (e.g., pg 8) whereas the actual differences are obscured. For example, does K-mean cluster produce orthogonal basis vectors? and are the clusters easier to interpret than principal components of PCA. What are the unique advantages of AA relative to PCA and K-mean cluster?

Printer-friendly version

Discussion paper

2) please explain how the case studies were chosen. Are the outcomes of the case studies supposed to inform us about the geophysical variables that one, or several of the approaches are more suitable than others?

3) For the SST case, I wonder what the take home message is in terms of the difference among the three methods as illustrated in Figs. 3-9? Fig 10 shows that the PCA features lower RMSE than others and yet the conclusion appears to be that these methods are all comparable.

4) For the Z500 anomaly case, what is the recommendation of lambda_w? And what methods offer a clear linkage between the resulting patterns and "physical extremes"?

Interactive comment on Nonlin. Processes Geophys. Discuss., https://doi.org/10.5194/npg-2020-7, 2020.

Printer-friendly version

Discussion paper