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Geoscientific Model Development Discussions

Interactive comment on "The Sailor diagram. An extension of Taylor's diagram to two-dimensional vector data" *by* Jon Sáenz et al.

Anonymous Referee #1

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The paper addresses a relevant and often appearing issue: comparing vector quantities. It reviews the different approaches developed so far, giving appropriate credit to those, and adds the idea of a novel graphics presentation as "sailor diagram". This is potentially a useful tool for a vast range of applications, several examples are chosen from different fields for illustration. The deviation of method is clearly outlined and valid, reproducibility is excellent. The title is excellently chosen, abstract is concise and the term "sailor diagram" justified in the paper. Language and maths are clear. Figures are less clear. Grey squares in all figures are hard to spot (and important). Although it is nice that the figures relate to real world examples, for introducing the concept it would be helpful to have figures showing clearly the benefits and limitations of the sailor diagram. Figure 2a is a very good one. The others are not easy to interpret, i.e.,

helping less to understand the concept. Applicability and interpretation, and general presentation would benefit from clearer examples. Given that the graphics are a central idea of the paper, following revisions are suggested, with the intention to improve understanding and uptake of the Sailor diagram for other researchers:

1) List and number the features of the Sailor diagram clearly, eg., like i) size of ellipse depicting covariance ii) direction of ellipse indicating error main axis iii) squares indicating bias for both components iv) options for scaling as indicated in Fig. 1

2) give one (possibly synthetic) example figure illustrating clearly each feature (e.g., datasets disagreeing on i) and agreeing on ii) and iii). For iv) note what scaling comes with which advantage / disadvantage.

3) Explain the underlying assumptions and the limitations (i.e., what could go wrong with the interpretation). For instance, in Fig 1, the almost orthogonal major axes – are they caused by the two EOF being approx. same size and some noise deciding on whether the correct EOFS are aligned in the graphics? Are Fig. 1 (major and minor axis) thus showing a possible pitfall of interpretation of the Sailor diagram? What other limitations and possible pitfalls do exist ?

4) Remove figures not adding information. The whole section 2 (data description) is not necessary for the understanding of the principle of the Sailor diagram and can be shortened significantly, just serving the understanding of real world examples. It is not clear for what Fig. 3a is needed – and its explanation is full of abbreviations (check "per" and "pers"). Somebody not familiar with these particular data sets cannot extract sensible information from section 4.4.

5) Figure 4 (right) needs clarification. It is impossible to relate the color codes to the 2 clusters of ellipses. Why are there exactly 2 clusters of ellipses? Furthermore, it is unclear what the centres should denote. Why are there 2 grey ellipses in the upper cluster? It is unclear what is intended to show. I cannot draw conclusions from this figure. Either clarify or remove this figure.

6) It is commendable you provided an R package SailoR. It would be good to state clearly in section 3.7 which figure is included in the manual (instead “some of these plots”)

7) For better visibility, consider plotting the squares on top of the lines, to change grey to black, and to enlarge the size of the squares.

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