

## ***Interactive comment on “On the Effect of Model Parameters on Forecast Objects” by Caren Marzban et al.***

### **Anonymous Referee #2**

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The authors have provided a clearly-written paper demonstrating a method of sensitivity analysis on “objects” in model output. The method is applied and evaluated in an appropriate manner. The description of the method is sufficient to allow for interested scientists to reproduce the results. The sensitivity analysis approach focuses on specific subsets of the model output, namely clusters that have been identified as “objects.” The manuscript provides readers with general guidance on determining the sensitivity of various model parameters to relevant aspects of these objects, such as location, amplitude, and orientation. Sensitivity to details in selection of cluster analysis methods was explored, and in the particular example provided, results were shown to not be sensitive to these details.

However, it is not clear that this approach is significantly different from established sen-

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sitivity analysis methods. The SA practitioner has to select a “response variable” which is typically a statistic based upon a subset of the full model output. Here, the authors use different cluster analysis approaches to define that subset and various statistics to summarize the model output from that subset. They do not argue for any specific cluster analysis method or statistic, and mention that clusters identified subjectively could also be used. This sounds like traditional SA using subjectively selected subsets of model output, therefore, it is not clear that this is a novel/new approach. Since the results in this manuscript were found to be consistent with previous sensitivity analysis work (Marzban et al. 2014) that did not use objects, it is also not clear that there are significant benefits to using the object-based approach described here. This leads the reader to question the value of going through the extra effort of object segmentation for sensitivity analysis versus traditional SA approaches. It is also not clear if this method has general relevance to the geo-scientific model development community beyond the weather/precipitation prediction application presented here. What other kinds of “objects” could be analyzed in other types of models? I cannot recommend acceptance for publication unless the authors provide a convincing argument for the novelty of the method and provide evidence of the benefits of performing sensitivity analysis on objects in model output.

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