

Peer Review

Review of: "Spatiotemporal Forecasting in Climate Data Using EOFs and Machine Learning Models: A Case Study in Chile"

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Comments

This study proposes a hybrid methodology that integrates machine learning methods for the forecasting of time series with statistical techniques. Some comments are given below:

*Abstract and Introduction

1. While the paper presents a strong mathematical foundation using EOF decomposition and SVD, the explanation remains highly notational and may hinder comprehension for a broader audience. It is recommended that the authors incorporate intuitive explanations and possibly a schematic diagram to clarify the interaction between spatial and temporal components. Additionally, the underlying assumption that EOF spatial coefficients remain stable throughout the forecast horizon is central to the model and should be supported by more than visual evidence—quantitative measures such as variance analysis or formal statistical testing are suggested.

*Methodology

2. The manuscript introduces a hybrid Wavelet–ANN model; however, its conceptual explanation is lacking. To aid understanding, the authors should briefly describe how MODWT decomposes the time series and how this decomposition benefits the neural network in capturing temporal structures. A small illustrative example or schematic could enhance clarity for readers unfamiliar with this approach.

*Results and Discussion

3. The study notes decreased forecasting accuracy in low spatial coherence clusters (e.g., clusters 1, 2, and 7). This is an important observation that merits further exploration. The discussion would benefit from concrete suggestions to improve model performance in these areas, such as: incorporating additional

geographic or meteorological features, region-specific parameter adjustments, or transfer learning techniques tailored to underperforming clusters.

***Conclusion**

4. While the methodology and preliminary results are promising, the paper would benefit from a clearer synthesis of the findings. Specifically, summarizing the implications of the EOF assumption, the value added by the Wavelet-ANN model, and potential pathways to address regional limitations would provide a more comprehensive and insightful conclusion.

*** Comments to Editors**

I have reviewed the paper and found that there are many aspects that need to be revised and supplemented; therefore, I recommend acceptance with major revision.

Declarations

Potential competing interests: No potential competing interests to declare.