

Interactive comment on “Hybrid improved EMD-BPNN model for the prediction of sea surface temperature” by Zhiyuan Wu et al.

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This paper proposed a hybrid EMD-BPNN model for SST prediction. The research work is very interesting and important. However, in my opinion, the paper needs minor revision before acceptance. You can find my questions and suggestions below.

1. Why the simple EMD algorithm is not compared to the EEMD and CEEMD? I suggest the authors to provide comparison results of the EMD-BPNN.
2. Mode mixing is the motivation that the authors applied the EEMD technique in the hybrid SST prediction model. Therefore, it is very important to demonstrate the mode mixing problem in decomposing the studied SST time series. But this is not given in this paper. I suggest the authors to provide discussions on the mode mixing problem

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in the present study.

3. Line 55, “Consequently, parameters such as mean and variance also do not change over time.” In this sentence, I think it will be better to revise “parameters” as “statistical parameters”.

4. Lines 59-62, “This method can decompose the signal data of different frequencies step by step according to the characteristics of the data and obtain several periodic and trending signals orthogonal to each other, which can decompose the stronger nonlinear and non-stationary signals into weaker nonlinear and non-stationary signals”. This sentence needs to make some corrections. As we know, the IMFs are orthogonal components, but the trending component is not orthogonal to any IMF component. Therefore, the above descriptions are not accurate. Besides, the sentence of “which can decompose the stronger nonlinear and non-stationary signals into weaker nonlinear and non-stationary signals” is ambiguous and makes no sense. Accurately, the EMD technique decomposes a non-stationary time series into several stationary sub-component and a trend. But it is not easy to say the nonlinearity becomes weaker. So, I suggest the authors to make the sentence more accurate.

5. Lines 117-119, “The purpose of this study is to combine the EEMD algorithm and the CEEMD decomposition algorithm respectively with the BP neural network algorithm to establish a new prediction model, an improved hybrid EMD-BPNN model.” Accurately, the models of EEMD-BPNN and CEEMD-BPNN themselves are not new. Various works about this models in different problems have already carried out in the last ten years. Therefore, I suggest the authors not to over emphasis “new” or “improved” here. Just simply describe them as “hybrid models”.

6. Lines 294-295, “This paper presents a novel SST predicting method based on the hybrid improved EMD algorithms and BP neural network method to process the SST data with strong nonlinearity and non-stationarity.” I suggest the authors to delete the word of “novel” here (and the same in the highlight part). Becomes the hybrid models

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have already explored extensively in various prediction problems. Besides, the authors argue that “the SST data with strong nonlinearity and non-stationarity.”, what is the standard of weak or strong nonlinearity and non-stationarity? Therefore, this sentence need to be corrected.

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