

Geosci. Model Dev. Discuss., referee comment RC1
<https://doi.org/10.5194/gmd-2021-396-RC1>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on gmd-2021-396

Anonymous Referee #1

Referee comment on "Simulation, precursor analysis and targeted observation sensitive area identification for two types of ENSO using ENSO-MC v1.0" by Bin Mu et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-396-RC1>, 2022

The manuscript entitled "Simulation, Precursor Analysis and Targeted Observation Sensitive Area Identification for Two Types of ENSO using ENSO-MC v1.0" by Mu et al. introduced the ENSO predict model for EP- and CP-types ENSO based on deep neural network with multichannel structure and the application of the model for precursor analysis. This is a good try to convergence of climate research and AI. And it is useful for short-term climate prediction and understanding of ENSO, I believe. However, there is still a gap between manuscript and publication. I hope the following comments will help authors improving the quality of the manuscript.

Major comments:

There are three parts of this manuscript, including ENSO prediction model named ENSO-MC, precursor analysis, and targeted observation sensitive area identification based on ENSO-MC. Accurately, the latter two parts are the application of ENSO-MC, and the conclusions are almost consisted with previous studies, such as Kumar et al. 2014, Duan and Hu 2016. Certainly, the method of precursor analysis and targeted observation sensitive area identification base on the deep neural network is an innovation, but I think the key point of this manuscript should be focusing on the ENSO-MC as the model description article. However, the description of ENSO-MC is inadequate, including the value of the weight in Loss function, discussions about the effects of the depth, structure, data for the neural network. I recommend authors add the discussion section. Moreover, it only showed the several cases and correlation results, but the more cases and RMSE also needed.

Minor comments:

- Usually we use the years covering the ENSO process, such as 1985-1986 defining the ENSO year, rather than the ENSO peak occurring year
- Line 20: "periodically", in fact, usually we called the ENSO is an irregular signal with 2-7 years period.
- Why did author select the combination of SODA and GODAS/ERA-Interim data? I'm very interested that whether the results keep consist if use other data, e.g. SODA and GODAS/ERA-5 (ERA-5 is better than ERA-Interim), or just using one datasets CERA-20C from 1901 to 2010 with almost same resolutions to SODA.
- Line 176: "although there are stronger anomalies in the eastern tropical Pacific during the growth phase", please double check it. I did not see stronger anomalies.
- Lines 195-196: please clarify what is the one- and multi-step strategy.
- Section 4 and 5, author should give the details of the initial perturbation distribution, at least the magnitude of the perturbation.