

Title of the Paper :

S4CAST v2.0: Sea Surface Temperature based Statistical Seasonal Forecast Model

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Summary:

The authors developed the Sea Surface Temperature based Statistical Seasonal foreCAST model (S4CAST) considering the non-stationary links between the predictor and predictand fields. Also, an application to West African rainfall showed the improved predictability. The contribution of present study are truly recognized. However, some improvements are required to achieve better quality suitable for publication. My major comments are listed as follows.

● Framework and Introduction

The purposes of this paper are to describe the development of the S4CAST model, to demonstrate the model's capability, and show its important "position" in various kinds of tools. Therefore, "various and general" studies of lag-lead relationship between climate variables can be addressed at the first. The authors are suggested to put the details of the Sahel rainfall prediction in the section of model applications. Then, different kinds of tools can be reviewed to show their strength or weakness. However, some statements cannot provide a clear information. For example, "Nevertheless, there are works discussing ..., and on the limitations in their applications." It is difficult for the readers to understand the main factors for predictability/applicability in these statistical models, e.g. nonlinear and non-stationary approaches. Besides, it seems that the version 1 of the S4CAST model was not mentioned. A brief development history would be helpful. Also, it is better to describe why the authors developed the version 2 and which part has been improved. That is the purpose to develop and introduce this model. Last, a couple of applications can be considered to show the applicability of the new model. The title of this paper might be slightly revised if needed. In addition to the framework, some grammatical errors in the introduction and the rest parts of the paper should be corrected, e.g. "the capacity of storage heat and release it ..." in the first sentence. Some sentences can be re-written for a better understanding.

● Model Description

The objective is to describe the development of the S4CAST model. Thus, the framework of model description can be revised, e.g. 2. Description of S4CAST model,

2.1 Statistical method, 2.2 Model structure, and

● **Model validation and applications**

Some suggestions are raised for the results and discussions in model applications.

A. (page 12 line 21)

"In this section the model has been validated through ..."

Has the model been validated in the previous study? If "yes", please include the citation of previous works. If "not", the authors only used the western Sahel rainfall to validate model in this study. A model typically requires the calibration, validation, and application examples. Also, the prediction capability of the S4CAST model can be revealed if a couple of examples with different characteristics (e.g. linear/nonlinear and stationary/non-stationary) can be provided.

B. (page 14 and page 19)

Some sentences about "the cooling of south Atlantic and the rainfall dipole over West Africa" are repeated many times in the context. The authors are suggested to make some deeper scientific discussions since the prediction results are excellent. When compared the CPT tool, the predictability due to different methods used in these models can be also discussed.

C. (page 15 line 1-3)

(i) "... SL0 and EP-SL3) when compared to SC." The EP-SL3 should be a typo.

(ii) "Opposite sign anomalies are observed over the tropical North Pacific and around the coast of California..." The authors would like to indicate the SSTA or anomalous rainfall. It is not clear in the context and the figure.

(iii) The quality of the figures should be improved.