

Earth Syst. Dynam. Discuss., referee comment RC2
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Comment on esd-2021-46

Anonymous Referee #2

Referee comment on "Weakened impact of the Atlantic Niño on the future equatorial Atlantic and Guinean Coast rainfall" by Koffi Worou et al., Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2021-46-RC2>, 2021

Review of the manuscript ESD-2021-46, "Weakened impact of the Atlantic Niño on the future equatorial Atlantic and Guinean Coast rainfall", by Koffi Worou, Hugues Goosse, Thierry Fichefet, and Fred Kusharski.

The submitted manuscript explores the rainfall annual cycle in the Guinea Coast, gives a detailed analysis of the future changes in the Atlantic Niño and their impact on the rainfall, and the modulation of the Bjerknes feedback in the future climate change projection. The investigation is based in 31 historical simulations from General Circulation Models of CMIP6 with some observations and reanalysis. The authors found that these models are able to simulate reasonably well the rainfall annual cycle in the Guinea Coast with a wet bias in boreal summer (July-August-September). They also found a rainfall decrease in the Tropical Atlantic region due to a weakening of the Bjerknes feedback over the equatorial Atlantic in future climate projection. This work will be a valuable contribution to Earth System Dynamics journal after some revisions.

The paper is well written, well documented, easy to follow and understand from the beginning up to section 4. In section 5, there are lots of information, and it's a bit dense. Please, what is the purpose of defining all the groups you defined? I am referring to group GC+, GC-, GC+-, GC++, OC+, OC-, ect... It will be nice if you could resume your findings about the previous mentioned groups in a table. Moreover, it is better to name the figure you are referring too early in the text than in the middle or at the end of a paragraph.

Minor

Line 35: "deepens" not "deepen"

Please, add a figure in the supplement material to show the different boxes of Table 2.

Provide a statement on how the data used for the study could be accessed.

Line 68: Precise the figure you refer to after giving the interval of the RMSE.

Line 160 and line 193: Which figures are you referring to? If it is not shown, please precise.

Line 197: Why you did not represent the bias relative to ERA5 instead of the mean state?

Line 216: The multimodel mean "underestimates" the SST STD in relation to ERA5 in the time period you have highlighted. Compared to other observations, the multimodel underestimates the SST STD in May-June and overestimates it the rest of the year.

L256-259: There are 24 GC+ and 6 GC- models. It seems like 1 model is missing because there are 31 GCMs in total.

Title of figure 6d: It is better to write ERA5 (ORAS5) than ERA5/ORAS5, or use only ORAS5, because it is confusing.

L260: Please, precise "not shown" after "nor in the observations".

L282: Please, precise the figure you are referring too at the end of the sentence (Fig. A4?).

Caption of figure A4, add the color of the box for each region.

L295: "The models show a poor to modest spatial correlation with ERA5, which ranges from -0.4 to 0.6". Precise the figure you are referring to, is it (Fig. 5a?)

L298: Is OC+ the sum of GC+ and GC- when referring to EAB region?

You did not use Figure A6. Please, remove the figure if it is not needed.

Figure 7b: Please, keep the same color in (a) and (b) for the period 2015-2039, 2040-2069, and 2070-2099.

L320: Refer the figure after 0.32°C.

L397: Remove one "zonal".