

Earth Syst. Dynam. Discuss., referee comment RC4  
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## **Comment on esd-2021-46**

Anonymous Referee #4

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Referee comment on "Weakened impact of the Atlantic Niño on the future equatorial Atlantic and Guinea Coast rainfall" by Koffi Worou et al., Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2021-46-RC4>, 2021

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General comments:

This paper investigates the present and future characteristics of the Atlantic Niño and its influence in the Gulf of Guinea and Equatorial Atlantic precipitation, using CMIP6 simulations. It shows that models project a weakening in the variability of the ATL3 region which would then lead to a weakening in the rainfall variability in the equatorial Atlantic and Guinean Coast.

In my opinion the paper has valuable information that is within the scope of ESD and deserves publication after the some revisions.

The paper has a lot of information that not always is presented in the clearest way. Specially when the authors divide the 31 models in different groups (GC+, GC-, OC+). I fell that the group OC+ is not at all necessary in section 4, and makes the discussion of the results a bit messy. Also section 5 is hard to follow in some places.

Specific comments:

Introduction:

ATL3 is an index that reflects the variability of the Atlantic Niño region, but I don't think it is correct to use ATL3 acronym to refer to the Atlantic Niño.

Data and methods:

Why do you perform a quadratic detrend of the data?

Section 3.1:

Figure 2: I don't understand the wind pattern. It is not consistent with Richter and Tokinaga (2020).

Please add in figure 2 or in any additional figure the boxes defined in table 2.

Section 3.2:

L. 213: I think that the statement "the winter Atlantic Niño has greatly influenced the ENSO events" is a bit too strong.

Also you should refer to Okumura and Xie (2006) when talking about the winter Atlantic Niño for the first time.

Okumura, Y., & Xie, X. (2006). Some overlooked features of tropical atlantic climate leading to a new Nino-like phenomenon. *Journal Of Climate*, 19, 5859-5874.  
doi:10.1175/JCLI3928.1

Section 4:

I would reorganize this section. I felt that section 4.1 belongs to section 3, in which the model performance of the patterns are described. Then, in section 4, the authors can focus in the impact of the Atlantic Niño on rainfall.

The authors jump from figure 5 to figure 6 and back in a confusing way.

I don't think that the analysis of OC+ models is necessary here.

Section 5:

Again is difficult to follow. I would rearrange figures 8 and 9 by areas, to make the discussion in the section easier to follow.

I would talk about OC+ models only from section 5.3 onwards. It doesn't seem necessary before and makes the discussion hard to follow.

Figure 7: Please use the same colors for each period in (a) and (b).

L. 406: I don't agree with the sentence " The projected ATL3-rainfall signal in the GC+-group is ... hardly robust over the Guinea Coast". I see a very robust decrease of rainfall over the green box in figure 10a.

Supplementary material:

Figure A6 is not discussed in the text

Technical corrections:

L. 23: Please replace "has moved" by "moves".

L. 45: Losada et al. 2009 should be Losada et al. 2010a.

L. 143 to 145: I find this description of the sign-dependent average a bit confusing.

L. 248: Change "Mohino and Losada (2015)" by "Mohino and Losada (2015), among others".

L. 355: Please move the sentence " This indicates a weakening... in the eastern equatorial

Atlantic" to the end of the paragraph.