

Interactive comment on “Sensitivity study of the Regional Climate Model RegCM4 to different convective schemes over West Africa” by Brahim Koné et al.

Anonymous Referee #1

Received and published: 20 July 2018

This manuscript assessed the sensitivity of RCM RegCM4 with land surface component CLM4.5 to five convective schemes over West Africa from Nov. 2002 to Dec. 2004. With quantitative assessment sensitivity tests, results revealed better performance of the configuration with Emanuel convection scheme to simulate the air surface temperature and precipitation over West Africa by RegCM4-CLM4.5. Since CLM offers improvements in land-atmosphere exchange as you said, some mechanism analysis based on the water and energy fluxes of land-atmosphere interface should be added in the results part. There're some drawbacks which are detailed blow should be addressed before the paper can be published in ESD. Thus, a careful and rigorous revision is needed.

C1

List of specific (major and minor) comments:

1. The abstract should present the main results rather than experiment setup in detail. Please rewrite the abstract.
2. Introduction section, P3, L73-77: You mentioned that RegCM-CLM led to weaker performance than RegCM-BATS over India, thus the performance of RegCM-CLM need to be assessed over West Africa? On the other hand, since CLM offers improvements in land-atmosphere exchange as you said, it might be better to give some mechanism analysis based on the water and energy fluxes of land-atmosphere interface in the results part. Additionally, many studies were found the model performs well using BATS over West Africa relative to CLM, could you present one result by RegCM-BATS to show how differences between them with same experiment setup?
3. P4, L115-117: many formats of citations are incorrect, such as Solmon et al., (2006) should be “Solmon et al. (2006)”. Please revise the whole manuscript.
4. P4, L122: “Zeng and al., (1998)” should be “Zeng et al. (1998)”
5. P4, L130: “(Im et al., 2008);” should be “(Im et al., 2008;”. L132: “Grell 1993” should be “Grell, 1993”
6. P5, L135-162: Some parts could be moved to 2.3 experiment setup.
7. P5, L158: Since RegCM uses Kilo-grid, it's not suitable to say all products are remapped onto RegCM4 grid ($0.44^{\circ} \times 0.44^{\circ}$).
8. P6, L196: What's is the model top?
9. P6, L197: In this study you adopt land surface component CLM4.5 which has more detailed description, thus need longer time to reach variable balance. Why do you just use two months run as spinup? And the computational cost is not too much.
10. P7, L210: “Where” should be “where” and assign number to the above equation and end with a comma.

C2

11. P8, L258: "Grell configuration presents a colder bias (reached -6°C)".
12. Figure 4: Could you explain why Tiedtke scheme show better performance in t2m than other convective schemes while it present larger winter bias in the central Sahel?
13. P9, L283-285: Which figure or reference support the conclusion "GPCP depicts a zonal band . . . Cameroon Mountains"
14. P9, L287: Fig.6a-c is Fig. 6a?
15. P9, L297-298: Please give more analysis or citation to support what you said.
16. P11, L365-367: From Figure 9a-b, you mentioned the three distinctively of monsoon phases are well represented by TRMM than GPCP. "well" is "better" and what's the criterion?
17. P14, L452: Format of superscript "o" seems wrong.
18. Revise all the captions of tables and figures with more details. And many texts in the figures are too small to see them.
19. Figure: Reduce the range of label bar to make those figures more comparable, such as range from 22 to 30. Same problem for Figure 3.
20. Since figure 3 show similar results with figure 2, consider removing one figure. Similar problem for Fig. 5 and 6.
21. Figure 7: No label bar. And consider using the differences rather than actual value.

Interactive comment on Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2018-44>, 2018.