

A Review of “COSMO-CLM Regional Climate Simulations in the CORDEX framework: a review” by Sørland et al.

General comments

This is a review paper intended to document the development, progress, and performances of COSMO-CLM regional climate simulations over a number of CORDEX domains including Europe, Africa, South Asia, East Asia and Australasia. While there have been many scientific publications of COSMO-CLM over individual domains, this review paper inter-compares its performances among different domains. I find this paper is useful and can provide guidance to future work in regional climate simulations especially in non-native domains of COSMO-CLM. The structure and logical flow of this review paper made it easy to read and follow. I have a few suggestions for further improvement.

Specific comments

1. In Figure 5 to 8, the last Taylor Diagram was labelled as “South-west Asia”. I suppose this refers to “South Asia”. Perhaps some changes should be made to supplementary figures as well.
2. “East Asia” was one of the CORDEX domains included in this study. However, this “East Asia” is the “old” domain prior to the establishment of “Southeast Asia” CORDEX domain (e.g. Tangang et al. 2020; www.cordex.org). The new “East Asia” CORDEX domain was shrunk a smaller domain. Hence, a sentence is needed to explain this and avoid confusion.
3. While much has been written on the performances of COSMO-CLM among its different versions and regions, very little review was provided on how this RCM fares compared to other RCMs in different regions.
4. List of GCMs in lines 295 – 303 is better placed in a proper table.
5. I am not sure the real purpose of having a detailed analysis of evaluation of GCM driven simulations in the context of providing a review on COSMO-CLM here? In Figure 5 to 8, the performances of various GCM driven runs were shown to be different. However, these differences are expected and reflect inter-GCM differences. I don’t see the relevance of this detailed analysis here in reviewing COSMO-CLM performances.
6. I think in the “Summary and outlook” section, the authors did not adequately address the issue of uncertainty in the simulations. Even within different versions of COSMO-CLM, we can see different biases (e.g. Figure 2 and 3). What does this mean in terms of uncertainty of using COSMO-CLM in different regions? Should this review paper recommend the use of different RCMs i.e. multi-RCM approach?

Ref:

Tangang et al. 2020. Projected Future Changes in Rainfall in Southeast Asia based on CORDEX – SEA Multi-model Simulations. *Climate Dynamics*, **55**, pages 1247–1267, <https://doi.org/10.1007/s00382-020-05322-2>