

Hamburg, 27.01.2021

Dear Editor,

for the upload of the correction file we modified the manuscript according to the reviewer's comments. These were mainly of a more technical nature:

l. 248: The notation 'z  $\neq$ s' is difficult to read. Is it 'not at the surface'? We changed the notation to  $X_{surf}$  for all variables at the surface allowing simply use  $X_z$  for all below-ground variables at depth  $z$ .

ll. 315 and 326: it would be better 'standard deviation of subgrid-scale orography'. Here, we changed the formulation to 'standard deviation of subgrid-scale orography'.

l. 819: insert break between 'CO2' and 'concentration'. The text was changed accordingly.

ll. 1116 and 1119: What is the difference between (Zimov, 2006a) and (Zimov, 2006b)? There, was a mix-up in our reference file which we since have corrected.

However, there was also one suggestion that lead a slightly larger modification of the manuscript. In the method section we described the parameter-setups that were used for the different simulations of our 20-member-ensemble. Here, the reviewer commented: I guess that ll. 414-439 are too technical. What it adds to the scientific results of the paper. (ll. 437 and 438: if the part of the text indicated in the previous item is still retained of the text, it is better to replace subscript 'pysics' to 'physics'.) Here we fully agree with the reviewer, that the passage is very technical and may not be of interest to all the readers. However, we think that this is not only the case for the paragraph mentioned by the reviewer, but for the entire description of the ensemble. This aspect is only relevant for those readers that are interested in the uncertainty and how certain formulations affect the simulated dynamics. Thus, we moved the entire description of the ensemble to the Appendix, where also the respective uncertainty is discussed (note that we also corrected the typo 'pysics' to 'physics').

Finally, we started uploading our data to the long-term archive of the German Climate Computing Center as soon as we learned that the manuscript was accepted. However, we still have not obtained the permanent URL for the data, which we will hand in as soon as we receive it.

Again, thank you for your help with our manuscript.

With best regards,  
Philipp de Vrese