Dear Reviewer2,

thank you very much for your review and comments. You seem to be mostly concerned with the usefulness of the dataset for the target audience:

> ***Original remark**:*
> *1.) " However, I still am left with the question of what is this data going to be used for beyond the work done by the authors. From my understanding, a publication in ESSD should be a dataset that one could expect to be used extensively by the larger community. If this covered the entire country or Europe then that would be a different story, but I just don't see it as is. I still believe the work should be published but the paper would greatly benefit by putting it all in a greater context. I suggest the discussion provide a much more detailed overview of what this data could be used for and why it is necessary to have a unique dataset instead of just having each researcher rerun the simulations. In essence, it would be nice to know what this dataset could provide the larger scientific community 5-10 years from now."*

Your remark is very similar to the one of the first reviewer, to which we responded already when revising the manuscript; but obviously we still need to make the case stronger.

First, we want to address the concern of a too small domain used. Given the complexity of our model system driven by the challenge to determine the evolution of the water and energy fluxes in the land-atmosphere system as complete as possible with a most advanced model system able to most directly simulate all relevant processes, we are limited by the currently available computational resources. Our wish to create a dataset of several years in order to allow for climatological analyses, we were forced to restrict ourselves spatially. Given the new hard- and software developments such as e.g. GPU computing, such simulations will potentially be possible for the country and/or Europe probably in about a decade. However – even then – problems will arise on the availability of sufficiently resolved and homogeneous information on the soil and sub-soil required for such simulations. We doubt that the quality of the respective data sets for the German state of Baden-Würtemberg, which we used in our work, will be available over Europe in a similar resolution and/or granularity. Under such conditions the results of spatially much more extended simulations would most probably signal more the different data sets than the processes – and thus restrict any analysis to the regions with consistent soil and – sub-soil data.

We see a range of applications for our data sets. Users may repeat our simulations with their own model system or use our system and experiment with alternative or improved input data or parameterizations and evaluate according sensitivities by comparison with our simulations, which would serve as the benchmark. This is currently not possible, because similar almost decade long fully coupled simulations of comparable complexity are not available but will for sure in the future. Since the information provided by our data set does allow users to apply observation operators for pseudo-observations, data assimilation experiments in the coupled system can be performed, which is what we are currently doing.

Since it was our goal to use the highest spatial grid resolutions and to reduce parameterization as much as possible under the computational constraints posed by currently available IT resources, the data set can be used to perform daily, seasonally and long-term analyses of intra- and intercompartmental water and heat energy fluxes and budgets in the land-vegetation-atmosphere system. The allows e.g. for

statistical analyses of the relations between the state and evolution of the soil moisture and temperature at any layer and the state of the atmospheric boundary layer and even precipitation patterns and vice versa taking into account also arbitrary lag-times. Given the diversity of landscape and land use contained in our simulations the dependency of such relations on the latter and on season can also be distilled from the data set. Since we cover a rather long time period and – given the comprehensiveness of the model system – large area, users can restrict such analyses also to sub-areas (e.g. smaller sub-catchments) or interesting time periods, certain times of the day, or seasons. Interesting examples are e.g. the dependency of convection in the atmosphere on the detailed state of the land and vegetation state and its heterogeneity in rather realistic settings or e.g. the magnitude of canopy evaporation after rain events at certain times of the day for a range of wind and temperature conditions.

If re-simulations with other model setups e.g. different parameterizations or spatial resolution are performed sensitivities of above relations to model configurations or parameterizations can be determined including e.g. failures in reproducing true or even threats in generating wrong connection can be detected, e.g. concerning the reaction of the atmosphere to certain features of the land. For our ongoing ensemble-based data assimilation experiments, we use due to prohibitive IT resources runs at lower resolutions, which clearly introduced biases especially in the subsurface. Also the impact of even more detailed parametrizations can easily be tested. E.g. one could alternatively use the tiling approach possible in CLM with several PFTs in one grid cell instead of only the dominant one as we did, or just a different microphysics scheme in the atmospheric component. Most probably only limited and well selected time periods would need to be re-run for such analyses.

In the future our setup can be extended to an ensemble. The data provided with our data set can be easily used to produce such an ensemble. E.g. the methods used to generate the soil and sub-soil can be used to produce a set of equally likely soil configurations given the always limited observations while atmospheric variability and uncertainty can be generated by the use of analysis ensembles for initialization and lateral boundary conditions.

All the points we mentioned here would be added to the manuscript in a slightly truncated form to make clear what kind of options are available with this dataset. We hope that this will inspire other people to use it rather than develop a setup on their own if possible.