Open Access

Earth System

Science

Data

Discussions

Interactive comment on "BAYWRF: a convection-resolving, present-day climatological atmospheric dataset for Bavaria" *by* Emily Collier and Thomas Mölg

Benjamin Poschlod (Referee)

b.poschlod@iggf.geo.uni-muenchen.de

Received and published: 8 July 2020

General comments

The manuscript by Emily Collier & Thomas Mölg gives a comprehensive overview of a high-resolution 30-year climatological data set over Bavaria. The climate simulations were produced by the WRF model in 1.5 km resolution, nested in a 7.5-km-resolution domain and driven by ERA5 boundary conditions. The authors evaluate the model performance for air temperature, relative humidity, winds, surface pressure, precipitation, and land surface temperature for a 12-month period where they compare simulated values to observational data. Additionally, the effect of the application of nudging is

assessed. Generally, the manuscript is well-written, and the figures support the presentation of the data set and its evaluation. In particular, the authors' handling of errors in the data set (e.g. sub-surface temperature in single glacier pixels) and explanation of deviations/biases (e.g. urban heat islands, connection between overestimated air temperature and overestimated radiation) are very valuable features of the data description. The data are easily accessible and valuable for further application with focus on impact-related studies. Though, the total size of the 30-year daily-resolution data set ($\sim$ 450 GB) may not be easy to handle for users, who are new to the application of high-resolution climate data. On the other hand, users from the field of climate science would be interested in even higher temporal resolution, especially regarding the precipitation data. In sum, I consider the manuscript and the data appropriate for the publication within ESSD, although I recommend minor revisions based on the following remarks.

Specific comments

L1: Title: the data set is described as "convection-resolving". Though, within the whole manuscript, no convective events have been evaluated. Furthermore, the data set is provided in daily resolution, which is why short convective events cannot be investigated properly. Hence, I would suggest replacing "convection-resolving" by "high-resolution".

L80 / Table 1: The Kain-Fritsch cumulus scheme is applied for the 7.5 km domain, but not for the 1.5 km domain. According to that, not only deep, but also shallow convection is explicitly resolved in the 1.5 km domain? I would suggest clarifying this in the text.

L143: "For the distributed trend analysis, we did not apply a field significance test (e.g., Wilks, 2016) due to the small sample size." – Does the "distributed trend analysis" refer to the results in L241 – 246 and Fig. 9? If yes – can you explain why is the sample size too small? If you test the trend at all 351x351 locations, the p-value should be adjusted for statistical tests at many locations (following e.g. Wilks 2016). Moreover,

the reference (Wilks, 2016) is missing in your Reference section. Please also clarify, which test or method you used to detect trends.

L180: Has the observational precipitation data from DWD been corrected for under-catch? Especially in (pre-)alpine regions, this plays a major role, in particular for solid precipitation. I would recommend to briefly discuss this source of uncertainty.

L385: Figure 4 gives a good overview of the biases averaged for all locations. Though, the spatial distribution of biases would be of high interest as well. As the manuscript is already quite long and contains many figures, I would suggest creating such bias maps and moving these additional figures to a supplementary file.

Technical corrections

L156: 273.16 unit is missing

Figures 3,4,5,7,8: Temperature unit is "C" instead of "°C". Figure 6: Here the unit is missing in the figure (and given in the caption instead) Figure 9: Here you use "K" –> Please unify

---