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Convection-permitting present-day climatological simulation with WRF over Bavaria

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Climate impact assessments require information about climate change at regional and ideally local scales. Traditionally, this information has been obtained using statistical methods, precluding the linkage of local climate changes to large-scale drivers in a process-based way. As part of recent efforts to investigate the impact of climate change on forest ecosystems in Bavaria, Germany, within the BayTreeNet project, we developed a high-resolution atmospheric modelling dataset, BAYWRF, for the region of Bavaria over the thirty-year period of September 1987 to August 2018. The open-source community-developed atmospheric model employed in this study, WRF, was configured with two nested domains of 7.5- and 1.5-km grid spacing centered over Bavaria and forced at the outer lateral boundaries by ERA5 reanalysis data. Based on a shorter evaluation period of September 2017 to August 2018, we evaluate two aspects of the simulations: (i) we investigate the influence of using grid-analysis nudging; and (ii) we assess model biases compared with an extensive observational data at both two-hourly and daily mean temporal resolutions. Then, we present a brief overview of the full dataset, which will provide a unique and valuable tool for investigating climate change in Bavaria with high interdisciplinary relevance. Minimally subsetting data from the finest resolution WRF domain are available for download at daily temporal resolution from a public repository at the Open Science Foundation.