Representation of mountain weather, climate, and climate change over the Greater Alpine Region in high-resolution datasets

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Weather and climate in mountainous regions are strongly affected by topography: the underlying complex terrain shapes temperature, precipitation, and wind systems on local scales. The complex terrain can also bring about and exacerbate extreme events such as downslope windstorms and heavy convective precipitation. Furthermore, these regions are particularly sensitive to climate change - higher elevations experience faster warming. Even though a substantial fraction of the world's population lives in mountainous areas, our understanding of local-scale atmospheric phenomena in complex terrain still remains limited. This is partially because reliable observational data is still sparse, and most currently available climate simulations are too coarse to resolve the relevant processes. In recent years, this problem has been to some extent alleviated by advances in computational power and various downscaling techniques, which gave rise to state-of-the-art ensembles of model data on kilometer scales. In this work, we utilize dynamically and statistically downscaled kilometer-scale data sets over Austria and the Greater Alpine Region (the ensemble from the Austrian Climate Scenarios ''OeKS15'' and the CORDEX-FPS ensemble on convective phenomena, respectively). The ultimate goal is to assess how the characteristics of extreme events and their underlying processes are represented in these two data sets, and how credible and physically consistent these various data sources are when evaluated against observations. Moreover, we also aim to understand how and why the extremes and their related processes will change in the warming climate. Here we present the first results, quantifying the statistical differences in the characteristics of precipitation in the CORDEX-FPS and OeKS15 ensembles.