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Orographic modulation and elevation dependence of regional fine scale precipitation change signals - European examples

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High number of regional climate model (RCM) experiments have been accomplished over different subregions of the globe in the framework of the international initiative called the COordinated Regional Downscaling Experiment (CORDEX). Being the European branches of the CORDEX program: EURO-CORDEX and Med-CORDEX provide RCM simulations targeting Europe at grid resolutions of 0.11°. Investigation of ensembles of driving GCM and nested RCM simulations for the late 21st century with respect to late 20th century from the CMIP5, EURO-CORDEX, and Med-CORDEX experiments are presented at high resolution, with a special focus on mountainous regions such as the Alps and the Carpathians. Present work gives an overview on how the fine-scale RCM downscaling can modulate the GCM-produced precipitation change signal in future climate projections over the regions of interest. Our findings point to the fact that the topographically induced fine scale precipitation signal is mostly of dynamical nature in winter, while is more thermodynamic in nature during summer which manifests in strong elevation dependence, thus the high-resolution representation of topography in climate models is crucial for the provision of fine scale precipitation projections in mountainous regions.