



## **Pattern scaling as a method to assess robustness of the CORDEX projections for Europe**

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The regional manifestation of climate change projections for Europe consistently indicates a future decrease in summer precipitation over southern Europe and an increase over northern Europe. However, individual models substantially modulate these overarching precipitation change signals. Despite considerable model improvements as well as increasingly higher model resolutions in regional downscaling efforts, these apparent inconsistencies so far seem unresolved. In the present study, we analyze European seasonal temperature and precipitation climate change projections using all readily available pan-European regional climate model projections for the twenty-first century with model increasing from  $\sim 50$  km to  $\sim 12$  km grid distances from the CORDEX modeling project. This allows for an in-depth understanding of what may be the most robust projection of the future climate. Employing a simple scaling with the global mean temperature change enables the identification of emerging robust signals of changes in seasonal temperature and precipitation. Likewise, the "what-if" approach, i.e. analysing the climate change signal from transient experiments at the time of an emerging global temperature exceedance of e.g. 1, 2 or 3 degrees offer a policy relevant approach to provide more accurate projections. Comparing the projections from these two approaches has never been done in a comprehensive manner and is the subject of the present study.