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From PRUDENCE and ENSEMBLES to Euro-CORDEX. What's the difference?

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Regional climate model resolutions have increased from a grid point distance of about 50 km (PRUDENCE 2001-2004) through 25 km (ENSEMBLES 2004-2009) to 12 km (Euro-CORDEX-11, 2011-present) and from time slice simulations covering 30 years (PRUDENCE) to transient experiments representing the time span of 1951-2100 (ENSEMBLES and CORDEX); from two, with one dominating, driving GCMs and the SRES A2 and B2 emission scenarios (PRUDENCE) to several GCMs (Euro-CORDEX) and multiple RCP scenarios. These projects have had the common aim to produce regional simulations of climate change for Europe.

In this poster we will examine details of the differences between results of these RCM ensemble simulations over the course of almost 20 years. We will examine mean changes of winter and summer temperature and precipitation, normalized with global temperature change, for 99 different simulations. With an EOF analysis in model/signal space we quantify the patterns of main differences between the multi-model ensembles of these projects.

In view of known model and GCM/RCM configuration deficits , particularly in the older part of the project sequence, the pattern-scaled projections of temperature and precipitation change across 20 years of model evolution are shown to be quite similar. Likewise, the patterns of change of annual mean temperature and precipitation can be found to compare well with the results from global models. This apparent robustness of the project sequence represents an important contribution to credibility of the projections provided by the Euro-CORDEX data set representing the current state of the art. Similar studies will be needed in the future for more complex climate parameters than simple averages, like changes in extremes.