



Climate Change Signals in the EURO-CORDEX Simulations

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A new high-resolution regional climate change ensemble has been established for Europe within the World Climate Research Program Coordinated Regional Downscaling Experiment (EURO-CORDEX) initiative.

Within this presentation, the first results on climate change signals based on simulations with a horizontal resolution of 12.5 km for the new emission scenarios RCP4.5 and RCP8.5 will be presented. The new EURO-CORDEX ensemble results have been compared to the SRES A1B simulation results achieved within the ENSEMBLES project. The presentation is based on the results of the Paper JACOB et al. (2013).

We concentrated on the statistical analysis of robustness and significance of the climate change signals for mean annual and seasonal temperature, total annual and seasonal precipitation, heavy precipitation, heat waves and dry spells, by using daily data for three time periods: 1971–2000, 2021–2050 and 2071–2100. The analysis of impact indices shows that for RCP8.5, there is a substantially larger change projected for temperature-based indices than for RCP4.5. The difference is less pronounced for precipitation-based indices. Two effects of the increased resolution can be regarded as an added value of regional climate simulations. Regional climate model simulations provide higher daily precipitation intensities, which are completely missing in the global climate model simulations, and they provide a significantly different climate change of daily precipitation intensities resulting in a smoother shift from weak to moderate and high intensities.

The analysis of projected changes in the 95th percentile of the mean length of dry spells shows similar patterns for all scenarios. The climate projections from the new ensemble indicate a reduced northwards shift of Mediterranean drying evolution and slightly stronger mean precipitation increases over most of Europe.

Within the high-resolution simulations in the EURO-CORDEX changes of the pattern for heavy precipitation events are clearly visible.

(Jacob2013)

Jacob, D.; Petersen, J.; Eggert, B.; Alias, A.; Christensen, O. B.; Bouwer, L.; Braun, A.; Colette, A.; Déqué, M.; Georgievski, G.; Georgopoulou, E.; Gobiet, A.; Menut, L.; Nikulin, G.; Haensler, A.; Hempelmann, N.; Jones, C.; Keuler, K.; Kovats, S.; Kröner, N.; Kotlarski, S.; Kriegsmann, A.; Martin, E.; Meijgaard, E.; Moseley, C.; Pfeifer, S.; Preuschmann, S.; Radermacher, C.; Radtke, K.; Rechid, D.; Rounsevell, M.; Samuelsson, P.; Somot, S.; Soussana, J.-F.; Teichmann, C.; Valentini, R.; Vautard, R.; Weber, B. & Yiou, P. (2013): EURO-CORDEX: new high-resolution climate change projections for European impact research Regional Environmental Change, Springer Berlin Heidelberg, 2013, 1-16.