

Expected climate changes in Croatia by the middle of the 21st century



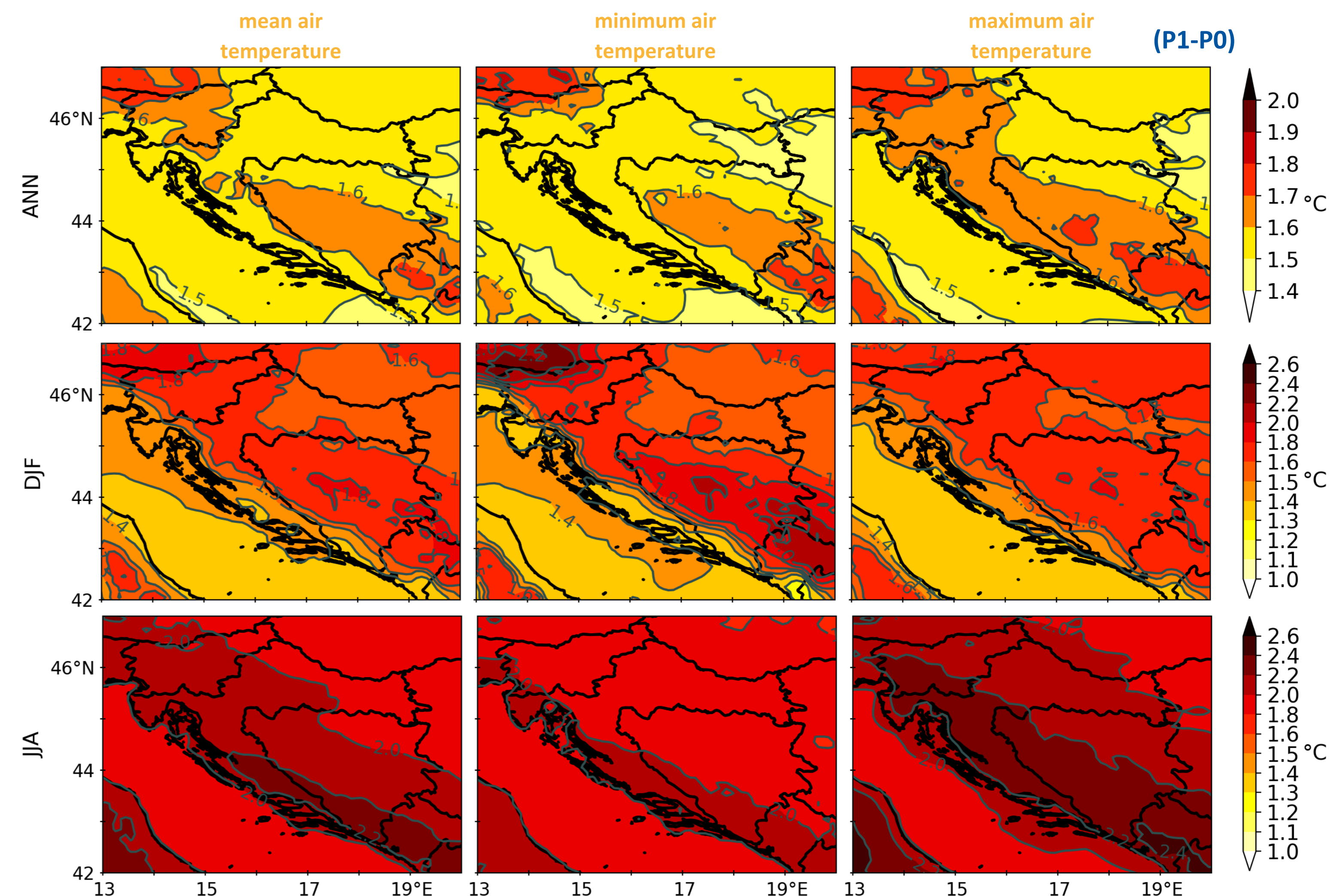
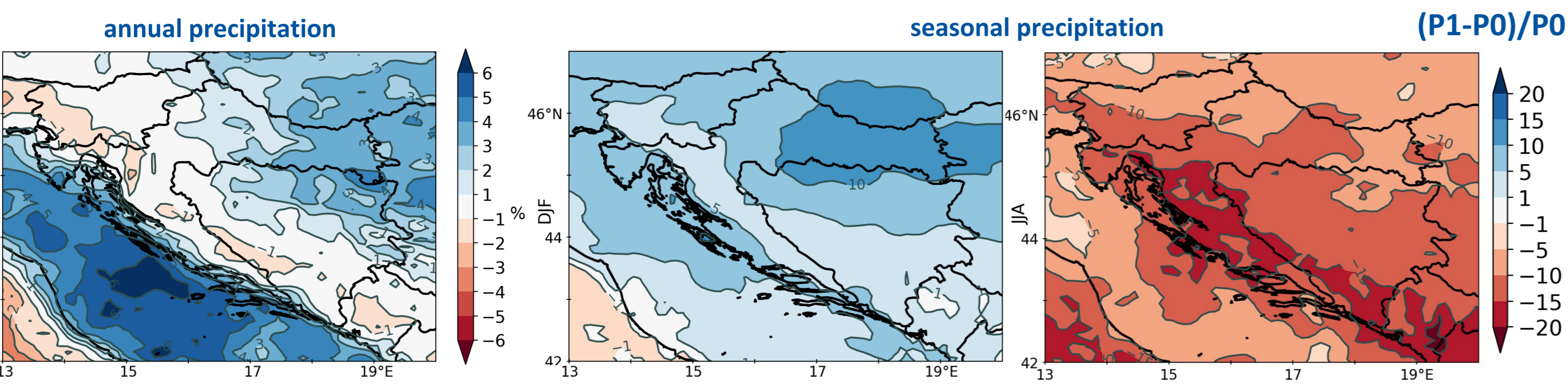
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1 MOTIVATION

- human influence has warmed the climate at a rate that has been unprecedented in at least the last 2000 years (IPCC, 2021)
- the wider Mediterranean area is projected to experience a continued rise in air temperature and an increase in the frequency of warm extremes, accompanied by a decrease in annual precipitation → more frequent agronomic and ecological droughts
- estimates for changes in extreme precipitation amounts show low agreement
- the aim is to gain a deeper understanding of these anticipated changes and their spatial variability specifically over the wider Croatia and Adriatic area
- provide the information for impact studies, risk assessment and regional adaptation

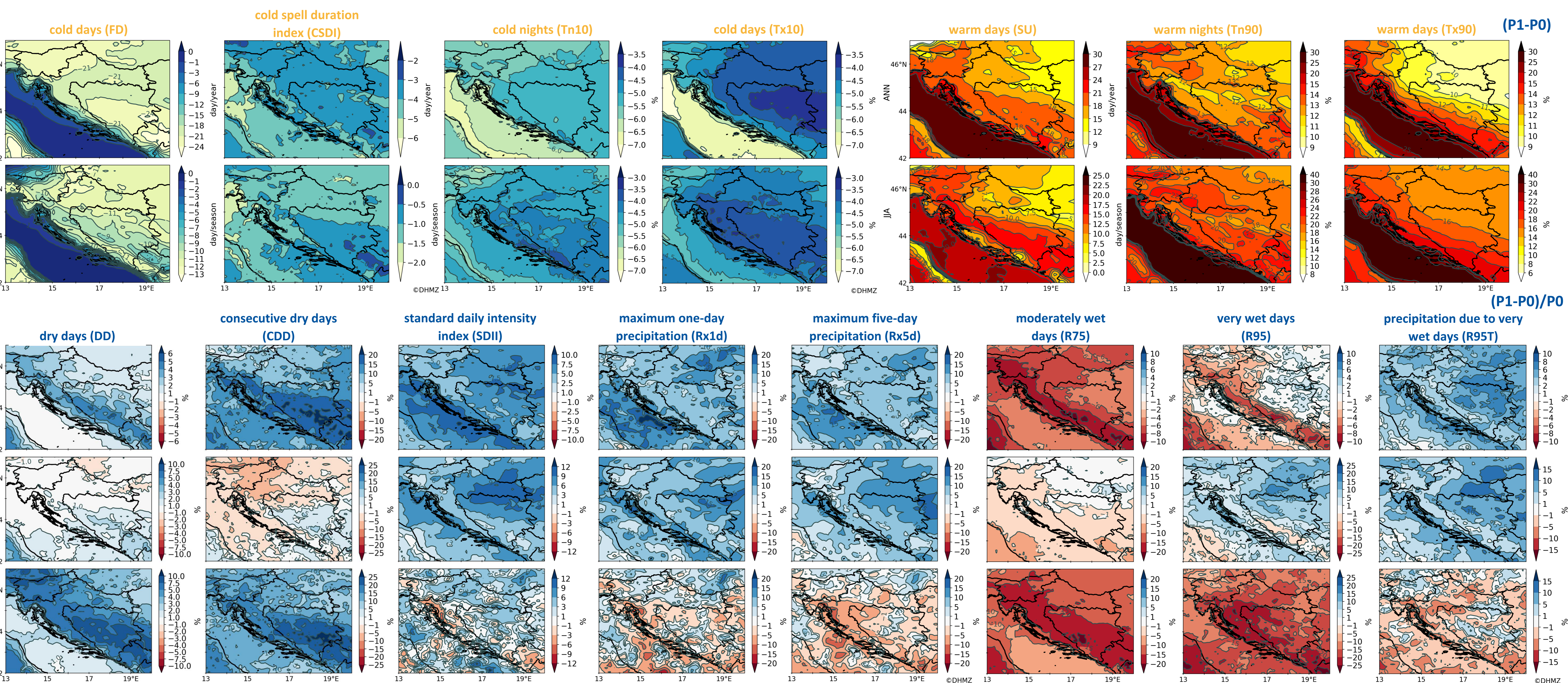


2 MODELS

- regional climate model historical and scenario simulations from the EURO-CORDEX ensemble at 0.11° spatial resolution
- moderate greenhouse gas concentrations scenario RCP4.5
- ensemble includes a total of 12 simulations → 3 RCMs driven by 4 CMIP5 global climate models (GCMs)
- RCMs: DHMZ-RegCM4-2, SMHI-RCA4 and CLMcom-CCLM4-8-17
- GCMs: CNRM-CM5, EC-EARTH, MPI-ESM and HadGEM2

3 METHOD

- climate change signal estimated for future period P1 (2041-2070) in comparison to historical period P0 (1981-2010)
- annual and seasonal changes in mean air temperature, minimum and maximum air temperature and precipitation
- annual and seasonal changes in cold and warm temperature indices and wet and dry precipitation indices (Klein Tank et al., 2009)



4 RESULTS

- changes in mean, minimum and maximum air temperature indicate a clear signal of an increase over the entire Croatia in both mean annual and seasonal values, with the highest increase in summer
- changes in total annual precipitation amount are relatively small, an increase is expected in the areas along the Adriatic coast and across the country mainland, especially over the easternmost regions, but changes are negligible over most parts of Lika, Gorski Kotar area and the Dalmatia inland
- changes in seasonal total precipitation amounts show a decrease in summer and an increase in winter precipitation over the entire country
- cold temperature indices show a decreasing signal in both annual and winter values

- for all considered warm temperature indices, an increase in the number of warm days and nights can be expected, especially across the mountainous area, and coastal areas of Dalmatia and Istria
- dry precipitation indices (DD and CDD) show an increase in number annually and especially in summer across the entire country
- precipitation intensity (SDII), maximum one-day and five-day precipitation are projected to increase annually and seasonally, with the exception of coastal mountainous and mountainous littoral areas in summer
- the number of moderately and very wet days shows a decreasing signal annually and in summer, while the precipitation due to very wet days shows annual and winter increase and a summer decrease

REFERENCES:

IPCC, 2021: *Climate Change 2021: The Physical Science Basis*. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press.

Klein Tank, A. M., Zwiers, F. W., Zhang, X. and Canada, E., 2009. Guidelines on analysis of extremes in a changing climate in support of informed decisions for adaptation. Available at: <http://www.clivar.org/organization/etcddi/etccdi.php>.

8 National Report of the Republic of Croatia under the United Nations Framework Convention on Climate Change

SCAN ME

