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Verification of EBU-POM regional climate model using E-OBS and ERA5-Land dataset over Pannonian Basin

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The direct approach to model evaluation is to compare regional climate model (RCM) output with observations and analyze the resulting difference in order to identify deficiencies in the model itself which can be reduced by its improvement or taken into account for understanding and interpretation projections of future climate change. In previous studies, it was noticed that most of EURO-CORDEX RCMs tend to overestimate the mean near surface air temperature and underestimate the precipitation in the Pannonian Basin during summer [1], leading to so-called summer drying problem [2]. Our intention for this study is to check does dry and warm bias is also present in the results of fully coupled atmospheric-ocean RCM EBU-POM [3]. The gridded observational dataset of E-OBS for the daily mean near surface air temperature and daily precipitation with horizontal resolution 0.11 degree (approximately 12 km) is used in the evaluation of the model for time period 2000-2010. Also, in order to further investigate the reason of warm and dry bias in EBU-POM model, we verified soil moisture content, heat fluxes, evaporation and runoff against gridded ERA5-Land dataset for selected time period.

Model skill for selected time period was expressed in term of three verification scores: BIAS, root mean square error (RMSE) and spatial correlation coefficient. Finally the calculated scores are averaged over Pannonian valley. From wider Pannonian Basin region bounded by longitudes, 14°E and 27°E, and latitudes, 43.5°N and 50°N we elect the sub-domain in the centre of this longitude-latitude box, in which topography elevation is below 200 m, and it is introduced to eliminate impact of scores obtained over surrounding mountains on average score value for Pannonian valley. To create compact sub-domain, few exceptions from elevation constrain was made. Visualization of the verification results was done using Taylor diagram.

According to the results, in summer season during evaluation period, warm and dry bias exists. To better understand the sources and reasons for summer drying problem further research is needed such as testing the hypothesis that the biases are related to a false representation of soil properties in this region.

References

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