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Geoscientific Model Development Discussions

Interactive comment on "Hindcast regional climate simulations within EURO-CORDEX: evaluation of a WRF multi-physics ensemble" *by* E. Katragkou et al.

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We thank anonymous referee #2 for his/her comments. Our response is provided below:

1)The reviewer wishes a more detailed discussion on the radiation-temperature dependence, including maximum and minimum temperature values. In our revised manuscript we added the temperature-maximum and minimum variables in the discussion and included two additional figures in the supplementary material Fig S1 (tas-max) and Fig S2 (tas-min). We shortly discuss the potential relationship with short- and long wave radiation. We certainly agree with the reviewer that this is an important topic;

however, a complex analysis of radiation-temperature relation is beyond the scope of the present study.

2)We updated our references-list with the missing references.

3)Figures 2, 4 and 5 were updated, as requested

4)All suggested minor technical corrections were added in the manuscript

5)Table 1 was updated with the requested information on relaxation zone and missing acronyms.

6)Details of the post-processing of the cloud cover was added in 2.2 section.

7)The impact of individual choices on modeling results is an issue, which is not easily answered. In this work we have a single-model (WRF) multi-physics ensemble with different configurations (nr of vertical layers, top pressures, boundaries). A perfect multi-physics ensemble would require identical configurations for all modeling groups. Technically, this is feasible, but it requires considerable simulation planning in advance. Currently, the only way to discuss the impact of different configurations is to perform sensitivity studies. However, this action requires considerable additional computational/storage/human resources, which are not easily available. Certainly, this is an issue to be considered in future similar modeling activities.

8)With respect to the interpolation methods: we certainly agree that interpolation procedures in general are a source of errors, especially in areas with strong temperature gradient, such as the coastlines. Each group is currently handling this problem in an independent way. This issue is currently discussed within the EURO-CORDEX community. We are looking for a methodology addressing this problem as accurately as possible. Still, there is a unanimous agreement, that the impact of interpolation methods is not so serious, as to affect the basic conclusions of our analysis. To gain more confidence in the comparison of the coarse satellite retrievals with the presented WRF simulations, we also compared WRF with the higher resolution CMSAF satellite data

(0.03o), for the time period that they were available (1997-2003). The qualitative results on the biases are the same, either when using ISCCP (low res) or CMSAF (high res) data. Therefore, we are confident, that the basic conclusions of our analysis are robust and not depended on the interpolation method used. We definitely, agree, naturally, that a consistent interpolation methodology should be followed by all modeling groups in the future studies.

Interactive comment on Geosci. Model Dev. Discuss., 7, 6629, 2014.

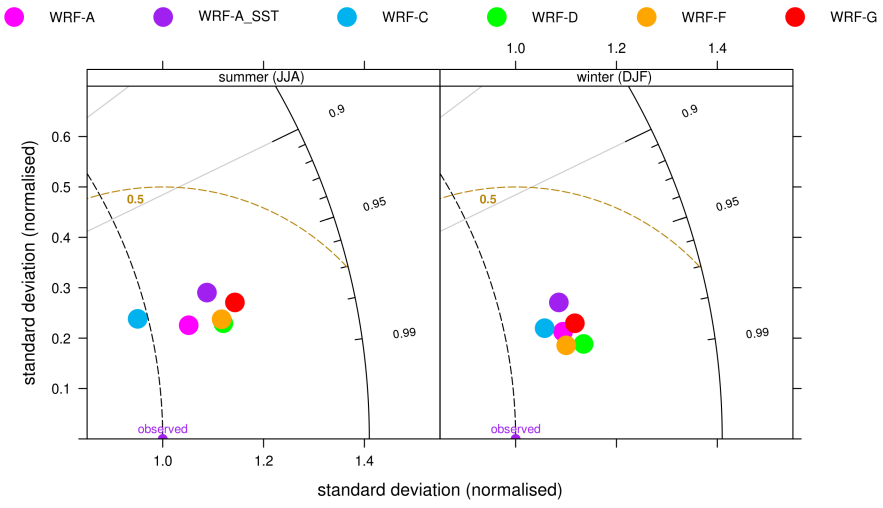

Fig. 1. Figure 2 Temporal (upper panel) and spatial (bottom panel) Taylor plots for surface temperature averaged over Europe for summer and winter 1990-2008.

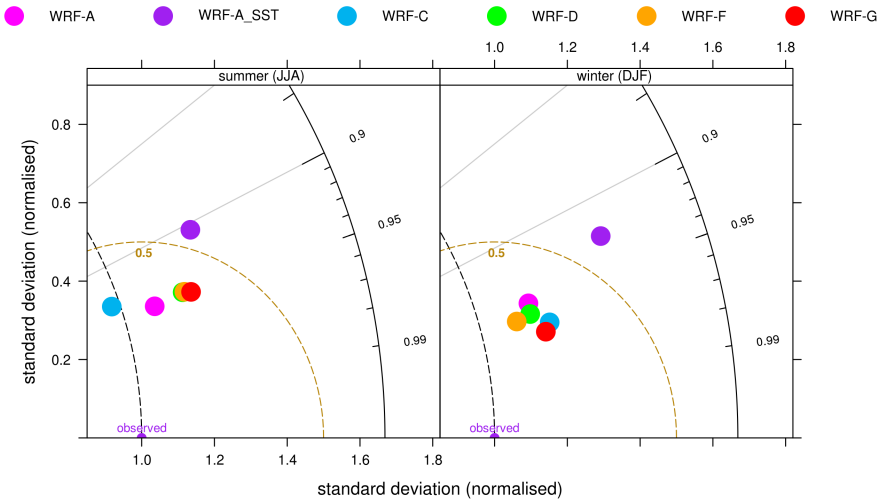

Fig. 2. Figure 2 Temporal (upper panel) and spatial (bottom panel) Taylor plots for surface temperature averaged over Europe for summer and winter 1990-2008.

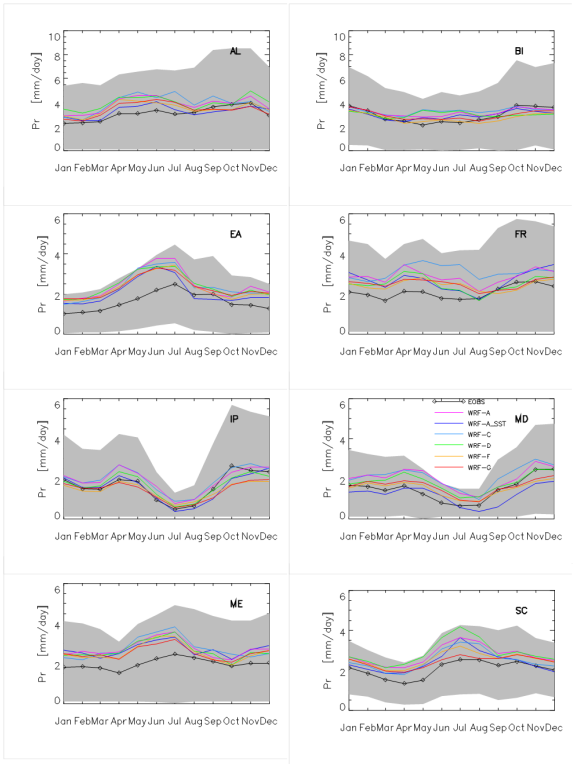

Fig. 3. Figure 4 Mean precipitation annual cycle. The grey area indicates observational standard deviation.

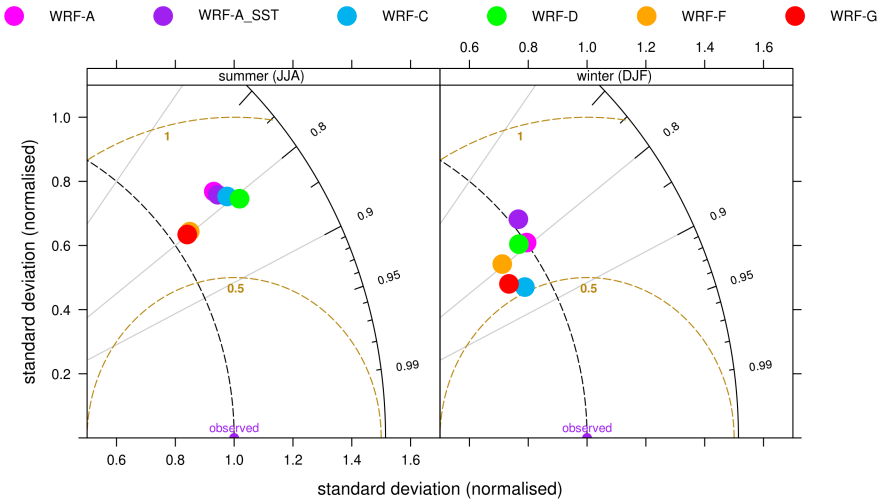

Fig. 4. Figure 5 Temporal (upper panel) and spatial (bottom panel) Taylor plots for precipitation averaged over Europe for summer and winter 1990-2008

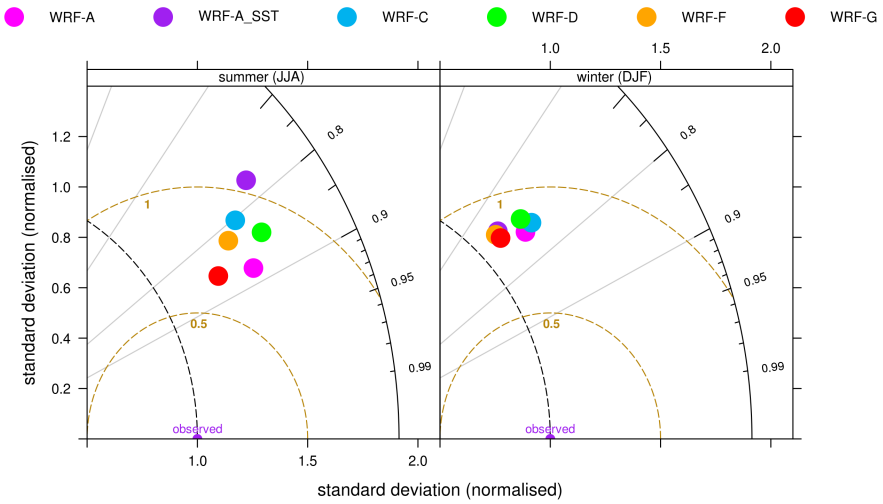

Fig. 5. Figure 5 Temporal (upper panel) and spatial (bottom panel) Taylor plots for precipitation averaged over Europe for summer and winter 1990-2008

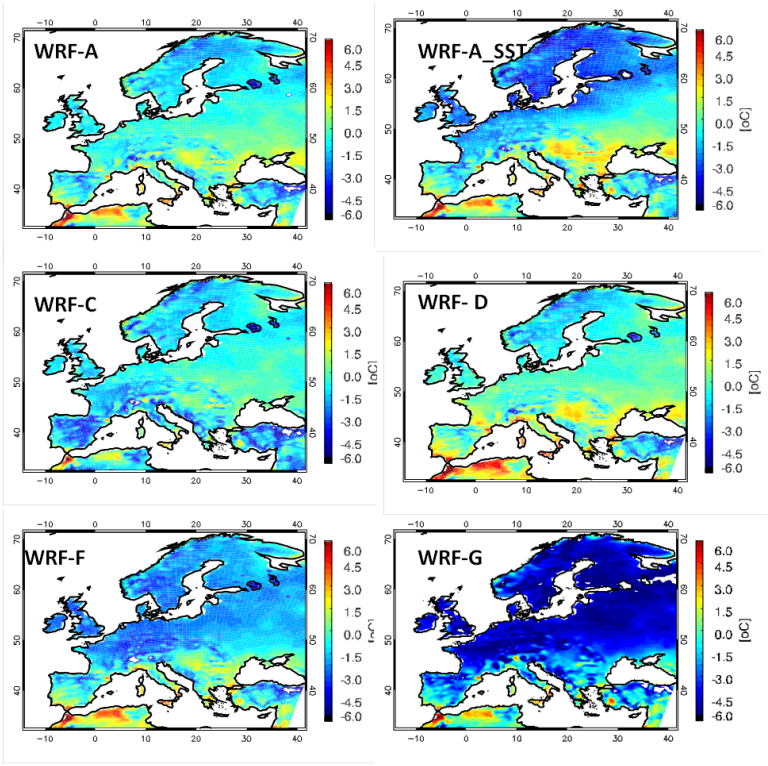

Fig. 6. Figure S1a Mean summer 1990-2008 surface maximum temperature bias (model-E-OBS9).

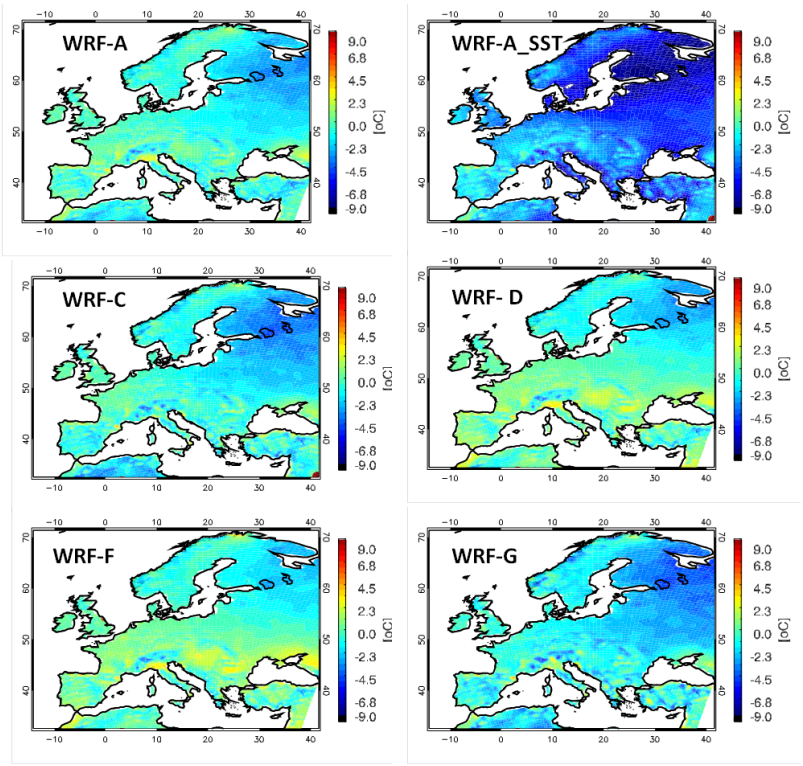

Fig. 7. Figure S1b Mean winter 1990-2008 surface maximum temperature bias (model-E-OBS9).

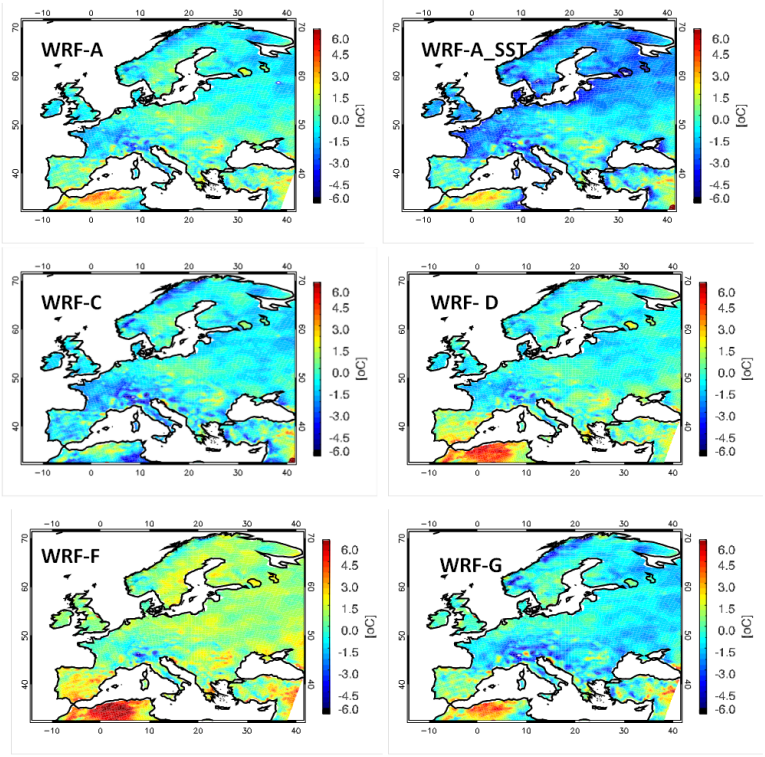

Fig. 8. Figure S1a Mean summer 1990-2008 surface minimum temperature bias (model-E-OBS9).

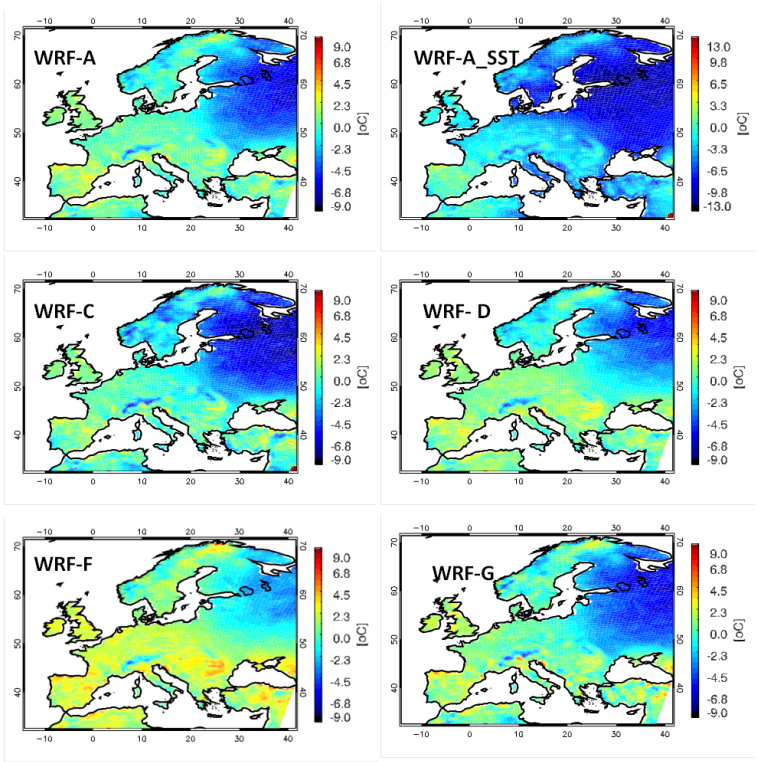

Fig. 9. Figure S1b Mean winter 1990-2008 surface minimum temperature bias (model-E-OBS9).