

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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This paper provides an analysis of the performance and causes of biases in the WRF multi-physics ensemble within EURO-CORDEX. Overall the paper is well written and provides a useful analysis for others in the WRF community and likely regional climate modelling more generally. Some significant contributory causes for common biases are identified and potential ways to alleviate them are presented. I think this paper is suitable for publication after addressing the technical and minor comments below.

Minor Comments

1. pg 6642: discussion of KF overestimation of high precip may also be related to use of C2341

YSU PBL. A number of previous studies have found that the PBL and cumulus schemes provide the strongest influence on precipitation (e.g. Evans, J., M. Ekström, and F. Ji (2012), Evaluating the performance of a WRF physics ensemble over South-East Australia, *Climate Dynamics*, 39(6), 1241–1258, doi:10.1007/s00382-011-1244-5; Ji, F., M. Ekström, J. P. Evans, and J. Teng (2014), Evaluating rainfall patterns using physics scheme ensembles from a regional atmospheric model, *Theor Appl Climatol*, 115(1-2), 297–304, doi:10.1007/s00704-013-0904-2; Di Luca, A., E. Flaounas, P. Drobinski, and C. L. Brossier (2014), The atmospheric component of the Mediterranean Sea water budget in a WRF multi-physics ensemble and observations, *Clim Dyn*, 43(9-10), 2349–2375, doi:10.1007/s00382-014-2058-z) with the combination of YSU and KF generally providing amongst the highest precipitation amounts. The EURO-CORDEX dependence on the YSU PBL scheme seems to promote the overestimation of precipitation (similar to the use of the Noah land surface scheme promoting a low temperature bias)

2. pg 6643, ln 11: “However, spectral nudging for upper air winds and thereby avoiding this problem,” I do not see the reason that nudging of upper air winds would solve a bias in sea level pressure. It should help place storm tracks in the correct location but this is not the same as solving the problem of a long-term Europe-wide bias in sea level pressure. What this sensitivity test does is suggest that the sea level pressure bias is not related to the storm track location – this does not contradict the suggestion from Kotlarski et al. (2014)

Technical Comments

3. pg 6632, ln 21: “temperature” should be “temperatures”
4. pg 6635, ln 27: “0.75” should be “0.75°”
5. Table 1: caption or footnote for table should explain all the word shortenings and acronyms. The table should also specify the lateral boundary relaxation zone size and type.

6. Pg 6639, ln 15: "finding in" should be "finding is"
7. pg 6639, ln 26: rather than "not shown" why not include the figure in the supplementary material? This comment applies to all uses of the "not shown" phrase
8. pg 6639, ln 17: Mooney et al (2013) reference is not present in the reference list!
9. pg 6641, ln 22: remove "over"
10. pg 6642, ln 24: "model into the" should be "model in the"
11. pg 6643, ln 27: "In few cases..." might better be written "In a few cases the models have difficulty correctly capturing the seasonal..."
12. pg 6644, ln 2: "be traced on... limits..." to "be traced to . . . limiting..."
13. pg 6644, ln 9: delete "that"
14. pg 6645, ln 5: "correlations is" should be "correlations are"
15. pg 6648, ln 7: delete "GD"
16. pg 6650: ln 22: delete the first "even further"

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