Interactive comment on "Optimising predictor domains for spatially coherent precipitation downscaling" *by* S. Radanovics et al.

Anonymous Referee #1

Received and published: 27 May 2013

This manuscript examines the way to define predictor domains used by an analogue downscaling method for precipitation downscaling for target zones covering France. The authors make a convincing analysis of the problem and their manuscript deserves publication in HESS. However, I think some improvements (minor revision) could be implemented before publication.

SOME GENERAL COMMENTS.

1. In its present form, the work appears to be highly regional in focus and the fine details are unlikely to generalise to other locations or variables (e.g. predictand or predictors). However, the paper could have sufficiently broad geophysical implications. For example, the optimization methodology could be more fully explained (is it applica-

ble everywhere?) and the possible ways to deal with this topic could be better clarified. Comments on this would be welcome.

2. It would be appropriate to better clarify whether this manuscript focuses on precipitation downscaling in climate change context, in weather forecasting, or in both, discussing the assumptions and implications of the downscaling in both cases. For example, the rather complex downscaling method adopted (e.g. 4 steps, several predictors, etc.) is not parsimonious and may not to be robust under climate change conditions, while it could work in weather forecasting.

3. Please clarify what is meant by "spatially coherent precipitation" in this study? For example, if several analogue days are selected and aggregated together considering the mean of the analogues, the downscaled field loses its true spatial coherence, regardless of the domain(s) of the predictor(s) considered.

4. Length of the paper. Although there are no restrictions on the number of words - at least as far as I know - the article in its current form is very dense and hard to follow. I therefore propose summarizing where possible.

SOME SPECIFIC COMMENTS.

1. TITLE. See general comment 3. As a suggestion: "over France" could be added to the title (see also general comment 1).

2. ABSTRACT. The abstract should help to understand the key messages of this study (see general comment 1). Please reword and clarify the broad geophysical implications of this study.

3. P 4018 line 16. Add "weather" before "forecasting".

4. P 4019 lines 6-12. This could be false. See general comment 3, too.

5. P 4020 line 9. Please correct "ressources".

6. P 4020 line 11. Horton et al. –> (Horton et al. ...).

7. P 4020 line 14. Why only geopotential?

8. P 4020 lines 15-17. Not clear.

9. P 4020 lines 18-27. Please write the objective of the paper once only (already reported at lines 13-17 p 4019).

10. P 4021 lines 14-15. What are the consequences of this?

11. P 4022 line 17 (and abstract). "Relevance maps" is not standard terminology, please define.

12. P 4022 line 17. Remove one "the".

13. P 4022 line 27. Why Fig. 4 here? I think it is better to remove it.

14. P 4023 line 1. Two times "autumn".

15. P 4023 l 20. Why temp. at 925 hPa at D+1?

16. P 4023 l 21. Is there always one and only one point as the closest to the target zone?

17. P 4024 l 5. Why 4 days and not more or fewer?

18. P4025 l11-15. So is this the first application to the whole of France? Also, is there no optimization of the entire downscaling procedure to the whole of France?

19. P 4026 l 9. Which years?

20. Discussion. This part could be summarised and shifted to the previous sections.

21. P 4028 RESULTS. Please add a comment on the size of the domains found. Is it greater or smaller than those normally used in precipitation downscaling? Probably it changes depending on the time scale considered.

22. RESULTS. Did you try to compare the skill using optimized domains and those used in other studies (or with domains of different sizes)? In general, what is the value

added to optimize the domain?

23. P 4036 lines 17-20. Not clear. What is meant by "data quality" in this context?

24. P 4038 lines 3-18. This part could be summarized.

25. P 4039 lines 3-5. You cannot generalize from a single example analyzed.

26. P 4039 This part could be summarized.

27. Fig 1. Please highlight the seven zones (e.g. with arrows).

28. Figures 7 and 8. Enlarge the coordinates.

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