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Climate of the Past Discussions

Interactive comment on "Impact of precipitation intermittency on NAO-temperature signals in proxy records" *by* M. Casado et al.

Anonymous Referee #1

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General Comments:

The authors investigate the importance of the precipitation intermittency bias in proxy records by comparing seasonal temperatures estimated with and without precipitation weighting. The authors provide evidence that this bias may reach locally up to 10 °C. They further investigate the implications of this bias to reconstructions of the North Atlantic Oscillation. The importance of the precipitation intermittency bias is also analysed with respect to the precipitation isotopic composition. The authors suggest that the isotopic δ18O signal may provide additional information for NAO reconstructions. The manuscript is well written, the methodologies and statistics are well applied, and the conclusions are largely sound. Therefore, I believe the manuscript is a worthy contribution to Climates of the Past. Nevertheless, a few minor aspects should be improved

before the paper is accepted. Therefore, I recommend a minor revision according to the comments given below.

Minor Comments:

#1: Page 4961, lines 16-21: As the authors correctly state, the precipitations amounts from reanalysis datasets may be very unrealistic. Thus, the reasoning here about comparing two different reanalysis datasets does not really make much sense. Instead, I suggest mentioning already here that, due to the shortcomings of precipitation in the reanalysis, the authors also consider observational datasets (as described in page 4962).

2: Page 4963, line 23: I wonder about this statement, as the horizontal and spatial resolutions are very different between ERA-40 and the ECMWF operational analysis. Please add some more information here (eventually taken from Risi et al., 2010).

3: Page 4965, line 25 – Page 4966, line 6: This paragraph is unclear to me, particularly as all the statements are based on "not shown" data. For example, there is a very clear diurnal cyclone of precipitation in some parts of the study area (e.g. over Central Europe during summer). Please enhance, and if necessary, add supplementary material to support the statements.

4: Page 4968, line 13: I consider Figure S8 quite important, and suggest moving it to the main manuscript.

#5: Page 4971, line 14 and Supplement E: The authors claim that "the NAO-Tp correlation appears remarkably stable through time". By closer inspection of Figures S6 and S7, this is actually not really the case. Please reformulate.

6: Page 4972, lines 4-11: While I generally agree with the statement, but I suggest reformulating this text segment, as it is difficult to follow the reasoning as it is.

7: Page 4974, lines 14-17: there has been some recent work on sources of precipitation for Europe (see some suggestions below, not exhaustive). Further, I do not

think “higher resolution simulations” would actually help here, but rather the using of appropriate back tracing methodologies on reanalysis datasets. Please reformulate.

Drumond, A., et al. (2011), A Lagrangian analysis of the variation in moisture sources related to drier and wetter conditions in regions around the Mediterranean Basin, Nat. Hazards Earth Syst. Sci., 11, 2307–2320.

Gimeno, L., et al. (2010), On the origin of continental precipitation, Geophys. Res. Lett., 37, L13804, doi:10.1029/2010GL043712.

8: Page 4975, lines 12-15: Please reformulate, same as comment #5.

9: Page 4975, lines 16-18. The authors have actually not yet really demonstrated that Tp presents a real advantage for past reconstructions. I suggest weakening this statement and starting with “We suggest that the Tp variable may present some advantages as a target for calibrating (. . .)”

10: Supplementary material B, second paragraph: There are actually quite big differences between the various reanalysis datasets. Compared to which reanalysis are the direct observations of precipitation intermittency bias similar to?? Please enhance.

11: Supplementary material, Figure S2: I suggest showing first JJAS as (a), and DJFM as (b), to be coherent with Figure 2.

12: Supplementary material, Figure S3: The leading EOF for MLSP calculated from LMDZiso, which should represent the NAO-pattern, look particularly strange for JJAS. Please check. Additionally, I strongly suggest adding the correspondent panels for ERA and NCEP for comparison (both DJFM and JJAS).

Interactive comment on Clim. Past Discuss., 8, 4957, 2012.