

## ***Interactive comment on “The method ADAMONT v1.0 for statistical adjustment of climate projections applicable to energy balance land surface models” by Deborah Verfaillie et al.***

### **Anonymous Referee #1**

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General comments: This paper describes a new sophisticated method to adjust and disaggregate daily RCM output to hourly values, which are usually necessary to force energy-balanced based land surface models. Such a method is an interesting and useful addition to the field. The work is therefore relevant, although the applied reanalysis data set used as reference is very specific and the performance of the method with other observational datasets first needs to be demonstrated. After the authors investigated the impact of the grid point selection, the “ultimate quantile mapping” and the transferability in time, it would also be interesting to know the impact of the weather regime consideration or not. This is just a wish and since the paper is already long enough I understand if the authors want to cut this point. Therefore, I recommend

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publishing the paper once the authors addressed at least the points listed below:

Specific comments:

L80: ADAMONT stands for what?

L123: daily RCM model outputs

L143: 4 weather regimes: Can they be named or described somehow? If I understand right, this means that every day in the reference period has been categorized in one of the four weather types, which is valid for all massifs for this day? Is this already implemented in ADAMONT for Europe as a kind of look-up table? The 4 weather regimes are based on quite old study. What about the consideration of 5 weather regimes as proposed in a recent study (<http://onlinelibrary.wiley.com/doi/10.1002/2017GL074188/epdf>) ?

L146: Integration: Would “Aggregation” not be the better term?

L148: 6 am to 6 am the next day: Is this UTC or local time?

L150: daily mean: 6 am to 6 am?

L152: Ok, you calculate the 99 percentiles, but what do you mean with “99 percentiles + 0.5 % and 99.5 % quantiles” ?

L160: For RCM values greater than the 99.5 % quantile, a constant adjustment based on the value of this last quantile is applied in order to allow for new extremes.

L170: A further criterion can be applied: Did you apply it or not?

L174: a random draw: This in contradiction to the desired “consecutive time slices” described above!

L175: browsed through: in which direction?

L186: RCM adjusted daily minimum and maximum: It should be mentioned before, that RCM often provide daily minimum and maximum temperatures.

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L201: Equation 4:  $T_h\text{RCM}(24h, i-1)$  is not available for the first day. What to take then?

L206-209:  $X_h\text{SAF}$  should be replaced with  $X_h\text{OBS}$ !

L231: Definition of snow year is missing!

L260: all massifs: Should it not be one massif, since the calculation is done by massif?

L282: Replace Method with ADAMONT

L300: I guess a given altitude level means a  $\pm 150$  m wide elevation band?

L304-372: References to the corresponding tables and figures would help a lot.

L391-393: Please mention that the good agreement for snow depth is due to the fact that the difference in winter precipitation is small (see Fig. 5)!

L403 & L412: Are there no noteworthy differences between massifs?

L415: smaller than  $150 \text{ kg m}^{-2}$  per month: This should also be expressed in percentage!

L422: biases never exceed 50 cm: This should also be expressed in percentage!

L430: Fig. 5 & 6

L533: as found by Lafaysse (2011)

L551: TSS are generally better for massifs of the Northern Alps: Could you please provide some percentage range!

L564: Why not Figs. 10-13?

L575-577: Please give a reference for this statement!

L602: biases for precipitation

L622-623: The new method ADAMONT is able to statistically adjust daily regional

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climate model projections and to provide hourly. . .

L647: ultimate quantile mapping: Should be again explained in more detail for the conclusion section.

Table 2: For a better understanding, the configuration with  $N=0$  should be also labeled as such.

Figure 1: An additional small map with numbered massifs (e.g. right of the elevation color bar) would give the reader a possibility to geographically locate the massifs listed in Table 3, where the same number needs to be inserted.

Figure 3 (top left): Why is the 1800 m elevation not considered?

Figure 3 (top right): I guess the time period of the SAFRAN reanalysis is 1980-2010. Please give this information in the legend or in the figure caption.

Figure 3 (caption L3): different elevations considered (900-2400 m. . .)

Figure 8: I guess the time period of the SAFRAN reanalysis is 1980-2010. Please give this information in the legend or in the figure caption.

Figure 10: Scale of the y-axis for the two elevations should be the same for comparability. The y-axis labeling in the 2. and the 4. column is missing. Should be like Figure 11.

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Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2017-135>, 2017.

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