Dear Reviewer,

We wish to thank you for the very constructive comments and for the positive opinion on our manuscript. The points which have been raised gave us the opportunity to discuss in deeper detail some features of the downscaling method, which we didn't examine in depth in the previous version.

The detailed answers to your comments are reported below in bold italic.

Best regards,
Silvia Terzago and co-authors

Reviewer #2

The paper is well written, the structure is clear (and as it should be) and the authors mention the necessary and useful references. The only two points, which I would recommend to improve, is

1) ***to say a little bit more about the improvements by their method in the different seasons. Often, in winter, spring and fall the improvement is larger than in summer. Have the authors made a similar experience and can they show how the improvement of the downscaling depends on season?***

The spectral slopes used by the RainFARM downscaling methods have indeed been computed separately for each month of the year (12 slopes in total), implying that the spectral properties of the large scale field (slightly variable month by month) are reproduced also in the downscaled fields. So, both the standard and the modified downscaling methods should take into account the seasonal cycle of precipitation. Following the suggestion of the reviewer we evaluated the performances of the standard and modified RainFARM methods for different seasons. We expanded figure 4 in the manuscript adding 4 new panels (d-e) which show the performances of the downscaling in the different seasons for low-precipitation gridpoints, which exhibit the most interesting behavior in our opinion. The new panels are now commented in the manuscript, in Section 4.2.
The same plots for high precipitation gridpoints (reported in Fig. R03 for completeness) reveal small differences among the different seasons.

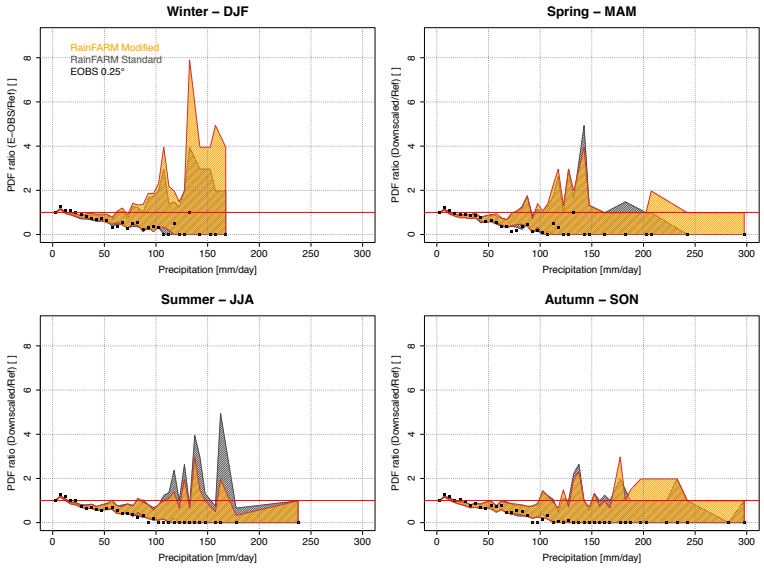

Figure R03. Ratio between the PDF of E-OBS downscaled precipitation and the PDF of the station observations, for high precipitation grid-points. The standard (gray) and the modified (orange) RainFARM methods are compared for different seasons (DJF, MAM, JJA, SON).

> ***2) To discuss shortly the inflation topic. There was somewhat a discussion about this topic in the last years. Typically, in a gridded model, small precipitation amounts are over-estimated, large precipitation amounts under-estimated. This underestimation of large precipitation events in the original gridded field leads to an inflation of the downscaled precipitation which may be a problem. It would be a good idea when the authors could explain how they tackled this problem.***

As a stochastic downscaling method, RainFARM actually is well suited to address directly the inflation problem. In fact, by reconstructing (through extrapolation in spectral space) the missing small scale variability of a smoother large-scale field, RainFARM effectively reintroduce the missing variance due to small-scale fluctuations by adding small-scale random fluctuations. This is similar to what suggested originally by von Storch (1999), but RainFARM does so by introducing perturbations which reconstruct a realistic spatial correlation of the precipitation fields. Additionally, an optional tuning of the final nonlinear transformation (typically, of the exponent of an exponential) in the RainFARM method may allow to obtain downscaled fields capable of reproducing even better the observed precipitation PDF, while at the same time maintaining a correct correlation structure. As also discussed in the original paper describing RainFARM (Rebora et al 2006; https://doi.org/10.1175/jhm517.1) and in subsequent papers (e.g. D'Onofrio et al., 2014) the RainFARM downscaled fields present a good reproduction of a wide range of statistical measures of observed precipitation. The modification suggested in this paper, which modifies locally the downscaled precipitation, further allows to achieve a better agreement in terms of climatology and, as we show, in terms of precipitation PDFs and an even better reproduction of the spatial correlation structure of the fields (see our reply to reviewer #1 and fig. R01), with improved RMSE compared to the reference fields.

Additionally: A question about the used stations: In the text, the authors say that they used also the stations of the daily gauges, but in Fig. 1 there are only the automated ones. Perhaps, the authors should explain this a little bit clearer.

Thank you very much for this useful comment, we have now better characterized the datasets which we used in the manuscript. We considered the daily precipitation dataset (parameter rka150d0) provided by MeteoSwiss (https:/gate.meteoswiss.ch/idaweb). This dataset includes a large number of stations, both manual and automated ones, providing time series of different temporal lengths and covering different periods. We checked the continuity of these time series and we retained only those providing at least 80% data over a common time period, i.e. 1981-2010. We ended up with 59 stations, and all of them are automated stations, as the reviewer correctly states. We better clarified this in the manuscript in Section 2.4.