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Climate of the Past Discussions

Interactive comment on "Probabilistic precipitation and temperature downscaling of the Twentieth Century Reanalysis over France" *by* L. Caillouet et al.

Anonymous Referee #2

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The paper presents a downscaling technique in order to reconstruct precipitation and temperature fields in France over the 20th century. The downscaling technique is a certain parametrization of the analogue method that is improved in order to reduce biases in the interannual cycle and to improve interannual correlation. Two improvements are assessed: the first relies on a calendar selection and the second adds two new analogy subsampling steps based on SST and the two-meter temperature. Both approaches provide interesting results that may be applied in different contexts.

The application of the analogue method for temperature downscaling is rather new, and addressing biases issues is an important point. The paper is thus worth publishing. It

is globally well written and well structured. Some improvements are suggested.

General issues:

- It is not always clear at what time step you are working. Most of the time it is a daily time step, but sometimes monthly? Is the monthly modeled time series an aggregation of the daily one, or a downscaling at a monthly time step? When it is the latter, how do you perform that?

- As you present the SANDHY method, is sounds like a method apart, as you do not replace it in its wider context. SANDHY is just a certain parameterization of the analogue method, which has many other variants. There are a few steps between the idea introduced by Lorenz and the work of Ben Daoud, and you may recapitulate some in section 3.1, and put SANDHY back in the general context of the analogue method.

- There is a classic confusion of the term "large-scale", as it truly means: "A large scale map only shows a small area, but it shows it in great detail. A map depicting a large area is considered a small scale map." (see also http://basementgeographer.com/large-scale-maps-vs-small-scale-maps/). The term local-scale is fine, but large-scale is confusing.

Minor issues:

- Intro of section 2 (p.4429) is very confusing. Please reformulate.

- p.4430 l. 27: the date is not correctly written

- p.4433 l.15: "the the"

- p.4435 sec 3.3.1: when you talk about the first domain, is it the optimal one per region, or the first globally? Please specify.

- p.4438 l.9: "here" instead of "her"

- p.4442 l.23-26: this sentence is not clear. Please specify.

- p.4443 l.12: I would not say “only” 1.0 °C, as the relative difference compared to 1.1 or 1.3 is not that big.

- p.4445 sec 5.1: the summer around 2000 seems also badly simulated.

- Figure 1: it would be easier to read with the 0 (# of stations) at the same level as the x axis

- Figure 4: the legend can be improved: the lines are really thin and we don’t see the colors well. Moreover, the box around the lines are not necessary and are even a bit confusing.

- Figure 5: same as Figure 4

- Figure 10: same as Figure 4

- Figure 11: Mainly an issue when printed. . . Can you widen the range of colors in order to better see the differences? Additionally, it may be easier to read without the borders around the dots.

- Figure 12: Mainly an issue when printed. . . The dots being really small, we mainly see their borders instead of the color inside, which makes it very difficult to read. What if you remove the borders and change the colors to avoid white?

Interactive comment on Clim. Past Discuss., 11, 4425, 2015.