**Atmospheric
Chemistry
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Discussions**

Interactive comment on "Comparing the effectiveness of recent algorithms to fill and smooth incomplete and noisy time series" *by* J. P. Musial et al.

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We are most grateful for the Editor's and the referee's constructive comments on our manuscript. These have allowed us to improve further our paper and to clarify a few points, especially for the benefit of a general readership. Furthermore we have expanded our analysis with additional quality fit criteria (Mean Bias Error, chi-squared test, autocorrelation of residuals) which support our main conclusions.

Response to the specific comments from the Reviewer 3:

The suggestion from the Reviewer to expand the analogy to radar has been implemented.

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The Reviewer suggests including more introductory materials on Lagrange and other standard methods near the start of Section 2. We have implemented some changes to briefly introduce the concept of Lagrange interpolation, but refrained to get into too much detail as ample information is available from Internet on these topics. On the other hand, this paper would not quite qualify as 'an inventory of background reading for the general audience', because there are probably many more options available. The Internet links were provided to point to the repositories of source codes utilized in the experiments.

The Reviewer also suggested including one or more figures showing the synthetic time series and some of the gap patterns. This has been implemented: see Figures 16 to 18.

The suggestion of specifying ', when analyzing satellite data' in subsection 3.3.1 is well taken and has been implemented.

The recommendation to add one or more figures in Section 3.4 with synthetic time series has been implemented: See Figures 19 to 21. On the other hand, reconstructions of extreme events are highly dependent on the particular distribution of gaps: each particular time series becomes a singular case: that is the main reason average results are provided.

The plots of Figures 5 to 10 are indeed based on results from a limited number of simulations and linearly interpolated. This has been emphasized in the text.

The Reviewer's comment on the size of the symbols used in the Figures is correct: there is a delicate balance between making the graphs easily readable and accurate. We will be glad to pursue the idea of publishing high quality and high-resolution versions of our Figures as web materials if the Publisher is interested.

The procedures to 'decimate data' and create gaps in records is indeed entirely random, and we have made this even clearer in the revised text.

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The original Sunspots and Mauna Loa records were quite complete and thus 'decimated' to create artificial gaps similar to those generated in synthetic time series for the purpose of the analysis, and Figures 12, 13 and 15 reflect the proportions of missing values artificially introduced.

The FAPAR data records naturally include data gaps, due to intermittent cloudiness, for instance. In this case, no additional data decimation was required.

Please find the final version of our paper attached with all comments included.

Yours Sincerely,

Jan Musial

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/11/C6832/2011/acpd-11-C6832-2011-supplement.pdf

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 14259, 2011.

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