**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Weekly cycles in precipitation in a polluted region of Europe" *by* C. W. Stjern

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Review of "Weekly cycles in precipitation in a polluted region in Europe" By C.J. Stjern

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General

This paper is of potential interest to ACP. It contributes to the discussion on weekly cycles in meteorological variables. The main interesting point is that the authors focus on a region where one could a priori probably expect a larger impact on weekly cycles. The authors perform a statistically more sound analysis of the data, as compared with many other studies in this area of research. Limitations of the paper are that, if a weak weekly cycle would be present, it will be more difficult to find a significant cycle

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because not so many stations are involved. I also think that further statistical analyses could even support this study more. Altogether, I think that the study can be published after moderate revisions.

Main comments

Title. Not only precipitation, but also other meteorological variables were analyzed. I suggest to modify the title.

Page 1779, Line 25-29. A more robust test than the ones performed by Barmet et al. (2009) is Monte Cralo bootstrapping, which was used for analysis in Hendricks Franssen (2008), Laux and Kunstmann (2008) and Hendricks Franssen et al. (2009). It would be good if that method would also be applied on your dataset.

Page 1780, Line 18. Is this not too little? Could there be an event-specific missing of data? I believe, the authors should further comment this.

Page 1780, Line 21-26. It is not so clear here which is the temporal support of the data you analyzed: daily data or 12h data?

Page 1781, Line 8. Please clarify what is a 31-day running mean. According to a moving window around the specific day?

Page 1781, Line 16-21. This provides a better, but not yet definitive test.

Page 1781, Line 22-24. How is the significance of spectral peaks tested? Is it only a visual inspection?

Page 1781, Line 16-26. It is very good that the data have been analyzed according these various methods. Nevertheless, I believe that Monte Carlo bootstrapping would provide more definitive, robust and firm conclusions.

Page 1783, Line 9. It is a bit surprising that the 7-day periodicity does not show up on the periodogram.

Page 1784, Line 6-9. Both papers were questioned by other papers, because of neglecting correlation amongst stations in the analysis. Therefore the conclusions from these papers have to be taken with care.

Page 1784, Line 19. What was the level of significance in the testing?

Page 1784, Line 22. If the significance level is 95% one would already expect 1.5 significant cycles in precipitation amount just by chance.

Page 1785, Line 20. Is this true? I saw studies with maximum precipitation in Central Europe on Saturdays. Could you be more specific here?

Page 1786, Line 27-29. Indeed, there is still a possibility that it is significant by chance, also because you analyze different seasons, and it becomes more likely that by chance a cycle is "significant". Also here further analyses with Monte-Carlo bootstrapping methods (also given the different test results here) could give maybe more insight.

Page 1801, Fig. 9. Spatial autocorrelation plays an important role here. The data are not independent and the stations in the East are expected to have more similar values among them, just because of spatial autocorrelatoion, and the same holds for the stations in the west. As a consequence, the effective sample is smaller than suggested by the graph and the uncertainty of the regression would be much larger if the spatial autocorrelation would be taken into account. I think that this analysis/Figure should be skipped or the analysis should be repeated taken into account spatial autocorrelation.

Minor comments

Page 1784, Line 15. "and" instead of "although"

Page 1787, Line 9. "week" instead of "weak".

Page 1795, Figure 3. Maybe it is better to write "clean" and not clean, or relax in the caption that "clean period" means only relatively clean.

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