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Interactive comment on "Assessment of impacts of climate change on water resources – a case study of the Great Lakes of North America" *by* E. McBean and H. Motiee

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The analysis of the behaviours of climatic variables is an important issue today, especially when trying to detect the presence of climate change. The literature about this subject counts a lot of contributions. Unfortunately the results are not always clearly presented.

In some cases the distinction between presence and absence of trend is very dubious and therefore it is extremely important to introduce proper statistical assumptions that should be thoroughly verified.

The referees of this paper pointed out very important remarks that are all to be taken into account when revising the manuscript. The issue of uncertainty is particularly delicate and important.

I would like to add a personal observation. I believe the paper should explain in detail how the statistical significance of the slope of the regression lines was evaluated. Was the correlation in the analysed records taken into account? It is well known that in the presence of correlation the confidence limits of the slope of the regression line may widen significantly. Therefore, a slope that is statistically significant under the hypothesis of uncorrelated data may become not significantly different from zero if correlation is properly taken into account. The widening of the confidence bands is enormous in the presence of long memory (see, for instance, Beran (1994)). An example where long memory is taken into account in a similar analysis is shown by Montanari et al. (1996). I think a discussion about this issue would provide a significant additional value to this paper. The topic is indeed interesting and I think it deserves to be treated with detail.

Overall, I believe the paper is good and worth refining by addressing all the referees' remarks.

References

Beran,J., Statistics for long-memory processes, Chapman & Hall, New York, 1994.

Montanari, A., R. Rosso, and M.S. Taqqu, Some long-run properties of rainfall records in Italy, J. Geophys. Res., 101(D23),431-438, 1996.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 3, 3183, 2006.