Manuscript: Change detection in the Great Lakes Hydro-climatic variables
Part III: A complementary data analysis

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Name of Reviewer: Barrie Bonsal

1. Are the objectives of the work clearly stated? **5**
   - Yes.

2. Are the methods employed valid, appropriate and sufficient to address the questions, hypotheses or the problem? **5**
   - The statistical methods used in the analyses are appropriate and used correctly.

3. Are the observations, conclusions and recommendations supported by the material presented in the manuscript (e.g., data, model and analyses)? **3**
   - There is a lack of interpretation in the majority of the results. Details are provided in General Comments below.

4. Are the assumptions used valid and are the mathematics presented correct? **5**
   - Yes.

5. Is the manuscript well organized, material precise and to the point, and clearly written using correct grammar and syntax? **4**
   - For the most part the manuscript is well written. A few suggestions/corrections are provided in Specific Comments below.

6. Are all of the figures and tables useful, clear, and necessary? **5**
   - Yes.

7. What is the quality of the overall work? **4**

Recommendation

B - acceptable with minor suggestions for revision as provided below**.**

Rating
 80

Signature: Barrie Bonsal   Date: May 26, 2009

Comments for Transmission to Authors

General Comments:

The report incorporates new Great Lakes' data to investigate trends and abrupt changes in statistical characteristics during the observed period of record. The report is well written, uses acceptable methodologies, and has added valuable information regarding historical trends/shifts in hydrologic variables regarding the Great Lakes. One concern, however, involves the interpretation of some of the results particularly, with respect to the change point findings. This information will likely be presented and expanded upon in future synthesis reports but I feel that some discussion could be included in this report. Issues that should be addressed include:

1. Do the identified shifts that are common to most of the time series (e.g, 1923-24, 1969, 1988-89) relate to similar shifts in major circulation patterns (i.e., ENSO, PDO, etc.)?

2. Do the different record lengths for the various time series impact the interpretation of the results (both in trends and change point detection)?

3. How do you interpret the monthly trend results versus the annual results (e.g., Table 11, 12, 13)? Is this consistent with observed climate trends and variability during the observed period of record (e.g., winter warming)? Similar comment for Tables 20-22.

Specific Comments:

1. Page 3, Part c of the four main steps: The segmented data (following the change point analysis) often contains relatively short periods (e.g., Tables 18 to 22). Is it meaningful to calculate trends on such short data intervals or is this just inter-decadal variability? Interpretations of these trend changes should be provided.

2. Page 4, lines 3-4: What is meant by the term 'special cases'?

3. Page 17, line 7: 'draughts' should be 'droughts'.

4. Page 19, Table 7 (and also Tables 8, 9, and 10): It might be a good idea to include the time periods for each variable. I realize that these are provided in previous tables, however, it would make the table more effective if the reader could see the various time periods used in the trend analysis.

5. Page 22, line 3: Should be 'data have'.

6. Page 41, lines 3-8. It is not entirely clear why 1972 was chosen when it appears that the majority of the analyses identified 1969 as a common change-point year. In addition, what about the other abrupt changes in the 1920s and late 1980s for example?

7. Page 44, second paragraph: Are the change points in 1965, 1975 and 1980 shown somewhere or am I missing something?

8. Page 47, line 6: I don't understand how the conclusion that 'a general change in trends has occurred in the second half of the 1980s' was reached (i.e., given the fact that the change point in 1975 and 1980 are quite similar). Please elaborate.

9. Tables 23 to 26: Significant values should be bolded.