Re-Review of "Examining controls on peak annual streamflow and floods in the Fraser River Basin of British Columbia"

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Summary: This revised manuscript remains a highly interesting and suitable article for possible publication in *Hydrology and Earth System Sciences*. The structure of the paper has been improved, the text is clear, and the figures depict key points discussed in the paper. Nevertheless, there remain some issues in regards to the inclusion of methods in the results section that need to be addressed before final publication of the article. This report therefore provides guidance for a few additional minor revisions that the authors should consider in preparing the final version of their manuscript.

The authors should note that it was difficult to follow the responses given that the three reviewers' original comments were not provided in the document. For future publications, the authors need to provide both the original comments and their responses in similar documents.

General Comments:

1) While the study focuses on the main stem Fraser River at Hope, BC that has an extended streamflow record, additional analyses are performed for four of its principal sub-watersheds (upper Fraser, Quesnel, Thompson and Chilko Rivers; see Table 1). These capture ~70% of the annual streamflow observed on the Fraser River's main stem at Hope, a statement reported in the abstract (p. 1, lines 20-21). Yet, no clear justification of the selection of these four additional sites is provided in Section 2.1, while other major tributaries to the Fraser are excluded in the present study? As stated in my previous report, the Nechako (Stuart/Nautley), Blackwater (West Road) and Chilcotin Rivers all form important tributaries to the Fraser River with generally complete observational records from the early 1950s onward (early 1970s for the Chilcotin River) and could provide further regional insights on the contributions of these systems to the APFs observed on the Fraser River at Hope.
2) Further to this, observed streamflow data for the Quesnel, Thompson and Chilko Rivers could easily be updated to 2014 to match the period of record for the Fraser River at Hope and at Shelley, BC.
3) Unfortunately, issues remain with the structure of the revised paper. Specifically, some of the methods used in the analyses are provided in the Results section, or are missing entirely from the Data/Methods section. Section 3.1 presents results of trend analyses on the input variables used in the VIC simulations, but nowhere in Section 2 are the methods for trend analyses discussed. Are trends inferred from linear regressions, the Mann-Kendall test, or another approach?

Section 3.3.3 focused on daily rainfall describes a method to deseasonalize the data, which also belongs in the Data and Methods section. Similarly, Section 3.4 that compare observed versus simulated streamflow and SWE is not well described previously in the Data and Methods section (e.g. the permutation test). Thus the authors need to revisit the entire paper and possibly undertake further restructuring to ensure methodological approaches are not introduced the Results section.

4) Some of the references are not in the appropriate journal format and/or lack important information such as range of pages/article numbers. In addition, some of the article titles are provided all in upper case letters, which is not required for HESS. The list of references must be carefully reviewed to ensure it matches the content and format requirements of the journal. Some specific issues are highlighted below.
5) Errors of up to ±12% arise in measurements of streamflow during high flow conditions (e.g., Shiklomanov et al., 2006). How would such uncertainty affect the comparison between annual peak flows (APFs) observed in the FRB versus that simulated by the VIC model? At the very least, the authors should acknowledge that there are also possible errors in the observational record that could influence direct comparisons with simulated streamflow data.

Specific Comments:

1) P. 1, line 14 and elsewhere throughout the paper: The journal may request the format for dates be changed to "1 April".
2) P. 2, line 14: Delete "in order".
3) P. 2, line 16: Consider another term than the colloquial "home".
4) P. 3, lines 2-3: Please note that Padilla et al. (2015) provide the climatological month of peak flows at 141 gauging stations across the FRB that corroborates this statement.
5) P. 4, line 24: Replace "8" with "eight".
6) P. 4, line 26: Insert the years of publication for these references.
7) P. 5, line 20: Replace "8" with "eight".
8) P. 5, line 21: Replace "Center" with "Centre".
9) P. 6, line 7: Use upper case letter in naming the Variable Infiltration Capacity (VIC) model.
10) P. 6, line 31: Delete "In order".
11) P. 8, line 4: Equations may need to be numbered in the paper.
12) P. 12, line 7: Rephrase this sentence so that it begins "Three of the five…" and then insert in parentheses "(Fig. 4) at the end of the sentence.
13) P. 12, line 8: Replace "2" with "two".
14) P. 13, line 32: Replace the colloquial term "job".
15) P. 14, line 8: Insert a space between values and units (i.e. "2200 m").
16) P. 15, line 4: Spearman's rho is now in bold lettering while it was not in previous uses.

17) P. 15, line 7: Consider rephrasing this sentence given the repetition of words here ("found" and "find").
18) P. 15, line 23: Change to "three weeks".
19) P. 17, lines 27-28: Is the different response of the Chilko owing to its glacier melt dominated regime or its location on the eastern flanks and in the rain shadow of the Coast Mountains?
20) P. 18, line 3: Consider deleting "Moving now to the MLR analysis".
21) P. 18, line 8: Colloquial language again with "are at the heart".
22) P. 18, line 26: Should the delta term be deleted in "$\Delta dT/dt$"?
23) P. 18, line 31: Replace "is still" with "remains".
24) P. 20, line 26: "large" is used twice here, consider using "heavy snowpack" instead.
25) P. 21, line 1: The degree symbol is missing with the units of Celsius.
26) P. 21, line 8: Insert "to" before "its smoother".
27) P. 21, line 29: I doubt the area near Chilliwack, BC was "densely populated" 1894.
28) P. 22, line 6: Use superscripts only for units (i.e. "m^3 s^{-1}").
29) P. 22, line 32: Change to "seven of the top ten".
30) P. 25, line 21: Provide the article number for this reference.
31) P. 25, line 25: Has this paper now been published in the regular section of HESS?
32) P. 28, line 11: Insert the article number for this reference.
33) P. 28, line 14: This should be "Milly, P. C. D."
34) P. 28, line 26: Add the year of publication for this reference.
35) P. 29, line 10: The range of pages for this article is 588-592.
36) P. 32, Table 1: Why are the Upper Fraser, Quesnel, Thompson and Chilko Rivers selected as subbasins for this study? Why does the period of record end in 2013 for three of these rivers?
37) P. 33, Table 3: The methods used for trend analysis must be described in Section 2 with other methods.

References:

Padilla, A., Rasouli, K., and Déry, S. J.: Impacts of variability and trends in monthly runoff and water temperature on salmon migration in the Fraser River Basin, Canada, Hydrological Sciences Journal, 60, 523-533, doi:10.1080/02626667.2014.892602, 2015.

Shiklomanov, A. I., Yakovleva, T. J., Lammers, R. B., Karasev, I. P., Vörösmarty, C. J., and Linder, E.: Cold region river discharge uncertainty – estimates from large Russian rivers, J. Hydrol., 326, 231–256, 2006.