

Interactive comment on “Variability in stream discharge and temperatures during ecologically sensitive time periods: a preliminary assessment of the implications for Atlantic salmon” by D. Tetzlaff et al.

D. Tetzlaff et al.

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General comments

We are pleased that the reviewer recognises the unique nature of the data sets that we analyse and states that the paper can make a “very useful contribution to the literature”. We agree that - as originally worded - the introduction gave a misleading impression that the paper would consider issues of data resolution in more detail. We also agree that the analysis of hydroecological associations (e.g. via analysis of CDVs) is the more important aspect of the paper and we have re-emphasised this in the introduction and abstract (as noted above in response to reviewer 1). The reviewer highlights the confusing overlapping of the “Study site” and “Data and methods” sections in the original

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manuscript, we have thus re-arranged these sections so that they are more consistent. Finally, we have restructured the discussion so the results of this study are discussed in a manner more directly linked to previous work.

Specific comments:

Introduction 1. Text is more precise. Objectives are now clearer. 2. Please see revised manuscript. 3. The text has been modified. 4. The text has been modified (paragraph now before Scottish Highland section). 5./6. Text has been modified. 7. Text has been modified and uniqueness of this data set more emphasised. 8. Text has been modified.

Study site 9. Text has been modified. More clear separation between study site description and later methodology section has been achieved. 10. Text is modified and rationale for time periods is now given in the methods section. We are surprised that the reviewer does not seem to see that these periods are plotted onto the flow and temperature accumulation curves (Fig. 5 and 7). This implicitly captures the long-term average in a clearer way than spikey daily mean plots would.

Data and Methods 11. As it is explained in the revised paper and the responses to Reviewer #1, it was not our intention to provide such nested analyses, nor give such emphasis of data resolution. Regarding longer term data, there are, for some periods concerns regarding data quality, particularly in relation to flows. Thus we focussed on the long-term period with highest quality environmental data. 12. Much clearer explanation of methodology is now given. In addition, the CDV approach is already reported in the introduction. 13./14. Text has been modified. 15. The incorrectly expressed text of the methodology of gap filling is now modified as noted above. The authors meant that they developed air-stream temperature relationship on an hourly basis, but separately for each month over the time period of ten years. 16. As explained in the text, the degree days approach is a widely used approach in ecological literature to express relationships between cumulative temperature and ecological processes. It was used as additional indicator instead of using it “over hourly observations”. 17. This

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is now explained in the biology section. For more details please see details in reference given (Tetzlaff et al., in press). Please see also point 19, referee#1. 18. Objectives are more clearer.

Results 19. The authors think that flow duration curves are conventionally used in hydrological publications to show intra- and inter annual variability. Due to the fact that the velocity time series is derived from discharge time series Figure 8 shows more a hydrograph form and can be used as additional explanation of variability. After suggestions of all three referees, Figure 8 shows now daily mean stream velocities. 20. Text was modified. 21. Commonly used statistical values to characterise hydrological conditions and allow comparisons between years and periods. 22. Text was modified. 23. Text is more clearer. 24. Explained more precisely. 25. Text was modified (already in earlier para, point 22). 26. Text has been modified.

Discussion 27. The text has been modified in relation to responses to the comments of reviewer 2. 28. This threshold was a result of plotting discharge against returning spawners. The result was that below $0.3 \text{ m}^3 \text{ s}^{-1}$ no returning spawners were found at the fish trap. 29./30. The discussion is restructured to provide paper emphasis.

Figures 31. Figure has been changed 32. Caption has been changed 33. In hydrology, this is a common approach to cumulate discharge volumes under consideration of catchment size and time resolution (unit mm instead $\text{m}^3 \text{ s}^{-1}$).

Tables: 34. Please see modified methodology section.

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