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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Riparian forest as a management tool for moderating future thermal conditions of lowland temperate streams" *by* P. B. Kristensen et al.

Anonymous Referee #1

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1. GENERAL COMMENTS

In their manuscript, authors characterized the longitudinal temperature pattern for streams flowing from open to forested riparian conditions. This study makes an incremental contribution by precisely quantifying the longitudinal cooling rate in forested reaches of lowland streams. Overall, the manuscript requires moderate revisions, mainly to address questions regarding the resolution considered for the sensors and to provide more context on hydrological conditions during the study.

2. SPECIFIC COMMENTS

2.1 The sentence "Availability of incoming solar energy in summer under clear-sky-conditions may be more than 90% in an unshaded stream" (p.6084) is not clear. What does availability of incoming solar energy refer to?

2.2 Authors should reconsider or better justify the resolution they have considered for water temperature sensors.

In their specification of the water temperature sensors, the manufacturer specifies a resolution of 0.14 °C. Authors need to better justify their 0.14 °C (2 x 0.07 °C) criteria in determining significant between-logger temperature differences. As such, bias was only evaluated for a subset of sensors and certain sensors could have a bias closer to that estimated by the manufacturer. Authors reported an average between-logger difference of $\pm$0.07 °C, but what was the maximum between-logger difference observed? Given the importance of the bias estimation in the interpretation of results, authors should provide a better justification for using a smaller bias than the one defined by the manufacturer.

Furthermore, were water temperature sensors protected from direct solar radiation when deployed in streams? PVC tubes or neoprene flaps have typically been used to avoid solar radiation warming up the sensor itself. This aspect should also be considered when assessing the between-logger bias.

2.3 Discharge and width-to-depth are treated as variables relatively constant throughout the study period. While this assumption holds for other physical characteristics studied, discharge, and as such water depth, tend to vary through time. Readers (such as me) are not necessarily familiar with the flow regime in Danish streams. Authors refer to a "relatively stable flow regime" (p.6085), does that mean that discharge was relatively constant from July to September? Only mean discharge values were provided but hydrographs for the study period would help evaluate variation in discharge during the study period.

If important variation in discharge occurred during the study period (e.g. due to precip-

itation events), than more information on water depth measurements is required.

a)If point measurements of water depth were made, then authors should consider if water depth measurements were made under flow conditions representative of the summer. Differences in width-to-depth ratio from one site to another could also be due to differences in flow conditions at the time of measurements. For example, if measurements were taken at base flow vs. in the rising or descending limb of the hydrograph, the width-to-depth ratio will not necessarily be comparable between different streams.

b)When performing the linear regression between July water temperature change in forest and width-to-depth ratio (Figure 2), authors should specify if only July water depth measurements were considered.

2.4 Results from the multiple linear regression should be included in the Results section. Results should at least include regression coefficients although a 2D graph could help visualize how canopy closure and width-to-depth ratio interact and influence water temperature. A measure of the proportion of variance explained by the regression should also be included. A similar measure (R^2) should also be added to linear regressions presented in Figure 2.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 6081, 2013.