

## **Response to comments of Anonymous Referee #2**

We would like to thank the referee for the thoughtful comments and suggestions. The follows are our response in regard to the comments and suggestions.

### **Comments to the Authors:**

1. In section 2 “Description of the problem”, the problem is not clearly defined. The author should clearly state the specific problem that they will address in this study.

#### **Reply**

As suggested, we have stated the problem we concern in this work in line 3 on page 2481 in section 2 as

“The problem of interest here is that of stream flow response to the temporal changes in lateral inflow rate, which is governed by Eq. (2). The solution to Eq. (2) with associated initial and boundary conditions will serve as the starting point for conducting the following investigation of stream flow variability.”

2. Page 2488 Line 12-13 “the increase of discharge variability with the temporal correlation scale at a fixed time agrees with common physical intuition” It is better to expand this statement a little bit. For example, what is the common physical intuition here?

#### **Reply**

Thanks for the comment. We have rewritten those sentences in lines 12-16 on page 2488 as:

“The correlation scale provides a measure of the strength of the persistence of fluctuations around the mean. It is anticipated that the stochastic processes will exhibit rather clear trends with relatively little noise (a smoother data profile) if the correlation scale is larger. In other words, the temporal fluctuations in inflow rate are either consistently above or below the mean inflow rate surface in the case of a larger temporal correlation scale. Those larger inclusions lead in turn to larger deviations of flow discharge from the initial uniform steady-state flow discharge.”

3. Compare to the analytical solution and closed-form expressions that the author proposed in this study, is there any other analytical solution of Eq. (2) or any other

ways to quantify the uncertainty of flow discharge? If yes, the authors should make a comparison among them to highlight the advantages of the proposed method in this paper.

**Reply**

To our knowledge, this is the first article in the literature to deal with the application of non-stationary spectral techniques in quantifying stream flow variability induced by the temporal variability of lateral inflow. We add the following sentences in the last paragraph of the Introduction to note that

“To the best of our knowledge, the issue on quantifying the effect of temporal variation of lateral inflow on the stream flow variability using non-stationary spectral techniques so far has not been addressed. It is hoped that the proposed approach and our findings obtained in this study will be useful for further research in this area.”

**Typing errors:**

1. Page 2481 Line 10: “it apparent from. ....” should be “it is apparent from”.

**Reply**

Thanks, the typo has been corrected.

2. Figure 1: the label “a” and “b” are missing.

**Reply**

The label “a” and “b” has been placed in Figure1.