

Based on my review, I recommend that this manuscript be declined in its current form, with an encouragement to resubmit after substantial revision. This recommendation is not based on the scientific merit of the work, which addresses an important topic and presents valuable experimental data, but rather on the need for significant restructuring of the presentation.

The manuscript would benefit from improved organization and flow, as the current structure sometimes creates disconnections between related ideas across paragraphs. Additionally, the separation between results and their interpretation could be clearer, and the discussion section needs substantial development.

The detailed comments below highlight specific instances where improvements are needed, though they should not be considered exhaustive. I encourage the authors to use these comments as guidance for a comprehensive revision. A resubmission that addresses these structural issues would make a valuable contribution to the field

Line 22: Consider revising the term "correlation trends." The figures present scatter plots showing relationships between dimensionless or dimensional variables. To strengthen the analysis, statistical measures (such as correlation coefficients) would be valuable additions to quantify these relationships.

Line 28: Consider strengthening the connection between "This paper is focused..." and the previous discussion of time-scales to improve the logical flow of ideas.

Line 30: Consider reviewing sentence structure throughout the manuscript. The current use of commas occasionally interrupts the natural flow of ideas.

Line 31: The discussion of hazards would be more impactful with specific examples, helping readers better understand the practical implications of this research.

Line 32: Consider expanding the statement "Sediment aggradation has been studied in the past for both the effects of pulsed sediment supply and the formation of depositional fronts" by including key findings from these studies, similar to the effective approach used in Line 39 regarding translational front and dispersive processes.

Line 36: Since celerity is a central concept in this work, consider providing its definition early in the text to establish a clear foundation for readers.

Line 49: The statement "as most (if not all) prior investigations" would be strengthened by citing specific references to support this claim.

Line 51: Consider using consistent terminology throughout the manuscript (e.g., replacing "for example" with "e.g." for consistency).

Line 57: Consider integrating the important explanation "that is the ratio of sediment discharge to the water-sediment mixture discharge" into the main text rather than using parentheses. This would improve readability and emphasize this significant information.

Line 59: Consider introducing the role of sediment concentration with more context, as this is a key parameter that would benefit from a clearer introduction.

Line 60: The use of "However" suggests a contrast - consider clarifying what is being contrasted to strengthen the logical flow.

Line 69: The phrase "something different" could be more specific - consider indicating whether this refers to a different equation, method, or approach.

Line 71: Consider rephrasing "determined as just mentioned" to provide clearer reference to the specific method being discussed.

Line 73: The three research questions presented provide a valuable framework. Consider strengthening how questions 1 and 2 are addressed in the text, as question 3 is well explained but the others would benefit from more explicit answers.

Line 90: Consider integrating parenthetical information into the main text throughout the manuscript. For example, the statement about volumetric concentration could be restructured to maintain better flow while preserving the important reference to Armanini et al. (2009).

Line 104, eq2: A minor technical correction: consider removing the "x" for clarity.

Line 208: The validation statement would be strengthened by providing references and additional details about the validation process.

Line 217: Consider enhancing the experimental description by including key parameters (flow velocity, Froude number, Reynolds number) early in the text. While these are discussed later, providing initial values would help readers better understand the flow regime.

Line 219: Consider focusing figure descriptions on the interpretation of results rather than describing the axes. This would help readers better understand the significance of the findings.

Line 224: The term "relatively high flow velocity" would be more informative with specific values provided.

Line 223: Consider replacing subjective terms like "evident" with more specific descriptions of the observations.

Line 283: Consider replacing subjective phrases like "obviously provides a nicer plot" with more objective descriptions of how the smoothing operation benefits the analysis.

Line 284: The Results section would be strengthened by focusing on specific observations rather than using terms like "evidently." Consider guiding readers through the interpretation with clear, objective descriptions.

Line 283 and 318: Consider incorporating the parenthetical information into the main text, as these details are important for understanding the analysis.

Figure 8: Consider revising the terminology from "correlation" to "scatter plot" to better reflect the analysis presented. To strengthen the relationship analysis, statistical measures (such as Pearson's  $r$  or Spearman's  $\rho$ ) could be added. This would allow for quantification of the observed relationships.

Line 324: The reference to "typical curves shown in mathematical studies" would be more helpful with specific examples or references provided.

Figures 9 and 10: Consider revising these figures to:

- Use consistent terminology (scatter plot rather than correlation)
- Maintain consistent axis scales where appropriate for comparison
- Clarify that the data points, rather than graphs, are obtained from the analysis

Line 340: Consider expanding the Discussion section to move beyond restating results, perhaps including broader implications and connections to other studies.

Lines 344 and 353: Consider replacing terms like "obviously" and "evidently" with specific explanations of the observations and their significance.

Line 355: Consider integrating the parenthetical phrase "(positive and thus)" into the main text to improve readability and clarity.