

## ***Interactive comment on “Technical Note: Monitoring of unsteady open channel flows using continuous slope-area method” by Kyutae Lee et al.***

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The paper “Technical Note: Monitoring of unsteady open channel flows using continuous slope-area method” by Lee et al. seeks to adopt the use of low-cost pressure transducers to better understand the role of hysteresis in open channel flows. In its current form, the article is difficult to follow. Therefore considerable changes are required before publication can be recommended. The concept of applying the continuous slope-area method is poorly defined and described in the introduction, as is the utility of this concept. Under what conditions would applying this method be beneficial? This is the fundamental part of the manuscript so a clear explanation is required. For a Technical Note, there is a lack of detail in the Methods section. A clearly presented

C1

Data Treatment section is required wherein the equations/calculations are presented. A conceptual diagram would also be beneficial to illustrate how the method is constructed and applied. A more thorough presentation of results is required, rather than simply directing the reader to the Figures.

The data used to drive the CSA method appears to be based on flow measurement, I assume collected following the development of a stage-discharge relation(?) at the USGS Clear Creek monitoring station (no information or data presented). Does this rating adequately capture both rising and falling limbs of the hydrograph? Some sensitivity analysis and discussion of this approach is required.

Specific Comments:

Page 2 Line 12 – 13: Reference required.

Page 2 Line 16: The acronym ‘CSA’ (first used on page 2 Line 16) is not defined in the main body of text. This could relate to the conventional, or continuous slope area method.

Page 2 Lines 16 – 20: Strange presentation of other research. Simply stating Steward et al (2012) following their findings would suffice. No need for information about USGS/Arizona.

Page 2 Line 23: “Steep” – be specific.

Page 2 Line 24: Replace “a.k.a” with i.e.

Page 2 Line 27: “They” – who is they? If it is the series of works referenced above then their findings should be placed prior to the reference.

Page 3 Line 1: What is a “proper” reach?

Page 3 Lines 8 – 16: Useful justification for site selection. However you do not state how your chosen site meets these criteria. This information could be presented in a table.

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Page 3 Lines 21 – 23: This information relating to bed slopes of sites used in other works is better suited to the introduction rather than a methods section.

Page 3 Lines 28: Assume that the Q data utilized in this research is in the form of a rating curve? This should be presented and actual method described.

Page 3 Line 29: “Cross-sectional information” is vague. Be specific.

Page 4 Lines 27 – 28: Any discussion provided by Smith et al (2010), or Stewart et al (2012) whereby the redundancy of their systems is discussed in order to back-up your use of only two sensors?

Page 4 Line 29: What pressure transducers were used? What is the associated precision and accuracy?

Page 5 Line 16: Be specific – How exactly does it compare?

Page 5 Line 19 – 20: Strangely formed sentence.

Page 5 Line 19 – 20: This is the first mention of the Fread method. How does this fit in with the experimental aims? A lack of detail is provided. If the modified Fread method is to be used then details need to be provided as the cited publication is not currently published.

Page 5 Lines 22 – 23: Small to mid-size is subjective. Catchment sizes should be given. The contributing area of Clear Creek should also be presented.

Page 5 Lines 25 – 26: Would be good to see these events placed within the context of the hydrological regime e.g. recurrence intervals.

Page 6 Lines 2 – 3: Axis information should be placed within the Figure caption.

Page 6 Lines 7 – 14: This detail, although interesting, is not related to the results. Indeed, you do not observe clockwise hysteresis so why comment on the processes driving its occurrence?

### C3

Page 6 Line 16: Use of “strong” is a subjective term – be specific.

Page 6 Line 22: Use of “very high” is a subjective term – be specific.

Page 6 Line 22: Changes in the cross-section should be presented.

Page 6 Line 25: “Sometimes not impossible” - double negative.

Page 6 Lines 26 – 27: Evidence of no major floods is provided. A Figure showing a hydrograph spanning the entire monitoring period would help place the three analysed events within the hydrological context.

Page 6 Line 30 – “Large differences” – be specific.

Page 7 Lines 30 – 32: Weak end to the conclusion. The final sentence should be more profound than being about time synchronization issues.

Figures:

General point: Appearance of all the figures and detail in the captions should be improved prior to publication.

Fig 1: A regional map as an inset would be useful to provide context. Credit to background image should be provided if appropriate.

Fig 2: Difficult to see details but at the peak stage, it looks like the steady non-uniform slope values are less than the rising and falling stage slope.

Fig 4: No useful information provided in the caption. Needs a better description.

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