Earth Surf. Dynam. Discuss.,
https://doi.org/10.5194/esurf-2020-25-RC2, 2020

Earth Surface Dynamics Discussions
Open Access
EGU

Interactive comment on "A bed load transport equation based on the spatial distribution of shear stress – Oak Creek revisit" *by* Angel Monsalve et al.

Allison Pfeiffer (Referee)

pfeiffa@wwu.edu

Received and published: 18 June 2020

This paper presents a new approach for predicting river bed load flux, calculating transport rate as a function of the distribution of local shear stress throughout the reach rather than a single reach-averaged shear stress. The authors argue that this new approach is better suited to representing transport at low flow because some portions of the bed remain mobile even when the reach averaged calculations would suggest otherwise.

This paper is exceptionally well written. I found it easy to read and digestâĂŤespecially impressive given that it's a sediment transport paper! I particularly appreciate the au-

Printer-friendly version

Discussion paper

thors approach to representing shear stress within a reach using gamma distributions that change systematically with flow.

While this paper could be published as is, I recommend a few minor edits and additions for completeness:

A. I would have assumed that local τ^* should be calculated using both the local shear stress AND the local grain size. Surface grain size varies substantially throughout a pool-riffle reach, and I might assume that subsurface grain size would as well. The authors should address this point in the text.

B. The authors don't address the fact that their approach has been applied to only one reach of river. Isn't it possible that another channel would be far less conducive to this approach? (e.g. complicated channel geometry could prevent the use of the gamma distribution technique). I think this can be addressed by adding a few caveat sentences to the end of the paper.

C. The choice of a subsurface (rather than surface) relation seems odd, given the goal of calculating sediment transport for lower flows. Shouldn't a surface relation be inherently better at representing low flow transport? I agree that Parker 1990 is convoluted to implement, but this distinction between a surface and sub-surface relation should be more directly addressed.

Line Notes:

Ln 45- I would replace "measuring" with "predicting"

Figure 3 – While not necessary, it would be nice to see the gamma distribution curves overlain on the histograms.

Figures 4, 8, 9 – Remove boxes around individual sub-plots.

Interactive comment on Earth Surf. Dynam. Discuss., https://doi.org/10.5194/esurf-2020-25, 2020.