

Earth Surf. Dynam. Discuss., referee comment RC1
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Comment on esurf-2022-2

Helen Beeson (Referee)

Referee comment on "Continuous measurements of valley floor width in mountainous landscapes" by Fiona J. Clubb et al., Earth Surf. Dynam. Discuss.,
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This manuscript presents a new tool for automated extraction of valley width that is a contribution to an open-source toolbox for topographic analysis – LSDTopoTools. They test the tool via comparison with geological maps in three river basins with varying conditions, then apply the tool to numerous small subbasins as well as continental-scale rivers in the Appalachian Plateau to investigate the relationships between valley width and drainage area across a tectonically stable region where disturbances to this relationship should be minimal.

In the automated tool, a valley mask is first defined by user input slope and elevation thresholds. Then, a centerline is computed and widths are continuously measured orthogonal to this centerline. For three river systems, they compare automated width measurements between 1) valleys defined using slope and elevation thresholds and 2) valleys defined by previously mapped alluvium, terraces, and glacial deposits. They find good agreement between the two methods and in cases where the automated valley-defining algorithm is off, they provide good evidence that the automated method actually better reflects the true valley floor. Furthermore, the measurements from the Appalachian Plateau show power law exponents that are in line with previously published values.

This is a really useful, well-tested tool that will greatly facilitate research on bedrock valley widths, from tectonic geomorphology to ecological implications. I sure wish I had it during my masters research! The manuscript is clear, organized, well-written and has beautiful, clear figures.

Line/figure comments:

393 or explore what drives the variability in valley width! Can't help noticing the order of magnitude variability in width over miniscule changes in drainage area (fig 12)!

Fig 7: probably should add the note about line colors and rolling averages you have in the other figure captions in case someone jumps to this figure.