

Earth Surf. Dynam. Discuss., referee comment RC2
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Comment on esurf-2021-39

Anonymous Referee #2

Referee comment on "Sand mining far outpaces natural supply in a large alluvial river" by Christopher R. Hackney et al., Earth Surf. Dynam. Discuss.,
<https://doi.org/10.5194/esurf-2021-39-RC2>, 2021

This paper quantifies sand extraction from the lower Mekong River using remote sensing. The authors document the number and dimensions of sand mining vessels from PlanetScope and Google Earth images respectively. Based on sand mining vessel dimension and number, the authors estimate the volume of sand extracted each month from 2016–2020. The extraction rate is compared to the total sand transport estimated from previous studies, and it is determined that the extraction far exceeds transport. As a consequence, the LMR bed is scouring. The authors demonstrate that the deepest scours of the channel bed correspond to the most active areas of mining, and therefore conclude that the primary cause of these bathymetric lows is driven by sand mining. This paper offers a simple method to estimate sand mining in the world's large rivers. The content is timely, as the industrial demand for sand continuously increases.

Comments:

The authors nicely demonstrate a correlation between intense sand mining and localized channel bed scour (e.g., Figure 7). It would be helpful if the authors made an explicit connection between these highly localized observations and the broader impacts of sand mining outlined in the introduction (L48–51). Do the scour locations here correspond to enhanced bank erosion or other morphological responses?

It would be helpful for the authors to explicitly state why Planet data are used to estimate the number of mining vessels and aerial images from Google Earth are used to get dimension. Why not use the daily images on Planet to estimate dimension? Presumably this is due to resolution, but the resolution of the Google Earth images is not stated.

Are the scours filled at all during low mining times?

Line Edits:

L12: remove "and". "...sand extraction are 50 Mt based on estimates from 2013."

L21: specify if this incision is localized or widespread.

L108: Please provide more information about the aerial images. How many images were used? What dates do the images span? Resolution?

L120: Is it assumed that mining vessels are active 7 days a week?

L127: Be consistent when reporting ranges (e.g., L127 "2016 – 2020" vs. L59 "2016–2020")

155: Be consistent reporting negative values. Sometimes a space is included, sometimes not (e.g., L157 "- 0.6 m" vs. L21 "-0.26 m")

L193: "negate the negative" – Improve word choice

L187–188: Please clarify this sentence. What is meant by "basin sand supply"? Sand supply to the basin?

L216: Should read "saw mining operations begin in 2017" rather than "saw mining operations began in 2017"

L228: "Attendant"? Word choice

283: Label the apex on Figure 1

Figure 1 caption: It's not clear what the author means by "basin country."

Figure 3 caption: State why water level is important here. (High water levels correspond to low vessel traffic).

Figure 4: Please state the source of data for the natural sediment supply at Kratie. Also, please choose a color-blind friendly palette.

Figure 7 L453: The word "change" is missing. The median rate of bed elevation...(insert change)