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Comment on esurf-2021-20: Effect of rock uplift and Milankovitch timescale variations in precipitation and vegetation cover on catchment erosion rates

Omer Yetemen (Referee)

Referee comment on "Effect of rock uplift and Milankovitch timescale variations in precipitation and vegetation cover on catchment erosion rates" by Hemanti Sharma et al., Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2021-20-RC2>, 2021

Effect of rock uplift and Milankovitch timescale variations in precipitation and vegetation cover on catchment erosion rates

by Sharma et al.

This paper investigates how Milankovitch timescale variations in precipitation affect catchment erosion rates via modelling approach. This is a very interesting and very good paper. It will be very good contribution to geomorphology. I have a very minor comments to the authors which are mostly clarification.

L33-35. Hedging required! Please reframe this statement "For example, recent work highlights that higher vegetation and lower precipitation both decrease erosion" with cites because some of them are only focused on bare soil, no vegetation, e.g., Bonnet and Crave (2003).

L63. Hedging required! "As precipitation increases, vegetation cover increases rapidly, and other factors become limiting (Breckle, 2002)." Not necessarily, water limitation can still be the limiting factor!

L67. I recommend relatively recent work (Knapp et al., 2017) about the MAP and ANPP relationship. Also, the same reference can be used in L136-138.

Knapp et al., 2017. Reconciling inconsistencies in precipitation–productivity relationships: implications for climate change. *New Phytologist* (2017) 214: 41–47.

L192. Table 1. Porosity value is 0.2. If it defines soil porosity, it is a bit lower than the reported values in the hydrology literature. Is there any reason for low value?

L393-395. I recommend to check Fig 2.g in Yetemen et al. (2015) (support your finding in modelling approach) to show how erosion (shear stress) change as a function of vegetation cover.

Yetemen, O., E. Istanbuluoglu and A.R. Duvall (2015). Solar radiation as a global driver

of hillslope asymmetry: Insights from an ecogeomorphic landscape evolution model. *Water Resources Research*, 51, 9843-9861.

For experimental approach:

Rogers & Schumm (1991). The effect of sparse vegetative cover on erosion and sediment yield. *Journal of Hydrology*, 123:1-2, 19-24.

L556-558. Seasonality in precipitation was introduced in landscape evolution models such as Istanbuloglu and Bras (2006) Yetemen et al. (2015).

MINOR POINTS

L33. Word choice. I recommend replacing "denser" for "higher" vegetation.

L197. Word choice. I recommend replacing "esteemed from" for "influenced by".

L220. Plural subject. Negative values....correspond....

L296. Insert comma before 'and'. Also L413.

L435. Please check. Possible typo? ...vegetation driven changes IN erosion will..

L455. Insert comma after. "sections".

L485. Typo! Maybe re-write! "un".

L532. Istanbuloglu AND BRAS, 2005. Also correct citation L742.

L532. Is Guzman (2019) a modelling study?

L657. Typo. Delete "Gregory".