How does abrasion affect channel response to a coarse sediment pulse?
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(Background)
In volcanic landscapes, large sediment pulse from the volcanoes are deposited in channels and affect channel morphology and bed texture. Here, we use a simple morphodynamic model to explore the extent to which bed material abrasion controls the downstream fate of sediment pulses in terms of transit time and the magnitude of response in channel bed elevation and grain size change.

Overarching hypothesis:
In volcanic landscapes, abrasion is an important control on the morphodynamics of sediment pulses from large mass wasting deposits of heterogeneous sedimentary characteristics.

(Conclusions)
Returning to our hypothesis:
- YES, abrasion (at a rate regularly seen in volcanic sediments) impacts the downstream fate of sediment pulses in terms of transit time and the magnitude of response in channel bed elevation and grain size change.

(Next) Model Improvements
Future improvements to this work will include:
1. Apply this toy model to a specific river with more realistic conditions.
2. Zeroing the model (running to steady state bed conditions) before adding pulse.
3. Running the model on CSiDSM High Performance Computing Cluster (HPCC).
4. Incorporate variable density and variable abrasion rate within a pulse.

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References: