

## ***Interactive comment on “Modelling sediment clasts transport during landscape evolution” by S. Carretier et al.***

### **Anonymous Referee #1**

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Referee Report on

Modelling sediment clasts transport during landscape evolution

by S. Carretier et al.

Classical landscape evolution models captures the relief dynamics of the surface topography. However most of these models do not trace the complex re-distribution fluxes of eroded/deposited materials in space and time. This information however is essential for dating non-stationary processes. In this manuscript Carretier and coworkers present a extension to landscape evolution models to account for this issue.

The paper is nicely structured and well written and will interest a broad range of geomorphologists working with transport-erosion/deposition systems. It is definitely suit-

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able for Esurf. However the description of the clast dynamics and its coupling to the landscape evolution, which is the central point of the paper, needs to be more detailed.

Below I will elaborate this point on some specific comments/questions/suggestions on the manuscript:

The initial paragraphs (until L.245) describing the landscape evolution modeling are very stringent and clear. However when it comes to the inclusion of the clast, the central part of this paper, the authors are quite brief. In Sec 3.2 the authors have to be more specific and describe the implemented procedures in more details especially clarifying the following points:

1. What is the initial setup of the 3d landscape?
2. Does the initial condition consist of a "geologic 3d map" composed of materials of different erodible materials at different location and depths?
3. How is the calst initially distributed in this 3d landscape
4. How has the initial grain size R of the clast material been chosen.

It is also not completely clear how the stochastic moment of clast is coupled with the deterministic rules of sediment transport. The authors have to explain more clearly how clast and sediment are coupled spatially and temporally.

One could imagine an awkward situations (with low probability) where all the sediment is removed, while the clast stays in place.

This section clearly needs a revision, to make the core part of this paper better understandable for the reader.

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