Earth **Surface**
Dynamics

Discussions

EGU

Interactive comment on "A Versatile, Linear Complexity Algorithm for Flow Routing in Topographies with Depressions" *by* Guillaume Cordonnier et al.

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Dear Referee,

Thanks for your time and appreciation of our paper. We will fix the minor issues that you pointed and improve the discussion regarding the two more important points. Here are some more specific answers:

1) It is hard to compare our sequential version to a parallel one, especially because the results mainly depend on the number of processors. This work is mainly motivated by problems where many different landscape evolution models have to be run at the same

time (for example for parameter estimation), or where distinct DEMs can be processed independently. In these cases, running many instances of a sequential algorithm is always faster than a sequential application of parallel algorithms. We did not explore any parallel implementation of our method, although many parts of the algorithm can be trivially vectorized. Further research need to be performed in finding the bottlenecks and benchmarking a parallel version. We will clarify all this in the paper.

2) We fully agree with the referee that the algorithm implementation should be available in a flexible way so that it could be reused in LEM applications as well as other DEM analysis and modeling applications. Although the current features implemented in the Fastscapelib library are mainly related to landscape evolution modeling, we are developing this library with a broader scope in mind, i.e., the analysis and modeling of topographic data. Features like the algorithm presented in this paper are implemented in the library in a composable way such that it could easily be reused in various contexts. For example, the basin graph is implemented in its own class. We also plan to provide top-level functions to apply our algorithm directly on elevation data. For better interoperability with other libraries, we finally provide wrappers for RichDEM's array objects and for some of its routines. For those reasons and for maintenance reasons, we think it is better to include our algorithm within the fastscapelib library rather than in a stand-alone version.

We will of course be happy to discuss both points if you disagree with our answers.

Best regards, The authors.

Interactive comment on Earth Surf. Dynam. Discuss., https://doi.org/10.5194/esurf-2018-81, 2018.