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Comparing landscape evolution models: framework and invitation to the modelling community

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In the last few decades, a wide range of landscape evolution models has been developed. These models have been used as geomorphology's virtual laboratory, to explore possibilities and answer science questions on spatial and temporal scales that cannot be observed directly. This ability to simulate what cannot be observed is also the models' weakness, because calibration and validation are difficult. Pertinent questions have been asked and will be asked regarding the level of trust that can be put into simulation results.
Two basic avenues lead to increased understanding of model validity. First, the comparison of simulation results from different models with each other, possibly based on idealised catchments. Differences between model outputs in such exercises can be pointers to model mistakes, or at the very least lead to interesting discussions about models' validity as a function of procedural (programming-code) decisions. Second, the comparison of model results to the few available records of landscape change. Although this set of options is the more promising, it has not often been attempted - because of a perceived mismatch between features that are observed in real landscapes, and the types of outputs that models produce.
We propose to provide a number of datasets with varying spatial and temporal resolution and extent, and from varying geomorphic regimes, that landscape evolution models can be compared against. Each dataset must contain information about boundary conditions (including a starting landscape), driving factors (such as climate) and the actual evolution of the landscape over time. As such, they will constitute a range of natural experiments in the sense of Tucker (ESPL, 2009).
The datasets will be made available to the general public if possible. We are planning to use four leading landscape evolution models with widely varying approaches and strengths to simulate the landscape evolution of the datasets, after which outputs will be compared with the known evolution. These models are CHILD, CAESAR, SIBERIA and LAPSUS.