News from the sandbox – from virtual sediment sections to full measurement models

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Geomorphic concepts and hypotheses are usually formulated based on empiric data from the field or the laboratory (deduction). After translation into models they can be applied to case study scenarios (induction). However, the other way around – expressing hypotheses explicitly by models and test these by empiric data – is a rarely touched trail. There are several models tailored to investigate the boundary conditions and processes that generate, mobilise, route and eventually deposit sediment in a landscape. Thereby, the last part, sediment deposition, is usually omitted. Essentially, there is no model that explicitly focuses on mapping out the characteristics of sedimentary deposits – the material that is used by many disciplines to reconstruct landscape evolution.

The R-package sandbox is a model framework that allows creating and analysing virtual sediment sections for exploratory, explanatory, forecasting and inverse research questions. sandbox is a probabilistic and rule-based model framework for a wide range of possible applications. It has been advanced and linked to another model to allow the full work flow of modelling luminescence measurements. This contribution introduces news about recent developments and shows a set of applications.