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# Spatial and temporal scales in fluvially conditioned mountain ranges

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Landform evolution involves several characteristic scales. In its simplest form, the stream power model widely used for bedrock incision does not contain any inherent spatial scale, but the erodibility defines a time scale. The simplest model at the hillslope scale, linear diffusion, also involves no inherent spatial scale, but only a relationship between spatial scale and time. In combination, however, the two models develop a characteristic scale separating the domains where one of the processes dominates. Extending the stream power model by sediment transport introduces a spatial scale. An additional spatial scale enters the system if flexural isostasy is included. All these scales may in principle interact with the external scales defined by the tectonic pattern.

Analyzing the potential interaction of these scales requires a model that is able to simulate domains of several 100 km in linear extension with a mesh width of less than 100 m. In particular, lithospheric flexure is a challenge here. We present simulations using the new landform evolution model openLEM combining fluvial erosion with hillslope processes, sediment transport and flexural isostasy. Focus is on the effect of the individual process scales on the overall landform evolution and their interaction with the other involved scales.