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The emergence of a complex high-relief landscape due to vertical fault displacement: results from a set of physical experiment

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We have designed a series of physical experiments to simulate the uplift and surface evolution of a linear mountain belt due to normal fault displacement: we applied a range of uplift rates in multiple experiments. Our experiments reveal a striking range of system response times both in terms of catchment morphology and sediment production. In our experiments hillslopes and channels are strongly coupled through mass movement and sediment transport within channels. We captured these internal dynamics through a unique set of measurement systems that allow us to relate the 3D evolution of topography to sediment flux from the model-orogen. This has enabled us to observe striking lags between the topographic response to accelerated rates of base-level fall and consequent sediment-efflux. Our experimental apparatus is an erosion box in which two opposing panels slide downwards, so simulating base-level fall across emerging topography. Rainfall is generated by an ultra-fine misting apparatus.