



Geomorphological experiments for understanding cross-scale complexity of earth surface processes

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The shape of the earth's surface is the result of a complex interaction of different processes at different spatial and temporal scales. The challenging problem is, that process observation is rarely possible due to this different scales. In addition, the resulting landform often does not match the scale of process observation. But it is indispensable for the development of concepts of formation of landforms to identify and understand the involved processes and their interaction. To develop models it is even necessary to quantify them and their relevant parameters.

Experiments are able to bridge the constraints of process observation mentioned above: it is possible to observe and quantify individual processes as well as complex process combinations up to the development of geomorphological units.

The contribution aims at showing, based on soil erosion research, the possibilities of experimental methods for contributing to the understanding of geomorphological processes. A special emphasis is put on the linkage of conceptual understanding of processes, their measurement and the following development of models. The development of experiments to quantify relevant parameters will be shown, as well as the steps undertaken to bring them into the field taking into account the resulting increase of uncertainty in system parameters and results. It will be shown that experiments are even so able to produce precise measurements on individual processes as well as of complex combinations of parameters and processes and to identify their influence on the overall geomorphological dynamics.

Experiments are therefore a methodological package able to check complex soil erosion processes at different levels of conceptualization and to generate data for their quantification. And thus, also a methodological concept to take more into account and to further develop in geomorphological science.