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Contemporary surface processes in the Sutlej region of North India.

H. Wulf (1), H. Elsenbeer (1), M. Märker (1), B. Bookhagen (2)

(1) Institute of Geoecology, University Potsdam, Postfach 601553, D-14415, Germany (Hendrik.Wulf@uni-potsdam.de)

(2) Geological and Environmental Sciences, Stanford University, Stanford, California, USA.

Geodynamic and climatic processes in active mountain belts may be strongly coupled through erosion. Our research-group addresses theses interacting relationships by quantifying and modeling the complex short-term erosion process dynamics of two basins in the Sutlej-region, which are characteristic for the drastic across-strike erosional gradient in the northwestern Himalaya, north India.

It is well documented that climate variability and extreme events cause spatially and temporally highly variable responses in erosion process, sediment transport and deposition patterns. The erosion dynamics in the non-glaciated northwestern Himalaya are mainly influenced by precipitation patterns, vegetation cover, terrain morphology, tectonic activity as well as lithology and soils. Moreover, a wide range of surface processes are involved such as surface wash, rill and gully erosion, debris-flows and landslides. However, little is known concerning the thresholds and quantity of these climate-induced surface processes on centennial, decadal or annual time scales in this outstanding fast eroding region.

With an integrated approach of direct measurements and indirect, non-invasive methods the temporal and spatial patterns of surface erosion processes will be assessed. In a second step these processes will be modeled and extrapolated. Thus, the recent landscape evolution will be analyzed and simulated. Diffusive and linear erosion processes are quantified directly in the field by rainfall event-based measurements on selected test plots. Moreover, different non-invasive methods will be applied to get further information on processes frequency and intensity. These methods include i) the analysis of high resolution time-series of satellite images, ii) dendrochronologi-

cal investigations, iii) Cs-137 dating, iv) sediment fingerprinting, v) soil hydrological investigations and vi) discharge measurements.

In this paper we illustrate our fieldwork approach and the conceptual modeling framework. Moreover, first results on morphological analysis will be presented. These data will help to verify physical models and lead to an integrated knowledge of the highly sensitive erosional system of the Himalaya.