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Contemporary and long-term erosion in the Kruger National Park, Lowveld Savanna, South Africa. First results.

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Human-induced soil erosion as a consequence of the transformation of landscapes to pasture or arable land is a function of natural conditions (relief and soil properties), natural drivers (climate) as well as land use and management. It is common understanding that humans have accelerated erosion of landscapes by modifying land surface characteristics, like vegetation cover and soil properties, among others. But the magnitude of the acceleration is not yet well established. Partly, the uncertainty about the magnitude of the problem is due to the fact that baseline values, i.e. data on rates of natural erosion from uncultivated land under current climate conditions, are difficult to find.

Against this background, we conducted an assessment of contemporary and long-term erosion in the Kruger National Park (KNP), South Africa. The KNP has been set aside for the recovery of wildlife in the early 20th century and was spared from agricultural practices even before that. Concerning soil properties and vegetation cover the KNP can thus be considered to represent a rather pristine savanna environment. In order to secure water provision to wildlife a number of reservoirs was established in the 1930s to 1970s with catchment areas entirely within the KNP boundaries. The size of the catchments varies from 4 to 100 km^2.

Volumetric mapping and dry bulk density measurements of reservoir deposits provided average minimum sediment yield rates for observation periods of 30 to 80 years. Hydrological modelling was used to assess the trap efficiency of the reservoirs and to estimate the most likely sediment yield rates. At the same time this exercise provided evidence for the stochastic nature of runoff and erosion events in this semi-arid environment and the need to evaluate contemporary erosion based on long observation periods. Measuring cosmogenic 10Be in quartz sand samples collected at the inlet of the reservoirs provided the corresponding average long-term erosion rates for periods of a few 100,000 years. This presentation provides first results based on more than 10 investigated reservoirs and compares contemporary and long-term erosion rates.