Hydrological or geomorphological processes in nature are often very diverse and complex. This is partly due to the regional characteristics which vary over time and space, as well as changeable process-influencing and -controlling factors. Despite being aware of this complexity, such aspects are usually neglected in the modelling of hazard-related maps due to several reasons. But particularly when it comes to creating more realistic maps, this would be an essential component to consider.

The first important step towards solving this problem would be to collect data related to regional conditions which vary over time and geographical location, along with indicators of complex processes. Data should be acquired promptly during and after events, and subsequently digitally combined and analysed.

In June 2009, considerable damage occurred in the residential area of Klingfurth (Lower Austria) as a result of great pre-event witness and repeatedly heavy rainfall, leading to flooding, debris flow deposit and gravitational mass movement. One of the causes is the fact that the mean-scale watershed (16 km²) of the Klingfurth stream is characterised by adverse geological and hydrological conditions. Additionally, the river system network with its discharge concentration within the residential zone contributes considerably to flooding, particularly during excessive rainfall across the entire region, as the flood peaks from different parts of the catchment area are superposed.

In the investigation and documentation of - information about the processes and the process systems and their complex spatial-temporal interactions - local situation (geology, vegetation and land use) - significant correlations between - local situation - dominant processes - and the spatial-temporal variability of the process-induced hazard potential (e.g. bed load potential induced by mass movements and fluvial erosion) should be deduced from this dataset.

Based on the acquired field knowledge, it was possible to distinguish areas of different heterogeneities/homogeneities of the dominant process chains for several micro-scale parts of the catchment area. Subsequently, conceptual slope profiles should be derived from the detailed field data, and these should include information of the dominant and complex process systems. This forms an essential starting point in order to be able to realistically consider relevant hazard-related processes as part of process-oriented modelling.