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Spatial Discretisation in semi-distributed hydrological Modelling using the Landscape Unit Mapping Program (LUMP)

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In hydrological and soil-erosion modelling, spatial discretisation of the model domain is usually accomplished in a fully distributed, semi-distributed or lumped scheme. For meso- and large scale modelling, semi-distributed approaches commonly describe the properties of a landscape unit using a representative catena or toposequence which is modelled in detail, with results then being extrapolated onto the represented model domain.

The manual delineation of the landscape units and the derivation of a representative toposequence is a time consuming task because of a lacking automated procedure. Objective results cannot be obtained because of the high degree of subjectivity involved. The necessary detailed expert knowledge and familiarity with the study area is not always available.

This poster presents an approach for semi-automated delineation of landscape units and their further partitioning into terrain components using the Landscape Unit Mapping Program (LUMP). LUMP incorporates an algorithm of retrieving catenas and their attributes based on a DEM and supplemental spatial data like vegetation or soil classes. By including user-specifiable weighting factors, the catenas are classified using cluster analysis. A representative toposequence and its attributes are computed for each class to provide the parameters for the resulting landscape unit. Spatial extent

of the landscape units result from interpolation between the classified catenas. In the next step, each toposequence is further sub-divided into homogeneous elements called terrain components by considering multiple attributes following the spatial concept of the WASA-model. The results show the capability of LUMP to derive characteristic toposequences of a landscape. Open questions remain concerning the proper choice of relevant terrain attributes and their respective weighting factors in the classification scheme.