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Hydrologic Modeling of the Loess Bluff in Dunaujvaros, Hungary

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The western shoreline of the Danube from Érd to Mohács consists of loess bluffs up to 50 m high. These bluffs can be susceptible to landslides when groundwater conditions weaken the supporting loess. Often this will occur during periods of high rainfall, however morphological, geological and other factors are also important in triggering these movements.
Changes in pore water pressures related to precipitation, confined water levels driven by remote catchments, and river level fluctuations are widely recognized as important factors controlling the loess bank stability. This work aims to determine the interaction of rainfall, river level, drainage and local pumping on the pore pressure regime and stability of the bluffs.
As a first step, a realistic 2-dimensional infiltration and groundwater model was built that reflects the influence of river levels, rainfall patterns, and local pumping. Based on model results, initial and boundary conditions have a strong influence on seasonal pore pressures. Local pumping also had a large effect, but must be addressed with a 3-D model. Further study will better define those influences on slope stability along the bluffs. This work was undertaken as part of a project funded by the EFOP-3.6.1-16-2016-00017