



## **Hydrogeological modelling of the Lezza Nuova earth slide – earth flow (northern Apennines, Italy)**

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Groundwater is the main triggering factor of earth slide – earth flow, so that the modelling of groundwater patterns in space and time is of relevant practical interest for planning hazard reduction actions such as drainage systems. In this study a hydrogeological model of the source area of the Lezza Nuova landslide was developed using Modflow 3D. The landslide resumed activity several times in the last decades, posing risk to key road connections crossing the source area of the phenomenon. The model was built upon data collected during coring, geophysical surveys, in situ permeability tests and displacement monitoring. Data from sensors recording on a semi-continuous basis rainfall, air temperature, outflow from natural springs or drainage systems, piezometric levels, pore pressure at the sliding surface, were used to calibrate and validate the model outputs in both the steady and the transient state. Despite the inevitable simplification introduced to reproduce underground conditions, the model still proved to be able to simulate the processes of groundwater recharge and, in particular, to highlight the groundwater transfer from disarranged rock masses to clayey landslide deposits. This resulted in relevant information for further analyses of equilibrium and strain-rate conditions in the slope and, ultimately, for the design of further subsurface drainage systems.