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Geological model and numerical simulation of a complex instability phenomenon in the Eastern Alps

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Since the sixties, the Lamosano village (north-Eastern Alps 30 km east from the Belluno town) has been affected by slope movements. The slope movements produce differential settlements causing crack to the buildings and the roads. As a consequence, some people have been recently moved from the damaged houses to a stable area. The geological sequence of the area presents a surface layer of morainic deposits, about 15-20 m thick, overlaying the miocenic bedrock, constituted by clayey - silty marls and, from the depth of 80 - 100 m, by sandy sandstones. Recenlty, new studies have been carried out to better define the geological model of the slope and to understand the instability mechanism. Firstly, a new drilling campaign was performed: three boreholes were carried out to a depth of 100 m, in order to obtain the detailed stratigraphic sequence of the involved materials. In addition, some field and laboratory tests on core samples were carried out, to evaluate the grain size and shear resistance of the morainic deposits and to estimate the uniaxial compression strength of the bedrock materials. Moreover, a geophysical campaign was performed, with the execution of refraction seismic lines and microtremor seimic stations, in order to reconstruct the seismic characteristics of the underground materials and to extend to the whole area the punctual information obtained from the boreholes. Ground displacements have been also measured: surface displacements have been studied by means of terrestrial laser scanner technique; deep displacements have been measured using inclinometers installed inside the new boreholes. The average velocity of the movement is some centimetres per year, involving the whole village area but not uniformly distributed in space and time. The integration of the information obtained by the different techniques allowed to reconstruct the detailed geological and geotechnical setting of the area and to model it whit a finite difference numerical code (FLAC), leading to a bet-

ter evaluation of the landslide mechanism and providing useful information about the remediation design.