



Reconstruction of the $550 \times 10^6 \text{ m}^3$ Molveno rock avalanche

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With an estimated source volume of $550 \times 10^6 \text{ m}^3$, the Molveno rock avalanche is one of the largest in the Trento Dolomites. Two source areas have been suggested one to the west at Mt. Soran and one to the east at Mt. Gazza. Conversely, some authors suggest the presence of two landslides one from each of the source areas. Rock avalanche debris dammed the gorge between the Molveno Valley to the north and the Nembia Valley to the south forming the Molveno Lake (823 m a.s.l.) (Sauro and Zampieri, 2001; Chinaglia and Fornero, 1995). Here we present results of a study aimed at better constraining the events leading up to the emplacement of this massive deposit on the valley floor. We improve constraints on the extent and volume of the deposit using a combination of GIS, field mapping, and literature review (including results from earlier geophysical investigations). This is then compared to volume calculations from the preferred Mt. Soran source area using a 3D model developed using a combination of Google Earth and standard GIS tools. In order to improve confidence in our assumed source area, we transfer our modelled pre-failure topography to DAN3D, a continuum dynamic model designed to analyze the runout of highly mobile landslides. Although calibrating the parameters for DAN3D requires a back-analysis of the landslide runout, we obtain a reasonably good fit between the modelled and observed deposits using our assumptions of a single event from Mt Soran. Surface exposure dating from a number of boulders located on top of the deposit allow us to better constrain the timing of the event.

Sauro, U. and Zampieri, D., 2001. Evidence of recent surface faulting and surface rupture in the Fore-Alps of Veneto and Trentino (NE Italy). *Geomorphology*, 40(3), pp.169-184.

Chinaglia, N. and Fornero, E., 1995. Ipotesi sulla possibile evoluzione cinematica di un movimento profondo di versante: l'esempio del M. Soran (Trentino meridionale). *Mem. Soc. Geol. Ital*, 50, pp.101-108.