The Gavon basin: a model of post-glacial debris-flow

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The Gavon basin hosts one of the major landslide deposits of the Eastern Italian Dolomites (Falcade, Belluno). This deposit is due to different phases of erosion carried out by the Gavon, which is a sinistral tributary of the Cordevole River, and it consists of a thick erodible sequence of Upper Permian Bellerophon Formation and Lower Triassic Werfen Formation (divided into Tesero, Mazzin, Andraz, Siusi, Gastropod Oolite, Campil, Val Badia, Cencenighe, San Lucano Members) that have been tectonically duplicated by thrust activity and uplifted by two superposed folding and diapiric deformations, rising the sequence to an elevation of 2499 meters a.s.l. at the Forca Rossa pass.

The Gavon basin is 5.98 km long and is characterized by a mean slope greater than 18%. The Lower Triassic sequence was eroded producing a 7.86 km^2 basin in pre-glacial time. The basin was filled up by early landslide deposits before the last glaciation, which onset date back to about 30 thousand years before present, and during historic time.

The catchment is now subjected to high erosion due to the frequent rainfall/snowfall events. The solid transport has always been high (up to 34400 m^3/y) and, for this reason, some dams were built 80 years ago. Three more check dams were built in 2005 to further decrease the erosion.

A reconstruction of the events in the postglacial time is carried out based on (a) the volume of the deposits and (b) the missing volume in the detachment area. A volume of 173 to 216 million cubic meters has been eroded by a series of events (or a unique large event) that ended approximately 4000 years ago (Fenti, 2018).

To complete this analysis, we numerically modelled the detachment and runout of a block of rock located in the top portion of the basin, where some tension cracks are now evident, and assuming that an intense rain event could mobilize it. The analysis has been processed using LiDAR data with QGis software, while the simulations are performed with GeoFlow-SPH.