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Back-analysis of a debris flow event: the case study of Fiames (Dolomites, Italy)

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Hazard assessment on debris-flow fans requires detailed data both about magnitude and rheology of debris flows and the topography of propagation and deposition areas. Interpretation of debris-flow events and hazard mapping can be carried out by means of numerical models, which predict flow and deposition characteristics.

On July 5^{th}, 2006, an intense rainfall (up to 65 mm/h) and hailstorm occurred close to Cortina d'Ampezzo (Dolomites, North-eastern Italy) causing the trigger of six debris flows. The debris flows propagated along ephemeral channels incised in scree slopes and expanded on coalescing alluvial fans. The largest debris flow involved a total volume of about 40000 m^3 and caused the interruption of a National Road on the alluvial fan and the formation of a temporary channel obstruction in the receiving stream.

Immediately after the 2006 event, detailed field surveys were carried out in the study area to measure extent, shape and depth of the deposits, grain size of the material, cross section of the debris-flow channels; initiation zones were also surveyed and described.

This study presents the modelling of the debris-flow event by means of FLO-2D. The numerical simulation was carried out using a DEM derived from the topographic map (1:5000) of the study area. A post-event DEM was created adding the simulated deposits thickness to the original DEM. By comparing the post-event DEM with an accurate DTM derived from a LiDAR dataset acquired on October 2006 and post event field surveys, it was possible to understand the accuracy of the back-analysis and the reliability of FLO-2D results.