DEBRIS-FLOW CALAMITIES: VALIDATION OF THE HAZARD MAPPING METHODOLOGY BASED ON THE TRENT2D MODEL, THROUGH A COMPARISON WITH A REAL CASE EVENT

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ABSTRACT

How reliable is a procedure of hazard mapping?
In this work we want to give a first answer to this important question by comparing the results of a back analysis of a real event with the ones obtained from a blind hazard mapping based on the model Trent2D [1][5].

The studied event occurred in August 2010 in the village of Campolongo (Province of Trento, Italy) as a result of torrential rains. The back analysis has been carried out starting from the application of a rainfall-runoff model in order to obtain liquid discharge. Solid discharges have been estimated from the measured volume of deposits. With these boundary conditions, several numerical simulations have been performed and the optimal values of model parameters that minimize the difference between measured and computed deposits have been obtained.

Afterwards, the model has been used in a predictive mode and the hazard map for the area has been obtained. In this step we used a blind approach, in which the model parameters have been fixed a priori, according to an assumption of local equilibrium in the upstream section of the flow field, without considering any indication from the back analysis.

Comparison of the hazard mapping results with the event reconstruction shows that the real event is well included in the prediction of the hazard map. This gives a first concrete evaluation, on one side, of the robustness of the physical assumptions of the Trent2D model and, on the other, of the reliability level reached by the current hazard mapping approach.

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