



Influences of geological characteristics on the debris flow activity of mountain torrents. Comparative case study of two couple of torrents in Valais, (South-western Switzerland)

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It is now well established that the geological settings of a catchment has a direct influence on its debris flow activity. Nevertheless, there are still questions on the role of parameters involved (lithology, weathering, tectonics, hydrogeology, quaternary history, etc). From the analysis of events chronicles we identified two couples of gullies that have a much differentiated activity (in magnitude as well as in occurrence), other parameters like lithology and climate being similar. All the catchments are located near the town of Martigny in Canton du Valais (Switzerland). For each couple the distance between gullies is less than 500 m. Four different properties were used to quantify the geomechanical characteristics of these catchments:

(1) we use a Schmidt hammer in order to evaluate the JCS (joint wall compressive strength) of outcrops within the gully; (2) the intrinsic rock resistance was tested through an abrasion test (ASTM: D 4644-87); (3) the rock mass properties were estimated by the geological strength index (GSI); (4) the characteristics of the present rock instabilities were assessed by field survey. It is supposed that the GSI gives a more global response than the Schmidt Hammer.

The preliminary results show that a general trend could be drawn from these tests. From the Schmidt hammer, GSI, and abrasion test we observed that rock mass quality is worse for the catchments that have a higher debris flow activity. These catchments are characterized by a high presence of rock instabilities. Locally we observed very coherent outcrops in the active torrents. When debris flow activity is high, the sub-

merged outcrops are constantly rejuvenated and the weathered surface are armoured.

These field surveys, in-situ measurements and their subsequent results raise questions: in which extent is the sampling representative of the catchment, in particular for the Schmidt hammer test? During surveys we observe, alternatively, resistant and weak outcrops in the same gully; at what level does the presence of bad rock qualities have an influence on the whole catchment? All these questions will be implemented in the next field survey campaign and it could help to determine whether the geomechanical parameters that are surveyed are pertinent or not.