



Active mitigation measures at Angerbach catchment, Austria, and their performance during the June 2006 flood

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After a heavy rainfall-triggered (debris) flood event the retention basins of the Angerbach torrent, Salzburg, Austria, were completely filled up with sediments and woody debris. Only little damage - caused by erosion - occurred on the embankments and therefore to the collateral single roads. Regarding the comparatively low magnitude of the event, the mitigation measures showed no further resources for more considerable magnitudes, for which the mitigation concept would have been designed. The Angerbach torrent is a left tributary to the river "Gasteiner Ache", which flows to the river Salzach. Due to former events, several mitigation structures (five open check dams with retention basins along the channel and on the densely populated alluvial fan) were constructed within the last years. In such a manner events with a return period of 150 years should have been controlled without any damage. The rainstorm event of June 19th, 2006 only affected the sub catchment of the Lafenbach torrent with a catchment area of 9.64 km². Migrating from west to east, the rainfall followed more or less the exposition of the torrent channel. The return period was estimated by 40 years, which is considerable lower than the design event of 150 years. The discharge increased from the basic runoff to the highest peak within 15 minutes, whereas the peak discharge was measured with about 30 m³/s. Because of clogging the outlets of the check dams with woody debris, huge amounts of predominantly fine sediment were retained in the basins, which triggered heavy bed erosion downstream the check dams. The water discharge was transported within the bordfull channel in the lower reach, so that the settlement area was barely not affected by any damages. Regarding the difference of the event magnitude compared to the design event, it is highly recommended to analyze the interaction of the rainfall event and to evaluate the mitigation

concept by hydrological and hydraulic investigations for further protection strategies, which seem to be essential.