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Analysis the flash floods occurred in the South Tyne river watershed (United Kingdom) on the 17th of July 2007

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On the 17th, 19th and 23rd of July 2007, a series of local thunderstorms induced flash floods in the upper part of the South Tyne river in Northumberland, a rural area located near the border between England and Scotland. These events led to moderate damages in the villages and losses of livestock in local farms. They were shadowed in comparison to the widespread lowland floods that occurred throughout the UK during the same period but were nevertheless extreme events for the region.

One of the affected streams, the Thinhope Burn, has been surveyed by the University of Gloucestershire during recent years. It is an active river from a geomorphological point of view. A survey conducted after the 2007 flood revealed that many of the boulders along the banks of the river, which had been deposited 50 to 100 years before, had been displaced, indicating a high return period for the flood (see EGU abstract EGU2008-A-04713).

A complementary survey was conducted in July 2008 with the objective of gathering information on the discharges, the rainfall amounts and the active runoff processes. 14 cross-sections were surveyed, pictures were collected enabling a validation of peak discharge estimates, 5 witnesses were interviewed and additional rainfall data and geomorphological evidence were collected.

This survey revealed that the peak discharges exceeded 5 m3/s/km2 in the most affected areas. Unfortunately, no rainfall measurements are available that would enable further analysis, including the computation of runoff rates. Nevertheless, witness accounts and field observations give a good insight into the hydrological processes indicating a significant initial storage capacity of the peat layer covering the affected watersheds.

Concerning the boulders, the field observations suggest surprising and unexplained transport processes. Blocks of up to one meter diameter were displaced over short distances and deposited on the river banks without any sign of established debris flow, as if short debris pulses occurred along the river course.

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