



When does extreme rainfall cause an extreme flood?

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Increased intensity and frequency of extreme rainfall events are projected for upcoming decades in many locations in Europe. Flash floods in the summer half of the year are the most serious consequences of these events. Quite recently, in June 2017, an extreme rainfall event occurred in the Czech Republic. Although the extremity of rainfall was enormous in several smaller catchment areas in central Bohemia (e.g. for the Radotínský potok catchment, the daily sum of high-intensity rainfall exceeded 100-year return period), the runoff response was significantly less extreme with flow rate only at about 5-year return period.

The rainfall event of June 2013 was compared to that of 2017. Two-day rainfall sums were similar for the Radotínský potok catchment. However, the runoff response represented a flood with a peak exceeding 100-year return period. Therefore, the main difference between the two events was found in the portion of rainfall and runoff volumes: 2–8 % in 2017 while 30–70 % in 2013. Our analysis indicates that the long-lasting hydrometeorological situation and saturation of soil that precede the rainfall event are essential parts of the direct runoff formation, even in the cases of extreme and very intense short-duration rainfall.