



Risk Management of Extreme Flash Floods

Pathways: Hydrological Aspects and Engineering Measures - an Event Perspective of the Müglitz Flood 2002 -

Introduction

In August 2002 Saxony was struck by a flood of a dimension that never occurred during the last hundred years.

The Elbe River and the Eastern Ore Mountains were especially effected: intense rainfall on 12 and 13 August led to extreme flash floods that caused tremendous damage. Valleys were inundated and houses, roads, and cultural assets were covered with mud and sediments, were damaged or completely destroyed.

Societal and economic damages:

Loss of human life:

20 persons in Germany

Economic damage sum:

8.6 Billion Euro in Saxony

9.2 Billion Euro in Germany

3.0 Billion Euro in Czech Republic

Damages of settlement and infrastructure in Saxony:

25.300 buildings, 740 km streets, 180 bridges, 540 km tracks

Flood is defined as a temporary covering of land by water beyond its normal confine.

Plain Floods or River Floods



water level will rise slowly, inundate the surrounding areas and remain for several days

result: water will leave a load of sediments behind

Flash Floods



short time event in mountainous areas with no possibility to spread into plains high velocity, high tractive force tremendous destruction on its way downwards

Hydrological Characteristics



The Müglitz River Basin

Length: 48.9 km

Catchment area: 210 km²

altitude difference: 750 m

Valley shape: V-type, narrow, smaller creeks joining the course

Land use: 50% agriculture incl. settlements, 50% forest

Flood control reservoir: Glashütte, built in 1954, Volume 50,000 m³

Mouth: Elbe River, south of Dresden Problem: short lead time (only 6 hrs)

→ in case of a flood wave only a very short warning time for people is possible

→ early warning is obligatory when heavy rainfall is forecasted

Chronology of the Event

09 and 10 August: forecast of continuous precipitation

11 August: sunny morning - rainy afternoon

12 August in the morning: raining cats and dogs. Warning - break of the Glashütte flood control reservoir is possible. Afternoon: rain of high intensity. The water level of all creeks of the Müglitz river basin rose high.



12 August, 16.30: the dam of the Glashütte flood control reservoir broke. An amount of 50.000 m³ flushed downwards to the valley.

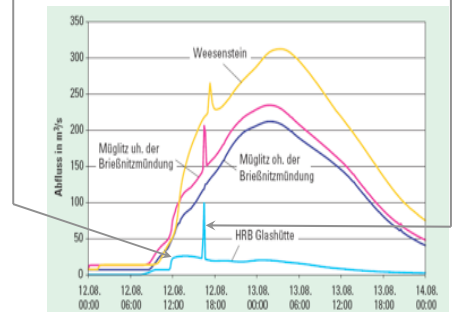


A flood wave of 4 m height outpoured into the town of Glashütte and destroyed houses and infrastructure.

The Flood Wave

The tremendous discharge of Briebnitzbach caused by the heavy rainfall was locally stored in Glashütte flood control reservoir until the outlet was blocked by sediments.

The following overtopping of the dam caused an immediate erosion of the dam surface followed by the crash of the dam. The tremendous flood wave of ca. 50.000 m³ dashed down the valley and the function of the flood control reservoir failed.



Conclusion

This event was denoted as a less than once-in-one-hundred-years event. Similar damages are shown in pictures from 1927 when still no flood control reservoir existed.



Technical measures like dams can protect people and settlements against severe floods, but there is always a certain risk left of rare extreme events that might cause a catastrophe - Flash Floods.

