



Risk Management of Extreme River Floods

Hydraulic Aspects

- a during the Event Perspective of the Elbe Flood August 2002 -

Meteorology

General information

Chronology of Dresden

Low-pressure system "Ilse" was responsible for the enormous amount of rainfall in the upper part of the Elbe-catchment in the Czech Republic. "Ilse" was a Vb-Cyclon which carried a high amount of water from the Mediterranean Sea to Middle-Europe. "Ilse" was a very stable and slowly moving low-pressure system. The whole Elbe-basin in the Czech Republic was affected by rainfall of more than 100 mm (Fig. 1).

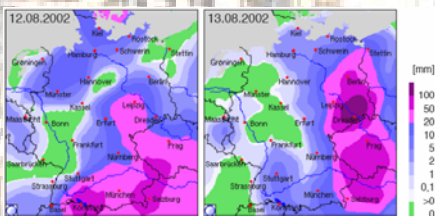


Figure 1: Daily rainfall totals [mm] at 8:00 a.m. MESZ (in 24h)

This water could not be retained in the soil because four other low-pressure systems, that preceded "Ilse", brought rain in this area and saturated the soil.

Teileinzugsgebiet	A _{EG} [km ²]	Niederschlagssummen [mm]		
		August 1961/90	1.08.-10.08	11.08.-13.08.
Elbe von der Quelle bis Mög. der Moldau	13800	62	24	62
Moldau	28000	74	80	108
Elbe (Mög. der Moldau bis Mög. der Schwarzen Elster)	8500	71	49	152

Figure 2: Area precipitation totals of subcatchments of the river Elbe

The Elbe flooding of August 2002 was caused by heavy rainfalls on August the 6th and 7th in the region of the Böhmerwald, on the 11th and 12th in South Bohemia and from 11th to 13th in the Ore-Mountains (not responsible for the Elbe-Flooding in Dresden) and the eastern part of the Elbe catchment in the Giant-Mountains. The estimated value of the rainfall amount in the Elbe basin for the gauging station Dresden was 5 bill. m³.

Sources: Dokumentation des Hochwassers vom August 2002 im Einzugsgebiet der Elbe - IKSE
 Hochwasser August 2002 Einfluss auf die Gewässergüte der Elbe, Arbeitsgemeinschaft für die Reinhaltung der Elbe, März 2003
 Das Augusthochwasser 2002 im Elbegebiet, BfG, September 2002
 Hochwasservorsorge in Deutschland Lernen aus der Katastrophe 2002 im Elbegebiet, DKKV, November 2003
 7sky.de/hochwasser_dresden/hochwasser_dresden.htm

The Elbe catchment upstream the Vltava mouth was not considerably effected. In this area the discharge was low. The actual flood in the Elbe began with the inflow of the Vltava river. The Vltava peak in Prague was achieved on the 14th of August with a discharge of 5160m³/s. This lead to a backwater of the Elbe river at the confluence of both rivers. The peak of the flooding event reached the German-Czech border on the 16th of August with an amount of 4780m³/s on the gauge Schöna and took 11 hours from this gauge to Dresden.



Figure 3: Elbe basin

Potential floodplains along the Elbe river exist on the German territory downstream of Dresden. These areas are called polder if the flooding is controlled, but some of the floodplains were flooded uncontrolled due to dike breaches. Furthermore the flood peak was cut by closing the Havel mouth at the 20th and 21th August. 75.4 mio. m³ of water were hold back in the Havel basin and so downstream communities were protected.

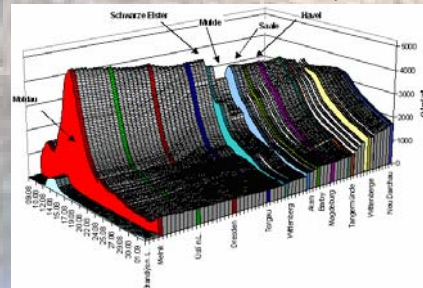


Figure 4: Discharge development

August 12th In the morning the warning level II was proclaimed. Due to continuing rainfall the water level of the Elbe river reached about 5 m as well as the level of the tributaries rose. Disaster alarm was declared. The first flooding of the city centre was caused by the Weißeritz, which took her old riverbed to the Elbe.

August 13th The gauge of the Elbe reached 6,66m. The Main Railway Station was flooded by the Weißeritz. Further tributaries brought additional floods. The bayous in Kaditz and in the Ostragehege were flooded.

August 15th The Elbe level rose over 8m. Evacuation of many city parts.

August 16th In the morning the highest historical water level of the year 1845 (8,77m) was exceeded. At this time the discharge peak was in Usti n.L.. Zwinger and Semperoper were threatened by the Elbe-water.



Figure 5: Satellite Picture of Dresden on Aug. 17th

August 17th The Peak of the water level reached Dresden: 9,40m – the highest water level ever measured in Dresden. Dam breach at the Kaditzer bayou: flooding of the commercial district "Elbepark" also flooding of the sewage plant. Over the course of the day the water level only slowly decreased. The groundwater level increased. People were warned not to pump the cellars of their houses.

August 18th The water level of the Elbe dropped to 8,20m.

August 26th The Disaster alarm ended for the whole city.



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