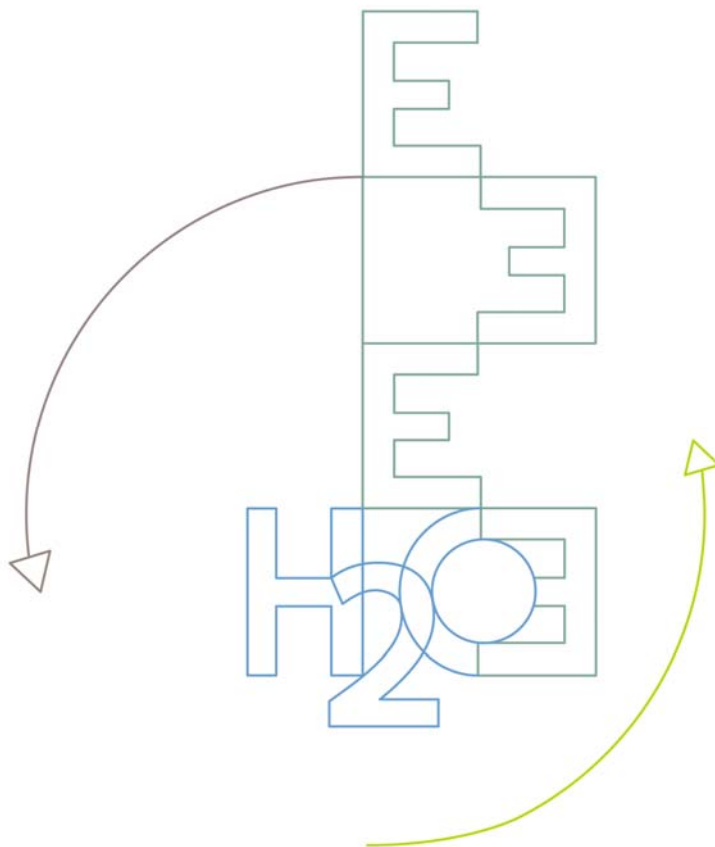


The June 2013 floodings in Germany – an overview

English translation of the report "Das Juni-Hochwasser 2013 in Deutschland in der Übersicht" that is a summary of the report „Bericht BfG-1797“ „Länderübergreifende Analyse des Juni-Hochwassers 2013“ (http://www.bafg.de/DE/Service/presse/2013_09_04_pm_bericht.pdf)



The report was initiated by the Federal Ministry of Transport, Building and Urban Development (*BMVBS*) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (*BMU*) and was produced in a cooperation between the Federal Institute of Hydrology (*Bundesanstalt für Gewässerkunde, BfG*) with the national meteorological service *Deutscher Wetterdienst (DWD)*. The report was complemented by contributions of the water management authorities of the federal states.

Koblenz, 15.08.2013

The June 2013 floodings in Germany

Very large amounts of precipitation of regionally more than 200 litres per square metre that fell in Germany first over the central regions and after 29 May mainly in the south and south-east caused floodflow in all German river basins. The most affected ones were the Danube and the Elbe basins, where new maximum water levels were recorded over long river reaches. Floodings, sometimes in catastrophic dimensions, occurred on numerous rivers widely in Bavaria, Baden-Württemberg, Saxony, and Thuringia, in southern and western Brandenburg, in the south of Lower Saxony, and in eastern and northern regions of Hesse. What makes the flood of June 2013 an extraordinary event is the widespread continuous heavy rain that was falling over much of Germany and neighbouring countries.

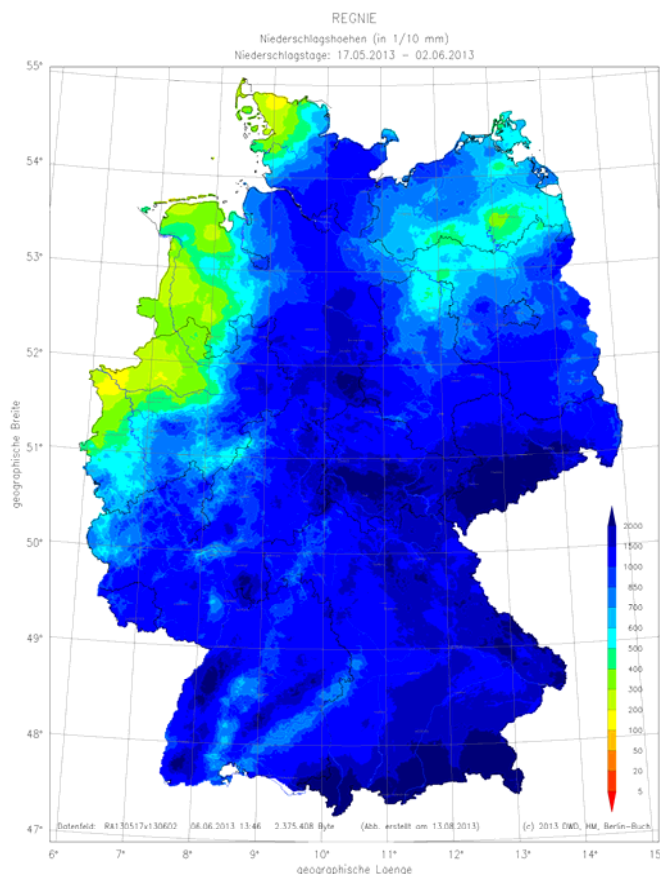


Figure 1: Cumulative daily precipitation depths from 17 May to 2 June 2013 (in 1/10 mm) (Source: DWD)

The flood was additionally enhanced by abundant antecedent rainfall in spring: in Germany, the year 2013 experienced the second wettest month of May since the beginning of records in 1881. At the end of the month, about 40 percent of the territory had soil-moisture saturation values that had never been observed since the beginning of such measurements in the year 1962.

The first flood wave hit the Weser river basin; already on 26 May the water levels in the rivers Werra and Fulda began to rise rapidly. The Rhine and its tributaries Neckar and Main followed suit after 31 May. In the Weser itself and in the River Rhine the flood peaks reached only moderate levels with return intervals of 2 years in the Weser and at maximum 10-20 years in the Rhine,

while in the tributaries the maximum return intervals were sometimes notably exceeded, as in the upper Neckar affluents, where periods of up to 100 years were determined.

New water-level records were measured already on 3 June 2013 in the River Danube at the inflow of the extreme flood wave of the River Inn. The gauge Passau/Danube measured on this day a water level of 1289 cm above zero-of-gauge. The flood wave in the Danube that arrived with some days delay assumed over long stretches river stages that had never been measured here before. This is particularly true for the Danube reach downstream of the town of Regensburg. Even the flood-peak reduction due to dyke failures in the area of Deggendorf brought little relief. The maximum flows in the Danube, which is a Federal waterway here, were around 2700 m³/s at Regensburg, about 3400 m³/s at Hofkirchen, and up to some 10000 m³/s in the region of Passau/gauge Achleiten¹ (cf. also Figure 2).

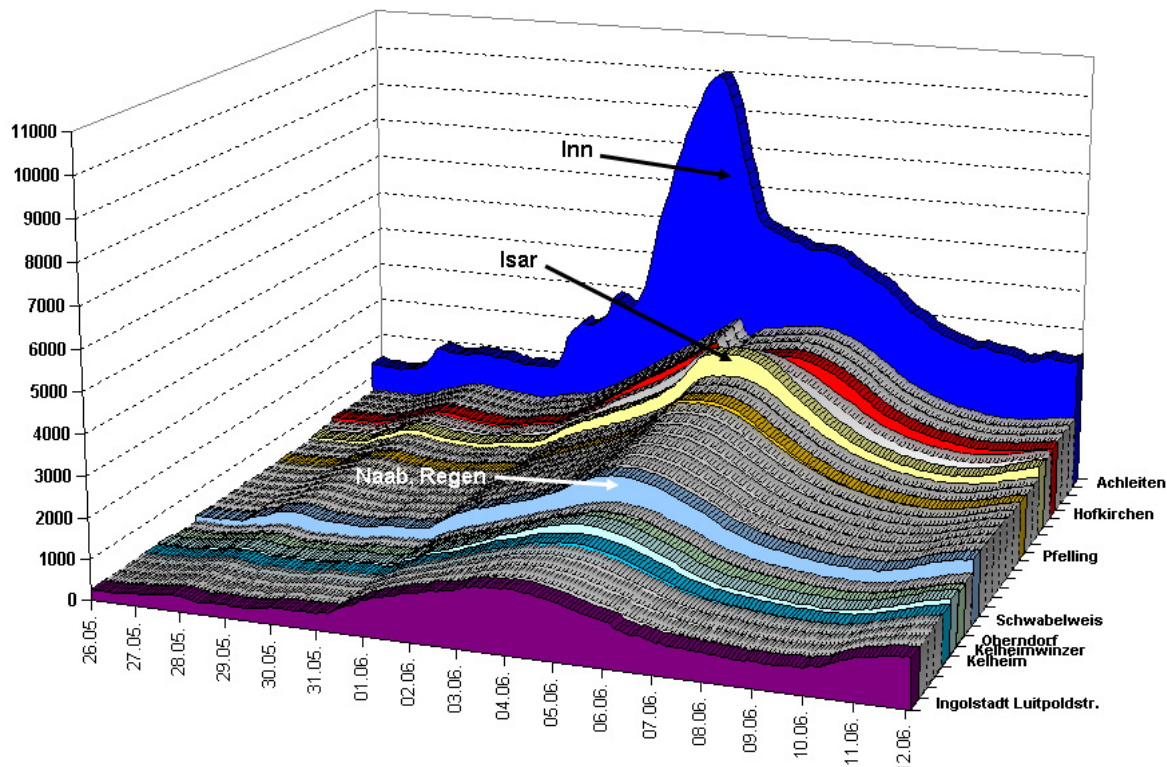


Figure 2: Course of the flood event in June 2013 on the Danube

In the Elbe river, a mighty flood wave had built up, above all, in the Czech River Vltava/Moldau that was fortunately reduced by the controlled operation of storage reservoirs. Its peak reached Germany on 6 June. This wave passed the upper Elbe, was building up further by inflowing flood waves from the rivers Mulde and Saale, to reach ultimately unprecedented dimensions in terms of height and length.

Temporarily the water levels of the River Elbe were over some 250 contiguous river kilometres at new record heights (Figure 3), sometimes exceeding the historical flood marks considerably, so at the gauge Magdeburg-Strombrücke by 46 cm. The River Saale, too, experienced wide exceedances of the known flood levels, despite successful flow reduction by the Thuringian storage reservoirs on the River Saale. The abnormally high flow contributions from the rivers Ilm and Weiße Elster (together with River Pleiße) were the underlying cause.

¹ Preliminary values and raw data

Dyke failures at Klein Rosenberg in the area between the confluent rivers Saale and Elbe, at Fischbeck between the confluence of Elbe and Havel, and near Tangermünde, together with the controlled flooding of lowland regions on the River Havel brought notable relief for the areas downstream. According to first computations, the flood peak at Wittenberge was thus reduced by 35-40 cm. The return intervals of the flood peaks in the Elbe ranged from 50-100 years at Dresden up to 200-500 years at the gauge Magdeburg-Strombrücke² (here in conjunction with a measured river discharge in the peak wave of some 5,100 m³/s on 9 June 2013).

Water-level measurements were this time considerably less problematic than during the flood of 2002, because of the efforts for improvement taken over recent years. However, several very extreme maximum flood levels (HHW) caused technical problems at some gauging stations, so that further efforts for improved gauge reliability will be necessary in the future.

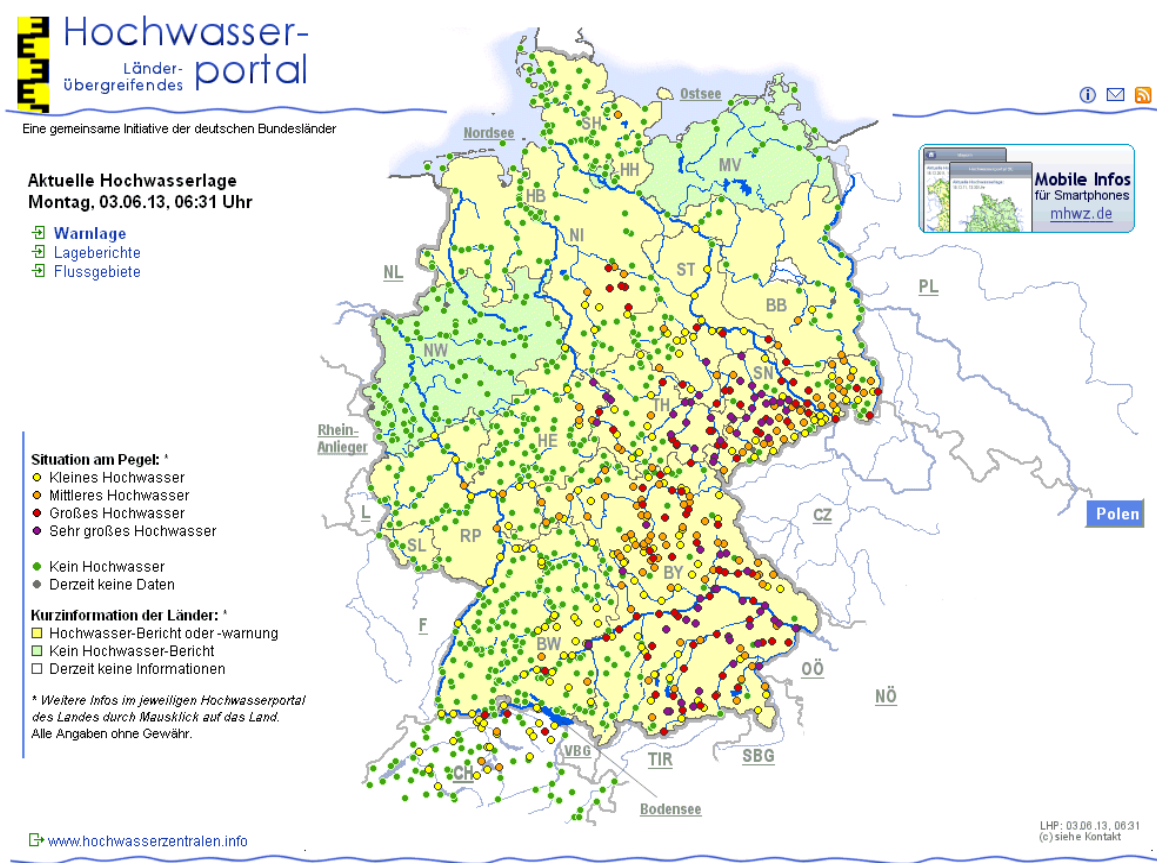
² Preliminary values based on raw data without plausibility check.



Figure 3: The rivers Elbe und Saale during the 2013 flood. River reaches where the highest ever measured water levels (HHW) were exceeded are marked in red.

Federal institutions and agencies of the effected Federal States made numerous river-discharge measurements during the flood event. Moreover, flood peaks were tracked by digital aerial photography in high resolution. These data serve – besides for the documentation of this event - after processing and evaluation above all to optimise the simulation and evaluation of flood events as well as their prediction.

The riparian population had access to up-to date information about the flood event on the Internet on the “LHP/Länderübergreifendes Hochwasserportal” (Inter-state Flood Portal, see Figure 4) and the linked portals of the individual Federal States. These offer - besides comprehensive information about the current flood event – river-basin related and regional flood warnings as well as flood forecasts to crisis management squads and the affected riparian dwellers.



Tabellarische Übersicht: Aktuelle Hochwasserlage, Montag, 03.06.13, 06:31 Uhr

Land	Pegel mit Hochwasser	... nach Größe	Kurzinformation	Bericht	Datenübermittlung
Baden-Württemberg	37 von 206	34 2 1 -	Entspannung absehbar Am Pegel Heidelberg / Neckar wurde der Scheitel von ca. 5,3 m am Sonntag Abend erreicht. Am Pegel Maxau / Rhein wurde am Sonntag um 13:15 MESZ ein		heute, 06:25 Uhr

Figure 4: Internet portal of the Federal States on the flood situation on 3 June 2013

Federal Institute of
Hydrology

Am Mainzer Tor 1
56068 Koblenz

P.O.Box 20 02 53
56002 Koblenz

Switchboard 0261/1306-0
Fax 0261/1306-53 02

E-Mail: posteingang@bafg.de
Internet: www.bafg.de



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