

# Understanding the impact of extreme weather to plan preventive measures

*“To meet end user requirements regarding data content and quality, Copernicus Services need access to open, up-to-date, and harmonised geospatial information across Europe. Data produced by National Mapping, Cadastral and Land Registration Authorities, the members of EuroGeographics, is therefore key to its success.*

*Typically, geospatial data is relevant for all the different services, but we have identified three key services which require geospatial data: the Copernicus emergency service and its rapid mapping, and risk and recovery mapping; the Copernicus land monitoring service; and the Copernicus Security Service which supports, inter alia, the EU External Action Service.*

*By working closely together, we can improve the use of authoritative data and services by Copernicus and ensure National Mapping, Cadastral and Land Registration Authorities are recognised for their essential contributions.”*

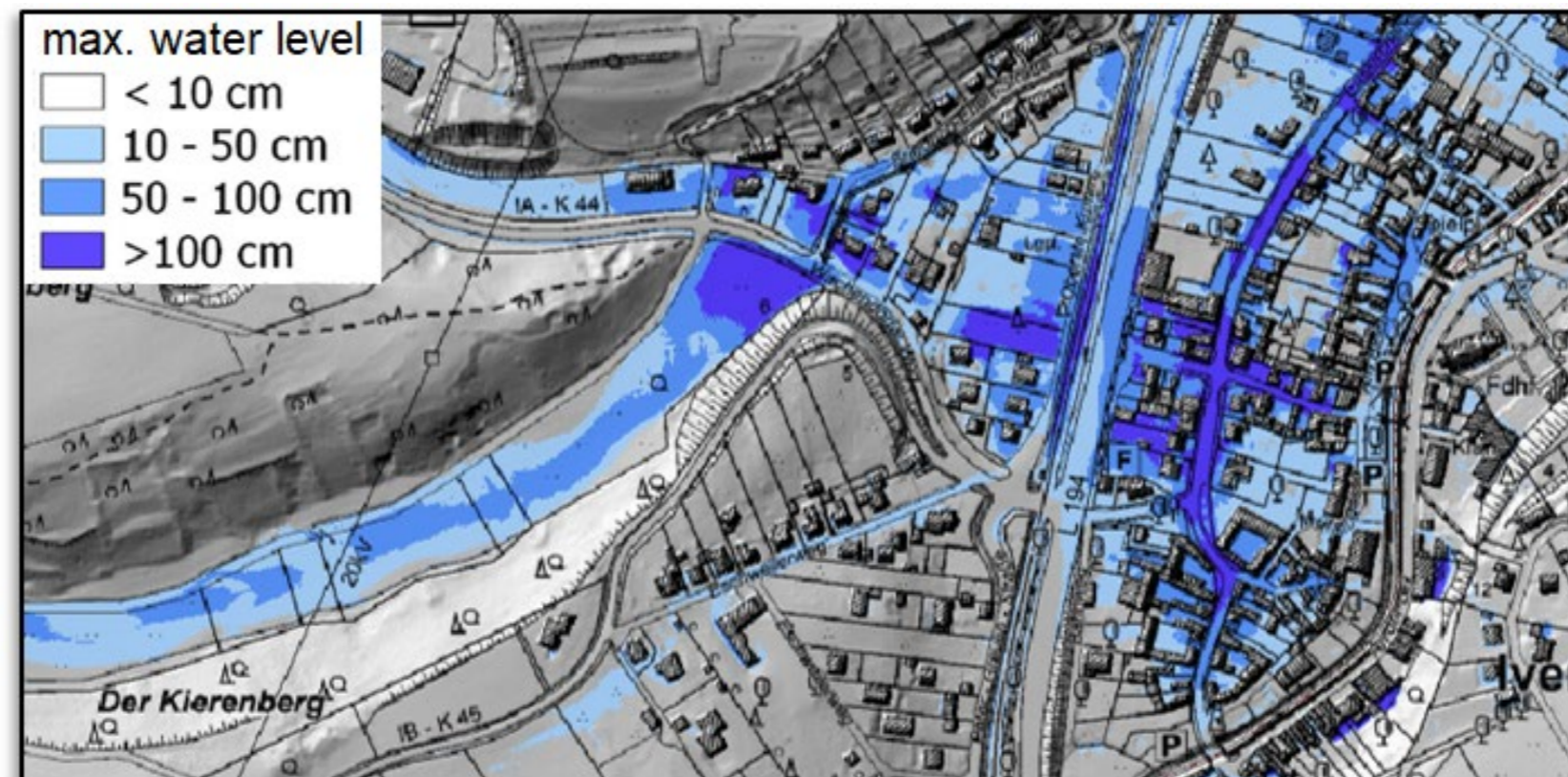
Jose Miguel Rubio Iglesias  
Geospatial Data Management Expert,  
European Environment Agency (EEA)

## Introduction

**Authoritative digital elevation and land cover data provided by the Federal Agency for Cartography and Geodesy (BKG), Germany is being used to better understand, predict and prevent future flooding caused by extreme weather.**

## Challenge

In July 2021, heavy rainfall caused catastrophic flooding that devastated communities and claimed at least 187 lives along the Moselle, Rhine and Ruhr rivers in Rhineland-Palatinate and North Rhine-Westphalia, Germany. To better prepare and recover from such events in the future, it was crucial to understand how the disaster evolved within such a short timescale.



## Benefits

- Informs the population, public decision-makers and emergency services about potential flooded areas in case of a heavy rain event.
- Provides important information for future construction projects and supports a building policy adapted to climate change.
- Enables precise planning of preventive measures by showing where infrastructure is most vulnerable using a spatial grid resolution of 1 metre.
- Establishes the first nationwide basis for heavy rainfall hazard information maps.
- Supplies municipalities with a basis for heavy rainfall risk management and can serve as a reference dataset for municipal mapping.
- Provides a freely accessible and easy-to-use heavy rainfall hazard information map on a central platform.
- Promotes cross-sectoral cooperation and exchange of expertise across public agencies.

## Solution

“Extreme weather conditions caused by global climate change have become increasingly frequent phenomena of our everyday life. By establishing a nationwide uniform basis for heavy rainfall hazard information maps in Germany, the Federal Agency for Cartography and Geodesy (BKG) is making an important contribution to risk management. As the first region mapped, North Rhine-Westphalia marks the beginning of the BKG project planned to be expanded to other federal states.”

### Professor Paul Becker

President, Federal Agency for Cartography and Geodesy (BKG), Germany

The Copernicus Emergency Management Service Risk and Recovery Standard was activated by the Federal Office of Civil Protection and Disaster Assistance (BBK) so that it could carry out a retrospective assessment of the flooding.

Elevation and land cover data from BKG and the German federal states were vital for the hydraulic modeling used to provide the temporal analysis. BKG harmonizes federal state one metre resolution Digital Terrain Models (DTM) to a national coverage. The DTM removes vegetation, buildings and other features to show elevation data and reveals the underlying topography of the area. Furthermore, the CORINE Land Cover dataset, which includes data supplied by BKG and is provided through the Copernicus Land Monitoring Service, enabled the identification of specific characteristics.

By contributing to the development of an accurate heavy rainfall information map, BKG data played a key role in the preparedness and recovery phase of the disaster management cycle.

BKG is now creating a standardised, public, freely accessible, and easy-to-use heavy rainfall hazard information map, with the North Rhine-Westphalia area being the first to be published.

By integrating geospatial data such as a DTM, meteorological data provided by the German National Meteorological Service (DWD) and land use data, heavy rain hazard simulations are produced for two scenarios. The first is a rare event that is not expected to take place more than once every hundred years is based on DWD regionalised long-term meteorological data, the second is an extreme scenario assuming a rainfall intensity of 90 mm/h. The map shows the hydro numerically computed water levels and flow velocities for each of the scenarios. The geodata are publicly accessible via the central platform of the German Spatial Data Infrastructure (www.geoportal.de).



**MORE INFORMATION**

[www.geoportal.de](http://www.geoportal.de)



**ACTIVATION**

<https://emergency.copernicus.eu/mapping/list-of-components/EMSN105>

