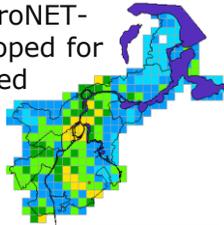


## Web application for radar rainfall data

The warning tool, implemented as an online web application, combines information from the vulnerability analysis, the hydrodynamic modelling and radar rainfall data with a high spatial resolution.

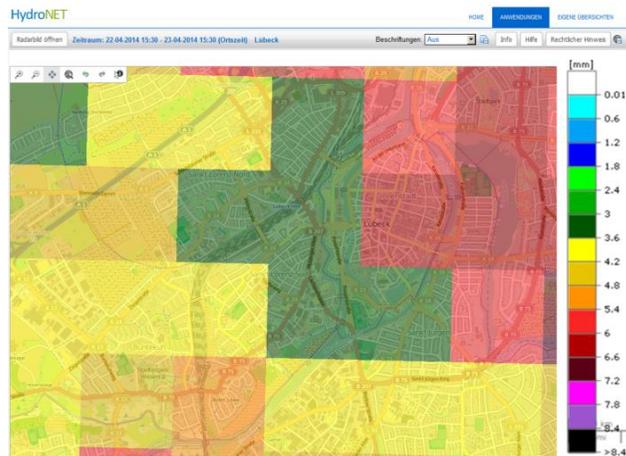
The online web application HydroNET-SCOUT has already been developed for the project HydroCity and is used by the State Agency for Agriculture, Environment and Rural Areas in Schleswig-Holstein, Germany.



Portal  
HydroNET-SCOUT

The web application can visualize measured radar rainfall data (see picture) and is able to plot time series at any selected point.

Corrected radar rainfall data will be used for the calculation of a short-term forecast over a period of one hour (nowcast), so that an early warning is possible, e.g. for the fire brigade.



web application HydroNet-SCOUT – segment of Luebeck (spatial resolution 1km x 1km)

## RainAhead - Team



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## RainAhead

Integrated  
planning and warning tool  
for heavy rain in urban regions



project term: 01-Jun-2013 to 31-May-2016



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

Supported by:



based on a decision of the Parliament  
of the Federal Republic of Germany





## RainAhead

Heavy rainfall events can cause severe damage through urban flash floods on a local scale. The results are flooded roads and basements. Potential damage can be reduced and areas susceptible to flooding protected by means of urban planning and improved warning systems.

The project "RainAhead" analyses how the impact on urban sewer systems can be reduced in order to enhance our ability to deal with heavy rainfall events more easily. Therefore a GIS based model will be developed for the City of Luebeck. Among other things, it will help to assess the danger in case of heavy rainfall.

Together with the project partners – hydro & meteo GmbH & Co.KG, Luebeck University of Applied Sciences and the Hanseatic City of Luebeck – further institutions such as the fire brigade, the "Entsorgungsbetriebe Luebeck" (municipal service for waste and wastewater), urban planning and citizens are working on innovative, transparent and sustainable methods.

RainAhead is funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

## Vulnerability map

A vulnerability map will give an overview of areas, objects or natural resources which are susceptible to urban flooding. In the second step all elements will be evaluated concerning their exposure to heavy rainfall.

The collected data will cover different aspects:

- Dangerous goods (e.g. heating oil tanks)
- Protective goods (e.g. underground parking)
- Population (e.g. age structure)
- Environmental data (e.g. sealing)

As an example, the following picture is showing substances hazardous to water (blue and yellow symbols) and sealed surface in a residential area.

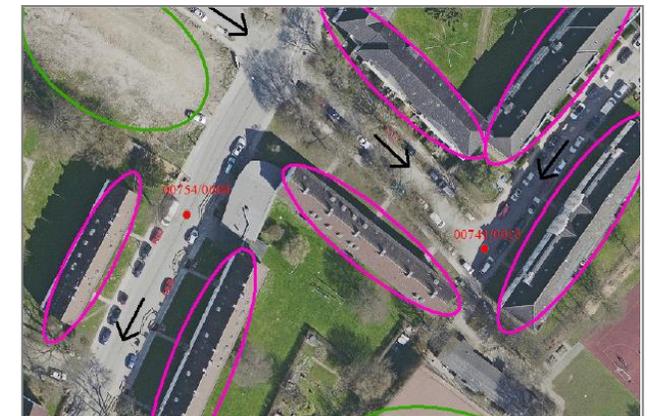


The vulnerability map will be extended for other aspects which are associated with climate change, e.g. health protection. The aim is to establish a comprehensive tool for the adaption to climate change for local planners.

## Hydrodynamic modelling and urban planning

In cases of flash floods the amount of precipitation often exceeds the design rainfall of urban sewer systems. Mostly, the sewer system is designed for precipitation events with return periods of 1-5 years. In order to get precise information on surface run off and flood risk, it is essential to couple a 1D-sewer system model with a 2D-surface run off model.

A detailed 1D/2D coupled hydrodynamic simulation is performed for the pilot district St. Lorenz Sued. Potentially endangered areas could be identified (see picture) and a number of protection measures have already been proposed and discussed in order to reduce storm water run off into the sewer system.



For the identification of possible flow paths in the whole city a GIS-based flow route analyses will be conducted. For the runoff modelling we will consider different climate scenarios and integrate the results in our vulnerability map in order to identify sensitive areas.