

## DATA SET DESCRIPTION

### Grids of return periods of heavy precipitation (design precipitation) over Germany (KOSTRA-DWD)

#### Version 2010R

**Cite data set as:** DWD Climate Data Center (CDC): Grids of return periods of heavy precipitation (design precipitation) over Germany (KOSTRA-DWD), version 2010R.

#### INTENT OF THE DATASET

These vector data sets for GIS contain statistical precipitation values as a function of the duration and the return period. The scope of the data is the engineering dimensioning of water management structures. These include, sewerage networks, sewage treatment plants, pumping stations and retention basins. They are also often used for the dimensioning of drainage systems and infiltration systems. With the help of the data, however, it is also possible to estimate the precipitation level of severe heavy precipitation events with regard to their return periods. This estimation is often used to assess damage events.

#### POINT OF CONTACT

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#### DATA DESCRIPTION

<b>Spatial coverage</b>	Germany															
<b>Temporal coverage</b>	01.01.1951 - 31.12.2010															
<b>Spatial resolution</b>	8.15 km x 8.20 km															
<b>Projection</b>	ETRS 1989, Lambert Conformal Conic, EPSG:3034, see <a href="http://spatialreference.org/ref/epsg/3034/">http://spatialreference.org/ref/epsg/3034/</a> .															
<b>Format(s)</b>	The data set contains the vector data sets of all 18 duration levels. A vector data set contains the statistical precipitation (HN, design precipitation) of the present duration level D for nine return periods T for the whole 79 x 107 grid. INDEX_RC describes the position of the grid in the format "line number multiplied by 1000 plus column number". Each row goes from West to East and each column goes from North to South. The first grid field is in the upper left corner. Grid fields that are not occupied have the missing value -99.9. Additionally, information about the projection (shp, dhx, prj, qpj-files), as well as layer style files for ESRI ArcGIS (lyr files) and QGIS (qml files) are available. Further information can be found in the support documents ( <a href="https://opendata.dwd.de/climate_environment/CDC/help/KOSTRA/KOSTRA_DWD_2010R">https://opendata.dwd.de/climate_environment/CDC/help/KOSTRA/KOSTRA_DWD_2010R</a> , in German only).															
<b>Parameters</b>	Statistical precipitation values (HN, design precipitation) for various durations (5 min to 72 h) and return periods (1 a to 100 a): <table><tr><td>INDEX_RC</td><td>Index of grid</td><td>(row number · 1000) + column number</td></tr><tr><td>HN_001A</td><td>Design precipitation for ...</td><td></td></tr><tr><td>HN_002A</td><td>... return period 1 a</td><td>mm</td></tr><tr><td>HN_003A</td><td>... return period 2 a</td><td>mm</td></tr><tr><td></td><td>... return period 3 a</td><td>mm</td></tr></table>	INDEX_RC	Index of grid	(row number · 1000) + column number	HN_001A	Design precipitation for ...		HN_002A	... return period 1 a	mm	HN_003A	... return period 2 a	mm		... return period 3 a	mm
INDEX_RC	Index of grid	(row number · 1000) + column number														
HN_001A	Design precipitation for ...															
HN_002A	... return period 1 a	mm														
HN_003A	... return period 2 a	mm														
	... return period 3 a	mm														

HN_005A	... return period 5 a	mm
HN_010A	... return period 10 a	mm
HN_020A	... return period 20 a	mm
HN_030A	... return period 30 a	mm
HN_050A	... return period 50 a	mm
HN_100A	... return period 100 a	mm

**Uncertainties**

Uncertainties are caused, on the one hand, from the statistical methods themselves, but also from the regionalization process, as well as from erroneous or missing observations. Uncertainties are the greater, the more rarely an event occurs statistically (Malitz & Ertel, 2015). Please note the following tolerance ranges:

$1 a \leq T \leq 5 a$	$\pm 10 \%$
$5 a < T \leq 50 a$	$\pm 15 \%$
$50 a < T \leq 100 a$	$\pm 20 \%$

**DATA ORIGIN**

The grids are based on the DWD station data. For further information about data and method see Malitz & Ertel (2015) as well as Junghänel et al. (2017).

**VALIDATION AND UNCERTAINTY ESTIMATE**

The actual information density depends on the station network. Two sets of stations are distinguished: data in temporal high resolution (5 min data) und daily data. The number of stations with temporal high resolution but a long time series is limited. The number increases rapidly from 1951 with 56 stations to 94 stations in 1961. Until 2010 there are about 10 additional stations. In terms of daily data, the number of stations increases from 3,500 in 1951 to the year 1989 to more than 4,500 stations and then decreases to 2,100 stations in 2010.

**CONSIDERATIONS FOR APPLICATIONS**

The data set is also available as ASCII data set ([https://opendata.dwd.de/climate\\_environment/CDC/grids\\_germany/return\\_periods/precipitation/KOSTRA/KOSTRA\\_DWD\\_2010R/asc](https://opendata.dwd.de/climate_environment/CDC/grids_germany/return_periods/precipitation/KOSTRA/KOSTRA_DWD_2010R/asc)).

**REFERENCES**

Malitz, G. und Ertel, H.: KOSTRA-DWD-2010 - Starkniederschlagshöhen für Deutschland (Bezugszeitraum 1951 bis 2010), Abschlussbericht, Deutscher Wetterdienst, Offenbach am Main, 2015 ([LINK](#), in German only).

Junghänel, T., Ertel, H. und Deutschländer, T.: KOSTRA-DWD-2010R - Bericht zur Revision der koordinierten Starkregenregionalisierung und -auswertung des Deutschen Wetterdienstes in der Version 2010, Deutscher Wetterdienst, Offenbach am Main, 2017 ([LINK](#), in German only).

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**REVISION HISTORY**

The data set represents the revision of KOSTRA-DWD-2010. Methodological changes have been made but the data basis and the format remain the same. For further information see Junghänel et al. (2017). This document is maintained by Unit Hydrometeorological Consultancy (KU41A) of DWD, last edited 19.12.2018.