

Geodaten der deutschen Landesvermessung

Bundesamt für Kartographie und Geodäsie

# Digital Terrain Model GRID Width 50 m DGM50



Product as of 2016

Federal Agency for Cartography and Geodesy

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# 1 Overview of dataset

Product	:	DGM50				
Contents	:	The Digital Terrain Model DGM50 describes the terrain forms of the earth's surface by means of a point quantity arranged in a regular grid, which is geo-referenced as to position and height. The grid width is 50 m.				
Area	:	Territory of the Federal Republic of Germany				
Spatial classification	:	Tiles 20 km x 20 km				
Georeferencing	:	UTM projection in zone 32 or 33 Ellipsoid GRS80, Datum ETRS89				
		Gauß-Krüger projection in the 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> or 5 <sup>th</sup> meridional strip,				
		Bessel Ellipsoid, Potsdam Datum (central point Rauenberg)				
		Height system: German national height system 1992, tide gauge Amsterdam (DHHN92) (see http://crs.bkg.bund.de/crseu/crs/eu- countrysel.php?country=DE)				
		(further georeferencings on request)				
Topicality	:	See metainformation system under www.geodatenzentrum.de.				
Source	:	Datasets of the Surveying Authorities of the States of the Federal Republic of Germany				
Production method	:	Acquisition of the height data by the Surveying Authorities of the States of the Federal Republic of Germany applying different methods: Laser scanning, photogrammetry and digitization of contour lines).				
		Adoption, format conversion and comprehensive examination of the data by BKG as well as final fusion of the data stocks into a consistent terrain model.				
Resolution	:	Position: 50 m Height: 0,01 m				
Accuracy	:	Position: ± 1-3 m Height: ± 2-4 m				
Data formats	:	X,Y,Z-ASCII GRID-ASCII GRID				
Data carriers	:	online(ftp), DVD				

#### 2 Description of the dataset contents

The Digital Terrain Model DGM50 describes the terrain forms of the earth's surface by means of a point quantity arranged in a regular grid, which is geo-referenced as to planimetry and altimetry. The grid width is 50 m.

The dataset covers the territory of the Federal Republic of Germany. In several parts also height values for areas outside the state borders are available.

The primary datasets were produced by the Surveying Authorities of the States of the Federal Republic of Germany using the following different techniques:

- Digitization of the height transparencies, for example of the TK25 and DGK5 map series, respectively, through vectorization and interactive revision of the contours.
- Photogrammetric determination of height information by means of profiling, grid measurement, collection of morphological structure elements or similar methods,
- Laser scanning.

Further processing of the data stocks was made by BKG:

- Georeferencing of the datasets into the UTM projection (zone32) and the height system DHHN92 (in case this was not yet done by the Surveying Authorities of the States).
- Verification of the height information in existing overlapping areas at the borders of the states (Länder). Correction of existing discrepancies through re-measurements in situ and elimination of height data obviously out of date, respectively. This is done in close collaboration with the Surveying Authorities of the States.
- Merging of the individual datasets of the Surveying Authorities of the States by interpolation into a dataset with a consistent grid width.

The current height accuracy amounts to  $\pm 1$  to 4 m, in dependency of the respective terrain type.

Hints on the current stock of data:

- Bridges do not form part of the DGM. However, in individual cases bridges may be represented in the DGM.
- Due to different water levels at the relevant recording dates height offsets may occur within waters.

#### 3 Data volume

The data volume of the total dataset amounts in the single data formats to:

XYZ-ASCII (zipped)	approx. 580 MB
GRID-ASCII (zipped)	approx. 460 MB
GRID	approx. 930 MB

# 4 Description of the data formats

#### 4.1 X, Y, Z-ASCII

This ASCII file contains per line a height point consisting of the planimetric coordinates of the point and the allocated height value. The data are in each case separated by a blank. The file extension reads ".xyz".

Dataset format (one height point per line):

<x-value>, <y-value>, <z-value>

Example:

```
3500000 5600000 57.10
3500050 56000000 57.12
```

In case of inexistent height values the whole line is dropped.

## 4.2 GRID-ASCII

The format introduced in line with the ARC/INFO geoinformation system includes, after a file header, only the height values for quadratically arranged grid points. Thus, it is more compact than the XYZ format given that the relevant planimetric coordinates for each single point are dropped. From the information contained in the file header (number of lines and columns, planimetric coordinates of the left lower height point and grid width) the planimetric coordinate for each height value can be determined. The file extension reads ".asc".

For the purpose of compatibility with the binary GRID format, in which the centre point of a cell constitutes the carrier of the height information, the left lower height point is in the file header of the GRID-ASCI format defined by XLLCENTER, YLLCENTER as the central point of the left lower GRID line. (GRID cells and meshes of the grid of height points are thus offset to each other by half a mesh width.)

Dataset format:

<File header> <Height values linewise starting from upper left, blanks as separators >

File header:

NCOLS	- number of columns
NROWS	- number of lines
XLLCENTER	<ul> <li>x-coordinate of the left lower height point</li> </ul>
YLLCENTER	- y-coordinate of the left lower height point
CELLSIZE	- cell size in meters
NODATA_VALUE	- value in case of inexisting height value (here –9999)

Example: Start of a clipping of the DGM50

 NCOLS
 1201

 NROWS
 721

 XLLCENTER
 3500000.0

 YLLCENTER
 5600000.0

 CELLSIZE
 50

 NODATA\_VALUE
 -9999

 57.10 57.12 57.15 57.20 57.26 57.30 .... ← line 721 (counting from end of file)

57.12 57.14 57.20 57.31 57.37 57.41 ... ← line 720

When counting from the end of file line 1 contains the data referring to the south, and line 721 the ones referring in the example to the north. XLLCENTER and YLLCENTER indicate the position of the lower left (south-westernmost) height point (which is also the central point of the GRID cell).

For the example above, this means for the value in column 2 and row 720 :

Easting (X)	=	xllcorner	+	50 * (2 –1)	=	3500000 + 50	=	3500050
Northing (Y)	=	yllcorner	+	50 * (720 – 1)	=	5600000 + 35950	=	5635950
Elevation (Z)	=	57.14						

#### 4.3 GRID

The GRID is a binary format especially used in Arcinfo for cell-based geographical datasets. The respective height data refer in each case to the centre of a GRID cell.

In derogation of the two ASCII formats the interpolated height points in these datasets are offset by half a grid width (for instance, at 3500025, 5600025 instead of at 350000, 5600000). As a result of this interpolation of heights at other planimetric points, the height values can in particular not be identical with the data given in the ASCII files.

## 5 Hints on the supply of data

The data are provided spatially structured in the form of 20 km x 20 km tiles, which means also in the case of selected rectangles and other spatial segments. In the GRID format always complete tiles including all height values are supplied. In the XYZ-ASCII and GRID-ASCII formats the tiles are cut according to the areas required, and in the case of GRID-ASCII filled with NODATA-VALUE, if required.

# 6 Data acquisition

#### 6.1 Test data

Test data can be downloaded from our website under the heading "Test data". In terms of content and structure, they correspond to the data supplied later and can therefore be used for very concrete application testing purposes.

#### 6.2 Ordering of data and services

Orders can be placed via the online ordering system on our website <u>www.bkg.bund.de</u> under the heading "Products & Services".

Alternatively, you can send your order to the Service Center (DLZ).

# 7 Terms of use and copyright

The data are protected by copyright. They are only provided against a fee. The provisions of the Directive on Fees for the Provision and Use of Geographic Reference

Data of the Surveying Authorities of the Laender of the Federal Republic of Germany (AdV Fee Directive - AdV-GR) shall apply. For the acquisition of rights of use, please contact the Central Office for Geotopography of the AdV / Service Center.

Federal Agencies and other holder of rights of use according to § 3 V GeoBund received the data free of charge.

The source has to be referenced. In particular, each user must place the source note to all geodata, metadata and geodata services recognizable and in an optical context. Changes, adaptations, new designs or other modifications must be accompanied by a change notice in the source note.

The source note and change notice are to be designed as follows. When displayed on a website, the source note must be linked to the URL "http://www.bkg.bund.de".

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## 8 Contact

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