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# Digital Terrain Model Grid Width 200 m

## *DGM200*



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Bundesamt für Kartographie und Geodäsie

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## 1 Overview of dataset

<b>Product</b>	: DGM200
<b>Contents</b>	: The Digital Terrain Model DGM200 describes the terrain forms of the earth's surface by means of a point quantity arranged in a regular grid, which is georeferenced to planimetry and altimetry. The grid width is 200 m,
<b>Area</b>	: Territory of the Federal Republic of Germany,
<b>Spatial structure</b>	: Complete dataset, no tiling,
<b>Georeferencing</b>	: UTM representation 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: Deutsches Haupthöhennetz 1992 (German First Order Levelling Network 1992), Amsterdam Water Level (DHHN92), (see <a href="http://crs.bkg.bund.de/crseu/crs/eu-countryssel.php?country=DE">http://crs.bkg.bund.de/crseu/crs/eu-countryssel.php?country=DE</a> ),  others on request – as free download a selection only,
<b>Topicality</b>	: See metainformation system under <a href="http://www.geodatenzentrum.de">www.geodatenzentrum.de</a> , ca. 1-year revision cycle at the planning stage,
<b>Source</b>	: Databases of the Land (state) survey and cadastral institutions,
<b>Production method</b>	: Capture of the height data by the Land survey and cadastral institutions by means of different methods: laser scanning, photogrammetry and digitization of contours, Adoption, format conversion and comprehensive verification of the data by BKG, as well as finally merging of the datasets into a uniform terrain model,
<b>Resolution</b>	: Planimetry: 200 m Altimetry: 0,01 m,
<b>Accuracy</b>	: Planimetry: ± 1 – 5 m Altimetry: ± 3 – 10 m,
<b>Data formats</b>	: XYZ-ASCII GRID-ASCII GRID,
<b>Data ordering</b>	: - download for free and as a view service - subject to a charge when using the ordering system - (CD, DVD, FTP),

## **2 Description of the dataset contents**

The Digital Terrain Model DGM1000 describes the terrain forms of the earth's surface by means of a point quantity arranged in a regular grid, which is georeferenced to planimetry and altimetry. The grid width is 1000 m.

The dataset covers the territory of the Federal Republic of Germany. In places, height values are available also on the other side of the state border.

Creation of the primary data collections was performed by the state survey institutions using the following different technologies:

- Digitization of height films, for instance of the map series TK25 and DGK5, respectively, through vectorization and interactive revision of the contours.
- Photogrammetric determination of height information by means of profiling, raster measurement, acquisition of morphological structural elements or similar procedures.
- Laser scanning.

A further preparation of the relevant datasets was performed by BKG:

- Georeferencing of the datasets into the UTM projection (zone 32) and the DHHN92 height system (if not already done by the Land Survey Offices).
- Review of the height information in the existing areas of overlap at the Land boundaries. Correction of existing inconsistencies through on-site remeasurements or elimination of evidently outdated height data, that is, in close cooperation with the Land Survey Offices.
- Consolidation of the particular data inventories held by the Land survey institutions through interpolation into a single database with uniform grid width.

Depending on the type of terrain the current height accuracy amounts to  $\pm 10$  m to 20 m.

Hints on the up-to-date data pool:

Bridges are generally not part of the DGM (DTM). However, bridges can occur singly in the DGM.

Due to different water levels at the recording times height offsets can occur in waters.

## **3 Data volume**

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

XYZ-ASCII (zipped)	ca. 2 MB
GRID-ASCII (zipped)	ca. 1 MB
GRID	ca. 3 MB

## 4 Description of the data formats

### 4.1 XYZ-ASCII

This ASCII file contains per line a spot height consisting of the planimetric coordinates of the point and the allocated height value. The figures are each separated by space characters. The file extension is ".xyz".

Dataset format (one spot height per line):

<x value> <y value> <z value>

Example:

```
3500000 5600000 57.10
3501000 5600000 57.12
...
```

For non-existent height values the whole row is in each case not applicable.

### 4.2 GRID-ASCII

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

For the purpose of compatibility with the binary GRID format, in which the center of a cell (CELL) is the carrier of the height information, the left lower spot height is in the file header of the GRID-ASCII format defined by XLLCENTER, YLLCENTER as the center of the left lower GRID line. (This means that the GRID cells and meshes of the spot height grid are offset by half a mesh size to each other).

Dataset format:

<file header>  
<height values line by line, beginning at the top left, blanks as separators>

File header:

NCOLS	- number of columns
NROWS	- number of lines
XLLCENTER	- x coordinate of the left lower spot height
YLLCENTER	- y coordinate of the left lower spot height
CELLSIZE	- cell size in meters
NODATA_VALUE	- value in case of non-existent height value (here -9999)

Example: beginning of a section of the DGM1000

```
NCOLS          1201
NROWS          721
XLLCENTER      3500000.0
YLLCENTER      5600000.0
CELLSIZE       1000
NODATA_VALUE   -9999
57.10 57.12 57.15 57.20 57.26 57.30 ... ← line 721 (counting from the 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, as given in the example, those referring to the north. XLLCENTER and YLLCENTER indicate the position of the left lower (most south-westerly) spot height (also the center of the GRID cell).

For the above example this means that with respect to the value given in column 2 and line 720:

Easting (X)	=	xllcenter + 1000 * (2 – 1)	=	3500000 + 1000	=	35001000
Northing (Y)	=	yllcenter + 1000 * (720 – 1)	=	5600000 + 719000	=	6319000
Altitude (Z)	=	57.14				

### 4.3 GRID

The GRID is a binary format especially used in ArcInfo for cell-based geographic datasets. The height data refer in each case to the middle of a GRID.

In contrast to the two ASCII formats the interpolated spot heights are in these datasets offset by half a grid width (for example at 3500500, 5600500 instead of 3500000, 5600000). Owing to this interpolation of the heights at other planimetric points, the height values can in particular not be identical with the data given in the ASCII files.

#### Test data

Test data for download can be found under:

[www.geodatenzentrum.de](http://www.geodatenzentrum.de) → *Auskunft über Daten und Dienste* → *Testdaten*

## 6 Terms of use and references

This dataset is available for download and online use via geodata services, according to the law on access to spatial data, for commercial and non-commercial usage exempted from payment.

Usage of the geodata and geodata services is regulated by the *Verordnung zur Festlegung der Nutzungsbestimmungen für die Bereitstellung von Geodaten des Bundes (GeoNutzV)* (Ordinance to determine the conditions for use for the provision of spatial data from the Federation) of 19 March 2013 (Bundesgesetzblatt Jahrgang 2013 Teil I Nr. 14) (Federal Law Gazette 2013, Part 1., No. 14).

In particular, every user must place the respective source note on all geodata, metadata and geodata services unambiguously and in optical relationship. Alterations, revisions, new designs or any other variations must be provided with an alteration notice in the source reference.

Source reference and alteration notice must be presented as follows: With the representation on a website the source reference must be linked with the URL "<http://www.bkg.bund.de>".

© GeoBasis-DE / BKG <year of last data ordering>

© GeoBasis-DE / BKG <year of last data ordering> (data changed)

*Example:*

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## 7 Data ordering

The dataset can be ordered free of charge in the most frequently requested specifications and as a Web service under

[www.geodatenzentrum.de](http://www.geodatenzentrum.de) → Open Data

Against reimbursement of the relevant costs the dataset can be ordered in further georeferencings from the service center's geodata shop and be delivered on data carrier or via per FTP:

[www.geodatenzentrum.de](http://www.geodatenzentrum.de) → Online-Shop → Geodaten-Shop

The respective extraordinary expense will be invoiced by BKG.

Orders and enquiries may be sent to the following address:

Bundesamt für Kartographie und Geodäsie  
Referat G15 - Dienstleistungszentrum  
Karl-Rothe-Straße 10-14  
D-04105 Leipzig

Tel.: +49(0)341 5634 333  
Fax: +49(0)341 5634 415  
Email: [dlz@bkg.bund.de](mailto:dlz@bkg.bund.de)

Further information and services can be found under [www.geodatenzentrum.de](http://www.geodatenzentrum.de).