



Documentation

TopPlus



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1 Overview of the dataset

Product:	TopPlus
Content:	The TopPlus product combines various open and official data sources and displays them in a harmonized web map and in high-resolution topographic presentation graphics. The different levels of detail of the TopPlus web map range from the global overview map to the detailed city map in Germany.
Area:	The web map is divided into different display areas depending on its georeferencing. The area of the worldwide map in the small-scale range, the area of Europe in the middle-scale range and the area of Germany as well as parts of the neighbouring foreign countries on a large scale is shown below for the zoom levels and the reference systems Web Mercator and UTM32: Web Mercator Projection (EPSG:3857) <i>Zoomlevel 0 – 10 (World)</i> X/Y-Values lower left -20037508,34 / -20037508,34 X/Y-Values upper right 20037508,34 / 20037508,34 <i>Zoomlevel 11 – 16 (Europe)</i> X/Y-Values lower left -3757032,81 / 2504688,54 X/Y-Values upper right 5009377,09 / 12523442,71 <i>Zoomlevel 17 – 18 (Germany + parts of neighbouring foreign countries)</i> X/Y-Values lower left 469629,10 / 5831228,01 X/Y-Values upper right 1878516,41 / 7514065,63 UTM32 (EPSG:25832) <i>Zoomlevel 0 – 10 (Europe)</i> X/Y-Values lower left -2550821,71 / 2544186,73 X/Y-Values upper right 2458555,37 / 7553563,81 <i>Zoomlevel 11 – 13 (Germany + parts of neighbouring foreign countries)</i> X/Y-Values lower left 149545,62 / 5127146,79 X/Y-Values upper right 1049668,07 / 6222948,02

	The high resolution presentation graphics (200 pixels per cm) are provided in the following scales and for the area described. Presentation Graphics in UTM32 (EPSG:25832): TopPlus-P5 1:5.000 X/Y-Values lower left 244000 / 5178000 X/Y-Values upper right 960000 / 6120000 TopPlus-P10 1:10.000 X/Y-Values lower left 244000 / 5176000 X/Y-Values upper right 960000 / 6120000 TopPlus-P17.5 1:17.500 X/Y-Values lower left 238000 / 5175000 X/Y-Values upper right 959000 / 6120000 TopPlus-P25 1:25.000 X/Y-Values lower left 240000 / 5170000 X/Y-Values upper right 960000 / 6120000 TopPlus-P50 1:50.000 X/Y-Values lower left 240000 / 5160000 X/Y-Values upper right 960000 / 6120000 TopPlus-P100 1:100.000 X/Y-Values lower left 240000 / 5160000 X/Y-Values upper right 960000 / 6120000 Presentation Graphics in Lambert-Projection (EPSG:3035) : TopPlus-P250 1:250.000 X/Y-Values lower left 1500000 / 900000 X/Y-Values upper right 6600000 / 5700000
Spatial structure:	Further details on spatial structure are listed in chapter 3.1.

Layer:

The following online services are offered for the TopPlus:

WMS TopPlus

Service: https://sg.geodatenzentrum.de/wms_topplus?
 Layer: web, web_grau
 Description: worldwide consistent web map.
 Color version and grayscale version
 Area: worldwide (for a detailed description, see area above)
 Resolution: 90.7 dpi monitor resolution

WMS TopPlus-P5

Service: https://sg.geodatenzentrum.de/wms_topplus_p5?
 Layer: p5, p5_grau, p5_hell
 Description: TopPlus 1:5.000
 High-resolution Digital Raster Graphics, Color version, grayscale version and brightened version
 Resolution: 508 dpi Print resolution or 0,25 Meter per pixel

WMS TopPlus-P10

Service: https://sg.geodatenzentrum.de/wms_topplus_p10?
 Layer: p10, p10_grau, p10_hell
 Description: TopPlus 1:10.000
 High-resolution Digital Raster Graphics, Color version, grayscale version and brightened version
 Resolution: 508 dpi Print resolution or 0,5 Meter per pixel

WMS TopPlus-P17.5

Service: https://sg.geodatenzentrum.de/wms_topplus_p17.5?
 Layer: p17.5, p17.5_grau, p17.5_hell
 Description: TopPlus 1:17.500
 High-resolution Digital Raster Graphics, Color version, grayscale version and brightened version
 Resolution: 508 dpi Print resolution or 0,875 Meter per pixel

WMS TopPlus-P25

Service: https://sg.geodatenzentrum.de/wms_topplus_p25?
 Layer: p25, p25_grau, p25_hell
 Description: TopPlus 1:25.000
 High-resolution Digital Raster Graphics, Color version, grayscale version and brightened version

Resolution: 508 dpi Print resolution or 1,25 Meter per pixel

WMS TopPlus-P50

Service: https://sg.geodatenzentrum.de/wms_topplus_p50?

Layer: p50, p50_grau, p50_hell

Description: TopPlus 1:50.000

High-resolution Digital Raster Graphics, Color version, grayscale version and brightened version

Resolution: 508 dpi Print resolution or 2,50 Meter per pixel

WMS TopPlus-P100

Service: https://sg.geodatenzentrum.de/wms_topplus_p100?

Layer: p100, p100_grau, p100_hell

Description: TopPlus 1:100.000

High-resolution Digital Raster Graphics, Color version, grayscale version and brightened version

Resolution: 508 dpi Print resolution or 5,00 Meter per pixel

WMS TopPlus-P250

Service: https://sg.geodatenzentrum.de/wms_topplus_p250_europa?

Layer: p250, p250_grau, p250_hell

Description: TopPlus 1:250.000

High-resolution Digital Raster Graphics, Color version, grayscale version and brightened version

Area: Europe (for a detailed description, see area above)

Resolution: 508 dpi Print resolution or 12,50 Meter per pixel

WMTS TopPlus

(https://sg.geodatenzentrum.de/wmts_topplus/1.0.0/WMTSCapabilities.xml)

The WMTS TopPlus provides the following TileMatrixSets and Layers:

TileMatrixSet: WEBMERCATOR

Layer: web, web_grau

Description: worldwide consistent web map, Color version and grayscale version.

Reference System Web Mercator (EPSG:3857)

Area: World (for a detailed description, see area above)

Resolution: 90.7 dpi monitor resolution

TileMatrixSet: EU_EPSG_25832_TOPPLUS

Layer: web, web_grau

	Description: europewide consistent web map, Color version and grayscale version. Reference System UTM32 (EPSG:25832) Area: Europe (for a detailed description, see area above) Resolution: 90.7 dpi monitor resolution												
Spatial reference:	The online services support the following reference systems: • WMS = EPSG:3034, 3035, 3044, 3045, 3857, 4258, 4326, 4647, 4839, 5243, 5650, 5676, 5677, 5678, 5679, 25832, 25833, 31466, 31467, 31468, 31469 und CRS: 84 • WMTS = EPSG:3857, 25832												
Currentness:	annual update												
Resolution:	• 90,7 dpi (Monitor resolution) for the web services • 508 dpi for High-resolution Digital Raster Graphics												
Data formats:	The online services provide the following graphic formats: • WMTS = PNG • WMS = JPEG, PNG, TIFF • When downloading raster data via web application: PNG, PNG8, PNG24, PNG32 • With file-based download of individual raster data tiles: GeoTiff • The tile archives of the TopPlus web map can be obtained in Mapproxy SQLite format. (see https://mapproxy.org/docs/1.11.0/caches.html#sqlite)												
Data supply:	• Online-service via WMS or WMTS • the tile archive, complete or individual tiles can be provided via the ordering system												
Data volume:	Tile archive of the TopPlus web map in Mapproxy SQLite-Format in EPSG:3857: 1676 GB Tile archive of the TopPlus web map in Mapproxy SQLite-Format in EPSG:25832: 575 GB Tile archive of the TopPlus Raster Graphics as GeoTiff-Rasterfiles in EPSG:25832: <table> <tr> <td>TopPlus 1:5.000 (TopPlus-P5):</td><td>750 GB</td></tr> <tr> <td>TopPlus 1:10.000 (TopPlus-P10) :</td><td>237 GB</td></tr> <tr> <td>TopPlus 1:17.500 (TopPlus-P17.5):</td><td>105 GB</td></tr> <tr> <td>TopPlus 1:25.000 (TopPlus-P25):</td><td>54 GB</td></tr> <tr> <td>TopPlus 1:50.000 (TopPlus-P50):</td><td>17 GB</td></tr> <tr> <td>TopPlus 1:100.000 (TopPlus-P100):</td><td>4 GB</td></tr> </table>	TopPlus 1:5.000 (TopPlus-P5):	750 GB	TopPlus 1:10.000 (TopPlus-P10) :	237 GB	TopPlus 1:17.500 (TopPlus-P17.5):	105 GB	TopPlus 1:25.000 (TopPlus-P25):	54 GB	TopPlus 1:50.000 (TopPlus-P50):	17 GB	TopPlus 1:100.000 (TopPlus-P100):	4 GB
TopPlus 1:5.000 (TopPlus-P5):	750 GB												
TopPlus 1:10.000 (TopPlus-P10) :	237 GB												
TopPlus 1:17.500 (TopPlus-P17.5):	105 GB												
TopPlus 1:25.000 (TopPlus-P25):	54 GB												
TopPlus 1:50.000 (TopPlus-P50):	17 GB												
TopPlus 1:100.000 (TopPlus-P100):	4 GB												

	Tile archive of the TopPlus Raster Graphics as GeoTiff-Rasterfiles in EPSG:3035: TopPlus 1:250.000 (TopPlus-P250): 16 GB
Data source:	Various data, see list: http://sg.geodatenzentrum.de/web_public/Datenquellen_TopPlus_07.07.2020.pdf

* Please note that not all forms of delivery can be provided with each reference system and data format. If you have any questions, feel free to contact the Service Centre (DLZ).

2 Description of the dataset and online services

2.1 Content

The web map TopPlus offers a worldwide consistent map representation in different levels of detail. Official spatial base data, georeference data and unofficial geo-information serve as data sources. The Internet services of TopPlus are offered via the standardized interfaces WMS and WMTS. Due to their high performance, they are suitable for presentation on the web.

In addition, high-resolution Digital Raster Graphics (Presentation Graphics) are also provided via the web services. Thus, free and graphically consistent map data are available for the territory of the Federal Republic of Germany and neighboring countries in the scales 1: 5,000 to 1: 250,000, which are optimally suitable for printing.

2.2 Reference Systems

As standard, the TopPlus web map is available in the widespread Web Mercator Projection (EPSG:3857) and in the reference system UTM32 (EPSG:25832). Via the WMS interface, the web map may also be used in further common projections. The presentation graphics TopPlus are originally available in the reference system UTM32 (EPSG:25832) but can also be obtained in the above mentioned reference systems.

The web map originally produced in the Web Mercator Projection (EPSG: 3857) is divided into three different display areas: Worldwide display for small scales, Europe-wide display for medium scales and detailed display for Germany and neighboring countries. The web map has 19 zoom levels.

The web map that was originally produced in UTM32 is divided into two display areas: Europe-wide display for medium scales and detailed display for Germany and neighboring countries. The web map has 14 zoom levels.

The high-resolution Raster Graphics in the scales 1: 5,000 to 1: 100,000 are originally produced in the UTM32 reference system (EPSG: 25832), the TopPlus in the scale 1: 250,000 in the LAEA reference system (EPSG: 3035). However, all Raster Graphics can also be obtained in the above mentioned reference systems.

2.3 Data Source

In comparison to the free TopPlusOpen web map, only official data is used in the case of the TopPlus web map in the territory of the Federal Republic of Germany. On the large scale, these are in particular the Digital Basic Landscape Model (Basis-DLM), the Official Building Polygons of Germany (HU-DE) and the Official House Coordinates of Germany (HK-DE). The relief is shown with the Digital Terrain Model 10 (DGM10).

In the medium-sized scales, official data are largely used across Europe. For the territory of the Federal Republic of Germany, records from the BKG, such as the Digital Landscape Model 1: 250,000 (DLM250), Administrative Areas 1: 250,000 (VG250) and Geographical Names 1: 250,000 (GN250) is used. For other European countries, i.a. official data from EuroGeographics such as the landscape models EuroRegionalMap or EuroGlobalMap served as data source.

OpenStreetMap data was used in the medium and large scales to represent the other areas. The global representation in small scales was made using Natural Earth data. Additional free or open data was also used.

See a list of all used data:

https://sg.geodatenzentrum.de/web_public/Datenquellen_TopPlus_07.07.2020.pdf

3 Data access

3.1 Ordering of data and services

The data and services are provided by the Service Center for Geoinformation and Geodesy at the Federal Agency for Cartography and Geodesy: <https://gdz.bkg.bund.de/>.

TopPlus is available in the following forms of deployment:

- Web Map Service (wms_topplus): web map in monitorresolution, in color and in grayscale
- Web Map Services of the Raster Graphics in printresolution, in color and in grayscale:
 - WMS TopPlus-P5 (wms_topplus_p5) 1:5.000
 - WMS TopPlus-P10 (wms_topplus_p10) 1:10.000,
 - WMS TopPlus-P17.5 (wms_topplus_p17.5) 1:17.500,
 - WMS TopPlus-P25 (wms_topplus_p25) 1:25.000,
 - WMS TopPlus-P50 (wms_topplus_p50) 1:50.000,

WMS TopPlus-P100 (wms_topplus_p100) 1:100.000

WMS TopPlus-P250 (wms_topplus_p250) 1:250.000

- Web Map Tile Service (wmts_topplus_web_open): contains the web map in color and grayscale and two TileMatrixSets WEBMERCATOR (EPSG:3857) and EU_EPSG_25832_TOPPLUS (EPSG:25832) are provided.
- TopPlus download: Via the ordering system, complete data sets, sections or tiles of the TopPlus Raster Graphics can be obtained via an interactive selection.
- Tile archive TopPlus: The colored web presentation can be ordered as SQLite databases in mbtile format. Please contact the [Service centre \(DLZ\)](#).

3.1.1 Notes on the tile archives of the Raster Graphics of TopPlus

The dimension of an image file is 8000 x 8000 pixels. The name of the tiles is based on the position of the lower left corner in the respective coordinate system and has the following structure:

PRODUCT_EAST_NORTH_SIZE

PRODUCT	- designates the product (e.g. topplus-p10)
RIGHT VALUE	- Right value (East) of the lower left corner of the tile in km (with leading number of zones for UTM)
NORTH VALUE	- North value of the bottom left corner of the tile in km
SIZE	- side length of the tile in km

In order to avoid an excessive number of files within a single directory, all tiles with the same East value (for UTM: East value with zone specification) are saved single directories.

3.1.2 Notes on the tile caches of TopPlus web presentation

The services for the web presentation are using raster tile caches as data source. A raster tile cache is defined by a tileset for fixed zoom levels/scales. Each zoom level is composed by grid of small raster tiles (256 x 256 pixels). Map coordinates can be calculated using the tileset origin and pixel size of the corresponding zoom level.

TopPlus raster caches are provided according to the [MBTiles-spezifikation](#) as SQLite-databases. For each zoom level a separate SQLite database is used.

For the TopPlus raster caches for the projections Spherical Mercator and UTM32 are provided. The zoom levels are defined as follow:

zoom level <i>Spherical Mercator</i>	zoom level <i>UTM32</i>	pixel size (meter)	scale denominator
0		156543.033928041	559082264.028718
1		78271.5169640205	279541132.014359
2		39135.7584820102	139770566.007179
3		19567.8792410051	69885283.0035897
4		9783.93962050256	34942641.5017948
5	0	4891.96981025128	17471320.75
6	1	2445.98490512564	8735660.375
7	2	1222.99245256282	4367830.188
8	3	611.496226281410	2183915.094
9	4	305.748113140705	1091957.547
10	5	152.874056570353	545978.7735
11	6	76.4370282851763	272989.3867
12	7	38.2185141425881	136494.6934
13	8	19.1092570712941	68247.34668
14	9	9.55462853564703	34123.67334
15	10	4.77731426782352	17061.83667
16	11	2.38865713391176	8530.918335
17	12	1.19432856695588	4265.459168
18	13	0.597164283477939	2132.729584

3.2 Examples of requests to the services

3.2.1 WMS TopPlus

GetCapabilities (GET):

https://sq.geodatenzentrum.de/wms_topplus?request=GetCapabilities&service=wms

https://sq.geodatenzentrum.de/wms_topplus_p5?request=GetCapabilities&service=wms

https://sq.geodatenzentrum.de/wms_topplus_p10?request=GetCapabilities&service=wms

https://sq.geodatenzentrum.de/wms_topplus_p17.5?request=GetCapabilities&service=wms

https://sq.geodatenzentrum.de/wms_topplus_p25?request=GetCapabilities&service=wms

https://sq.geodatenzentrum.de/wms_topplus_p50?request=GetCapabilities&service=wms

https://sq.geodatenzentrum.de/wms_topplus_p100?request=GetCapabilities&service=wms

https://sq.geodatenzentrum.de/wms_topplus_p250_europa?request=GetCapabilities&service=wms

GetMap (GET), wms_topplus, Layer „web“:

https://sq.geodatenzentrum.de/wms_topplus?service=wms&version=1.3.0&request=GetMap&Layers=web&STYLES=default&CRS=EPSG:25832&bbox=500000,5700000,500200,5700200&width=150&Height=150&Format=image/png

GetMap (GET), wms_topplus_p5, Layer „p5“ (TopPlus 1:5.000):

https://sq.geodatenzentrum.de/wms_topplus_p5?service=wms&version=1.3.0&request=GetMap&Layers=p5&STYLES=default&CRS=EPSG:25832&bbox=500000,5700000,500100,5700100&width=400&Height=400&Format=image/png

GetMap (GET), wms_topplus_p10, Layer „p10“ (TopPlus 1:10.000):

https://sq.geodatenzentrum.de/wms_topplus_p10?service=wms&version=1.3.0&request=GetMap&Layers=p10&STYLES=default&CRS=EPSG:25832&bbox=500000,5700000,500200,5700200&width=400&Height=400&Format=image/png

GetMap (GET), wms_topplus_p17.5, Layer „p17.5“ (TopPlus 1:17.500):

https://sq.geodatenzentrum.de/wms_topplus_p17.5?service=wms&version=1.3.0&request=GetMap&Layers=p17.5&STYLES=default&CRS=EPSG:25832&bbox=500000,5700000,500350,5700350&width=400&Height=400&Format=image/png

GetMap (GET), wms_topplus_p25, Layer „p25“ (TopPlus 1:25.000):

https://sq.geodatenzentrum.de/wms_topplus_p25?service=wms&version=1.3.0&request=GetMap&Layers=p25&STYLES=default&CRS=EPSG:25832&bbox=500000,5700000,500500,5700500&width=400&Height=400&Format=image/png

GetMap (GET), wms_topplus_p50, Layer „p50“ (TopPlus 1:50.000):

https://sq.geodatenzentrum.de/wms_topplus_p50?service=wms&version=1.3.0&request=GetMap&Layers=p50&STYLES=default&CRS=EPSG:25832&bbox=500000,5700000,501000,5701000&width=400&Height=400&Format=image/png

GetMap (GET), wms_topplus_p100, Layer „p100“ (TopPlus 1:100.000):

https://sq.geodatenzentrum.de/wms_topplus_p100?service=wms&version=1.3.0&request=GetMap&Layers=p100&STYLES=default&CRS=EPSG:25832&bbox=500000,5700000,502000,5702000&width=400&Height=400&Format=image/png

GetMap (GET), wms_topplus_p250_europa, Layer „p250“ (TopPlus 1:250.000):

https://sq.geodatenzentrum.de/wms_topplus_p250_europa?service=wms&version=1.3.0&request=GetMap&Layers=p250&STYLES=default&CRS=EPSG:3035&bbox=4200000,2900000,4205000,2905000&width=400&Height=400&Format=image/png

3.2.2 WMTS TopPlus

GetCapabilities (GET):

https://sq.geodatenzentrum.de/wmts_topplus/1.0.0/WMTSCapabilities.xml

Examples for requesting an XYZ-Layer:

Example for requesting an XYZ-Layer "web" (color) and the TileMatrixSet "WEBMERCATOR" (EPSG:3857)

http://sqx.geodatenzentrum.de/wmts_topplus/tile/1.0.0/web/default/WEBMERCATOR/{z}/{y}/{x}.png

Example for requesting an XYZ-Layer "web_grau" (grayscale) and the TileMatrixSet "WEBMERCATOR" (EPSG:3857)

http://sqx.geodatenzentrum.de/wmts_topplus/tile/1.0.0/web_grau/default/WEBMERCATOR/{z}/{y}/{x}.png

Example for requesting an XYZ-Layer "web" (color) und das TileMatrixSet "EU_EPSG_25832_TOPPLUS" (EPSG:25832)

http://sqx.geodatenzentrum.de/wmts_topplus/tile/1.0.0/web/default/EU_EPSG_25832_TOPPLUS/{z}/{y}/{x}.png

Example for requesting an XYZ-Layer "web_grau" (grayscale) und das TileMatrixSet "EU_EPSG_25832_TOPPLUS" (EPSG:25832)

http://sqx.geodatenzentrum.de/wmts_topplus/tile/1.0.0/web_grau/default/EU_EPSG_25832_TOPPLUS/{z}/{y}/{x}.png

Some applications also expect the order of TileMatrix, TileRow and TileCol to be specified as a number:

http://sqx.geodatenzentrum.de/wmts_topplus/tile/1.0.0/web/default/WEBMERCATOR/{0}/{2}/{1}.png

Example for the request of a single tile from the Layer "web" (color) and the TileMatrixSet "WEBMERCATOR" (EPSG:3857)

https://sq.geodatenzentrum.de/wmts_topplus/tile/1.0.0/web/default/WEBMERCATOR/10/343/549.png

Example for the request of a single tile from the Layer "web_grau" (grayscale) and the TileMatrixSet "EU_EPSG_25832_TOPPLUS" (EPSG:25832)

https://sq.geodatenzentrum.de/wmts_topplus/tile/1.0.0/web_grau/default/EU_EPSG_25832_TOPPLUS/8/608/867.png

4 Terms of use and copyright

The data are protected by copyright. Federal authorities and beneficiaries within the meaning of Section 4 V GeoBund will be provided with the data free of charge on the basis of the contract for the continuous transmission of official digital geodata of the federal states for use in the federal area from 01.07.2019 (V GeoBund).

Each user has to place the source reference to all geodata, metadata and geodata services recognisably and optically linked. Alterations, processings, new designs or other adaptations have to be affixed with an indication of the alteration in the source reference. Source reference and indication of alteration have to be formulated as follows.

© Federal Agency for Cartography and Geodesy <year of last data download>, Data sources

© Federal Agency for Cartography and Geodesy <year of last data download> (data changed), Data sources

The source reference has to be linked with the URL "http://www.bkg.bund.de" for the representation at a website. In addition, a link to the word „data sources“ with the following

URL is permitted when using the view services:

http://sg.geodatenzentrum.de/web_public/Datenquellen_TopPlus.pdf.

Otherwise the date of data acquisition has to be added to the URL, e.g.:

http://sg.geodatenzentrum.de/web_public/Datenquellen_TopPlus_07.07.2020.pdf.

Example of a presentation on a website or in an app (with links):

[© Federal Agency for Cartography and Geodesy 2020](#), [data sources](#)

Example of a representation on a printed map (without linking)

© Federal Agency for Cartography and Geodesy 2020, Data sources:

http://sg.geodatenzentrum.de/web_public/Datenquellen_TopPlus_07.07.2020.pdf

5 Contact

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