Package 'gloBFPr'

June 11, 2025

Type Package

Title Access Global Building Height Datasets

Version 0.1.0

Description Provides tools to access, search, and download global 3D building footprint datasets (3D-GloBFP) generated by Che et al. (2024) <doi:10.5194/essd-16-5357-2024>. The package includes functions to retrieve metadata, filter by bounding box, and download building height tiles.

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URL https://github.com/billbillbilly/gloBFPr

BugReports https://github.com/billbillbilly/gloBFPr/issues

Encoding UTF-8

Language en-US

Depends R (>= 4.1)

Suggests testthat (>= 3.0.0), knitr, rmarkdown

Imports sf, dplyr, httr2, terra, utils, rlang

RoxygenNote 7.3.2

VignetteBuilder knitr, rmarkdown

NeedsCompilation no

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Repository CRAN

Date/Publication 2025-06-11 13:00:09 UTC

Contents

`get_metadata` *get_metadata*

Description

Returns a spatial grid (as an sf object) containing metadata and download URLs for global 3D building footprint tiles (3D-GloBFP).

Usage

```
get_metadata(test = FALSE)
```

Arguments

`test`	logic, Ignored during normal use; included for internal testing purposes. Defaults to `FALSE`.

Details

The metadata of 3D Global Building Footprints (3D-GloBFP) dataset is uploaded on zenodo. More detials about this dataset can to found here.

The data is detailed in the following article

Value

sf a spatial polygon grid with attributes: `id`, `gridID`, bounding box coordinates, and `download_url`.

References

Che, Y., Li, X., Liu, X., Wang, Y., Liao, W., Zheng, X., Zhang, X., Xu, X., Shi, Q., Zhu, J., Zhang, H., Yuan, H., & Dai, Y. (2025). 3D-GloBFP: the first global three-dimensional building footprint dataset. Zenodo. https://doi.org/10.5281/zenodo.15487037

Che Yangzi, Li Xuecao, Liu Xiaoping, Wang Yuhao, Liao Weilin, Zheng Xianwei, Zhang Xucai, Xu Xiaocong, Shi Qian, Zhu Jiajun, Zhang Honghui, Yuan Hua, & Dai Yongjiu (2024). 3D-GloBFP: the first global three-dimensional building footprint dataset. Earth Syst. Sci. Data, 16, 5357-5374

Examples

```
meta <- gloBFPr::get_metadata(test=TRUE)
```

search_3dglobdf *search_3dglobdf*

Description

Search and retrieve 3D-GloBFP tiles that intersect a given bounding box or area of interest, with options to return vector or raster outputs including building polygons, binary presence rasters, and height-coded rasters.

Usage

```
search_3dglobdf(
  bbox,
  metadata,
  crop = TRUE,
  out_type = "poly",
  mask = FALSE,
  cell_size = 1
)
```

Arguments

bbox	sf, sfc, or a numeric vector (xmin, ymin, xmax, ymax) defining the area of interest.
metadata	sf. Typically output from get_metadata(), containing tile extents and download URLs.
crop	logical. If TRUE, the resulting building footprint geometries will be cropped to the input bbox. Default is TRUE.
out_type	character. Default is 'poly'. Output type(s) to return. Options include: • "poly": building footprints as an sf polygon object. • "binary_rast": binary terra raster where buildings = 1. • "graduated_rast": terra raster encoding building height values. • "rast": a named list with both binary and graduated rasters. • "all": a named list including the polygon layer and both raster layers.
mask	logical (optional). Default is FALSE. If TRUE, masks the graduated raster using the building footprint layer. Only used when out_type is "graduated_rast", "rast", or "all".
cell_size	numeric (optional). Default is 1. Only used when out_type is "graduated_rast", "rast", or "all".

Value

Varies based on out_type:

- If "poly": an sf object of building footprints.

- If "binary_rast": a binary SpatRaster (terra) indicating building presence.
- If "graduated_rast": a quantitative SpatRaster of building heights.
- If "rast": a named list with two SpatRaster objects: binary and graduated.
- If "all": a named list with poly (sf), binary, and graduated rasters.

Note

The downloading process may take some time, depending on the number and size of building footprint tiles.

This implementation relies on the current structure of the dataset as hosted on Figshare. It may break if the dataset owner changes the file organization or metadata format.

References

Che Yangzi, Li Xuecao, Liu Xiaoping, Wang Yuhao, Liao Weilin, Zheng Xianwei, Zhang Xucai, Xu Xiaocong, Shi Qian, Zhu Jiajun, Zhang Honghui, Yuan Hua, & Dai Yongjiu (2024). 3D-GloBFP: the first global three-dimensional building footprint dataset. Earth Syst. Sci. Data, 16, 5357-5374

Examples

```
metadata <- gloBFPr::get_metadata(test=TRUE)
buildings <- gloBFPr::search_3dglobdf(bbox=c(-84.485519,45.636118,-84.462774,45.650639),
                     metadata=metadata)
```

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