Structural building damage mapped with use of remote sensing in the Ahr valley (https://doi.org/10.4121/8f7a21d3-9bb9-4808-ae51-761eb3fba986)

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# Licence

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# Citation

**When using the data please cite:**

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# Data Description

The following vector layer (ESRI Shapefile) encompasses 19507 polygons (buildings) in the Ahr Valley, Rhineland-Palatinate, Germany, having as attribute the structural damage grades in the aftermath of the extreme event of July 2021.

The polygons were extracted from OpenStreetMap (OpenStreetMap contributors, 2022). Only the geometries were used.

The damage grades assessment to each building followed the classification scheme by Maiwald & Schwarz (2019) and was accomplished by visual assessment.

## Links/relationships to ancillary data sets:

The data contains (up to) three damage grades estimated by three different raters based on two remote sensing data:

1. Orthophotos collected by the “State Office for Surveying and Geographic Information” of Rhineland-Palatinate (LVermGeo - *Landesamt für Vermessung und Geobasisinformation*) collected between July 24 and 28, 2021. This data is available at http://mapcache.de/ahr/
2. Textured 3D mesh based on aerial survey from GeoFly GmbH (Magdeburg) collected on July 22, 2021. This data is available at <http://web.geofly.eu/>. For easier navigation, the 3D model was accessed via the platform from virtualcitySYSTEMS GmbH (Berlin).

## Was data derived from another source?

OpenStreetMap (http://www.openstreetmap.org)

## Data collection Procedure:

The raters, independently, accessed the two above mentioned data and identified the buildings in the previously provided OSM vector layer. They added the attributes, i.e. the damage grade of each building, individually and manually via GIS. Only these added attributes are provided in this data repository.

The first round of rating comprised 612 buildings in selected affected districts where on-site damage grading was previously accomplished (Samprogna Mohor et al., 2024) showing acceptable agreement. Later, one of the raters extended the activity to other affected districts, totalling 7197 affected buildings.

## Date of data collection:

2022-06 to 2023-04

## Geographic location of data collection:

Landkreis Ahrweiler, Rheinland-Pfalz, Deutschland [District of Ahrweiler, Rhineland-Palatinate, Germany]

# File description

The data is a ESRI Shapefile, a polygon vector layer, with 19507 polygons and five attributes. The vector layer is in the coordinate system EPSG:4326.

## File inventory

The data encompasses solely one ESRI Shapefile. Shapefiles are composed of a minimum three obligatory files plus optional files. All files belonging to the same layer have the same name (*SamprognaMohor\_etal\_Raters123.\**), but different extensions (*\*.xxx*). Relevant files are [https://desktop.arcgis.com/en/arcmap/latest/manage-data/shapefiles/shapefile-file-extensions.htm]:

.shp—The main file that stores the feature geometry;

.shx—The index file that stores the index of the feature geometry;

.dbf—The dBASE table that stores the attribute information of features;

.prj—The file that stores the coordinate system information.

File list:

1. this Documentation
2. SamprognaMohor\_etal\_Raters123.zip Vector-layer of building polygons with the collected attributes (zipped Shapefile)

- SamprognaMohor\_etal\_Raters123.shp

- SamprognaMohor\_etal\_Raters123.shx

- SamprognaMohor\_etal\_Raters123.prj

- SamprognaMohor\_etal\_Raters123.dbf

- SamprognaMohor\_etal\_Raters123.cpg

- SamprognaMohor\_etal\_Raters123.sbx

- SamprognaMohor\_etal\_Raters123.sbn

- SamprognaMohor\_etal\_Raters123.shp.xml

## Description of data tables

### SamprognaMohor\_etal\_Raters123.dbf

|  |  |  |
| --- | --- | --- |
| Column Header | Description | Format |
| Fachwerk | Flag for building material | [F] Timber framed building;  [G] Mixed material;  [-] (supposedly masonry) |
| DmgGrd\_R1 | Structural damage grade estimated by Rater 1 | D0 – D6 [see Maiwald & Schwarz, 2019] |
| DmgGrd\_R2 | Structural damage grade estimated by Rater 2 | D0 – D6 [see Maiwald & Schwarz, 2019];  [D5b] was used for buildings that were not fully destroyed right after the flood, but demolished afterwards |
| DmgGrd\_R3 | Structural damage grade estimated by Rater 3 | D0 – D6 [see Maiwald & Schwarz, 2019];  [D5b] was used for buildings that were not fully destroyed right after the flood, but demolished afterwards |
| Abgerissen | Flag for buildings demolished afterwards, estimated by Rater 2 | Equivalent to [D5b] above, but flagged separately to differentiate the estimated direct damage and the later demolishing |
| Analysed | Flag for the buildings used in the analysis of Samprogna Mohor et al. (2024) | 1, if included in the analysis |

# Contributor Role Taxonomy (CRediT)

- Conceptualization: Sieg, Tobias; Samprogna Mohor, Guilherme.

- Collection: Buhrmann, Aaron; Samprogna Mohor, Guilherme; Koch, Oliver.

- Data curation: Samprogna Mohor, Guilherme.

- Formal Analysis: Samprogna Mohor, Guilherme.

- Resources: Sieg, Tobias.

- Funding acquisition: Thieken, Annegret; Kirschbauer, Lothar

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Maiwald, H., & Schwarz, J. (2019). Unified damage description and risk assessment of buildings under extreme natural hazards. Mauerwerk, 23(2), 95–111. https://doi.org/10.1002/dama.201910014

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Samprogna Mohor, G., Sieg, T., Koch, O., Buhrmann, A., Maiwald, H., Schwarz, J. & Thieken, A. H. (2024): Remote sensing‐based mapping of structural building damage in the Ahr valley. Journal of Flood Risk Management, e12983. <https://doi.org/10.1111/jfr3.12983>