

Fracture Patterns from the Lilstock Pavement, Bristol Channel, UK

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About this dataset

This dataset contains fracture patterns from carbonate pavements at Lilstock, Bristol Channel, UK. The fracture traces have been derived from UAV photogrammetry that was previously published as an image dataset (see <https://publications.rwth-aachen.de/record/793416>). Large-scale fracture networks corresponding to five regions, named as Area 1 – 5, are available. The dataset contains a total of 80 files which are briefly described below by file type and naming convention.

1. **ESRI shapefiles:** Fracture pattern data corresponding to the five areas within the dataset has the *.shp extension and are named as Area1.shp, Area2.shp etc. These can be accessed within GIS software such as QGIS or ArcGIS. Mapping Toolbox within MATLAB also has built-in shapefile processing functions. Note that *.dbf and *.shx files are associated with the *.shp and need to be saved in the same folder in order to access them. In order to project the vector data correctly to the orthophotos (from <https://publications.rwth-aachen.de/record/793416>), the Coordinate Reference System EPSG: 32630 or UTM Zone 30N may be used. The fracture networks enclose and form polygons of unfractured rocks. The geometry and spatial distribution of the fracture polygons are also available as shapefiles and these are named as Area_1_polygons.shp, Area_2_polygons.shp etc. These can also be correctly georeferenced using the coordinate reference system described above.
2. **CSV:** The fracture network data can be represented as spatial graphs, i.e., graph data structures with edges and nodes, and with spatial positioning information pertaining to each node. The information required to create such primal graphs are available as *.csv files in the form of node and edgelist (Area_1_primal_Edgelist.csv, Area_1_primal_Nodelist etc). These files may be used to create graph objects in R (iGraph package), Python (NetworkX), or Julia. They can be spatially positioned using the node positional information available in Area_1_spatial_positioning_list.csv. The fracture network data may also be represented as dual graphs. The nodes and edgelist for this type of graph representation is available in the *.csv files named as Area_1_dual_Edgelist.csv, Area_1_dual_Nodelist.csv etc.
3. **MAT:** MATLAB provides support for various graph and network analysis routines. For access in MATLAB, we provide graph objects for the primal and dual representations which are organized as Area1_fracture_graph_primal.mat, Area1_fracture_graph_dual.mat etc. Spatial positioning matrix for graph nodes are in files named as Area1_spatial_positioning.mat. The primal spatial graphs have an origin of (0,0) in 2D. These can be georeferenced to CRS EPSG: 32630 by adding the Area1_xmin.mat and Area1_ymin.mat to the x and y coordinates of the spatial positioning matrix.