-- Ex 1

1:250 000 Scale Colour Raster™ Free OS OpenData

Get the regional view of towns and villages, roads and places of interest.

Coverage: **All of Great Britain**
Data structure: **Raster**
Supply format: **TIFF-LZW**
Version Date: **2022-06**

Documentation

Product information

Download 1:250 000 Scale Colour Raster™

All OS OpenData can be freely downloaded under the Open Government Licence.

1. Specify an area — All of Great Britain

2. Data format — TIFF-LZW Size: 135.12 MB

3. Download — 1:250 000 Scale Colour Raster™ - TIFF-LZW GB (135.12 MB)

-- Ex 2

```
D:\Program Files\PostgreSQL\14\bin>raster2pgsql.exe -s 3763 -N -32767 -t 100x100 -I -C -M -d D:\SQL_code\ra
s250_gb\data\*.tif  uk_250k | psql -d lab7 -h localhost -U postgres -p 5432
Processing 1/56: D:\SQL_code\ras250_gb\data\HP.tif
Warning 1: The definition of geographic CRS EPSG:4277 got from GeoTIFF keys is not the same as the one from
 the EPSG registry, which may cause issues during reprojection operations. Set GTIFF_SRS_SOURCE configurati
on option to EPSG to use official parameters (overriding the ones from GeoTIFF keys), or to GEOKEYS to use
custom values from GeoTIFF keys and drop the EPSG code.
Password for user postgres:
BEGIN
NOTICE:  table "uk_250k" does not exist, skipping
DROP TABLE
CREATE TABLE
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
```

uk_250k 1 × | Output

SELECT rid, rast FROM public.uk_250k limit 10   Enter a SQL expression to filter results (use Ctrl+Space)

	rid	rast
1	1	010000010000000000000394000000000000039C000000000006A18410000000020D633410000000000
2	2	010000010000000000000394000000000000039C00000000010911841000000020D633410000000000
3	3	010000010000000000000394000000000000039C00000000020B818410000000020D633410000000000
4	4	010000010000000000000394000000000000039C00000000030DF18410000000020D633410000000000
5	5	010000010000000000000394000000000000039C00000000040061941000000020D633410000000000
6	6	010000010000000000000394000000000000039C00000000502D19410000000020D633410000000000
7	7	010000010000000000000394000000000000039C00000000060541941000000020D633410000000000
8	8	010000010000000000000394000000000000039C00000000707B19410000000020D633410000000000
9	9	010000010000000000000394000000000000039C00000000080A21941000000020D633410000000000
10	10	010000010000000000000394000000000000039C000000000090C919410000000020D633410000000000

-- Ex 3

```
CREATE INDEX idx_rast_gist ON uk_250k
USING gist (ST_ConvexHull(rast));

SELECT AddRasterConstraints('public'::name,'uk_250k'::name,'rast'::name);

select st_union(rast)
from uk_250k
```
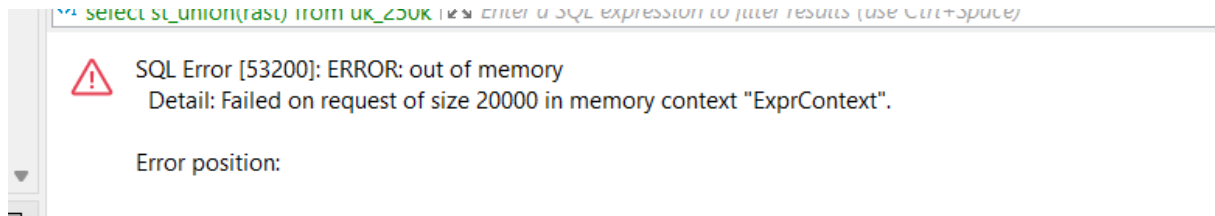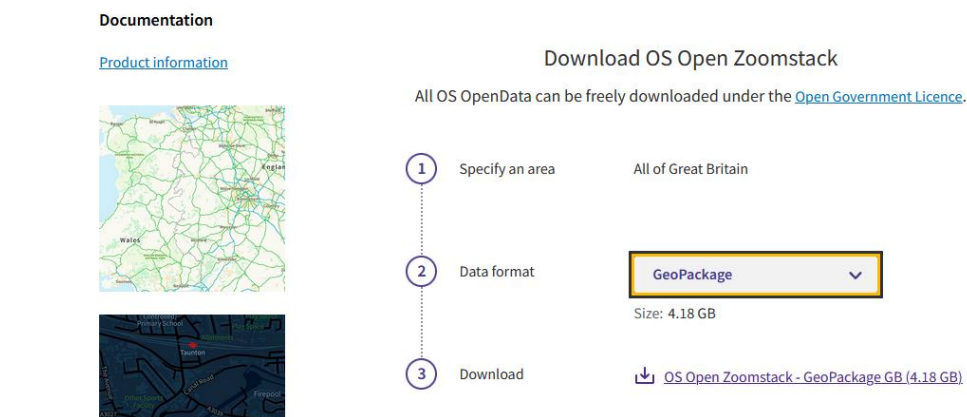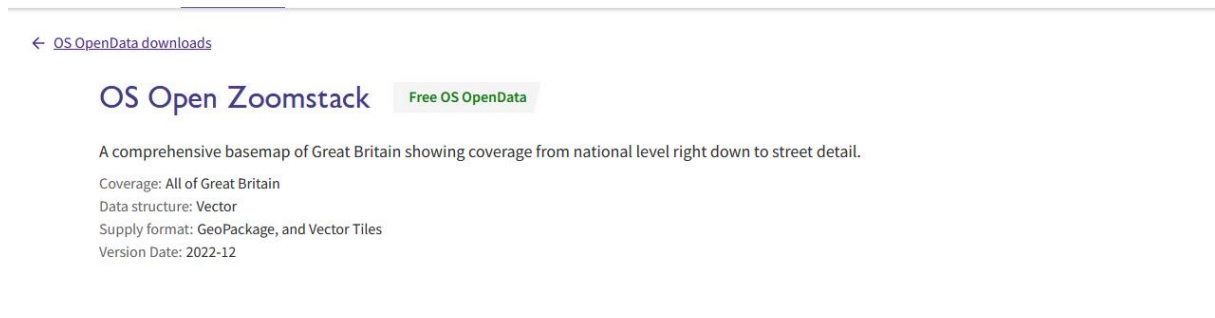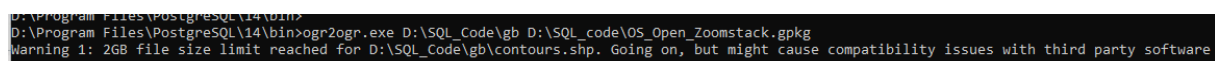

Po kilku próbach wczytania cały czas występował błąd.

-- Ex 4

-- Ex 5
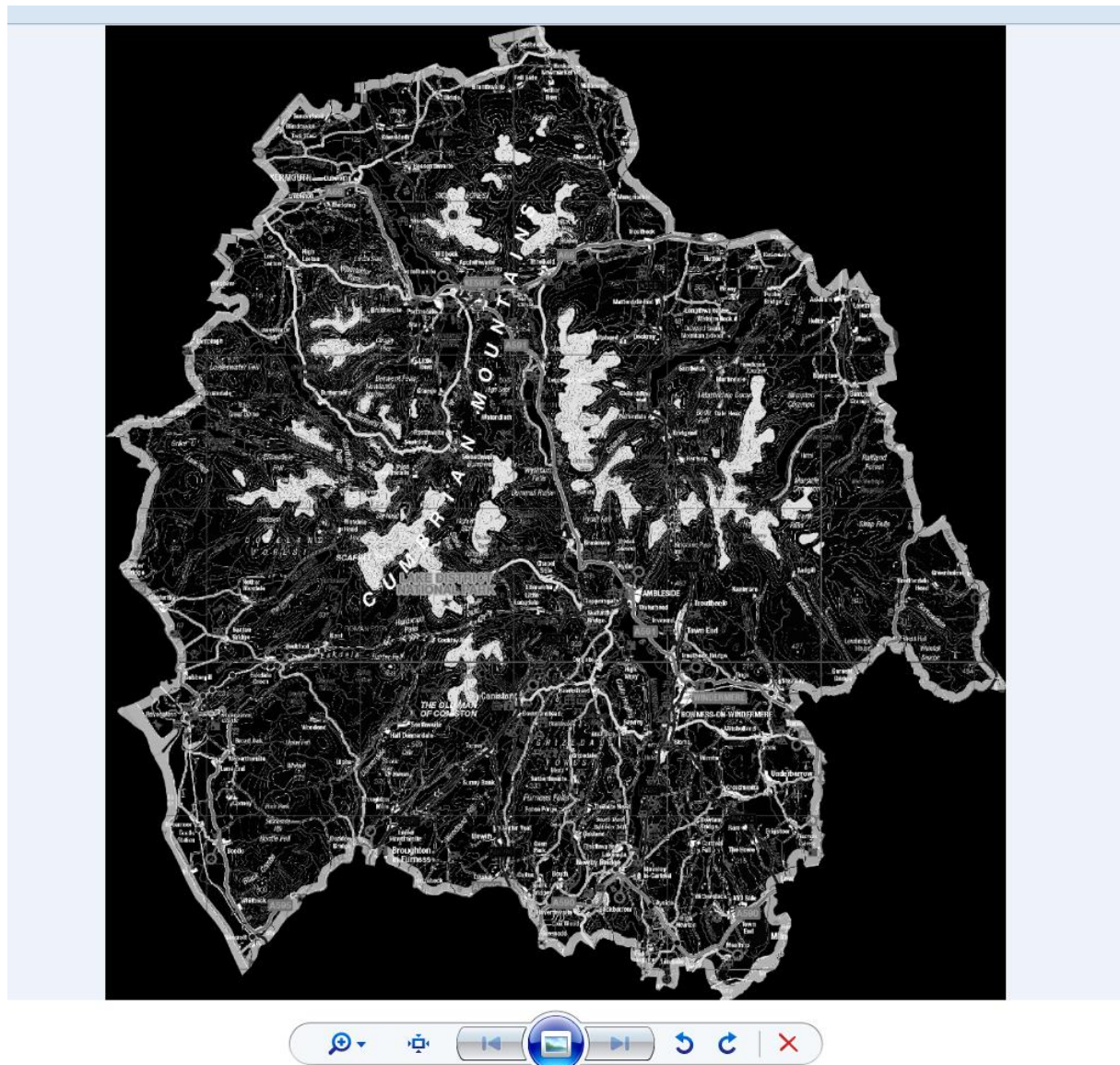
ogr2ogr.exe D:\SQL_Code D:\SQL_code\OS_Open_Zoomstack.gpkg

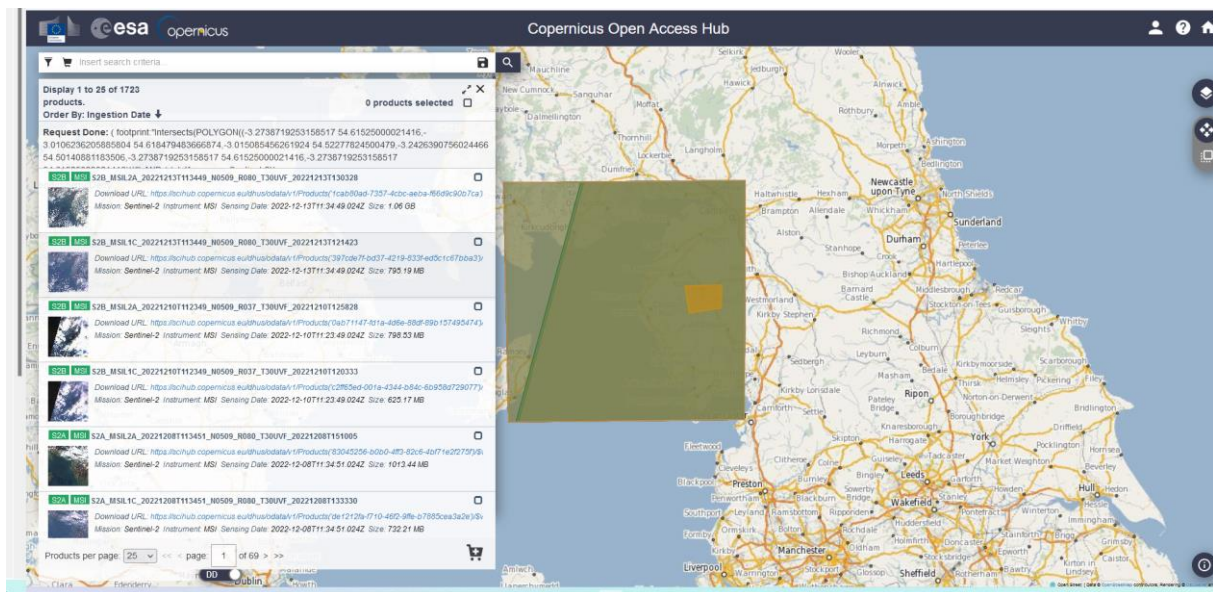| Nazwa	Data modyfikacji	Typ	Rozmiar
local_buildings.dbf	14.12.2022 21:21	Plik DBF	1 168 132 KB
local_buildings.prj	14.12.2022 19:53	Plik PRJ	1 KB
local_buildings.shp	14.12.2022 21:21	Plik SHP	2 069 783 KB
local_buildings.shx	14.12.2022 21:21	Plik SHX	115 372 KB
names.dbf	14.12.2022 21:21	Plik DBF	285 800 KB
names.prj	14.12.2022 21:20	Plik PRJ	1 KB
names.shp	14.12.2022 21:21	Plik SHP	18 147 KB
names.shx	14.12.2022 21:21	Plik SHX	5 185 KB
national_parks.dbf	14.12.2022 21:21	Plik DBF	1 KB
national_parks.prj	14.12.2022 19:53	Plik PRJ	1 KB
national_parks.shp	14.12.2022 21:21	Plik SHP	368 KB
national_parks.shx	14.12.2022 21:21	Plik SHX	1 KB
rail.dbf	14.12.2022 21:21	Plik DBF	8 352 KB
rail.prj	14.12.2022 21:18	Plik PRJ	1 KB
rail.shp	14.12.2022 21:21	Plik SHP	9 703 KB
rail.shx	14.12.2022 21:21	Plik SHX	825 KB
railway_stations.dbf	14.12.2022 21:21	Plik DBF	547 KB
railway_stations.prj	14.12.2022 21:18	Plik PRJ	1 KB
railway_stations.shp	14.12.2022 21:21	Plik SHP	96 KB
railway_stations.shx	14.12.2022 21:21	Plik SHX	28 KB
roads_local.dbf	14.12.2022 21:21	Plik DBF	776 280 KB
roads_local.prj	14.12.2022 21:18	Plik PRJ	1 KB
roads_local.shp	14.12.2022 21:21	Plik SHP	362 688 KB
roads_local.shx	14.12.2022 21:21	Plik SHX	24 842 KB
roads_national.dbf	14.12.2022 21:21	Plik DBF	30 251 KB
roads_national.prj	14.12.2022 21:20	Plik PRJ	1 KB
roads_national.shp	14.12.2022 21:21	Plik SHP	14 227 KB

shp2pgsql -s 27700 D:\SQL_code\gb\national_parks.shp national_parks | psql -U postgres -h localhost -p 5432 -d lab7

```sql
-- Ex 6
SELECT UpdateGeometrySRID('national_parks','geom',3763);

CREATE TABLE uk_lake_district AS
SELECT a.rid,ST_Clip(a.rast, b.geom,true) as rast
FROM uk_250k AS a, national_parks AS b
where b.gid = 1 and ST_Intersects(b.geom,a.rast);
```



```sql
--Ex 7

CREATE TABLE tmp_out AS
SELECT lo_from_bytea(0,
ST_AsGDALRaster(ST_Union(rast), 'GTiff', ARRAY['COMPRESS=DEFLATE',
'PREDICTOR=2', 'PZLEVEL=9'])
) AS loid
FROM uk_lake_district;
-------------------------------------------------
SELECT lo_export(loid, 'D:\SQL_code\gb\raster.tiff')

FROM tmp_out;
```

```
-----------------------------------------------
SELECT lo_unlink(loid)
FROM tmp_out; --> Delete the large object.
```


-- Ex 8
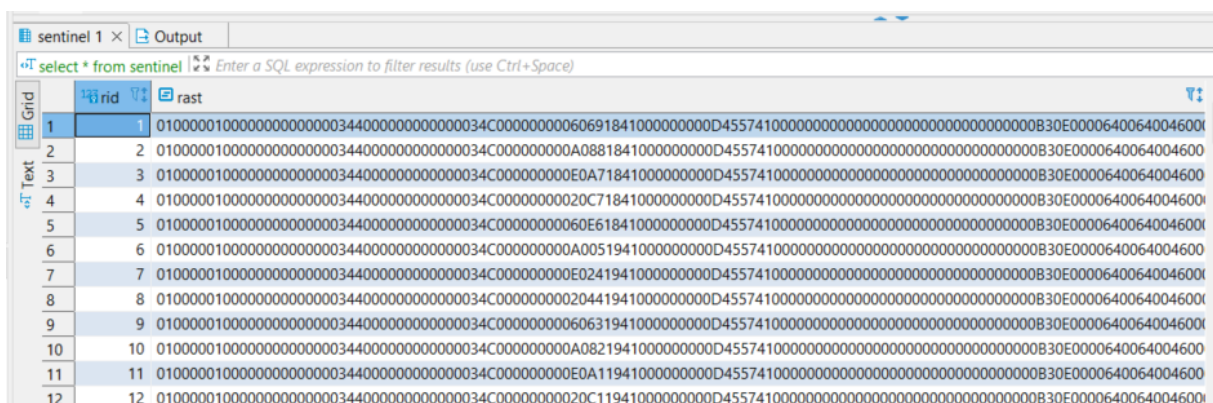
-- Ex 9

raster2pgsql.exe -s 3763 -N -32767 -t 100x100 -I -C -M -d D:\SQL_code\sentinel-2\S2B_MSIL1C_20221213T113449_N0509_R080_T30UVF_20221213T121423.SAFE\GRANULE\L1C_T30UVF_A030136_20221213T113448\IMG_DATA\T30UVF_20221213T113449_B07.jp2 sentinel| psql -d lab7 -h localhost -U postgres -p 5432


```
CREATE INDEX idx_rast_gist ON sentinel
USING gist (ST_ConvexHull(rast));
```

```sql
SELECT AddRasterConstraints('public'::name,'sentinel'::name,'rast'::name);

-- Ex 10
create or replace function ndvi(
value double precision [] [] [],
pos integer [][],
VARIADIC userargs text []
)
RETURNS double precision AS
$$
BEGIN
--RAISE NOTICE 'Pixel Value: %', value [1][1][1];-->For debug purposes
RETURN (value [2][1][1] - value [1][1][1])/(value [2][1][1]+value
[1][1][1]); --> NDVI calculation!
END;
$$
LANGUAGE 'plpgsql' IMMUTABLE COST 1000;


CREATE TABLE ndvi AS
WITH r AS (
SELECT *
FROM sentinel
)
SELECT
r.rid,ST_MapAlgebra(
r.rast, ARRAY[1,4],
'ndvi(double precision[],
integer[],text[])'::regprocedure, --> This is the function!
'32BF'::text
) AS rast
FROM r;
```



```sql
CREATE TABLE uk_lake_district_sentinel AS
SELECT a.rid,ST_Clip(a.rast, b.geom,true) as rast
FROM ndvi AS a, national_parks AS b
```

```
where b.gid = 1 and ST_Intersects(b.geom,a.rast);
```


Powstał pusty obiekt, nie ma wspólnej części dwóch obiektów

-- Ex 11

```
CREATE TABLE tmp_out AS
SELECT lo_from_bytea(0,
ST_AsGDALRaster(ST_Union(rast), 'GTiff', ARRAY['COMPRESS=DEFLATE',
'PREDICTOR=2', 'PZLEVEL=9'])
) AS loid
FROM uk_lake_district_sentinel;
------------------------------------------------
SELECT lo_export(loid, 'D:\SQL_code\sentinel-2\raster.tiff')

FROM tmp_out;
------------------------------------------------
SELECT lo_unlink(loid)
FROM tmp_out; --> Delete the large object.
```