Nowa baza danych

```
PS C:\Program Files\PostgreSQL> pg_restore -U postgres -d postgis_raster -1 "C:\Users\PC\13powod\przestrzenne\PostGIS raster - dane\PostGIS raster - dane\postgis_raster.backup"
pg_restore: warning: restoring tables WITH OIDS is not supported anymore
pg_restore: warning: restoring tables WITH OIDS is not supported anymore
Hasto:

PS C:\Program Files\PostgreSQL>
```

Ładowanie wysokości

Przykład 1 – ładowanie rastru przy użyciu pliku .sql

& do uruchomienia aplikacji

```
PS C:\Program Files\PostgreSQL\rasters> & "C:\Program Files\PostgreSQL\17\bin\raster2pgsql.exe" -s 3763 -N -32767 -t 100 x100 -I -C -M -d "C:\Program Files\PostgreSQL\rasters\srtm_1arc_v3.tif" rasters.dem > "C:\Users\PC\13powód\przestrzenne\ dem.sql"
Processing 1/1: C:\Program Files\PostgreSQL\rasters\srtm_1arc_v3.tif
```

Przykład 2 – ładowanie rastru bezpośrednio do bazy

```
PS C:\Program Files\PostgreSQL> & "C:\Program Files\PostgreSQL\17\bin\raster2pgsql.exe" -s 3763 -N -32767 -t 100x100 -I -C -M -d "C:\Program Files\PostgreSQL\rasters\srtm_larc_v3.tif" rasters.dem | psql -d postgis_raster -h localhost -U postgres -p 5432
Processing 1/1: C:\Program Files\PostgreSQL\rasters\srtm_larc_v3.tif
Has\undersdownika postgres:

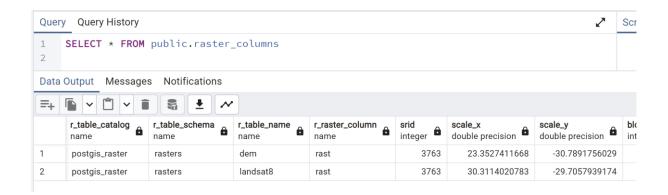
BEGIN
UWAGA: tabela "dem" nie istnieje, pomini\u00e4tto
DROP TABLE
CREATE TABLE
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
```

```
INSERT 0 1
INSERT 0 1
CREATE INDEX
ANALYZE
UWAGA: Adding SRID constraint
UWAGA: Adding scale-X constraint
UWAGA: Adding scale-Y constraint
UWAGA: Adding blocksize-X constraint
UWAGA: Adding blocksize-Y constraint
UWAGA: Adding alignment constraint
UWAGA: Adding number of bands constraint
UWAGA: Adding pixel type constraint
UWAGA: Adding nodata value constraint
UWAGA: Adding out-of-database constraint
UWAGA: Adding maximum extent constraint
 addrasterconstraints
 t
(1 wiersz)
COMMIT
VACUUM
PS C:\Program Files\PostgreSQL>
```

Przykład 3 – załadowanie danych landsat8 o wielkości kafelka 128x128 bezpośrednio do bazy danych.

```
PS C:\Program Files\PostgreSQL> & "C:\Program Files\PostgreSQL\17\bin\raster2pgsql.exe" -s 3763 -N -32767 -t 128x128 -I -C -M -d "C:\Program Files\PostgreSQL\rasters\Landsat8_L1TP_RGBN.TIF" rasters.landsat8 | psql -d postgis_raster -h local host -U postgres -p 5432
Processing 1/1: C:\Program Files\PostgreSQL\rasters\Landsat8_L1TP_RGBN.TIF
Hasło użytkownika postgres:

BEGIN
UWAGA: tabela "landsat8" nie istnieje, pominiÄtto
DROP TABLE
CREATE TABLE
INSERT 0 1
INSERT 0 1
INSERT 0 1
```



Przykład 1 - ST_Intersects

```
3 ➤ CREATE TABLE schema_stec.intersects AS
     SELECT a.rast, b.municipality
4
5
     FROM rasters.dem AS a, vectors.porto_parishes AS b
     WHERE ST_Intersects(a.rast, b.geom) AND b.municipality ilike 'porto';
8 v alter table schema_stec.intersects
     add column rid SERIAL PRIMARY KEY;
9
10
11 • CREATE INDEX idx_intersects_rast_gist ON schema_stec.intersects
12
     USING gist (ST_ConvexHull(rast));
13
14
     -- schema::name table_name::name raster_column::name
     SELECT AddRasterConstraints('schema_stec'::name, 'intersects'::name,'rast'::name);
15
Data Output Messages Notifications
                           #
                                   SQL
     addrasterconstraints
     boolean
1
     true
```

```
| CREATE TABLE schema_stec.clip AS | SELECT ST_Clip(a.rast, b.geom, true), b.municipality | Aggregates | Aggr
```

Przykład 3 - ST_Union

```
CREATE TABLE schema_stec.union AS

SELECT ST_Union(ST_Clip(a.rast, b.geom, true))

FROM rasters.dem AS a, vectors.porto_parishes AS b

WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom,a.rast);

Data Output Messages Notifications

SELECT 1

Query returned successfully in 96 msec.
```

Tworzenie rastrów z wektorów (rastrowanie)

Przykład 1 - ST_AsRaster

```
27 • CREATE TABLE schema_stec.porto_parishes AS
     WITH r AS (
     SELECT rast FROM rasters.dem
29
     LIMIT 1
30
31
     SELECT ST_AsRaster(a.geom,r.rast,'8BUI',a.id,-32767) AS rast
32
     FROM vectors.porto_parishes AS a, r
33
     WHERE a.municipality ilike 'porto';
Data Output Messages
                     Notifications
SELECT 7
Query returned successfully in 86 msec.
```

Przykład 2 - ST_Union

```
36 DROP TABLE schema stec.porto parishes; --> drop table porto parishes first
37 ▼ CREATE TABLE schema_name.porto_parishes AS
     WITH r AS (
     SELECT rast FROM rasters.dem
    LIMIT 1
41
42
     SELECT st_union(ST_AsRaster(a.geom,r.rast,'8BUI',a.id,-32767)) AS rast
     FROM vectors.porto_parishes AS a, r
    WHERE a.municipality ilike 'porto';
Data Output Messages Notifications
 DROP TABLE
 Query returned successfully in 68 msec.
Przykład 3 - ST_Tile
46 DROP TABLE schema_stec.porto_parishes; --> drop table porto_parishes first
47 • CREATE TABLE schema_stec.porto_parishes AS
48 WITH r AS (
49 SELECT rast FROM rasters.dem
50 LIMIT 1 )
51 SELECT st_tile(st_union(ST_AsRaster(a.geom,r.rast,'8BUI',a.id,-32767)),128,128,true,-327
    FROM vectors.porto_parishes AS a, r
53 WHERE a.municipality ilike 'porto';
Data Output Messages Notifications
 SELECT 8
```

Konwertowanie rastrów na wektory (wektoryzowanie)

Przykład 1 - ST_Intersection

Query returned successfully in 61 msec.

```
56 v create table schema_stec.intersection as

57 SELECT a.rid,(ST_Intersection(b.geom,a.rast)).geom,(ST_Intersection(b.geom,a.rast)).val

58 FROM rasters.landsat8 AS a, vectors.porto_parishes AS b

59 WHERE b.parish ilike 'paranhos' and ST_Intersects(b.geom,a.rast);

Data Output Messages Notifications

SELECT 6629

Query returned successfully in 2 secs 534 msec.
```

```
CREATE TABLE schema_stec.dumppolygons AS

SELECT a.rid,(ST_DumpAsPolygons(ST_Clip(a.rast,b.geom))).geom,(ST_DumpAsPolygons(ST_Clip
FROM rasters.landsat8 AS a, vectors.porto_parishes AS b

WHERE b.parish ilike 'paranhos' and ST_Intersects(b.geom,a.rast);

Data Output Messages Notifications

SELECT 6422

Query returned successfully in 120 msec.
```

Analiza rastrów

Przykład 1 - ST_Band

```
G6 V CREATE TABLE schema_stec.landsat_nir AS
SELECT rid, ST_Band(rast,4) AS rast
FROM rasters.landsat8;

Data Output Messages Notifications

SELECT 384

Query returned successfully in 330 msec.
```

Przykład 2 - ST_Clip

```
70 CREATE TABLE schema_stec.paranhos_dem AS
71 SELECT a.rid,ST_Clip(a.rast, b.geom,true) as rast
72 FROM rasters.dem AS a, vectors.porto_parishes AS b
WHERE b.parish ilike 'paranhos' and ST_Intersects(b.geom,a.rast);

Data Output Messages Notifications

SELECT 4

Query returned successfully in 57 msec.
```

Przykład 3 - ST_Slope

```
75 CREATE TABLE schema_stec.paranhos_slope AS
76 SELECT a.rid,ST_Slope(a.rast,1,'32BF','PERCENTAGE') as rast
77 FROM schema_stec.paranhos_dem AS a;

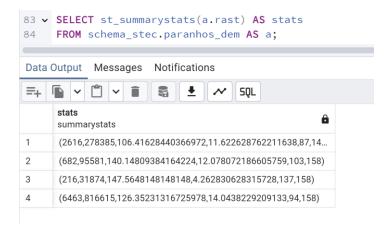
Data Output Messages Notifications

SELECT 4

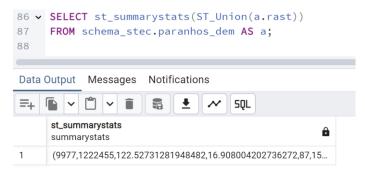
Query returned successfully in 105 msec.
```

Przykład 4 - ST_Reclass

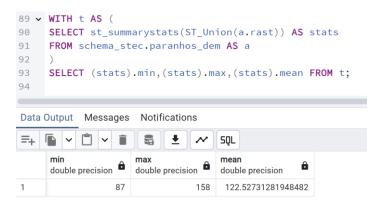
Przykład 5 - ST_SummaryStats



Przykład 6 - ST_SummaryStats oraz Union



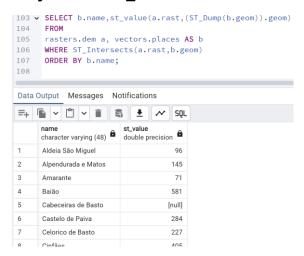
Przykład 7 - ST SummaryStats z lepszą kontrolą złożonego typu danych



Przykład 8 - ST SummaryStats w połączeniu z GROUP BY

```
95 v WITH t AS (
       SELECT b.parish AS parish, st_summarystats(ST_Union(ST_Clip(a.rast, b.geom,true))) AS s
97
      FROM rasters.dem AS a, vectors.porto_parishes AS b
 98
      WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom,a.rast)
99
      group by b.parish
100
101
      SELECT parish, (stats).min, (stats).max, (stats).mean FROM t;
102
Data Output Messages Notifications
=+ • • • •
                        mean
      parish
                                                                                      â
                                                                                         double precision
                                                                                                                          •
                                                                        double precision
      character varying (254)
                                                                                                          double precision
      Bonfim
                                                                                                     159
                                                                                                            107.5658842667906
2
      Campanhã
                                                                                      0
                                                                                                      178
                                                                                                            74.66732213085449
3
      Paranhos
                                                                                      87
                                                                                                     158
                                                                                                           122.52731281948482
4
      Ramalde
                                                                                      48
                                                                                                     108
                                                                                                            77.5844444444444
                                                                                      -4
                                                                                                      83
                                                                                                            34.66735489791237
      União das freguesias de Aldoar, Foz do Douro e Nevogilde
                                                                                      1
                                                                                                     157
                                                                                                            95.00277741039545
6
      União das freguesias de Cedofeita, Santo Ildefonso, Sé, Miragaia, São Nicolau e Vitó...
      União das freguesias de Lordelo do Ouro e Massarelos
                                                                                                     117
                                                                                                            49.50051440329218
```

Przykład 9 - ST_Value



Przykład 10 - ST_TPI

```
109 v create table schema_stec.tpi30 as
110    select ST_TPI(a.rast,1) as rast
111    from rasters.dem a;
112    --Poniższa kwerenda utworzy indeks przestrzenny:
113 v CREATE INDEX idx_tpi30_rast_gist ON schema_stec.tpi30
114    USING gist (ST_ConvexHull(rast));
115    --Dodanie constraintów:
116    SELECT AddRasterConstraints('schema_name'::name, 'tpi30'::name,'rast'::name);
117

Data Output    Messages    Notifications
```

SELECT 589

Query returned successfully in 25 secs 785 msec.

Problem do samodzielnego rozwiązania

```
117
118 CREATE TABLE schema_stec.tpi30_porto AS
119 SELECT ST_TPI(a.rast, 1) AS rast
120 FROM rasters.dem a, vectors.porto_parishes b
121 WHERE ST_Intersects(a.rast, b.geom)
122 AND b.municipality ILIKE 'Porto';
123

Data Output Messages Notifications

SELECT 25

Query returned successfully in 2 secs 169 msec.
```

Algebra map

```
129
130 V CREATE TABLE schema_stec.porto_ndvi AS
131
     WITH r AS (
SELECT a.rid,ST_Clip(a.rast, b.geom,true) AS rast
133 FROM rasters.landsat8 AS a, vectors.porto_parishes AS b
WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom,a.rast)
135
136 SELECT
137
     r.rid,ST_MapAlgebra(
138 r.rast, 1,
139
    r.rast, 4,
     '([rast2.val] - [rast1.val]) / ([rast2.val] + [rast1.val])::float','32BF'
    ) AS rast
141
142 FROM r;
```

Data Output Messages Notifications

SELECT 23

Query returned successfully in 355 msec.

Przykład 2 – Funkcja zwrotna

```
CREATE TABLE schema_stec.porto_ndvi2 AS
WITH r AS (
SELECT a.rid,ST_Clip(a.rast, b.geom,true) AS rast
FROM rasters.landsat8 AS a, vectors.porto_parishes AS b
WHERE b.municipality ilike 'porto' and ST_Intersects(b.geom,a.rast)
)
SELECT
r.rid,ST_MapAlgebra(
r.rast, ARRAY[1,4],
'schema_stec.ndvi(double precision[], integer[],text[])'::regprocedure, --> This is the function!
'32BF'::text
) AS rast
FROM r;
6
```

Oata Output Messages Notifications

SELECT 23

Duery returned successfully in 132 msec

```
28 CREATE INDEX idx_porto_ndvi2_rast_gist ON schema_stec.porto_ndvi2
USING gist (ST_ConvexHull(rast));

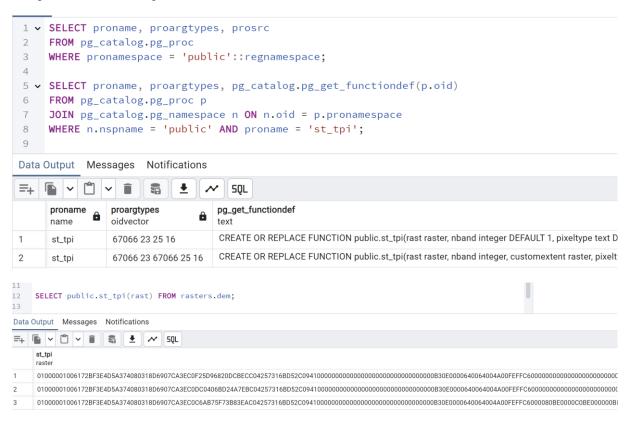
SELECT AddRasterConstraints('schema_stec'::name, 'porto_ndvi2'::name,'rast'::name);

Data Output Messages Notifications

Addrasterconstraints boolean

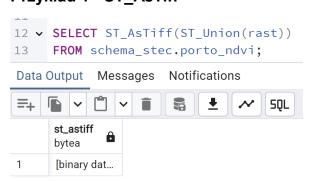
1 true
```

Przykład 3 - Funkcje TPI

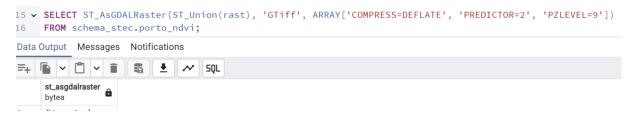


Eksport danych

Przykład 1 - ST_AsTiff



Przykład 2 - ST_AsGDALRaster



Przykład 3 - Zapisywanie danych na dysku za pomocą dużego obiektu (large object, lo)

