

Zad 1/2

Insertowanie wartości do tabeli uk_250k

```
C:\Program Files\PostgreSQL\14\bin>psql -t -c "select count(*) from uk_250k;"
count
-----
89600
(1 row)
```

Zad 3

Funkcja ST_Union na rastrach trwała parę godzin, po których pojawił się błąd. Rastry są zbyt duże żeby je połączyć w jedną mozaikę.

Zad 4/5

```
C:\Program Files\PostgreSQL\14\bin>ogr2ogr.exe D:\BDP\OS_Open D:\BDP\OS_Open_Zoomstack.gpkg
Warning 1: 2GB file size limit reached for D:\BDP\OS_Open\contours.shp. Going on, but might cause compatibility issues with third party software
```

parks			Enter a SQL expression to filter results (use Ctrl+Space)			
	gid	fid	geom			
1	0	0	MULTIPOLYGON (((356612.4129999997 508769.34410000034, 356827.09399999996 508804.46900000005, 356900 508780, 357052.78100000004 508862.15599999995, 357279.46899999996 508984.03099999997, 357506.15899999998 509106.11199999999, 357733.46899999999 509228.19399999999, 357960.15899999999 509350.27599999999, 358187.46899999999 509472.35799999999, 358414.77899999999 509594.43999999999, 358642.08899999999 509716.52199999999, 358869.39899999999 509838.60399999999, 359096.70899999999 509960.68599999999, 359324.01899999999 510082.76799999999, 359551.32899999999 510204.84999999999, 359778.63899999999 510326.93199999999, 359999.94899999999 510448.01399999999, 360227.25899999999 510570.09599999999, 360454.56899999999 510692.17799999999, 360681.87899999999 510814.25999999999, 360909.18899999999 510936.34199999999, 361136.49899999999 511058.42399999999, 361363.80899999999 511180.50599999999, 361591.11899999999 511302.58799999999, 361818.42899999999 511424.66999999999, 362045.73899999999 511546.75199999999, 362273.04899999999 511668.83399999999, 362500.35899999999 511790.91599999999, 362727.66899999999 511912.99799999999, 362954.97899999999 512035.07999999999, 363182.28899999999 512157.16199999999, 363409.59899999999 512279.24399999999, 363636.90899999999 512401.32599999999, 363864.21899999999 512523.40799999999, 364091.52899999999 512645.48999999999, 364318.83899999999 512767.57199999999, 364546.14899999999 512889.65399999999, 364773.45899999999 513011.73599999999, 365000.76899999999 513133.81799999999, 365228.07899999999 513255.89999999999, 365455.38899999999 513377.98199999999, 365682.69899999999 513500.06399999999, 365910.00899999999 513622.14599999999, 366137.31899999999 513744.22799999999, 366364.62899999999 513866.30999999999, 366591.93899999999 513988.39199999999, 366819.24899999999 514110.47399999999, 367046.55899999999 514232.55599999999, 367273.86899999999 514354.63799999999, 367501.17899999999 514476.71999999999, 367728.48899999999 514598.80199999999, 367955.79899999999 514720.88399999999, 368183.10899999999 514842.96599999999, 368410.41899999999 514965.04799999999, 368637.72899999999 515087.12999999999, 368865.03899999999 515209.21199999999, 369092.34899999999 515331.29399999999, 369319.65899999999 515453.37599999999, 369546.96899999999 515575.45799999999, 369774.27899999999 515697.53999999999, 369999.94899999999 515819.62199999999, 370227.25899999999 515941.70399999999, 370454.56899999999 516063.78599999999, 370681.87899999999 516185.86799999999, 370909.18899999999 516307.94999999999, 371136.49899999999 516430.03199999999, 371363.80899999999 516552.11399999999, 371591.11899999999 516674.19599999999, 371818.42899999999 516796.27799999999, 372045.73899999999 516918.35999999999, 372273.04899999999 517040.44199999999, 372500.35899999999 517162.52399999999, 372727.66899999999 517284.60599999999, 372954.97899999999 517406.68799999999, 373182.28899999999 517528.76999999999, 373409.59899999999 517650.85199999999, 373636.90899999999 517772.93399999999, 373864.21899999999 517895.01599999999, 374091.52899999999 518017.09799999999, 374318.83899999999 518139.17999999999, 374546.14899999999 518261.26199999999, 374773.45899999999 518383.34399999999, 375000.76899999999 518505.42599999999, 375228.07899999999 518627.50799999999, 375455.38899999999 518749.58999999999, 375682.69899999999 518871.67199999999, 375910.00899999999 518993.75399999999, 376137.31899999999 519115.83599999999, 376364.62899999999 519237.91799999999, 376591.93899999999 519360.00099999999, 376819.24899999999 519482.08299999999, 377046.55899999999 519604.16499999999, 377273.86899999999 519726.24699999999, 377501.17899999999 519848.32899999999, 377728.48899999999 519970.41099999999, 377955.79899999999 520092.49299999999, 378183.10899999999 520214.57499999999, 378410.41899999999 520336.65699999999, 378637.72899999999 520458.73899999999, 378865.03899999999 520580.82099999999, 379092.34899999999 520702.90299999999, 379319.65899999999 520825.00099999999, 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391136.49899999999 527173.26499999999, 391363.80899999999 527295.34699999999, 391591.11899999999 527417.42899999999, 391818.42899999999 527539.51099999999, 392045.73899999999 527661.59299999999, 392273.04899999999 527783.67499999999, 392500.35899999999 527905.75699999999, 392727.66899999999 528027.83899999999, 392954.97899999999 528150.00099999999, 393182.28899999999 528272.08299999999, 393409.59899999999 528394.16499999999, 393636.90899999999 528516.24699999999, 393864.21899999999 528638.32899999999, 394091.52899999999 528760.41099999999, 394318.83899999999 528882.49299999999, 394546.14899999999 529004.57499999999, 394773.45899999999 529126.65699999999, 395000.76899999999 529248.73899999999, 395228.07899999999 529370.82099999999, 395455.38899999999 529492.90299999999, 395682.69899999999 529614.98499999999, 395910.00899999999 529737.06699999999, 396137.31899999999 529859.14899999999, 396364.62899999999 529981.23099999999, 396591.93899999999 530103.31299999999, 396819.24899999999 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402727.66899999999 533399.52699999999, 402954.97899999999 533521.60899999999, 403182.28899999999 533643.69099999999, 403409.59899999999 533765.77299999999, 403636.90899999999 533887.85499999999, 403864.21899999999 534009.93699999999, 404091.52899999999 534132.01899999999, 404318.83899999999 534254.10099999999, 404546.14899999999 534376.18299999999, 404773.45899999999 534498.26499999999, 405000.76899999999 534620.34699999999, 405228.07899999999 534742.42899999999, 405455.38899999999 534864.51099999999, 405682.69899999999 534986.59299999999, 405910.00899999999 535108.67499999999, 406137.31899999999 535230.75699999999, 406364.62899999999 535352.83899999999, 406591.93899999999 535474.92099999999, 406819.24899999999 535597.00299999999, 407046.55899999999 535719.08499999999, 407273.86899999999 535841.16699999999, 407501.17899999999 535963.24899999999, 407728.48899999999 536085.33099999999, 407955.79899999999 536207.41299999999, 408183.10899999999 536329.49499999999, 408410.41899999999 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414318.83899999999 539625.70899999999, 414546.14899999999 539747.79099999999, 414773.45899999999 539869.87299999999, 415000.76899999999 539991.95499999999, 415228.07899999999 540114.03699999999, 415455.38899999999 540236.11899999999, 415682.69899999999 540358.20099999999, 415910.00899999999 540480.28299999999, 416137.31899999999 540602.36499999999, 416364.62899999999 540724.44699999999, 416591.93899999999 540846.52899999999, 416819.24899999999 540968.61099999999, 417046.55899999999 541090.69299999999, 417273.86899999999 541212.77499999999, 417501.17899999999 541334.85699999999, 417728.48899999999 541456.93899999999, 417955.79899999999 541579.02099999999, 418183.10899999999 541701.10299999999, 418410.41899999999 541823.18499999999, 418637.72899999999 541945.26699999999, 418865.03899999999 542067.34899999999, 419092.34899999999 542189.43099999999, 419319.65899999999 542311.51299999999, 419546.96899999999 542433.59499999999, 419774.27899999999 542555.67699999999, 419999.94899999999 542677.75899999999, 420227.25899999999 542799.84099999999, 420454.56899999999 542921.92299999999, 420681.87899999999 543044.00499999999, 420909.18899999999 543166.08699999999, 421136.49899999999 543288.16899999999, 421363.80899999999 543410.25099999999, 421591.11899999999 543532.33299999999, 421818.42899999999 543654.41499999999, 422045.73899999999 543776.49699999999, 422273.04899999999 543898.57899999999, 422500.35899999999 544020.66099999999, 422727.66899999999 544142.74299999999, 422954.97899999999 544264.82499999999, 423182.28899999999 544386.90699999999, 423409.59899999999 544508.98899999999, 423636.90899999999 544631.			

Zad 6

[illegible]

Zad 7

The screenshot shows the QGIS application window. The top panel displays the executed SQL script:

```
CREATE TABLE lake_out AS
SELECT lo_from_bytea(0,
ST_AsGDALRaster(ST_Union(clip), 'GTiff', ARRAY['COMPRESS=DEFLATE',
'PREDICTOR=2', 'PZLEVEL=9']))
) AS loid
FROM uk_lake_district ;
```

```
SELECT lo_export(lo_id, 'D:\BDP\lakes.tiff')
FROM lake_out;
```

```
SELECT lo_unlink(lo_id)
FROM lake_out; --> Delete the large object.
```

The bottom panel shows the results of the SQL execution:

Statistics	Value
Rows	0

A message box indicates: "--> Delete the large object."

The right panel shows a map view of the UK Lake District area, displaying the spatial distribution of lakes and land cover data.

Zad 8

S2A MSI

S2A_MSIL1C_20221128T113421_N0400_R080_T30UWG_20221128T132929

Download URL: <https://scihub.copernicus.eu/dhus/odata/v1/Products/bf40ef94-bf8-489b-ac57-2254ec4df17a>
Mission: Sentinel-2 Instrument: MSI Sensing Date: 2022-11-28T11:34:21.024Z Size: 784.78 MB

S2A MSI

S2A_MSIL1C_20221128T113421_N0400_R080_T30UWF_20221128T132929

Download URL: <https://scihub.copernicus.eu/dhus/odata/v1/Products/31fe63e4-60a7-4841-93ba-c2d3af772610>
Mission: Sentinel-2 Instrument: MSI Sensing Date: 2022-11-28T11:34:21.024Z Size: 489.28 MB

S2A MSI

S2A_MSIL1C_20221128T113421_N0400_R080_T30UWG_20221128T132929

Download URL: <https://scihub.copernicus.eu/dhus/odata/v1/Products/0c73da80-c4d1-4df0-ba79-b062f1488ebc>
Mission: Sentinel-2 Instrument: MSI Sensing Date: 2022-11-28T11:34:21.024Z Size: 699.94 MB

S2A MSI

S2A_MSIL1C_20221128T113421_N0400_R080_T30UVE_20221128T132929

Download URL: <https://scihub.copernicus.eu/dhus/odata/v1/Products/3820e09d-edba-40ff-a6b5-197260fc60da>
Mission: Sentinel-2 Instrument: MSI Sensing Date: 2022-11-28T11:34:21.024Z Size: 734.27 MB

S2A MSI

S2A_MSIL1C_20221128T113421_N0400_R080_T30UVE_20221128T132929

Download URL: <https://scihub.copernicus.eu/dhus/odata/v1/Products/ac022535-6480-4433-8452-4c3d7c12050d>
Mission: Sentinel-2 Instrument: MSI Sensing Date: 2022-11-28T11:34:21.024Z Size: 263.99 MB

S2A MSI

S2A_MSIL2A_20221125T112411_N0400_R037_T30UVE_20221125T151458

S2B_MSIL2A_20221213T113449_N0509_R080_T30UVF_20221213T130328

<https://scihub.copernicus.eu/dhus/odata/v1/Products/1cab80ad-7357-4c9c-aeba-f56d9c90b7ca>

Footprint

Quicklook

Attributes

Summary

Date: 2022-12-13T11:34:49.024Z

Filename: S2B_MSIL2A_20221213T113449_N0509_R080_T30UVF_20221213T130328.SAFE



Identifier: S2B_MSIL2A_20221213T113449_N0509_R080_T30UVF_20221213T130328



Instrument: MSI

Satellite: Sentinel-2

Inspector

Zad 9

	 id	 rast
1	1	01000001000000000000024400000000000024C000000006069184100000000D45574100000000000000000000000000767F0006400640060000B10F78106811891070106C114811CC10C20CEB00D4D0C1
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4	4	01000001000000000000024400000000000024C000000004098184100000000D45574100000000000000000000000000767F000640064006000005C0701070D072F073495079407D5071A085E082C08A
5	5	01000001000000000000024400000000000024C00000000E0A7184100000000D45574100000000000000000000000000767F00064006400600007206A0E08D06A0D69A069C0669560062306400647064
6	6	01000001000000000000024400000000000024C0000000080B7184100000000D45574100000000000000000000000000767F0006400640060000C0E0C0FF750E05D0E9D0240D60C750BEA0FA04A3A0
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8	8	01000001000000000000024400000000000024C00000000CD6184100000000D45574100000000000000000000000000767F00064006400600007C10740F9011D810C81190143C16DD147811BE0F990F1
9	9	01000001000000000000024400000000000024C0000000060E6184100000000D45574100000000000000000000000000767F00064006400600001032982AD8231C1DE019D818E815E017A4176918AD181
10	10	01000001000000000000024400000000000024C000000000F6184100000000D45574100000000000000000000000000767F00064006400600000980CB0D840D260E98103411E0105010F80E920F120FDC
11	11	01000001000000000000024400000000000024C00000000A05194100000000D45574100000000000000000000000000767F00064006400600006E0C90DF04A50D6011C8132813A41498190D1FCD11
12	12	01000001000000000000024400000000000024C000000004015194100000000D45574100000000000000000000000000767F00064006400600005D079D920CE0C7E08E809C8091408B20C00D280E
13	13	01000001000000000000024400000000000024C00000000E024194100000000D45574100000000000000000000000000767F0006400640060000B20E7A0F3C1140138125713801438126C113413141291
14	14	01000001000000000000024400000000000024C000000008034194100000000D45574100000000000000000000000000767F0006400640060000C112B11BE0D7A0A860A780B380F59132014801384109
15	15	01000001000000000000024400000000000024C000000002044194100000000D45574100000000000000000000000000767F00064006400600000A0AEEA040ED40CC07C305D0A076C092007A04078B0
16	16	01000001000000000000024400000000000024C00000000C053194100000000D45574100000000000000000000000000767F0006400640060000B0CB0E30D70A09360D30109C10F50F
17	17	01000001000000000000024400000000000024C000000006063194100000000D45574100000000000000000000000000767F0006400640060000A30DEE0CD70CB0A0C20E8D0A0710720840BDF0D0A
18	18	01000001000000000000024400000000000024C00000000073194100000000D45574100000000000000000000000000767F00064006400600006412E810400D7F0DD0CB0C90CE60C26D220C160B5001
19	19	01000001000000000000024400000000000024C00000000A082194100000000D45574100000000000000000000000000767F0006400640060000B90FB60CC20ACD0A0A0A3C0BD80A780B8E082C0B81
20	20	01000001000000000000024400000000000024C000000004092194100000000D45574100000000000000000000000000767F00064006400600008118158410C1010B11E80794080A074A08008F0D09C
21	21	01000001000000000000024400000000000024C00000000E0A1194100000000D45574100000000000000000000000000767F0006400640060000A60B0F40C740BA707F0774073A0820E08E07D0A0E0E4
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25	25	01000001000000000000024400000000000024C0000000060E0194100000000D45574100000000000000000000000000767F000640064006000084121D109D08B08E88D086D0800D741A10C0E18105
26	26	01000001000000000000024400000000000024C000000000F0194100000000D45574100000000000000000000000000767F0006400640060000540C5C07C0F53D082D0A80D2D0DCE0DF20CF680A0
27	27	01000001000000000000024400000000000024C00000000A0FF194100000000D45574100000000000000000000000000767F0006400640060000E20B070C860F4CF440F3E0A807CD0667089C0BA00E
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31	31	01000001000000000000024400000000000024C00000000203E1A4100000000D45574100000000000000000000000000767F0006400640060000530FD1A064124E0E20CE0BF8132812440E77D0FF0C8
32	32	01000001000000000000024400000000000024C00000000C04D1A4100000000D45574100000000000000000000000000767F00064006400600008E06CE069D06A507490A804A408320B4008B940
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35	35	01000001000000000000024400000000000024C00000000A07C1A4100000000D45574100000000000000000000000000767F00064006400600001C16CC17AC13BC11681035D04F0907A07347E0A97900
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38	38	01000001000000000000024400000000000024C0000000080AB1A4100000000D45574100000000000000000000000000767F00064006400600000400C5C0CDEAC0F60B0C20B500A0E08C091C
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40	40	01000001000000000000024400000000000024C00000000C0CA1A4100000000D45574100000000000000000000000000767F0006400640060000F015DC157815B014CB146810A81028144016B8156814
41	41	01000001000000000000024400000000000024C0000000060D1A4100000000D45574100000000000000000000000000767F00064006400600000C012C710D0F30E884D0500EFC137C14D8173C14BC1
42	42	01000001000000000000024400000000000024C000000000EA1A4100000000D45574100000000000000000000000000767F0006400640060000881124161818C17D418A91999199C1AD41C81E701E

	 id	 rast
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2	2	010000010000000000000344000000000000034C0000000070A31E4100000000D45574100000000000000000000000000767F000640064006000028080808E9074B079E6D7C065C0E7067068060A4061
3	3	010000010000000000000344000000000000034C00000000B0C21E4100000000D45574100000000000000000000000000767F0006400640060000CB0F7066A07BB076907C4061C06E00519063063E0E
4	4	010000010000000000000344000000000000034C00000000F0E11E4100000000D45574100000000000000000000000000767F000640064006000005D066B068F06A040F0C6C7073A0810849080E08800E
5	5	010000010000000000000344000000000000034C0000000030011F4100000000D45574100000000000000000000000000767F000640064006000000B0CB0E30D70A09360D30109C10F50F
6	6	010000010000000000000344000000000000034C0000000070201F4100000000D45574100000000000000000000000000767F000640064006000011DC11151281083D040CA30C04D080FE10021
7	7	010000010000000000000344000000000000034C00000000B03F1F4100000000D45574100000000000000000000000000767F00064006400600003B0F7D0E440F25108810B4119410430F3B113D12F4121
8	8	010000010000000000000344000000000000034C00000000F05E1F4100000000D45574100000000000000000000000000767F00064006400600000910D12D0B99C720C740CBO083709B908FE0B220BF0E1
9	9	010000010000000000000344000000000000034C00000000307E1F4100000000D45574100000000000000000000000000767F0006400640060000071A30FB410E6139B138811381103141B17CF169E154
10	10	010000010000000000000344000000000000034C00000000709D1F4100000000D45574100000000000000000000000000767F0006400640060000A00A1B0AD6097809B0CD270EC0CD4E0EBA0CCDD0C
11	11	010000010000000000000344000000000000034C00000000B0BC1F4100000000D45574100000000000000000000000000767F00064006400600000E0FB4107810A80E480D0CC05CE0171A02D102B21
12	12	010000010000000000000344000000000000034C00000000F0DB1F4100000000D45574100000000000000000000000000767F0006400640060000D0BCDD02A0E84AD0CE0E60CD10C20C230D510B
13	13	010000010000000000000344000000000000034C0000000030FB1F4100000000D45574100000000000000000000000000767F00064006400600000F0B8B0B63C41D0A80A0540C990B30805130D51
14	14	010000010000000000000344000000000000034C00000000380D204100000000D45574100000000000000000000000000767F00064006400600005807420746074907C074A078A07B4071D081F081E08
15	15	010000010000000000000344000000000000034C000000000D81C204100000000D45574100000000000000000000000000767F0006400640060000CC06D306C106D8068C06B306A806A106AE06B606C1
16	16	010000010000000000000344000000000000034C000000000782C204100000000D45574100000000000000000000000000767F000640064006000007106D606370734072C070707A206BA0E480753075507
17	17	010000010000000000000344000000000000034C00000000183C204100000000D45574100000000000000000000000000767F0006400640060000C806D806D806DE068E0DF06BF06C906B0684069E0
18	18	010000010000000000000344000000000000034C00000000B84B204100000000D45574100000000000000000000000000767F00064006400600002F0625069506620785063406A906A0677071907FE062
19	19	010000010000000000000344000000000000034C0000000058B8204100000000D45574100000000000000000000000000767F0006400640060000806D9E09DB094D09AD08D80E080E8450974096E093C0
20	20	010000010000000000000344000000000000034C00000000F86A204100000000D45574100000000000000000000000000767F00064006400600007006E0671069306B806D406F406DA06A306B206A40
21	21	010000010000000000000344000000000000034C00000000987A204100000000D45574100000000000000000000000000767F00064006400600003F0633062706280628062A06250638064C0659065065
22	22	010000010000000000000344000000000000034C00000000388A204100000000D45574100000000000000000000000000767F00064006400600003706F705F205030661069D06680657062F0612060706F
23	23	010000010000000000000344000000000000034C00000000D899204100000000D45574100000000000000000000000000767F00064006400600001307BD060207E506EA06E806D806A7069F069D068E06
24	24	010000010000000000000344000000000000034C0000000078A9204100000000D45574100000000000000000000000000767F0006400640060000608A70E3080209E8028096F98809B909A009
25	25	010000010000000000000344000000000000034C0000000018B9204100000000D45574100000000000000000000000000767F0006400640060000A0A0E0FAA30A350AC0CADF09320A99AD0BAA0CA0A
26	26	010000010000000000000344000000000000034C00000000B8C182621A4100000000D45574100000000000000000000000000767F0006400640060000B1262128A11E180B08750D4E0D060D700DCE06D

Zad 10

```
select updategeometrysrid('parks', 'geom', 32630);

-----

create table NDWI as
with tmp as (
select s.rid, ST_Clip(s.rast, p.geom, true) as clip
from sentinel2 s, parks p
where p.gid = 1 and ST_Intersects(p.geom, s.rast)
)
select tmp.rid, ST_MapAlgebra(tmp.clip, 1, tmp.clip, 4, '([rast2.val] - [rast1.val])/([rast2.val] + [rast1.val]))' as NDWI
from tmp;

-----

select * from NDWI
```

Wypróbowałem dwa pliki z Sentinel-2, które ze sobą graniczą. Żaden z nich nie ma wspólnej części z Lake_District, chociaż na mapie wygląda jakby powinny być koło siebie.

Zad 11

Z pustej tablicy nie powstanie tiff.