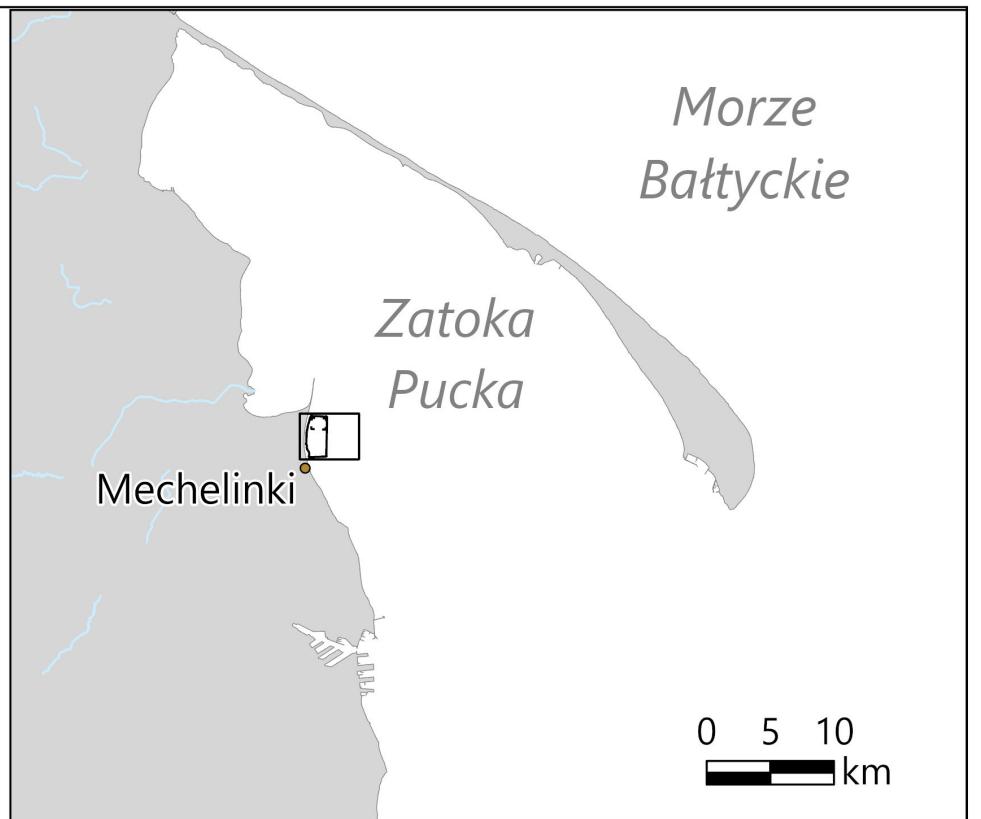


Wyznaczenie typów osadów
budujących dno przybrzeża przy
Mechelinkach za pomocą
danych backscatter.

Weronika Pucek

WPROWADZENIE



Legenda

- Mechelinki obwód
- rzeki obszaru danych
- Obwód Polska
- wybranego obszaru





Czym jest backscatter?

- Backscatter to intensywność rozproszenia sygnału akustycznego z powrotem do nadajnika dźwięku (Ferrini & Flood, 2006).
- Osady o większej średnicy ziarna cechują się większą siłą backscatteringu (Collier & Brown, 2005).

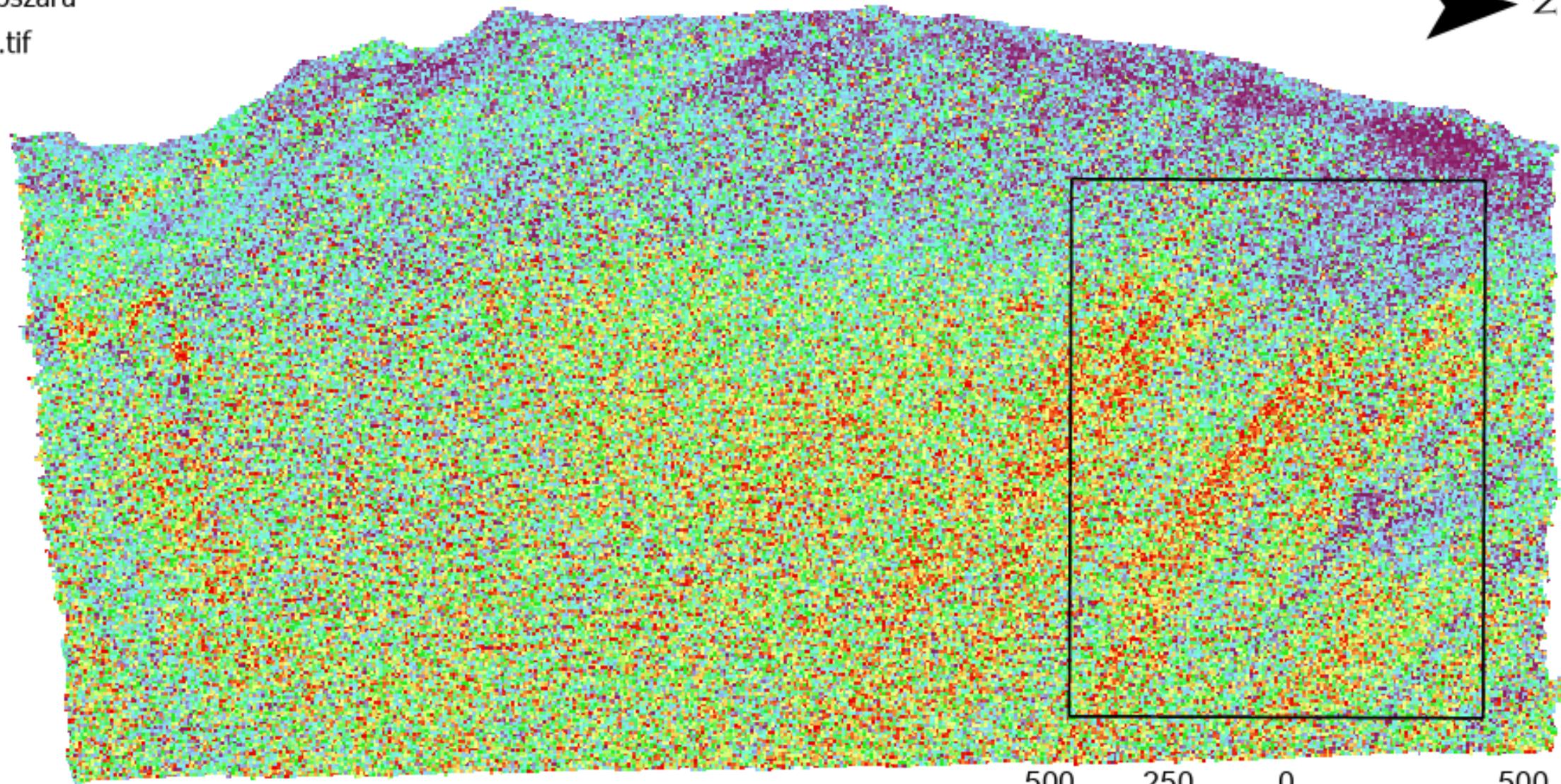
Obwód_obszaru

MECH_BS_02m.tif

Value

-10.4804

-60.56



z

500 250 0 500
m

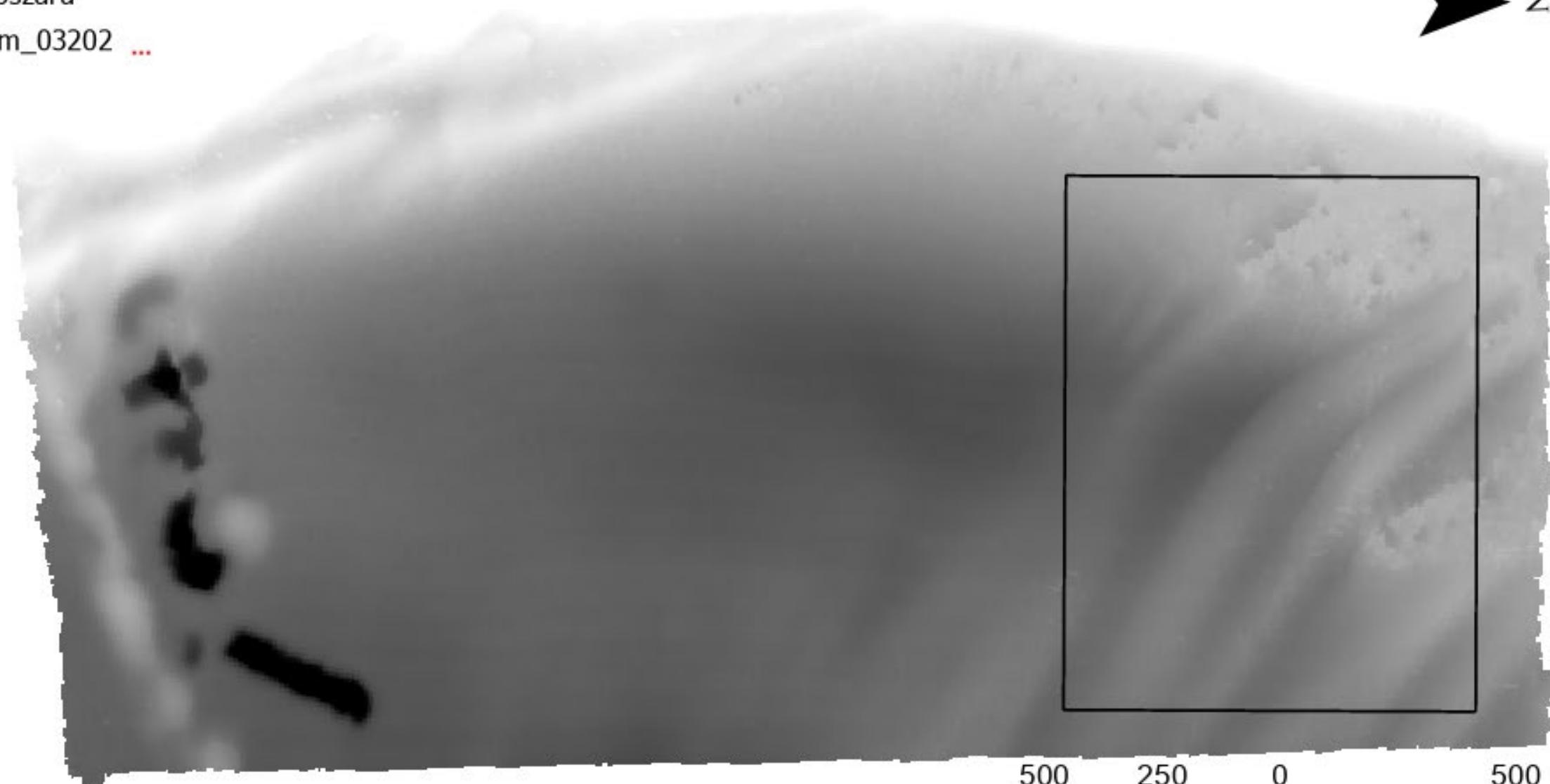
Obwód_obszaru

MECH_DEM_02m_03202 ...

Value

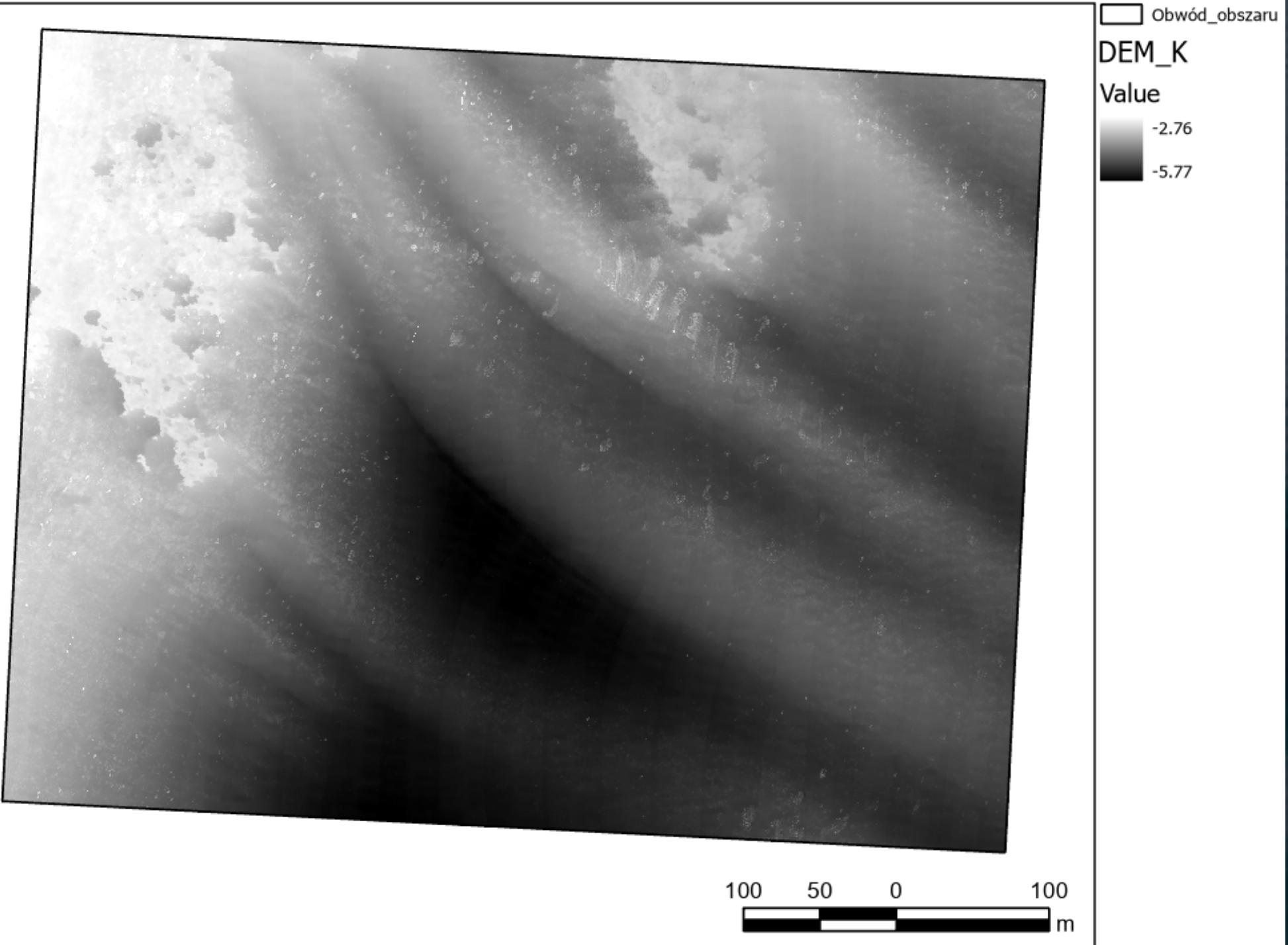
-1.01

-8.13

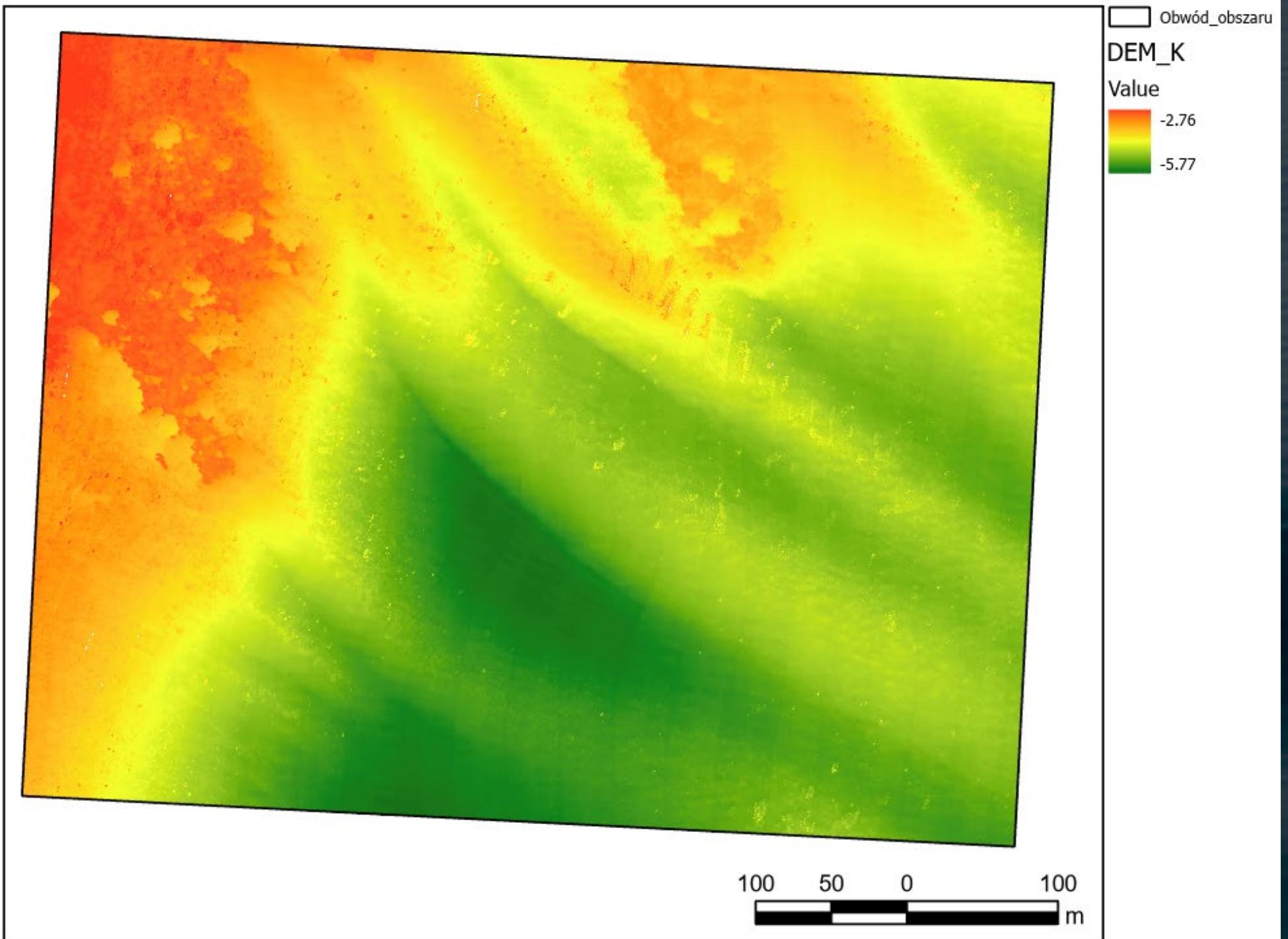


500 250 0 500
m

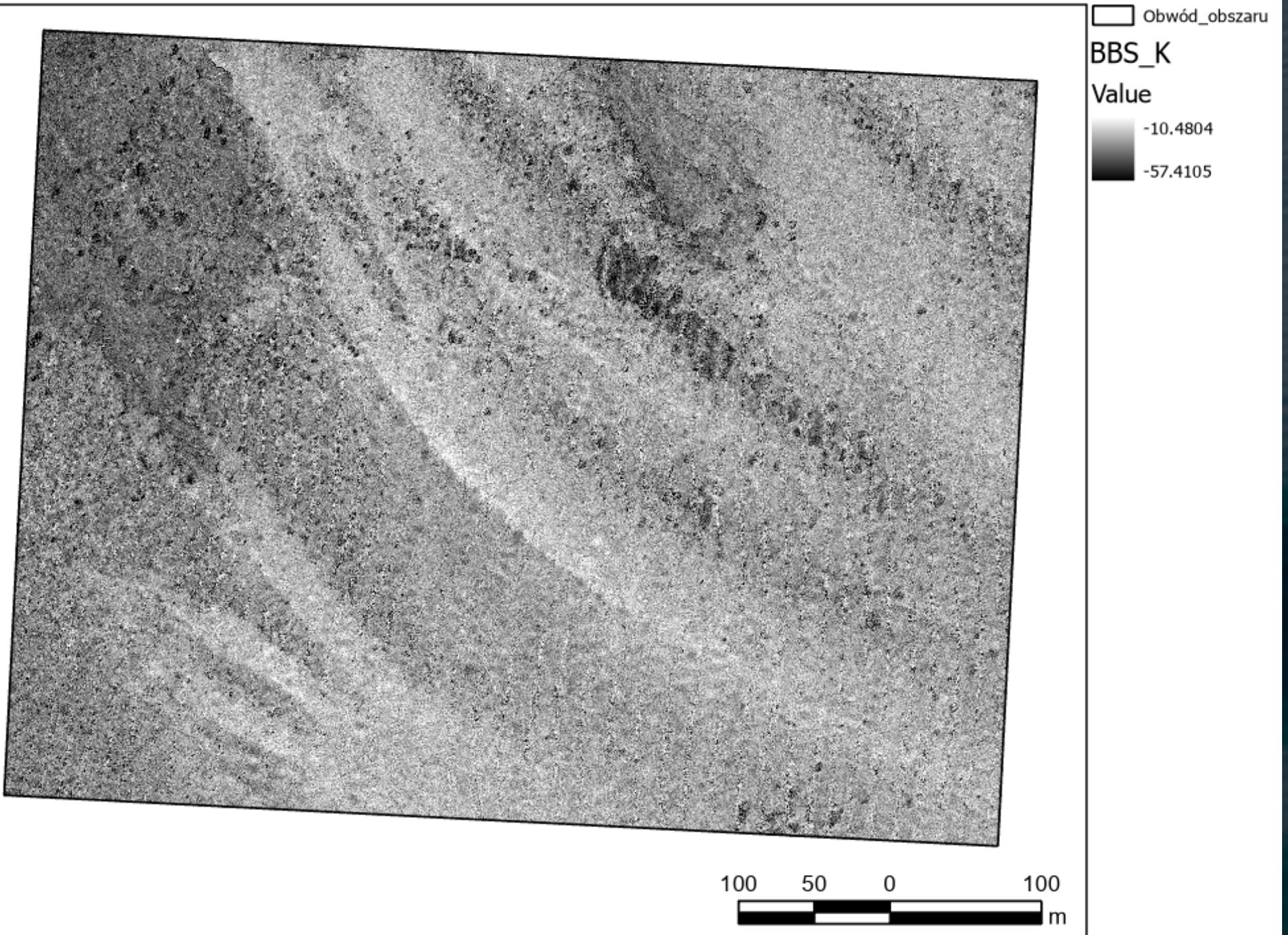
BATYMETRIA

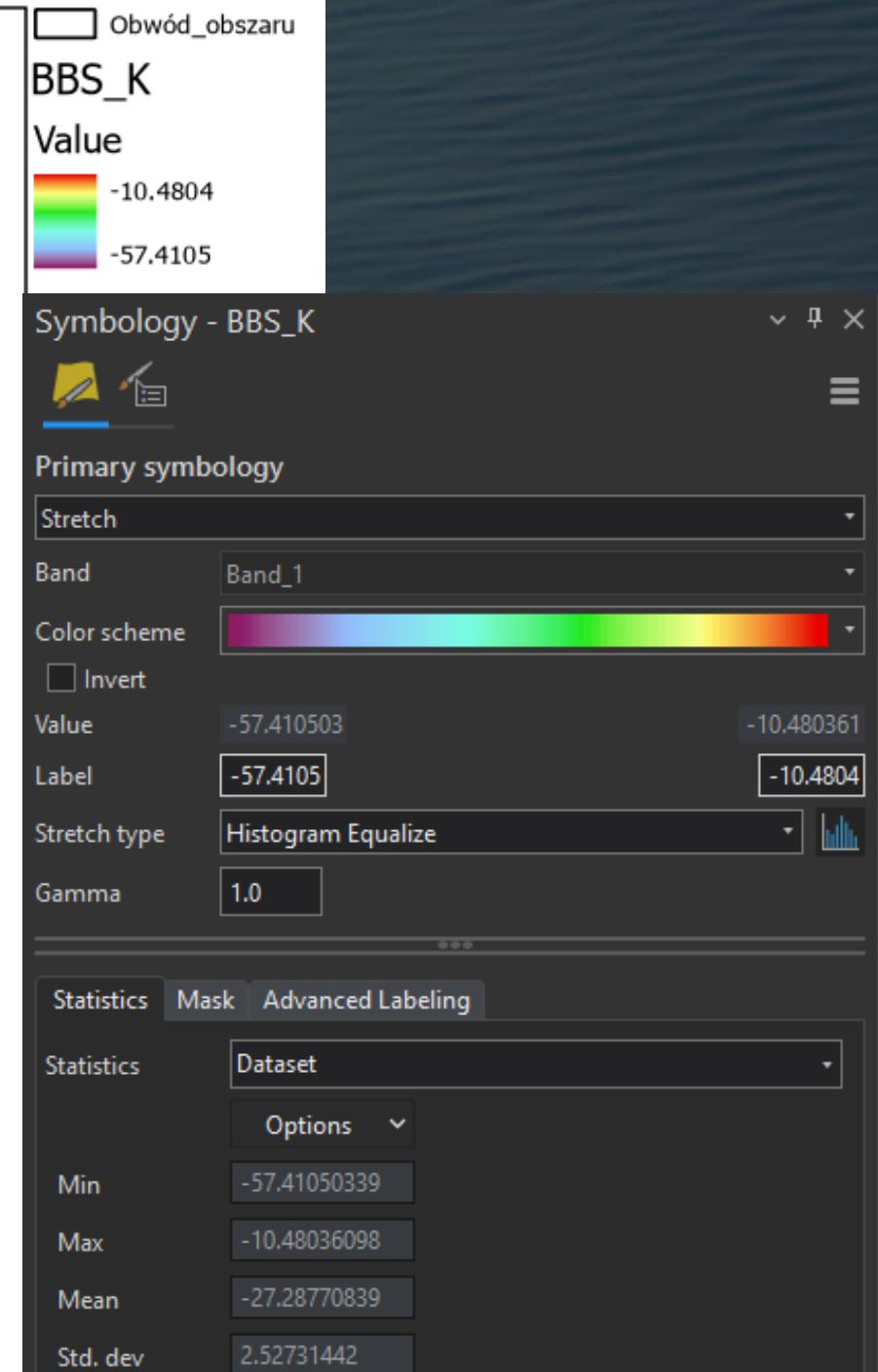
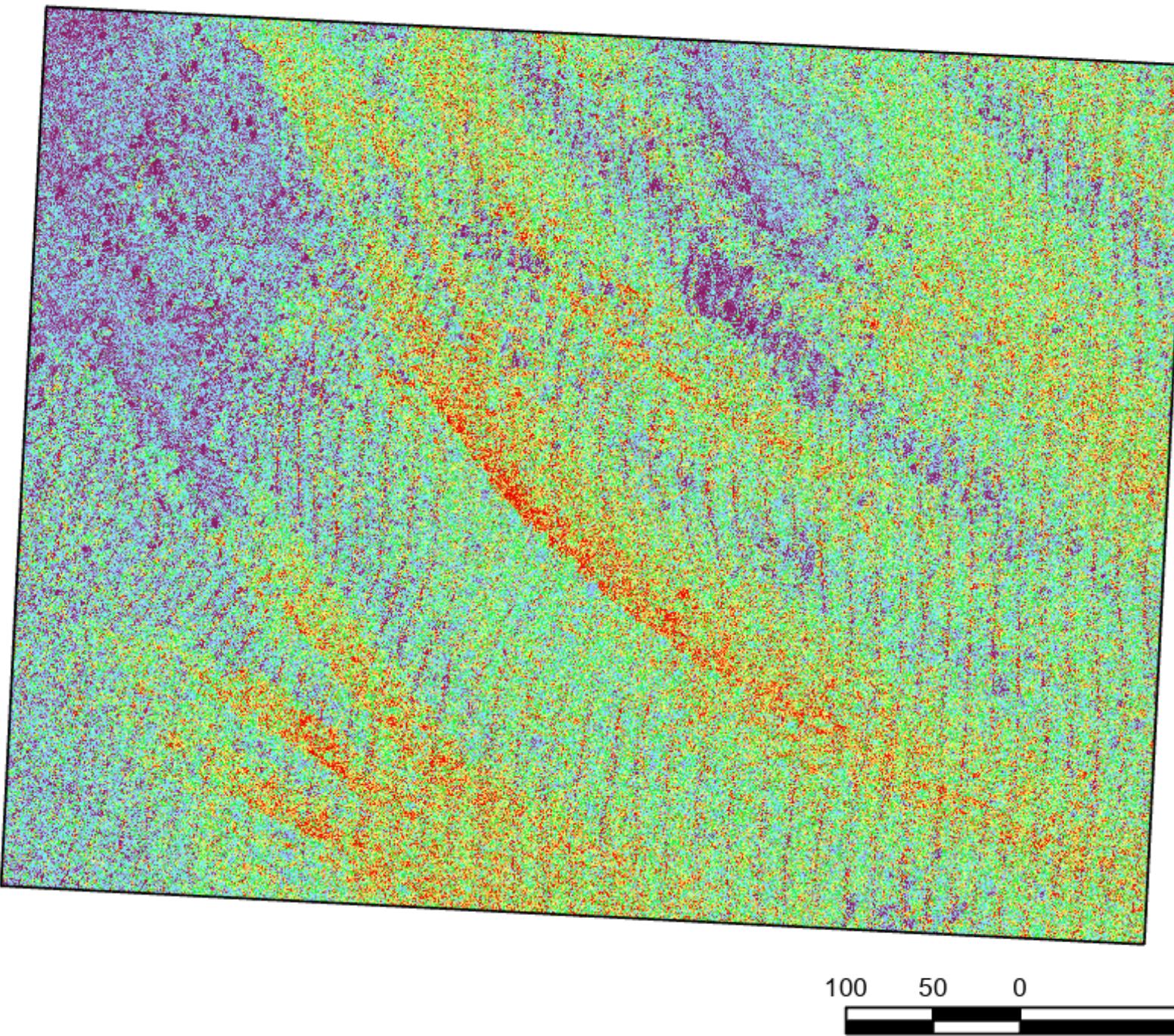


BATYMETRIA



BACKSCATTERING



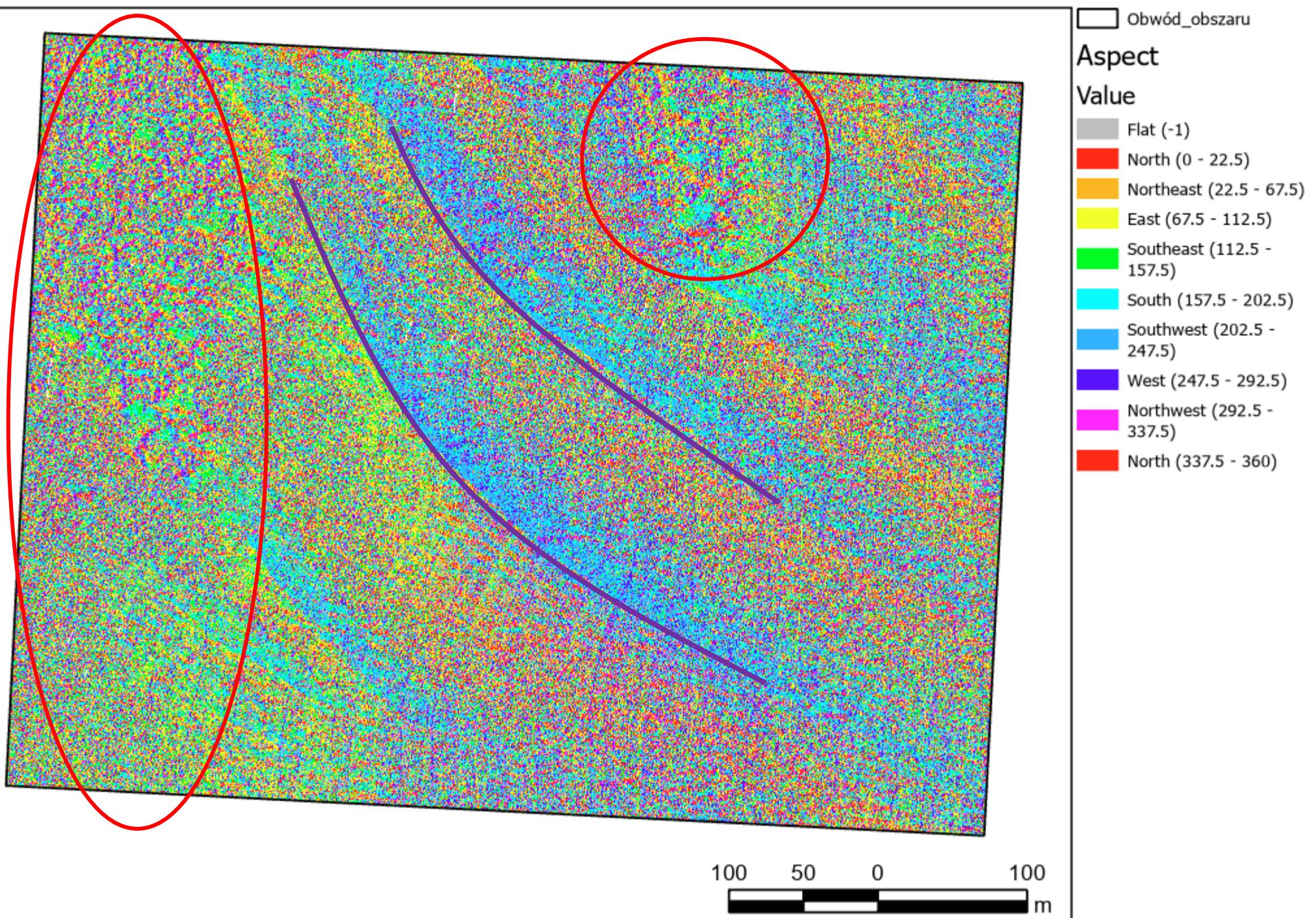


CEL

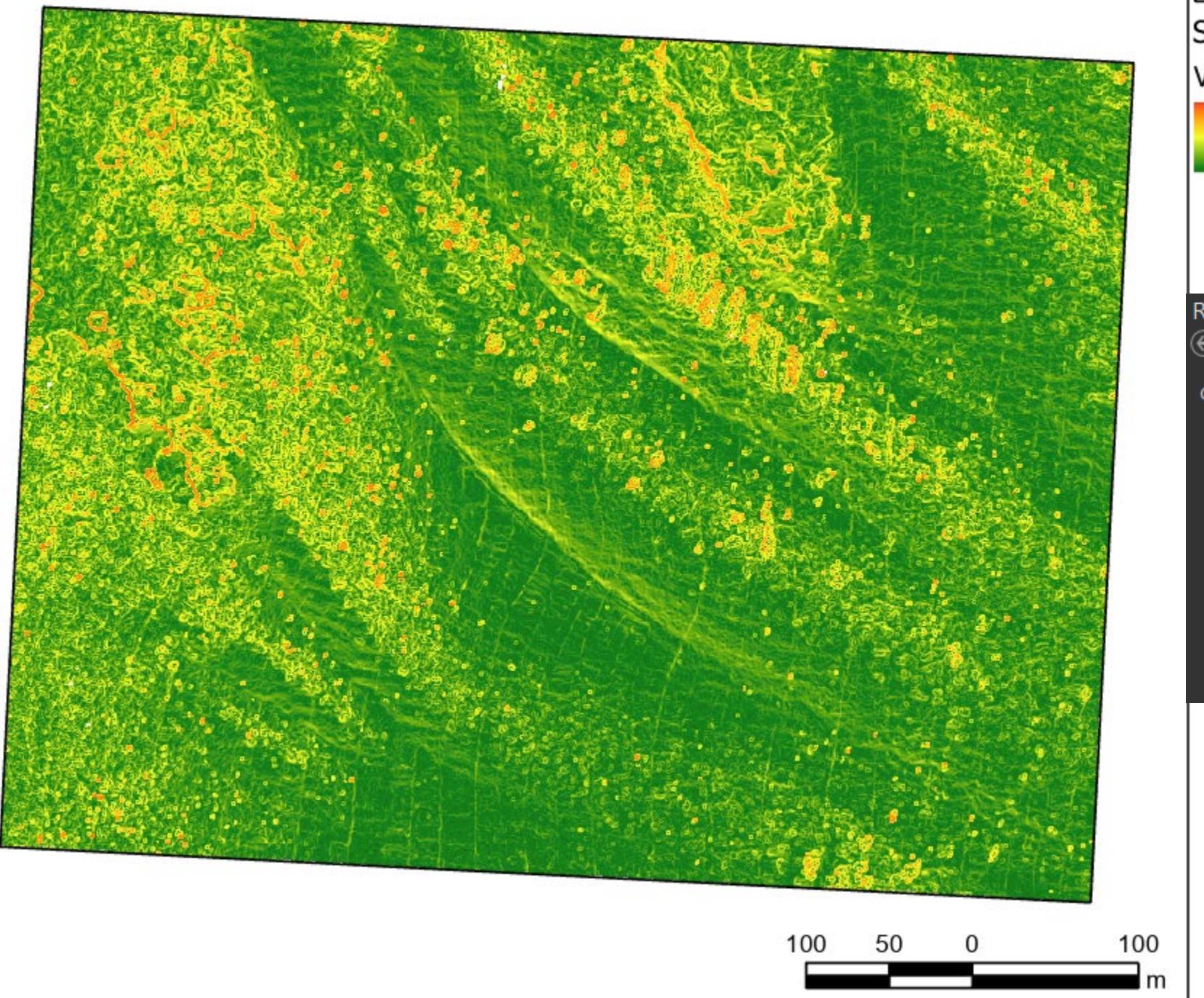
- Wyznaczenie miejsc o danym typie osadów na obszarze analizy za pomocą danych rozproszenia odbicia wstecznego i batymetrii.

METODY

ASPECT



SLOPE
degrees
 $z=15$



Obwód_obszaru

SLOPE

Value

90

0

Raster Functions

General Parameters

DEM

DEM_K

Scaling

Degree

Z Factor

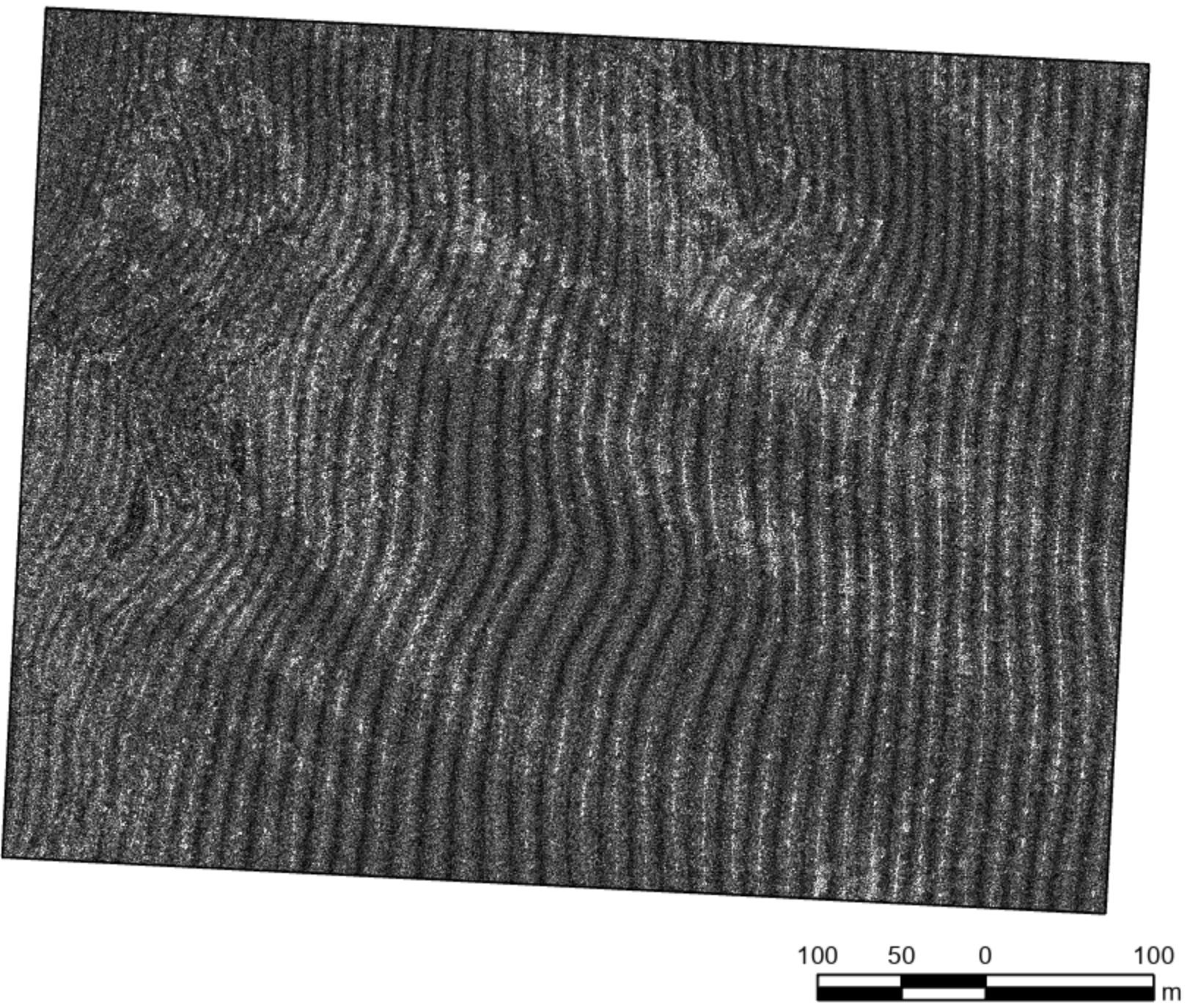
15

Disable default edge pixel interpolation

? X

Slope Properties

BBS ODCHYLENIE STANDARDOWE



Obwód_obszaru
BBS_STD

Value

9.25812
0.146168

Raster Functions

Focal Statistics Properties

General Parameters

Raster: BBS_K

Neighborhood Settings

Neighborhood: Rectangle

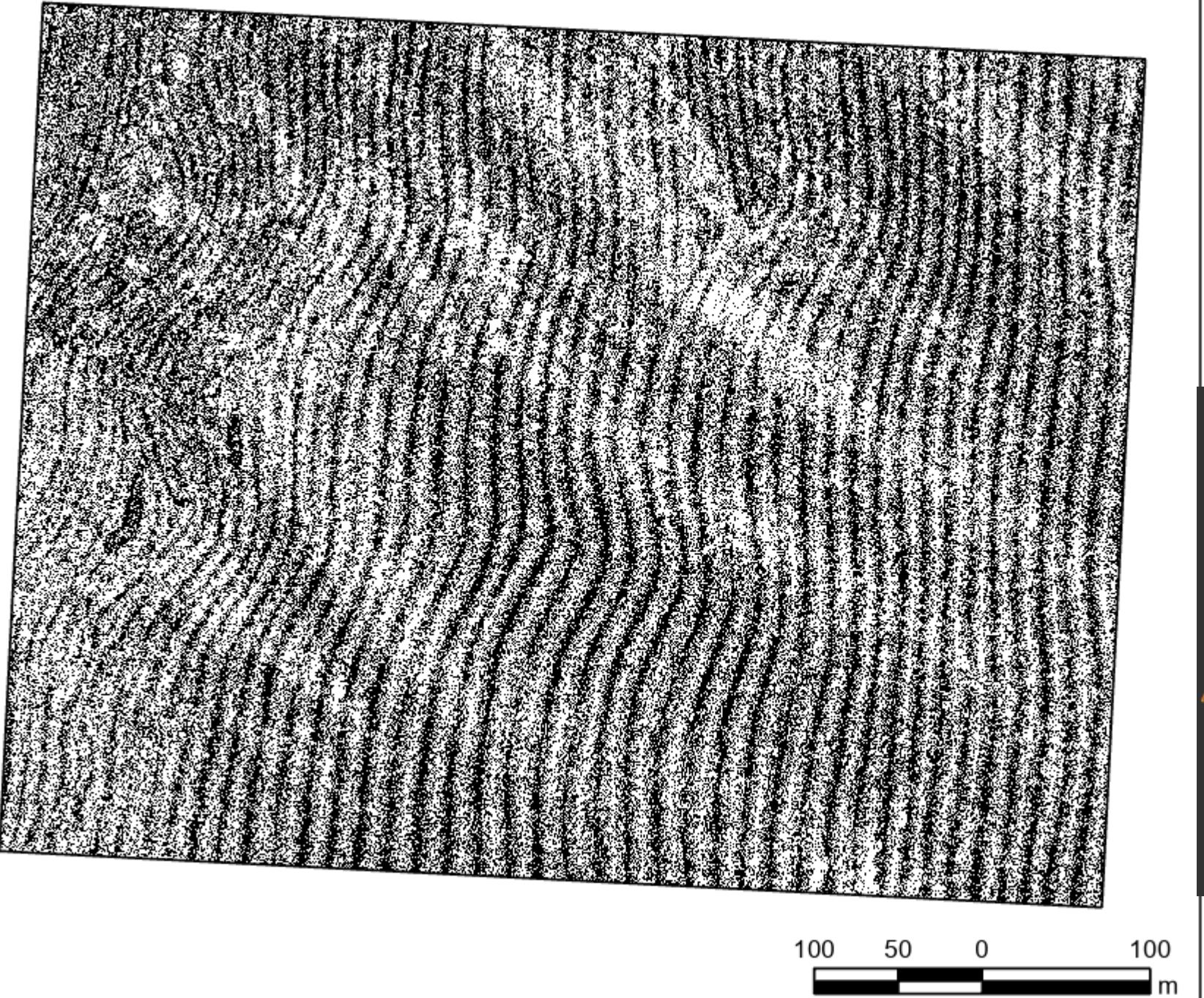
Width: 3

Height: 3

Statistics

Statistics Type: Standard Deviation

Ignore Nodata in Calculations



Obwód_obszaru

BBS_STD_Iso3

Value

1
2
3

Geoprocessing

Iso Cluster Unsupervised Classification

Parameters Environments

Input raster bands: BBS_STD.tif

Number of classes: 3

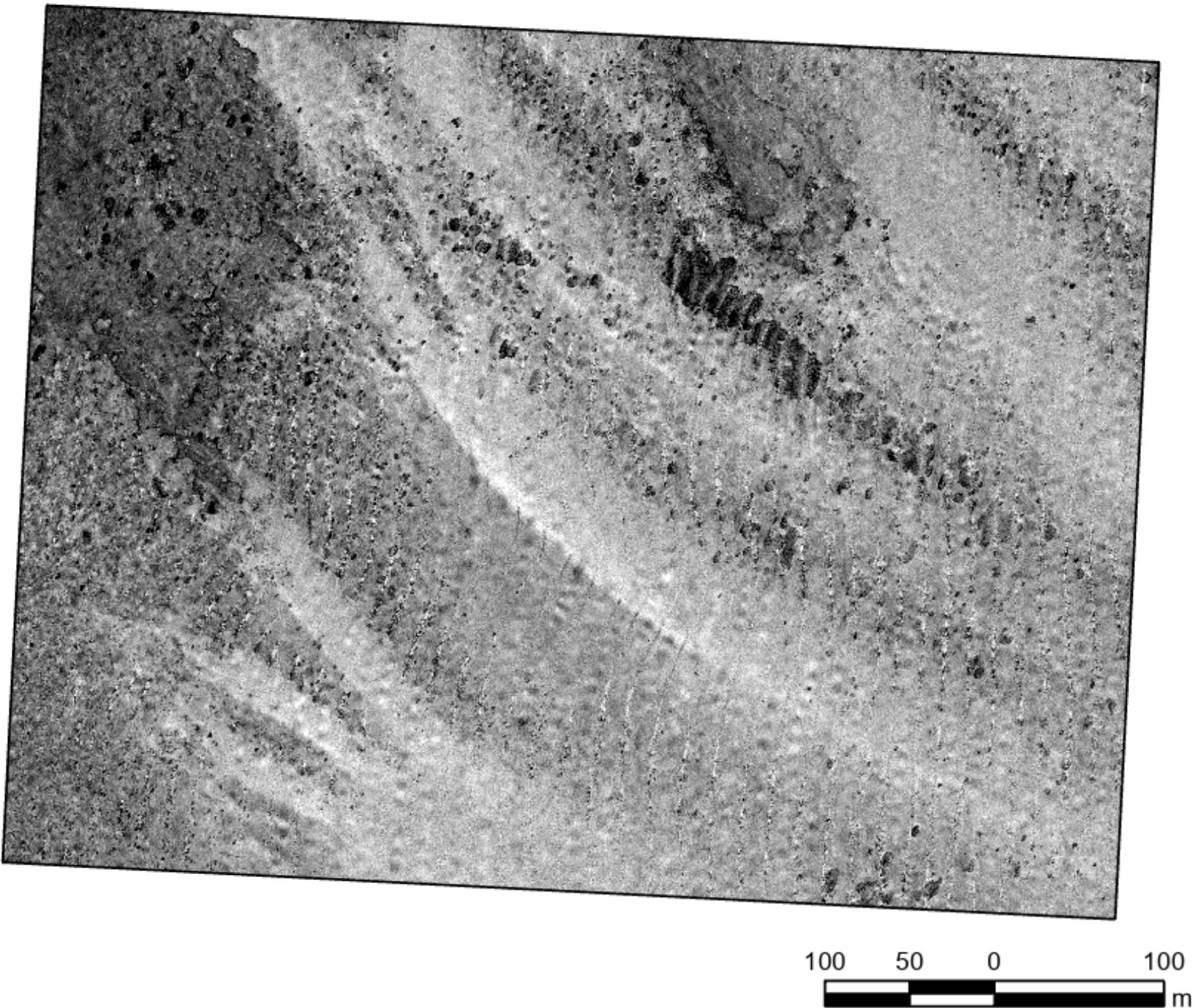
Output classified raster: BBS_STD_Iso3

Minimum class size: 20

Sample interval: 10

Output signature file:

BBS ŚREDNIA



Obwód obszaru
BBS_MEAN

Value

-20.3472
-40.2241

Raster Functions

Focal Statistics Properties

General Parameters

Raster

BBS_K

▼ Neighborhood Settings

Neighborhood

Rectangle

Width

3

Height

3

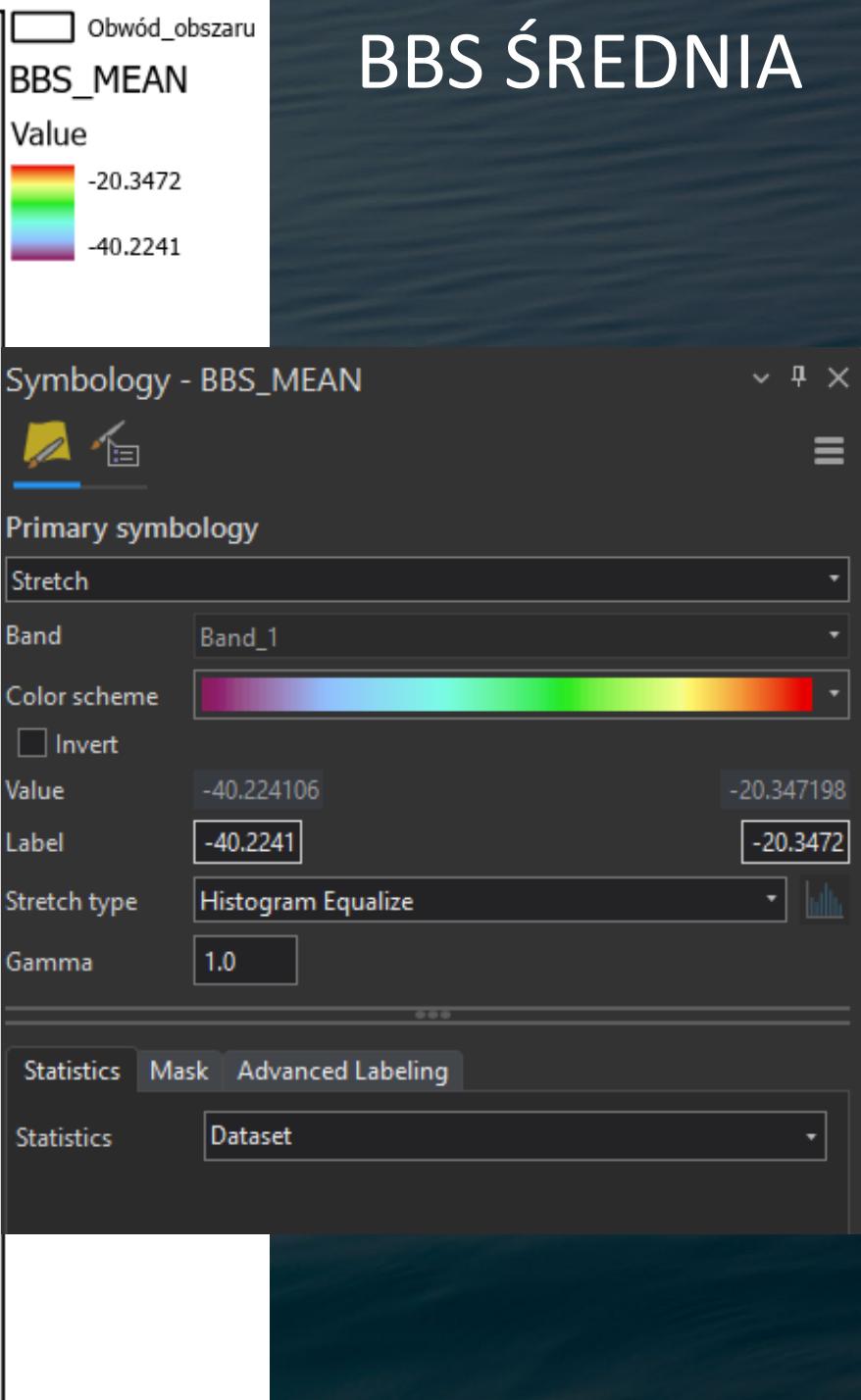
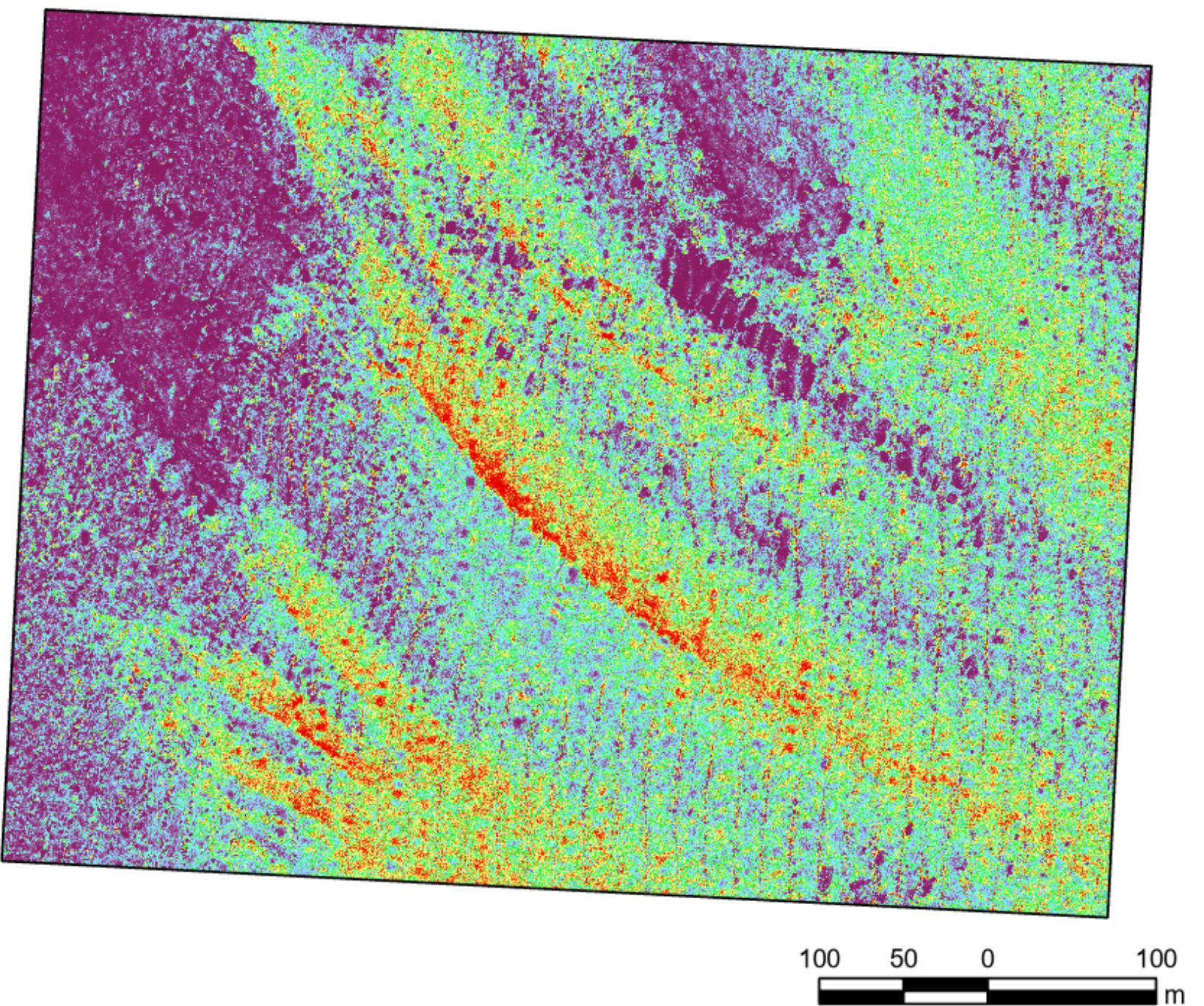
▼ Statistics

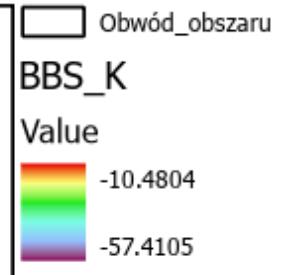
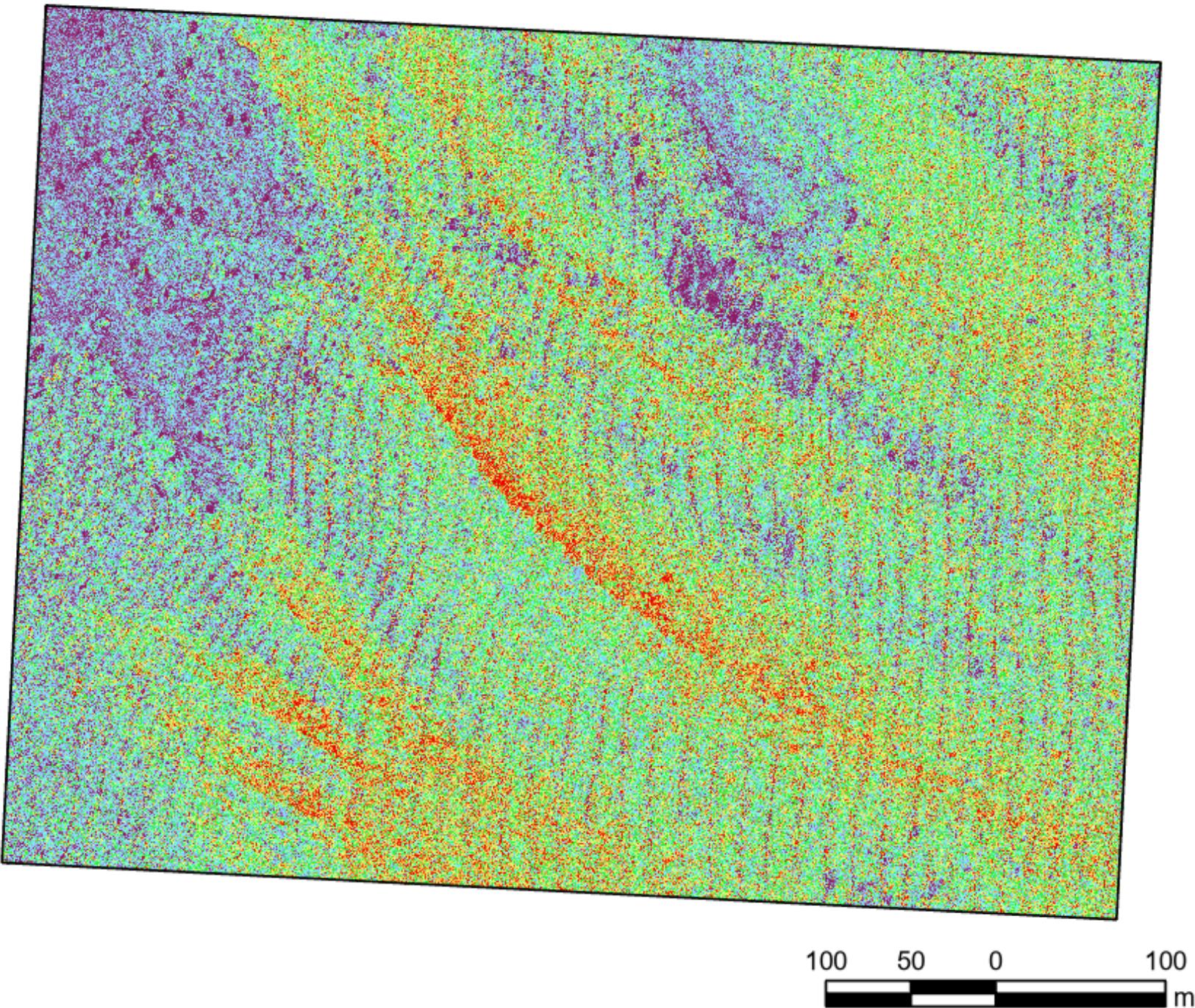
Statistics Type

Mean

Ignore Nodata in Calculations

BBS ŚREDNIA





Symbology - BBS_K



Primary symbology

Stretch

Band

Band_1

Color scheme



Invert

Value

-57.410503

-10.480361

Label

-57.4105

-10.4804

Stretch type

Histogram Equalize



Gamma

1.0

Statistics

Mask Advanced Labeling

Statistics

Dataset

Options

Min

-57.41050339

Max

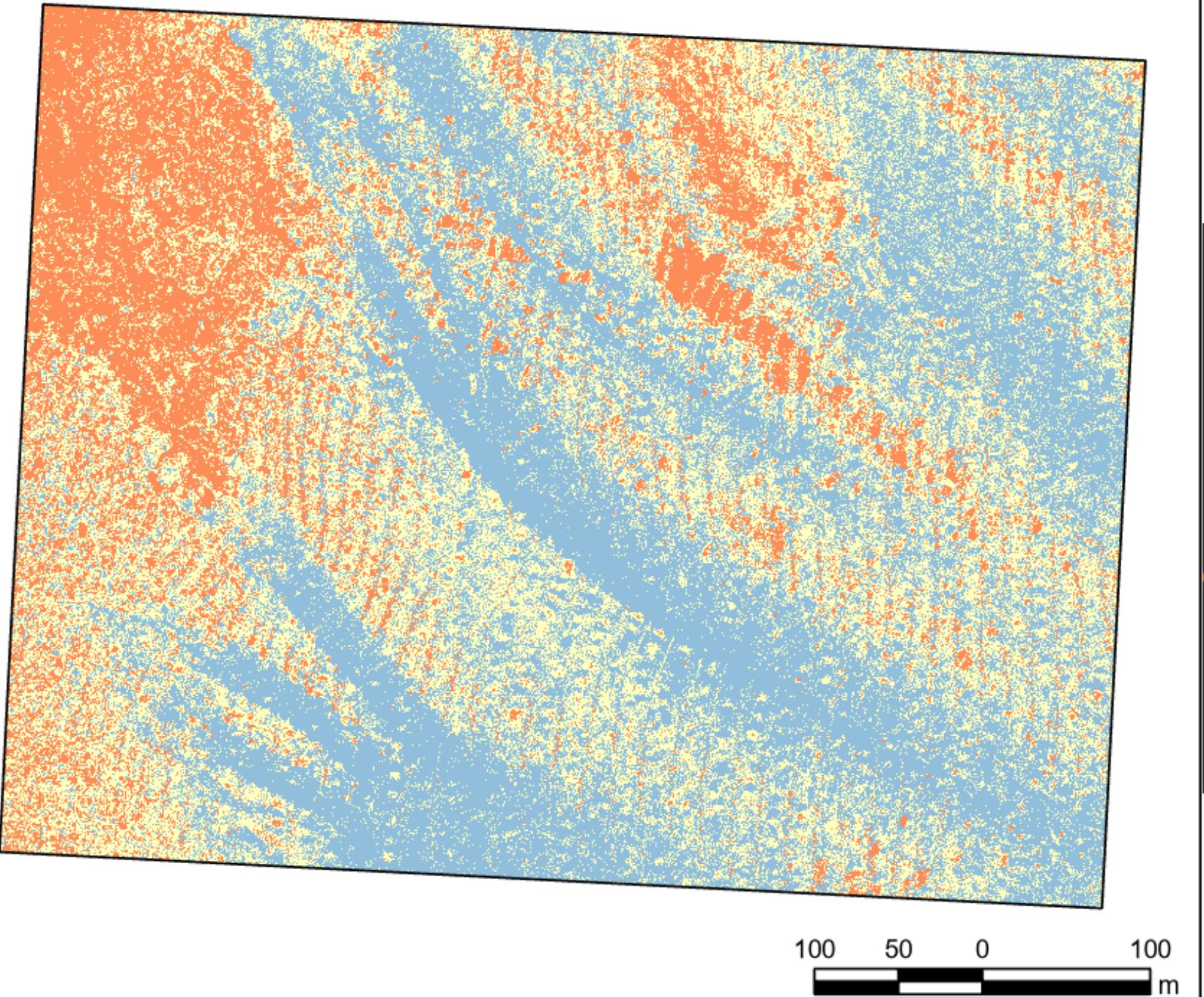
-10.48036098

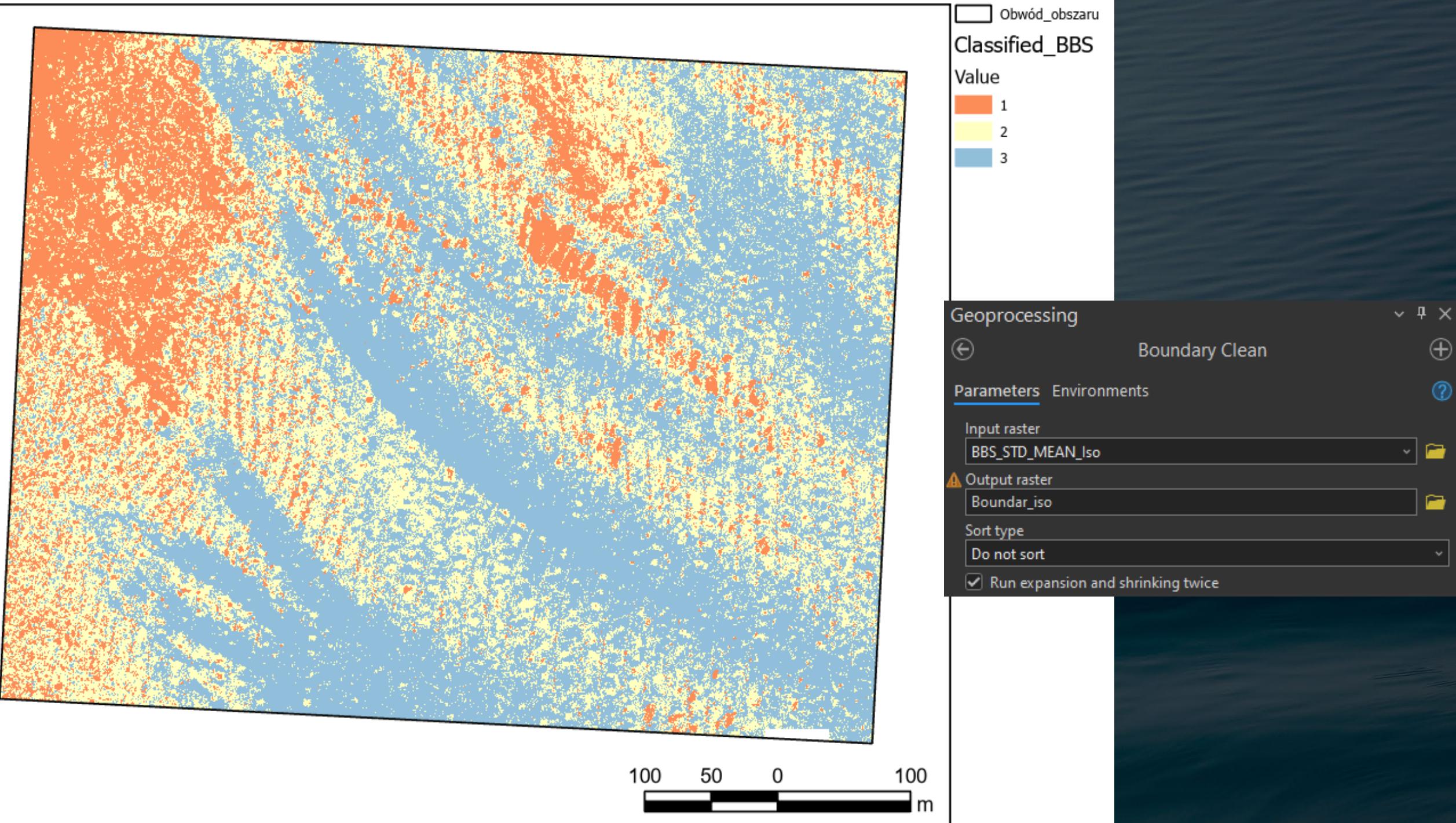
Mean

-27.28770839

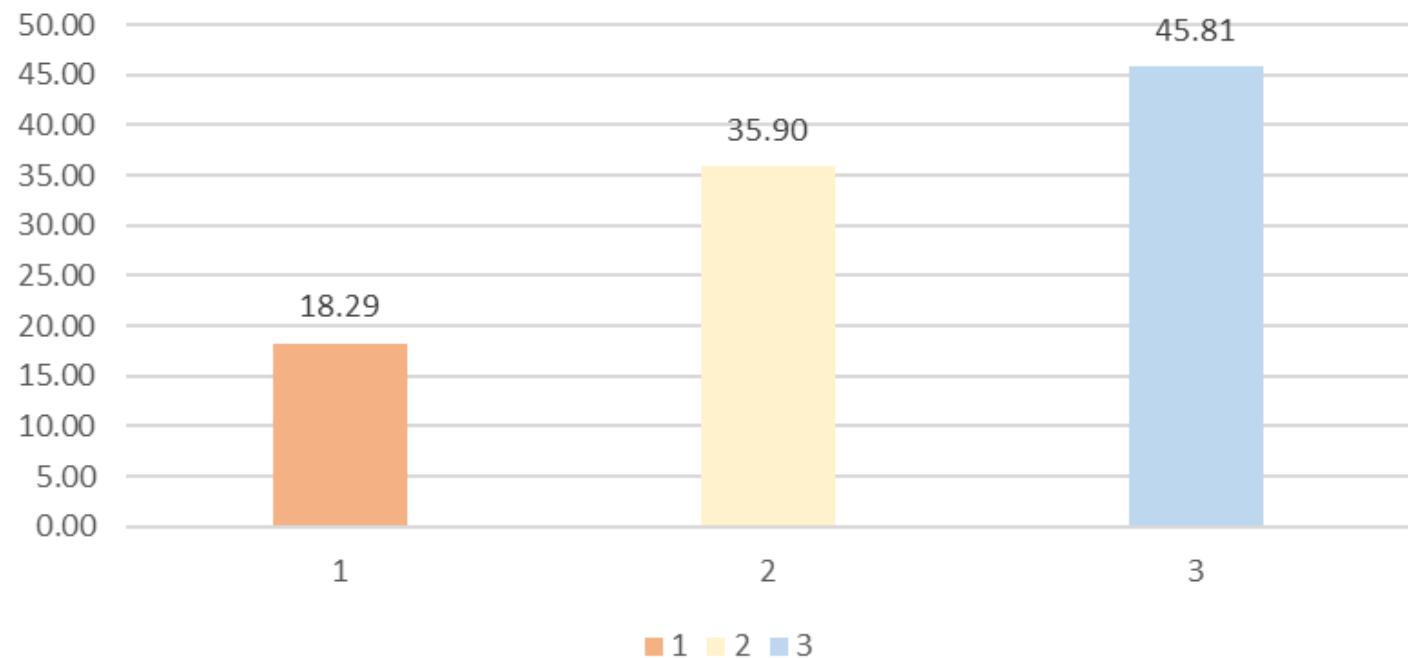
Std. dev

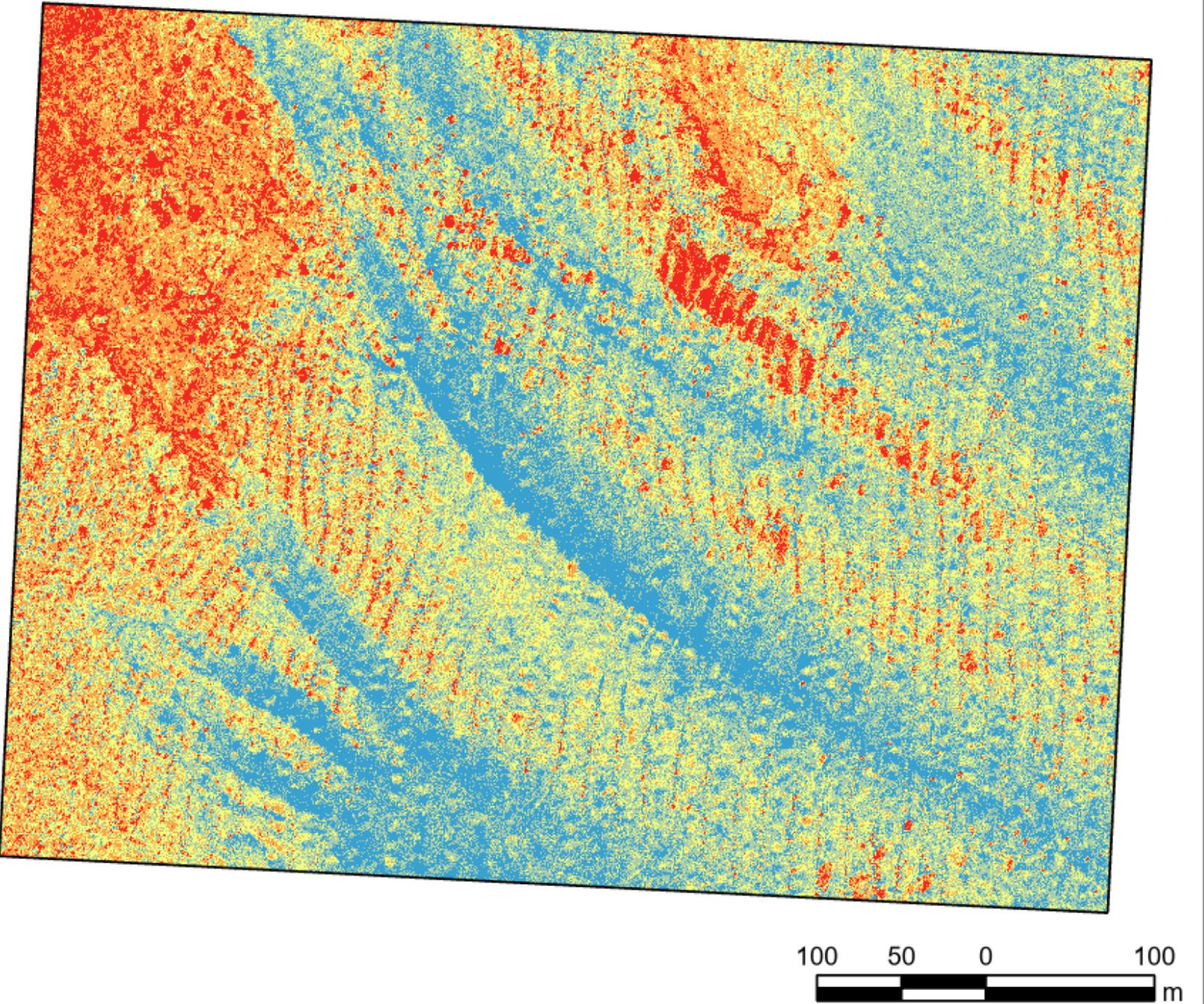
2.52731442





Powierzchnia sklasyfikowanych osadów [%]





Geoprocessing

Iso Cluster Unsupervised Classification

Parameters Environments

Input raster bands

- BBS_MEAN_2.tif
- BBS_STD.tif

Number of classes

Output classified raster

BBS_MEAN_STD_5

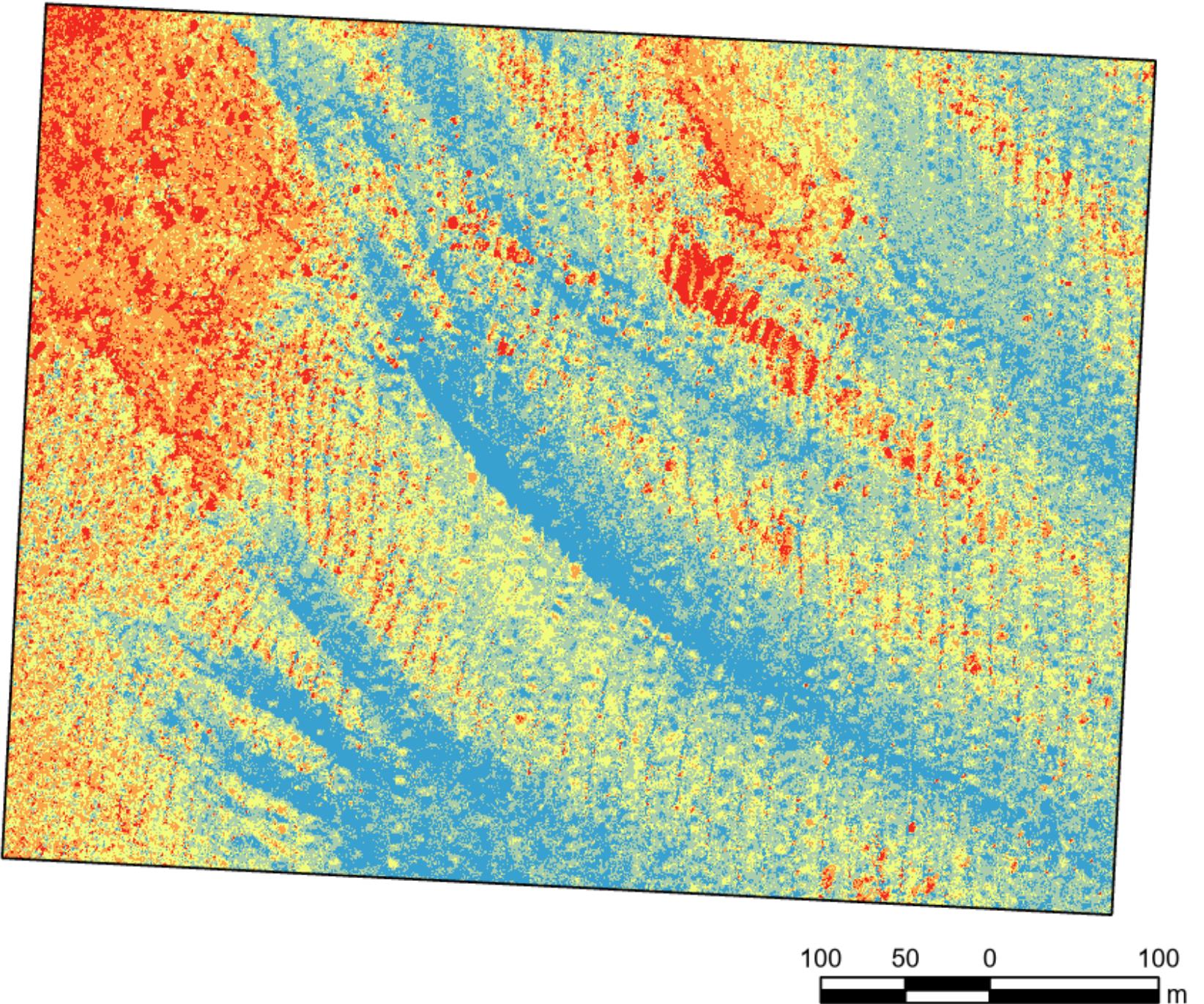
Minimum class size

20

Sample interval

10

Output signature file



Geoprocessing

Boundary Clean

Parameters Environments

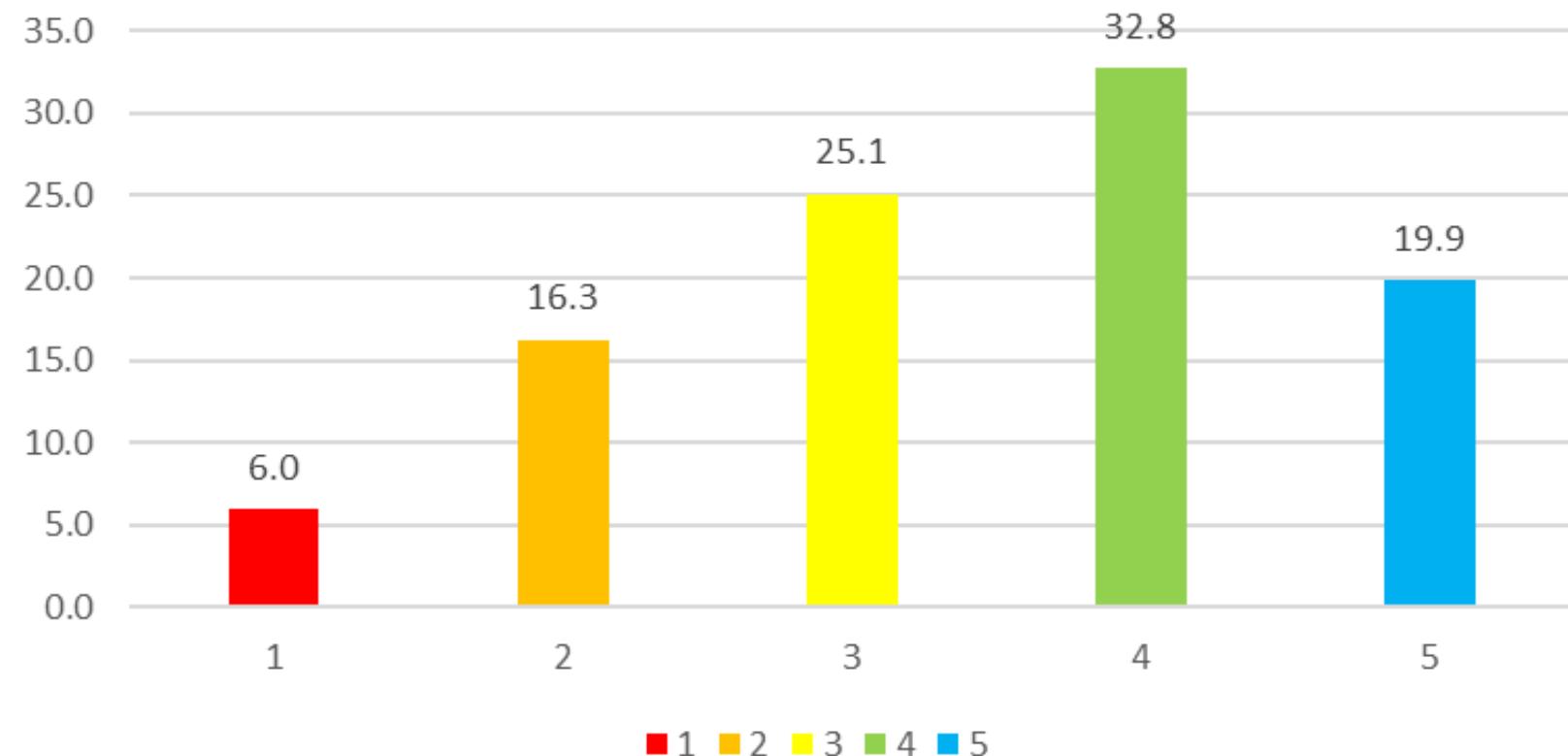
Input raster: BBS_MEAN_STD_5

Output raster: BC_BBS_MEAN_STD_5

Sort type: Do not sort

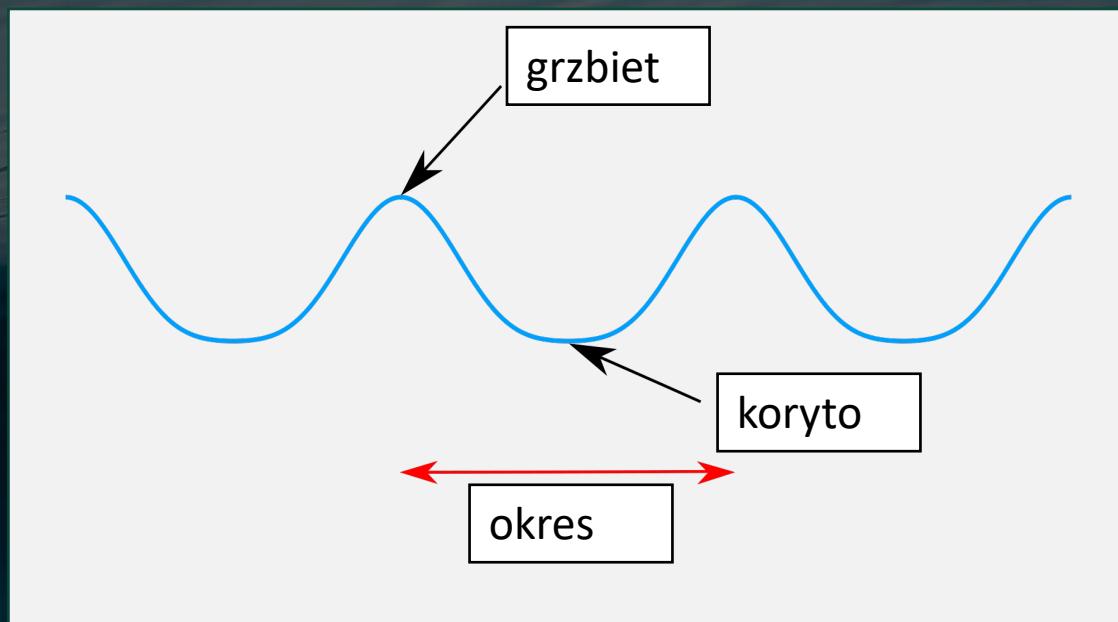
Run expansion and shrinking twice

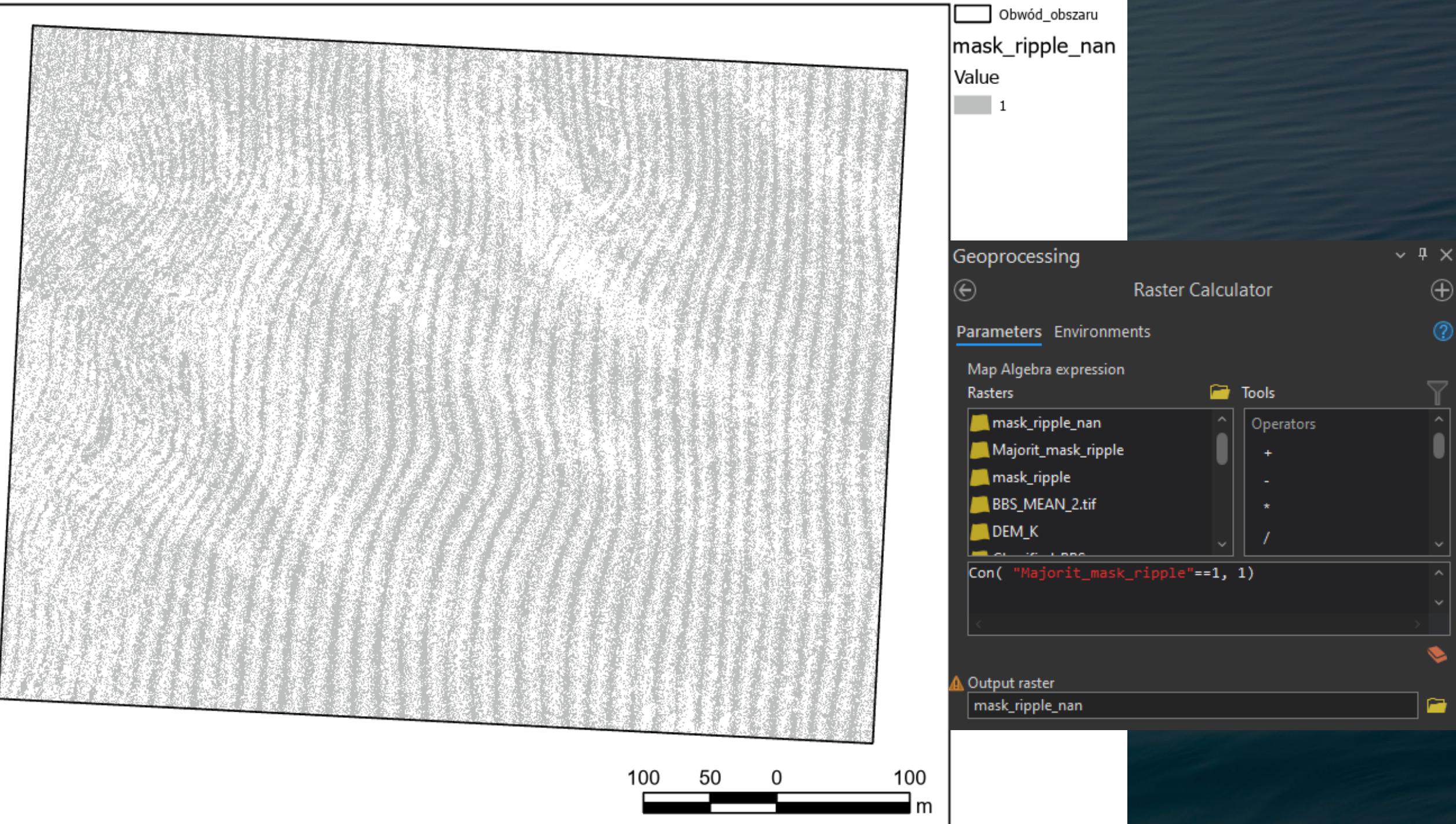
Powierzchnia sklasyfikowanych typów osadów [%]

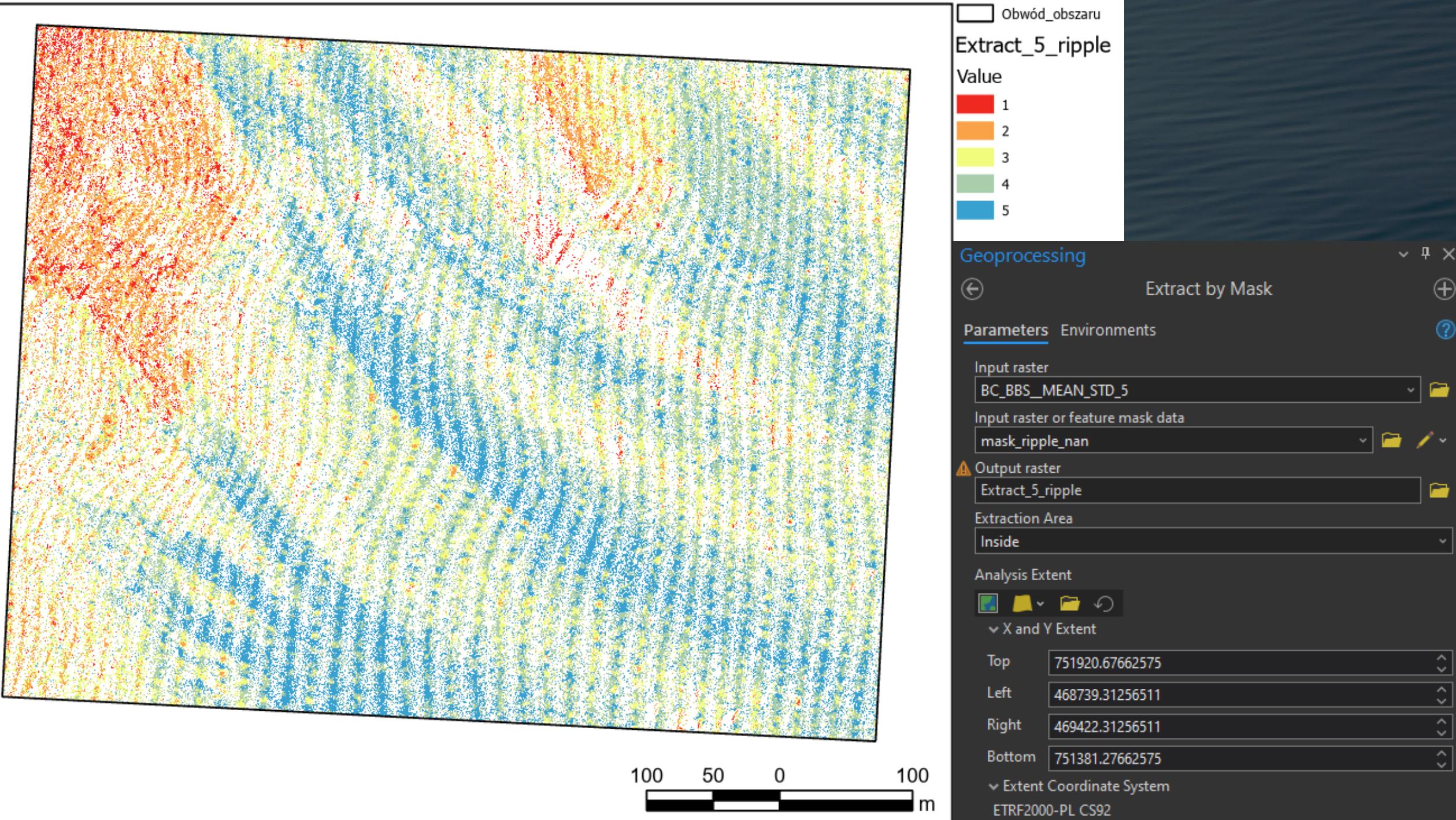


Jakie osady występują na ripplemarkach?

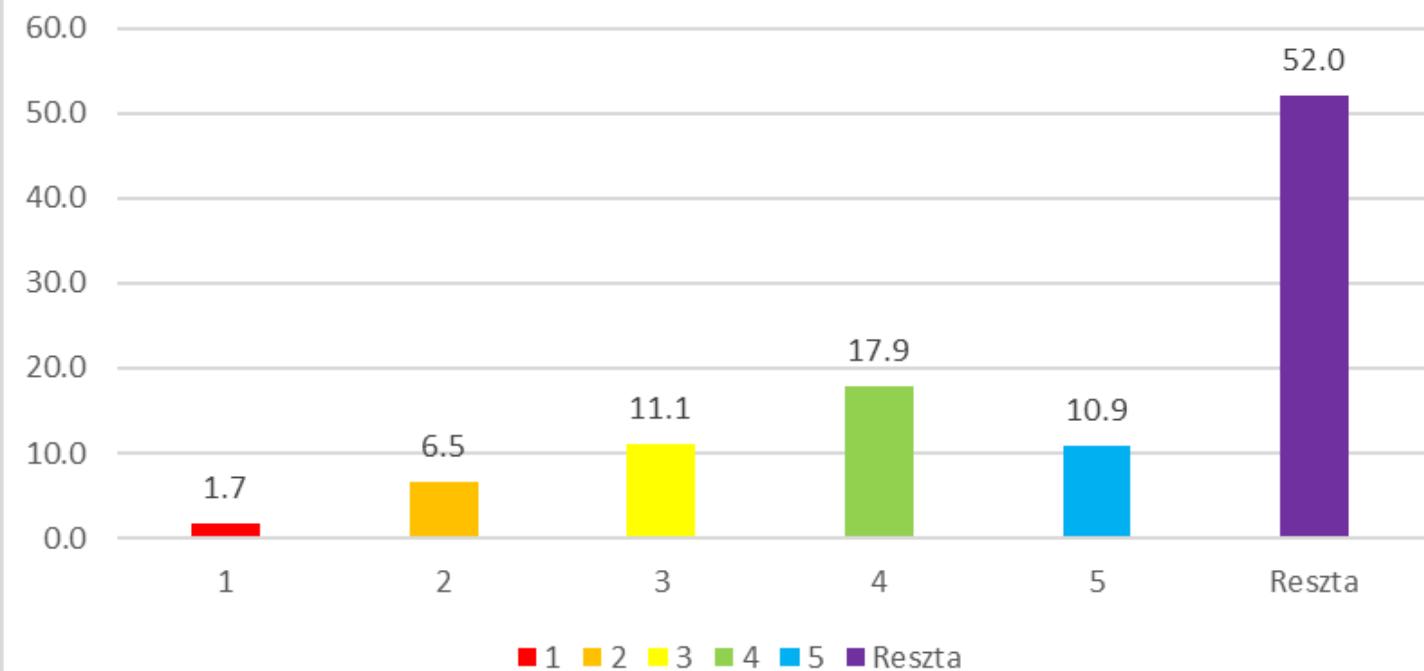
- Według Foti i Blondeaux (1995) osady o większej średniej średnicy osiadają się na grzbietach ripplemarków podczas ich powstawania. Osady o mniejszej średniej średnicy osiadają w korytach ripplemarków.







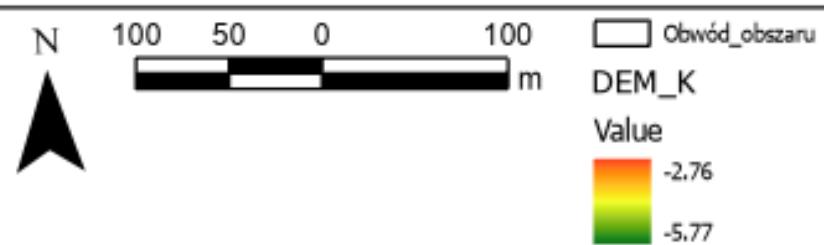
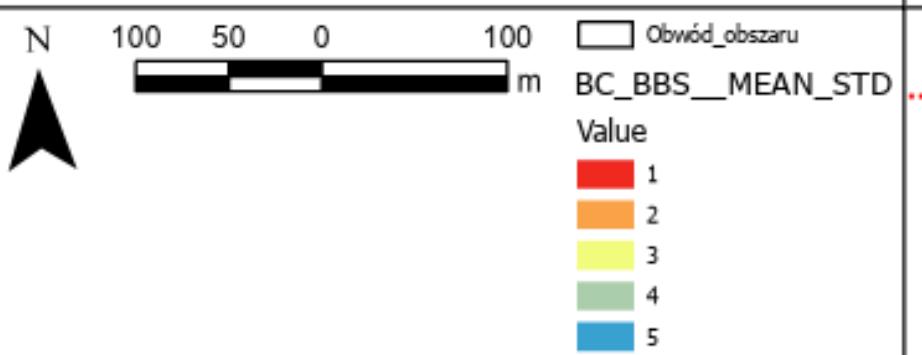
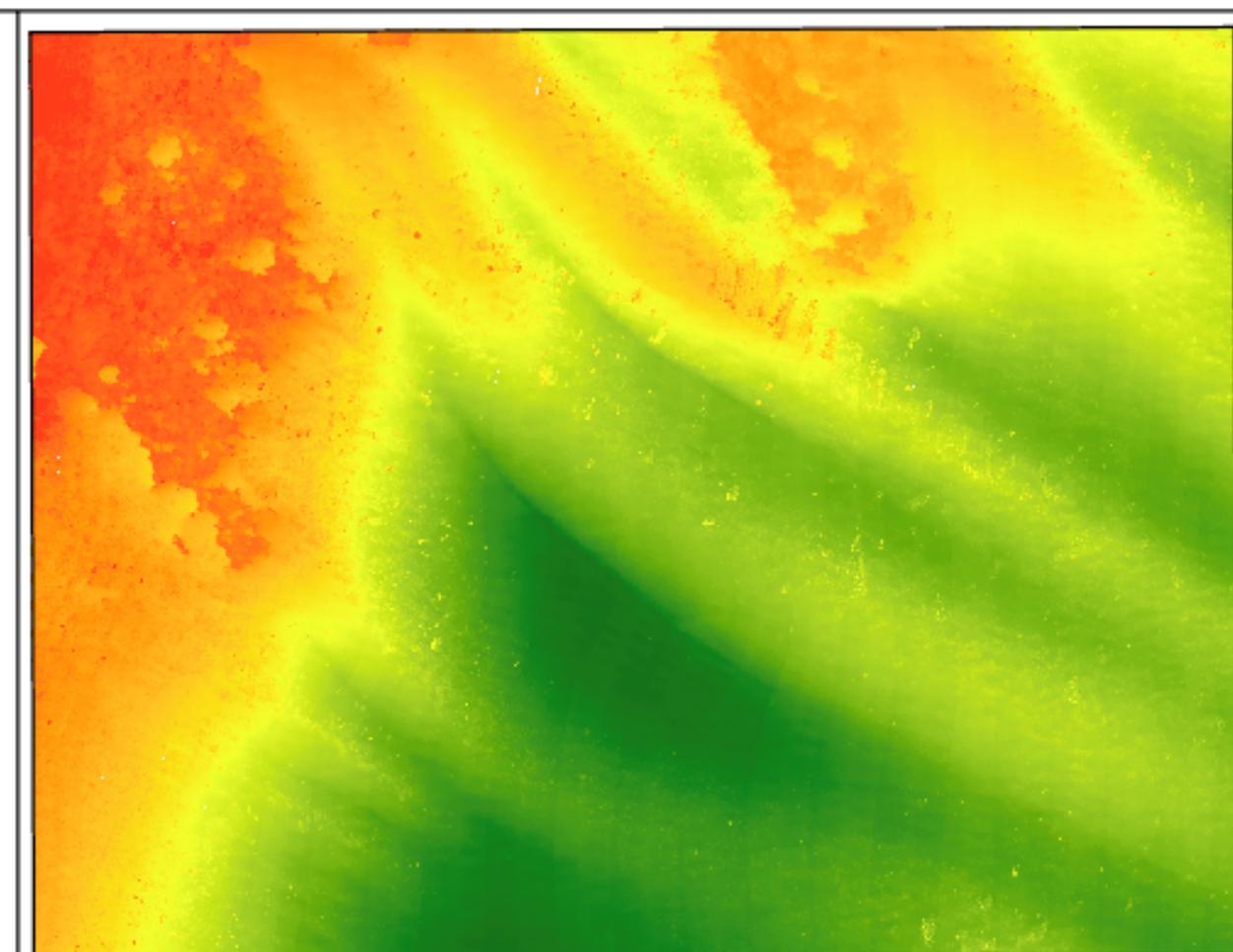
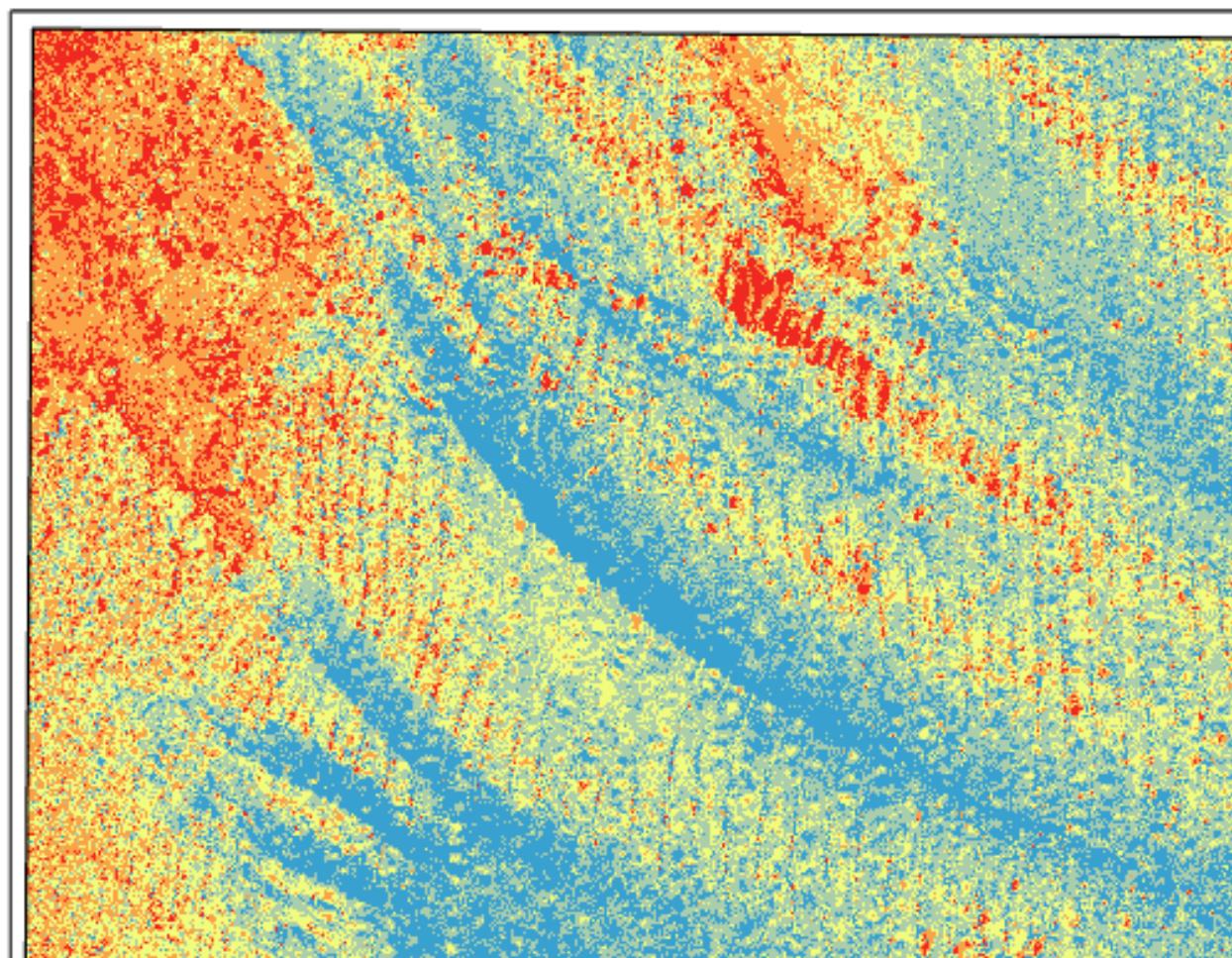
Powierzchnia [%] sklasyfikowanych klas osadów po nałożeniu maski

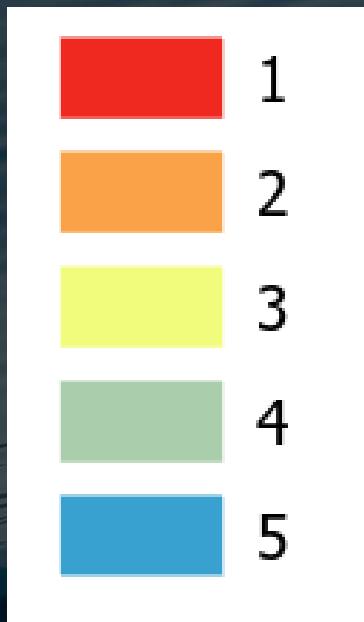


Użyte narzędzia:

- Extract by Mask
- Raster Functions – Aspect, Slope
- Focal Statistics – Mean, Standard Deviation
- Iso Cluster Unsupervised Classification
- Boundary Clean
- Raster Calculator

WYNIKI





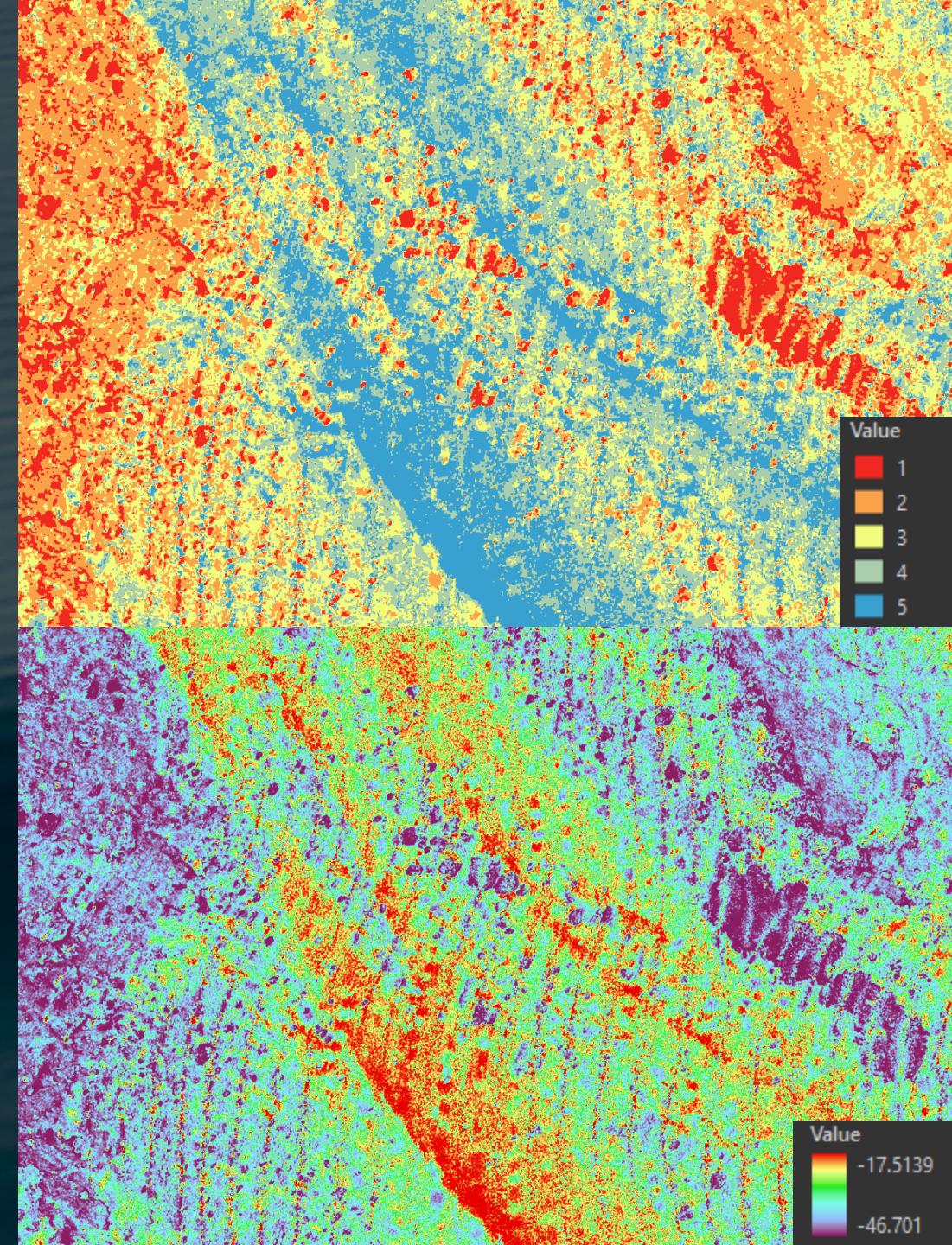
Osady o większej średniej średnicy ziarna



Osady o mniejszej średniej średnicy ziarna

PODSUMOWANIE

- Uzyskany został raster klasyfikacji typów osadów, lecz trudno stwierdzić wiarygodność wyników.
- Do uzyskania większej wiarygodności potrzebne są próbki osadów z obszaru analizy.
- Skoro osady o grubszej średnicy ziarna osiadają na grzbietach ripplemarków to mniejsze wartości backscatteringu widoczne na rastrach są charakterystyczne dla takiej wielkości osadu.



Literatura

- [1] Osadczuk A., Geofizyczne metody badań osadów dennych, 2007, Studia Limnologica et Telmatologica, s. 25-32
- [2] <https://storymaps.arcgis.com/stories/3810da9e97ef4a0ca2a83d8fef04a129> - metodyka analizy
- [3] Porskamp P, Rattray A, Young M, Ierodiaconou D. Multiscale and Hierarchical Classification for Benthic Habitat Mapping. *Geosciences*. 2018; 8(4):119. <https://doi.org/10.3390/geosciences8040119>
- [4] Foti, E., & Blondeaux, P. (1995). Sea ripple formation: the heterogeneous sediment case. *Coastal Engineering*, 25(3-4), 237–253. doi:10.1016/0378-3839(95)00005-v.
- [5] Collier, J. S., & Brown, C. J. (2005). Correlation of sidescan backscatter with grain size distribution of surficial seabed sediments. *Marine Geology*, 214(4), 431–449. doi:10.1016/j.margeo.2004.11.011
- [6] Ferrini, V. L., & Flood, R. D. (2006). The effects of fine-scale surface roughness and grain size on 300 kHz multibeam backscatter intensity in sandy marine sedimentary environments. *Marine Geology*, 228(1-4), 153–172. doi:10.1016/j.margeo.2005.11.010

Źródła danych

- [1] <https://www.iopan.gda.pl/HabitatMappingGIS/> - dane osadów budujących dno Morza Bałtyckiego
- [2] <https://www.geofabrik.de/> - dane shapefile dla województwa pomorskiego

DZIĘKUJĘ ZA UWAGĘ