

Universität Potsdam

REMOTE SENSING OF THE ENVIRONMENT

WINTERSEMESTER 2024-2025

LAB 6

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Question 1

In Figure 1, Figure 2, Figure 3 and Figure 4 you can see the four maps for Question 1. Two show the results of K-means, the other two those of ISODATA. Two cards each had the settings $NumberOfClasses = 10$, the other two $NumberOfClasses = 20$. This makes it easy to compare them with each other.

The K-Means algorithm produces less accurate and more incorrect clustering results than the ISODATA algorithm. With K-Means_10Classes, water areas and large parts of the city were packed into one class, which is very imprecise. With K-Means_20Classes this was already better differentiated. However, there were difficulties in clearly identifying forests. This difficulty was also experienced by the ISODATA algorithm. Here, too, the map with more classes is more accurate, although there are too many classes here. The best map is the one from ISODATA_20Classes (Figure 2).

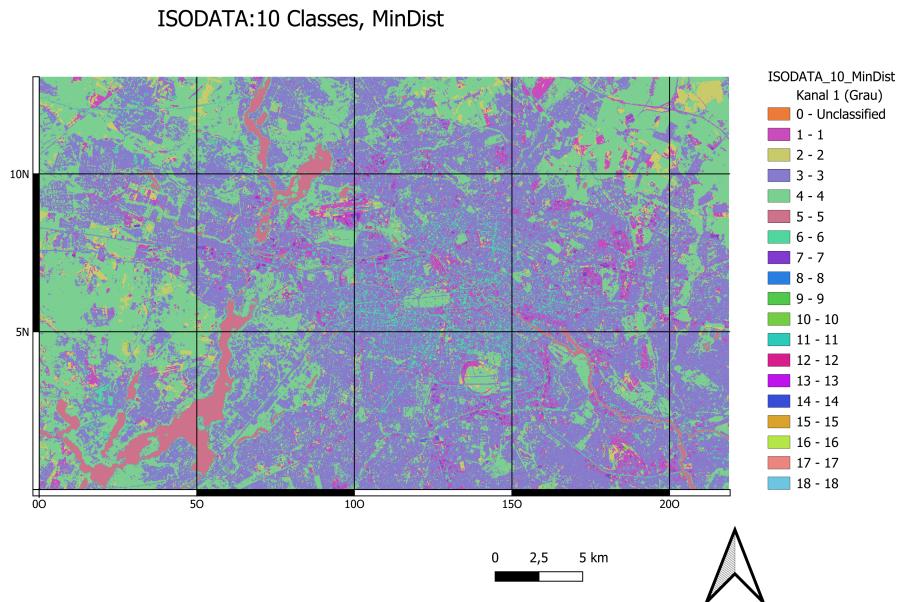


Figure 1

Question 2

In Figure 5 you can see a map of Berlin with an urban-class-mask. All classes that were clustered by ISODATA_20Classes and in my opinion belong to an urban area are colored terracotta and all other classes are transparent. Here you can see the normal RGB map.

I have combined 5 classes for this urban-class-mask. Unfortunately, the “Reclassify by table” function did not work for me, so I colored the maps by hand so that my reclassification is clearly visible.

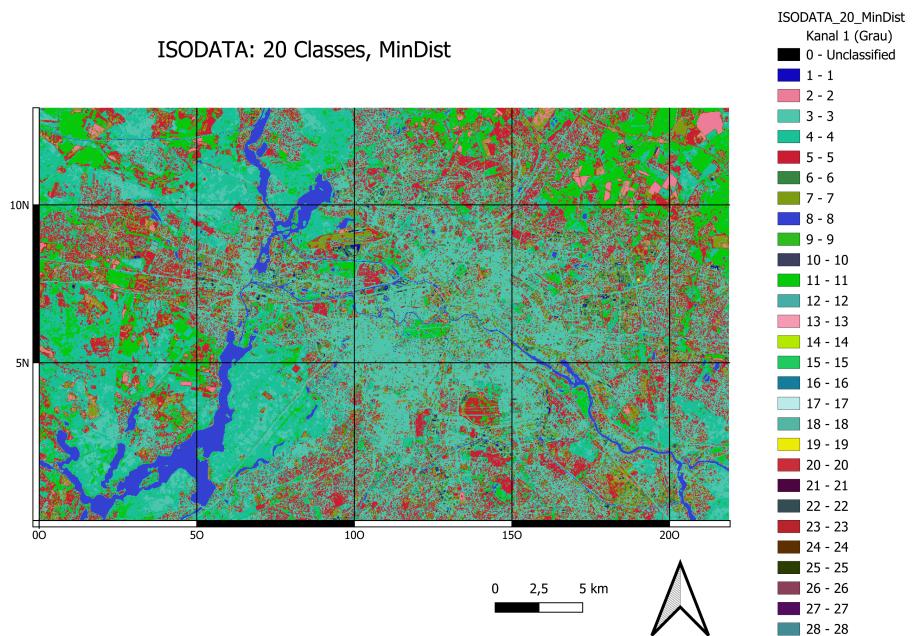


Figure 2

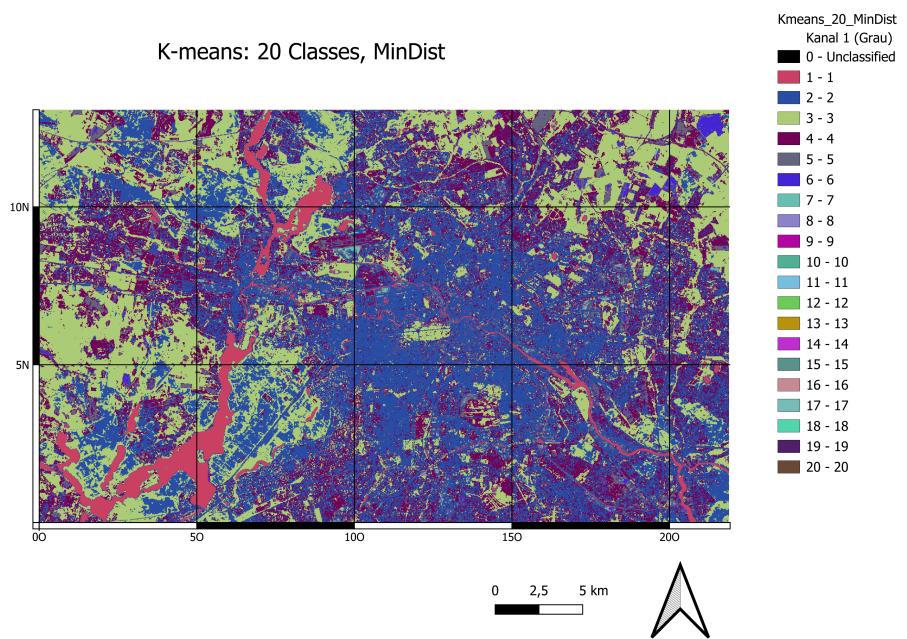


Figure 3

K-means: 10 Classes, MinDist

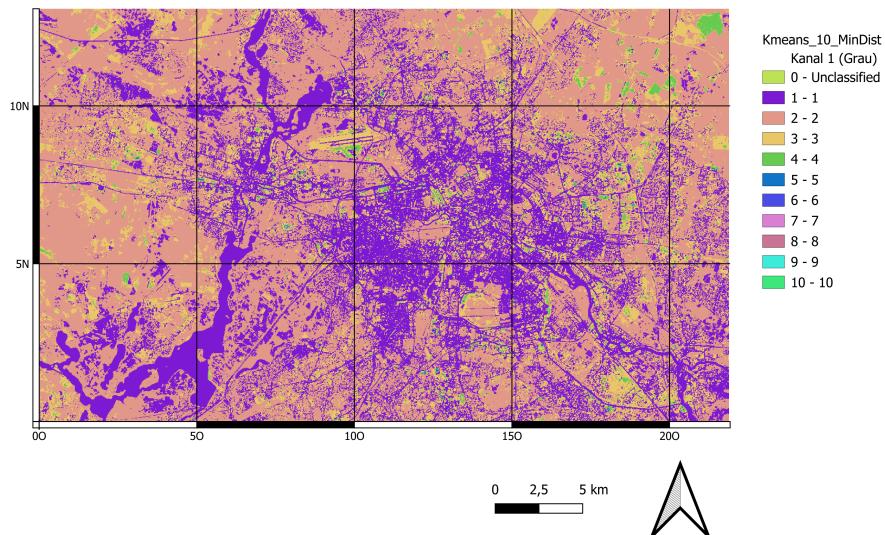


Figure 4

Reclassified ISODATA: 20 Classes, MinDist
with RGB-Map underneath

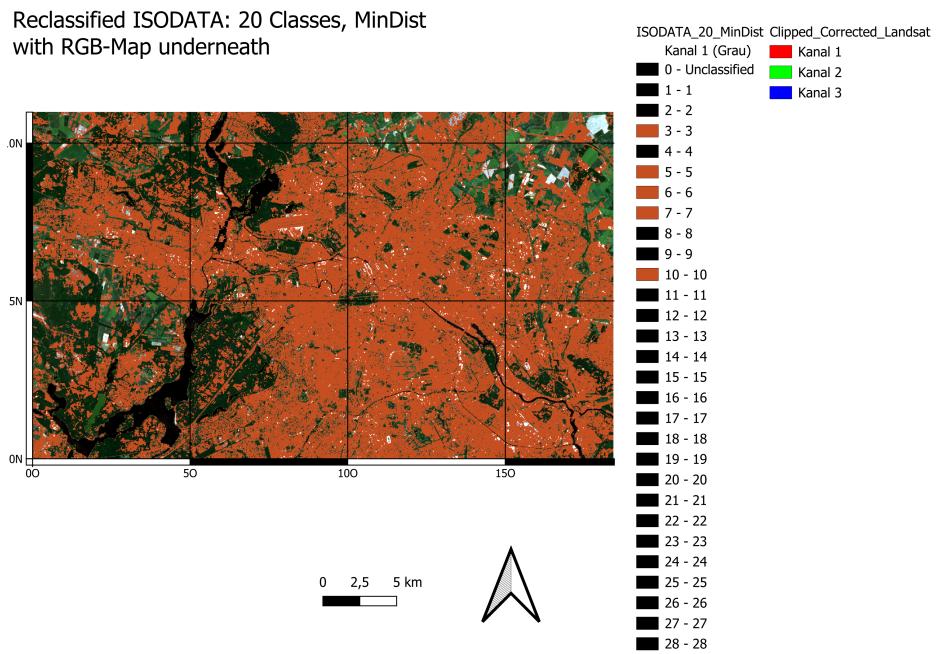


Figure 5

Homework with own Data

1.

In Figure 6, Figure 7, Figure 8 and Figure 9 you can see the four maps of different unsupervised algorithms and class numbers. Two maps show the results of K-means, the other two those of ISODATA. Two cards each had the settings $NumberOfClasses = 10$, the other two $NumberOfClasses = 20$. This makes it easy to compare them with each other.

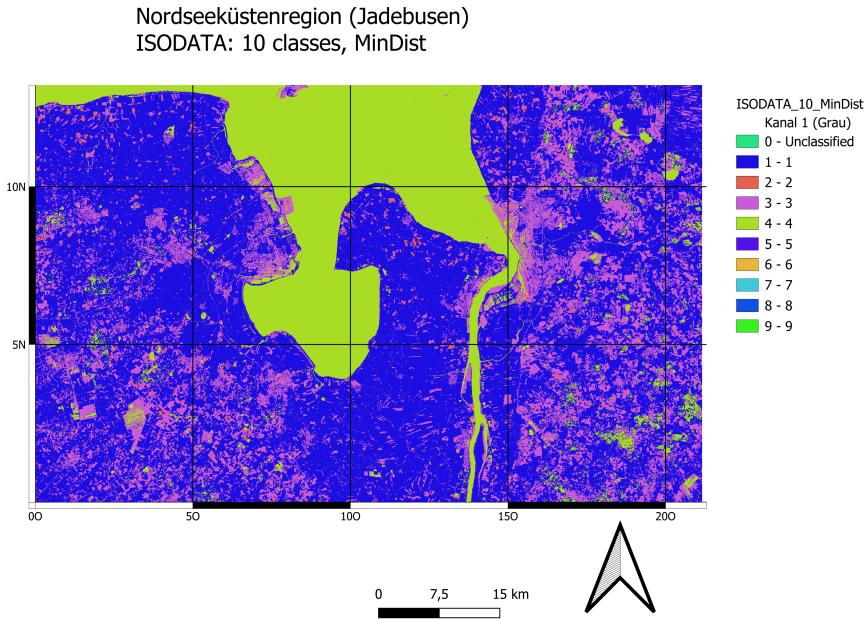


Figure 6

2.

In Figure 10 you can see a map with a water-mask. All classes that were clustered by ISODATA_20Classes and in my opinion belong to an water area are colored blue and all other classes are transparent. Here you can see the normal RGB map.

I have combined 3 classes for this water-mask.

3.

In Figure 11 you can see a map of the German North Sea coast, which was reclassified after the ISODATA_20classes algorithm. I have chosen 4 classes: Water (blue), urban areas (red), paths and roads (gray) and nature (green).

4.

It was easiest to combine the water class from the existing classes, as this area was the easiest to differentiate. All other classes (urban, nature, paths) were more difficult. However, in some places where I knew the area, I was able to recognize the individual classes well and the reclassification applied this to the

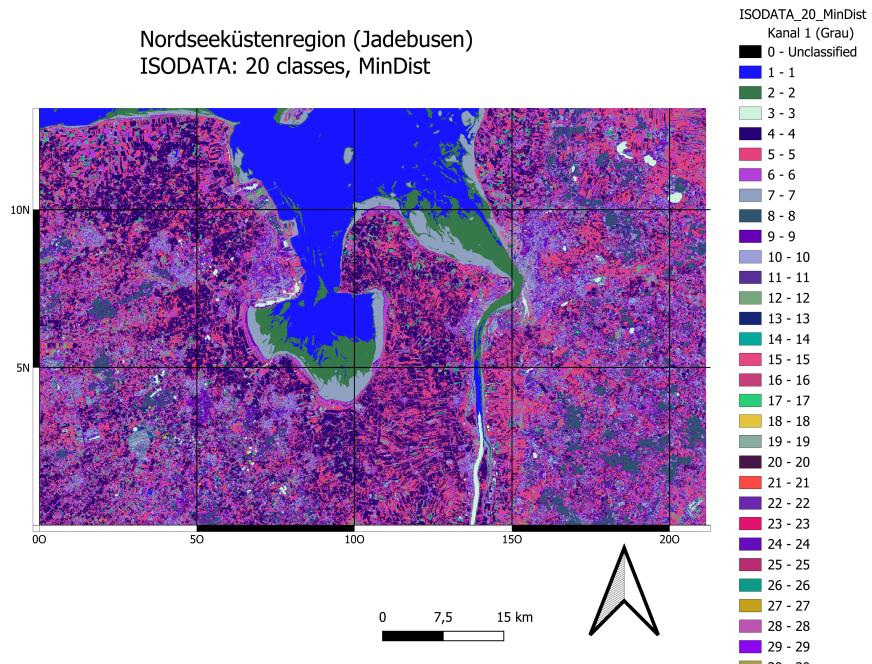


Figure 7

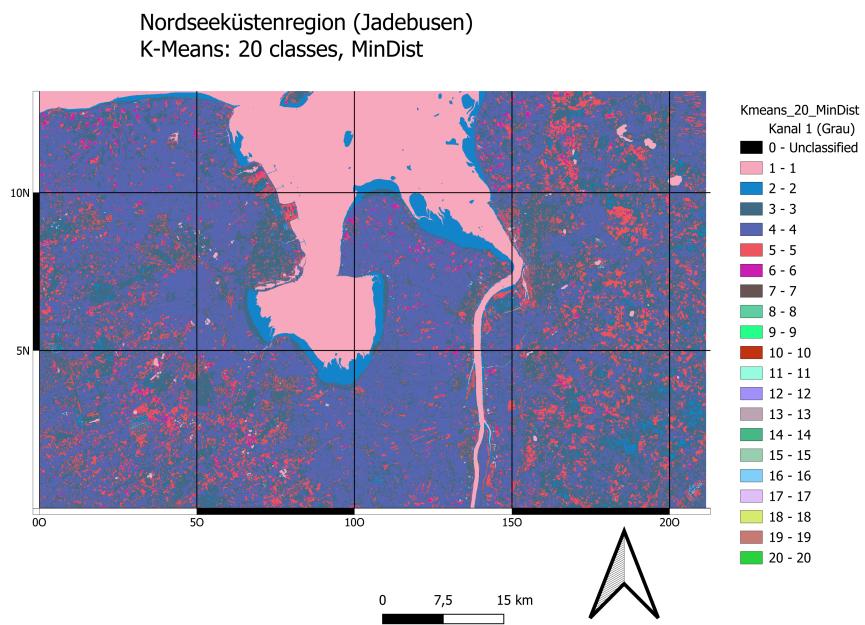


Figure 8

Nordseeküstenregion (Jadebusen)
K-Means: 10 classes, MinDist

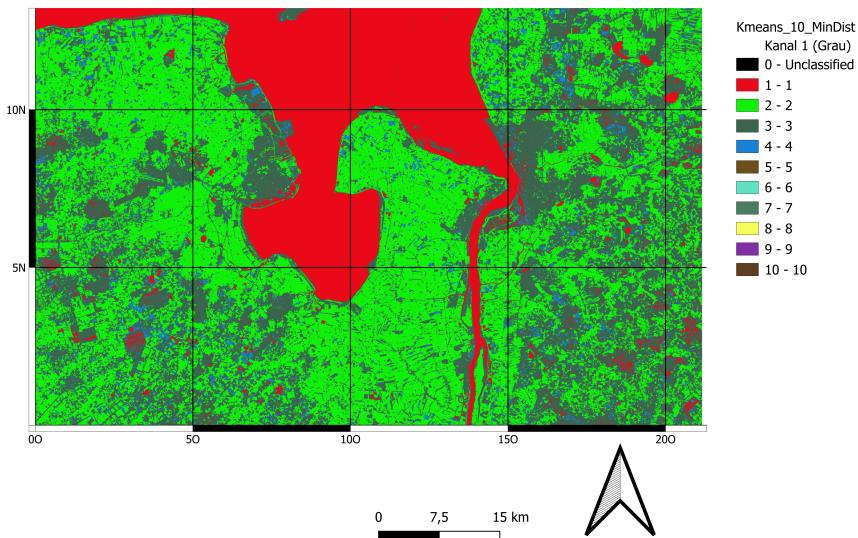


Figure 9

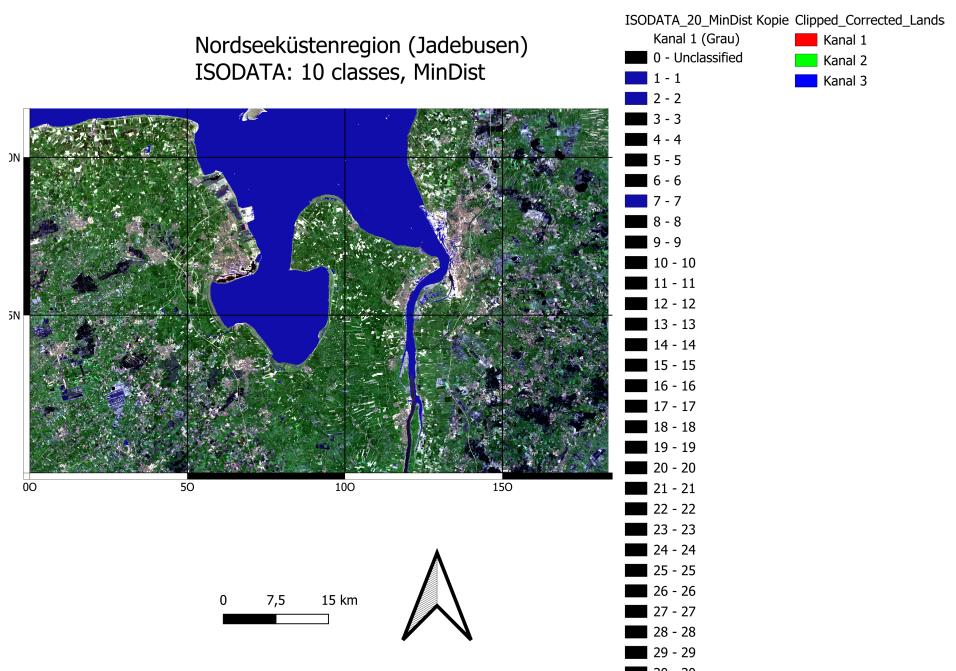


Figure 10

Nordseeküstenregion (Jadebusen)

ISODATA: 20 classes, MinDist -> reclassified to 4 classes

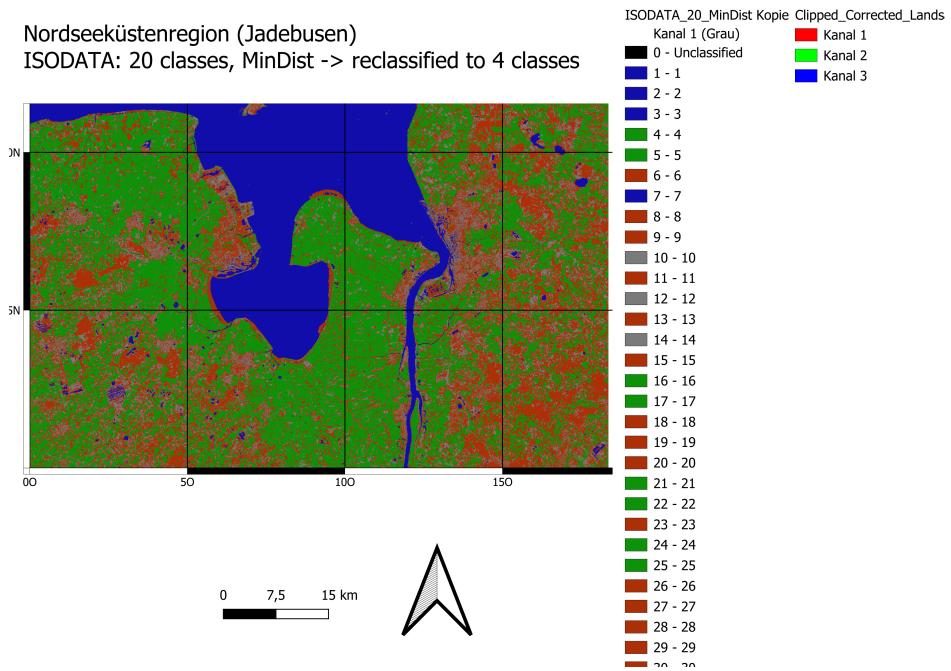


Figure 11

whole map. The final result is ok, but not particularly good. Especially in the lower right area, urban and natural areas are difficult to distinguish, despite classification.