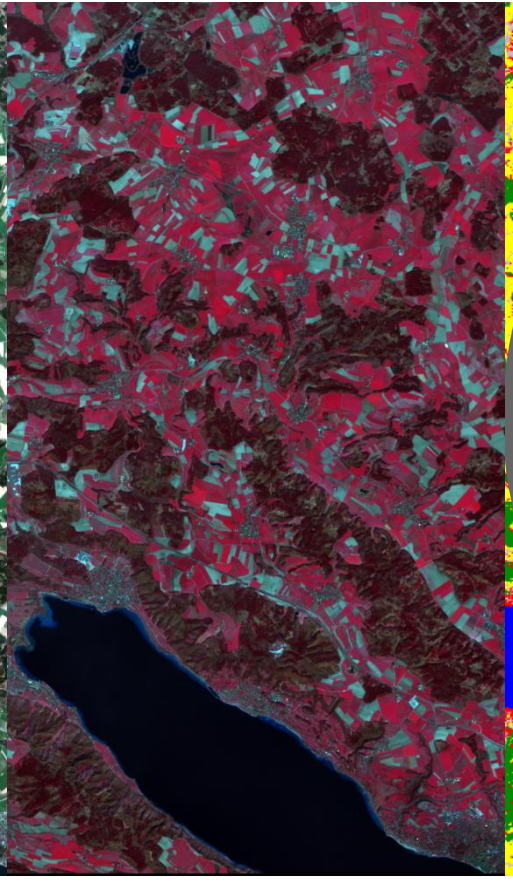
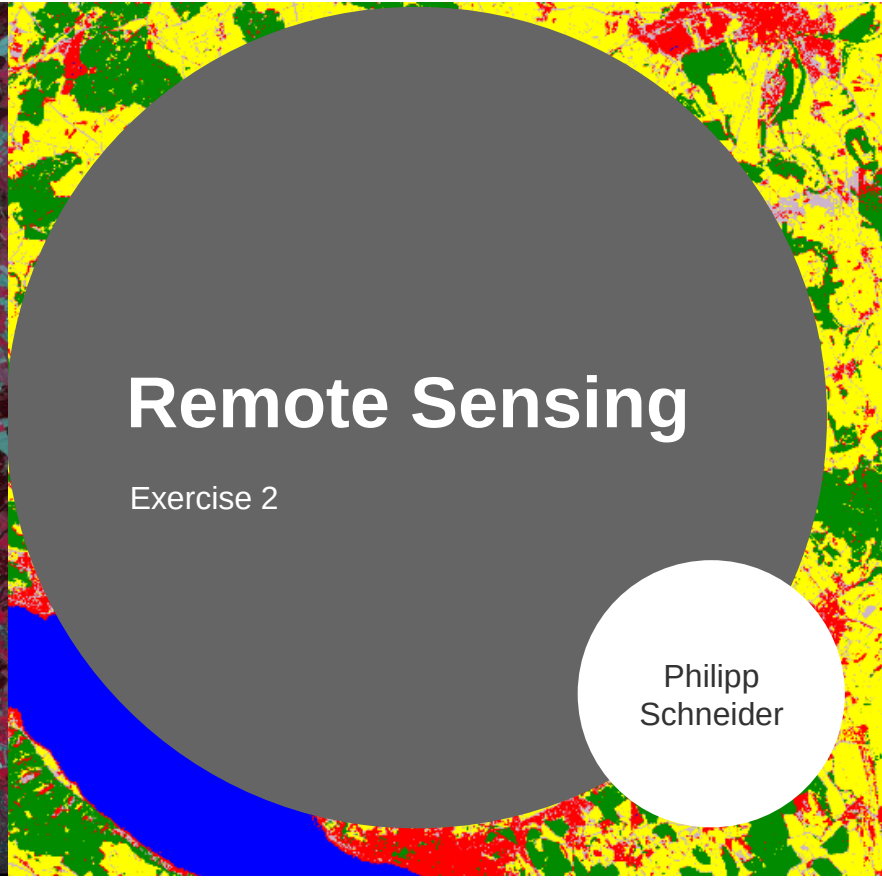
Universität Stuttgart





Remote Sensing

Exercise 2

Philipp
Schneider

ifp

Remote Sensing – Exercise 2

organizational

Philipp Schneider

Institut for Photogrammmetry

Philipp.Schneider@ifp.uni-stuttgart.de

0711 685 84092

Remote Sensing – Exercise 2

Goals of this exercise

Exercise 1 (last time)

- How to download optical image data from Sentinel-2 (an area of your choice)
- Learn how to import it to the ENVI software
- Export a geoTiff from ENVI

Exercise 2

- **Interpret the different bands**
- **Do some useful analysis (Vegetation and agricultural monitoring)**

Exercise 3

- Classification (supervised and unsupervised)

Remote Sensing – Exercise 2

Goals of this exercise

Part 1

- Before we start the demo part we'll have a look on some potential exam questions

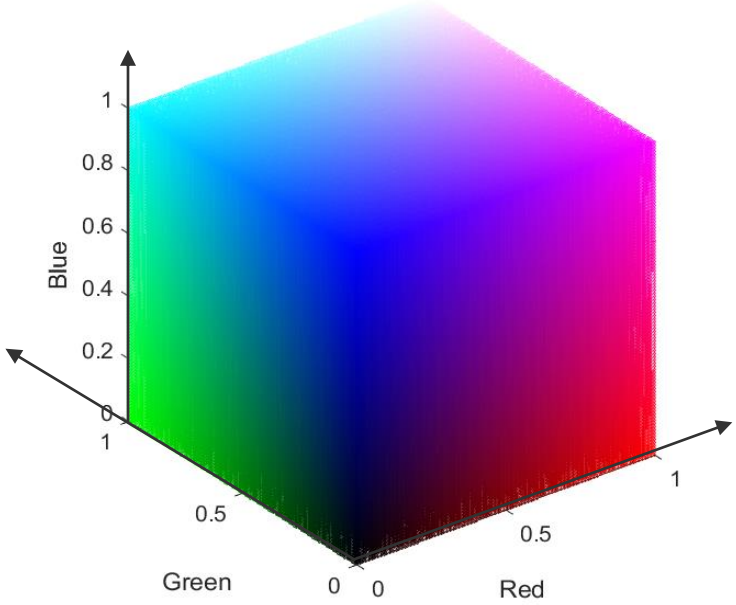
Part 2

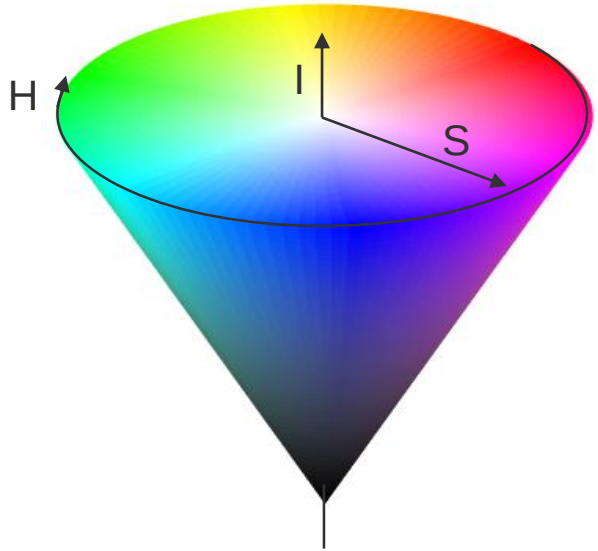
- I will show you how to solve the homework

Remote Sensing – Exercise 2

Questions

Q: Which color spaces do you know?
A: RBG (cartesian), HSI (cylindrical)





more

Remote Sensing – Exercise 2

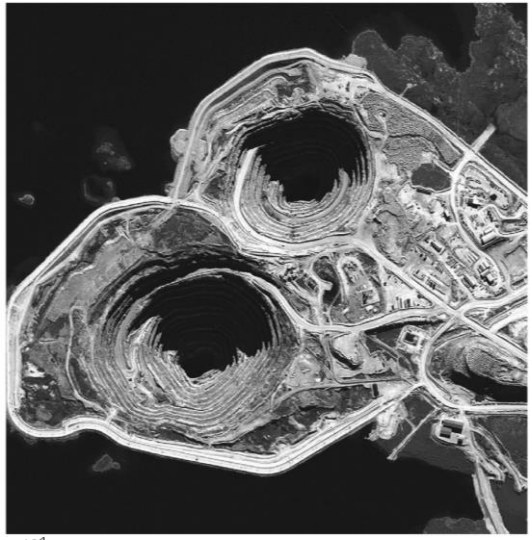
Questions

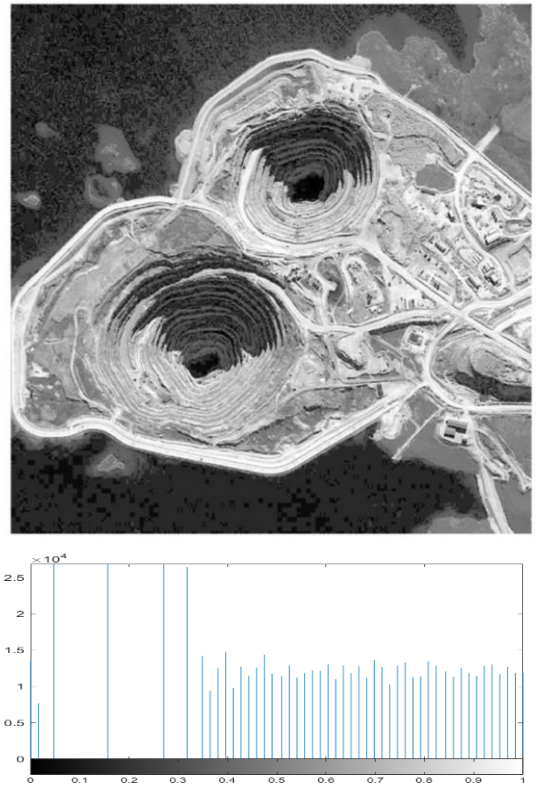
Q: What can you tell about an image by its histogram?

A: peaks on the sides of a histogram are hints for an unbalance lightning in the image.

You can fix such images, using histogramm equalization methods, like stretching.

i.e. MATLAB:
`histeq()`



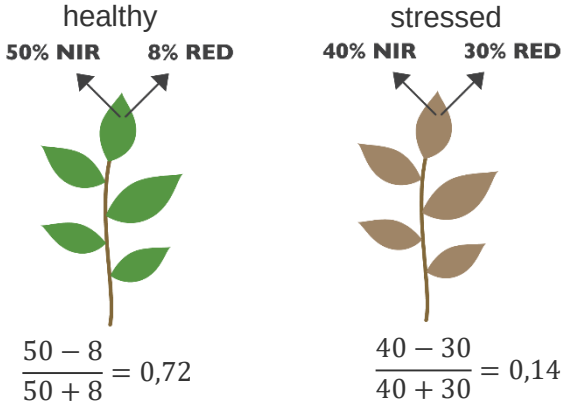


Remote Sensing – Exercise 2

Questions

Q: What is the NDVI?

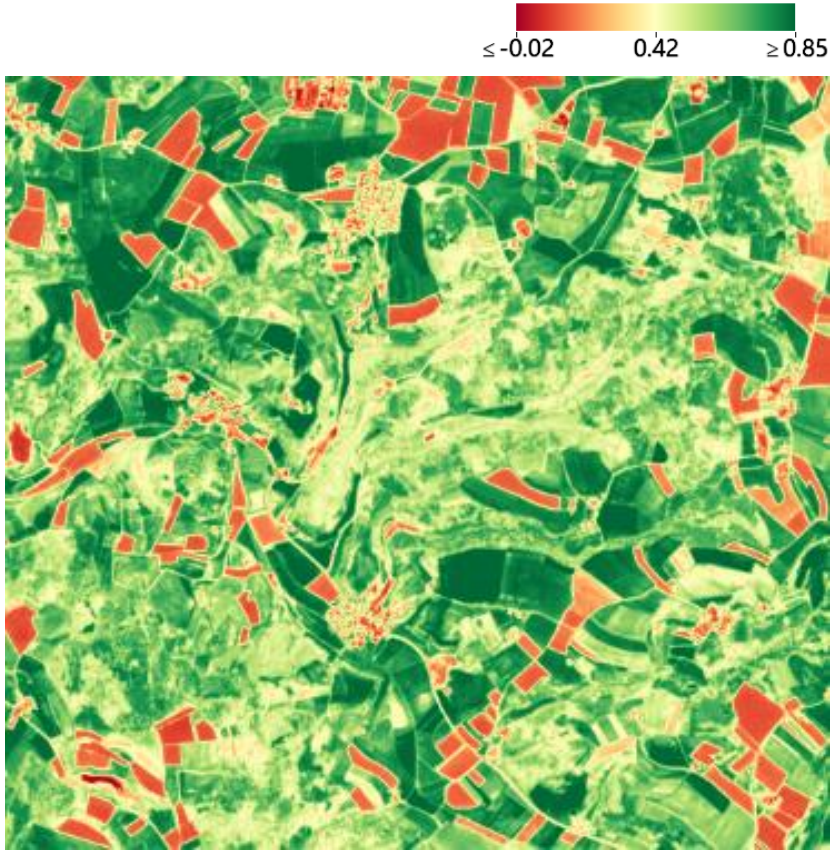
A: The Normalized Differential Vegetation Index helps you to judge plant grow activity.



$$\frac{50-8}{50+8} = 0{,}72 \qquad \frac{40-30}{40+30} = 0{,}14$$

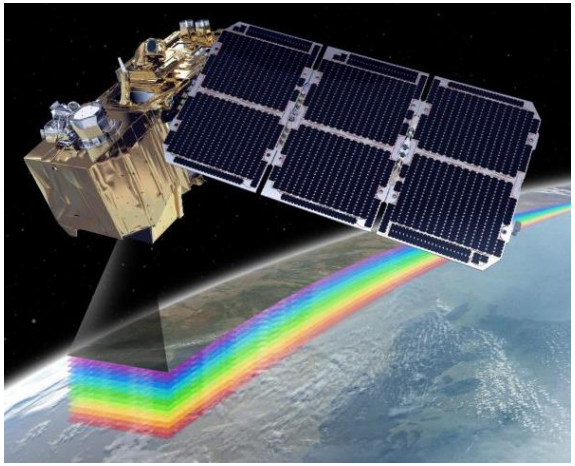
$$\text{NVDI} = \frac{NIR-RED}{NIR+RED}$$

NIR: 833nm (B8) RED: 665nm (B4)

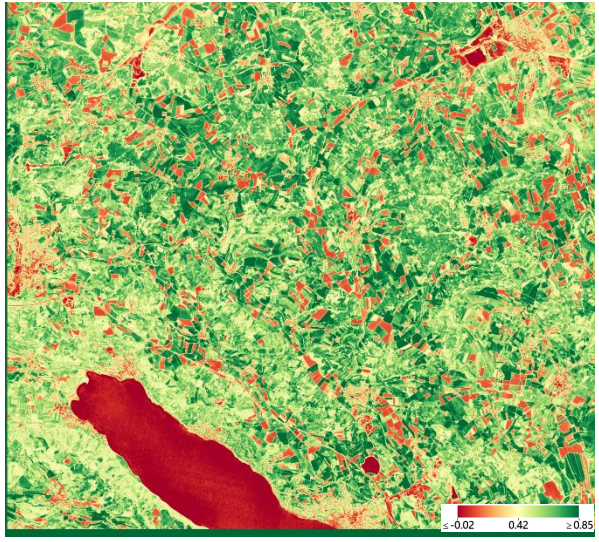


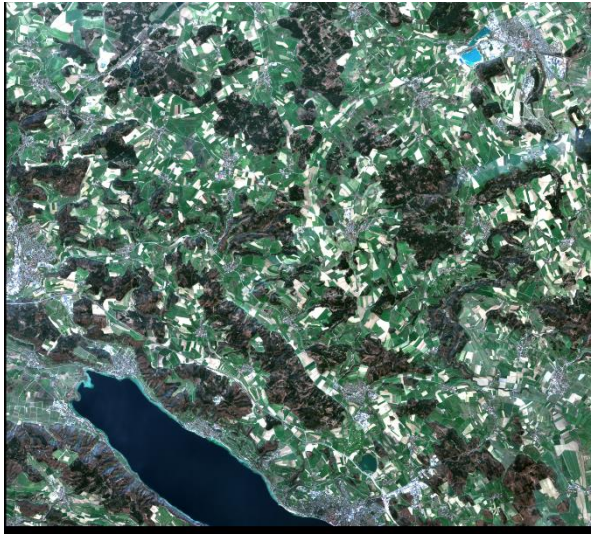
Remote Sensing – Exercise 2

Goals of todays exercise



- Use the “Band Math” Tool in Envi
- Create an NDVI map
- Use the „Spectral Indices“ Tool to calculate a second index
- Add a colorbar to the indices



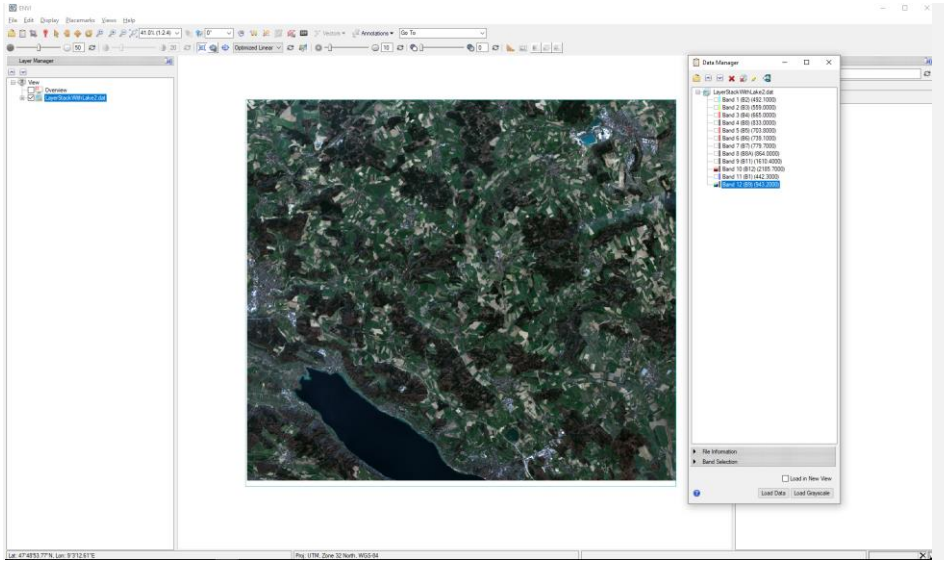


Remote Sensing – Exercise 2

Download Sentinel-2 data

- Import the layer stack from Excersie 1 to Envi
  - File-> Open -> select the .dat file

  - Make sure you have all 12 Bands in the Data Manager (F4)



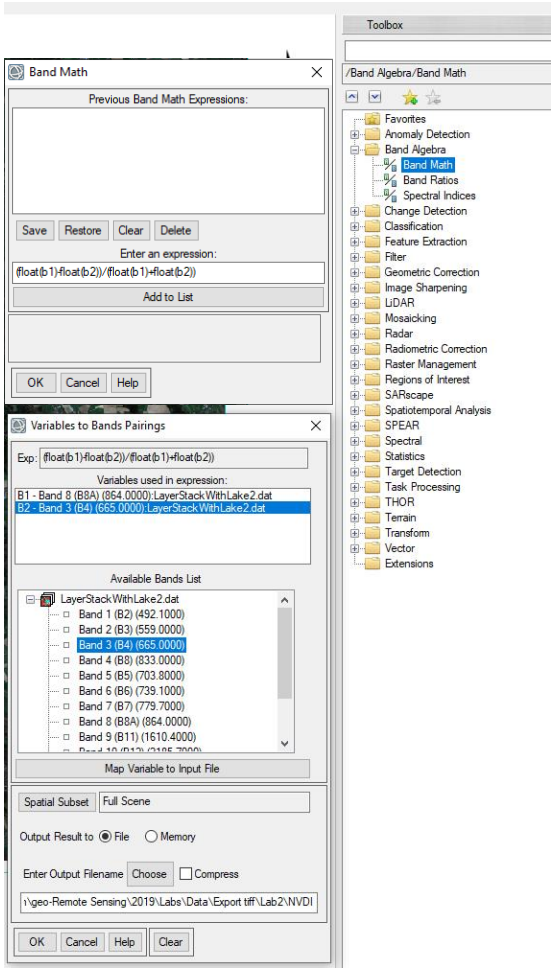
Remote Sensing – Exercise 2

Download Sentinel-2 data

- From the Toolbox in the left, select the „Band Math“ tool
- Enter the expression for the NVDI

  `(float(b1)-float(b2))/(float(b1)+float(b2))`

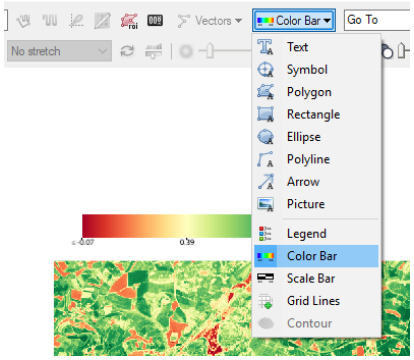
  `b1` and `b2` are variables, `float()` typecasts the uint16 values to float
- Assign the near infrared chanel to B1 and the red chanel to B2
- Display your result

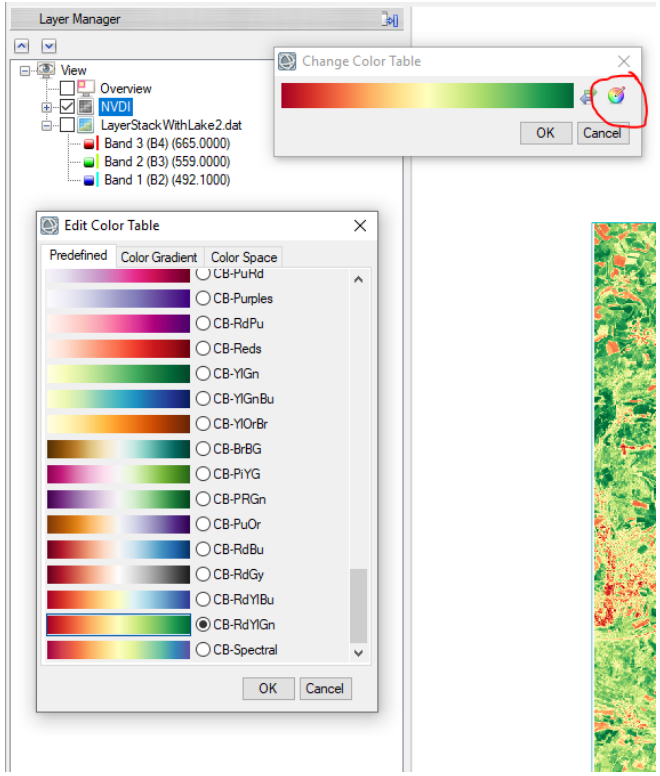


Remote Sensing – Exercise 2

Download Sentinel-2 data

- Change the color table (righ click on layer) to CB-RdYlGn gradient, so high values will be displayed as green, medium as yellow and low as red
- Add a colorbar by selecting „annotations“ in the topbar and drawing its expansions.
- Export as tif and present it in your assignment





Remote Sensing – Exercise 2

Download Sentinel-2 data

- Use the „Spectral Indices“ tool to calculate another index. (Explaine it and present the formular in your assignment)
- Choose a proper color table and colorbar
- Export as tif and present in your assignment