
Hands on practices on products and applications.

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Presentation overview

- Download Sentinel-1 and Sentinel-2 data
- SNAP download
- Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)
- Sen2Cor download
- Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (Sen2Cor, SNAP)



Download Sentinel-1 and Sentinel-2 data



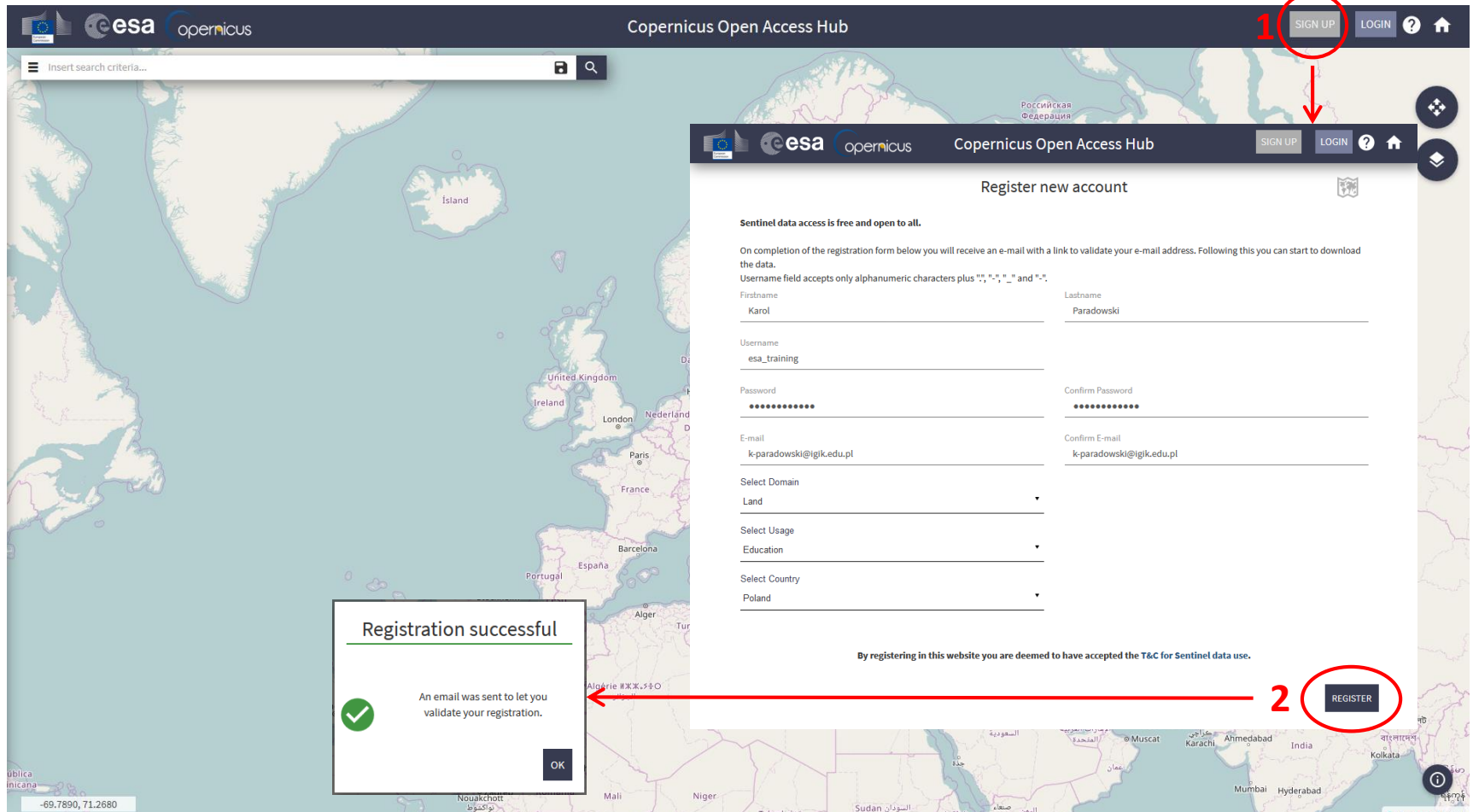
The screenshot shows the Copernicus Open Access Hub website. The header includes the Copernicus logo, the text 'Copernicus Open Access Hub', the ESA logo, and the European Union flag. Below the header is a dark blue banner with the text 'Welcome to the Copernicus Open Access Hub'. A paragraph below the banner states: 'The Copernicus Open Access Hub (previously known as Sentinels Scientific Data Hub) provides complete, free and open access to Sentinel-1, Sentinel-2 and Sentinel-3 user products, starting from the In-Orbit Commissioning Review (IOCR)'. A row of five navigation buttons is displayed: 'Open Hub' (circled in red), 'API Hub', 'S-3 PreOpsHub', 'User Guide', and 'Roadmap'. Below this is an 'Access Points' section with three sub-sections: 'Open Access Hub', 'API Hub', and 'Sentinel-3 Pre-operational Hub'. At the bottom is a 'Statistics' section with two data points: '6933 products published in the last 24h (S1 + S2 + S3)' and '59198 products downloaded in the last 24h (SciHub + API Hub + S3 PreOps)'. A small note at the bottom right of the statistics section says 'Data updated hourly'.

<https://scihub.copernicus.eu/>



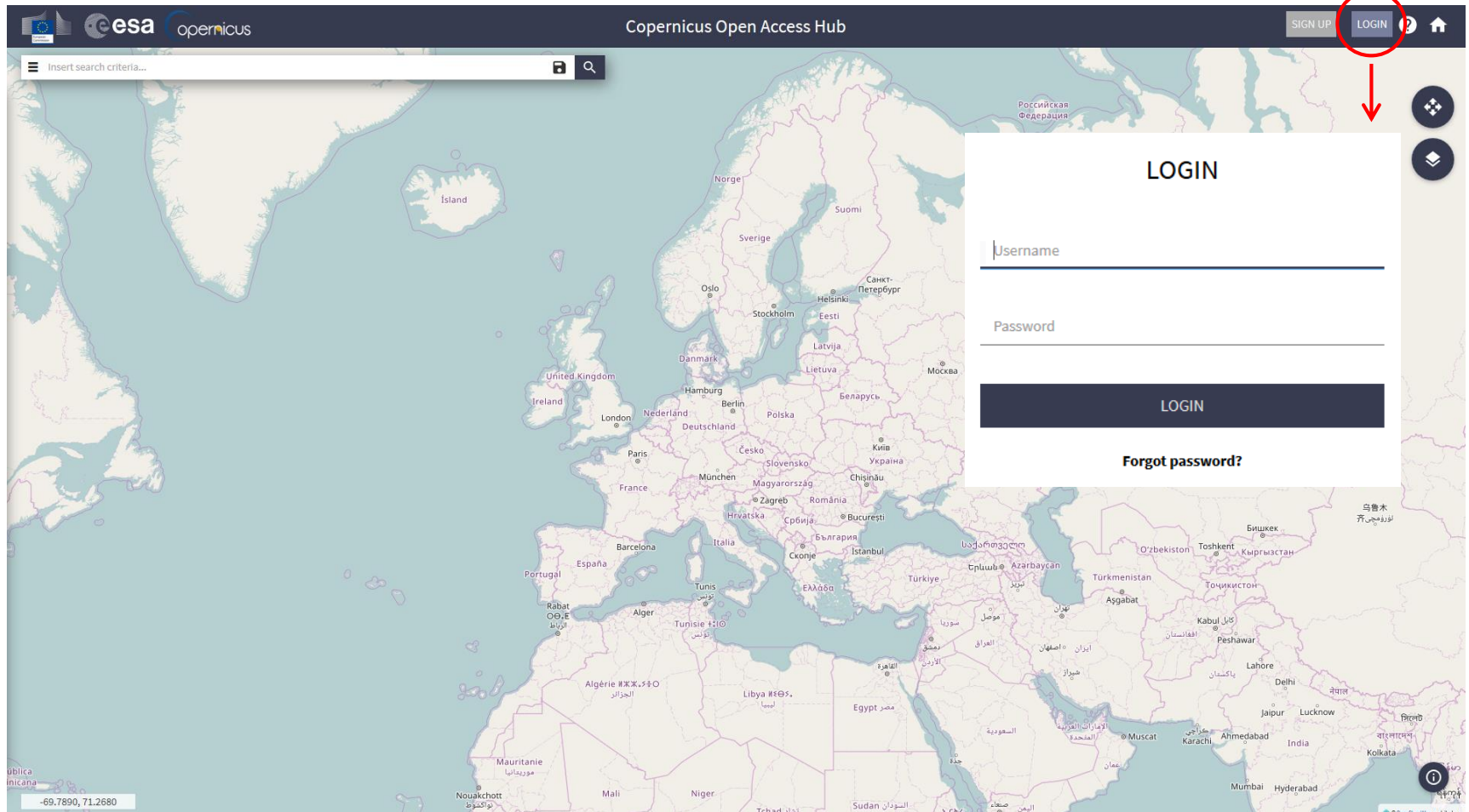
Open Hub

Download Sentinel-1 and Sentinel-2 data



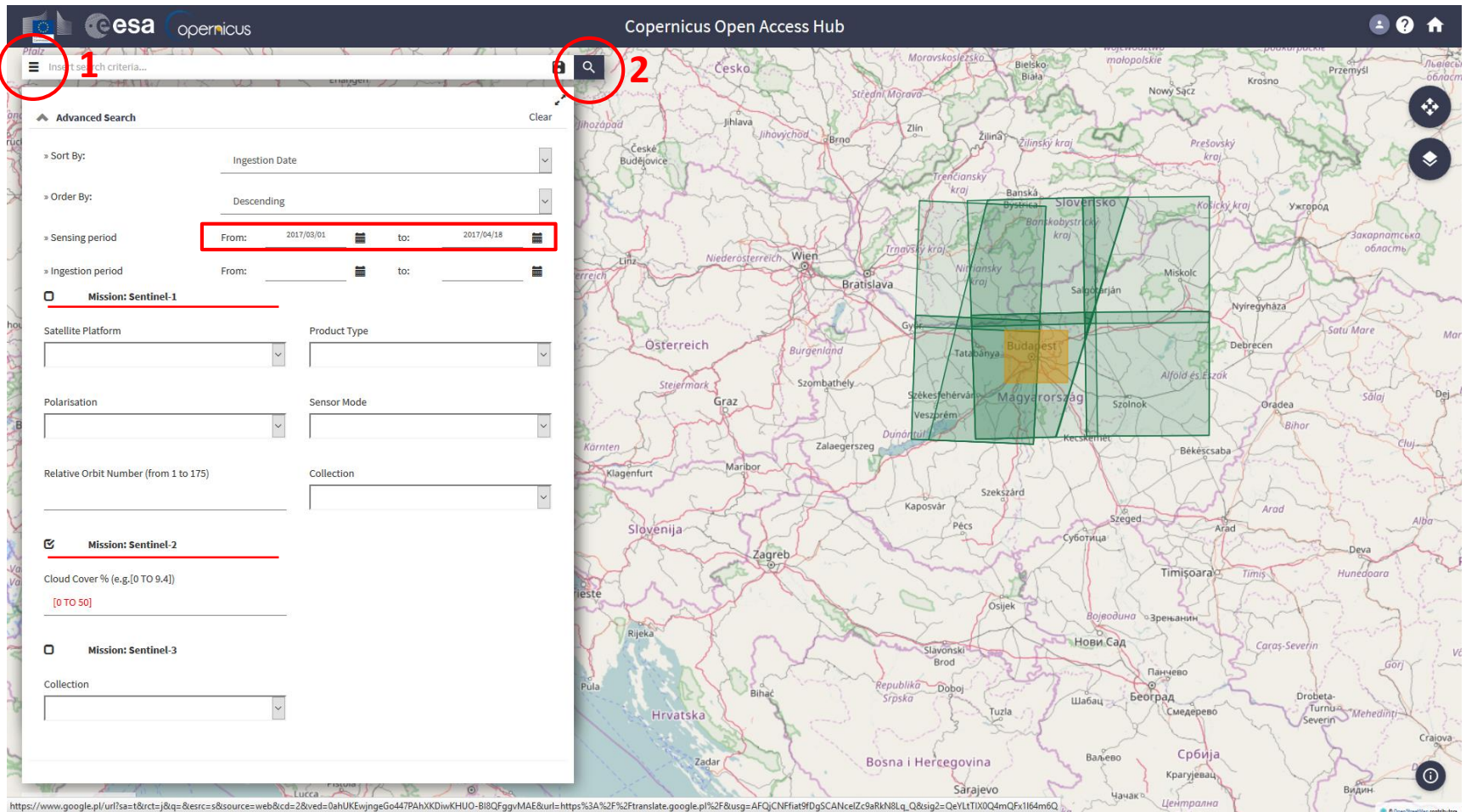
The screenshot shows the Copernicus Open Access Hub website. The top navigation bar includes the ESA and Copernicus logos, a search bar, and 'SIGN UP' and 'LOGIN' buttons. A red circle and arrow labeled '1' point to the 'SIGN UP' button. Below the navigation bar is a map of Europe. A registration form is overlaid on the map, titled 'Register new account'. The form includes fields for Firstname (Karol), Lastname (Paradowski), Username (esa_training), Password, Confirm Password, E-mail (k-paradowski@igik.edu.pl), Confirm E-mail (k-paradowski@igik.edu.pl), Select Domain (Land), Select Usage (Education), and Select Country (Poland). A 'REGISTER' button is at the bottom right of the form, circled in red with a red arrow labeled '2' pointing to it. Below the form, a message states: 'By registering in this website you are deemed to have accepted the T&C for Sentinel data use.' In the bottom left, a 'Registration successful' notification box displays a green checkmark and the text: 'An email was sent to let you validate your registration.' with an 'OK' button.

Download Sentinel-1 and Sentinel-2 data



The screenshot shows the Copernicus Open Access Hub interface. At the top right, there are buttons for 'SIGN UP' and 'LOGIN'. The 'LOGIN' button is circled in red, and a red arrow points from it to a white login form that is overlaid on the right side of the map. The form contains fields for 'Username' and 'Password', a 'LOGIN' button, and a link for 'Forgot password?'. The background is a map of Europe and the Middle East with various countries and cities labeled.

Download Sentinel-1 and Sentinel-2 data



Copernicus Open Access Hub

Advanced Search

Sort By: Ingestion Date

Order By: Descending

Sensing period: From: 2017/03/01 to: 2017/04/18

Ingestion period: From: to:

Mission: Sentinel-1

Satellite Platform: Product Type:

Polarisation: Sensor Mode:

Relative Orbit Number (from 1 to 175): Collection:

Mission: Sentinel-2

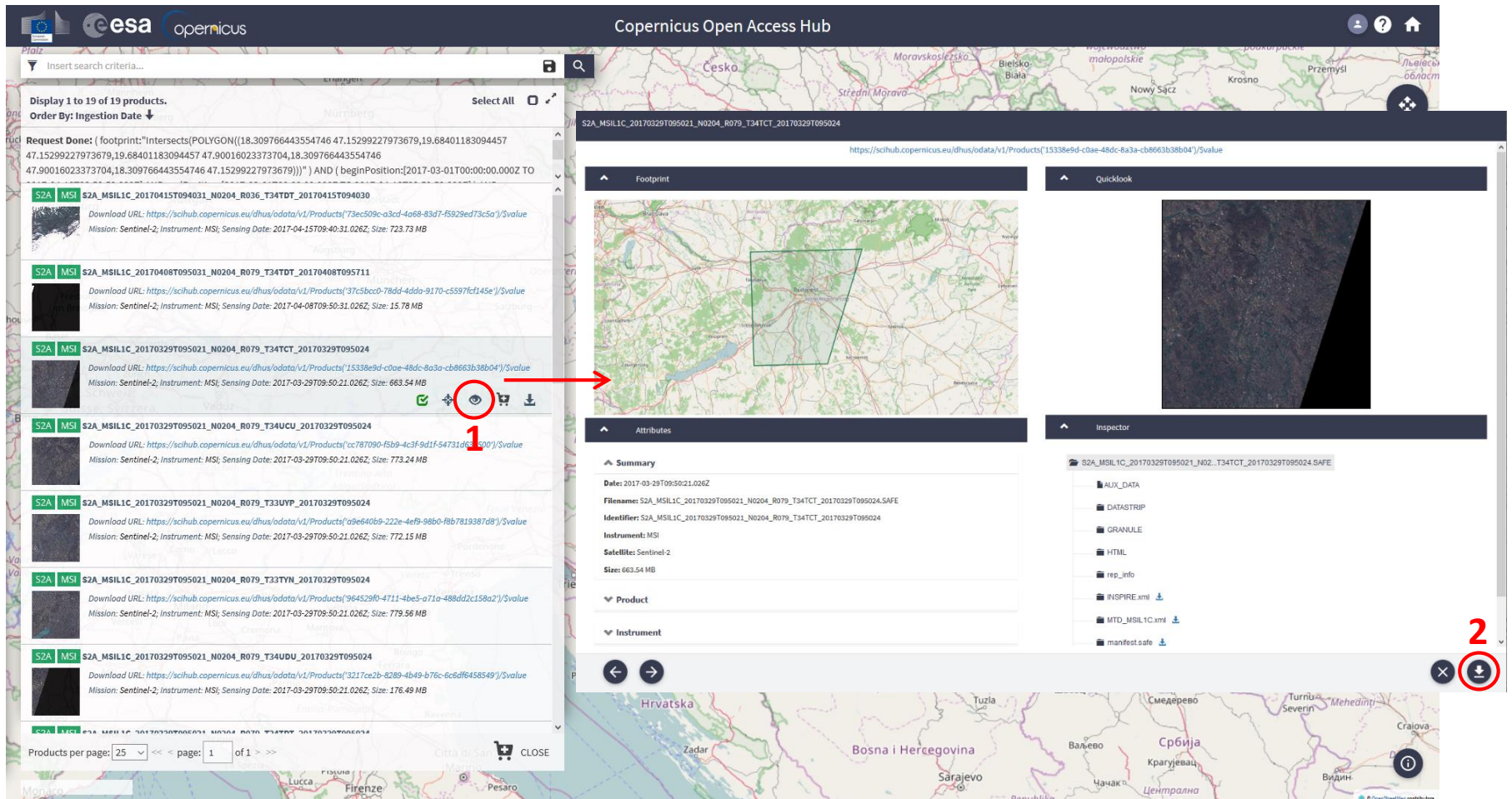
Cloud Cover % (e.g., [0 TO 9.4]): [0 TO 50]

Mission: Sentinel-3

Collection:

https://www.google.pl/url?sa=t&srct=j&q=&esrc=s&source=web&cd=28&ved=0ahUKEwjngeGo447PAhXXDiwKHUO-Bi8QFggvMAE&url=https%3A%2F%2Ftranslate.google.pl%2F&usq=AFQjCNFiat9fDgSCANcelZc9aRkN8Lq_Q&sig2=QeYLTIX0Q4mQF1164m6Q

Download Sentinel-1 and Sentinel-2 data



The screenshot displays the Copernicus Open Access Hub interface. On the left, a list of Sentinel-2 products is shown, ordered by ingestion date. A red circle highlights the 'eye' icon in the product list, with a red arrow pointing to the 'Footprint' map on the right. The 'Footprint' map shows a green polygon over a satellite image of a region in Central Europe. Below the map, the 'Attributes' section provides details for the selected product: S2A_MSIL1C_20170329T095021_N0204_R079_T34TCT_20170329T095024. The 'Inspector' panel on the right shows the file structure of the product, including folders for ALX_DATA, DATASTRIP, GRANULE, HTML, rep_info, INSPIRE.xml, MTD_MSIL1C.xml, and manifest.safe. A red circle highlights the download icon in the bottom right corner of the interface.

SNAP: Sentinel Application Platform

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 science toolbox exploitation platform

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- SNAP
- Sentinel 1 Toolbox
- Sentinel 2 Toolbox
- Sentinel-3 Toolbox
- SMOS Toolbox
- Download
- Community
- Useful Links



[Home](#) > [Download](#)

Download

Here you can download the latest installers for SNAP and the Sentinel Toolboxes.

Data provision is available to all users via the [Sentinel Data Hub](#).

Current Version

The current version is **5.0.0** (05.12.2016 14:40).

For detailed information about changes made for this release please have a look at the release notes of the different projects: [SNAP](#), [S1TBX](#), [S2TBX](#), [S3TBX](#), [SMOS Box](#), [PROBA-V Toolbox](#)

We offer three different installers for your convenience. Choose the one from the following table which suits your needs. During the installation process each toolbox can be excluded from the installation. Toolboxes which are not initially installed via the installer can be later downloaded and installed using the plugin manager. Please note that SNAP and the individual Sentinel Toolboxes also support numerous sensors other than Sentinel.

	Windows 64-Bit	Windows 32-Bit	Mac OS X	Unix 64-bit
Sentinel Toolboxes	These installers contain the Sentinel-1 , Sentinel-2 , Sentinel-3 Toolboxes			
	Download	Download	Download	Download
SMOS Toolbox	This installer contains only the SMOS Toolbox . Download also the Format Conversion Tool (Earth Explorer to NetCDF) and the user manual .			
	Download	Download	Download	Download
All Toolboxes	These installers contain the Sentinel-1 , Sentinel-2 , Sentinel-3 Toolboxes, SMOS and PROBA-V Toolbox			
	Download	Download	Download	Download

If you later decide to install an additional toolbox to your installation you can follow this [step-by-step guide](#).

http://step.esa.int/main/download/

2017



ESA POLInSAR 2017 Workshop

2016



Colour and Light in the Ocean
Earth Observation



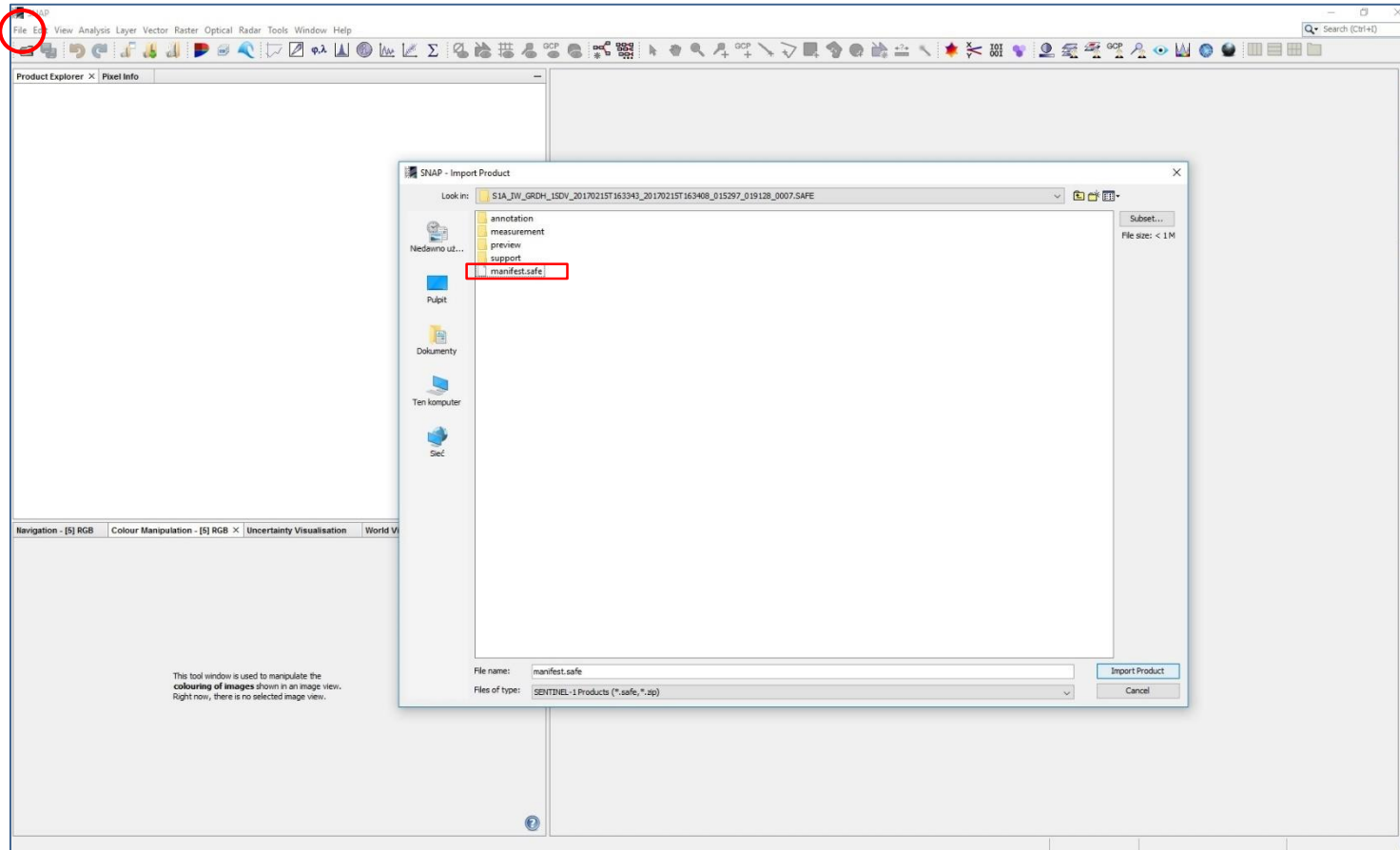
Earth Observation Open Science
2016 Conference



SA EO summer school on "Earth
system Monitoring & Modelling"



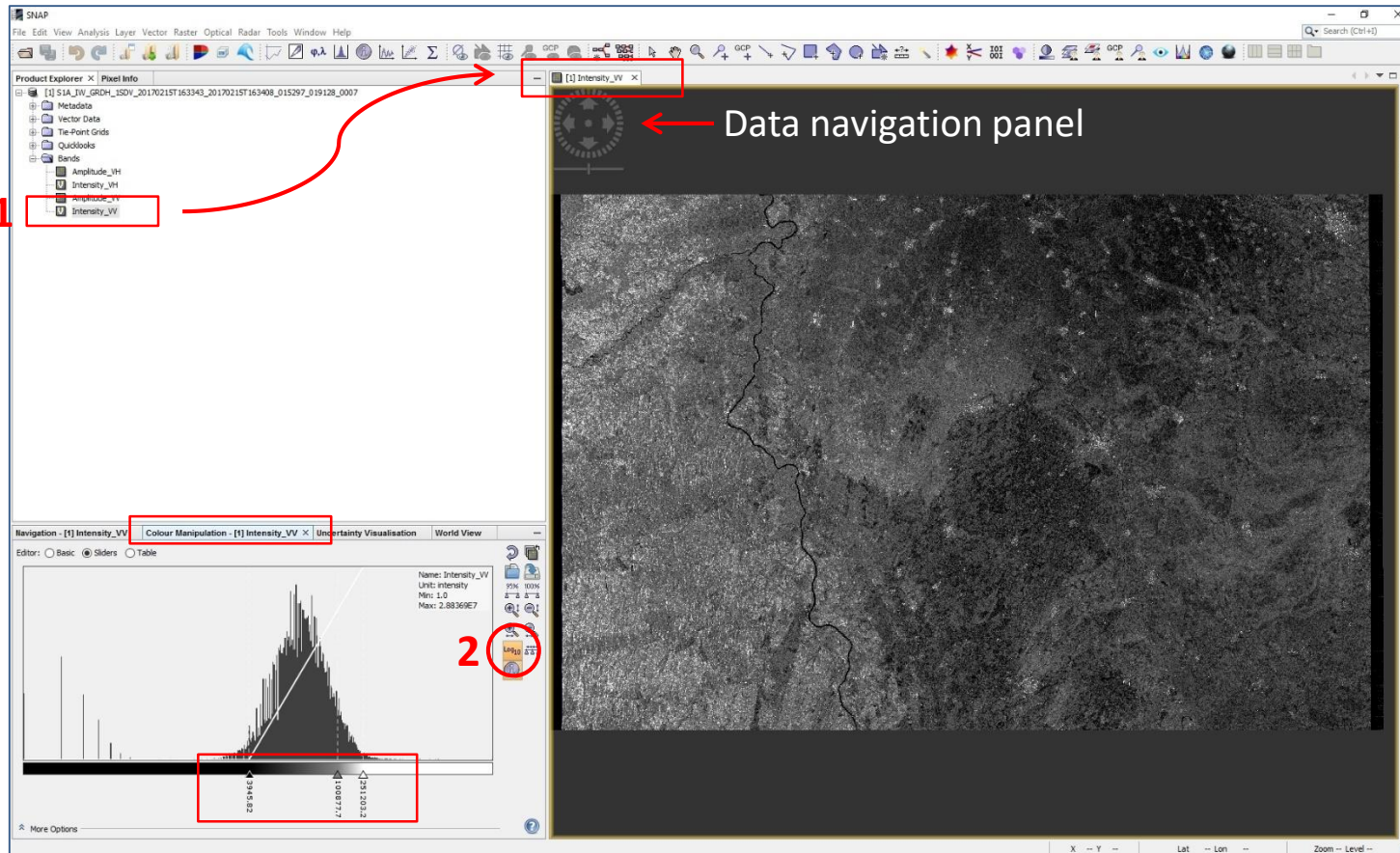
Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)



- > File
- > Import
- > SAR Sensors
- > SENTINEL-1

Navigate to first of three Sentinel-1 data folder, select „manifest.safe” and confirm with „Import Product” button.

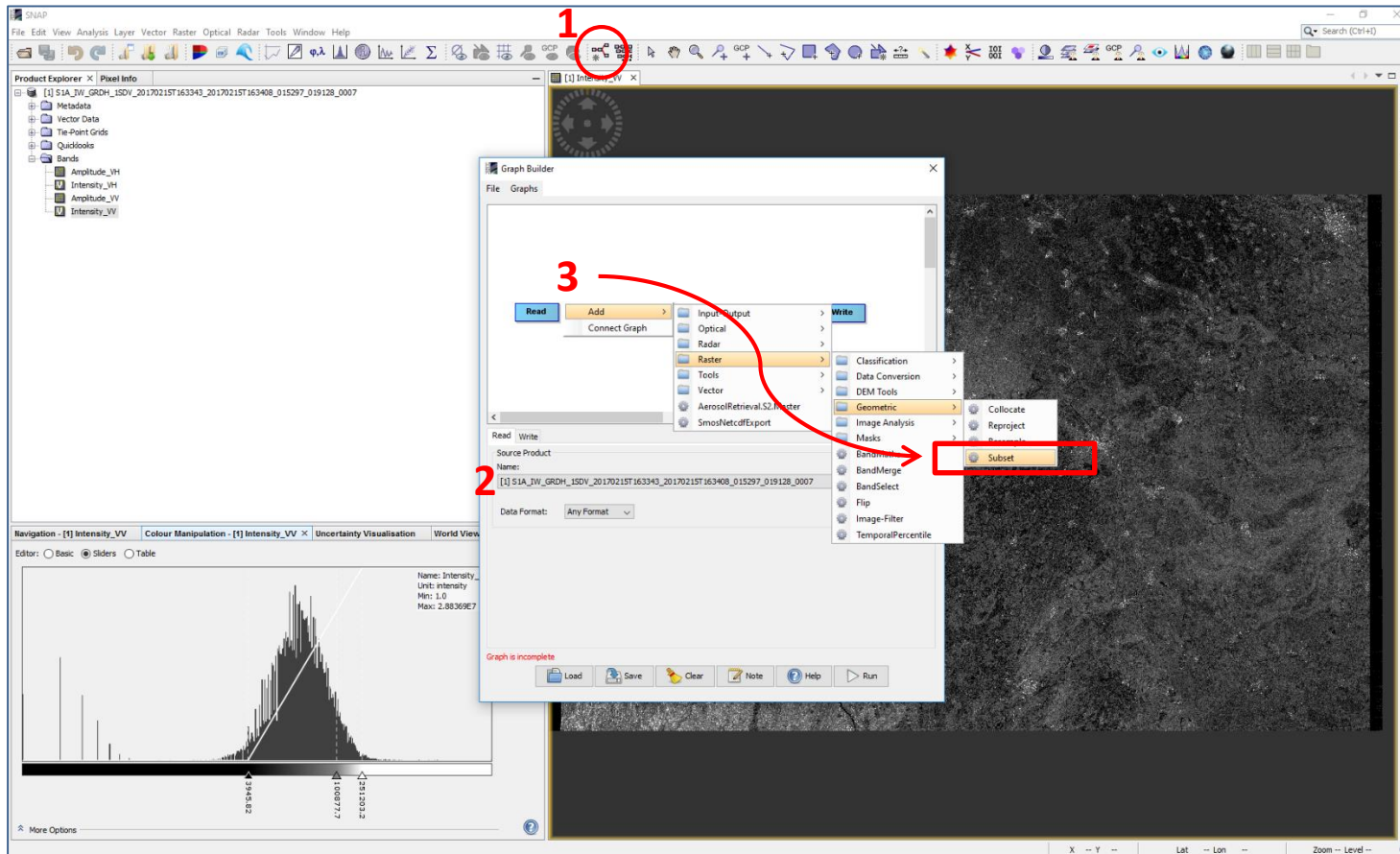
Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)



1 In „Product Explorer” panel navigate to „Bands” and double-click on „Intensity_VV” to visualize the data with VV polarization.

2 In „Colour Manipulation” panel click on „Switch to logarithmic display” and use black, grey and white sliders to stretch image histogram.

Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)



1 Click on „Graph Builder” icon to open empty graph.

2 Select Sentinel-1 image from drop-down list of open layers.

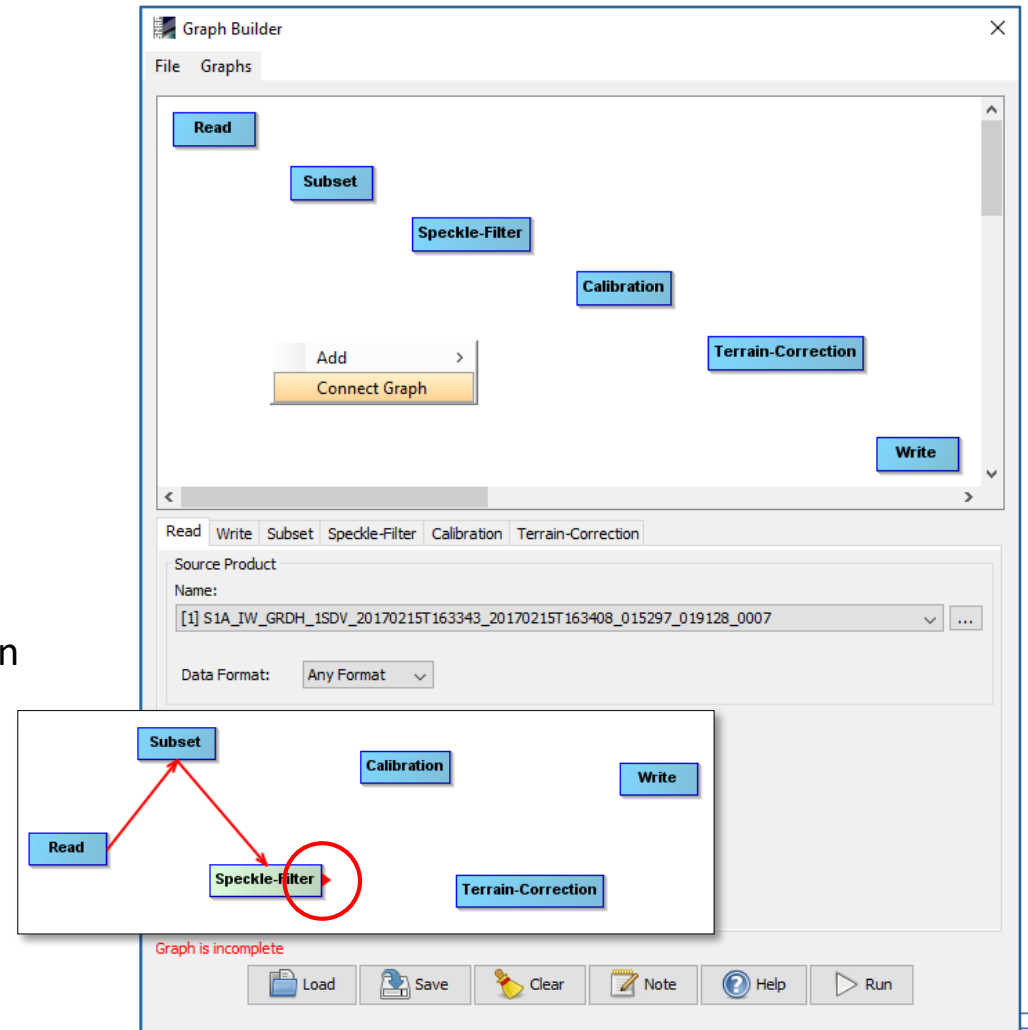
3 Right-click on the empty canvas and navigate to „Subset” tool (Add -> Raster -> Geometric -> **Subset**). A new TAB appears below the canvas.

Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)

In the same way as „Subset” tool add „Speckle-Filter”, „Calibration” and „Terrain-Correction” tools to the canvas.

- **Speckle-Filter**
 - Add -> Radar -> Speckle Filtering -> **Speckle-Filter**
- **Calibration**
 - Add -> Radar -> Radiometric -> **Calibration**
- **Terrain-Correction**
 - Add -> Radar -> Geometric -> Terrain Correction -> **Terrain-Correction**

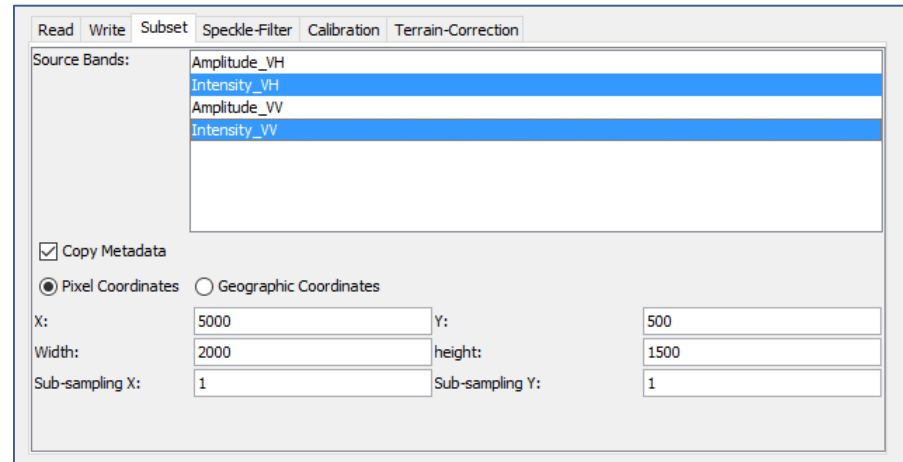
Right-click on the canvas and click „Connect Graph” or connect tools manually by dragging arrows - starting from the right border of each element



The screenshot shows the SNAP Graph Builder interface. The main canvas contains a workflow graph with the following tools: Read, Subset, Speckle-Filter, Calibration, Terrain-Correction, and Write. A red circle highlights the right border of the Speckle-Filter tool, and a red arrow points from the right border of the Read tool to the Speckle-Filter tool. Below the canvas, a status bar indicates "Graph is incomplete". The bottom toolbar includes buttons for Load, Save, Clear, Note, Help, and Run.

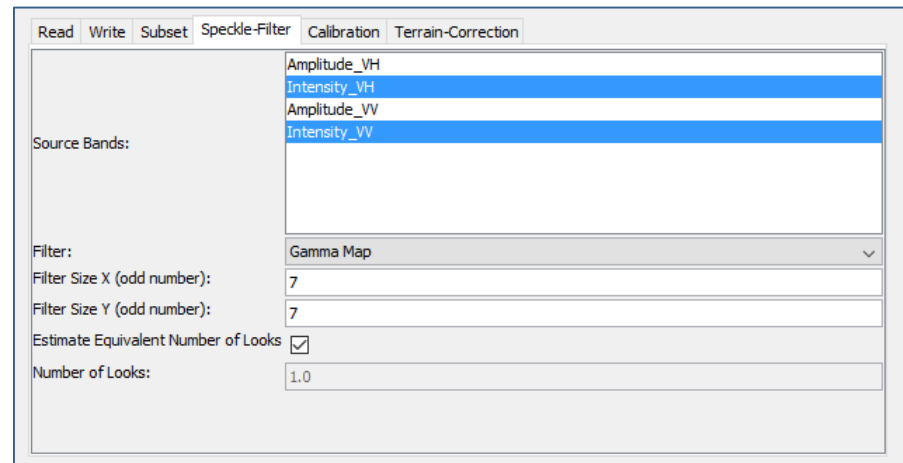
Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)

Open „Subset” tab and define in pixel coordinates upper left corner (X, Y) and size (Width, height) of the desired subset. If „Source Bands:” window is empty simple switch between different tabs to refresh the view. Select two Intensity layers only (with Ctrl button).



The screenshot shows the 'Subset' dialog box in SNAP. The 'Source Bands' list contains four items: Amplitude_VH, Intensity_VH, Amplitude_VV, and Intensity_VV. The two Intensity layers are selected with blue highlights. Below the list, the 'Copy Metadata' checkbox is checked. The 'Pixel Coordinates' radio button is selected. The X coordinate is 5000, Y is 500, Width is 2000, height is 1500, Sub-sampling X is 1, and Sub-sampling Y is 1.

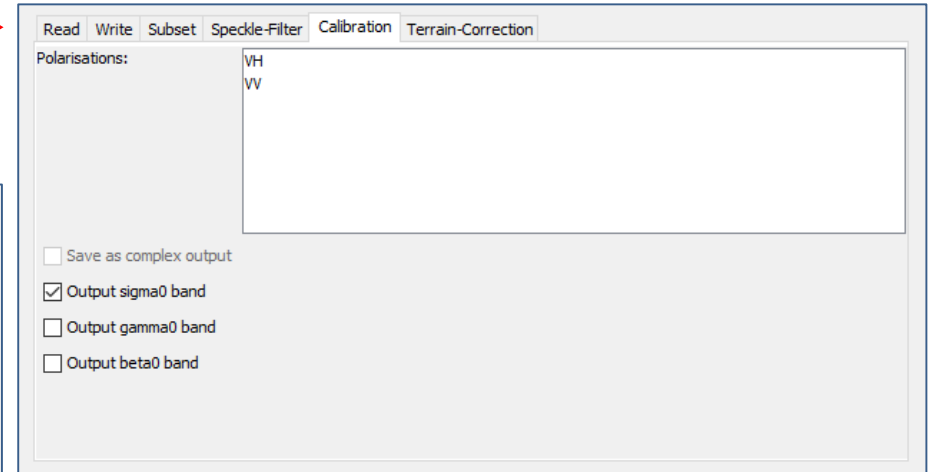
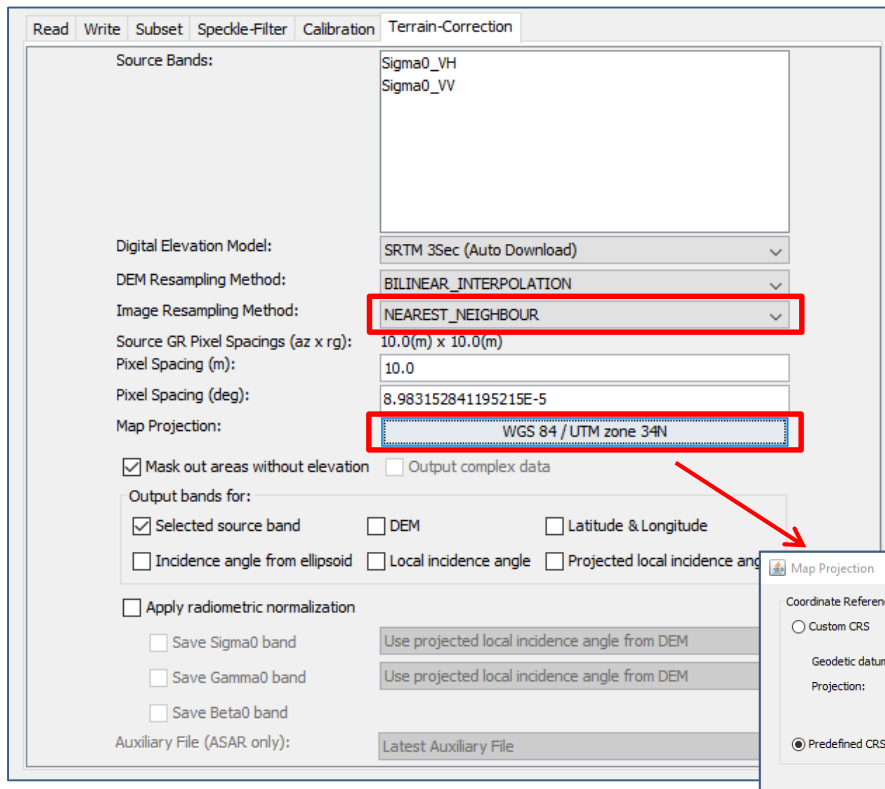
Open „Speckle-Filter” tab and define Filter (e.g. Gamma Map) and Filter Size X and Y (e.g. 7). Select two Intensity layers only (with Ctrl).



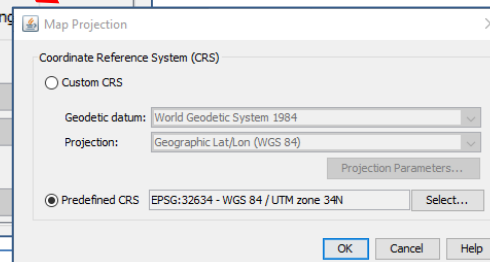
The screenshot shows the 'Speckle-Filter' dialog box in SNAP. The 'Source Bands' list is the same as in the Subset dialog, with the two Intensity layers selected. The 'Filter' dropdown is set to 'Gamma Map'. The 'Filter Size X (odd number)' is 7, and the 'Filter Size Y (odd number)' is 7. The 'Estimate Equivalent Number of Looks' checkbox is checked, and the 'Number of Looks' is 1.0.

Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)

Leave „Calibration” tab options without changing anything. →



← In „Terrain-Correction” tab change “Image Resampling Method” to „NEAREST_NEIGHBOUR” and “Map Projection” to desired projection.



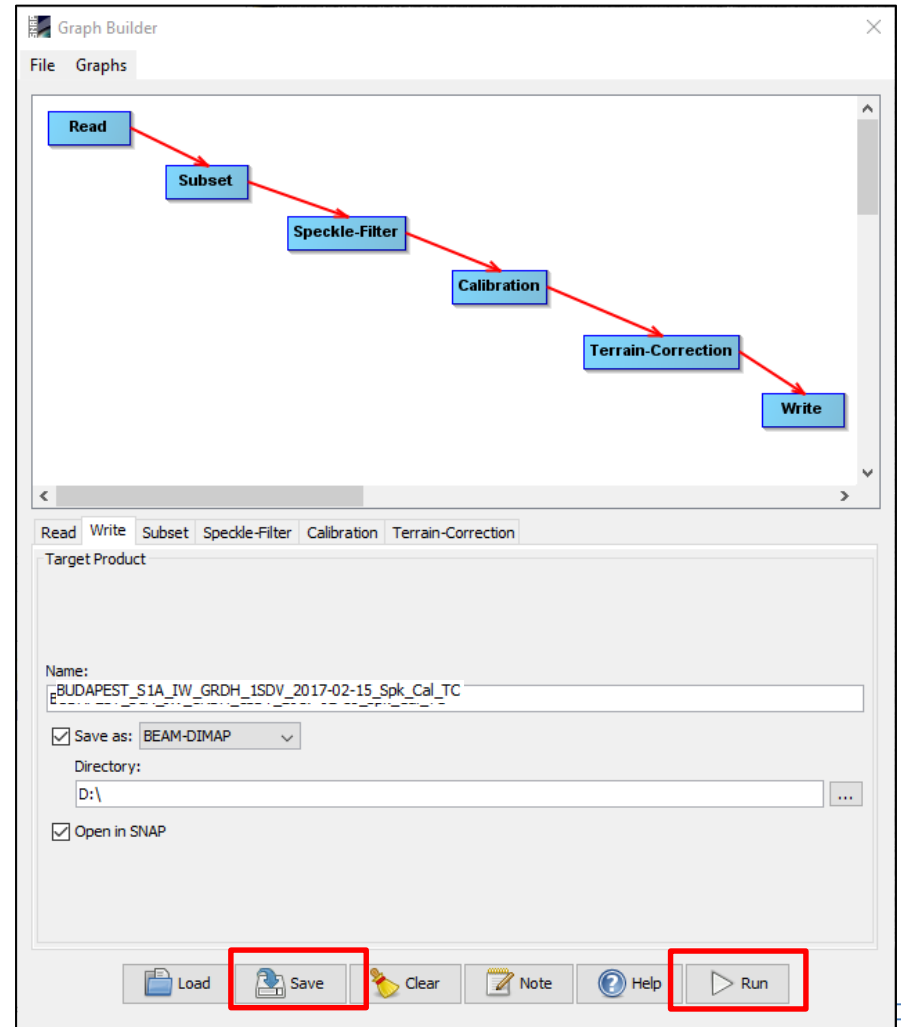
Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)

Open „Write” tab and define processed file name (you can leave it default), file format (BEAM-DIMAP as default), and saving location.

Click on „Save” button to save created Graph and hit „Run” to execute workflow. The processed image will appear in „Product Explorer” window.

Repeat the procedure to generate preprocessed subsets for two other data sets from different acquisition dates:

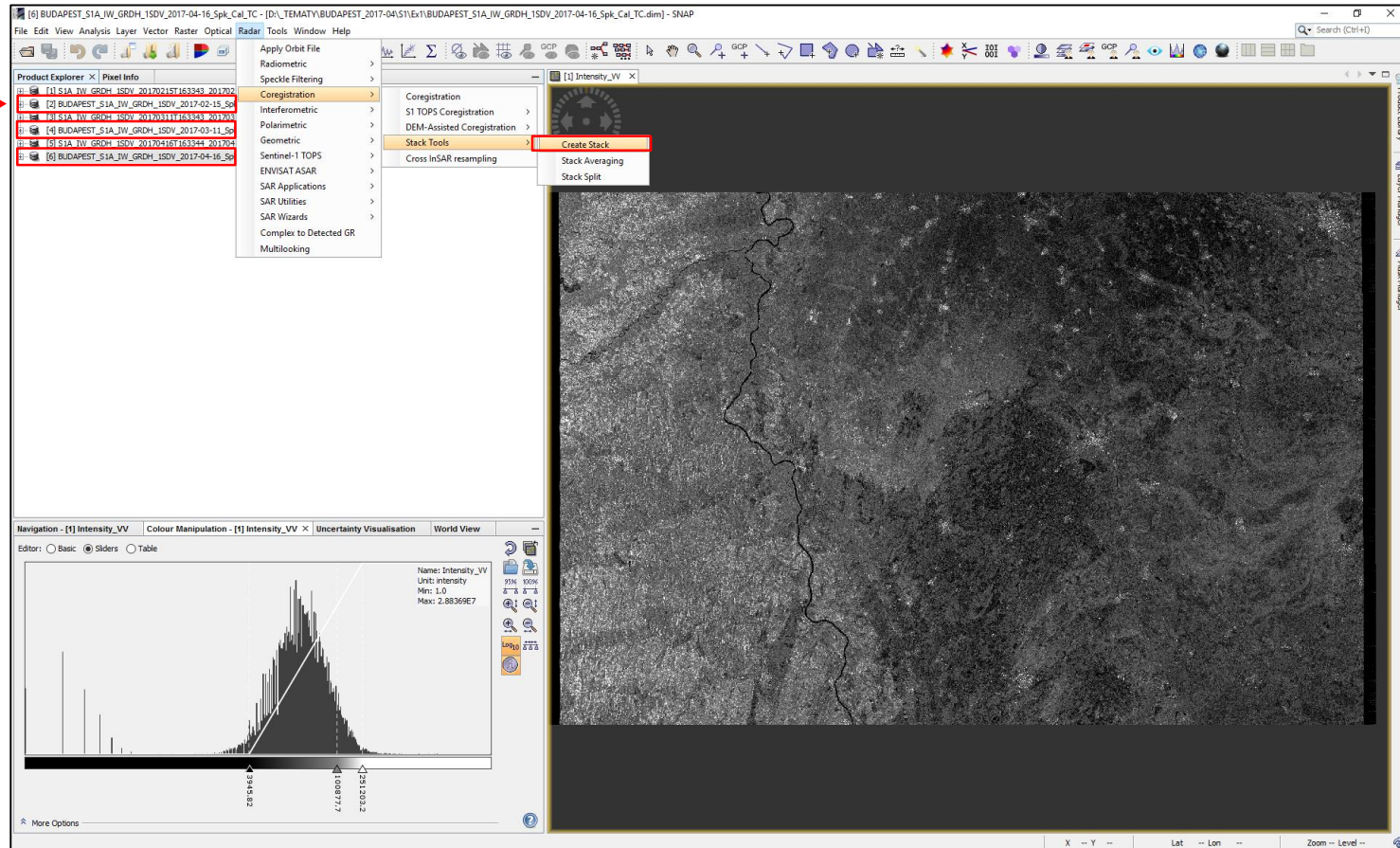
- import Sentinel-1 data into SNAP
- use „Graph Builder” to load and execute previously saved workflow.



Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)

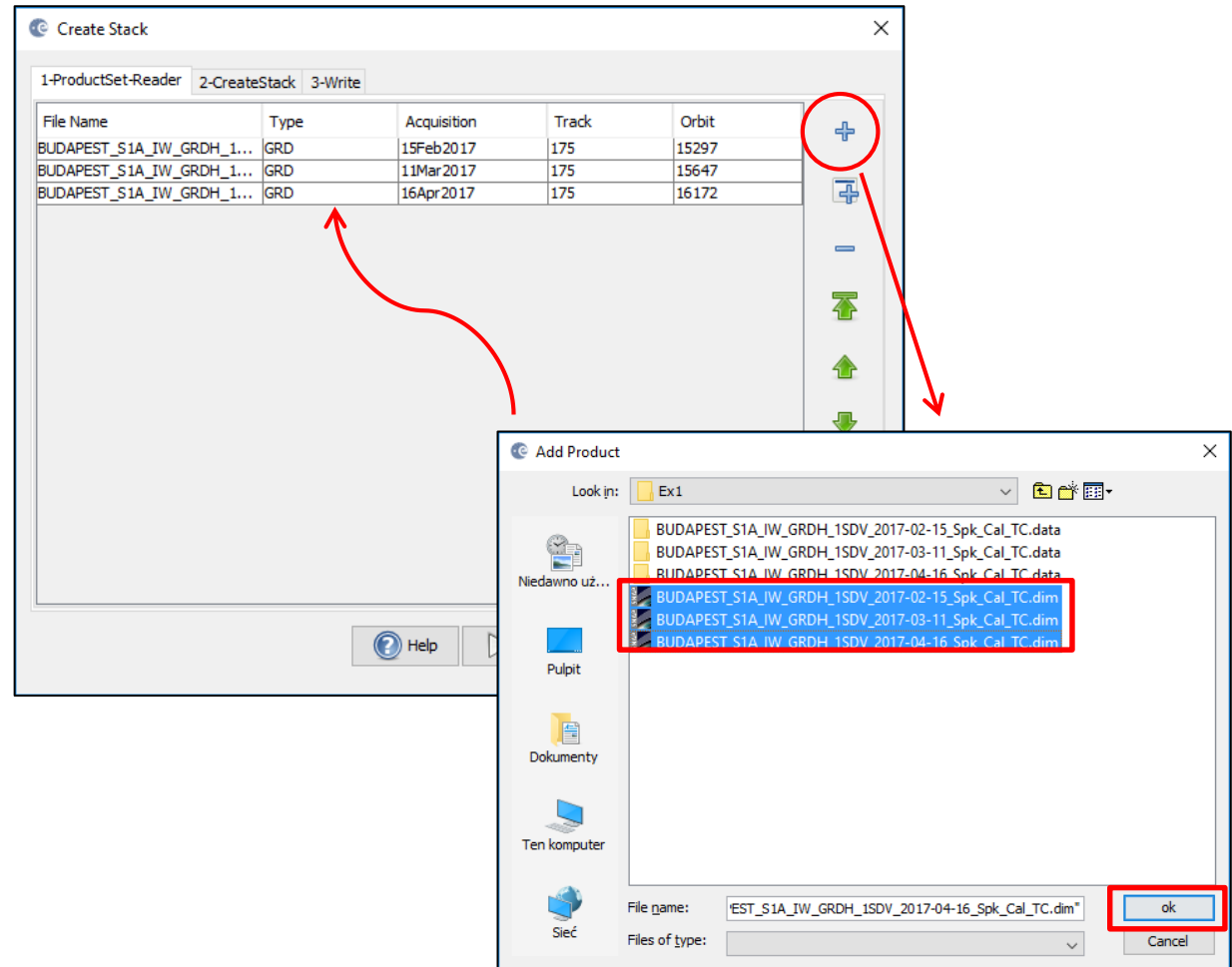
Generated Sentinel-1 subsets for three different acquisition dates.

Navigate to:
-> Radar
-> Coregistration
-> Stack Tools
-> **Create Stack**
to open stack creation tool.

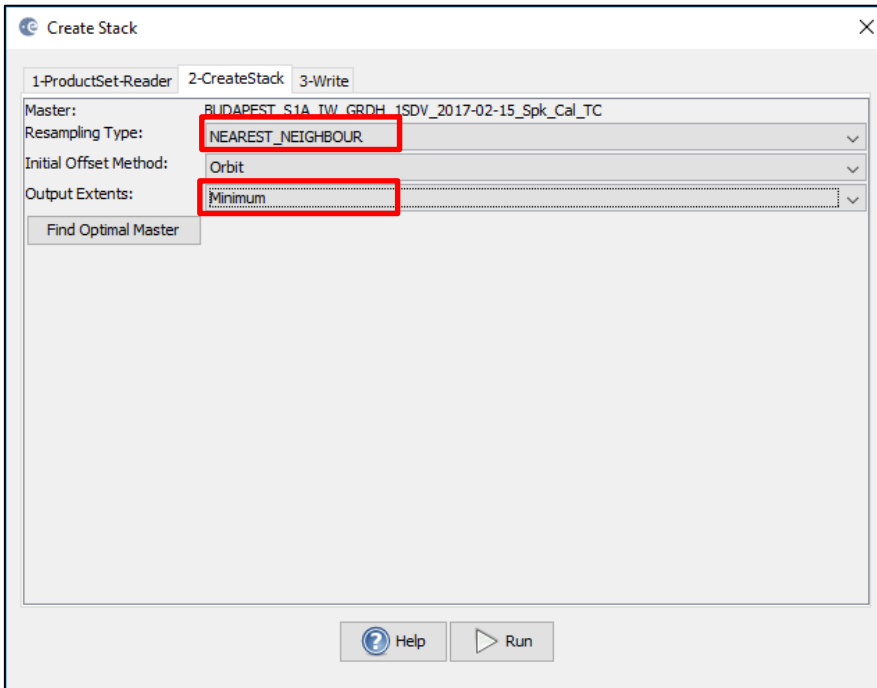


Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)

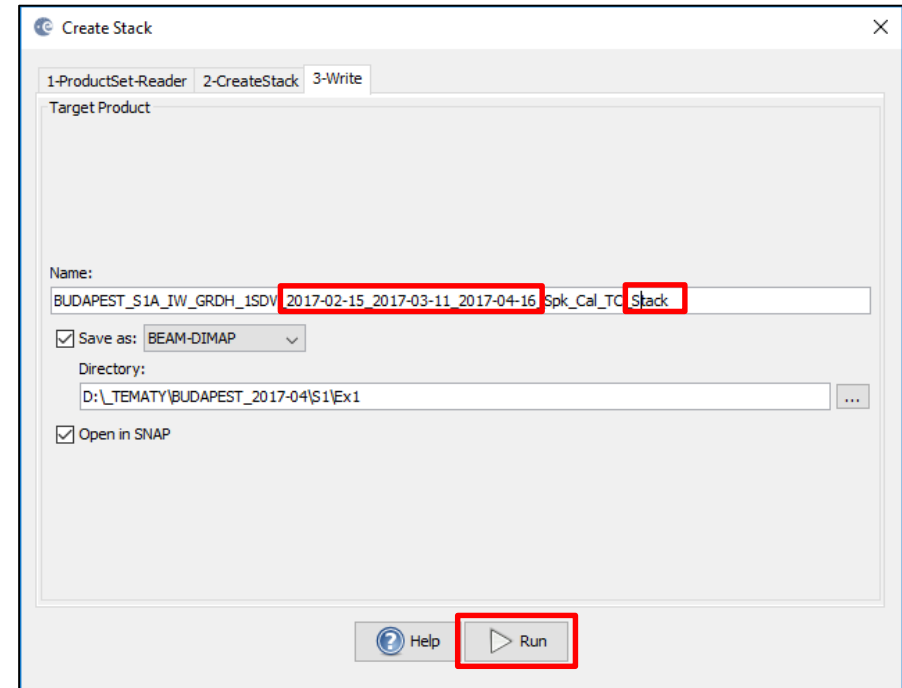
In „1-ProductSet-Reader” tab use plus symbol to open „Add Product” dialog. Navigate to and select three Sentinel-1 subsets (with Ctrl button). Press „ok” button to add files to the list.



Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)



In „2-CreateStack” tab change „Resampling Type:” to „NEAREST_NEIGHBOUR” and „Output Extents:” to „Minimum”.

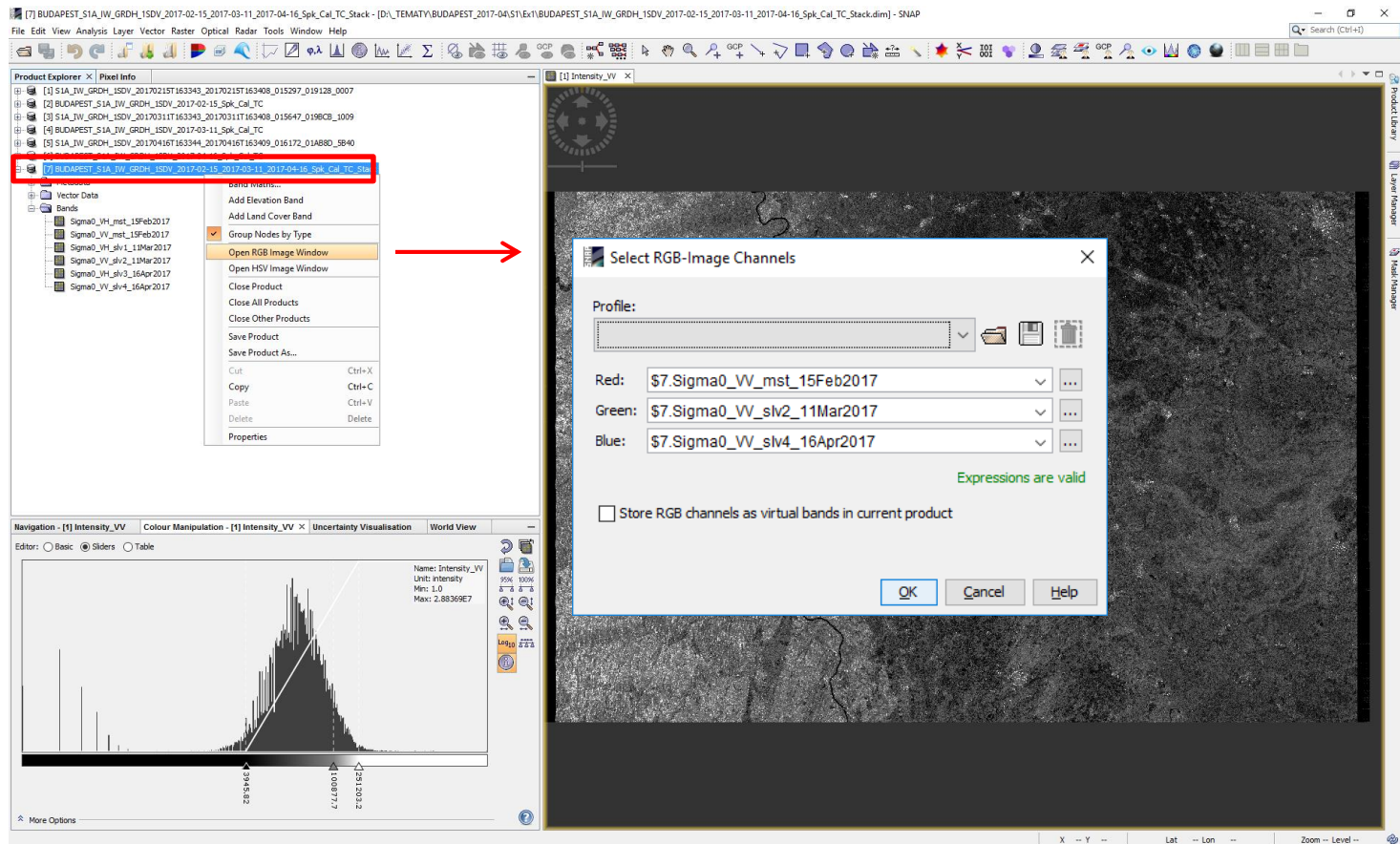


Go to „3-Write” tab and modify (or leave default values) product name and output directory. Execute tool by pressing „Run” button.

Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)

Right-click on the newly created stack and select „Open RGB Image Window”.

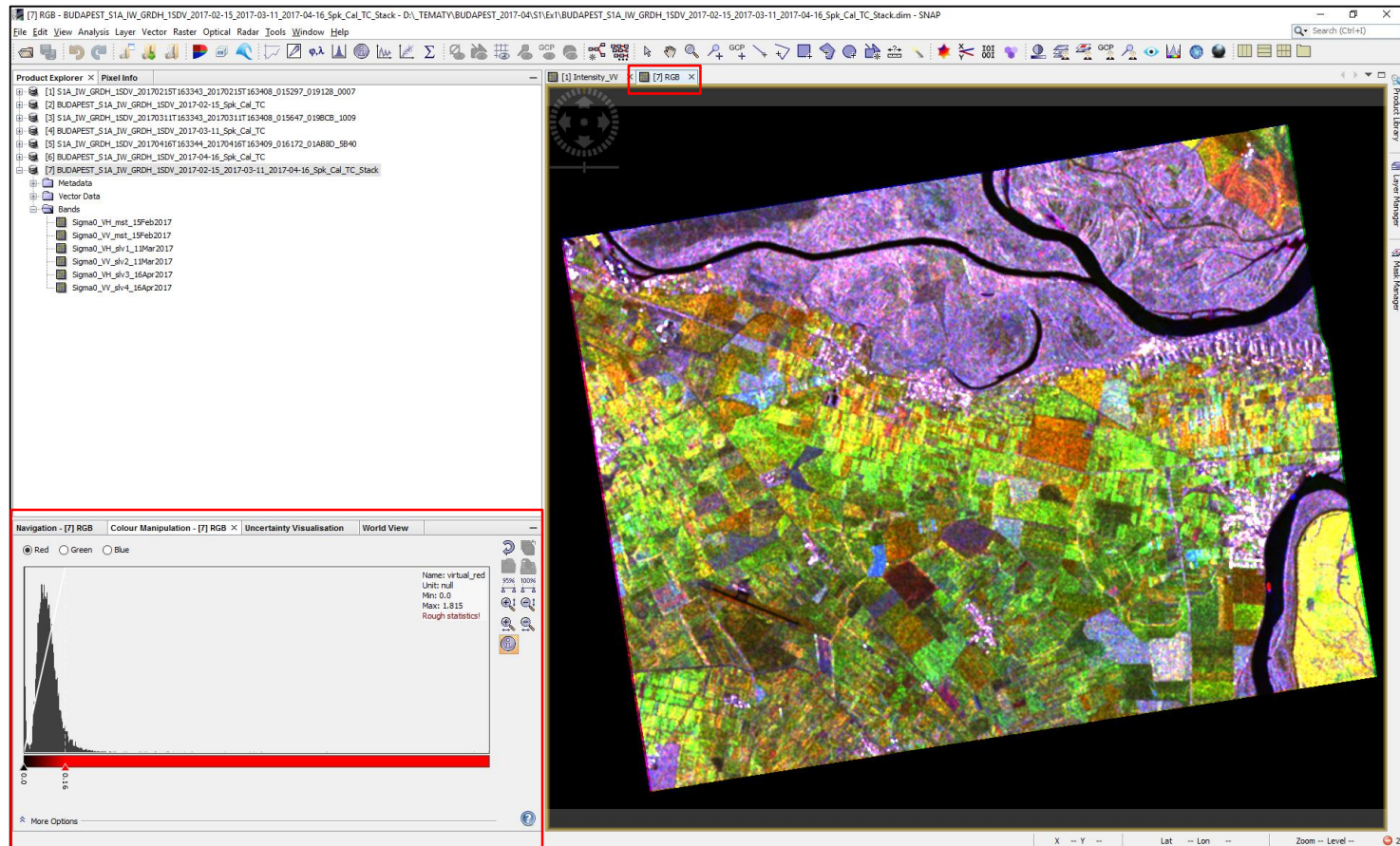
From drop-down list select VV bands (three different dates) for red, green and blue and press „OK” to create RGB composition.



The screenshot displays the SNAP software interface. The 'Product Explorer' on the left shows a stack of products, with the selected product highlighted in red. A red arrow points from this product to the 'Open RGB Image Window' dialog box. The dialog box has three input fields for the Red, Green, and Blue channels, each set to a specific VV band from the product stack. Below the dialog box, a histogram of the 'Intensity_VV' band is visible, showing the distribution of intensity values. The histogram has a peak around 1.0 and a tail extending to 2.8836967. The dialog box also includes a 'Store RGB channels as virtual bands in current product' checkbox and 'OK', 'Cancel', and 'Help' buttons.

Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)

A new “Image Window” will appear with RGB composition.



If needed, adjust histogram stretching for each layer (red, green, blue)

Exercise 1 – Sentinel-1 preprocessing and data fusion (SNAP)

Make sure that the stacked image is selected in „Product Explorer” window.

Navigate to:

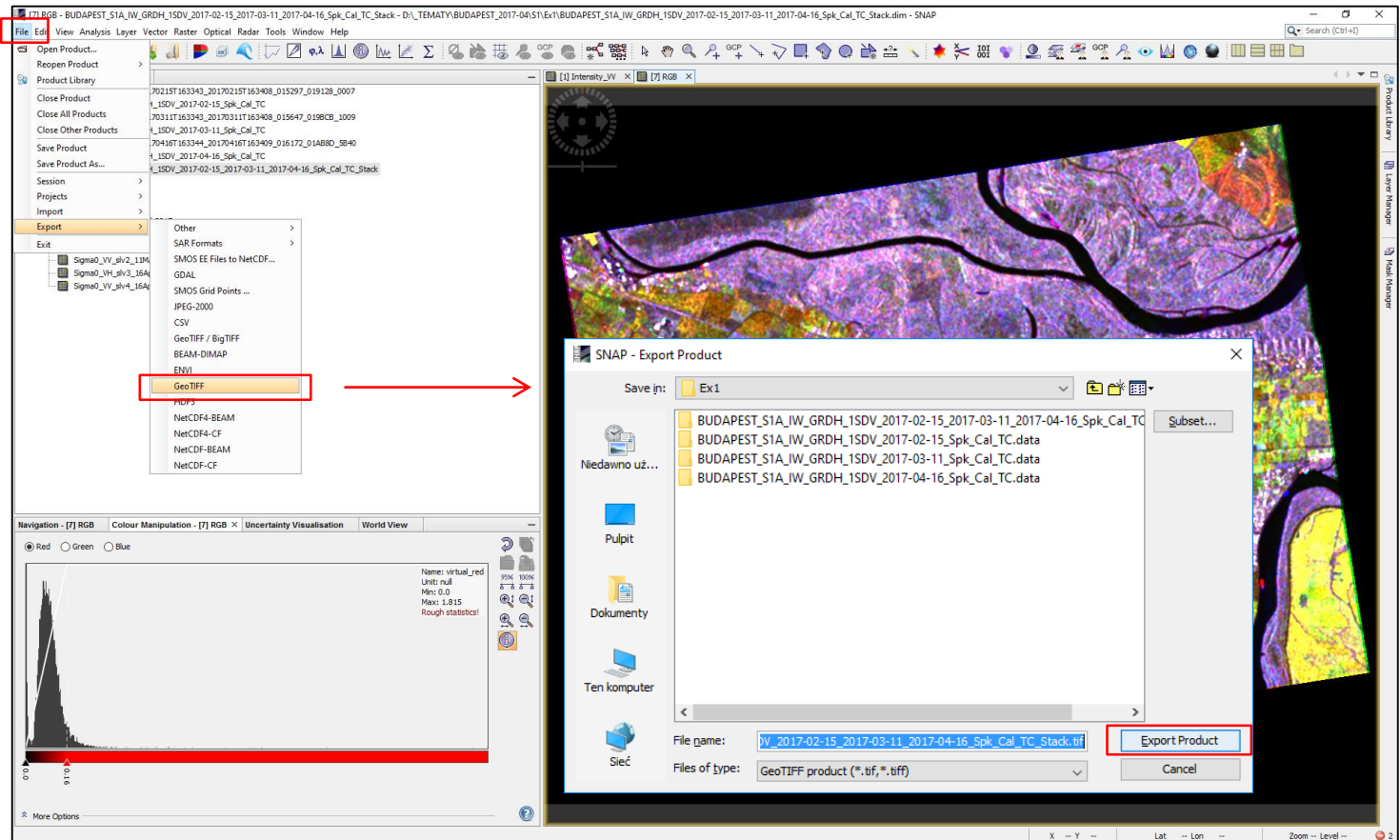
-> File

-> Export

-> **GeoTIFF**

to open „SNAP – Export Product” tool.

Specify file name and location and press „Export Product” button.



Sen2Cor: Sentinel-2 Level 2A Atmospheric Correction Processor



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SEN2COR

SEN2THREE

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Home > Third Party Plugins > Sen2Cor

Sen2Cor

Sen2Cor is a processor for Sentinel-2 Level 2A product generation and formatting; it performs the atmospheric-, terrain and cirrus correction of Top-Of- Atmosphere Level 1C input data. Sen2Cor creates Bottom-Of-Atmosphere, optionally terrain- and cirrus corrected reflectance images; additional, Aerosol Optical Thickness-, Water Vapor-, Scene Classification Maps and Quality Indicators for cloud and snow probabilities. Its output product format is equivalent to the Level 1C User Product: JPEG 2000 images, three different resolutions, 60, 20 and 10 m.

Sen2Cor should be installed according to the [STEP](#) manual. The Sen2Cor processor can be launched from a command line in SNAP (as it is described in the chapter 3.2.2.2 of the [STEP](#) manual) or from the [Sen2Cor](#) GUI. See the [STEP](#) manual sections for download links.

For any questions about the installation or usage of Sen2Cor, please follow the STEP forum area dedicated to Sen2Cor: <http://forum.step.esa.int/c/s2tbx/sen2cor>.

Latest release:

- 2.3.1 – It was released on February 13, 2017. This version runs on the operating systems: Linux, Mac OSX and Windows (64 bit is mandatory). For details about the features and fixes, see the release note. For installation procedure, check the user manual.

Windows installer: [sen2cor-2.3.1.zip](#)
Linux&Mac installer: [sen2cor-2.3.1.tar.gz](#)
Release Note: [\[L2A-SRN\] S2-PDGS-MPC-L2A-SRN \[2.3.1\].pdf](#)
Software User Manual: [\[L2A-SUM\] S2-PDGS-MPC-L2A-SUM \[2.3.0\].pdf](#)
Sentinel-2 Level 2A Product Format: [\[L2A-PFS\] S2-PDGS-MPC-L2A-PFS \[1.4.2\].pdf](#)
Sentinel-2 Level 2A Product Definition: [\[L2A-PDD\] S2-PDGS-MPC-L2A-PDD \[1.4.2\].pdf](#)

Colour and Light in the Ocean from Earth Observation

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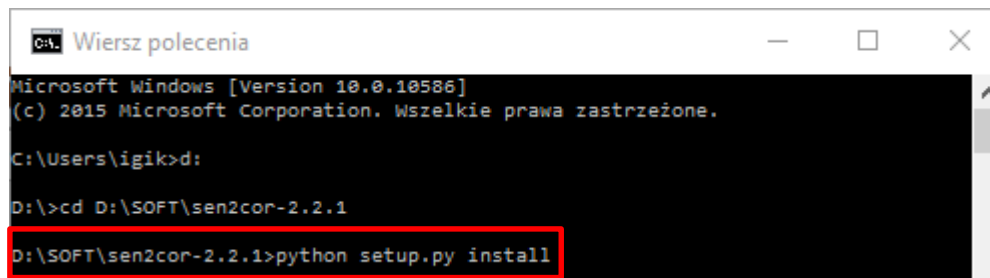
<http://step.esa.int/main/third-party-plugins-2/sen2cor/>

Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (**sen2cor**, SNAP)

Sentinel-2 MSI – Level-2A Prototype Processor Installation and User Manual

CHAPTER 3 – CONFIGURATION AND INSTALLATION (page 31)

- Setting up the Runtime Environment (**Anaconda** Upgrade/Installation)
 - <http://continuum.io/downloads>
- **Sen2Cor** Installation
 - In the command line utility navigate to the sen2cor-2.3.1 folder, type “python setup.py install” and follow the instructions. The setup will install the Sen2Cor application and all its dependencies under the Anaconda python distribution.



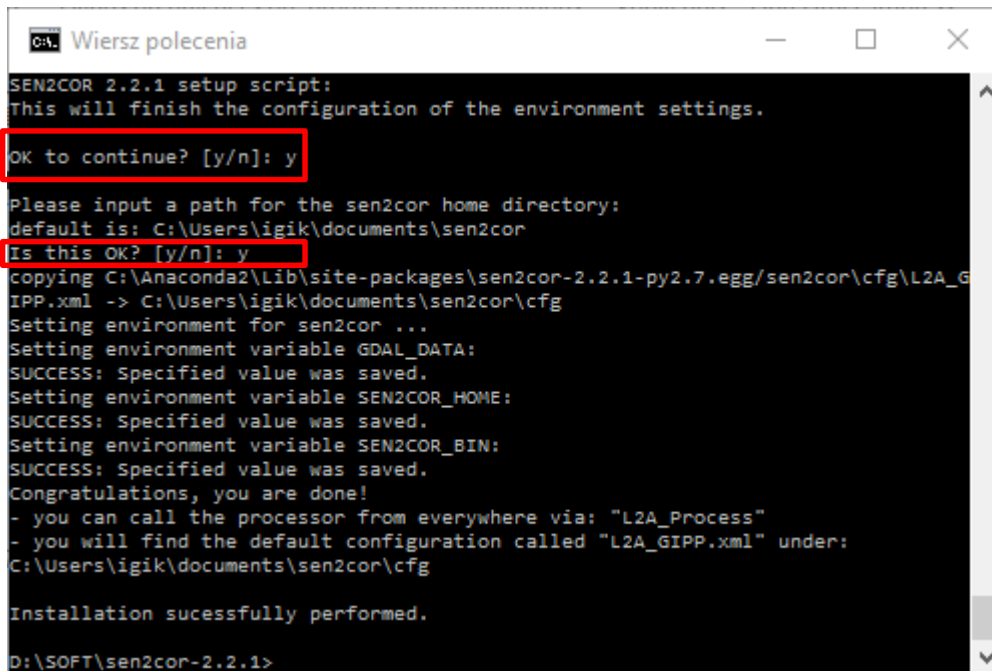
```
C:\> Wiersz poleceń
Microsoft Windows [Version 10.0.10586]
(c) 2015 Microsoft Corporation. Wszelkie prawa zastrzeżone.

C:\Users\igik>d:

D:\>cd D:\SOFT\sen2cor-2.2.1
D:\SOFT\sen2cor-2.2.1>python setup.py install
```

Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (**sen2cor**, SNAP)

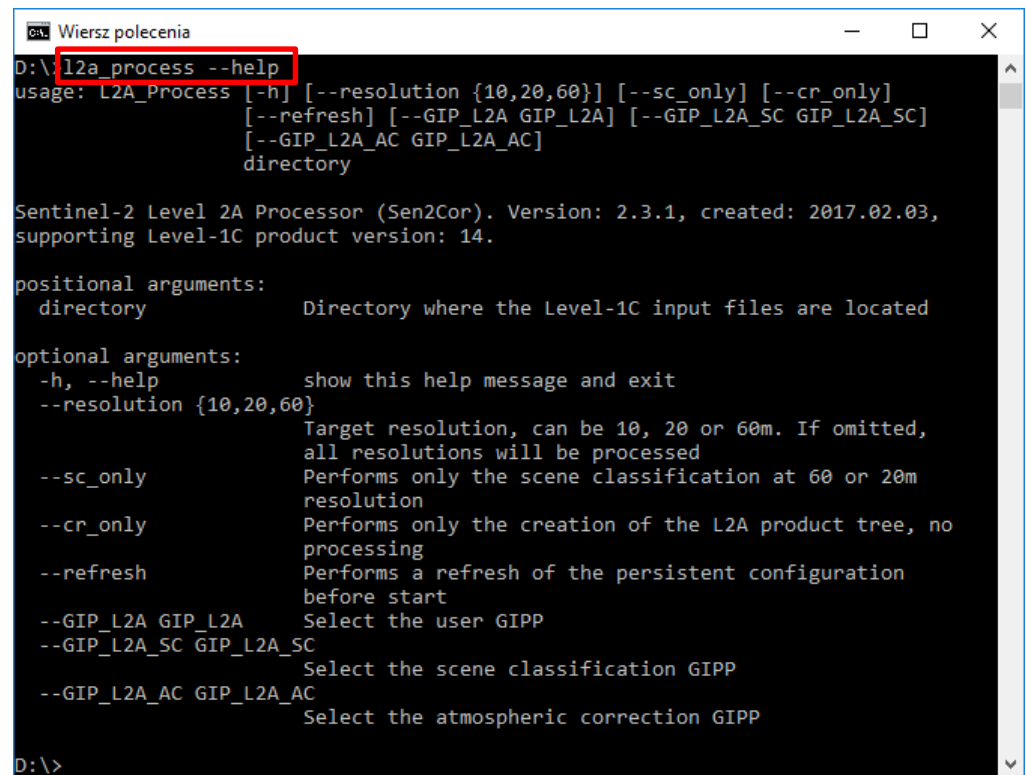
- Sen2Cor installation script will use internet connection to download all needed packages.
- User will be asked to press „y” and „Enter” to finish the configuration of environment settings and confirm location of sen2cor home directory (which will store e.g. sen2cor configuration file).



```
Wiersz polecenia
SEN2COR 2.2.1 setup script:
This will finish the configuration of the environment settings.
OK to continue? [y/n]: y
Please input a path for the sen2cor home directory:
default is: C:\Users\igik\documents\sen2cor
Is this OK? [y/n]: y
Copying C:\Anaconda2\Lib\site-packages\sen2cor-2.2.1-py2.7.egg\sen2cor\cfg\L2A_G
IPP.xml -> C:\Users\igik\documents\sen2cor\cfg
Setting environment for sen2cor ..
Setting environment variable GDAL_DATA:
SUCCESS: Specified value was saved.
Setting environment variable SEN2COR_HOME:
SUCCESS: Specified value was saved.
Setting environment variable SEN2COR_BIN:
SUCCESS: Specified value was saved.
Congratulations, you are done!
- you can call the processor from everywhere via: "L2A_Process"
- you will find the default configuration called "L2A_GIPP.xml" under:
C:\Users\igik\documents\sen2cor\cfg
Installation successfully performed.
D:\SOFT\sen2cor-2.2.1>
```


Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (**sen2cor**, SNAP)

- Use „L2A_PROCESS --help” command to display help screen with possible options.



```
Wiersz polecenia
D:\>l2a_process --help
usage: L2A_Process [-h] [--resolution {10,20,60}] [--sc_only] [--cr_only]
                  [--refresh] [--GIP_L2A GIP_L2A] [--GIP_L2A_SC GIP_L2A_SC]
                  [--GIP_L2A_AC GIP_L2A_AC]
                  directory

Sentinel-2 Level 2A Processor (Sen2Cor). Version: 2.3.1, created: 2017.02.03,
supporting Level-1C product version: 14.

positional arguments:
  directory              Directory where the Level-1C input files are located

optional arguments:
  -h, --help            show this help message and exit
  --resolution {10,20,60}
                        Target resolution, can be 10, 20 or 60m. If omitted,
                        all resolutions will be processed
  --sc_only             Performs only the scene classification at 60 or 20m
                        resolution
  --cr_only            Performs only the creation of the L2A product tree, no
                        processing
  --refresh            Performs a refresh of the persistent configuration
                        before start
  --GIP_L2A GIP_L2A    Select the user GIPP
  --GIP_L2A_SC GIP_L2A_SC
                        Select the scene classification GIPP
  --GIP_L2A_AC GIP_L2A_AC
                        Select the atmospheric correction GIPP

D:\>
```

Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (**sen2cor**, SNAP)

In case of environment variables error (on Windows OS) use following commands to set them correctly:

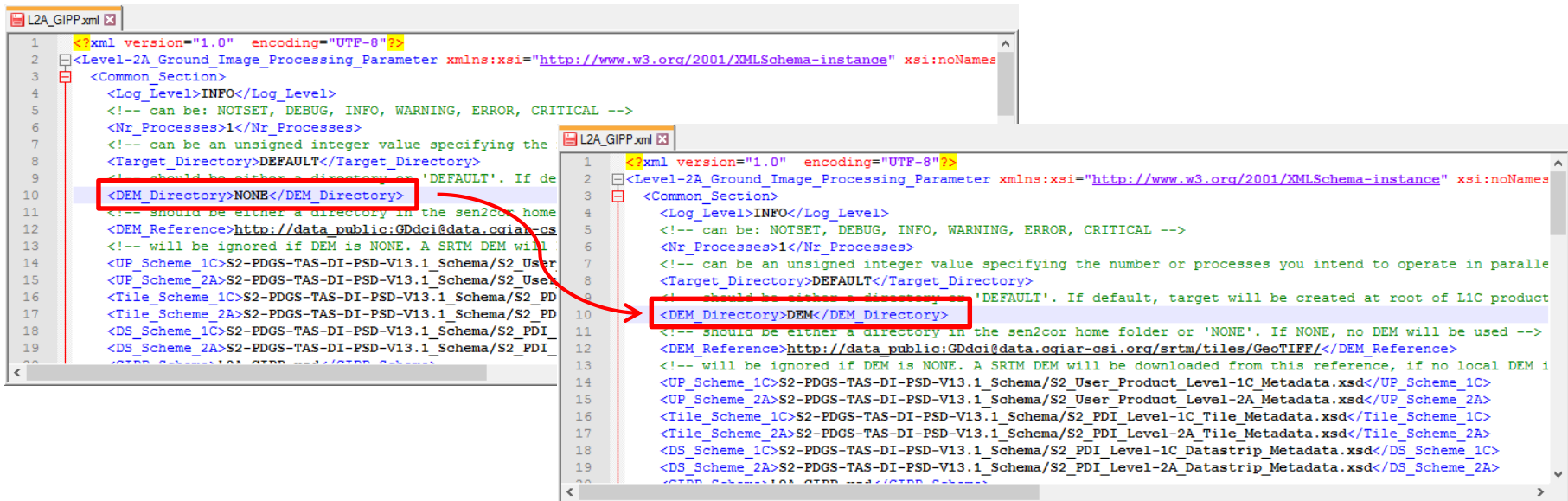
- SET SEN2COR_HOME=C:\Anaconda2\Lib\site-packages\sen2cor-2.3.1-py2.7.egg\sen2cor
- SET SEN2COR_BIN=C:\Anaconda2\Lib\site-packages\sen2cor-2.3.1-py2.7.egg\sen2cor

If needed adjust both paths to point to the sen2cor folder within Anaconda installation folder.

```
D:\SOFT\sen2cor-2.2.1>SET SEN2COR_HOME=C:\Anaconda2\Lib\site-packages\sen2cor-2.2.1-py2.7.egg\sen2cor
D:\SOFT\sen2cor-2.2.1>SET SEN2COR_BIN=C:\Anaconda2\Lib\site-packages\sen2cor-2.2.1-py2.7.egg\sen2cor
```

Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (sen2cor, SNAP)

- To include DEM data in data correction go to the sen2cor home folder (usually in user's Documents folder, e.g. „C:\Users\\Documents\sen2cor”) and in the „cfg” folder open L2A_GIPP.xml file with appropriate editor (like Notepad++).
- In the line with „DEM_Directory” tags change „NONE” to any other name (e.g. „DEM”).



The image shows two screenshots of the L2A_GIPP.xml file in Notepad++. The left screenshot shows the original configuration with the tag `<DEM_Directory>NONE</DEM_Directory>` highlighted in red. The right screenshot shows the modified configuration with the tag `<DEM_Directory>DEM</DEM_Directory>` highlighted in red. A red arrow points from the original tag to the modified tag.

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <Level-2A_Ground_Image_Processing_Parameter xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNames
3 <Common_Section>
4 <Log_Level>INFO</Log_Level>
5 <!-- can be: NOTSET, DEBUG, INFO, WARNING, ERROR, CRITICAL -->
6 <Nr_Processes>1</Nr_Processes>
7 <!-- can be an unsigned integer value specifying the
8 <Target_Directory>DEFAULT</Target_Directory>
9 <!-- should be either a directory or 'DEFAULT'. If de
10 <DEM_Directory>NONE</DEM_Directory>
11 <!-- should be either a directory in the sen2cor home
12 <DEM_Reference>http://data_public:GDdci@data.cgiar-cs
13 <!-- will be ignored if DEM is NONE. A SRTM DEM will
14 <UP_Scheme_1C>S2-PDGS-TAS-DI-PSD-V13.1_Schema/S2_User
15 <UP_Scheme_2A>S2-PDGS-TAS-DI-PSD-V13.1_Schema/S2_User
16 <Tile_Scheme_1C>S2-PDGS-TAS-DI-PSD-V13.1_Schema/S2_PD
17 <Tile_Scheme_2A>S2-PDGS-TAS-DI-PSD-V13.1_Schema/S2_PD
18 <DS_Scheme_1C>S2-PDGS-TAS-DI-PSD-V13.1_Schema/S2_PDI
19 <DS_Scheme_2A>S2-PDGS-TAS-DI-PSD-V13.1_Schema/S2_PDI
20 <GIPP_Schema_1C>S2-PDGS-TAS-DI-PSD-V13.1_Schema/S2_GIPP
21 <GIPP_Schema_2A>S2-PDGS-TAS-DI-PSD-V13.1_Schema/S2_GIPP
```

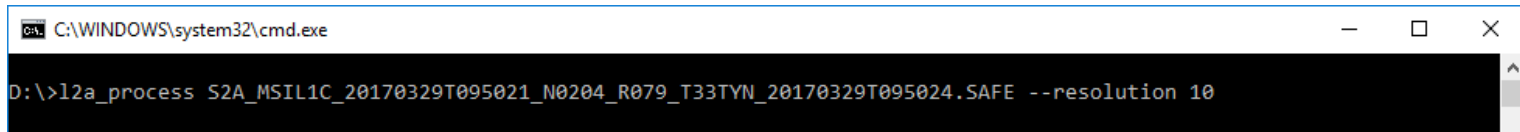
Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (**sen2cor**, SNAP)

To start data processing use the following command:

L2A_PROCESS <unzipped image data folder path> <optional parameters>

e.g.

„L2A_PROCESS D:\S2A_MSIL1C_20170329T095021_N0204_R079_T33TYN_20170329T095024.SAFE
--resolution 10”



```
C:\WINDOWS\system32\cmd.exe
D:\>l2a_process S2A_MSIL1C_20170329T095021_N0204_R079_T33TYN_20170329T095024.SAFE --resolution 10
```

INPUT FOLDER:

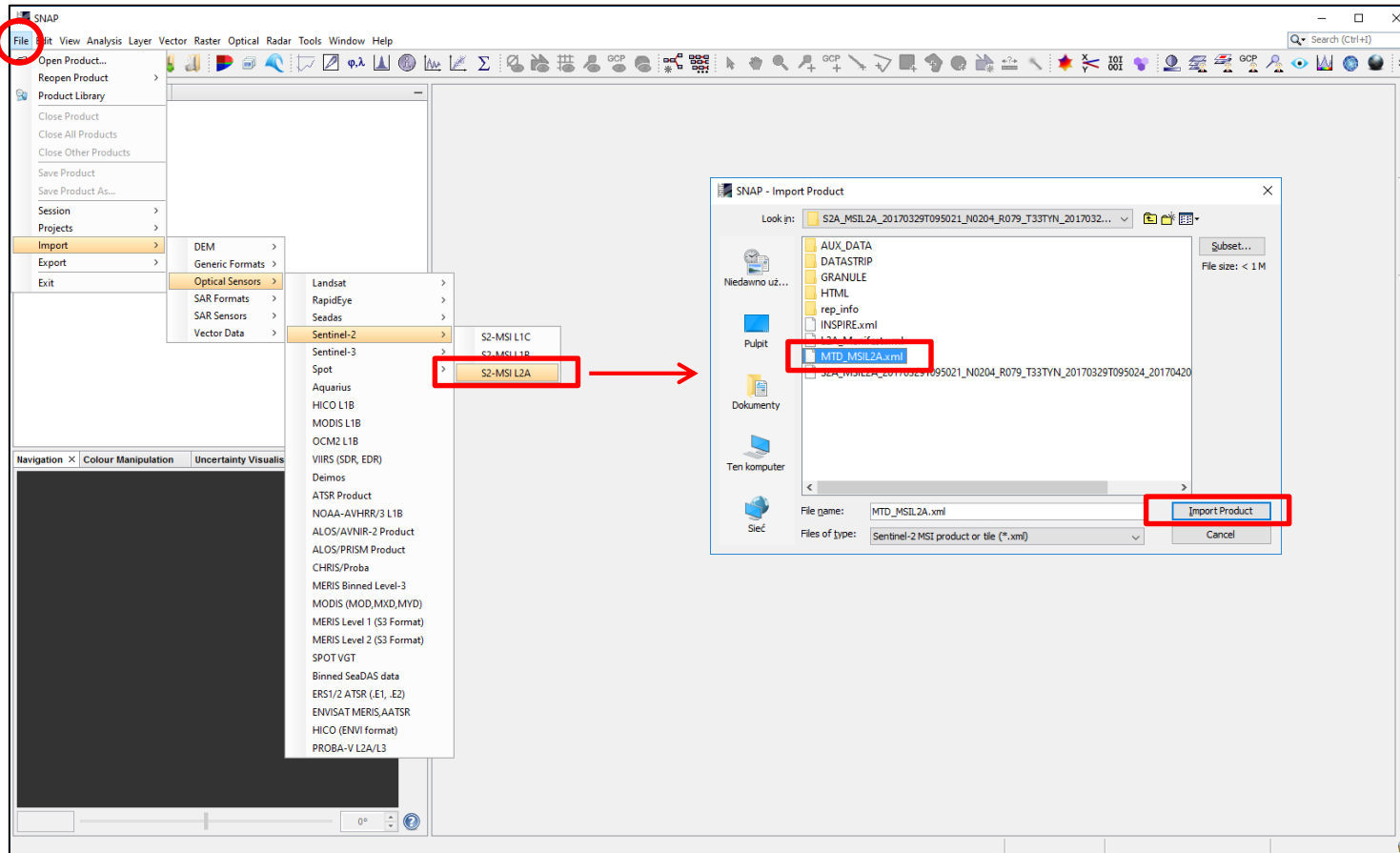
S2A_MSIL1C_20170329T095021_N0204_R079_T33TYN_20170329T095024.SAFE



OUTPUT FOLDER:

S2A_MSIL2A_20170329T095021_N0204_R079_T33TYN_20170329T095024.SAFE

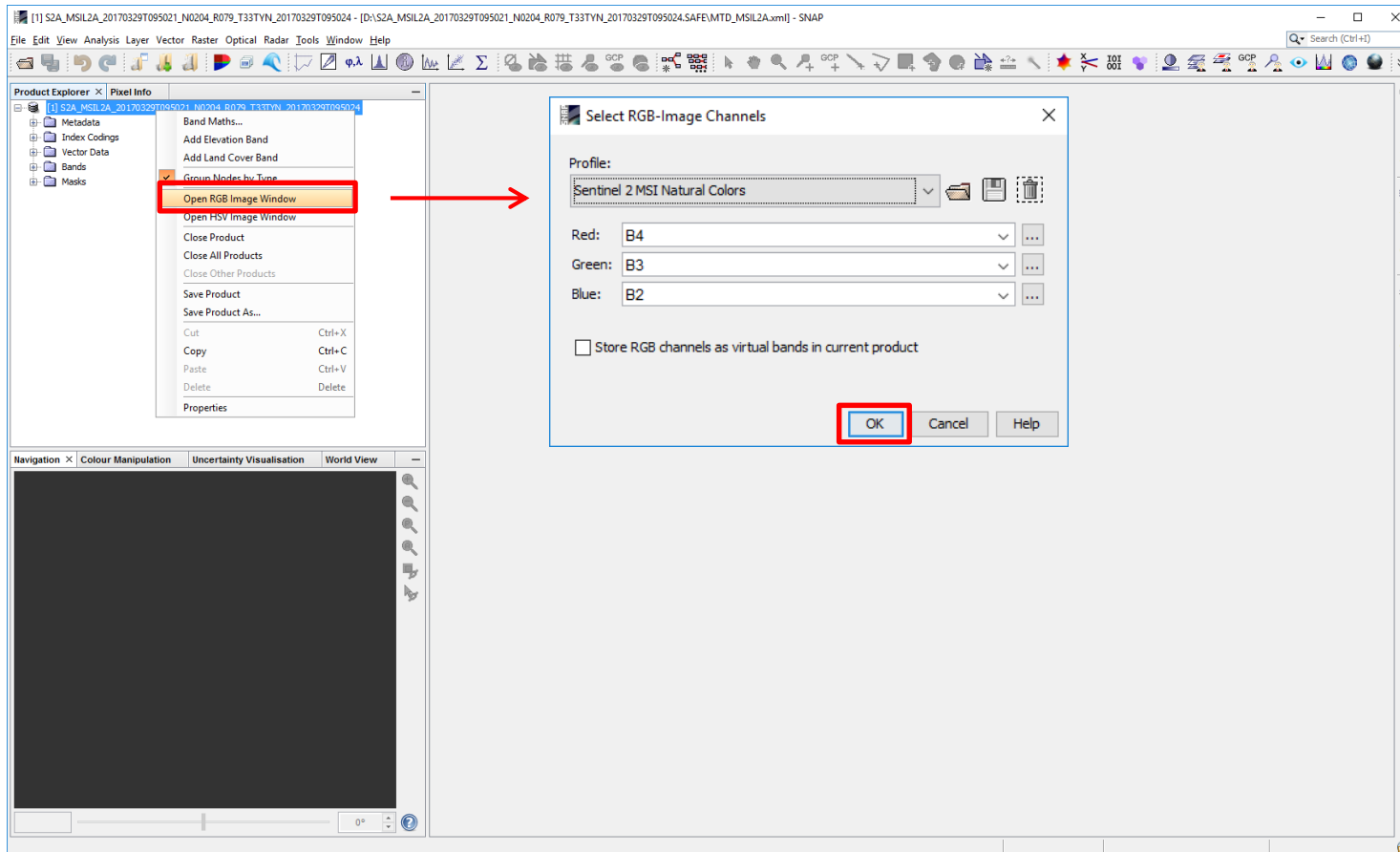
Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (sen2cor, SNAP)



In **SNAP** navigate to:
-> File
-> Import
-> Optical Sensors
-> Sentinel-2
-> **S2-MSI-L2A**

Navigate to processed Sentinel-2 main data folder, select „MTD_MSIL2A.xml” file and use „Import Product”.

Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (sen2cor, SNAP)

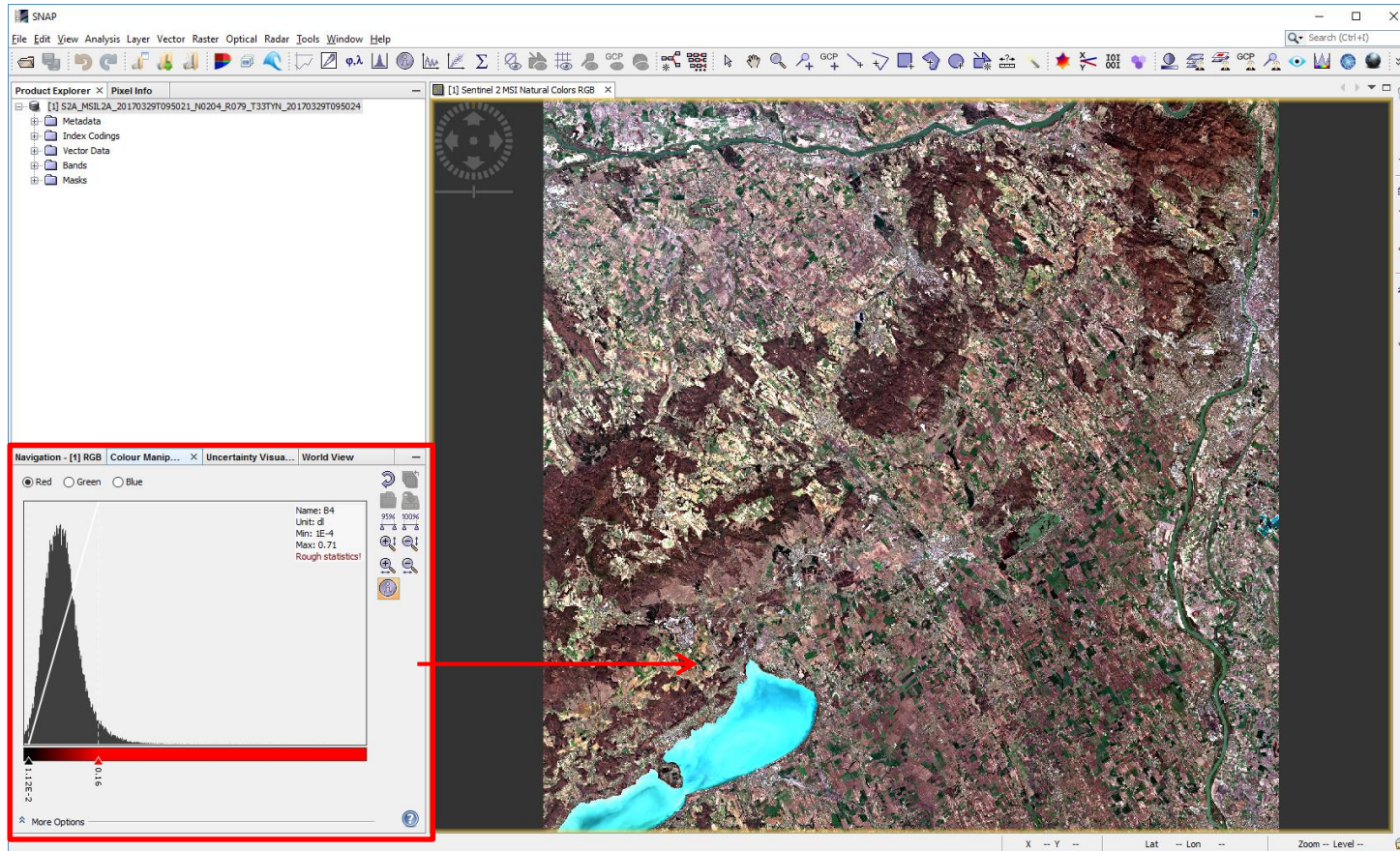


In „Product Explorer” window right-click on the newly added data and select „Open RGB Image Window” tool.

In „Select RGB-Image Channels” window select „B4” band as red, „B3” as Green and „B2” as Blue to create „Natural Colors” composition. Confirm with „OK”.

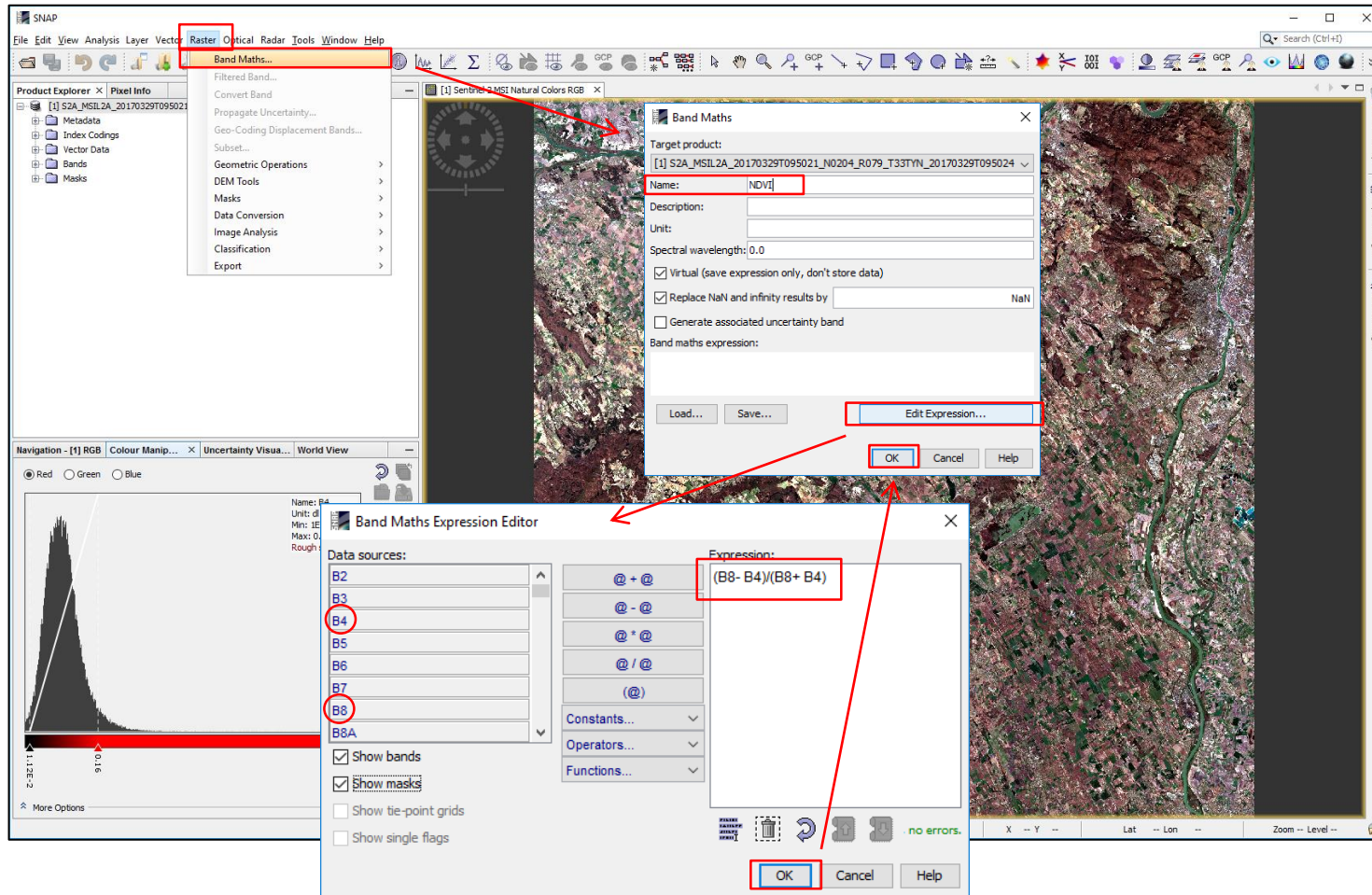
A new „Image Window” will appear.

Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (sen2cor, SNAP)



If needed, manipulate with sliders for Red, Green and Blue bands in the „Colour Manipulation” panel to stretch the histogram.

Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (sen2cor, SNAP)



The screenshot shows the SNAP software interface. The 'Raster' menu is open, and 'Band Maths...' is selected. The 'Band Maths' dialog box is open, with 'Name' set to 'NDVI' and the 'Edit Expression...' button highlighted. The 'Band Maths Expression Editor' dialog box is also open, showing the expression $(B8 - B4)/(B8 + B4)$ and the 'OK' button highlighted. Red arrows indicate the sequence of actions: from the 'Raster' menu to 'Band Maths...', then to the 'Edit Expression...' button, then to the 'Band Maths Expression Editor' dialog, and finally to the 'OK' button.

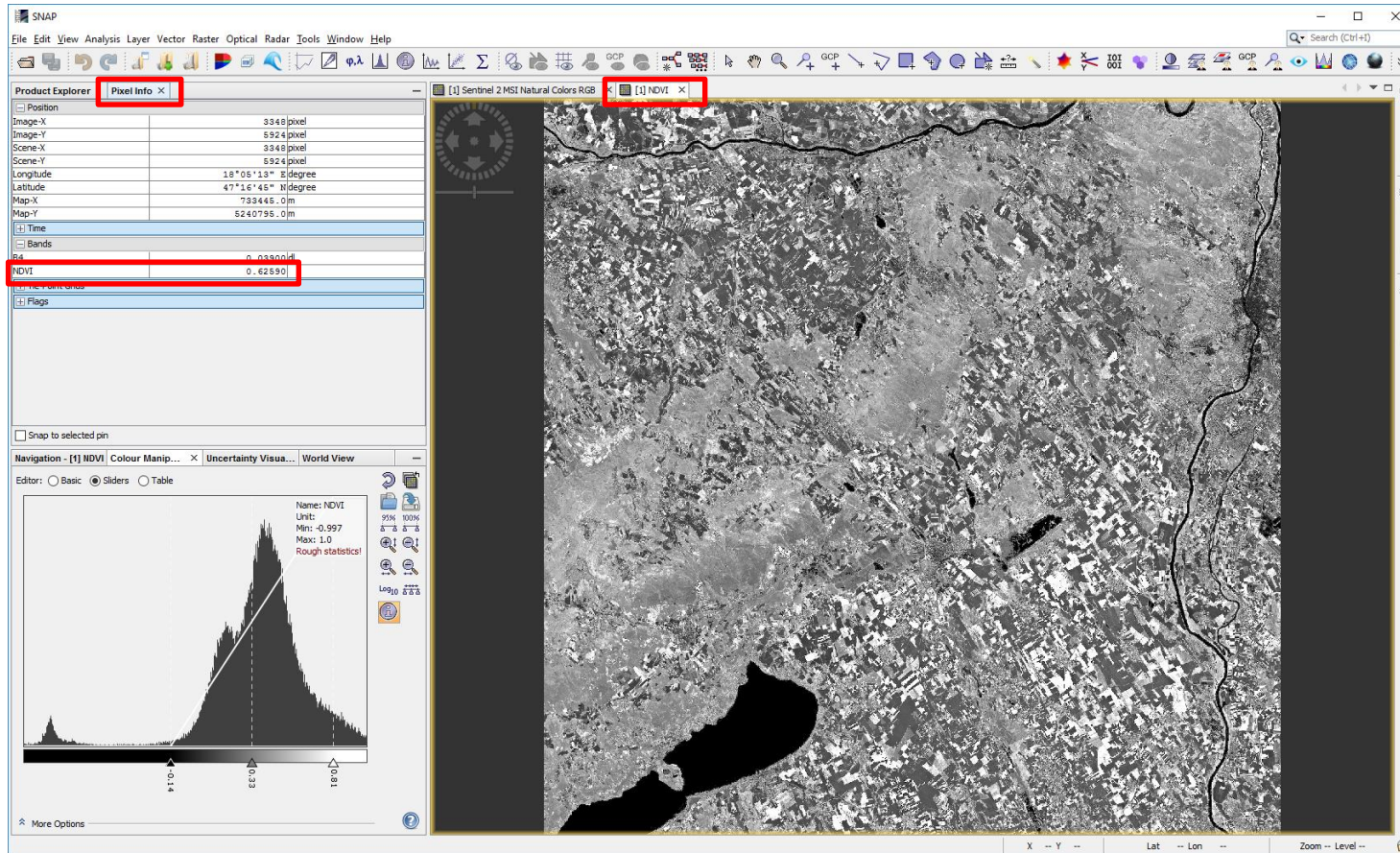
From menu „Raster” select „Band Maths...”.

In „Band Maths” dialog define name (e.g. „**NDVI**”) and select „Edit Expression...” button.

In „Band Maths Expression Editor” define expression as: „ **$(B8 - B4)/(B8 + B4)$** ” and press „OK”.

Confirm with „OK” in „Band Maths” window.

Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (sen2cor, SNAP)



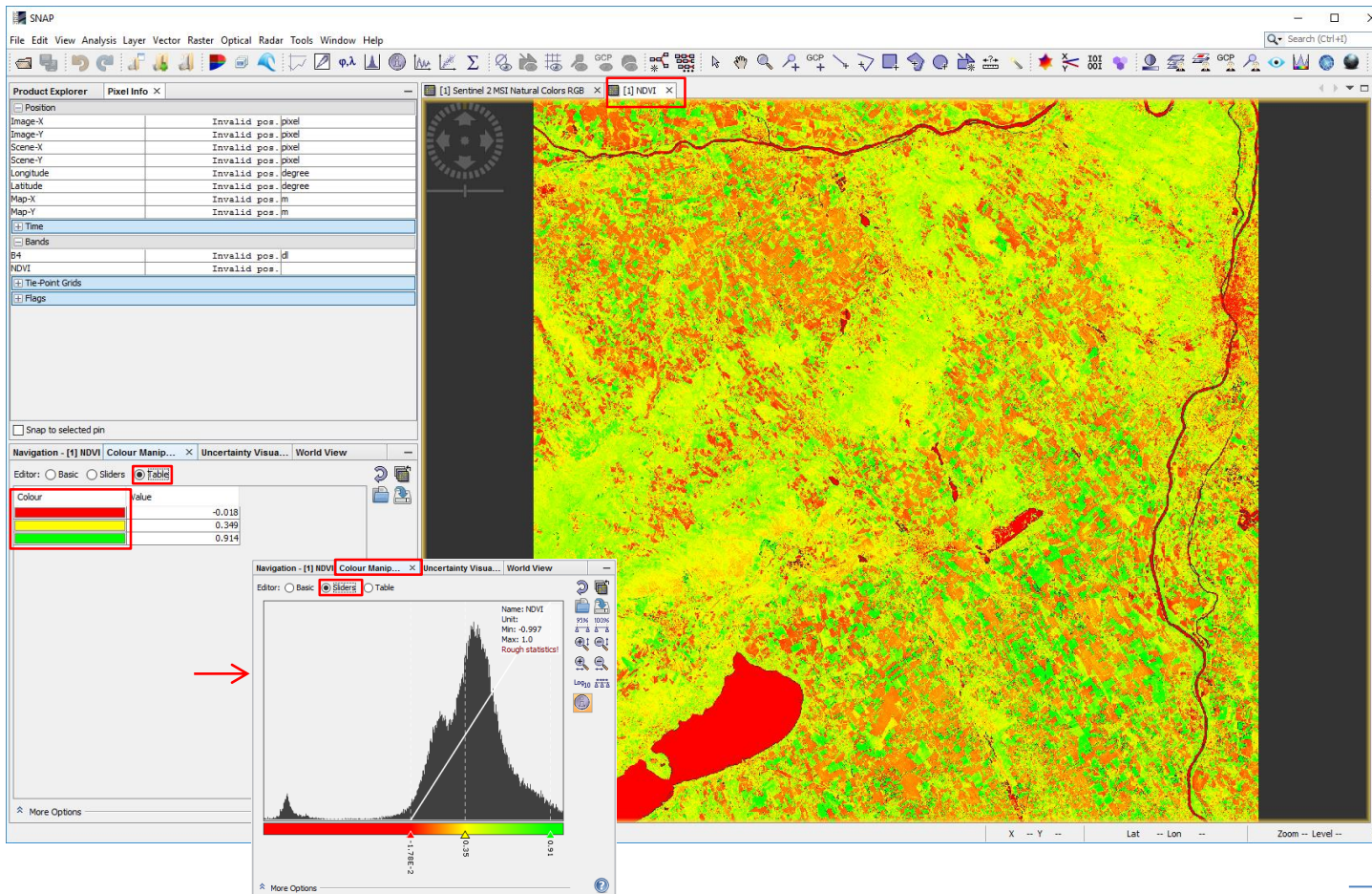
A new „Image Window” with calculated NDVI in grey scale will appear.

Switch to „Pixel Info” tab to inspect NDVI values updated from the current cursor position.

Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (sen2cor, SNAP)

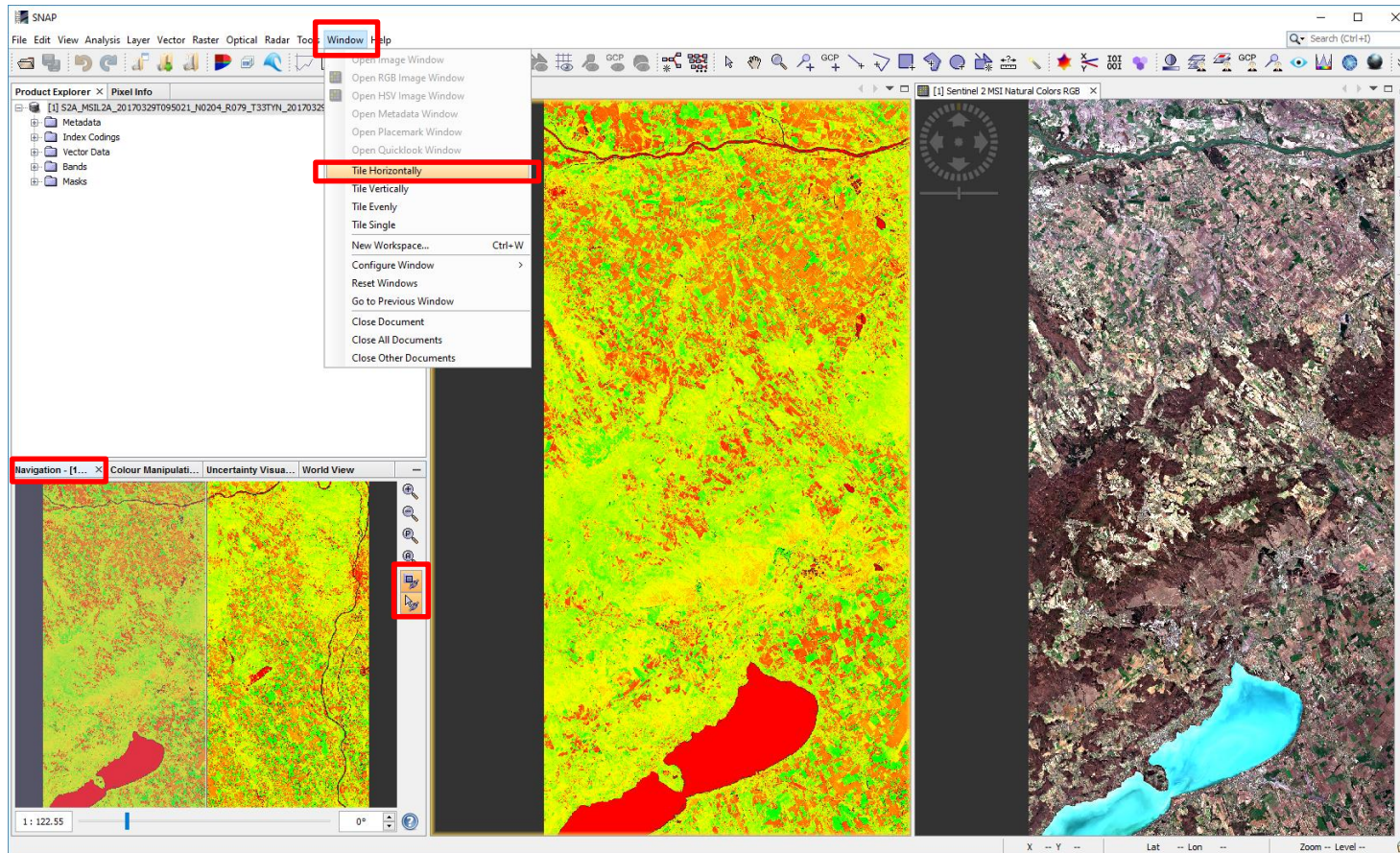
In “Colour Manipulation” panel switch to “Table” view and set red, yellow and green colors in “Colour” column.

Go to “Sliders” view and adjust histogram to improve clarity of the data.



The screenshot shows the SNAP software interface. The main window displays a Sentinel-2 MSI Natural Colors RGB image with an NDVI index overlay. The NDVI index is visualized using a color scale from red to green. The Colour Manipulation panel is open, showing the 'Table' view. The 'Table' view shows the 'Colour' column with values -0.018, 0.349, and 0.914. The 'Sliders' view is also visible, showing a histogram of the NDVI index with a red arrow pointing to the 'Sliders' view. The histogram shows a distribution of values from -1.78E-2 to 0.91. The 'Sliders' view is used to adjust the histogram to improve the clarity of the data.

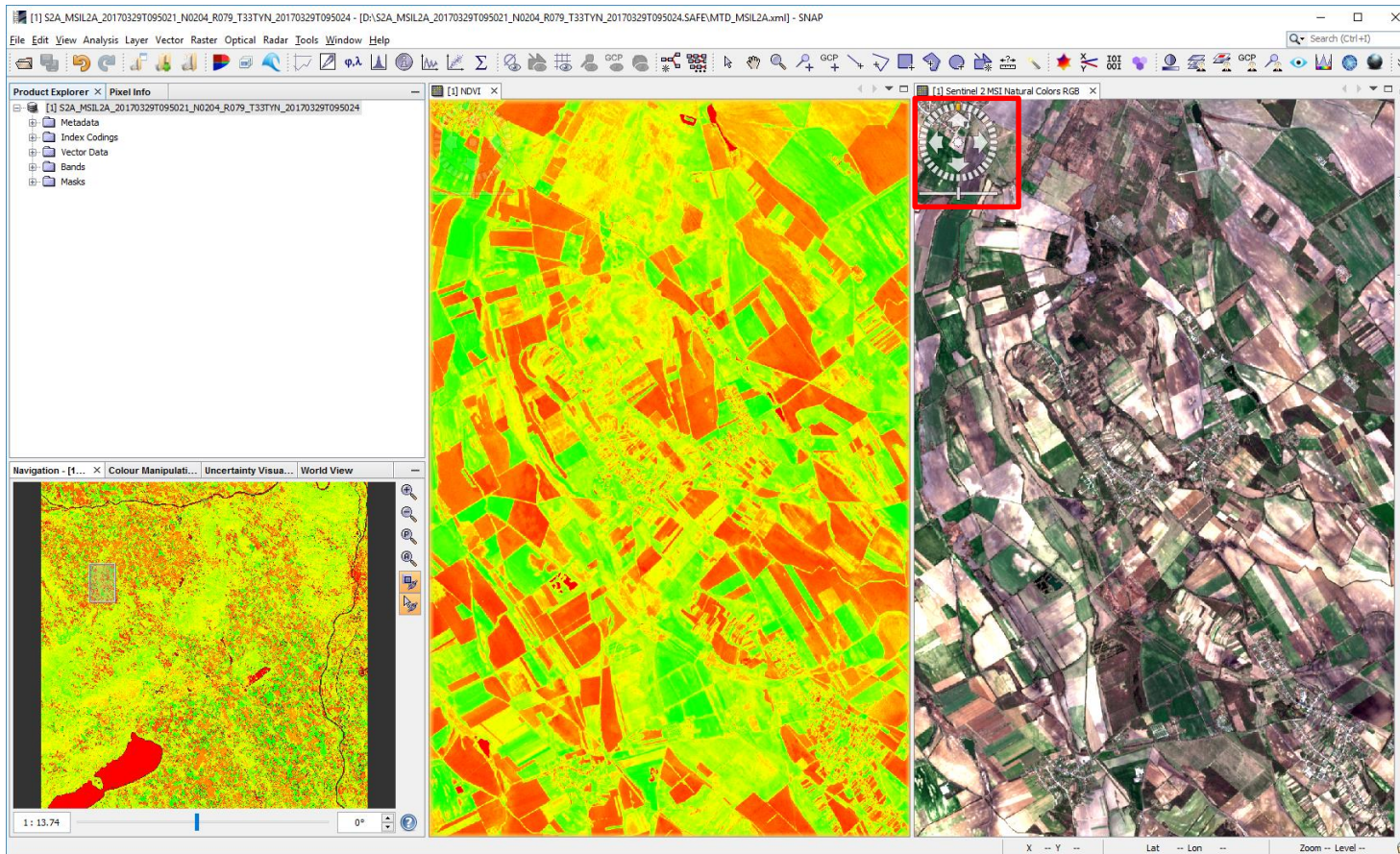
Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (sen2cor, SNAP)



In menu “Window” select “Tile Horizontally”.

In “Navigation” tab make sure that both synchronize views and cursor positions buttons are selected.

Exercise 2 – Sentinel-2 atmospheric correction and NDVI index (sen2cor, SNAP)



Use on-screen navigation buttons to inspect the data.

Thank you for your attention.

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