



Common borders. Common solutions.

«Επεξεργασία Δορυφορικών Εικόνων για την Αποτύπωση των Επιπτώσεων Πλημμυρικών Φαινομένων και Παράκτιας Διάβρωσης»

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Σεμινάριο εκπαίδευσης ΓΕΩΤΕΕ
παράρτημα Ανατολικής Μακεδονίας,

18 Φεβρουάριου 2022



CERTH
CENTRE FOR
RESEARCH & TECHNOLOGY
HELLAS



Περιεχόμενα



**Εισαγωγή στις
δορυφορικές
εικόνες**



**Βάσεις δεδομένων
δορυφορικών
εικόνων**



**Εργαλεία επεξεργασίας
δορυφορικών
εικόνων**



**Μεθοδολογία αξιολόγησης
πλημμυρικών φαινομένων**



**Μεθοδολογία
αξιολόγησης παράκτιας
διάβρωσης**

Βάσεις δορυφορικών εικόνων

Ελεύθερες Βάσεις Δορυφορικών Εικόνων

Earth Explorer



Landsat 4-5 ETM

- Spatial Res.: 30m
- 1984 – 2013
- Number of Bands: 7

Landsat 8

- Spatial Res.: 30m
- 2013 – Still active
- Number of Bands: 8
- Swath Width: 185 km

Copernicus Hub



Sentinel 2A & 2B

- Spatial Res.: 10, 20, 60m
- 2015 – Still active
- Number of Bands: 13
- Number of Sat.: 2
- Swath Width: 290 km

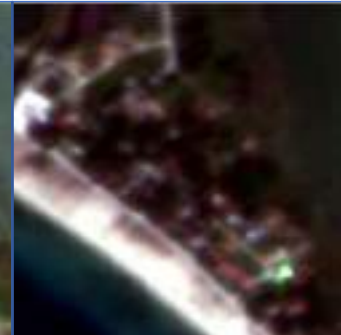
Planet Explorer



RapidEye

- Spatial Res.: 5 m
- 2009 – March 2020
- Number of Bands: 5
- Number of Sat.: 5
- Swath Width: 77 km

Planet Explorer



PlanetScope

- Spatial Res.: 3.6 m
- 2016 – Still active
- Number of Bands: 4
- Number of Sat.: more than 120 optical satellites
- Swath Width: 24.6 km x 16.4 km

Landsat 4-5 TM, Landsat 8 OLI and Sentinel 2 Band lists

Landsat 4-5 TM	Wavelength (micrometres)	Resolution (meters)
Band 1 (Blue)	0.45-0.52	30
Band 2 (Green)	0.52-0.60	30
Band 3 (Red)	0.63-0.69	30
Band 4 (NIR)	0.76-0.90	30
Band 5 (SWIR-1)	1.55-1.75	30
Band 6 (Thermal)	10.40-12.50	120 (30)
Band 7 (SWIR-2)	2.08-2.35	30

Landsat 8 OLI	Wavelength (micrometres)	Resolution (meters)
Band 1 (Coastal / Aerosol)	0.433 – 0.453	30
Band 2 (Blue)	0.450 – 0.512	30
Band 3 (Green)	0.525 – 0.600	30
Band 4 (Red)	0.630 – 0.680	30
Band 5 (Near Infrared)	0.845 – 0.885	30
Band 6 (SWIR)	1.560 – 1.660	120 (30)
Band 7 (SWIR)	2.100 – 2.300	30
Band 8 (Panchromatic)	0.500 – 0.680	15
Band 9 (Cirrus)	1.360 – 1.390	30

Sentinel 2	wavelength (micrometres)	Resolution (meters)
Band 1 (coastal aerosol)	0.44	60
Band 2 (Blue)	0.49	10
Band 3 (Green)	0.56	10
Band 4 (Red)	0.66	10
Band 5 (Red Edge 1)	0.70	20
Band 6 (Red Edge 2)	0.74	20
Band 7 (Red Edge 3)	0.78	20
Band 8 (NIR)	0.83	10
Band 8A (NIR Vapor)	0.86	20
Band 9 (Water Vapor)	0.94	60
Band 10 (SWIR-Cirrus)	1.37	60
Band 11 (SWIR-1)	1.61	20
Band 12 (SWIR-2)	2.20	20



Επιλογή κατάλληλης δορυφορικής εικόνας

Αξιολόγηση πλημμυρικών φαινομένων:

- ✓ Επιλογή εικόνας **πρίν** και **μετά** την εκδήλωση του φαινομένου
- ✓ Η **ευκρίνεια** της εικόνας (**νεφοκάλυψη**)
- ✓ Εικονες με συστή **γεω-αναφορά**

Αξιολόγηση παράκτιας διάβρωσης:

- ✓ Η **ευκρίνεια** της εικόνας (**νεφοκάλυψη**)
- ✓ Η σωστή **γεω-αναφορά** της εικόνας
- ✓ Η **εποχικότητα** - Όλες οι εικόνες που θα ανακτηθούν θα είναι κατά τη διάρκεια των θερινών μηνών

Ελεύθερες Βάσεις Δορυφορικών Εικόνων



<https://earthexplorer.usgs.gov/>



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



<https://www.planet.com/explorer/>

Earth Explorer

Εγγραφή στον Earth Explorer

<https://earthexplorer.usgs.gov/>



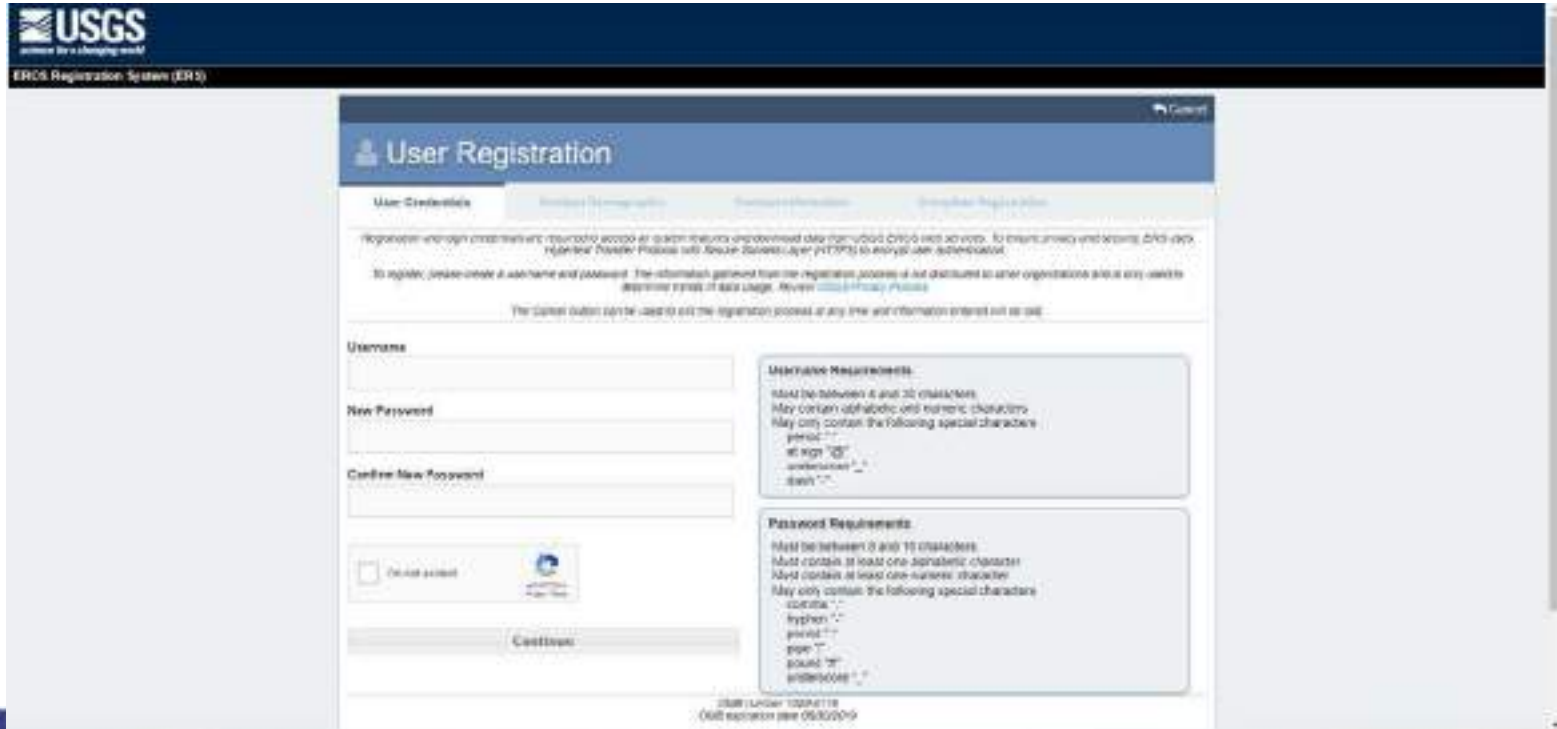
The screenshot shows the Earth Explorer website interface. At the top left is the USGS logo with the tagline 'science for a changing world' and 'EarthExplorer - Home'. Below this is a navigation bar with 'Home', 'Search Criteria', 'Data Sets', 'Advanced Criteria', and 'Results'. A search criteria form is visible on the left, with sections for '1. Enter Search Criteria', 'Coordinates', and 'Date Range'. The 'Coordinates' section has a message 'No coordinates selected.' and buttons for 'Use Map', 'Add Coordinates', and 'Clear Coordinates'. The 'Date Range' section has input fields for 'Search from' and 'to' and a 'Search months' dropdown. On the right, a 'Search Criteria Summary' section shows a map of the world with a search area highlighted. A red box highlights the 'Login - Register' button in the top right corner. A grey box in the top right corner contains the text 'User: userduth' and 'Pass: admin2018'.

User: userduth
Pass: admin2018

Login - Register



Εγγραφή στον Earth Explorer



USGS
United States Geological Survey
EROS Registration System (ERS)

User Registration

User Credentials | Personal Information | Contact Information | Organization Registration

Registration and login credentials are required to access all data features and processed data from USGS EROS web services. To ensure security and privacy, EROS uses Microsoft Passport. Passport uses Secure Sockets Layer (SSL) to encrypt user information.


To register, please create a username and password. The information generated from the registration process is not distributed to other organizations and is only used for your personal use of data usage. Review [USGS Privacy Policy](#).

The Cancel button can be used to exit the registration process at any time and information entered will be lost.

Username

New Password

Confirm New Password

Default account 

Continue

Username Requirements:
Must be between 6 and 30 characters
May contain alphabetic and numeric characters
May only contain the following special characters:
period "."
at sign "@"
underscore "_"
dash "-"

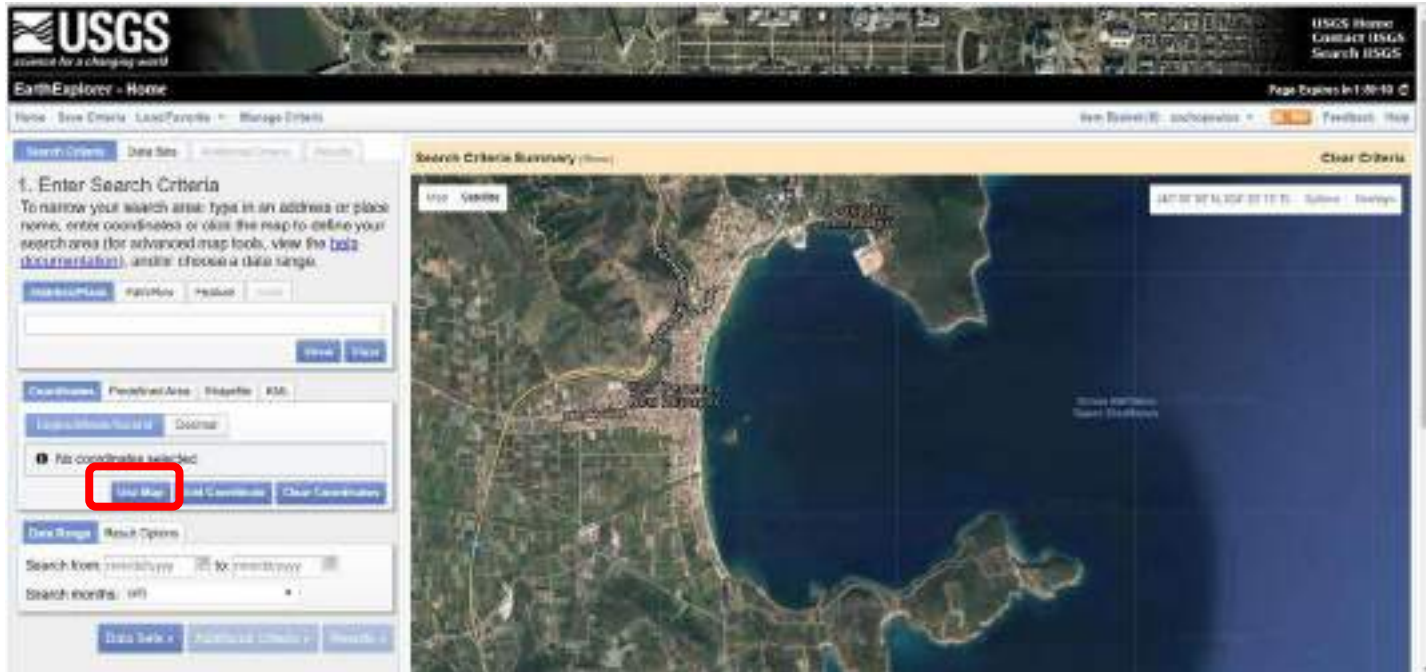
Password Requirements:
Must be between 8 and 16 characters
Must contain at least one alphabetic character
Must contain at least one numeric character
May only contain the following special characters:
comma ","
hyphen "-"
period "."
pipe "|"
underscore "_"
asterisk "*"
colon ":"

2008 (under 1000x118)
Old version: see 05/02/09



Περιήγηση στον Earth Explorer

Βήμα 1: Επιλογή τοποθεσίας

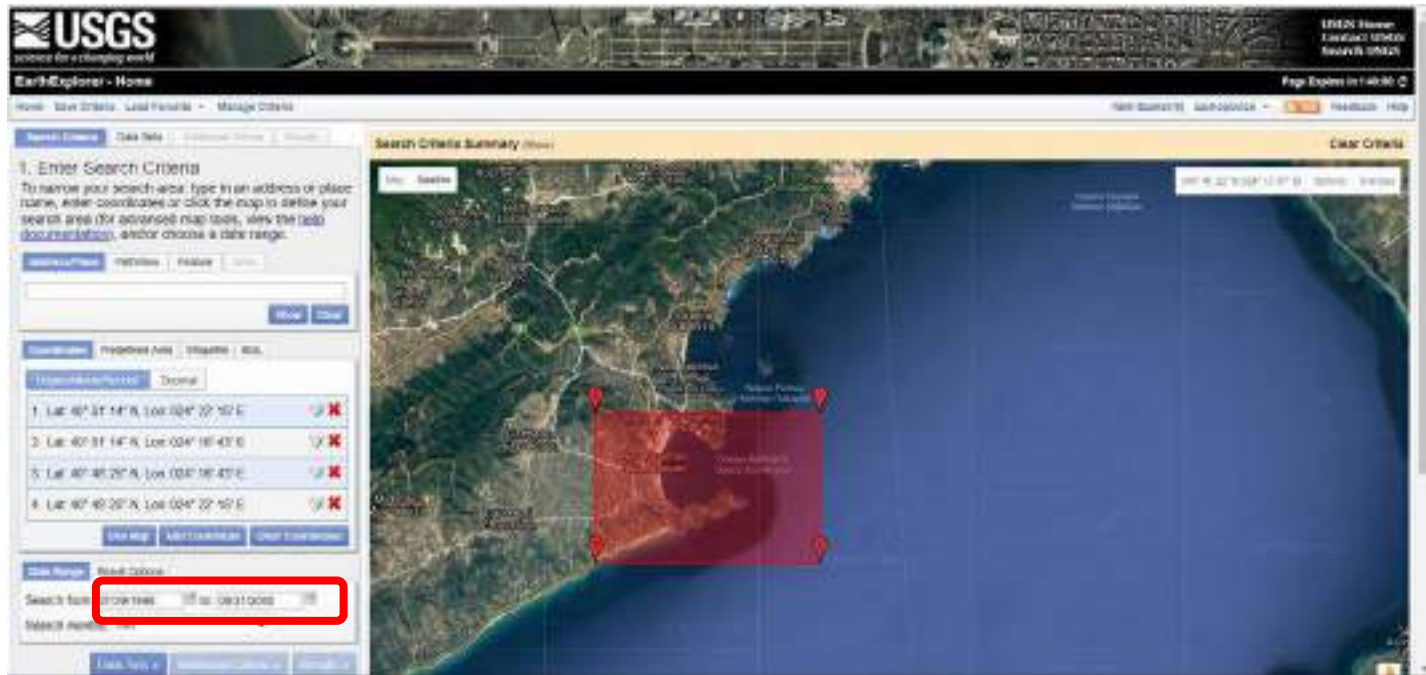


The screenshot displays the USGS Earth Explorer interface. The top navigation bar includes the USGS logo and the text "Earth Explorer - Home". Below the navigation bar, there are tabs for "Search Criteria", "Data Sets", "Advanced Search", and "Results". The main content area is titled "1. Enter Search Criteria" and provides instructions on how to narrow the search area. A red box highlights the "Use Map" button, which is used to select a search area on the map. The map shows a coastal area with a bay and surrounding land. The search criteria summary shows "Use Map" as the selected option. The interface also includes a "Data Set" section with a search box and a "Data Set" button.



Περιήγηση στον Earth Explorer

Βήμα 2: Επιλογή χρονικής διάρκειας



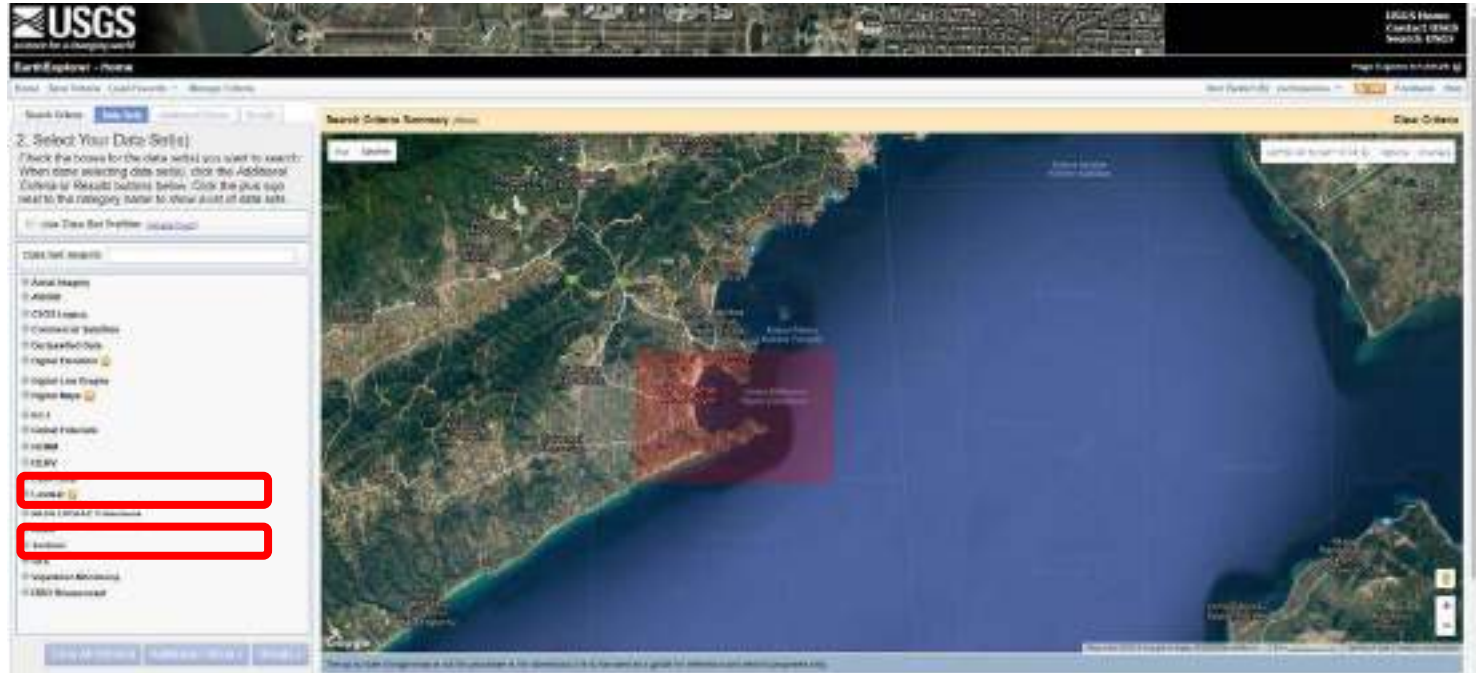
The screenshot displays the USGS Earth Explorer interface. The main search area is titled "1. Enter Search Criteria". Below this, there are several sections for defining search parameters:

- Coordinates:** A list of four coordinate pairs is shown, each with a "Clear" button. The first pair is highlighted in blue: 1. Lat: 40° 31' 41" N, Lon: 004° 22' 50" E.
- Date Range:** A section with a "Select Criteria" button. Below it, a "Search from" field is highlighted with a red rectangle, containing the text "from 1981" and a "to" field containing "to: 08/31/2002".

The right side of the interface shows a "Search Criteria Summary" section with a "Clear Criteria" button. Below this is a satellite map of a coastal region with a red rectangular search area overlaid on it.

Περιήγηση στον Earth Explorer

Βήμα 3: Επιλογή Data Set



Επιλογή Δορυφορικών εικόνων Landsat

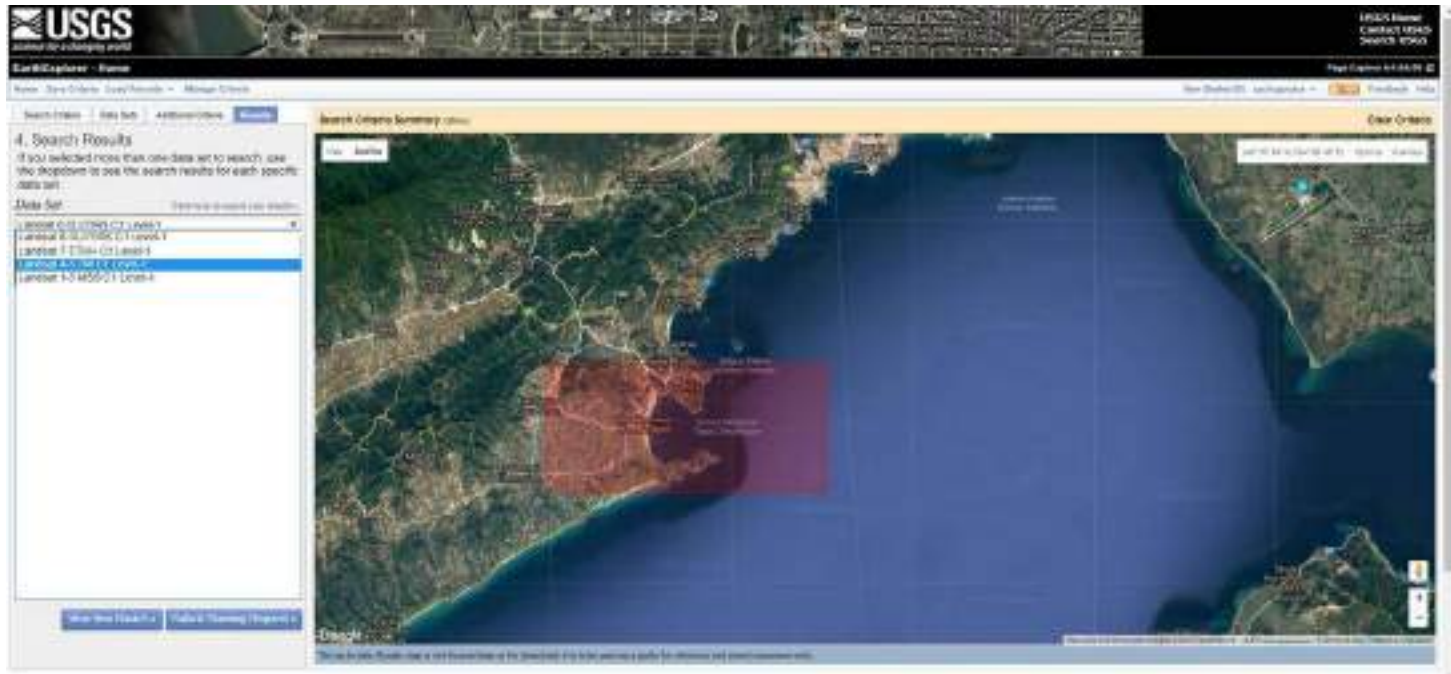
Βήμα 4: Επιλογή Landsat Data Set



The screenshot shows the USGS Earth Explorer interface. The main heading is "2. Select Your Data Set(s)". Below this, there are instructions and a list of data sets. A red box highlights the "Landsat Collection 1 Level-1" option, which includes sub-options for "Landsat 5 TM", "Landsat 7 ETM+", "Landsat 8 TIRS", and "Landsat 9 TIRS". A red arrow points to this highlighted section. The background of the interface shows a satellite map of a coastal region.

Επιλογή Δορυφορικών εικόνων Landsat

Βήμα 5: Επιλογή Landsat Data Set



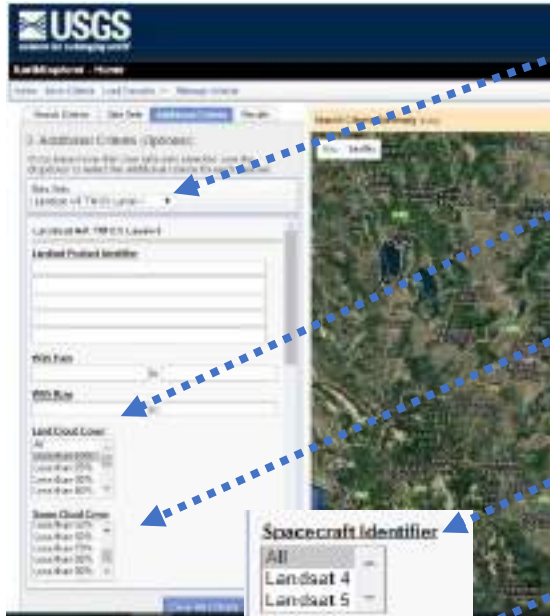
The screenshot displays the USGS Earth Explorer web application. The top navigation bar includes the USGS logo and the text "imagine the world". The main interface is divided into a left sidebar and a central map area. The sidebar contains a "Search Results" section with the following text: "If you selected more than one data set to search, use the dropdown to see the search results for each specific data set." Below this, a "Data Set" dropdown menu is open, showing a list of search results:

- Landsat 4-5 (L4-5) L4-5
- Landsat 7 (L7) L7
- Landsat 8 (L8) L8
- Landsat 9 (L9) L9
- Landsat 10 (L10) L10

The central map area shows a satellite image of a coastal region with a red rectangular selection box overlaid on a landmass. The map includes a search bar at the top right and a "Data Set" dropdown menu. The bottom of the interface features a footer with the text: "The USGS Earth Explorer is not responsible for the accuracy of the displayed data. Use the search results for reference and visualization only."

Επιλογή Δορυφορικών εικόνων Landsat

Βήμα 6: Επιλογή επιπλέον κριτηρίων



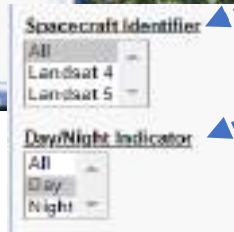
1. Επιλογή data set

2. Νεφοκάλυψη στην χερσαία περιοχή

3. Νεφοκάλυψη σε όλη την εικόνα

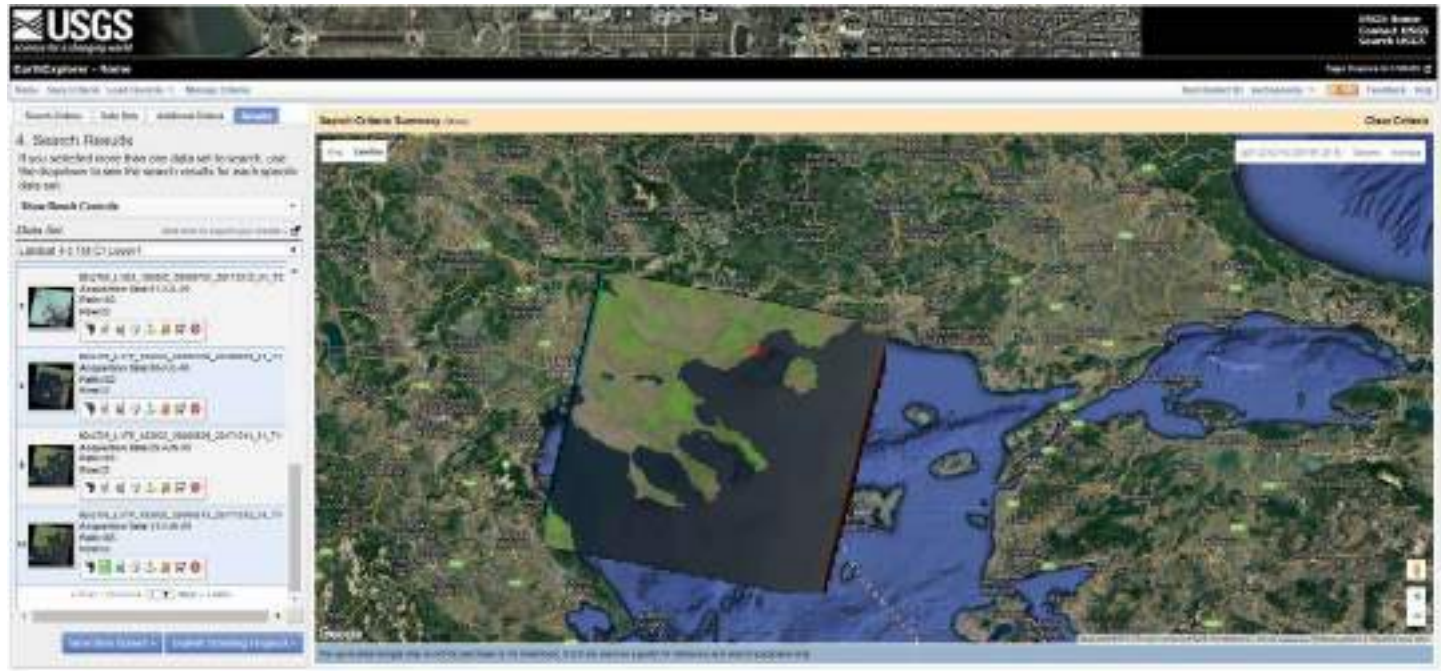
4. Επιλογή δορυφόρου

5. Επιλογή μέρας ή νύχτας



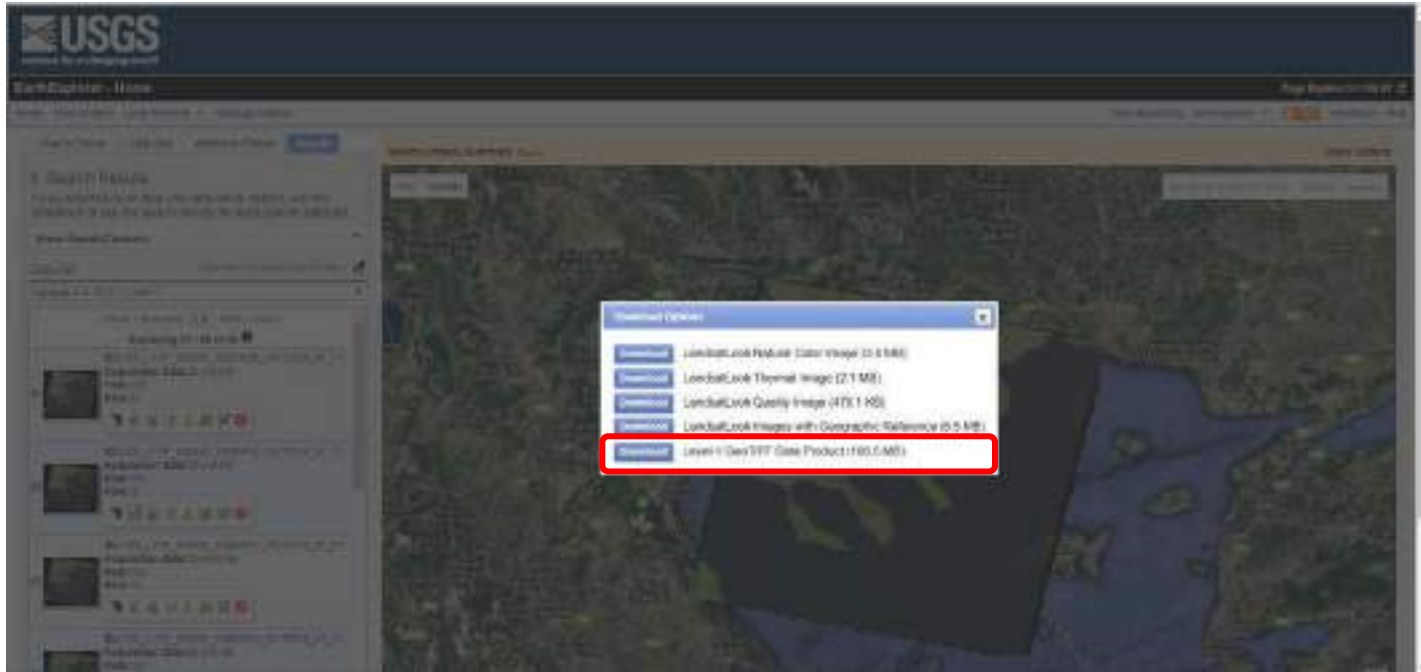
Λήψη Δορυφορικών εικόνων

Βήμα 7: Επιλογή δορυφορικής εικόνας



Λήψη Δορυφορικών εικόνων

Βήμα 8: Λήψη εικόνας Landsat



Ανάλυση ληφθέντος αρχείου Landsat 4-5 TM


























Βήμα 9: Άνοιγμα ληφθέντος αρχείου

LT05_L1TP_183032_19870610_20170212_01_T1.zip 15-Oct-18 12:49 PM WinRAR ZIP archive 4,530 KB



LT05_L1TP_183032_19870610_20170212_01_T1 15-Oct-18 1:13 PM File folder



													
LT05_L1TP_1830 32_19870610_20 170212_01_T1.tif	LT05_L1TP_1830 32_19870610_20 170212_01_T1_A NG.txt	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 1.TIF	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 1.TIF.aux.xml	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 2.TIF	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 2.TIF.aux.xml	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 3.TIF	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 3.TIF.aux.xml	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 4.TIF	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 4.TIF.aux.xml	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 5.TIF	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 6.TIF	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 6.TIF.aux.xml	
										 README.GTF			
LT05_L1TP_1830 32_19870610_20 170212_01_T1_B 7.TIF	LT05_L1TP_1830 32_19870610_20 170212_01_T1_B QA.TIF	LT05_L1TP_1830 32_19870610_20 170212_01_T1_G CP.txt	LT05_L1TP_1830 32_19870610_20 170212_01_T1_ MTL.txt	LT05_L1TP_1830 32_19870610_20 170212_01_T1_ QB.tif	LT05_L1TP_1830 32_19870610_20 170212_01_T1_T IR.tif	LT05_L1TP_1830 32_19870610_20 170212_01_T1_T IR.tif.aux.xml	LT05_L1TP_1830 32_19870610_20 170212_01_T1_V ER.jpg	LT05_L1TP_1830 32_19870610_20 170212_01_T1_V ER.txt					

Copernicus Open Access Hub

Είσοδος στο Copernicus Open Access Hub

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



The screenshot shows the Copernicus Open Access Hub website. The header includes the Copernicus logo, the text "Copernicus Open Access Hub", and the ESA logo. The main content area is divided into several sections:

- Welcome to the Copernicus Open Access Hub:** A text block explaining that the hub provides free and open access to Sentinel-1, Sentinel-2, Sentinel-3, and Sentinel-6 data products, starting from the 3rd Data Contracting Review (DCR).
- Reports & Stats:** A section showing statistics for the last 24h, including 38,892 articles published and 338,550 downloads.
- Resources:** A section with links to "Data Open Access Portal" and "Copernicus Open Access Portal".
- Latest News:** A section with a search bar and a "Latest News" link.
- Navigation:** A row of four buttons labeled "Open Hub", "AFC Hub", "S-DP Pre-Op", and "FOO Hub".



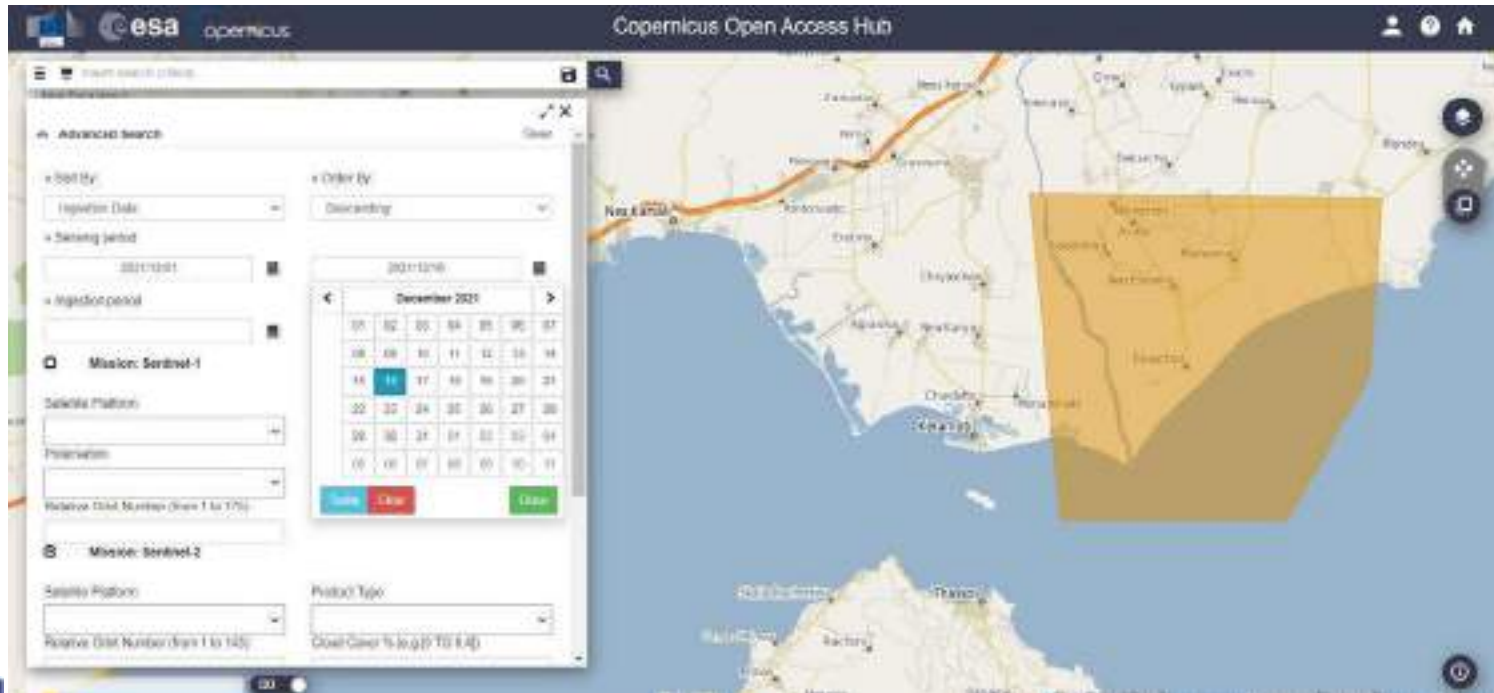
Εγγραφή στο Copernicus Open Access Hub



Ορισμός της περιοχής ενδιαφέροντος



Περιήγηση στο Copernicus Open Access Hub



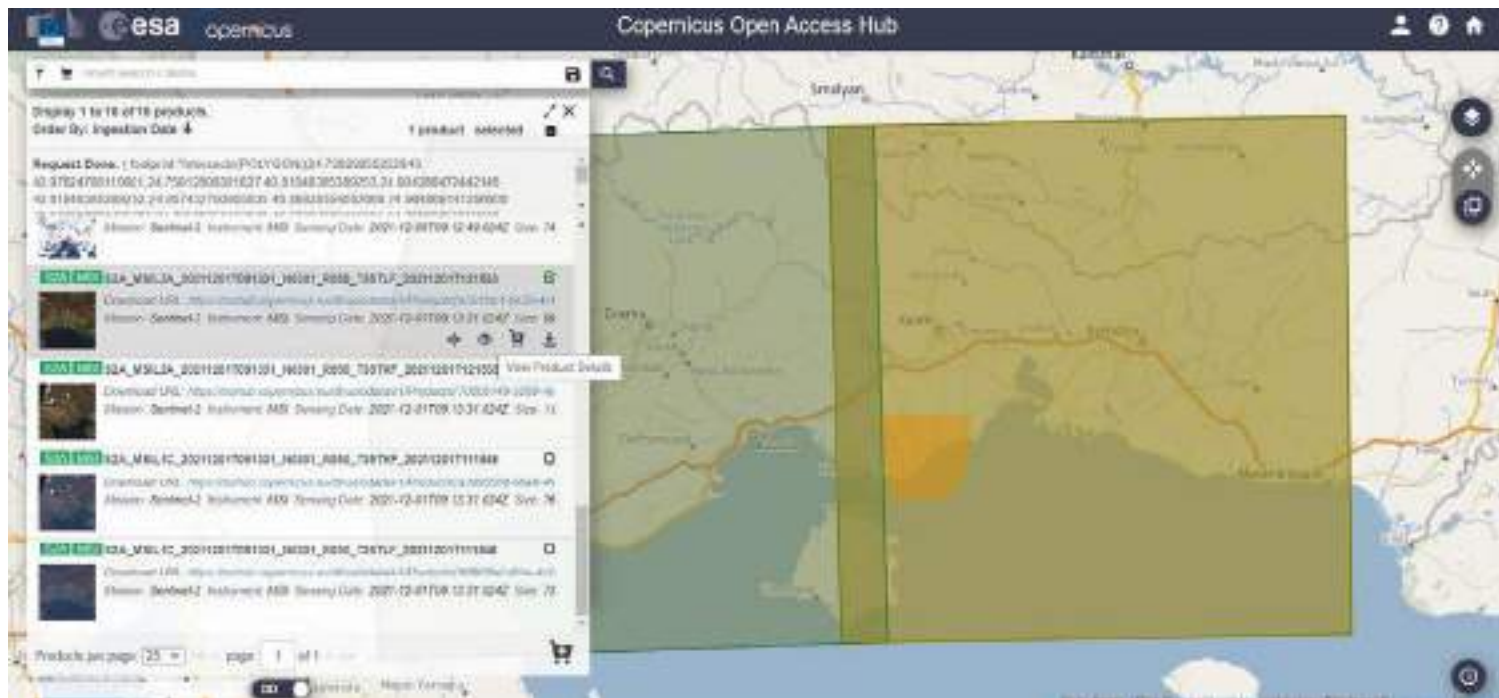
The screenshot displays the Copernicus Open Access Hub interface. On the left, an 'Advanced Search' panel is visible with the following options:

- Sort By:** Register Date
- Order By:** Descending
- Search period:** 2017-2018
- Registration period:** 2017-2018
- Mission:** Sentinel-1
- Satellite Platform:** (empty)
- Polarization:** (empty)
- Relative Orbit Number (from 1 to 175):** (empty)
- Mission:** Sentinel-2
- Satellite Platform:** (empty)
- Product Type:** (empty)
- Relative Orbit Number (from 1 to 143):** (empty)
- Cloud Cover % (up to 8.4):** (empty)

The main area shows a map of the Aegean Sea region with a large orange shaded area indicating a search region. The map includes labels for cities like Izmir, Bursa, and Çeşme, and islands like Rhodes and Kos. The interface also features a calendar for December 2017, with the 16th highlighted.



Επιλογή δορυφορικής εικόνας



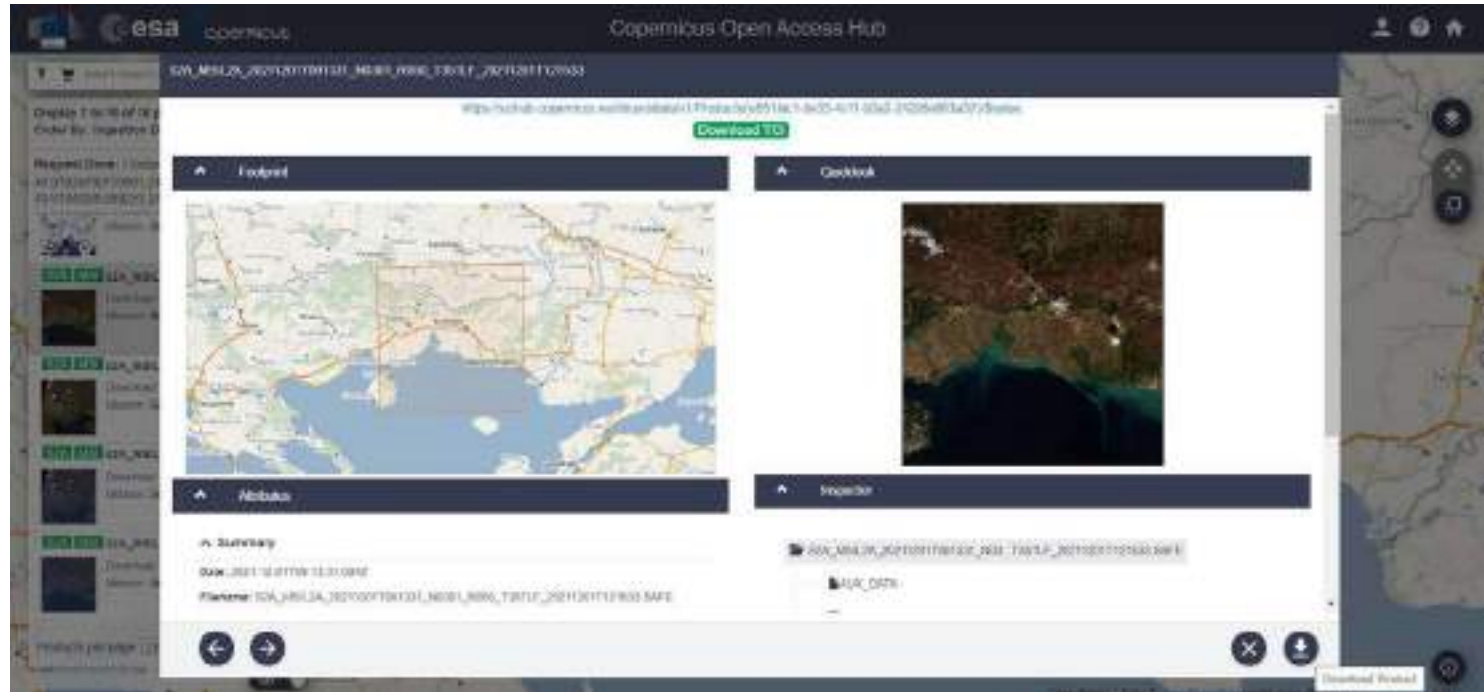
The screenshot displays the Copernicus Open Access Hub interface. On the left, a list of satellite products is shown, including details such as Request Date, Product ID, Mission, Instrument, and Acquired Date. The products listed are:

- Request Date: 2021-12-01 10:00:00, Product ID: S2A_MSI_L1A_20211201T001001_N001_R080_T08T00_20211201T001001, Mission: Sentinel-2, Instrument: MSI, Acquired Date: 2021-12-01T00:10:01.000Z, Size: 74
- Request Date: 2021-12-01 10:00:00, Product ID: S2A_MSI_L1A_20211201T001001_N001_R080_T08T00_20211201T001001, Mission: Sentinel-2, Instrument: MSI, Acquired Date: 2021-12-01T00:10:01.000Z, Size: 74
- Request Date: 2021-12-01 10:00:00, Product ID: S2A_MSI_L1A_20211201T001001_N001_R080_T08T00_20211201T001001, Mission: Sentinel-2, Instrument: MSI, Acquired Date: 2021-12-01T00:10:01.000Z, Size: 74
- Request Date: 2021-12-01 10:00:00, Product ID: S2A_MSI_L1A_20211201T001001_N001_R080_T08T00_20211201T001001, Mission: Sentinel-2, Instrument: MSI, Acquired Date: 2021-12-01T00:10:01.000Z, Size: 74
- Request Date: 2021-12-01 10:00:00, Product ID: S2A_MSI_L1A_20211201T001001_N001_R080_T08T00_20211201T001001, Mission: Sentinel-2, Instrument: MSI, Acquired Date: 2021-12-01T00:10:01.000Z, Size: 74

The right side of the interface shows a map of the region, with a large yellow rectangular area highlighting a specific geographic location. The map includes labels for 'Smyrni' and 'Dionysia'.




Λήψη δορυφορικής εικόνας




Ανάλυση ληφθέντος αρχείου Sentinel 2

Βήμα 9: Άνοιγμα ληφθέντος αρχείου








 S2A_MSIL2A_20211201T091331_N0301_R050_T35TLF_20211201T121533.zip



 S2A_MSIL2A_20211201T091331_N0301_R050_T35TLF_20211201T121533



File Explorer path: GRANULE > L2A_T35TLF_A033652_20211201T091334 > IMG_DATA > R10m

Name	Date modified	Type	Size
 T35TLF_20211201T091331_AOT_10m.jp2	12/1/2021 2:44 PM	JP2 File	938 KB
 T35TLF_20211201T091331_B02_10m.jp2	12/1/2021 2:45 PM	JP2 File	108,435 KB
 T35TLF_20211201T091331_B03_10m.jp2	12/1/2021 2:45 PM	JP2 File	109,704 KB
 T35TLF_20211201T091331_B04_10m.jp2	12/1/2021 2:45 PM	JP2 File	109,076 KB
 T35TLF_20211201T091331_B08_10m.jp2	12/1/2021 2:45 PM	JP2 File	108,764 KB
 T35TLF_20211201T091331_TCI_10m.jp2	12/1/2021 2:45 PM	JP2 File	130,893 KB
 T35TLF_20211201T091331_WVP_10m.jp2	12/1/2021 2:44 PM	JP2 File	57,191 KB

Λήψη και εγκατάσταση του QGIS

Λήψη και εγκατάσταση QGIS

<https://www.qgis.org/en/site/>



The screenshot shows the QGIS website homepage. At the top, there is a navigation bar with the QGIS logo, version 3.22.3, and the text "1.98.16 LTR". The main heading reads "QGIS A Free and Open Source Geographic Information System". A central banner features a green map background with the text "QGIS 3.22 Białowieża has been released!". Below the banner, there are two buttons: "Download Now" and "Support QGIS". The "Download Now" button is highlighted in green. At the bottom, there is a "PROJECT NEWS" section.

QGIS 3.22.3
1.98.16 LTR

QGIS
A Free and Open Source Geographic Information System

QGIS 3.22 Białowieża
has been released!

Download Now

Support QGIS

Version 3.22.3
Version 1.98.16 LTR

PROJECT NEWS

QGIS is licensed under the GNU GPL license.
The only packaging 32-bit OS is Windows (32-bit).
Web site and documentation: <http://qgis.org> and <http://docs.qgis.org>

Query, edit, visualize, analyze and publish geospatial information on Windows, Mac, Linux, BSD and mobile devices.

For your system, select a package to download (or to download manually).

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Version 3.22.3
Version 1.98.16 LTR

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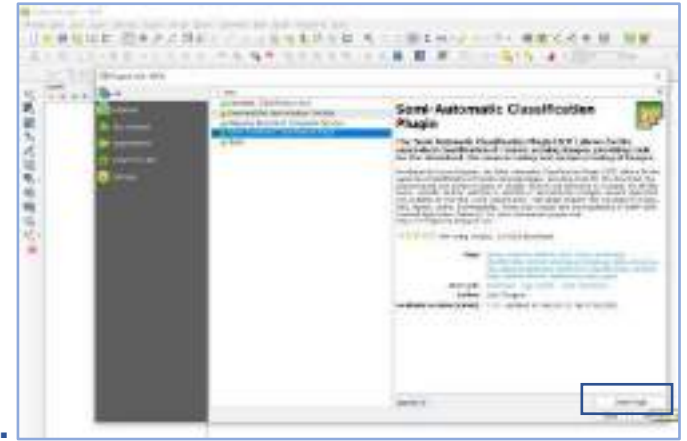
Semi Automatic Classification plug-in

Εγκατάσταση στο QGIS του SCP tool

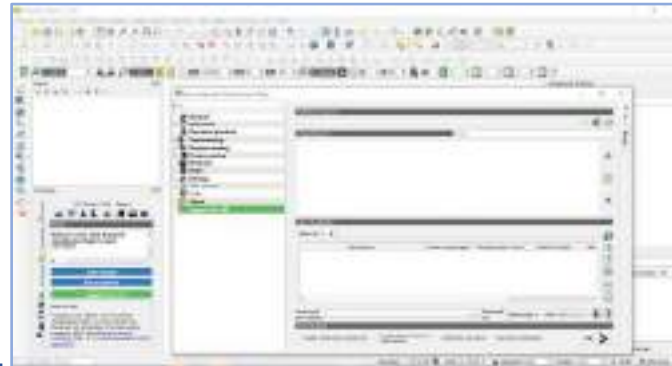
1.



2.



3.



Μεθοδολογία για πλημμύρες

Βήματα υπολογισμού πλημμυρισμένων εκτάσεων

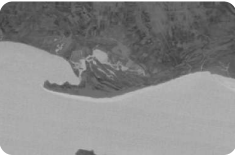
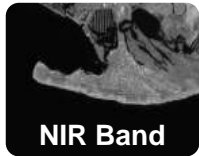
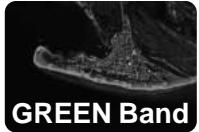
QGIS

NDWI

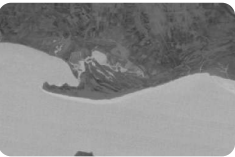
Semi-Automatic Classification Plugin
version 7

$(NDWI_Class_{\text{πριν}} - NDWI_Class_{\text{μετά}})$

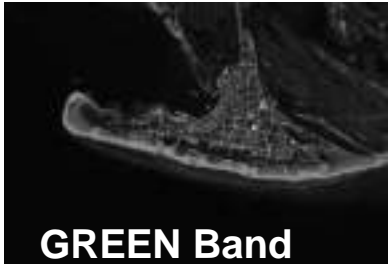
01/12/2021



16/12/2021



Περιγραφή Μεθοδολογίας

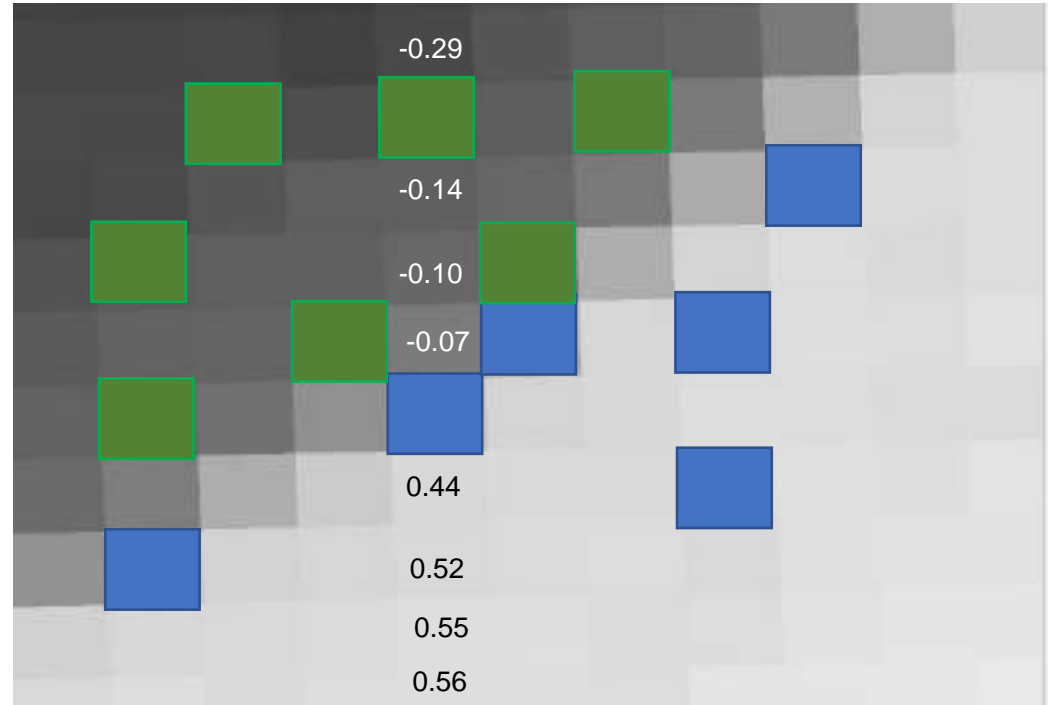


$$NDWI = \frac{(GREEN - NIR)}{(GREEN + NIR)}$$



Περιγραφή Μεθοδολογίας

Εκπαίδευση Αλγορίθμου



Περιγραφή Μεθοδολογίας

Ταξινόμηση δορυφορικής εικόνας

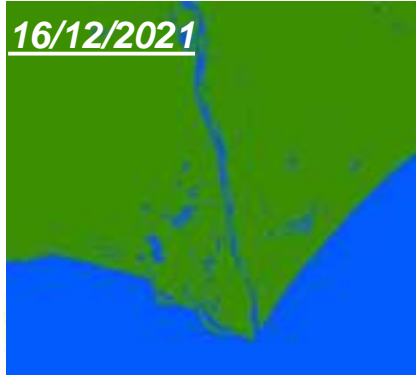


Περιγραφή Μεθοδολογίας

01/12/2021



16/12/2021

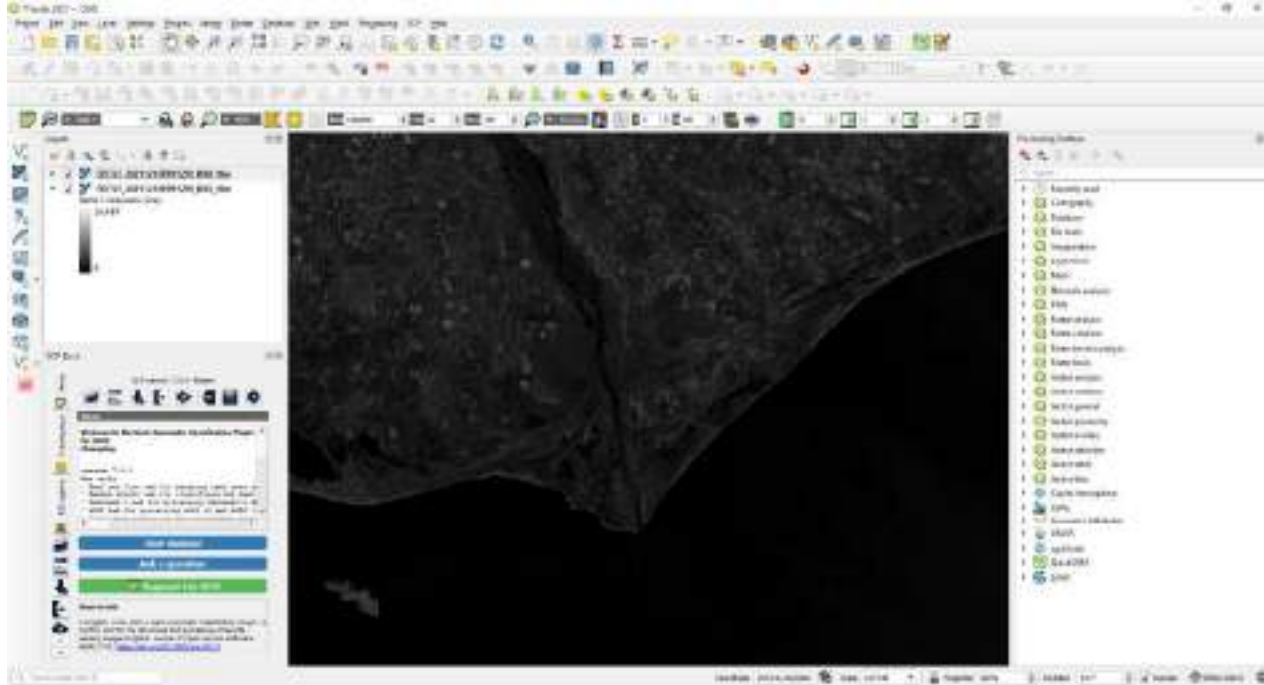


$$(NDWI_Class_{\text{πριν}} - NDWI_Class_{\text{μετά}})$$

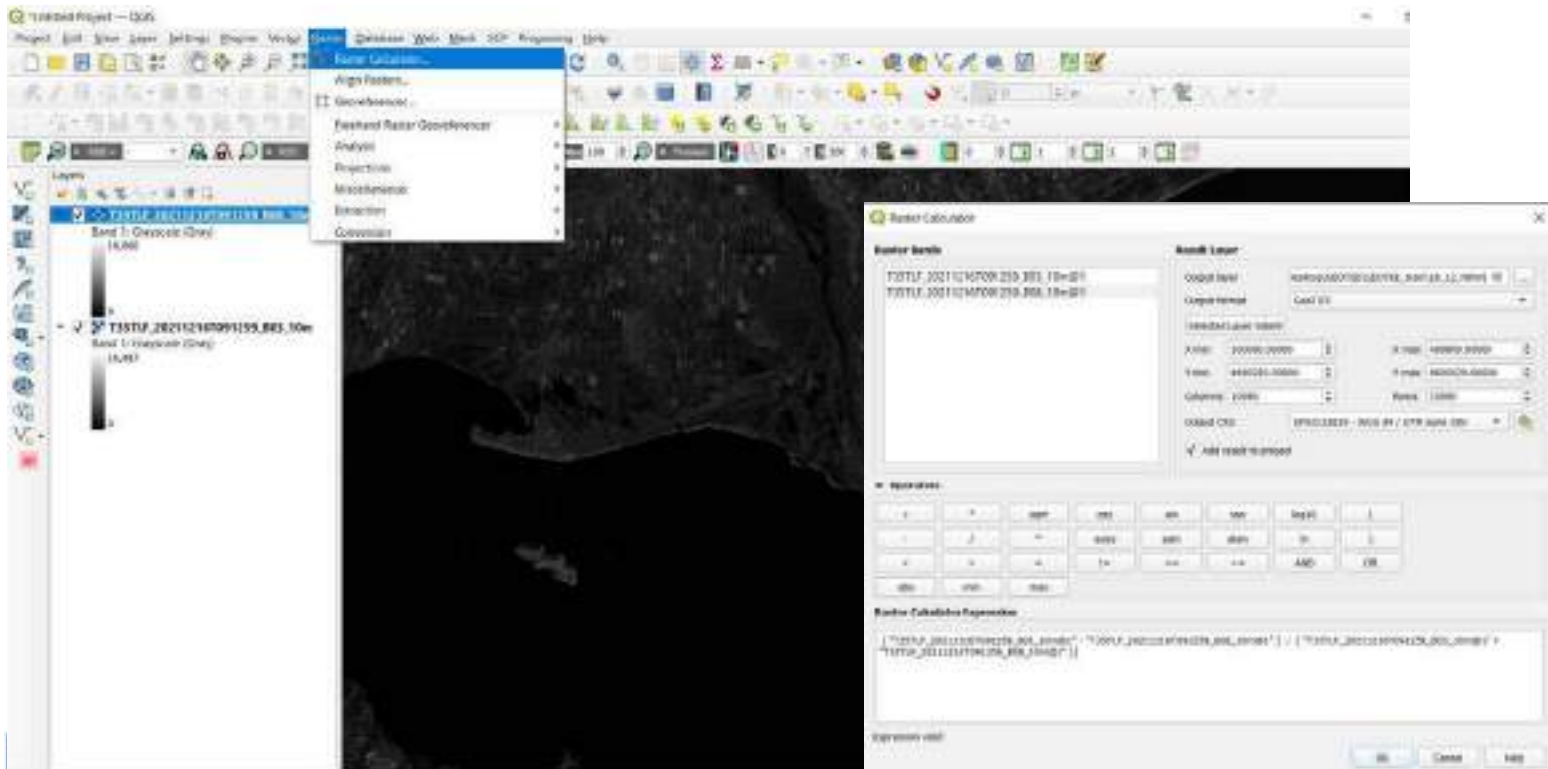


Πρακτική εφαρμογή της Μεθοδολογίας

Βηματική αποτύπωση της μεθοδολογίας



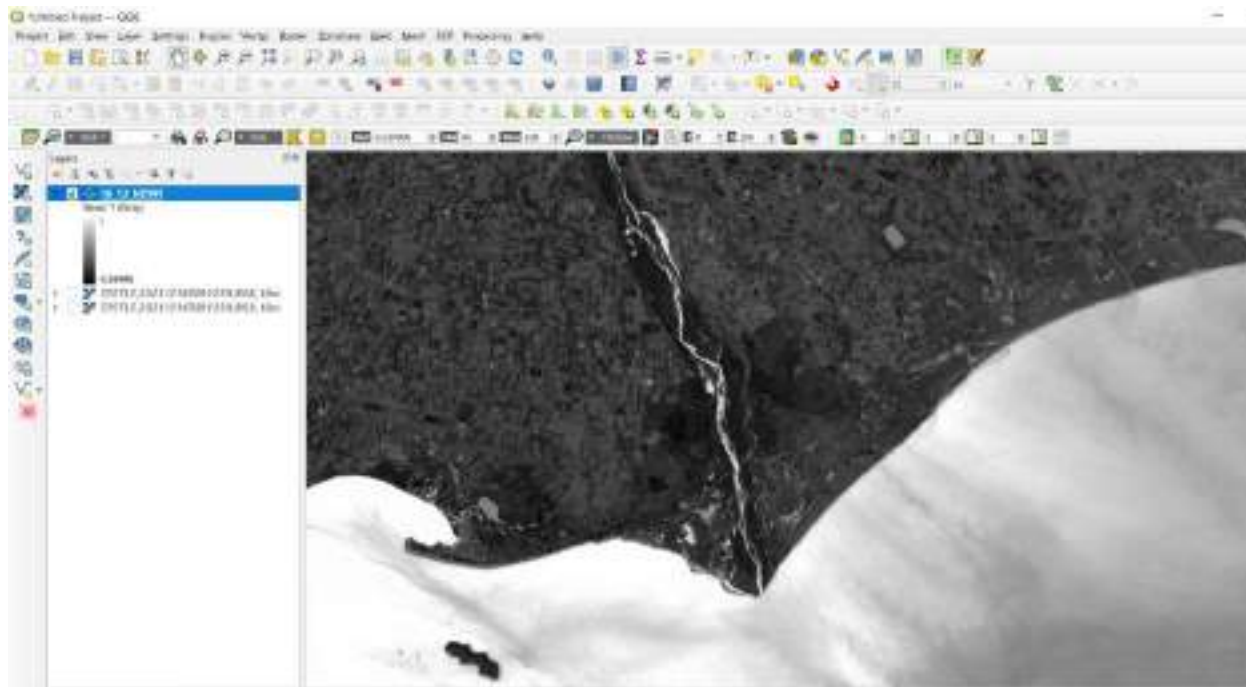
Βηματική αποτύπωση της μεθοδολογίας



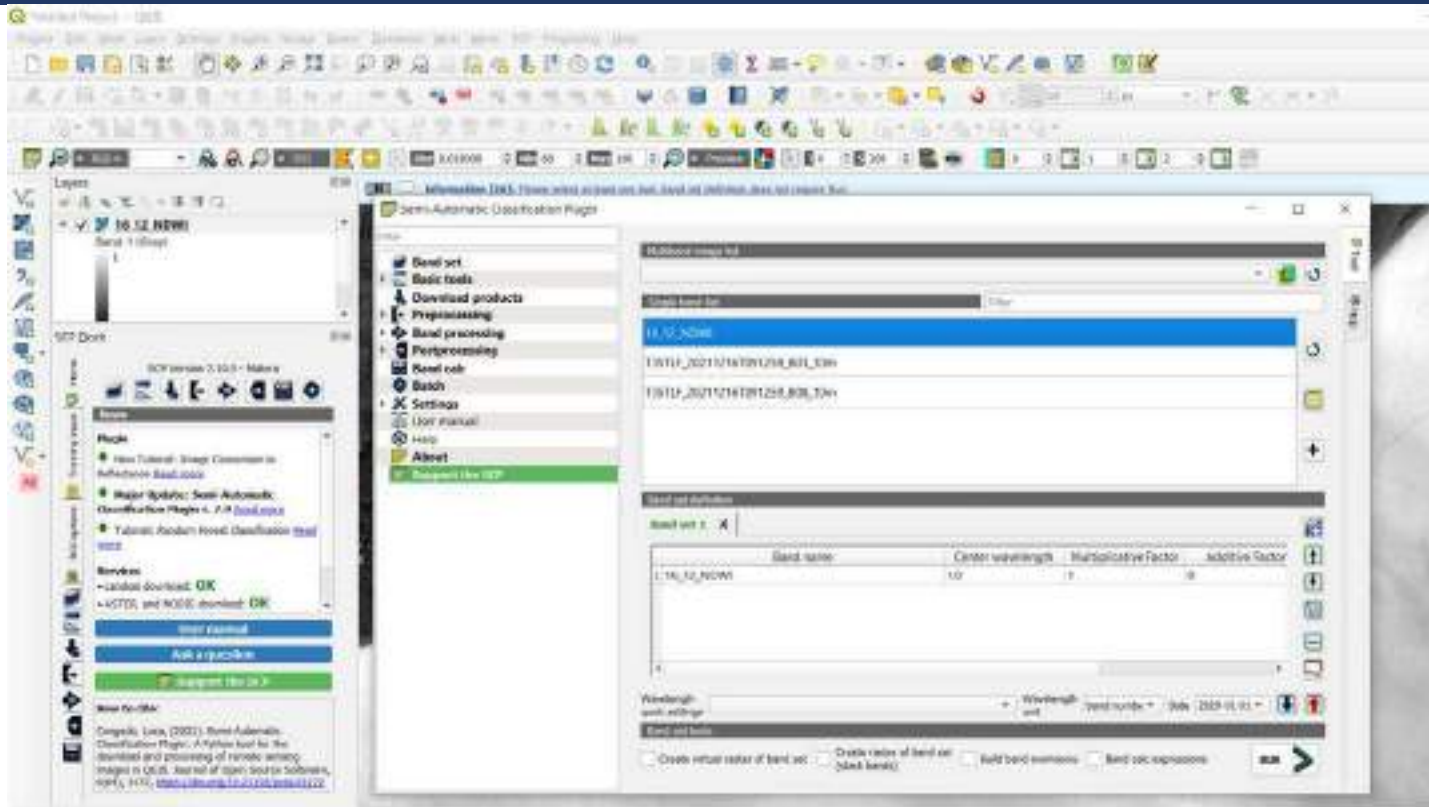
The screenshot illustrates the 'Raster Calculator' tool in ArcGIS. The 'Raster Layer' section is configured with 'Value: 20000.0000' and 'Type: 40960.0000'. The 'Operations' section shows a grid of mathematical operators. The 'Raster Calculator Expression' field contains the following expression:

$$([T15TUF_20211210700210_001_000] + [T00UF_20211210700210_001_000]) * ([T15UF_20211210700210_001_000] + [T15UF_20211210700210_001_000])$$


Βηματική αποτύπωση της μεθοδολογίας



Βηματική αποτύπωση της μεθοδολογίας



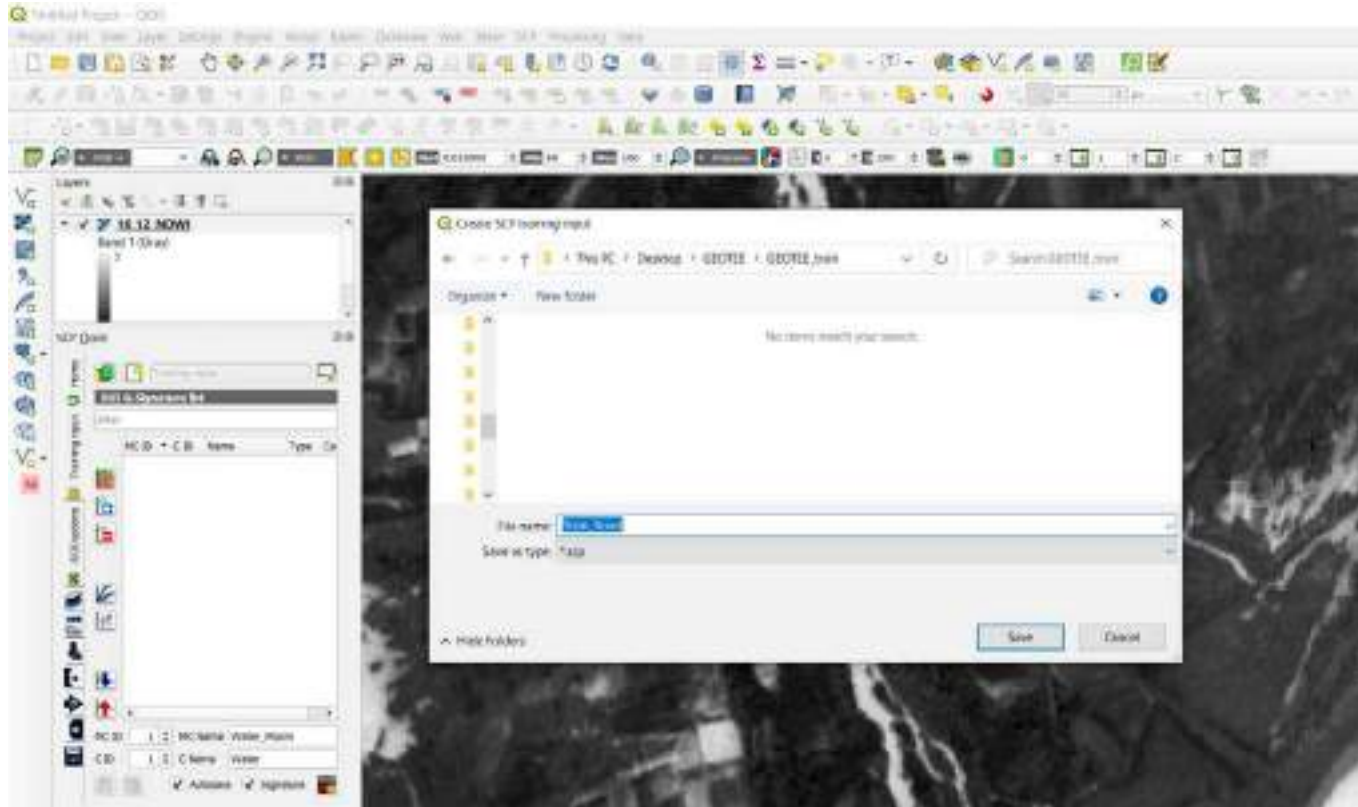
The screenshot displays the PONTOS software interface. The main window is titled 'Dem. Automatic Classification Plugin'. On the left, there is a 'Layers' panel showing '16_12_NEW1' and a 'Tools' panel with various icons. The central area shows a tree view of the plugin's structure, including 'Band set', 'Basic tools', 'Download products', 'Preprocessing', 'Band processing', 'Postprocessing', 'Band calc', 'Batch', 'Settings', 'Help', and 'About'. The 'Batch' section is expanded, showing a table of band sets.

Band set	Band name	Center wavelength	Multiplicative Factor	Additive Factor
16_12_NEW1		1.0	1	0

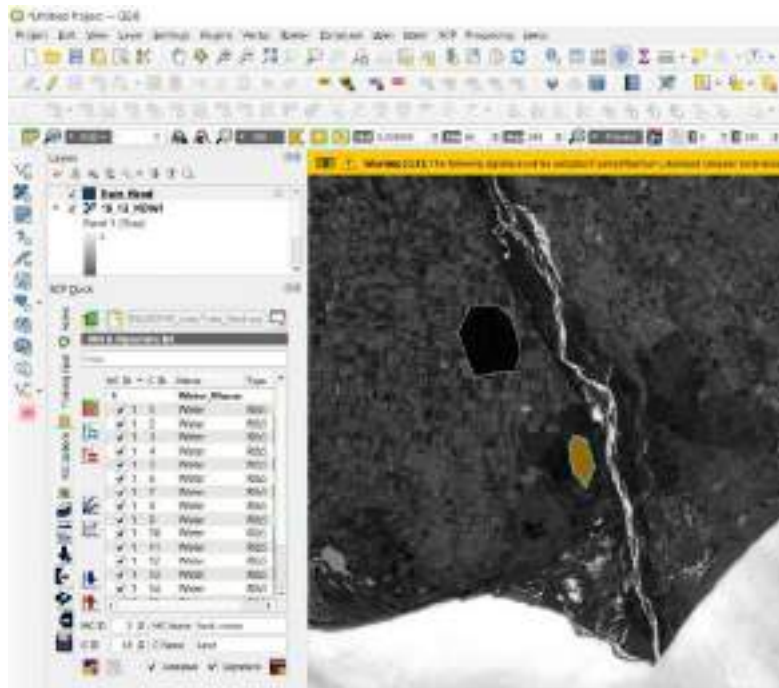
Below the table, there are fields for 'Wavelength unit: width' and 'Band number: 16'. At the bottom, there are checkboxes for 'Create virtual raster if band set', 'Create raster of band set (band bands)', 'Band band names', and 'Band calc expressions'.



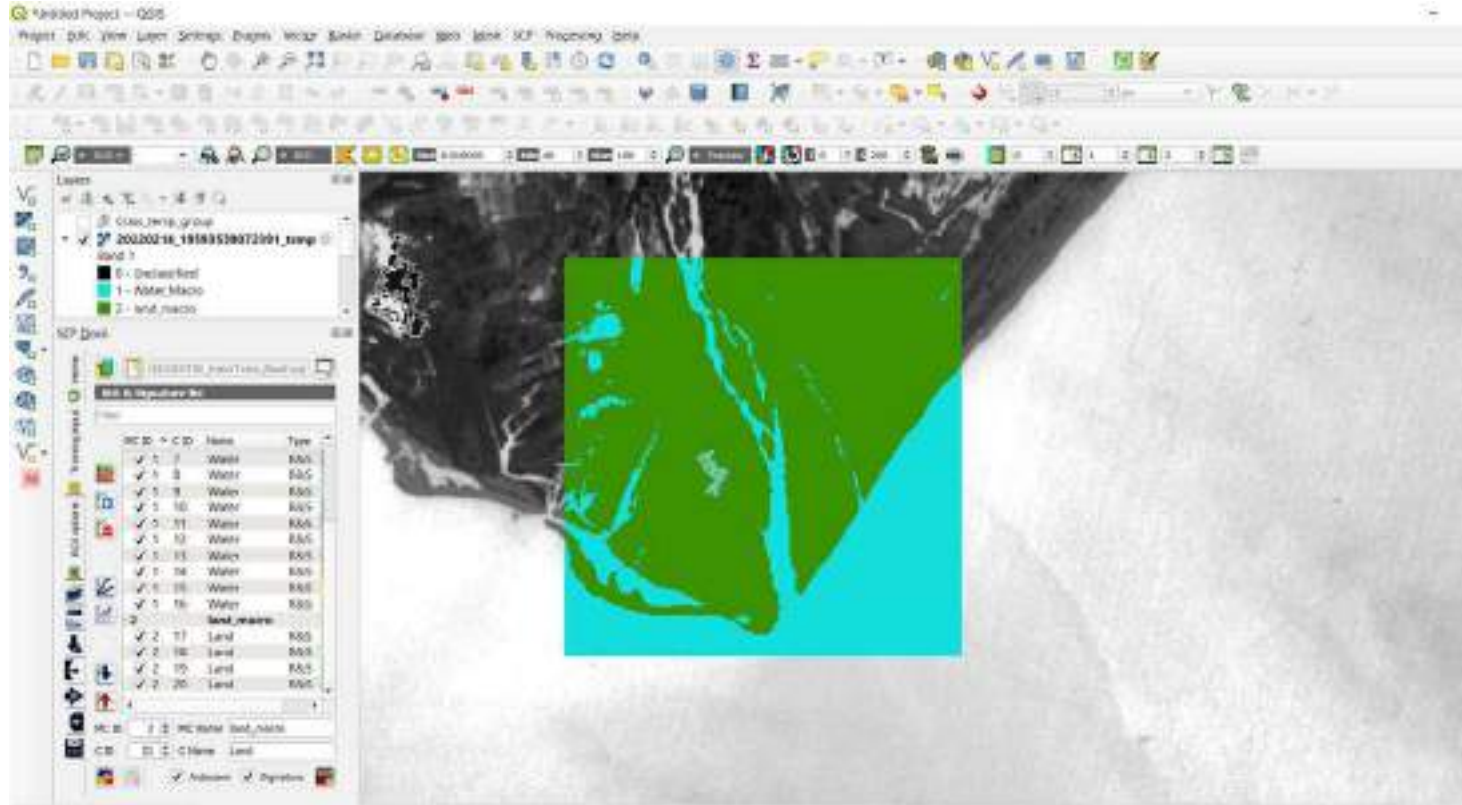
Βηματική αποτύπωση της μεθοδολογίας



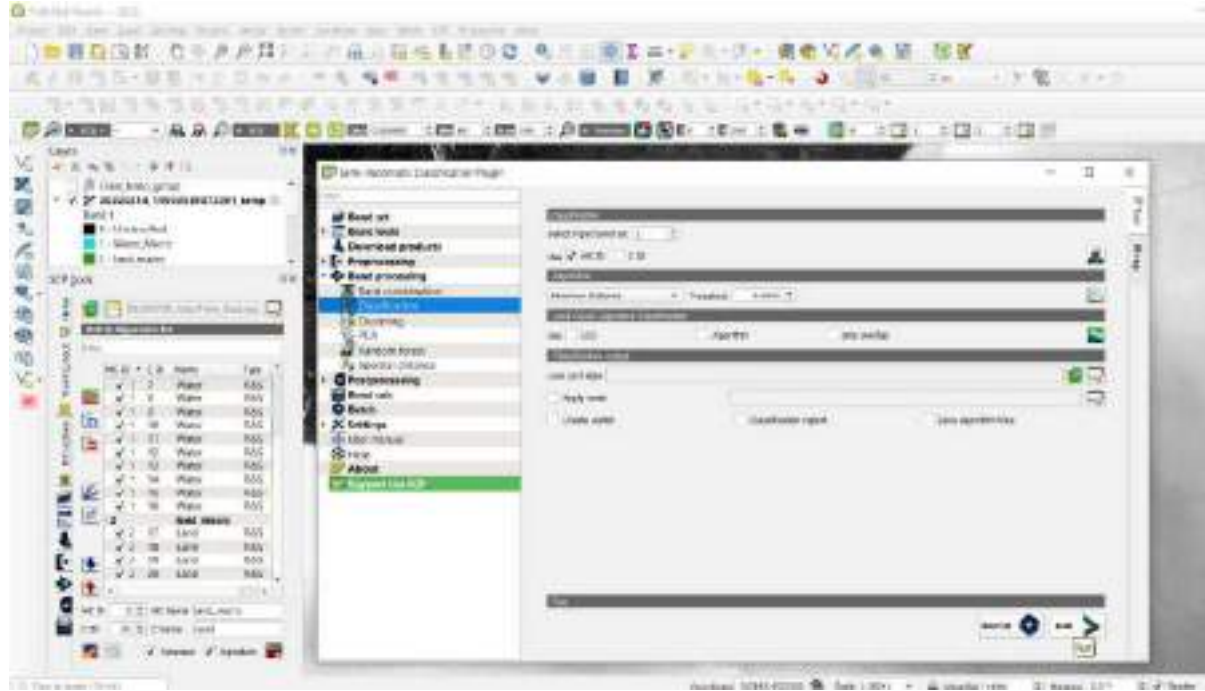
Βηματική αποτύπωση της μεθοδολογίας



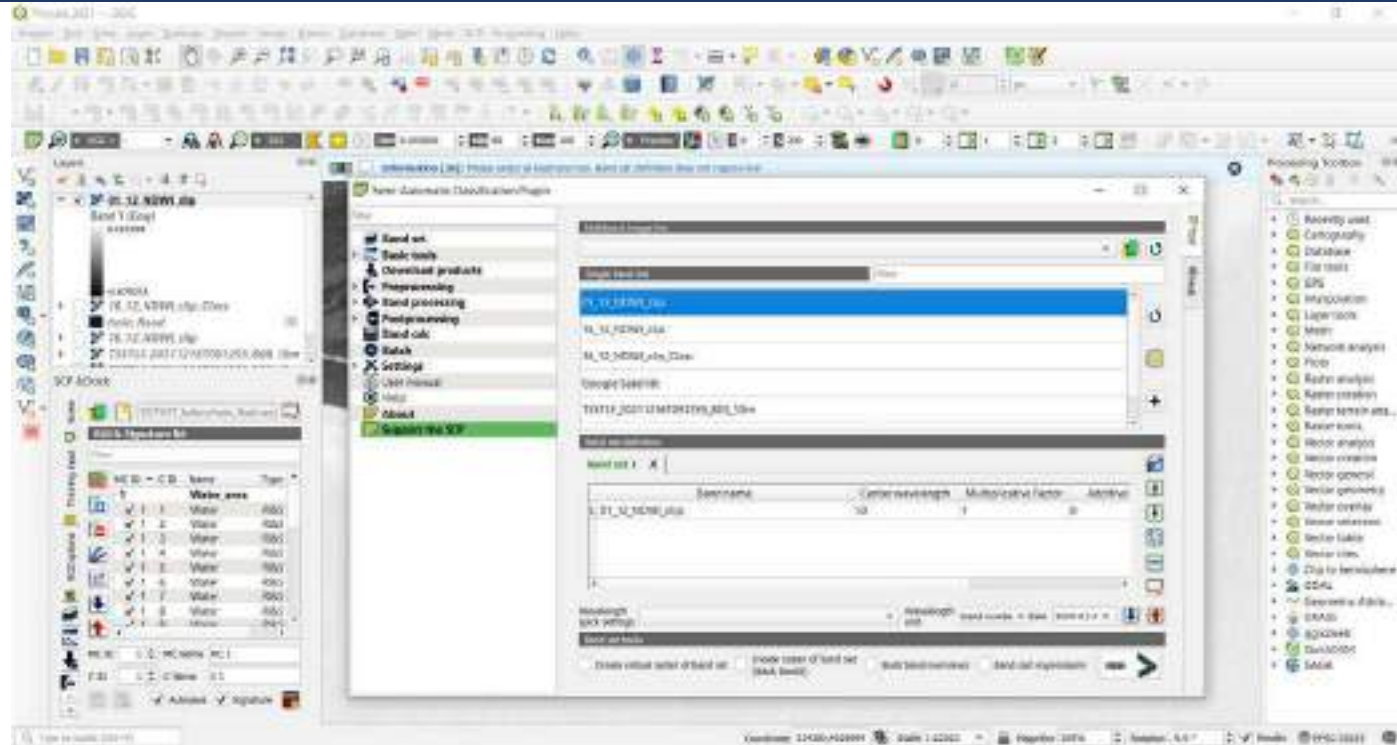
Βηματική αποτύπωση της μεθοδολογίας



Βηματική αποτύπωση της μεθοδολογίας



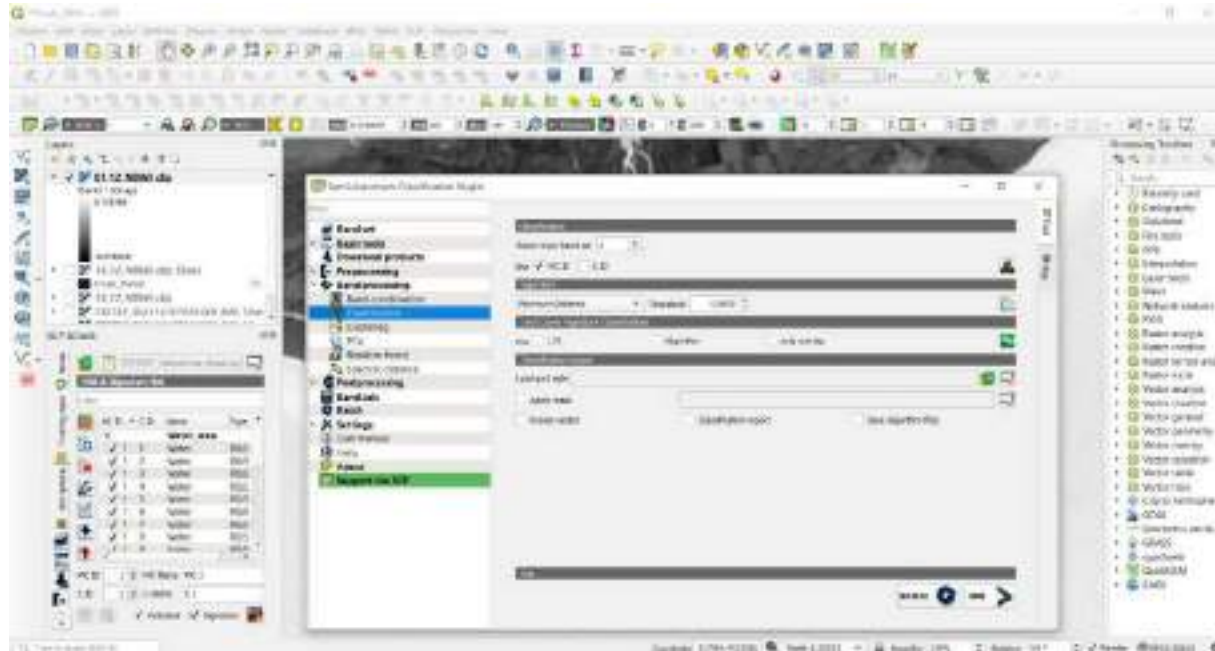
Βηματική αποτύπωση της μεθοδολογίας



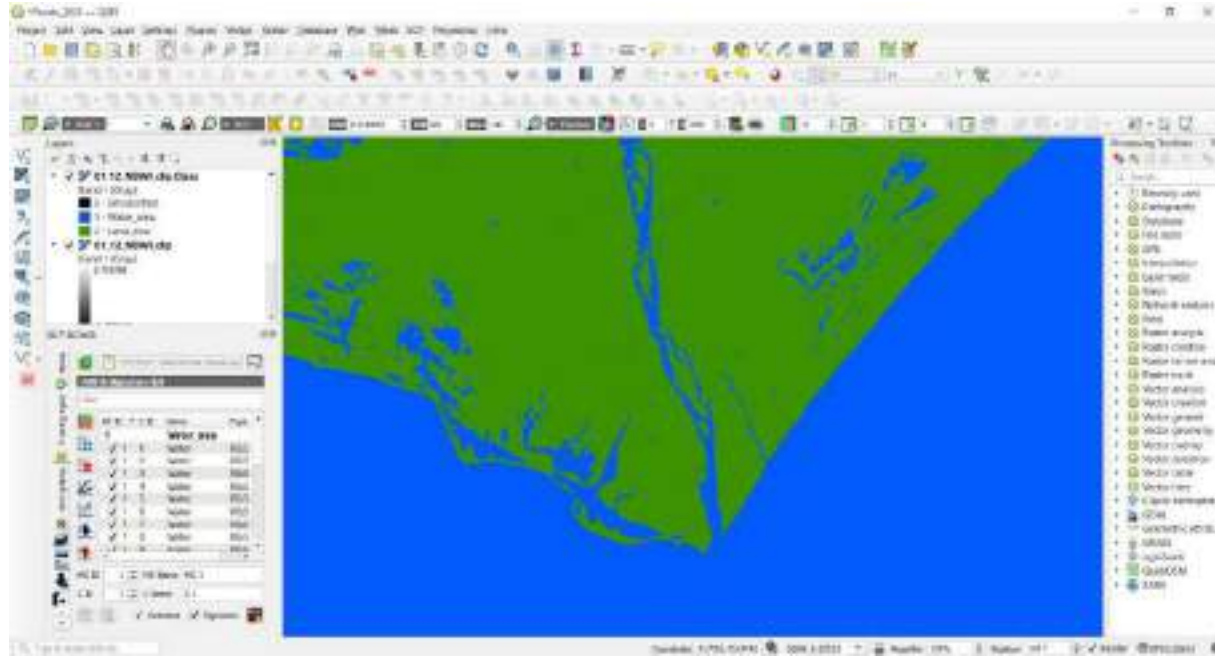
The screenshot displays the ArcGIS Desktop interface with a project titled 'PONTOS_2011 - 2012'. The main workspace shows a 'Project Explorer' on the left with a tree view of the project structure, including folders for 'Raw Data', 'Preprocessing', 'Classification', and 'Output'. The central pane shows a 'Toolbox' with various processing tools, and the 'Tool Properties' window is open for the 'Classify' tool. The 'Tool Properties' window shows the 'Input Raster or Feature Class' field populated with 'D1_12_2012_010'. Below this, the 'Class Name' field is empty, and the 'Class Field' is set to 'Value'. The 'Output Raster or Feature Class' field is also empty. The 'Method' dropdown is set to 'Maximum Likelihood', and the 'Use Weighted Neighbors' checkbox is checked. The 'Classify' tool is highlighted in the toolbox, and the 'Tool Properties' window is open for it.



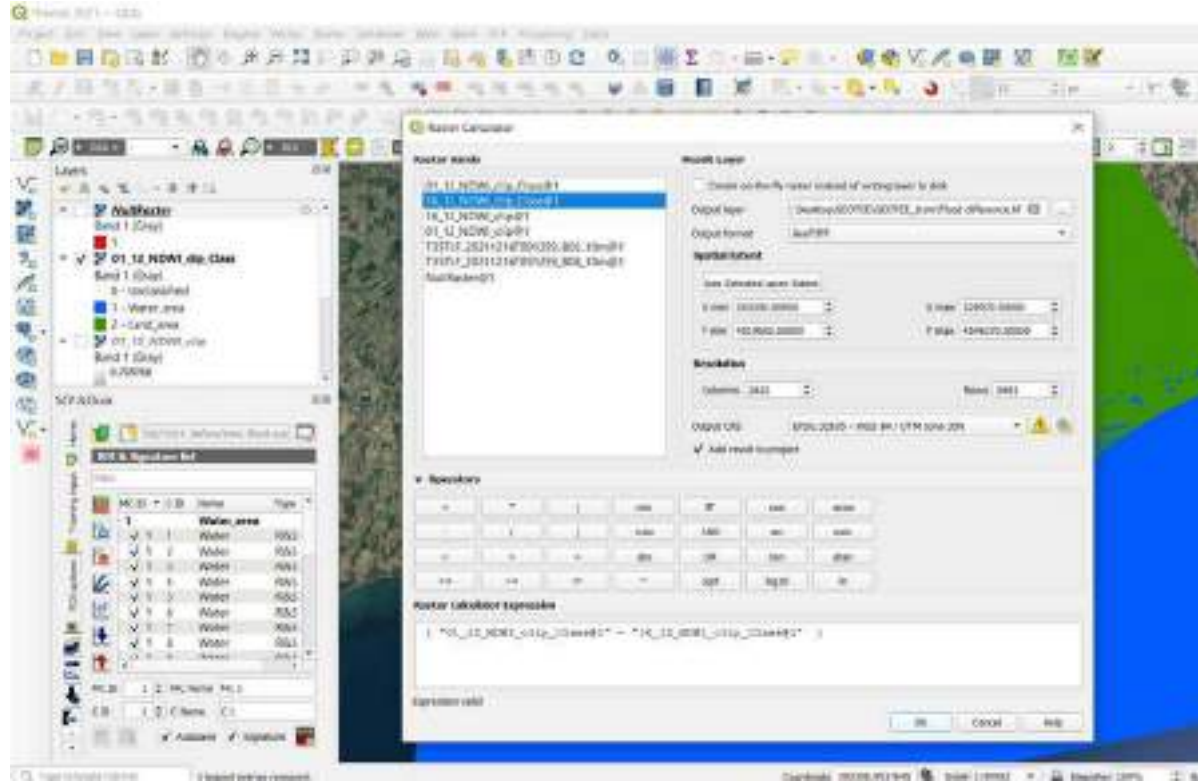
Βηματική αποτύπωση της μεθοδολογίας



Βηματική αποτύπωση της μεθοδολογίας



Βηματική αποτύπωση της μεθοδολογίας



Raster Calculator

Raster inputs

- 01_11_NDW_01p_Flood1
- 01_11_NDW_01p_Drain1

Mask Layer

Check only for NoData instead of NoData to 0

Output Name: Output\00100100101_11_NDW_01p.tif

Output Format: GeoTIFF

Spacial Extent

Use Selected Area Only

Extent: 1000000.000000 1000000.000000

Y Extent: 1000000.000000 1000000.000000

Block Size

Columns: 255 Rows: 255

Output CRS: EPSG:2020 - EPSG:2020 (UTM Zone 20E)

Add result to map

Repository

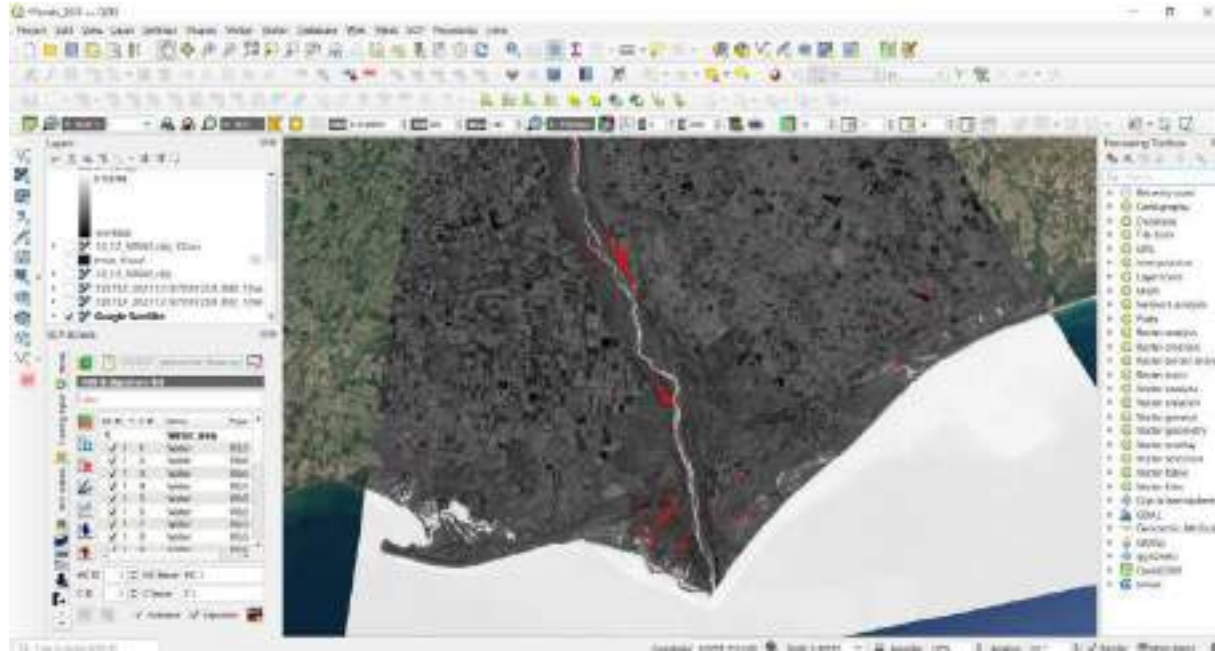
Raster calculator expression

! 01_11_NDW_01p_01p_Flood1 - ! 01_11_NDW_01p_01p_Drain1

Expression valid

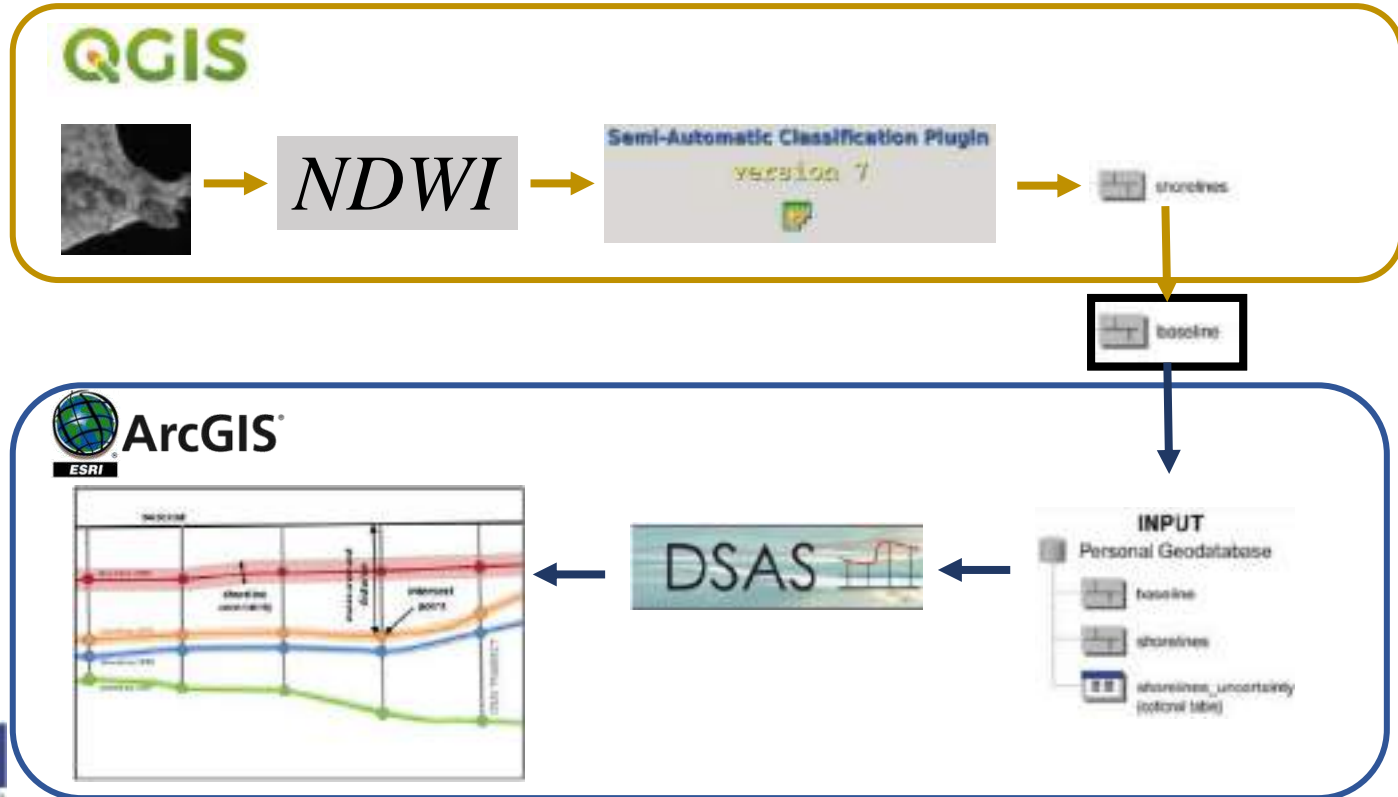


Βηματική αποτύπωση της μεθοδολογίας



Μεθοδολογία για Διάβρωση

Περιγραφή Μεθοδολογίας



Βήματα εξαγωγής της ακτογραμμής από Δορυφορική εικόνα

QGIS



Λίστα Δορυφορικών Εικόνων

No	Date	Data Products	Resolution	Dataset	Type of file / Format	Index
1	23-08-85	Landsat 4-5 TM	30 m	TM Collection 2 Level-1	.TIF	NDWI
2	19-08-90	Landsat 4-5 TM	30 m	TM Collection 2 Level-1	.TIF	NDWI
3	31-07-95	Landsat 4-5 TM	30 m	TM Collection 2 Level-1	.TIF	NDWI
4	16-08-00	Landsat 4-5 TM	30 m	TM Collection 2 Level-1	.TIF	NDWI
5	29-07-05	Landsat 4-5 TM	30 m	TM Collection 2 Level-1	.TIF	NDWI
6	12-08-10	Landsat 4-5 TM	30 m	TM Collection 2 Level-1	.TIF	NDWI
7	09-07-15	Landsat 8	30 m	OLI collection Level-1	.TIF	NDWI
9	25-08-15	Sentinel 2	10 m	Sentinel-2 mission	.TIF	NDWI
10	10-07-16	Sentinel 2	10 m	Sentinel-2 mission	.TIF	NDWI
11	30-07-17	Sentinel 2	10 m	Sentinel-2 mission	.TIF	NDWI
12	14-08-18	Sentinel 2	10 m	Sentinel-2 mission	.TIF	NDWI
13	14-08-19	Sentinel 2	10 m	Sentinel-2 mission	.TIF	NDWI
14	28-08-20	Sentinel 2	10 m	Sentinel-2 mission	.TIF	NDWI

Ο **Normalized Difference Water Index (NDWI)** χρησιμοποιείται για την ταξινόμηση νερού – ξηράς (McFeeters, 1996)

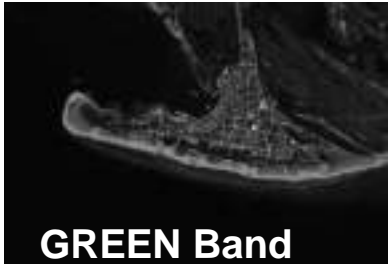
$$NDWI = \frac{(GREEN - NIR)}{(GREEN + NIR)}$$

Ο **NDWI** είναι χρήσιμος δείκτης στην τηλεπισκόπηση για:

- την χαρτογράφηση Ξηράς - Θάλασσας,
- Τον εντοπισμό εσωτερικών υδάτων



Περιγραφή Μεθοδολογίας

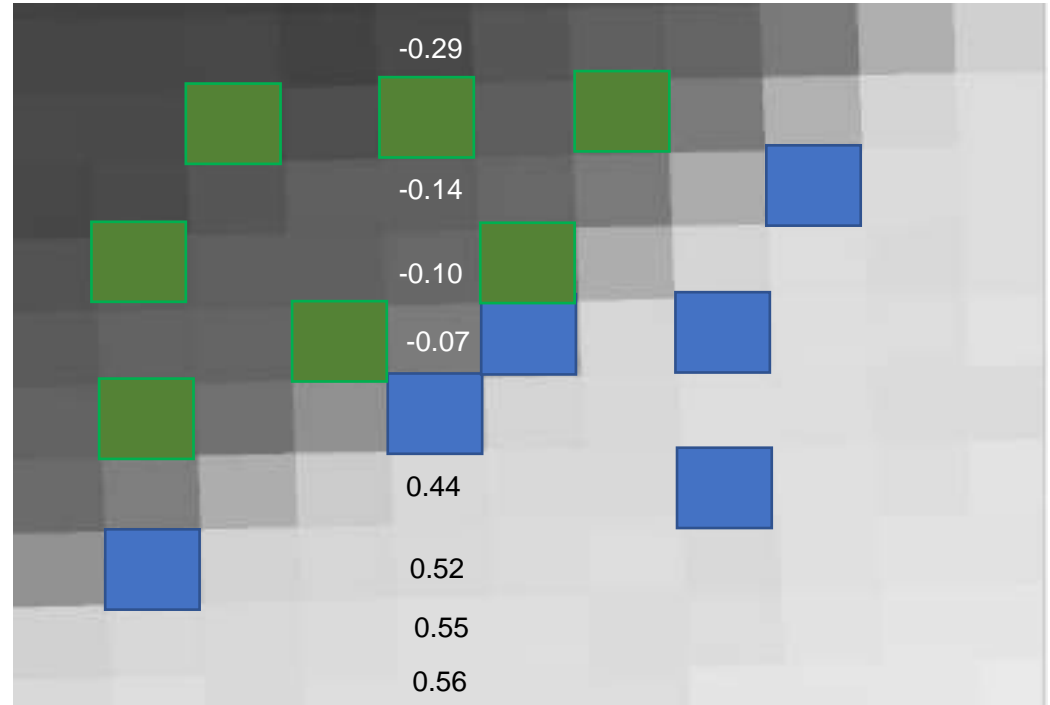


$$NDWI = \frac{(GREEN - NIR)}{(GREEN + NIR)}$$



Περιγραφή Μεθοδολογίας

Εκπαίδευση Αλγορίθμου



Περιγραφή Μεθοδολογίας

Ταξινόμηση δορυφορικής εικόνας



Περιγραφή Μεθοδολογίας

Μετατροπή εικόνας σε
διάνυσμα
(Raster to Vector)

Raster – Conversion – Polygonize (Raster to Vector)



Περιγραφή Μεθοδολογίας

Εξαγωγή ιστορικής ακτογραμμής

SAGA – Convert Polygons to lines

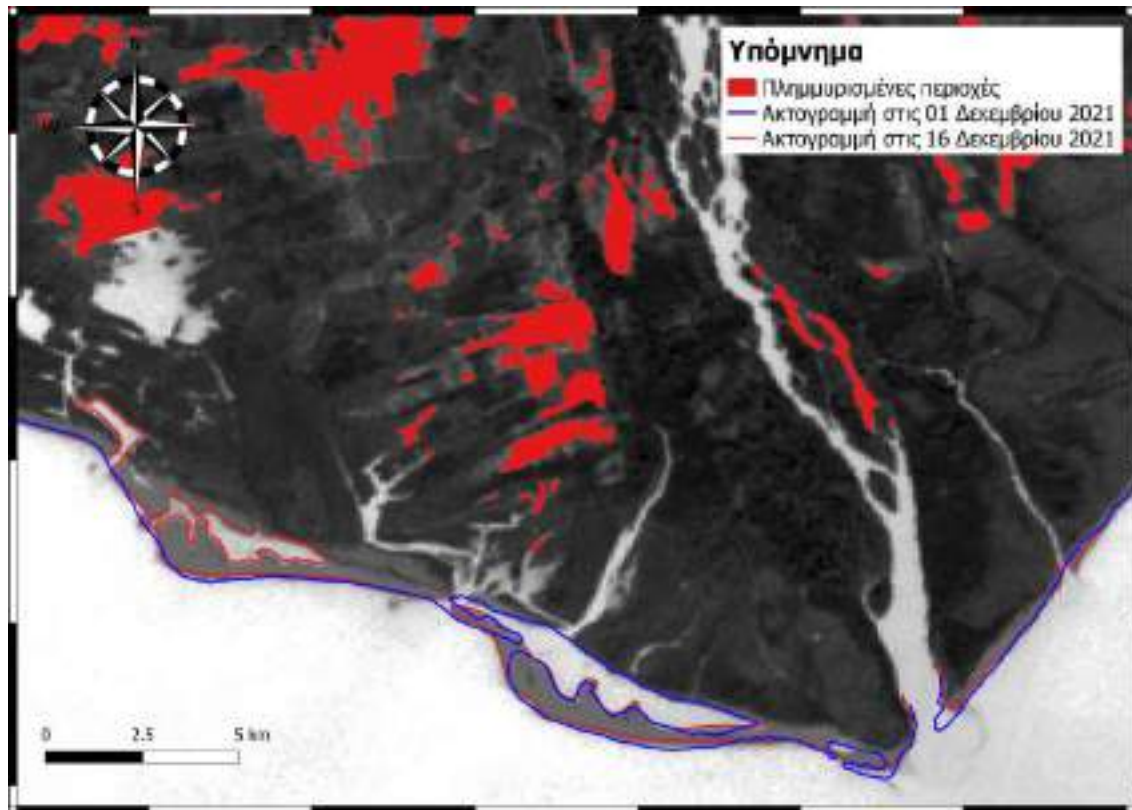


Ιστορικές ακτογραμμές



Ενδεικτικά αποτελέσματα

Αποτελέσματα



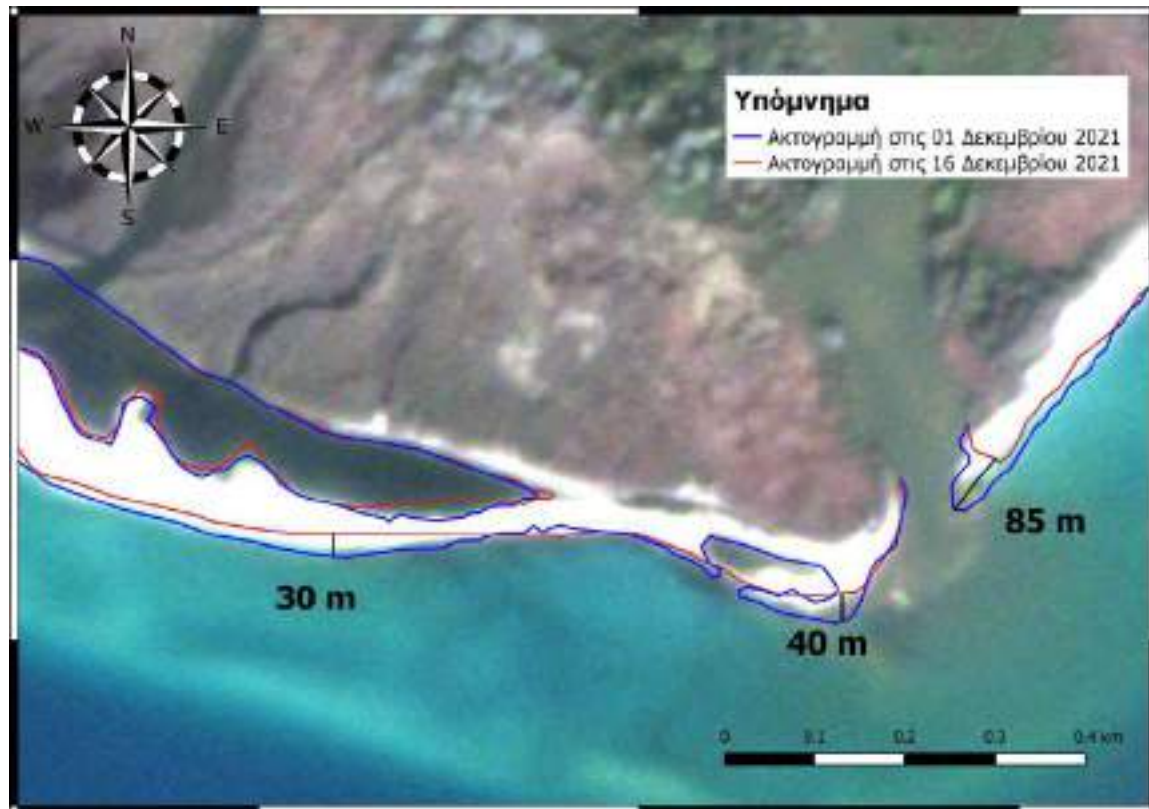
Αποτελέσματα



Αποτελέσματα



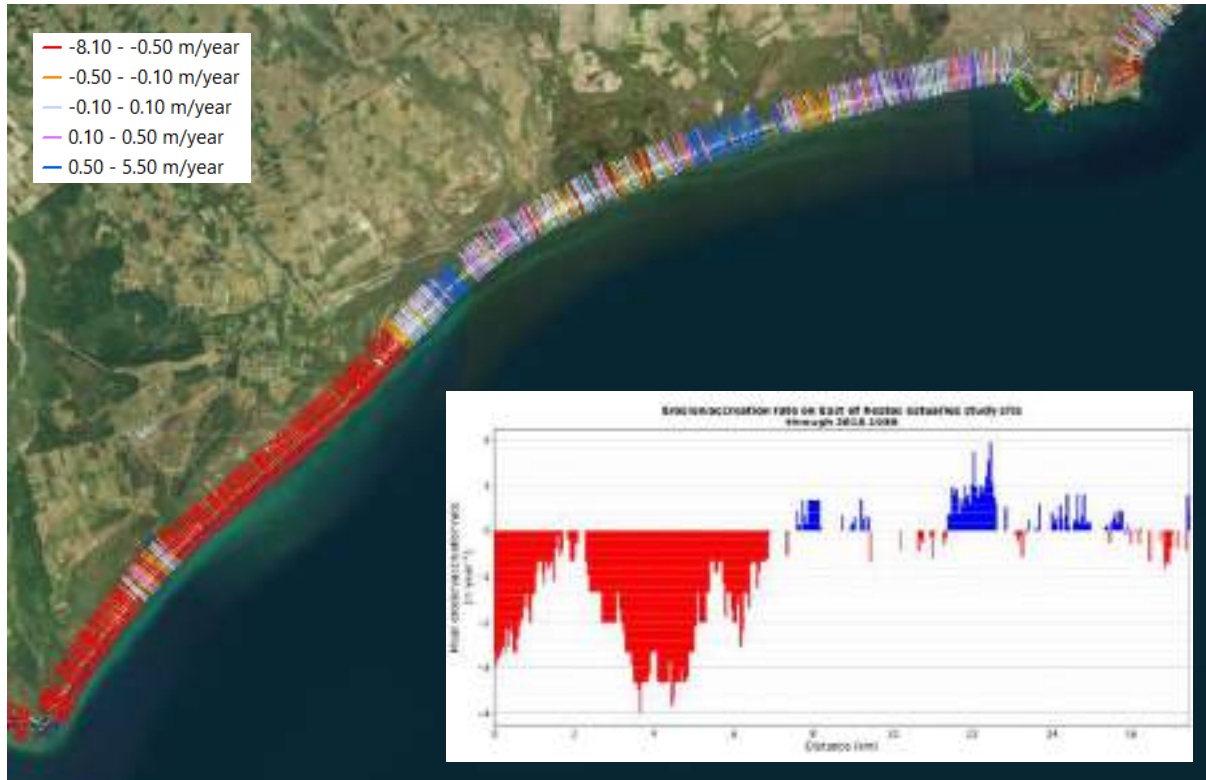
Αποτελέσματα



Αποτελέσματα



Αποτελέσματα



Αποτελέσματα



Λογισμικά και Πρόσθετα

- Δημιουργία λογαριασμού στο **Copernicus Open Access Hub**
 - <https://scihub.copernicus.eu/>
- Δημιουργία λογαριασμού στο **Earth Explorer**
 - <https://earthexplorer.usgs.gov/>
- Λήψη και εγκατάσταση του **QGIS**
 - <https://www.qgis.org/en/site/forusers/download.html>
- Λήψη και εγκατάσταση του **Semi-Automatic Classification Plugin** για το **QGIS**
 - <https://plugins.qgis.org/plugins/SemiAutomaticClassificationPlugin/>

Ευχαριστώ πολύ!!!