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PONTOS

Black Sea CROSS BORDER COOPERATION

**Common borders. Common solutions.**

CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

# Training of Trainers in Thessaloniki (GR)

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## Tutorial material on PONTOS Web Application

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Lecturer: Eleftherios Katsikis, MSc, Research Assistant at CERTH/ITI

This tutorial material was prepared in cooperation with Dr. Ioannis Manakos, Principal Researcher in Remote Sensing at CERTH/ITI

Contact Details: Centre for Research and Technology Hellas (CERTH), Information Technologies Institute (ITI), Building A, 6th km Harilaou-Thermi, 57001, Thermi, Thessaloniki, Tel: +30 2311 257 760, e-mail: imanakos@iti.gr, lefkats@iti.gr
Website: http://eos.iti.gr/

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## 1. INTRODUCTION

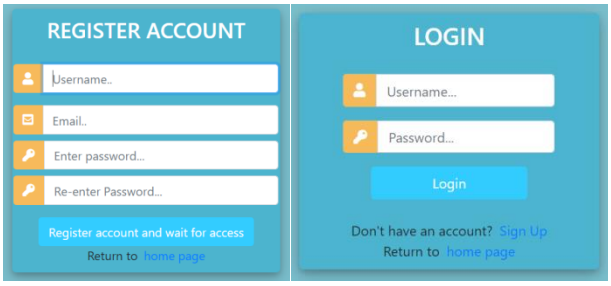
This web application is going to work complementary to PONTOS Data Cube and the webGIS, offering functionalities specifically aimed at the exploitation of Satellite, Airborne and In-situ data. Users are able to analyze existing data that have been collected and stored to the database or upload and analyze their own data.

## 2. USER REGISTRATION AND LOGIN

All interested stakeholders and potential users have to fill a registration form in order to be able to access the web application tools. Required fields that have to be filled are: username, email and password. Upon

completion of the registration procedure, the account is automatically created, but will remain inactive until a super user activates the account from the admin page. Any account can have its status changed between active and inactive at any time.

Steps: Sign up > Fill the form > Administration activates the account > Login




# 3. SERVICES

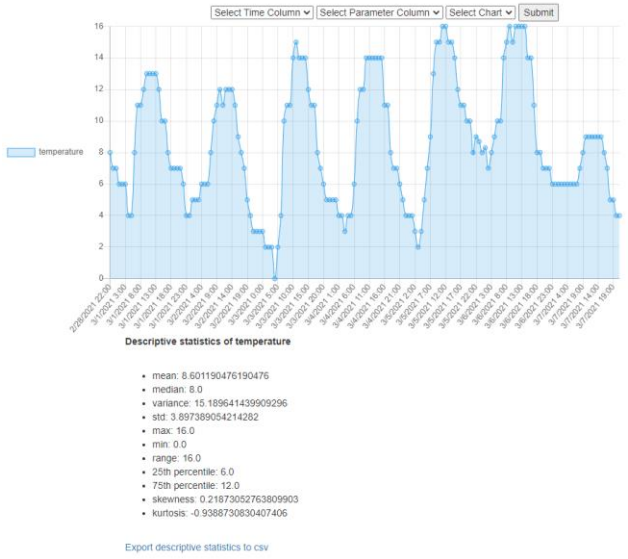
## 3.1 EXISTING DATA ANALYSIS

Satellite, In-situ and Airborne data have been stored to the Web Application's database and are provided to the users for analysis.

### 3.1.1 IN-SITU DATA ANALYSIS

Users are able to process existing in-situ data by visualizing with charts (i.e., line charts, bar charts) parameter time-series. In parallel with the process of time-series visualization, descriptive statistics are automatically extracted (i.e., mean, median, variance, standard deviation, max, min, range, 25th percentile, 75th percentile, skewness, kurtosis). All descriptive statistics extracted will be available for download as csv files.

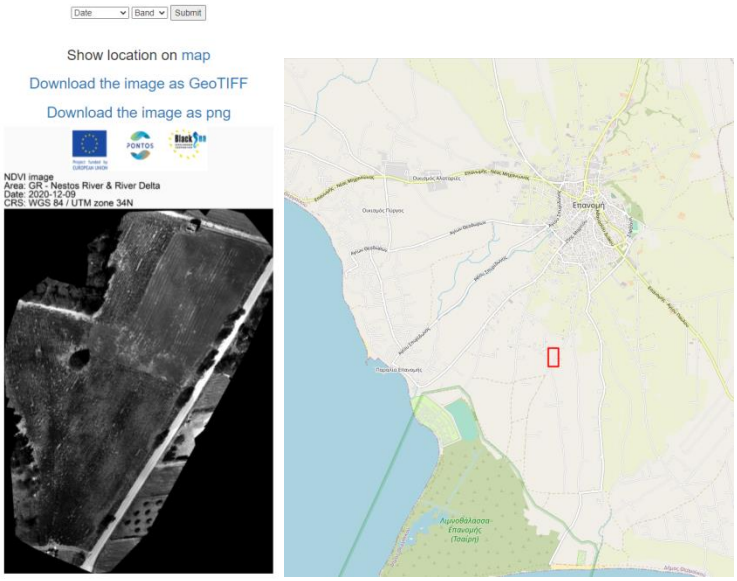
Steps: Services > Existing Data > In-situ Data Analysis > select pilot site > select features and chart > submit > In-situ data are visualized and their descriptive statistics has been calculated
Descriptive statistics can as csv by clicking to "Export descriptive statistics as csv".




### 3.1.2 VISUALIZE AIRBORNE DATA

Airborne images from the pilot sites will be provided to the users, to visualize them or download them as GeoTIFF or png format. Users can also see the exact images' location on the map.

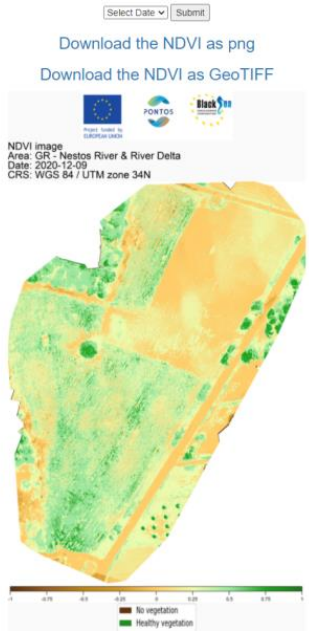
Steps: Services > Existing Data > Visualize Airborne Data > select pilot site > select band & date > submit




### 3.1.3 AIRBORNE DATA NDVI

NDVI (Normalized Difference Vegetation Index). NDVI is a vegetation index used for the monitoring of plants and vegetation density. It is calculated based on the following formula NDVI = (NIR-RED) / (NIR+RED), where NIR and RED are the spectral reflectance measurements in the Near-Infrared (NIR) and Red regions of the spectrum respectively. Users can calculate the NDVI index, visualize it and download it as GeoTIFF or png format.

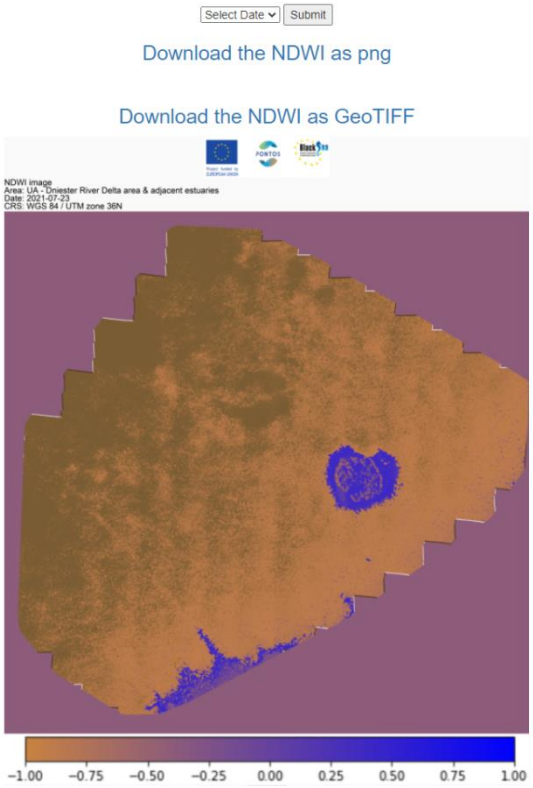
Steps: Services > Existing Data > Airborne Data NDVI > select pilot site > select date > submit




### 3.1.4 AIRBORNE DATA NDWI

NDWI (Normalized Difference Water Index). NDWI is a water related index, used for the monitoring of water content and delineation of open water features. Due to the fact that SWIR data are not available in airborne images from drones, the index calculation utilizes the Green and NIR bands available using the formula: NDWI = (GREEN - NIR) / (GREEN+NIR). Users can calculate the NDWI index, visualize it and download it as GeoTIFF or png format.

Steps: Services > Existing Data > Airborne Data NDWI > select pilot site > select date > submit




*This lake contains floating vegetation, which is recognized as “no water” by the NDWI index.

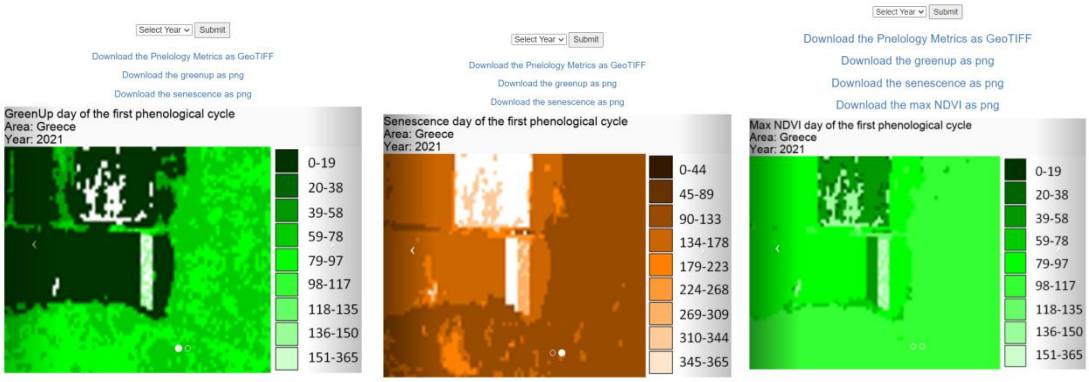
Steps: Services > Existing Data > Airborne Data NDWI > select pilot site > select date > submit

### 3.1.5 PHENOLOGY METRICS

Phenology Metrics module utilizes a time-series NDVI images and aims to identify the phenological cycles of one year. The outputs are the day of the year that was occurred the “greenup”, the “senescence” and the “max NDVI” in each phonological cycle.

The user can download the Phenology Metrics as GeoTIFF, the greenup, the senescence and the maximum value of the NDVI as png.

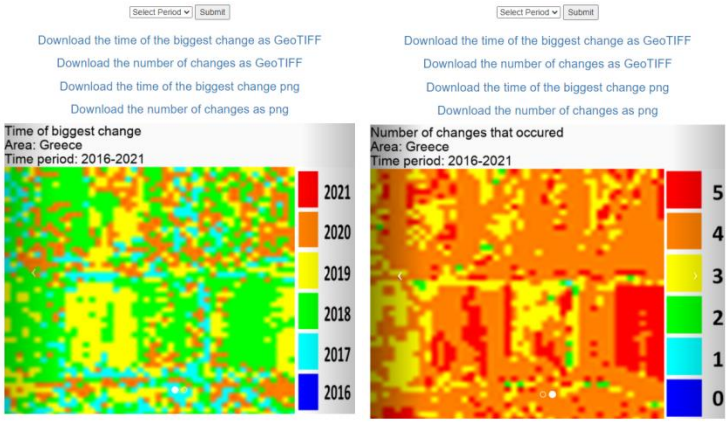
Steps: Services > Existing Data > Phenology Metrics > select pilot site > select year > submit




## 3.1.6 PHENOLOGY CHANGES

Phenology Changes module aims to the monitoring of changes along annual vegetation cycles of consequent years, utilizing as inputs a time-series NDVI images. The outputs include the time of the biggest change and the number of changes that occurred in each area. The user can download the outputs as GeoTIFF or png format.

Steps: Services > Existing Data > Phenology Changes > select pilot site > select period > submit




## 3.2 USERS' UPLOAD DATA

The current web application offers to the users the functionality of uploading their own data, which are not already contained in PONTOS databases, targeting on the utilization of the processing capacity offered. These data could be either satellite, airborne or in-situ. By default, no data is stored on the server

upon completion of the user's query. The uploaded data could be saved in the database upon user's consent and respecting the GDPR legislation. The data uploaded should adhere to the specifications described below.

### 3.2.1 IN-SITU DATA ANALYSIS

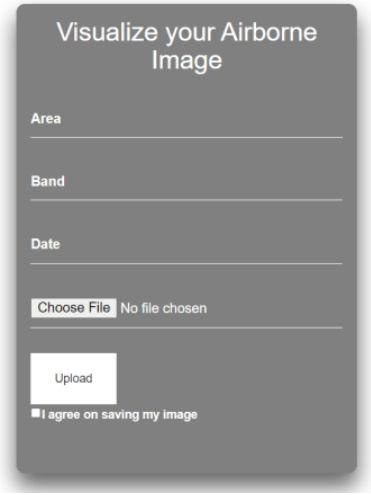
Users can upload their own in-situ data in xslx or csv format in order to create graphs and calculate the descriptive statistics. The descriptive statistics can be downloaded by the user as csv.

Steps: Services > Upload Data > In-situ Data Analysis > fill the "Area" field and choose the in-situ file > Upload


### 3.2.2 VISUALIZE AIRBORNE DATA

Users can upload, visualize their own airbone images and find the exact image's location on the map. An option to save the image to the Web Application's database also provided. The airborne image should be in GeoTIFF format.

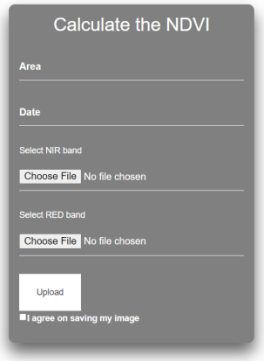
Steps: Services > Upload Data > Visualize Airborne Data > Fill the form with the "Area", "Band", "Date" and choose the GeoTIFF file > Upload




### 3.2.3 AIRBORNE DATA NDVI

Users can calculate the NDVI index from their airborne data, visualize it and download it as GeoTIFF or png format. The uploaded images should be in GeoTIFF format and the users can save them to the Web Application's database.

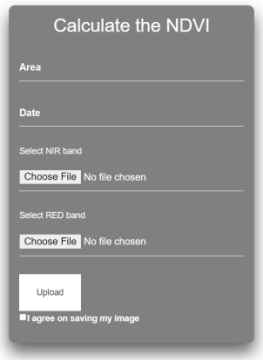
Services > Upload Data > Airborne Data NDVI > Fill the form with the "Area", "Date", choose the "NIR" and "RED" band > Upload




### 3.2.4 AIRBORNE DATA NDWI

Users can calculate the NDWI index from their airborne data, visualize it and download it as GeoTIFF or png format. The uploaded images should be in GeoTIFF format and the users can save them to the Web Application's database.

Services > Upload Data > Airborne Data NDWI > Fill the form with the “Area”, “Date”, choose the “GREEN” and “RED” band > Upload




### 3.2.5 EXTRACT NDVI FROM NETCDF TO GEOTIFF

This service is implemented to support the utilization of the Phenology Metrics and Phenology Changes modules. The user will download the NDVIs as NetCDF from the PONTOS Data Cube and will be able to convert them in GeoTIFF format, which is the acceptable input of the Phenology Metrics and Phenology Changes modules.

Steps: Services > Upload Data > Extract NDVI from NetCDF to GeoTIFF > choose the NetCDF file > Upload

The Uploaded NetCDF file should contain the NDVI layer with name ‘ndvi’.


## 3. FEEDBACK FORM

Constant improvement and quality validation of the tools is an important part of PONTOS project. To achieve this, a feedback form is provided in the PONTOS Web Application to enable users in providing

continuous feedback about the quality of the application. Users are able to write their own message about their experience or suggest improvements. All user input is saved in the database with respect to GDPR legislation and super users can review them at any time.

Steps: Submit Feedback > Fill the form with the message, the name and the e-mail > Send