PONTOS project

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Common borders. Common solutions.

Project acronym - PONTOS

Project title - Copernicus assisted environmental monitoring across the Black Sea Basin

Programme priority - Promote coordination of environmental protection and joint reduction of marine litter in the Black Sea Basin

Main objective - Improve joint environmental monitoring

Project duration - 30 months (01.07.2020 - 31.12.2022)

Funding - ENI CBC Black Sea Basin Joint Operational Programme 2014-2020

Project funded by
EUROPEAN UNION

PONTOS

Black Sea
CROSS BORDER
COOPERATION

AUA ACOPIAN CENTER for the ENVIRONMENT
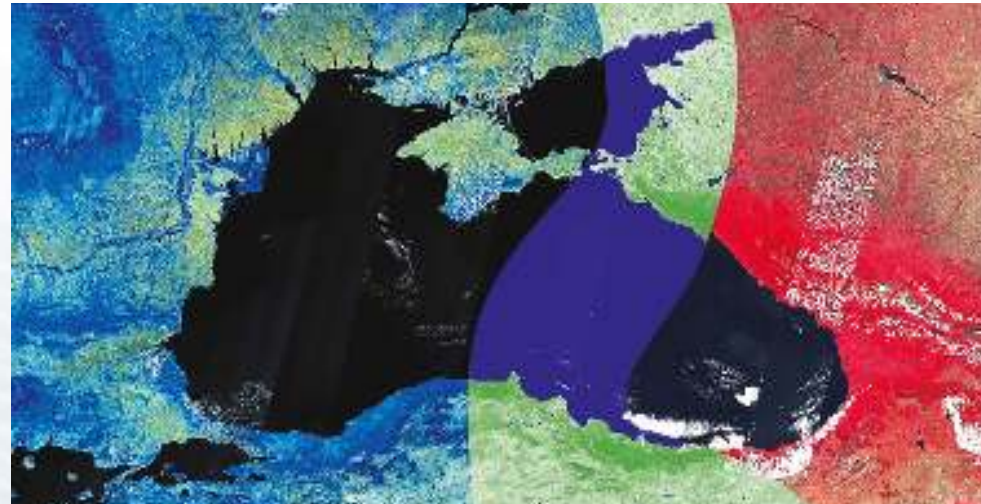
CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

Green Alternative

1865

Project Partners

- American University of Armenia (Lead Partner), Armenia

- Centre for Research and Technology Hellas, Greece

- Democritus University of Thrace, Greece

- Environmental Protection and Mining Inspection Body of the Republic of Armenia

- Green Alternative, Georgia

- Odessa National I.I. Mechnikov University, Ukraine

Overall and Specific Objectives

The overall objective is to make information and knowledge available to scientists, policy makers, citizens and other relevant stakeholders and provide a full picture of the state and temporal evolution of Black Sea region environment.

1. **Technology transfer among the Black Sea nations** - developing the technological and knowledge infrastructure for the setup of online services

2. **Use of the Copernicus program for environmental monitoring** - Copernicus derived information will be coupled with local knowledge

3. Engagement of local and regional actors at multiple levels as co-designers and receptors of the benefits accrued by PONTOS

Project description

- PONTOS will advance environmental monitoring at **transboundary and regional levels** with strategies that remain detailed enough **to apply at a local scale**.

- PONTOS focuses on **land cover and use changes**, as a result of geogenic and anthropogenic processes.

- The project adopts an **intelligent synthesis of validated Earth Observation data** and results from numerical models to produce quantitative estimations of physicochemical variables, descriptive of environmental conditions in the Black Sea region.

- Significant issues like **agricultural water footprint, nutrient fluxes, eutrophication processes, coastal erosion/deposition zones, land-use changes and afforestation/deforestation** will be assessed by PONTOS at representative pilot sites in all partner countries.

Project main outputs

- PONTOS operational platform and tools

- Assessments of environmental issues in pilot areas using Earth Observation (EO) data and services

- Compendium on training material used for the capacity building activities

- Formation of local clusters on water management and pollution prevention in all participating countries

PONTOS Platform

PONTOS Platform aims to

- deliver an operational platform incorporating **various applications and tools** for the users' community in the form of **easy-to-access** and **easy-to-use online services**

- support and enhance environmental monitoring in the Black Sea Basin area with the use of Earth Observation products obtained from Earth Observation satellite missions, airborne and ground sources

PONTOS Platform Parts & Services

1. **PONTOS Data Cube** - Easy production of maps from satellite data

2. **PONTOS Web Application** - Support of airborne and in-situ data management

3. **PONTOS WebGIS** - Combination of information already existing on maps (e.g., Copernicus services)
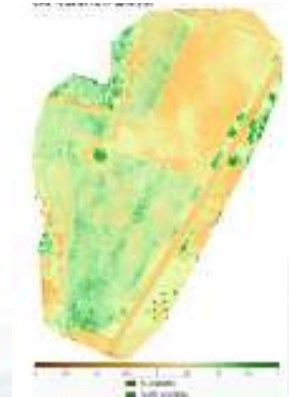
Pilot Sites

1. **Georgia** - a) Entire coastline of Georgia; b) Downstream part of Rioni river, including delta area and Kolkheti National Park

2. **Armenia** - Sevan Lake and its catchment area

3. **Greece** - Nestos River, its Delta and the coastal zone close to the Delta

4. **Ukraine** - a) Best beaches and recreational areas in the south of Ukraine from Odessa city to the Danube river delta; b) Dniester river delta area and adjacent estuary

Implementation in pilot sites

Five assessments are performed, combining Earth Observation (EO) and field data.

Main purposes:

- Characterize the main environmental issues challenging the balance of the human-nature interface at the pilot areas

- Analyze and illustrate which type of EO data can be easily utilized as an alternative to field data or in case of absence of field observation

- Find out which type of EO data would be better be used in combination with field data and complement each other to improve the accuracy of environmental assessments.

Assessments of environmental issues

1. Assessment on dynamics of coastal line changes (Ukraine, Georgia, Greece)

2. Assessment on forest cover changes and its consequences for the environment (Georgia, Armenia)

3. Assessment on changes in wetland and floating vegetation cover (Ukraine, Georgia, Armenia)

4. Assessment on chlorophyll concentration and eutrophication dynamics (Ukraine, Georgia, Greece, Armenia)

5. Assessment on agricultural water balance, water productivity and water stress indices (Greece, Armenia, Ukraine)
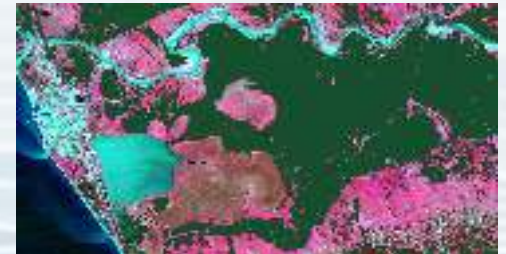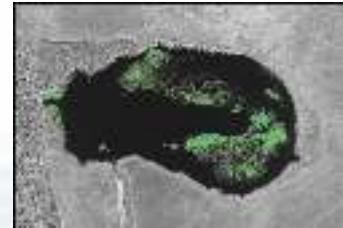
Assessment on dynamics of coastal line changes
(Ukraine, Georgia, Greece)

Project partners will use PONTOS solutions
- to map the sea coast line change dynamics within the pilot areas
- will use historical data to identify the main factors triggering sea coast line changes for the last 20 years.

The DSAS statistical software will be used to derive coastal erosion/deposition rates and define erosion 'hotspots'.

Greek pilot site - coast line change dynamics over time

Assessment on forest cover changes and its consequences for the environment (Georgia, Armenia)

- PONTOS platform will utilize Copernicus, NASA, USGS, and national repositories and monitoring services to monitor the **dynamics of tree cover loss and gain** (due to fires, deforestation, etc.) across the last 2 decades.

- Their impacts in the Black Sea will be assessed.

Georgian pilot site. Forest cover changes.
Red – tree loss / Light blue - gain

Assessment on changes in wetland and floating vegetation cover
(Ukraine, Georgia, Armenia)

- Changes in wetland and floating vegetation cover (growth intensity) associated with nutrient concentration in surface waters will be assessed.

- PONTOS platform will be used to estimate the dynamic of changes in wetland and floating vegetation cover, identification areas and time of floating vegetation blooms
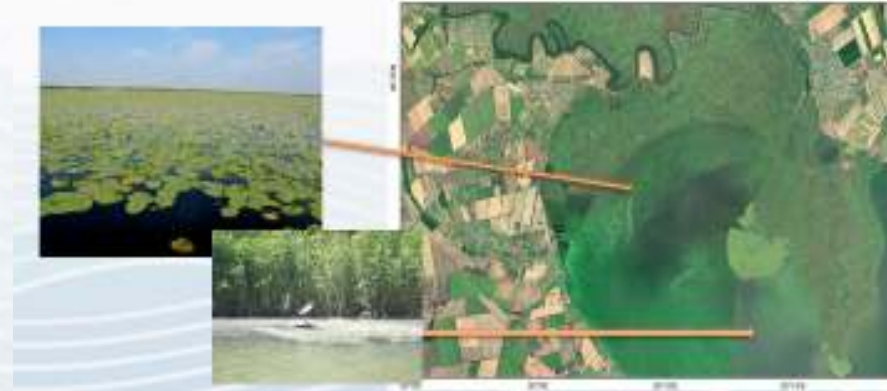
Ukrainian pilot site. Wetlands and floating vegetation

Assessment on chlorophyll concentration and eutrophication dynamics
(Ukraine, Georgia, Greece, Armenia)

PONTOS platform will acquire data from land and marine databases and process space-borne images

- **to assess the dynamics of chlorophyll concentration &**
- **to monitor nutrient pollution within the pilots for the period 2009-2021.**

In-situ historical and PONTOS field data (e.g. total N, dissolved organic N, NO3-, NH4+ & Phosphorus total P, PO43-) will be used for establishing correlations.
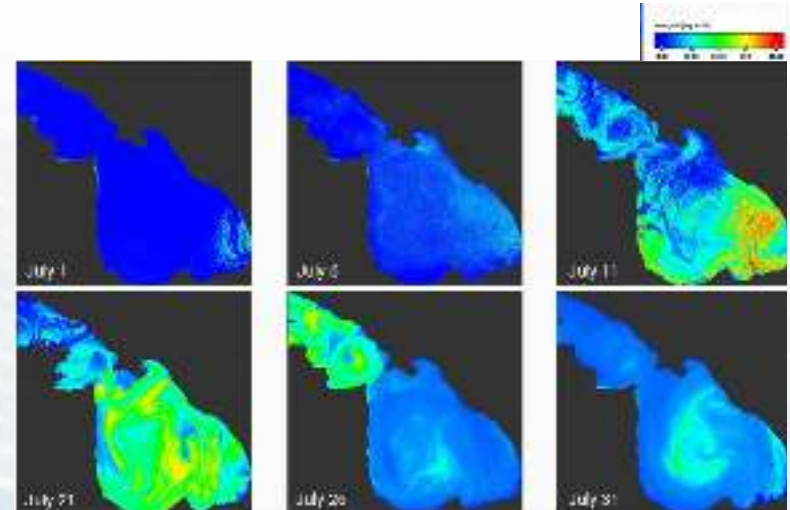
Armenian pilot site

Assessment on agricultural water balance, water productivity and water stress indices (Ukraine, Greece, Armenia)

- Precipitation and evapotranspiration data will be derived using satellite-borne and Copernicus-based databases.

- Using indicative soil profiles from national/ international databases **Aquacrop model** results will produce water balance components and water productivity indicators.

- Space-borne data will be used to assess the water stress status.

AquaCrop Model Input Data
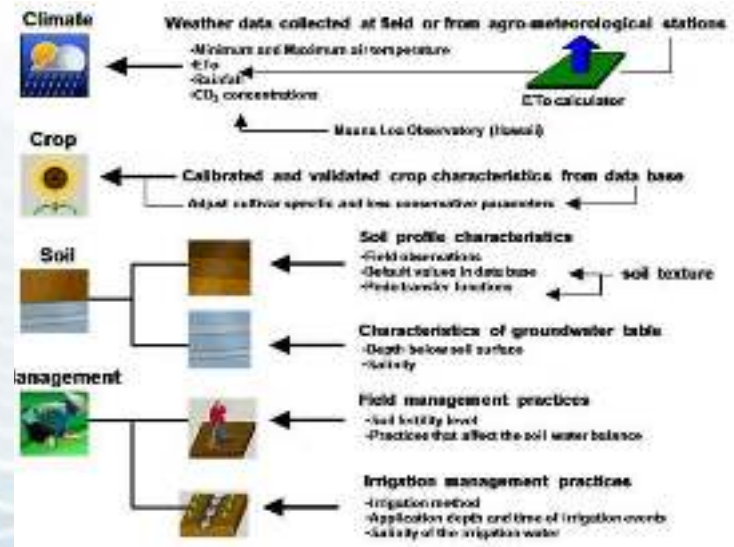
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