PONTOS Newsletter #5

Common borders. Common solutions.

Copernicus assisted environmental monitoring across the Black Sea Basin

EU PONTOS WEEK HELD IN ARMENIA

On October 10-14, the American University of Armenia (AUA) Acopian Center for the Environment (Armenia) held PONTOS week in Armenia in collaboration with the Environmental Protection and Mining Inspection Body (EPMIB) of the Republic of Armenia (RA). Participating institutions included the Center for Research and Technology Hellas (CERTH), Democritus University of Thrace (DUTH, Greece), Green Alternative (GRAL, Georgia), and I.I. Mechnikov Odessa National University (ONU, Ukraine).

The PONTOS Week included a wide range of events and activities, including the Second set of Training Sessions on Earth Observation and Environmental Monitoring for Young Scientists and Practitioners,a field visit to Lake Sevan, the PONTOS final conference, a panel discussion and press conference, and the PONTOS hackathon.

More than 100 participants attended PONTOS Week, among them policymakers, government officials and various agency representatives, scientists, researchers, students, civil society representatives, journalists, and others. All national agencies having relevance to the PONTOS project were invited to participate.

PONTOS Final Conference

Opening speeches were delivered by Alen Amrikhanian, director of the AUA Acopian Center for the Environment, Dr. Levon Azizyan, acting director of the Hydrometeorology and Monitoring Center (a state non-commercial organization), and Hovhannes Martirosyan, head of the RA Environmental Protection and Mining Inspection Body.

"Within the framework of the PONTOS project, the data and services of the Copernicus system are used to conduct analysis and monitoring of the environment. Consequently, we have created tools and algorithms to analyze satellite images and see what changes have taken place,what the dynamics are, and what predictions can be made. We can use satellite images to go back 20, 30 or more years and see what the situation with Lake Sevan was like in the 1980s and successively,how it has changed, and what will happen next," mentioned Aghavni Harutyunyan in her speech.

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Black Sea CROSS BORDER COOPERATION

CROSS BORDER COOPERATION

During the conference, PONTOS project outputs — the findings from the five completed assessments and the PONTOS operational platform — were shared with the audience. Presentations included topics related to environmental challenges, their assessments and public participation in the PONTOS project pilot areas. The latter includes Lake Sevan and its catchment area (Armenia), the entire coastline of Georgia and the Kolkheti lowlands (Georgia), the Nestos River, its delta, the coastal zone near the delta (Greece), and the Dniester River delta and adjacent estuary, beaches and recreation areas from the city of Odessa to the Danube Delta (Ukraine). Researchers and scientists from four countries, namelyProfessor Georgios Sylaios of the Democritus University of Thrace, Dr. Irakli Macharashvili of Georgia's Green Alternative, Dr. Sergiy Medinets of the Odessa National I.I. Mechnikov University, and Dr. Garabet Kazanjian of the AUA Acopian Center for the Environment presented the objectives and results of their respective assessments.

Subsequently, there were presentations by the partners from Greece, Dr. Ioannis Manakos of the Centre for Research and Technology Hellas, Eleftherios Katsikis of the Centre for Research and Technology Hellas, and Dr. Nikolaos Kokkos of Democritus University of Thrace. They touched upon the PONTOS Platform and Resources, its components and demonstration, including PONTOS data cube, PONTOS web application, and PONTOS webGIS. More information is available on the PONTOS **website**.

Representatives of several Black Sea Basin (BSB) projects being implemented in Armenia also attended PONTOS Week, namely BSB963 Protect-Streams-4-Sea, BSB1034 The Sea of Wine, BSB1107 BeECO, and BSB1135 AGREEN. In turn, they shared insights about their respective projects and relevant updates.

The conference concluded with a press briefing to respond to questions from over ten media reporters present.

The final conference recording is available **here**.

THREE-DAY TRAINING FOR YOUNG SCIENTISTS AND RESEARCHERS

During the PONTOS week, a three-day training was organized for young scientists, researchers, local and national government representatives, and university students. The trainees were from the RA Ministry of Environment, Ministry of Territorial Administration and Infrastructure, Ministry of Emergency Situations, Yerevan State University, Ararat Marzpetaran (district government), the RA National Academy of Sciences, Armenian National Agrarian University, and Hydrometeorological Monitoring Center. The topics specifically addressed monitoring of environmental problems and challenges, revelation of environmental problems and their study through satellite images. The training covered the PONTOS platform along with theoretical and practical exercises on earth observations for the following areas of study – water quality; eutrophication; assessment of water balance, water productivity, and water stress indices; and assessment of forest cover changes and their impact on the environment.

The training concluded with a study visit to the PONTOS Armenian pilot area, Lake Sevan. The field trip included both participants and PONTOS team members. The training resources are available **here**.

THE PONTOS HACKATHON

On October 12-13, EPMIB and the AUA Acopian Center for the Environment jointly organized the PONTOS hackathon for teams from different academic institutions in Armenia.

Five teams and twenty-seven students and researchers participated, including Libero (Yerevan State University); Ecoteam (Center for Ecological Noosphere Studies of the RA National Academy of Sciences); ASPU PONTOS (Armenian State Pedagogical University); Mind Galactice (Yerevan State University); and EcoFuture (National Agrarian University of Armenia).

The hackathon challenges consisted of two parts — generation of new ideas using the PONTOS operational platform and mounted online services/tools, and the suggestion to create a useful application (or stand-alone solution/tool) for the PONTOS platform using Copernicus data. The suggested topics of the hackathon include ideas related to sustainable development goals; land changes (it can include different classes of land cover/land use, such as forests, crops, grassland, water surfaces and artificial covers like roads and buildings); water health and pollution; agricultural practices (such as estimate crop size to provide soil moisture information and to forecast yield); climate change, and so on.

EcoFuture's idea is to clean Lake Sevan with the help of different machines and pumps from cyanobacteria, as needed, and use the waste to generate biogas. For biogas production various types of waste from Lake Sevan can be utilized.

Ecoteam's idea is to create a beach assessment layer in the PONTOS platform that will reflect the environmental status of private and public beaches. It will be obtained by combining the existing layers in the PONTOS platform. The idea supports tourism development in the lake area.

ASPU PONTOS proposes to create extracurricular content and activity in schools to include the PONTOS educational system as a mobile application and a website where students can get ecological knowledge and information (similar endeavors are the Armath engineering laboratory, My School, Edmodo, Solo Learn systems).

Libero offers to clean Lake Sevan through two methods: using cyanobacteria viruses and physical cleaning for further usage. Also, the team suggests improving PONTOS by adding a system that records methane emissions.

Mind Galactics' idea is to construct a pipeline along the entire Lake Sevan, pumping sewage into the pipeline, chemically cleaning it, and returning the water to the lake.

PONTOS IMPACT

Capacity

- 8 capacity building trainings with about 200 young scientists trained in 4 countries
- 18 trainers trained
- Pontos platform built
- 4 assessments carried out in Lake Sevan
- 4 assessments carried out in Dinester River Delta
- 4 assessments carried out in Rioni River Delta
- 3 assessments carried out in Nestor River Delta

Events

- 4 brainstroiming events with 200 participants
- 4 local events for familiraization with the project
- Participation in 4 international events
- Hackathon organized
- 30 team meetings organized
- 7 press conferences organized
- 1 media tour for journalists in Armenian pilot site

Partnership

- 4 countries in a consortium
- 6 partner organizations
- 9 memoranda of understanding signed in four countries
- 4 local clusters formed on water management and pollution prevention in all participating countries

Outreach

- 170,000 members of the general public reached through newsletters, website, social media
- 6 newsletters prepared
- 6 virtual trainig modules prepared for the general public
- Website pontos-eu.aua.am built and managed
- About 5000 promotional leaflets distributed
- Project video prepared

PONTOS EVENTS HELD IN ODESA, UKRAINE

Several online events organized by the Regional Centre for Integrated Environmental Monitoring (RCIEM) of the Odessa National I.I. Mechnikov University (ONU) took place in July 2022 in the framework of the Copernicus Assisted Environmental Monitoring Across the Black Sea Basin (PONTOS) Project funded by the European Union's ENI CBC Black Sea Basin Programme 2014-2020.

On July 20, the Joint Open Workshop in Odessa was attended by 60 participants. In this event, the PONTOS consortium updated the stakeholders on the overall project progress in four participating countries (Armenia, Georgia, Greece, and Ukraine) and presented the preliminary results.

The workshop was opened by Prof. Volodymyr Ivanytsya, the ONU Vice Rector. He welcomed the participants on behalf of the Rector, Prof. Vyacheslav Truba. "I hope," Prof. Ivanytsya said, "that today's and upcoming PONTOS events will be of interest to a wide circle of participants – representatives of the scientific community, authorities, sectoral agencies, NGOs – and that the project data on the current environmental challenges will be helpful in the post-war sustainable restoration of the country."

The next speaker, Aghavni Harutyunyan, Project Manager of the PONTOS project from the American University of Armenia (AUA), also greeted the participants and presented general information on the project – its goals, outcomes, partners, pilot areas in all partner countries, overall and specific objectives and the expected results.

During the session dedicated to the PONTOS activities, the project partners were told about the preliminary results of the assessments performed in the pilot areas. A report on the dynamics of coastal line changes assessment in Greece, Georgia and Ukraine were presented by Dr. Konstantinos Zachopoulos, DUTH, Greece. Assessment of the forest cover changes and their consequences on the environment performed in Armenian and Georgian pilot areas was covered by Dr. Irakli Matcharashvili, GRAL, Georgia. Assessment of changes in wetland and floating vegetation cover was described by Dr. Sergiy Medinets, ONU, Ukraine. Assessment of Chl concentration and eutrophication dynamics was presented by Dr. Garabet Kazanjian, AUA, Armenia. Agricultural water balance, water productivity, and water stress indices were covered by Dr. Ioannis Tsakmakis, DUTH, Greece.

The next session was dedicated to presentations of partner organizations (BSB projects implemented in the Ukrainian pilot).

IASON Project (BSB 1121): monitoring of Invasive Alien Species (IAS) in the Danube Delta and risk assessment presented by Dr. Mykhailo Son, Institute of Marine Biology (National Academy of Sciences of Ukraine).

Dr. Valeriy Lebid and Dr. Kateryna Vasutunska from the Odesa Polytechnic National University (Ukraine) presented the LeNetEco2 (BSB 1088) Project – Establishment of Learning Network for the consolidation effort of joint environmental control and monitoring in the Black Sea Basin.

Next presentation was dedicated to the Protect-streams-4-Sea Project (BSB 963) made by Dr. Ilia Trombitsky, Executive Director of the Eco-TIRAS International Association of River Keepers Moldova.

Last but not least came the presentation on the ANEMONE Project (BSB 319): Results of the project in the Ukrainian part of the Black Sea delivered by Yuriy Denga of the Ukrainian Scientific Centre of the Ecology of Sea, Odessa.

The Joint Open Workshop was wrapped up by Dr. Sergiy Medinets, who thanked all the speakers for their comprehensive presentations and words of support for the Ukrainian people.

Despite all the challenges, he said, from Covid-19 to the full-scale invasion of Russia to Ukraine, the project has already produced many valuable results and will be completed successfully and on time.

The Local Open Workshop in Odessa took place on July 21, 2022. In this event, the team from Odessa National I.I. Mechnikov University, the Ukrainian partner of the PONTOS project, presented in more detail the preliminary results of the four regional assessments performed in the Ukrainian pilot area:

1. Coastline changes (Prof. Evgen Cherkez)
2. Dynamics of chlorophyll concentration and eutrophication (Dr. Volodymyr Medinets)
3. Changes in aquatic vegetation cover (Dr. Sergiy Medinets)
4. Agricultural water balance (Dr. Sergiy Medinets)

The same day afternoon, on July 21, one more online workshop was organised, the Local event for the familiarization with the PONTOS platform in Odessa. During this event, the PONTOS team presented to the participants a fully-operated beta-version of the interactive PONTOS Platform developed within the project. The capacities of the three modules of the Platform are shown in the example of the Ukrainian pilot site. The participants gained practical hands-on experience on how to effectively and efficiently use the Platform as they had a chance to repeat after the speakers using their laptops or smartphones. The participants asked questions and made their suggestions.

The Open Data Cube and Web Application modules were presented by Eleftherios Katsikis (CERTH) and the Web GIS module by Dr. Nikolaos Kokkos (DUTH).

The participants of all three events showed their high interest in the project results and asked many questions about the practical implementation.

In particular, all the participants appreciated the PONTOS platform's possibilities and convenience and expressed their willingness to use it in their daily work.

On the 26 and 27 of July 2, Training Session on Earth Observation (EO) and Environmental Monitoring for Young Scientists and Practitioners in Odessa was held online. Forty-three participants attended the training. The event was opened by Dr. Sergiy Medinets (ONU), who greeted the participants willing to increase their knowledge and skills in space image processing. Even Gazetov, the ONU senior researcher, for two days telling the participants different 'secrets' and 'peculiarities' of using the EO, from the basic knowledge required to work with the PONTOS interactive platform and the data portals Copernicus Open Access Hub and Sentinel Hub to the advanced ins and outs of chlorophyll concentration calculations using the Sentinel Application Platform (SNAP) instrument and basics of images processing using Semi-automatic Classification Plug-in (SCP) based on a machine learning algorithm.

EO is a source of objective information to monitor the environment. It can raise the stakeholder's awareness of its state significantly, especially in the Black Sea Basin countries, in most of which the in-situ environmental monitoring networks are either still underdeveloped or not extensive enough. The training has demonstrated the EO's daily use's great potential for almost everyone, from a student to a regional authority representative.

The participants expressed their deep gratitude to the PONTOS team for the work done and the knowledge shared on the primary and contemporary methods of space image processing. They expressed their great interest in further training on the EO data used for environmental monitoring.

PONTOS ORGANIZES MEDIA TOUR TO LAKE SEVAN BASIN

The American University of Armenia (AUA) Acopian Center for the Environment, along with the Environmental Protection and Mining Inspection Body of the Republic of Armenia (RA) organized a media tour to Lake Sevan and its catchment area. The tour included visits to Hayrivanq, Noratus, Litchq, and Martuni areas. The PONTOS project research team examines the pilot site, Lake Sevan and its catchment area, conducting assessments and analysis of land cover and land use changes in areas induced or burned by fires and resulting consequences, as well as wetland and floating vegetation cover changes from 2009 to 2019; eutrophication incidents from 2009 to 2021 (frequency and magnitude) and their relation to land-based nutrient fluxes; and agriculture water balance, water productivity, and water stress indices.

During this field visit, the journalists were introduced to the specific environmental challenges and problems of the pilot site that the PONTOS project is currently addressing, such as aquatic vegetation and related challenges, the problem of solid waste and wastewater, forest cover challenges, fish farms and aquatic vegetation, and so on.

In each area, the PONTOS researchers presented the problems, the solutions and support that could be provided within the framework of this project.

The PONTOS program largely contributes to the development of research methodology and builds capacity within the relevant organizations in Armenia while leveraging urgent attention to existing problems.
Project outcomes include a number of significant contributions for Armenia and partner countries. In particular: The creation of the PONTOS platform, including data cube, WebGIS, and Web application, which creates an opportunity for policymakers,

Dr. Garabed Kazanjian, PONTOS Researcher

journalists, researchers, students, and interested citizens to get a quick analysis of the PONTOS project pilot area Lake Sevan.

The platform ensures the availability and updating feature of relevant data and information for transboundary environmental monitoring of the Black Sea basin.

Through partner-developed educational materials and resources in addition to capacity-building activities, the program promotes the development and use of a consolidated methodology across all pilot areas of the PONTOS project.

The creation of a collaborative team comprising members from PONTOS partner countries, which in turn brings together local specialists involving them in the project implementation to ensure consistency of action among all specialists from partner countries. This significantly facilitates data sharing through the use of the PONTOS project tools.

The project raises awareness of water quality and dynamics. At the end of the media tour, the participating journalists and media representatives released articles related to the tour.

PROJECT COORDINATION MEETING HELD ONLINE IN UKRAINE

On July 15, Copernicus Assisted Environmental Monitoring Across the Black Sea Basin – PONTOS consortium members participated in the fourth coordination meeting held online and organized by the PONTOS Ukrainian partner from Odessa National I.I. Mechnikov University team. The whole PONTOS team, including researchers, project managers, communication and administration teams participated in the meeting.

The meeting commenced with welcoming remarks from Sergiy Medinets of Odessa National I.I. Mechnikov University (ONU). Project Coordination Meeting Agenda was dedicated to the implemented activities and progress of the project team since the last coordination meeting in Tbilisi. The team discussed the upcoming deliverables and works.

As the project is getting close to be finished in six months, the updates on the assessments in the pilot sites of PONTOS project were presented. Research team has started the preparation of the final reports for each of the four assessments (forest cover changes, changes in wetland and floating vegetation cover, Chl concentration and eutrophication dynamics, and agricultural water balance, water productivity and water stress indices) compiling the findings of the fieldwork and research.

Dr. Garabed Kazanjian presenting at the 36th CISL

PROFESSOR KAZANJIAN ATTENDS 36TH CONGRESS OF THE INTERNATIONAL SOCIETY OF LIMNOLOGY

BERLIN, Germany — On August 8, American University of Armenia (AUA) Assistant Professor and PONTOS project researcher Dr. Garabet Kazanjian participated in the 36th Congress of the International Society of Limnology (SIL 2022) on the topic "The next 100 years — Sensing and Safeguarding Inland Waters." At SIL 2022, Dr. Kazanjian gave a research presentation on the assessment of chlorophyll concentration and eutrophication dynamics within the PONTOS project. The presentation was followed by an active discussion on questions related to enhancing remote sensing capabilities and nature-based solutions to improving the water quality of Lake Sevan. Productive discussions with researchers from scientific institutions in Germany, Netherlands, France, Canada, and other countries, as well as the Berliner Wasserwerk, established fertile ground for future collaboration on the topic.

Founded in 1922 by visionaries August Thienemann and Einar Naumann, the International Society of Limnology (SIL) established the science of inland waters, encompassing lakes and ponds, streams and rivers, surface and groundwater, and wetlands. This comprehensive undertaking reflected the founders' broad perspective and set the course to consolidate limnology as a systems science drawing on physics, chemistry, biology and increasingly the socioeconomic sciences, while recognizing the value of combining curiosity-driven research and analysis of real-world problems. Most notably, however, SIL and its conferences stand out as being genuinely international in nature, aspiring to represent science and people from all continents, a hallmark of the society from its inception at the 1922 inaugural congress in Plön, Germany.

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GREEN ALTERNATIVE

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