An open surface Water Quality Emergency Monitoring Service (WQeMS) for the water utilities' industry leveraging on the Copernicus products and services. Target is an optimized use of resources by gaining access to frequently acquired, wide covering and locally accurate water-status information.

Newsletter VI

WQeMS e-Training Service

Ioannis Manakos, project coordinator
(on behalf of the consortium)

This project has received funding from the European Union's Horizon 2020 Research and Innovation Action program under Grant Agreement No 101004157

Contents

Highlights

During last few months, we had the chance to organise and contribute to multiple dissemination and outreach activities in Earth Observation and the Water sectors. Among numerous occasions, we may highlight here our contributions a) to the GEOSS community during the Open Data/Open Knowledge Workshop in Geneva (Switzerland), b) the Copernicus community at the RSCy2023 Conference in Ayia Napa (Cyprus), and c) the engagement with the private sector at the Water Innovation Europe (WIE) events in Brussels (Belgium), where WQeMS supported a booth and took part in Working Group discussions. Moreover, WQeMS was shortlisted for its candidacy at the WIE Global Water Challenges Award category 2023. You may find many more in the Chapter "Outreach Activities" that follows.

Editorial

Dear Reader,

competitiveness is linked to the ability of the professionals to accept and adopt state-of-the-art technological tools and workflows in their daily practice. In this context we support water sector stakeholders to acquire the necessary capacity for the use of earth observation services and products in their daily activities through the delivery of an up-to-date online and free e-Training service.

In this newsletter we kindly welcome you to learn more about the capacity building material and the features of the WQeMS e-Training service. You may also read about our efforts and activities to inform the earth observation community and water sector stakeholders about the project service lines and the benefits utilizing the WQeMS platform.

Visit our website for more information: https://wqems.eu/.

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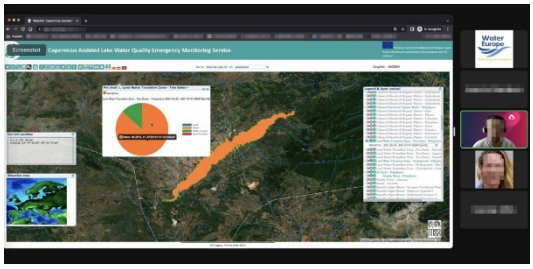
Outreach Activities

The whole duration of the project dissemination and communication activities took place at local, national and international levels reaching towards a diversity of stakeholders and possibly interested/ benefitting parties. The last months towards the completion of the project, and pursuing sustainability, dissemination and communication activities intensified through all available means (online, like populating website with new material, the delivery of the platform, and the social media; and on site through existing and expanding WQeMS network of stakeholders). In the following we have selected to present relevant on-site activities during the last 3 months, which are of higher value for the project.

29 June 2023: WQeMS co-organized the first webinar of the Water Europe Human Capital Working Group: "Train and Develop yourself". The webinar showcased the WQeMS Platform and the e-Training Service.



26-29 June 2023: WQeMS contributed with presentations to the 10th Workshop of the South Central and Eastern European Regional Information Network of the Global Observations of Forest Cover and Land Use Dynamics in Brno, Czechia.

20-22 June 2023: WQeMS actively contributed to the Water Innovation Europe 2023 in Brussels, Belgium. Capacity building and innovation were in focus. A booth supported project's visibility throughout the event, while WQeMS competed against other international efforts for innovative initiatives that have contributed to achieving the water-related Sustainable Development Goals – SDGs! This way the remarkable efforts of WQeMS consortium in advancing water monitoring solutions by assimilating Copernicus products were recognised by the esteemed judging panel.

15-16 June 2023: WQeMS participated in the GEO organized Open Data/Open Knowledge Workshop in Geneva, and showcased its contribution to the GEOSS Portal, amplifying the accessibility and availability of

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WQeMS water quality monitoring service products.

25 May 2023: The WQeMS was presented at the Sustainable Value Creation Summit 2023 in NOVA SBE, Carcavelos, Portugal, where companies and professionals in Earth Observation services (and beyond) discussed about market challenges and products' exploitation.

17 May 2023: The possibility of the WQeMS services to be adopted by Copernicus Emergency Management Service was discussed with key policy makers, both at national and EU level at the Workshop 'Satellite-based Services for Disaster Risk Management' in Nicosia, Cyprus. The event was co-organised by the Deputy Ministry of Research, Innovation and Digital Policy in Cyprus, the European Union Agency for the Space Program (EUSPA) and the international organization Eurisy.

23-28 April 2023: WQeMS working team members discussed its results in the framework of the European Geosciences Union General Assembly 2023, Vienna, Austria.

25-27 April 2023: WQeMS was awarded the best paper award at the 9th International Conference on Geographical Information Systems Theory, Applications and Management 2023 in Prague, Czechia.

6-7 April 2023: The WQeMS project held meetings with key technical and policy making local stakeholders in Cyprus to raise awareness: i) the Water Development Department of Cyprus; ii) the Water Board of Limassol; and iii) the Department of Electronic Communications which acts as the National Contact Point of ESA and Copernicus in Cyprus. Similar events took place in Spain, Italy, Greece, and Finland within the last months of the project.

3-5 April 2023: The WQeMS project organized a "Water Resources" session with 5 oral presentations at the Copernicus community 'Ninth International Conference on Remote Sensing and Geoinformation of Environment - RSCy2023' in Ayia Napa, Cyprus.

14-15 March 2023: The WQeMS project was represented in the Water Market Europe 2023. WQeMS, as a solution provider presented its products and discussed their exploitation opportunities.

Important achievement: The WQeMS - ONDA catalogue Demo has been published on ONDA marketplace, where it exploits the ONDA DIAS infrastructure for accessing Copernicus products.

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The e-Training Platform

Accessing the e-Training Platform can be achieved through the "Training" tab at the WQeMS main portal (https://wqems.eu), or through the WQeMS Platform at https://portal-wqems.opsi.lecce.it on the top left side of the Dashboard. The e-Training Platform is also offered for direct access through the URL: https://training.wqems.eu .

A new user interested in utilizing the full spectrum of features and functionalities offered by the WQeMS e-Training Platform must start by creating a new account. This can be done by clicking the "Create New Account" button located in the lower right corner of the login page (Figure 1).

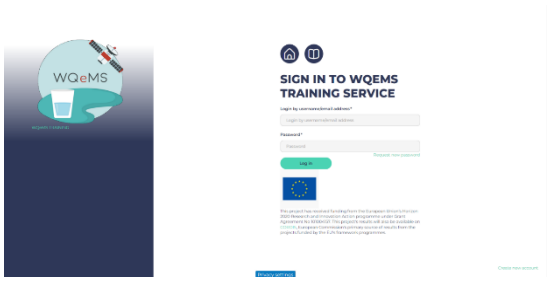

Figure 1. Landing Page of the WQeMS e-Training Service

The main functionality is offered through the Catalogue section, which provides a list of the WQeMS Courses in which the user can enrol, to explore and enhance their skills and knowledge. Currently, the Platform hosts the WQeMS Course developed in the English language with multiple Modules and Units. Parts of the Course are also offered in separate localised versions for the partner languages (Figure 2).

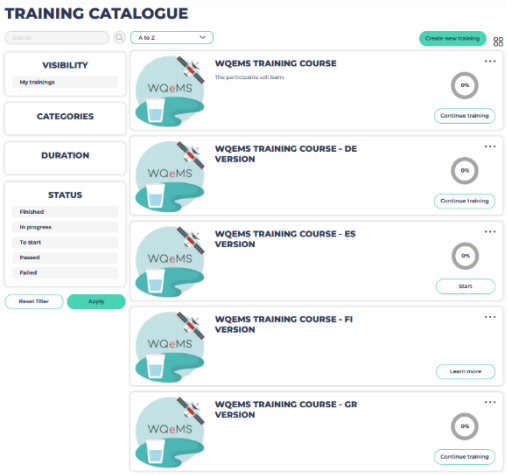

Figure 2. The Training Catalogue page

Training Content

The WQeMS Training Content is organised into six (6) Modules with several Units in each Module, aiming to offer a full coverage of the addressed topics. The Course structure is as follows:

Pre-assessment Questionnaire.

Module 1: Understanding Copernicus data and services.

- Unit 1.1: Introduction to Copernicus.
- Unit 1.2: How to access the Copernicus data and services.

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Module 2: Technical aspects in Earth Observation services.

- Unit 2.1: Understanding images and spectra from the earth.
- Unit 2.2: Understanding remote sensing.
- Unit 2.3: Modelling of environmental processes.
- Unit 2.4: Classification, clustering, and other machine learning tools.
- Assessment activities.

Module 3: Inland water features' estimation services enabled by earth observation.

- Unit 3.1: Introduction to the WQEMS services.
- Unit 3.2: Earth observation related water quality features.
- Unit 3.3: Algae bloom events detection.
- Unit 3.4: Land-water transition zone change detection.
- Unit 3.5: Extreme events detection (floods, muddy water, oil spills).
- Unit 3.6: WQeMS alerting service (reporting and crowdsourcing).
- Unit 3.7: Semantic interoperability between earth observation and non-earth-observation datasets.
- Unit 3.8: Water data analytics for decision support.
- Assessment activities.

Module 4: WQeMS Platform - Use-cases – Applications.

- Unit 4.1: Managing water resources with earth observation data (including enabling technologies and application use-cases).
- Unit 4.2: The WQeMS Platform – Range of functionalities and user manual.
- Unit 4.3: WQeMS Platform Use-cases.

Post-evaluation Questionnaire.

Training Pathways

The trainee is expected to first start the Course by accessing and completing the "pre-assessment questionnaire". This activity aims at generating a profile of the trainee, capturing his/her academic and professional background, as well as his/her expectations from attending the WQeMS Course. After submitting the pre-assessment questionnaire, the trainee is presented with a feedback note, which is directly linked to five pre-identified Training Pathways as presented in the sequel, with an aim to offer a tailored learning experience.

Training Pathway 1: Full-range training.

- Full range of content and a complete blended training experience. All Modules and all Units are recommended to be utilised in their full potential.
- Emphasis on the hybrid mode of training, with material supporting self-training and the trainers to deliver the on-site trainings.

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Training Pathway 2: Familiar with background knowledge; requiring strong WQeMS-related skills for specific services.

- Covering the need of trainees that are already familiar with the background knowledge that is offered by Modules 1 and 2.
- Trainees do not need to focus on all WQeMS services. Selection of Module 3 Units is implemented.
- Differences may apply per training site, based on the actual needs.
- The Module 4 may be fully included, to facilitate trainees need to implement services in their everyday practice.

Training Pathway 3: Training to attract interest of domain experts.

- Covering the need to 'attract interest'.
- The trainees are assumed to have not decided on whether to use the WQeMS Platform; they need some basic training to help them decide.
- There is no need going into details in Module 3 and also there is no need to cover Module 4.
- It is important to go through Modules 1 and 2, focusing on understanding all concepts and being able to understand the benefits.

Training Pathway 4: Focusing on Academia.

- Promoting relevant research; offering opportunities to young researchers through relevant workshops and other events.
- This is not focusing on the application of the services, but mostly on the coverage of all subjects and the triggering of the relevant discussions horizontally within the core scientific subjects.

Training Pathway 5: Focusing on Industry.

- Targeting stakeholders in ICT industry, aiming to promote the earth observation technologies, especially, in the water sector.
- Focusing on presenting the basics about Copernicus and the WQeMS services.
- The trainee is invited to go little deeper into Module 2, which discusses the technical background.
- The objective is to encouraged access at own convenience of the trainee to learn more.
- Module 4 can be omitted since the focus in this type of training need/pathway is not on the hands-on training.

Based on the responses of the trainee and a set of rules, a score is calculated for each of the training pathways. At the end, depending on which training pathway has received the higher score, the trainee is presented with a recommendation about the pathway to follow.

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Content presentation

The WQeMS e-Training Platform provides a very easy and accessible way of navigating through the training content. The structure of the content is presented on the left of the screen (Figure 3), initially in a collapsed form. The trainee can expand the Units using the small arrows next to the titles of the Units. Expanding a Unit reveals a list of training activities, which can be clicked to present the respective content on the right.

The training activities contain interactive content that has been created with the support of the H5P tool (www.h5p.org), fully integrated within the adopted e-Learning Platform. The tool provides access to multiple types of activities, supporting reading and assessment (self or guided). The adopted approach for all Units was to first present the reading material created by the project and then present third-party supportive material that the trainee can use to enhance their knowledge. At the end of Modules 2 and 3, separate assessment Units are included, where multiple types of interactive assessment exercises are utilised as explained below.

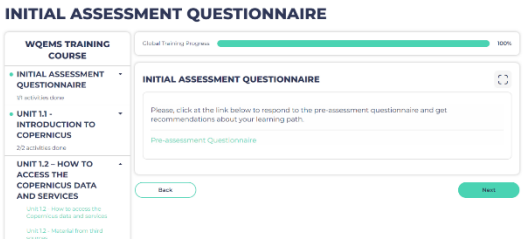

Figure 3. The Training Catalogue page

The reading activities comprise textual information, slides/presentations, as well as images and videos (internally streamed or embedded from third sources). For the convenience of the trainee and for the clarity of the content, a specific style has been used consistently in the project-created reading material. An example is presented in Figure 4. The e-Training Platform provides easy navigation through the slides.

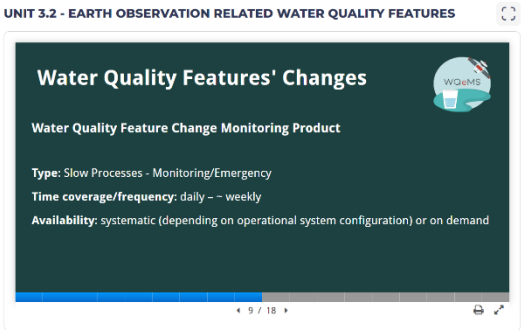

Figure 4. An example of a reading activity of type slide/presentation

The trainees have free and easy access to all related reading material.

In addition to the reading material, the WQeMS Course also offers a range of assessment activities. These activities are of different types, i.e., single/multiple choice questions, fill-in the blanks from a list of pre-defined

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options using drag&drop, fill-in the blanks without a pre-defined list, drag&drop items (text or images) to put in an order, true/false questions, etc. Examples of all types of activities are provided in Figure 6 to Figure 8. The trainees can use the assessment activities to evaluate their acquired knowledge and skills.

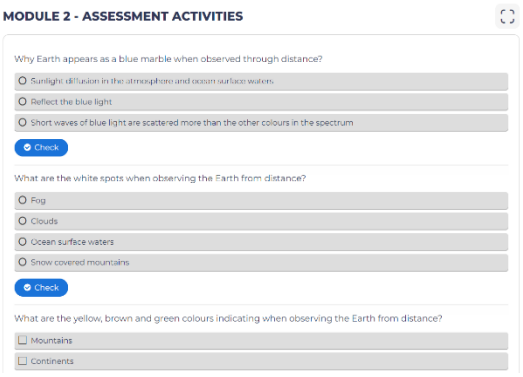

Figure 6. Example of single/multiple choice assessment activities

Figure 7. Example of true/false type of assessment activity

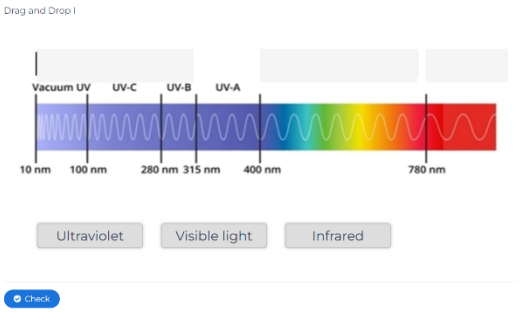

Figure 8. Example of drag&drop type of activity, with images

Assessment & immediate feedback

When working on the assessment activities, trainees receive prompt feedback on the correctness of their chosen answers. This immediate feedback mechanism plays a crucial role in the learning process, allowing trainees to assess their performance and gain valuable insights into their understanding, as well as identify areas that may require further attention. In case of an incorrect response, trainees can review the correct solution and learn from their mistakes. They may also have the chance to retry the question, reinforcing their understanding.

In general, navigating through the course is a seamless process. The trainees can progress from one module or unit to the next by following a straightforward navigation system. Each section is designed to build upon the knowledge gained, providing a comprehensive learning experience.

By actively engaging with assessments and navigating through the course, users can confidently track their progress, strengthen their understanding, and acquire the necessary skills in earth observation based inland water sources monitoring.

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Trainees' engagement

The administrators of the WQeMS e-Training Platform have access to a "Statistics" section that provides very useful insights about the usage patterns of the training content. As an example, Figure 9 presents the monthly statistics for May 2023, showing the number of trainees interacting with the platform every day, as well as the percentages of completion/use of the training content.

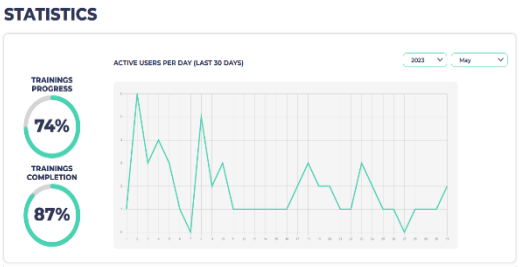

Figure 9. Monthly statistics of the trainees' engagement – May 2023

The engagement of the trainees is captured through the percentages of involvement in the course, as well as the completion of the course.

Sustainability

As explained, the emphasis of this work is on the water professionals to acquire the necessary capacity (knowledge, skills, and competencies/attitudes/autonomy) for the effective adoption, and subsequently the sustainability of the developed services. The WQeMS e-Training Platform has been built on top of an open-source Learning Management System (LMS) (https://www.opigno.org/), which is distributed under the terms of the GNU GPL v.3 license. In addition, the access to the training content is provided free of charge to the trainees that want to follow a self-training mode.

The adopted operation framework of the platform enables long-term positive impact of the WQeMS capacity building activities. Stakeholders will continue to have easy access to high quality and detailed training content. Existing trainees can revisit the Course modules and refresh their knowledge on background items or on specific WQeMS services' background theory and actual use through the WQeMS Platform. In parallel, new trainees can have free access to attractive material that will offer them background knowledge for the quick adoption of the WQeMS services.

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