



POSTER

eosc | AquaINFRA

April 2025

aquainfra.eu

   /aquainfraeu

Contents

Editorial: Coordinators Address	1
AquaINFRA Interaction Platform (AIP) & Virtual Research Environment (VRE)	2
Data Discovery and Access Service (DDAS)	3
Open Educational Resources (OERs)	4
Case Studies	5
Upcoming Events	7

Dear Readers,

As the AqualNFRA project moves into its second year, this newsletter provides an opportunity to introduce the main aims and objectives and review the progress made during the first year.

AqualNFRA is a pioneering project at the forefront of aquatic open science, funded through the European Open Science Cloud (EOSC) initiative. With a strategic investment of €16 million, AqualNFRA and its sister project Blue-Cloud 2026 play a pivotal role in advancing research within the marine and freshwater domains of the European Open Science Cloud (EOSC).

AqualNFRA's significance lies in its ability to address the pressing need for collaboration across marine and freshwater domains and directly contribute to the EU's mission to "Restore our Ocean and Waters" by 2030. Furthermore, it advances the European Open Science Cloud (EOSC) by developing a comprehensive research infrastructure tailored to the needs of aquatic scientists.



The work carried out in the AqualNFRA project is dedicated to enhancing collaboration, accessibility, and interoperability within the aquatic research community. By leveraging EOSC's robust infrastructure and services, AqualNFRA aims to connect researchers globally, providing access to diverse resources and ensuring seamless data exchange.

The project addresses challenges such as: Lack of data interoperability, Lack of efficient tools for data collection, analysis, and visualisation. Collaboration barriers due to the lack of platforms that facilitate interdisciplinary cooperation among stakeholders.

AqualNFRA addresses these needs through key objectives, including ensuring seamless access to comprehensive freshwater and ocean data, developing online research environments, breaking down data silos, implementing practical case studies, and building capacity. It also focuses on providing policymakers with science-based tools and seamlessly integrating with the European Open Science Cloud (EOSC). To meet these objectives, AqualNFRA is co-designing and developing EOSC-compliant services that allow users to easily find and access harmonised data. The services comprise the AqualNFRA Interaction Platform (AIP), AqualNFRA Data Discovery and Access Service (DDAS), and the Virtual Research Environment (VRE), supported by interactive visualisation. Practical case studies demonstrate real-world applications and the impact of AqualNFRA services, validating the project's impact on water quality improvement, ecosystem restoration, and biodiversity conservation.

AqualNFRA's holistic approach and integration with EOSC position it as a key driver of innovation and collaboration within the marine and freshwater domains, contributing significantly to aquatic research and sustainable management of aquatic ecosystems.

Progress over the first half of the 4 year project has been good and many services are now demonstrable, but there is more work to be done. We look forward to collaborating with you at various conferences over the coming months, including: European Ocean Days (March), EGU General Assembly (April), LBS 2025 - 19th International Conference on Location Based Services (May), Baltic Sea Science Congress 2025 (May), One Ocean Science Congress (June), 2025 UN Ocean Conference (June), AGILE 2025 - Association of Geographic Information Laboratories (June), Oceans 2025 Brest (June), ESA Living Planet Symposium 2025 (June).

We hope you enjoy reading this newsletter.

Professor Henning Sten Hansen & the coordination team.

AquaINFRA Interaction Platform (AIP) & Virtual Research Environment (VRE)

Markus Konkol, 52° North, Germany

The AquaINFRA Interaction Platform (AIP) [<https://aquainfra.dev.52north.org/>] serves as the primary gateway for scientific communities to discover, access, and reuse aquatic digital resources.

Built on top of the previously described DDAS, it provides a user-friendly entry point to research data, software, services, and training materials related to the aquatic domain. It is designed to help users efficiently search for, inspect, and select relevant data for analysis within the [Virtual Research Environment](#) (VRE). At the core of the homepage is the search bar, a familiar feature from other search engines. Users can enter keywords and choose a data provider via the drop-down menu to the left of the search bar. Clicking “SEARCH” redirects them to a results page, where they can browse search hits and apply additional filters.

The next page is designed to display search results and allow users to refine their queries using various filtering options. Users can narrow their results by selecting or deselecting multiple data providers, filtering for entries with a direct download link, or defining a specific area of

interest using a bounding box on an interactive map. Additional features include specifying a bounding box based on catchment areas and utilizing an ontology to enhance keyword-based searches.

The VRE is envisioned as a web-based application where users can reuse existing tools, contribute new ones, and integrate them to create shareable and reproducible workflows. To ensure flexibility, scalability, and ease of contribution, the platform must be modular, extensible, and open source. Rather than developing a new system from scratch, we opted to build the VRE on Galaxy—a widely used, freely available online platform released under an open license. Galaxy enables users to analyze data, create workflows, and share both data and workflows. Check [this blog post](#) for more information on our choice to use Galaxy.

Key advantages of Galaxy include its extensive library of training materials and its active user community. While originally developed for life sciences research, Galaxy has increasingly been adopted by the geoscience community (e.g., climate.usegalaxy.eu and earth-system.usegalaxy.eu).



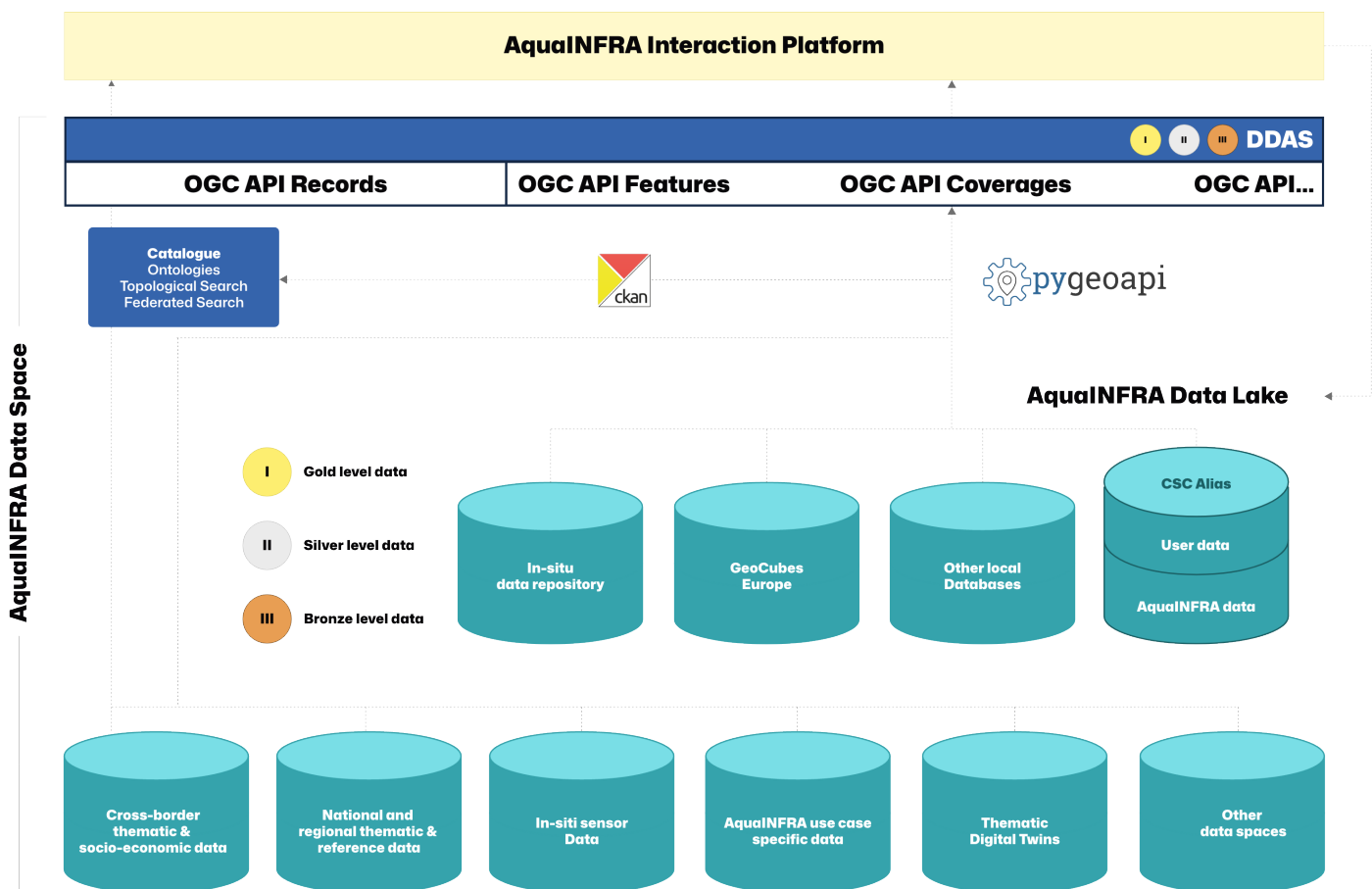
Data Discovery and Access Service (DDAS)

Hanna Lahtinen, Pekka Latvala, Juha Oksanen, FGI

AquaINFRA goal is to provide easy and seamless access to multiple geospatial datasets from freshwater and marine domains. Interoperability advances in compliance with other EOSC services, as well as recent Digital Twin initiatives such as EDITO (the European Digital Twin of the Ocean) and the Iliad project.

The AquaINFRA Data Space, including Data Discovery and Access Service (DDAS) layer, has been implemented onto the AquaINFRA platform and currently offers metadata from 15 providers to the use of AquaINFRA Interaction Platform (AIP). Data providers include domain-relevant organisations such as Copernicus Marine Service (CMEMS) and the European Environment Agency (EEA). All of the data is accessed as

federated data from the data providers with the implementation of OGC APIs and custom data provider plugins as on-the-fly searches. The only exception is the local refined data, such as some raster datasets, which are stored in a centralised in-cloud repository, the AquaINFRA Data Lake. For enriching DDAS's metadata search functionalities, the AquaINFRA Ontology Search, was created. In practice, this means that in the AIP, for example, the search term "salt content" alone will return five results from different data providers, while the addition of an ontology search will provide closely related search term suggestions for the searched content.





Open Educational Resources (OERs)

Sadra Matmir, Bochum University of Applied Sciences

The AqualNFRA project is developing Open Educational Resources (OERs) to enhance the accessibility and usability of the AqualNFRA Interactive Platform (AIP). These efforts aim to equip researchers, policymakers, and other stakeholders with the necessary knowledge to effectively utilise AqualNFRA's Data Discovery and Access System (DDAS), and the Virtual Research Environment (VRE).

To achieve this, the team has actively engaged with project partners and stakeholders through a series of partner meetings and workshops across Europe:

- Copenhagen, Denmark (February 2023): Individual Data Collection Workshop
- Riga, Latvia (October 2023): Open Group Discussion
- Copenhagen, Denmark (May 2024): Online Survey
- Online (June 2024): In-depth Interviews (Malta and Pan-European use cases)
- Barcelona, Spain (November 2024): Focus Group Discussion (All use cases)

These engagements have enabled the project team to identify training needs, collect feedback on platform usability, and create structured educational content. The discussions have also offered valuable insights into the unique challenges and opportunities within AqualNFRA's regional use cases, including the Baltic Sea, North Sea, Mediterranean, and Pan-European initiatives.

Key Achievements so far:

- Identification of training needs through stakeholder consultations
- Development of an initial training framework for AqualNFRA users
- Creation of educational profiles for use cases, ensuring targeted learning
- Alignment of training materials with scientific and technical requirements
- Integration of feedback from project partners to refine learning resources

Developing Educational Profiles for Use Cases

One key outcome is the development of educational profiles for AqualNFRA use cases. These profiles serve as structured learning guides tailored to the specific requirements of regional and thematic applications. By focusing on real-world data challenges and solutions, the profiles ensure that users can efficiently navigate and apply AqualNFRA services to their research and decision-making processes.

As the team continues its work, the emphasis remains on creating high-quality, user-friendly educational materials that promote long-term capacity-building and the sustainable use of the AqualNFRA platform.

Case Studies

Solvita Strake & Andris Andrusaitis, Latvijas Hidroekoloģijas institūts

The Case Studies aim to demonstrate the use of the components and services provided by the AqualNFRA Research Infrastructure in actual use in the Baltic Sea, the North Sea, Mediterranean and Pan-European regions.

The AqualNFRA use cases represent context-specific challenges across the land-sea continuum and are united by the overarching objective to collate reliable cross-sectorial data and develop transparent methodologies and workflows to ultimately increase our knowledge about the aquatic environment and answer the most acute research and management questions related to its protection and sustainable use. All case studies depend on large sets of variable comprehensive, comparable and quality-assured data and data processing algorithms produced by various data providers and processes. All case studies also face challenges related to data aggregation for analysis at different scales – data resolution and, subsequently, statistical algorithms for the assessment on the scale of a river basin or even sub-basin largely differ from those applied in the sea basin-scale assessments.

An interactive map has been added to the AqualNFRA website to allow easy exploration of the case studies.

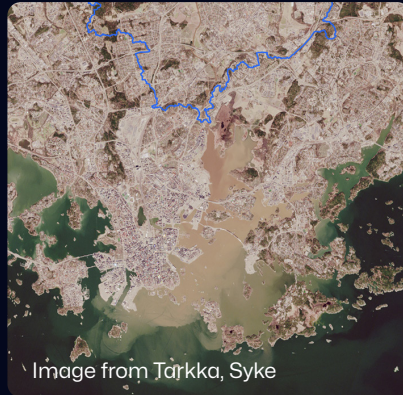


Case Study

Explore the case studies



Daugava River catchment and the Gulf of Riga



The Vantaanjoki River Basin and the Gulf of Finland



Environmental management data in Finland and Latvia



Elbe River



Oslofjord and Glomma River



North Sea and Baltic Sea region



Tordera catchment and Llobregat Delta



Malta



Pan-European

Upcoming Events

Dates for your calendar

- **19th International Conference on Location Based Services**, Otaniemi, 7th - 9th May
- **Work Package 5 Meeting**, Oulu, 13th - 15th May
- **Baltic Sea Science Congress 2025**, 27th - 30th May
- **One Ocean Science Congress**, Nice, 3th - 6th June
- **2025 UN Ocean Conference**, Nice, 9th - 13th June
- **AGILE 2025 - Association of Geographic Information Laboratories**, Dresden, 10th - 13th June
- **Iliad Symposium & Brest Ocean Conference**, Brest, 16th - 19th June
- **Coordination Meeting of EOSC-related Projects**, 26th - 27th June
- **MPA-MSP Conference**, Bodø, 9th - 12th July
- **EOSC Symposium**, Brussels, 3rd - 5th November
- **AquaINFRA Partner Meeting and GA**, Oslo, 2nd - 4th December

Partners



Project Coordinator

Henning Sten Hansen,
Professor, dr.scient.
Aalborg University Copenhagen
A.C. Meyers Vænge 15
DK-2450 Copenhagen
E-mail: hsh@plan.aau.dk
Phone: +45 28156464