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ONEWATER, WATER4ALL SUPPORT TO FAIR AND VRE

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Version 1.0



Géosciences pour une Terre durable

brgm

ONEWATER, WATER4ALL SUPPORT TO FAIR AND VRE

Sylvain Grellet

10/12/2025

HydroDWG / WMO Workshop Florence, Italy, 9-11/12/2025



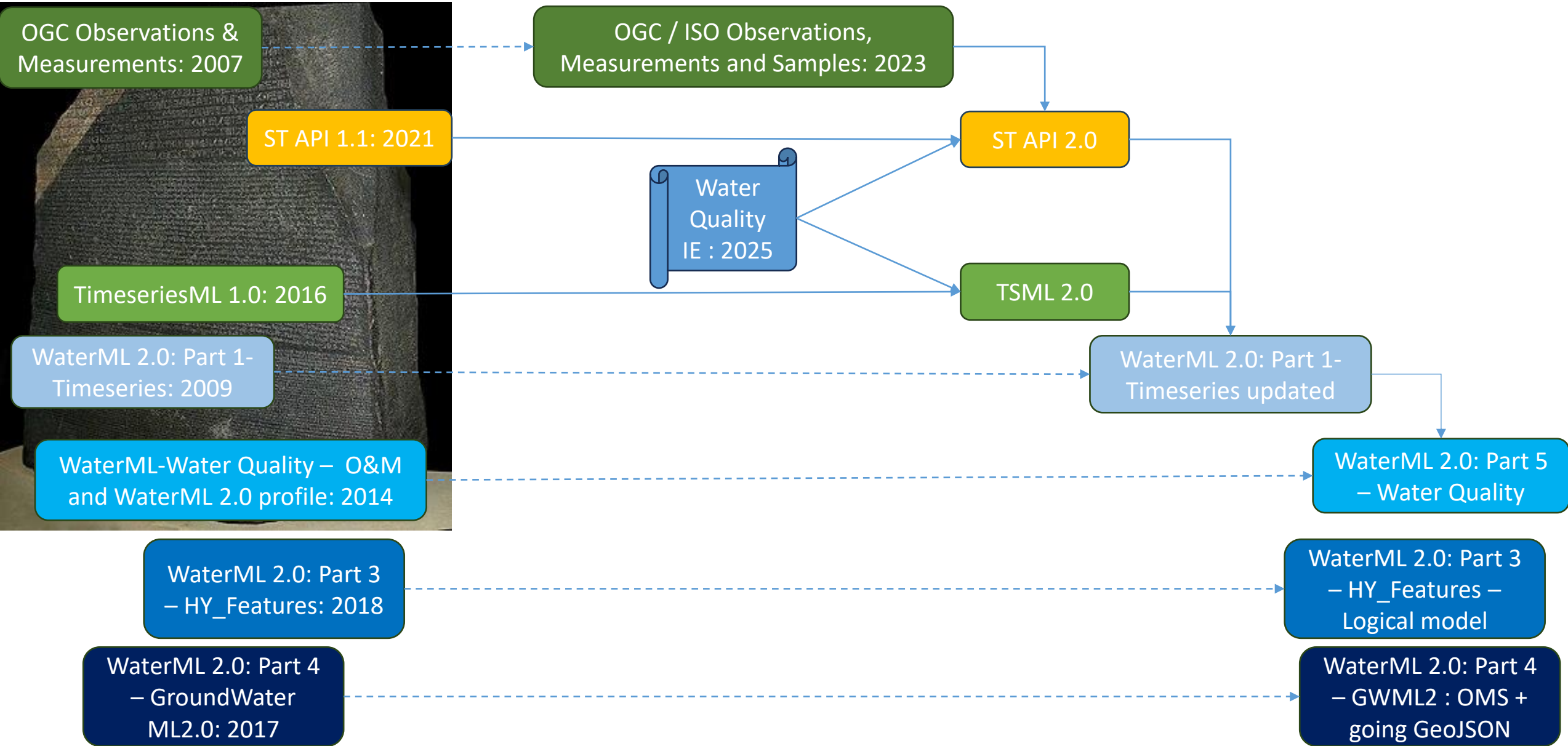
BY SA

TOPICS






- Support to standardisation
- FAIR for Water
- Training on standards
- EU public monitoring Water catalogues inventory
- When FAIR Water standards (W3C, OGC, ...) meet VREs

SUPPORT TO STANDARDIZATION






Standard baseline refresh master plan



FAIR FOR WATER ?

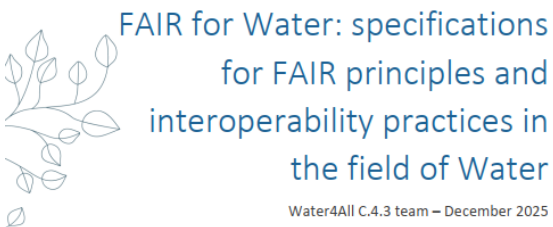
- FAIR principles have to be translated into practical IT practices
- OpenData dynamics (in EU : INSPIRE then High Value Dataset) were precursors. The target is the same. Let's build on it ...
- ... and foster FAIR Water data exchange using well known and already deployed interoperability standards and practices ( ,  ,  , INSPIRE  , ) enriching them when needed

FAIR FOR WATER ?

Foster FAIR Water data exchange using well known and already deployed interoperability standards and practices ( ,  ,  ,  , ) enriching them when needed



European Partnership



F2. DATA ARE DESCRIBED WITH RICH METADATA

Water4all recommendations

- Metadata describing the dataset => ISO 19115 or W3C:DCAT
- Documenting the dataset itself => data models (UML, ontology)
- Scientific metadata such as documenting observations
=> ISO 19156/OGC Observations, Measurements and Samples or W3C:SSN/SOSA

I2. METADATA AND DATA USE VOCABULARIES THAT FOLLOW FAIR PRINCIPLES

Water4all recommendations

- Contribute to the drive to make pre-existing standards FAIR within Water4All area of activity (water and the models concerned),
- Shared vocabularies (codeLists) using FAIR practices (ex : "Ten simple rules for making a vocabulary FAIR")
- Identify controlled vocabularies that meet the needs expressed in Water4all projects and tasks, help bring those that are not FAIR into compliance and create new vocabularies if a need arises in an area that is not already covered.

A1. METADATA AND DATA ARE RETRIEVABLE BY THEIR IDENTIFIER USING A STANDARDISED COMMUNICATIONS PROTOCOL

Water4all recommendations

- Protocol read as exchanges of data in the software application layer on the Internet => HTTP Protocol
- RESTful FAIR APIs defined by international standards and best practices (e.g. OGC APIs). In each case, described in accordance with international best practices (e.g. OpenAPI, OData).
 - Previous OGC services are still valid
 - Avoid ad'hoc/home made APIs

etc ...

TRAINING ON STANDARDS

- Combined effort with OGC & WMO Staff, OneWater, Water4all & DataTerra/Gaiadata projects
- Training on 3 levels

Personas	Level	Requirement	Position
Managers	Intro	To understand benefit of OGC Standards	National Hydrological Advisor
Data Managers	Intermediate	To understand how OGC Standards are used to share data	
Developers/Dev Ops	Advanced	To understand how to configure APIs, etc	

- Topic Covered : Intro
 - Why FAIR ?
 - SensorThings
 - Observations, Measurements & Samples
 - Vocabularies
 - Interoperability Toolbox
- Upcoming
 - Metadata
 - Data life cycle
 - Maps Services
 - Features Services
 - WaterML parts
 - ...

TRAINING ON STANDARDS

OGC Sensorthings API Explained by a coffee vending machine



SensorThings API

What is an API?

A REST API

A REST API (*Representational State Transfer*) is a type of API that allows clients to interact with resources (such as data or services) **over the web** using standard **HTTP methods**.

REST APIs are designed to be lightweight, flexible, and easily **scalable**, making them suitable for a wide range of applications.

Observation of a Smiley Face

This course introduces the OGC/ISO Observations, Measurements and Samples (OMS) Standard which is also an ISO Standard, 19156:2023. The OMS family of Standards provides a conceptual framework for the discovery, collection, and analysis of observational data from features involved in the observation process as well as features involved in sampling when making observations.

To illustrate the applicability of OMS, we use the analogy of determining the color of a smiley face sticker. This example has been abstracted from the usual use cases for OMS, often pertaining to measurements on specific media.

GETTING STARTED

OMS

Vocabularies

Controlled vocabulary

A FAIR vocabulary

SKOS and OWL standards

Low level of formalization → High level of formalization

Glossary Taxonomy Thesaurus **Ontology**

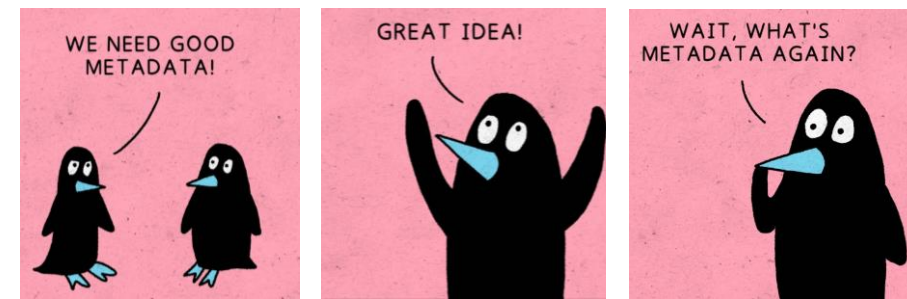
We have seen previously that ontologies are controlled vocabularies used to describe a **domain of knowledge** through **reasoning** links between **terms** and **concepts**.

Ontologies are built using the **OWL** (Web Ontology Language) **standard**. This standard, like SKOS, is a **W3C** standard that represents knowledge in **RDF** (Resource Description Framework), a model that represents information in the form of triples (Subject – Relation – Object).

The OWL standard allows **information** to be **structured** in such a way that it is not only easy to **navigate** between terms, as in a thesaurus, but also to perform **automatic reasoning**.

EU CATALOGUES FOR WATER INVENTORY

- Starting point
 - Really hard, even in 2025 to have a quick overview of available water data in Europe (and beyond) => we need a clear vision of available metadata catalogues/portals that contain water related data.
 - Even when found, often hard to interoperate with such metadata catalogue/portal in a FAIR approach.
- Current list
 - Work in progress
 - Action focused more on catalogues about public monitoring for now
 - https://docs.google.com/spreadsheets/d/1i1kLVRvPUKO_roezuR7hz2tfycS3hsz6Vi29ufiVV_RU/edit?gid=0#gid=0



EU CATALOGUES FOR WATER INVENTORY

• Synthesis

- Around 130 portals identified, with contribution from the Water4All community (thanks).

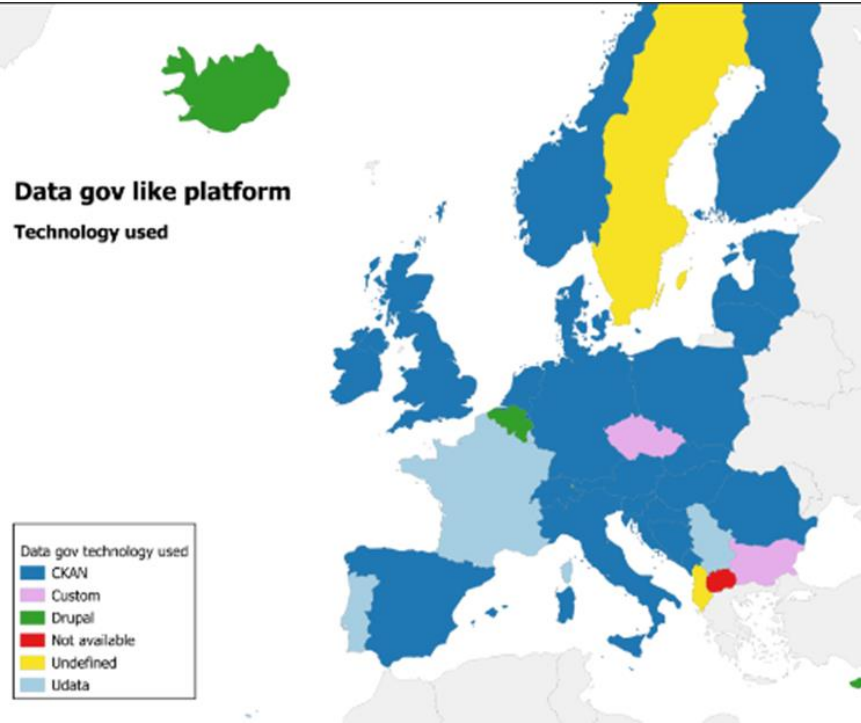
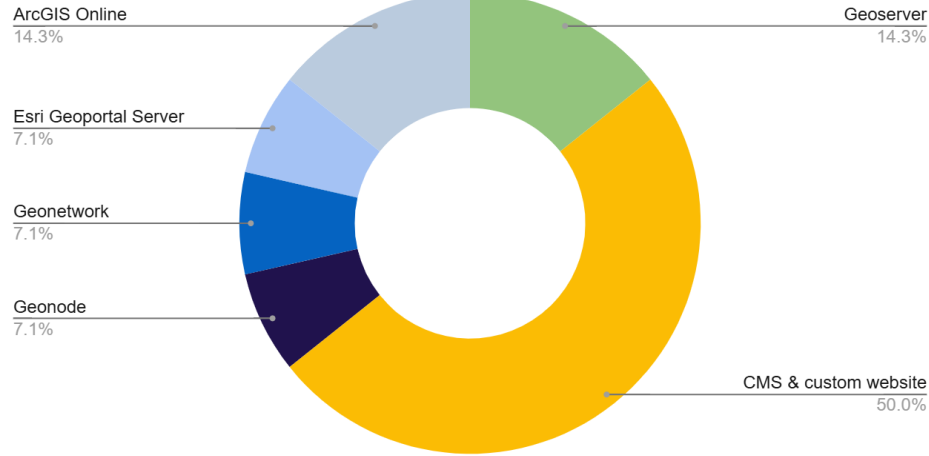
FAIR Connexion to EU Water Catalogues

Name	Coverage	Region/lands	Point of contact	Portal category	Harvestable	Technology used	Filters/keyw	Test harvest	Standard	Portal URL	End points (APIs, Webservices, ...)	Comment
Milieu Marin	France		OFB	Geodata portal	Yes	Geonetwork			CSW	https://data.ofb.fr/catalogue/data-milieuamfrance/ire/catalogue/search/home		
Eau	France		OFB	Geodata portal	Yes	Geonetwork			CSW	https://data.ofb.fr/catalogue/data-eaufrance/ire/catalogue/search/home		
Biobanking for a healthier world	European Union			Simple website	?	Molgenis			SPARQL ?	https://directory.bbmi-eric.eu/eric/directory/igraphol		
PARC	European Union			Simple website	No	Drupal				https://www.eu-parc.eu/thematic-areas/tools-resources/parc-fair-data-hub		not published yet
Elixir	European Union			Simple website	No	Drupal				https://elixir-europe.org/services/tax/data-resources		
FAIR2Adapt	European Union			Simple website	No	Wordpress				https://www.tei.org/projects/fair2adapt-fair-to-adapt-to-climate-change/		
European Marine Observation and Data Network	European Union			Geodata portal	Yes	Geonetwork			CSW	https://emodnet.ec.europa.eu/geonetwork/srv/eng/catalogue/search?from=1&to=30		
data.europa.eu	European Union			Data portal	Yes	CKAN Drupal Cigale			DCAT/SPARQL	https://data.europa.eu	https://data.europa.eu/api/hub/search/	
Datos	Spain			Data portal	Yes	CKAN			CKAN/SPARQL	https://datos.gob.es/en/catal	https://datos.gob.es/en/sparql	https://datos.gob.es/en/apidata
Infraestructura de Datos Espaciales de España	Spain			Geodata portal	Yes	Geonetwork			CSW	https://www.idee.es/		
Pordata	Portugal			Dataviz	No	Drupal Tableau				https://www.pordata.pt/		
Plataforma aberta de dados públicos portugal	Portugal			Data portal	Yes	udata			DCAT	https://dados.gov.pt/	https://dados.gov.pt/api/1/	
Geoportal	Romania		Apele Romane	WebGIS	Yes	ArcGIS Online				https://portal-gis.rowater.ro/	https://portal-gis.rowater.ro/maps/rest/services/	
Cat Europe	European Union		Oleau	Geodata portal	Yes	Geonetwork				https://www.aquacoope.org/cat_europe/srv/ire/catalogue/search/home		
Data Austria	Austria			Data portal	Yes	CKAN			CKAN	https://www.data.eu.at/suche	https://www.data.eu.at/api/hub/repo/	
DDP Austria	Austria			Data portal	Simple w	Wordpress				https://www.opendataportal.at/		
Der Suchdienst des Bundesamtes fuer Eich-	Austria			Geodata portal	Yes	Geonetwork				https://data.bev.gv.at	https://data.bev.gv.at/geonetwork/srv/ire/csw	
Inpire Austria	Austria			Geodata portal	Yes	Geonetwork			CSW	https://geoportal.inspire.gv.at/metadata/suche/inspire/ire/catalogue/search/home		
Data	Belgium			Data portal	No	Drupal			DCAT	https://data.gov.be	https://github.com/Fedict/dcatools	
Data vindplaats	Belgium			Data portal	?	CKAN				https://www.vlaanderen.be/datavindplaats/catalogus		
Open data Wallonie-Bruxelles	Belgium			Data portal	No	OpenDataSoft			DCAT	https://www.odwb.be/pages/	https://www.odwb.be/api/explore/v2.1/console	
Geoportal Wallonie	Belgium			Data portal	No	Jahia				https://geoportal.wallonie.be	https://geoportal.wallonie.be/home/cartes-et-donnees/webservices.html	
MetaVtal	Belgium			Geodata portal	Yes	Geonetwork			CSW	https://metavtal.wallonie.be/ce	https://www.wallonie.be/geonetwork/srv/ire/csw	
Carte Hydrogéologique de Wallonie	Belgium		SPW ARNE direct	WebGIS	No	Cigale				https://geosps.wallonie.be/Cigale/Public/VIEWER+EGPW+RBOV+9060+886038438708+320939+11396156123_-81	https://datastore.brussels/	Web application dedicated to the hydrogeological map of Wallonia
Datastore.brussels	Belgium			Data portal	?	Custom				www.waterinfo.be	https://vha.waterinfo.be/arcgis/rest/services	water quantity focus: contains real time data, historical data, a map catalog; contains all subsoil related data, including groundwater levels (https://www.waterinfo.be)
waterinfo	Belgium		waterinfo (VMM)	WebGIS	Map server	Yes	ArcGIS Online		WMS/WFS	https://www.dov.vlaanderen.be	https://www.dov.vlaanderen.be/geonetwork/srv/dut/csw	contains all subsoil related data, including groundwater levels (https://www.waterinfo.be)
DOV	Belgium		DOV	Geodata portal	Yes	Geonetwork				https://www.vlaanderen.be/feiten-cijfers/water/kwaliteit-waterlopen/databank-waterkwaliteit		database on water quality measurements (contains open data, but also no dashboard on salinisation of surface water, using online real-time sensors;
VMM water quality	Belgium		VMM	Dataviz	No	IBM Cognos				https://vmm.vlaanderen.be/feiten-cijfers/water/kwaliteit-waterlopen/verzilingsdashboard		
verzilingsdashboard	Belgium		VMM	Dataviz		Power BI				https://data.egov.be	https://data.egov.be/data/linkedData	
National Portal	Bulgaria			Data portal	Dataviz	?	ElasticSearch	Custom		https://data.gov.hr/	https://data.gov.hr/ckan/data	
https://data.gov.hr/	Croatia			Data portal	Yes	CKAN			DCAT/CKAN/SPARQL	https://geoportal.nipp.hr/	https://geoportal.nipp.hr/geonetwork/srv/eng/csw	
https://geoportal.nipp.hr/	Croatia		NIPP	Geodata portal	Yes	Geonetwork			CSW	https://www.geohrvatska.hr/	https://www.geohrvatska.hr/wfs	
https://www.geohrvatska.hr/	Croatia		State Geodetic	WebGIS	Map server	Yes	Geoserver	Custom	WFS/WMS	https://data.gov.cy	https://data.gov.cy/catalog.json	
https://data.gov.cy	Cyprus			Data portal	Yes	Drupal			DCAT	https://data.gov.cz/	https://geoportal.gov.cz/	other portal: https://geoportal.gov.cz/web/guest/other-portals/
https://data.gov.cz/	Czech Republic		Digital and inform	Geodata portal	Data	?	LinkedPipes	DCAT-AP View		https://datafordeler.dk/	https://dataviser.dk/catalog/catalog.jsonld	
https://datafordeler.dk/	Czech Republic		CENIA	Geodata portal	?					https://dataviser.dk/	https://dataviser.dk/catalog/catalog.jsonld	
https://dataviser.dk/	Denmark			Data portal	?	custom			DCAT/CKAN	https://data.gov.fr/fr/	https://www.data.gouv.fr/api/3	
https://data.gov.fr/fr/	Denmark		Digitaliseringssty	Data portal	Yes	CKAN			DCAT	https://www.limateenistus.ee/isee/veed/ajaloolised-vaatlusandmed/vooluhulgad/	https://www.avindata.fi/	https://www.avindata.fi/data/catalog.jsonld
https://www.limateenistus.ee/isee/veed/ajaloolised-vaatlusandmed/vooluhulgad/	Estonia			Data portal	No				CKAN/DCAT	https://www.avindata.fi/	https://www.avindata.fi/data/catalog.jsonld	
https://www.avindata.fi/	Finland			Data portal	Yes	Drupal	CKAN		CKAN/DCAT	https://www.avindata.fi/	https://www.avindata.fi/data/catalog.jsonld	

EU CATALOGUES FOR WATER INVENTORY

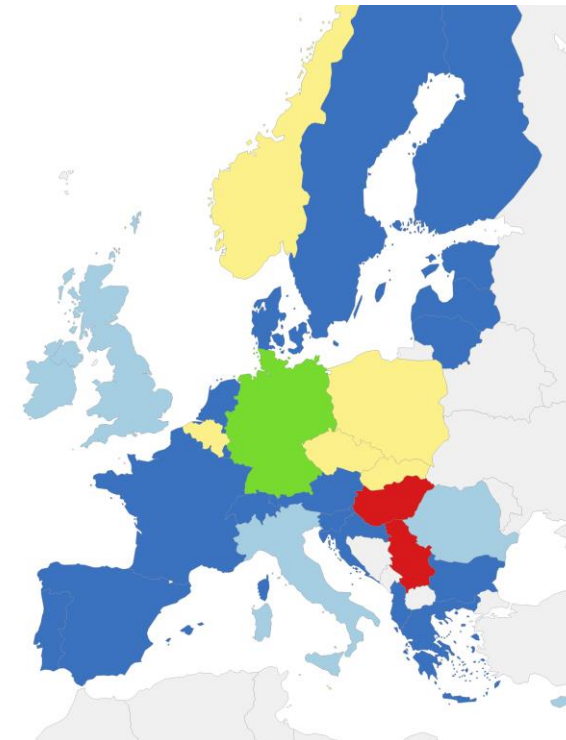
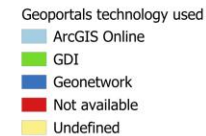
Water Commission "data" portals

Technology used



National geoportals

Technology used



- ⇒ Strategy to connect Water4all metacatalogue to them
- 1°/ Fetch water metadata from data.gov like portals
 - 2°/ Enrich with water metadata from national geo portals
 - 3°/ Complement with the identified water portals and sub-national ones (landers, regions)

WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

- Starting place
 - On one hand : data hopefully catalogued and accessed thanks to FAIR Water Standards
 - On the other hand : Virtual Research Environments (VRE) vastly used : JuPyTer but also Galaxy
- ~ same context as OGC Open Science Demonstrator
- exact same context as French DataTerra Research Infrastructure



A screenshot of the OneWater Water4All FAIR Platform interface. The interface is displayed in a browser window with the title "Galaxy OneWater4All". The main content area features the platform's logo, "OneWater Water4All Eau Bien Commun Water security for the planet". Below the logo, there is a section titled "OneWater Water4all FAIR Platform" with a sub-header "Our platform allows members from the water community". This section lists three key features: "Find, access, understand and reuse water data from both public & research sources.", "Integrate and reuse these data in scientific workflows & processes for in-depth analysis.", and "Share both data and code with partners in a FAIR and collaborative approach." At the bottom of the interface, there are two prominent buttons: "Data Search and Access" and "Data Import". The left sidebar contains a list of tools and workflows, and the right sidebar shows a history panel with a search bar and a message indicating that the history is empty.

WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

FIND

How?

You have a simple question: *“What river quality data is available in my region?”*

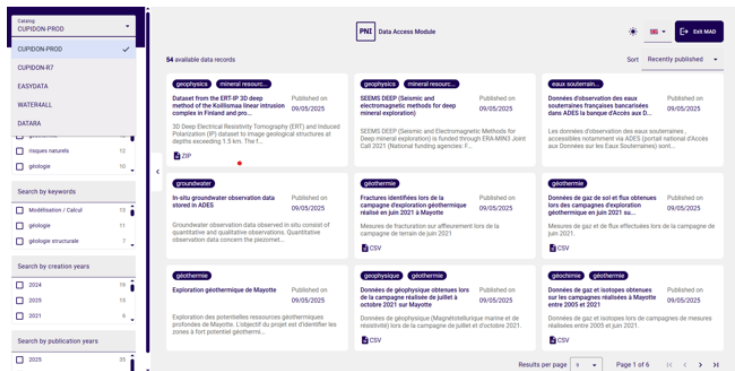
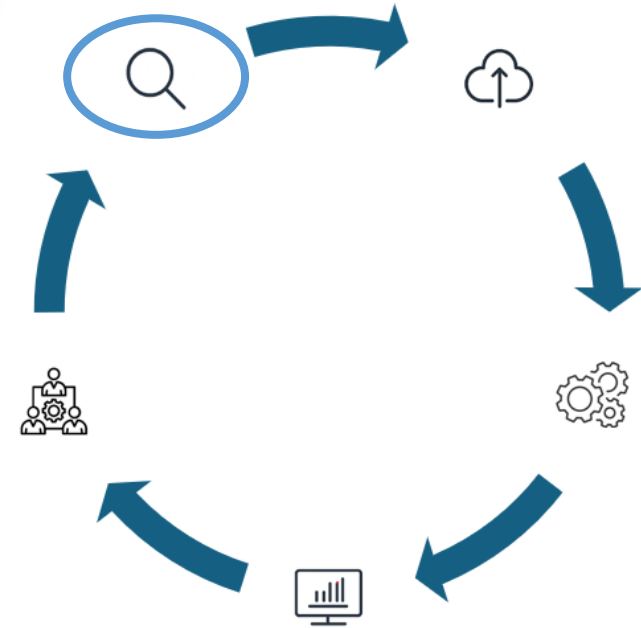
You go to the platform and use a **simple search interface**

Water4all catalogue will be connected to identified EU catalogues public & research water data (*previous slides*)

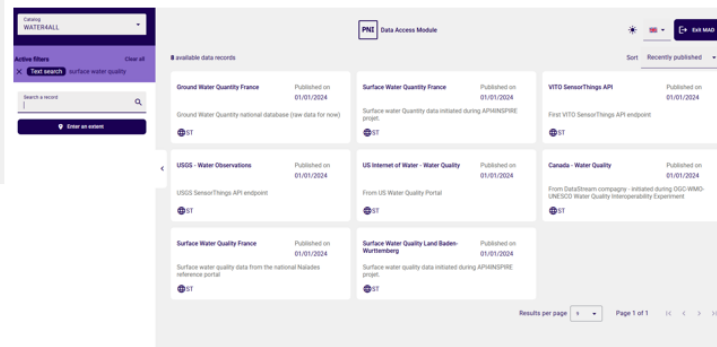
You can then find datasets thanks to **clear descriptions (metadata)**, keywords, and filters.

Benefit

No need to search across many fragmented sources — everything is in one place



Search across various catalogues



Search for datasets based on criterias
Ex : water quality data services

WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

Access & understand

• How?

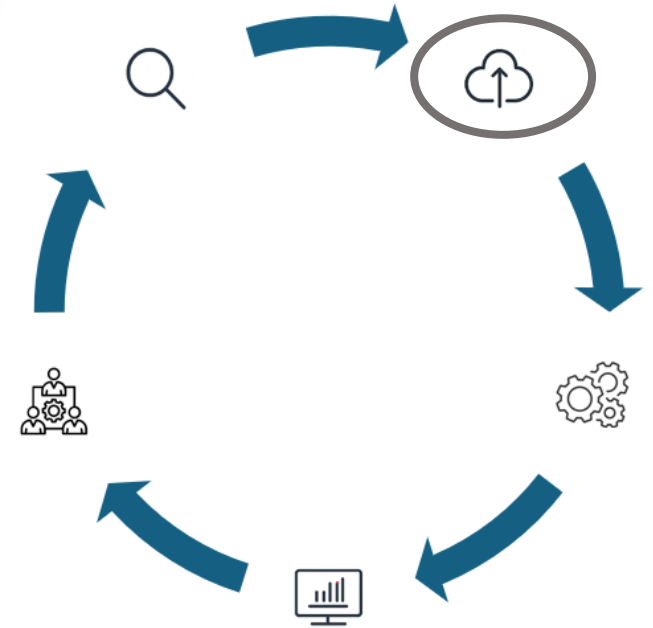
From the search answer you open a dataset metadata

You can see who produced it, when, how it was collected, and whether it's up to date

Data that available thanks to FAIR standards can be more easily reused by the platform

• *Benefit*

Simplified data subsetting for reuse in projects and workflows



PN1 Module d'accès aux données FR - Quitter MAD Retour

Emprise

Informations données

Jeu de données du réseau hydrographique français métropolitain exposés selon le respect des critères FAIR définis dans le cadre du PEPR OneWater

Accès aux données

- Service WMS, WFS et WCS (4)
- Service WMS du réseau hydrographique français métropolitain version 2017
- Service WMS des cours d'eau français métropolitains version 2017
- Service WFS du réseau hydrographique français métropolitain version 2017
- Service WFS des cours d'eau français métropolitains version 2017

Metadonnées

Création	15/07/2024
Révision	09/09/2025
Publication	01/08/2025
Contraintes légales	etalab-2.0
Uniform Resource Identifier (URI)	
Lien vers la fiche consultée (CUPIDON-REC)	

Mots clés Cours d'eau

Thématiques Eau

Dates

Création	15/07/2024	Identifiant URI	-
Révision	15/07/2024	Identifiant HTTPS	-
Publication	01/08/2024	Contraintes légales	etalab-2.0

mardi 16 septembre 2025

French river network dataset metadata. FAIR access standards used are detected

WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

Access & understand

PNL Module d'accès aux données

Emprise Informations données Accès aux données

Jeu de données du réseau hydrographique français métropolitain exposés selon le respect des critères FAIR définis dans le cadre du PEPR OneWater

Wbservice WMS, WFS et WCS (4)

Service WMS du réseau hydrographique français

Type de service : WMS

Construction de la requête

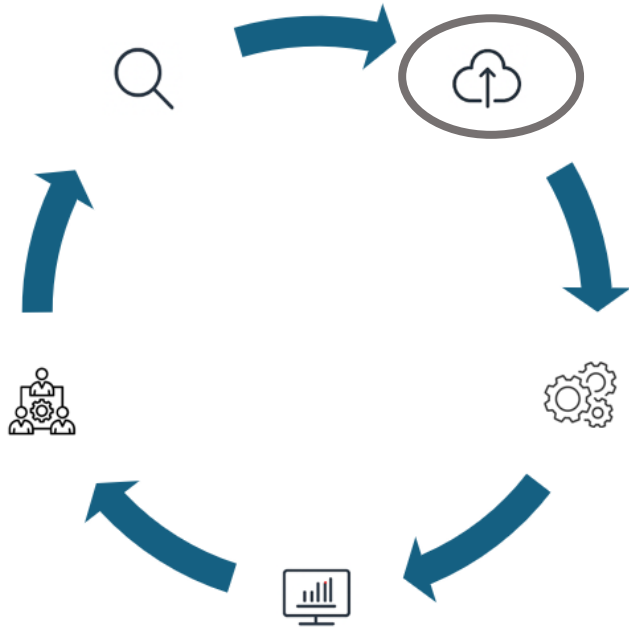
Service de données
https://data.onewater.fr/api/surfacewater/hy-p/ows?service=WMS&request=GetCapabilities

<input checked="" type="checkbox"/>	Nom	Titre
<input checked="" type="checkbox"/>	Watercourse	Watercourse

Prévisualisation



WMS : French River Network preview



PNL Module d'accès aux données

Informations données

Mots-clés : forage, forage profond, géothermie, modèle, profil sismique

Thématiques : géologie, géologie des ba., géophysique, géothermie

Accès aux données

Données à télécharger (13)

010_bly_fr_e01_transformed_to_I2.ts

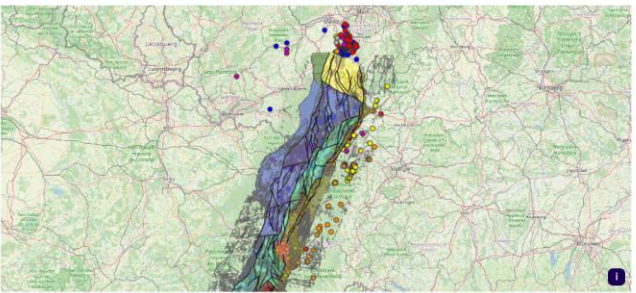
Type de service : WMS

Construction de la requête

Service de données
https://services.lgrb-bw.de/index.php?VERSION=1.1.1&SERVICE=WMS&SERVICE_NAME=lgrb_georg_basic_de&request=GetCapab

<input checked="" type="checkbox"/>	Nom	Titre	Description
<input type="checkbox"/>	g_area	Projektgebiet	Die Karte zeigt die Lage und Ausdehnung der Modellierungszonen und definierter Teilgebiete des GeORG-Projekts.
<input checked="" type="checkbox"/>	g_welpl	Bohrungen	Die Karte zeigt die Lage von Bohrdaten, die im GeORG-Projekt zur Interpretation und geologischen 3D-Modellierung verwendet wurden.
<input type="checkbox"/>	g_setsurvl	Seismische Profile	Die Karte zeigt den Profilverlauf seismischer 2D-Daten, die im GeORG-Projekt zur Interpretation und geologischen 3D-Modellierung verwendet wurden.
<input type="checkbox"/>	g_geol	Geologische Karte	Die Karte zeigt die Verbreitung der im GeORG-Projekt harmonisierten Modelleinheiten und den Verlauf von Störungen an der Erdoberfläche.
<input checked="" type="checkbox"/>	g_tec	Tektonische Übersichtskarte	Die Karte zeigt die Gliederung des Oberhängegrabens in Becken und Schwellenbereiche, den Verlauf von Haupt- und Nebenstörungen und die Abgrenzung tektonischer Regionen. Details siehe Abschlussbericht zum INTERREG IV-Projekt "GeORG".

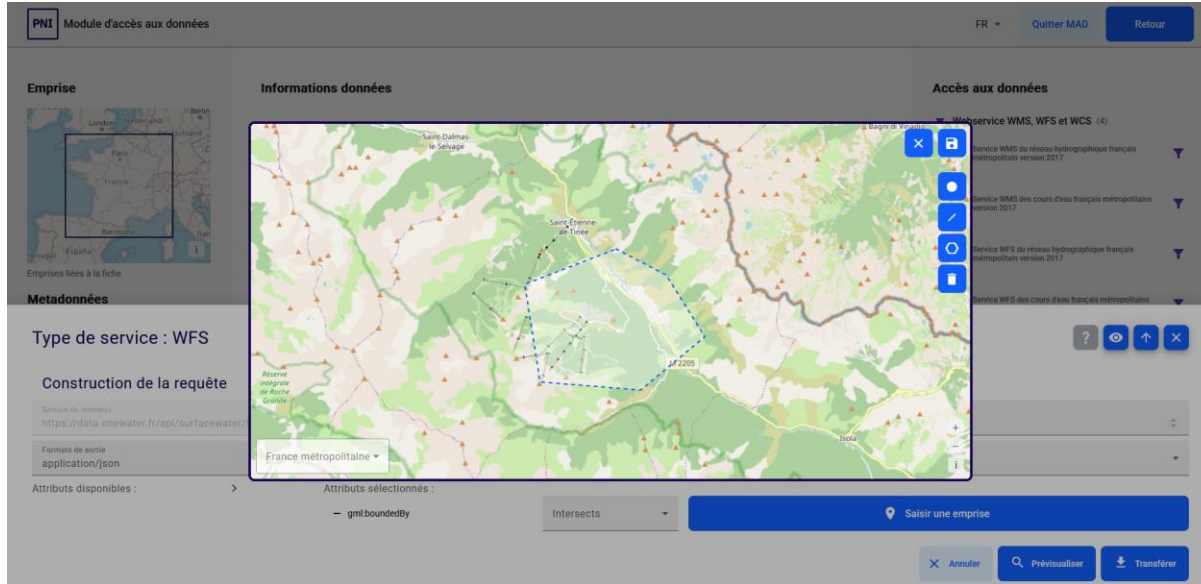
Prévisualisation



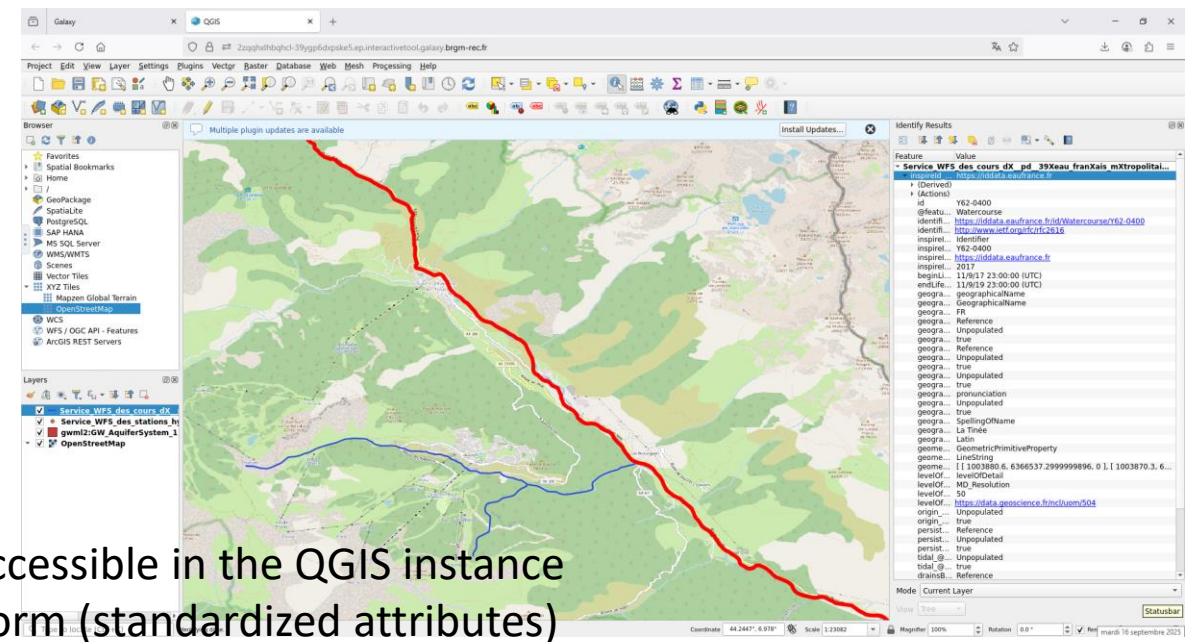
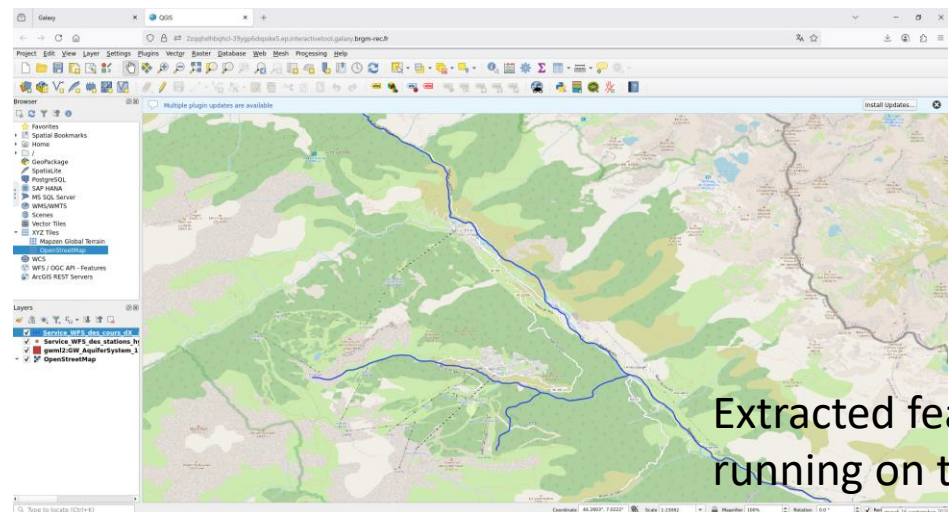
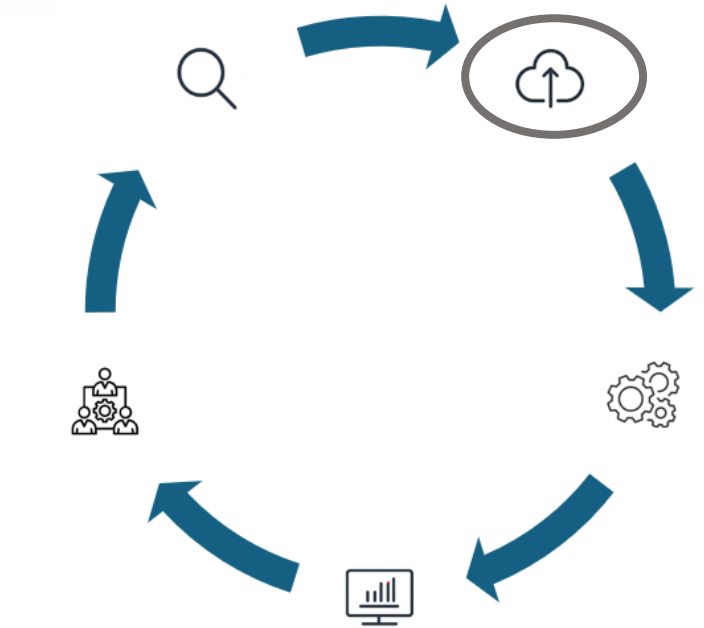
WMS: Example underground data preview

WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

Access & understand



WFS : French River Network spatial features extraction



Extracted features accessible in the QGIS instance running on the platform (standardized attributes)

WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

Access & understand

PNi Module d'accès aux données

FR - Quitter MAD Retour

Emprise

Informations données

Jeu de données RGE ALTI® exposé selon les respect des critères FAIR Définis dans le cadre du PEPR OneWater

Accès aux données

Webservice WMS, WFS et WCS (1)

Service WCS du RGE ALTI

Type de service : WCS

Construction de la requête

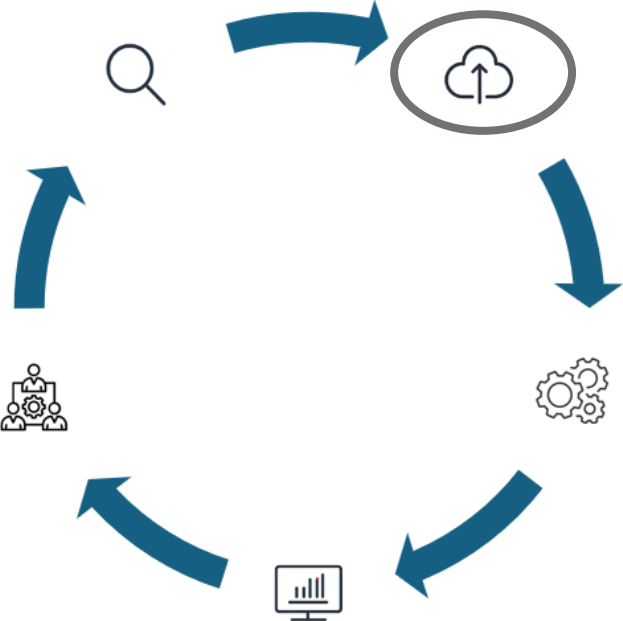
Service de données: <https://data.geoscience.fr/api/coverage/rgealti/wcs?service=WCS&request=GetCapabilities>

Formats de sortie: image/tiff

Couverture: France métropolitaine et Corse

Modifier mon emprise

Annuler Prévisualiser Transférer



Example Digita Elevation Model access through OGC WCS service

Galaxy

Using 6% of 18.9 GB

65: Service_WCS__RGEALTI_5M_CRS2970_D971_2020.tif

35.9 MB format tiff génome de référence ? uploaded tiff file

You can display your dataset with the following links:

- display at (Aviator)

or select a visualization from below.

Visualisations

OpenSeadragon High-resolution Zoomable Images

Tiff Viewer Tiff Image Viewer

AVIATOR

CHOOSE A FILE

CHANNELS VOLUME

Additive Blending

galaxy_e84c68fb000e04

ADD CHANNEL

SHOW VOLUME (RGB RENDERING)

HIDE PICTURE-IN-PICTURE

SHOW SIDE-BY-SIDE

Example DEM handlings

Galaxy

Using 2% of 16.9 GB

Interactive Tools

Launch and manage interactive tools

Active Interactive Tools

GGIS Running | Created less than a minute ago

Interactive JupyterLab Notebook BRGM 1.0.0

GGIS ForGEO Interactive geographi c informatio n system (GIS)

History

History Multiview

Notifications

More

History

search dataset

Unnamed history

331 MB 0 65

72: Service_W CS_du_RGE_AL tI_22-09-202 5-18:47:33

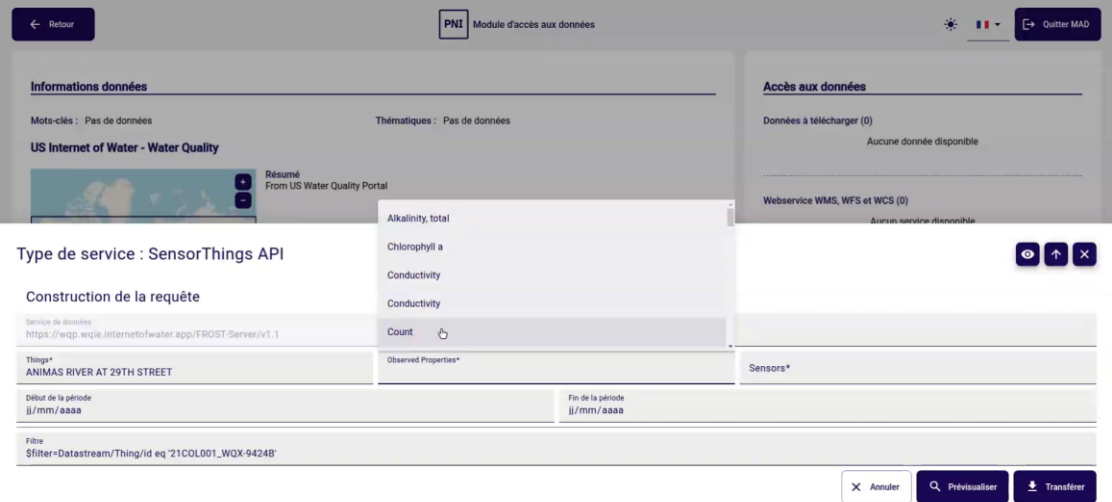
66: Service_W CS_du_RGE_AL tI_22-09-202 5-17:44:44

43: Service_W CS_du_RGE_AL tI_22-09-202 5-15:26:03

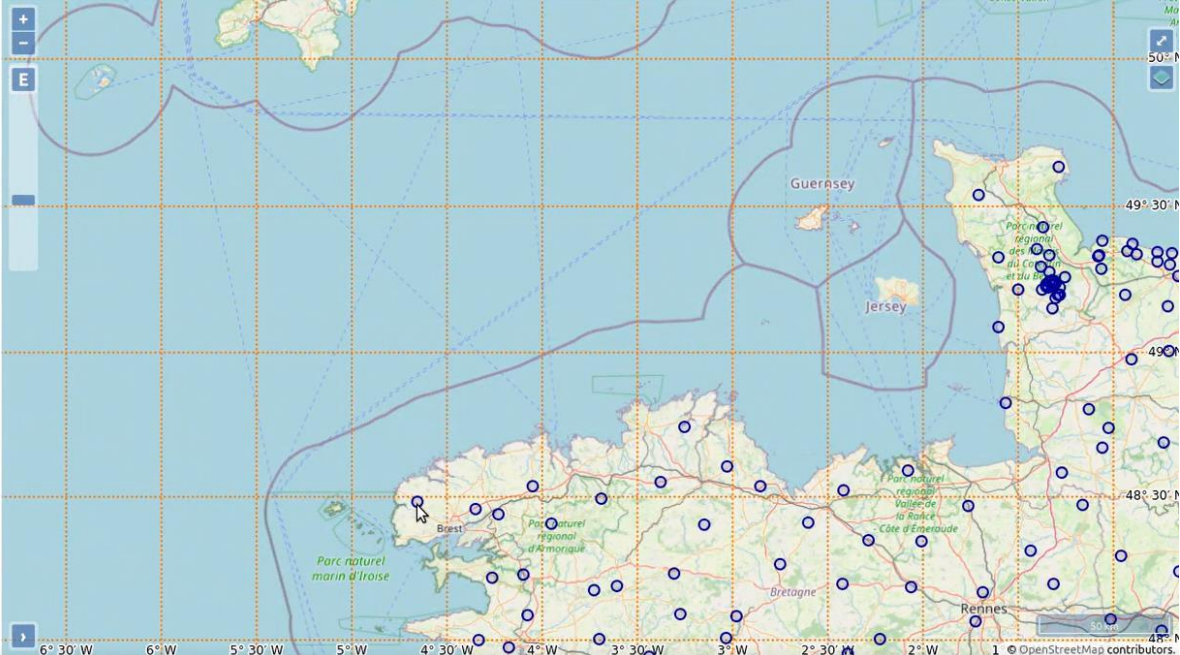
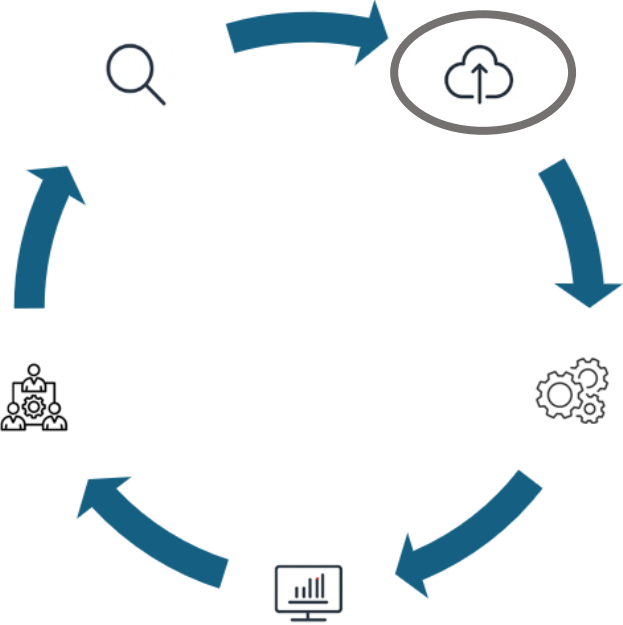
38: gwmI2GW AquiferSyste m_11-09-202 5-14:59:58

WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

Access & understand

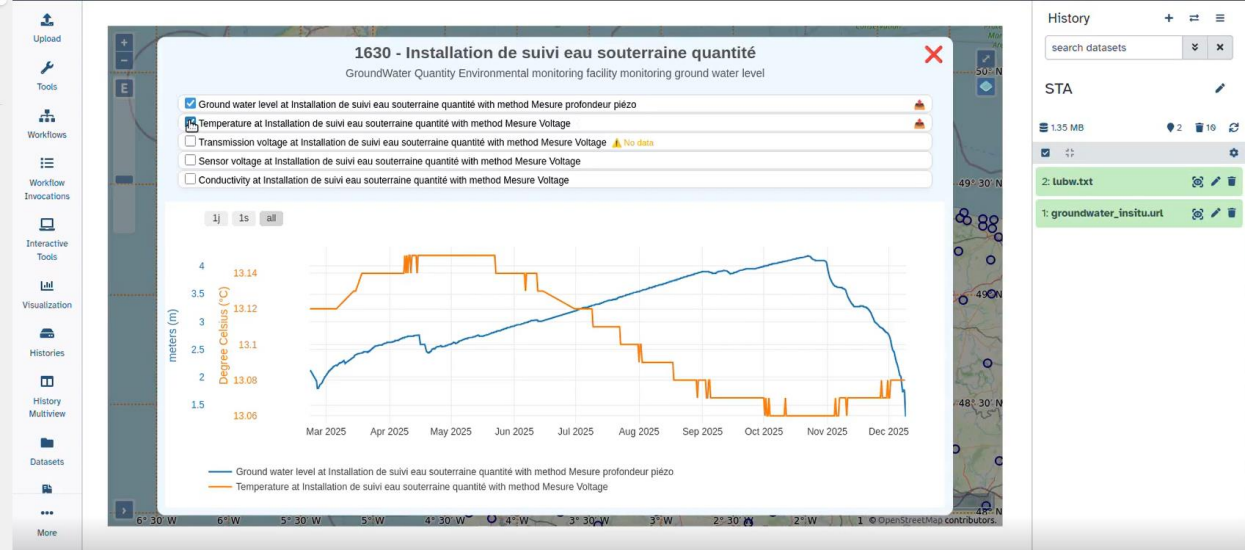


SensorThins API GUIs to subset data ...

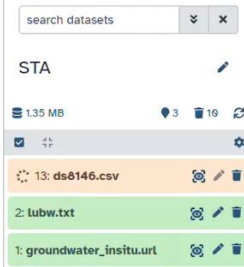
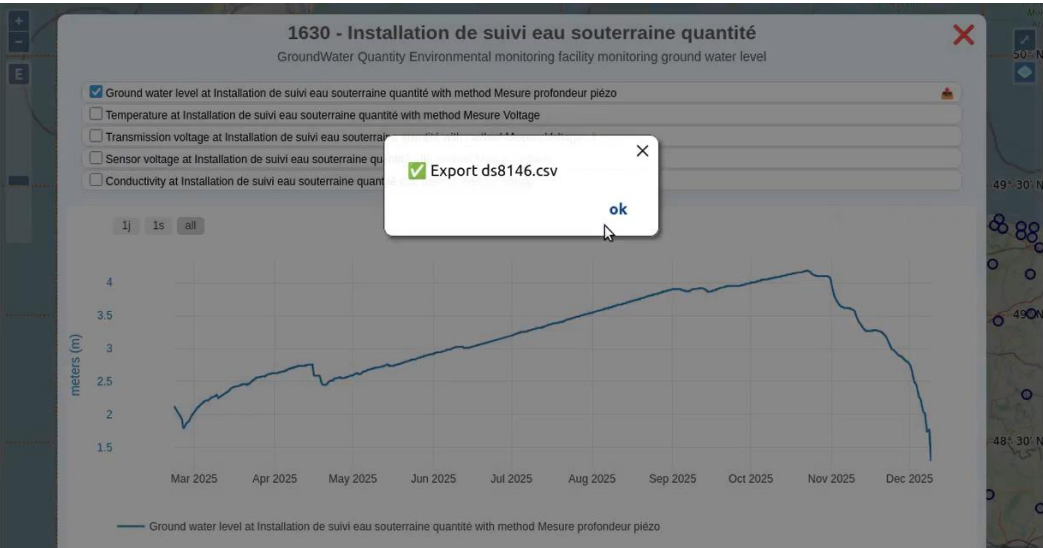


WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

Access & understand



SensorThings API GUIs to subset data ...



... and push it to Galaxy for processing

WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

Transforme & Compute

• How?

Now that data reached the platform it can be **processed/transformed using tools from the community**

E.g: user can aggregate daily values into monthly averages, clean missing values, generate indicators, do geospatial processing => **No advanced coding required**

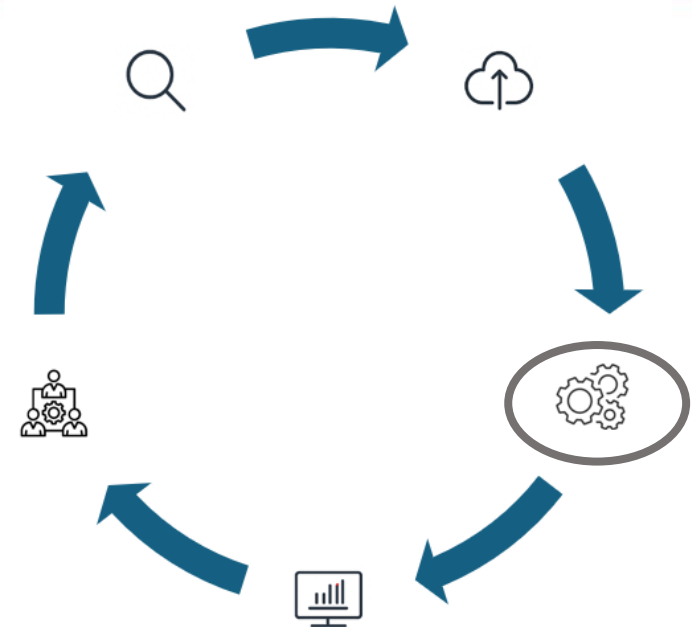
Data can be **combined with other datasets** (e.g. hydrology + climate + land use)

We are currently pushing hydro codes from the community to Galaxy

• **Benefit**

Saves time — no need to manually prepare data elsewhere

Enable sharing a scientific workflow with the community and redo it (scientific reproducibility)



Ex : groundwater level isolines

WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

Transforme & Compute

- **How?**

Running a scientific analysis or model directly within the platform environment.

Outputs: graphs, maps, or summary statistics.

Results can be **saved, shared, and cited**.

Data generated by a workflow/process is associated with its metadata (lineage, provenance)

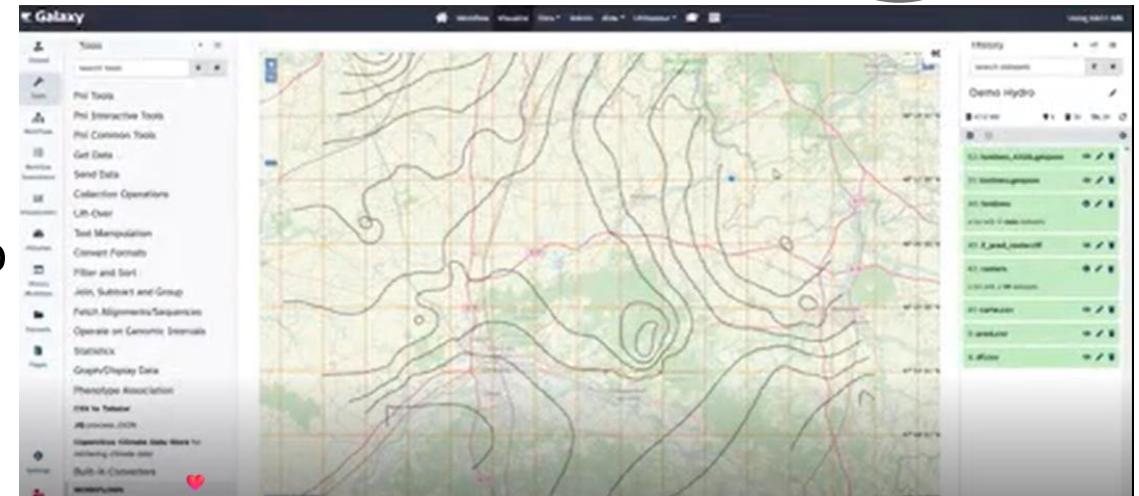
- **Benefit:**

End-to-end workflow — from data discovery to scientific insights, all in one ecosystem

- **Live Demos**

Finding and accessing FAIR observation services in a catalogue

Extracting data and passing it to a workflow about groundwater recharge



Workflow/process results can be visualised

WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

Share

• **How?**

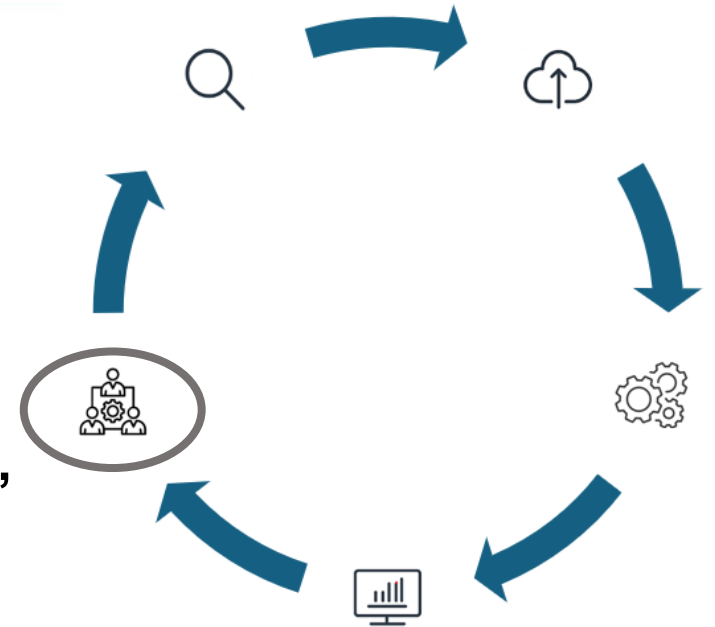
Users can share their processed dataset back into the platform catalogue **History**, analysis results and workflows can be shared **with colleagues in a project and, when deemed mature enough, with the broader community through Water4all FAIR catalogue**

No lock-in: data and process are compatible with other tools and platforms using FAIR standards

• **Benefit**

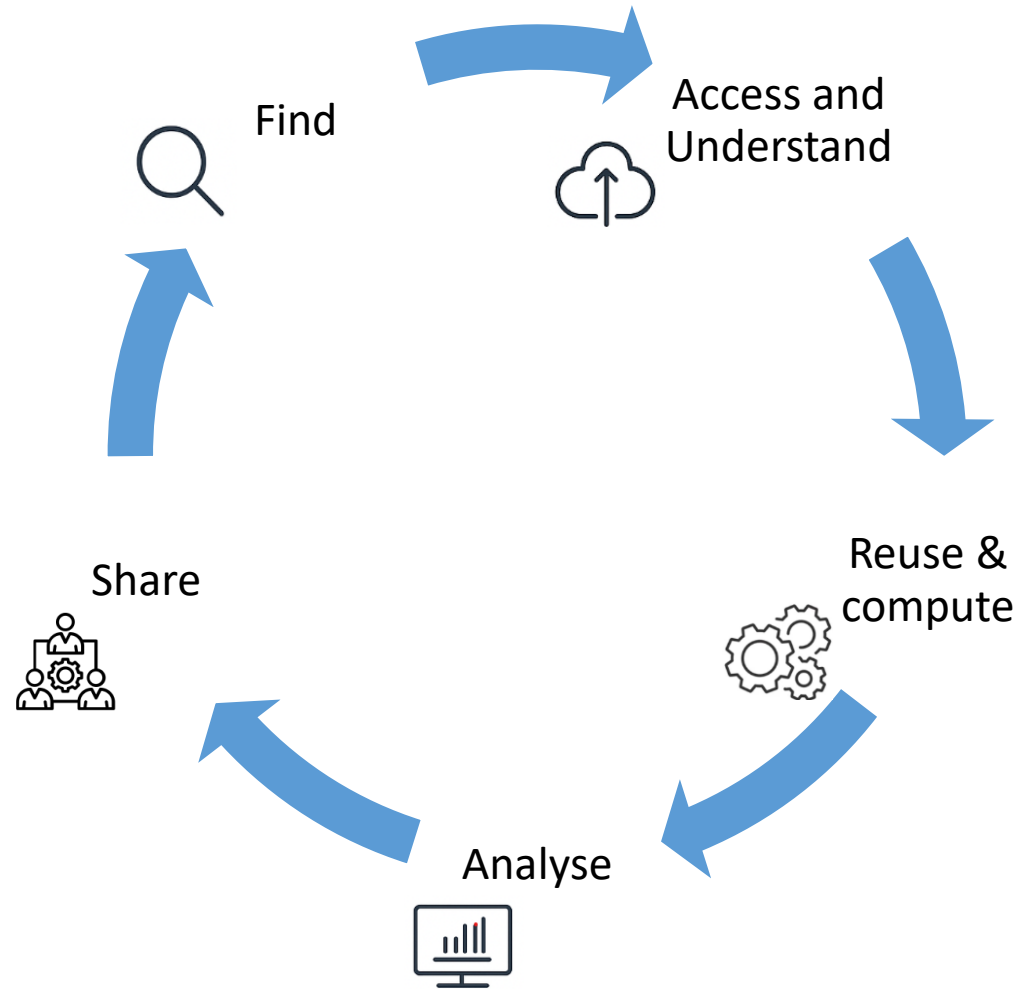
Creating a **cycle of reuse and enrichment**

Strengthening the **community around water data**



WHEN FAIR WATER STANDARDS (W3C, OGC, ...) MEET VRE

Let's



... research and public monitoring data/algorithms using the same paradigm shift other scientific communities (bio informatics, biodiversity, oceanography, ...) and some Research Infrastructures are doing



RÉPUBLIQUE
FRANÇAISE

Liberté
Égalité
Fraternité



Géosciences pour une terre durable

brgm

PROJECTS CONTEXT

- OneWater : French research project

- Référence ANR-22-PEXO-0009

- <https://www.onewater.fr/>

OneWater
Eau Bien Commun

PROGRAMME NATIONAL
DE RECHERCHE SUR L'EAU



- Water4all: Water security for the planet : European (EU) partnership

- European Commission: Directorate-General for Research and Innovation, Horizon Europe strategic plan 2021-2024, Publications Office of the European Union, 2021,

- <https://data.europa.eu/doi/10.2777/083753>

- <https://www.water4all-partnership.eu/>

 Water4All
Water security for the planet



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THANK YOU

Are you too busy to improve?

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