

Il sistema informativo di condivisione e pubblicazione dei dati idrologici

Silvano Pecora

Area Idrologia e Idrografia – Servizio IdroMeteoClima

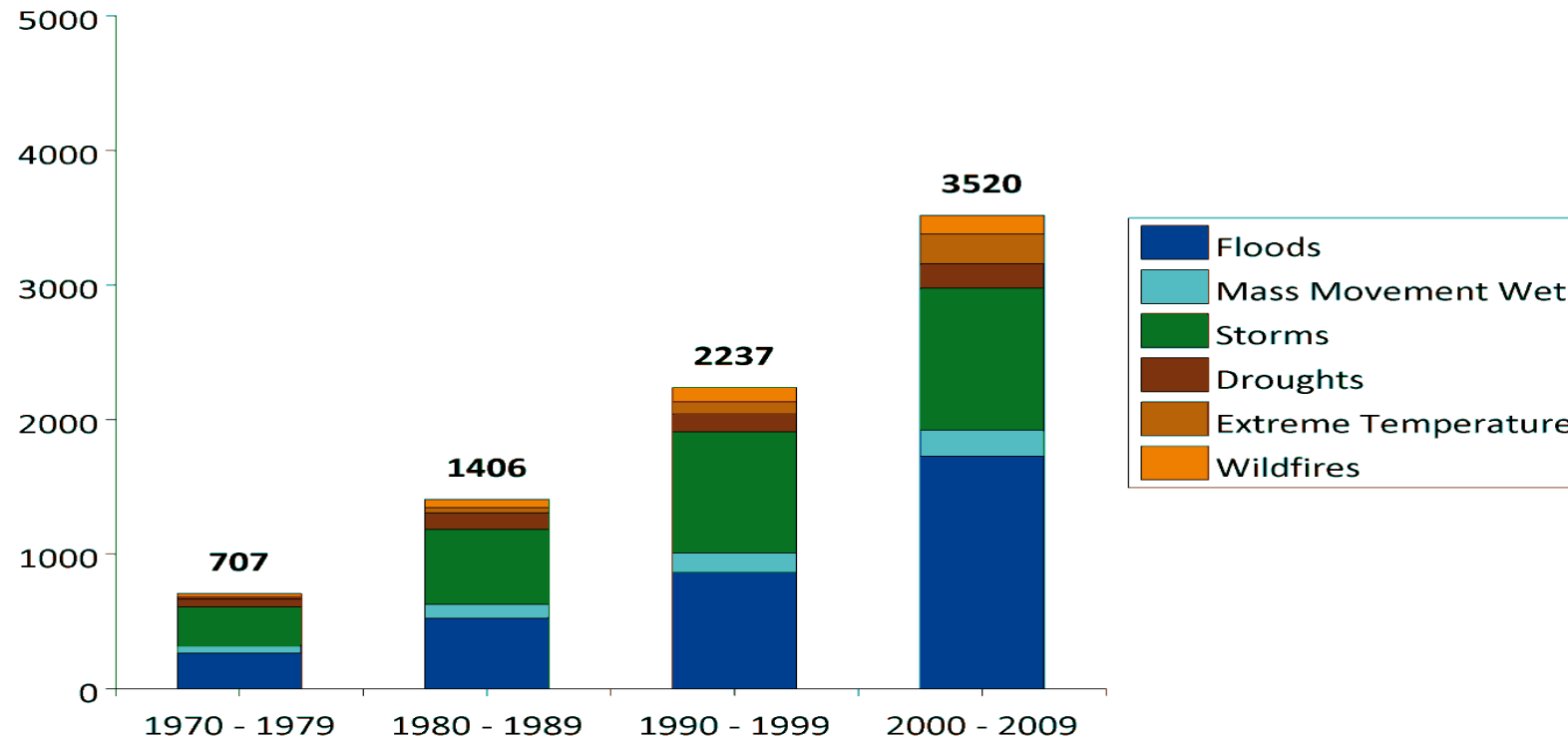
ARPAE Emilia Romagna



CReIAMO PA

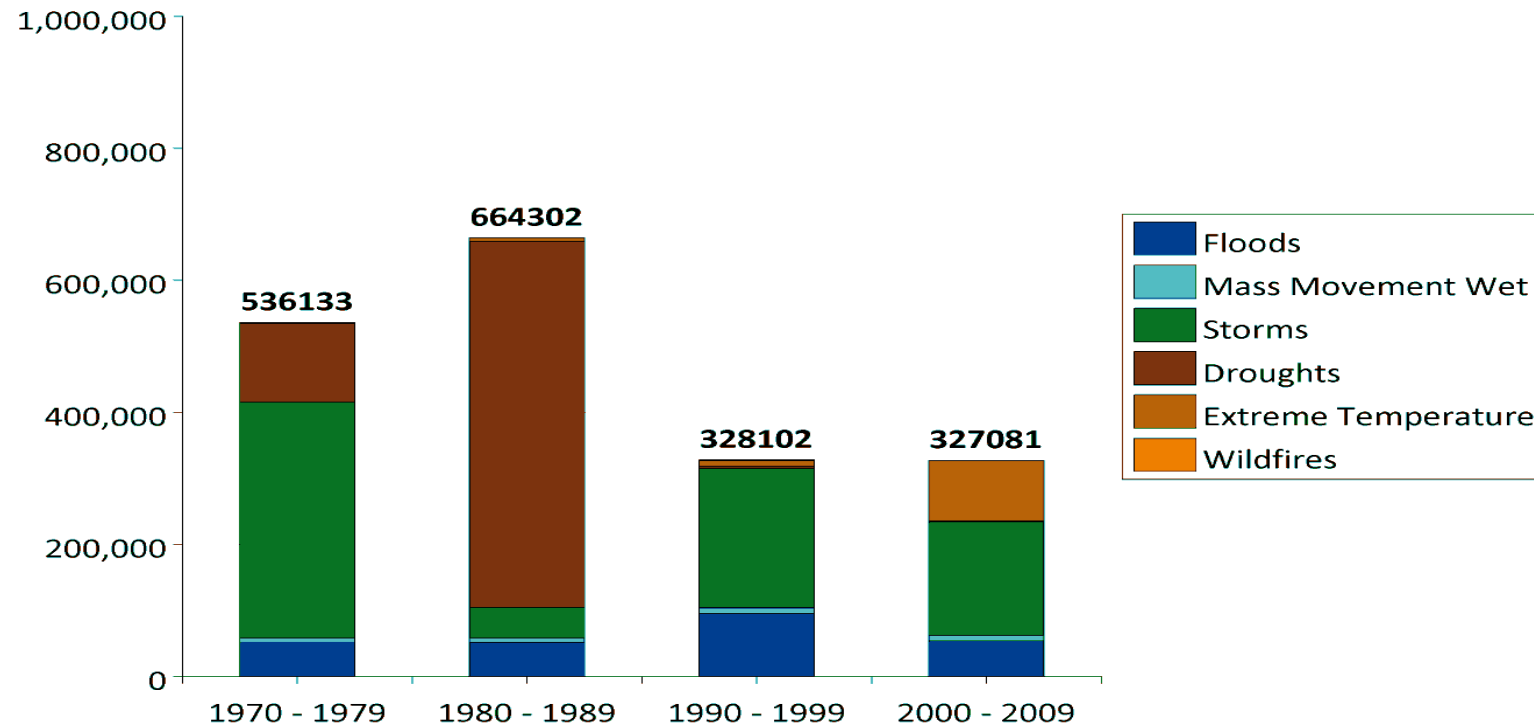
Per un cambiamento sostenibile

Statistica dei disastri associati con gli eventi meteorologici, idrologici e climatici nel mondo per il periodo 1970 - 2009



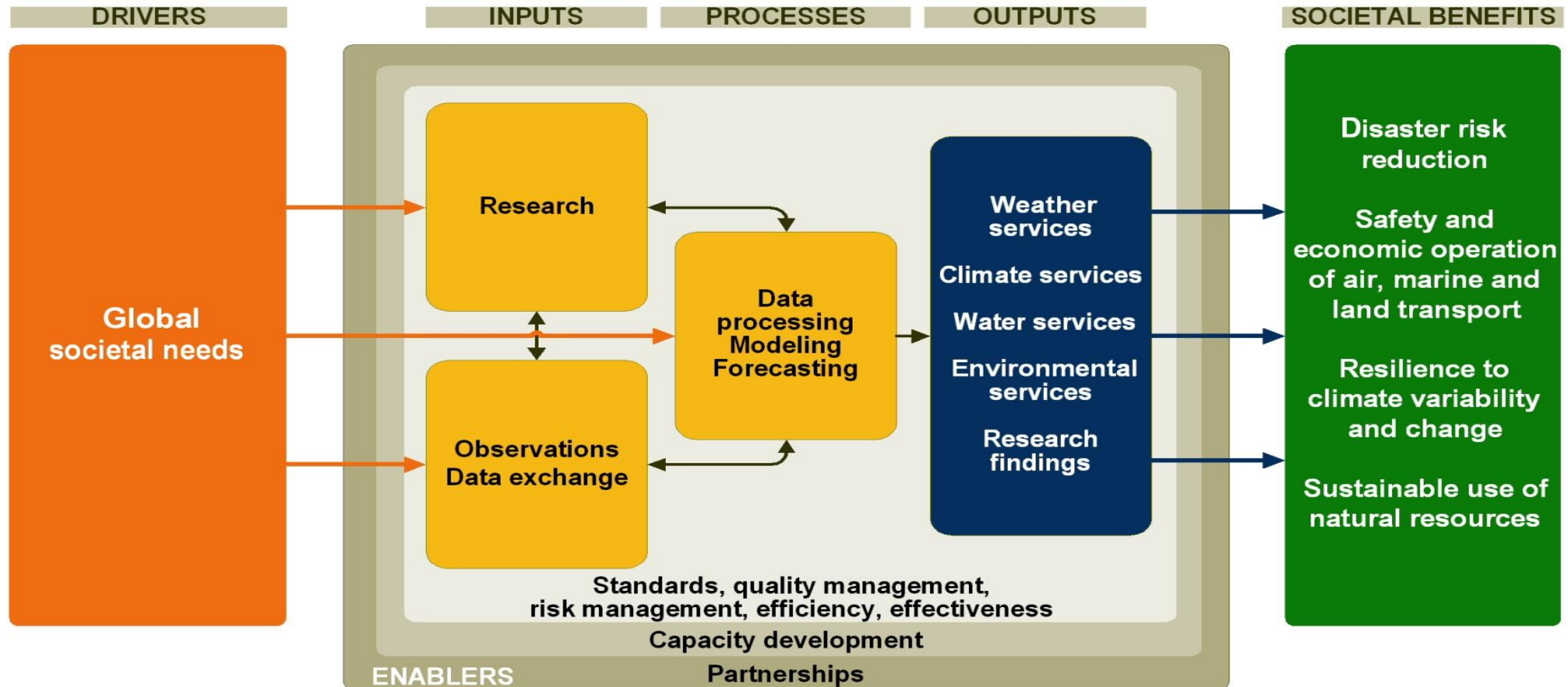
Suddivisione del numero totale dei disastri nel mondo per decade e per tipologia di rischio: incremento significativo

Statistica dei disastri associati con gli eventi meteorologici, idrologici e climatici nel mondo per il periodo 1970 - 2009



Suddivisione del numero totale delle vittime nel mondo per decade e per tipologia di rischio: decremento significativo

Rappresentazione schematica del WMO Strategic Plan

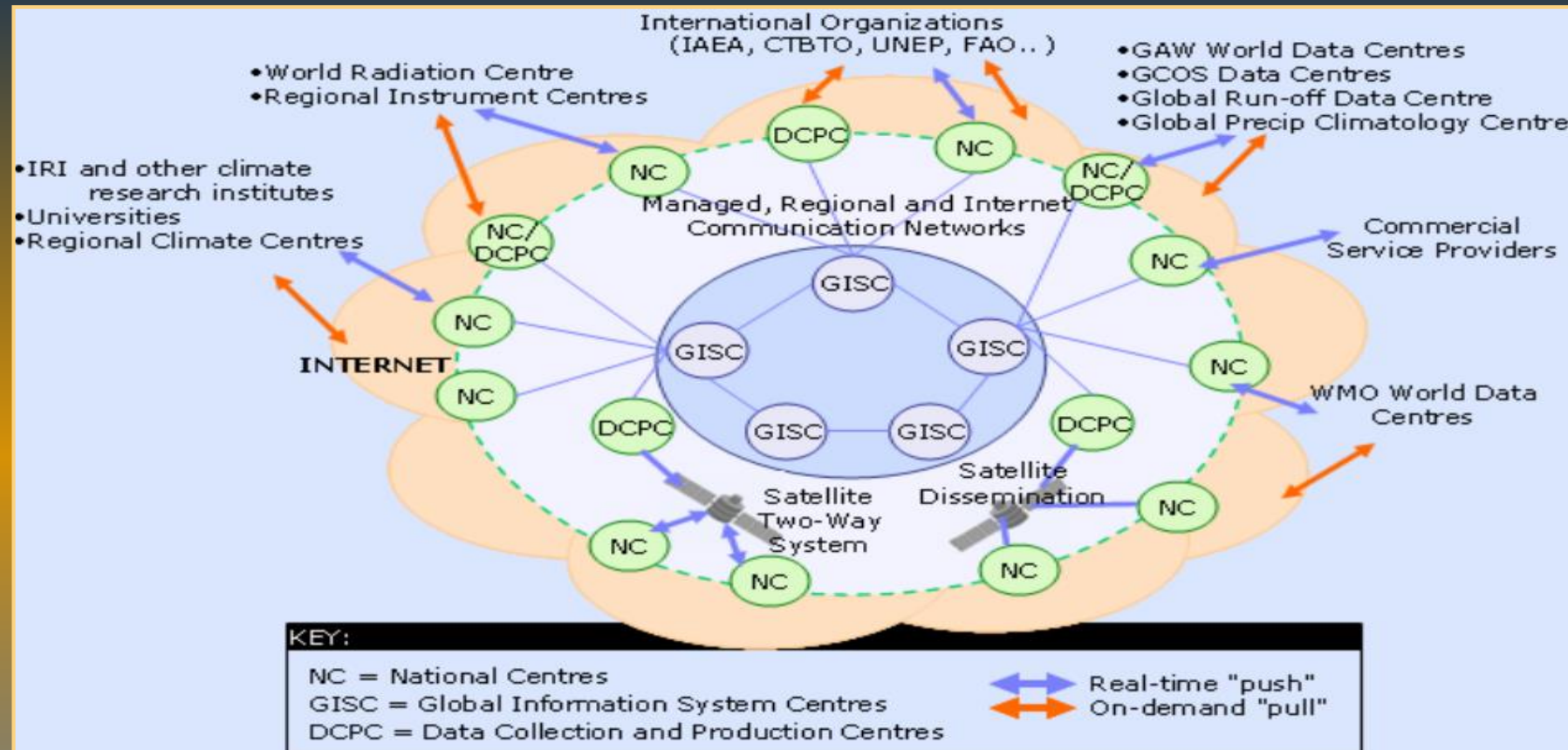


Processi per raggiungere risultati attesi e apportare benefici sociali

WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS) and WMO HYDROLOGICAL OBSERVING SYSTEM (WHOS)



WIS – WMO Information System



Ingests data from National Centers . . .
. . . synthesized globally through communication networks



ISPRA

Istituto Superiore per la Protezione
e la Ricerca Ambientale

W H O S

WMO Hydrological Observing System

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ISPRA HIS Sistema informativo idrologico servizio registri Web

Il monitoraggio idrologico italiano viene effettuato mediante una rete federata composta da 19 regioni amministrative e 2 province autonome, insieme con **ISPRA**, che è l'organo tecnico governativo istituito dal Ministero dell'Ambiente italiano.

Il portale fornisce l'accesso alle osservazioni idrologiche in Italia, comunemente pubblicate come Annali idrologici. In particolare, per le osservazioni in situ, fornisce ulteriori capacità operative, quali un registro nazionale di servizio dati, catalogati utilizzando le norme e le procedure della Geospatial Consortium e l'Organizzazione meteorologica mondiale.

Le interfacce pubblicate sul portale permettono di recuperare i dati idrologici regionali direttamente dai fornitori tramite abilitazione e download.



WEB SERVICE CATALOG SYSTEM

- Brokered services: 19
- Brokered sites: 6088
- Brokered variables: 6
- Brokered values: 73491569
- Geographic extent: [6.704337, 18.48, 35.5017, 47.03659]

<http://www.hiscentral.isprambiente.gov.it>



Brokered services

Data Service Title	Observation Network Name	WSDL	CreatedDate	Organization	Status	Earliest Start Date	Latest End Date
Provincia Autonoma di Bolzano	Provincia di Bolzano	WSDL	2013.09.04	Provincia Autonoma di Bolzano - Ripartizione Protezione incendi e civile - Ufficio Idrografico		1920.01.01	1999.01.01
Regione Abruzzo	Regione Abruzzo	WSDL	2013.09.04	Dipartimento Opere Pubbliche, Governo del Territorio e Politiche Ambientali, Servizio Emergenza di Protezione Civile, Ufficio Idrografico Mareografico (PE), Gestione Colonna Mobile		1921.01.01	2014.11.30
Regione Basilicata	Regione Basilicata	WSDL	2013.09.04	Protezione Civile Regione Basilicata		2001.01.01	2014.11.29
Regione Calabria	Regione Calabria	WSDL	2013.09.04	ARPACAL - Centro Funzionale Multirischi		1900.01.01	2014.10.31
Regione Campania	Regione Campania	WSDL	2013.09.04	Centro Funzionale Regione Campania - CEMPID		1995.01.01	2014.12.31
Regione Emilia Romagna	Regione Emilia Romagna	WSDL	2013.02.28	ARPA Emilia Romagna		1918.01.01	2014.12.31
Regione Friuli Venezia Giulia	Regione Friuli Venezia Giulia	WSDL	2013.09.04	Regione Autonoma Friuli Venezia Giulia		1912.01.01	2012.12.31
Regione Lazio	Regione Lazio	WSDL	2013.09.04	Regione Lazio - Centro Funzionale Regionale		1921.01.01	2004.12.31
Regione Liguria	Regione Liguria	WSDL	2013.09.04	ARPA Liguria - Centro Funzionale Meteo Idrologico di Protezione Civile		1913.01.01	2009.12.31
Regione Lombardia	Regione Lombardia	WSDL	2013.09.04	U.O. Servizio Meteorologico e Rete Idro-Meteo regionale		1763.01.01	2014.11.25
Regione Marche	Regione Marche	WSDL	2013.09.04	Dipartimento per le politiche integrate di sicurezza e per la protezione civile della Regione Marche - Centro Funzionale		1928.01.30	2013.12.31
Regione Molise	Regione Molise	WSDL	2013.09.04	Agenzia Regionale di Protezione Civile - Centro Funzionale del Molise		2007.01.01	2014.12.31
Regione Piemonte	Regione Piemonte	WSDL	2013.09.04	Arpa Piemonte - Agenzia Regionale per la Protezione Ambientale del Piemonte - Dipartimento Sistemi Previsionali		1987.09.25	2013.12.31
Regione Puglia	Regione Puglia	WSDL	2013.09.04	Centro Funzionale - Servizio Protezione Civile		2004.01.01	2004.12.31
Regione Sardegna	Regione Sardegna	WSDL	2013.09.04	ARDIS - Servizio Tutela e Gestione delle Risorse Idriche, vigilanza sui servizi idrici e gestione delle siccità		1920.01.01	2008.12.31
Regione Sicilia	Regione Sicilia	WSDL	2013.09.04	Regione Siciliana - Osservatorio delle Acque		1916.01.01	2008.12.31
Regione Toscana	Regione Toscana	WSDL	2013.09.04	Servizio Idrologico - Centro Funzionale		1916.01.01	2015.03.31
Regione Valle d'Aosta	Regione Valle d'Aosta	WSDL	2013.09.04	Assessorato opere pubbliche, difesa del suolo e edilizia residenziale pubblica - Centro funzionale regionale		1994.12.31	2013.12.31
Regione Veneto	Regione Veneto	WSDL	2013.09.04	Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto		1992.01.01	2013.12.31



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Regione Emilia Romagna ARPA Emilia Romagna



Regione Emilia Romagna
WaterML Service

WFS Service

Contact: Silvano Pecora
specora@arpa.emr.it

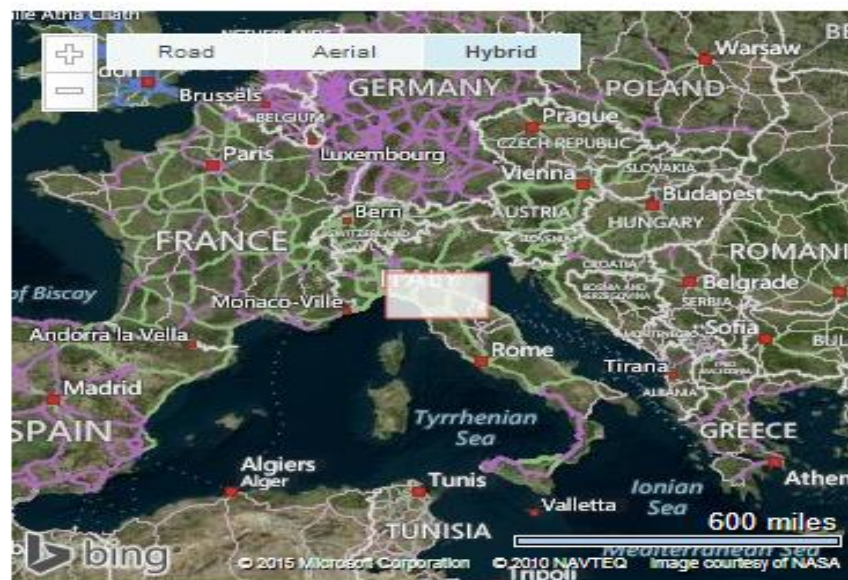
Service Statistics:

Sites:	717	Geographic Extent:	45.1443	
Variables:	6		8.8493	12.73278
Values:	6618109		43.51029	

Last Harvested on 7/1/2015 12:50:49 PM
(updated weekly, assumed static)

Abstract

ARPA SIMC, Servizio Idro-Meteo-Clima dell'Agenzia Regionale Prevenzione e Ambiente Emilia-Romagna, svolge attività osservative e previsionali operative e di ricerca e sviluppo, in meteorologia, climatologia, idrologia, agrometeorologia, radarmeteorologia e meteorologia ambientale.



Citation

I dati si riferiscono alle stazioni di monitoraggio selezionate per la pubblicazione degli Annali Idrologici.

I servizi web di catalogo



Published interfaces

The following catalog interfaces are available:

- **CUAHSI API interface**
Endpoint: <http://www.hiscentral.isprambiente.gov.it/hiscentral/webservices/hiscentral.asmx>
Target namespace: <http://hiscentral.cuahsi.org/20100205/>
[Capabilities document](#)
- **CSW/ISO 2.0.2 interface**
Endpoint: <http://arpa-er.geodab.eu/gicat/services/cswiso?>
Target namespace: <http://jaxws.ogc.essi.imaa.cnr.it/>
[Capabilities document](#)
- **CSW/ISO-GEO 2.0.2 interface**
Endpoint: <http://arpa-er.geodab.eu/gi-cat/services/cswisogeo>
Target namespace: <http://jaxws.ogc.essi.imaa.cnr.it/>
[Capabilities document](#)
- **OPENSEARCH interface**
Endpoint: <http://arpa-er.geodab.eu/gi-cat/services/opensearch>
Target namespace: http://_2_0_2.csw.sdi.floraresearch.eu/
[OpenSearch description](#)
- **CKAN interface**
Endpoint: <http://arpa-er.geodab.eu/gi-cat/services/ckan?wsdl>
Target namespace: <http://ckan.sdi.floraresearch.eu/>
[Capabilities description](#)
- **OAI-PMH 2.0 interface**
Endpoint: <http://arpa-er.geodab.eu/gi-cat/services/oaipmh>
Target namespace: http://oai_pmh.sdi.floraresearch.eu/
[Identify response](#)
- **WPS interface**
Endpoint: <http://arpa-er-axe.geodab.eu/gi-axe/services/http-get?>
Target namespace: <http://essi.imaa.cnr.it/wps/1.0.0/wsd/>
[Capabilities response](#)



ISPRA

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WHS

WMO Hydrological Observing System



Home

Services

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About

Print

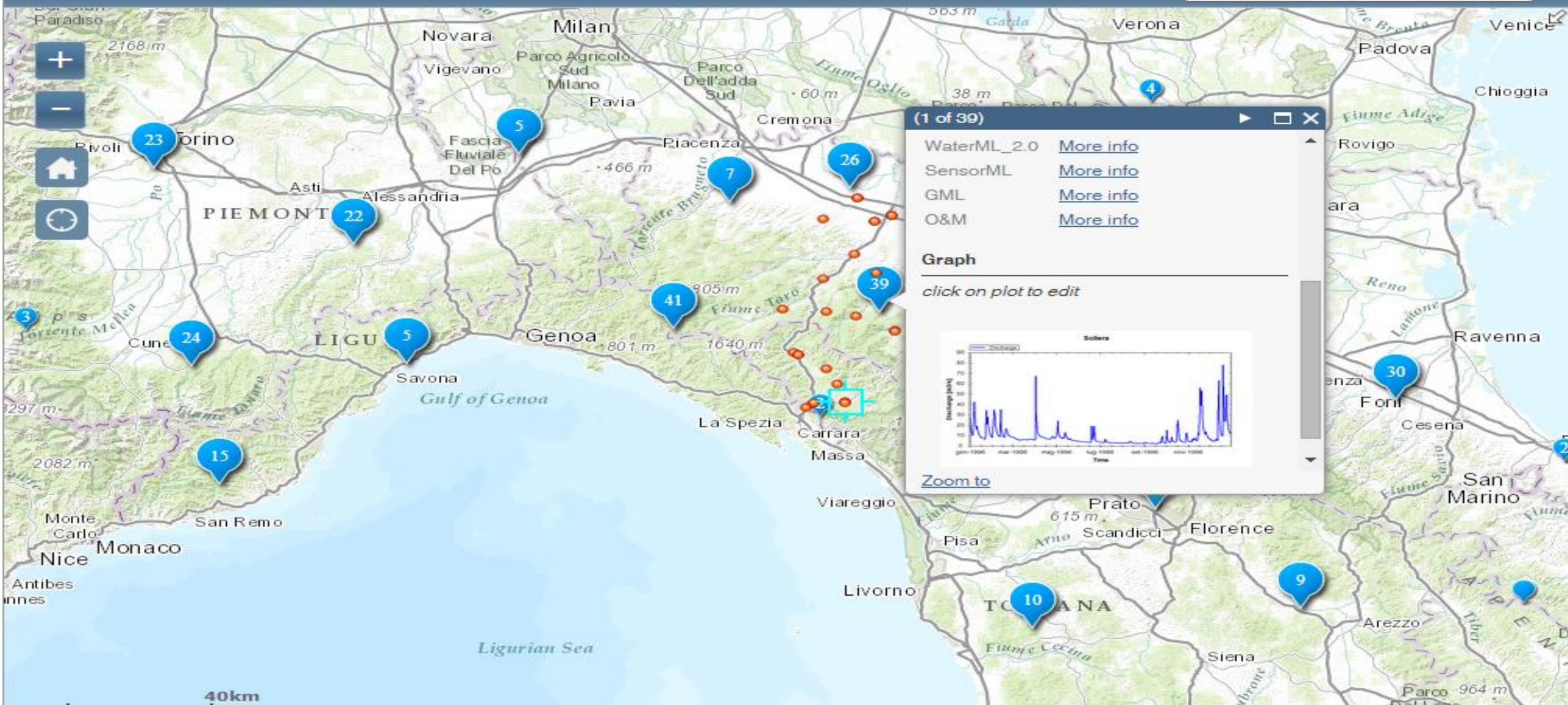
Layers

Basemap

Measure

Share

Find address or place



(1 of 39)

- WaterML_2.0 [More info](#)
- SensorML [More info](#)
- GML [More info](#)
- O&M [More info](#)

Graph

click on plot to edit

[Zoom to](#)



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WHS

WMO Hydrological Observing System

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Permalink | Help | Add bookmark | Imprint | © 52°North. GmbH 2015

Search for time series



Choose data source

Dataprovider

Regione Basilicata

Regione Calabria

- ODM:Discharge (ODM:Discharge-Average)
- ODM:Precipitation (ODM:Precipitation-Cumulative)
- ODM:Tmax (ODM:Tmax-Maximum)
- ODM:Tmin (ODM:Tmin-Minimum)
- ODM:Water_Level (ODM:Water_Level-Unknown)

ODM:Precipitation-Cumulative

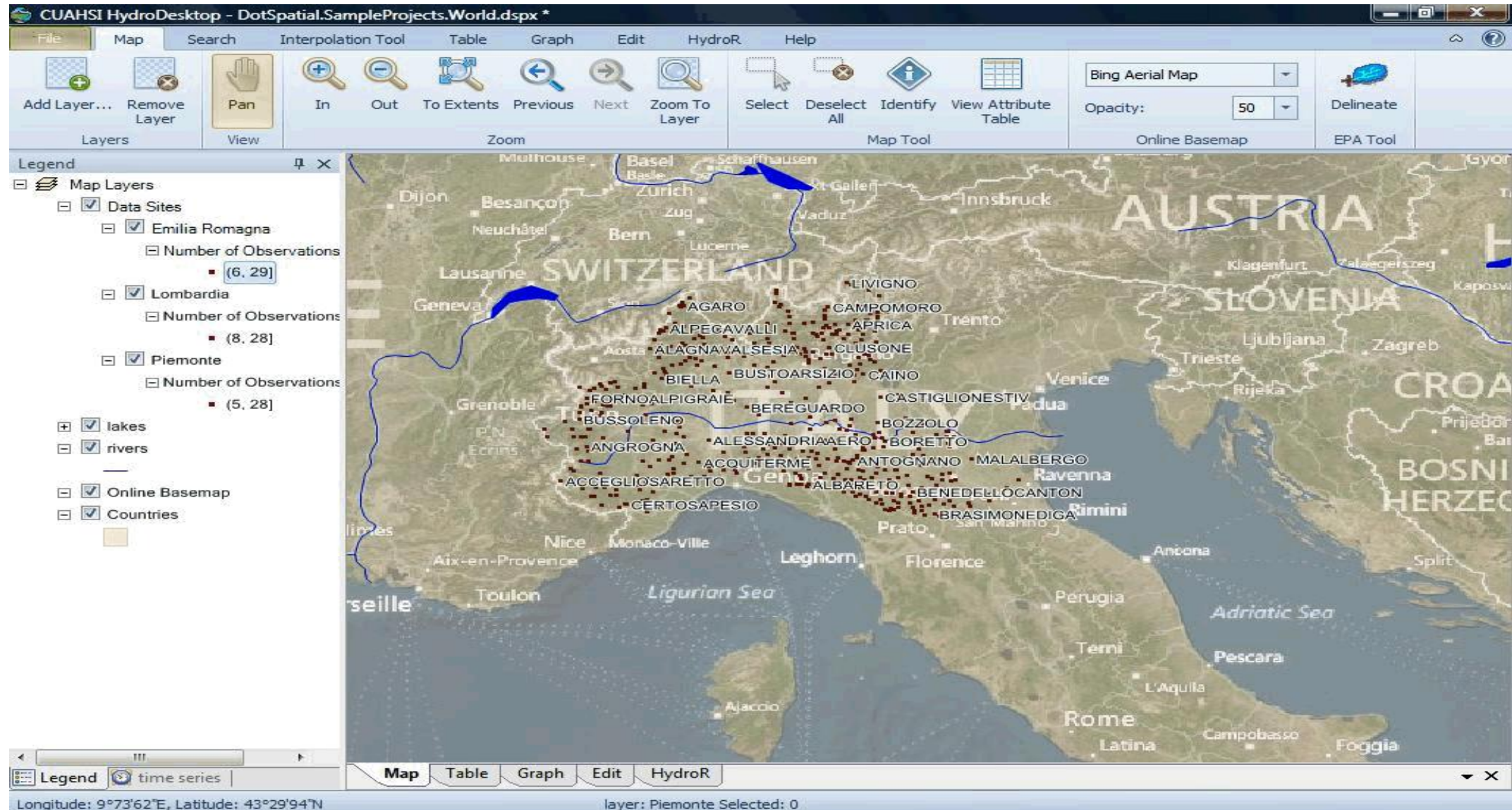
Station: OD:1000

Description:	Measurement of ODM:Precipitation with sensor type Cumulative
Name:	ODM:Precipitation-Cumulative
ProcessMethod Description:	No method specified
Station:	
Sensor:	Cumulative
Parameter:	ODM:Precipitation
Sample Medium :	



Lon: 18.87000528769781, Lat: 38.51270093981255 (EPSG:4328)

HYDRODESKTOP e HIS tramite CUAHSI API



Legend

- Map Layers
 - Data Sites
 - Lombardia
 - Number of Obs (8, 28)
 - Emilia Romagna
 - Number of Obs
 - Piemonte
 - Number of Obs
 - lakes
 - rivers
 - Online Basemap
 - Countries

Download Manager

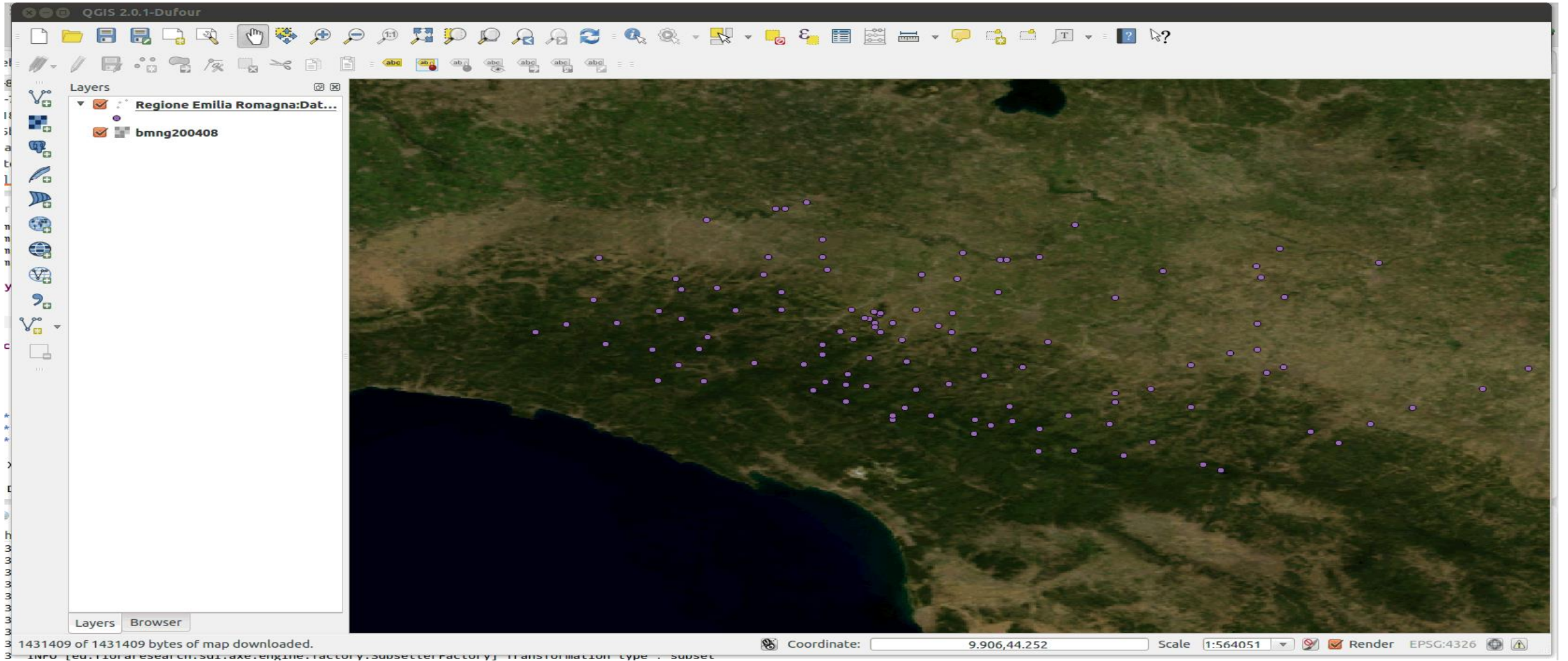
Downloading...

Total series: 163 Downloaded and saved: 75
 Remaining series: 54 With error: 34
 Estimated time: 00:24:36

	ServiceUrl	SiteCode	VariableCode	SiteName	VariableName	Status
	http://192.168.1...	OD:ALADISTURA	ODM:Precipitation	ALADISTURA	Precipitation	Ok
	http://192.168.1...	OD:ALBA	ODM:Precipitation	ALBA	Precipitation	Ok
	http://192.168.1...	OD:ASTI	ODM:Precipitation	ASTI	Precipitation	Ok
	http://192.168.1...	OD:BALME	ODM:Precipitation	BALME	Precipitation	Ok
	http://192.168.1...	OD:BERTESSENO	ODM:Precipitation	BERTESSENO	Precipitation	Ok
	http://192.168.1...	OD:BORGOFRA...	ODM:Precipitation	BORGOFRANCO...	Precipitation	Ok
	http://192.168.1...	OD:BRA	ODM:Precipitation	BRA	Precipitation	Ok
	http://192.168.1...	OD:BROSSASCO	ODM:Precipitation	BROSSASCO	Precipitation	Ok
	http://192.168.1...	OD:CALCINERE	ODM:Precipitation	CALCINERE	Precipitation	Ok

Details... Send error Copy log Re-download: All series with errors Auto scroll

QGIS e HIS tramite WFS



GEOSS e HIS

The screenshot shows a web browser window displaying the GEOSS Geo Discovery and Access Broker interface. The browser's address bar shows the URL `184.73.174.89/gi-cat-StP/gi-portal/index.jsp`. The page header features the GEOSS logo and the text "EuroGEOSS GEO DISCOVERY AND ACCESS BROKER".

On the left side, there is a "Hide sources selection" panel with a list of data sources. A red arrow points to the "HIS Central Italy" entry, which is selected with a checkmark. The other sources listed are:

- Knossos
- Web Accessible Folder
- HIS Central US
- One Geology
- New Zealand Monitoring Network
- NASA Global Change Master Directory
- HIS Central Italy
- GEOSS Clearinghouse
- IODE
- EEA SDI Catalog

Below the list is a "Start search" button. At the bottom left, there are links for "Welcome Page" and "Configuration page", and a footer indicating the system is "Powered by" the Italian Institute of Geology and Volcanology (INGV) and CNR-IRA, along with the EuroGEOSS logo.

On the right side, there is a "Map" tab showing a satellite view of the world. Below the map is a "Search results" section with a dropdown menu set to "Search Results - All". The results table has columns for "Access/Use Constraints" and "Title", and it displays the message "No records found."

GI-PORTAL e HIS tramite WPS

The screenshot displays the GI-CAT BROKER web application interface. The browser window title is "GI-portal - Mozilla Firefox" and the address bar shows "gea.pin.unifi.it:8080/gi-cat/gi-portal/index.jsp". The page header includes the GEOSS EuroGEOSS logo and the "GI-CAT BROKER" title.

The interface is divided into several sections:

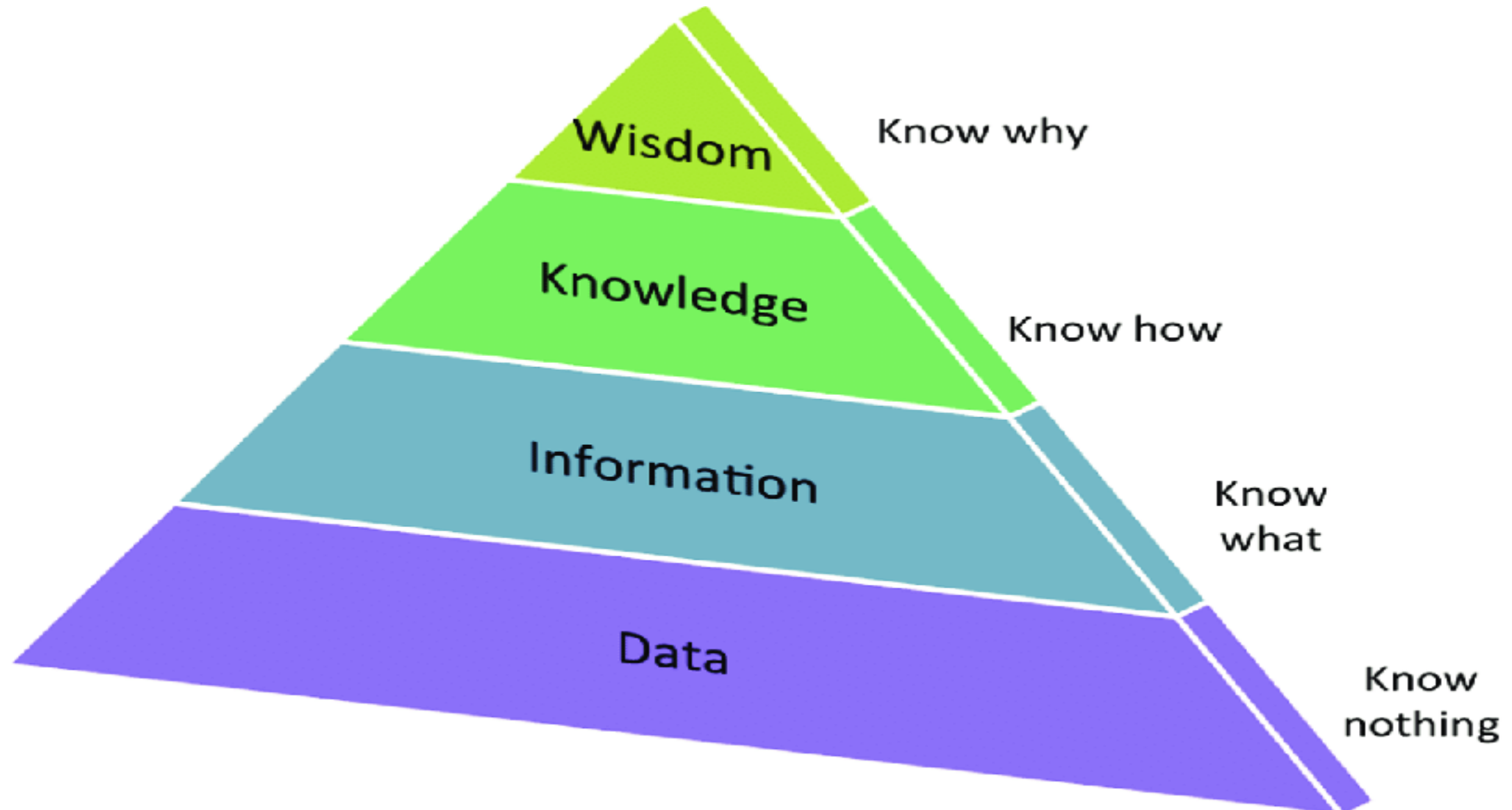
- Query constraints selection:** Includes a "Keyword" field, "All" and "GEOSS Data Core" buttons, a "Location" field, and an "Area selection" section with coordinate input fields (3.792, 48.389, 16.185, 40.633) and radio buttons for "Overlaps", "Contains", and "Disjoints".
- Map:** A satellite map of Europe with several red location pins. A "Map" tab and "Close Tab" button are visible.
- Search results:** A blue bar indicates "Search results: 718 - Elapsed time: 5 seconds". Below it, a table shows search results for "earth obs".

The search results table is as follows:

Access/Use Constraints	Title
	Tiled dataset w/ about 718 HIS time series

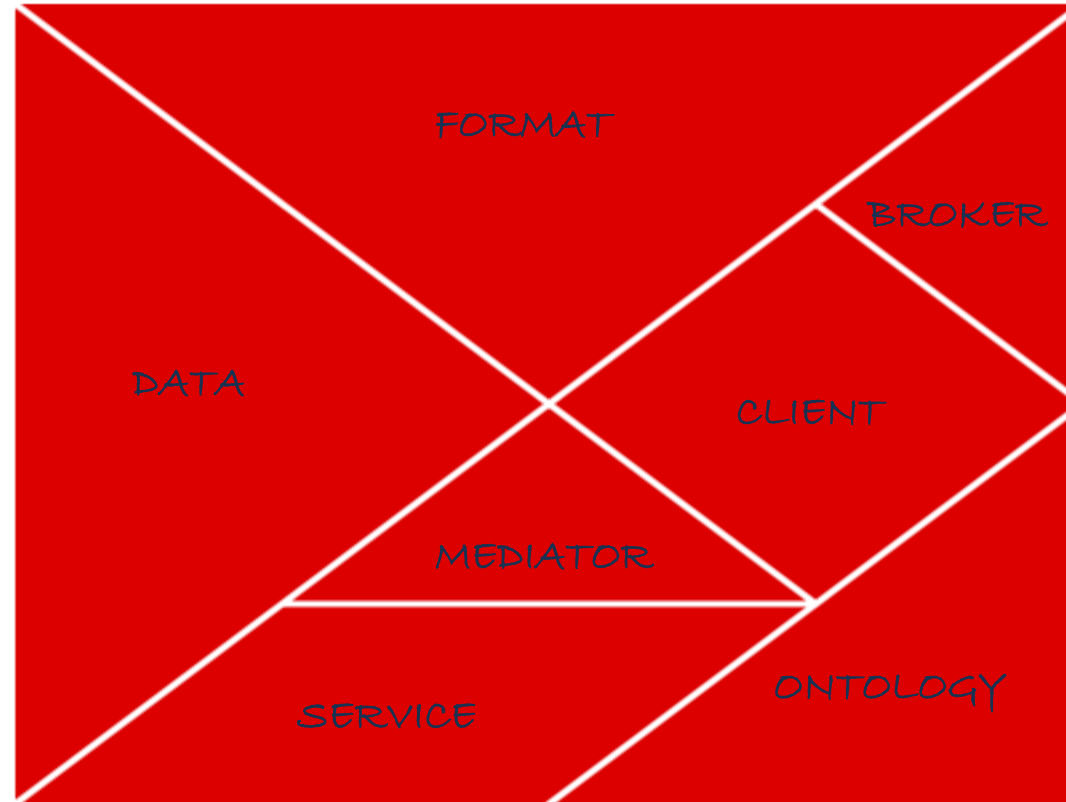
At the bottom of the page, there is a search bar with "earth obs" entered and navigation links: "Previous", "Next", "Highlight all", "Match case", and "Reached end of page, continued from top".

Modello di crescita conoscitiva



Compiled based on Ackoff, R. L. (1989). From data to wisdom. *Journal of Applied Systems Analysis*, 16(1), 3-9. and Zeleny, M. (1987). Management support systems: towards integrated knowledge management. *Human Systems Management*, 7(1), 59-70.

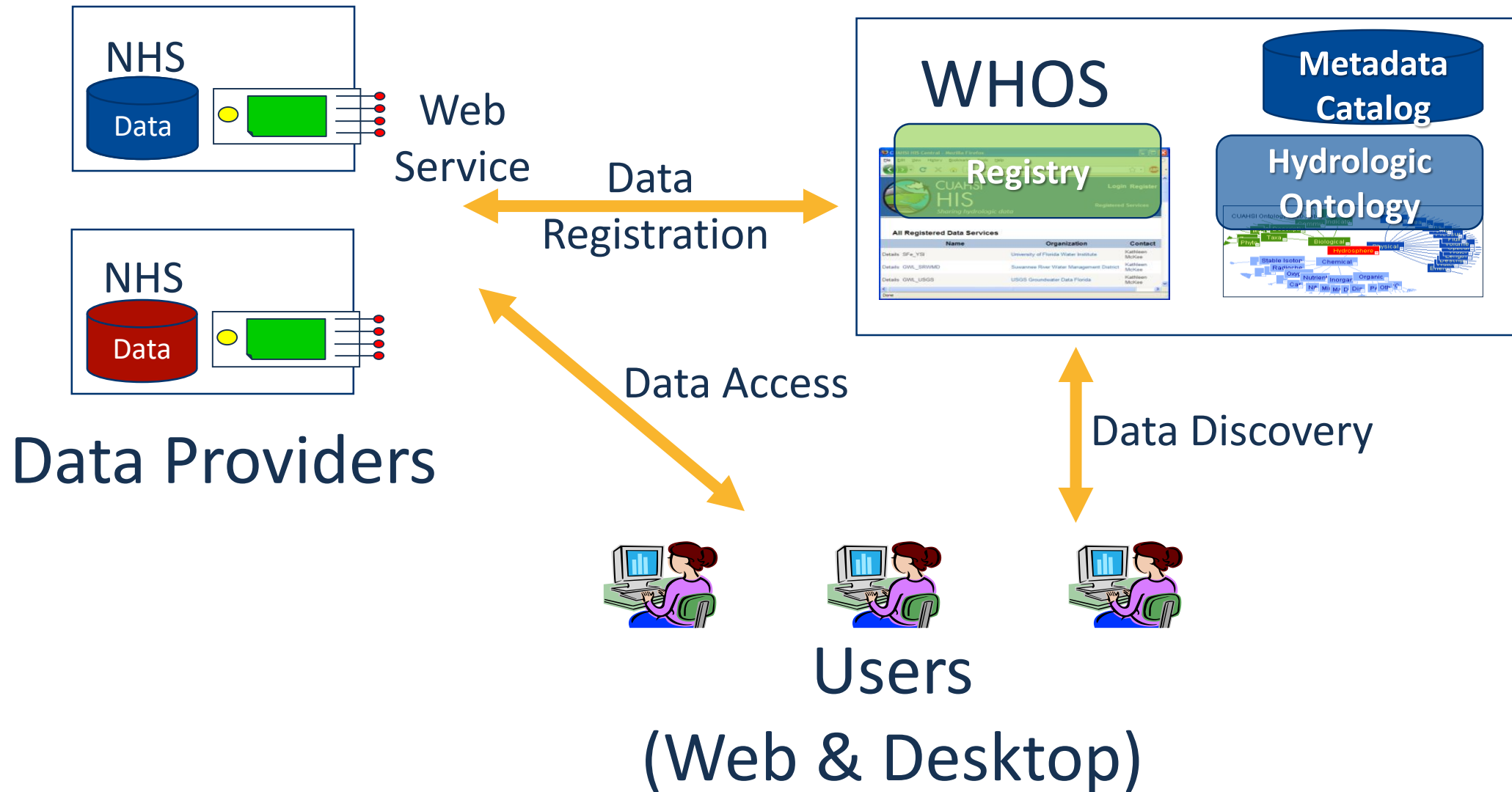
WHOS



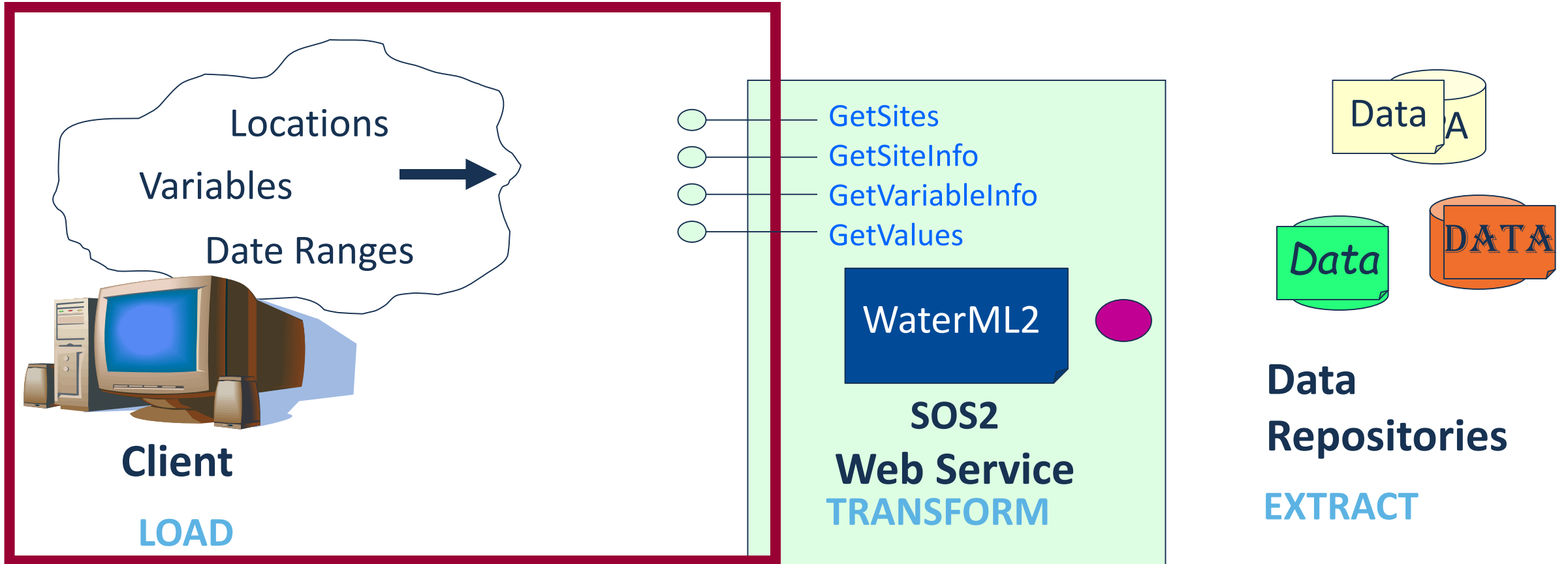
reshaping data in hydrology



WHOS Architecture Overview



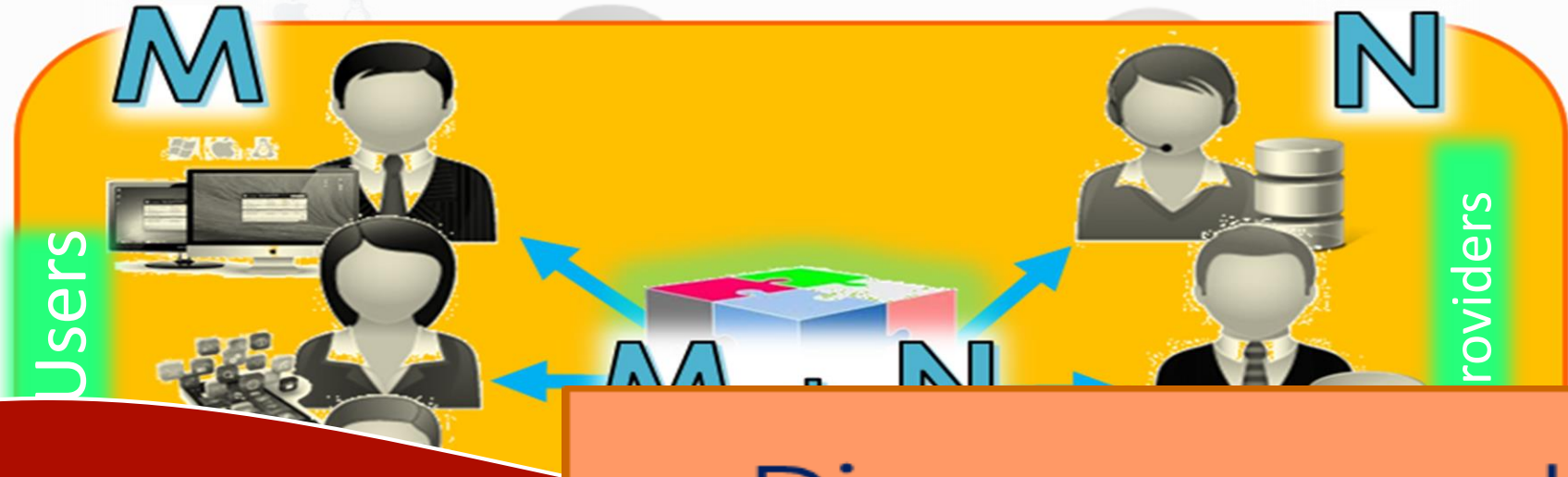
WaterML2 and SOS2



SOS2 is how you ask for data
WaterML2 is the format of what comes back

Broker Approach

Applications



Data Infrastructures

**Collaborative-Access
Management approach**
[Governance]

Discovery and
Access
[functionality]



WMO Hydrological Observing System

WMO Hydrological Ontology

The WMO Hydrological Ontology is a formal naming and definition of the types, properties, and interrelationships of entities that really or fundamentally exist in the domain of hydrology; in particular, it compartmentalizes the variables needed in hydrology and establishes the relationships between them.

i More about this visualisation

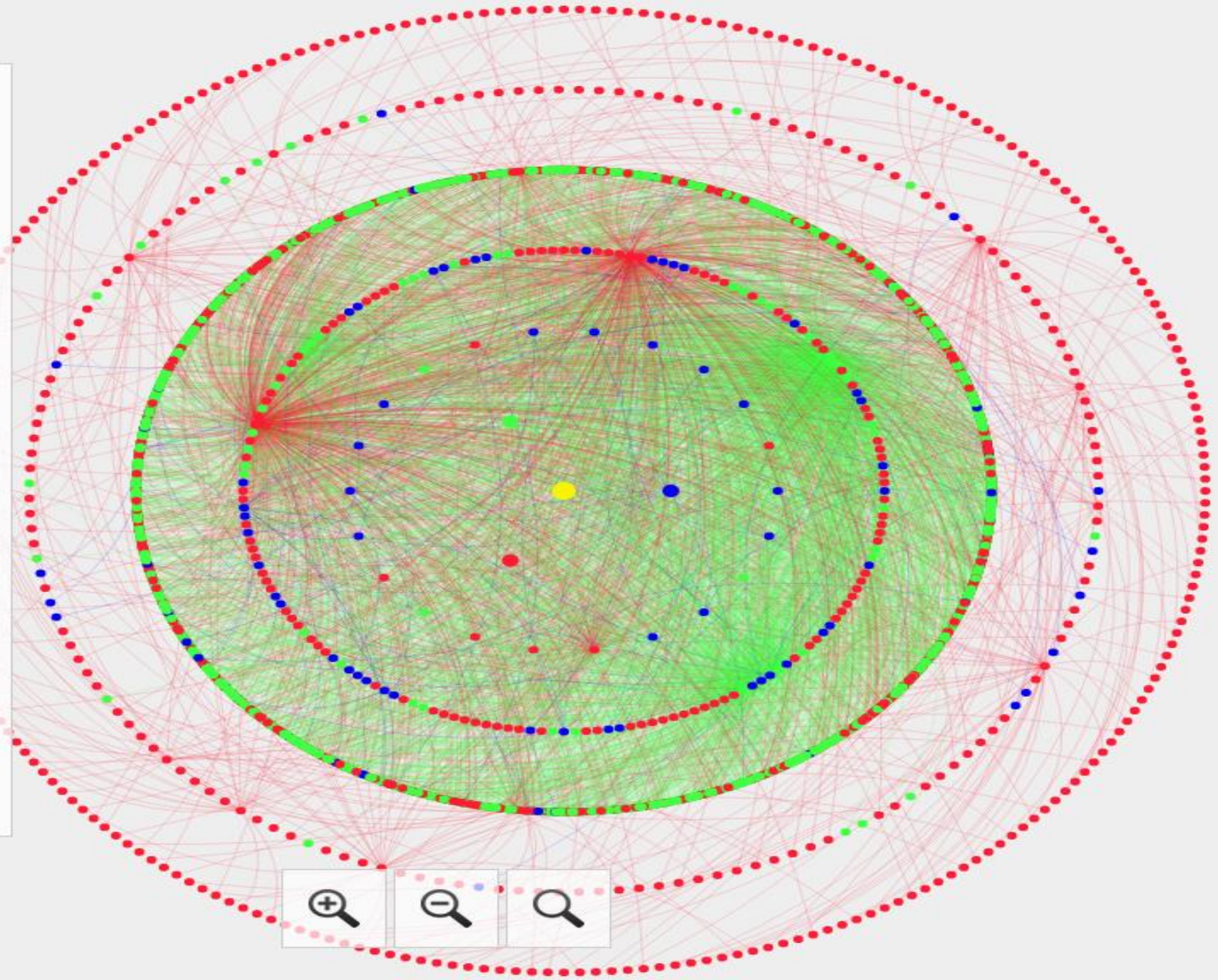
Legend:

- A concept
- A relationship between two concepts
- Colour represents a grouping of concepts according to their properties

Ontology client



Search:





WMO Hydrological Observing System

WMO Hydrological Ontology

The WMO Hydrological Ontology is a formal naming and definition of the types, properties, and interrelationships of entities that really or fundamentally exist in the domain of hydrology; in particular, it compartmentalizes the variables needed in hydrology and establishes the relationships between them.

i More about this visualisation

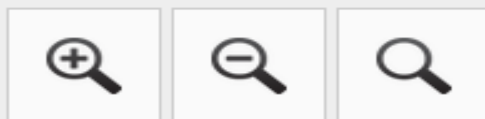
Legend:

- A concept
- A relationship between two concepts
- Colour represents a grouping of concepts according to their properties

Ontology client



Search:



Return to the full network

Information Pane

Flux, discharge

Variables

Connections:

- [Discharge, groundwaterflow](#)
- [Discharge, in conduit](#)
- [Discharge, stream](#)
- [Discharge, unspecified](#)
- [Discharge, well flow rate](#)
- [Flux](#)
- [Storm water flow](#)

Synonyms:

- Flujo, caudal
- Flusso, portata
- Flux, débit



WMO Hydrological Observations

WMO Hydrological Ontology

The WMO Hydrological Ontology provides a common naming and definition of hydrological concepts, their properties, and interrelationships that really or fundamentally exist in the domain of hydrology; in other words, it compartmentalizes the variable concepts of hydrology and establishes the relationships between them.

i More about this visualisation

Legend:

- A concept
- A relationship between two concepts
- Colour represents a group of concepts according to their domain

Ontology client



Search:

- Caudal, agua subterránea
- Discharge, well flow rate
- Portata, in condotta
- Débit, dans une conduite
- Discharge, per batch
- Depth of flow in pipe or conduit
- Flow, per batch
- Discharge, groundwaterflow
- Storm water flow
- Débit, cours d'eau
- Flow, in conduit pipe or treatment plant
- Caudal, en conducto
- Discharge, stream
- Caudal, corriente
- Discharge, unspecified
- Portata, corsi d'acqua
- Portata, acque sotterranee
- Discharge, in conduit
- Débit, écoulement souterrain
- Streamflow

Return to the full network

Information Pane

Flux, discharge

- Discharge, groundwaterflow
- Discharge, in conduit
- Discharge, stream
- Discharge, unspecified
- Discharge, well flow rate
- Discharge, flow



```
1 PREFIX : <http://www.semanticweb.org/ontologies/hydrology#>
2 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3 select distinct ?name
4 where {?x rdf:type :Variable.
5         ?x :variablename ?name.
6         ?x :searchedBy ?y.
7         ?y rdf:type :Concept.
8         ?y :conceptname ?z.
9         filter regex(?z, "level, stream", "i" )}
```



Table

Raw Response



Showing 1 to 18 of 18 entries

Search:

Show

50



entries

name



- 1 Water depth, stream
- 2 Profondeur de l'eau, cours d'eau
- 3 Profondità dell'acqua, corsi d'acqua
- 4 Nivel del agua, corriente
- 5 Stream gage height
- 6 Gage height stream
- 7 Profundidad del agua, sección transversal promedio
- 8 Hauteur d'eau, cours d'eau
- 9 Water depth, cross-sectional averaged
- 10 Profondeur de l'eau, coupe transversale moyenne

International Standardization for Water Data

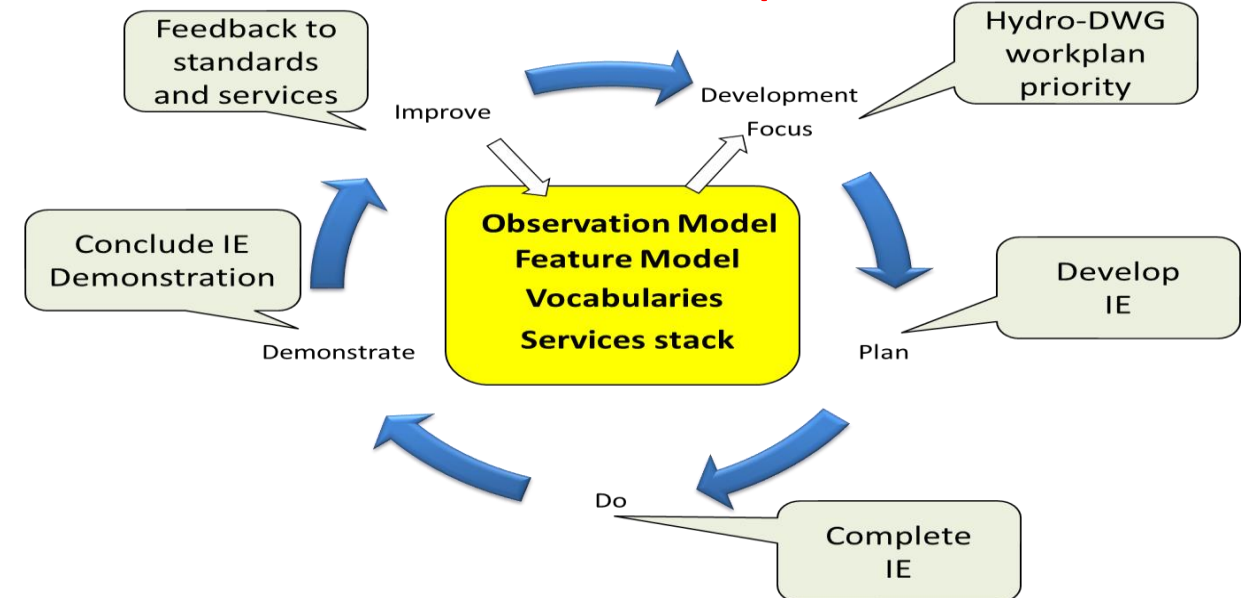
- **OGC\WMO Hydrology Domain Working Group**
 - standards for water data: **WaterML 2.0 suite**
 - organizing Interoperability Experiments (IEs) on different sub-domains of water

focused

Chairs:

- Silvano Pecora (Italy)
- David Blodgett (USA)
- Tony Boston (Australia)

Iterative Development



WaterML2.0 standards



Part 1 -
Timeseries

Part 2 –
Ratings,
Gaugings and
Sections

Part 3 –
Surface water
features

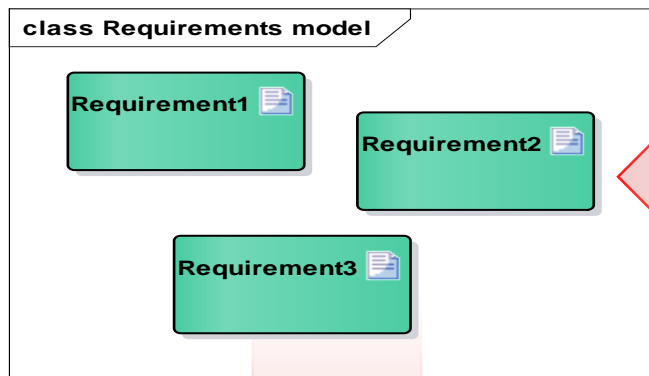
Part 4 –
Groundwater

Part 5 –
Water quality
(best
practice)



Specification to data encoding

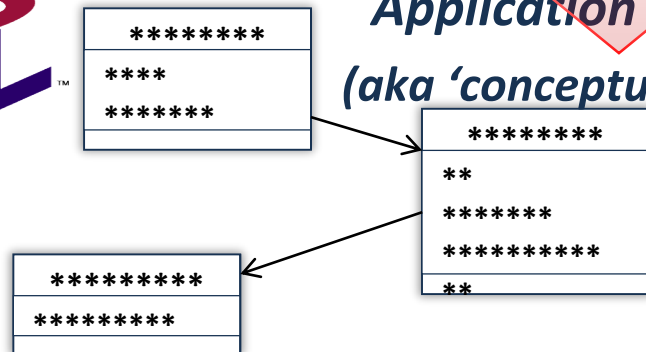
Requirements model



WMO regulation and other specifications



Application Schema (aka 'conceptual model')



Technology independent description of content and structure of information to be exchanged for a given application

XML Schema 1.0 Schematron



Validation schema and rules

XML instance documents



Validatable data products

« derived from »

« conforms to »



WIGOS Metadata Standard (WMDS)

- Specifies metadata elements to be recorded and exchanged for all stations/platforms under WIGOS
- Applies to all WIGOS component observing systems: GOS, GAW, WHOS, GCW
- Practical implementation via the OSCAR/Surface database (metadata repository)

WIGOS METADATA PRINCIPLES:

- Enable adequate use of observations
- Timestamp on every piece of metadata
- For all internationally exchanged observations
- Metadata updates in a timely/useful manner
- For all types of observations
- Applicable to all disciplines
- Acceptable to and applicable by all Members
- Forward-looking but also respect legacy



WMDS CATEGORIES:

- 1- Observed variable
- 2- Purpose of observation
- 3- Station/Platform
- 4- Environment
- 5- Instruments and methods of observation
- 6- Sampling
- 7- Data processing and reporting
- 8- Data quality
- 9- Ownership and data policy
- 10- Contact



SMN Aigle

WIGOS Metadata Standard - Approved at Cg-17 June 2015

- What Members have to do:**
- Keep records of WIGOS metadata
 - For observations exchanged internationally:
 - Exchange also the associated WIGOS metadata
 - Keep entries in **OSCAR/Surface** up to date



Three levels of metadata reporting

- Mandatory** - Required for all WIGOS observing systems/platforms
- Conditional** - Required if applicable (e.g. instrument calibration makes little sense for a human observer)
- Optional** - Desirable/useful, but non-compulsory



The Observing Systems Capabilities Analysis and Review tool (OSCAR) database is the key source of information for WIGOS metadata - other global compilations of specific components of WIGOS are held in several databases, e.g. GAWSIS, JCOMMOPS.

- WIGOS Identifiers**
- Used to link observations, stations/platforms and other items to their associated WIGOS metadata;
 - For any station/platform known to Members, regardless of the commitment for data quality or sustained operation;
 - For managing and planning the networks

Source:
https://www.wmo.int/pages/prog/www/wigos/documents/Cg-17/WIGOS_Metadata.pdf

WIGOS Metadata Implementation phases		
2016	2017-18	2019-2020
Metadata elements that are less challenging to implement	Elements that will require additional data and/or changes to procedures	Remaining elements



my sources

Dashboard

Sources

Catalogs

Favourites

+ Add

Delete

Refresh

Show 10 entries

Search:

<input type="checkbox"/>	Source	Description	Endpoint	Type
<input type="checkbox"/>	Argentina	Historical daily temperature		Thredds
<input type="checkbox"/>	Canada	Real-time discharge		Ftp
<input type="checkbox"/>	Emilia Romagna	Historical daily discharge		Hydroserver
<input type="checkbox"/>	Switzerland	Historical daily precipitation		Hydroserver

Showing 1 to 4 of 4 entries

Previous 1 Next

Source Usage Information

Source editor is a very flexible, advanced plugin for data dissemination. In the admin interface, we are using a specialized version of the source plugin built for hydrological purposes. We have also customized the plugin with user-friendly editors in place of command-line tools. For complete documentation on the source plugin, visit the website [WHOS](#).

[View Source Documentation](#)



WMO Hydrological Observing System

ITA Lazio

The ultimate goal of data collection in hydrology, be it precipitation measurements, water-level recordings, discharge time series, groundwater monitoring and water quality sampling, is to provide a set of sufficient verified quality data that can be used in water resources management decision-making. Such needs span all aspects of water resources management, in a wide range of operational applications, as well as in research. Decisions may be made directly from raw data measurements, based on derived statistics, or from the results of many stages of modelling beyond the raw data stage. Regardless of any added value though, it is the collected data that form the basis for these decisions. Data sets are of great intrinsic value as they are collected through a huge commitment of human and financial resources and often during a long period of time. Further, they have additional value when they are made available in a usable form for the many users to respond to their specific needs. The portal provides access to the available hydrological observations. In particular, the portal provides additional operational capability, for in situ water observations, as an international registry of hydrological data services catalogued using the standards and procedures of the Open Geospatial Consortium and the World Meteorological Organization.



Brokered services: 1

Brokered sites: 114

Brokered variables: 4

Geographic extent: [11.5989, 42.8942, 13.4633, 41.3422]



WMO Hydrological Observing System

Published interfaces

The following catalog interfaces are available:

CUAHSI API interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/services/hiscentral/vae113e0745bc4894bd03be86cdae24fe>

Target namespace: <http://hiscentral.cuahsi.org/20100205/>

[Capabilities document](#)

REST interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/services/api-rest/vae113e0745bc4894bd03be86cdae24fe/datasets/report>

[Capabilities document](#)

OAIPMH interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/services/oaipmh/vae113e0745bc4894bd03be86cdae24fe>

Target namespace: http://oai_pmh.sdi.floraresearch.eu/

[Capabilities document](#)

OAIPMH ISO 2007 interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/services/oaipmhiso2007/vae113e0745bc4894bd03be86cdae24fe>

Target namespace: http://oai_pmh.sdi.floraresearch.eu/

[Capabilities document](#)

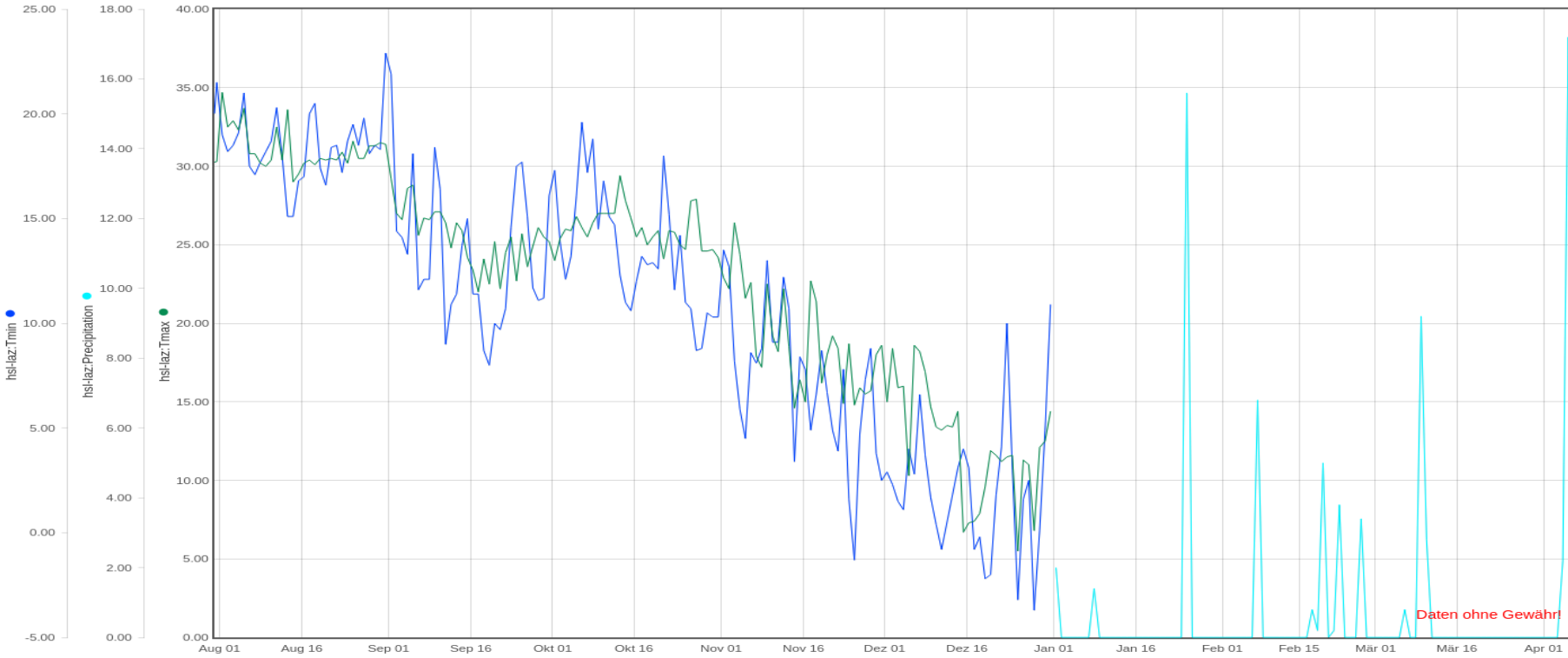
Test Portal interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/search?viewId=vae113e0745bc4894bd03be86cdae24fe>

[Capabilities document](#)

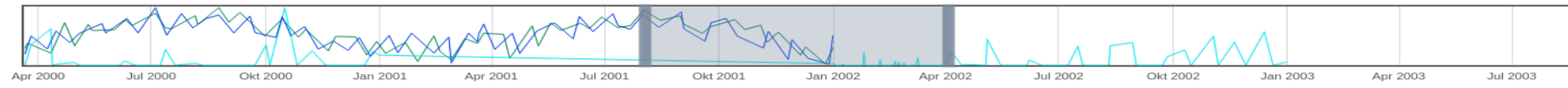
OPENSEARCH interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/services/opensearch/vae113e0745bc4894bd03be86cdae24fe>



Legende

- hsl-laz:577200@1602109545 ☆
hsl-laz:Tmax
hsl-laz:Tmax-Maximum
Tmax
- hsl-laz:577200@1602109545 ☆
hsl-laz:Precipitation
hsl-laz:Precipitation-Cumulative
Precipitation
- hsl-laz:577200@1602109545 ☆
hsl-laz:Tmin
hsl-laz:Tmin-Minimum
Tmin



10:14:10 [refresh] [filter] [date range: 30.07.01 - 05.04.02] [list icon]





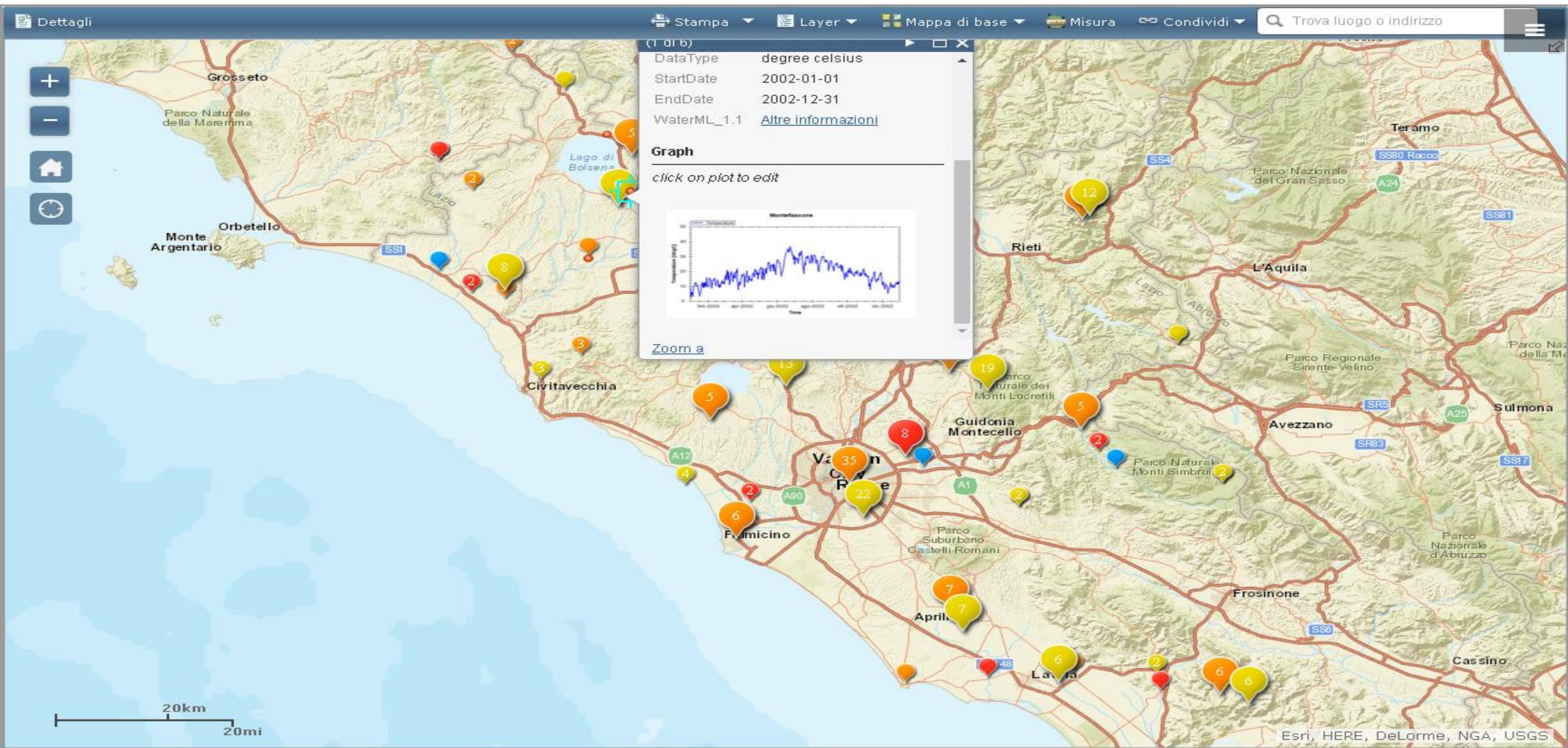
20km
20mi

(1 of 6)

Data Type	degree celsius
StartDate	2002-01-01
EndDate	2002-12-31
WaterML_1.1	Altre informazioni

Graph
click on plot to edit

[Zoom a](#)



SEARCH

Search terms

Start time

End time

RESULTS

SOURCES

FILTERS

Matching results: 359

1 2 3 4 5



Acquisitions at Falcognana - Precipitation

Lazio

Start time

1995-01-01 08:00:00

End time

2002-12-31 08:00:00



Acquisitions at Formello - Temperature

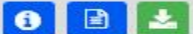
Lazio

Start time

1995-01-01 08:00:00

End time

2002-12-31 08:00:00



Acquisitions at Monte Terminillo

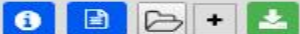
Lazio

Start time

1955-01-01 08:00:00

End time

2002-12-31 08:00:00



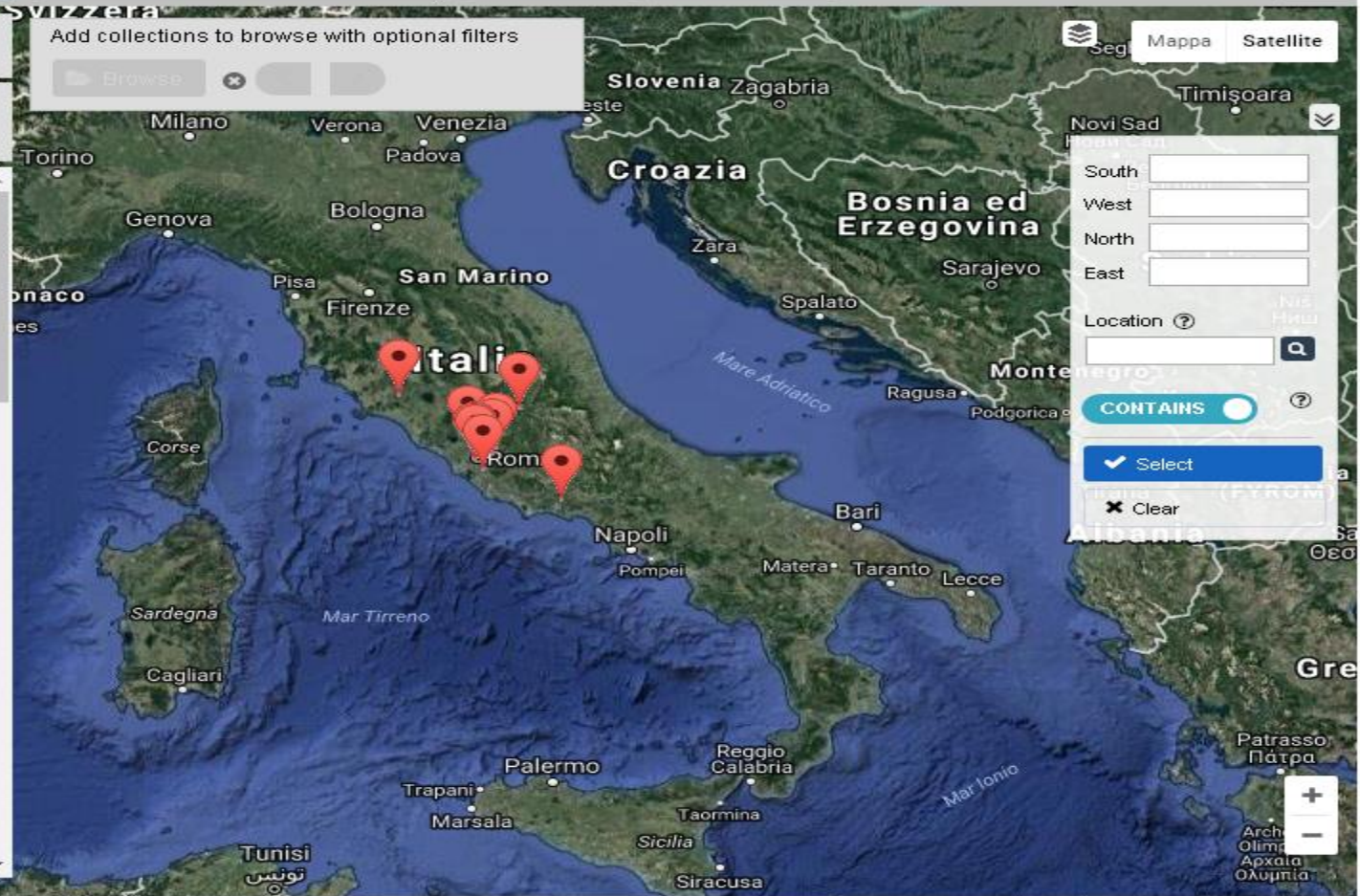
Acquisitions at Guidonia - Precipitation

Start time

Add collections to browse with optional filters

Browse

Mappa Satellite



South
West
North
East

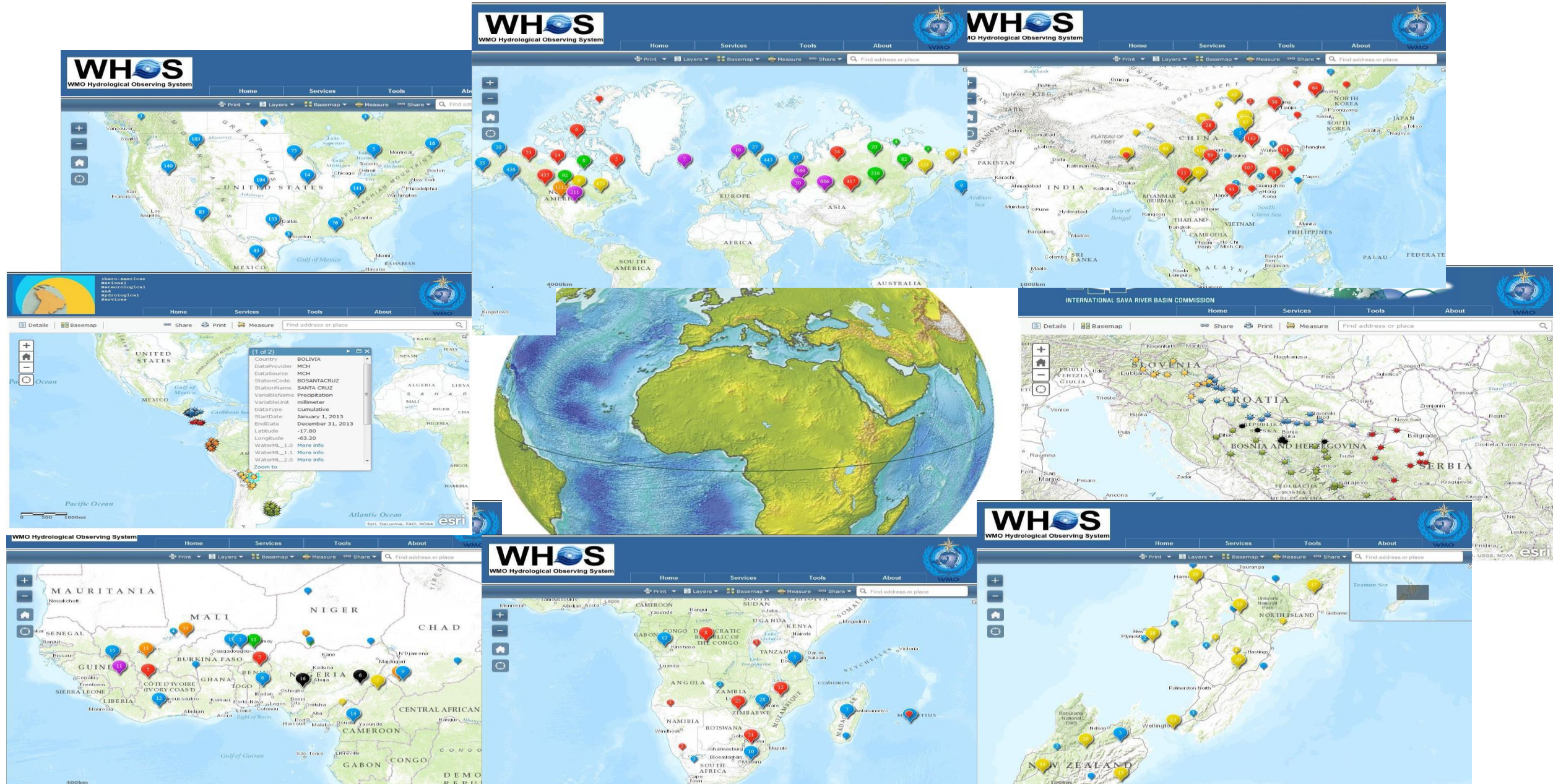
Location ?

CONTAINS

Select

Clear

STANDARDIZED DATA EXCHANGE IN HYDROLOGY



Catalog sources

Sources Available
Showing all 71

Filter

→ →

- ARC Canada
- ARC Denmark
- ARC Finland
- ARC Iceland
- ARC Norway
- ARC Russia

Sources Selected
Showing all 6

Filter

← ←

- SAVA Bars
- SAVA FedBA
- SAVA Hr
- SAVA Me
- SAVA Rs
- SAVA Si

[Save](#) [Cancel](#)

Coordinates	Sources	Image

Showing 1 to 4 of 4 entries

Previous **1** Next

Catalog Usage Information

Catalog editor is a very flexible, advanced plugin for data dissemination. In the admin interface, we are using a specialized version of the catalog plugin built for hydrological purposes. We have also customized the plugin with user-friendly editors in place of command-line tools. For complete documentation on the catalog plugin, visit the website [WHOS](#).

[View Catalog Documentation](#)

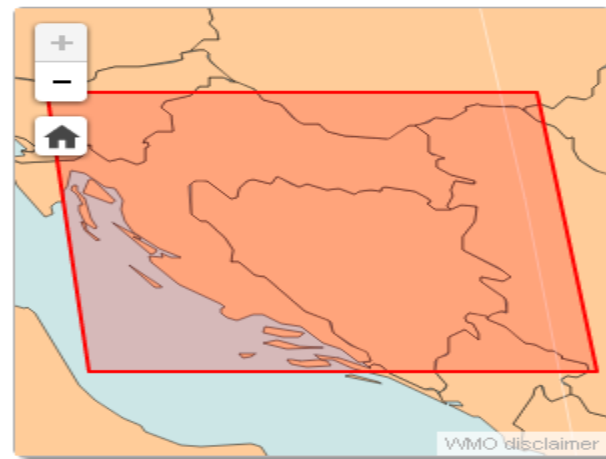
WMO Hydrological Observing System

SAVA

The Sava hydrologic monitoring is a federated network composed by 5 States (Bosnia and Herzegovina, Croatia, Montenegro, Serbia and Slovenia), including 2 Entities (Federation of Bosnia and Herzegovina - Bosnia and Herzegovina, Republika Srpska), together with the International Sava River Basin Commission, an international organization established by the Framework Agreement on the Sava River Basin (FASRB), which is the unique international agreement integrating all aspects of the water resources management.

The portal provides access to the hydrological observations in the International Sava River Basin, commonly published as Hydrological Yearbooks. In particular, it provides additional operational capability, for in situ water observations, as a national registry of water data services catalogued using the standards and procedures of the Open Geospatial Consortium and the World Meteorological Organization.

The published interfaces of the portal retrieve data from distributed national water data providers, enabling plots and download.



Brokered services: 6

Brokered sites: 114

Brokered variables: 5

Geographic extent: [14.1653, 46.34, 20.4547, 42.8333]



WMO Hydrological Observing System

Published interfaces

The following catalog interfaces are available:

CUAHSI API interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/services/hiscentral/vcbff308ddc874631933e0f9defcd3aeb>

Target namespace: <http://hiscentral.cuahsi.org/20100205/>

[Capabilities document](#)

REST interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/services/api-rest/vcbff308ddc874631933e0f9defcd3aeb/datasets/report>

[Capabilities document](#)

OAIPMH interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/services/oaipmh/vcbff308ddc874631933e0f9defcd3aeb>

Target namespace: http://oai_pmh.sdi.floraresearch.eu/

[Capabilities document](#)

OAIPMH ISO 2007 interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/services/oaipmhiso2007/vcbff308ddc874631933e0f9defcd3aeb>

Target namespace: http://oai_pmh.sdi.floraresearch.eu/

[Capabilities document](#)

Test Portal interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/search?viewId=vcbff308ddc874631933e0f9defcd3aeb>

[Capabilities document](#)

OPENSEARCH interface

Endpoint: <http://arpa-er.geodab.eu/gi-cat-arpa/services/opensearch/vcbff308ddc874631933e0f9defcd3aeb>

CHAI ISI HydroDesktop - World Map - fpx
 File Map Search Table Graph Edit Hydro Help
 Current Sites Select Features Draw Rectangle Select Multiple Observers Start 2/1/2011 End 2/1/2016 Select Data Select Data Source Add Sites Layer Search WaterML2 Show Attribute Table Show Map Popup Download Selected Download Settings

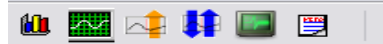
Legend
 Map Layers
 Data Sites
 International Sava River Basin Commission
 Number of Observations
 Search Rectangle
 Rivers
 Online Basemap
 Lakes
 Countries

Download Manager
 Download Complete
 Total sites: 1 Downloaded and saved: 1
 Remaining sites: 0 WML error: 0
 Estimated time: 0:00:00 Value downloaded: 1,000

ServiceUrl	SiteCode	VariableCode	SiteName	VariableName	Status
http://sparenet...	GAWA_KICAWA	GAWA_KICAWA	SKIRUZVONA	WaterLevel	OK

Details... Send error Copy log Re-download All series with errors Autoclose

Longitude: 17°22'41" East Latitude: 44°02'10" North
 Map Table Graph Edit Hydro
 No Layer Selected Ready



Data Viewer

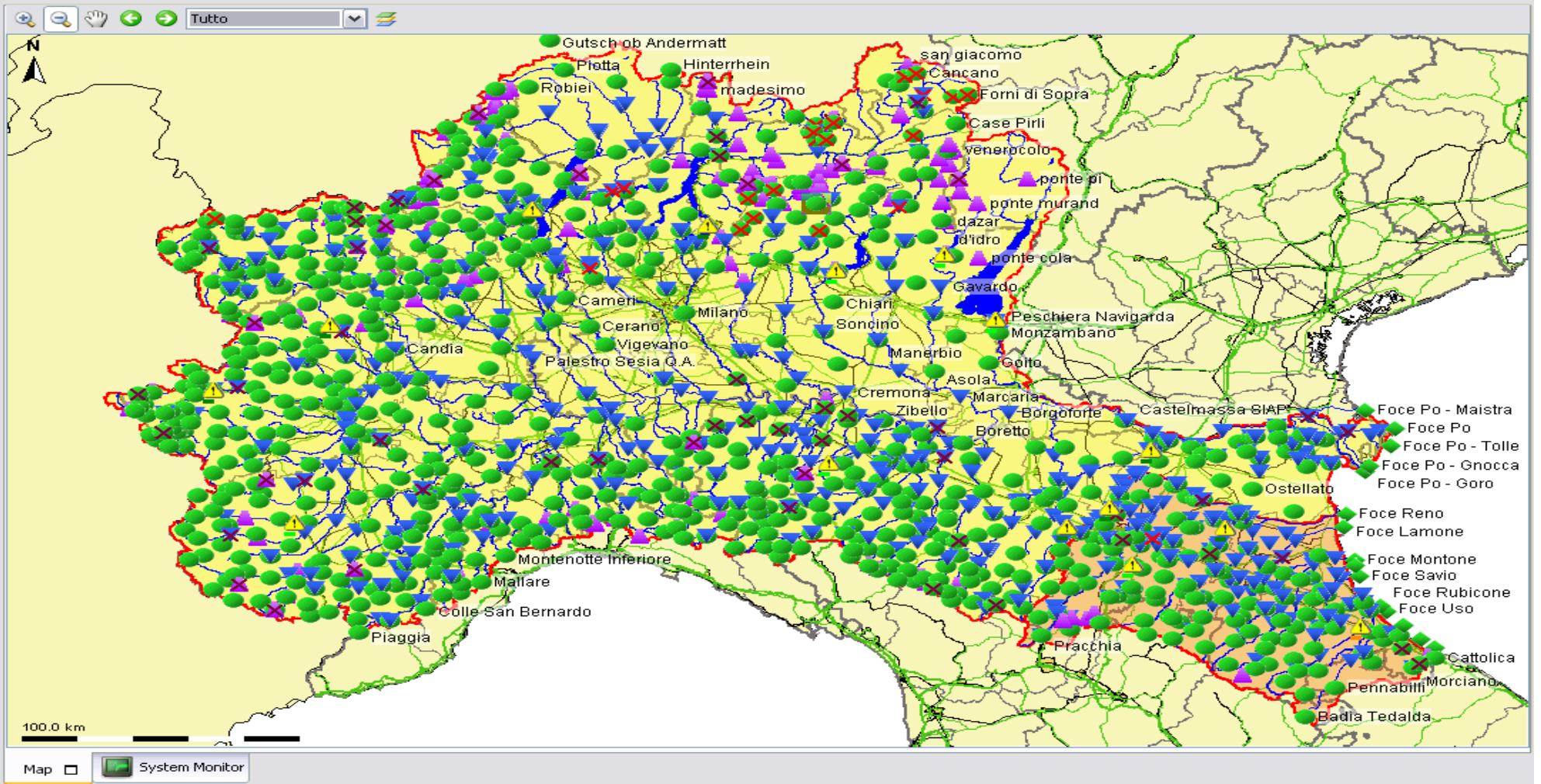
- Gauges
- Stochastic Models
- External Forecast Points
- LAMI Forecast Points
- COSMO Forecast Points
- Hydrol. Model subbasins
- Sobek Delta Low Flow
- Ribasim
- Performance Indicators
- Romagna

5 : Data Viewer

- Tricerro
- Trivero
- Unchio Trobaso
- Upega
- Vaccera
- Val Clarea
- Valbondione
- Valcanale ERICSSON

Calculated Discharge
Observed Water Levels
Observed Salinity
Observed Precipitation
Observed Drybulb Temperature
Observed Volume

Map System Monitor



Logs

10-06-2010 11:41:46 INFO - LocalDataStore.Finished: Compact cache files finished
10-06-2010 11:41:41 INFO - DataStore.Info: Compact time series cache files
10-06-2010 11:41:41 INFO - LocalDataStore.Start: Compact cache files started

6 : Logs

Import data from a WaterML2 webservice

WaterML2 Server import

Here is an example import module configuration file that imports data from a WaterML2 webservice:

```
<?xml version="1.0" encoding="UTF-8"?>
<timeSeriesImportRun xmlns="http://www.wldelft.nl/fews"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.wldelft.nl/fews http://fews.wldelft.nl/schemas/version1.0/timeSeriesImportRun.xsd">
  <!-- This is an example import configuration file for importing WaterML data from a WaterML server -->
  <import>
    <general>
      <!-- Class name of WaterML server parser -->
      <parserClassName>nl.wldelft.waterml.timeseriesparsers.WaterMLServerParser</parserClassName>

      <!-- Path to directory containing libraries -->
      <binDir>%REGION_HOME%/Modules/waterml-bin</binDir>

      <!-- Directory from which CSV files are to be imported -->
      <serverUrl>http://nwisvaws02.er.usgs.gov/ogc-swie/wml2/uv/sos</serverUrl>
      <idMapId>IdImportWaterML2_usgs</idMapId>
      <importTimeZone>
        <timeZoneOffset>-06:00</timeZoneOffset>
      </importTimeZone>
    </general>
    <timeSeriesSet>
      <moduleInstanceId>ImportWaterML2_usgs</moduleInstanceId>
      <valueType>scalar</valueType>
      <parameterId>MyPar</parameterId>
      <locationSetId>MyLocSet</locationSetId>
      <timeSeriesType>external historical</timeSeriesType>
      <timeStep unit="nonequidistant"/>
      <readWriteMode>add originals</readWriteMode>
      <synchLevel>1</synchLevel>
    </timeSeriesSet>
  </import>
</timeSeriesImportRun>
```

Import WaterML2 data from a directory

WaterML2 file import

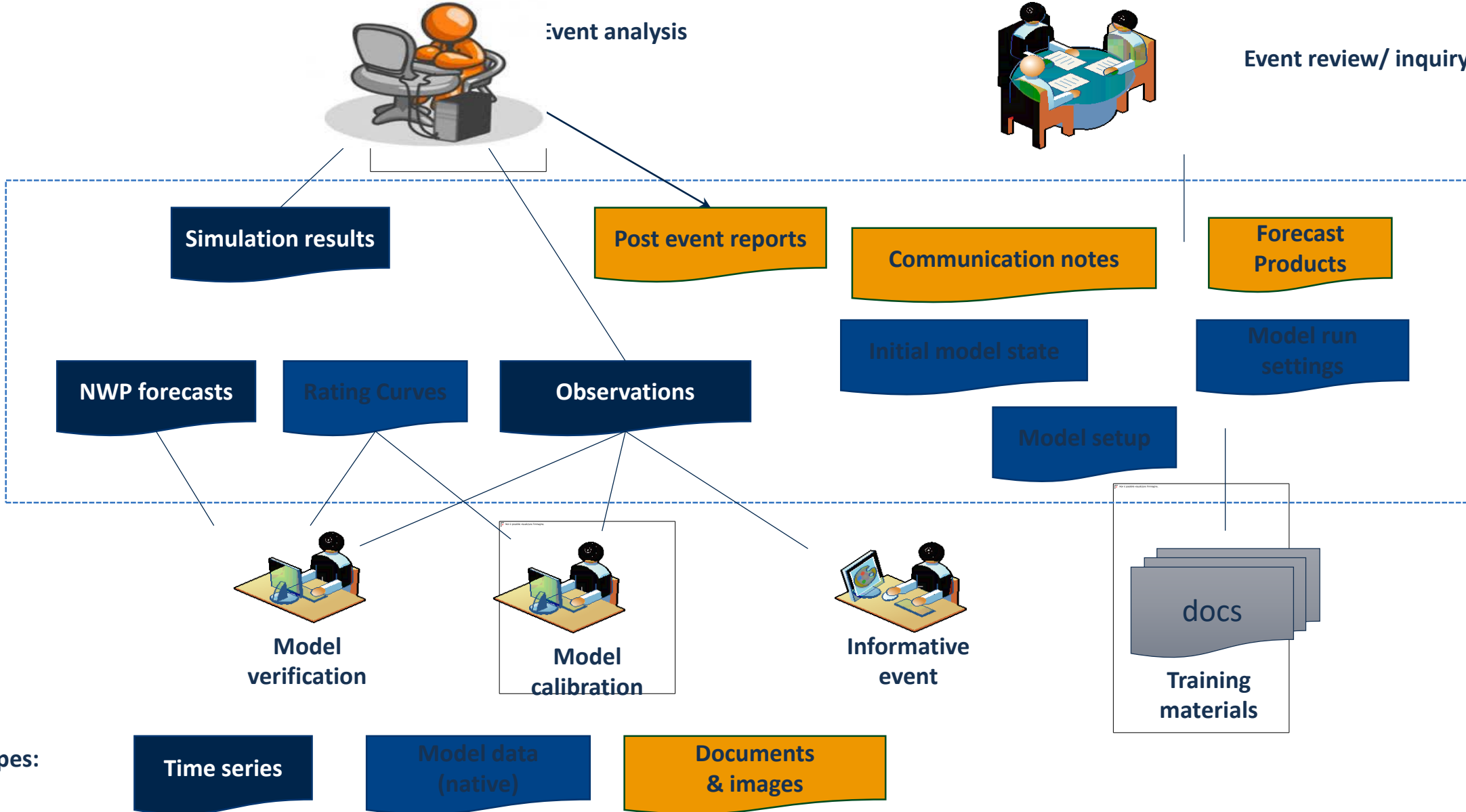
Here is an example import module configuration file that imports data from a directory

```
<?xml version="1.0" encoding="UTF-8"?>
<timeSeriesImportRun xmlns="http://www.wldelft.nl/fews"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.wldelft.nl/fews http://fews.wldelft.nl/schemas/version1.0/timeSeriesImportRun.xsd">
  <!-- This is an example import configuration file for importing WaterML data from a WaterML server -->
  <import>
    <general>
      <!-- Class name of WaterML server parser -->
      <parserClassName>nl.wldelft.waterml.timeseriesparsers.WaterMLTimeSeriesParser</parserClassName>

      <!-- Path to directory containing libraries -->
      <binDir>%REGION_HOME%/Modules/waterml-bin</binDir>

      <!-- Directory from which CSV files are to be imported -->
      <folder>$IMPORT_FOLDER_WATERML$</folder>
      <idMapId>IdImportWaterML2_usgs</idMapId>
      <importTimeZone>
        <timeZoneOffset>-06:00</timeZoneOffset>
      </importTimeZone>
    </general>
    <timeSeriesSet>
      <moduleInstanceId>ImportWaterML2_usgs</moduleInstanceId>
      <valueType>scalar</valueType>
      <parameterId>MyPar</parameterId>
      <locationSetId>MyLocSet</locationSetId>
      <timeSeriesType>external historical</timeSeriesType>
      <timeStep unit="nonequidistant"/>
      <readWriteMode>add originals</readWriteMode>
      <synchLevel>1</synchLevel>
    </timeSeriesSet>
  </import>
</timeSeriesImportRun>
```

Archive use case analysis

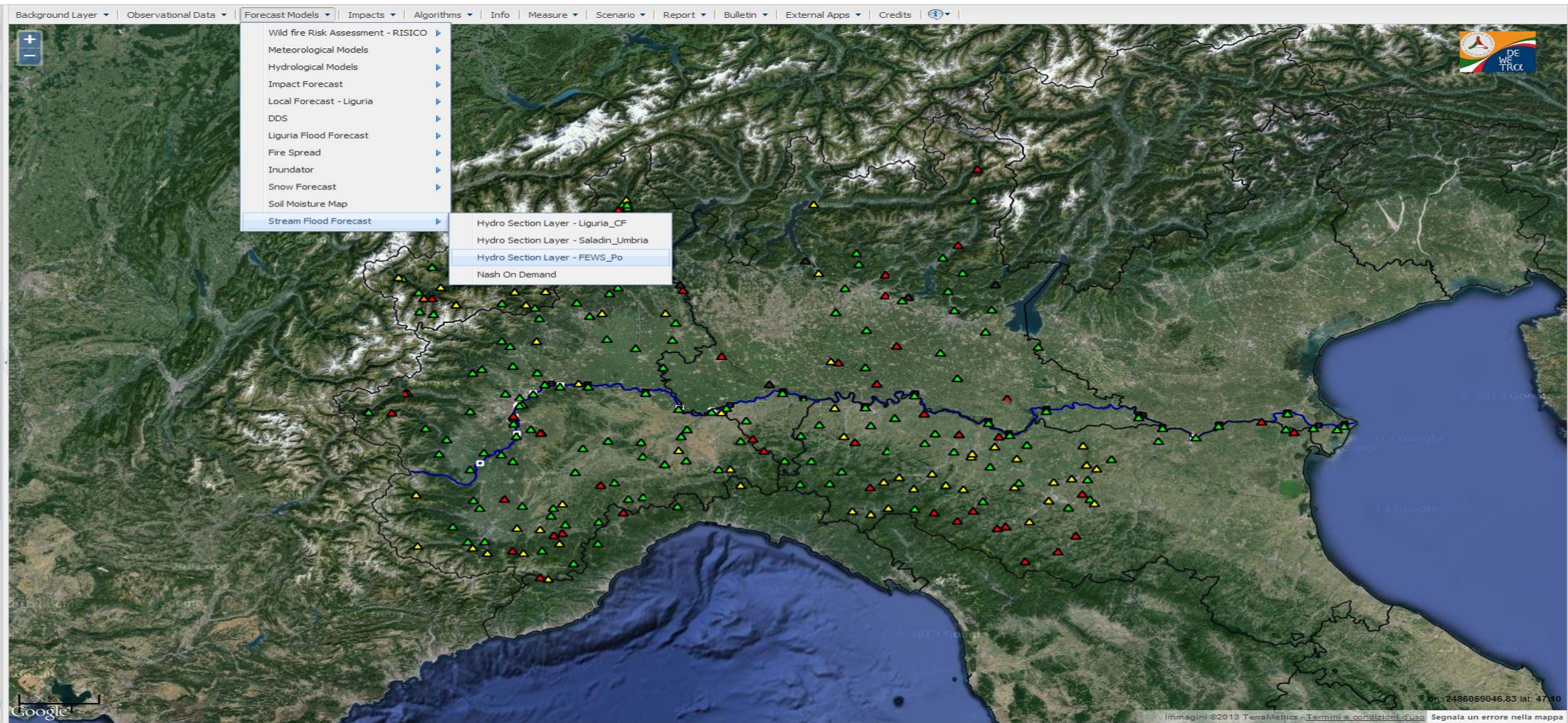


Find in Google Maps

Rain Map LAMI 7 RISICO

Layer List

- Sele [CIMA]
- Scrivia [CIMA]
- Sarno [CIMA]
- Reno [CIMA]
- Potenza [CIMA]
- Po [CIMA]
- Piave [CIMA]
- Pellice [CIMA]
- Parma [CIMA]
- Ombrone [CIMA]
- Oglio [CIMA]
- Ofanto [CIMA]
- Nure [CIMA]
- Musone [CIMA]
- Misa [CIMA]
- Mincio [CIMA]
- Metauro [CIMA]
- Marecchia [CIMA]
- Maira [CIMA]
- Magra [CIMA]
- Lemene [CIMA]
- Lamone [CIMA]
- Lambro [CIMA]
- Garigliano [CIMA]
- Foglia [CIMA]
- Fiumi_Uniti [CIMA]
- Esino [CIMA]
- Enza [CIMA]
- DoraBallea [CIMA]
- Crostolo [CIMA]
- Crati [CIMA]
- Cornia [CIMA]
- Cormor [CIMA]
- Chienti [CIMA]
- Cesano [CIMA]
- Cedrino [CIMA]
- Cecina [CIMA]
- Candelaro [CIMA]
- CanaleBianco [CIMA]
- Brenta [CIMA]
- Bradano [CIMA]
- Biferno [CIMA]
- Basento [CIMA]
- Aterno_Pescara [CIMA]
- Aso [CIMA]
- Arno [CIMA]
- Adige [CIMA]
- Adda [CIMA]
- Instability archive



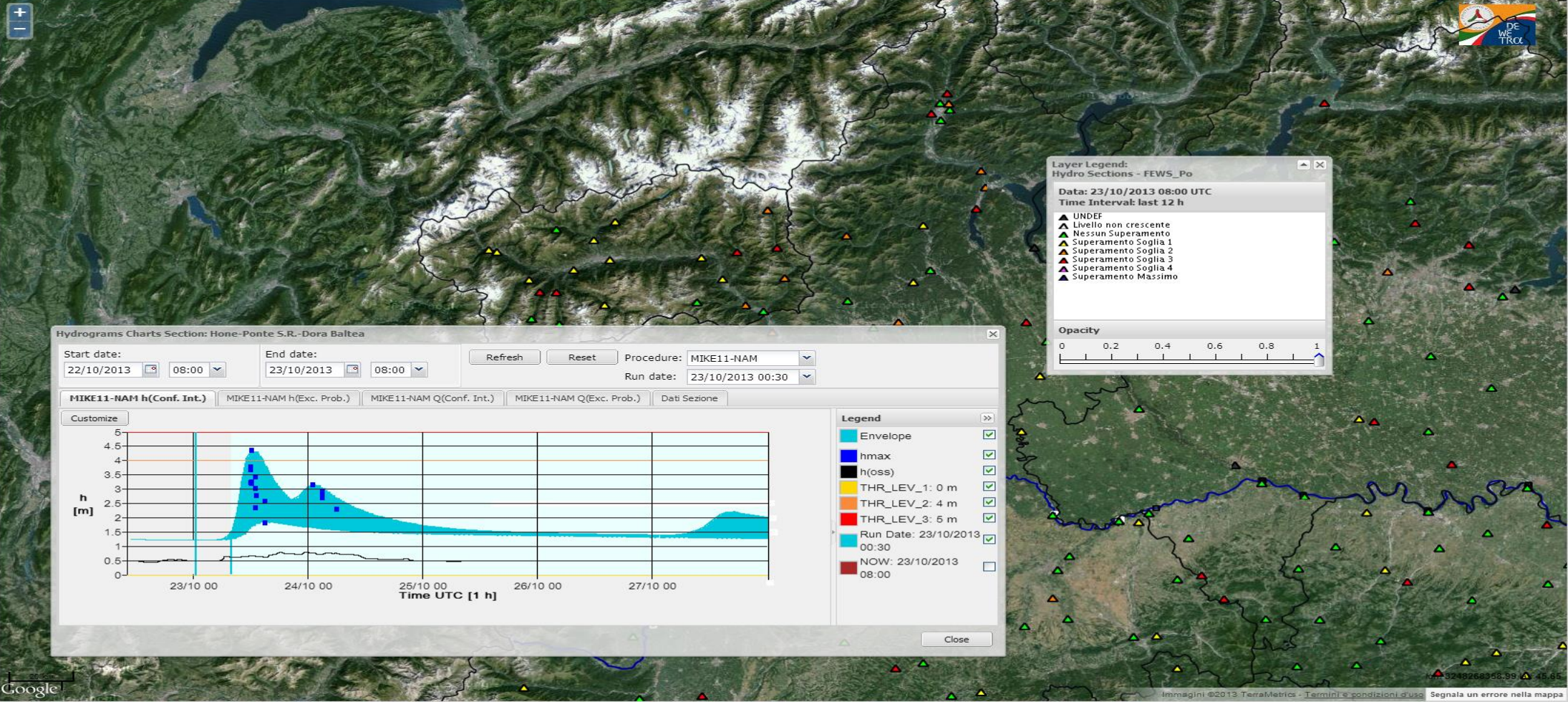
Find in Google Maps

Rain Map LAMI 7 RISICO

Layer List

- Dynamic Layers
- Tool Layers
 - Hydro Sections - FEWS_Po
 - Search Result
 - Scenario
 - Measure
- Ancillary layers
 - Wild fire
 - Warning Areas [DPC]
 - Trento
 - Seismic Structures Observatory [DPC]
 - Rivers [DBPrior10k]
 - River_Instrumented [CIMA]
 - Regions 2010 [ISTAT]
 - Radar [DPC]
 - RISICO fuel map
 - Provinces 2010 [ISTAT]
 - Municipalities 2010 [ISTAT]
 - Meteo-Vigilance Areas [DPC]
 - Ligurian Small Catchments
 - Lakes[DPC]
 - Italian Basin Authorities [GN]
 - Dams[DPC]
 - Dams ICON
 - Corine Land Cover 2006 [EEA]
 - Contour_levels_step 100 m [CIMA]
 - Catchments_Liguria
 - Catchments_Italy
 - Catchments [ISPRA]
 - Flood wave graph
 - Volturno [CIMA]
 - Tronto [CIMA]
 - Trebbia [CIMA]
 - Tirso [CIMA]
 - Ticino [CIMA]
 - Tevere [CIMA]
 - Tenna [CIMA]
 - Tanaro [CIMA]
 - Tagliamento [CIMA]
 - Stura_d_Lanzo [CIMA]
 - Stella [CIMA]
 - Sesia [CIMA]
 - Serchio [CIMA]
 - Sele [CIMA]
 - Scrivia [CIMA]
 - Sarno [CIMA]
 - Reno [CIMA]

Background Layer Observational Data Forecast Models Impacts Algorithms Info Measure Scenario Report Bulletin External Apps Credits



Layer Legend: Hydro Sections - FEWS_Po

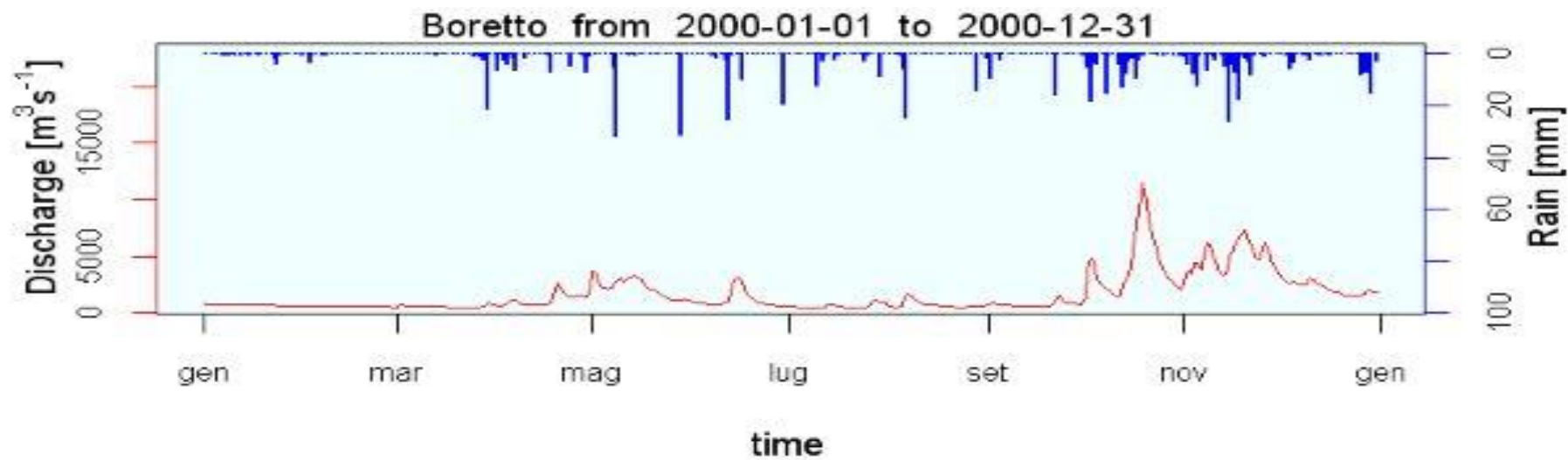
Data: 23/10/2013 08:00 UTC
Time Interval: last 12 h

- ▲ UNDEF
- ▲ Livello non crescente
- ▲ Nessun Superamento
- ▲ Superamento Soglia 1
- ▲ Superamento Soglia 2
- ▲ Superamento Soglia 3
- ▲ Superamento Soglia 4
- ▲ Superamento Massimo

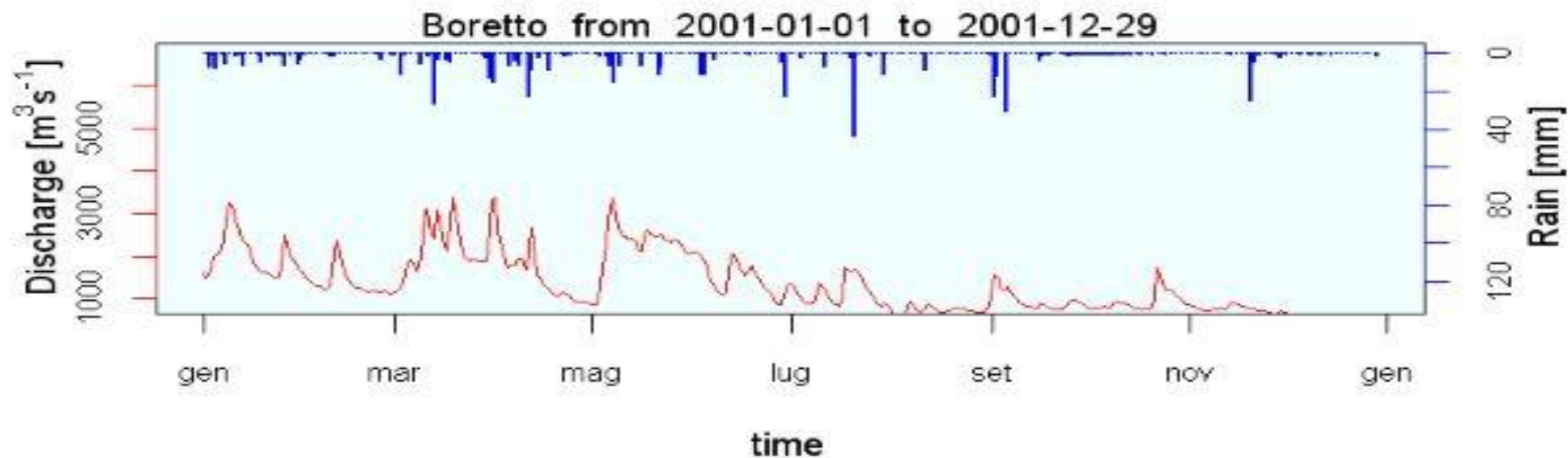
Opacity

0 0.2 0.4 0.6 0.8 1

Discharge_Precipitation

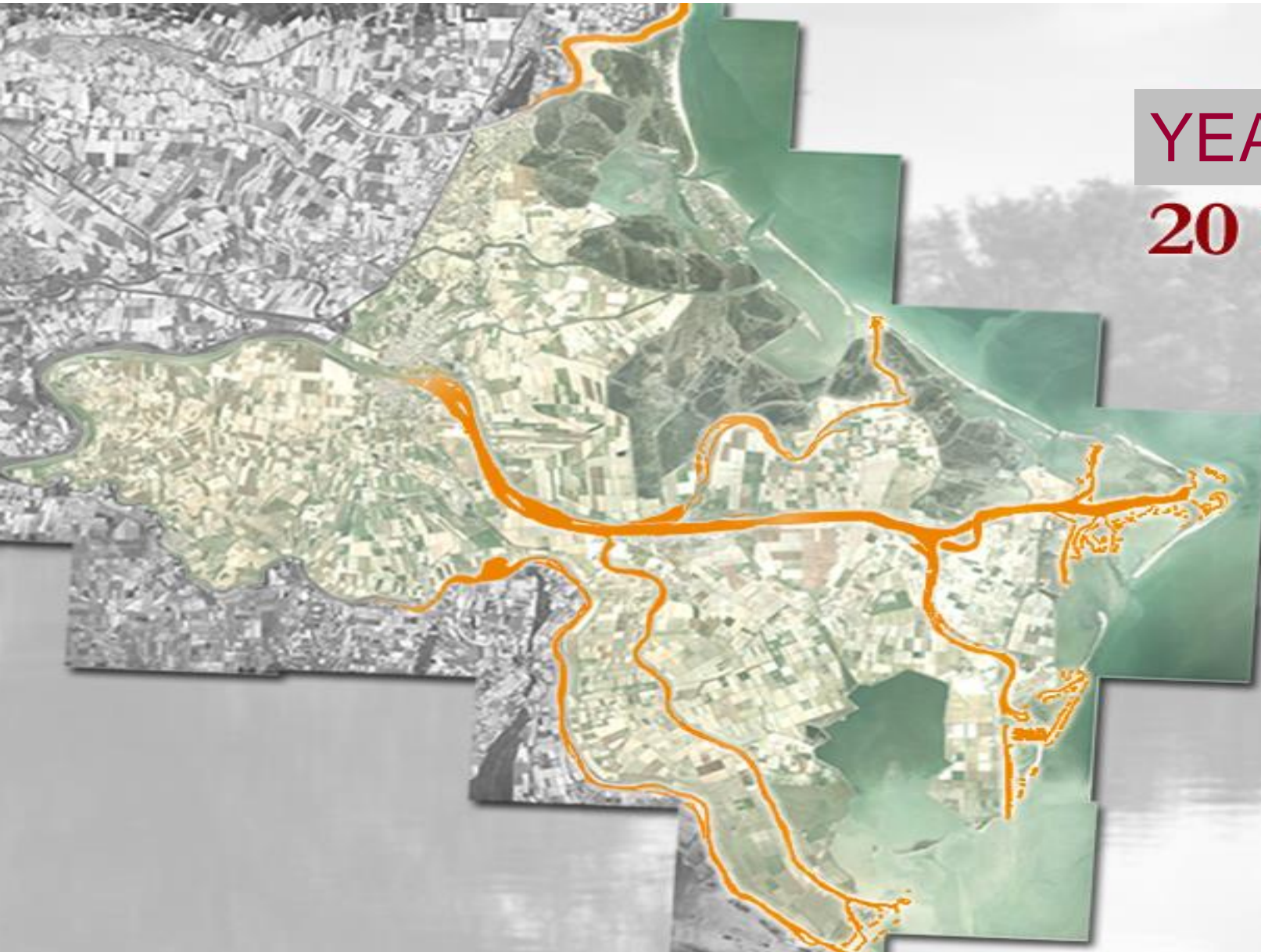


Discharge_Precipitation



L'utente può scaricare i dati e visualizzare in diverse modalità le elaborazioni di interesse

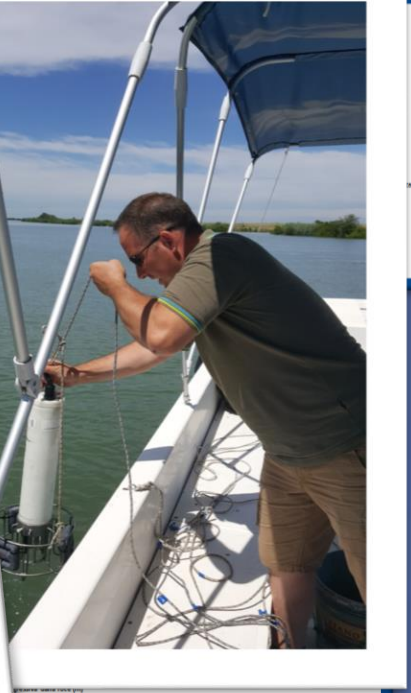
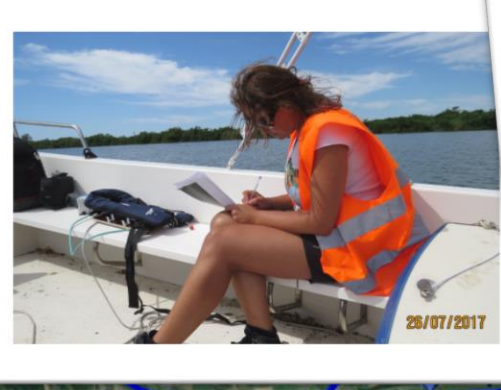
Salt intrusion



YEARS **2000**

20 Km from mouth

CUNEO SALINO

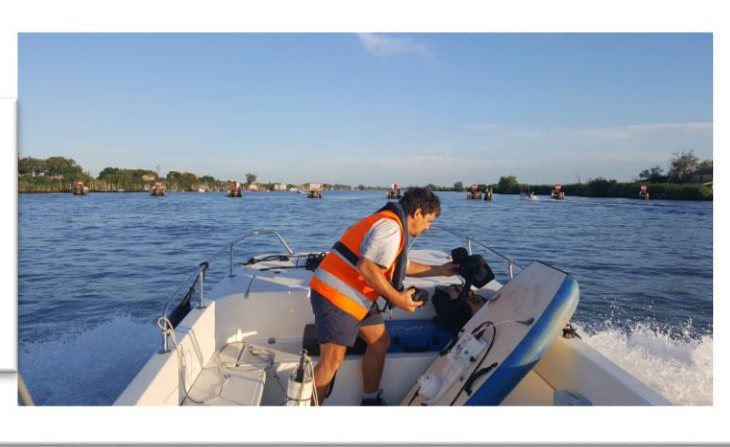
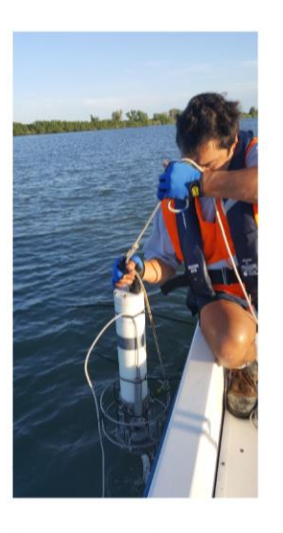


arpav

Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto

arpae

agenzia
prevenzione
ambiente energia
emilia-romagna

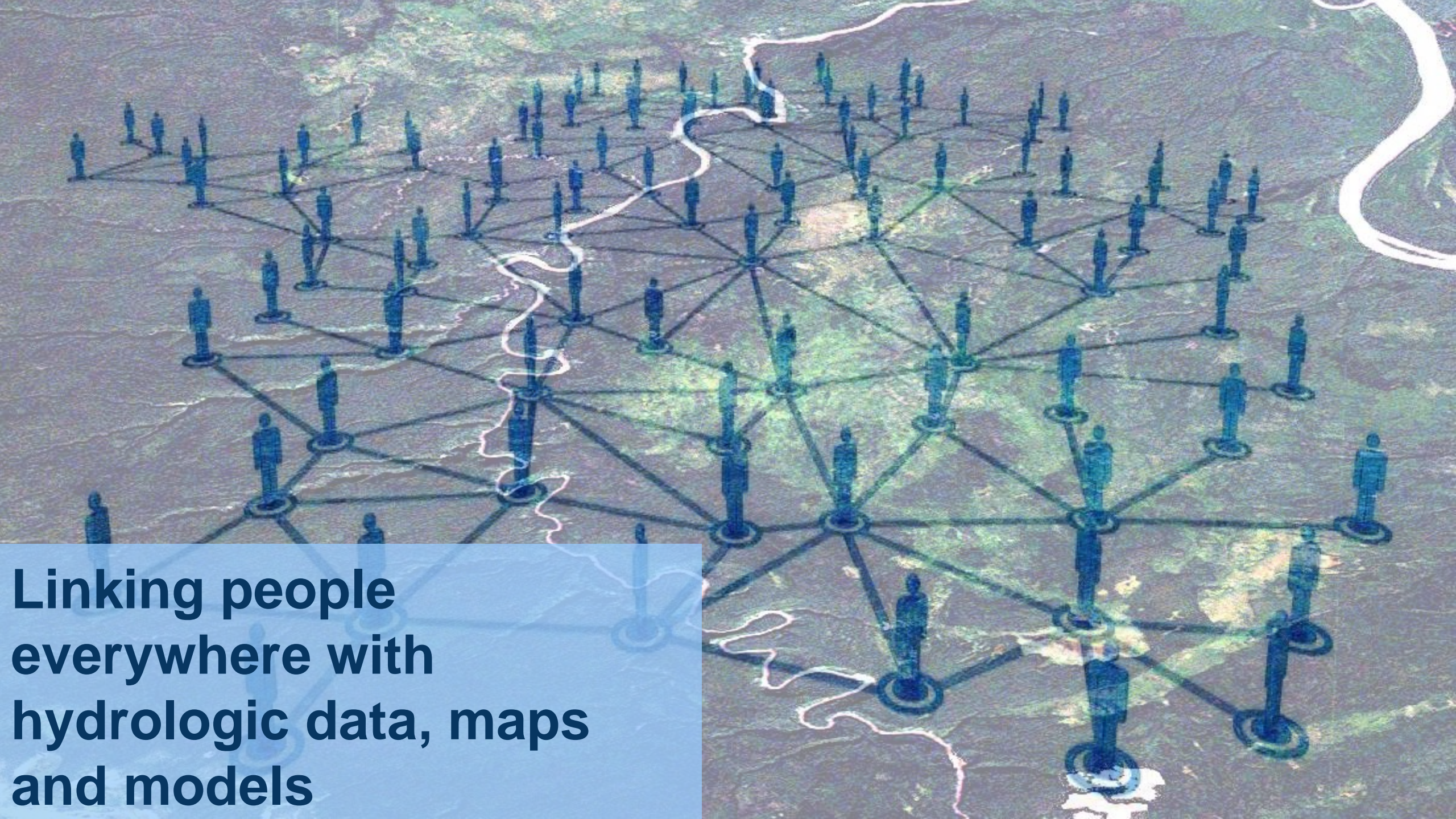


Amministrazioni Regionali e Statali in Idrologia Operativa



Brokered services

Data Service Title	Observation Network Name	WSDL	CreatedDate	Organization	Status	Earliest Start Date	Latest End Date
Provincia Autonoma di Bolzano	Provincia di Bolzano	WSDL	2013.09.04	Provincia Autonoma di Bolzano - Ripartizione Protezione anticendi e civile - Ufficio Idrografico		1920.01.01	1999.01.01
Regione Abruzzo	Regione Abruzzo	WSDL	2013.09.04	Dipartimento Opere Pubbliche, Governo del Territorio e Politiche Ambientali, Servizio Emergenza di Protezione Civile, Ufficio Idrografico Mareografico (PE), Gestione Colonna Mobile		1921.01.01	2014.11.30
Regione Basilicata	Regione Basilicata	WSDL	2013.09.04	Protezione Civile Regione Basilicata		2001.01.01	2014.11.29
Regione Calabria	Regione Calabria	WSDL	2013.09.04	ARPACAL - Centro Funzionale Multirischi		1900.01.01	2014.10.31
Regione Campania	Regione Campania	WSDL	2013.09.04	Centro Funzionale Regione Campania - CEMPID		1995.01.01	2014.12.31
Regione Emilia Romagna	Regione Emilia Romagna	WSDL	2013.02.28	ARPA Emilia Romagna		1918.01.01	2014.12.31
Regione Friuli Venezia Giulia	Regione Friuli Venezia Giulia	WSDL	2013.09.04	Regione Autonoma Friuli Venezia Giulia		1912.01.01	2012.12.31
Regione Lazio	Regione Lazio	WSDL	2013.09.04	Regione Lazio - Centro Funzionale Regionale		1921.01.01	2004.12.31
Regione Liguria	Regione Liguria	WSDL	2013.09.04	ARPA Liguria - Centro Funzionale Meteo Idrologico di Protezione Civile		1913.01.01	2009.12.31
Regione Lombardia	Regione Lombardia	WSDL	2013.09.04	U.O. Servizio Meteorologico e Rete Idro-Meteo regionale		1763.01.01	2014.11.25
Regione Marche	Regione Marche	WSDL	2013.09.04	Dipartimento per le politiche integrate di sicurezza e per la protezione civile della Regione Marche - Centro Funzionale		1928.01.30	2013.12.31
Regione Molise	Regione Molise	WSDL	2013.09.04	Agenzia Regionale di Protezione Civile - Centro Funzionale del Molise		2007.01.01	2014.12.31
Regione Piemonte	Regione Piemonte	WSDL	2013.09.04	Arpa Piemonte - Agenzia Regionale per la Protezione Ambientale del Piemonte - Dipartimento Sistemi Previsionali		1987.09.25	2013.12.31
Regione Puglia	Regione Puglia	WSDL	2013.09.04	Centro Funzionale - Servizio Protezione Civile		2004.01.01	2004.12.31
Regione Sardegna	Regione Sardegna	WSDL	2013.09.04	ARDIS - Servizio Tutela e Gestione delle Risorse Idriche, vigilanza sui servizi idrici e gestione delle siccità		1920.01.01	2008.12.31
Regione Sicilia	Regione Sicilia	WSDL	2013.09.04	Regione Siciliana - Osservatorio delle Acque		1916.01.01	2008.12.31
Regione Toscana	Regione Toscana	WSDL	2013.09.04	Servizio Idrologico - Centro Funzionale		1916.01.01	2015.03.31
Regione Valle d'Aosta	Regione Valle d'Aosta	WSDL	2013.09.04	Assessorato opere pubbliche, difesa del suolo e edilizia residenziale pubblica - Centro funzionale regionale		1994.12.31	2013.12.31
Regione Veneto	Regione Veneto	WSDL	2013.09.04	Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto		1992.01.01	2013.12.31

An aerial view of a topographic map with a network of blue human icons connected by black lines. A white, winding line representing a river or path is overlaid on the map. The network is dense and interconnected, covering a large area of the map. The background is a textured, brownish-green topographic map.

**Linking people
everywhere with
hydrologic data, maps
and models**

Grazie per
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