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Presentation · April 2017

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Collaborative tools for integrated management of a large river system: the Rhône river (France)

F. Arnaud¹,

D. Roux-Michollet², L. Chirol¹, A. Antonio¹, K. Michel¹, C. Mouquet-Noppe¹,
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Goal of this talk: present collaborative tools to centralize, structure, archive & share scientific data for integrated management of the Rhône river

1. The Rhône river
2. Scientific context of the Human-Environment Observatory
« Rhône Valley »
3. Collaborative tools

The Rhône river: one of the main European alpine rivers

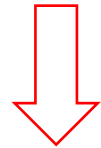
Watershed = 98 500 km²

Length = 812 km

$$Q_{\text{mean}} = 1\,700 \text{ m}^3 \text{ s}^{-1}$$

$$Q_{\text{max}} = 12\,000 \text{ m}^3 \text{ s}^{-1}$$

$$Q_{\text{spec}} = 17.8 \text{ l.s.km}^{-2}$$



River engineering for more than 150 years

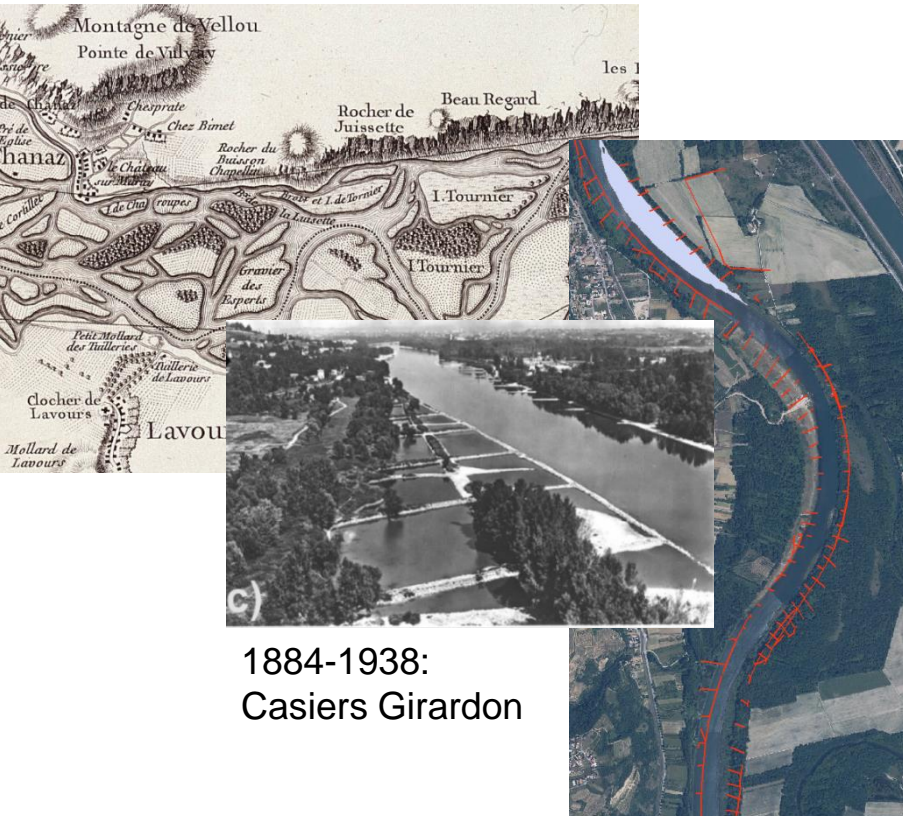
**Flood
1856**

Braided river
channel

Channelization, damming
for flood protection, navigation
& electricity production



1976-1986:
Nuclear industry

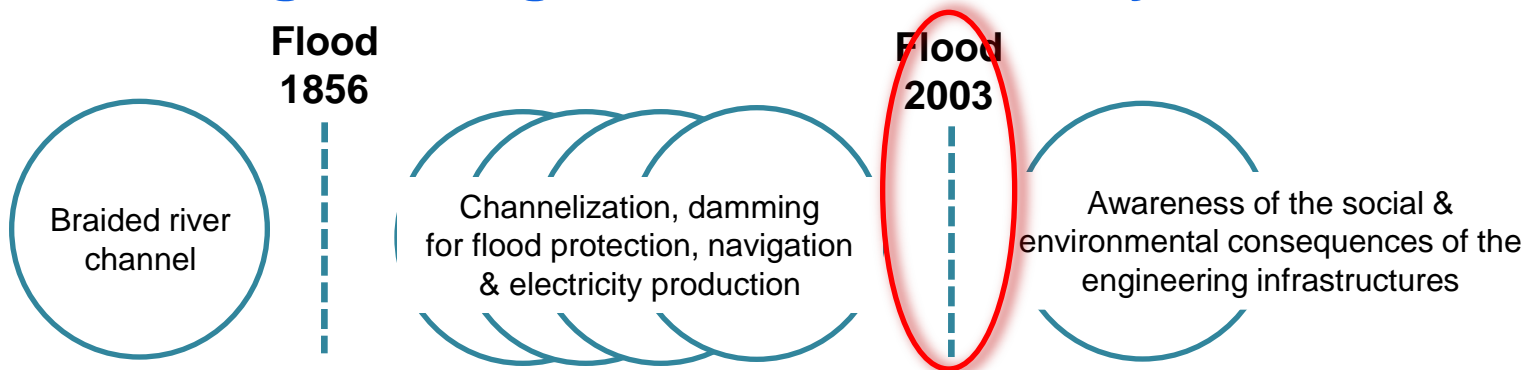


1884-1938:
Casiers Girardon



1925-1986:
Damming & by-passing

River engineering for more than 150 years



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Bussink et al. (2016)

➔ 2011 : Human-Environment Observatory « Rhône Valley » (OHM VR)

- Evolutionary trajectory
- Sustainable development
- Socio-ecosystem functioning
- Environmental risks
- Ecological restoration

Collaborative tools

DATA COLLECTION

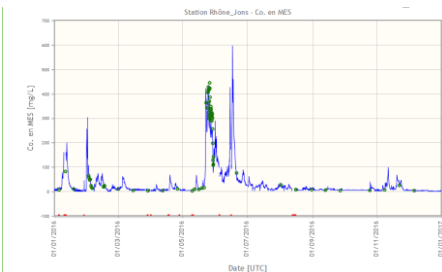
Research teams
River managers
External structures

STORAGE
long-term & centralized archiving

BDRhône:
Geographic database



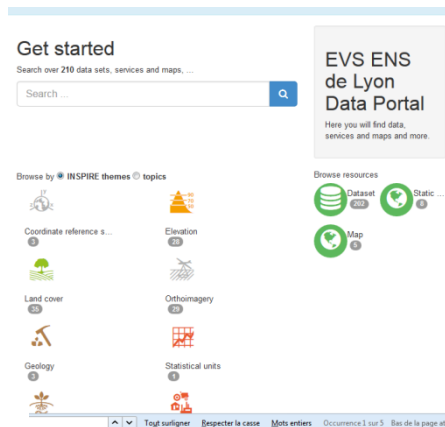
BDOH:
Hydrological database



Data used to produce new knowledge

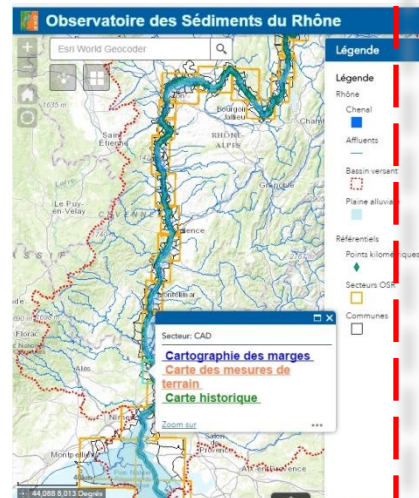
DESCRIPTION
data properties

MetaRhône:
Metadata geocatalog



DIFFUSION
data & web maps

GeoRhône:
Webmapping



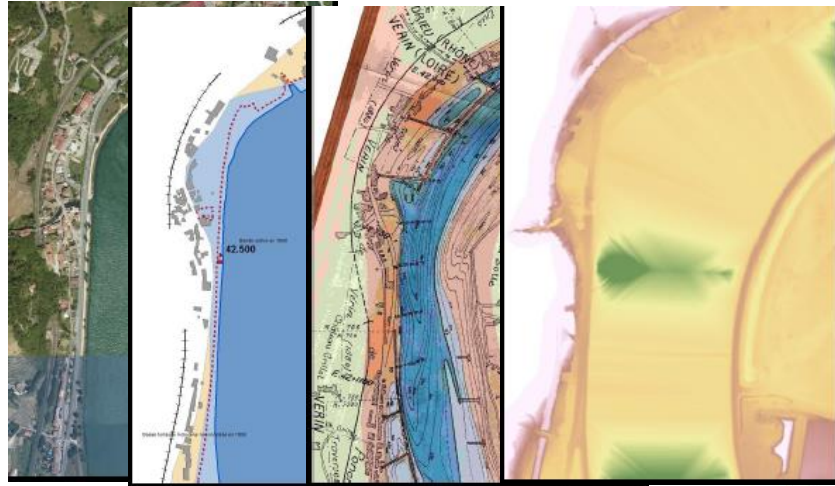
Research teams
River managers
External structures

Spatio-temporal Data Infrastructure

BDRhône: Geographic database

- Secure FTP server
- 237 GB data

GIS layers



Aerial imagery Thematic vector layers 18th-20th c. maps LiDAR

Agreements for data provision labs ↔ river managers

Iconographic resources



Urban planning scheme



Channel restoration scheme

Tabular resources

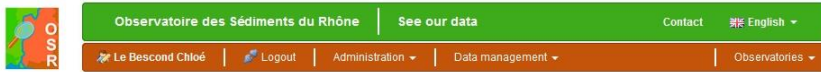
ECAPITULATIF DES DRAGAGES - CURAGES D'ENTRETIEN DES CHUTES 2008										
	DESIGNATION	DATE DEBUT	DATE FIN	MOTIF	LOCALISATION	ENTREPRISE	MODE	DEVENIR MATERIAUX	MO A	VOL/RE-GRAMERS (m³)
5	St. Chadagny	01-03-08		C	R	TOURNAUD	DA PCA	DE	CNR	17 000
3	GENISIAI	01-10-08	15-12-08	X	R	TOURNAUD	PCL	SH	CNR	0
13	PEAGE DE ROUSSILLON	11-02-08	19-02-08	N	E	TOURNAUD	DA	SH	CNR	0
14	SANT VALLEIS	14-04-08	30-05-08	N	C	TOURNAUD	PCL	SH	CNR	4 800
14	SANT VALLEIS	20-04-08	16-06-08	N	C	TOURNAUD	PCL	SH	CNR	0
17	SAINT LOUIS NEUF	03-03-08	03-03-08	C	O	TOURNAUD	DA	SH	CNR	0
15	BOURS LES VALENCIS	05-03-08	12-03-08	N	E	TOURNAUD	DA	SH	CNR	0
15	BOURS LES VALENCIS	05-03-08	08-03-08	N	E	TOURNAUD	PCL	SH	CNR	0
16	BEAUCHASTEL	05-03-08	07-03-08	N	E	TOURNAUD	PCL	SH	CNR	0
17	SAINT LOUIS NEUF	07-03-08	08-03-08	N	E	TOURNAUD	DA	SH	CNR	0
19	DONDERE MONDRAGON	26-11-08	08-01-09	N	E	EMCC	DA	SH	CNR	0
22	VALLABREGUES	16-07-08	05-08-08	N	E	BAILLAND Suez traitant	DA	SH	CNR	0
22	VALLABREGUES	06-08-08	18-08-08	X	O	BAILLAND Suez traitant	DA	SH	CNR	0
23	PALIER DARLES	ANANT-DEPUENT	23-09-08	09-12-09	N	C	EMCC	PCL	RE	17 384
23	PALIER DARLES	ECLUSE		N	C	EMCC	PCL	RE	CNR	16 660
23	PALIER DARLES	DUNAS ET REGIONNAUX		N	C	EMCC	PCL	RE	CNR	0
23	PALIER DARLES	0948 AU ET 02/10	3008 1310	E	O	SCV	CHT	DE	CNR	0
23	PALIER DARLES	RESTAURATION ECOLOGIQUE DE LA LONE		E	O	SCV	CHT	DE	CNR	0
		25-08-2009	02-09-2009							0
	TOTALX									65 450

Dam dredging volumes

- Observatoires (\\gn-evs.ens-lyon.fr) (W)
- Depots
- Echanges
- OHM_VR
- OSR
 - 0_BaseDeConnaissances
 - 2_DonneesVectorielles_Raster
 - ff-ReperesdeCruce
 - ff-Secteurs_OSR
 - Morphologie
 - Stations de mesure
 - 3_ImagerieAerienne
 - 4_DonneesTabulaires
 - 5_TopoBathy
 - 6_CodeInfo
 - 7_Iconographie
 - 8_AudioVideo
 - 9_These E Parrot
 - 10_P Gaydou_SchémaDirecteur
 - Ac5OSR2_EVS-GF_ArcGisBuilder
 - ff-Evolution topographique
 - ff-OccSol
 - ff-OuvragesLinéaires
 - ff-Patrimoine
 - ff-ZonesSchémaDirecteur
 - f-PuissanceSpecifique
 - ff-1-Cartes_CatalogueDeCartes
- TransData
 - 0_BaseDeConnaissances
 - 1_Cartes_CatalogueDeCartes
 - 2_DonneesVectorielles
 - 3_ImagerieAerienne
 - 4_IGN
 - ff-5_TopoBathy
 - ff-6_BDT-Rhône
 - BDT_Hydro
 - BDT_Lidar
 - BDT_Ouvrages
 - BDT_Plaine
 - BDT_Profil

BDOH: Hydrological database (<https://bdoh.irstea.fr>) developed to :

- store & manage continuous or discontinuous time-series such as water discharge, solid particulate matter, contaminant concentrations (Hg, PCB, trace metals, radioelements)
- calculate automatically particulate contaminant fluxes at time scale ranging from hydrological event to pluri-annual assessments



The Rhône Sediment Observatory (OSR) was established in 2009 to address issues that had emerged in the integrated project Plan Rhône. Over the 500 km-long Rhône river from Lake Geneva to the Mediterranean Sea, the Observatory aims at producing, collecting and managing data for documenting stocks and fluxes of sediments and the associated contamination.

OSR is a project funded by the Plan Rhône and several partners, and supported by the European Fund for Regional Development research program. It is a research platform that combines scientists (CNRS, Irstea, ENTPE, IRSN, Ifremer) and the main managers of the river (governmental authorities, water agency, CNR, EDF and the regional councils of Rhône-Alpes, Provence-Alpes-Côte d'Azur and Languedoc-Roussillon). It is one of the observatories of the Rhône catchment research community (ZABR).

Cite these data: Thollet, F.; Le Bescond, C.; Le Coz, J.; Coquery, M.; Panay, J.; Lagouy, M.; Dramais, G.; (2015). Observatoire des Sédiments du Rhône, Irstea. <http://dx.doi.org/10.17180/OBS.OSR>

To cite this observatory, you may refer to DOI 10.17180/OBS.OSR (More about this DOI)

To learn more : <http://www.graie.org/osr/>

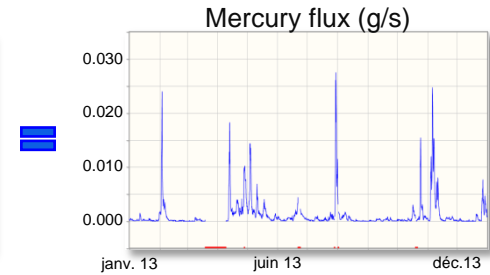
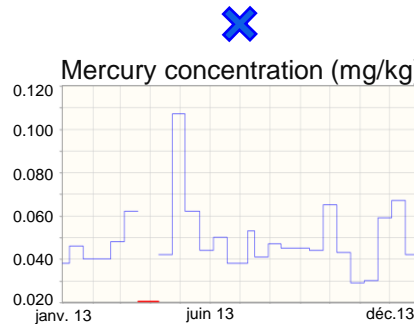
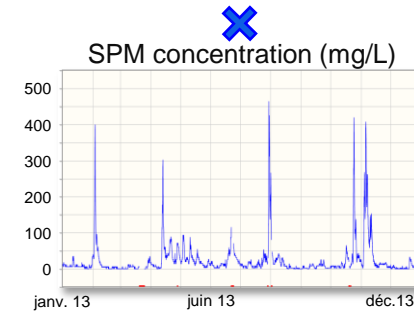
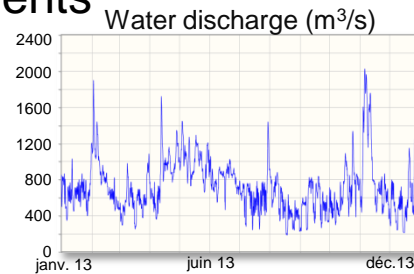
Experimental sites

- Flux OSR
Ce site expérimental regroupe les suivis par les différents partenaires de l'OSR des débits, des concentrations en sédiments en suspension et des taux de micropolluants sur le Rhône et ses affluents.

Parameters

- Discharge
- Mercury concentration
- Particulate organic carbon concentration
- Suspended Solid concentration
- Suspended solid flux
- Turbidity

Advanced search

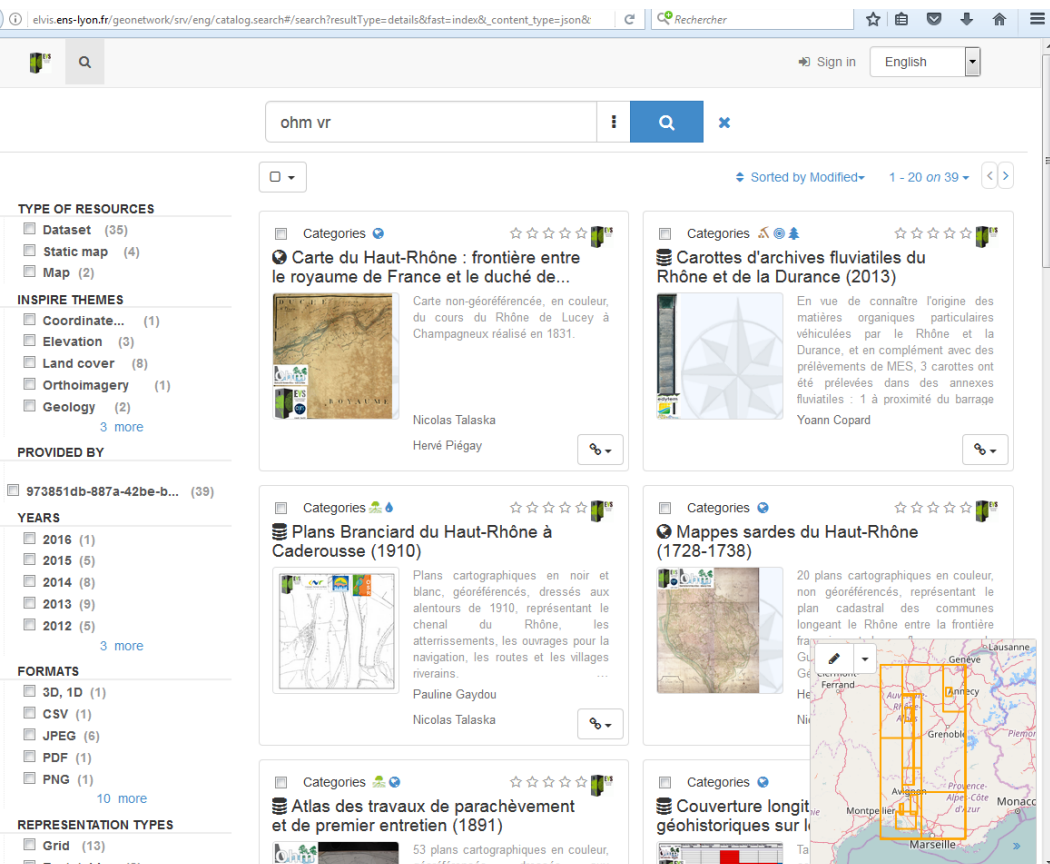


Time-series of the Rhône river at Jons displayed in BDOH (measured data in blue, gaps in red)

MetaRhône: Metadata geocatalog (<http://elvis.ens-lyon.fr>)

= Information about data: who, what, when, where, how, why? Permits to:

- search for data produced or collected within a research action / contact data authors
- use data with full knowledge of technical properties and legal constraints
- enhance the visibility of research results / initiate new collaborations



The screenshot shows a web browser window with the URL elvis.ens-lyon.fr/geonetwork/srv/eng/catalog.search#/search?resultType=details&fast=index&content_type=json&. The search bar contains 'ohm vr'. The results are sorted by 'Modified' and show 1-20 of 39 items. The interface includes a sidebar with filters for 'TYPE OF RESOURCES' (Dataset: 35, Static map: 4, Map: 2), 'INSPIRE THEMES' (Coordinate: 1, Elevation: 3, Land cover: 8, Orthoimagery: 1, Geology: 2), 'PROVIDED BY' (973851db-887a-42be-b...: 39), 'YEARS' (2016: 1, 2015: 5, 2014: 8, 2013: 9, 2012: 5), 'FORMATS' (3D, 1D: 1, CSV: 1, JPEG: 6, PDF: 1, PNG: 1), and 'REPRESENTATION TYPES' (Grid: 13). The main content area displays several metadata entries, each with a thumbnail, title, description, and author information.



INSPIRE & ISO 19139 metadata standards

 Coordinate reference sy... 3	 Elevation 28	 Land cover 35
 Orthoimagery 29	 Geology 3	 Statistical units 1
 Soil 9	 Land use 3	 Geographical grid sys 3
 Environmental monitorin... 4	 Natural risk zones 3	 Habitats and biotopes 6
 Administrative units 1	 Cadastral parcels 1	 Hydrography 36

MetaRhône: Metadata geocatalog (<http://elvis.ens-lyon.fr>)

Contact of researchers / assistance to fill metadata sheets

Atlas des travaux de parachèvement et de premier entretien (1891)

Updated: 2 months ago

53 plans cartographiques en couleur, géoréférencés, dressés aux alentours de 1891 par l'Administration des Ponts et Chaussées (Services Spéciaux du Rhône) en aval de Lyon. Ils représentent le chenal du Rhône, les annexes fluviales, les ouvrages de correction construits et projetés et l'occupation du sol.

Download and links

Site web de l'OHM Vallée du Rhône

Site de l'OHM VR

About this resource

INSPIRE themes **Land cover**

Categories 

Keywords

- Rhône
- OHM VR
- Occupation des terres
- imageryBaseMapsEarthCover

Language

- Français

Resource identifier

- 2014-TALASKA-ATLAS1891

Legal constraints

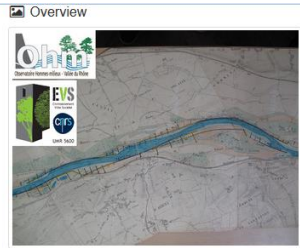
Mention obligatoire sur tout support de diffusion : "Ces travaux ont bénéficié du soutien du LabEx DRIHM et de l'OHM Vallée du Rhône".

Utilisation commerciale directe ou indirecte interdite.

Contact for the resource

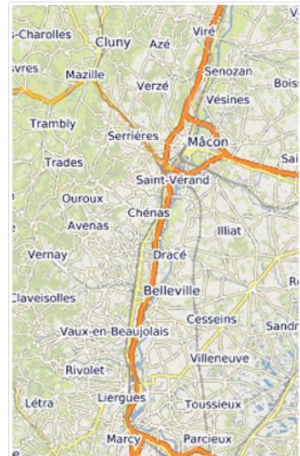
 **author**

GEOPEKA
Nicolas Talaska (Chargé d'études)
15 Pavis René Descartes BP 7000, Lyon, 69007,
France



Spatial extent

- Pierre-Bénite à Donzère-Mondragon.



Technical information

Representation type	grid
Scale	• 1/10000
Coordinate reference system	• -RGF93 / Lambert-93 (EPSG:2154)
Format	TIF
Lineage	<p>Les plans ont été collectés dans les archives départementales du Rhône par les chercheurs de l'UMR 5600 EVS (vacataires). Ils ont été géoréférencés en Lambert 93 à partir des orthophotographies de l'IGN. La RMS est comprise entre 3 et 9 m.</p> <p>Le jeu de données se compose de 53 planches de pK0 au pK193: Secteur de Pierre-Bénite (PBN): 8 planches Secteur de Vaugris (VAU): 3 planches Secteur de Péage-de-Roussillon (PDR): 10 planches Secteur de Saint-Vallier (VAL): 3 planches Secteur de Bourg-les-Valence (DLV): 1 planche Secteur de Beauchastel (BEA): 6 planches Secteur de Baix-Logis-Neuf (BLN): 5 planches Secteur de Montélimar (MON): 8 planches Secteur de Donzère-Mondragon (DZM): 9 planches</p> <p>Une couche vectorielle de digitalisation des ouvrages de correction est jointe au jeu de données.</p>

Metadata information

 Download metadata

Contact

 **pointOfContact**

UMR 5600 EVS - ENS de Lyon
Fanny Amaud (Ingénieur d'études)
15 Pavis René Descartes BP 7000, Lyon, 69007,
France
Call 04 37 37 64 94

Metadata language

- Français

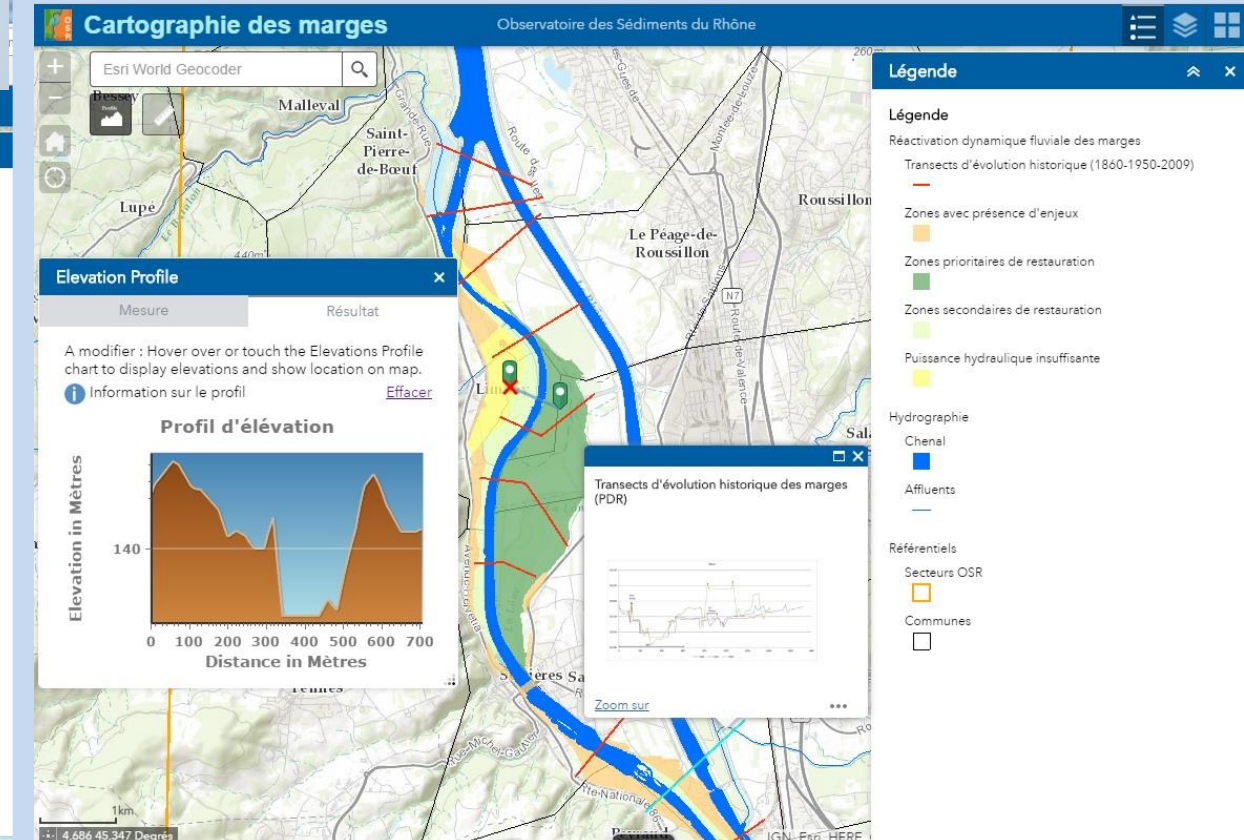
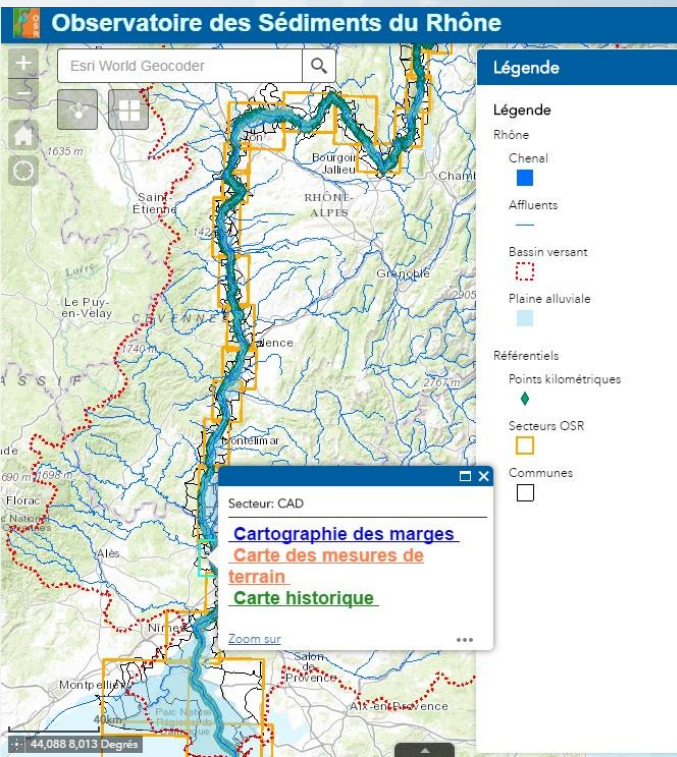


GeoRhône: Webmapping

Developing a simple, functional, aesthetic web-GIS platform, allowing river managers, funders & research partners to:

- display research data and territories (thematic web maps)
- perform simple queries on geographic layers (analysis tools)
- promote the emergence of new research questions on specific reaches

Portal for ArcGIS



Conclusions

Spatio-temporal Data Infrastructure: the result of researchers' and river managers' collective and long-term investment





Conclusions

Spatio-temporal Data Infrastructure: the result of researchers' and river managers' collective and long-term investment

Strengths:

Knowledge structuration & diffusion: allows to answer complex scientific questions by coupling data from different sources (spread in different labs and researchers not always connected)

A tool for measuring the Observatory activity: number of published metadata, web-GIS maps, visits to the websites, data exchanges, ...

Conclusions



Challenging issues:

Personnel resources for tool maintenance and data publishing

Mobilizing the researchers (cataloguing = time-consuming & undervalued)

Communicating on tools to increase their visibility



3rd International Conference on the Status and Future of the

World's Large Rivers

18-21 April 2017, New Delhi, India

Thanks for your attention !

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