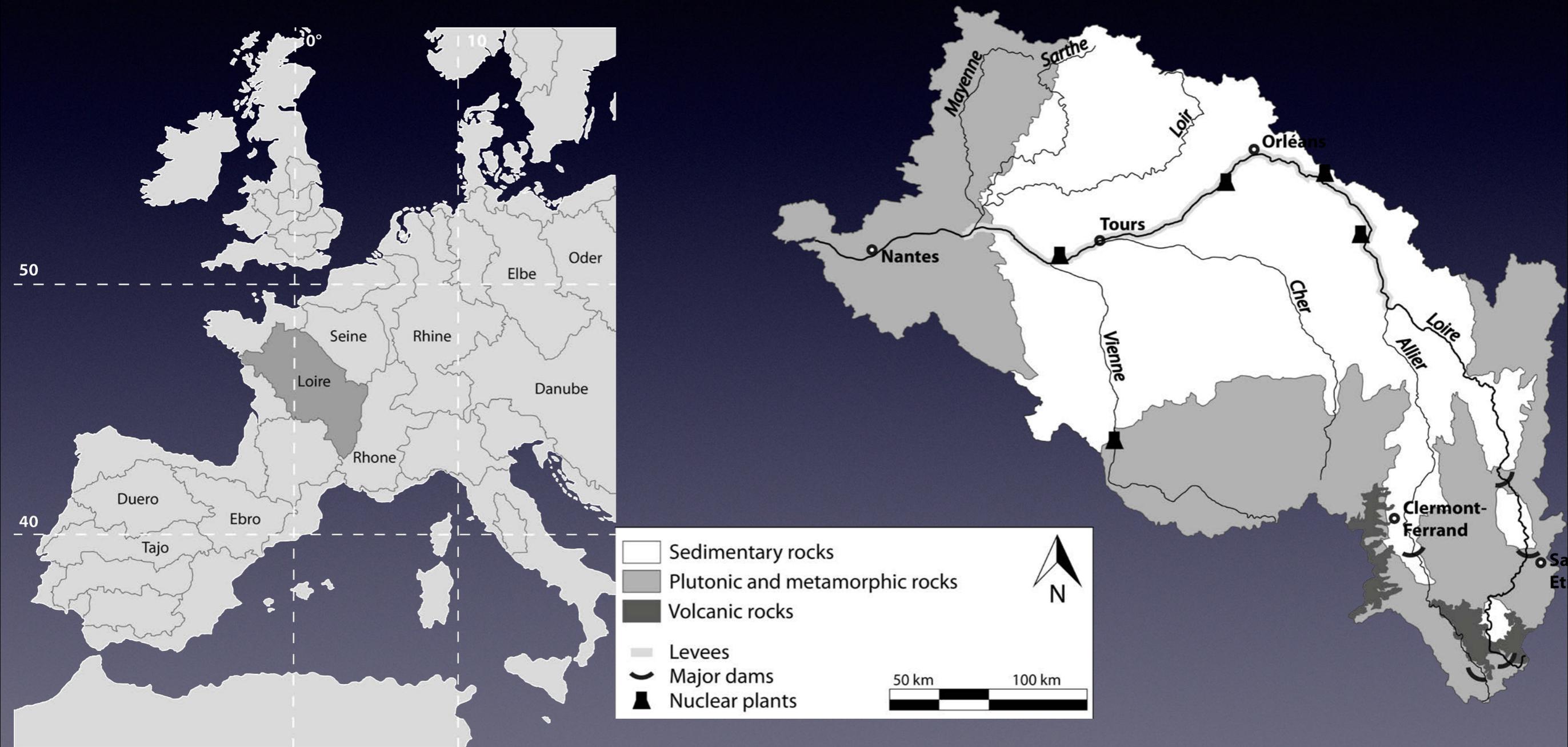


The logo features a stylized yellow river winding across the frame. Three overlapping circles in shades of blue, purple, and green are positioned behind the text. The background is a dark blue gradient.

OSLA

The Observation Network
of the Loire river basin Sediments

The Loire river basin









Liberté • Égalité • Fraternité
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ETABLISSEMENT



**PUBLIC
LOIRE**

**PLAN
LOIRE
GRANDEUR NATURE**



UE/EU - FEDER/ERDF

OSLA Network









14 research actions

1

Sediment transport
and geomorphological
evolutions

2

Fluxes and stocks of
pollutants

3

Sediments and
ecological interactions

4

Tools for sediments management

14 research actions

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Variations of grain size in relation with cross section hydrodynamics and tributary confluences in a large sand-gravel bed river: the Loire (France)

Valverde L.¹, Rodrigues S.¹, Jugé Ph.¹, Desmet M.¹, Recking A.², Pene L.¹, Rincel M.¹, E.A. 6293 GÉHCO, Géo-Hydrosystèmes Continentaux, Tours University, France
 Delancet R.¹, Bakyono J.-P.¹
 Contact: lauren.valverde@univ-tours.fr

Study area

Aim of the study:

Many current management issues are linked to the natural processes of fluvial dynamics, such as sediment transport, erosion and deposition.

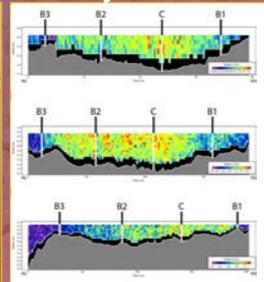
This study aimed at better understanding the behavior of one of the key factors in sediment transport: grain size.



Among the ten largest West-European rivers and the largest French basin: 117,000 km² - Average discharge: 374 m³/s at Tours gauging station

Methods

Flow velocity measurements



4 samples per cross-section in the main channel only:

C: main sample at maximum speed

B1, B2, B3: additional samples to assess transversal variability

Mean flow velocity varied from 0.18 to 0.94 m/s

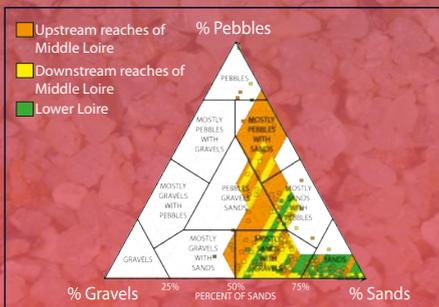
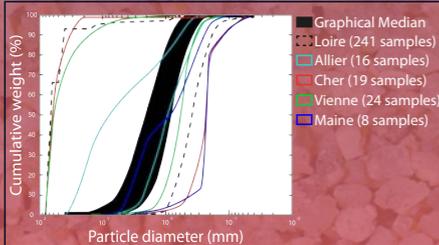
Mean measured depth varied from 0.48 to 2.84 m

Sediment sampling



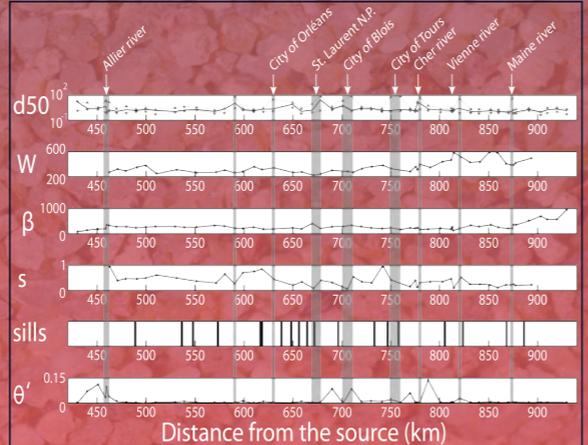
First results

Grain size



Silts and clays are not figured as they represented 0.1% or less.

Downstream variations



Averaged d50 variations (median, min and max) compared to river bankfull width (W), aspect ratio (β), slope (s), major sills, and critical Shields parameter ($\theta^* = u^* / (C^* \times 1.65 \times d_{50})$).



Variability is much greater transversally than longitudinally, but mean grain size did not vary with flow velocity, the median ranging from 1.35 to 1.71 mm.

Perspectives:

- comprehend sediment transport processes during low flow (see Claude, 2012)
- refine a large scale 1-D model on hydraulics and sediment transport (Latapie, 2011)
- define tributary inputs and signatures through petrological analyses (see Macaire et al, 2013)

The VERSEAU – TRACKSED Project: Origin of Loire River basin sediments

Rosalie Vandromme¹, Olivier Cerdan¹, Aurore Gay¹, Anthony Foucher², Sébastien Salvador-Blanes², Valentin Landemaine³, Marc Desmet²

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³M2C, Université de Rouen, France



INTRODUCTION

In France, since the beginning of 20th century, rural landscapes have been completely modified by human activities. These practices have resulted in profound sedimentary and morphological alterations (channel bed incision, deposition of fine sediment, bank erosion, etc.), detrimental to the achievement of good water status [1]. Several research efforts have already investigated either global budgets at the river basin or continental scale or local detailed budgets at the plot to the field scale. However, very few studies have tried to analyze the connectivity between fluxes and storages and to draw the links between the different scales. The purpose of this study is to examine source-to-sink dynamic of the sediment cycle for the Loire River Basin. This project is broken down into two steps:

- Understand poorly studied processes such as sediment production by agricultural drainage or bank erosion through catchment monitoring.
- Elaborate a distributed model of sediment connectivity from hillslopes to basin outlet.

MATERIAL AND METHODS

1. for the first step, two catchment sites are studied, using historical data or monitoring:

- the linear (21 km) of two small streams ("La Ligoire")
- the Louroux pond catchment.

Those two catchments are for the most part intensively cultivated and have been extensively submitted to subsurface drainage using drain tiles. The objectives of this part are:

- quantify incision and deposition processes since the channelization of the streams (1970 and 1945),
- quantify in-channel deposition rates of fine sediments
- explain the spatial distribution of these deposits.

2. For the second step, the modeling approach is based on the use of indicators to describe hillslope processes, potential downstream retention, attempting to link river basin characteristics to a prediction of sediment exports in rivers. It provides insight in the identification of the most influent sediment redistribution processes on the total sediment fluxes and on the differences between various basin typologies [2] [3].



FIRST RESULTS

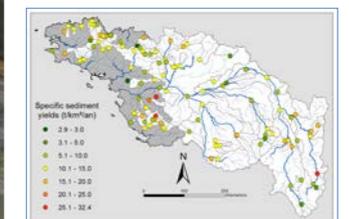
The Ligoire study shows an important stream incision (around 30 cm in 40 years) and the influence of water obstacles on sediment distribution.



The Louroux monitoring should allow a better understanding of the origin and dynamics of sediment transport within small intensively cultivated plain catchments.



The first results from the second step on mean annual suspended sediment loads, show that catchments contribute from $4.8 \cdot 10^2$ to $3.7 \cdot 10^5$ t.yr⁻¹ to the overall Loire river sediment exports (which equals $8.6 \cdot 10^5$ t.yr⁻¹) and area-specific suspended sediment yields have been calculated.



CONCLUSION AND PERSPECTIVES

Investigations on catchments global characteristics should then allow the identification of dominant processes of sediment redistribution and help to draw local then regional distributed sediment budgets to bridge the gap between the different spatial scales. Contribution of hillslopes to the overall catchment budget should finally help to assess in-stream contributions and redistribution processes.

References:

- Aarts et al., (2004) Food and Chemical Toxicology 42:45-49;
- Cerdan et al. (2012) Comptes Rendus Geoscience 344:636-645;
- Delmas et al. (2012) Journal of Hydrology 420-421:255-263



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Techniques de carottage et premières analyses - Projets MetOrg 1, Verseau, MetMines et Dynamics

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http://info-sed.plan-loire.fr

INFO-SED

Outil de connaissances partagées des sédiments du bassin de la Loire

Accueil Catalogue Recherche textuelle Recherche géographique Recherche

Catalogue

Ce catalogue affiche la liste des documents principaux du référentiel INFO-SED. Cliquez sur le lien pour accéder à la fiche ainsi qu'à la liste complète des documents associés.

Type	Références	Date	Auteur
	Spatio-temporal evolution of the Choisille River (southern Parisian Basin) during the Weichselian and the Holocene as a record of climate trend and human activity in north-western Europe, Quaternary S...	2011	Morin E. et al.
	Lower and Middle Pleistocene human settlements recorded in fluvial deposits of the middle Loire River Basin, Quaternary Science Reviews 30, pp. 1474-1485	2011	Desprée J. et al.
	Classification and mapping of anthropogenic landforms on cultivated hillslopes using DEMs and soil thickness data - Example from the SW Parisian Basin, Geomorphology 135, pp. 8-20	2011	Chartin C. et al.
	Effet de l'évolution du parcellaire agricole sur la redistribution des sols et la morphologie des versants cultivés: exemple du Sud-Ouest du bassin parisien - Thèse 3ème cycle, Université de Tour...	2011	Chartin C.
	Modélisation de l'évolution morphologique d'un lit alluvial: application à la Loire moyenne - Thèse 3ème cycle, Université de Tours	2011	Latapie A.
	Poster de présentation du Réseau d'Observation des Sédiments de la Loire et de ses Affluents (O.S.L.A.), n°1, octobre 2011	2011	Valverde L.
	Fluvatile palaeoenvironments in archeological context: geographical position, methodological approach and global change - hydrological risk issues - Quaternary International, Vol. 216, Issues 1-2, pp...	2010	Arnaud-Fasseta G. et al.
	Caesium-137 in sandy sediments of the River Loire: assessment of an alluvial island evolving over the last 50 years, Geomorphology, Vol. 115, Issues 1-2, pp. 11-22	2010	Détriché S. et al.
	Le transport solide de la Loire : des sédiments sans cesse en mouvement, Géosciences, Vol. 12, p. 110	2010	Rodrigues S. et Claude N.
	La Loire, usine à carbonates, Géosciences, Vol. 12, pp. 54-59	2010	Grosbois C. et al.

Langue

- Français
- English

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Partenaires



Gestionnaire de couches

- Info-Sed
 - Ouvrages ROE (par sous bassins)
 - Sous Bassins versants
 - Couches de contexte
- Unités adminis...
 - Hydrographie
 - Cartes IGN
 - Ortho-imagerie

Légende

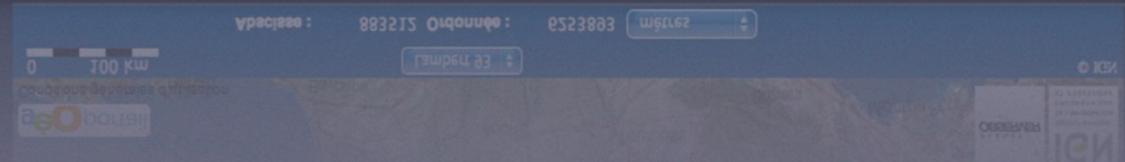
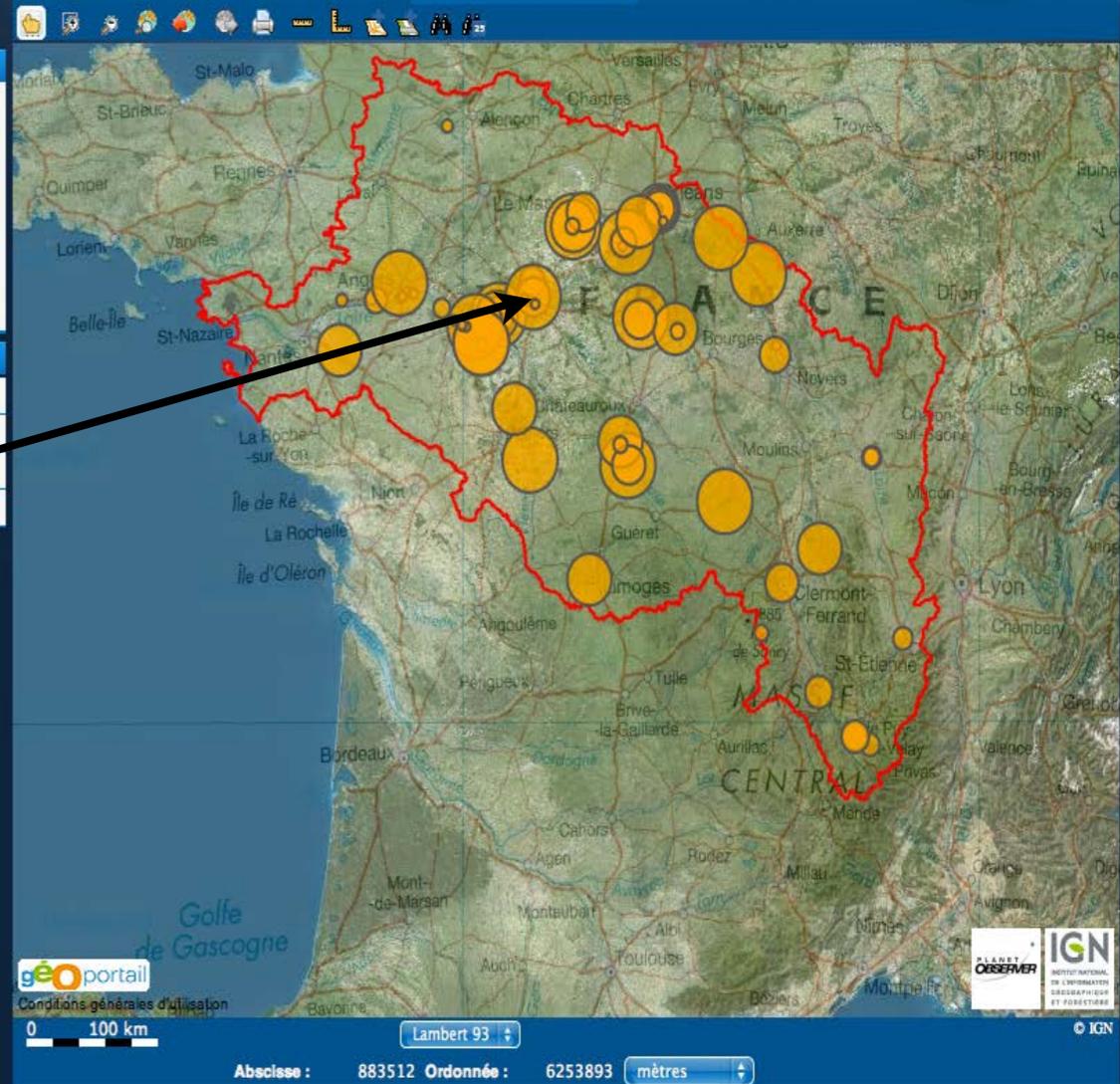
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2015

1. Booklets for decision makers

2. International seminar



Bringing operational knowledge to Loire basin decision makers



Exchanging experiences with researchers and stakeholders from other similar basins

Conclusion

Before OSLA

Scale of the site



NOW

Scale of the basin

One study : One discipline



Pluridisciplinary research

Each team has its
own tools



Tools are shared

Doing more with less

No communication
between researchers,
no link between science
and policy



Networking

**Priority : financing
coordination / communication**