



# « What is the French strategy of Research (2015-2020) for facing the water and climate change challenges ? »

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Ministry of Education, Higher Education and Research

DG Research and Innovation

Scientific service “Agronomy, Ecology, Earth System and Universe Sciences”

*Lead by Elisabeth Vergès*

**French – German – Polish Conference**  
**Water and Climate change, November 16-17<sup>th</sup> 2015,**  
**Helmoltz center for Environmental Research, UFZ, Leipzig, Germany**



[www.enseignementsup-recherche.gouv.fr](http://www.enseignementsup-recherche.gouv.fr)



# Water and Climate Change Research in France:

4 main ministries, Universities/schools, 7 national research organisms, 3 main funding agencies for water research

Horizon 2020 JPI Water JPI Climate EIP Water  
KIC Climate COPERNICUS + *ESFRI*

EUROPE 

## MENESR

Ministry for Education,  
Higher Education and Research

Universities & Schools, CNRS, BRGM, IRSTEA,  
INRA, IRD (MFA), CNES (M.Defense)

ANR

Ministry for  
agriculture and food

INRA, IRSTEA

Ministry of Ecology,  
Sustainable  
Development and  
Energy

BRGM

Meteo-France

ONEMA, ADEME

Ministry of Economy,  
Industry and Digital  
technology

BRGM

FRANCE

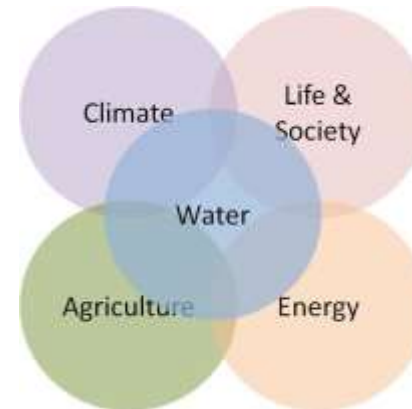




**Water: a cross-cutting research field between climate, agriculture, human health, environment, societal and energy needs.**

**In the General Direction of Research and Innovation (MENESR), 4 research and innovation scientific services support this cross-cutting topic :**

- Environment-Agronomy
- Health
- Humanities and social sciences
- Energy



**Research organisms implied in the topic are gathered in 4 national research alliances : AllEnvi (Environment), Athena (Humanities and social sciences), Ancre (Energy) and Aviesan (Biology and Health)**



## Support of the *Ministry of Education, Higher Education and Research (MENESR)* on the topic of **water and climate change**

**Stratégie Nationale de Recherche (SNR) 2015-2020** : in accordance with other ministries and the research alliances.

The SNR is mainly implemented through :

- research funding agency programming (ANR)
- contracts between research institutes / universities and the MENESR

The Strategy is consistent with the societal challenges of Horizon 2020.

- Challenge 1: Sustainable management of the resources, adaptation to the climate change
- Challenge 5: Food security and demography

## National report « Innovation - Agriculture 2025 »

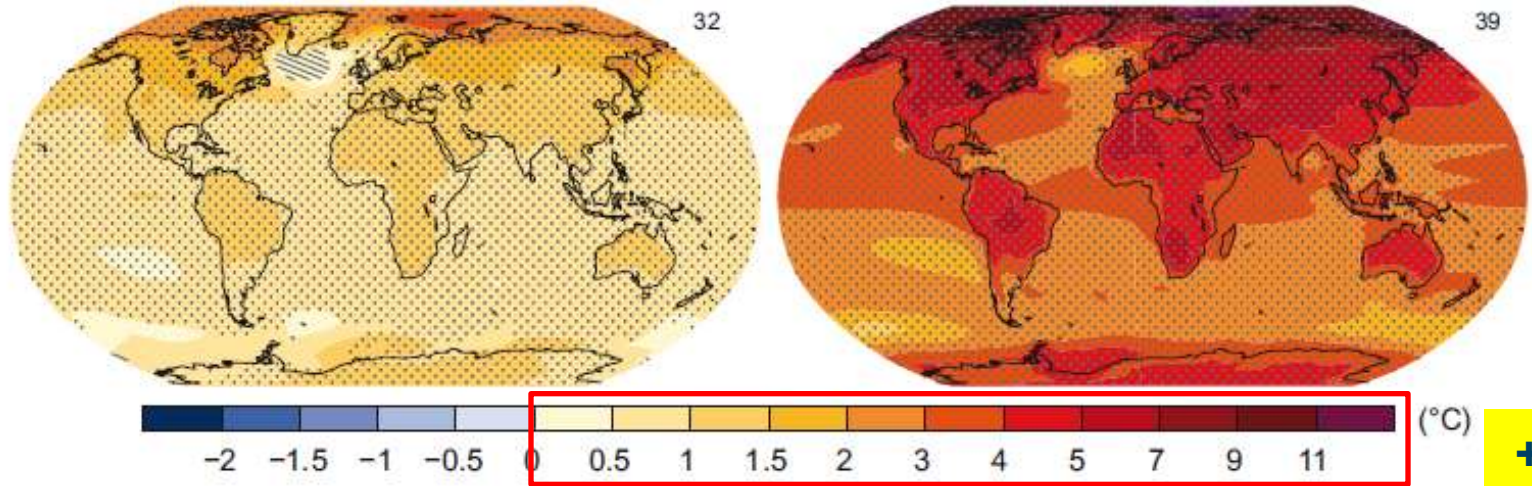
Development of agroecology, including water (preservation of resources, quality)



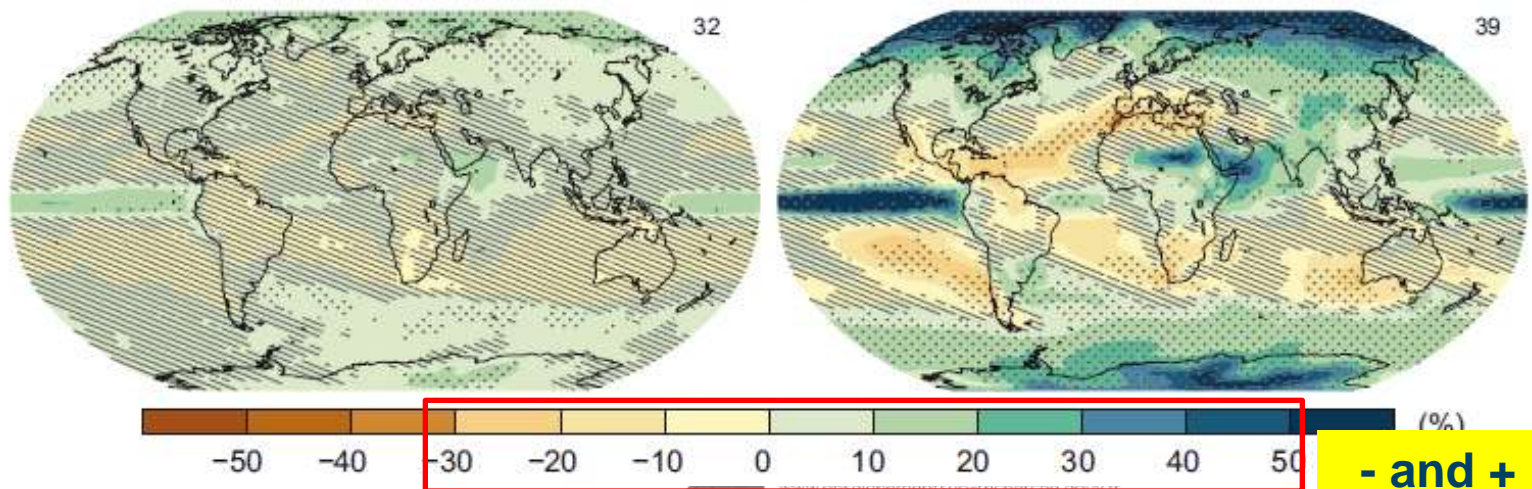
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# IPCC (report 2014)

(a) RCP 2.6 RCP 8.5  
Change in average surface temperature (1986–2005 to 2081–2100)



(b) Change in average precipitation (1986–2005 to 2081–2100)



# Projected future changes over France : rainfall amount

Rainfall amount change for 2050 (IPCC) (% change, scenario SRES-A1B or RCP 6)

**Winter**

**Summer**

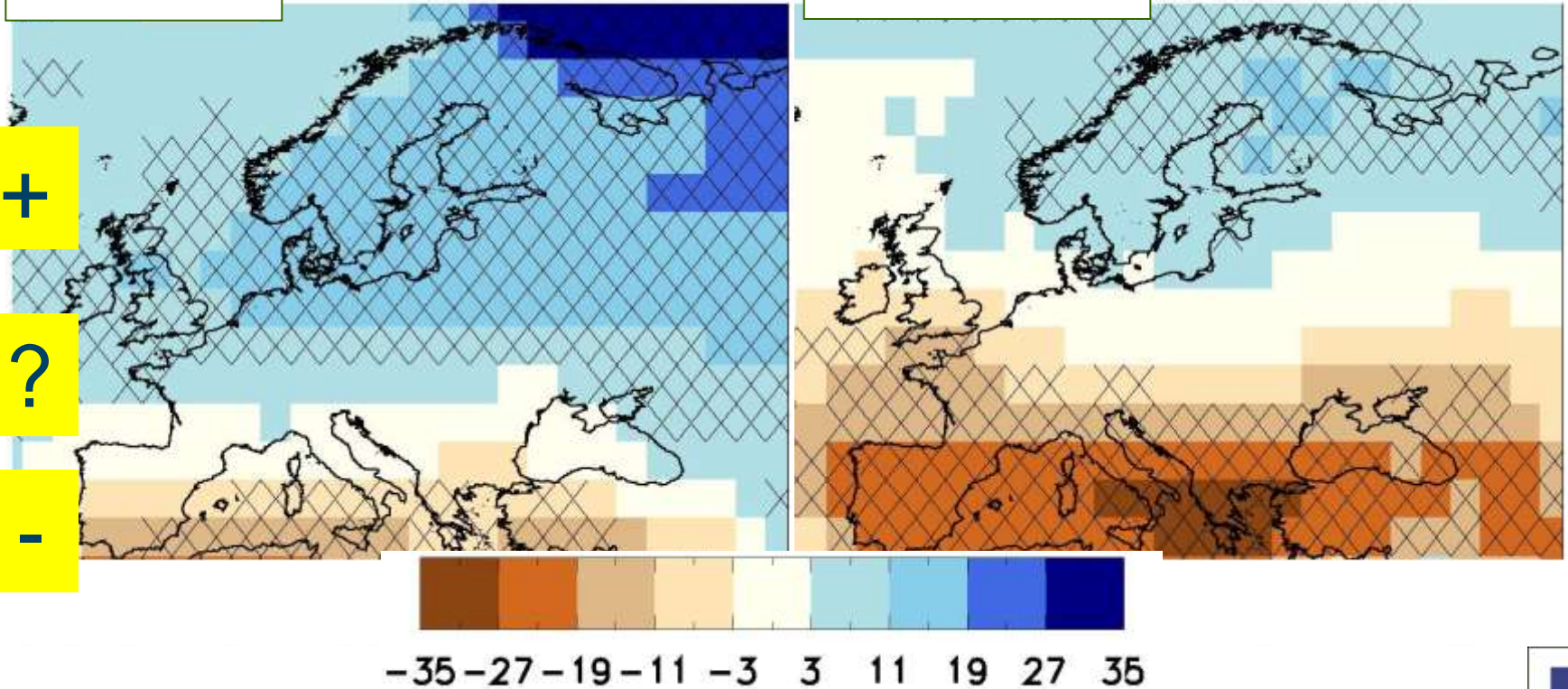


Fig: Julien Boé, CERFACS

X: Sign consistent for at least 85% of climate models

**Project RExHySS, (2009, 2013), F. Habets, A. Ducharne et al.**



## Research priorities (SNR)



### CC + demographic pressure:

2015: 7 Billion human beings

2100: 9 Billion human beings

### Impacts:

- Access to water in quantity and in good quality
- Crop yields
- Food security and nutrition
- Energy (cooling, hydroelectricity, conflicts in water-use...)
- Water stress and drought
- Pluvial flooding
- Fluvial flooding & Tropical cyclones (where applicable)
- Submersion
- Coastal regions

### Knowledge, innovation

- Modelling of the surface and groundwater systems
- Water quality, emerging contaminants
- Conflicts in water use
- Water technology, water reuse
- Water management
- Extreme events and risk

### Interdisciplinarity, systemic approach (uncertainties, downscaling, inter & retroactions, non linearities...)

- Climate
- Agriculture
- Ecosystem services
- Coastal areas
- Human health, « One health »
- Adaptation and Mitigation Climate Change



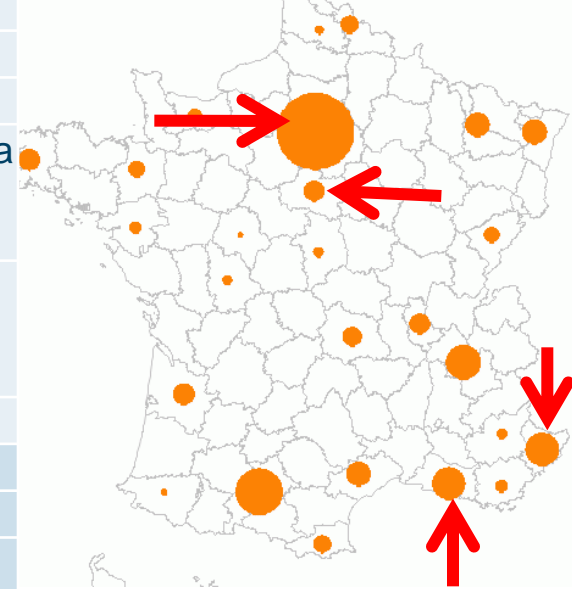
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2009-2018 :  
75 M€  
*Marginal costs*

## Investments for the Future (PIA) – France - 2009-2018

### Laboratory of Excellence (LabEx) and Equipment of Excellence (EquipEx)

6 LabEx $\Sigma = 40 \text{ M€}$	BASC (Paris)	Biodiversité, Agroécosystèmes, Société, Climat
	OTMed (Aix)	Objectif Terre : bassin méditerranéen
	L-IPSL (Paris)	Comprendre le climat, modélisation
	OSUG@2020 (Grenoble)	Stratégies innovantes pour l'observation et la modélisation des systèmes naturels, surveillance sismologique
	VOLTAIRE (Orléans)	étude des géofluides et des VOLatils, Terre-Atmosphère Interactions pour les Ressources et l'Environnement
	DRIIHM/IRDHEI	Interactions Hommes-Milieux
5 EquipEx $\Sigma = 35 \text{ M€}$	IAOOS	Arctic Ocean observing system
	NAOS	Observation des océans
	CRITEX	Fonctionnement hydrologique, hydrogéologique et géochimique de bassins versants
	ASTER-CEREGE	plateforme de datation par le Be10
	GEOSUD	Couverture satellitaire du territoire français





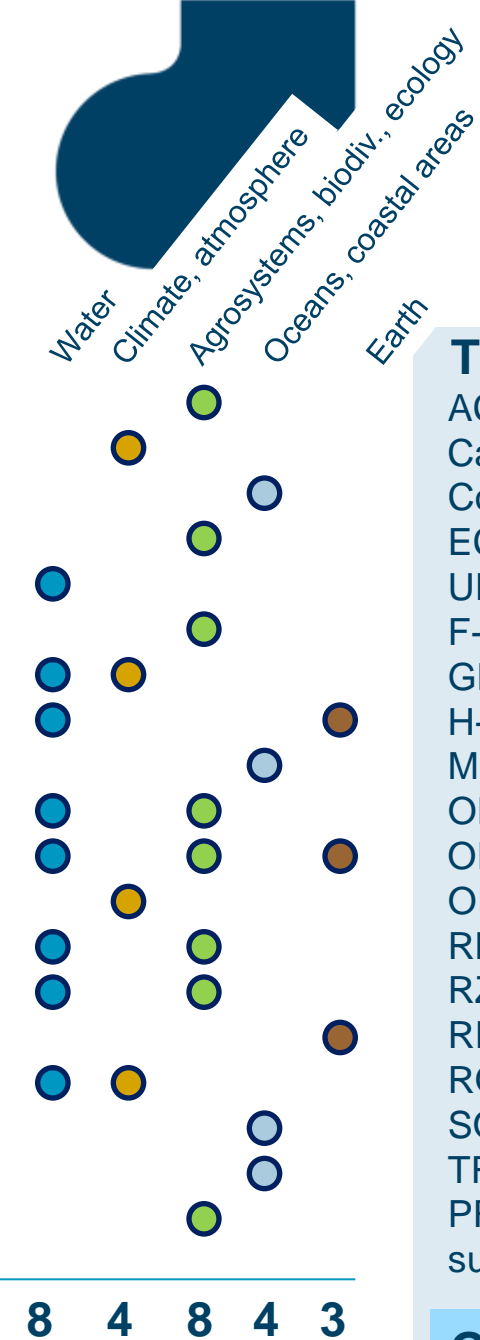
# Environmental research long term observatories (SOERE)

Elementary facilities directly funded by the MENESR  
1.5 M€ /year *Marginal costs*

## Those facilities gathered in national and Eu RI

- ACBB - Agrosystèmes, cycles biogéochimiques, biodiversité (ANAE)
- Carbone et gaz réactifs (ICOS)
- Coriolis – Océanographie physique
- ECOSCOPE – Réseau des observatoires de recherche sur la biodiversité (EUBON)
- URBIS – Environnement urbain
- F-ORE-T – Fonctionnement des écosystèmes forestiers (ANAE)
- Glacioclim - Réseau d'observation des glaciers (LTER)
- H+ international - réseau international de sites hydrogéologiques (LTER)
- Moose - Mediterranean Ocean Observing System on Environment (JERICHO)
- OLA - Observatoire des lacs alpins (ANAE)
- OPE - Observatoire pérenne de l'environnement (LTER)
- ORAURE - Observations en réseaux des aérosols (ACTRIS)
- RBV Réseau des bassins versants (LTER)
- RZA Réseau des zones ateliers (LTER)
- RESIF - Réseau sismologique et géodésique français (EPOS)
- ROSEA - Réseau d'observation de l'atmosphère (ACTRIS)
- SONEL - Système d'observation du niveau des eaux littorales (JERICHO)
- TRAIT DE COTE , aménagements littoraux (JERICHO)
- PRO - Impacts environnementaux du recyclage des produits résiduaire organiques sur les écosystèmes cultivés (ANAE)

Groups of SOERE + SNO, SO → National RI → ESFRI



# Competitiveness clusters (« Pôles de compétitivité »)

A competitiveness cluster (or cluster) brings together private companies, research organisms and universities, all working together in a specific region to develop synergies and cooperative efforts around a shared theme.

## 3 clusters in the field of water

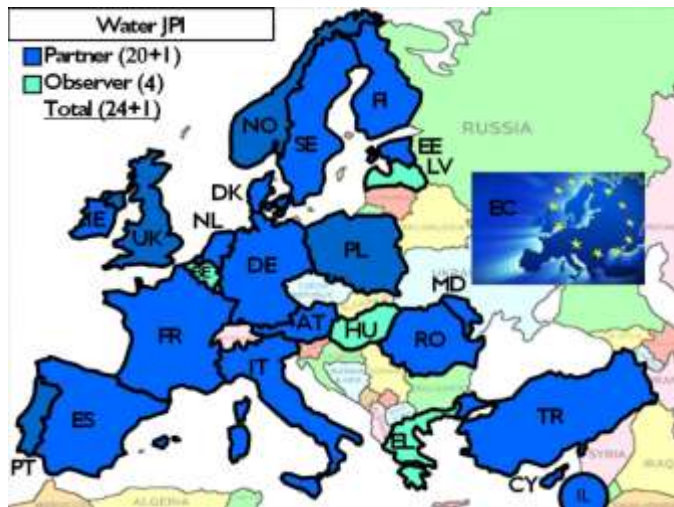
- **DREAM** (Centre - Orléans)
- **HYDREOS** (Alsace-Lorraine)
- **Eau** (Languedoc-Roussillon)





« Water Challenges for a Changing World »

## Increasing support of France to the Water JPI



### Five core themes:

1. Maintaining Ecosystem Sustainability;
2. Developing Safe Water Systems for the Citizens;
3. Promoting Competitiveness in the Water Industry;
4. Implementing a Water-Wise Bio-Based Economy; and
5. Closing the Water Cycle Gap.

### French funds to 2 calls (~ 4 M€, marginal costs):

- Pilot call 2014 : Emerging water contaminants - anthropogenic pollutants and pathogens.
- EraNet Co-fund: Waterworks2015 on Sustainable water use in Agriculture, to increase water use efficiency and reduce soil and water pollution
- + Future call in 2017 ? : « Closing the water cycle gap ».

Since 2015 : France lead

- Coordination

- Secretariat

- Coordination of the SRIA

(strategic research and innovation agenda)



# Some key milestones

## COP-21, Paris (30 Nov. to 11 Dec. 2015)

- Pre-event : scientific conference « our common future under climate change » – UNESCO, July 2015
- Water issues which will be central to discussions (S. Royal, French Ministry of Ecology)
- ½ day dedicated to Water (4 December). World bank

## Art. 185

- **BONUS 2** (Baltic Sea, North Sea, English Channel)
- **PRIMA** Partnership for Research and Innovation in the Mediterranean Area → integrated programme on food systems and water resources for the development of inclusive, sustainable and healthy Euro-Mediterranean societies
- **IntensAfrica** : research partnership between Europe and Africa on sustainable agriculture intensification

## New roadmap of RI (ESFRI)

**JPI's works** (Water, Climate, Oceans, Urban Europe, FACCE) and associated EraNet co-funds

## Horizon 2020

## COPERNICUS



**Thank you for your attention  
and I wish you a very promising conference**

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Peace for Paris



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