

L.A.R.A.

Laboratorio **A** Rete per le **A**cque della Regione Emilia
Romagna

Il Progetto L.A.R.A.,
Laboratorio a Rete per le Acque della Regione Emilia
Romagna:

un esempio di integrazione multidisciplinare sui
temi della tutela delle risorse idriche in una prospettiva
di collaborazione europea

Francesco Dondi

Department of Chemistry, University of Ferrara di Chimica

L.A.R.A.

f.dondi@unife.it

AMBIENTE - 7 FP - UNIFE 16.1.08

Laboratorio A rete Regionale sulle Acque



Nuovo Punto di Interesse

QUALITÀ DELL'ARIA E SALUTE"

Laboratorio A rete Regionale sulle Acque



A. OUTLINE: Water

- General Structure of the LARA Water Regional Laboratory
- Project in preparation
- Project – idea

B. OUTLINE: Air

- Air Quality and Health



L.A.R.A

**LAND NETWORK LABORATORY FOR WATERS
of Emilia Romagna Region**

**A Joint Program among
Universities**

Industries and

Water and Environment Agencies

in

**Science and Engineering of Water
Resources**





L.A.R.A. STAF

Università di
Ferrara

**20 Post
Doctoral
positions**

45 Researchers



9 Main projects



L.A.R.A. Mission

- To create a **Laboratory dedicated** to technologies and the research activities towards “waters”, able to interact with both **public and private** institutes,
- To produce **innovative** technologies,
- To give **integrated** services to solve environmental issues for water matrix,
- To realize **synergic collaborations** between knowledge in different sectors of applied research on water and
- To offer **educational projects** linked with research activities

SKIP



STRUCTURE & PROJECTS

Three main Units belong to L.A.R.A., working in synergy on both multi-disciplinary projects and independently on their own research activities:

- I. WATER-PIPE NETWORK MANAGEMENT
- II. WATER QUALITY
- III. GROUND WATER MANAGEMENT

L.A.R.A. activity is regulated through an Advisory Board made of International Scientists of the field. Purposes of this Board are to discuss and support to the L.A.R.A. activities together with the Unit Coordinators.





L.A.R.A. Partners

UNIVERSITÀ DI FERRARA

- Department of Biology
- Department of Chemistry
- Department of Engineering
- Department of Earth Sciences
- Department of Architecture

Assistance and Governance:



SKIP

- UNIVERSITY OF BOLOGNA
 - Department of Civil, Environmental and Transport, Waters (DISTART),
 - Department of Physical Sciences



-  CNR-ISOF Ist. per la Sintesi Organica e la Fotoreattività



-  CADF Spa

-  SAT Spa



The Three Sections of L.A.R.A.

- Water-Pipe Network Management
Chair Ing. Prof. Marco Franchini
- Water Quality
Chair Prof. Francesco Dondi
- Groundwater Management
Chair : Prof. Torquato Nanni



Water-Pipe Network Management (Chair Prof. M.Franchini)

- Optimization models for adjusting the control apparatus of water distribution system.
- Algorithms for multi-objective optimal scheduling of maintenance actions on water distribution system.
- Models for economic evaluation of leakages and leakage detection planning



Water Quality

(Chair Prof. F.Dondi)

- Emergent contaminants: analysis methodology, monitoring and remediation
- Aquatic Colloids of environmental interest
- Remediation techniques (Electronbeam, Purification plants, Electrochemistry remediation and Photochemistry remediation).
- -QA/QC: assistance and develop of laboratory QA/QC plans.



Groundwater Management Chair : Prof. Torquato Nanni

- Estimate of potential exploitation of groundwater for drinking purpose.
- Design of new groundwater catchment facilities.
- Aquifer vulnerability and risk assessments.
- Aquifer monitoring and protection



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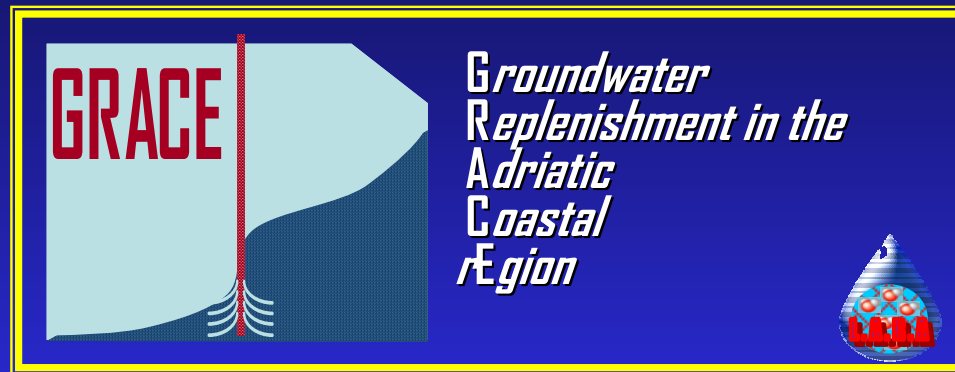
B. OUTLINE: Air

- Air Quality and Helth



IPA ADRIATIC CROSS-BORDER COOPERATION PROGRAMME 2007-2013

PRIORITY 1 – Economic, Social and Institutional Cooperation
Measure 1.1 – Research and Innovation



PARTNERS

- Province of Ferrara
- CIRSA (Integrated Geosciences Research Group – University of Bologna)
- Parco Delta del Po
- CETI (Centre for Ecotoxicological Research of Montenegro)
- Municipality of Cacak, Serbia

OTHERS ARE KINDLY WELCOME



PROJECT IDEA

1. IPCC Assessment Report, 2007
2. The Economics of Climate Change, 2006
3. EA Report on Water Stress, 2006

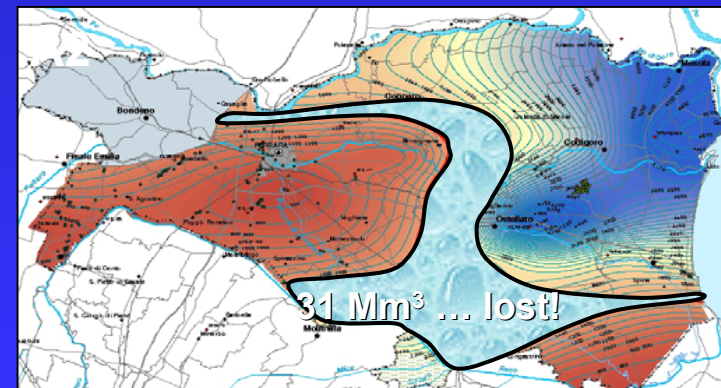
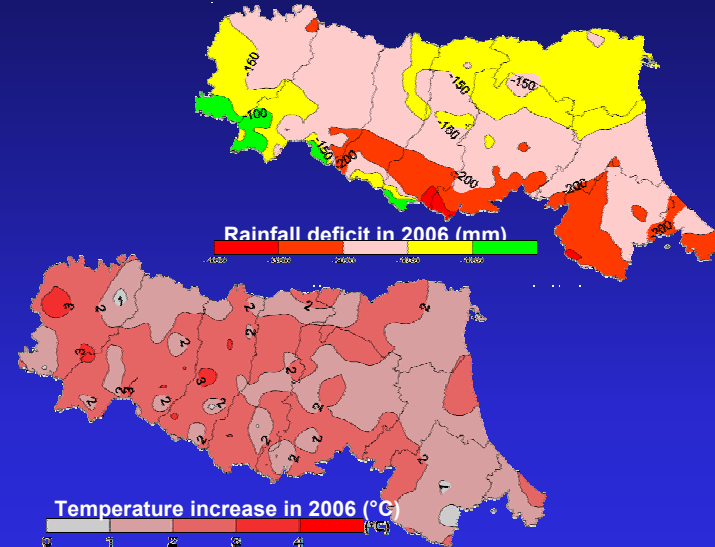
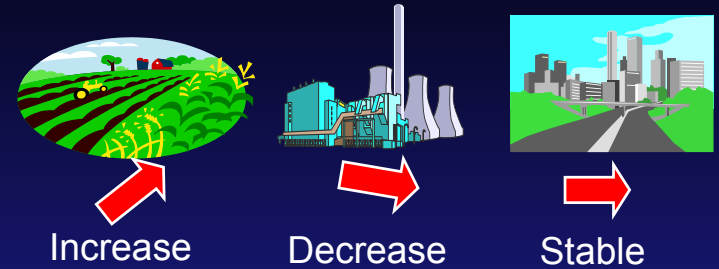
Global water consumption rose sixfold in the last century - *at twice the rate of population growth*

1/3 of the world population lives in countries with moderate to high water stress; by 2025, it'll be 2/3

Climate change will account for 20% of increase in global water scarcity

An aspect that threaten both quantity and quality of water resources is saltwater intrusion in coastal areas

Saltwater intrusion affects mainly industrial and populous area hit by over-abstraction



GENERAL OBJECTIVES

In this picture, the chance of prevention of these phenomena seems compromised and the necessity to mitigate negative effects within “acceptable” limits seems to be the sole solution

The aim of this project is to better coordinate the resources addressing lack of knowledge and overexploitation of water resources. We intend:

- to address the lack of knowledge on the saltwater/freshwater interaction in both surface and aquifers,
- to design medium and long term actions to mitigate problems induced both by environmental change and resources overexploitation,
- to test different procedures to face water demand with saving strategies and also developing alternative ways to use water resources.
- to promote integrated management among regulators and stakeholders keeping in mind that technical-scientific innovation is the tool to administrate in an excellent way our precious water resources.

SKIP

Laboratorio Regionale sulle Acque
U.A.B.A.



EXPECTED RESULTS

Water scarcity, whatever its dimension or origin, has a devastating impact on the socio-economic well being of a country. In this picture, possible fall-down associated to GRACE research project are:

- Technical/scientific sphere: enhancement of understanding concerning processes that govern flow and transport for freshwater/saltwater interaction to better design medium and long term actions to mitigate problems
- Administrative sphere: creation of an integrated GIS database on the “hydrologic system” to which Public Entities can refer in the decisional and operative procedures; definition of technical/normative regulations for MAR applicability as a tool to enhance water resources management and protection in coastal areas.
- Economical sphere: chance to recover alternative and low cost groundwater resources for agricultural and drinking purpose both at local and at large scale.

TARGET GROUPS

- Public Institutions responsible for water resources management
- Private Companies involved in water catchments and mains network management
- All subjects needing water supply for their activities: thermo-electrical plants, industries, agricultural and breeding farms, touristic parks ...

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Cooperation with Hessen, Aragona and Emila Romagna Regions for INTERREG Cooperation Project

- **Water Scarcity & Drought**
- **Cooperation with Prof. M. Ostrowski
Engineering Hydrology & Water Menagement
Darmstadt University of Technology:
Mathematical simulation of water supply and
sewer networks and water systems in general
(Prof. M. Franchini and T.Nanni, L.A.R.A. UNIFE)**



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Qualità dell'aria e Salute nella Pianura Padana

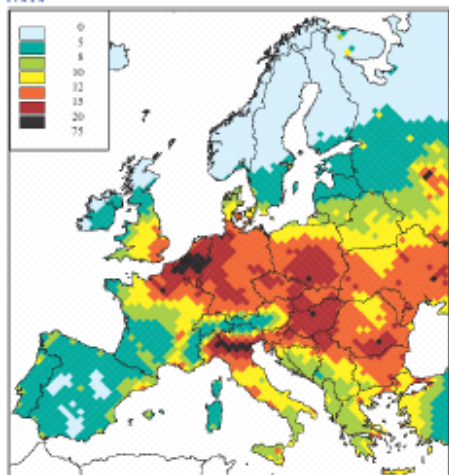
- Contesto
- Base di partenza
- Partners
- Prospetive



Le stime di Polveri Sottili (PM) e proiezioni in termini di perdita di aspettativa di vita del rapporto CAFE

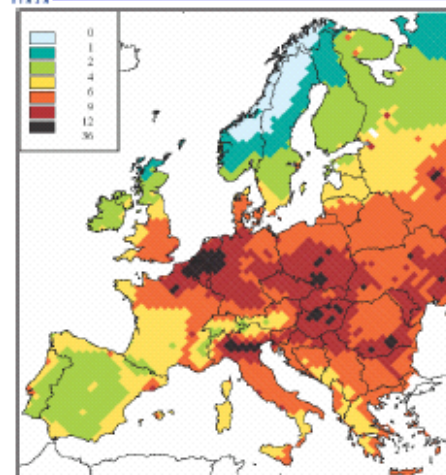
Contributo antropogenico (attività umane alle Polveri sottili)

2000



Results of EMEP Eulerian model
50*50 km average concentrations,
annual mean [$\mu\text{g}/\text{m}^3$]
from known anthropogenic sources excluding sec. org. aerosols
Average of calculations for 1997, 1999, 2000 & 2003 meteorologies

Perdita di aspettativa di vita attribuibile alle polveri sottili (mesi)



Loss of average statistical life expectancy due to identified anthropogenic PM2.5
Average of calculations for 1997, 1999, 2000 & 2003 meteorologies
Provisional calculations with generic assumption on urban increment of PM

**Nella Pianura Padana la perdita di aspettativa
È compresa tra 24 e 36 mesi.**

**La perdita di aspettativa di vita per incidenti stradali
è di circa 18 mesi**

Qualità dell'aria e Salute nella Pianura Padana –

Base di Partenza: Il Progetto “Moniter”

- Progetto “Moniter” : Progetto Integrato di monitoraggio dell’impatto sulla salute degli inceneritori (8) nell’area RR
- Monitoraggio Chimico, Tossicologico ed Epidemiologico
- Ente Promotore Regione ER
- Finanziato per un costo c.a. 3ML Euro (2007-10)
- ARPA ER, Università, CNR
- Cooperazioni Internazionali in sviluppo: Lander Baviera, GSF Monaco, Università di Augsburg



Qualità dell'aria e Salute

Targets

- Necessità di approcci armonizzati ed integrati
- Osservazioni sperimentali su tempi medio-lunghi per:
- Attribuzione dei contributi delle varie sorgenti di emissioni in scenari variati
- Verifica di ipotesi pertinenti sugli effetti sulla salute
- Indicazioni alla Governance per il contenimento degli effetti avversi
- Miglioramento della salute
- Contenimento delle spese sanitarie



Qualità dell'aria e Salute

STARTERS, Partners, *Obiettivi*

- ER, BAVIERA...
- UniFe, uniBo, cnr...
- *Costituzione di un Network in di piattaforme tecnologiche (Supersites) analoghe ed in dialogo*
- *Aree disciplinari: Chimica dell'ambiente; Tossicologia; Epidemiologia, Fisica dell'Atmosfera, Governance*
- *Attivazione di Progetti QA armonizzati*

Call: Giugno 2008





Laboratorio **A Rete** regionale per le **Acque** **LARA**

Università di
Ferrara



Università di Ferrara
– POLO Scientifico e Tecnologico –

Head:

Prof. Remigio Rossi

Scientific Coordination

Prof. Francesco Dondi

Administration:

Dr. Mauro Vitali

Contact:

Dr. Simone Mori

Tel. 0532 291389

email: simone.mori@unife.it

www.laboratoriinrete.unife.it



Advisory Board di L.A.R.A.

WATER-PIPE NETWORK MANAGEMENT :

Prof. Dragan SAVIC
Director, Centre for Water Systems
University of Exeter, UK

Prof. Slobodan P. SIMONOVIC,
Institute for Catastrophic Loss Reduction
University of Western Ontario
London, Ontario, Canada

WATER QUALITY

Prof. Hartmut FRANK
Environmental Chemistry and Ecotoxicology
University of Bayreuth, G

Prof. Reinhard NIESSNER
Institute of Hydrochemistry and Chemical Balneology
Technische Universität München, G

Prof. Wolfgang BUCHBERGER
Johannes Kepler Universität Linz, A

GROUNDWATER MANAGEMENT

Prof. Giovanni Maria ZUPPI
Dipartimento di Scienze Ambientali
Univ. Venezia

Prof. Henning PROMMER
CSIRO Land and Water
Wembley, Australia