

THE UNIVERSITY OF REIMS CHAMPAGNE-ARDENNE

has recognized skills and indispensable know-how in the study and **management of water**. Our technical resources and scientific skills in water management enable us to find solutions for monitoring, preserving and improving the quality of water bodies and for maintaining the balance of ecosystems.

Expertise for water studies and management

Ecotoxicology

- Bioassays carried out in the laboratory or in artificial rivers and natural environments
- Study of the responses of aquatic organisms to biotic and abiotic stresses
- Study of the mechanisms of toxic action of contaminants: oxidative stress, genotoxicity, immunotoxicity and reprotoxicity
- Study of the effects of endocrine disruptors
- Study of the effects of contaminants on the energy metabolism of aquatic organisms

Development of biomonitoring tools and methods

- Study of early responses of interest predictive of the health status of organisms exposed to contaminants
- Use of such responses as biomarkers of environmental quality
- Development of measurement tools for the study of biological responses
- Determination of biomonitoring procedures for aquatic environments
- Establishment of integrated water management strategies in rural areas

Dynamics of organic and inorganic contaminants

- Identification and quantification of organic and inorganic contaminants and of degradates ; detection of pathogens in water (protozoa, viruses, cyanobacteria)
- Behaviour and transfer of pollutants in water, soil, sediments and bio-waste (WWTP sludge, digestate, etc.)
- Speciation of organic pollutants (pesticides, pharmaceuticals) and inorganic pollutants (metallic trace elements)
- Modelling of pollutant transfer processes at interfaces
- Remediation

Characterisation of surface and underground water bodies

- Study of water retention and soil permeability
- Study of the flow of liquid and solid material by runoff and erosion
- Hydraulic and geochemical monitoring of retention basins in order to optimise them
- Study of karstic flows
- Groundwater-river relationships during low-water periods
- Inventory of hydraulic systems in watercourses
- Study of the piezometry, flow and quality of groundwater bodies
- Study of the transfer of contaminants to and within water bodies

4 MAIN RESEARCH AREAS

- Ecotoxicological studies
- Development of biomonitoring tools and methods
- Dynamics of organic and inorganic contaminants
- Quantitative and qualitative characterisation of surface and groundwater bodies

KEY FIGURES



75 Researchers and teacher-researchers



3 patents

+ than 50 industrial collaborations



5 European projects obtained in the past 5 years

3 laboratories *



For applications in



Regulation



Health



Environment



Monitoring and diagnosis



Viticulture



Geography



Pollution control

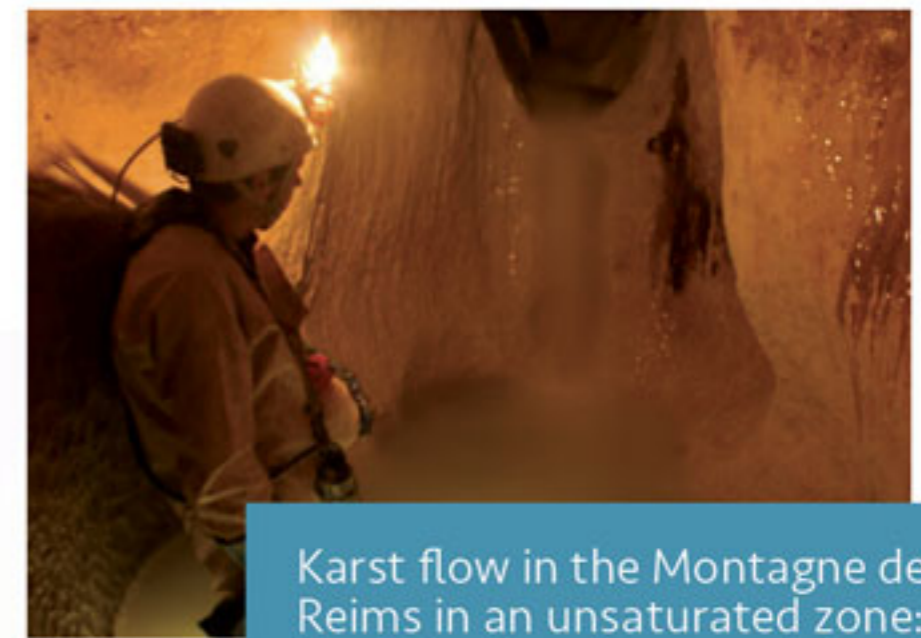


Agriculture

* UMR-I-02 URCA/INERIS Stress Environnementaux et BIOSurveillance des milieux aquatiques (SEBIO)
EA3795 Groupe d'Etude sur les Géomatériaux et Environnements Naturels Anthropiques et Archéologiques (GEGENAA)
UMR 7312 URCA/CNRS Institut de Chimie Moléculaire de Reims (ICMR)

Biomonitoring of the freshwater - seawater continuum using model organisms.

1. Zebra mussels, 2. Gammarids,
3. Sticklebacks, 4. Copepods,
5. Shrimps, 6. Blue Mussels, 7. Sea bass



Karst flow in the Montagne de Reims in an unsaturated zone: the Trépail underground river in the Champagne chalk

State-of-the-art equipment at the service of our researchers and industry network



Ecotoxicologie- Biosurveillance

- Cytometry (MOBICYTE technical platform)
- Histology platform
- UPLC Q-TOF; Qtrap
- q-PCR, Nanodrop, Droplet Digital-PCR
- Systems for breeding and exposure of animal organisms under controlled conditions
- Lotic mesocosm platform (12 20-metre channels)
- Multiparameter physico-chemical analysis probes



Contaminant dynamics

- Instrumented soil incubators
- Micro X-ray fluorescence
- Analysis of metallic trace elements (MTEs) and nanoparticles (ICP-OES, ICP-QQQ)
- Analysis of organic contaminants (HPLC, GC-MS, LC-MS / MS)
- Controlled temperature and relative humidity chambers



Water bodies

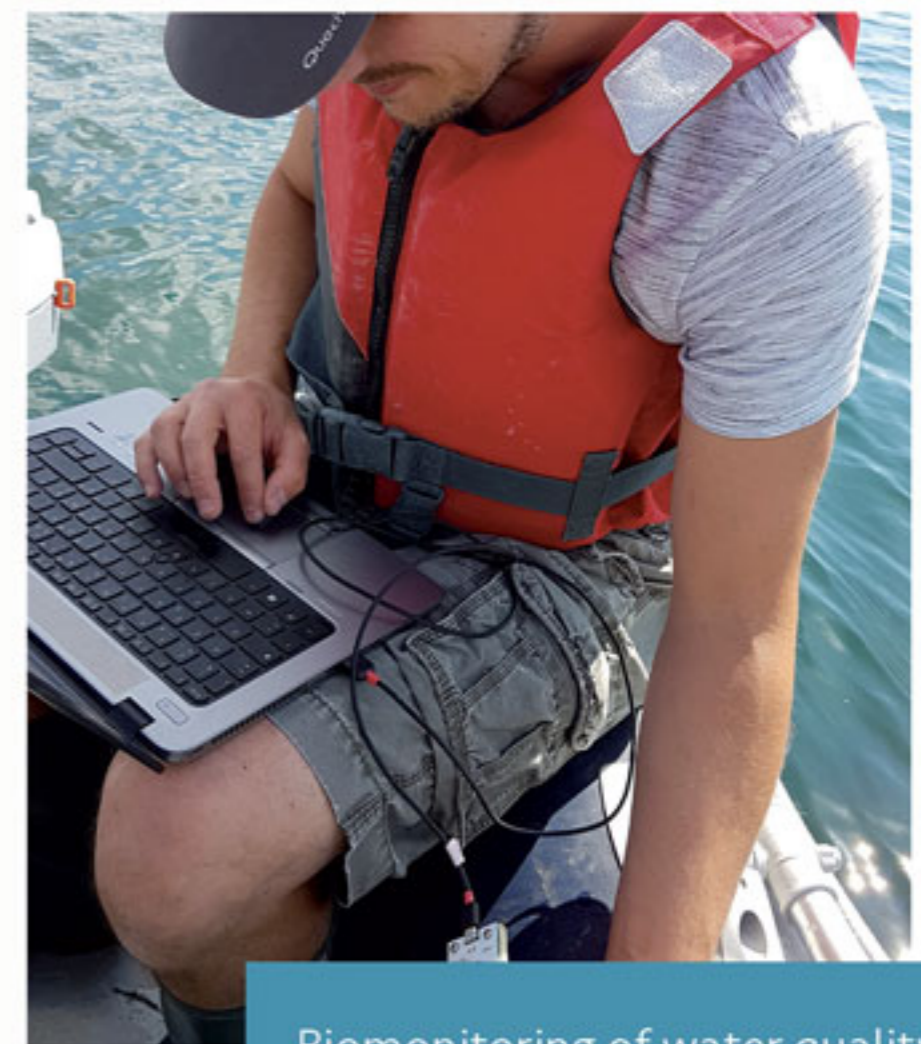
- Membrane pressure apparatus
- Infiltrimeters
- Rainfall simulator
- PIREE stream gauging rod
- Current meters
- Automatic samplers
- Multi-parameter probes
- Manual and automatic piezometric probes
- Equipment for borehole sampling
- Hydrodynamic modelling software

Some publications

- Barjhoux, I. *et al.* Application of a multidisciplinary and integrative weight-of-evidence approach to a 1-year monitoring survey of the Seine River. *Environmental Science and Pollution Research* 25, 23404–23429 (2018).
- Cao, F. *et al.* Heterogeneous behaviour of unconfined Chalk aquifers infer from combination of groundwater residence time, hydrochemistry and hydrodynamic tools. *Journal of Hydrology* 581, 124433 (2020).
- Sayen, S., Ortenbach-López, M. & Guillon, E. Sorptive removal of enrofloxacin antibiotic from aqueous solution using a ligno-cellulosic substrate from wheat bran. *Journal of Environmental Chemical Engineering* 6, 5820–5829 (2018).

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Biomonitoring of water quality

Quality training courses

Initial training

Are you looking for future collaborators? Do you wish to complete your studies? A wide range of quality training courses provided at URCA focus on water management.

To find out more: www.univ-reims.fr

Formation professionnelle

Does your structure / company wish to support its employees by training them in water management?

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To find out more: dfpa@univ-reims.fr

