

SCIENTIFIC REPORT  
2021-2022

idæa

EXCELENCIA  
SEVERO  
OCHOA

INSTITUT DE DIAGNOSI AMBIENTAL I ESTUDIS DE L'AIGUA



CSIC

CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

|     |   |                                     |     |   |                                          |
|-----|---|-------------------------------------|-----|---|------------------------------------------|
| 4   | ● | <b>From the Director</b>            | 191 | ● | <b>Research training</b>                 |
| 6   | ● | <b>The Institute</b>                | 192 |   | Doctoral Theses                          |
| 8   |   | Welcome                             | 194 |   | Master Theses                            |
| 8   |   | Location                            | 196 |   | Final Degree Projects                    |
| 9   |   | Organisation                        | 197 | ● | <b>Teaching activities</b>               |
| 10  | ● | <b>Who are we?</b>                  | 201 | ● | <b>Communication and dissemination</b>   |
| 14  | ● | <b>Research Groups</b>              | 201 |   | Dissemination activities                 |
| 15  |   | Environmental Chemistry Department  | 205 |   | Media appearances                        |
| 46  |   | Geosciences Department              | 206 |   | Social media channels                    |
| 63  | ● | <b>Research Supporting Services</b> | 206 |   | Website and newsletter                   |
| 81  | ● | <b>Supporting Departments</b>       | 207 | ● | <b>Innovation and Knowledge Transfer</b> |
| 83  | ● | <b>Research Highlights</b>          | 207 |   | Scientific Impact                        |
| 103 | ● | <b>Severo Ochoa</b>                 | 209 |   | Economic Impact                          |
| 115 | ● | <b>IDÆA in numbers</b>              | 212 |   | Societal Impacts                         |
| 123 | ● | <b>Scientific Results</b>           | 215 | ● | <b>Organisation of Conferences</b>       |
| 124 |   | SCI publications                    | 217 | ● | <b>Awards</b>                            |
| 188 |   | Other publications                  | 219 | ● | <b>Support Services</b>                  |
| 189 |   | Edited Books                        |     |   |                                          |
| 189 |   | Book chapters                       |     |   |                                          |

Cover: Adaptation from the mural painted by the artists Twee Muizen (Cristina Barrientos and Denís Galocha) at IDÆA’s building in the framework of the outreach project BCN Art-Ambient (21 S01378 -006), funded by the Barcelona City Council (Premis Barcelona 2020); 2021.  
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Director of IDÆA

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### It's not easy being green

We live in challenging times: the 21<sup>st</sup> century Anthropocene. The human population has exceeded 8 billion, is currently growing by more than 200,000 people per day, and we impact on all ecosystems on planet Earth. *The Lancet* Commission on pollution and health has recently (2022) concluded that *pollution remains responsible for approximately 9 million deaths per year, corresponding to one in six deaths worldwide*, with the main culprits being air pollution and toxic chemical contamination. By now, after decades of widespread denial, it is increasingly difficult even for the most sceptical to ignore the accelerating effects of anthropogenic climate change and global pollution.

IDÆA stands squarely in the forefront of these two great issues of our time. Many of the key challenges resulting from this unprecedented environmental stress centre on sub-disciplines that lie at the heart of scientific research in our Institute, which collectively calls attention to the global-scale ecosystem damage being done. With our expertise on air and water our goal is to emphasise not only the immediate key threats concerning water security and cleanliness and the commonly poor quality of the air we breathe, but also expand our vision to embrace the human-driven biogeochemical changes currently underway everywhere in the biosphere.

So, in the middle of this environmental maelstrom, how have we been doing as a research institute? I have never seen IDÆA working so hard. As Kermit the Frog sang in *The Muppets*: "It's not easy being green". Over the last two years, boosted by our newly-won status as a Severo Ochoa Centre of Excellence, we have not just been participating in but leading many major international projects, and publishing more and better papers in top journals. We have positioned ourselves directly to influence environmental policies of intergovernmental organisations such as WHO, IPCC, and EU Environment. Our staff include not only top-cited scientists in atmospheric science and water chemistry, but also a force of bright young highly motivated researchers newly attracted to the Institute by our vision to put hard science to work for a greener future. We have never been so active in social media and public outreach. Our laboratories have never been better supplied with state-of-the-art equipment, run by equally state-of-the-art science technicians. Our administrative and computing staff have responded magnificently to the pressure of Severo Ochoa expansion, especially under the learning curve stress of a newly imposed information system. Although it is sometimes difficult for all of us to rise above the day-to-day frustrations of work pressure, we should remind ourselves that everyone in the Institute is contributing to a vision of IDÆA as an avant-garde global driver in environmental science research excellence, working to depollute our contaminated biosphere.

Looking across Europe, IDÆA stands out as unusual, with its combination of atmospheric and aquatic biogeochemical skills backed up by an exceptionally strong support capability in top quality in-house analytical laboratories and experienced CID administration. Since the publication of our last biennial report, continued emphasis on synergistic co-operation between IDÆA staff is leading us to new frontiers as we merge what began as separate research groups into an integrated, futuristic reorganisation designed to launch our bid for renewed Severo Ochoa status this year. This "New IDÆA" will be structured along three interconnected research areas: **anthropogenic environmental stressors**, **human pollutant exposure**, and **environmental circular economy solutions**. These will be secured by horizontal support from our exceptional **analytical chemistry** equipment base, our burgeoning **environmental toxicology** expertise, and our award-winning **chemometrics and modelling** capabilities.

Our future focus will therefore be based upon a tripartite "challenges-impacts-solutions" structure operating within overlapping spheres of research activity supported by the best of lab-based equipment, mathematical and administrative skills. Fostering excellence and success within this advanced synergistic research organisation will be the next step in the development of IDÆA as a world leader in the scientific search for sustainable, economically efficient and socially equitable solutions to our most pressing environmental problems. More than ever, I believe that human society needs scientific environmental institutes like IDÆA, and for the sake of future generations we must step up to the challenge.

"We care for the **water** we drink  
and the **air** we breathe"





## 2.1 Welcome

IDÆA is an environmental science institute devoted to the study of the footprint of the chemical changes our species is imposing on the biosphere. Much of the research work at this institute is centred on two of the great environmental challenges of our time, namely the cleanliness and availability of the WATER we drink and the quality of the AIR we breathe, guided by the principle that our scientific understanding of current threats to global ecosystems is best approached from a holistic, systems-based viewpoint.

Founded in 2008, IDÆA was envisaged as a new multidisciplinary research institute bringing together a wide range of expertise in environmental science and organized under two broad Departments (Environmental Chemistry and Geosciences). The institute has demonstrated particular strengths in the analysis of organic pollutants and their impact on ecosystems, the study and management of water resources, the development of multivariate resolution algorithms in chemometrics, and in the study of inhalable particulate matter and toxic gases.

The international research profile of the various research groups working at IDÆA is firmly grounded upon a solid analytical base operating within the institute building which houses large environmental geochemistry laboratories focused on analysing atmospheric and aqueous pollutants. The Institute is also responsible for prestigious, state-of-the-art air monitoring “supersites” integrated into international networks and have enabled the institute to achieve research dominance in the field of source apportionment and transboundary migration of atmospheric pollutants.

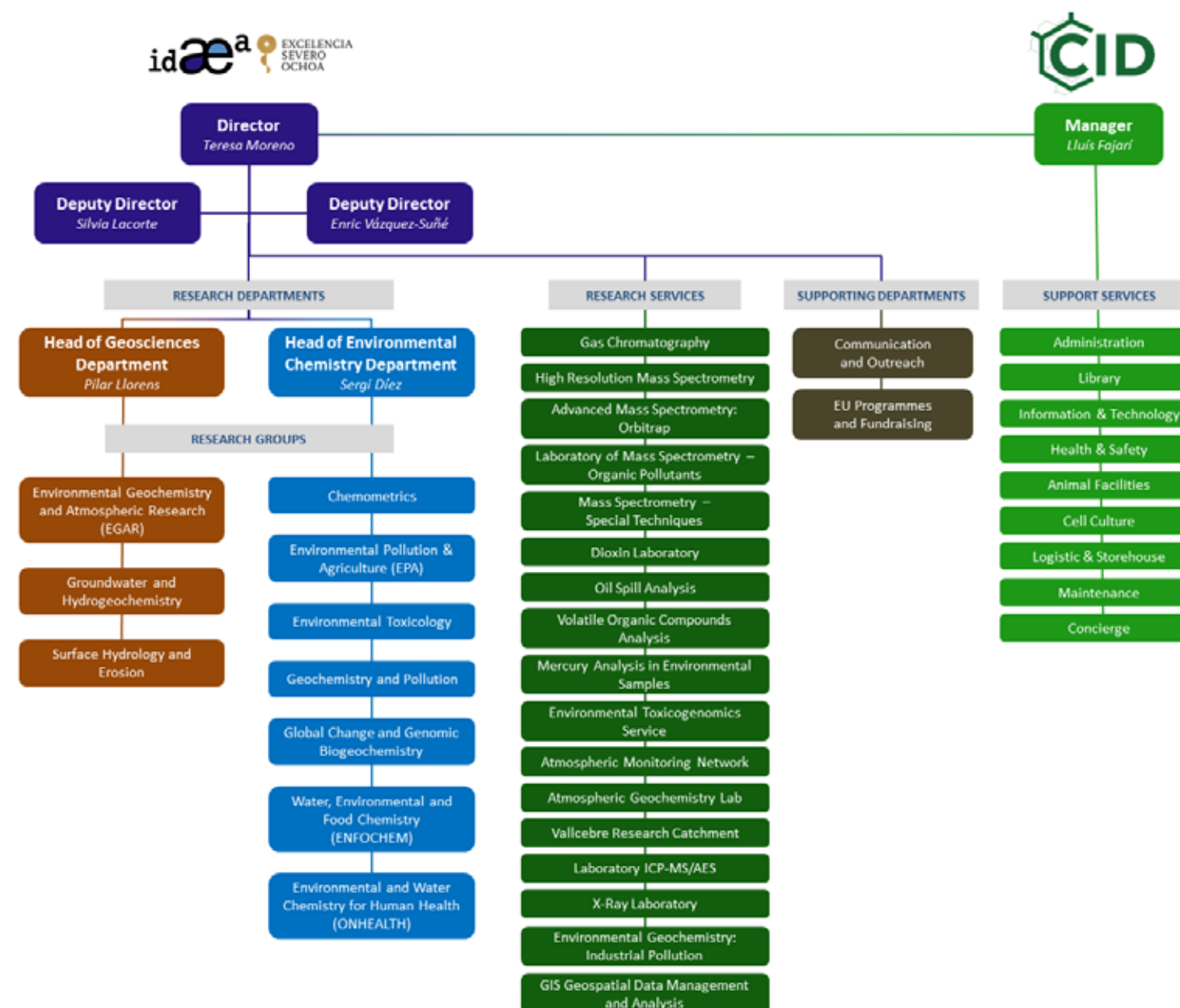
Since December 2019 IDÆA is a “Centre of Excellence Severo Ochoa”, an award given within the subprogram of Institutional Strengthening of the State Plan for Scientific and Technical Research and Innovation, to fund and accredit public research centres that demonstrate scientific leadership and impact at global level, as well as active collaboration in their social and business environment.

## 2.2 Location

IDÆA is located at the University Campus of Pedralbes  
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## 2.3 Organisation





IDÆA is proud of being a multidisciplinary research institute bringing together a wide range of expertise in environmental science and organized under two broad Departments: Environmental Chemistry and Geosciences.

### Environmental Chemistry Department

The **Environmental Chemistry Department** focusses on the assessment of origin, transport and evolution of natural and anthropogenic organic inputs to the environment, including the atmosphere, the water column, soils, sediments and organisms. The groups operating within the department have a world-class reputation for their research strength in the analysis, occurrence, fate and behaviour of organic pollutants, the development of chemometric methods of data analysis, the bioavailability and toxicity of emerging contaminants, and the interactions between organic pollutants and major biogeochemical cycles. Multiple methodologies have been developed for the analysis of polar and non-polar, volatile and non-volatile chemical compounds, based on different techniques such as gas and liquid chromatography, capillary electrophoresis and mass spectrometry. Other relevant topics involve the study of fossil molecular compounds as traces of climate change in the past and the toxicity of organic pollutants in organisms such as fish, shellfish and human beings.

### Geosciences Department

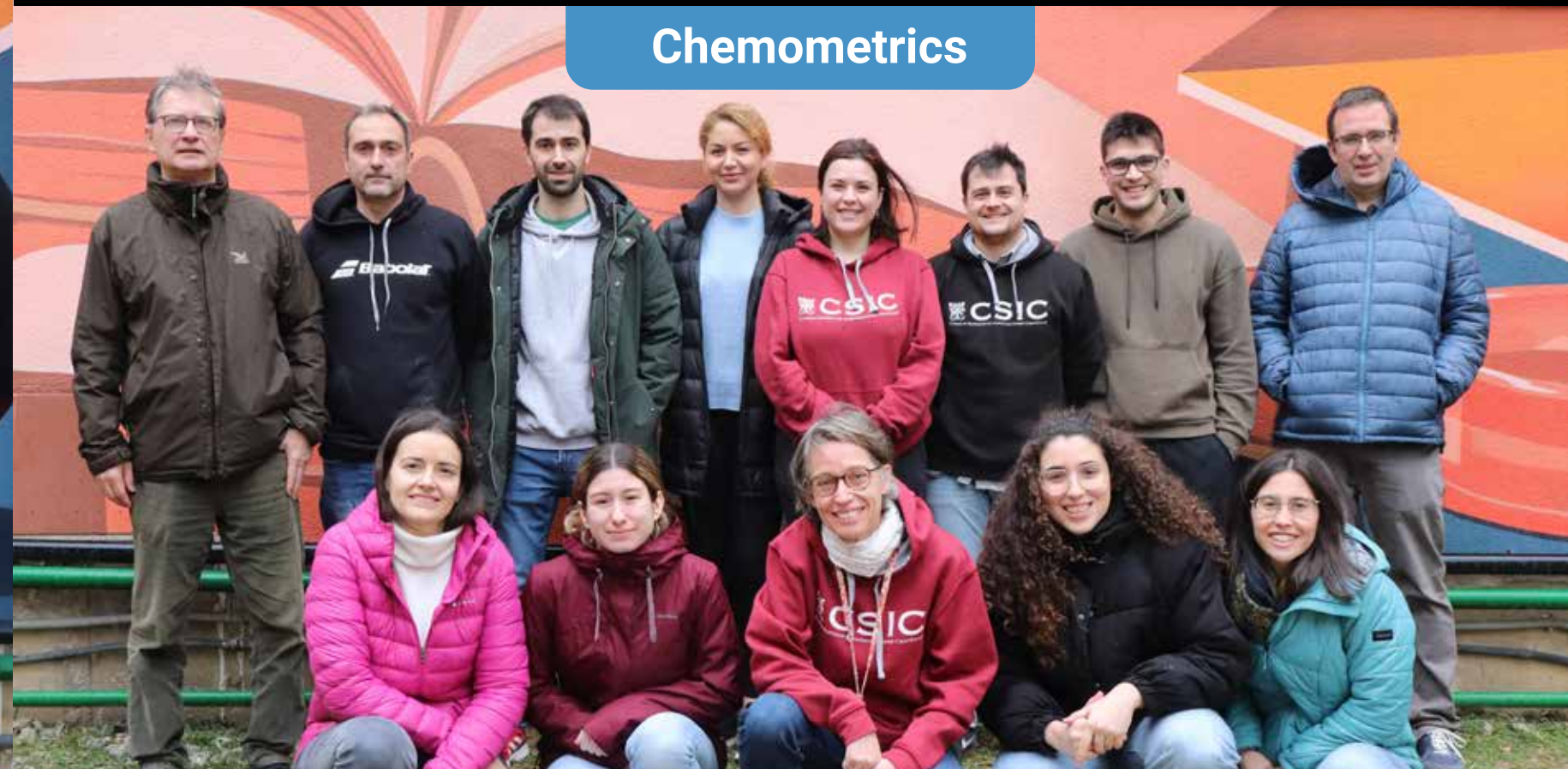
The **Geosciences Department** research interests focus on environmental issues related to air and water. Our atmospheric work includes study of the sources, transport and evolution of natural and anthropogenic inorganic compounds within the environment with a direct link to important global environmental issues such as urban air quality, the abatement of industrial emissions, the transboundary movement of regional aerosol plumes, and the interaction of aerosols and climate. Our hydrogeological expertise embraces the exploration of groundwater resources and pollutants, urban aquifer management, marine intrusion in coastal aquifers, and development of numerical models to assess suitable hydrogeological conditions for safe long-term waste storage and subsurface energy exploitation. Many aspects of our research involve applications in civil and mining engineering, and are again directly relevant to key environmental challenges facing modern society. Our surface hydrology approaches are multidisciplinary and include study of the role of vegetation on the hydrological cycle, rainfall-runoff dynamics, runoff generation processes and erosion and sediment transport processes.





## Environmental Chemistry Department

## Chemometrics



## Group

🐦 @ch4eor



## Permanent Research Staff

Jaumot Soler, Joaquim  
Lacorte Bruguera, Silvia  
Tauler Ferré, Romà (Group leader)

## Postdoctoral Research Staff

Bedia Gírbés, Carmen  
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Zuri, Giuseppina

## Chemometrics



The Chemometrics group develops and applies analytical methodologies and data analysis methods to various research fields, including environmental, analytical, and omics. The main goal of the Chemometrics group is to provide tools for interpreting multidisciplinary analytical data and solving environmental and omics problems.

The key research lines of the group include i) developing chemometric approaches for diverse high-throughput analytical platforms; ii) evaluating the effects of chemical pollutants and global change stressors on environmentally relevant organisms using New Approach Methodologies (NAMs) such as metabolomic;,, iii) analyzing environmental data (i.e. monitoring studies on air, surface waters, wildlife, sediments and soils) to identify, resolve, and assess the impact and risk of pollution sources; and iv) developing of monitoring and biomonitoring tools including ceramic passive samplers for integrated water monitoring.

## Projects



- Estrategias ómicas no dirigidas para la evaluación de sistemas ambientales multiestresados; CTQ2017-82598-P; Ministerio de Economía y Competitividad, Proyectos I+D - subpr. estatal de gener. de conocimiento - prog. est. fom. de la investigación científica y téc. de excelencia - PEICTI 2013-2016; J. Jaumot; 01/01/2018 - 30/09/2021; 64.130 €
- Quimiometría: desarrollo de métodos y aplicación a problemas multidisciplinarios analíticos (MULTICHEMO); 2017SGR753; Ayudas para apoyar a los grupos de investigación (SGR), Generalitat Catalunya; R. Tauler; 01/01/2018 - 30/09/2021; 44.480 €
- Gestió integral de la qualitat i quantitat de les aigües en processos d abastiment i distribució (IMAQUA); COMRD116-1-0063; Generalitat Catalunya, Acreditacion de comunidades RIS3CAT y en el programa operativo FEDER de Catalunya 2014-2020; S. Lacorte; 01/01/2018 - 20/03/2021; 79.242 €
- Metodologías analíticas y quimiométricas aplicadas a química ambiental; PID2019-105732GB-C21; Ministerio de Ciencia, Innovación y Univ, Proyecto I+D - Subpr. Estatal de gener. de conocimiento- Programa Estatal de generacion de conocimiento y fortalecimiento cient. y téc.del sistema I+D+i - PEICTI 2017-2020; R. Tauler; 01/06/2020 - 31/05/2023; 108.900 €
- Ayudas extraordinarias para la preparación de proyectos 2020. Esta ayuda está relacionada con el proyecto CTQ2017-82598-P; 2020AEP131; Consejo Superior de Investigaciones Científicas, CVCSIC-AEPP-Ayudas Extraordinarias Preparacion Proyectos 2020; J. Jaumot; 01/01/2021 - 31/12/2021; 4.607 €

- Integración de metodologías analíticas y quimiométricas para determinar contaminantes en aguas y su degradacion pirolítica; TED2021-131552B-C21; Ministerio de Ciencia e Innovación, Proyecto I+D TED- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; S. Lacorte; 1/12/2022 - 30/11/2024; 155.250 €

## Contracts

- Desarrollo y validación de modelos quimiométricos para el tratamiento de datos registrados en el análisis de aguas procedentes de 3 orígenes distintos: Llobregat- Planta Abrera, Ter - Planta Cardedeu y El Prat - Desaladora ITAM. (Proyecto DOMA); R. Tauler; 19/5/2020 - 31/1/2021; 10.285 €
- Determination of organochlorine compounds in muscle and liver of captured fish species during the summer and autumn seasons of 2021/2022 at the balma lake rouen lake. Project "Alpa II - Alpinelakes: Indicators of Global Change, Part II; R. Tauler; 1/2/2022 - 31/12/2022; 8.000 €
- Measurements and reporting on certified reference material ERM-CE100 (HCB AND HCBd in fish tissue); S. Lacorte; 31/8/2022 - 30/9/2022; 9.000 €



## Environmental Pollution and Agriculture (EPA)



### Environmental Pollution and Agriculture (EPA)

The Environmental Pollution and Agriculture group is focused on the natural processes affecting the fate of contaminants in the environment to find nature-based approaches to mitigate chemical pollution and the associated impact of human activity on the ecosystems. The research lines range from environmental chemistry to environmental forensics to identify the pollution sources and the key processes affecting their fate in the environment, including sustainable wastewater treatment systems, biogeochemistry of Mercury in ecosystems and fate of contaminants in agroecosystems. Non-target screening and metabolomic methods are developed to get further insight into the contaminant degradation pathways and their impacts into the downstream environment.

### Projects

- Dinámica de la acumulación de antibióticos, metales y genes de resistencia bacteriana en cultivos agrícolas por fertilización orgánica. Implicaciones en la producción vegetal (DAMA); AGL2017-89518-R; Ministerio de Economía y Competitividad, Proyecto I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2013-2016; JM. Bayona; 01/01/2018 - 30/09/2021; 163.350 €
- Explorando la química de la simbiosis en la atenuación de contaminantes emergentes. Avances en el tratamiento biológico de aguas residuales; CTM2017-91355-EXP; Ministerio de Economía y Competitividad, Proyecto EXPLORA - Subpr. estatal de gener. de conocimiento - prog. est. fom. de la investigación científica y téc. de excelencia - PEICTY 2013-2016; V. Matamoros; 01/11/2018 - 30/09/2021; 60.500 €
- Reducción del uso de mercurio en comunidades dedicadas a la minería artesanal y en pequeña escala en Colombia; COOPB20362; Consejo Superior de Investigaciones Científicas, ICOOPA2018; Díez Salvador, Sergi; 1/4/2019 - 31/12/2021; 28.938,00 €
- Improvement and disclosure of efficient techniques for manure management towards a circular and sustainable agriculture (AGRICLOSE); ENV/ES/000439; European Commission, LIFE 2017 ENV; JM. Bayona; 01/07/2018 - 30/06/2022; 283.792 €.
- Estrategias para la valorización de la estrella de mar-ACUISTAR; Cluster de Agricultura de Galicia, Programa PLEAMAR 2019 de la Fund. Biodiversidad para el Minist. Tran. Ecológica; S. Díez; 09/10/2019 - 09/10/2021; 27.485 €
- Optimización y evaluación de una planta piloto de osmosis directa combinada con nanofiltración para riego agrícola. Aplicación de membranas biomiméticas.; 202080E268; Consejo Superior de Investigaciones Científicas, Proyectos Intramurales CSIC(2009); JM Bayona; 01/12/2020 - 30/11/2023; 59.512 €



### Group

@epa\_csic



### Permanent Research Staff

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### Technical Staff

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Rodríguez Espelta, Yolanda



- Ayudas extraordinarias para la preparación de proyectos 2020. Esta ayuda está relacionada con el proyecto AGL2017-89518-R; 2020AEP137; Consejo Superior de Investigaciones Científicas, JM. Bayona; 01/01/2021 - 31/12/2021; 37.112 €
- Nature-based solutions to reduce antibiotics, pathogens and antimicrobial resistance in aquatic ecosystems; PCI2021-121969; Ministerio de Ciencia, Innovación y Univ, Programación Conjunta Internacional; V. Matamoros; 1/9/2021 - 31/8/2024; 199.562 €
- Soluciones basadas en la naturaleza como una nueva manera de gestion del rechazo procedente del tratamiento con membranas de aguas residuales y subterráneas; TED2021-132869B-I00; Ministerio de Ciencia e Innovación, Proyecto I+D TED- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; V. Matamoros; 1/1/2022 - 31/12/2023; 110.400 €
- Evaluación de la contaminación por mercurio en comunidades dedicadas a la minería artesanal de oro en Colombia; COOPA20490; Consejo Superior de Investigaciones Científicas, Programa CSIC de Cooperación Científico para el Desarrollo I-COOP 2021; S. Díez; 01/01/2022 - 31/12/2023; 23.233 €
- Decision support-based approach for sustainable water reuse application in agricultural production; OPE01824 – 1822; European Commission, PRIMA Foundation; JM. Bayona; 01/07/2019 – 31/05/2022; 200.000 €
- Green solutions for treating groundwater pollution to meet drinking water directive standards (LIFE-SPOT); ENV/ES/000199; European Commission, LIFE 2018 ENV; V. Matamoros; 01/07/2019 – 30/06/2023; 214.898 €
- Eco-efficient system for waste water tertiary treatment and water reuses in Mediterranean region (BIODAPH20); 101074191; European Commission, LIFE-2021-SAP-ENV-ENVIRONMENT; V. Matamoros; 01/08/2022 – 31/01/2026; 177.552 €
- Flipping the current paradigm towards a comprehensive understanding of human exposure to organic chemicals; 20213AT019; Consejo Superior de Investigaciones Científicas, Ayudas atracción de talento Ramón Cajal 2019; P. Gago; 01/10/2021 - 30/09/2024; 150.000 €

### Contracts

- Análisis de muestras de posibles contaminaciones en el medio marino EM20-624; JM. Bayona; 15/4/2020 - 14/4/2022; 193.600 €
- Anàlisis 33 mostres fracció sòlida. Avaluar la variació temporal de la carrega d'antibiòtics i gens de resistència durant el compostatge a escala real; JM. Bayona; 17/9/2021 - 16/10/2021; 4.991 €
- Determinación de hopanos y esteranos en muestras de sedimentos marinos; JM. Bayona; 20/10/2021 - 19/12/2021; 15.790 €
- Identificación y seguimiento de microcontaminantes en efluentes de lavandería; V. Matamoros; 1/12/2021 - 30/11/2022; 15.730 €
- Identificación de contaminantes emergentes en muestras de agua residual.; V. Matamoros; 8/4/2022 - 7/10/2022; 30.250 €
- Analítiques de seguiment d'antibiòtics i gens de resistència en mostres d'aigua, sols i purins; V. Matamoros; 13/6/2022 - 9/12/2022; 11.253 €



## Environmental Toxicology



### Group

#### Permanent Research Staff

Barata Martí, Carlos  
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Porte Visa, Cinta (Group leader)  
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#### PhD Student

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Martínez López, Rubén Francisco  
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Moro Cano, Hugo  
Menéndez Pedriza, Albert

#### Technical Staff

Casado Belloso, Marta  
Pérez Albaladejo, Elisabet  
Pujol Badell, Sergi  
Gual Gimeno, Marta

### Environmental Toxicology

The Environmental Toxicology group studies and assesses the bioavailability and toxicity of existing and emerging contaminants and their mixtures. To this end, the group applies an array of lab toxicity tests (i.e. transgenic yeast, cell lines, zebrafish embryos and *Daphnia magna* models), and field assays conducted with feral fish and invertebrates from both marine and freshwater environments. Effects are assessed across different biological levels using epigenomics, transcriptomic, lipidomics, metabolomics, morphogenetic and specific cell response, including effects on whole organism and population. Some of the key achievements of the group involve the use of biomarkers and sentinel species to biomonitor contamination in marine and freshwater systems, the first evidence of endocrine disruption in fish (estrogenic effects in fish) and aquatic invertebrates, the application of -omic technologies to monitor effects and mode of action (MoA) on model species, the use of video-tracking technologies to assess neurobehavioral changes in model species, the determination of the 'obesogenic' effect of contaminants in fish, fish cell lines and invertebrates and the development of animal-free bioassays for endocrine disruption and related toxic effects for both human (placenta, lung) and fish (liver) cell models.

### Projects

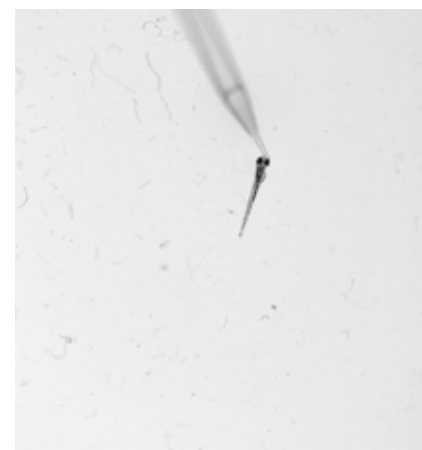
- Toxicologia Ambiental; 2017 SGR 00902; Generalitat de Catalunya, GCT - Ayudas para apoyar a los grupos de investigación (SGR) que desarrollen investigación en Catalunya en las diferentes áreas científicas.; B. Piña; 01/01/2018 - 30/09/2021; 20.000 €
- Evaluación del riesgo biológico asociado a usos agrícolas de aguas residuales y biosólidos procedentes de depuradoras; RTI2018-096175-B-I00; Ministerio de Ciencia, Innovación y Univ, Proyecto I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; B. Piña; 01/01/2019 - 30/9/2022; 242.000 €
- Combined effect of microplastics and chemical and organic pollutants on skeletal deformities in a marine teleost fish, *Aphanius fasciatus*.; COOPB20368; Consejo Superior de Investigaciones Científicas, ICOOPA2018; B. Piña; 1/4/2019 - 31/12/2021; 29.000 €
- Preparación de propuesta para el ERC Consolidator Grant 2021: Caracterización de las interacciones existentes entre tóxicos, epigenomas microbiomas y el sistema endocrino; EIN2019-102993; Ministerio de Ciencia, Innovación y Univ, Acciones de dinamización Europa investigación - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; L. Navarro; 01/06/2019 - 31/5/2022; 10.000 €
- Ayudas extraordinarias para la preparación de proyectos 2020. Esta ayuda está relacionada con el proyecto CTM2017-83242-R.; 2020AEP132; Consejo Superior de Investigaciones Científicas; D. Raldúa; 01/01/2021 - 31/08/2021; 16.430 €
- Análisis multi-ómico con resolución unicelular para estudios medioambientales (environmental single-cell multi-omics); EQC2021-007069-P; Ministerio de Ciencia e Innovación, PE-Adquisición





de Equipamiento Científico-Subprograma Estatal de Infraestructuras de Investigación y Equipamiento Científico-Técnico- PEGCFCT- SISTEMA I+D+i - Plan est. 2017-2020; B. Piña; 01/06/2021 - 31/12/2023; 1.376.162 €

- New generation of drugs protecting against neurotoxic industrial chemicals; SPS G5852; NATO Science for Peace and Security (SPS) Programme - Special Call for Proposals on Security-Related Advanced Technologies 2019; D. Raldúa; 3/6/2021 - 30/6/2024; 109.200 €
- Desarrollo y aplicación de ensayos de comportamiento y respuestas ómicas para la identificación de nuevos efectos cognitivos adversos en compuestos neuro-activos en el agua; PID2020-113371RB-C21; Ministerio de Ciencia e Innovación, Proyecto I+D+i - Programa Estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; C. Barata; 01/09/2021 - 31/08/2024; 193.600 €
- Prototipos de Sistemas Integrados para la Investigación de la Conducta de Organismos Acuáticos; PDC2021-120754-I00; Ministerio de Ciencia e Innovación, Proyectos de I+D+i de «Pruebas de Concepto», Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020.; D. Raldúa; 01/12/2021 - 30/11/2023; 115.000 €
- Ayudas extraordinarias para la preparación de proyectos 2021. Esta ayuda está relacionada con el proyecto PGC2018-097513-B-I00; 2021AEP038; Consejo Superior de Investigaciones Científicas; C. Porte; 01/01/2022 - 31/08/2022; 28.234 €
- Ayudas extraordinarias para la preparación de proyectos 2021. Esta ayuda está relacionada con el proyecto RTI2018-096175-B-I00; 2021AEP043; Consejo Superior de Investigaciones Científicas; B. Piña; 01/01/2022 - 31/08/2022; 43.000 €
- Internacional National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3R) (FISH-ON-CHIP); C. Barata; 1/1/2022 - 31/5/2022; 100.000 €
- Multiómica espacial y unicelular: un enfoque integrador para el estudio del impacto de los disruptores endocrinos en las células germinales de peces durante la pubertad; PID2021-122929OB-C33; Ministerio de Ciencia e Innovación, Proyecto I+D PID- subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; L. Navarro; 01/09/2022 - 31/08/2025; 181.984 €
- Nuevas metodologías para la evaluación de la toxicidad de plásticos biodegradables y aditivos plásticos; PID2021-122592NB-I00; Ministerio de Ciencia e Innovación, Proyecto I+D PID- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; C. Porte; 01/09/2022 - 31/08/2025; 169.400 €

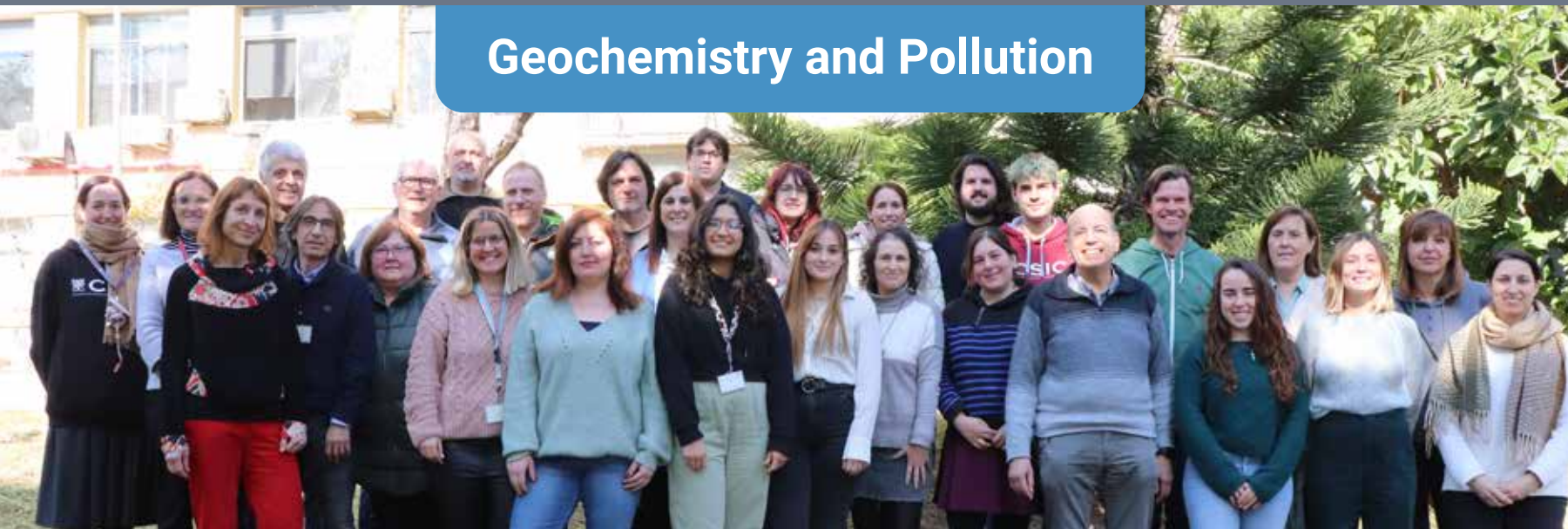


- High throughput toxicological methodologies for the identification of harmful environmental effects of real hazardous contaminant mixtures in water; TED2021-130845B-C31; Ministerio de Ciencia e Innovación, Proyecto I+D TED- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; C. Barata; 1/12/2022 - 30/11/2024; 161.000 €
- Investigando la interacción contaminantes-lipidoma en modelos acuáticos; PGC2018-097513-B-I00; Ministerio de Ciencia, Innovación y Universidades, Programa Estatal de generación de conocimiento y fortalecimiento científico y técnico del sistema I+D+I - PEICTI 2017-2020; C. Porte; 01/01/2019 - 31/12/2021; 120.000 €
- EPIgenetic Signatures as biomarkers of ecoTOXicological effects (EPISTOX); 797725 (H2020-MSCA-IF-EF-RI/0414); European Commission; MSCA-IF-EF; B. Piña; 01/02/2019 - 10/05/2021; 170.122 €
- Environmental Exposure Assessment Research Infrastructure Preparatory Phase Project (EPI-BOOST); 101078991; European Commission, WIDERA-HE; L. Navarro; 01/10/2022 - 30/09/2025; 505.140 €

### Contracts

- Cellular responses to contaminant exposure in marine mammals from the Arctic; C. Porte; 26/10/2020 - 31/12/2021; 10.000 €
- Evaluación de la toxicidad potencial del agua de los canales de drenaje del Delta del Ebro en las Náyades. Bases científicas para la mejora de su gestión ambiental; C. Barata; 22/9/2021 - 21/5/2023; 13.988 €
- Analysis of phthalates and uncoupler compounds from water samples; C. Barata; 2/2/2022 - 1/8/2022; 9.072 €

## Geochemistry and Pollution



### Geochemistry and Pollution

The Geochemistry and Pollution group studies natural organic matter, anthropogenic contaminants and biogenic toxins as a source of knowledge of the evolution of ecosystems, including climate change and transport processes, distribution, transformation and effects of organic pollution in organisms, including humans. These approaches also include the study of molecules of viral activity, and, in the present times, contributing to understanding the environmental occurrence of SARS-CoV-2 pandemic. Under certain conditions, some organisms can produce toxins such as cyanotoxins, ciguatoxins, tetrodotoxins, palitoxins or lipophilic marine biotoxins that pose a risk to ecosystems and human health.

The overall goal includes the development of analytical methods to study the concentrations of deleterious molecules, their transfer flows between environmental compartments and their incorporation into organisms. It also covers the investigation of how organic compounds can provide geochemical information on past and present ecosystems and molecules that are useful to describe the health status of organisms.

### Group



#### Permanent Research Staff

Abad Holgado, Esteban  
Caixach Gamisans, Josep  
Fernández Ramón, Pilar  
Grimalt Obrador, Joan (Group leader)  
López Fernández, Jordi  
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Mateo Pérez, Bárbara  
Paraian, Alexandra  
Parera Costa, Jordi  
Planas Pastor, Carles  
Sauló Dalmau, Jordi

### Projects

- Project "GEF GMP2" GF4030-4F34; GEF\_2016; Internacional Global Environment Facility; E. Abad; 01/02/2016 - 31/3/2022; 827.436 €
- Influencia de la inversión térmica en la contaminación orgánica atmosférica; PGC2018-102288-B-I00; Ministerio de Ciencia, Innovación y Univ, Proyectos I+D - Subpr. estatal de gener. de conocimiento- programa estatal de generacion de conocimiento y fortalecimiento cient. y tec.del sistema I+D+i - PEICTI 2017-2020; MP. Fernandez; 01/01/2019 - 30/6/2022; 211.750 €
- Iberian Climate Change paleoarchive - synthesis and stewardship of land-ocean data, taking the past 2000 years (2k) as a reference [IBCC-lo2k]; LINKA20102; programa CSIC conexión internacional I-link+ para la promoción de la colaboración científica internacional del CSIC con instituciones extranjeras B. Martrat; 01/01/2019 - 31/12/2021; 28.525 €
- Ayuda de ciencia ciudadana del Ayuntamiento de Barcelona para CSIC para desarrollo de proyecto: exposición a contaminantes emergentes en el agua de consumo de Barcelona; 19S01448-006; Ayuntamiento de Barcelona con la participación de la Fundación La Caixa; plan BARCELONA CIENCIA 2019; C. Flores; 27/12/2019 - 30/1/2022; 69.918 €
- Exposición prenatal a sustancias poli y perfluoradas en agua de consumo y neurodesarrollo en el inicio de la vida.; ISGlobal, Proyectos de investigación en salud. 2020; J. Caixach; 24/11/2020 - 31/12/2023; 32.400 €

- Estudio integrado de la exposición a glifosato y su metabolito en una región con gran actividad agrícola de la provincia de Córdoba (Argentina). Análisis del riesgo ambiental y ocupacional; IN-CGLO0037; Consejo Superior de Investigaciones Científicas; J. Grimalt; 1/7/2021 - 31/12/2023; 29.280 €
- Development a smart forewarning system to assess the occurrence, fate and behaviour of contaminants of emerging concern and pathogens in waters.; PCI2021-121972; Agencia Española de Investigación, Programación Conjunta Internacional; E. Abad; 1/9/2021 - 30/08/2024; 59.896 €
- Ayudas extraordinarias para la preparación de proyectos 2021. Esta ayuda está relacionada con el proyecto PGC2018-102288-B-I00; 2021AEP037; Consejo Superior de Investigaciones Científicas; MP. Fernández; 01/01/2022 - 31/08/2022; 39.500 €
- Determinación de emergentes.; 20222TE001; Ministerio para Transición Ecológica, MITERD - Dirección General del Agua- Investigación en recursos e infraestructuras hidráulicas. financiación proyectos PTOS 2022; A. Bartolomé; 07/07/2022 - 07/12/2023; 150.000 €
- IBCC: Iberian Climate Change paleoarchive; 202280I204; Consejo Superior de Investigaciones Científicas, Ayudas para la incorporación de personal investigador a las escalas científicas del CSIC. OEP 2018-2019; B. Martrat; 03/11/2022 - 31/12/2023; 5.000€
- Exploring the Neurological Exposome (NEUROSOME); H2020-MSCAITN- 2017 SEP-210411486; European Commission, Marie Skłodowska-Curie Actions, Innovative Training Networks (ITN); J. Grimalt; 01/12/2017 - 30/11/2021; 247.873 €.
- Metabolic effects of Endocrine Disrupting Chemicals: novel testing METHods and adverse outcome pathways (EDCMET); European Commission, RIA (RESEARCH and INNOV.ACT.); H2020-HEALTH/0490 – 825762; J. Grimalt; 01/01/2019 – 31/12/2023; 360.050 €
- Restoration of aquatic ecosystems of protected areas from the Alps and Pyrenees (RESQUE AL-PYR); LIFE20 NAT/ES/00369; European Commission; Life 2020 NAT; B. Van Drooge; 01/01/2022 – 31/12/2026; 123.621 €
- Environmental Exposure Assessment Research Infrastructure Preparatory Phase Project; 101079789; European Commission; HORIZON-INFRA-2021-DEV-02-01; J. Grimalt; 01/10/2022 – 30/09/2025; 114.225 €
- Partnership for the Assessment of Risks from Chemicals; 101057014; European Commission; COFUND HORIZON-HLTH-2021-ENVHLTH-03-01; J. Grimalt; 01/05/2022 – 30/04/2029; 3.359.546 €

Contracts

- Estudio relacionado con el análisis de compuestos orgánicos en matrices tales como agua de bebida envasada; J. Caixach; 1/9/2012 - 30/8/2022; 221.793 €
- Control de contaminantes orgánicos emergentes en aguas subterráneas; J. Caixach; 1/3/2014 - 28/2/2022; 16.940 €
- Apoyo tecnológico sobre las emisiones de dioxinas y furanos procedentes de fuentes estacionarias durante el proceso de producción de clinker, mediante sistemas de captación de gases en semicontinuo; E. Abad; 29/10/2014 - 28/12/2021; 27.104 €
- Análisis de contaminantes atmosféricos; E. Abad; 2/5/2016 - 22/3/2047; 4.447 €
- Determinación de dioxinas y furanos en muestras de suelo, vegetación y puntos de agua; E. Abad; 24/4/2017 - 31/12/2022; 116.160 €
- Screening de contaminantes orgánicos; J. Caixach; 27/11/2017 - 26/11/2021; 62.242 €
- Análisis de dioxinas de las factorías de Arcelormittal en España; E. Abad; 1/1/2019 - 31/12/2021; 14.738 €
- Análisis de dioxinas en muestras de alimentos y/o alimentación animal; E. Abad; 1/1/2019 - 31/12/2022; 16.510 €
- Determinación de contaminantes orgánicos en muestras de agua; J. Caixach; 1/2/2019 - 31/1/2021; 46.282 €
- Análisis de contaminantes orgánicos en muestras de agua; J. Caixach; 24/5/2019 - 23/5/2021; 23.087 €
- Determinación de contaminantes emergentes en agua; J. Caixach; 1/10/2019 - 30/9/2021; 30.272 €
- Análisis de dioxinas y compuestos relacionados en muestras de aceite; E. Abad; 1/10/2019 - 30/9/2021; 34.091 €
- Análisis de dioxinas en muestras de suelo y biota; E. Abad; 25/5/2020 - 24/2/2021; 27.588 €
- Analítica compuestos orgánicos agua y sedimentos 2020-2021; J. Caixach; 1/7/2020 - 31/12/2021; 44.165 €
- Análisis de contaminantes orgánicos; J. Caixach; 7/7/2020 - 6/7/2022; 15.730 €

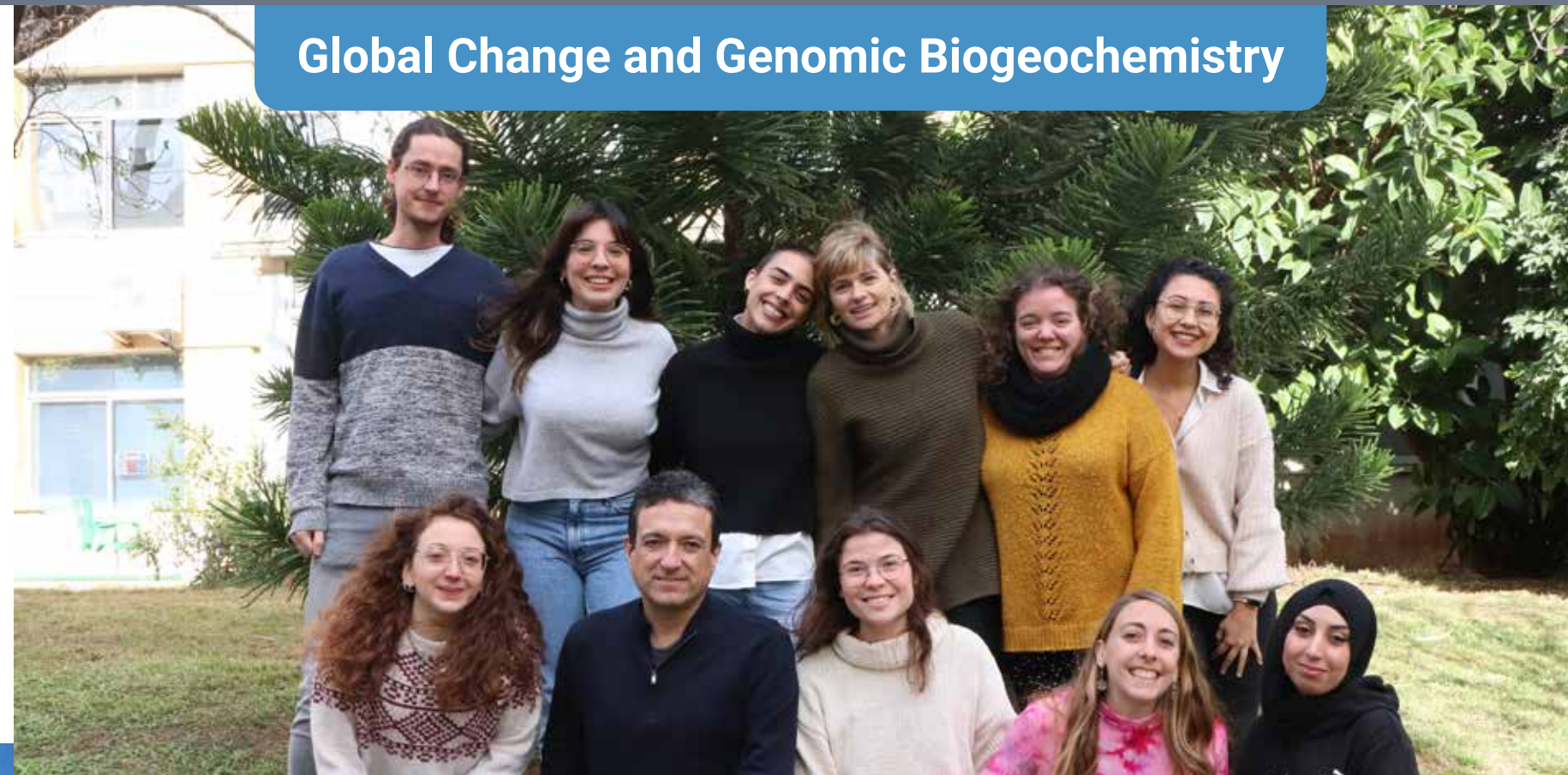
- Servicio para las actividades de investigación, control y referencia en el ámbito de los contaminantes orgánicos persistentes halogenados en alimentos; E. Abad; 1/9/2020 - 31/8/2021; 17.545 €
- Estudio de contaminantes orgánicos en matrices ambientales; E. Abad; 1/10/2020 - 31/12/2021; 63.735 €
- Determinación de dioxinas y furanos en materias primas para la alimentación animal y en alimentos para animales; (MAPA); E. Abad; 09/10/2020 – 09/01/2024; 129.600€
- Determinación de dioxinas y furanos según la norma UNE-EN 1498 en soportes de emisiones de gases de fuentes estacionarias para la unidad móvil de emisiones atmosféricas UME; E. Abad; 24/11/2020 - 23/11/2021; 7.962 €
- Determinación de contaminantes emergentes en agua; J. Caixach; 16/12/2020 - 15/12/2022; 17.932 €
- Análisis de contaminantes orgánicos; J. Caixach; 15/1/2021 - 14/1/2022; 36.106 €
- Measurements and reporting on certified reference material BCR-450 according to the technical specifications in annex; E. Abad; 30/1/2021 - 31/12/2021; 9.120 €

- Determinación de dioxinas, furanos y pcbs similares a dioxinas en muestras biológicas y ambientales; E. Abad; 5/2/2021 - 4/2/2022; 12.554 €
- Estudio de contaminantes orgánicos en matrices ambientales; E. Abad; 17/3/2021 - 16/3/2022; 26.318 €
- Screening de contaminantes orgánicos CBN. muestreo con GAC analítico; J. Caixach; 24/3/2021 - 23/3/2023; 6.776 €
- Análisis de dioxinas en muestras de suelo y biota; E. Abad; 14/4/2021 - 13/1/2022; 27.588 €
- Determinación de dioxinas, furanos y pcbs similares a dioxinas en muestra biológica en el estudio epidemiológico en relación con la planta de valorización energética que forma parte del complejo medioambiental de Gipuzkoa; E. Abad; 27/5/2021 - 26/9/2023; 120.008 €
- Acquisition of analytical services for the determination of polycyclic aromatic hydrocarbons (pahs) and polychlorinated biphenyl compounds (pcbs) in marine sediment samples; J. Grimalt; 11/11/2021 - 31/12/2021; 49.000 €
- Determinación de dioxinas, furanos y pcbs similares a dioxinas en muestras biológicas y ambientales; E. Abad; 13/12/2021 - 12/3/2024; 75.322 €
- Determinació de paràmetres de qualitat química en mostres de peixos i sediments als rius i embassaments de Catalunya, mostrejades en el període 2019-2024. Anàlisi de compostos bioacumulats en peixos; J. Grimalt; 17/12/2021 - 31/3/2025; 242.545 €
- Elaboración de procedimientos normalizados para el análisis de cop para los países de américa latina y caribe; E. Abad; 22/12/2021 - 21/4/2022; 26.640 €
- Determinación de contaminantes orgánicos en muestras de agua; C. Planes; 25/1/2022 - 24/1/2023; 9.982 €
- Análisis de contaminantes orgánicos; C. Flores; 24/2/2022 - 23/2/2023; 8.349 €
- Measurements and reporting on certified reference material BCR-420; E. Abad; 2/3/2022 - 31/12/2022; 5.400 €
- Mostreig de contaminants orgànics amb carbó actiu granular (GAC) analític i posterior anàlisi per espectrometria de masses; C. Planes; 16/5/2022 - 31/7/2023; 2.420 €



- Measurements and reporting on certified reference material BCR-536 according to the technical specifications; E. Abad; 20/5/2022 - 31/12/2022; 5.400 €
- Fortalecimiento de capacidades y marcos regulatorios para la gestión racional de químicos y desechos en países de América Latina y Caribe; E. Abad; 11/11/2022 - 10/3/2023; 40.000 €
- Convenio enc. gestión entre la AE CSIC, M.P. (IDÆA) y la Agencia Esp. de Seguridad Alimentaria y Nutrición (AESAN OA) del M. Consumo para la colab. en el marco de las activ. del laboratorio nac. de ref. de contaminantes orgánicos persistentes (COP); E. Abad; 21/11/2022 - 21/11/2024; 66.000 €
- Anàlisi de substàncies prioritàries i altres contaminants, substàncies preferents, i contaminants emergents en aigües superficials i subterrànies de Catalunya en el període 2022-2024. Control i determinació de substàncies prioritàries, preferen; J. Grimalt; 14/12/2022 - 31/12/2025; 1.101.689 €
- Determinacions de dioxines, furans i pcb's; E. Abad; 14/12/2022 - 31/3/2023; 25.047 €
- Análisis de contaminantes orgánicos (PAH, pesticidas y PFO'S) en agua de mar para el cumplimiento de la DMA (Directiva Marco el Agua) en aguas portuarias; C. Planes; 23/12/2022 - 22/12/2026; 151.323 €

## Global Change and Genomic Biogeochemistry



### Group

 @GEN\_BGC\_GROUP



### Permanent Research Staff

Dachs Marginet, Jordi  
Vila Costa, Maria

### Postdoctoral Research Staff

Sanz Sáez, Isabel

### PhD Student

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### Technical Staff

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### Master students

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Dahman Iduere, Amina  
Luna Manteca, Mar

### Global Change and Genomic Biogeochemistry

The Global Change and Genomic Biogeochemistry group focuses its research on the anthropogenic organic component of the carbon and nutrient cycles at regional and global scale. This research is focused on the marine environment, from coasts to global oceans, and in polar environments, mainly in Antarctica.

The research approach combines the use of intensive field work in oceanographic campaigns, combining chemical analysis of anthropogenic compounds in seawater and organisms (plankton, bacteria, krill), characterization of the sources (atmospheric, currents...), the biogeochemistry of anthropogenic organic compounds, and the microbial-pollutant mutual interactions addressed through metagenomic and molecular approaches. The group is international leader on Oceanic and Antarctic research, with contributions addressing the transport, occurrence and fate of anthropogenic chemicals in all oceans, the role of biodegradation mitigating marine pollution, the comparison of the fate of plastics and plasticizers, and the influence of organic pollutants on microbiome's structure and function. The research group has also made important contributions on the atmospheric deposition of organic compounds in the oceans and the polar regions (both Arctic and Antarctica).

The research group combines scientists with expertise on environmental organic chemistry and microbial biogeochemistry and environmental genomics, and its evolution in recent years has involved the merging of chemical and metagenomic approaches to study the biogeochemistry of anthropogenic organic chemicals, their biodegradation by natural microbiomes and their effects on the major anthropogenic cycles of carbon and phosphorus.



### Projects



- Cambio global y biogeoquímica genómica - BIOGEOGEM; 2017 SGR 00800; Generalitat de Catalunya, AGAUR; J. Dachs; 01/01/2018 - 30/09/2021; 15.000 €
- Transporte y biogeoquímica de contaminantes emergentes y materia orgánica antropogénica en el Océano Austral; PGC2018-096612-B-I00; Ministerio de Ciencia, Innovación y Univ, Proyecto I+D - Subpr. estatal de gener. de conocimiento- Programa estatal de generación de conocimiento y fortalecimiento cient. y tec. del sistema I+D+i - PEICTI 2017-2020; J. Dachs; 01/01/2019 - 30/6/2022; 283.140 €
- Generación de hidrógeno y bioremediación; TED2021-132070B-C22; Ministerio de Ciencia e Innovación, Prooyecto I+D TED- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; M. Vila; 1/1/2022 - 31/12/2023; 108.790 €
- Ayudas extraordinarias para la preparación de proyectos 2021. Esta ayuda está relacionada con el proyecto PGC2018-096612-B-100; 2021AEP036; Consejo Superior de Investigaciones Científicas; J. Dachs; 01/01/2022 - 31/08/2022; 52.854 €
- Microbiomas como indicadores del impacto de los contaminantes orgánicos en la calidad del agua; PID2021-128084OB-I00; Ministerio de Ciencia e Innovación, Proyecto I+D PID- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; M. Vila; 01/09/2022 - 31/08/2025; 246.840 €
- Carbono orgánico antropogénico persistente en los océanos y en la Antártida (PANTOC); PID2021-127769NB-I00; Ministerio de Ciencia e Innovación, Proyecto I+D PID- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; J. Dachs; 01/09/2022 - 31/08/2026; 306.130 €
- Equipación del nuevo laboratorio de genómica ambiental del grupo Global Change and Genomic Biogeochemistry; 202280I126; Consejo Superior de Investigaciones Científicas, Ayudas para la incorporación de personal investigador a las escalas científicas del CSIC. OEP 2018-2019; M. Vila; 03/11/2022 - 31/12/2023; 5.000 €

## Water, Environmental and Food Chemistry (ENFOCHEM)



### Water, Environmental and Food Chemistry (ENFOCHEM)

The Water, Environmental and Food Chemistry (ENFOCHEM) group focuses its research on the investigation of the occurrence and fate of organic pollutants in the environment and the risks they pose to the environmental and human health. The organic pollutants investigated include both regulated substances, i.e., priority contaminants, such as pesticides, polycyclic aromatic hydrocarbons, alkyl-phenols or phthalates, and contaminants of emerging concern (CECs), such as endocrine disrupting compounds, Watch List substances, pharmaceuticals, personal care products, drugs of abuse, plastic additives, or micro-/nano-plastics. These contaminants are investigated with different purposes in a large variety of matrices, including all types of waters, suspended particulate matter, sediments, soils, sewage sludge, air, aquatic and terrestrial organisms, crops, food and human biological samples. The objectives of these studies are diverse: assessment of their bioavailability, bioaccumulation and biomagnification potential through the food web as well as of the human exposure to them, investigation of adsorption/desorption and (bio)degradation processes and the formation of transformation products, compliance with current regulations, environmental risk assessment, evaluation of new water treatments, safe reuse of (waste)water for agriculture irrigation and aquifer replenishment, study of the population life-style and drug consumption estimations through sewage-based epidemiology, etc. These objectives are achieved through the development of advanced analytical methodologies (including environmental proteomics and non-target analysis and suspect screening by HRMS) and their application in very different contexts, from laboratory experiments to large scale, real world scenarios that go from heavily polluted aquatic or terrestrial systems to pristine areas such as Antarctica.

### Group

#### Permanent Research Staff

Barceló Cullerés, Damià  
Díaz Cruz, Silvia  
Ginebreda Martí, Antoni  
López de Alda Villaizán, Miren (Group leader)

#### Postdoctoral Research Staff

Bonansea, Rocío Inés

#### PhD Student

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García Vara, Manuel  
Orlando Véliz, Pierina  
Quintana López, Gerard  
Pérez López, Carlos  
Sunyer Caldú, Adrià



### Projects

- Riesgos emergentes de contaminación química y microbiológica en la reutilización de aguas residuales para riego agrícola: estudio integrado (ROUSSEAU); CTM2017-89767-C3-1-R; Ministerio de Economía y Competitividad, Proyectos I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2013-2016; S. Díaz; 01/01/2018 - 30/06/2021; 139.150 €
- Unidad de calidad del agua y suelos; 2017 SGR 1404; Generalitat de Catalunya; M.J. López; 01/01/2018 - 30/09/2021; 44.480 €
- Análisis del potencial de antibiosis de la biomasa de bofedales alto andinos en la Reserva Nacional de Salinas y Aguada Blanca, Arequipa, Perú; MHE-200050; Consejo Superior de Investigaciones Científicas, EMHE-2017; S. Díaz; 01/02/2018 - 31/07/2021; 28.385 €
- Enfoque innovador para la detección de sustancias citotóxicas y reprotóxicas en agua regenerada y potable (ENFOCAR); Fundación General CSIC, Programa Comfuturo; C. Postigo; 01/09/2018 - 30/09/2021; 159.000 €



- Recarga gestionada de acuíferos: abordando los riesgos de recargar agua regenerada; PCI2019-103603; Ministerio de Ciencia, Innovación y Univ, Proyectos programación conjunta internacional - programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; S. Díaz; 17/05/2019 - 31/5/2023; 149.090 €
- Red científica sobre los riesgos de la contaminación y escasez dle agua en ecosistemas acuaticos ibericos en un contexto de cambio global: recomendaciones de gestion; RED2018-102737-T; Nacional Ministerio de Ciencia, Innovación y Univ, Acciones de dinamización redes de investigación - subpr. Estatal de gener. de conoc.- prog. est. gener. conocim. y fortalec. cientif. y tecnológico del sistema de I+D+i- PEICTI-2017-2020; D. Barceló; 01/01/2020 - 31/12/2021; 31.000 €
- Contaminantes emergentes y prioritarios en las aguas reutilizadas en agricultura: riesgos y efectos en suelos, producción agrícola y entorno ambiental; LINKB20030; Consejo Superior de Investigaciones Científicas; D. Barceló; 01/01/2020 - 31/12/2021; 24.000 €
- Life cycle effects from removing hazardous substances in sludge and plastic through thermal treatment Life cycle effects from removing hazardous substances in sludge and plastic through thermal treatment; 302371; Research Council of Norway, MILJØFORSK programme; D. Barceló; 16/03/2020 - 15/03/2024; 56.286 €

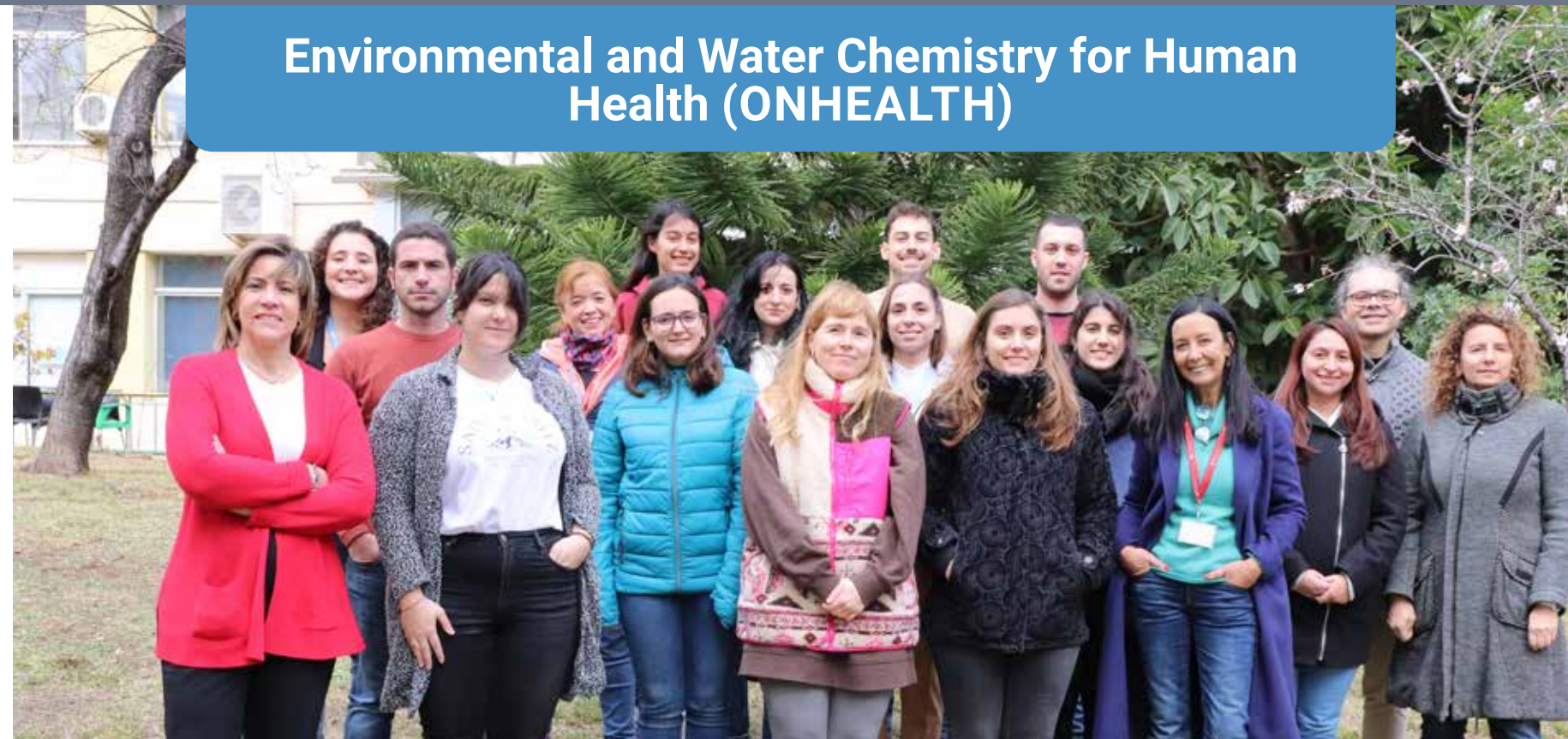


- Ayudas extraordinarias para la preparación de proyectos 2020. Esta ayuda está relacionada con el proyecto CTM2017-89767-C3-1-R.; 2020AEP136; Consejo Superior de Investigaciones Científicas; S. Díaz; 01/01/2021 - 31/12/2021; 9.997 €
- Descubrimiento de marcadores biológicos de exposición presentes en aguas residuales sin tratar y tratadas mediante proteómica ambiental; PID2020-114065RB-C22; Ministerio de Ciencia e Innovación, Proyecto I+D+i - Programa Estatal de I+D+i orientada a los retos de la sociedad - Plan Estatal de investigación científica y técnica y de innovación 2017-2020; D. Barceló; 01/09/2021 - 31/08/2024; 181.500 €
- Preventing Recalcitrant Organic Mobile Industrial chemicalS for Circular Economy in the Soilsediment- water system (PROMISES); 101036449 (H2020-GD/0923); European Commission; Green Deal; MJ. Lopez; 01/11/2021 – 30/04/2025; 433.078 €
- Mediterranean wAter management solutions for a sustainable aGriculture supplied by an Online collaborative platform (MAGO); PRIMA/0830; European Commission; PRIMA-SECCION 1-2020; MJ. Lopez; 01/05/20221 – 30/04/2024; 100.241 €
- Reactive barriers for water renaturalization during managed aquifer recharge in the Baix Camp region (REMAR); LIFE20 ENV/ES/000284; European Commission; S. Diaz; 01/12/2021 – 30/11/2025; 533.963 €

**Contracts**

- Anàlises de pesticides em águas, solos e plantas, no âmbito do projeto fitofarmgest; M. López; 2/3/2019 - 31/12/2021; 51.000 €
- Analíticas de sustancias de lista de observación según la decisión UE 2018/840 y/o decisión UE 2015/495 u otras de similar naturaleza que se puedan añadir en el futuro; M. López; 27/3/2020 - 26/3/2021; 16.580 €
- Determinación de contaminantes emergentes en fangos de Edar; S. Díaz; 1/7/2020 - 31/12/2021; 6.375 €
- Anàlisi de substàncies d'abús en mostres d'aigua residual d'entrada a les edars de Lleida i Barcelona; M. López; 20/4/2021 - 31/12/2021; 12.027 €
- Servei d'anàlisi de substàncies d'abús en mostres d'aigua residual d'entrada a les Edars de Lleida, Barcelona-Baix Llobregat i Barcelona-Besós; M. López; 29/3/2022 - 31/12/2022; 18.143 €
- Analysis of UV filters in water samples from Hawaii by TFC-HPLC-MS/MS; S. Díaz; 29/3/2022 - 28/10/2022; 7.875 €
- Analíticas de sustancias de lista de observación según la decisión UE 2020/1161 Conforme a los requerimientos que dicha decisión hace sobre las sustancias, los métodos analíticos y sus límites de detección que deben de aplicarse.; M. López; 20/4/2022 - 31/12/2022; 10.890 €

## Environmental and Water Chemistry for Human Health (ONHEALTH)



**Group**  
 @onhealth4

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 Vega Herrera, Albert

**Technical Staff**

Alcalà Pavo, Paula  
 Borrell Díaz, Xavier

### Human exposure to organic chemicals



The Environmental and Water Chemistry for Human Health (ONHEALTH) group aims to enhance the understanding of the sources, occurrence, fate, and behavior of pollutants of anthropogenic and biogenic origin and their impact on the environment and human health.

The major focus is on engineered systems, aquatic environments, terrestrial habitats, and the exposure to living organisms.

To achieve these goals, we perform chemical and biological analysis to reliably detect and measure contaminants at ultra-trace levels in different matrices, we conduct controlled conditions experiments at our research facilities, assess the impact of complex mixtures in the environment and humans, and assess the biota and human exposure to mixture of contaminants through different routes (dietary, inhalation, dermal).

### Projects

- Microplásticos y microcontaminantes en la costa mediterránea: toxicidad e impacto ambiental y en la salud humana (PLAS-MED); CTM2017-89701-C3-1-R; Ministerio de Economía i Competitividad, Proyectos I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2013-2016; M. Farré; 01/01/2018 - 30/09/2021; 177.870 €
- Herramientas y tecnologías inteligentes para la evaluación del destino ambiental y el riesgo de los contaminantes en un nuevo escenario de cambio climático; RTI2018-097158-B-C33; Ministerio de Ciencia, Innovación y Univ, Proyectos I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; S. Pérez; 01/01/2019 - 31/12/2022; 162.140 €
- Impacto de la degradación de biomicroplásticos en el medioambiente; RTI2018-097860-J-I00; Consejo Superior de Investigaciones Científicas, Proyectos I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; M. Llorca; 01/11/2019 - 31/10/2022; 216.534 €
- Impacto de las actividades agrícolas en la fauna de los Parques Nacionales; 2392/2017; Ministerio de Agricultura, Alimentación y Medio Ambiente, Proyectos de Investigación Científica en la Red de Parques Nacionales; E. Eljarrat; 11/12/2019 - 11/12/2022; 79.741€
- Evaluación de la exposición humana a aditivos químicos asociados al plástico; PID2019-110576RB-I00; Ministerio de Ciencia, Innovación y Univ, Proyectos I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; E. Eljarrat y T. Moreno; 01/06/2020 - 31/05/2023; 193.600 €



- Ayudas extraordinarias para la preparación de proyectos 2020. Esta ayuda está relacionada con el proyecto CTM2017-89701-C3-1-R.; 2020AEP134; Consejo Superior de Investigaciones Científicas; M. Farré; 01/01/2021 - 31/08/2021; 12.779 €
- Presencia, destino y comportamiento de contaminantes de preocupación emergente, incluidos los micro/nano plásticos desde el agua residual hasta las redes alimentarias; PID2020-116789RB-C41; Ministerio de Ciencia e Innovación, Proyecto I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; M. Farré; 01/09/2021 - 31/08/2024; 181.500 €
- Development a smart forewarning system to assess the occurrence, fate and behaviour of contaminants of emerging concern and pathogens in waters (FOREWARN).; PCI2021-121972; Agencia Española de Investigación, Programación Conjunta Internacional; M. Farré; 1/9/2021 - 30/08/2024; 59.896 €
- Evaluation de l'exposition orale aux micro et nanoplastiques et de leur translocation dans les barrières gastro-intestinales humaines.; ANSES-21-EST-077; ANSES, Programme National de Recherche en Environnement-Santé-Travail 2021. PNR EST 2021; M. Farré; 27/11/2021 - 27/02/2024; 45.742 €
- Characterizing oral exposure to micro- and nanoplastics and their translocation into human gastro-intestinal barriers (EXAMINA); French agency for Food, Environmental and Occupational Health Safety; M. Farré; 1/1/2022 - 31/12/2022; 47.572 €

- Desarrollo de recubrimientos multifuncionales biodegradables para aplicaciones de embalaje de papel y cartón - BIOFUNPAPER; CPP2021-008973; Ministerio de Ciencia e Innovación, Proyectos en colaboración público-privada 2021- Subp. est transferencia conoc-Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023-MRR; E. Eljarrat; 01/06/2022 - 31/05/2025; 95722 €
- Pinturas antiincrustantes, biobasadas y biodegradables para pinturas marinas (Nautilus); CPP2021-008466; Ministerio de Ciencia e Innovación, Proyectos en colaboración público-privada 2021- Subp. est transferencia conoc-Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023-MRR; M. Farré; 01/09/2022 - 31/08/2025; 129.063 €
- Haz el cambio, Be Plastic Free; 22S06957-001; Ayuntamiento de Barcelona, GCT-Subvenciones por el Clima: ayudas para el desarrollo de proyectos en el marco de la emergencia climática de la ciudad de Barcelona 2022; E. Eljarrat; 26/10/2022 - 25/10/2023; 31.667 €
- EUROpean quality Controlled Harmonization Assuring Reproducible Monitoring and assessment of plastic pollution (EUROQCHARM); H2020-CLIMATE/0775 – 101003805; European Commission, Coordination and Support Action (CSA); M. Farré; 01/11/2020 – 30/10/2023; 95.933€
- Quality and management of intermittent rivers and associated groundwaters in the Mediterranean basins (INWAT); 201980E121; CSIC, Proyecto Intramural; S. Perez; 01/07/2019 – 30/06/2022; 165.000 €
- Synergising International Research Studies into the Environmental Fate and Behaviour of Toxic Organic Chemicals in the Waste Stream (INTERWASTE); 734522 (H2020-MSCA-RISE/0253); European Commission; E. Eljarrat; 01/01/2017 – 30/06/2022; 76.815 €
- Nutritious, safe and sustainable seafood for consumers of tomorrow (SEAFOODTOMORROW); 773400 (H2020-FOOD/0370); European Commission; E. Eljarrat; 01/11/20217 – 30/04/2021; 171.857 €
- Twinning for enhancing the scientific excellence of faculty of technology novi sad for innovative solutions to protect environmental resources from contaminants of emerging concern (TwIN-Sol-CECs); 101059867; European Commission; HORIZON-WIDERA-2021-ACCESS-02-01; M. Farré; 01/08/2022 – 31/07/2025; 365.155 €



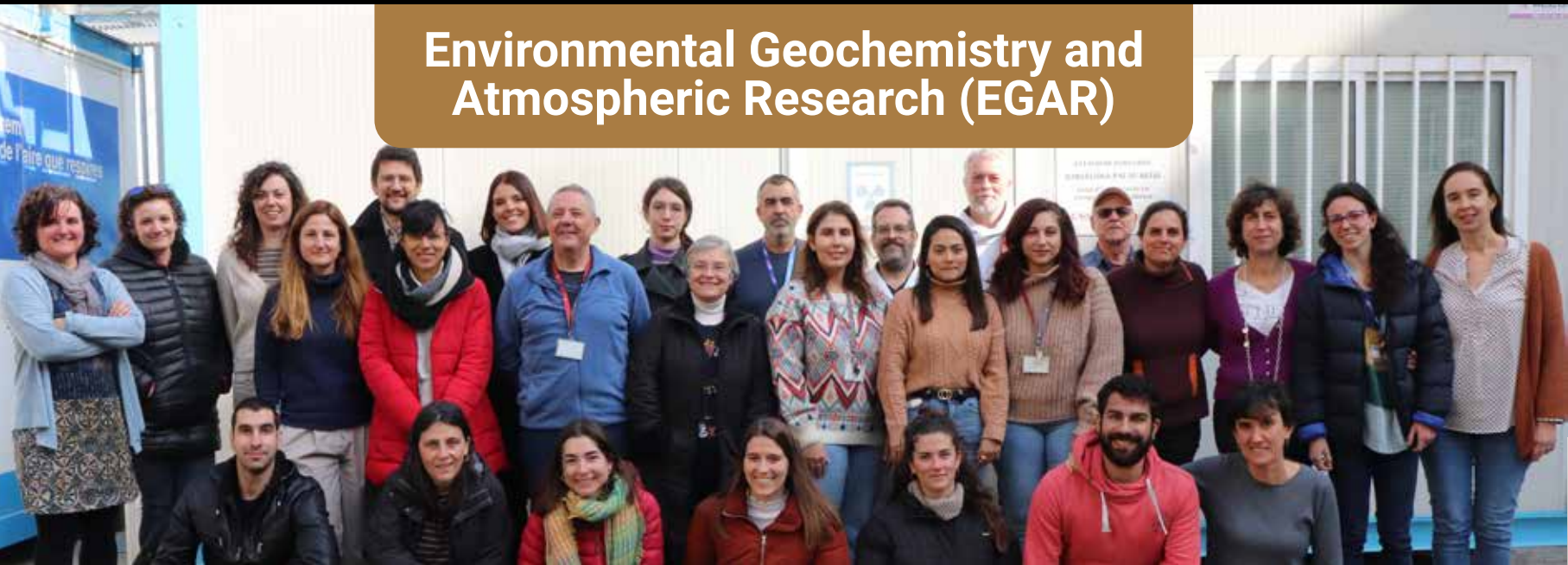
### Contracts

- Análisis de retardantes de llama organofosforados (opfrs) en muestras de agua y biomasa en el marco del proyecto Biopot; E. Eljarrat; 10/3/2021 - 9/3/2023; 24.321 €
- Apoyo tecnológico para caracterizar los materiales empleados en tres tipos de filtros diferentes y para caracterizar la calidad del aire una vez que éste pasa a través de la mascarilla con el filtro seleccionado; E. Eljarrat; 11/6/2021 - 10/6/2022; 37.812 €
- Análisis de retardantes de llama organofosforados (opfrs) en muestras de agua, biomasa, plástico y sedimentos; E. Eljarrat; 15/10/2021 - 14/10/2023; 8.100 €
- Evaluación del posible grado de exposición humana a nano y microplásticos y aditivos plásticos a través de las aguas de consumo; M. Farré; 1/11/2021 - 30/4/2023; 31.944 €
- Apoyo y asesoramiento para llevar a cabo los compromisos del scp-rac en el marco del programa the mediterranean sea programme -enchancing environmental security. Muestreo pfos, hbcd y sccp y valoracion de la analítica; E. Eljarrat; 9/3/2022 - 8/9/2023; 70.180 €
- Proyecto de apoyo tecnológico “estudio metabolómico”; M. Farré; 4/4/2022 - 3/7/2022; 13.213 €
- Análisis de microplásticos; M. Farré; 13/10/2022 - 12/11/2022; 16.698 €



Geosciences Department

Environmental Geochemistry and Atmospheric Research (EGAR)



Group

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Project manager

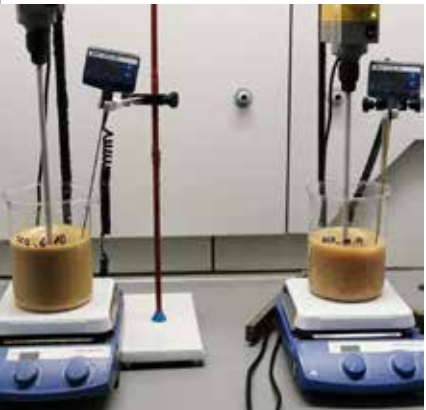
Monge Azemar, Marta

Environmental Geochemistry and Atmospheric Research (EGAR)

The Environmental Geochemistry and Atmospheric Research group investigates the chemical and physical processes responsible for the emission, transport, fate and removal of atmospheric pollutants that impact on human health and ecosystems. A major objective is to investigate measures (technological and non-technological) to improve air quality and reduce human exposure to air pollution. Main research lines include, air quality research, source apportionment assessment, atmospheric processes affecting air quality, aerosols and climate change (interpreting optical aerosol radiative effects), human exposure to air pollutants, including commuting, schools, occupational and other indoor and outdoor environments, industrial emissions and industrial wastes (environmental impact and utilisation).

Projects

- Co-development of Climate Services for adaptation to changing Marine Ecosystems, OPE01726; Internacional Swedish Research Council Formas, Era-Net Era4cs; X. Querol; 15/09/2017 - 28/02/2021; 40.000 €
- Geoquímica Ambiental e Investigación Atmosférica (EGAR); 2017 SGR 00041; Generalitat de Catalunya, (SGR); X. Querol; 01/01/2018 - 30/09/2021; 44.480 €
- Emisión de partículas en áreas portuarias generación, destino y gestión; RTI2018-098095-B-C21; Ministerio de Ciencia, Innovación y Univ, proyectos I+D+I - Programa Estatal De I+D+I Orientada a los Retos de la Sociedad - Plan Estatal de Investigación Científica y Técnica y de Innovación 2017-2020; M. Viana; 01/01/2019 - 30/9/2022; 96.800 €
- Wildfire emissions, exposure and human health risks in a changing climate; EIN2019-103405; Ministerio de Ciencia, Innovación y Univ, Acciones de dinamización Europa Investigación - Programa Estatal de I+D+I Orientada a los Retos de la Sociedad - Plan Estatal de Investigación Científica y Técnica y de Innovación 2017-2020; M. Viana; 01/06/2019 - 31/05/2021; 8.055 €
- Traffic-related air pollution and birth weight: the roles of noise, placental function, green space, physical activity, and socioeconomic status (FRONTIER); 4959-RFPA15-1/18-1; Health Effects Institute, RFA 17/1; X. Querol; 01/06/2019 - 31/05/2021; 34.229€
- Emisiones non-exhaust por tráfico rodado: desarrollo de medidas basadas en el impacto en calidad del aire, salud e implicaciones de la penetración de vehículos electricos; PID2019-110623RB-I00; Ministerio de Ciencia, Innovación y Univ, Proyectos I+D+I - Programa estatal de I+D+i Orientada a los Retos de la Sociedad - Plan Estatal de Investigación Científica y Técnica y de Innovación 2017-2020; F. Amato; 01/06/2020 - 31/05/2023; 169.400 €





- Cambios en la composición de los aerosoles y sus implicaciones en calidad del aire y clima en el NE de España; PID2019-108990RB-I00; Nacional Ministerio de Ciencia, Innovación y Univ, Proyectos I+D+I - Programa Estatal de I+D+i orientada a los Retos de la Sociedad - Plan Estatal de Investigación Científica y Técnica y de Innovación 2017-2020; X. Querol; 01/06/2020 - 31/05/2023; 284.350 €
- Evaluación de la presencia y de la eficiencia de desinfección de SARS-CoV-2 en superficies y aire de autobuses de transporte público; CSIC-COV19-154; Consejo Superior de Investigaciones Científicas, Proyectos Intramurales; T. Moreno; 22/06/2020 - 21/06/2021; 36.000 €
- Las chicas son de ciencias; FCT-19-14462; Fundación Española Ciencia y Tecnología-FECYT, Ayudas para el programa de la cultura científica y de la innovación; M. Viana; 01/07/2020 - 29/06/2021; 12.000 €
- Geoquímica de aerosoles atmosféricos: implicaciones en salud y clima; 202030E261; Consejo Superior de Investigaciones Científicas, Proyectos Intramurales; A. Alastuey; 01/01/2021 - 31/12/2023; 81.000 €
- Trabajos relacionados con la contaminación atmosférica y por cops; 20213TE002; Ministerio para Transición Ecológica, MITECO - Dirección General de Calidad y Evaluación Ambiental- financiación proyectos PTOS 2021; X. Querol; 04/06/2021 - 04/06/2025; 200.000 €
- BCN art-Ambient; 21S01378-006; Ayuntamiento de Barcelona, Convocatoria a los Premios Barcelona 2020 del Institut de Cultura de Barcelona - Línea de divulgación científica y arte y ciencia.; T. Moreno; 12/07/2021 - 9/11/2022; 10.000 €
- Next Generation Tools for advanced mobility solutions Next4Mob; PLEC2021-007824; Ministerio de Ciencia e Innovación, Proyectos de I+D+i en líneas estratégicas, en colaboración público- Programa estatal de I+D+i orientada a los retos de la sociedad - PEICTI 2017-2020; T. Moreno; 01/09/2021 - 31/08/2024; 59.194 €
- Mobility2030 (Plataforma PTI de Movilidad); LINKD20003; Nacional Consell Insular de Formentera, CSIC Conexión Internacional i-LINK+ para la promoción de la colaboración científica internacional; T. Moreno; 01/01/2022 - 31/12/2023; 12.000 €
- Emisiones volátiles en bosques de abedules - medición y modelización del impacto del estrés por herbivoría; PID2021-122892NA-I00; Ministerio de Ciencia e Innovación, Proyecto I+D PID- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; R. Seco; 01/09/2022 - 31/08/2025; 73.810 €



- Estudio de las propiedades de dispersión por partículas atmosféricas en el Noroeste de España; 202230I100; Consejo Superior de Investigaciones Científicas, Ayudas para la incorporación de personal investigador a las escalas científicas del CSIC; M. Pandolfi; 03/11/2022 - 31/12/2023; 5.000 €
- Evaluación de la exposición humana a aditivos químicos asociados al plástico; PID2019-110576RB-I00; Ministerio de Ciencia, Innovación y Univ, Proyectos I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; E. Eljarrat y T. Moreno; 01/06/2020 - 31/05/2023; 193.600 €
- Desarrollo de técnicas isotópicas avanzadas para estudiar la dinámica de elementos traza derivados del tráfico en suelos urbanos; 202230I101; Consejo Superior de Investigaciones Científicas, Ayudas para la incorporación de personal investigador a las escalas científicas del CSIC; M. Izquierdo; 03/11/2022 - 31/12/2023; 5.000 €
- Aerosol, Clouds and Trace Gases Research Infrastructure Implementation Project (ACTRIS-IMP); H2020-INFRA/0614 – 871115; European Commission, Research and Innovation Act. (RIA)- INFRAS; A. Alastuey; 01/01/2020 – 31/12/2023; 12.235€
- Chemical On-Line cOmpoSition and Source Apportionment of fine aerosol (COLOSSAL); European Commission, COST Action CA16109; MC. Minguillón; 03/03/2017 - 02/03/2021; 312.068 €.
- FRontiers in dust minerAloGical coMposition and its Effects upoN climate (FRAGMENT); H2020-ERC-COG/0392 - 773051; European commission, European Research council, ERC-Consolidator Grant; X. Querol; 01/10/2018 - 30/09/2023; 503.256 €.
- Pre-natal exposure to urban AIR pollution and pre and post-Natal Brain development - AIR-NB; H2020-ERC-ADG/0526 – 785994; European commission, European Research council, ERC-Advanced Grant; X. Querol; 01/09/2018 – 31/08/2023; 142.000€
- Recovery of added-valuable Elements from Copper Primary Production: fast track (RECOPP); H2020-EIT/0872 – EIT20076; European Commission, EIT RAW Materials; P. Cordoba; 01/01/2021 – 31/12/2023; 373.255 €
- Smart biohybrid phyto-organisms for environmental in situ monitoring (WATCHPLANT); 101017899 (H2020-FET-PROACT/0778); European Commission; X. Querol; 01/01/2021 – 31/12/2024; 317.395 €
- Solutions for Sustainable Access to Atmospheric Research Facilities (ATMOS-ACCESS); 101008004 (H2020-INFRA/0806); European Commission; A. Alastuey; 01/04/2021 – 31/03/2025; 63.988 €

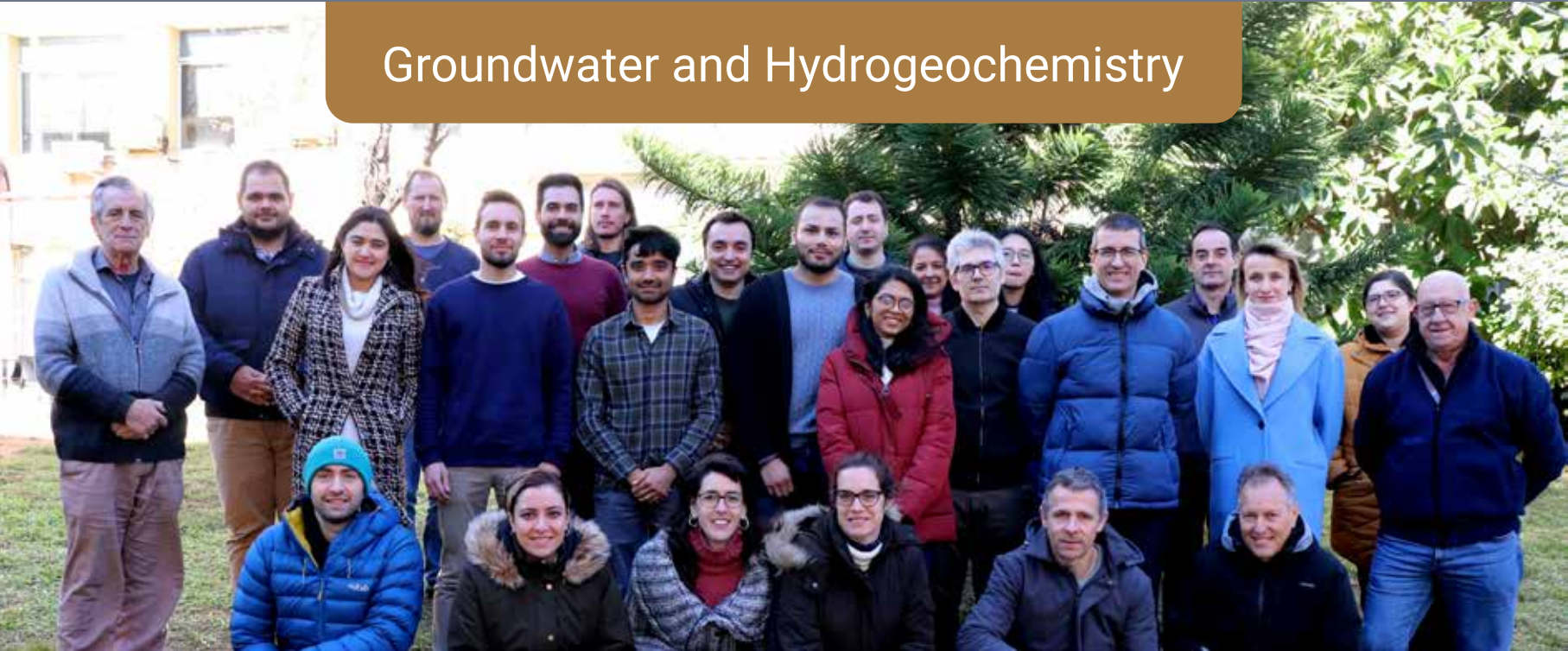


- Nanoparticle emissions from the transport sector: health and policy impacts (NPETS); 954377 (H2020-TRANSPORT/0821); European Commission; F. Amato; 01/06/2021 – 30/11/2024; 874.812 €
- Research Infrastructures Services Reinforcing Air Quality Monitoring Capacities in European Urban and Industrial AreaS (RI-URBANS); 101036245 (H2020-GD/0912); European Commission; X. Querol; 01/10/2021 – 30/09/2025; 1.042.000 €
- Innovative technologies and socio-ecological-economic solutions for fire resilient territories in Europe (FIRE-RES); 101037419 (H2020-GD/0920); European Commission; M. Viana; 01/12/2021 – 30/11/2025; 573.750 €
- Research Reinforcing in the Western Balkans in Offline and Online Monitoring and Source Identification of Atmospheric Particles (WeBaSOOP); 101060170; European Commission; HORIZON-WID-ERA-2021-ACCESS-02-01; A. Alastuey; 01/07/2022 – 30/06/2025; 221.875 €
- Fast track to cleaner, healthier urban Aerosols by market ready Solutions of retrofit Filtration Devices for tailpipe, brake systems and closed environments (AeroSolfd); 101056661; European Commission; HORIZON-CL5-2021-D5-01-15; T. Moreno; 01/05/2022 – 30/04/2025; 547.396 €
- Identifying determinants for indoor air quality and their health impact in environments for children: measures to improve indoor air quality and reduce disease burdens (INCHILDHEALTH); 101056883; European Commission; HORIZON-HLTH-2021-ENVHLTH-02-02; M. Viana; 01/09/2022 – 31/08/2026; 587.036 €
- Non-CO2 Forcers and their Climate, Weather, Air Quality and Health Impacts (FOCI); 101056783; European Commission; HORIZON-CL5-2021-D1-01-01; M. Pandolfi; 01/09/2022 – 31/08/2026; 429.955 €
- Reducing Emission Modelling uncertainty (REMY); LIFE20 PRE/IT/000004; European Commission; F. Amato; 01/05/2021 – 30/04/2024; 161.144 €
- Reducing nanoparticle exposures in industrial workplaces (NANOHEALTH); LIFE20 ENV/ES/000187; European Commission; M. Viana; 01/01/2022 – 31/12/2024; 145.302€
- Caucho reciclado y superficies recreativas: la química de los microplásticos vulcanizados utilizados en parques infantil; EUR2022-134037; Agencia Española de Investigación – MRR; Europa Excelencia 2022; T. Moreno; 01/12/2022 – 30/11/2024; 89.646 €

Contracts

- Detección de episodios naturales de aportes transfronterizos de partículas y otras fuentes de contaminación material particulado y de formación de ozono troposférico; MAPA; X. Querol; 17/4/2018 - 16/11/2021; 551.634 €
- Estudio de contribución de las emisiones atmosféricas de la planta de valorización energética de las lomas a la contaminación detectada en las proximidades del Parque Tecnológico de Valdemingomez; A. Alastuey; 2/9/2019 - 1/3/2021; 240.427 €
- The first service contract entitled service contract n° ECMWF/COPERNICUS/2019/CAMS\_21a\_CNRS-IGE/SC1; A. Alastuey; 11/2/2020 - 10/1/2021; 13.012 €
- Provider master service to purchase certain services through the placement of orders; M. Viana y F.Amato; 17/5/2020 - 16/5/2023; 31.656 €
- Interpretación de la monitorización de la calidad del aire en pistas de atletismo; M. Viana; 1/6/2020 - 31/8/2021; 30.286 €
- Mineralogical and geochemical characterization of coal and coal-related samples; . Querol; 20/7/2020 - 19/1/2021; 6.420 €
- Elaboració de la base de dades sobre les activitats realitzades al transport públic pel SARS COVID 19; T. Moreno; 27/11/2020 - 26/11/2021; 12.357 €
- Estudio presencia de SARSCOV2 en superficies de autobuses y metros; T. Moreno; 2/12/2020 - 1/3/2021; 3.025 €
- Implementing framework agreement ECMWF/COPERNICUS/2019/CAMS\_21A\_CNRS-IGE. The second services contract; A. Alastuey; 1/1/2021 - 30/10/2021; 6.988 €
- Identificació de fons de contaminants atmosfèrics en diferents zones de catalunya; X. Querol; 21/4/2021 - 31/12/2021; 120.395 €
- Servei de realització d'estudis d'avaluació de la qualitat de l'aire a Lleida; M. Viana; 14/2/2022 - 13/2/2023; 26.106 €
- Analítiques sobre la retenció del carbó actiu; T. Moreno; 28/9/2022 - 27/9/2026; 14.520 €

# Groundwater and Hydrogeochemistry



## Groundwater and Hydrogeochemistry

The Groundwater and Hydrogeochemistry group studies the hydraulic, chemical, thermal and mechanical processes that take place in porous media from pore to regional scale. The group employs mathematical and numerical approaches as well as laboratory and field scale experiments and sampling methods (using hydraulic, hydro-geochemical and environmental isotope data sampled directly or through specifically designed tests). The group is active in the development of numerical and mathematical models and modelling techniques for complex porous media processes across spatial and temporal scales, laboratory and field scale experimentation and sampling and data analysis.

This includes geospatial data and information management. Applications include the assessment and management of groundwater resources, groundwater and soil remediation, the management of urban aquifers, the study of emerging pollutants in urban aquifers and artificial recharge facilities, the study of wetlands, seawater intrusion in coastal aquifers, water management in mining operations, civil works, storage of waste and/or its recovery, water decontamination methodologies, the study of the unsaturated zone, the study of the hydro-thermo-mechanical and chemical processes associated with the injection and extraction of fluids at great depth (storage of CO2, storage of nuclear waste, geothermal energy, shale gas, induced seismicity).

### Group

#### Permanent Research Staff

Soler Matamala, Josep Maria (Group leader)  
Aquino, Tomás  
Cama Robert, Jordi  
Carrera Ramírez, Jesús  
Dentz, Marco  
Jurado Elices, Anna  
Queralt Mitjans, Ignasi  
Vázquez Suñé, Enric  
Vilarrasa Riaño, Víctor

#### Postdoctoral Research Staff

Ben-Noah, Ilan  
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De Simone, Silvia  
Dell’Oca, Aronne  
Hidalgo González, Juan José

Jotkar, Mamta  
Nikolenko, Olha  
Pujades Ganes, Estanislao  
Rahimzadeh Kivi, Iman  
Scheiber Pagès, Laura  
Thayssen, Eike  
Valdivielso Mijangos, Sonia  
Valhondo González, Cristina  
Teixidó Planes, Marc

#### PhD Student

Alharfouch, Loujain  
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Botey, Joan  
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Giacomi, Guillermo  
Giannetta, Max  
González Fuentes, Sebastián  
Ignacio

Gutiérrez León, Joan  
Hanckmann, Wout  
Hassanzadeh, Ashkan  
Leone, Francesco  
Nepal, Animesh  
Ortiz Montealegre, Sara  
Pérez Hueros, Paloma  
Satoshi, Tajima  
Schmidlin, Diego  
Vafaie, Atefeh  
Xu, Jiaqi

#### Technical Staff

Bellés Felip, Jordi  
Jurado Duarte, Deby

### Projects

- Biogeoquímica Urbana: Integrar el aire, el agua, el suelo y la ciencia microbiológica para la gestión de la contaminación; RTI2018-097346-B-I00; Ministerio de Ciencia, Innovación y Universidades, Proyectos I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; E. Vázquez; 01/01/2019 - 30/9/2022; 193.600 €
- Herramientas y criterios para la gestión de las aguas subterráneas en zonas urbanas; PCI2019-103616; Ministerio de Ciencia, Innovación y Universidades, Proyectos programación conjunta internacional - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; E. Vázquez; 01/09/2019 - 31/08/2022; 154.877 €
- Aislamiento Zonal Perforación y Explotación EGS; PCI2018-093272; Ministerio de Ciencia, Innovación y Universidades, Acciones de programación conjunta internacional - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; J. Carrera; 03/09/2019 - 1/11/2021; 100.000 €
- PLataforma agregadora de mOdelos para la Gestión óptima de cuencas hidrográfiCas (LOGIC); RTC2019-007484-5; Ministerio de Ciencia e Innovación, PN2019 - Retos Colaboracion - Programa Estatal de I+D+i orientada a los Retos de la Sociedad -Plan Estatal de Invest.Científica y Técnica y de Innovación 2017-2020; J. Carrera; 01/06/2020 - 01/12/2022; 64.706 €





- Mezcla y dispersión en el transporte de energía y solutos; PID2019-110212RB-C21; Ministerio de Ciencia, Innovación y Universidades, Proyectos I+D+I - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; J. Carrera; 01/01/2020 - 31/12/2022; 182.710 €
- Recàrrega gestionada d'aqüífers i ús de substrats orgànics per accelerar la renaturalització de l'aigua (RESTORA); ACA7210/18/0040; Agència Catalana de l'Aigua, Proyectos de investigación en la gestión del agua y la preservación y mejora del medio acuático; J. Carrera; 28/01/2020 - 27/01/2023; 211.254 €
- Un nuevo enfoque para el escalado de flujo multifásico, deformación mecánica y transporte hidrodinámico en medios permeables: Nuevos enfoques estocásticos y teoría de escalado; PID2019-106887GB-C31; Ministerio de Ciencia, Innovación y Universidades, Proyectos I+D - Subpr. estatal de gener. de conocimiento- programa estatal de generación de conocimiento y fortalecimiento cient. y tec.del sistema I+D+i - PEICTI 2017-2020; M. Dentz; 01/06/2020 - 31/05/2023; 145.200 €
- Contaminantes de preocupación emergente en acuíferos urbanos: ¿Son un problema para el uso del agua subterránea?; PID2019-107945RJ-I00; Ministerio de Ciencia, Innovación y Universidades, Proyectos I+D+i - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; A. Jurado; 01/12/2020 - 30/11/2023; 222.584 €
- Ayudas extraordinarias para la preparación de proyectos 2020. Esta ayuda está relacionada con el proyecto CGL2017-82331-R.; 2020AEP133; Consejo Superior de Investigaciones Científicas; J. Cama; 01/01/2021 - 31/08/2021; 7.824 €
- The geological influence and mitigation on induced seismicity; COOPA20414; Consejo Superior de Investigaciones Científicas, ICOOPA2020; V. Vilarrasa; 01/01/2021 - 31/12/2022; 12.000 €
- Interface-aware numerical methods for stochastic inverse problems; DP210103092; Internacional Australian Research Council, ARC Discovery Project Grant; J. Carrera; 30/6/2021 - 31/12/2024.
- Agua Urbana; 21S03151-001; Ayuntamiento de Barcelona, Convocatoria ordinaria para a la concesión de subvenciones para llevar a cabo proyectos, actividades i servicios de distrito y de ciudad para el año 2021; E. Vázquez; 22/07/2021 - 31/12/2021; 7.200 €
- Transferencia de metales al Océano Atlántico desde el estuario de Huelva: Estabilidad de los precipitados de drenaje ácido de mina; PID2020-119196RB-C22; Ministerio de Ciencia e Innovación, Proyectos I+D+i - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; J. Cama; 01/09/2021 - 31/08/2024; 133.100 €



- Proyecto:“ASSET WATER” evaluación de la eficiencia de los sistemas de drenaje urbano para reducir los contaminantes y hacer más sostenible el uso del agua; retos urbanos frente la pandemia de la COVID-19; E. Vázquez; 25/10/2021 - 24/10/2022; 54.842 €
- Proyecto: “Energia geotèrmica com a eina per a la remediació d'aigües subterrànies a Barcelona” para dar solución a retos urbanos frente la pandemia de la COVID-19; E. Vázquez; 10/11/2021 - 09/11/2022; 25.000 €
- Ayudas extraordinarias para la preparación de proyectos 2021. Esta ayuda está relacionada con el proyecto RTI2018-097346-B-I00; 2021AEP052; Consejo Superior de Investigaciones Científicas; E. Vázquez; 01/01/2022 - 31/08/2022; 53.300 €
- Experimental and numerical study of geologic carbon storage; PCI2021-122077-2B; Agencia Estatal de Investigación, Proyectos de Colaboración Internacional; V. Vilarrasa; 01/05/2022 - 30/04/2024; 124.310 €
- Hydrochemical coupled processes affecting contaminants of emerging concern in urban groundwater; UCRAN20070; Consejo Superior de Investigaciones Científicas, Programa csic de cooperación científica con Ucrania; A. Jurado; 01/06/2022 - 31/12/2024; 102.844€
- Energía geotérmica para la mejora de la eliminación de contaminantes orgánicos emergentes y polares en el agua subterránea; PID2021-128995OA-I00; Ministerio de Ciencia e Innovación, Proyectos I+D PID- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; E. Pujades; 01/09/2022 - 31/08/2025; 111.441 €
- Estudio de los procesos hidroquímicos que controlan el comportamiento de los fármacos en acuíferos urbanos; 202230I107; Consejo Superior de Investigaciones Científicas, Ayudas para la incorporación de personal investigador a las escalas científicas del CSIC; A. Jurado; 03/11/2022 - 31/12/2023; 5.000 €
- Avances para la implantación del almacenamiento subterráneo de hidrógeno para una economía basada en hidrógeno verde: Mezcla y reacción; TED2021-129991B-C33; Ministerio de Ciencia e Innovación, Proyectos I+D TED- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; M. Dentz; 1/12/2022 - 30/11/2024; 257.370 €
- Evaluación del destino de los contaminantes en medios porosos durante el crecimiento de biopelículas; TED2021-131188B-C31; Ministerio de Ciencia e Innovación, Proyectos I+D TED- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; J. Carrera; 1/12/2022 - 30/11/2024; 322.000 €

- Creación de resiliencia del agua urbana: Sistemas de drenaje urbano sostenibles para hacer frente a la contaminación por escorrentía de aguas pluviales, así como el aumento; TED2021-132894B-I00; Ministerio de Ciencia e Innovación, Proyectos I+D TED- Subpr. estatal de gener. de conocimiento- Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - PEICTI 2021-2023; E. Vázquez; 1/12/2022 - 30/11/2024; 186.300 €
- European training Network for In situ imaGing of dynaMic processes in heterogeneous subsurfAce environments (ENIGMA); 722028 (H2020-MSCA-ITN-ETN/0212); European Commission; J. Carrera; 01/01/2017 – 31/01/2021; 495.746 €
- Nitrogen removal from waste rock (NITREM); H2020-EIT/0437 - EIT17013; European Commission, EIT RAW Materials; J. Carrera; 01/01/2018 – 31/03/2021; 149.272 €
- MOdular Recovery process services for hydrometallurgy and water treatment (Morecovery); H2020-EIT/0550 – EIT18190; European Commission, EIT RAW Materials; J.M. Soler, C. Ayora; 01/01/2019 – 31/12/2021; 121.235 €



- PredictinG EaRthquakES induced by fluid injection (GEOREST); H2020-ERC-STG/0479 – 801809; European Commission, European research council; ERC-Starting Grant; V. Vilarrasa, 01/02/2019 – 31/01/2024; 1.438.201 €
- Quantification of mixing and dynamic uncertainty for transport in heterogeneous porous media (MIXUQ); H2020-MSCA-IF-EF-ST/0680 – 895152; European Commission, Marie Skłodowska-Curie Actions, Individual fellowship (IF); M. Dentz; 01/12/2020 – 28/02/2023; 160.932€
- European Joint Programme on Radioactive Waste Management (EURAD); 847593; European Commission; H2020-EURATOM/0654; V. Vilarrasa; 01/06/2019 – 31/05/2024; 114.610 €
- Analysis and Risk Mitigation measures for Induced Seismicity in supercriTICal gEothermal systems (ARMISTICE); 882733; European Commission; H2020-MSCA-IF-EF-ST/0664; V. Vilarrasa; 01/09/2021 – 31/08/2023; 160.932 €
- Control Prediction and LeaRning in Mixing processes (CoPerMix); 956457; European Commission; H2020-MSCA-ITN-ETN/0746; M. Dentz; 01/01/2021 – 31/12/2024; 501.810 €
- A Novel Framework Predictiong Steeady Flow and Solute Transport in Partially Saturated, Heterogeneous Media (USFT); 101066596; European Commission; HORIZON-MSCA-2021-PF-01-01; M. Dentz; 01/06/2022 – 31/05/2024; 181.152 €
- Metal influenced acid water as a source of valuable and critical raw materials (REECOVERY); EIT21033; European Commission; HE/EIT/0106; J. Cama; 01/01/2022 – 31/12/2024; 127.598 €
- Understanding groundwater Pollution to protect and enhance WATER quality (UPWATER); 101081807; European Commission; HORIZON-CL6-2022-ZEROPOLLUTION-01-01; E. Vazquez; 01/11/2022 – 30/04/2026; 861.626 €

Contracts

- Trabajos de modelación hidrogeológica SQM-SALAR; E. Vázquez; 20/4/2018 - 19/4/2021; 304.793 €
- Revisión cálculos hidrogeológicos y seguimiento de los efectos producidos por el agotamiento del freático en el ámbito de la ejecución del túnel de la plaça de les Glòries; E. Vázquez; 10/4/2019 - 9/4/2021; 47.432 €
- Estudio de la intrusión marina en los acuíferos del poble nou y su posible evolución futura en el mar de las obras de la plaça les Glòries; E. Vázquez; 27/1/2020 - 26/1/2021; 46.827 €

| Research Groups  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Geosciences Department |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| Research Group 1 | <ul style="list-style-type: none"><li>• Evaluation of the SKB task force on modeling of groundwater flow and transport of solutes, increasing the realism in solute, transport modeling-modeling de field experiments of Rrepro and LTDE-SD (2020); JM. Soler; 12/5/2020 - 11/5/2021; 24.691€</li><li>• Estudio de la aplicación eficiente de los procesos de lavado domésticos y concienciación en el consumo responsable del agua; E. Vázquez; 1/6/2020 - 28/11/2021; 13.310 €</li><li>• Plataforma agregadora de modelos para la gestión integrada de datos de calidad y estado de masas de agua superficial (LOGIC); J. Carrera; 1/6/2020 - 1/12/2022; 64.706€</li><li>• Redacció de un informe tècnic especialitzat de la problemàtica de filtracions de les aigües freàtiques als soterrani de les promocions d habitatges de la Rambla Prim 160-166 de Barcelona; E. Vázquez; 20/7/2020 - 19/7/2021; 15.657 €</li><li>• Asesoría para el diseño, seguimiento y adecuación de la implementación de los sistemas de drenaje y el control hidráulico de la conexión de los pozos verticales con el túnel del AVE (Tramo Sants - Sagrera); E. Vázquez 16/9/2020 - 15/3/2021; 39.930 €</li><li>• Diseño de una planta de tratamiento pasivo de aguas de mina; J. Cama; 13/10/2020 - 12/4/2021; 47.471 €</li><li>• Modeling of the ci-d experiment at Mont Terri; JM. Soler; 20/10/2020 - 30/6/2022; 36.420 €</li></ul> | Research Group 2       | <ul style="list-style-type: none"><li>• Trabajos de caracterización hidrogeológica e hidrogeoquímica en relación al agotamiento del freático en la Av. Eduard Maristany, par 12, Badalona; E. Vázquez; 28/9/2021 - 27/11/2021; 19.360 €</li><li>• Furnishing of professional services for c803 pre-contract professional consultancy services for design of south of walrah pumping station and outfall; E. Vázquez; 30/9/2021 - 29/4/2022; 61.211 €</li><li>• Actualització i avaluació dels impactes hidrogeològics que pot produir l’extracció d’aigües subterrànies a l’entorn de l’estació de Baró de Viver pel seu aprofitament energètic; E. Vázquez; 23/11/2021 - 22/11/2022; 17.242 €</li><li>• 3D Modelling of the monopole-2 in situ diffusion (Grimsel test site - long term diffusion project)-2022.; JM. Soler; 13/5/2022 - 12/2/2023; 21.111 €</li><li>• Actualización geológica e hidrogeológica del margen este del delta del Llobregat (Sector Puerto de Barcelona); E. Vázquez; 29/6/2022 - 28/2/2023; 22.385 €</li><li>• Diseño específico, seguimiento e interpretación de los ensayos de bombeo para la caracterización hidráulica del terreno y posterior diseño del sistema de drenaje de las estaciones de la L8.; E. Vázquez; 2/7/2022 - 1/10/2022; 35.991 €</li><li>• Projecte de ressegellat i actuacions complementàries al dipòsit de residus de can planas; J. Carrera; 13/7/2022 - 31/12/2022; 6.050 €</li><li>• Revisión de estudios hidrogeológicos en diferentes áreas de interés para CODELCO; E. Vázquez; 2/9/2022 - 1/9/2024; 50.250 €</li><li>• Realización del proyecto de investigación y desarrollo titulado “aiblocks4water”, en colaboración con la empresa Neuritelab; J. Carrera; 11/11/2020 – 10/07/2021; 14.500€</li></ul> |
|                  | <ul style="list-style-type: none"><li>• Modelado del flujo subterráneo en el ámbito del trazado de la línea 8 y evaluación de efectos sobre los acuíferos de la ciudad de Barcelona; E. Vázquez; 20/11/2020 - 19/3/2021; 30.515 €</li><li>• At anàlisi zones amb assentaments lmt detectades amb infometria radar a diversos trams; E. Vázquez; 1/1/2021 - 31/8/2021; 18.090 €</li><li>• 3D Modelling of the monopole- 2 in situ diffusion (Grimsel test site - long-term diffusion project); JM. Soler; 29/3/2021 - 28/12/2021; 18.833 €</li><li>• Previsión de caudales y concentración en as a tratar durante los trabajos de agotamiento freático; E. Vázquez; 16/4/2021 - 15/6/2021; 14.520 €</li><li>• Estudio de las causas origen de la surgencia de agua en un solar en obras, Calle Llacuna 42, Barcelona; E. Vázquez; 10/6/2021 - 9/8/2021; 19.122 €</li><li>• Estudio y seguimiento de la evolución del drenaje y los niveles freáticos al entorno de la Plaça de la Vila de Sant Adrià del Besòs; E. Vázquez; 22/9/2021 - 21/12/2021; 12.100€</li></ul>                                                                                                                                                                                                                                                                                                                                                     |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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58

59

# Surface Hydrology and Erosion



## Surface Hydrology and Erosion

The Surface Hydrology and Erosion group is oriented towards the study of the hydrological dynamics of Mediterranean mountain areas using a multidisciplinary and multiple-scale approach. Several aspects of the hydrological cycle are investigated, utilising the Vallcebre Research Catchments (NE Spain) as a field laboratory to observe, quantify and model hydrological processes at the plot and catchment scale. The role of forests on hydrological processes and balances, the societal challenges induced by intense erosion processes and the regime of temporary rivers are among the main research subjects studied by this group. Additionally, the group is studying aquatic biodiversity, including both fundamental and applied approaches, with the aim of improving our current understanding and management of aquatic ecosystems in the face of global change.

## Projects

- Proyecto de colaboracion institucional para financiar las tareas que tienen que realizar el grupo fehm del IDÆA-CSIC (TRIVERS); 2017SGR01643; Universitat de Barcelona; F. Gallart; 11/02/2019 - 02/02/2021; 15.000 €
- Estat ecològic dels rius temporals: Mètodes d’avaluació de les bases desconnectades; ACA/210/18/0022; Agència Catalana de l’Aigua (ACA), Proyectos de investigación en la gestión del agua y la preservación y mejora del medio acuático; F. Gallart; 28/01/2020 - 27/1/2023; 39.270 €
- Utilizando los isótopos estables del agua para desenredar el funcionamiento eco-hidrológico de las cuencas de cabecera mediterráneas; PID2019-106583RB-I00; Ministerio de Ciencia, Innovación y Universidades, Proyectos I+D+i - Programa estatal de I+D+i orientada a los retos de la sociedad - Plan estatal de investigación científica y técnica y de innovación 2017-2020; J. Latron 01/06/2020 - 31/05/2023; 169.400 €
- Tracing water fluxes in the soil-vegetation-atmosphere continuum using stable isotopes.; LINKB20081; Consejo Superior de Investigaciones Científicas, CSIC Conexión internacional i-LINK+ para la promoción de la colaboración científica internacional; P. Llorens; 01/01/2022 - 31/12/2023; 23.833 €
- Conservación de la biodiversidad acuática en los Parques Nacionales de las Islas Canarias en un contexto de estrés hídrico y especies invasoras.; SPIP2022-02901; Ministerio para Transición Ecológica, Proyectos de investigación científica en la red de Parques Nacionales; M. Cañedo-Argüelles; 1/5/2022 - 30/4/2024; 83.336 €
- Distribución y vulnerabilidad al cambio climático de los macroinvertebrados acuáticos de las Islas Canarias; EIC21-1-368; Fundación BBVA, Ayudas de la Fundación BBVA a proyectos de investigación científica; M. Cañedo-Argüelles; 30/06/2022 - 30/06/2024; 124.598 €



## Group

### Permanent Research Staff

Llorens Garcia, Pilar  
Latron, Jérôme  
Gallart Gallego, Francesc (‘ad honorem’ since 13 March 2022)

### Postdoctoral Research Staff

Cañedo-Argüelles, Miguel  
Acosta Rivas, Raúl

### PhD Student

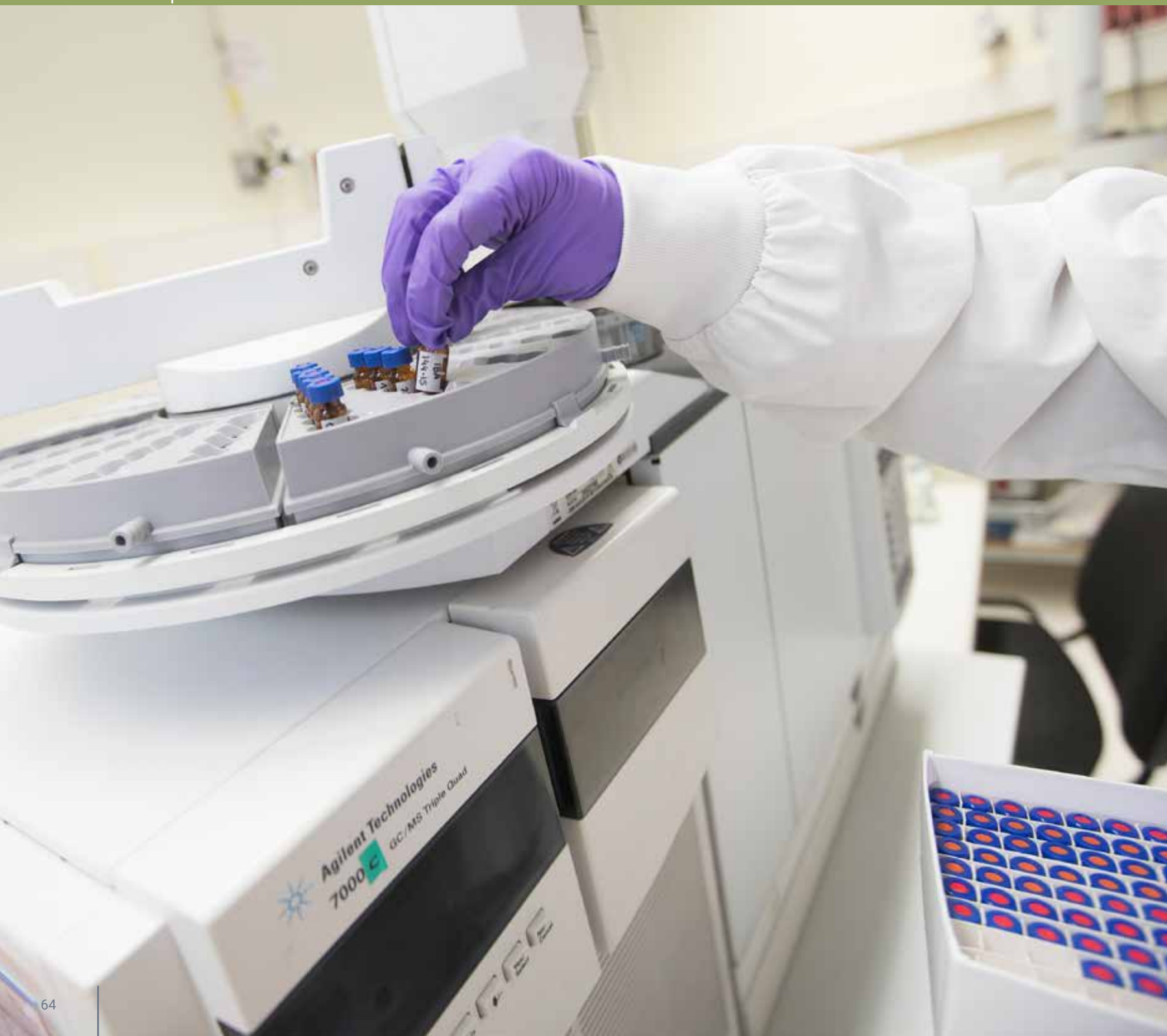
Alharfouch, Loujain  
Moyano-Salcedo, Álvaro  
Pinos Flores, Juan Andrés  
Saurat, Pauline

### Technical Staff

Bertran Creus, Gisela

- Contracts
- Optimización del consumo de agua del bosque para la recuperación del agua azul; P. Llorens; 3/10/2022 - 3/10/2024; 3.500 €





### Gas Chromatography

#### Staff

Fernández Escobar, Inmaculada  
(Service supervisor)

This service has currently twelve gas chromatographs equipped with different detectors (FID, ECD, NPD). Most of them have automated systems to introduce liquid samples or by SPME into Split/Splitless, On-Column or PTV injectors. The service is available to users as self-service who are supported by a technician assigned to the service. The greater part of applications that are carried out within this service are related to environmental pollution, for example Alkenone determination in paleoclimatic studies (GC-FID), Trihalomethane analysis (HS-SPME-GC-ECD), Priority organic pollutants (PCBs, pesticides, ...) in environmental and biological samples (GC-ECD), Monitoring organic synthesis reactions (GC-FID).

### High Resolution Mass Spectrometry

#### Staff

Sauló Dalmau, Jordi  
(Service supervisor)

This service is suitable for analysis at trace levels and sub-traces and is currently used mainly for the analysis of persistent organic pollutants in environmental matrices and food. The service includes:

1. High resolution HRMS: High Resolution Mass Spectrometer, AutoSpec Ultima NT. (Waters), MS magnetic sector coupled to a high-resolution gas chromatograph.
2. Low Resolution LRMS: Low resolution Mass Spectrometer ISQ, (Thermo Scientific) MS single quadrupole, coupled to a high-resolution gas chromatograph.

### Advanced Mass Spectrometry Analysis: Orbitrap

#### Staff

Flores Rubio, Cintia  
(Service supervisor)

Bartolomé Rodríguez, Arancha  
Herrera Hernández, Eva María

The service consists of a HPLC-HESI-HRMS Orbitrap system and focuses in the analysis of non-volatile and polar substances at trace levels in environmental and food matrices by liquid chromatography coupled to high resolution mass spectrometry and electrospray ionization. Nowadays, she is approaching different challenges related with: the concern of identification of “know-unknowns” compounds; targeted, non-targeted and suspects screening strategies; and, lipidomic and metabolomics approaches.

The service is supported by R&D agreements with public and private entities, provision of services and projects in collaboration with international and national research institutions.

The performance of LC-HRMS-Orbitrap system that differentiates against other LC-MS systems is the accurate mass measurements (AMM) of isolated compounds and their fragmentation products on food and environmental samples. HRMS is a very powerful technique in Full Scan acquisition mode that allows to: carry out a reliable and robust identification and quantitation; detect unmonitored, new, and emerging compounds, initially not included in the targeted MS and MS/MS methods; and, perform screening and retrospective analysis.

Examples of priority and emerging organic compounds studied are: drugs, cytostatic compounds, haloacetic acids (HAAs), surfactants, per- and polyfluoroalkyl substances (PFAS), pharmaceuticals, pesticides, cyanotoxins, ciguatoxins, palitoxins, lipophilic marine biotoxins, lipids, triglycerides, natural organic matter (NOM), etc.

Examples of analyses:

- Non-targeted multi-analysis of organic compounds by HPLC-ESI-HRMS.
- Characterization of compounds by accurate mass measurement (AMM) and ultra-HRMS.
- Metabolite analysis by HPLC-ESI-HRMS and all ion fragmentation.
- Analysis of degradation products by HPLC-ESI-HRMS and HCD fragmentation.
- Determination of isotopic profiles by ESI-HRMS.
- Lipidomic and metabolomic approaches.



### Laboratory of Mass Spectrometry – Organic Pollutants

#### Permanent staff

Bartolomé Rodríguez, Arancha  
Flores Rubio, Cintia  
Planas Pastor, Carles

#### Technical Staff

Herrera Hernández, Eva María  
Mateo Pérez, Bárbara  
Paraian, Alexandra

The main research activity of the Laboratory of Mass Spectrometry-Organic Pollutants focuses in developing, updating and integrating analytical methodologies based on the most recent Mass Spectrometry techniques (MS, HRMS and MS/MS) to study the presence, transport and degradability of organic pollutants (persistent [POPs], priority and emerging) and toxins both in environmental and food matrices.

The chemical substances under study include organic compounds from different families of persistent, priority and emerging pollutants such as PAHs, PCBs, PBDEs, pesticides, DBPs, surfactants, PFAS, pharmaceuticals, benzotriazoles and toxins. The methodologies and substances under study are updated according to the evolution of the different legislation (RD 140/2003, Water Framework Directive, Watch List, etc ...) and the families of emerging compounds.

- Research on Organic Pollutants (persistent [POPs], priority, emerging) with MS and HRMS analytical methodologies in aquatic environments (water, sediments, soils, sludges and biota) and in food and other related products intended for human consumption.
- Targeted, Non-targeted and Suspects Screening HRMS and MS/MS strategies.
- Fate and behavior of organic compounds and degradation products in advanced water treatment processes: wastewater (WWTP), desalination, drinking (DWTP) and reclaimed water (ERA), for the improvement and optimization of treatments.
- Research about toxins (cyanotoxins, ciguatoxins, tetrodotoxins, palitoxins and lipophilic marine biotoxins) by HRMS and MS/MS.
- Analysis of disinfection by-products (DBPs).
- Screening of volatile organic pollutants (VOCs) by Closed Loop Stripping Analysis (CLSA) and GC-MS.
- Organic pollutant trapping methodology using analytical granular activated carbon (GAC) columns.
- Lipidomic and metabolomic approaches based in new HRMS-AMM techniques.
- Identification of non-targeted compounds and unknowns in different environmental and food matrices by HRMS-AMM supported with new HRMS software's for nominate/apply.
- Characterization of dissolved organic matter by HRMS.
- Research of substances capable of giving tastes and smells in consumer beverages.
- Research of migration products and off-flavors compounds in food.



**Mass Spectrometry-Special Techniques**

The Mass Spectrometry-Special Techniques Service is composed by a large number of mass spectrometers hyphenated to gas and liquid chromatographs. It is devoted to trace organic analysis in all sort of samples, namely environmental matrices and foodstuffs. These instruments are very powerful and allow the analysis of pure compounds, and also complex mixtures.

**Staff**

Chaler Ferrer, Roser  
(Service supervisor)

In GC-MS, we analyze volatile and semi-volatile compounds. The service encompasses priority pollutants (as pesticides, aromatic hydrocarbons PAHs, polychlorinated biphenyls PCBs, phthalates, and brominated flame retardants PBDEs), and also emergent ones (pharmaceuticals, bisphenol).

García Barrera, Alexandre

In LC-MS, we analyze non-volatile and polar compounds. The service encompasses priority pollutants (as pesticides), and also emergent ones (abuse drugs, pharmaceuticals, biocides).

In this service, we can find routine instruments (GC-MS simple quad, GC -MS/MS and LC-MS/MS triple quad) and also high performance ones (GC-MS/MS Q-Orbitrap, LC-MS/MS Q-Orbitrap, LC-MS/MS Q-ToF).



Dioxin Laboratory  
(accredited)

Staff

Abad Holgado, Esteban  
(Service supervisor)

Ábalos Navarro, Manuela  
Adrados León, Miguel Ángel  
Martrat Castellví, María Generosa  
Parera Costa, Jordi  
Sauló Dalmau, Jordi

The Dioxin Laboratory focuses on the development and application of analytical methodologies for the study of these compounds, both in environmental samples and food and feed matrices. Accredited according to UNE-EN-ISO/IEC 17025, the laboratory also participates in projects related with toxicological and epidemiological studies in which the effects on humans are subject of investigation. It is also noticeable, that the laboratory participated in a Circumnavigation study, in which, among other items, it was reported as for the first time the levels of some persistent organic pollutants, including dioxins and dioxin-like compounds, in open oceans and their role in the global distribution of these pollutants worldwide.

Oil Spill Analysis  
(Accredited)

Staff

Domínguez Fernández, Carmen  
(Service supervisor)

Pulgar García, Sandra  
Bayona, Josep Maria

This service is another accredited IDÆA laboratory since 2012, in this case awarded the accreditation by ENAC (ISO 17025) and based on the chemical characterization of oil spills in the aquatic environment according to the CEN 15522-2 legal standard, which is based on the principles of environmental forensics. The products capable of being assayed include crude oil and its derivatives which contain a significant proportion of hydrocarbons with a boiling point higher than 200°C. The method is based on a comparative study of ratios of molecular markers between the different candidate sources and the contaminated samples. Even though the laboratory has a great expertise in the determination of a wide range of environmental samples, the accreditation scope is specifically limited to seawater, sampling nets, emulsioned samples and tar balls. This IDÆA marine geochemistry laboratory is responsible for all the steps in the analytical process of the oil spills except sampling and transportation.

In addition, since 2021 the laboratory has extended its scope of accreditation for the identification of accumulated organic chemical on the marine surface, based on an internal procedure (i.e. non-mineral oils, FAMES, cyclosiloxanes, phthalates...).

**Volatile Organic  
Compounds  
Analysis**

**Staff**  
Marco Asensio, Esther  
(Service supervisor)

The service provides sampling, identification and quantification of volatile organic compounds (VOCs) emitted into the environment from anthropogenic and biogenic sources. Dynamic methods onto sorbent cartridges are used for atmospheric samples and BIO-VOC™ devices and sorbent cartridges for exhaled breath samples. These samples are analyzed by thermal desorption coupled to gas chromatography and mass spectrometry. Aldehydes are determined by high-performance liquid chromatography with ultraviolet detector. VOCs present in water samples are analyzed by purge and trap coupled to gas chromatography and mass spectrometry. The service also provides analysis of VOCs emitted by textile materials and present in pharmaceutical products.



**Environmental  
Toxicogenomics  
Laboratory**

**Staff**  
Casado Belloso, Marta  
(Service supervisor)

Barata Martí, Carlos  
Piña Capó, Benjamí

The Environmental Toxicogenomics Service offers a suite of equipment to carry out several molecular biology techniques such as: RNA and DNA extraction and quantification, RNA quality control, agarose gel electrophoresis, gene detection, gene expression analysis, genetic variation analysis, etc. The Service includes two Real Time PCR systems (LightCycler 480, Roche) equipped with 96 and 384 reactions block; a thermocycler with two independent 48-well blocks (Biorad); an 8-channels Nanodrop UV-Vis Spectrophotometer and a Bioanalyzer (Agilent).

**Mercury Analysis  
In Enviromental  
Samples**

**Staff**  
Díez Salvador, Sergi  
(Service supervisor)

This laboratory has the capability to analyse total mercury (Hg) in any kind of solid and liquid samples (e.g. water, sediment, soil, particulate material, biological material, food, etc). This service includes two pieces of equipment: the AMA-254 from Leco and a brand-new DMA-80 EVO double beam from Milestone. In both devices, the procedure is based on the thermal decomposition of the solid sample, gold trap amalgamation, thermal desorption and detection by atomic absorption spectrophotometry using the method EPA 7473, as well as the ASTM D-6722-01 and the ASTM D-7623-10 methods.



Atmospheric  
Monitoring  
Network

Staff

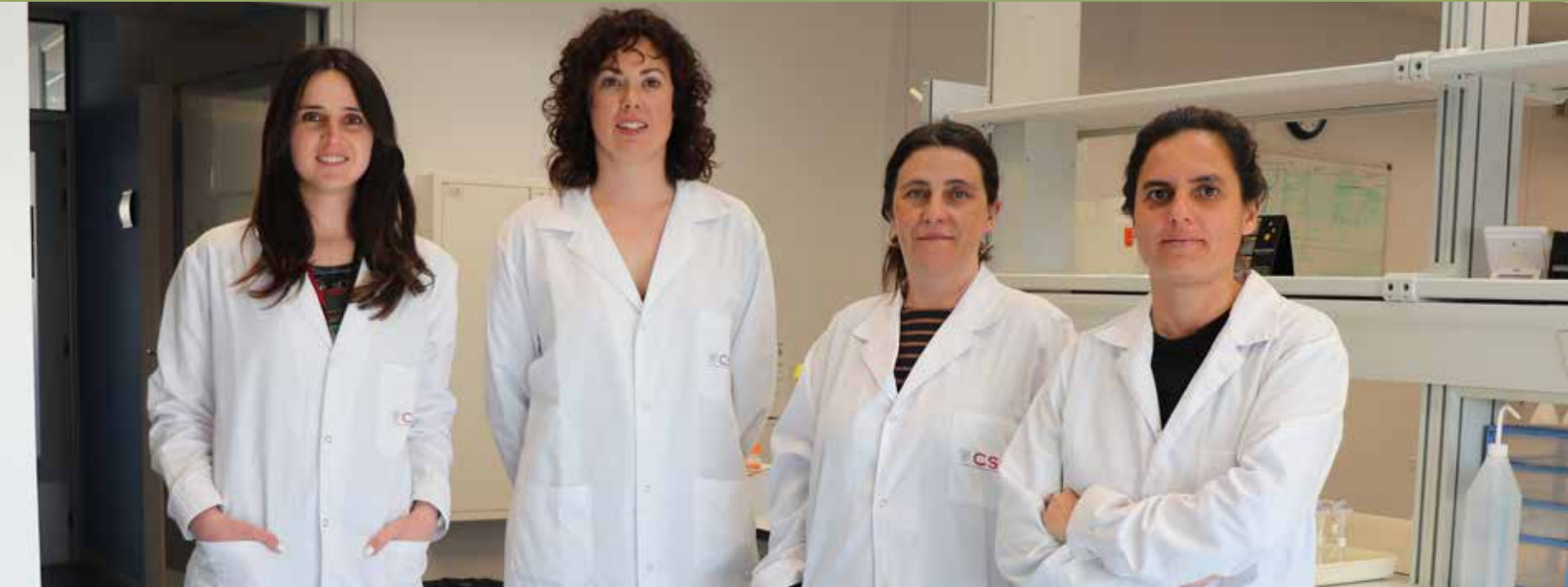
Alastuey Urós, Andrés  
(Service supervisor)

Amato, Fulvio  
Blanco Zarcero, Diana  
Minguillón Bengochea, María Cruz  
Moreno Pérez, Teresa  
Pandolfi, Marco  
Pérez Lozano, Noemí  
Querol Carceller, Xavier  
Reche Andúgar, Cristina  
Viana Rodríguez, Mar

The IDÆA Atmospheric Research network is a unique infrastructure for atmospheric research located in NE Spain. It is integrated by a Mobile Unit and a cluster of three observational platforms for atmospheric aerosols: Montsec (MSA, mountain site, 1590 m.a.s.l.), Montseny (MSY, Regional background, 720 m.a.s.l.), and Barcelona (BCN, Urban background, 78 m.a.s.l.). The infrastructure is particularly well-equipped for the in-situ characterization of aerosols (optical, physical, and chemical offline and online). All sites are also equipped with instruments for trace gases and two of them (MSY and BCN) will be equipped with instruments for VOCs online. Ceilometers are also operated at MSA and MSY, for remote sensing observation of atmospheric aerosols.

The three sites are part of the ACTRIS network. The Barcelona urban background site is one of the only 5 sites in Europe that has been initially accepted as an ACTRIS National Facility so far ([www.actris.net](http://www.actris.net)).

Access to the network permits investigating three different environments, connecting Air Quality, Health and Climate Research. It is the only infrastructure as such in the Western Mediterranean Basin, a unique region for atmospheric research given the high insolation, the specific meteorology, the elevated emissions of pollutants, and the frequent impact of dust outbreaks.



Atmospheric  
Geochemistry Lab

The Atmospheric Geochemistry Laboratory provides all the elementary tools and materials for the complete physicochemical characterization of environmental samples:

Staff

Blanco Zarcero, Diana  
(Service supervisor)  
Olmos Liberal, Mar  
(Service supervisor)  
  
Rodríguez Luque, Ainhoa  
Vázquez de la Hera, Rebeca

- Filter treatments for sampling atmospheric particulate matter
- Total acid digestion and subsequent ICP-AES and ICP-MS analyses
- Leaching test and subsequent chromatography and selective electrodes analyses
- Organic carbon and Elemental carbon analyses
- Ion Chromatography analyses
- Quantitative ammonium concentrations analyses
- Quantification of mercury in solid and liquid samples
- Gravimetric analysis
- Particle-size distribution by laser method
- Aerosol chemical speciation monitor
- Potentiometry/Electrometric analysis (pH, conductivity, selective electrodes)



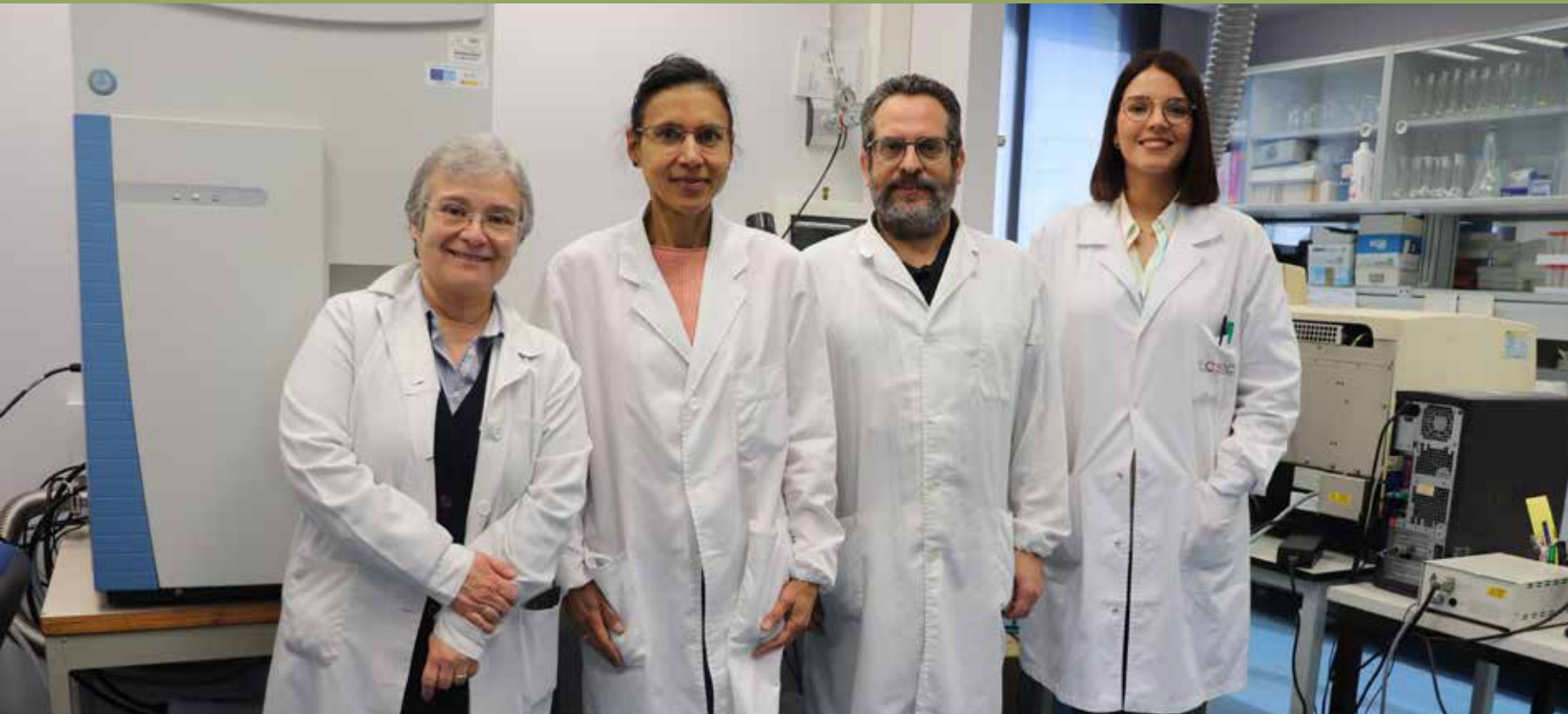
Vallcebre Research Catchment

This service includes a network of long-term (30 years) instrumented small hydrological catchments located in the South-Eastern Pyrenees (1100-1700 m a.s.l.) with a mean annual precipitation around 880 mm.

**Staff**  
Llorens García, Pilar  
(Service supervisor)

The scientific infrastructure and the available datasets in the Vallcebre research catchments consist of:

- A network of rainfall gauges to measure and sample rainfall. Precipitation is recorded (3 locations) at 5-min intervals and sampled for water stable isotopes (1 location) each 5-mm of rainfall and weekly (2 locations).
- Two complete meteorological stations, which record air temperature and relative humidity, net radiation and wind speed and direction at 5-min intervals.
- A network of gauging stations at the outlets of catchments ranging from 0.025 to 4.17 km<sup>2</sup>. These gauging stations record stream discharge (5 locations) and suspended sediment concentrations (3 locations) at 5-min intervals. Stream water is also sampled weekly and during runoff events for water stable isotopes.
- A network of sensors for soil water content recording at 5-min intervals in the first 90 cm of the soil (3 locations).
- A network of piezometers for groundwater level recording at 10-min intervals (20 locations). Groundwater is also sampled weekly for stable isotopes.
- Two forest plots (*Pinus sylvestris* and *Quercus pubescens*) for eco-hydrological processes studies. These plots record throughfall, stemflow, soil water content and trees transpiration at 5-min intervals.



Laboratory ICP-MS/AES

This laboratory provides semiquantitative and quantitative inorganic analysis of major, minor and trace elements by ICP-AES, and quantitative inorganic analysis of trace and ultratrace elements by ICP-MS.

**Staff**  
Cabañas Albero, Mercè  
(Service supervisor)  
  
Bartrolí Solé, Rafael  
García Martínez, Miriam  
Martínez Sánchez, Silvia  
Torres Agulló, Ana  
Martínez-Carrasco Pérez, Ana M<sup>a</sup>

The samples can come from atmospheric particulate matter, soils, waste mining water and coals.



X-RAY  
LABORATORY

**Staff**  
Moreno Palmerola, Natalia  
(Service supervisor)

Our X-ray laboratory has two different sections:

- Powder X-ray diffraction (XRD): Powder X-ray diffraction is one of the most useful techniques for the characterization of materials that are wholly, or part, crystalline. It is a non-destructive technique, which can be used in natural or synthetic materials of a wide variety of scientific disciplines such as environmental sciences, geology, chemistry and materials science among others. The laboratory is intended for the development of studies related to the crystalline structure of the material, identification of crystalline phases from diffraction patterns, semi-quantitative and quantitative analysis of crystalline phases, polymorphs and impurities determination, clay analysis, with prior preparation of oriented aggregates, grazing incidence X-ray diffraction (GIXRD) analysis and crystal structure refinement by Rietvel method.
- Analysis of air filters using X-ray fluorescence: Our Energy Dispersive X-Ray Fluorescence (EDX-RF) instrumentation is ideal for determining concentrations of multiple elements on air filters. We analyse the elements from sodium to americium with minimal sample preparation and can accommodate air filters with sizes from 25 mm to 47 mm in diameter.



Environmental  
Geochemistry:  
Industrial Pollution

**Staff**  
Córdoba Sola, Patricia  
(Service supervisor)

Bellés Felip, Jordi  
Rojas Castro, Samanta

Investigations into different industrial processes based on copper primary production, wastewater plants, recycling plants, coal combustion products (CCPs), flue gas desulphurisation (FGD) systems, among others, in relation to inorganic trace pollutants and management of residues including treatment processes and valorization.

Services:

Environmental Geochemistry Labs: 1402 and 1403

- Hydrometallurgical processes
- Chemometric methods and tools
- Assemble of industrial processes at lab scale
- Acid-digestion of samples with different matrices for further determination of major, minor, and trace elements
- % Carbonate determination in solid samples
- Mercury determination
- Grain size distribution

GIS Geospatial  
Data Management  
and Analysis

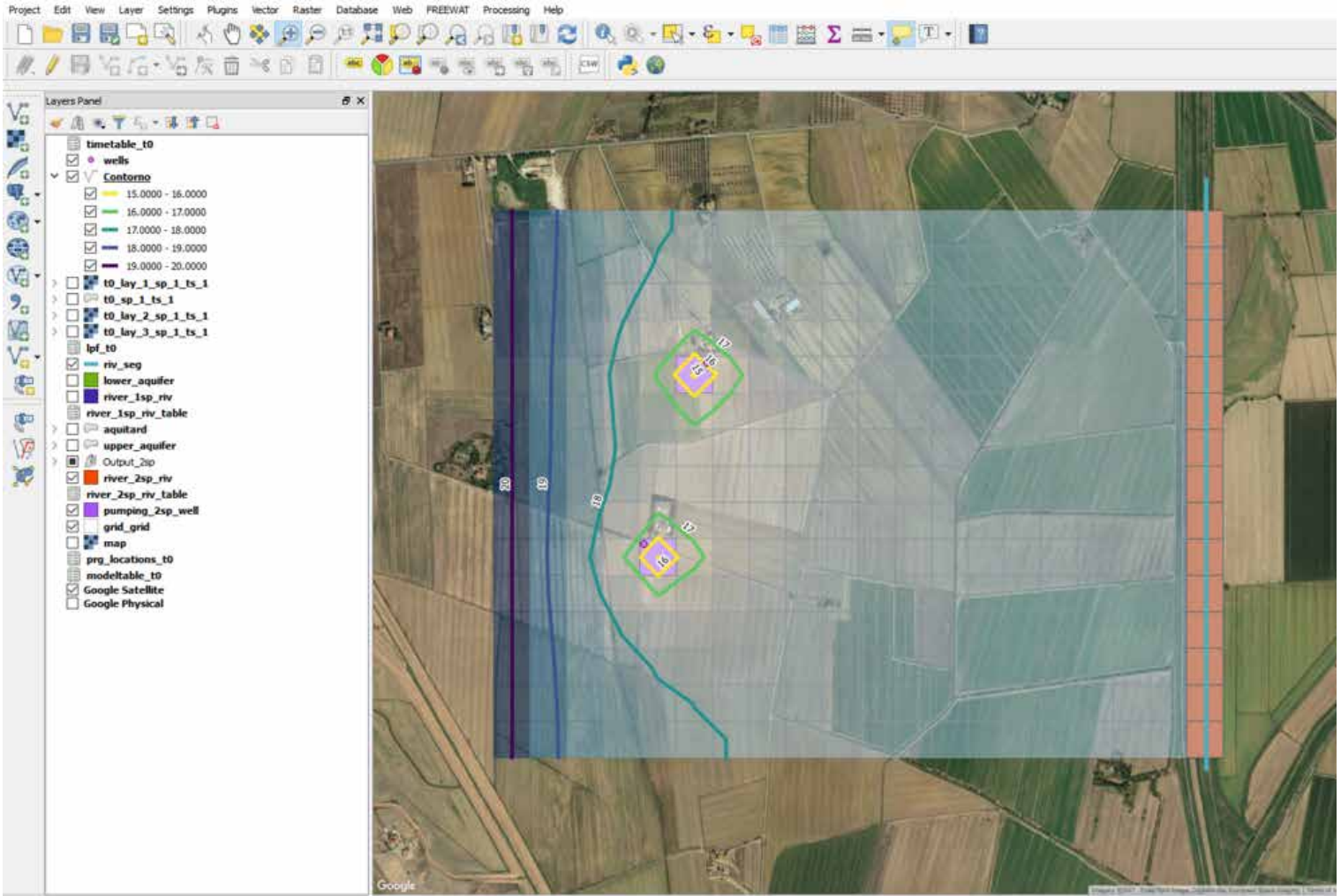
Staff

Vázquez Suñé, Enric  
(Service supervisor)

The GIS Geospatial Data Management and Analysis service provides solutions for the management, visualization and analysis of environmental data at both professional and scientific levels.

The service designs and develops tools for the optimization of management, data mining (data science), analysis, pre-processing, post-processing, visualization, time series, geospatial mapping, space-time representation, etc. The applications are varied, but until now the service has mainly focused in geo-sciences (geology, hydrogeology, geotechnics, mining, hydrometeorology, hydrology, water resources, etc.), although the application field can expand much broader (for example, in biota and ecosystem models, soil, water and atmosphere pollution, atmospheric and oceanographic variables, etc.).

This is a user-friendly service, whose application allows carrying out scientific or professional environmental assessments. Applications can be based on standard tools or custom tools. The standard tools are based on Databases, Geographic Information Systems and in spreadsheets, whereas the custom tools are coded in different programming languages. Training and courses are also offered to improve the skills and usage of all this software.





### Communication and Outreach

#### Staff

S. Arroyo, Alicia  
(Department manager)

Sotres Fernández, Ana  
Rodríguez Bermejo, Alejandro

The Communication and Outreach Department is responsible for the overall leadership in the communication strategy and dissemination of the IDÆA's research production. Department's activities target the scientific community, media and the general public, including educational organisations, business companies and public administration.

During the 2021-2022 period, the Department has strengthened stable relationships with journalists to bring IDÆA to the media frontline. It has also contributed to increase policy influence by publishing factsheets about research studies for regional policymakers. Supporting researchers to meet the requirements in terms of dissemination of their projects is also an essential goal of the Department. It has also attracted specific funding to carry out outreach projects. Finally, the team keeps accomplishing various tasks, such as website maintenance, graphic design, video production, and event organisation, among others.

### Projects

- Fes el canvi, Be Plastic Free; 22S06957-001; Ajuntament de Barcelona (Subvencions Pla Clima 2022); 2022-ongoing; 31.666€
- BCN Art-Ambient; 21 S01378 -006; Ajuntament de Barcelona (Premis Barcelona 2020); 12/07/2021-31/12/2021; 10.000€
- Las chicas son de ciencias (CSIC4Girls); FCT-19-1446; Con la colaboración de la Fundación Española para la Ciencia y la Tecnología - Ministerio de Ciencia e Innovación. M. Viana and Communication and Outreach Department; 01/07/2020 - 30/09/2021; 12.000€



### EU Programmes and Fundraising

#### Staff

Ratera Bastardas, Mercè  
(Department manager)

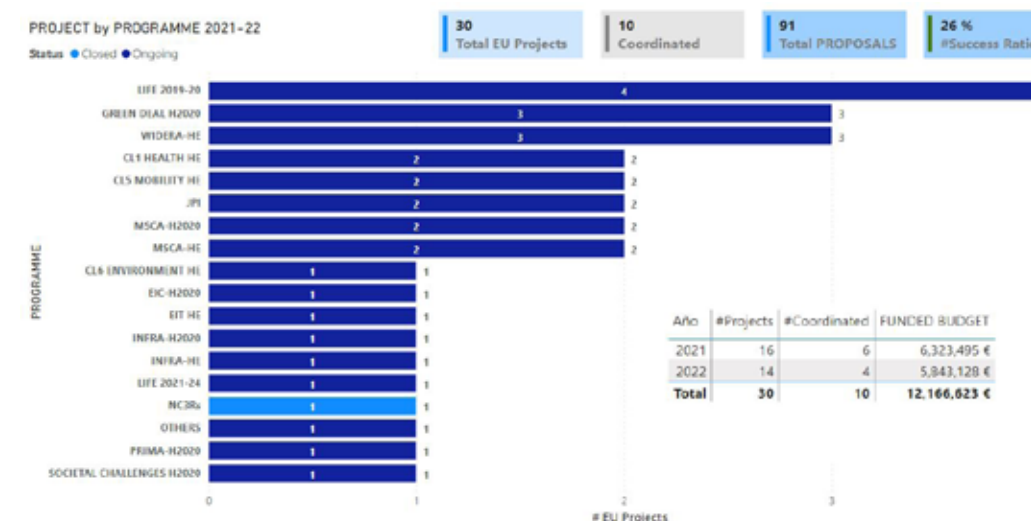
de Campos Paus, Sergio

The IDÆA's EU Programmes and Fundraising Office (EUoffice) is focused on supporting the researchers to increase their participation in European Funding instruments, as well as increasing IDÆA's visibility at EU level. Founded in 2019, the office works closely with the researchers to translate their ideas and expertise into opportunities to apply for EU Research and Innovation programmes. EUoffice's activities embraces from the surveillance of EU Programmes, the definition of strategies to build collaborative consortia, the development of methodologies to efficiently coordinate projects (collaborative tools, templates, contents, etc...), up to developing EU proposals/projects information system for analysing the results for the different EU programmes.

Since January 2020, IDÆA has submitted more than 120 EU proposals (H2020, HEurope and LIFE) with 33 of them being awarded. The EUoffice team have provided special support to the more than 40 proposals coordinated by IDÆA. This effort has been translated into 33 EU ongoing projects (mostly H2020,

HEurope and LIFE), being 12 of them coordinated. The analysis shows an average of 29% of success ratio (in number of proposals) while a 19% success ratio in budget (EC contribution awarded/total requested).

During 2022, the EUoffice has also launched a capacity building strategy for EU proposals, including internal training on proposal preparation, hands-on training and standard contents, but also providing tools and best practices for project management.



DAEA is a high-impact research institute. Over the two years covered by this report, IDAEA has continued to consolidate and develop itself as a reference research institute. We have increased our number of publications in SCI journals, attaining a new record of 684 papers (582 in Q1 journals) and continue to

be one of the most productive institutes in CSIC. A selection of these publications from all IDAEA research groups in 2021-2022 period is shown below, this corresponding to the papers published in 2021 with highest citations at present and those published in 2022 in the journals with highest impact factor.

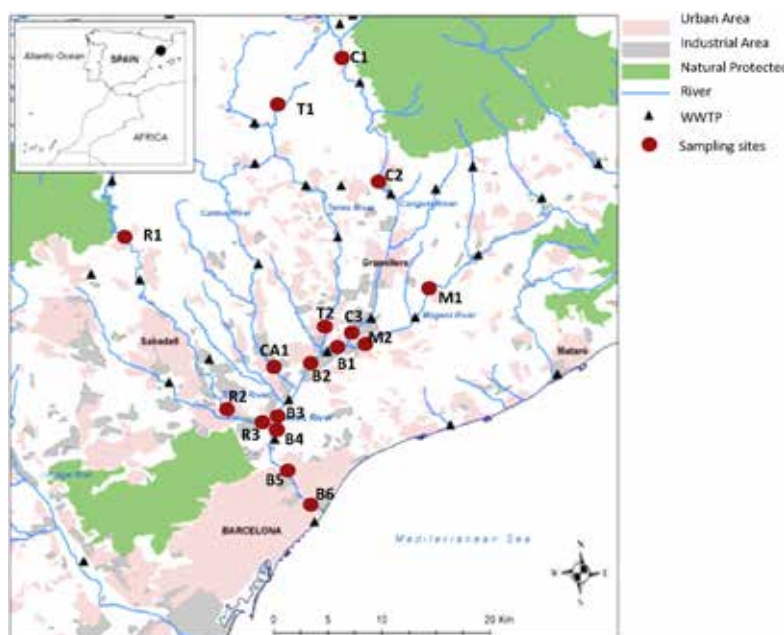
#### ENVIRONMENTAL CHEMISTRY DEPARTMENT

**Bolívar-Subirats, Gabino; Rivetti, Claudia; Cortina-Puig, Montserrat; Barata, Carlos; Lacorte, Sílvia; 2021; Occurrence, toxicity and risk assessment of plastic additives in Besos river, Spain; *Chemosphere*; DOI: 10.1016/j.chemosphere.2020.128022**

#### Chemometrics

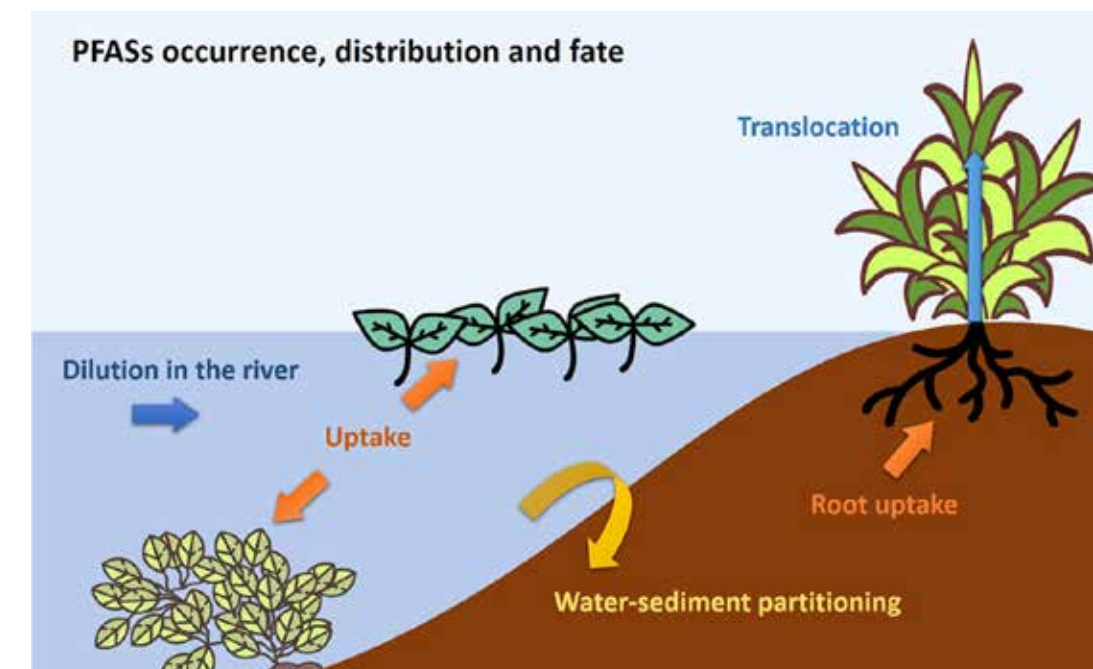
The objective of the present study is to evaluate the presence, seasonal variability and impact of plastic additives along the Besos river basin (Catalonia, Spain). This river flows through a highly urbanized and industrialized area with discharge of >25 Wastewater Treatment Plants (WWTPs) and with large amounts of floating plastics. Compounds studied included 5 phthalates, its substitutes acetyl tributyl citrate (ATBC) and bis(2-ethylhexyl) adipate, 12 long and short chain alkylphenols, bisphenol A and benzophenone, most of them high volume production chemicals. High-performance liquid chromatography-tan-

dem mass spectrometry (HPLC-MS) was used to determine ng/L concentrations. Toxicity evaluation was performed for each individual compound using *Daphnia magna* as test organism and it was found that the effect concentration (EC50) decreased with increasing octanol-water partition coefficients. The EC50 values calculated and Measured Environmental Concentrations were used to determine the risk quotients. Only diethylhexylphthalate, nonylphenol and octylphenol, with median concentrations from 41.9 to 826 ng/L, caused a small risk mostly in downstream waters with 50–75% of the samples overpassing the Environmental Quality Standards set by the European Union. Seasonal variations were observed with higher levels in summer due to low water flows. WWTPs effluents and leaching from floating plastics or microplastics were presumably main sources of pollution.



**Colomer-Vidal, Pere; Jiang, Longfei; Mei, Weiping; Luo, Chunling; Lacorte, Silvia; Rigol, Anna; Zhang, Gan; 2022; Plant uptake of perfluoroalkyl substances in freshwater environments (Dongzhulong and Xiaoqing Rivers, China); *Journal of Hazardous Materials*; DOI: 10.1016/j.jhazmat.2021.126768**

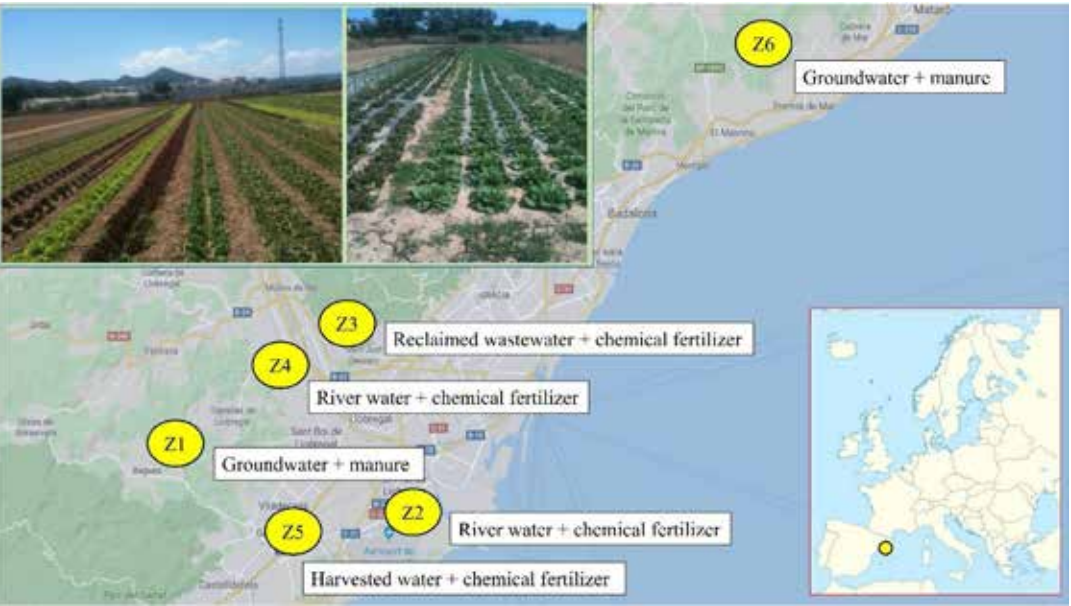
This study provides new knowledge on the mobility, behavior, and partitioning of 17 perfluoroalkyl substances (PFASs) in the water-sediment-plant system along the Dongzhulong and Xiaoqing Rivers. The fate of PFASs in these rivers is also discussed. The study area is affected by the industrial production of perfluorooctanoic acid (PFOA). The  $\Sigma$ PFASs in water and sediments close to the industrial discharge were  $84,000 \pm 2000$  ng/L and  $2300 \pm 200$  ng/g dw, respectively, with the concentrations decreasing along the river due to dilution. PFOA was the dominant compound (74–97% of the  $\Sigma$ PFASs), although other PFASs were identified close to urban areas. Principal component analysis and solid-liquid distribution coefficients revealed that long-chain PFASs accumulated in the sediment whereas short-chain PFASs remained in the water all along the river. PFASs were taken up by plants and remobilized to different plant compartments according to shoot concentration factors (SCFs), root concentration factors (RCF), and transfer factors (TFs). Among the four plant species studied, floating plants absorbed high levels of PFASs, while rooted species translocated short-chain PFASs from the roots to the shoots. Therefore, floating species, due to their high uptake capacity and large proliferation rate, could eventually be used for phytoremediation.



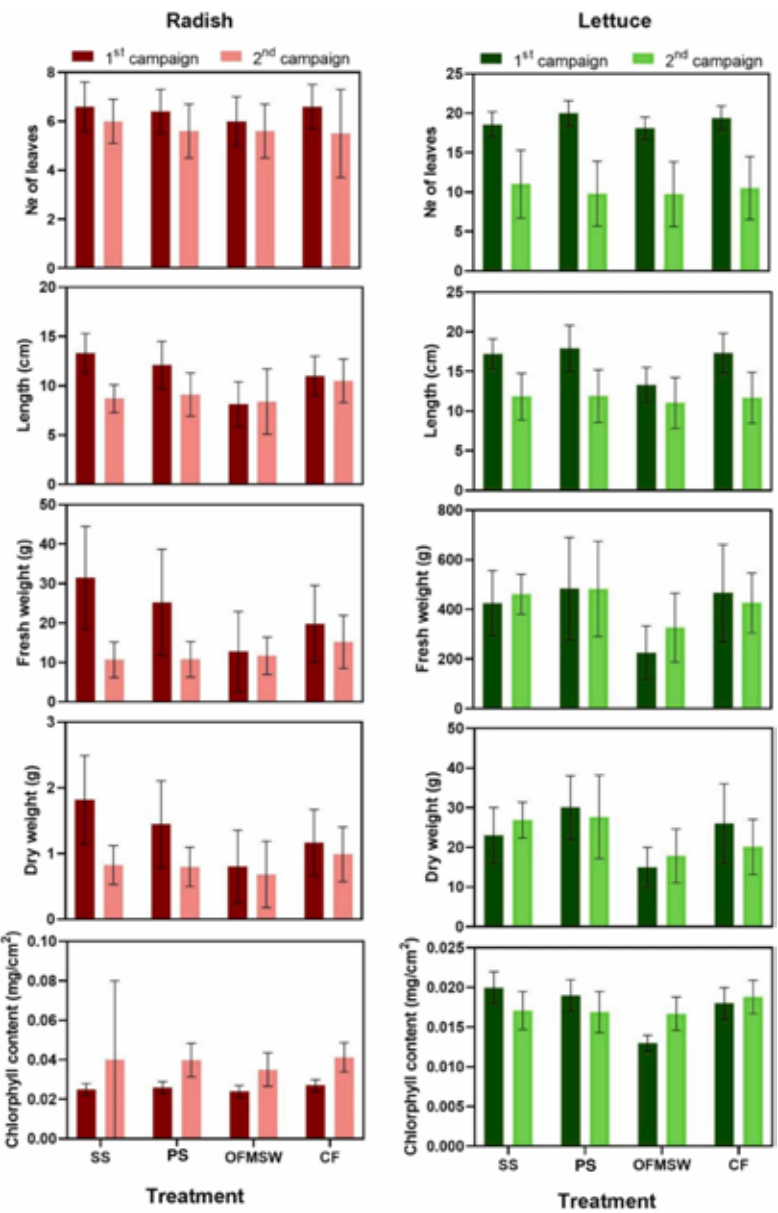
Environmental  
Pollution and  
Agriculture (EPA)

Tadić, Đorđe; Bleda Hernandez, Maria José; Cerqueira, Francisco; Matamoras, Víctor; Piña, Benjamin; Bayona, Josep Maria; 2021; Occurrence and human health risk assessment of antibiotics and their metabolites in vegetables grown in field-scale agricultural systems; *Journal of Hazardous Materials*; DOI: 10.1016/j.jhazmat.2020.123424

The occurrence of antibiotics (ABs) in four types of commercially grown vegetables (lettuce leaves, tomato fruits, cauliflower inflorescences, and broad bean seeds) was analyzed to assess the human exposure and health risks associated with different agronomical practices. Out of 16 targeted AB residues, seven ABs belonging to three groups (i.e., benzyl pyrimidines, fluoroquinolones, and sulfonamides) were above the method detection limit in vegetable samples ranging from 0.09 ng g<sup>-1</sup> to 3.61 ng g<sup>-1</sup> fresh weight. Data analysis (quantile regression models, principal component and hierarchical cluster analysis) showed manure application, irrigation with river water (indirect wastewater reuse), and vegetable type to be the most significant factors for AB occurrence in the targeted crops. Metabolites were detected in 70 of the 80 vegetable samples analyzed, and their occurrence was both plant- and compound-specific. In 73 % of the total samples, the concentration of AB metabolites was higher than the concentration of their parent compound. Finally, the potential human health risk estimated using the hazard quotient approach, based on the acceptable daily intake and the estimated daily intake, showed a negligible risk for human health from vegetable consumption. However, canonical-correspondence analysis showed that detected ABs explained 54 % of the total variation in AB resistance genes abundance in the vegetable samples. Thus, further studies are needed to assess the risks of antibiotic resistance promotion in vegetables and the significance of the occurrence of their metabolites.



Matamoras, V.; Casas, M. Escolà; Mansilla, S.; Tadić, Đ.; Cañameras, N.; Carazo, N.; Portugal, J.; Piña, B.; Díez, S.; Bayona, J.M. 2022; Occurrence of antibiotics in Lettuce (*Lactuca sativa* L.) and Radish (*Raphanus sativus* L.) following organic soil fertilisation under plot-scale conditions: Crop and human health implications; *Journal of Hazardous Materials*; DOI: 10.1016/j.jhazmat.2022.129044

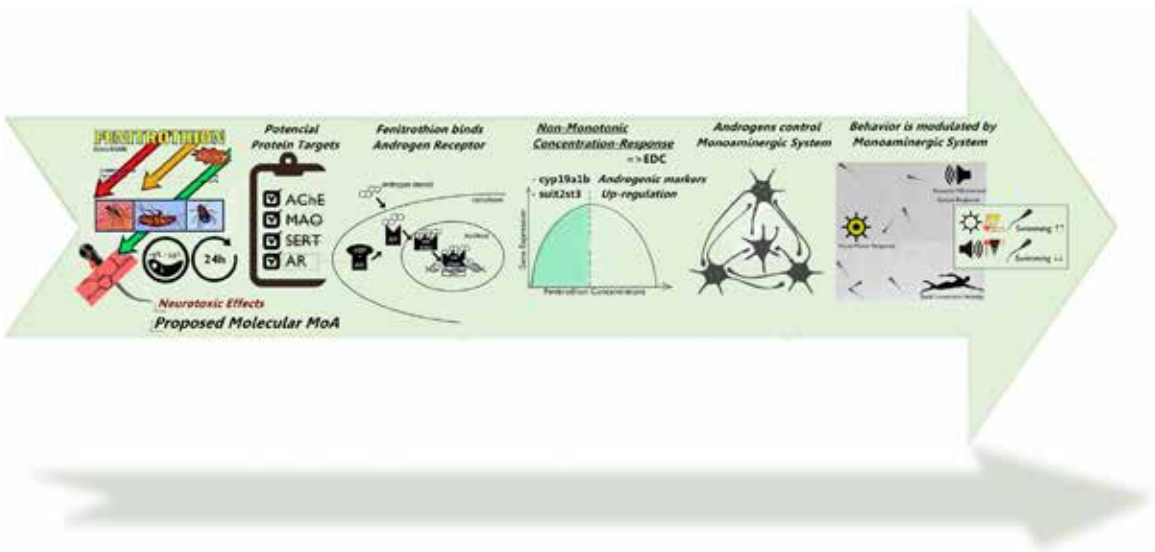


Recent studies have demonstrated the crop uptake of antibiotics (ABs) from soils treated with AB-carrying fertilisers. However, there is a lack of plot-scale studies linking their effects at the agronomic and metabolomic/transcriptomic level to their impact on human health. This paper assesses the plant uptake of 23 ABs following two productive cycles of lettuce and radish cropped with sewage sludge, pig slurry, the organic fraction of municipal solid waste, or chemical fertilisation under plot-scale conditions (32 plots spanning 3-10 m<sup>2</sup> each). AB uptake by plants depended on both the vegetable and the AB class and was higher in radish than in lettuce edible parts. Levels ranged from undetectable to up to 76 ng/g (fresh weight). Repetitive organic fertilisation resulted in an increase in the concentration of ABs in lettuce leaves, but not in radish roots. Significant metabolomic and transcriptomic changes were observed following soil fertilisation. Nevertheless, a human health risk assessment indicates that the occurrence of ABs in lettuce or radish edible parts does not pose any risk. To our knowledge, this is the first holistic plot-scale study demonstrating that the use of organic fertilisers containing ABs is safe for crop security and human health.

Environmental  
Toxicology

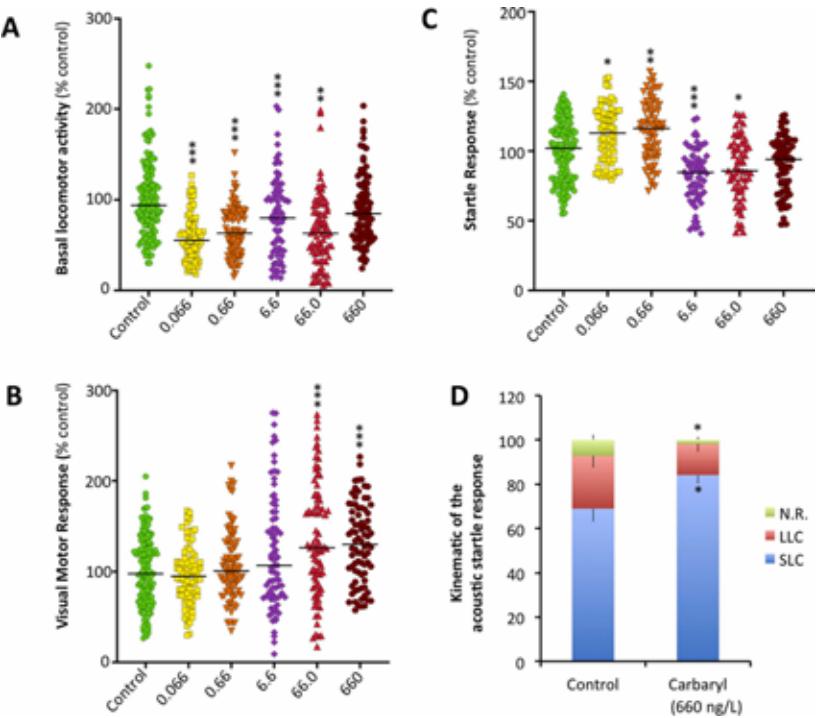
Faria, Melissa; Prats, Eva; Rosas Ramírez, Jonathan Ricardo; Bellot, Marina; Bedrossiantz, Juliette; Pagano, Maria; Valls, Arnau; Gomez-Canela, Cristian; Porta, Josep M.; Mestres, Jordi; Garcia-Reyero, Natalia; Faggio, Caterina; Gómez Oliván, Leobardo Manuel; Raldua, Demetrio; 2021; Androgenic activation, impairment of the monoaminergic system and altered behavior in zebrafish larvae exposed to environmental concentrations of fenitrothion; *Science of the Total Environment*; DOI: 10.1016/j.scitotenv.2021.145671

Fenitrothion is an organophosphorus insecticide usually found in aquatic ecosystems at concentrations in the range of low ng/L. In this manuscript we show that 24 h exposure to environmental concentrations of fenitrothion, from ng/L to low µg/L, altered basal locomotor activity, visual-motor response and acoustic/vibrational escape response of zebrafish larvae. Furthermore, fenitrothion and expression of gap43a, gfap, atp2b1a, and mbp exhibited a significant non-monotonic concentration-response relationship. Once determined that environmental concentrations of fenitrothion were neurotoxic for zebrafish larvae, a computational analysis identified potential protein targets of this compound. Some of the predictions, including interactions with acetylcholinesterase, monoamine-oxidases and androgen receptor (AR), were experimentally validated. Binding to AR was the most suitable candidate for molecular initiating event, as indicated by both the up-regulation of cyp19a1b and sult2st3 and the non-monotonic relationship found between fenitrothion and the observed responses. Finally, when the integrity of the monoaminergic system was evaluated, altered levels of L-DOPA, DOPAC, HVA and 5-HIAA were found, as well as a significant up-regulation of slc18a2 expression at the lowest concentrations of fenitrothion. These data strongly suggest that concentrations of fenitrothion commonly found in aquatic ecosystems present a significant environmental risk for fish communities.



Faria, Melissa; Bellot, Marina; Bedrossiantz, Juliette; Ramírez, Jonathan Ricardo Rosas; Prats, Eva; Garcia-Reyero, Natalia; Gomez-Canela, Cristian; Mestres, Jordi; Rovira, Xavier; Barata, Carlos; Oliván, Leobardo Manuel Gómez; Llebaria, Amadeu; Raldua, Demetrio; 2022; Environmental levels of carbaryl impair zebrafish larvae behaviour: The potential role of ADRA2B and HTR2B; *Journal of Hazardous Materials*; DOI: 10.1016/j.jhazmat.2022.128563

The insecticide carbaryl is commonly found in indirectly exposed freshwater ecosystems at low concentrations considered safe for fish communities. In this study, we showed that after only 24 h of exposure to environmental concentrations of carbaryl (0.066–660 ng/L), zebrafish larvae exhibit impairments in essential behaviours. Interestingly, the observed behavioural effects induced by carbaryl were acetylcholinesterase-independent. To elucidate the molecular initiating event that resulted in the observed behavioural effects, in silico predictions were followed by in vitro validation. We identified two target proteins that potentially interacted with carbaryl, the α2B adrenoceptor (ADRA2B) and the serotonin 2B receptor (HTR2B). Using a pharmacological approach, we then tested the hypothesis that carbaryl had antagonistic interactions with both receptors. Similar to yohimbine and SB204741, which are prototypic antagonists of ADRA2B and HTR2B, respectively, carbaryl increased the heart rate of zebrafish larvae. When we compared the behavioural effects of a 24-h exposure to these pharmacological antagonists with those of carbaryl, a high degree of similarity was found. These results strongly suggest that antagonism of both ADRA2B and HTR2B is the molecular initiating event that leads to adverse outcomes in zebrafish larvae that have undergone 24 h of exposure to environmentally relevant levels of carbaryl.



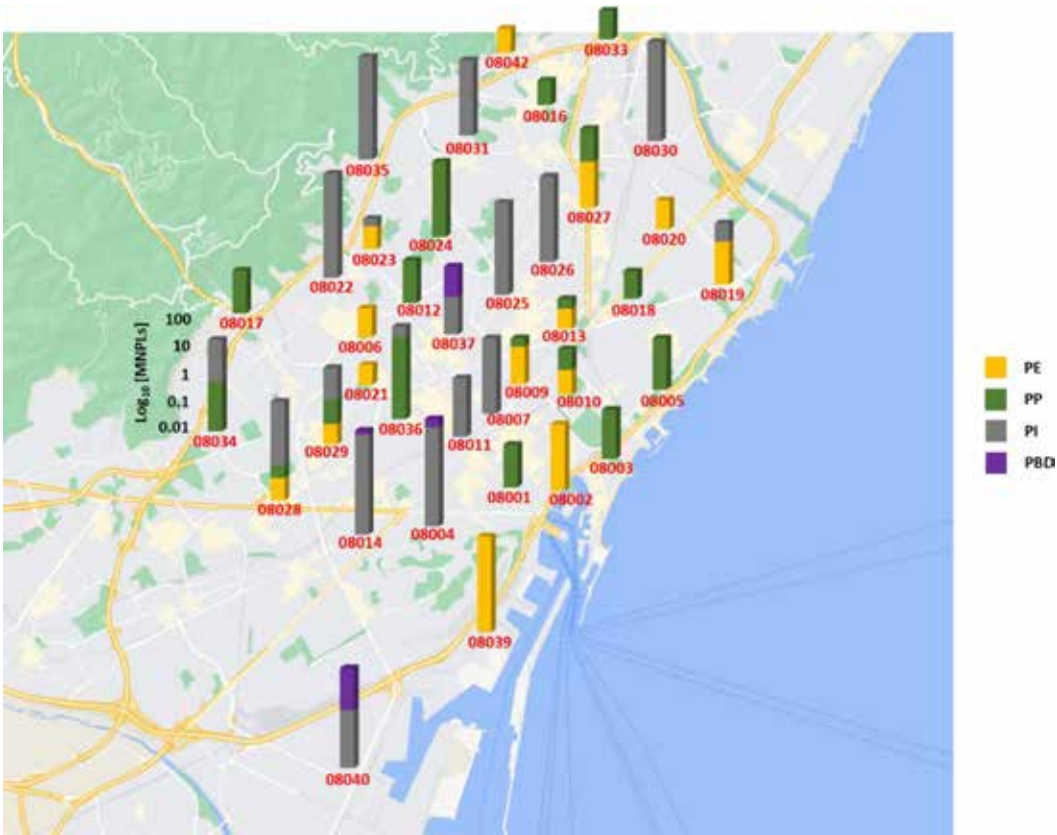
**Onhealth** Fernández-Arribas, J.; Moreno, T.; Bartrolí, R.; Eljarrat, E.; 2021; COVID-19 face masks: A new source of human and environmental exposure to organophosphate esters; *Environment International*; DOI: 10.1016/j.envint.2021.106654

For the first time, organophosphate ester (OPE) content was studied in different types of surgical, self-filtering (KN95, FFP2, and FFP3) and reusable face masks used for COVID-19 prevention. OPEs were detected in all mask samples, although in highly variable amounts which ranged from 0.02 to a maximum of 27.7 µg/mask, with the highest mean concentrations obtained for KN95 masks (11.6 µg/mask) and the lowest for surgical masks (0.24 µg/mask). Twelve out of 16 tested analytes were detected, with TEP, TPHP, TNBP, TEHP and TCIPP being the most common OPEs as well as present at the highest concentrations. The non-carcinogenic and carcinogenic risks of OPE inhalation were calculated as being always several orders of magnitude lower than threshold levels, indicating that the use of face masks is safe with regard to OPE contamination. However, given the wide range of OPEs observed in different masks, it can be concluded that some masks (e.g. reusable) are less OPE-contaminated than others (e.g. KN95). With regard to environmental pollution, the disposal of billions of face masks is adding to the already substantial levels of microplastics and associated toxic additives worldwide, an impact that is lessened by use of reusable masks, which also have the lowest economic cost per user. However, in situations of relatively high risk of viral inhalation, such as poorly ventilated indoor public spaces, we recommend the use of FFP2 masks.



Vega-Herrera, Albert; Llorca, Marta; Borrell-Diaz, Xavier; Redondo-Hasselerharm, Paula E.; Abad, Esteban; Villanueva, Cristina M.; Farré, Marinella; 2022; Polymers of micro(nano) plastic in household tap water of the Barcelona Metropolitan Area; *Water Research*; DOI: 10.1016/j.watres.2022.118645

Microplastics (MPLs) are emerging persistent pollutants affecting drinking water systems, and different studies have reported their presence in tap water. However, most of the work has a focus on particles in the 100–5 µm range. Here, a workflow to identify and quantify polymers of micro and nanoplastics (MNPLs), with sizes from 0.7 to 20 µm in tap water, is presented. The analytical method consisted of water fractionated filtration followed by toluene ultrasonic-assisted extraction and size-exclusion chromatography, using an advanced polymer chromatography column coupled to high-resolution mass spectrometry with atmospheric pressure photoionization source with negative and positive ionization conditions (HPLC(APC)-APPI(±)-HRMS) and normal phase chromatography HILIC LUNA® column and electrospray ionisation source in positive and negative mode (HPLC(HILIC)-ESI(±)-HRMS). The acquisition was performed in full scan mode, and the subsequent tentative identification of MNPLs polymers has been based on increasing the confirmation level, including the characterisation of monomers by using Kendrick Mass Defect (KMD) analysis, and confirmation and quantification using standards. This approach was applied to assess MNPLs in tap water samples of the Barcelona Metropolitan Area (BMA), that were collected from August to October 2020 from home taps of volunteers distributed in the

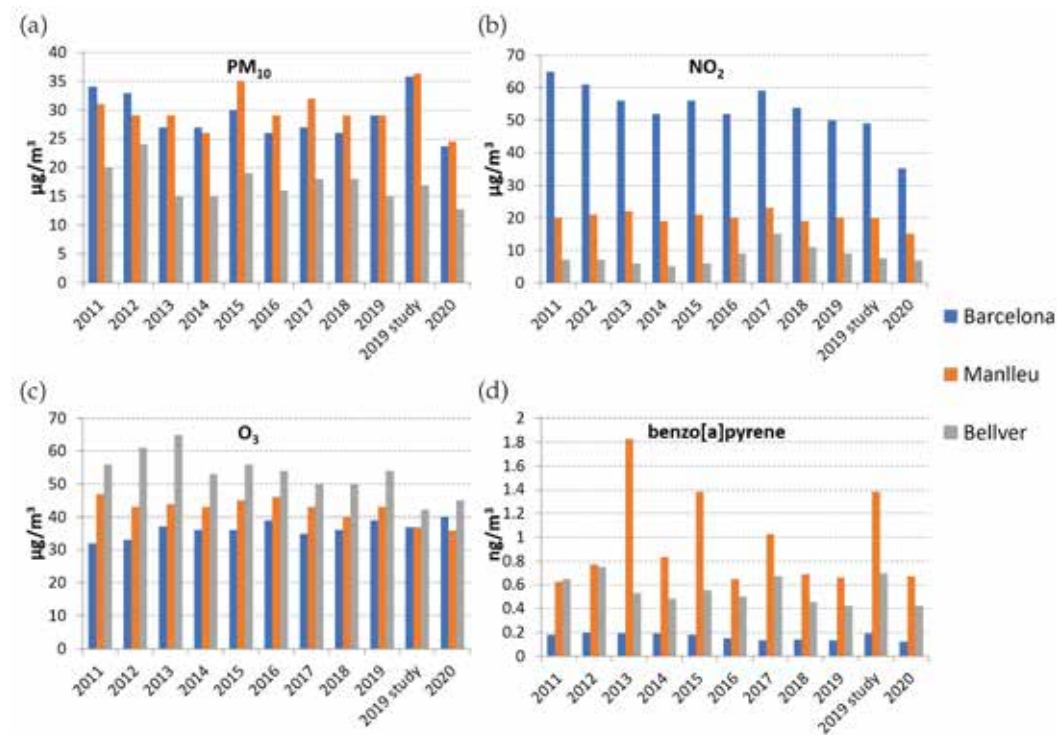


42 postal codes of the BMA. Polyethylene (PE), polypropylene (PP), polyisoprene (PI), polybutadiene (PBD), polystyrene (PS), polyamide (PA), and polydimethylsiloxanes (PDMS) were identified. PE, PP, and PA were the most highly detected polymers, and PI and PBD were found at the highest concentrations (9,143 and 1,897 ng/L, respectively). A principal component analysis (PCA) was conducted to assess differences in MNPLs occurrence in drinking water, that was provided from the two drinking water treatment plants (DWTPs) suppliers. Results showed that no significant differences (at 95% confidence level) were established between the drinking water supplies to the different areas of the BMA.

Geochemistry and  
Pollution

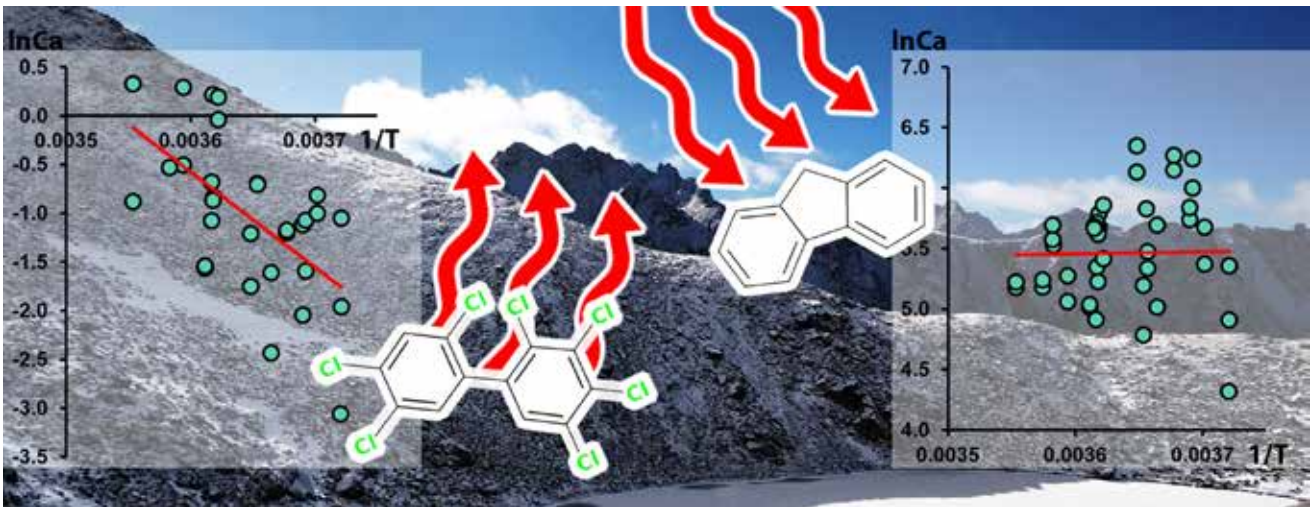
Jaén, Clara; Villascclaras, Paula; Fernández, Pilar; Grimalt, Joan O.; Udina, Mireia; Bedia, Carmen; van Drooge, Barend L.; 2021; Source apportionment and toxicity of PM in urban, sub-urban, and rural air quality network stations in Catalonia; *Atmosphere*; DOI: 10.3390/atmos12060744

Air quality indicators, i.e., PM<sub>10</sub>, NO<sub>2</sub>, O<sub>3</sub>, benzo[a]pyrene, and several organic tracer compounds were evaluated in an urban traffic station, a sub-urban background station, and a rural background station of the air quality network in Catalonia (Spain) from summer to winter 2019. The main sources that contribute to the organic aerosol and PM toxicity were determined. Traffic-related air pollution dominated the air quality in the urban traffic station, while biomass burning in winter and secondary organic aerosol (SOA) in summer impact the air quality in the sub-urban and rural background stations. Health risk assessment for chronic exposure over the past decade, using WHO air quality standards, showed that NO<sub>2</sub>, PM<sub>10</sub> and benzo[a]pyrene from traffic emissions pose an unacceptable risk to the human population in the urban traffic station. PM<sub>10</sub> and benzo[a]pyrene from biomass burning were unacceptably high in the sub-urban and rural background stations. Toxicity tests of the PM extracts with epithelial lung cells showed higher toxicity in wintertime samples in the sub-urban and rural stations, compared to the urban traffic station. These results require different mitigation strategies for urban and rural sites in order to improve the air quality. In urban areas, traffic emissions are still dominating the air quality, despite improvements in the last years, and may directly be responsible for part of the SOA and O<sub>3</sub> levels in sub-urban and rural areas. In these later areas, air pollution from local biomass burning emissions are dominating the air quality, essentially in the colder period of the year.



Prats, Raimon M.; van Drooge, Barend L.; Fernández, Pilar; Grimalt, Joan O.; 2022; Changes and distribution of gas-phase polycyclic aromatic hydrocarbons and organochlorine compounds in a high-mountain gradient over a three-year period (Pyrenees, 2017–2020); *Science of the Total Environment*; DOI: 10.1016/j.scitotenv.2022.154602

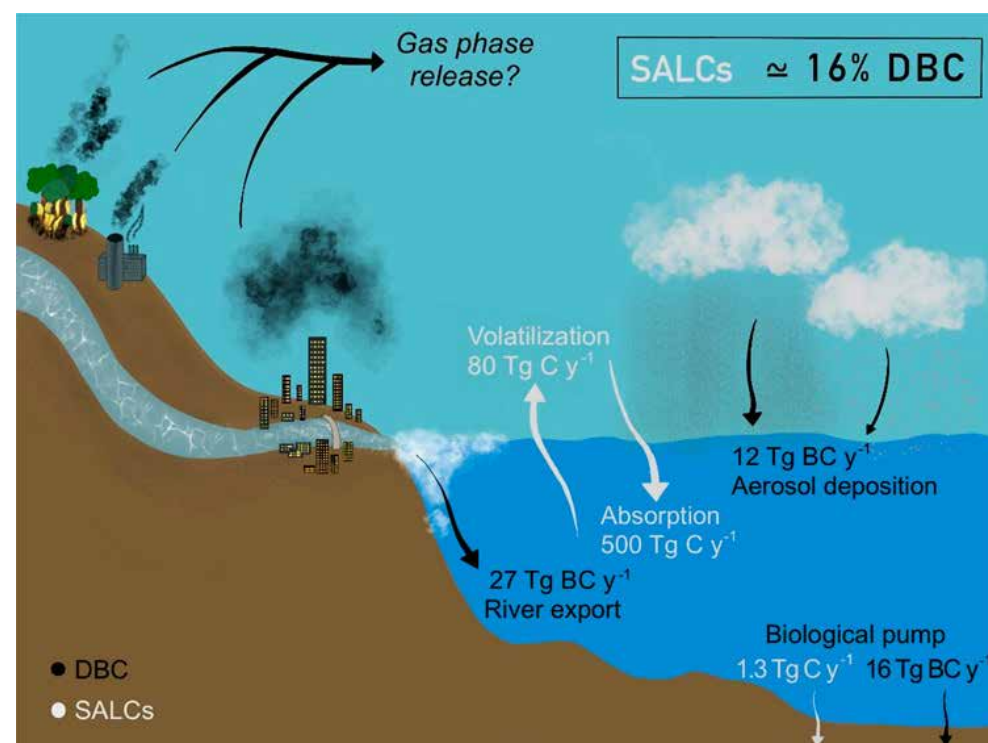
The atmospheric gas-phase concentrations of several polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), hexachlorobenzene (HCB), and pentachlorobenzene (PeCB) were measured in six high-mountain sites in the Pyrenees (1619–2453 m). Polyurethane foam passive air samplers were used for this purpose, providing continuous records spanning over three years (2017–2020). The mean concentrations of ΣPCBs, HCB, and PeCB,  $13 \pm 4$  pg m<sup>-3</sup>,  $44 \pm 18$  pg m<sup>-3</sup>, and  $23 \pm 20$  pg m<sup>-3</sup>, respectively, were of the order of those reported in other mountain sites and similar to those measured 20 years ago in the same area, evidencing the persistence of these compounds despite the international regulatory actions. The mean concentration of ΣPAHs was  $631 \pm 238$  pg m<sup>-3</sup>, representing between two- and three-times lower values than 20 years ago in the same area, but still in the range of other mountain regions. Statistically significant increases in gas-phase concentrations at higher temperatures were observed for most compounds. The experimental phase-change pseudo-enthalpies calculated from the slopes of the regressions between the natural logarithm of the concentrations and the reciprocal of temperature were lower than the reference values for nearly all compounds. This difference suggested a main contribution of long-range atmospheric transport of the gas-phase PAH and organochlorine concentrations in this mountain area. However, the less volatile compounds such as benz[a]anthracene, PCB138, and PCB180 showed a closer similarity between experimental and laboratory enthalpies, indicating that a significant portion of the variations in concentration of these compounds originated from temperature-dependent diffusive exchange by re-volatilization from local surfaces. The concentrations found in these sentinel ecosystems demonstrate that long-range transport of organic pollutants remains a risk in remote continental environments.



Global Change  
and Genomic  
Biogeochemistry

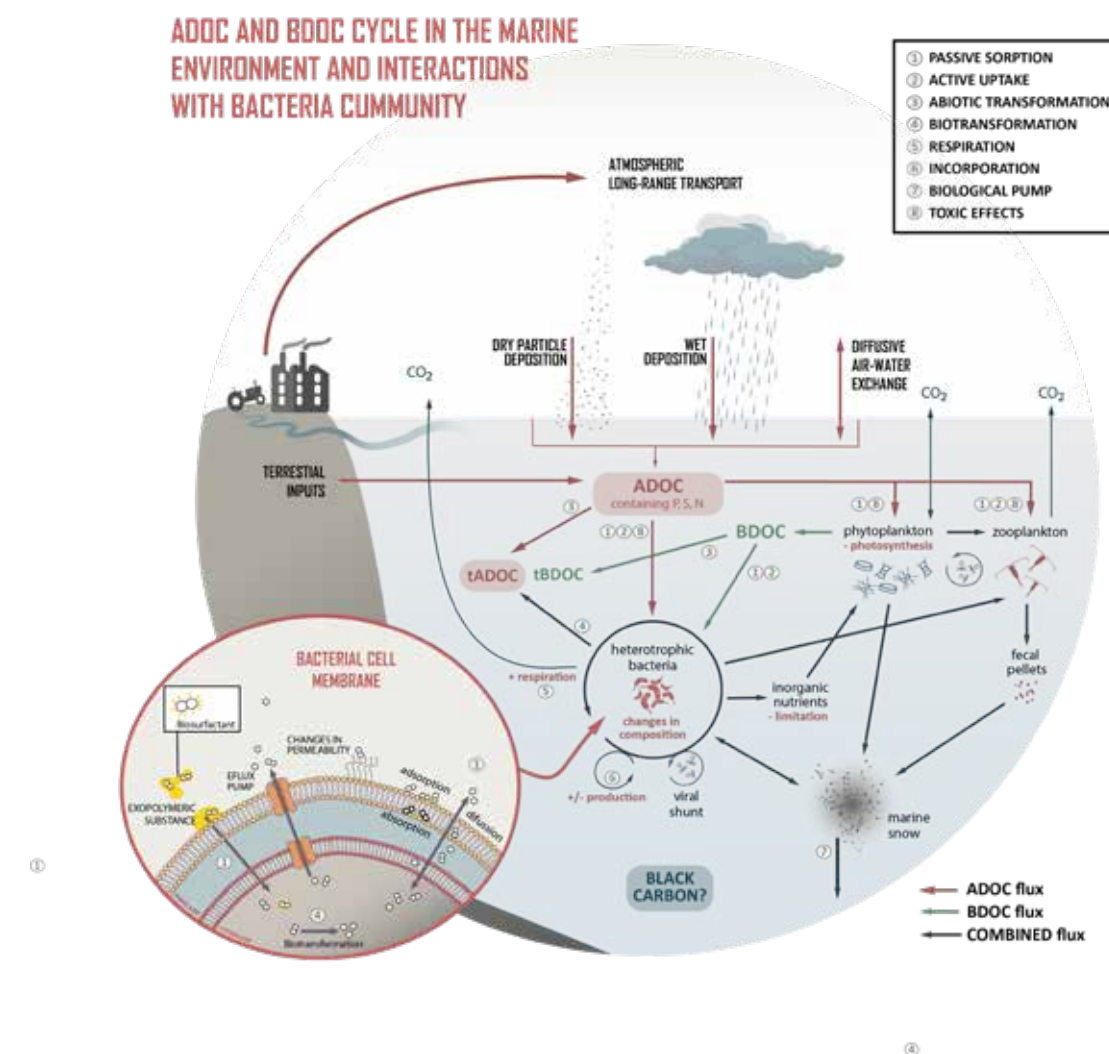
Trilla-Prieto, Núria; Vila-Costa, Maria; Casas, Gemma; Jiménez, Begoña; Dachs, Jordi; 2021; Dissolved Black Carbon and Semivolatile Aromatic Hydrocarbons in the Ocean: Two Entangled Biogeochemical Cycles?; *Environmental Science and Technology Letters*; DOI: 10.1021/acs.estlett.1c00658

Dissolved black carbon (DBC) plays a role in the oceanic carbon cycle. DBC originates from the heating and incomplete combustion of organic matter, including fossil fuels, a shared origin with polycyclic aromatic hydrocarbons (PAH). DBC is quantified using the benzene polycarboxylic acids produced by oxidation of the organic extract, a fraction of which derive from PAHs and other semivolatile aromatic-like compounds (SALCs). However, the current view of the DBC cycle does not take into account the inputs and sinks known for PAHs, such as diffusive air–water exchange and degradation. A meta-analysis of oceanic PAHs, SALCs, and DBC concentrations shows that SALCs account for 16% of DBC (ranging from 5% to 31%). Such a large contribution of semivolatile aromatic hydrocarbons to DBC is consistent with the large atmospheric input of SALCs (estimated as 400 Tg C y<sup>-1</sup>). Furthermore, photodegradation at the surface ocean and microbial degradation in the water column of semivolatile DBC can be important sinks, consistent with the ubiquitous occurrence of the degradation genes of the metabolic routes for aromatic hydrocarbons. Future work should focus on the characterization of semivolatile DBC and its degradation in order to constrain its contribution to refractory organic matter and the anthropogenic perturbation of the carbon cycle.



Dachs, Jordi; Vila-Costa, Maria; 2022; Toward a Multi-Omics-Based Single-Cell Environmental Chemistry and Toxicology; *Environmental Science and Technology*; DOI: 10.1021/acs.est.2c02831

Increasing resolution has always been a goal for environmental chemistry and toxicology in their quest to expand knowledge on the transport, biogeochemistry, and sinks of natural- and anthropogenic chemicals in the environment, as well as their functions and effects in ecosystem and human health. Linking biology and chemistry is at the core of environmental sciences, (1) and it is now possible to study comprehensive cell signatures by means of single-cell approaches. The trend toward the analysis of increasingly smaller samples, eventually reaching nanosamples and even single-cell approaches, (1–5) has resulted in massive data sets. The measures at cellular level, at higher temporal and spatial scale resolution, require significant methodological development, but allows for new questions with eventual knowledge breakthroughs.

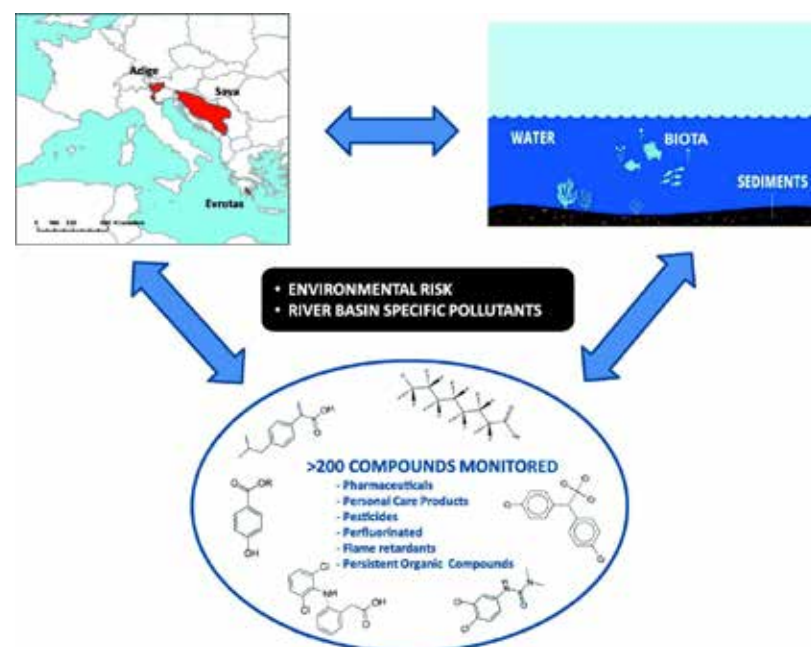


## Water, Environmental and Food Chemistry (ENFOCHEM)

Köck-Schulmeyer, Marianne; Ginebreda, Antoni; Petrovic, Mira; Giulivo, Monica; Aznar-Alemany, Òscar; Eljarrat, Ethel; Valle-Sistac, Jennifer; Molins-Delgado, Daniel; Diaz-Cruz, M. Silvia; Monllor-Alcaraz, Luis Simón; Guillem-Argiles, Nuria; Martínez, Elena; Miren, López de Alda; Llorca, Marta; Farré, Marinella; Peña, Juan Manuel; Mandarić, Ladislav; Pérez, Sandra; Majone, Bruno; Bellin, Alberto; Kalogianni, Eleni; Skoulidakis, Nikolaos Th.; Milačič, Radmila; Barceló, Damià; 2021; **Priority and emerging organic microcontaminants in three Mediterranean river basins: Occurrence, spatial distribution, and identification of river basin specific pollutants**; *Science of the Total Environment*; DOI: 10.1016/j.scitotenv.2020.142344

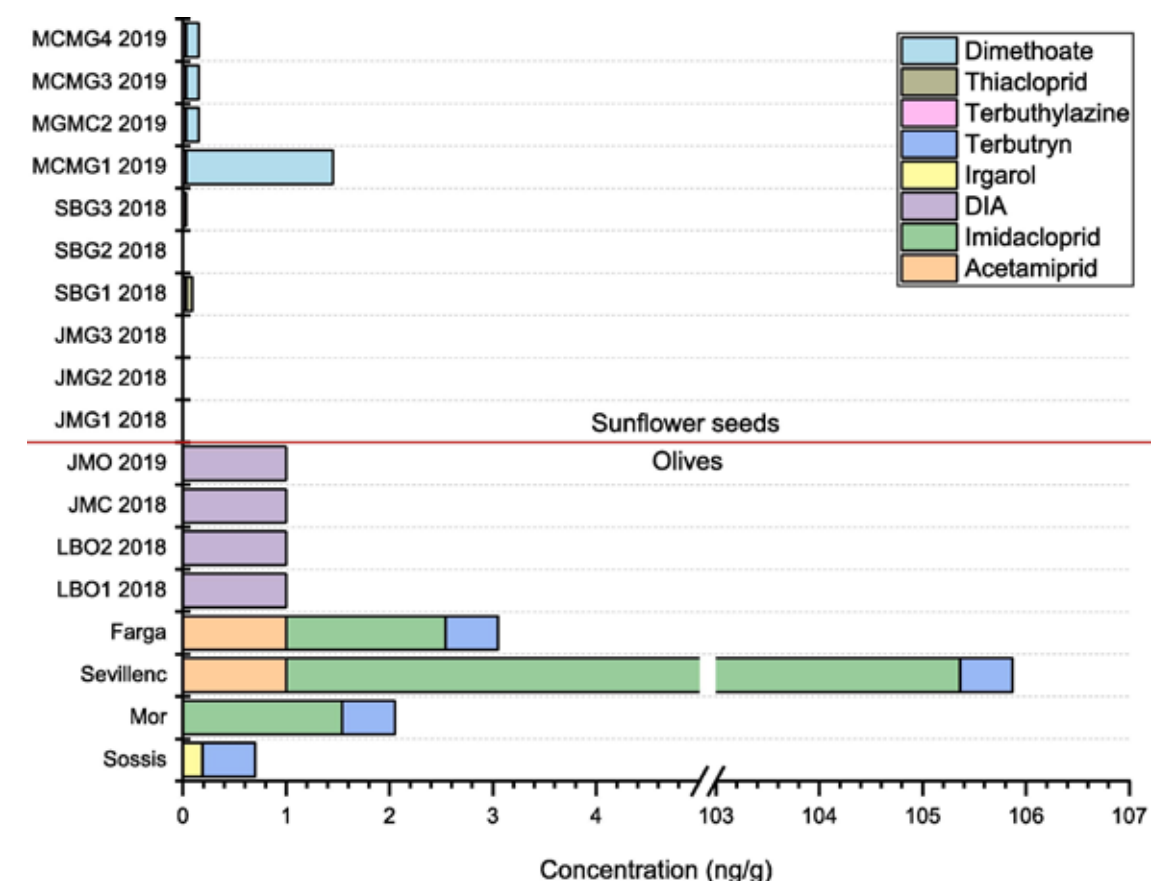
There is a worldwide growing use of chemicals by our developed, industrialized, and technological society. More than 100,000 chemical substances are thus commonly used both by industry and households. Depending on the amount produced, physical-chemical properties, and mode of use, many of them may reach the environment and, notably, the aquatic receiving systems. This may result in undesirable and harmful side-effects on both the human and the ecosystem's health. Mediterranean rivers are largely different from Northern and Central European rivers in terms of hydrological regime, climate conditions (e.g. air temperature, solar irradiation, precipitation), and socio-economics (e.g. land use, tourism, crop types, etc.), with all these factors leading to differences in the relative importance of the environmental stressors, in the classes and levels of the pollutants found and their environmental fate. Furthermore, water scarcity might be critical in affecting water pollution because of the lowered dilution capacity of chemicals. This work provides raw chemical data from different families of microcontaminants identified in three selected Mediterranean rivers (the Sava, Evrotas, and Adige)

collected during two sampling campaigns conducted in 2014 and 2015 in three different matrices, namely, water, sediments, and biota (fish). More than 200 organic micro-pollutants were analyzed, including relevant groups like pharmaceuticals, personal care products, perfluorinated compounds, pesticides, pyrethroid insecticides, flame retardants, and persistent organic pollutants. Data obtained were summarized with some basic statistics for all compound families and matrices analyzed. Observed occurrence and spatial patterns were interpreted both in terms of compound physical-chemical properties and local environmental pressures. Finally, their spatial distribution was examined and their ecotoxicological risk in the water phase was assessed. This allowed locating, at each basin, the most polluted sites ("hot spots") and identifying the respective river basin specific pollutants (RBSPs), prioritizing them in terms of the potential ecotoxicological risk posed to the aquatic ecosystems.



García-Vara, Manuel; Postigo, Cristina; Palma, Patricia; Bleda, María José; López de Alda, Miren; 2022; **QuEChERS-based analytical methods developed for LC-MS/MS multiresidue determination of pesticides in representative crop fatty matrices: Olives and sunflower seeds**; *Food Chemistry*; DOI: 10.1016/j.foodchem.2022.132558

Oilseed crops are greatly extended all over the world. Their high fat content can interfere during pesticide multiresidue analysis through liquid chromatography-tandem mass spectrometry (LC-MS/MS). This work aimed at overcoming this issue by developing and validating two QuEChERS-based methods for LC-MS/MS determination of 42 pesticides in two fatty food matrices: olives and sunflower seeds. Optimization of the extraction method was achieved following a 26-2 fractional factorial design in a highly cost-effective way. Validation of the multi-residue methods demonstrated improved limits of detection, below the established maximum residue levels (MRLs) for almost all compounds, good precision, and trueness, in compliance with SANTE guidelines. Application of these methods to the analysis of real samples from the Iberian Peninsula showed the presence of some pesticides of relevant environmental concern, including four compounds contained in the Pesticide Action Network International list of highly hazardous pesticides, found at levels between 0.03 ng/g and 104 ng/g.



GEOSCIENCES  
DEPARTMENT

Environmental  
Geochemistry  
and Atmospheric  
Research (EGAR)

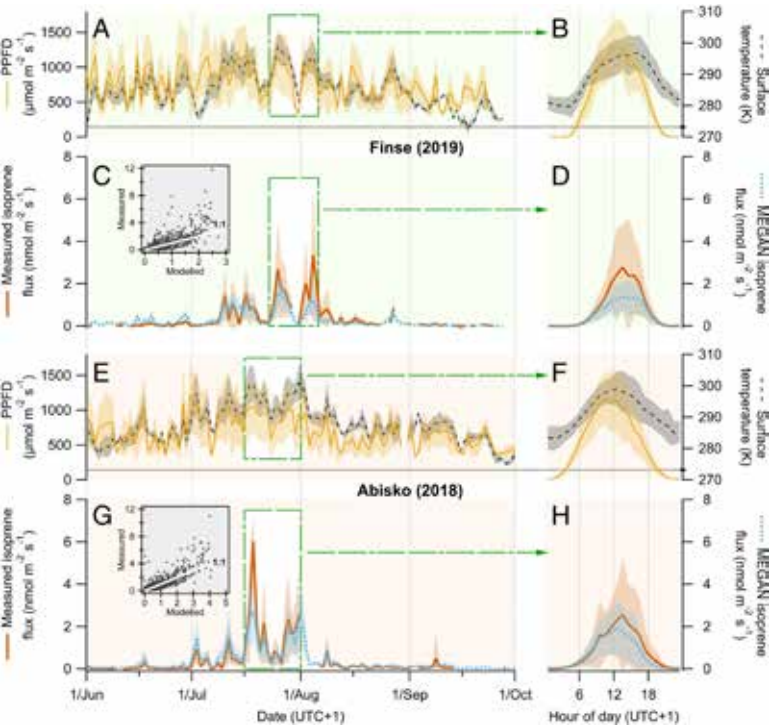
Moreno, Teresa; Pintó, Rosa María; Bosch, Albert; Moreno, Natalia; Alastuey, Andrés; Minguillón, María Cruz; Anfruns-Estrada, Eduard; Guix, Susana; Fuentes, Cristina; Buonanno, Giorgio; Stabile, Luca; Morawska, Lidia; Querol, Xavier; 2021; Tracing surface and airborne SARS-CoV-2 RNA inside public buses and subway trains; *Environment International*; DOI: 10.1016/j.envint.2020.106326

We report on a study involving the collection of 99 samples taken from inside Barcelona buses and subway trains in May to July 2020. From this sample group 82 (58 surface swabs, 9 air conditioning (a/c) filters, 3 a/c dust, 12 ambient air) were selected to be analysed by RT-PCR for traces of the SARS-CoV-2 virus. Thirty of these samples showed evidence for one or more of 3 target RNA gene regions specific for this virus (IP2, IP4, E). Most (24) of them showed positivity for only 1 of the 3 RNA targets, 4 samples yielded 2 targets, and 2 samples provided evidence for all 3 targets. RNA remnants were more common in surface swabs from support bars (23 out of 58) than in ambient air inside the vehicles (3 out of 12), with relatively higher concentrations of viral RNA fragments in buses rather than in trains. Whereas subway train a/c filters examined were all virus-free, 4 of the 9 bus a/c filter/dust samples yielded evidence for viral RNA. After nocturnal maintenance and cleaning most buses initially yielding positive results subsequently showed elimination of the RT-PCR signal, although signs of viral RNA remained in 4 of 13 initially positive samples. The presence of such remnant viral traces however does not demonstrate infectivity, which in the present study is considered unlikely given the fragmentary nature of the gene targets detected. Nevertheless, best practice demands that close attention to ventilation systems and regular vehicle disinfection in public transport worldwide need to be rigorously applied to be effective at eliminating traces of the virus throughout the vehicle, especially at times when COVID-19 cases are peaking. Additionally, infectivity tests should be implemented to evaluate the efficiency of disinfection procedures to complement the information resulting from RT-PCR analysis. Modelling the probability of infection whilst travelling in buses under different scenarios indicates that forced ventilation greatly reduces the risk.



Seco, Roger; Holst, Thomas; Davie-Martin, Cleo L.; Simin, Tihomir; Guenther, Alex; Pirk, Norbert; Rinne, Janne; Rinnan, Riikka; 2022; Strong isoprene emission response to temperature in tundra vegetation; *Proceedings of the National Academy of Sciences of the United States of America*; DOI: 10.1073/pnas.2118014119

Emissions of biogenic volatile organic compounds (BVOCs) are a crucial component of biosphere–atmosphere interactions. In northern latitudes, climate change is amplified by feedback processes in which BVOCs have a recognized, yet poorly quantified role, mainly due to a lack of measurements and concomitant modeling gaps. Hence, current Earth system models mostly rely on temperature responses measured on vegetation from lower latitudes, rendering their predictions highly uncertain. Here, we show how tundra isoprene emissions respond vigorously to temperature increases, compared to model results. Our unique dataset of direct eddy covariance ecosystem-level isoprene measurements in two contrasting ecosystems exhibited Q10 (the factor by which the emission rate increases with a 10 °C rise in temperature) temperature coefficients of up to 20.8, that is, 3.5 times the Q10 of 5.9 derived from the equivalent model calculations. Crude estimates using the observed temperature responses indicate that tundra vegetation could enhance their isoprene emissions by up to 41% (87%)—that is, 46% (55%) more than estimated by models—with a 2 °C (4 °C) warming. Our results demonstrate that tundra vegetation possesses the potential to substantially boost its isoprene emissions in response to future rising temperatures, at rates that exceed the current Earth system model predictions.

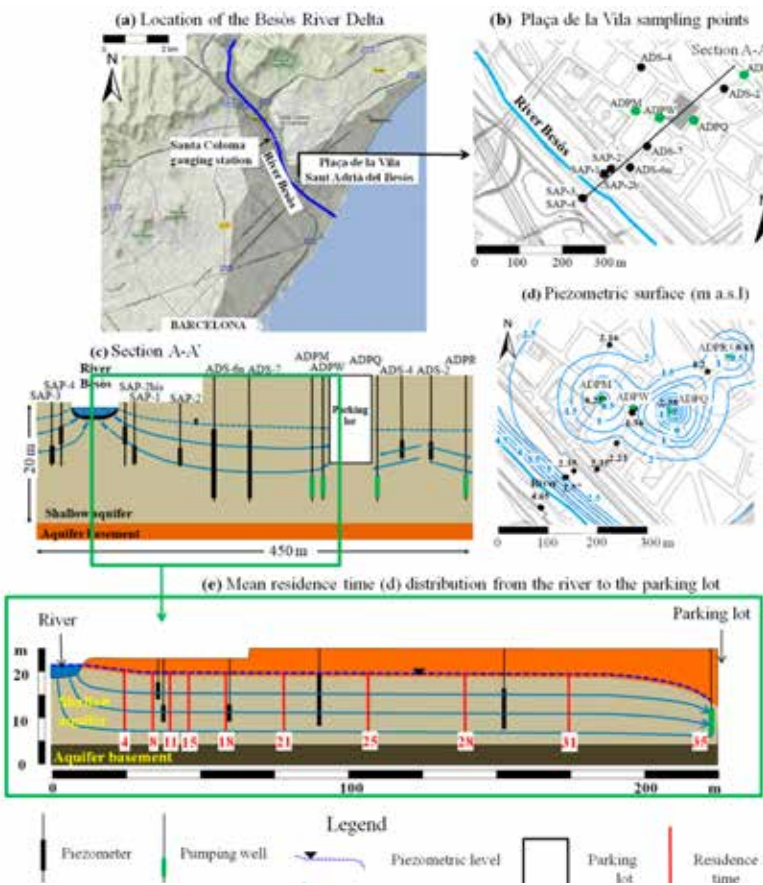


Groundwater and Hydrogeochemistry

Jurado, Anna; Vázquez-Suñé, Enric; Pujades, Estanislao; 2021; Urban groundwater contamination by non-steroidal anti-inflammatory drugs; *Water*; DOI: 10.3390/w13050720

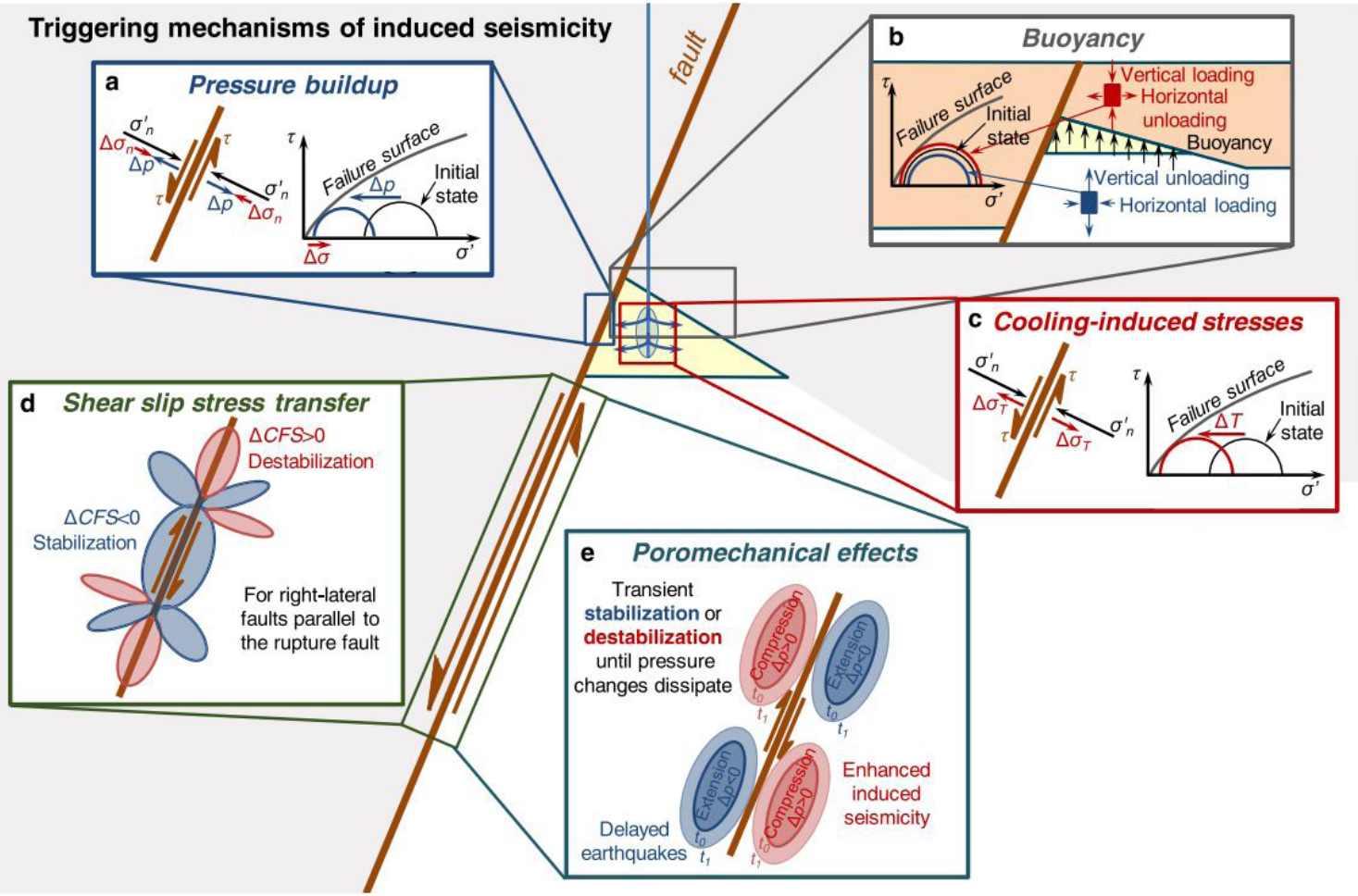
Pharmaceuticals, such as non-steroidal anti-inflammatory drugs (NSAIDs) and their metabolites, have become a major concern due to their increasing consumption and their widespread occurrence in the environment. In this paper, we investigate the occurrence of NSAIDs and their metabolites in an urban aquifer, which may serve as a potential resource for drinking water, and propose a methodology to assess the removal of these substances in the river–groundwater interface. Then, risk quotients (RQs) are computed, in order to determine the risk posed by the single NSAIDs and their mixture to human health. To this end, six NSAIDs and two metabolites were collected from an urban aquifer located in the metropolitan area of Barcelona (NE, Spain), in which the major pollution source is a contaminated river. All of the target NSAIDs were detected in groundwater samples, where the concentrations in the aquifer were higher than those found in the river water (except for ibuprofen). Diclofenac, keto-profen, propyphenazone and salicylic acid were detected at high mean concentrations (ranging from 91.8 ng/L to 225.2 ng/L) in the aquifer. In contrast, phenazone and mefenamic acid were found at

low mean concentrations (i.e., lower than 25 ng/L) in the aquifer. According to the proposed approach, the mixing of river water recharge into the aquifer seemed to some extent to promote the removal of the NSAIDs under the sub-oxic to denitrifying conditions found in the groundwater. The NSAIDs that presented higher mean removal values were 4OH diclofenac (0.8), ibuprofen (0.78), salicylic acid (0.35) and diclofenac (0.28), which are likely to be naturally attenuated under the aforementioned redox conditions. Concerning human health risk assessment, the NSAIDs detected in groundwater and their mixture do not pose any risk for all age intervals considered, as the associated RQs were all less than 0.05. Nevertheless, this value must be taken with caution, as many pharmaceuticals might occur simultaneously in the groundwater.



Vilarrasa, Víctor; De Simone, Silvia; Carrera, Jesus; Villaseñor, Antonio; 2022; Multiple induced seismicity mechanisms at Castor underground gas storage illustrate the need for thorough monitoring; *Nature Communications*; DOI: 10.1038/s41467-022-30903-6

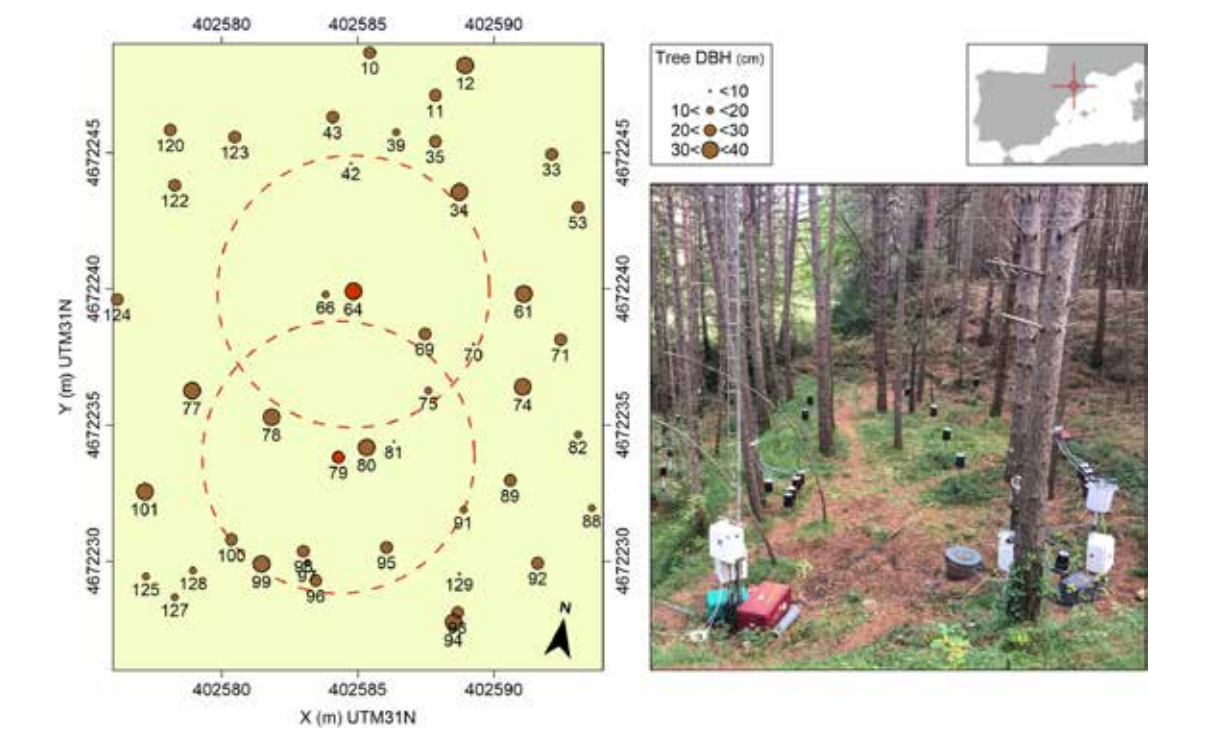
A recent publication by Cesca et al.<sup>1</sup> reanalyzes and expands seismic data to identify hypocenters of observed seismicity induced by the Castor Underground Gas Storage (UGS) operations. Their results confirm those of previous studies<sup>2,3</sup> that earthquakes occurred below the storage formation on a fault dipping opposite from the Amposta fault, which bounds the reservoir. However, two important sets of disagreements require revising the conclusions by Cesca et al.<sup>1</sup>: the depth of hypocenters and the processes leading to seismicity. Inaccurate estimates of hypocenters location and partial consideration of the physical mechanisms that induce seismicity may imply endangering future deep underground projects.



Surface Hydrology  
and Erosion

Pinos, Juan; Latron, Jérôme; Levia, Delphis F.; Llorens, Pilar; 2021; Drivers of the circumferential variation of stemflow inputs on the boles of Pinus sylvestris L. (Scots pine); *Ecohydrology*; DOI: 10.1002/eco.2348

The spatial variability of stemflow on the bole of trees has rarely been the focal point of stemflow studies, despite its potential importance for stemflow-induced changes to soils. This study helps close this data gap by supplying quantitative data on possible drivers of circumferential variation of stemflow on the boles of two Pinus sylvestris L. (Scots pine). Hence, the objectives of the present study were to quantify the circumferential spatial variability of stemflow on tree stems and to assess how some biotic and abiotic factors affect this variability. Continuous stemflow data observed for two trees within a mature stand of Scots pine during a 20-month period (May 2018 to December 2019) showed the existence of preferential flowpaths around the stem, with patterns of stemflow distribution differing between the two trees. Data suggest that biotic factors (trunk lean, bark morphology and tree neighbourhood) have a greater influence on stemflow distribution on tree stems than abiotic factors (rainfall intensity peaks). Our comprehensive spatio-temporal fine-scale measurements strongly support prior observations of non-uniform stemflow. Further studies of stemflow distribution across tree species and aboveground vegetative surfaces are needed to improve our mechanistic understanding of stemflow dynamics vis-à-vis rainfall interception processes and to gain further insight as to how the circumferential variation of stemflow on tree boles alters stemflow–soil interactions.



Llorens, Pilar; Latron, Jérôme; Carlyle-Moses, Darryl E.; Nätke, Kerstin; Chang, Jeffrey L.; Nanko, Kazuki; Iida, Shin'ichi; Levia, Delphis F.; 2022; Stemflow infiltration areas into forest soils around American beech (Fagus grandifolia Ehrh.) trees; *Ecohydrology*; DOI: 10.1002/eco.2369

The size of stemflow infiltration areas around the boles of trees is currently a topic of interest and debate within the hydrologic community. There is a gap in our knowledge of stemflow infiltration areas in many wooded ecosystems and a need for more than the few studies that have examined stemflow infiltration areas directly. Hence, this field study was specifically undertaken to mitigate the existing data gap by providing direct measurements of stemflow infiltration areas from high stemflow-producing American beech (*Fagus grandifolia* Ehrh.) trees. Different stemflow rates (290, 72 and 31 L h<sup>-1</sup>) were simulated using dye-infused stemflow and the areas of stemflow infiltration around four trees determined by measuring the areal extent of dye on the soil surface. Our results revealed that stemflow infiltration areas ranged from 0.0035 to 0.0951 m<sup>2</sup> tree<sup>-1</sup>. The mean basal area funnelling ratio was 46.5 ± 1.8, whereas the funnelling ratios per unit infiltration areas, (Formula presented.), were between 32.0 and 258.4. Despite intentionally high stemflow rates, chosen to compensate for the high infiltration capacities of forest soils, these results reinforce the fact that stemflow is an extremely localized input in natural forests. Thus, these results, even if specific to *F. grandifolia* within a particular forest and soil type, support a growing body of work indicating that stemflow infiltration areas are usually <1 m<sup>2</sup>, and often much smaller, in natural forests. Moreover, the high values of (Formula presented.) provide further evidence indicating that stemflow inputs are important for the development of hot spots in near-trunk soils.





**Apoyo a Centros de Excelencia Severo Ochoa; Ministerio de Ciencia, Innovación y Universidades, Programa Estatal Fomento de la investigación científica y técnica de excelencia; IDÆA; 16/12/2019 – 15/12/2023; 4.000.000€. Scientific Director: Teresa Moreno.**



The Severo Ochoa Distinctive has allowed us to promote existing actions, as well as to achieve new ones such as the formation of new six committees, the creation of the call on talent attraction, reinforcement of the technical staff and its expansion with new positions for PhDs and postdoctoral, improve the infrastructure of the Institute through the acquisition of additional state-of-the-art equipment, and increase our scientific production.

During 2021 and 2022, the Communication Department has been increased the dissemination actions and visibility of the institute, and at 2021 a new committee has been established, the “Innovation and Transfer committee” to improve technology transfer activities of the institute laboratories and research facilities.

During 2021-2022, the following staff has been hired by the project Severo Ochoa (SO):

- 1 person to support the human resources office
- 10 Predoctoral students (8 PhDs partially funded with SO funds, 2 SO PhDs)
- 6 Technician contracts
- 8 Postdoctoral contracts
- 5 Master Students (JAE Intro)

#### External Scientific Advisory Committee

The IDÆA External Scientific Advisory Committee is formed by 8 internationally recognized scientists. The first visit to IDÆA was in November 2019. Two meetings were hosted online in February 2021 and in March 2022. These meetings are annually repeated to discuss the progress and future actions for improvement in the institute.

#### Staff

Diana Aga – *College of Arts and Sciences, University of Buffalo, Buffalo, U.S.A.*

Juliane Hollender – *Department Environmental Chemistry, Eawag – Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland*

Roy Harrison – *School of Geography, Earth and Environmental Sciences, University of Birmingham, UK*

Kevin Jones – *Lancaster Environmental Centre, Lancaster Environment Center, Lancaster, UK*

María José Sanz Sánchez – *BC3 Basque Center for Climate Change, Leioa, Spain*

Jordi Sunyer Deu – *Childhood and Environment Programme, ISGlobal, Barcelona, Spain*

Dörte Tetzlaff – *Department of Ecohydrology, Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin, Germany*

Bert van Bavel – *Center for Freshwater Research, Norwegian Institute for Water Research (NIVA), Oslo, Norway*

#### Severo Ochoa Committees Talent Attraction

#### Staff

Amato, Fulvio

Díaz, Silvia

Moreno, Teresa

Tauler, Romà

Dachs, Jordi

Grimalt, Joan

Raldúa, Demetrio

Vázquez, Enric

IDÆA aims to attract new researchers who can contribute to achieving the strategic targets of our research priorities. This is being done by using open competitive calls to hire young postdoc researchers and by attracting national and international talented researchers with proven profile success at a postdoctoral or early senior level. The aim is that these researchers will constitute a nucleus for future projects and collaborations with EU and International Institutes.

They will act as independent researchers and they should be open to research collaboration with other IDÆA researchers.

Work done by the members of the TALENT commission:

- Evaluation of CVS and research projects
- Interview of the candidates
- Live/Online (covid) discussion and evaluation

8 young postdoctoral researchers have been recruited.

Seminars

Staff

Cañedo-Argüelles, Miguel  
Faria, Melissa  
Jaumot, Joaquim  
Pérez, Sandra

Trechera, Pedro  
Teixidó, Marc  
Vecchi, Valeria

IDÆA organizes biweekly seminars with an audience of between 10 to 50 participants. During the 2021-2022 period, the seminars committee has organized 34 seminars and 3 special day-long sessions (new staff, Sinergia projects, ...). In addition, we have actively participated in the organization of events such as the IDÆA Young Researchers Week or other scientific conferences hosted at IDÆA.

There are three main types of seminars:

- Internal seminars. For and by predoctoral, postdoctoral, staff and visiting researchers. In these seminars, speakers present their new projects and results. In addition, there are special sessions devoted to the presentation of new IDÆA staff and talent attraction researchers or Sinergia projects results.
- Invited speakers. Seminars are given by national and internationally recognized scientists.
- Special seminars and events. Skills workshops for developing scientific and transversal competencies.



- Example of workshops and seminars
- The Impact of Plastics in our Environment and in our Health (Plastic Oceans NGO)
- Creativity in Science (Enrique Conches and Jordi Diaz)
- How to write a European Proposal (Pills from the IDÆA EU Office)

Gender Equality

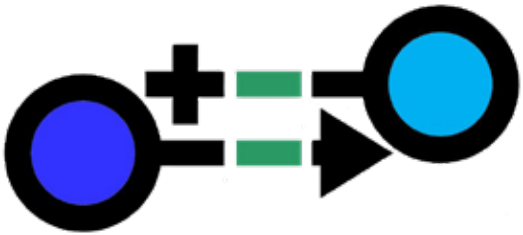
Staff

Alastuey, Andrés  
Barata, Carlos  
Blanco, Diana  
Carnerero, Cristina

Fernández, Pilar  
Gallart, Francesc  
Lacorte, Sílvia  
Moreno, Teresa  
Viana, Mar

Objectives:

- Planning and participation in annual educational and dissemination activities.
- Increasing awareness of gender inequalities in science and at the institute.
- Identification and inversion of attitudes and practices that stimulate gender inequalities.
- Promotion of inclusive language in official documents and communications.
- Informing and preventing sexual harassment and violence.



On-going and Future Actions:

- Presentation of the IDÆA Gender Equality Committee at the meeting of CSIC Equality Committees; 10/02/2021; ICM-CSIC
- Letter of commitment to equality of Teresa Moreno (IDÆA-CSIC) and Gemma Fabriàs (IQAC-CSIC)
- Reading and selection of books for the International Day of Women and Girl in Science; 11/02/2021; CID Equality Committee
- Constitution of the CID-IDÆA-IQAC Equality Committee; 11/02/2021
- BCN Art-Ambient (21 S01378 -006), project funded by the Barcelona City Council (Premis Barcelona 2020); 12/07/2021-31/12/2021
- Participation in the Severo Ochoa External Committee Meeting; 18/02/2021
- Accésit of the Gender Equality Accreditation CSIC 2020; 08/03/2021
- Visit and meeting of the Gender Equality Committees from IDÆA and ICM; 23/03/2021
- Participation in the 1st Meeting SOMMa Gender; 16/04/2021
- Organising of the training course “Curso liderazgo eficaz”; 18/05/2021
- Participation in the meeting SOMMa GT2 Good practices; 20/05/2021
- Talk “Gender equality talk by the Alliance of Excellence Research Centers and Units Severo Ochoa and María de Maeztu” organised by the SOMMa Alliance; 26/05/2021
- Exhibition “Catalan Female Scientists 2.0” (Científiques Catalanes); Communication and outreach Department; 01/09/2021-13/10/2021
- Production of an informative video about the IDÆA Gender Equality Committee; Communication and Outreach Department; 02/09/2021
- Inauguration of the artistic mural ‘BCN Art-Ambient: art, science and gender’; Communication and Outreach Department; 11/02/2022
- Participation in the meeting SOMMa Gender; 24/02/2022
- Exhibition ‘Women and Science’; 08/03/2022
- V Equality Newsletter March 2022; 08/03/2022
- Participation in the meeting of Equality Committees from all CSIC Centres; 12/04/2022
- VI Equality Newsletter June 2022; 08/06/2022
- Inauguration of the breastfeeding room at CID-IDÆA-IQAC facilities
- Participation in the 2nd Meeting SOMMa Gender; 17/06/2022
- Participation in the 3rd Meeting SOMMa Gender; 04/11/2022
- Posters to promote inclusive language in the workplace; 25/11/2022
- Participation in the SOMMa round table about mentoring; 29/11/2022

Sustainability

Staff

Abad, Esteban  
Martrat, Belén  
Montemurro, Nicola  
Moreno, Teresa

Piña, Benjamí  
Ratera, Mercè  
Valhondo, Cristina  
Vila, Maria

The IDÆA Sustainability Committee mission is to propose short- and long-term actions for reducing the environmental footprint of the Institute.

The Committee’s actions and activities carried out during 2021 and 2022 are grouped into five areas:

1. Construction and refurbishment\_

- *Evaluation and Optimization of the energetic efficiency of the Institute:* 2 Master Thesis of the UPC faculty of architecture are starting the evaluation of possible improvements of the sustainability and efficiency of the building . (2021-2022)



**2. Recycling and waste reduction.** Minimization of waste generation / optimization of recycling. The Committee is continuously analysing different possibilities to minimise the amount of waste the IDÆA generates.

- Distribution of 30 recycle bins for paper and plastic (2021)
- Facilitation of the safe disposal of CoViD-19 face masks (2020-2021)
- Set up the use of recycled paper, black-and-white printing, and both-sides printing options as by default (2021)
- Ice Packs Reuse Program. We keep them and reuse them! (2021)
- Reducing paper for signature procedures (*Portafirmas – Firma electrónica*) (2021-2022)

**3. Travel and transport.** Decarbonization of transport and commuting.

- A survey on CO2 footprint assessment and awareness among CID members (2021)
- Support list to remove the bus station located in front of the building, which generates noise and air pollution, affecting the staff work quality (2021)
- A bike repair kit is now available to replace a flat tire, fix brakes, etc (2021)
- Increase in the bike parking places (2021)
- Van fleet replacement by more electric models (2022)
- Protection of the bike parking from pigeons’ gifts (2022)

**4. Dissemination and environmental education.** Creating and disseminating ecological knowledge and awareness.

- *Round table Som-hi Aire BCN.* As part of the European Green Week 2021, the IDÆA and the Eixample Respira neighbourhood platform co-organized a round table, where they discussed air pollution and Barcelona’s air quality. A children’s workshop on the atmosphere was held in parallel by CSIC4Girls project (30/05/2021)
- *Seminar “What is normality? Towards the energy transition and a sustainable use of natural resources”.* The Committee organised a seminar on the unsustainable exploitation of natural resources and the future of energy in a changing world, with specialists from the ICM, ICMAB and IDÆA (20/12/2021)
- *Conference “Reasonable and sustainable food: organic, proximity and food sovereignty”.* On the occasion of the International Food Loss and Waste Awareness Day, the IDÆA Sustainability Committee organised this conference where several specialists will discuss the current food system from a nutritional and environmental point of view, addressing progress and challenges for the future. A catering served after the round table was prepared following practises discussed during the day, from the origin to table (e.g. products from sustainable and regenerative agriculture, plastic and packaging minimisation, zero C transportation, etc ) (03/10/2022)

- *IDÆA has long been implicated in many educational activities at multiple levels*, from participating in Graduate courses and training stages to performing dissemination activities in primary and high schools (“CSIC a l’aula”, 2021-2022)
- *Citizen Project “Fes el canvi, Be Plastic Free”.* Funds from Ajuntament de Barcelona for Climate Plan 2030 (2022-ongoing)

**5. Water management.** Creating models for efficient water use.

- Adjust the garden watering schedule to limit the use of water (2021)
- Substitute the use of well water for potable water in laboratories. The use of well water is now limited to garden irrigation (2021)
- We started the implementation for using well water to flush the toilet (2022)

Synergy Projects

Staff

Barceló, Damià  
Carrera, Jesús  
Dentz, Marco  
Lacorte, Sílvia  
Llorens, Pilar

López de Alda, Miren  
Matamoros, Víctor  
Moreno, Teresa  
Querol, Xavier  
Tauler, Romà  
Viana, Mar

One of the key points to be strengthened in the IDÆA is the collaboration between researchers from the center on research issues. The SYNERGY PROJECTS promote the research between the different groups financed with Severo Ochoa funds. The objective of the annual calls is to finance projects that will seed future research proposals in national and international calls of longer duration.

There have been four calls:

- 1. First call** June 2020. 8 projects awarded
- 2. Second call** January 2021.

6 projects awarded:

- Building Urban Resilience: Assessment of Conventional and Upgraded Sustainable Urban Drainage Systems to Enhance Metal and Persistent and Mobile Organic Chemical Removal Prior to Aquifer Recharge; S. Perez and M. Teixido; 01/01/2021 – 31/12/2021; 29.500€
- Chronic exposure of zebrafish (Danio rerio) to Rare Earth Elements in low doses: speciation effects and ecotoxicological implications; M. Faria and M. Izquierdo; 01/01/2021 – 31/12/2021; 30.000€
- Dinámica biológica del CO2 en aulas dado contexto actual de cambio climático y pandemia provocada por el virus SARS-CoV-2 (enfermedad CoViD-19); B. Martrat and N. Moreno; 01/01/2021 – 31/12/2021; 30.000€
- Efectos de la erosión atmosférica y la fotodegradación en la bioaccesibilidad de micro(nano-plásticos) y aditivos plásticos a través de la inhalación; M. Llorca and T. Moreno; 01/01/2021 – 31/12/2021; 30.000€
- Environmental risk of complex mixtures of emerging persistent and mobile chemicals in aquatic ecosystems (MixPersiRisk); N. Montemurro and D. Raldua; 01/01/2021 – 31/12/2021; 30.000€
- Fármacos en aguas subterráneas urbaNAs: Estudio de los procesos hidrogeológicos y químicos para una óptima gestión de los recursos hídricos urbanos (FANATIC); A. Ginebreda and A. Jurado; 01/01/2021 – 31/12/2021; 29.000€

**3. Third call** January 2022.

4 projects awarded:

- Presencia e impacto de contaminantes orgánicos persistentes y móviles en aguas subterráneas (PCMOC-SUB); E. Pujades and M. Farré; 01/01/2022 – 30/06/2023; 30.000 €
- Characterization of Persistent Organic Pollutants in Oceanic plankton using HRMS and single-cell approaches (Planktonpops); P. Gago and J. Dachs; 01/01/2022 – 30/06/2023; 30.000 €
- Antibiotic Resistance Genes in Urban atmospheric Sites (Argus); J. Subirats and B. Van Droge; 01/01/2022 – 30/06/2023; 30.000 €
- Impact of air pollution on childhood neurodevelopment in a highly-polluted European country (NeuroHipo); A. Tobias and M. Garí; 01/01/2022 – 30/06/2023; 30.000 €

**4. Fourth call** July 2022.

6 projects awarded:

- New Directions in Wastewater-based Epidemiology. Identification of small and large biomolecules as Biomarkers of public health and industrial activities (ND-WBE); D. Barceló and R. Gil; 15/07/2022 – 14/07/2023; 30.000 €
- Dinámica de contaminantes inorgánicos emergentes en suelos urbanos y rizosfera: interacciones y especiación sólida mediante técnicas de sincrotrón (Sincrouban); S. Carrero and S. Diez; 15/07/2022 – 14/07/2023; 30.000 €
- Nuevos sistemas de humedales construidos basados en procesos Bioelectroquímicos para reducir la contaminación de aguas superficiales y subterráneas (Verbena); L. Scheiber and V. Matamorros; 15/07/2022 – 14/07/2023; 28.000 €
- Inter-species single cell lipidomics in environmental toxicology: exploring the frontiers of cell heterogenicity (Scientox); C. Bedia and L. Navarro; 15/07/2022 – 14/07/2023; 29.970€
- Análisis del efecto interactivo de los plaguicidas y la salinidad sobre la biodiversidad asociada a los arrozales del Delta del Ebro usando las aves y los quironómidos como organismos indicadores; M. Cañedo and A. López; 15/07/2022 – 14/07/2023; 30.000 €
- Impact of VOC-ALTERED Rainwater on Agricultural CROPS (VOCrops); A. Yañez and M. Escola; 15/07/2022 – 14/07/2023; 30.000 €

Furthermore, a new IDÆA Synergy-Innovation Call was launched to strengthen IDÆA intra researcher's collaboration and to generate and accelerate internally the innovations generation and knowledge transfer of research results. Two synergy-innovation projects have been awarded:

- Biorecovery of Zn using microbial electrolysis cells from Cu wastes; M. Vila and P. Cordoba; 15/07/2022 – 14/07/2023; 30.000 €
- Development and deployment of new Ceramic Passive Samplers for the monitoring of contaminants in groundwater (GW\_CPS); S. Lacorte and E. Vazquez; 15/07/2022 – 14/07/2023; 30.000 €

Innovation and  
Transfer

Staff

De Campos, Sergio  
Díez, Sergio  
Lacorte, Silvia

Llorens, Pilar  
Moreno, Teresa  
Ratera, Mercè  
Vázquez, Enric

IDÆA generates a wide scientific, economic and social impact. In 2021 we created an Innovation and Transfer committee to review, manage, impulse and increase innovation and knowledge transfer activities. The objective of the committee is to ensure that scientific and technological developments carried out at the IDÆA have a maximised impact into the society.

Its members work together to develop and promote the implementation of the IDÆA knowledge and technology transfer strategy in a mutually beneficial environment that encourages open communication, teamwork and career development.

The Committee works with an Open Innovation Group (OIG) to retrieve ideas (internal and external) from researchers, partners, proposals and ongoing projects.

We are raising awareness of our research outcomes by targeting peers in pure and applied research, industry, health agencies, and policy makers, to encourage and enable them to use our results. In particular, to connect with industry we prepared an IDÆA Solutions brochure demonstrating our potential to solve applied science problems and how we can respond to industrially-based needs and challenges.

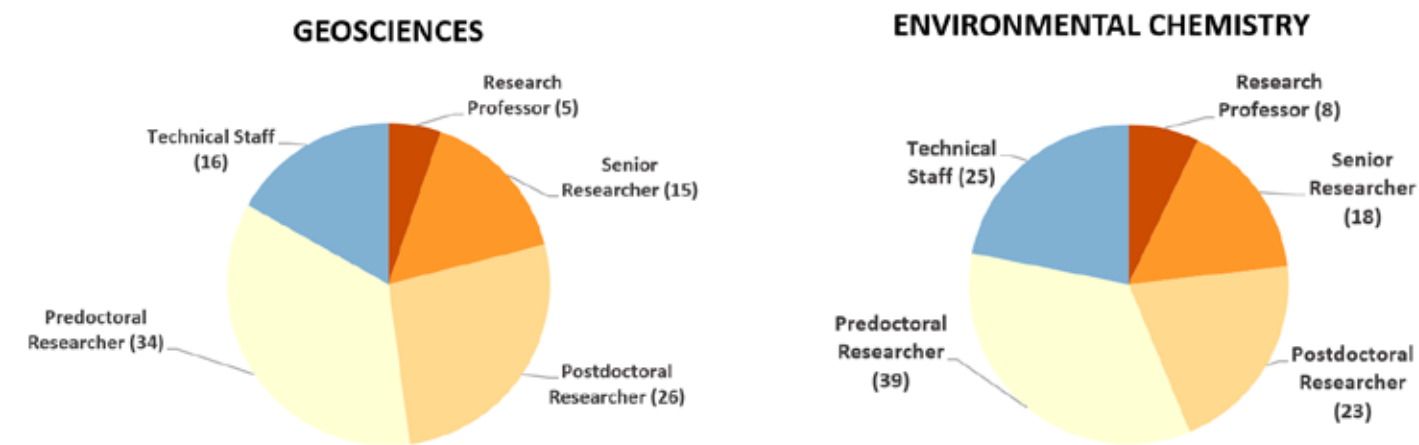


Actions carried out during 2021 and 2022:

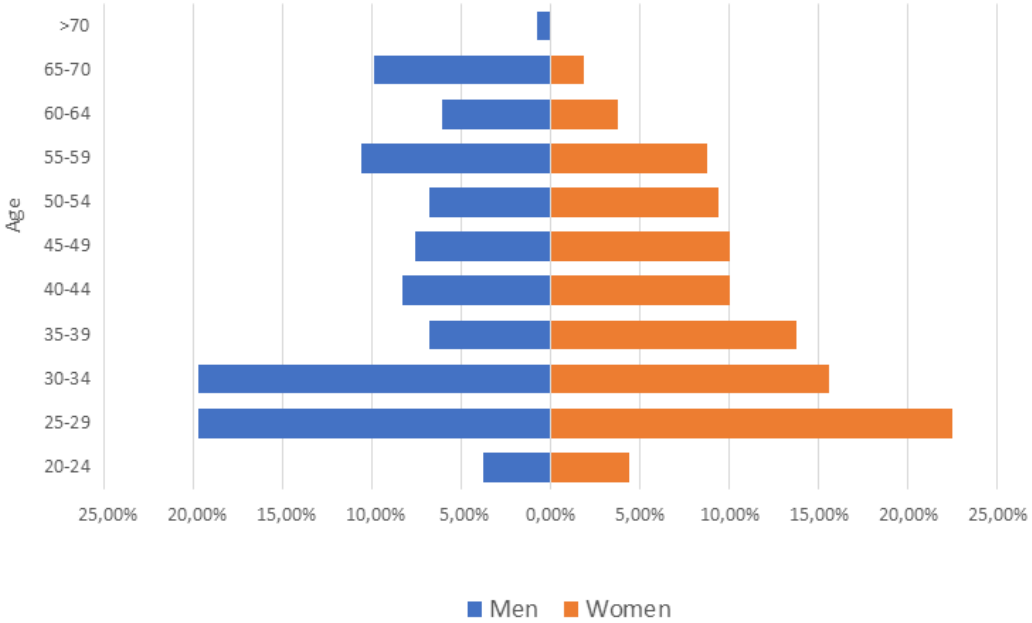
- IDÆA Solutions Brochure (2021)
- Innovation and Knowledge Transfer Workshop. One-day workshop that focused to inspire IDÆA scientific staff based on other technology transfer projects and to encourage new opportunities for IDÆA's projects (21/10/2021)
- IDÆA IPR-status evaluation (2021)
- 1st IDÆA Open Innovation Group meeting. First day to share experiences, learn and identify needs when it comes to transferring research results and innovating (07/06/2022)
- Open Days to Industry
  - WaterTalks – Challenges and solutions for the management and treatment of groundwater by Catalan Water Partnership. It focused on groundwater with experts from the sector to learn about the challenges, current trends and R&D projects and solutions to improve efficiency both in the management and in the treatment of underground water (05/04/2022)
  - Participation on the Circular Economy HotSpot 2021 (European on Circular Economy) (15-18/11/2021)
  - DIALOGS Series – Catalonia Waste Cluster: about innovation and use of non-conventional industrial resources and their impact in the environment: packaging, plastic and rubber, textile and skin (26/05/2022)
- IDÆA Innovation and Knowledge Transfer Strategy (2022)
- SOMMa Working Group KTi-Knowledge Transfer and Innovation: active participation (2021, 2022)



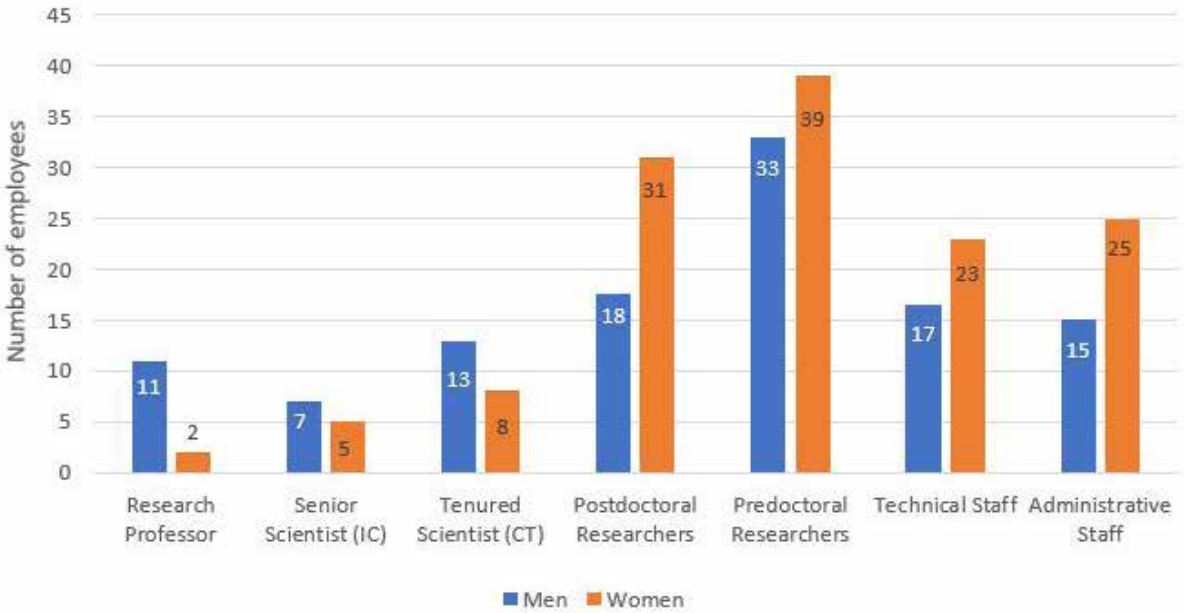
Scientific career



IDÆA Staff Age



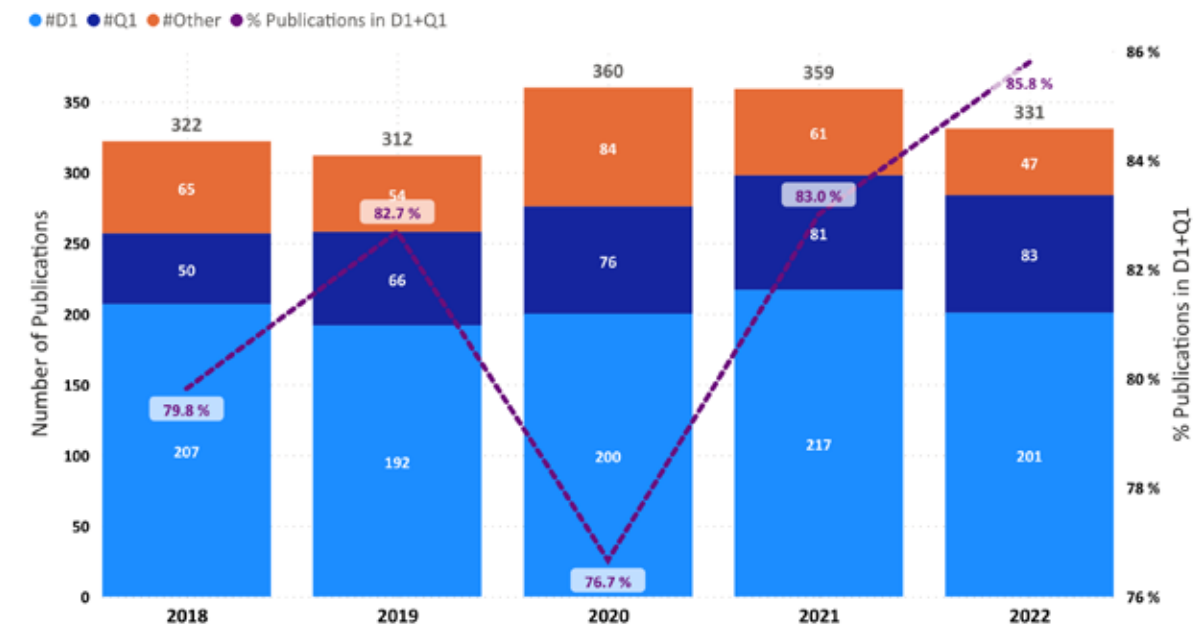
Gender distribution



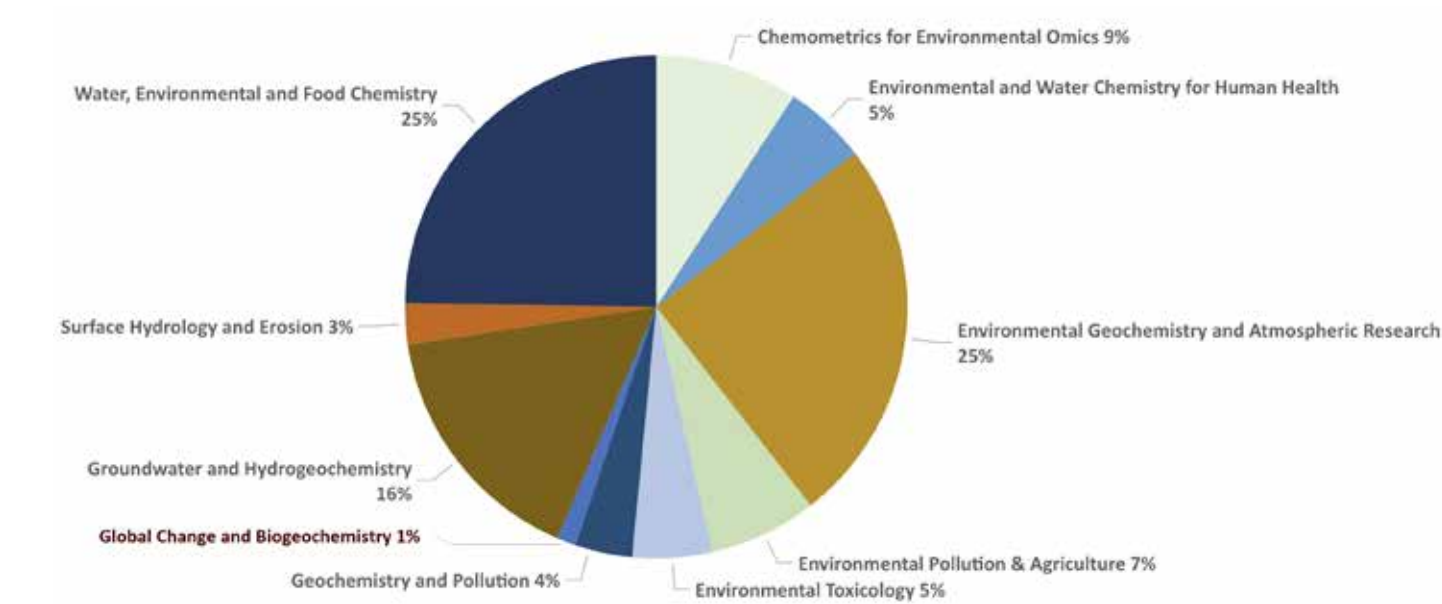
World visitors to IDÆA



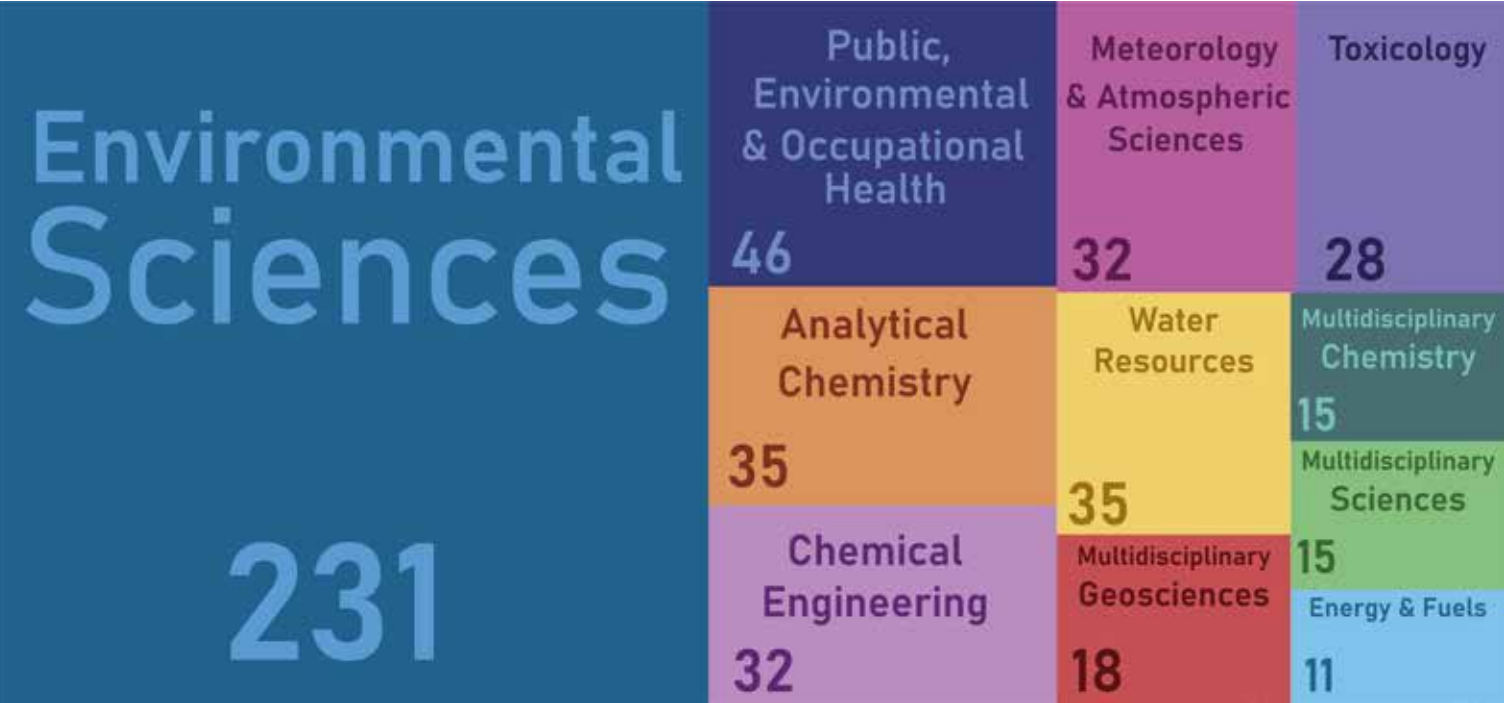
Number of publications



Publications per research group



Subject area of IDÆA publications



IDÆA total uptake (contracts + projects) by year



Outreach activities

31

OUTREACH  
ACTIVITIES

2011



PEOPLE HAVE APPROACHED OUR  
RESEARCH THROUGH WORKSHOPS,  
TALKS AND VISITS

IDÆA in the media

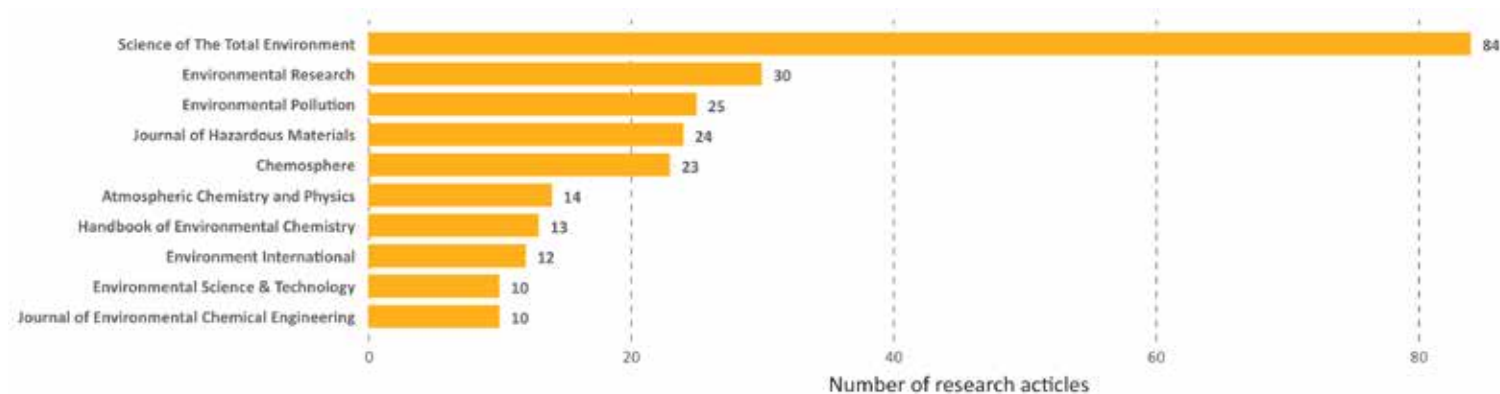
336

MEDIA  
APPEARANCES

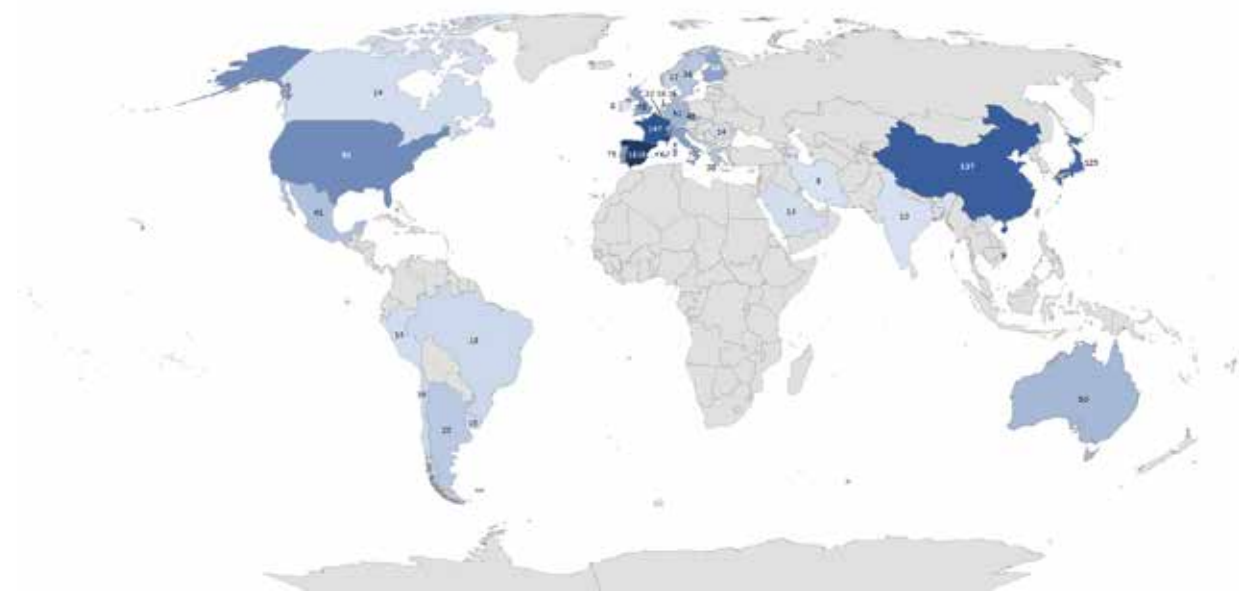


18

PRESS RELEASES  
PUBLISHED



The top 10 journals where IDÆA has published more articles in 2021 and 2022.



IDÆA collaboration map. The numbers represent the amount of institutional affiliations on IDÆA's scientific publications during 2021 and 2022.

#### SCI Publications

- Aalizadeh, Reza; Alygizakis, Nikiforos A.; Schymanski, Emma L.; Krauss, Martin; Schulze, Tobias; Ibáñez, María; McEachran, Andrew D.; Chao, Alex; Williams, Antony J.; Gago-Ferrero, Pablo; Covaci, Adrian; Moschet, Christoph; Young, Thomas M.; Hollender, Juliane; Slobodnik, Jaroslav; Thomaidis, Nikolaos S. **“Development and Application of Liquid Chromatographic Retention Time Indices in HRMS-Based Suspect and Nontarget Screening”**. Analytical Chemistry. 2021. DOI: 10.1021/acs.analchem.1c02348.
- Abad, Esteban; Abalos, Manuela; Fiedler, Heidelore. **“Air monitoring with passive samplers for dioxin-like persistent organic pollutants in developing countries (2017-2019)”**. Chemosphere. 2022. DOI: 10.1016/j.chemosphere.2021.131931.
- Abass, Khaled; Unguryanu, Tatiana; Junqué, Eva; Mazej, Darja; Tratnik, Janja Snoj; Horvat, Milena; Grimalt, Joan O.; Myllynen, Päivi; Rautio, Arja. **“Pilot study on the concentrations of organochlorine compounds and potentially toxic elements in pregnant women and local food items from the Finnish Lapland”**. Environmental Research. 2022. DOI: 10.1016/j.envres.2022.113122.
- Abu, Alex; Carrey, Raúl; Valhondo, Cristina; Domènech, Cristina; Soler, Albert; Martínez-Landa, Lurdes; Díaz-Cruz, Silvia; Carrera, Jesús; Otero, Neus. **“Pathways and efficiency of nitrogen attenuation in wastewater effluent through soil aquifer treatment”**. Journal of Environmental Management. 2022. DOI: 10.1016/j.jenvman.2022.115927.
- Ackerer, Philippe; Carrera, Jesus; Delay, Frédérick. **“Identification of aquifer heterogeneity through inverse methods”**. Comptes Rendus - Geoscience. 2022. DOI: 10.5802/crgeos.162.
- Agathokleous, Evgenios; Barceló, Damià; Aschner, Michael; Azevedo, Ricardo Antunes; Bhattacharya, Prosun; Costantini, David; Cutler, G. Christopher; De Marco, Alessandra; Docea, Anca Oana; Dórea, José G.; Duke, Stephen O.; Efferth, Thomas; Fatta-Kassinos, Despo; Fotopoulos, Vasileios; Ginebreda, Antonio; Guedes, Raul Narciso C.; Hayes, A. Wallace; Iavicoli, Ivo; Kalantzi, Olga-Ioanna; Koike, Takayoshi; Kouretas, Demetrios; Kumar, Manish; Manautou, José E.; Moore, Michael N.; Paoletti, Elena; Peñuelas, Josep; Picó, Yolanda; Reiter, Russel J.; Rezaee, Ramin; Rinklebe, Jörg; Rocha-Santos, Teresa; Sicard, Pierre; Sonne, Christian; Teaf, Christopher; Tsatsakis, Aristidis; Vardavas, Alexander I.; Wang, Wenjie; Zeng, Eddy Y.; Calabrese, Edward J. **“Rethinking Subthreshold Effects in Regulatory Chemical Risk Assessments”**. Environmental Science and Technology. 2022. DOI: 10.1021/acs.est.2c02896.

- Agathokleous, Evgenios; Barceló, Damià; Calabrese, Edward J. **“US EPA: Is there room to open a new window for evaluating potential sub-threshold effects and ecological risks?”**. Environmental Pollution. 2021. DOI: 10.1016/j.envpol.2021.117372.
- Agathokleous, Evgenios; Barceló, Damià; Iavicoli, Ivo; Tsatsakis, Aristidis; Calabrese, Edward J. **“Disinfectant-induced hormesis: An unknown environmental threat of the application of disinfectants to prevent SARS-CoV-2 infection during the COVID-19 pandemic?”**. Environmental Pollution. 2022. DOI: 10.1016/j.envpol.2021.118429.
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- Jurado Duarte, Deby; **Transporte de trazadores en roca granítica fracturada**; Escuela Técnica Superior de Ingeniería de Caminos, Canales y Puertos - Universidad Politécnica de Cataluña (ET-SICCP - UPC); Josep Soler Matamala; 20/07/2022.

- López Pérez, Tania; **Does the discharge of Wastewater Treatment Plants effluents affect the marine environment? Risk assessment**; Universitat de Barcelona (UB); Silvia Díaz Cruz, Cristina Valhondo González; 22/09/2022.
- Margalef España, Ferran; **Eliminación de contaminantes emergentes presentes en aguas residuales tratadas en operaciones de recarga de acuíferos con barreras reactivas**; Escuela de ingenieros de caminos canales y puertos - UPC; Silvia Díaz Cruz, Cristina Valhondo González; 20/07/2022.
- Silveiro Pedroso, Gretchen; **Niveles y variabilidad de partículas ultra-finas en entornos de tráfico rodado y fondo urbano en tres ciudades europeas**; Màster de tecnologia Ambiental; Universidad Internacional de Andalucía (UNIA); Xavier Querol Carceller; 20/09/2022.
- Valeria Bobrisev; **Estimation of alcohol consumption in Spain through the analysis of sewage waters**; Máster en Genética, Física y Química Forense. Facultad de Química. Universidad Rovira i Virgili; M<sup>a</sup> José López de Alda; Julio 2022.
- Villa Arroyave, María Alejandra; **Potential of riverbank filtration in the removal of emerging organic contaminants**; Technische Universitaet Dresden; Anna Jurado Elices, Estanislao Pujades Garnes; 02/09/2022.

Final Degree Projects

- Álvarez Servin, Gabriela; **Estudio de procesos químicos durante la recarga gestionada de acuíferos**; Escuela de ingenieros de caminos canales y puertos - UPC; Cristina Valhondo González; 17/10/2022.
- Escorza González, Carlos; **Presencia y distribución de contaminantes organoclorados en peces de lagos de alta montaña**; Universitat Politècnica de Catalunya (UPC); Joan Grimalt Obrador, Raimon Martínez Prats, Pilar Fernández Ramon; 04/10/2021.

## Teaching activities

- Alastuey Uros, A.; "La Calidad del Aire en España. Mediciones de nuevos contaminantes en calidad del aire"; Cursos de Verano de la Universidad Jaume I de Castellón; 01/06/2022.
- Alastuey Uros, A.; "Contaminación atmosférica y gestión de la calidad del aire"; Universidad de la Experiencia. Programa de Meteorología y Astronomía; Universitat de Barcelona; 13/10/2022.
- Barceló Culleres, D.; "Analysis of Microplastics in Water"; Environmental Analysis, Mass Spectrometry, Microscopy, Raman Spectroscopy, Water-Wastewater; Pittcon 2021; 02/03/2021.
- Barceló Culleres, D.; "Analysis of Microplastics in Water"; Pittcon 2021 - Short course; Pittcon 2021; 07/09/2021.
- Bleda, J.; "Introducción al software estadístico-aplicaciones en estadística básica"; Plan de formación CSIC 2022; 24/10/2022.
- Carrera Ramírez, J.; "Planificación, Gestión y optimización de los recursos hídricos"; XI curso hispanoamericano de hidrología subterránea; Universidad de la República de Uruguay; 27/09/2021.
- Criollo, R.; Jurado, A.; Sheiber, L.; Pujades, E.; "Interacción obras urbanas/aguas subterráneas"; curso anual AIH - Capítulo Chileno (2022) Hidrogeología urbana; Asociación Internacional de Hidrogeólogos; 30/03/2022.
- Díaz Cruz, S.; "Contaminants orgànics en ecosistemes aquàtics i el seu risc ambiental"; Màster en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 28/09/2022.
- Grimalt, J.; "Efectes dels contaminants orgànics sobre la salut humana"; Màster en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 30/11/2022.
- Jaumot Soler, J.; "Contaminants orgànics en ecosistemes aquàtics i el seu risc ambiental"; Màster oficial en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 14/12/2022.
- Jaumot Soler, J.; "Tractament de dades ambientals"; Màster en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 14/12/2022.
- Llorca, M.; "Contaminants orgànics persistents"; Màster en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 05/10/2022.

- Matamoros, V.; Postigo, C.; "Atenuació de contaminants orgànics durant el tractament d'aigües residuals i potables. Reutilització agrícola (I)"; Màster en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 19/10/2022.
- Pérez, S.; Montemurro, N.; "Atenuació de contaminants orgànics durant el tractament d'aigües residuals i potables. Reutilització agrícola (II)"; Màster en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 26/10/2022.
- Querol, X.; "Muestreo de aerosoles, bioaerosoles y su aplicación en COVID 19"; Pandemias, salud global y COVID-19; CSIC-UIMP; 10/01/2022.
- Querol, X.; "Monitorización ambiental"; Máster universitario en ciencias, tecnologías y gestión ambiental; Universidad A Coruña; 18/03/2022.
- Querol, X.; "Aplicació de la geoquímica a la millora de la qualitat de l'aire urbà"; Facultat de geologia; Universitat de Barcelona; 06/04/2022.
- Seco Guix, R.; "Micrometeorological measurements applied to ecosystems trace gas exchange"; Máster en meteorología; Universitat de Barcelona; 07/04/2022.
- Soler Matamala, J.; "Use of radioactive tracers in URL experiments (input to safety cases)"; Grimsel Training Centre (GTC), Suiza; 30/08/2021.
- Soler Matamala, J.; "Modelación hidrogeoquímica"; Programa de máster, Departamento de Ingeniería Civil y Ambiental, UPC; Escuela Técnica Superior de Ingeniería de Caminos, Canales y Puertos - Universitat Politècnica de Catalunya; 29/09/2022.
- Tauler Ferré, R.; "Avaluació de la qualitat i del risc ambiental"; Contaminants orgànics en ecosistemes aquàtics i el seu risc ambiental; Universitat Politècnica de Catalunya; 21/12/2022.
- Tauler Ferré, R.; "Contaminants orgànics en ecosistemes aquàtics i el seu risc ambiental. Avaluació de la qualitat i del risc ambiental"; Màster en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 21/12/2022.
- Valhondo, C.; "Comportament dels contaminants orgànics durant la reutilització d'aigua residual en la recàrrega d'aqüífers"; Màster en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 16/11/2022.
- Van Drooge, B.; "Distribució i impacte dels contaminants orgànics atmosfèrics en sistemes aquàtics"; Màster en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 23/11/2022.
- Vázquez Suñé, E.; "Modelación hidrogeológica mediante el código Feflow"; Curs de formació especialitzada en el codi numèric Feflow; Agència Catalana de l'Aigua; 14/02/2021.
- Vázquez Suñé, E.; "Teoría de la modelación matemática del transporte en hidrología subterránea"; V Curso, Modelación hidrogeológica AIH-Grupo español; Universidad de Alicante; 12/07/2021.
- Vázquez Suñé, E.; "Hidrogeología en la obra civil y recursos energéticos"; Máster profesional en hidrología subterránea 10ª edición (2021-2022); Universitat Politècnica de Catalunya; 13/09/2021.
- Vázquez Suñé, E.; "Métodos de campo en hidrogeología"; Maestría en recursos hídricos con orientación en hidrogeología; Universidad Nacional de Honduras; 13/09/2021.

- Vázquez Suñé, E.; “Transporte de solutos y trazadores y Contaminación de aguas subterráneas”; XI curso hispano-americano de hidrología subterránea (CHHS); Universidad de la República de Uruguay; 27/09/2021.
- Vázquez Suñé, E.; “Hidrología e hidrogeología aplicadas a la minería”; Máster en geología y gestión ambiental de los recursos minerales; Universidad de Huelva; 15/05/2022.
- Vázquez Suñé, E.; “Teoría de la modelación matemática del transporte de solutos en hidrología subterránea”; VI Curso, Modelación hidrogeológica AIH-Grupo español; Universidad de León; 11/07/2022.
- Vila, M.; Dachs, J.; “Biogeoquímica marina dels contaminants orgànics i el rol dels microorganismes”; Màster en Enginyeria Ambiental; Universitat Politècnica de Catalunya; 02/11/2022.



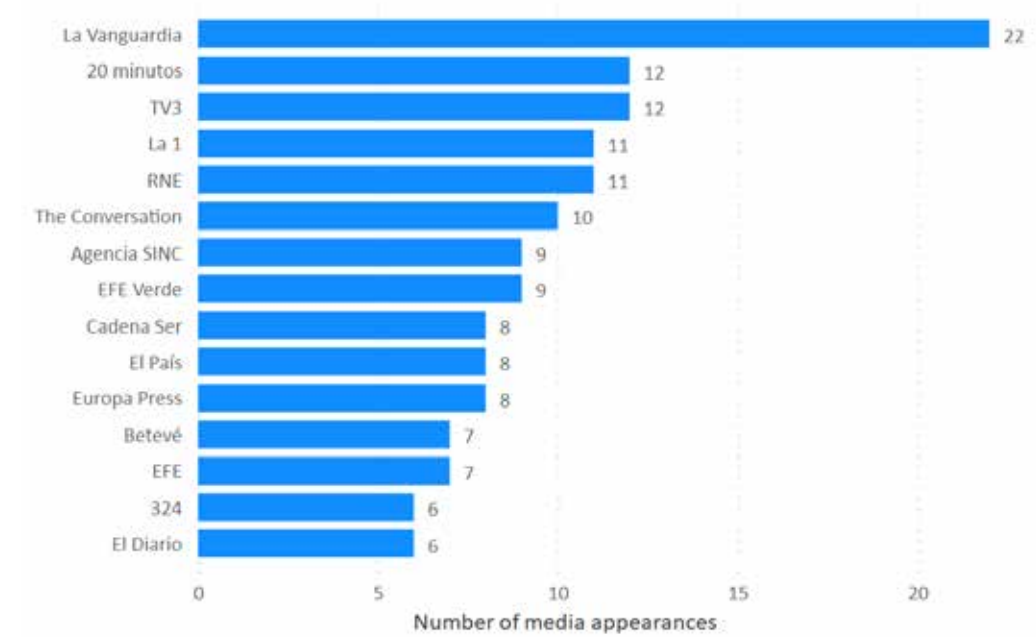
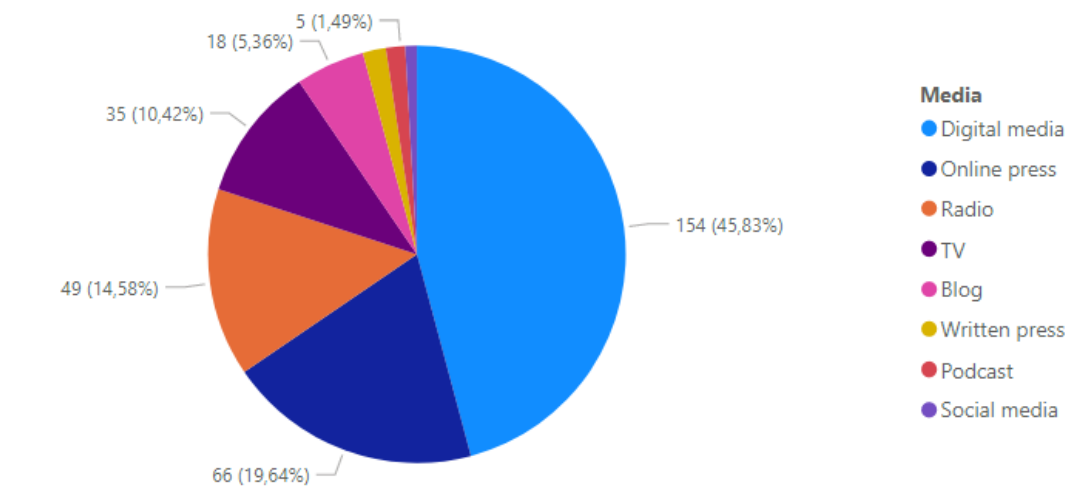
#### Dissemination Activities

|                               | 2021      |            | 2022      |             |
|-------------------------------|-----------|------------|-----------|-------------|
|                               | Amount    | Attendees  | Amount    | Attendees   |
| <b>Conferences</b>            | 7         | 278        | 9         | 548         |
| <b>Round tables / Debates</b> | 2         | 107        | 0         | 0           |
| <b>Workshops</b>              | 2         | 51         | 3         | 82          |
| <b>Guided tours</b>           | 1         | 9          | 2         | 59          |
| <b>Exhibitions</b>            | 1         | 350        | 1         | 450         |
| <b>Fairs</b>                  | 1         | 56         | 1         | 70          |
| <b>Other</b>                  | 1         | -          | 1         | 75          |
| <b>Total</b>                  | <b>15</b> | <b>851</b> | <b>17</b> | <b>1284</b> |

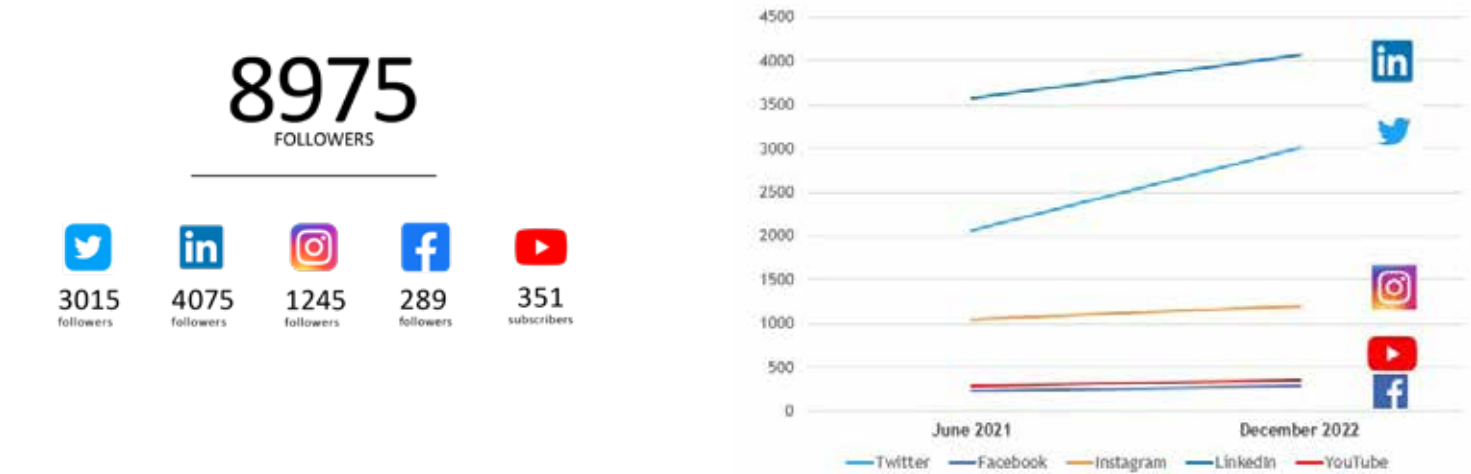
- **Mesa redonda 8M “Mujeres y ciencia. Soy de la Generación Igualdad”.** 08/03/2021. Postigo Rebollo, Cristina; Faria, Melissa; Bedia Girbes, Carmen; Vila Costa, Maria; Gallart Gallego, Francesc.
- **Video serie 8M “Trabajadoras del CSIC Cataluña y sus referentes femeninos”.** 08/03/2021-22/03/2021.
- **Taula rodona EU Green Week “Som-hi Aire BCN”.** 30/05/2021. Querol Carceller, Xavier; Ratera Bastardas, Mercè.
- **Exhibition “Científiques catalanes 2.0”** at the IDÆA-IQAC-CID facilities. 01/09/2021-13/10/2021
- **EXPOQUIMIA 2021.** 14-17/09/2021. Matamoros Mercadal, Victor; Lacorte Bruguera, Sílvia
- **Las consecuencias de la minería: del problema al recurso.** 22/09/2021. Noche Europea de los Investigadores. Carrero Romero, Sergio.
- **Innovation and Knowledge Transfer Workshop.** 21/10/2021. Seminario Comité de Innovación y Transferencia. Vazquez Suñe, Enrique; Córdoba Sola, Patricia
- **IDÆA Young Researchers’ Week 2021.** 27-28/10/2021
- **MinerMat 2021.** 15-19/11/2021. Querol Carceller, Xavier; Córdoba Sola, Patricia
- **Circular Economy Hotspot CAT.** 16/11/2021. Córdoba Sola, Patricia; Escolà Casas, Mónica
- **Plátanos, rayos cósmicos, Chernobil: la radioactiviad que nos rodea.** 17/11/2021. Semana de la Ciencia Izquierdo Ramonet, Maria
- **Saps què respire?** 17/11/2021. Semana de la Ciencia. Moreno Palmerola, Natalia
- **¿Sabes qué respiras? and Green thinking: diseñando ideas para un futuro sostenible.** 19/11/2021. Semana de la Ciencia. Moreno Palmerola, Natalia; Rojas Castro, Samanta
- **¡Ven a CSIC4Girls y descubre qué es la ciencia!** 21/11/2021. Semana de la Ciencia. Trilla i Prieto, Núria; Iriarte Martínez, Jon; Serrano Lorigados, Clara; Bedrossiantz, Juliette.
- **Cursa cap a la transició energètica i un ús sostenible dels recursos naturals.** 20/12/2021. Seminario Comité de Sostenibilidad. Córdoba Sola, Patricia; Izquierdo Ramonet, Maria; Vazquez Suñé, Enrique.
- **Inauguración mural BCN Art-Ambient.** 11/02/2022. Arroyo, Alicia; Sotres Rodríguez, Ana; Rodríguez Bermejo, Alejandro; Blanco Zarcero, Diana; Moreno Pérez, Teresa.
- **Visita guiada al Proyecto intergeneracional CRENCO.** 22/02/2022. López Olivé, María.
- **Toxicología Ambiental: pez cebra y dafnia para estudiar el impacto de los contaminantes en la biodiversidad.** 16/03/2022, Saló de l’Ensenyament 2022. Bedrossiantz, Juliette; Barata Marti, Carlos.
- **Reptes i solucions per a la gestió i tractament d’aigües subterrànies.** Water Talks (Catalan Water Partnership). 05/04/2022. Vázquez-Suñé, Enric; Matamoros Mercadal, Victor; Pérez Solsona, Sandra.
- **Animals de laboratori fantàstics i on trobar-los.** 29/05/2022. Festa de la Ciència. Bedrossiantz, Juliette.
- **1a Jornada de l’IDÆA Open Innovation Group.** 07/06/2022. Seminario Comité de Innovación y Transferencia. Vazquez Suñe, Enrique; Córdoba Sola, Patricia; Ratera Bastardas, Mercè.
- **Powerful presentations Workshop.** 27-28/06/2022.
- **La contaminació invisible: què ens expliquen les aus?** 29/09/2022. Noche Europea de los Investigadores. Oro i Nolla, Bernat.
- **Alimentación razonable y sostenible: orgánicos, proximidad y soberanía alimentaria.** 03/10/2022. Seminario Comité de Sostenibilidad.
- **Impacte dels compostos plastificants en la salut humana i el medi ambient.** 17/10/2022. Aula Extensió Universitaria Rubí. Eljarrat Esebag, Ethel.
- **IDÆA Young Researchers’ Day 2022.** 10/11/2022. Bedrossiantz, Juliette; Oro i Nolla, Bernat; Diez Palet, Isabel; Martínez Prats, Raimon; Pyambri Pramani, Maryam.
- **Visita guiada “¿Cómo se estudian los plastificantes en el laboratorio?”** 14/11/2022. Semana de la Ciencia. Eljarrat Esebag, Ethel; Fernandez Arribas, Julio; Balasch Garcia, Aleix; Callejas Martos, Sandra.
- **Exposición “La ciencia según Forges”.** 14/11/2022-21/12/2022. del Blanco Rodríguez, Fernando.
- **Bienvenid@s al mundo de la toxicología acuática.** 15/11/2022. Semana de la Ciencia. Carrera Ramírez, Jesús; Bedrossiantz, Juliette.
- **Analiza los contaminantes químicos en nuestro laboratorio.** 16/11/2022. Semana De La Ciencia. Piña Capo, Benjamín; Oro i Nolla, Bernat
- **PLASTIC’2022: 2as Jornadas sobre Contaminación por Plásticos: el SECTOR TEXTIL.** 21-22/11/2022. Eljarrat Esebag, Ethel.
- **Atenció, alerta amb els contaminants!** 25/11/2022. Esco-Lab. Bedrossiantz, Juliette.

Media appearances

|                   | 2021 | 2022 |
|-------------------|------|------|
| Press releases    | 12   | 6    |
| Media appearances | 216  | 120  |



Social media channels



Website and newsletter



IDÆA research and innovation outputs have **scientific, economic and societal impacts**.

**Scientific Impact** IDÆA is a leading research institution in **air, water and soil quality** with excellence scientific results.

IDÆA as a national and European leading institution on **air quality** participates in **scientific and policy committees as advisors** and signing contracts to run forecast services for local and national governments. Some of these recent assignments are:

- 2021. WHO Geneve commissioned to IDÆA 3 Systematic Review of the Health Effects of Biomass Burning, Road Dust and Desert Dust. The 3 guides were used to deliver the new *WHO Air Quality Guidelines* published on 21/09/2021
- Spanish Ministry for Ecological Transition and the Demographic Challenge (MITERD) commissioned IDÆA Annual reports on:
  - 2018-2021: African dust episodes affecting air quality in Spain (IDÆA-EGAR). Evaluation of each of the episodes and contribution to daily PM10 and PM2.5 reports are sent to the European Commission by MITERD every year, to justify the exceedances of the daily and annual PM10 health protection limits.
  - 2018-2022: to assess and forecast the occurrence of the African dust episodes and to give alerts 24 hours before the occurrence (IDÆA-EGAR).
  - 2021 to 2024: to draft documents for the National Ozone Plan.

IDÆA has established strong collaborations with policy-making institutions (water agencies, climate change offices, forestry offices), and acted as a scientific and technical consultant for applied analysis in the protection of **water resources** and the determination of **emerging pollutants** and public health. Some of the close collaborations include:

- Air quality: ACTRIS (Aerosols, Clouds and Trace gases Research Infrastructures), GAW (Global Atmosphere Watch), United Nations Environment Programme, Madrid City Council, Generalitat de Catalunya, etc.

- Water quality: ACA (Agència Catalana de l'Aigua), AGBAR (Aigües de Barcelona), Agència de Salut Pública de Catalunya, ATLL (Aigües Ter-Llobregat), CCB (Consorci de la Costa Brava), CHE (Confederación Hidrográfica del Ebro), etc.
- Oceans Waters: CIRCE (Conservación, Información y Estudios sobre Cetáceos), ICMAN (Instituto de Ciencias Marinas de Andalucía), IEO (Instituto Oceanográfico Español).
- Public Health: Banco de Leche- Banc de Sang i Teixits de Catalunya, Hospital Sant Joan de Déu, Barcelona Institute for Global Health ISGlobal.
- Hydrodynamic flow and transport in porous media: IGME (Instituto Geológico y Minero de España), SKB (Svensk kärnbränslehantering aktiebolag, Sweden), NAGRA (National Cooperative for the Disposal of Radioactive Waste, Switzerland), Monte Terri (Switzerland).

#### Air quality



#### Water quality



#### Oceans water



#### Public health



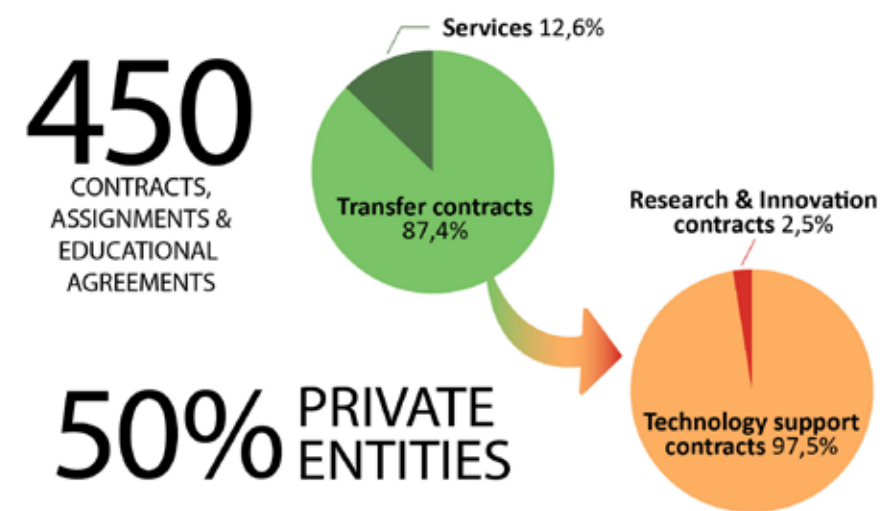
#### Hydrodynamic flow and transport in porous media



IDÆA establishes active collaborations with policy-making institutions in the protection of water resources and the analysis of emerging pollutants and public health.

Economic Impact

Our economic impact from *knowledge transfer and exploitation* has been based on *transfer activities*. IDÆA is **leading knowledge transfer in expert advice** through transfer activities as i) publication of Guides, Recommendations, Policy briefs and Policy recommendations, and ii) Direct R&I contracts and expert advice contracts with administration, public entities and industry



|                                       | 2021   | 2022   |
|---------------------------------------|--------|--------|
| Transfer contracts                    | 44     | 31     |
| Funding uptake by transfer contracts* | 1,17M€ | 1,68M€ |

\*The higher funding uptake signed both years have been with Agencia Catalana del Aigua (0.42M€, 0.91M€, 2021 and 2022 respectively)

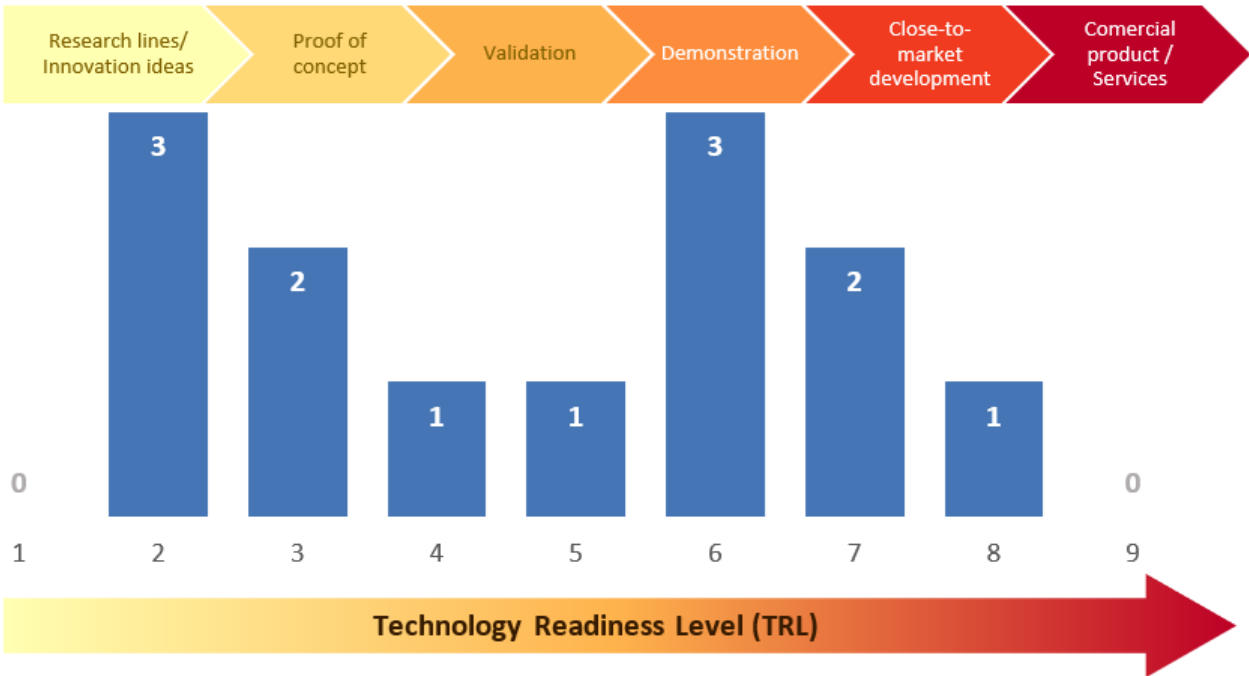
Examples of contracts, agreements and assignments signed recently with the private and public administration are:

1. “Investigación y desarrollo de filtros tipo EPI y de estándares de caracterización para mascarillas faciales de alta capacidad filtrante, seguras para la salud y con propiedades anticongestivas, balsámicas y ergonómicas” (ConfortMask) (IDI-20210547)” founded by BIOINICIA S.L., April 2021 - June 2022

2. “Contracting of support and advisory services to carry out the commitments of the SCP/RAC within the framework of The Mediterranean Sea Programme (MEDPROGRAMME): Enhancing Environmental Security-GEF ID 9607” founded by the Agència de Residus de Catalunya, March 2022 - September 2023
3. Collaboration with public administration for the assessment of the risk of the use of manure in agriculture (Ministry of Climate Action, Food and Rural Agenda).
4. Collaboration with a private company for the assessment of the reuse of laundry wastewater in the frame of circular economy (GIRBAU SA-CDTI project).

Actions carried out in 2021 and 2022:

- *Ideas and Intellectual property (IP) status* is based on four actions: training, generation, acceleration and protection of innovations coming from research results. Innovations portfolio in different levels of technological maturity has increased with 13 innovations in different levels of technology maturity (TRL) from Proof of concept-TRL 2-3 to actual system proven in operational environment-TRL8-9 close to market or spin-off creation (2021)



Number of IDÆA innovations in every TRL level during the 2021-2022 period

- *External Accelerator Programmes participation.* Two innovation ideas developed in research projects have participated in *The Collider* Programme of the Mobile World Capital:
  - DAMAR (2022) BlueNetOnCampus *New sampler for metal monitoring in aquatic systems (TRL7 for surface water).*
  - CPS (2022) Call for Technologies *Ceramic Passive Sampler (TRL4 for groundwater, TRL7 for surface water).*
- *IP protection* has increased in 3 new patents in PCT application process and in business and commercialization studies right now (from an EIT Raw Material project: RECOPPs); 14 softwares to be analysed for registration and 2 patentability studies:
  - Patent: P. Cordoba. Separation of arsenic from antimony and bismuth in an eluate (Propiedad intelectual RECOPPs (20076)-P. Córdoba) 1.2021.0069/ BAR. PCT/EP4092147A1 (23/11/2022-Publication)
  - Patent: P. Cordoba. A method for the selective recovery of bismuth as a high value by-product from solid impurity stream (Propiedad intelectual RECOPPs (20076)-P. Córdoba). 1.2021.0068EP PCT (2021)
  - Patent: P. Cordoba. Methods for the recovery of high value byproducts and safe removal of toxic by-products from a HCl solution (Propiedad intelectual RECOPPs (20076)-P. Córdoba).
  - Softwares 2022: AkvaGIS, AkvaMaps, FEPLUG, GeoEVS, GeoPROPY (E. Vázquez)
- *Foster co-operation between IDÆA experts and stakeholders and industrial partners* has been pursued with 7 affiliations and active participation on: Norman Network (European), Clean Rivers Hub (European), Deep Tech and Photonics European Cluster SECPhO (2021 affiliation, European), Catalan Water Partnership (CWP, Regional), Xarxa Marítima de la Generalitat de Catalunya (Regional), Prismàtic (Regional), Barcelona+Sostenible (Barcelona city).



IDÆA has active affiliations with 7 stakeholders and industrial partners.

Societal Impacts

The high number of communication and dissemination activities extensively prove the impact of all IDÆA research results on ONE HEALTH, environmental, animal and human health. All knowledge generated by IDÆA researchers is expected to impact on present and future society by different transfer activities: i) Guides and public recommendation, ii) policy briefs and recommendations, iii) patents, data bases, software and new technological prototypes, and iv) expertise/advisory activities directly to public administration and industry, or participating in National and International Committees and Organizations.

In 2023 IDÆA has submitted through the Spanish Ministry for Ecological Transition and Demographic Recovery (MITERD) its candidacy to participate in the preparation of the seventh edition of the Global Environment Outlook Assessment (GEO-7) and its corresponding Summary for Policymakers, to be launched in 2025 and organized by the UNEP (United Nations Environment Programme), in compliance with resolution UNEA-5/.

5. Guides/ public recommendations:
- *Guide for ventilation towards healthy classrooms.* COST Action CA17136 report. CSIC publications. <http://hdl.handle.net/10261/225519>.
  - *Ventilation guide for indoor environments.* COST Action CA17136 report. <https://indairpollnet.eu/wp-content/uploads/2021/12/Ventilation-guide-of-indoor-environments.pdf>.
  - *Urban Bus Air Quality: A technical Guide based on Barcelona BUSAIR data (2021, Spain)* by the Spanish Ministry of Science and Innovation: ISBN 978-84-092-9861-7
  - *Proposal for changes in the Public Hydraulic Domain Regulation (2022)* to the Spanish Ministry for Ecological Transition and the Demographic Challenge to propose an amendment to improve groundwater protection regulations, which have been brought into line with European regulations following the adoption of the Water Framework Directive.
  - *Guide for the interpretation of hydraulic tests* (Spain, 2021)
  - Software TREHS - Temporary Rivers Ecological and Hydrological Status: an open-access software tool used by several Water Agencies in the context of the European Water Framework Directive. (Spanish Ministry for Ecological Transition and Demographic Challenge, MITECO, 2021) to establish the new *Guide for the assessment of surface and groundwater status*.
  - Increasing the Realism in Solute Transport Modelling Based on the Field Experiments REPRO and LTDE-SD (2021-2022, Sweden) by Svensk Kärnbränslehantering AB Swedish Nuclear Fuel and Waste Management Co.

6. Coordinated IDÆA responses **to national and European policy documents**: to achieve our main objective to be the environmental reference centre in Europe is inherent linked to our vision to transform our societies into healthier, safer and more sustainable places to live. IDÆA is raising citizens' awareness and performing lobby and advocacy to politicians and governments to regulate and legislate about pollution. A clear example of that is the new Law 07/2022 of April 8 on waste which a part of transposing European Directives (2018 and 2019) is adding an article banning the use of phthalates and bisphenol A in food packaging.

IDÆA is constantly providing scientific evidence for new policies on chemical pollution. As member on the International Panel on Chemical Pollution and jointly to re-known scientists last 2021 published in Science: "*We need a global science-policy body on chemicals and waste*". Science 371 (2021,IF: 63.71).

Some of the policy and recommendation documents:

- *Methodology for calculating the impact of forest management on ecosystem services: carbon, water and biodiversity* (2022, Spain): Report number: B 10265-2022 Affiliation: Generalitat de Catalunya
- Data contribution to European Monitoring Centre for Drugs and Drug Addiction: [https://www.emcdda.europa.eu/publications/html/pods/waste-water-analysis\\_en](https://www.emcdda.europa.eu/publications/html/pods/waste-water-analysis_en);
- *Climate change and human health in the Eastern Mediterranean and middle east: Literature review research priorities and policy suggestions* (2022, International). DOI: 10.1016/j.envres.2022.114537
- *Sand and Dust Storms Risk Assessment in Asia and the Pacific* (2021, International) by Asian and Pacific Centre for the Development of disaster Information Management

- *WHO global air quality guidelines. Particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide* (2021, International): ISBN 978-92-4-003421-1

- Draft Royal Decree establishing the technical-sanitary criteria for the supply and control of the quality of water for human consumption. Regulatory impact analysis report (2021, Spain) by the Spanish Ministry of Health

- The need to legislate on the use of endocrine disruptors (2022, Spain, 4-8 dissemination activities to targeted public, also in Press release).

7. IDÆA is highly active in **Expertise advisor activities** as the main tacit knowledge transfer activity (>40) mainly to public entities and administration and in some cases to private organisations. Some examples are:

- IDÆA is acting as "developer in the validation process of an alternative method for the identification of compounds with the ability to alter the thyroid system. This is method 7a "*Measurement of intrafollicular thyroxine (T4) using zebrafish eleutheroembryos*", and the body responsible for the validation process is the EU Reference Laboratory for alternatives to animal testing (EURL ECVAM), which belongs to the JCR. As a method developer IDÆA has actively participated in the drafting of the SOP and provide advice to the laboratory responsible for the validation.

- Advisor on modification nº1 of the service contract for the physical-chemical control of groundwater bodies in the Ebro basin "key: 09.831.084/421. Ebro River Basin Authority (Spain, 2021)

- Consultancy to evaluate the award of contract for the analysis of pollutants in groundwater in the Jucar basin. Jucar Hydrographic Confederation (Spain)

8. IDÆA's researchers participate in **National and International Organizations and Committees** in the board of directors, presidents, advisor board, or as chairs or vice-chairs, founders, delegates or members. IDÆA is participating in 69 organisations and committees 67 of them Internationals. Some of them are:

- Board Member of the International Panel on Chemical Pollution. Zürich (Switzerland)

- Member of the United Nations Environmental Programme (UNEP) to implement an Intergovernmental Panel on Climate Change (IPCC) of chemical compounds.

- Member of the World Health Organisation (WHO) Expert Groups on Air Quality since 2020

- Member of the European Chemicals Agency (ECHA)

- Vice-Chair of the Scientific Bureau of EMEP\_UN\_ECE, Convention for the Long Range Transport of Air Pollutants since 2011

- Member Clean Air For Europe (CAFE) of the DG Environment-EU air quality directives

- Member of the Committee of the co-operative programme for monitoring and evaluation of the long-range transmission of air pollutants in Europe (EMEP)

- Representing IDÆA in the NORMAN Network of reference laboratories, research centres and related organisations for monitoring of emerging environmental substances (representing the IDÆA).

- Assessing policy actions on air quality and vehicle emissions as experts in the European Commission and the OECD.

- Vice-chair of the Scientific bureau on the Swiss Environmental Agency and LRTAP-UNECE

- Spanish coordinator of the Euromediterranean Network of Experimental and Representative Basins (ERB)

- Presidency of the Spanish Society of Mass Spectrometry.

- Vice President of the Board of the Spanish Society of Chromatography and Related Techniques (SECyTA)

- Member of the Earth Science Women Network (International)

- Working Group on Risk Assessment for Birds and Mammals of the European Food Safety Authority (EFSA)



- Barceló, D.; Wastewater-Based Epidemiology to monitor COVID-19 outbreak: Present and future diagnostic methods to be in your radar; 17th International Conference on Environmental Science and Technology; Greece; September 2021.
- Barceló, D.; Red Nacional de Ecosistemas Fluviales: Retos y Estrategias de Futuro; IBERAQUA-NET Conference; Spain; 24/11/2021.
- Barceló, D.; One Health Next Generation Wastewater Management and Reuse: The Role of Non-target and Retrospective Analysis, Bioassays, and Wastewater Surveillance; SETAC Europe 32nd Annual Meeting; SETAC Europe; Denmark; May 2022.
- Pujades, E.; Jing, M.; Jurado Elices, A.; Vilarrasa, V.; Quality and quantity issues of urban hydrogeology; General Assembly 2022 of the European Geosciences Union; European Geosciences Union (EGU); Austria; 26/05/2022.
- Querol, X.; Monfort, E.; La qualitat de l'aire en Espanya; Universitat Jaume I de Castelló- UJI; Spain; 01/06/2022.
- Vázquez Suñé, E.; Congreso Ibérico de las aguas subterráneas 2021; Asociación Internacional de Hidrogeólogos Grupo Español (IAH-GE) y Universitat Politècnica de Valencia; Spain; 17/11/2021.
- Yáñez, A.; Member of the organizing committee of the Gordon Research Seminar: Biogenic Hydrocarbons and the Atmosphere; Gordon Research Conference; United States of America; 11/06/2022.



### Awards

- Assessing SUDs Efficiency to Reduce Urban Runoff Water Contamination ASSET-WATER; Premios Científicos y de Innovación a los Retos Urbanos de la ciudad de Barcelona 2021; España; Ajuntament de Barcelona; 12/03/2021.
- Assessment of the efficiency of urban drainage systems to reduce polluting assets and make water use more sustainable; Sheiber, L.; Teixidó, M.; Criollo, R.; Vázquez, E.; Award-winning project. Awards for Scientific Research into Urban Challenges in the City of Barcelona 2020; Barcelona City Council; 2021.

- Doctor Honoris Causa of the University of Silesia; Tauler, R.; Honorary Doctor of the University of Silesia; Polonia; University of Silesia in Katowice; 28/04/2022.
- Doctor Honoris Causa of the University of Lleida (UdL); Barceló, D.; Spain; Universitat de Lleida; 23/06/2021.
- Chemometrics Lifetime Achievements Award 2022; Tauler, R.; Chemometrics Lifetime Achievements Award 2022; Italia; Université de Lille; 12/09/2022.
- Geothermal energy to promote the degradation of organic compounds found in Barcelona's groundwater; Pujades Garnes, E.; Vázquez, E.; Award-winning project. Awards for Scientific Research into Urban Challenges in the City of Barcelona 2020; Barcelona City Council; 2021.
- Premi de la Societat Catalana de Química al Talent Científic Emergent; 2ª edició; Gago-Ferrero, Pablo; 21/06/2022; Societat Catalana de Química; 2022
- Premi ex aequo de la Societat Catalana de Química a l'Excel·lència Científica; 2ª edició; Grimalt O., Joan; 21/06/2022; Societat Catalana de Química; 2022
- Premio Alfons Bayó para jóvenes investigadores; Marazuela, Miguel Ángel; 12ª Edición Premios AIH-GE 2021; España; Asociación Internacional de Hidrogeólogos - Grupo Español; 2021.
- Premio Alfons Bayó para jóvenes investigadores; Fernández Ayuso, A.; Valdivielso Mijangos, Sonia; 13ª Edición Premios AIH-GE 2022; España; Asociación Internacional de Hidrogeólogos - Grupo Español; 02/02/2022.
- Premio Escarabajo Verde RTVE; Querol, X.; Premio Escarabajo Verde RTVE; España; Radio Televisión Española; 31/05/2022.
- Premio Extraordinario de Doctorado UPC, Tesis doctoral: Hydrogeology of salt flats: the Salar de Atacama example; Marazuela, Miguel Ángel; dirección: Vázquez-Suñé, Enric; España; Universitat Politècnica de Catalunya; 01/01/2022.
- Radboud Excellence Initiative Professorship Visiting Award; Tauler, R.; Radboud Excellence Initiative Professorship Visiting Award; Países Bajos; Radboud University Nymegen; 17/05/2021.



**Manager (CID)**

Fajarí Agudo, Lluís

**Communication and Outreach (IDÆA-CID)**

S. Arroyo, Alicia

Rodríguez Bermejo, Alejandro

Sotres Fernández, Ana

**EU Programmes and Fundraising (IDÆA)**

de Campos Paus, Sergio

Ratera Bastardas, Mercè

**Administration (IDÆA)**

Andreu Albertos, Rosa

Gómez Quiroga, Neila

**Library (CID)**

del Blanco Rodríguez, Fernando

**Animal Facility (CID)**

Padilla García, Alejandro

Prats Miravittlas, Eva (Supervisor)

Rodríguez Palacios, Juan Manuel

**Cell Culture (CID)**

Fabriàs Domingo, Gemma (Supervisor)

Pérez Pomeda, Ignacio

**Administration (CID)**

Al-bare Taib, Iqram

Aznar Carreño, José

Beltrán Fabregat, Lúdia

Bleda Hernández, María José

Burgos Fernández, Jordi

Cano, Antonio

Farré Sánchez, Anna

Font Piqueras, Oriol

Sosa Dominguez, Garay

Guillem Argiles, Núria

Isart Margarit, Rosa

Jiménez Sánchez, Carmen

de Julián Margalef, Esperanza

López Pinar, David

Martinez, Joan Carles

Martinez Blanch, Jordi

Martínez Pérez, Laura

Martínez Serra, Elena

Mañas, Marc

Moliner Ferrer, Leonor

Monge Azemar, Marta

Quiroga Fernández, Àngels

Rodríguez, Bernardino

Santalices Redondo, Carlos

Soto Núñez, Núria

Vega Roldán, Dolores

Vélez García, Carmen

Vílchez González, Alberto

Yélamos Muñoz, Esperanza

**Ad Honorem (IDÆA)**

Gallart, Francesc

Rodríguez Clemente, Rafael



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