



## Job opportunities / grants

### →FPU candidate

Universidad de Castilla-La Mancha, España



Se buscan candidatos para solicitar un contrato predoctoral dentro de la convocatoria [FPU 2024](#). La tesis doctoral se realizará dentro del grupo de “Biotecnología y Recursos Naturales” de la Universidad de Castilla-La Mancha (UCLM), en el Instituto de Desarrollo Regional (Campus de Albacete), y estará asociada al proyecto de investigación “Evolución microbiana del nitrógeno en cuencas mediterráneas afectadas por incendios forestales a través de multi-ómicas (NITROMICS)”, financiado por la Agencia Estatal de Investigación (ref. PID2023-151025NA-I00). La tesis doctoral abordará el ciclo microbiano del nitrógeno en cuencas afectadas por incendios forestales integrando muestreos de campo, experimentos en microcosmos y análisis ómicos (metagenómica, metatranscriptómica y metaproteómica) para evaluar los cambios a corto y largo plazo en el ciclo del nitrógeno y la composición del microbioma.

Para más información, contactar antes del 31 de enero con el Dr. Nicolás Valiente Parra ([nicolas.valiente@uclm.es](mailto:nicolas.valiente@uclm.es)).

### →FPU candidate

Universidad de León, España



Se busca candidato/a para solicitar un contrato predoctoral dentro de la convocatoria [FPU 2025](#). La tesis doctoral se realizará en el Laboratorio de Diatomología de la Universidad de León, en el Instituto de Medio Ambiente, Recursos Naturales y Biodiversidad (IMARENABIO), y estará asociada al proyecto de investigación ‘Aquatic environmental impact of biodegradable packaging materials: A citizen science project (CiDIA-micro)’ que se desarrolla en colaboración con la Montanuniversität Leoben (Austria) y la Université de Lorraine (Francia), financiado por el Ministerio de Ciencia, Innovación y Universidades, dentro de EURECA-PRO, la Universidad Europea para el Consumo y la Producción Responsable.

Los/as candidatos/as interesados/as pueden contactar antes del 31 de enero de 2025 con el Dr. Saúl Blanco Lanza ([saul.lanza@unileon.es](mailto:saul.lanza@unileon.es)).

## → Group leader position in ecohydrological modelling

Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB), Germany



The successful candidate will develop a research group and program on how ecohydrological processes in landscapes affect water bodies (lakes, ponds, rivers, floodplains, wetlands, littoral zones or marshlands), and how ecohydrological settings as well as human-induced changes (urbanization, climate change, management) affect ecohydrological processes in freshwater ecosystems. The position follows the IGBs commitment and the strategic need to enhance capacity in the critical area of ecohydrological modelling. We seek a dynamic, motivated and ambitious scientist to join an interdisciplinary science and modelling team to support the development of coupled hydrological-ecological modelling at IGB. This expansion of the Department builds on a long history of internationally recognised research excellence in ecohydrology. This position aims to understand the functioning of connected landscapes and waterscapes. The impacts of global change on these connected landscape-waterscape ecosystems will be investigated through advanced process-based modelling approaches.

Any questions can be directed to Prof Dörthe Tetzlaff ([doerthe.tetzlaff@igb-berlin.de](mailto:doerthe.tetzlaff@igb-berlin.de)).

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## → Postdoc and technic position in biodiversity and conservation

Universidad Rey Juan Carlos, España



Oferta de contrato de POSTDOC y TÉCNICO para trabajar en el Área de Biodiversidad y Conservación perteneciente al Instituto de Investigación en Cambio Global (IICG) de la Universidad Rey Juan Carlos (Móstoles, Madrid). Las personas contratadas se incorporarán a la línea de investigación sobre "Efectos del cambio climático en especies costeras" para colaborar en labores relacionadas con los proyectos PERSIST e InterMaRest que se llevan a cabo en colaboración con la Universidad de Oviedo. La publicación pueden consultarla en el tablón de la sede electrónica de la URJC [sede electrónica de la URJC](#) y en la página web de [convocatorias con cargo a proyectos](#). El plazo de inscripción es hasta el día 31/01/2025. Fecha aproximada de incorporación: 07/03/2025 Las inscripciones se harán a través de la sede electrónica, [Convocatorias](#).

Para más información pueden contactar con Rosa M. Chefaoui ([rosa.chefaoui@urjc.es](mailto:rosa.chefaoui@urjc.es)).

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## → Group leader position in Molecular Ecology of Aquatic Ecosystems

Wasser Cluster Lunz, Austria



WasserCluster Lunz (WCL) offers a stimulating international scientific working environment. Several laboratories, including a molecular biology, a microbiology, and a radionuclide lab amongst others, are equipped with state-of-the-art infrastructure.

More information [here](#).

## → Ruta por Los Carriles de Alcobendas

Plataforma Ciudadana Salvemos Los Carriles

En el Día Mundial de los Humedales, la Plataforma Ciudadana Salvemos Los Carriles, en colaboración con el Proyecto ClimaRiskinPond y tres de sus investigadoras limnólogas de la Universidad Autónoma de Madrid, queremos dar a conocer y reivindicar la importancia de estos ecosistemas y de su conservación. Para ello hemos organizado una Ruta por Los Carriles de Alcobendas, donde disfrutaremos de estos maravillosos hábitats dentro de los cuales se desarrolla la vida calladamente. Será el próximo domingo, día 2 de febrero, a las 11:00 frente a la Sede de la Policía Local, Avda. Valdelaparra, 124, de Alcobendas.

La importancia de los humedales es fundamental para la vida en todo el planeta, gracias a que son ecosistemas donde habitan un gran número de especies animales y vegetales. Se encargan de regular el ciclo del agua y el clima, creando, de esta manera, un equilibrio perfecto.

Se estima que los humedales constituyen uno de los ecosistemas más afectados por el rápido crecimiento poblacional, el desarrollo tecnológico, la producción y el vertiginoso consumo insostenible, entre otros factores. Esto contribuye de manera considerable a su pérdida, deterioro y degradación.

El bienestar de nuestro planeta y el de futuras generaciones dependerá del grado de concienciación acerca de la importancia de la preservación y cuidado que deben tener los humedales. Os invitamos a ser parte de la solución con esta Ruta por Los Carriles de Alcobendas acompañadas de tres importantes investigadoras limnólogas de la Universidad Autónoma de Madrid: Paloma Alcorlo, Christian Arnanz y Marina Tomás-Martín.

El proyecto ClimaRiskinPond es un proyecto de investigación que prioriza la conservación de lagunas temporales en la España peninsular ante sus amenazas actuales, como la llegada de especies exóticas, el cambio climático y las perturbaciones antropogénicas. El proyecto quiere contribuir a la conciencia pública frente a las amenazas del cambio climático y las invasiones biológicas, y a los alineamientos políticos para priorizar áreas de conservación.

[plataformaloscarriles@gmail.com](mailto:plataformaloscarriles@gmail.com); [Web](#); [Instagram](#); [X](#); [Facebook](#); [Youtube](#)

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## → Evento: humedales ante catàstrofes naturales

Centre de Cultura Octubre, València

Jueves 6 de febrero 2025, 10:30-14:00

Más información e inscripciones <https://fundacionglobalnature.org/humedales-como-aliados-2025/>

## CATÁSTROFES HÍDRICAS IBÉRICAS (Adenda)

Miguel Álvarez Cobelas, Museo Nacional de Ciencias Naturales (CSIC), Serrano 115 dpdo., 28006 Madrid, [malvarez@mncn.csic.es](mailto:malvarez@mncn.csic.es)

Durante las navidades de 2024 he pasado unos días en la ciudad murciana de Cartagena, lugar que ha padecido varias inundaciones a lo largo de su historia. Ya había enviado mi manuscrito sobre las catástrofes hídricas a la *ALQUIBLA Newsletter* (Álvarez Cobelas, 2024), pero encontré algunas informaciones adicionales sobre el tema, que paso a comentar al posible lector interesado.

El camping de Bolnuevo, en Mazarrón (Murcia), padeció una inundación que causó grandes daños materiales y la muerte de dos personas en septiembre de 1989 (véase la Tabla I de mi artículo precedente). Es triste, lamentable y pasmoso constatar que en 2024 el camping sigue situado en el mismo lugar: en la desembocadura de la rambla de Las Moreras, por la que llegó la riada de 1989. Le han cambiado el nombre, eso sí. Lo que no creo que cambie mucho es el periodo de retorno del agua fluvial, que está entre 25 y 100 años en las cuencas levantinas (Francés García, 1997); y ya han pasado 35 años desde el suceso.

En plan “artístico”, he tenido también noticia de una novela escrita por la cartagenera Carmen Conde y publicada en 1978. Titulada *La rambla*, es una narración sobre el remordimiento, donde se usa la inundación como metáfora de las porquerías que el agua expulsa fuera de nosotros. Y así nos lava, aunque con resultados inesperados y tremendos en ocasiones, tal como describe la novelita. La escritora recrea allí la terrible inundación padecida por Cartagena en septiembre de 1919, llamada *la riada de San Miguel*, en la que murieron 22 personas (<https://cartagenaantigua.wordpress.com/2013/06/01/inundaciones-la-borrasca-de-santa-catalina/>).

A la riada, que llegó a la ciudad por su camino habitual (la rambla de Benipila), le dedica Carmen Conde un capitulillo sin nombre ni número, entre las páginas 113 y 117, donde describe

*La rambla que todos temían era la de Benipila, y su ancho, pedregoso cauce, corría ahora repleto, rebosante de aguas limosas, de aguas que arrastraban árboles, animales ahogados, cosas que arrebató de sus sitios y que paseaba en loca y vertiginosa carrera hasta llevarlas al mar.*

### Bibliografía citada

Álvarez Cobelas, M. 2024. Catástrofes hídricas ibéricas: la meteorología, el paisaje, el paisanaje y las víctimas. *ALQUIBLA Newsletter* (Diciembre): 31 pp.

Conde, C. 1978. *La Rambla*. Editorial Magisterio Español. Madrid. 149 pp.

Francés García, F. 1997. *Delimitación del riesgo de inundación a escala regional en la Comunidad Valenciana*. Universidad Politécnica de Valencia y Generalitat Valenciana. Valencia. 72 pp.

1 Fue la primera mujer elegida como miembro de la Real Academia Española de la Lengua, en 1978. Aunque escribió mucho para niños, era considerada poeta fundamentalmente. Entre sus muchos versos, tiene algunos dedicados al Mar Menor, escritos mucho antes de su desastre ambiental y urbanístico actual.

2 En mi artículo citado anteriormente no aparece. Fallo mío: lo borré inadvertidamente en una de sus varias versiones.

**Antonio José García Meseguer**, Universidad de Murcia

Understanding how biotic, abiotic, and historical factors interact to shape species distribution is a central theme in ecology and evolution, with significant implications for biodiversity conservation. Coastal habitats, which are ecotones affected by marine and terrestrial conditions, include supratidal rockpools, which are extremely dynamic and fragmented environments, unpredictable in terms of water quantity, temperature, and salinity. Thus, these habitats sustain a community poor in species number but formed by unique organisms adapted to withstand harsh environmental conditions. The beetle genus *Ochthebius*, one of the few aquatic insect lineages capable of living in these environments, represents a good model to study the ecological and evolutionary processes that shape the occurrence, distribution, and genetic structure of organisms living in one of the planet's most inhospitable habitats, and thus predict responses to future environmental change scenarios. This thesis aims to determine the spatial patterns in the population genetic structure of three *Ochthebius* species (*O. lejolsii*, *O. subinteger* and *O. quadricollis*) inhabiting the supratidal rockpools of the Iberian Mediterranean coast, and to characterise their ecological niche and their patterns of co-occurrence. Moreover, the thesis identifies the abiotic factors that enable their coexistence in such extreme habitat and tries to disentangle the drivers behind the patterns of genetic diversity and population structure. In chapter 1, we analyse the spatio-temporal occurrence patterns of *O. lejolsii* and *O. quadricollis*, estimate and compare the environmental niches of adults and larvae of these species, and determine the environmental variables driving their distribution and abundance patterns. Negative correlations between the abundances of both species were found, suggesting spatial-temporal segregation based on their different environmental responses. These results suggest that subtle interspecific differences in their ecological niches, greater in larvae than in adults, and mainly related to the hydroperiod and pool salinity, could determine the storage effect as one of the main coexistence mechanisms at local and regional scales. In chapter 2, we explore the potential role of oceanic currents and fronts in shaping the contemporary genetic structure of the three species in the western Mediterranean basin, combining population genetics and biophysical modelling. Results showed that the biophysical model based on ocean currents and fronts in the Western Mediterranean predicted the observed genetic structure better than simple isolation by distance in both species. Strong genetic discontinuities were observed in populations separated by the Ibiza Channel and the interface between the Alborán Sea's anticyclonic gyres, suggesting these oceanographic features act as significant barriers to dispersal. In chapter 3, we examine the genome of *Ochthebius* and develop and characterise microsatellite markers (SSR) loci through next-generation high-throughput sequencing (NGS) to facilitate population identification and genetic structure studies, valid for the three species of *Ochthebius* coexisting in the Iberian Mediterranean. Finally, in chapter 4, we determine the genetic diversity and population structure of these species using microsatellites as molecular markers, in order to elucidate population connectivity, and discern the underlying factors shaping their patterns of population genetic differentiation. The results revealed low genetic diversity and high connectivity and gene flow among populations of these *Ochthebius* species, likely due to passive dispersal mechanisms. *O. quadricollis* was the only one presenting a marked genetic structure, with significant genetic break at the Alboran gyres interface and isolation by distance without significant influence from the environmental factors explored at the studied spatial scale. Overall, the results of this thesis make a significant contribution to the understanding of the abiotic factors that enable the coexistence and determine the genetic structure in organisms inhabiting supratidal rockpool, integrating ecological studies and phylogeography, and enhancing our understanding of their distribution patterns and genetic variation, which reflect their distinct evolutionary histories, microhabitat preferences, and dispersal mechanisms.

# PhD: Functional consequences of biodiversity loss caused by emergent diseases in freshwater ecosystems

**Alberto Alonso Blanco.** Universidad del País Vasco/Euskal Herriko Unibertsitatea  
Supervisors: Luz Boyero González & Jaime Bosch Pérez

Biodiversity on Earth is decreasing at alarming rates, with freshwater ecosystems suffering higher extinction rates than their terrestrial and marine counterparts. Biodiversity loss is known to affect ecosystem functioning and structure, but most research focuses on random species loss, which is unrealistic because species differ in extinction risk based on their traits and sensitivity to stressors. Emergent diseases entail an increasing risk to a wide range of species, with trees and amphibians being two taxonomic groups strongly affected. In this context, this thesis aimed to assess how the loss of several species of trees and amphibians, vulnerable to extinction due to emergent diseases, could impact the functioning and structure of freshwater ecosystems.

The first three chapters explored how the loss of vulnerable riparian tree species affects headwater ecosystems, which rely on leaf litter as the main basal resource of a predominantly brown food web, finding important effects on leaf litter decomposition and associated communities, but in different directions depending on leaf traits of the species lost. In chapter 1, a field experiment demonstrated that loss of alder (*Alnus glutinosa*), with highly palatable leaf litter, reduced decomposition via complementarity effects among leaf litter types in mixtures, which were promoted by alder and disappeared in its absence, and altered aquatic hyphomycete and invertebrate communities. In chapter 2, a microcosm experiment found similar but weaker effects of alder loss, whereas effects of losing oak (*Quercus robur*), with low leaf litter palatability, were opposite. In chapter 3, another microcosm experiment demonstrated that infection of alder (*A. lusitanica*) by *Phytophthora alni* tended to enhance its leaf litter palatability and decomposition but, after alder disappearance and their replacement by the invasive black locust (*Robinia pseudoacacia*), the trend was just opposite, with strong reduction of decomposition and changes in aquatic hyphomycete communities.

The other three chapters addressed the loss of one anuran and two urodeles in montane streams and ponds in the presence and absence of other amphibians, showing different effects on periphyton accrual and leaf litter decomposition through competitive and trophic interactions, as well as changes in algal communities and invertebrate foraging preferences. In chapter 4, a field experiment conducted in montane streams showed that loss of common midwife toad (*Alytes obstetricans*), in the absence of other amphibian grazers, promoted periphyton biomass accrual but inhibited invertebrate growth, possibly because tadpoles facilitated invertebrate feeding. In chapter 5, using a mesocosm experiment simulating ponds where common midwife toad loss was compensated by gain of other amphibian species, the opposite effect was found, with a reduction in periphyton biomass accrual after their loss due to competitive release of more active species; besides, a similar but weaker effect was found after marbled newt (*Triturus marmoratus*) loss through its top-down control on zooplankton. And in chapter 6, another field experiment demonstrated that loss of salamander (*Salamandra salamandra*) released invertebrates of predatory pressure so they shifted their foraging preferences from leaf litter, which is a safer resource in the presence of predators, towards periphyton, resulting in reduced leaf litter decomposition and periphyton biomass accrual and changes in algal communities.

Overall, these results highlighted the importance of considering species traits and the biological and environmental contexts for predicting the impacts of species loss on ecosystems, emphasizing the relevance of studying real-case scenarios if we are to better understand the consequences of extinctions and improve species conservation and ecosystem management.

# PhD: Comparative ecophysiological responses of supratidal rockpools *Ochthebius* species (Coleoptera: Hydraenidae) to multiple stressors

Juana María Mirón Gatón. Universidad de Murcia.

Supervisors: Josefa Velasco García & Andrés Millán Sánchez

The ecophysiologicalists face one of today's greatest challenges: understanding species' adaptation to environmental changes in an ever-transforming world. They use ecosystems with extreme environmental conditions as models, which present significant physiological challenges to the organisms inhabiting them. One interesting study system are the Mediterranean supratidal rockpools that suffer long periods of desiccation, resulting in significant environmental fluctuations with extreme conditions of high temperature and salinity.

This thesis focuses on the ecophysiological comparative responses to multiple stressors of three aquatic beetle species from the genus *Ochthebius*: *O. quadricollis*, *O. lejolisii*, and *O. subinteger*, exclusive of rockpools. The main goal was to seek their common or different response patterns.

**Chapter 1.** The temperature at which heat coma occurs was determined and compared among populations of the three *Ochthebius* species. The effect of acclimation salinity (at non-stressful and sublethal levels) on thermal tolerance in adults and larvae of *O. quadricollis* and *O. lejolisii* was studied. Furthermore, thresholds of temperature for escape responses (water emergence and flight) were identified. Significant differences were found in thermal tolerance between species and populations. *Ochthebius quadricollis* exhibited greater thermal tolerance without the effect of saline acclimation. In contrast, *O. lejolisii* showed effects on thermal tolerance at a sublethal salinity, increasing tolerance in larvae and decreasing in adults. Thresholds of temperature for escape responses varied between species in accordance with their physiological tolerance. Salinity affected the thresholds of temperature for water emergence in both species. An additive effect of temperature and salinity on the frequency of emergence and flight was observed in both species. These findings provide valuable information for developing survival models against climate change.

**Chapter 2.** The realized and fundamental saline niches of adults, larvae, and eggs of *O. quadricollis* and *O. lejolisii* were identified and compared. The realized niche was determined using field data on the abundance of adults and larvae, while the fundamental niche was analysed in laboratory experiments exposing adults, larvae, and eggs to different salinity levels. A discrepancy was found between the realised and fundamental niches. Both species proved to be euryhaline, tolerating extreme salinities in their natural habitat, especially *O. quadricollis*. In the laboratory, *O. lejolisii* showed greater physiological tolerance than *O. quadricollis* in all life stages. Comparing life stages, both larvae and eggs were more tolerant than adults. These species exhibited a high physiological capacity to withstand extreme salinities, a factor that could be exacerbated by climate change.

**Chapter 3.** The cross-tolerance of *O. quadricollis* and *O. lejolisii* to salinity and desiccation was evaluated. Adults, larvae, and eggs of both species were acclimated to non-stressful and sublethal salinity levels, followed by exposure to extreme desiccation. Both species showed similar responses to desiccation throughout ontogeny, with larvae and eggs being more resistant than adults. *Ochthebius lejolisii* larvae were more desiccation-tolerant than *O. quadricollis* larvae, while *O. quadricollis* eggs had greater success following acclimation to non-stressful salinity. *Ochthebius lejolisii* eggs maintained similar hatching rates at both salinity levels.

**Chapter 4.** Two hypotheses were tested in populations of *O. lejolisii* from areas with different thermal variability: the Metabolic Cold Adaptation (MCA) and Climatic Variability Hypotheses (CVH). Reciprocal acclimation experiments under different fluctuating temperature regimes were conducted to evaluate phenotypic plasticity and local adaptation in metabolic rates and thermal limits. The population at higher latitude, featuring a colder climate, showed higher metabolic rates at low temperatures, confirming the MCA. The lower latitude population, with greater climatic variability, demonstrated higher thermal tolerance. Only the higher latitude population exhibited plasticity in its upper thermal limit. These results suggest trade-offs between tolerance and plasticity in the thermal adaptation, increasing the vulnerability of Mediterranean coastal populations against higher latitude Atlantic populations to extreme temperature increases by climate change.

All these findings contribute to understanding the effect of stress factor interactions on the studied species and their responses throughout their life cycle. The differences between species and life stages may be related to the different microenvironmental niches each species occupies.

# PhD: Ice cover phenology of Mediterranean high mountain lakes (Central System) in a context of climate change. Modulation by climatic and geomorphological factors, and effects on winter limnology.

**Manuel Toro Velasco**, Universidad Autónoma de Madrid

Supervisors: Carlos Montes del Olmo & Antonio Camacho González

One of the most intense consequences of anthropogenic global change currently affecting the planet is induced climate change, with global warming accentuated over the last century due to the increase in greenhouse gas emissions, and expected to continue to increase at least in the short term. The effects are particularly significant in the cryosphere, and in the case of high mountain lakes they are affecting the extent and duration of their ice cover, whose phenology responds rapidly to the main climatic variable that determines it, temperature. The impacts on the overall functioning of these ecosystems in their physical, chemical and biological processes are largely unknown and likely to be difficult to reverse under projected future scenarios. Although the southernmost ice-covered lakes in the northern hemisphere are expected to be more vulnerable to climate change (Figure 1), the phenology of ice cover and its trends and rates of change in the current climatic context have not been addressed in Mediterranean high mountain lakes. Iberian alpine lake districts are of unquestionable ecological value, representing unique relicts of boreo-alpine character in an environment of Mediterranean climate or transition to the Atlantic climate, and therefore need to be investigated to understand their vulnerability and response to climate change. The aim of this doctoral thesis is to define the response to induced climate change of the phenology of the ice cover in the Mediterranean high mountain lake district of the Iberian Central System in Spain, identifying how morphogenetic, topoclimatic, morphometric and meteorological factors influence the phenology, the coherence of its response and its vulnerability as a lake district and individually of each lake, in a regional and global geographical context. Firstly, a cataloguing of the high mountain lakes of the Central System located at an altitude of over 1600 m a.s.l. in the sierras of Gredos (Central Massif of Gredos, Sierra del Barco and Sierra de Béjar) and Guadarrama has been carried out. The main limnological characteristics that identify them as a lake district have been described, inventing a total of 26 lakes with a surface area of at least 0.5 ha and/or a maximum depth of more than 0.5 m, and which have a winter ice cover lasting more than one month. Furthermore, for the first time in an Iberian mountain system, a detailed typological classification of the glacial morphogenesis of its lake basins has been carried out, defining 9 morphogenetic types that show the geomorphological richness of these lakes, belonging to two main genetic groups: hole, generated by the direct action of glacial over-deepening, and morainic, formed by the damming of the water produced by the materials eroded, transported and deposited by glaciers.

Based on previous knowledge of glacial morphogenetic types, the lakes have been characterized and classified topoclimatically and morphometrically, the results of which, including their bathymetry, reflect a morphometric uniformity with differences and similarities with respect to other lake districts of the Iberian Peninsula with which they are compared, although they present internal diversity because of morphogenetic richness. There is a predominance of relatively small lakes, typical of the Iberian region, with some exceptions of larger dimensions due to the damming suffered for hydroelectric and irrigation use, constituting outliers for many of the variables studied. Internally, the lakes of the Sierra de Guadarrama differ from the rest of the Gredos mountains in their lower lake density ( $L_r$ ) and average size, as well as the predominance of an E orientation, unusual in the Central system. Two unique groups are also distinguished from the rest: the temporary lakes and the fluvial lakes.



To establish the main phenological variables of the lake ice cover, a methodology has been developed based on data from water column thermistors, satellite images and direct observations, following criteria chosen among the most widely used by other authors to facilitate the comparison of the results with other regions of the northern hemisphere. The long observation series of ice cover phenology in the Peñalara (1990-2022), Grande de Gredos and Cimera (2006-2022) lakes, obtained with direct thermistor data in the water column, constitute the longest time series in a high mountain lake district in the Iberian Peninsula. In addition, phenology and intra-annual variability for the period 2015-2022 have been described for the 26 catalogued lakes, studying their relationship with annual meteorology and climate, inter-annual variability, their recent trend and the rates of change of phenological variables. It has been observed that recent changes in climate and the evolution of the NAO pattern, with higher frequency of higher winter temperatures and lower snow cover, are increasing the interannual variability of phenology and the frequency and extent of ice cover intermittency, and decreasing its duration (ice-days), with an unequal intensity depending on variables such as altitude and other topoclimatic (e.g. orography of the lake area and its orientation), morphometric or geographical (e.g. latitude) factors.

The different morphogenetic types show a greater homogeneity in the ice-on date, which is more dependent on the synoptic meteorological conditions common to all lakes at the beginning of winter, than in the ice-off date, as the latter is more influenced by the topoclimatic and morphometric characteristics of each type. In addition to the autumn and spring 0 °C isotherms, altitude and maximum depth are the variables that best explain the variability of the ice-on date, and altitude and radiation the ice-off date. The intermittency of the ice cover throughout the winter is decisively influenced by the higher radiation received, the orientation of the orographic environment further away from the northern component and the lower altitude.

Based on the phenological data obtained, the 26 lakes were classified according to their vulnerability to climate warming based on the most influential topoclimatic and morphometric variables and their genetic type. This classification constitutes a very useful management tool for designing and extending monitoring programmes for these ecosystems, facilitating the selection of the most sensitive and vulnerable lakes of each type and lake complex as representatives of the whole, in which to implement and maintain long-term monitoring.

The results corroborate the existence of a coherence in the response of the phenology of the ice cover of the lakes to climate, both at the mountain range scale and between the different mountain ranges, revealing also the variables that modulate it individually, showing rates and trends of change in relation to the two most influential variables, altitude and air temperature, higher than the average rates of lake districts of any other latitude and altitude in Europe and North America, being therefore more vulnerable to global warming than lakes at higher latitudes.

A conceptual model is developed to explain the relationships and feedback (positive or negative) between climatic, morphogenetic, topoclimatic and morphometric factors, that influence the phenological variables (ice-on, ice-off and ice-days) of the ice cover of high mountain lakes in the Iberian Central System (Figure 3). Predictive models quantifying the relationships of phenology with the most influential variables have been successfully validated with long time series data from three lakes. This model constitutes a basis for the future development of mechanistic modelling exercises under global change scenarios, which can be optimized by incorporating other influential variables after regionalization at the lake scale, such as snowfall, wind or the 0 °C isotherm.

To provide a prediction of some possible consequences of climate change in Mediterranean high mountain lakes, the interannual dynamics during a period of 5 winters (2010-2015) of the under-ice water column of a lake has been described in relation to the climatic variability of these winter periods. Thus, it has been observed that climatic patterns (NAO and EA) condition the phenology of the ice cover and its thickness, determining the occurrence of two modes depending on the winter meteorology (snowfall and temperature): “dark”, with a greater thickness and opacity of the cover due to high snowfall, and hypoxia at the bottom of the lake, and “clear”, with a less thick and more transparent cover due to the absence of snow, and greater oxygen at the bottom due to increased photosynthesis under the ice. Although it is very likely that topoclimatic and morphometric factors modulate their response, the current successional dynamics of these modes seem to characterize Mediterranean high mountain lakes, as they differ from those found in other latitudes. The alteration of phenology and ice cover characteristics because of recent changes in climate would lead to a higher frequency of occurrence of the “clear” mode, which would alter the dynamics of the ecological functioning of these Mediterranean high mountain lakes, with important ecological effects on their ecosystems.

Although the possible future effects of recent changes in ice cover phenology on the ecological functioning of Central System lakes are not yet known in detail, several ecological impacts can already be perceived or anticipated in some processes and biological communities of several lakes. These Mediterranean high mountain lakes of the SC have a coherent sensitivity and vulnerability to global warming as a lake district, individually modulated by geomorphological and climatic factors, which is higher than that of other lake districts in the northern hemisphere. Therefore, they are excellent sensors and sentinels of environmental changes at different geographical scales, Iberian, Mediterranean and Northern Hemisphere, as they show rates and trends of change in ice cover phenology higher than the average of known lake district series at any other latitude and altitude in Europe and North America, and whose evolution in the near future inevitably leads to a disappearance of winter ice cover.

This work corroborates the importance and the need to implement and maintain long-term research and monitoring in aquatic ecosystems, and in the case of lake ice cover phenology, should be part of monitoring and early warning programmes of the effects of induced climate change on these ecosystems and their catchments.

## →Urban runoff pollutants: Occurrence and impacts on freshwater ecosystems, and mitigation strategies

Donostia-San Sebastián, Spain, June 12 -13, 2025

We are pleased to announce the opening of registrations and the call for abstracts for the conference "Urban runoff pollutants: Occurrence and impacts on freshwater ecosystems, and mitigation strategies", which will take place on June 12 and 13, 2025, in Donostia-San Sebastián (Basque Country, Spain), organized within the framework of the CityPoll project.

This conference will gather studies about urban runoff pollutants, their dynamics and concentrations, their impact on freshwater ecosystems, and strategies to mitigate their effects. Participants will have the opportunity to present their works through oral presentations or posters in one of the following three sessions:

- Hydrology and modelling of urban runoff
- Urban runoff pollutants
- Impacts of urban runoff on freshwater ecosystems

The deadline for registration is April 1, 2025. Access the registration form:

- Via this link: <https://forms.office.com/e/x4hX26Hkm7>
- By clicking the "Fill out this form" link in the PDF attached to this email.
- By visiting the website, navigating to the "CityPoll conference" section, and scrolling down to point "8. Registration", then clicking on "the registration form" highlighted in blue.

Once we have received the registration form, we will proceed to arrange the payment of the registration fee.

Further information:

- Website: [CityPoll Conference - CityPoll Project](#)
- Email: [info@citypoll.eu](mailto:info@citypoll.eu)
- Social media: Twitter [@ProjectCityPoll](#), Instagram [@project\\_citypoll](#)

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