OPCC Colloquium 2019

3rd International Colloquium on Climate Change in Mountain Areas

Conclusions document

3rd International Colloquium on Climate Change in Mountain Areas. 22 and 23 October 2019.

1. Introduction

On 22 and 23 October 2019, the 3rd International Colloquium on Climate Change in Mountain Areas, organised by the OPCC, the Pyrenean Climate Change Observatory, took place at the Palacio de Congresos in Jaca. The colloquium had more than 100 speakers, specialists in climate change in mountain areas and representatives from the most important research centres in the territories that make up the Working Community of the Pyrenees (CTP).

This colloquium fulfilled its objective of creating a meeting and exchange point over the two days between citizens and the scientific and technical community (research centres, local authorities, universities, technical organisations, associations, and technical services belonging to the different government bodies) to share knowledge about how climate change is affecting mountain areas and how to tackle the process of adaptation. In this regard, the colloquium also featured a session on good adaptation practices in the Pyrenees.

The sessions on 22 October focused on the presentation of the results of the research projects associated with the OPCC which, over three years, have studied different aspects of the impact of climate change in the Pyrenees. These projects focus on the effects of climate change on the biodiversity and ecosystems of the massif, as well as the most vulnerable socio-economic sectors and actors in this cross-border mountain area. The OPCC's work is based on a network of local, regional and cross-border collaborators of a multidisciplinary nature. The work has allowed us to better understand the evolution of the climate in the Pyrenean massif and anticipate its effects from the point of view of the different scientific disciplines and socio-economic sectors.

And the following day, 23 October, had a more institutional focus, with representatives from different organisations and bodies taking the floor to highlight the need to inform the general public about the vulnerability of mountain areas to climate change and the need to take action. There was also a session on the role of territorial cooperation to address the challenges of climate change in mountain areas and another on good adaptation practices.

Participants at the OPCC 2019 colloquium on Tuesday 22 October in front of the Palacio de Congresos in Jaca.

The OPCC2 2019 colloquium follows the two previous international colloquiums on climate change in mountain areas that took place in Pamplona in November 2013 and in Biarritz in November 2017.

2. OPCC Colloquium 2019 Programme

The main purpose of this third OPCC Colloquium was to present the results of the OPCC2 project and its associated projects (REPLIM, FLORAPYR, CANOPEE, CLIM'PY and PIRAGUA). The various presentations focused on the following topics:

- The impact of climate change on flora, water resources, aquatic and forest ecosystems and climate change in the Pyrenees;
- International cooperation in mountain areas to tackle climate change;
- How the socio-economic sectors of the massif adapt to climate change and some good adaptation practices in this area;
- Citizen science in the Pyrenees: development, potential and challenges.

COLOQUIO OPCC 2019

3º Coloquio internacional sobre cambio climático en zonas de montaña OPCC2 2019

22 y 23 / 10 / 2019 — Palacio de Congresos de Jaca, Huesca

ESTRATEGIA PIRENAICA
STRATÉGIE PYRÉNÉENNE

Comité técnico y Comité ejecutivo de la CTP

Comité coordinación y Socios del proyecto OPCC2

Con el apoyo de

Interreg POCTEFA

COLOQUIO OPCC 2019

3º Coloquio internacional sobre cambio climático en zonas de montaña OPCC2 2019

Programa OPCC2 2019
Palacio de Congresos de Jaca, Huesca

Miércoles 23 de octubre

Traducción simultánea ES—FR—EN

08:30 · 09:15 · 09:45 · 11:15 · 11:45 · 12:30 · 14:00 · 15:30 · 17:00 · 17:45

ACREDITACIONES — PAUSA CAFÉ — PAUSA BUFET

CAFÉ DE BIENVENIDA

09:15 — 09:45 SALA AUDITORIO

APERTURA INSTITUCIONAL DEL COLOQUIO

- José Manuel Ramón Ipas (Alcalde del Ayuntamiento de Jaca)
- Antonio Pascual (Secretario General de la Comunidad de Trabajo de los Pirineos)
- Jean François Blanco (Consejero regional de la Región Nouvelle-Aquitaine)
- Pascal Péraldi (Consejera Regional, Región de Occitanie)
- Sonia Castañeda (Directora de la Fundación Biodiversidad del Ministerio para la Transición Ecológica de España)
- Elena Visnar-Malinovska (Jefa de Unidad de Adaptación en la Dirección General de Acción por el Clima de la Comisión Europea)
- Isabel Aranda (Programme Officer de la Secretaría Ejecutiva de la Convención Marco de Naciones Unidas sobre el Cambio Climático)

Modera: Idoia Arauzo (Coordinadora OPCC de la CTP)

09:45 — 11:15 SALA AUDITORIO

COOPERACIÓN INTERNACIONAL EN ZONAS MONTAÑOSAS Y CAMBIO CLIMÁTICO

- Nathalie Morelle (Secretariado Permanente de la Convención Alpina)
- Klaudia Kuraś (Secretariado de la Convención de los Cárpatos)
- Idoia Arauzo (Coordinadora del OPCC de la CTP)
- Caroline Adler (Mountain Research Institute)
- Marco Pregnolato (Fondazione Lombardia per l'Ambiente)
- João Azevedo (La Red Ibérica de Investigación en Montaña)

Modera: Frank D'Amico (Univ. de Pau et des Pays de l'Adour)

11:45 — 12:30 SALA AUDITORIO

PROYECTO OPCC2: resultados y desarrollo de la estrategia del observatorio pirenaico

Performance a cargo de Butaca78 y Paola Lloret (Asistente comunicación OPCC), Juan Terrádez (Técnico OPCC de la CTP) e Idoia Arauzo (Coordinadora OPCC de la CTP).

12:30 — 14:00 SALA AUDITORIO

- Proyecto REPLIM y su red de observación de lagos y turberas (Blas Valero IPE-CSIC)
- Proyecto CLIMPY: evolución del clima en los Pirineos (J.María Cuadrat UNIZAR)
- Proyecto CANOPEE: los bosque pirenaicos frente al cambio climático (Sébastien Chauvin FORESPIR)
- Proyecto FLORAPYR: seguimiento del impacto del cambio climático en la flora pirenaica (Gérard Largier CBNPMP)
- Proyecto PIRAGUA: evaluación del ciclo hidrológico en los Pirineos en un contexto de cambio climático y global (Santiago Beguería EEAD-CSIC)

Modera: Lluis Guitard (Referente territorial OPCC, Catalunya) y Pedro Zuazo (Referente territorial OPCC, Navarra).

15:30 — 17:00 SALA AUDITORIO

CÓMO SE ADAPTAN AL CAMBIO CLIMÁTICO LOS SECTORES SOCIOECONÓMICOS?

Ejemplos de buenas prácticas.

1 · **FLOODUP:** Una iniciativa de ciencia ciudadana para la mejora de la capacidad de adaptación frente al cambio climático. *María del Carmen Llasat Botija (Catedrática de Física del Aire, Depto. de Física Aplicada. Univ de Barcelona)*

2 · **OPEN2PRESERVE:** modelo de gestión sostenible para la preservación de los espacios abiertos de montaña. *Rosa María Canals Tresserras (Profesora Titular Univ Pública de Navarra) y María Durán Lázaro (Ingeniera Forestal y del Medio Natural, Univ Pública de Navarra)*

3 · **AGRÍVALEUR:** Adaptar las prácticas agrícolas en los Pirineos centrales a un contexto de cambio climático. *Fabienne Gilot y Pierre Pujos (COPYC/GIEE AGRIVALEUR)*

4 · **INFORME:** Evaluación de la vulnerabilidad y riesgo de los municipios vascos ante el cambio climático. *Carlos Castilla (Ihobe)*

5 · **ADAPTUR:** Adaptación de destinos turísticos de montaña al cambio climático. *Jérémie Fosse (Asociación eco-union)*

6 · **NIVOPYR:** Impactos y adaptación al cambio climático de las estaciones de esquí del Pirineo. Oriol Travesset (Observatori de la Sostenibilitat d'Andorra)

7. **PHUSICOS:** medidas basadas en la naturaleza contra los riesgos naturales. *Santiago Fábregas (AECT Espacio Portalet)*

Modera: Malake Muñóz y Mari Luz Gómez (Referentes territoriales OPCC, Euskadi)

17:00 — 17:45 SALA AUDITORIO

ACTO DE CLAUSURA

- Marta de Santos Loriente, (Directora general de Cambio Climático y Educación Ambiental)
- Mercè Rius (Directora General de Qualitat Ambiental i Canvi Climàtic, de la Generalitat de Catalunya)

Agradecimientos: al Gobierno de Aragón, como presidencia de la CTP, al Ayuntamiento de Jaca por acoger amablemente este evento, al Ayuntamiento de Jaca por la cesión del Palacio de Congresos y a todo su equipo, a los estudiantes del IES Domingo Miral por sus aportaciones y a los voluntarios del programa IVY "Interreg Volunteer Youth" por su inestimable ayuda.
A los ponentes y asistentes y a todos aquellos que han colaborado en la organización de este coloquio.

Los proyectos OPCC2, FLORAPYR, REPLIM, PIRAGUA, CLIMPY y CANOPEE han sido cofinanciados al 65% por el Fondo Europeo de Desarrollo Regional (FEDER) a través del Programa Interreg V-A España-Francia-Andorra (POCTEFA 2014-2020). El objetivo del POCTEFA es reforzar la integración económica y social de la zona fronteriza España-Francia-Andorra. Su ayuda se concentra en el desarrollo de actividades económicas, sociales y medioambientales transfronterizas a través de estrategias conjuntas a favor del desarrollo territorial sostenible.

En colaboración con el Mobile Film Festival

3. Institutional opening

In a context of general awareness about the global climate emergency, the speakers of the OPCC 2019 colloquium stressed the importance of informing society about the special vulnerability of mountain areas to the impacts of climate change and getting people involved. As confirmed by the results obtained by the different research projects under the OPCC umbrella, the Pyrenean massif, like other mountainous areas, is particularly sensitive to the effects of climate change. This highlights the crucial role of scientific cooperation and the joint action of policy makers at local, regional, national and cross-border levels. For Jean-François Blanco (Regional Councillor of Nouvelle Aquitaine) the work of the OPCC and the associated projects should serve as a basis for guiding the climate policies of the Pyrenean territories, thus facilitating decision-making by public authorities. To develop more effective climate policies, it is important to continue with the ongoing research in order to fully understand how climate change is affecting the Pyrenees. “Given the current climate emergency, we have to be clear-headed in order to identify and assume our responsibilities,” noted Jean-François Blanco.

Sonia Castañeda, Director of the Biodiversity Foundation

Another priority about which the different public figures involved in this session agreed was the need to disseminate the scientific results in a more forceful way using the appropriate media. Sonia Castañeda (Director of the Biodiversity Foundation of the Spanish Ministry for the Ecological Transition) said that “We need to produce a ‘click’ in the mentality of society so that we all jump into action.” This mobilisation of civil society is also necessary according to Eva García Abós (Councillor for the Environment of the municipality of Jaca). In this regard, citizen science initiatives are a useful tool to involve citizens in the scientific work of data collection and to provide new results, at the same time increasing public awareness of the challenge of climate change.

Antonio Pascual, Secretary-General of the CTP.

Aware of this, the Pyrenean Climate Change Observatory has focused its efforts on information and communication activities. Antonio Pascual (Secretary-General of the CTP) insisted that “the OPCC is the most ambitious project of the Working Community of the Pyrenees, created to address the issue of climate change in the mountain range”. He also stressed the important work carried out by the OPCC to coordinate the work and consolidate the results of the associated projects. Thanks to networking, the OPCC is capitalising on the results and knowledge acquired from five POCTEFA projects, also obtaining added value from the synergies and complementarities between these projects. “The Pyrenean territory is home to a particularly rich natural, linguistic and cultural diversity and is a place that we must preserve,” concluded the Secretary-General of the CTP.

Elena Visnar-Malinovska (Head of the Adaptation Unit of the Directorate-General for Climate Action of the European Commission) highlighted two key elements in the fight against climate change in Europe. First, the European Climate Change Adaptation Strategy (COM 2013), which establishes the general framework for adaptation action in the Member States, and the PESETA project developed by the research services of the European Commission. This project has been providing scientific evidence and tools for adaptation to climate change for more than a decade.

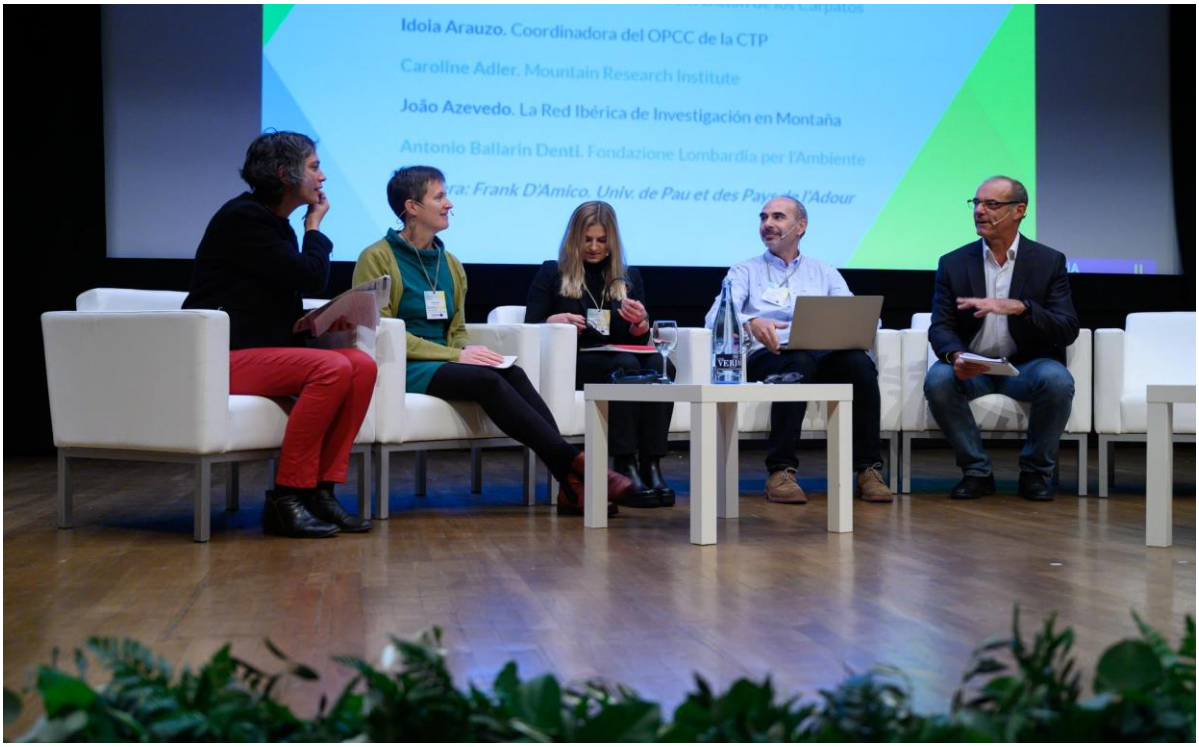
Elena Visnar-Malinovska, Head of the Adaptation Unit of the Directorate-General for Climate Action of the European Commission.

The study corroborates the particular vulnerability of the Pyrenees, and of mountain areas in general, to the impacts of climate change. It is therefore necessary to continue researching and observing the evolution of these environments. In this regard, Elena stressed “the need for the OPCC of the CTP to continue with its magnificent efforts to improve knowledge about the impacts of climate change in this region rich in biodiversity and unique ecosystems”.

Isabel Aranda (Programme Officer of the Executive Secretariat of the United Nations Framework Convention on Climate Change) highlighted some of the key messages that emerged at the climate summit organised by the Secretary General of the United Nations, Antonio Gutiérrez, which took place on 23 September in New York. Gutierrez said that “countries, regions and local organisations must do more and do it faster to fight climate change. It is time to abandon rhetoric and start implementing concrete climate plans”. Isabel Aranda insisted that “we can only limit the climate emergency if we all cooperate in order to respect the Paris Agreement”.

4. International cooperation in mountain areas and climate change.

This session of the conference focused on the role played by European research organisations and networks in the fight against climate change in mountain areas. The participants were Nathalie Morelle (Permanent Secretariat of the Alpine Convention), Klaudia Kuraś (Secretariat of the Carpathian Convention), Idoia Arauzo (OPCC Coordinator), Antonio Ballarin Denti (Fondazione Lombardia per l'Ambiente, FLA), João Azevedo (Iberian Mountain Research Network, RIIM) and Caroline Adler (Institute for Mountain Research, MRI).



Idoia Arauzo, Nathalie Morelle, Klaudia Kuraś, João Azevedo and Frank D'Amico (session moderator).

All the participants agreed on the importance of international and cross-border cooperation in European mountain areas. More specifically, the participants highlighted the need to join voices to transmit the special incidence of climate change in the European mountainous areas to those who formulate policies for the mountains.

The fundamental role that European research networks play is that they represent a set of regions and, therefore, a considerable number of European citizens, providing an asset for

strengthening and better promoting the messages to be transmitted. It also adds complementarity and consensus to research papers.

“There are many European programmes that support the processes of adaptation to climate change in European rural areas, and it is true that many of them are located in mountain areas. In contrast, there are few programmes that specifically support mountain areas. Nevertheless, mountain areas have specific characteristics and needs that rural areas do not share, and this has to be taken into account,” Klaudia emphasized.

Hence the need to support research networks in mountainous areas and to continue the work to analyse the special vulnerability of these territories to climate change, whose results are essential to attract the attention of the policy makers.

Klaudia Kuraś, Secretariat of the Carpathian Convention

5. OPCC2 PROJECT: results and development of the Pyrenean Climate Change Observatory strategy.

On 22 October, parallel seminars on the results of the projects associated with the OPCC2 opened proceedings. The five colloquiums took place in parallel throughout the morning, with the aim of going into the details of the work carried out and the results of each thematic project. Attendees had the opportunity for an in-depth look at the different topics addressed, depending on their interests, freely choosing the seminar or session to attend from: the REPLIM project (lakes and peat bogs), FLORAPYR (flora), CANOPEE (forests), CLIM'PY (climate evolution) and PIRAGUA (water resources).

The central session of the colloquium, the presentation of the OPCC2 project and the results of the associated projects, took place on Wednesday 23 October. The OPCC was created in 2010 under the presidency of the former Midi-Pyrénées region as the cross-border initiative of the Working Community of the Pyrenees on climate change. The members of the CTP and therefore of the OPCC are the two French regions of Nouvelle-Aquitaine and Occitanie, the four Spanish autonomous communities of the Basque Country, Navarre, Aragon and Catalonia, and the Principality of Andorra.

Idoia Arauzo, OPCC coordinator.

Since its creation, the OPCC has succeeded in consolidating itself as the leading initiative on climate change in the Pyrenees, both locally and internationally. In recent years there has been an unprecedented increase in its visibility. This success is due both to the daily communication work of the OPCC and to the publication of reports, the organisation of colloquiums and thematic workshops, and also the participation in events dealing with the issue in the Pyrenean

territory and internationally. In November 2018, the OPCC published its report “Climate change in the Pyrenees: impacts, vulnerabilities and adaptation”, which had unprecedented media coverage.

Juan Terrádez (CTP-OPCC) presenting the OPCC2 project.

In March 2019, the OPCC was also present at the event “Tackling climate change in the Pyrenees” at the United Nations headquarters in New York. In addition, it participated in the final of the Project Slam contest organised by INTERACT on Interreg projects in Brussels during the European Week of Regions and Cities in October 2019.

During the colloquium, the theatrical performance with which the OPCC participated in the final of the Interreg Project Slam contest in Brussels.

The OPCC has consolidated its position as the leading initiative in terms of knowledge about climate change in the Pyrenees, thanks to the work carried out as a network by the associated projects and their partners through cross-border cooperation. On the website of the Observatory, you can access the various tools that have been developed to promote adaptation in the Pyrenees, such as the geoportal, which allows you to consult and download key cartographic information on climate change in the mountain range, the database of good adaptation practices and the StoryMap that makes it possible to review the OPCC results in an intuitive way. The OPCC, through the FLORAPYR and REPLIM projects, also participates in citizen science initiatives, aimed at involving citizens in scientific work as well as making it possible for them to collaborate in the collection of data on flora, fauna and sensitive high mountain ecosystems. These are accessible to all users of the OPCC website.

Summary of the OPCC 2018 report on climate change in the Pyrenees.

Since its inception in 2016, the OPCC2 project has strengthened the role of the Observatory as an interface between the scientific community, the regional and Andorran governments and the socio-economic sectors of the Pyrenean territory. In addition to its coordination and communication efforts, the OPCC has worked on the transfer of knowledge and good practices among the actors involved in order for them to better adapt to the consequences of climate change, thereby reducing their vulnerability and increasing their adaptive capacity. The OPCC's work will continue in the coming years with the development of its strategy through the OPCC ADAPYR project, which will lead the CTP from January 2020.

During the colloquium, the OPCC and its associated projects presented the work carried out and the results obtained during the three years of the projects. The data obtained confirm a clear trend of rising average temperatures in the Pyrenees, alterations in the temperature behaviour and also certain climatic events with greater frequency and intensity.

Network cooperation between the associated projects and the OPCC.

The REPLIM project and its observation network for lakes and peat bogs.

The REPLIM project monitors the status of the wetland ecosystems of the Pyrenees: high mountain lakes and peat bogs. Both ecosystems are emblematic elements of the Pyrenean landscape and are also particularly sensitive to climate change and the externalities of human activity. In addition to providing society with water resources, habitats and other resources (grazing and even tourism resources), these are complex ecosystems with high biodiversity, capable of storing carbon, metals and organic pollutants. The clear warming trend of the surface waters of the “ibones” (Pyrenean lakes), especially in summer and autumn, is affecting the chemical composition of water in these sensitive ecosystems. In addition, accelerated melting of glaciers and permanently frozen soils could increase the movement of organic and inorganic pollutants, with serious consequences for the health of ecosystems and human beings, as well as affecting the climate due to an increase in CO_2 emissions.

Blas Valero (IPE-CSIS) presenting the REPLIM project.

In order to monitor the effects of climate change on high mountain lakes and peat bogs, the REPLIM cross-border network is measuring several biophysical parameters characteristic of these ecosystems at regular intervals, including: temperature at different depths, sediment composition, and level and quality of water. The observations are made annually or twice a year in all the lakes and peat bogs in the network. The results obtained by the project so far show a

clear trend towards an increase in the temperature of the surface waters of the Pyrenean lakes, a change in their internal ecological structure and also a potential change in their chemical composition. The data collected also indicate an acceleration of the peat decomposition process, which is causing an increase in emissions of methane and CO_2, the main gases responsible for global warming.

Colloquiums on the REPLIM (left) and CLIM'PY (right) projects, Tuesday 22 October.

CLIM'PY project: climate change in the Pyrenees

In a context of global climate change, the CLIM'PY project aims to analyse the recent evolution of the climate and make predictions about changes in behaviour in the Pyrenees in terms of temperature, rainfall and snow until the end of the 21st century. With a higher temperature increase compared to the world average, the Pyrenees are experiencing variations in rainfall patterns and changes in the frequency and intensity of a number of extreme events, which are likely to intensify in the future. The CLIM'PY project has generated the necessary elements for the detailed study of these trends (homogenised cross-border database, generation of climate indicators, and generation of regionalised climate projections) essential to limit the impact of climate change in the Pyrenees and guide adaptation policies.

The vast homogenised and refined database created by the project has been the basis for the study of climatic developments, the generation of climate change indicators and future climate modelling with regionalised climate projections.

José María Cuadrat (UNIZAR) presenting the CLIM'PY project.

CANOPEE: Pyrenean forests in the context of climate change.

Since more than half of the surface area of the Pyrenees is occupied by forest, it is important to anticipate the potential effects of climate change on the forest areas. The main consequence of climate change might be, a priori, the progressive deterioration of the Pyrenean forest landscapes. The study of the forests of the mountain range through the monitoring of certain species has revealed important environmental and global changes. This type of study aims to find formulas to preserve the ecosystem services provided by trees and forest ecosystems in mountainous areas.

The CANOPEE project has been based on three main objectives: to increase the knowledge regarding the effects of climate change on the Pyrenean forests through studies and analysis; to establish a forecast on the ability of a tree to overcome a trauma with a climatic origin; and to implement different forest management actions to reduce their vulnerability. For this purpose, the CANOPEE project has completed the phenological monitoring previously initiated during the OPCC project (results available on the OPCC website) and has created a climatic water balance map according to different scenarios of temperature increase and a series of relative climate monitoring maps for 13 forest species. The project has also developed a mobile application aimed at forest managers belonging to different public authorities, through which the

health status of trees and their potential for resilience can be easily determined. These accomplishments provide a solid basis for the implementation of effective adaptation strategies.

In addition, the results of the project have shown an exceptionally rapid deterioration of some forest populations since the 1980s, due to a combination of direct human factors (changes in land use) and other global changes, including climate change.

Sébastien Chauvin (FORESPIR) and Emmanuel Rouyer (Centre National de la Propriété Forestière) presenting the CANOPEE project.

FLORAPYR: monitoring the impact of climate change on the Pyrenean flora.

FLORAPYR has been the key associated project for addressing the impact of climate change on the biodiversity of the Pyrenees. It has a threefold objective: to complete, synthesise and facilitate access to knowledge about the status of the flora and vegetation of the Pyrenees as a basis for combining this information with the changes in the climate; to define the main problems of conservation of plant diversity in the Pyrenees, select priority species and communities for conservation and guide common conservation policies for the entire mountain range; and to produce a complete set of indicators for the monitoring of the Pyrenean flora and vegetation in relation to the climate.

The work carried out in FLORAPYR has enabled completion of the atlas of the Pyrenees flora, in which 5,068 vascular plants and 1,069 bryophytes have been catalogued and which now has more than 2.18 million observations in a web interface. A distribution map of *Androsace ciliada*, an endemic plant in the central Pyrenees, is also available. In addition, the catalogue of Pyrenean flora particularly sensitive to climate change has been defined (and currently has more than 170

species). This is a fundamental database for increasing awareness and sensitivity on conservation issues.

Gérard Largier (CBN-PMP) and James Molina (CBN-MP) presenting the FLORAPYR project.

The FLORAPYR project, meanwhile, has led to the definition of the red list of vascular flora of the Pyrenees, an essential stage in order to establish the current situation regarding the risk of extinction of the main species of vascular plants in the cross-border Pyrenean bioregion. This list will then guide conservation strategies. The production of the list was carried out following the standardised methodological framework defined by the International Union for Conservation of Nature (IUCN). Of the 3,303 plants examined through 2.2 million observations, 178 plants (including 27 endemic plants) were identified as Endangered or Near Threatened.

Regarding the production of monitoring indicators, it is worth mentioning the snow monitoring system implemented in 14 sites since 2011 thanks to the participation of seven partners. In addition, the international GLORIA (Global Observation Research Initiative in Alpine Environments) programme has also provided surveillance through its deployment in four sites in the Pyrenees. Finally, the Phénoclim citizen science programme has been established in 42 observation areas spread across the Pyrenees, through the mobilisation of local model participants and thanks to the local support for the initiative.

The work of the FLORAPYR project underlines the difficulty of assessing the direct effects of climate change on the Pyrenean flora due to the complexity of the interactions between the

different elements related to these changes. The cross-border dynamics promoted by the FLORAPYR project must continue to be maintained in order to consolidate these results.

PIRAGUA project: evaluation of the hydrological cycle in the Pyrenees in a context of global climate change

The PIRAGUA project is studying the evolution of water resources in the Pyrenean massif, which feed a basin that extends from Gironde to Hérault and Cantabria. This basin provides drinking water to six million people, supplying water resources to agriculture for irrigation and to the hydroelectric sector for energy production. The water cycle and therefore the renewal of the water resources of the region depends on the run-off and the recharging of the aquifers in the Pyrenean massif. The PIRAGUA project covers a region that incorporates eight territorial administrations and seven water agencies.

Santiago Beguería (EEAD-CSIS) presenting the PIRAGUA project.

The objectives of the project are threefold: to characterise recent and future changes in water resources, to work on adaptation strategies to mitigate the effects of climate change and to disseminate the knowledge acquired about these effects. Based on the hydrological data provided by numerous stakeholders and competent agencies in the field of water resources from the different territories, the project is working to establish a database of surface and groundwater in the cross-border region and also a database of flooding in the Pyrenees. In addition, using the climate projections of the CLIM'PY project, PIRAGUA will also evaluate future impacts on the main economic activities according to different scenarios through seven case studies.

The panel of speakers during the presentation of the results of the projects associated with the OPCC. Moderation by Lluis Guitard and Pedro Zuazo.

6. How do sectors adapt to climate change? Examples of good adaptation practices.

For the next section, several associations were invited to share good practices for adaptation to climate change in the Pyrenees. María del Carmen Llasat Botija presented the FLOODUP project, a citizen science initiative to collect data on extreme rainfall and flood events; Rosa María Canals Tresserras and María Durán Lázaro presented the SUDOE OPEN2PRESERVE project; Fabienne Gilot and Pierre Pujos presented the AGRIVALEUR initiative; Carlos Castillo from Ihobe presented the work on the mapping of the vulnerability to climate change of the Basque municipalities carried out in the context of the Basque Country strategy KLIMA 2050; and Jérémie Fosse presented the ADAPTUR project and Santiago Fábregas the H2020 PHUSICOS project.

FLOODUP

FLOODUP is a mobile application developed within the framework of the PIRAGUA project. Its purpose is to collect observations on the impacts of natural hazards (specifically extreme rainfall and flooding) and also on good and bad adaptation practices, through citizen participation. This mobile application has been designed for Android and iOS. It contains a map with shared observations and various educational resources. Registered volunteers can post their comments by completing a short form. This form includes questions about observations, their relationship with climate change and the acceptability of adaptation measures.

María del Carmen Llasat Botija, Professor of Air Physics at the University of Barcelona.

OPEN2PRESERVE

Mountain areas are experiencing intense changes in the landscape due to climate change, rural abandonment and changes in production systems. The reduction of pastures due to the gradual decrease of extensive livestock especially affects open spaces and natural high mountain pastures. This is manifested through the process of gradual reforestation of open spaces, leading to the accumulation of combustible material and increasing the risk of large forest fires: a growing threat considering the current climate change scenario, with more intense periods of drought and more frequent heat waves.

The OPEN2PRESERVE project, a SUDOE project, proposes a sustainable management model for mountain pastures for the conservation of these areas. It is a project involving territorial cooperation between the south of France, Spain and Portugal aimed at promoting the use of traditional techniques for the sustainable management of open mountain spaces in the SUDOE territory.

Rosa María Canals Tresserras, Professor, and María Durán Lázaro, Forestry and Environmental Engineer, Public University of Navarre.

AGRIVALEUR

The AGRIVALEUR project focuses on the adaptation of agricultural practices in a context of climate change, through a system of rotation of crops and pastures, combined with transhumance activities in summer. This has a positive effect on the land, such as increasing the soil permeability, which increases its natural fertility while reducing the risk of flooding.


Fabienne Gilot and Pierre Pujos, COPYC/AEIE AGRIVALEUR.

KLIMA 2050 Report

The aim of the technical study carried out within the framework of the KLIMA 2050 strategy of the Basque Country is to identify good adaptation practice in the Basque territory. In the context of the Basque Country strategy to combat climate change, high-resolution mapping has been carried out to assess the vulnerability of Basque municipalities to climate risks. This vulnerability mapping has been carried out by combining climate data with risk mapping, also associating a list of the actions carried out and pending completion, classified by sectors, municipalities and by type of impact. This type of tool is helping to prioritise the implementation of a number of adaptation measures in the Basque municipalities to tackle climate risks such as flooding.

Carlos Castillo, Ihobe.

ADAPTUR

The ADAPTUR project has analysed the climatic vulnerability of several key tourist destinations, including some in mountain areas. Since mountain areas are a point of convergence between climate and tourism policies, the ADAPTUR project aimed to pool the management schemes of a number of these destinations to examine the inconsistencies of different management policies, also addressing the issues related to greater climatic variability. Another of the objectives of ADAPTUR has been to raise the awareness of the interested parties, in this case tourists.

Thanks to this project, it has been possible to carry out a study to determine the climatic and social vulnerability of mountain tourist destinations by analysing their adaptability. The main objective of this exercise has been to study the socio-economic dimension of adaptation to climate change in the tourism sector, involving the stakeholders from an early stage.

Jérémie Fosse, eco-union association.

PHUSICOS: Solutions to the threat of natural hazards inspired by nature.

PHUSICOS is an H2020 project that demonstrates the effectiveness of nature-based solutions and their positive impacts involving the reduction of natural hazards such as landslides, falling of boulders, floods and avalanches in several mountainous areas within Europe (Norway, Italy,

Austria, Germany and the Pyrenees). “Nature-based solutions are cost effective and, in general, sustainable ways of tackling natural hazards in the mountains,” explained Santiago Fábregas.

Santiago Fábregas (EGTC Portal).

In the PHUSICOS project, which will end in 2022, the focus is on demonstrating the effectiveness of nature-based solutions (NBS) and their ability to reduce the negative impacts of extreme events on rural mountain landscapes through pilot cases, as well as the need to define together, with all stakeholders, the measures that must be taken in order to maximise their acceptance and long-term effectiveness.

7. Round table “The power of citizen science: the present and the future of citizen science networks in the Pyrenees”.

This round table focused on the role that citizen science networks play in research. “There has been a real revolution in the relationship between citizens and science, thanks above all to technological advances,” noted María Begoña García (IPE-CSIC). On the one hand, this has made science much more accessible. And on the other hand, it has allowed citizens to play a role in research, including data collection. Compared to 20 years ago, the quantity of data available is unprecedented. Citizen science networks have multiplied because citizens now have direct access to science and can actively contribute.

Sara Arjó (Verd e Blu), James Molina (Conservatoire Botanique National Méditerranéen de Porquerolles), Gabrielle Martin (Institut Méditerranéen de la Biodiversité et de l’Écologie), Colin Van Reeth (CREA Mont-Blanc), María Begoña García (IPE-CSIC).

However, one of the concerns raised during the session was the question of the quality as opposed to the quantity of data, since in many cases data collection is by people who do not always have scientific training. Nevertheless, it cannot be denied that there is a great deal of exchange of information between all the parties involved in participatory science. First, to guarantee the validity of the data, measurements are always carried out following well-defined

protocols which are made available to volunteers. And in a second phase, follow-up activities are carried out by the scientific promoters of the initiative in question which identify the data from incorrect observations, and feedback is also given to the volunteers to ensure the correct recording of future observations. “Thanks to this procedure, in addition to validating the data from the volunteers, the correct way to collect scientific data is also explained to them along with the importance of scientific rigour when carrying out research,” noted James Molina (Conservatoire Botanique National Méditerranéen de Porquerolles).

Colin Van Reeth (CREA Mont Blanc) pointed out that it is important to emphasise that in participatory science we must accept mistakes. “Scientists have the required knowledge to process the information and can see if the data is correct or not. In fact, far from being an impediment to the promotion of such initiatives, it should stimulate them,” concluded the scientist from the Alps.

8. Closing session

Marta de Santos Loriente, Director General of Climate Change in the Government of Aragon.

For Marta de Santos Loriente, Director General of Climate Change in the Government of Aragon, it is essential to bring scientific knowledge to the attention of citizens. In this regard, the OPCC ADAPYR project, which continues the work of OPCC2, will be a fundamental instrument to achieve this. Today we are already tackling the challenges of adapting to the effects of climate change, but we must also do everything possible to reduce its scope. We are at a crucial moment to influence the policies that are carried out at different levels of government to ensure that they act to preserve the environment, our most valuable common good. “We must do more to preserve the mountain areas, a magnificent environment which is in danger because of our bad practices.”

COLOQUIO OPCC 2019

3º Coloquio internacional sobre cambio climático en zonas de montaña OPCC2 2019

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ESTRATEGIA PIRENAICA
STRATÉGIE PYRÉNÉENNE

Comité técnico y Comité ejecutivo de la CTP

Comité coordinación y Socios del proyecto OPCC2

Con el apoyo de