

**CLIMATE
EMERGENCY**
facts and data



Project: Climate Emergency Manual. Facts and data.

Writing up of materials and preparation of the dossier: CEACV and Xicrea technical team.

Exhibition cards: CEACV and Xicrea technical team.

Advice and review: Regional Ministry of Agriculture, Rural Development, Climate Emergency and Ecological Transition

If you need to print this manual, we recommend that this be done on recycled paper. When printing this A4 32-page publication with 100% recycled paper instead of non-recycled paper, the following can be saved in each unit:

65g of waste
14g of CO₂
1.54 litres of water
0.2 kW-h of energy
105g of wood

Source: "Descarboniza! Que non é pouco..." project





Table of contents

| | | |
|--------------------------|------------------------|----|
| <input type="checkbox"/> | Presentation | 04 |
| <input type="checkbox"/> | Justification | 05 |
| <input type="checkbox"/> | Methodological options | 06 |
| <input type="checkbox"/> | Panel guide | 08 |
| <input type="checkbox"/> | Exhibition panels | 09 |
| <input type="checkbox"/> | References | 30 |
| <input type="checkbox"/> | Work materials | 31 |





Presentation

Climate Emergency Manual. Facts and data

On 6 September 2019, the Council presented the **Climate Emergency Declaration**, assuming responsibility for giving a greater impetus to the fight against climate change. This declaration aims to formally address the climate emergency, ecological crisis and respond to the demands of civil society.

The declaration of climate emergency means assuming, as a responsibility of the Valencian Government, the increase in awareness among citizens and generating a critical and transforming attitude in citizens and public administrations through formal and non-formal environmental education. This is a challenge that the **Centre of Environmental Education of the Community of Valencia** takes up by preparing this exhibition, which also includes a fundamental aspect of the declaration; the recognition of the existence of a complex, structural and interdependent context that requires a different approach on a global scale, which is much more inclusive, consistent and comprehensive, in line with the **2030 Agenda and the Sustainable Development Goals of the United Nations**.

Similarly, the **Valencian Strategy for Climate Change and Energy 2030**, drawn up in a coordinated manner among all the departments of the Council with competences or those affected by this strategy, is a key element to start on the path to a decarbonized and resilient society against the effects of climate change. Some of the measures covered are improving society's knowledge and perception of climate change or disseminating information on the possible effects of climate change and how to reduce and adapt to them.

In short, the **Environmental Education Action Guide (EAR)** is the backbone of the environmental education initiatives carried out throughout the Valencian territory and serves as a theoretical and practical framework for initiatives such as this exhibition and its manual.

MANUAL. A book that summarises the most important aspects of a subject. It conveys practicality, usefulness.

EMERGENCY is the most commonly used term to talk about climate change after IPCC's 1.5 °C report. "Climate Emergency" is a term coined at the 4th RESCLIMA Seminar in 2018 and represents the moment we are experiencing and what this exhibition intends to communicate very well.





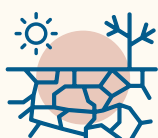
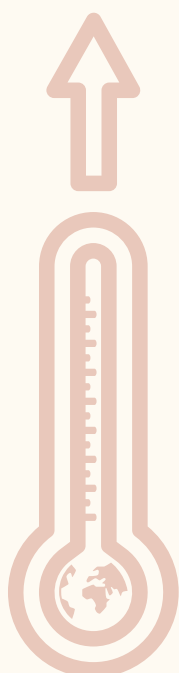
Justification

The framework in which the CEACV undertook the preparation of this exhibition is clearly defined:

- 01 Declaration of Climate Emergency by the Council.
- 02 2030 Agenda and the Sustainable Development Goals of the United Nations
- 03 Valencian Climate Change and Energy Strategy 2030.
- 04 Environmental Education Action Guide (EAR).

Meeting the requirements of this framework and that of the CEACV's own educational project, characterized the **Climate Emergency Manual project. Facts and data**, the objective of which is to:

- 01 Create a manual to disseminate basic climate knowledge for a wide range of audiences, to help understand the crisis and climate emergency moment in which we find ourselves in.
- 02 Have an educational resource that meets the demand for information, contributes to raising awareness and is a proposal for action, all with a systemic vision, as climate action requires.
- 03 Create a travelling exhibition that is part of the CEACV's resources and serves to expand and strengthen its scope of action.





Methodological options

The exhibition is designed to offer different methodological alternatives:

- a. Non-guided exhibition for adults.
- b. Guided exhibition for young people and adults. In this case, it requires content support with the material referred to on pages 31 and 32.
- c. As supporting material combined with other materials in the CEACV's **Climate Emergency Education Resource Guide**.
- d. Within the visit to the CEACV facilities, as part of one of the activities proposed by the educational team.

The exhibition features different blocks that can be worked on independently, depending on the needs and goals set:



A. CLIMATE KNOWLEDGE BASES

The exhibition collects the most up-to-date scientific information obtained from official, reliable, national and international sources. The aim is to show the basic knowledge that will consolidate a basic understanding of climate and its relation to life-related processes on Earth.



B. FROM GLOBAL TO OUR TERRITORY

The climate crisis is a global problem and therefore requires a vision from a more personal and local level. The exhibition aims to link both spaces (global and local) to achieve a better understanding of impacts on the immediate environment, to facilitate mobilization for action and adaptation to climate change.



C. REASONS FOR HOPE, PROPOSALS FOR ACTION

Environmental education is an action tool and the commitment to protect our immediate environment and the planet as a whole. For this reason, this exhibition encourages people's analysis, critical thinking and action through proposals, framed in areas ranging from staff to community spheres, which challenge all spheres of society.



D. STRATEGIES, ALLIANCES AND ACTORS IN CLIMATE EMERGENCY

This is an exhibition that highlights the need for an alignment of entities and people for a common goal: the fight against climate change. The content shows alliances in the field of awareness-raising, communication and education for climate emergency, but it also encourages this line of alliances to be explored in all spheres of society.

Climate: an interconnected, interactive system.

Weather and climate are not the same, confusing them can lead to misconceptions.

The scientific world leads a major challenge for humanity: climate change.

Science is society's main ally in tackling climate change.

By knowing the characteristics of climate properly, we will understand the changes that occur.

Climate change is real and we can see that in some of the planet's vital signs.

Climate change is about people like you.

Measuring our carbon footprint is the first step to reducing and off-setting.



Raise awareness, sensitise and empower citizens to join the action against climate change

There are reasons for hope, but we must take the road of adaptation.

The Mediterranean coast is an environment that is especially vulnerable to climate change.

An opportunity to take a new path that will improve people's lives.

Acting against climate change to prevent its negative impacts means implementing mitigation and adaptation measures.

Climate change is leading us to an unprecedented situation

Our responses to this crisis will indicate the risks that future generations will have to face



Panel outline

- Introduction
- 01** What do we know about climate?
- 02** Weather *versus* climate
- 03** Knowing our climate
- 04** Scientific alert
- 05** Global warming: history and science
- 06** The reality of climate change
- 07** Climate change in the Mediterranean
- 08** Paying attention to alerts, we are facing a climate crisis
- 09** A human gaze at the climate crisis
- 10** Mitigation and adaptation to climate change
- 11** A fair ecological transition
- 12** The way to a decarbonized society
- 13** Proposals to reduce the CO₂ footprint and address climate change
- 14** Environmental education for climate change
- 15** Sustainable Development Goals (SDGs)
- Closing





CLIMATE EMERGENCY

facts and data

The aim of this exhibition, which is focused on environmental education and based on proven scientific information, is to provide the basic foundations that are behind the climate crisis we are experiencing.

It is presented as a sequential tour, but it is also possible to approach the exhibition by taking into account four large blocks of differentiated contents.

CLIMATE KNOWLEDGE BASES



The exhibition collects the most up-to-date scientific information obtained from official, reliable, national and international sources. The aim is to show the basic knowledge that will consolidate a basic understanding of climate and its relation to life-related processes on Earth.

FROM THE GLOBAL TO SETTING FOOT ON OUR TERRITORY



The climate crisis is a global problem and it requires a vision from a more personal and local perspective due to this. The exhibition aims to link both spaces (global and local) to achieve a better understanding of impacts on the immediate environment, to facilitate mobilization for action and adaptation to climate change.

REASONS FOR HOPE PROPOSALS FOR ACTION



Environmental education is an action and commitment tool to protect our most immediate environment and the planet as a whole. For this reason, this exhibition encourages people's analysis, critical thinking and action through proposals framed in areas ranging from people to the community and that challenge all spheres of society.

STRATEGIES, ALLIANCES AND ACTORS FOR CLIMATE EMERGENCY



This is an exhibition that highlights the need for an alignment of entities and people with a common objective: the fight against the climate crisis. The content shows alliances in the field of awareness-raising, communication and education regarding climate emergency, but it also encourages this line of alliances to be explored in all spheres of society.

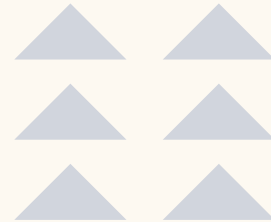


CLIMATE



KNOWLEDGE

BASES



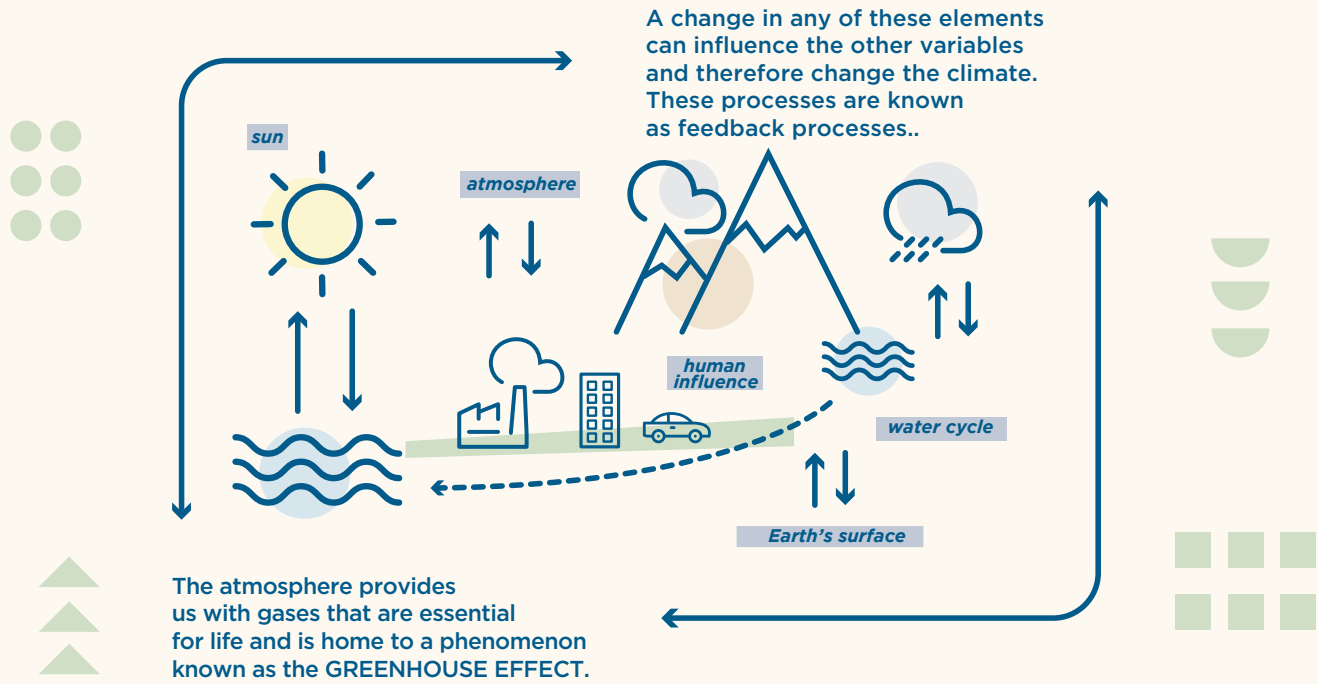
01 What do we know about climate?

| | |
|-------------------|-----------------------|
| Climate | Interconnected system |
| Greenhouse effect | Greenhouse effect |
| | Greenhouse gases |

Climate, an interconnected, interactive system

What is climate?

The planet's climate is the result of an interconnected system that is influenced by many factors: solar radiation, the composition of the atmosphere, water cycle, characteristics of the Earth's surface...



The greenhouse effect

The greenhouse effect process occurs in the atmosphere: it is a natural phenomenon thanks to which there is life on this planet.

Without the greenhouse effect, the Earth's average temperature would be -18 °C.

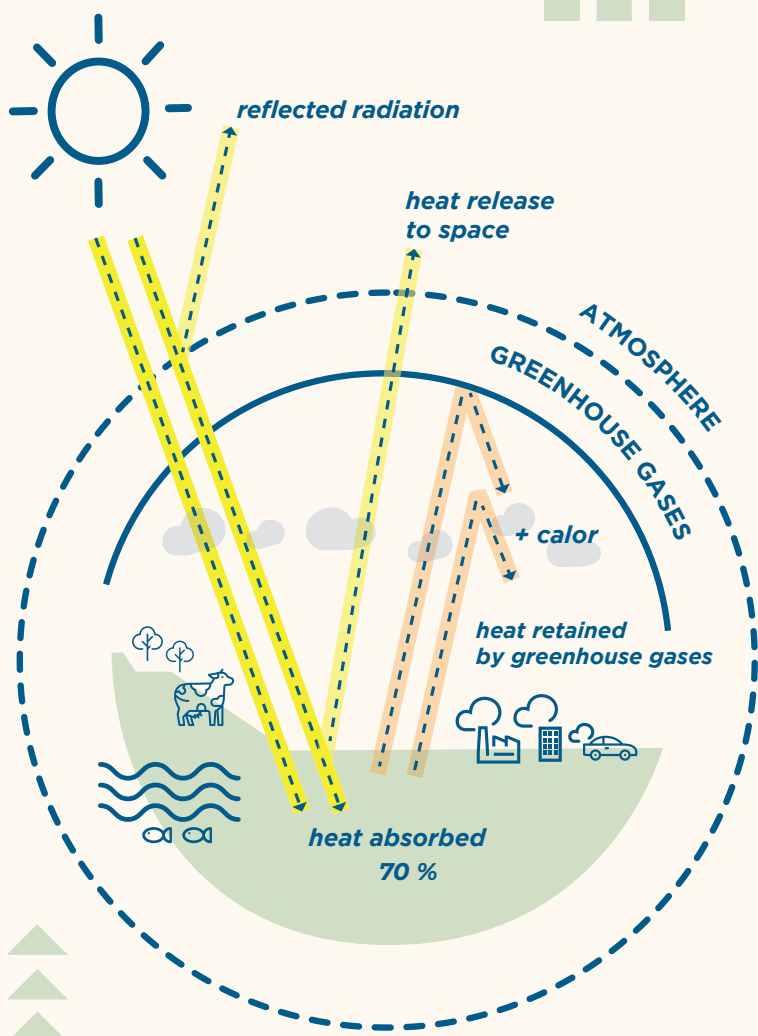
Greenhouse gases, together with clouds and aerosols, absorb radiation emitted by the Earth's surface and the atmosphere. These atmospheric components emit infrared radiation in all directions and, in particular, towards the Earth's surface. Therefore, the net amount of energy emitted to space is lower than if emitted in the absence of these components, because part of it remains trapped in the surface-troposphere system.

Greenhouse gases (GHG)

A higher concentration of greenhouse gases increases the magnitude of this effect, and the difference is generally called the enhanced greenhouse effect. The increase in the concentration of greenhouse gases contributes to the increase in temperature in the surface and in the troposphere.

- CO2 Carbon dioxide
- SF6 Sulfur hexafluoride
- N2O Nitrous oxide
- HFCs Hydrofluorocarbons
- CH4 Methane
- PFCs Perfluorocarbons

CO₂, CH₄ and N₂O are the main greenhouse gases emitted by human activities.



These gases increase every year and are a source of concern to scientists, as they are directly related to global warming and climate change.

The Earth's temperature does not increase infinitely, because when the surface and the atmosphere receive solar radiation they release heat into space. This is what is called the Earth's radiation balance.

| | |
|-----------------------------|-----------------------------|
| Weather | Climate |
| Factors influencing weather | Factors influencing climate |

Weather and climate are not the same, and confusing them can lead to misconceptions

A rainy weekend in July This is not a summer with an "atypical climate". [WEATHER] ↔ [CLIMATE]





An afternoon in February in Ourense with more than 25°C Neither supports nor contradicts the reality of climate change

What does the State Meteorological Agency say? 

WEATHER

State of the atmosphere at a given moment, defined by various meteorological elements.




FACTORS INFLUENCING WEATHER

-  **TEMPERATURE**
Degree of heat of the air at a certain location and time.
-  **WIND**
Mass movement of air in the atmosphere.
-  **ATMOSPHERIC PRESSURE**
Pressure exerted by the air on the Earth's surface.
-  **CLOUDS**
Drops of liquid or frozen water in suspension.

CLIMATE

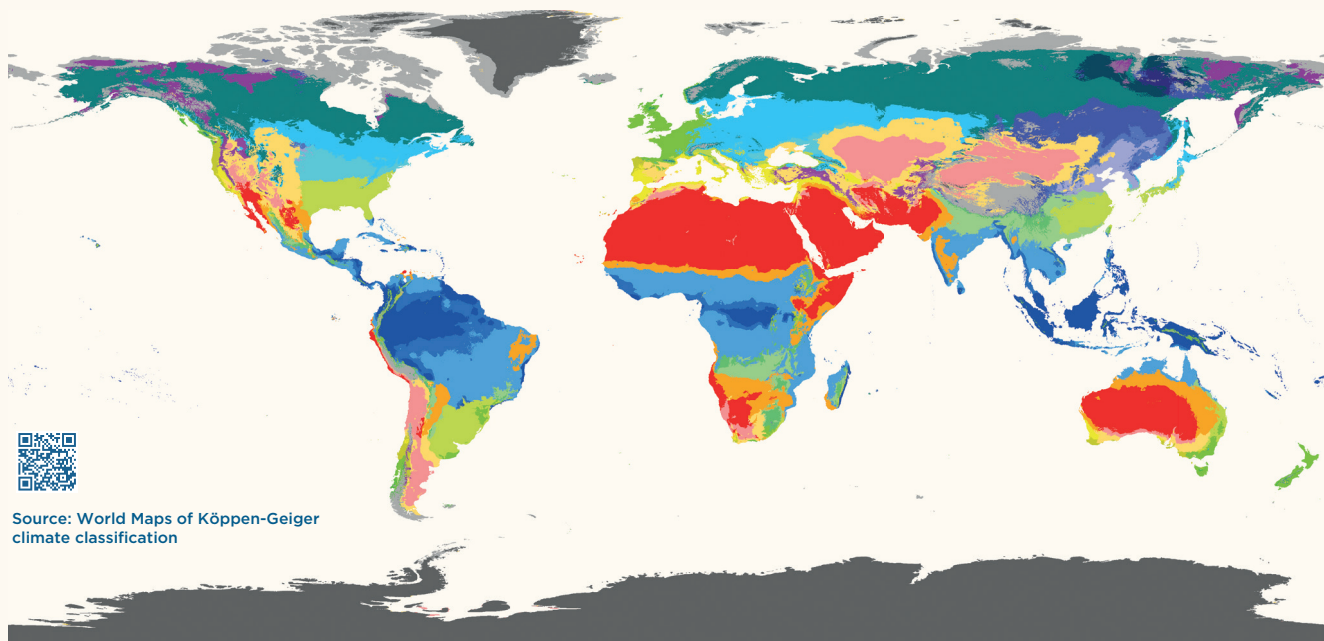
This groups together all the results obtained on weather in a given area. The minimum registration period is 30 years. The data recorded are analysed over years to establish the type of climate in that area. In addition to factors such as temperature, wind or pressure, there are other factors that influence climate and can change significantly.

FACTORS INFLUENCING CLIMATE

-  **ALTITUDE**
Vertical distance between a point on the earth and sea level. The higher it is, the colder the weather is.
-  **LATITUDE**
Distance from a particular place to the equator. The closer to equator, the warmer the climate is.
-  **OCEAN CURRENTS**
Water mass displacements due to the action of wind, tides, and due to density differences.

KÖPPEN-GEIGER CLIMATE CLASSIFICATION

TROPICAL DRY TEMPERATE CONTINENTAL POLAR



Source: World Maps of Köppen-Geiger climate classification



**FROM GLOBAL
TO OUR
TERRITORY**



We will only understand the changes that occur if we know the characteristics of climate well

FACTORS INFLUENCING CLIMATE



GEOGRAPHIC FACTORS

The geographical location, influence of the sea and characteristics of the topography, generate really different climatic situations. Latitude influences the hours of sunshine and atmospheric circulation, as well as climatic variations during the seasons.



ATMOSPHERIC FACTORS

The general circulation of the atmosphere, both in height and surface, explains the variations experienced by climate throughout the year. This is the case, for example, of the passage of a (cold or warm) front or the arrival of a gota fria (cold front).



BIOLOGICAL FACTORS

Biological aspects are also involved in the definition of climate. The Planet's biodiversity interacts with the atmosphere, in its composition and dynamics.

ELEMENTS DEFINING CLIMATE



LIQUID-SOLID PRECIPITATIONS



TEMPERATURE



HOURS OF SUNSHINE AND RADIATION



BIODIVERSITY



WIND



HUMIDITY AND EVAPOTRANSPIRATION



ATMOSPHERIC PRESSURE

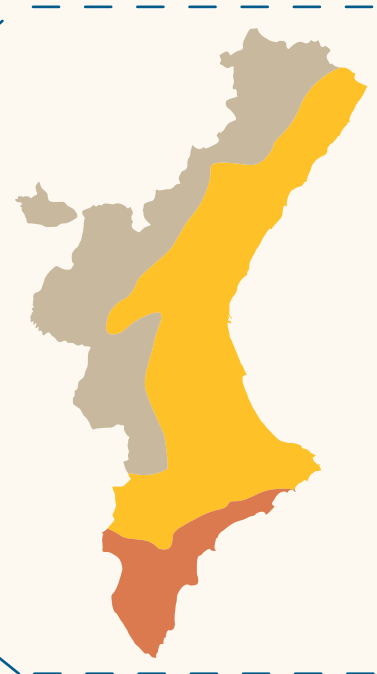
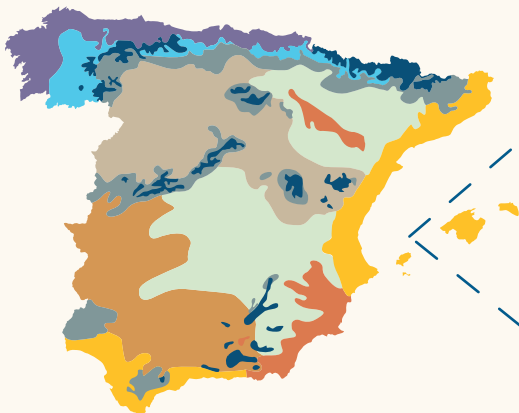


The combination of climatic factors and elements allows the characteristics and distribution of the main types of climate to be understood.

This is how our climate is

The area for which the climate is defined can vary from a few square kilometres to larger territories (the most common case) where geographical and meteorological characteristics are more or less common.

Spain is located at the temperate zone of the Planet and has four climatic zones: **Oceanic, Mediterranean, Mountainous and Subtropical**. The Mediterranean climate is the one that occupies the largest area.



OCEANIC

- COASTAL OCEANIC
- TRANSITIONAL COASTAL OCEANIC

TEMPERATE MEDITERRANEAN

- SUB-HUMID CONTINENTAL MEDITERRANEAN
- CONTINENTAL MEDITERRANEAN WITH COLD WINTERS
- CONTINENTAL MEDITERRANEAN WITH WARM SUMMERS
- WARM MEDITERRANEAN INLAND
- COASTAL MEDITERRANEAN
- ARID AND SEMI-ARID MEDITERRANEAN

MOUNTAIN

- MOUNTAIN

SUBTROPICAL CANARY ISLANDS

- WARM COASTAL
- TEMPERATE DRY MIDLANDS
- HUMID
- COLD SUMMITS

Source: National Geographic Institute

The climate of the Valencian Community presents certain contrasts related to altitude and the layout of the relief.

The coastal strip has a Mediterranean coastal climate, which could be called a typical Mediterranean climate.

In the south of the province of Alicante there is a sub-desert Mediterranean climate, while in pre-coastal areas and mountainous areas the climate is continental.

| | |
|-------------------|------------------|
| IPCC expert group | IPCC goals |
| IPCC operation | IPCC work groups |
| | IPCC reports |

The scientific world faces a major challenge for humanity: climate change

What is the IPCC?

IPCC. Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is the main international body for the assessment of climate change. It is a scientific body.

Who created the IPCC?

It was established in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO).



IPCC's main goal

To conduct comprehensive assessments on the state of scientific, technical and socio-economic knowledge on climate change, its causes, implications and response strategies..

The IPCC represents an extraordinary opportunity to provide rigorous, balanced scientific information to decision makers. Governments must recognize the authority of its scientific content and translate it into climate change policies.

IPCC, Nobel Peace Prize (2007)

The IPCC and former US Vice President, Al Gore, received the 2007 Nobel Peace Prize for their work on climate change.



How does the IPCC work?

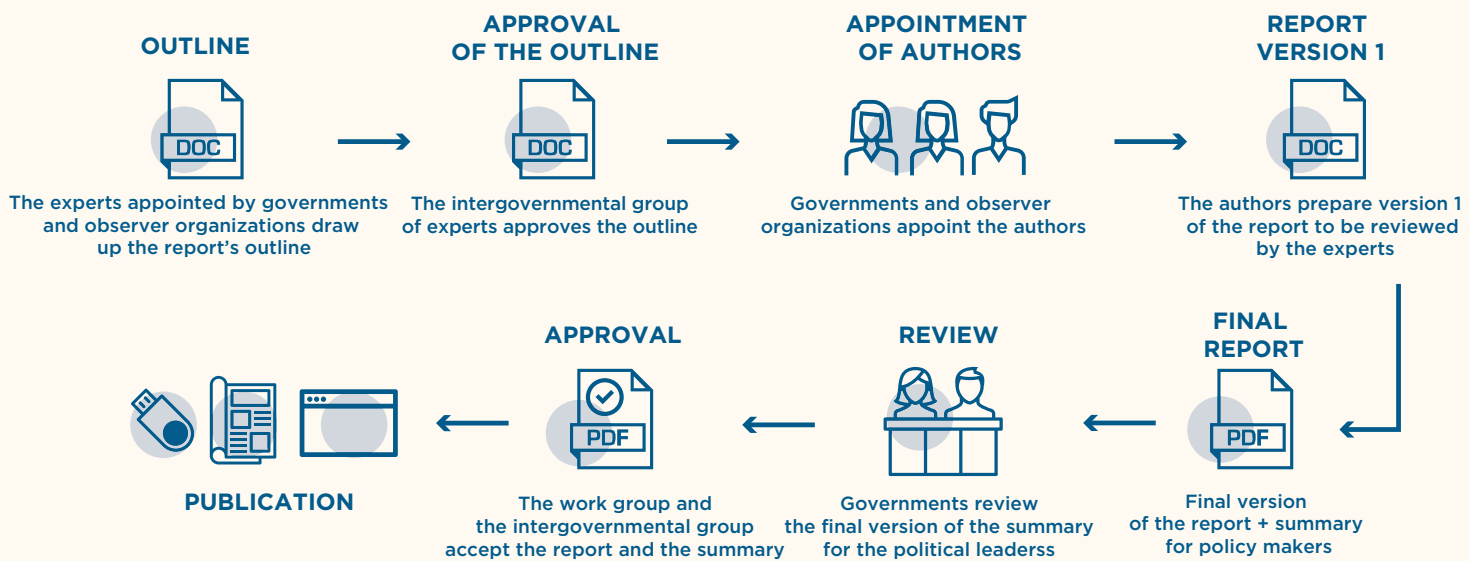
Thousands of scientists from around the world voluntarily contribute to IPCC's work as authors, collaborating authors and reviewers.

The IPCC is currently organized into three work groups and one special group.



The IPCC publishes specific reports in addition to the assessment reports. Among them is the special report on global warming of 1.5 °C (SR1.5), published in 2018, which served as the basis, for this exhibition, among other reports.

Preparation of IPCC reports



The synthesis report for the Sixth Assessment Report is expected to be completed by 2022.

| | |
|------------------|----------------|
| Anthropic origin | Global warming |
| Science | Greenhouse |
| #ShowYourStripes | |

Science is society's main ally for tackling climate change

1824

Jean-Baptiste Joseph Fourier



FRENCH MATHEMATICIAN AND PHYSICIST (1768-1830)

In 1824 he proved that the planet did not heat indefinitely while absorbing solar radiation. The Earth re-emits heat to space so that there is a thermal balance on the planet... But there was something else; he understood that there was something in the atmosphere that retained some of that heat emitted by the Earth: the greenhouse effect. He even spoke of the capacity of humans to influence this process.

1856

Eunice Newton Foote



CLIMATOLOGIST AND INVENTOR IN THE UNITED STATES (1819-1888)

In 1856 she presented *Circumstances Affecting the Heat of the Sun's Ray* to the American Academy of Sciences and Arts. In her research, she discovered that an atmosphere with more CO₂ could raise the Earth's temperature, and that the same had already happened at some point in the history of the planet.

1859

John Tyndall



IRISH PHYSICIST AND CHEMIST (1820-1893)

This physicist wanted to know what gases were responsible for the greenhouse effect in the atmosphere. In addition to methane and carbon dioxide, he highlighted the role of water steam in this phenomenon. He determined that the three retained some of the heat emitted by the Earth.

1896

Svante Arrhenius



SWEDISH PHYSICIST AND CHEMIST (1859-1927)

In 1896, supported by Högborn's estimates, he concluded that halving the CO₂ concentration in the atmosphere would be sufficient to produce a glaciation, while doubling that concentration would generate 5 to 6 degrees warming.

1894

Arvid Gustav Högborn



SWEDISH GEOLOGIST (1857-1940)

In 1894, he wrote an article asking how the release of CO₂ into the atmosphere by massive coal burning would affect temperature. What happens if the average temperature increases? Would the water vapour in the atmosphere increase and therefore backfeed this process further increasing the temperature?

1960

Charles David Keeling



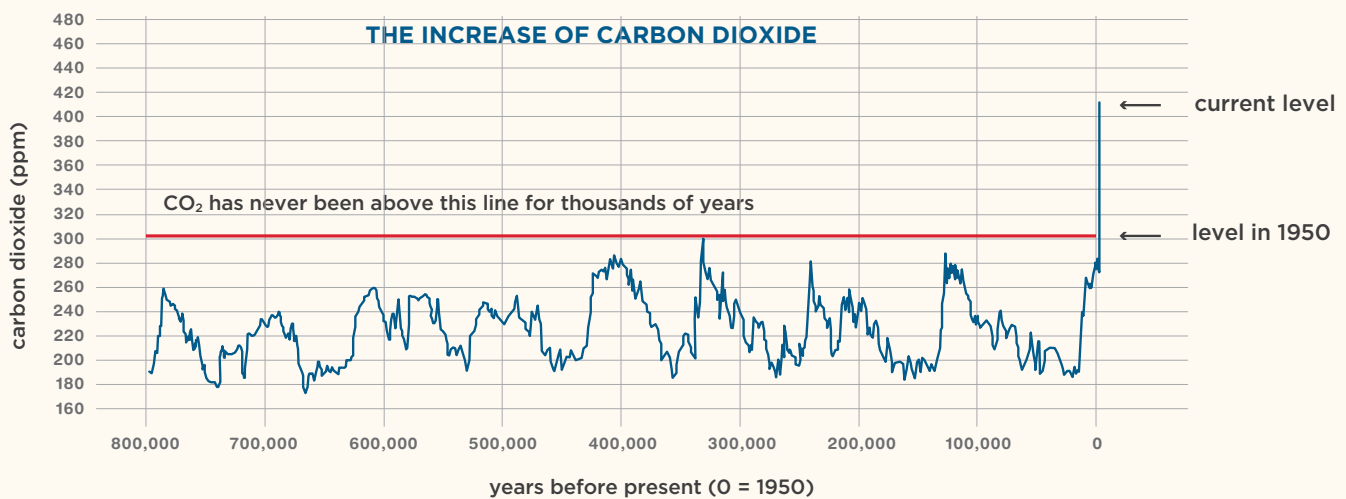
USA CHEMIST (1928-2005)

Charles David Keeling proved that the CO₂ level in the atmosphere was increasing. This was a graph based on continuous measurements taken at Mauna Loa (Hawaii) and shows changes in CO₂ concentration in the atmosphere since 1958. Keeling's research showed that the atmospheric concentration of CO₂ increased from 315 ppm in 1958 to the current record of 415 ppm in May 2019.

2020 **The highest CO₂ levels of the last 800 000 years**

CO₂ levels in the atmosphere are currently the highest in the last 400,000 years. During the ice age, CO₂ levels were around 200 ppm, and during the warmer interglacial periods they ranged around 280 ppm.

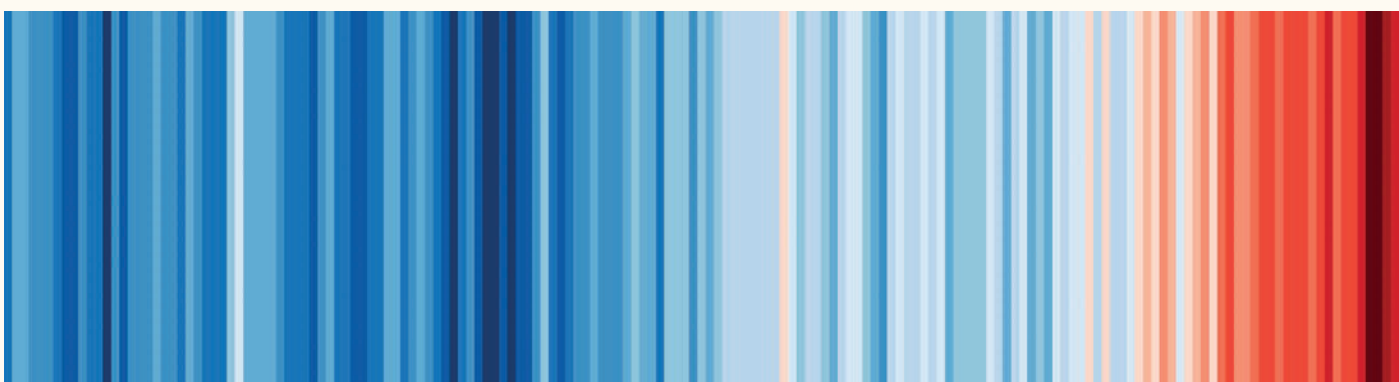
In 2013, CO₂ levels exceeded 400 ppm for the first time in recorded history.



#ShowYourStripes

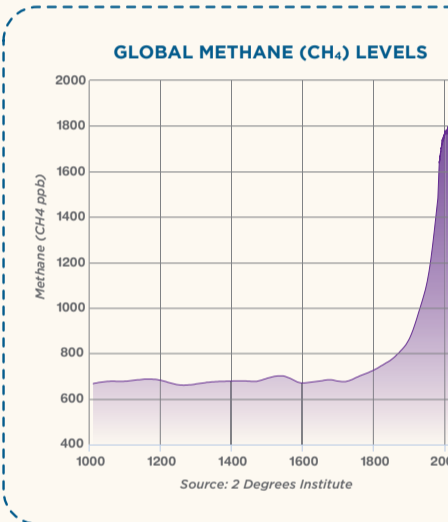
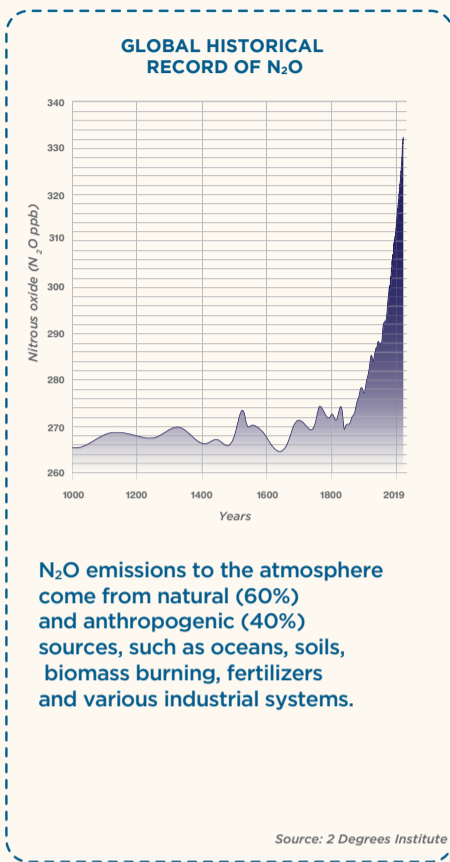
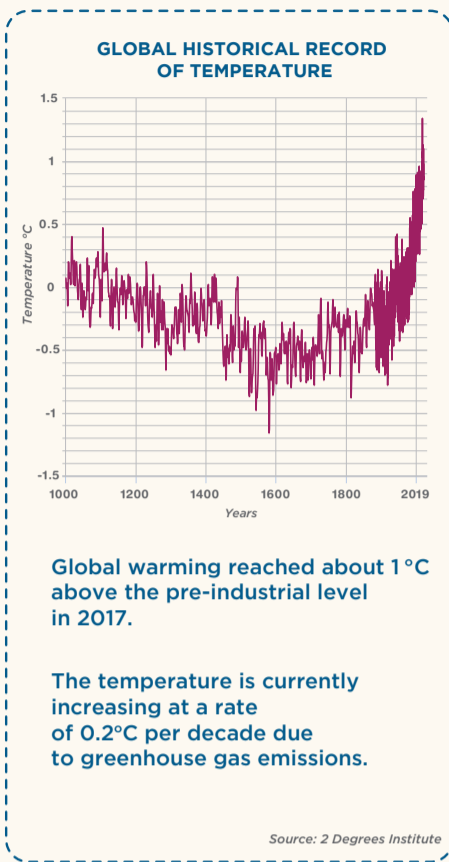
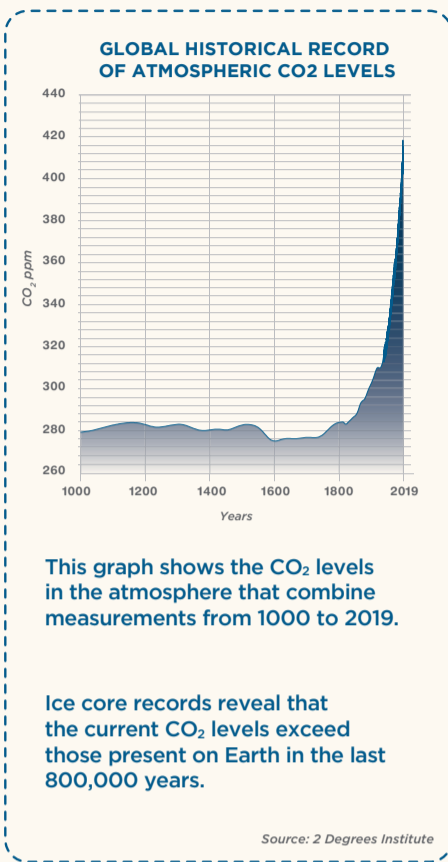
Ed Hawkins, a climate scientist at the University of Reading, prepares simple graphs to communicate global warming in an accessible way. The bars represent the annual average temperature recorded each year over a given period of time. The higher the temperatures are, the more intense the red stripes are.

This graph represents the Planet's global warming from 1850 to 2018.



| | |
|-------------------------------------|------------------------------------|
| Atmospheric N ₂ O levels | Atmospheric CO ₂ levels |
| Temperature | Atmospheric NH ₄ levels |
| Cryosphere | Sea level |

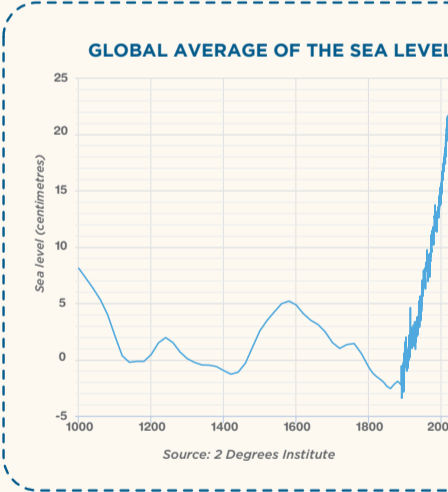
Climate change is real and we can see it in some of the Earth's vital signs



Methane (CH₄) is a gas responsible for 20% of greenhouse gas emissions. CH₄ is about thirty times more powerful for global warming than CO₂, but its lifetime is much shorter, about 12 years.

Human methane emissions are associated with the use of fossil fuels, livestock and agriculture, both due to direct emissions from livestock and due to the burning of agricultural land to prepare it for cultivation.

Methane emissions from natural sources also occur through processes undertaken by soil microorganisms, especially in areas near rivers and wetlands, as well as through the melting of permanent ice sheets, known as permafrost.

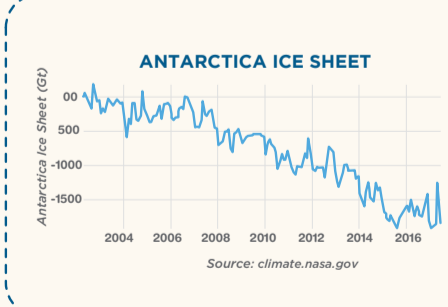


Glaciers and ice sheets in polar and mountainous regions are losing mass, and this is contributing not only to the acceleration of the rise in sea levels, but also to the expansion of warm waters in the oceans. Sea levels increased worldwide by about 15 cm during the 20th century.

Currently, due to the high greenhouse gas emissions emitted by humans, it increases at twice the speed and is 3.6 mm per year, 10 times higher than last century (1.4 mm/year).

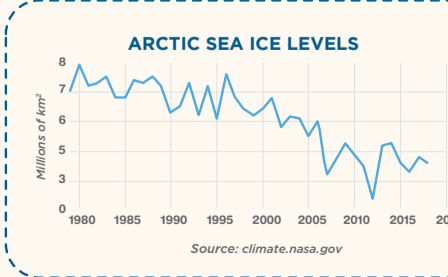
Even by drastically reducing these emissions, the increase could be 30 to 60 cm by 2100. Otherwise, if global warming follows the current pace, it would be 60-110 cm.

Source: *The Ocean and Cryosphere in a Changing Climate (SROCC) IPCC, 2019.*



Satellite data show that land ice layers in Antarctica and Greenland have been losing mass since 2002.

Both ice layers have accelerated their ice mass loss since 2009.



Arctic sea ice reaches its minimum every September and is declining at a rate of 12.8% per decade. The graph shows the average monthly coverage of Arctic sea ice each September since 1979, derived from satellite observations.

The 2012 coverage is the lowest on satellite records.

07 Climate change in the Mediterranean

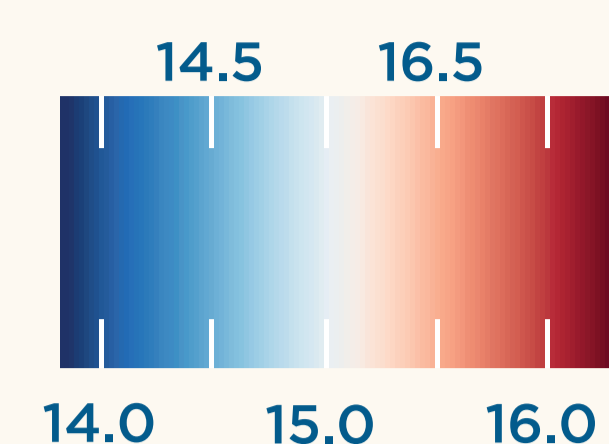
Vulnerability of the Mediterranean coast

| | |
|--------------------------------------|----------------------|
| Hawkins Chart | More tropical nights |
| Temperature of the Mediterranean Sea | Summer lengthening |

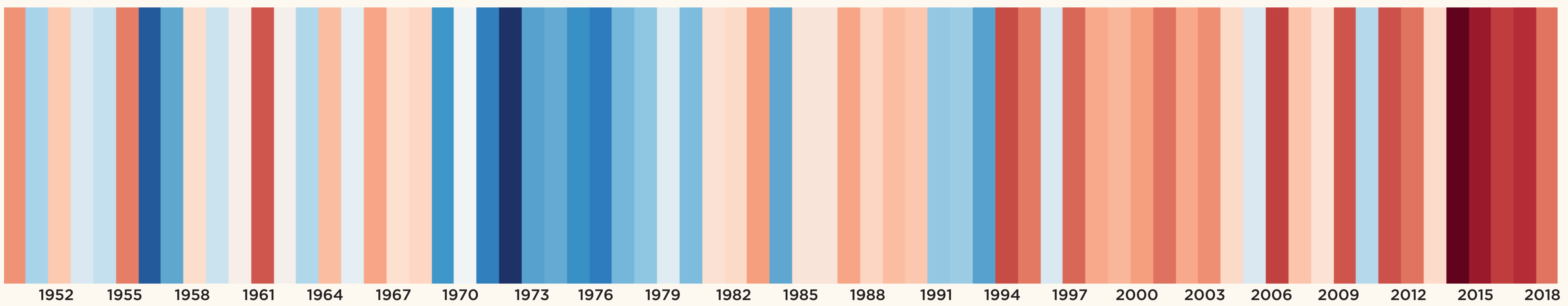
The Mediterranean coast is a particularly vulnerable environment to climate change.

The Hawkins Bar Graph

The Hawkins graph represents chronologically the evolution of the annual temperature, in this case that of the Comunitat Valenciana in the period from 1950 to 2018. In this graph we can see a clear trend towards higher temperatures.

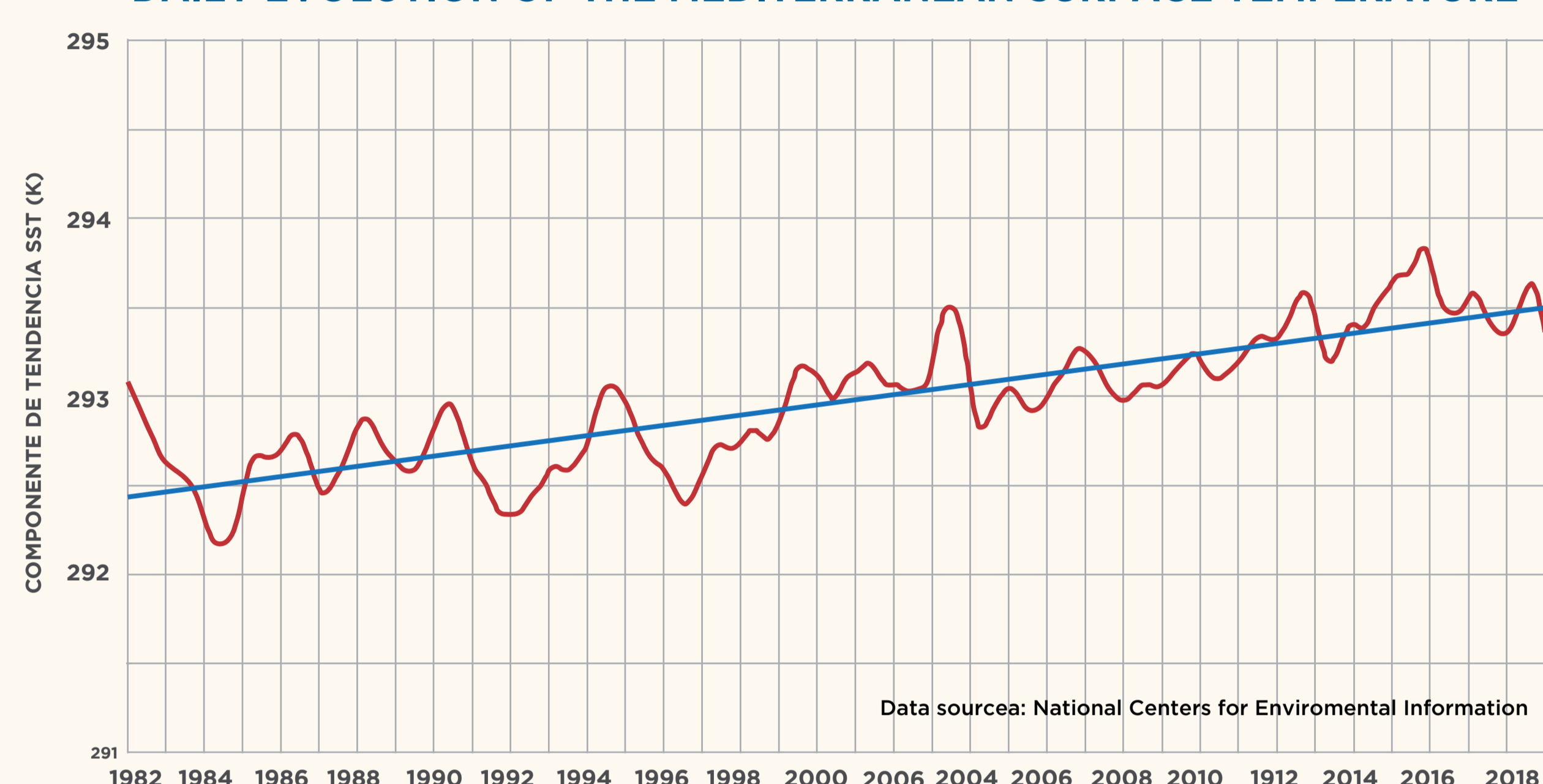


AVERAGE ANNUAL TEMPERATURE IN THE VALENCIAN COMMUNITY 1950-2018



RISE IN TEMPERATURE OF THE MEDITERRANEAN SEA

DAILY EVOLUTION OF THE MEDITERRANEAN SURFACE TEMPERATURE

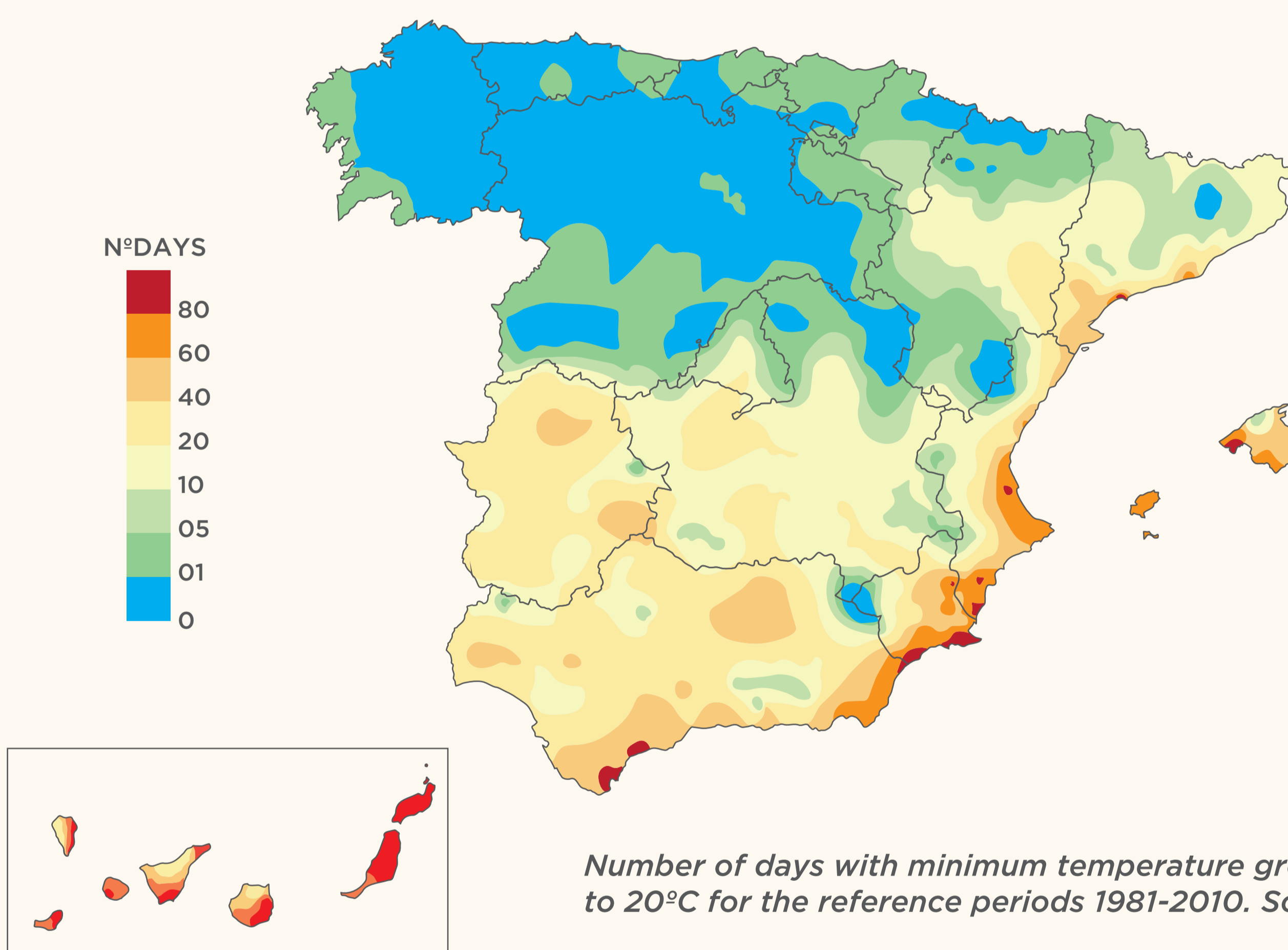


The surface temperature of the Mediterranean has been increasing at a rate of 0.34°C per decade since the early 1980s.

Daily evolution data of the Mediterranean surface temperature from 1982 to 2019 provided by CEAM.

CEAM; Centre for Mediterranean Environmental Studies is a research, development and technological innovation centre for the improvement of the environment in the Mediterranean area.

INCREASE IN THE NUMBER OF TROPICAL NIGHTS



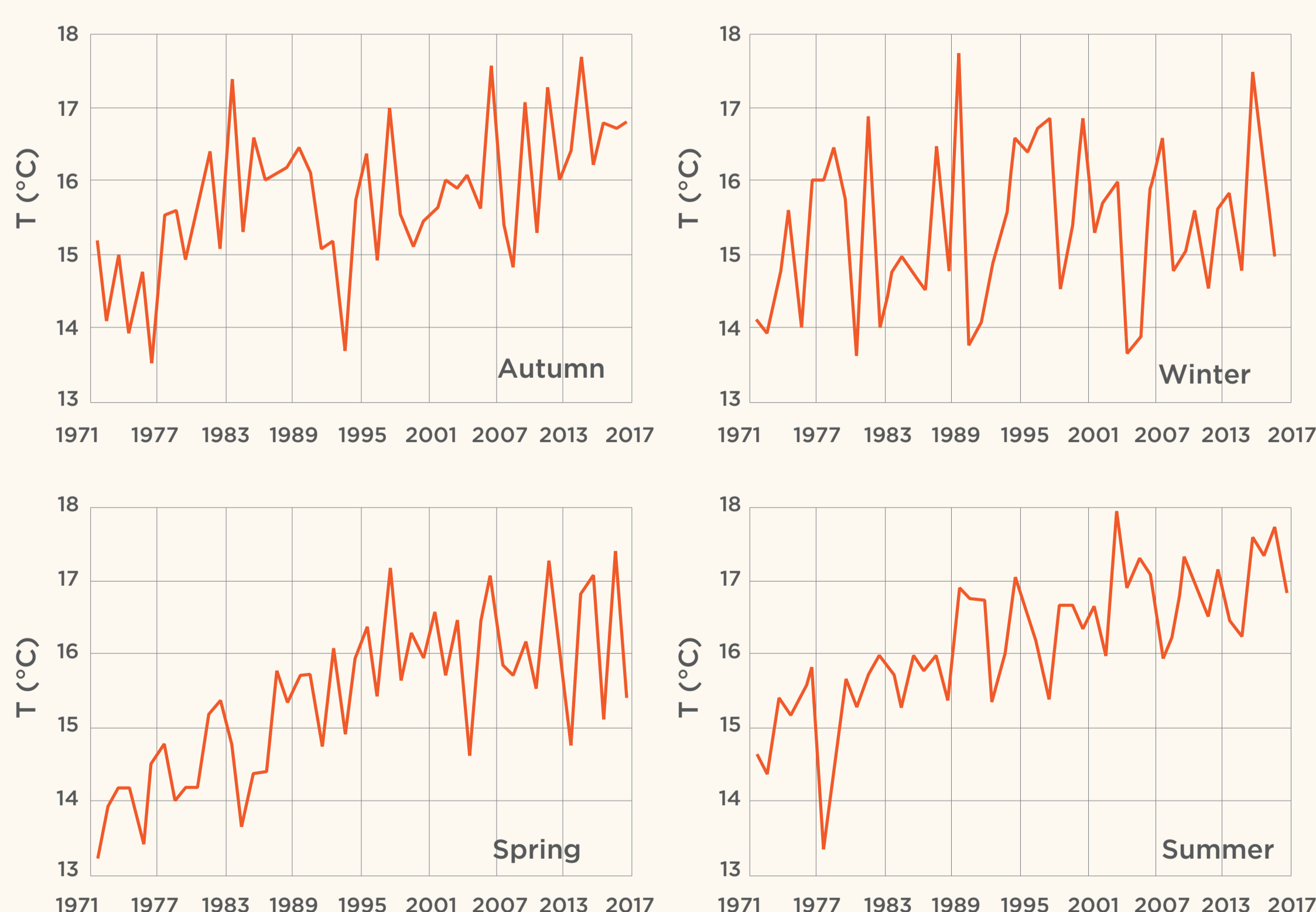
The Mediterranean coast is an area particularly vulnerable to climate change. The increasingly warmer Mediterranean is having an impact on its coastal regions, increasing the number of tropical nights, defined as those in which the minimum temperature is equal to or higher than 20°C.

In the Mediterranean region, the area with more than 60 tropical nights (especially in the eastern region and the Balearic archipelago) is expanding significantly.

Number of days with minimum temperature greater than or equal to 20°C for the reference periods 1981-2010. Source AEMET.

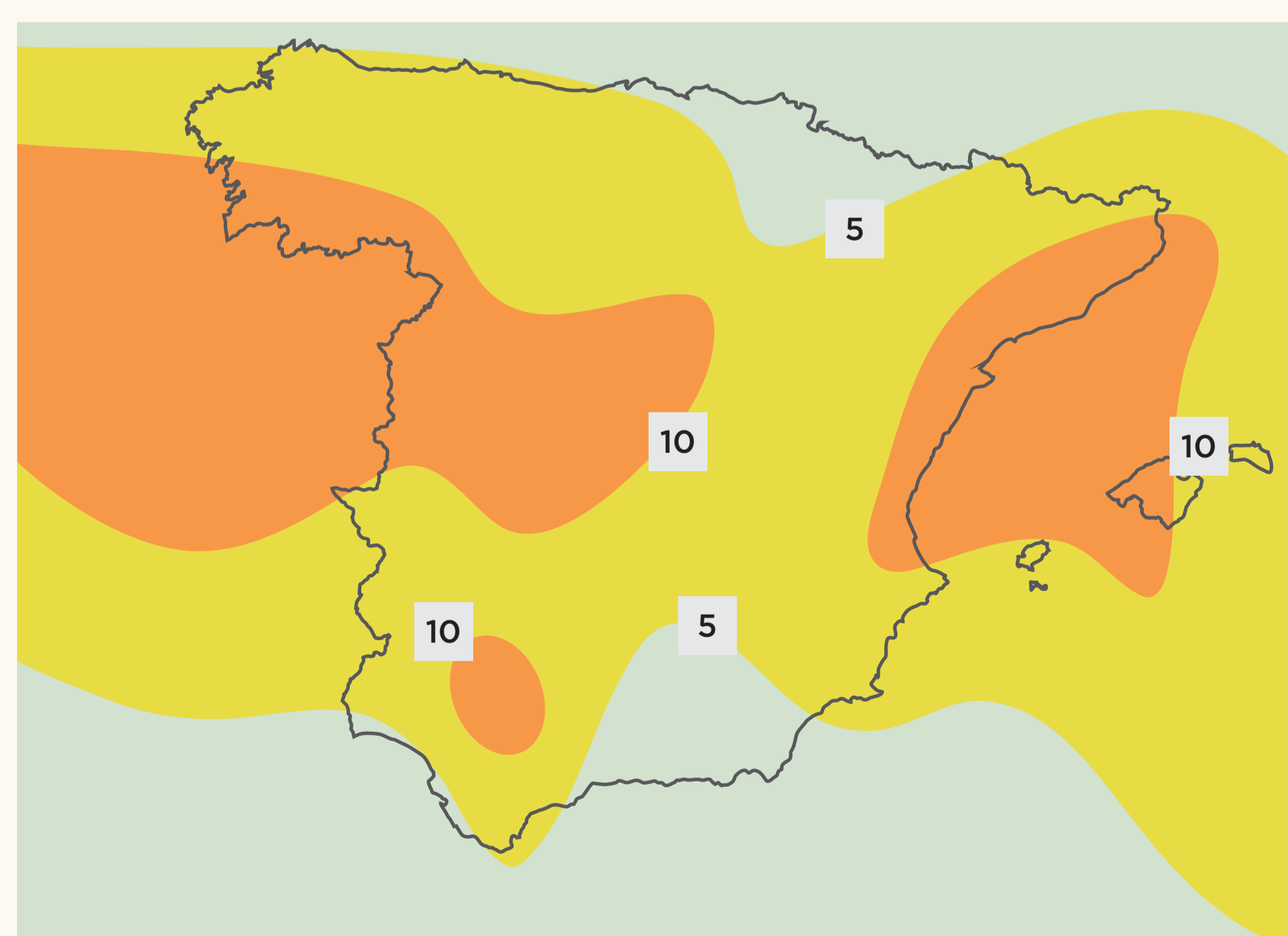
LONGER SUMMERS

AVERAGE SEASONAL TEMPERATURE



Average temperatures are getting higher every year, the rise is most noticeable in spring and, above all, in summer. Summer is the season most affected by climate change.

DAYS OF SUMMER LENGTHENING UNDER TEMPERATURE CRITERIA



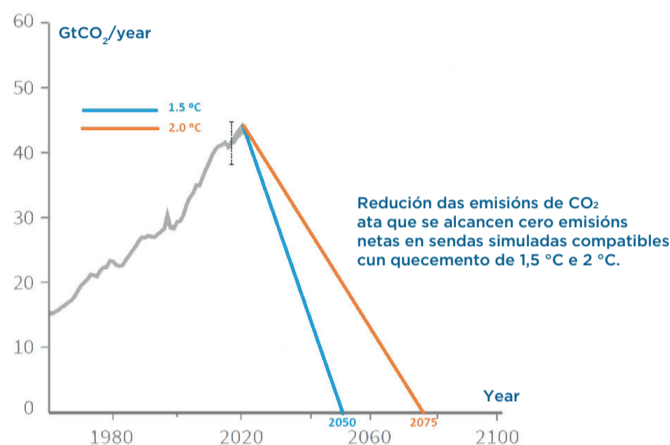
Days of summer lengthening by decades. Source AEMET.

Summer is lengthening by an average of 9 days per decade, 5 weeks longer than in the early 1980s.

| | |
|------------------|----------------|
| | Climate crisis |
| Global warming | Ecosystems |
| From 1.5 to 2 °C | Risks |

Climate change is leading us to an unprecedented situation. Our response to this crisis will indicate the risks that future generations will have to face

The term CLIMATE CRISIS reflects the need to emphasize that what is happening on Earth; this is a crisis that requires binding initiatives, responsibilities, and responses.



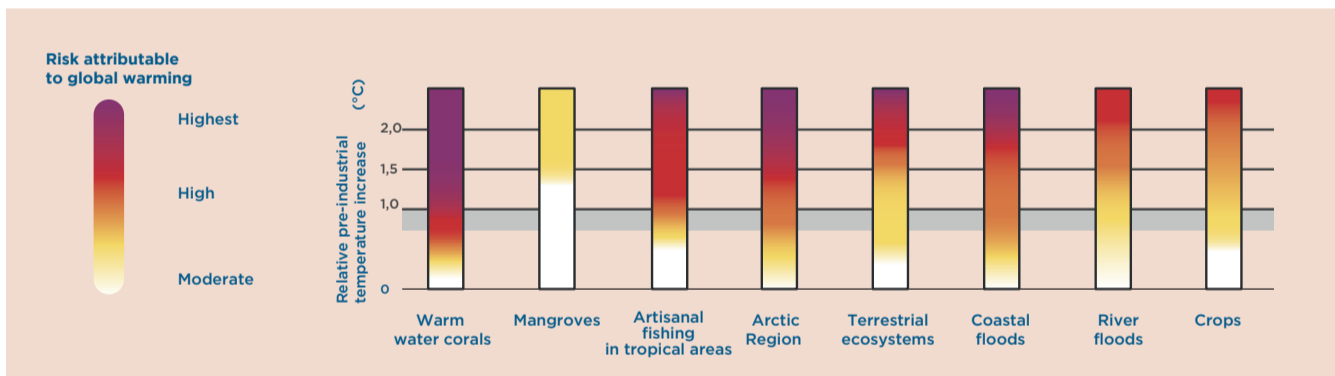
Man-induced global warming reached about 1 °C above the pre-industrial level in 2017. A warming of between 1.5 and 2 °C would entail irreversible losses in many ecosystems.

One of the main objectives of the Paris Memorandum of Understanding is to keep the increase of the world average temperature well below 2 °C.

Limiting the increase to 1.5 °C will reduce the risks and impact of climate change.

There are limits for adaptation and losses even for a 1.5 °C warming with specific implications for vulnerable regions and populations.

Risk of global warming level for key elements of the Earth's system.



IRREPARABLE DAMAGES TO ECOSYSTEMS
 4% of ecosystems will undergo a transformation with a 1.5 °C warming. With a 2 °C warming, this transformation will affect 13%.

LOSSES OF SPECIES
 Of the 105,000 species studied, 6% of insects, 8% of plants and 4% of vertebrates are expected to lose more than half of their geographical distribution with a 1.5 °C warming. For a 2 °C warming, it would be 18% of insects, 16% of plants and 8% of vertebrates.

DETERIORATION OF MARINE ECOSYSTEMS
 With a 1.5°C warming, it is estimated that many marine ecosystems will suffer damage, including loss of coastal resources and reduced productivity. Impact risks will be greater for 2 °C than for 1.5 °C.

FOREST FIRES
 Forest fires and the increase of invasive species will be less with 1.5 °C than with a 2 °C global warming.

RISING SEA LEVELS
 Slower sea level rise associated with 1.5°C warming reduces the risks to coastal ecosystems and populations and enhances the potential for adaptation.

DISAPPEARANCE OF SEA ICE
 If global warming stabilizes at 1.5 °C, the Arctic Ocean would be ice-free once every 100 years. However, if temperature increases by 2 °C, this would occur once every three years.





REASONS



FOR



HOPE



| | |
|-------------------|---------|
| Climate Migration | Justice |
| Gender | Health |
| | Poverty |

| Climate change affects people like you

CLIMATE MIGRATION



Environmental degradation has been an element that has influenced human mobility throughout the history of humanity. However, the current situation is unprecedented, as present and future generations, especially in the most vulnerable regions of the planet, face increasingly intense and frequent climate events, rise in sea-levels and desertification, among others. All these phenomena are making living conditions difficult in certain places and many people will have to leave their homes.

Climate migration is a complex, heterogeneous and multi-factor phenomenon, which include situations as different as those of communities that, facing a severe drought, see their crops at risk and send a family member to work in a nearby village to increase their income, as well as inhabitants of small low-lying island states, which witness the advance of the sea in their territories together with their consequences (aquifer salinization, crop loss, etc.).

These realities are already happening all over the world, from Alaska to small island states of the Pacific Ocean such as Kiribati or Tuvalu, and are expected to increase, as the effects of climate change become greater.

HEALTH



Climate change has a major impact on people's health, as evidenced by numerous scientific reports. Climate change influences social and environmental determinants of health, such as clean air, clean water, adequate food, and decent housing.

The impact on health is manifested from different perspectives: air pollution, extremes in temperature, vector-borne diseases, risks in the food and water sector. This leads to the displacement of the population and different diseases. A more specific case is that of hot and cold waves, which have serious public health consequences as they can aggravate cardiovascular and respiratory diseases and even, cause death.

Understanding the impact of climate change by health professionals is essential to detect risks and vulnerabilities early, to design and articulate the corresponding prevention plans capable of reducing these impacts.



POVERTY



Climate change poses risks for everybody. Climate change especially affects the lives of poor people: it reduces crop yields, destroys households, causes food prices to rise and creates food insecurity. However, it is a problem for everyone: the risks posed by climate change affect all people and all countries (UNDP). Its impacts are expected to exacerbate poverty but also to create new foci, both in developed and developing countries (IPCC). In addition to aggravating poverty, climate change generates population movements, creates climate refugees and increases competition for resources.

A Stanford University study published in Proceedings of the National Academy of Sciences, predicts that inequality between nations, which has dramatically decreased in recent decades, would have slowed much more if climate change had not become a reality. Moreover, it shows that from 1961 to 2000, climate change affected per capita incomes in the world's poorest countries by 17 to 30 per cent. The countries that have suffered the greatest impact are also some of the largest. India, the second most populated country in the world, would have been 30 per cent richer without climate change.

GENDER



Climate change affects us all, but affects disadvantaged people and groups even more. The highest poverty rates and worst effects of global warming are found in the same areas: South-east Asia and Sub-Saharan Africa. And all over the world, among the most disadvantaged and thus the most vulnerable, women tend to be the majority. In fact, they account for 70% of the world's poor people.

Women are the majority among the most rural communities and represent two-thirds of the labour force in the least developed countries, which are at the same time are exposed to greater aridity and desertification. Women in rural areas produce more than 60% of their home's food, but they rarely own the land. In the Sub-Saharan region, they account for 75% of the labour force, but they own only 1% of the land, according to Oxfam. And when they do, they tend to be smaller and more marginal lands. According to the World Economic Forum, 60% of people suffering from malnutrition today are women and children.

Women are the majority of people who die in natural disasters, such as floods and extreme droughts, having 14 times more chance of dying.

| | |
|---------------------------|----------------|
| Mitigation | Adaptation |
| Energy | Infrastructure |
| CO ₂ emissions | Food |
| Transport | Research |

Acting against climate change to prevent its negative impacts means implementing mitigation and adaptation measures



ENERGY EFFICIENCY



Energy efficiency is based on the idea of using less energy, obtaining the same products and services and therefore reducing greenhouse gas emissions. But there is also a key aspect to be added to this: the security of supply.

TAX ON CO₂ AND EMISSIONS MARKETS



The carbon tax seeks to reduce CO₂ emissions by charging a price for it. A maximum allowable emission volume is established in emission markets. The Kyoto Protocol agreed to create a CO₂ market in which countries and companies could buy and sell emissions certificates based on whether they emit greenhouse gases or help reduce emissions through renewable energy.

RENEWABLE ENERGY



There is only one way for the energy transition to address climate change: moving from a fossil-fuel model to a renewable one.



EFFICIENT TRANSPORT



Reduce CO₂ emissions from means of transport in two ways: making them more efficient and changing the fuel used.



Mitigation measures are actions aimed at reducing and limiting greenhouse gas emissions.

MITIGATION

ADAPTATION

Adaptation measures are actions aimed at reducing the damage caused by the effects of climate change.



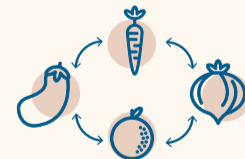
SAFER BUILDINGS



Rising sea levels and increasingly frequent extreme weather events require facilities and infrastructures to be built and improved so that they ensure the safety of people, as well as the provision of services and mobility.



AGRO-ECOLOGICAL PRACTICES



Specific strategies of organic agriculture, such as incorporating organic matter into the soil, changing crop rotation or reducing the use of external inputs, to ensure food production in an increasingly populous world.



LANDSCAPE RESTORATION AND REFORESTATION



Climate change will bring about an intense environmental change and a balance needs to be found with ecosystems. The strategy is based on the reconstruction, creation and use of sturdy and resilient ecosystems for a very different climate future.



RESEARCH, DEVELOPMENT AND EMERGENCY PLANS



A wide range of technological measures are required to deal with climate change while taking into account the social aspect. The creation of evacuation plans and response systems in case of storms and severe floods can save lives, should these catastrophes occur.

11 A fair ecological transition

| | |
|-----------------------------|-----------------------|
| Circular and social economy | Green employment |
| Sustainable food | Streamlined transport |
| | Efficient technology |

Acting against climate change to prevent negative impacts means implementing mitigation and adaptation measures



A fair ecological transition, which does not leave disadvantaged people along the way, does not create inequalities and prioritizes the general interest.



ENERGY TRANSITION

Energy transition relies on 3 axes:

- To decarbonize the energy source from a fossil sources model to a 100% renewable one.
- To increase energy efficiency through technical and social changes.
- To reduce total energy consumption.



CIRCULAR ECONOMY

The circular economy is a production and consumption model that involves sharing, renting, reusing, repairing, renewing and recycling existing materials and products whenever possible to create added value. This extends the life cycle of products.



SUSTAINABLE FOOD

Agriculture is one of the largest emitters of GHG, but it is also one of the greatest allies of climate. The agricultural sector can play a very important role in reducing emissions and preventing a further loss of the carbon stored in forests and soil. Keeping soils and forests healthy also helps combat climate change, as both act as carbon-catching "sewers". It also helps to reduce food loss and waste, and advocates for better consumption patterns. We need to sustainably increase agricultural productivity and improve farmers' incomes; increase farmers' resilience to climate change and help them find ways to adapt themselves and reduce emissions.



NATURE-BASED SOLUTIONS

These are solutions that, from a broad perspective, use nature and its processes to mitigate the impacts of climate change and promote the adaptation of towns and citizens to change. These solutions include both microscale interventions in buildings, such as green roofs or façades, as well as other natural elements, green and blue infrastructures in public spaces, connected to parks and natural areas in towns.

FAIR

ECOLOGICAL TRANSITION



COOPERATIVE AND SOCIAL ECONOMY

The new economies (Economy for the Common Good, Collaborative Economy, Social and Solidarity-based Economy, Circular Economy, Blue Economy, Transition Movement or Ethical Finance) have a common goal: transforming the economy and putting it at the service of people and the planet. These proposals offer specific tools to make changes that involve mitigating or adapting to the effects of climate change. This economic model leads to a reduction in emissions and an adaptation to climate change in the following sectors: Energy, industry, mobility, urban planning, construction, tourism, finance and consumption.



TECHNOLOGIES WITH ECO-EFFICIENCY CRITERIA

Any fair ecological transition must put science and technology at the service of the common good, serving the needs of the majority, and having long-term sustainability criteria. It is also necessary to recover and place value on traditional knowledge of the past, which was adapted to more sustainable societies.



SUSTAINABLE TRANSPORT

Cities must foster an urban development model that produces cities where people can live and move around through walking, using bicycles and public transport. Freight transport is mainly carried out by road and must be transferred to trains. Planes are the most unsustainable means of transport on short journeys. The tourism sector must offer alternatives to the mass use of flights.



ENVIRONMENTAL EDUCATION (EE)

One of the most commonly used slogans in recent times is: "More environmental education against climate change." EE helps close the gap between the dimension of the environmental problem and social perception. We need to recover the ecosystem vision, where everything we do and experience has an impact on the environment. EE will help large social majorities to assume small changes in habits to have a great impact on resource savings.



GREEN TAX MEASURES

Green taxation proposes a series of changes aimed at improving the protection and conservation of the environment, and promotes sustainable behaviours. It also fosters a greater contribution to the public coffers by those having the greatest impact on the environment. These measures should help to reduce social imbalances, promote good practices and discourage those that are harmful to the environment.



GREEN EMPLOYMENT

Green employment promotes productive sectors that favour a different industrial fabric, based on SMEs, cooperatives and the social economy. It represents an opportunity for job creation in sectors such as renewable energies, rehabilitation of housing, organic farming and environmental education.

12 The way to a decarbonized society

| | |
|-------------------------------------|---------------------------------|
| Carbon footprint | Daily CO ₂ emissions |
| Calculation of the carbon footprint | Carbon footprint off-setting |
| | CEACV didactic resources |

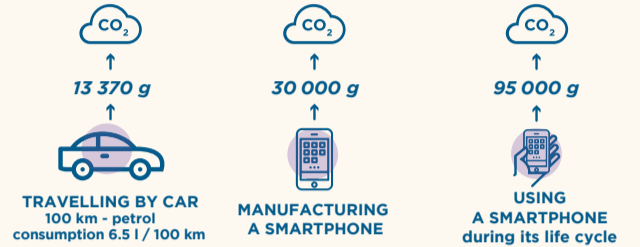
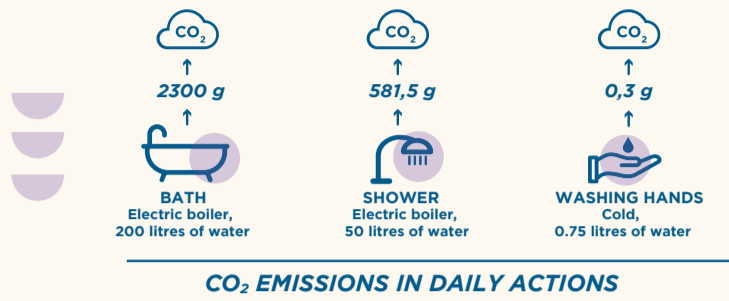
Measuring our carbon footprint is the first step to reducing and off-setting

What is the carbon footprint?

The carbon footprint refers to the amount of greenhouse gas emissions (GHGs) that occur in the various activities we perform.

Everyday decisions, whether driving to work, eating lunch or using our mobile phone, contribute to our personal carbon footprint.

Fortunately, we have control over our own impact on climate change, and the first step to being part of the solution is to understand that our lifestyle generates greenhouse gas emissions and to assess how much these are.



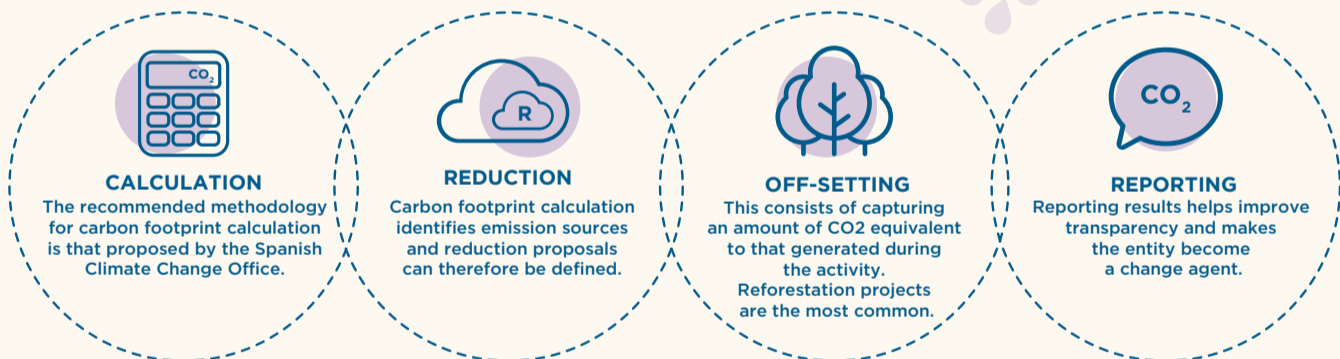
AVERAGE GRAMS OF CO₂. Source: Own elaboration/ Guia Càlcul Oficina Catalana de Canvi Climàtic / Beck Market

How is the CO₂ footprint measured?

Measuring the carbon footprint of an event or activity, project, service, entity, company, and even a consumer product is possible.



The purpose of this calculation is not only to quantify the GHG emitted, it also helps to assess and communicate the contribution of these activities or entities to climate change, and above all it serves as a basis for preparing, assessing and implementing actions to help reduce emissions.



There are several tools available to calculate the carbon footprint; it is a matter of finding the one that fits the needs.

The Spanish Climate Change Office has tools to facilitate the calculation of the carbon footprint and the estimation of carbon dioxide emissions generated by an off-setting project.

This seal makes it easy for organizations to demonstrate the effort they have made in the fight against climate change.

Organizations wishing to obtain this stamp should calculate their carbon footprint and register in the relevant section of the Spanish Climate Change Office.



Target - Neutral in carbon

The CEACV has the seal since 2019, referring to the 2018 carbon footprint.



Achieving a zero carbon footprint is difficult. Therefore, being carbon neutral can compensate for the CO₂ footprint that has not been reduce. This off-setting can be made with a financial contribution to a project or by directly carrying out the action, as is the case with tree planting.

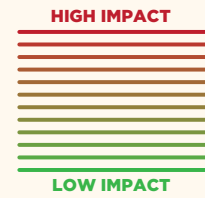
In addition, the CEACV currently has almost 10 ha of surface area covered with vegetation of very diverse characteristics, which have been recovered throughout its 20 years of life. All this vegetation is carrying out CO₂ fixation processes through its photosynthetic function and, therefore, it is compensating, in an important part, the emissions generated by our activities.

| | |
|----------|-------------|
| Mobility | Consumption |
| Energy | Food |
| | Waste |

There is reason for hope if we begin to reduce our carbon footprint

With these actions, anyone can help curb climate change. None, however simple it seems, is insignificant and anybody can make a difference.

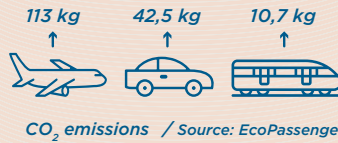
They are sorted from the greatest to the least impact on greenhouse gas emissions.



PLAN YOUR TRIPS AND AVOID FLYING

Planes are the means of transport that have most increased the carbon footprint in recent years. Before starting a trip, evaluate existing travel alternatives.

**Travel from Valencia to Barcelona
1 person / 350 km**



On a short and mid-distance journey, the train can be the most sustainable option.



CONTRACTING RENEWABLE ENERGY

Contracting renewable energy is a perfectly feasible option. There are companies and cooperatives that supply this type of electricity, and changing a contract is an easy and affordable process.



ENERGY LABELLING AND SOURCE GUARANTEE SYSTEM

Available from National Commission on Markets and Competition

REDUCE YOUR MEAT CONSUMPTION

Industrial meat production generates large amounts of CO₂ and methane, and intensively uses water. Fruit, vegetables and legumes have a much more efficient environmental behaviour than meat production.

Fruit, vegetables and legumes,



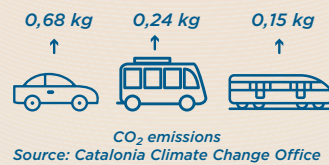
use up to 13 times fewer tons of equivalent CO₂ for every million calories produced

The UN confirms that opting for a diet with a higher percentage of vegetables, fruit and legumes would reduce emissions associated with food production by 70%.

USE PUBLIC TRANSPORT AND CYCLING

Public transport is an efficient option to reduce urban CO₂ emissions: it pollutes less than private vehicles, saves money and reduces the number of vehicles in use.

3 km route in the city



Cycling is the most effective way to get around the city.



44% of the Galician population say they use bicycles with some frequency. *Bicycle Barometer of 2019 in Spain*

SHARE THE CAR OR DON NOT USE IT

The car represents half of the economic expenditure on energy of Galician families. Road transport accounts for 18% of Galicia's total territorial greenhouse gas emissions (2018).

Private car



New ways to share a car:

- CARSHARING:** Car rental for short periods of time.
- CARPOOLING:** Shared use of vehicles and travelling with other passengers.

CORRECTLY INSULATING YOUR HOUSE

Insulating a home consists of making the elements that the house has, which are contact with the outside, increase their resistance to the passage of cold/heat. This is achieved by incorporating insulating materials into exterior walls, ceilings, partitions and floors.



Improving thermal insulation in buildings reduces carbon dioxide emissions by 30% due to lower energy consumption in thermal installations in buildings.

PLANT TREES!

Offsetting our CO₂ emissions can be offset by planting trees. You can collaborate in forest maintenance by supporting reforestation projects carried out by public or private entities.

500 billion trees

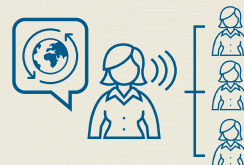


To absorb 25% of the CO₂ present in the atmosphere. *Source: Science*

To absorb 25% of the CO₂ in the atmosphere, it would be necessary to increase the forest area by 25%, which means planting about 500 billion trees.

TALK ABOUT CLIMATE CHANGE

Climate change is a relevant reality that has to move consciences and to condition political decisions. It is important to keep it in mind in our conversations and comment on social networks.



It is essential to stay informed by always consulting reliable and proven sources. A good reference for obtaining rigorous information is the IPCC:



REUSE USED CLOTHING

The textile industry has a carbon footprint of close to 1,700 million tons of CO₂ per year, making it the second most polluting industry on the planet, accounting for 20% of the toxins poured into water.

**Textile industry
1,700 million tons of CO₂/year**



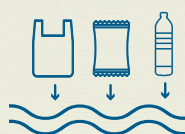
Source: WWF Suiza

Reusing clothes that we do not use reduces the use of resources such as cotton or oil and favours the circular economy.

REDUCE WASTE

About 4.8 to 12.7 million tons of plastic end up in the oceans each year. The European plastics strategy estimates that the emission of 3.4 million tons of equivalent CO₂ per year could be avoided.

4,8 - 12,7 million tons of plastic per year into the oceans

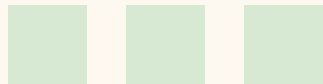


Source: Europarl

Limit the purchase of food in disposable plastic containers and purchase bulk products using reusable containers.



STRATEGIES, ALLIANCES AND ACTORS



| | |
|--------|-------------------------|
| | Environmental Education |
| CEACV | Climate and Energy |
| CENEAM | EAR |

Raise awareness, sensitize and empower citizens to lead the active fight against climate change

What is environmental education?

Environmental Education is a pedagogical strategy that offers new ways of looking at and understanding the world to improve people's relationships with the environment. It is based on the idea that in nature everything is related, interconnected and constantly changing.

EE is an education for action, for commitment to protect our immediate environment and the planet as a whole.

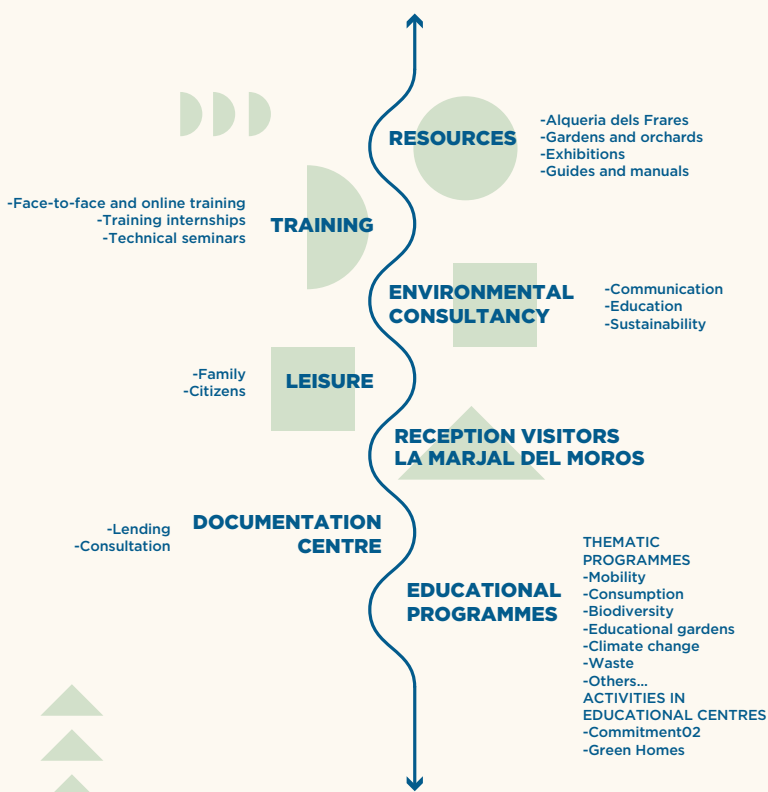


CENTRE D'EDUCACIÓ AMBIENTAL
DE LA COMUNITAT VALENCIANA



The CEACV is the reference centre for environmental education in the Valencian Community for training, informing and raising awareness in Valencian society as a whole.

The CEACV's headquarters is the Alqueria dels Frares, an old house typical of the coastal plains of the Valencian Community, dating from the end of the 17th century. It is located in the municipality of Sagunt, within the boundaries of the Marjal dels Moros, a natural area of the Natura 2000 Network.



What is the EE's role in the climate emergency?

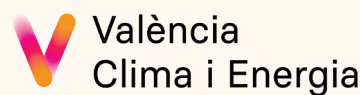
Environmental Education develops important keys to learn to live and intervene in a world that is changing dramatically due to climate change. In this process of change, there can be situations of extreme difficulty for life as we know it.

EE must help create a decarbonized society that is both resilient and adaptable.



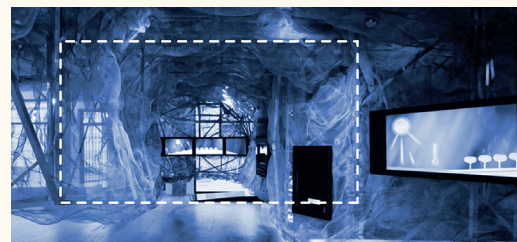
The Environmental Education en Route (EAR Guide) is the strategic framework of reference and educational support for the construction of a model of society based on the principles of sustainability.

The EAR also has a Commitments to Action Plan that includes the actions promoted throughout the Valencian territory by the entities adhered to and committed to the EAR.



VALÈNCIA CLIMA I ENERGIA is the educational and informative centre in Valencia to train, raise awareness and sensitise about climate change.

It currently manages the Climate Change Observatory, an educational and informative facility, and the Energy Office, a space for resolving citizens' doubts and promoting the energy transition.



ORGANISMO AUTÓNOMO PARQUES NACIONALES
CENTRO NACIONAL DE EDUCACIÓN AMBIENTAL



The National Centre for Environmental Education (CENEAM) has been working on responsibility of citizens in relation to the environment since 1987.

It was created as a resource centre at the service of all public and private groups that carry out environmental education programmes and activities.

| |
|-------------------------|
| SDGs |
| 2030 Agenda |
| SDG13 Climate action |

An opportunity to take a new path that will improve people's lives

What is the 2030 Agenda?

In 2015, the UN adopted the 2030 Agenda for Sustainable Development, an opportunity for countries and their societies to take a new path to improve people's lives, leaving no one behind.

«The 2030 Agenda 2030 is a new global social contract. Our ethical commitment to collective development forms the basis of an inclusive society based on the humanistic values of solidarity and equal opportunities».



Federico Buyolo



In 2019, the Xunta de Galicia created a coordination commission to implement the 2030 agenda in our land.



What are SDGs?

The Agenda has 17 Sustainable Development Goals, ranging from the eradication of poverty to fighting climate change, education, gender equality, environmental protection and social transformation in cities.

The United Nations publishes an annual report that provides an overview of the efforts made to date for the implementation of SDGs worldwide. The Spanish Sustainable Development Network (REDS in Spanish) has monitoring reports on SDGs around the world.

SDG 13 - CLIMATE ACTION

Goal 13 of SDG Climate Action, proposes adopting urgent measures against climate change and its effects.

ABILITY OF ADAPTATION

To strengthen the resilience and the ability of adaptation to the risk related to climate and natural disasters in all countries.

ECONOMIC COMMITMENT

Meeting the commitment of developed countries to achieve the goal of jointly mobilizing 100,000 million dollars by 2020, in order to meet the needs of developing countries regarding the adoption of specific measures, and putting in full operation the Green Climate Fund by capitalizing on it as soon as possible.

POLITICAL MEASURES

Add climate change-related measures to national policies, strategies and plans.

EDUCATION AND AWARENESS

Improve education, awareness and human and institutional capacity regarding climate change mitigation, adaptation to it, reduction of its effects and early warning.

SUPPORT TO VULNERABLE REGIONS

Promote mechanisms to increase capacity for effective planning and management of climate change in the least developed countries and small developing island States, with particular emphasis on women, youth and marginalized local communities.





CLIMATE EMERGENCY

facts and data

With this panel we are not just closing the exhibition, but opening a path of collaboration and joint work that can begin today.

Reducing the ecological footprint, decarbonizing our activities, improving the relationship with the environment and demanding a fair ecological transition are the key pillars for this path to succeed.

ALLIES AGAINST CLIMATE CHANGE



#PORELCLIMA Community
This aims to mobilize the whole society, including businesses, organizations, administrations and citizens to deal with the climate crisis.



Fridays for future
This is a youth movement for the defence of our planet, a global student initiative that seeks to focus attention on the environmental crisis our planet is facing.



Extinction Rebellion XR
XR is made up of people who have decided to join the non-violent international rebellion against the extinction of species and ecological and existential crises.



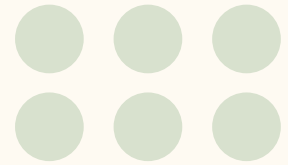
Network of Spanish cities for the climate
This is section of the Spanish Federation of Municipalities and Provinces formed by local governments that are integrating the mitigation and adaptation to climate change in their policies.



ESenRED
As per Spanish, Schools toward Network Sustainability.
This is a state network of sustainable schools promoted by public administrations (autonomous communities, town councils, provincial governments...).



Covenant of Mayors
The Covenant of Mayors for Climate and Energy brings together thousands of local governments who voluntarily commit themselves to implementing the EU's climate and energy goals.



References

▪ AEMET. Climate services



▪ Climate maps of Spain. AEMET.



▪ Manual for the use of meteorological terms. 2015 edition. AEMET.



▪ IPCC in Spanish.



▪ IPCC assessment reports..



▪ #Showyourstripes.



▪ 2degreesinstitute.



▪ Climatelevels.



▪ The ocean and the cryosphere in a changing climate. IPCC.



▪ The effects of climate change in Spain. AEMET.



▪ Climate Change: 1.5 °C global warming



▪ Climate Migration: An Approach to the
Current Scene. ECODOS.

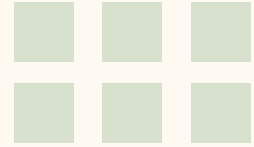


▪ GHG emissions calculation guide.
Catalan Office for Climate Change



▪ Valencian Cooperation for Sustainable Development.





WORK MATERIALS



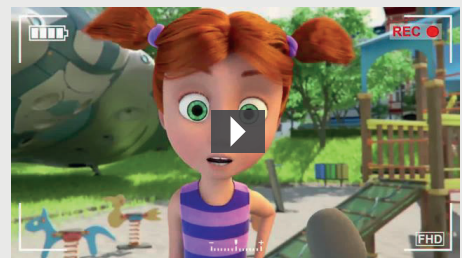
CARBON FOOTPRINT IN EDUCATIONAL CENTRES
A guide to undertaking carbon footprint projects in educational centres.



CARBON FOOTPRINT IN AN EVENT
A guide to calculate an event's carbon footprint.
























POSTERS AND INFOGRAPHS
Material to communicate an emergency.



CLIPS TO SAVE THE WORLD
A collection of videos for classroom work: climate change, energy, waste, food waste, etc.



Work materials

- 8 keys to a "LOW CARBON" diet. 
- Endangered climate. 
- 52 gestures for climate change. 
- SDG 13: Action to protect the climate. 
- Carbon neutral events. 
- Knowing and assessing climate change: proposals for group work. MAPFRE Foundation. 
- Young people in action before climate change. 
- Food mileage. 
- Calculate and compensate your CO₂ emissions. 
- The impacts of climate change at 1.5°C, 2°C and above. 
- Report: Agroecology to cool the planet. 
- @es_INE e-platform to monitor compliance with #SDG. 
- "Go Goals!" game 
- SDG and gender 
- Unesco Etxea materials on SDGs. 
- The SDG challenge in high schools. Teaching programme for development. You are part of the challenge. Project teaching materials. 
- ECODES Good Practice Guide for Food Waste. 
- Consume to transform. Cristina Enea. 
- Guide to school meals in the Valencian Community. 
- Planet Life Report 2018. 
- Wildlife and global warming: the effects of climate change on the biodiversity of WWF's priority sites. 





**GENERALITAT
VALENCIANA**

Conselleria d'Agricultura,
Desenvolupament Rural,
Emergència Climàtica
i Transició Ecològica



**CENTRE D'EDUCACIÓ
AMBIENTAL**

DE LA COMUNITAT VALENCIANA



Environmental Education Centre of the Valencian Community

Headquarters address

Ctra. Siderúrgica, km 2
46500 Sagunt (València)

Postal address

Apartat de Correus 100
46520 Port de Sagunt (València)

Information and reservations

Tel.: 96 261 79 30

Fax: 96 261 79 40

ceacv@gva.es

www.agroambient.gva.es/web/ceacv

