



# Ice cores for teachers

## GIFT session @EGU24

16 April 2024



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 955750

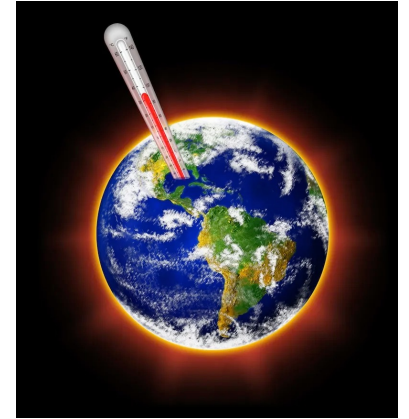
# Introduction

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GIFT Workshop EGU24

The Changing Climate of our Planet



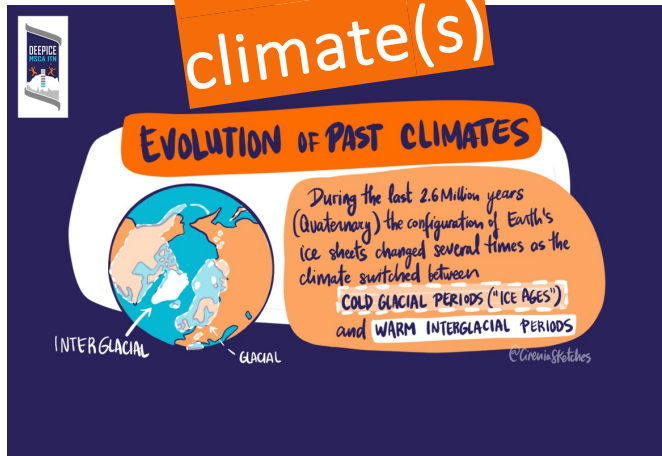
(Image credit: David Carillet | Shutterstock.com)

Ice cores for teachers -  
an educational kit for teaching  
climate and geosciences

# Introduction

## Ice cores for teachers -

Past changing  
climate(s)



**EVOLUTION OF PAST CLIMATES**

During the last 2.6 Million years (Quaternary) the configuration of Earth's ice sheets changed several times as the climate switched between **COLD GLACIAL PERIODS ("ICE AGES")** and **WARM INTERGLACIAL PERIODS**

INTERGLACIAL      GLACIAL

@GreenSketches



An Icy Archive



**STUDYING the PAST through NATURAL ARCHIVES**

SCIENTISTS STUDY them to RECONSTRUCT PAST CLIMATE CHANGES

Contain information as old as 1.5 Million years

TREE RINGS      CORALS      SPELEOTHEMS      ICE CORES

@GreenSketches

A  
precious  
cylinder  
of ice



**DRILLING ICE CORES TO UNRAVEL THE PAST**

Drilling Camp

ICE SHEET

BASAL ICE      BEDROCK

ANTARCTICA

ICE SHEETS. A TIME CAPSULE

YOUNGER      OLDER

@GreenSketches



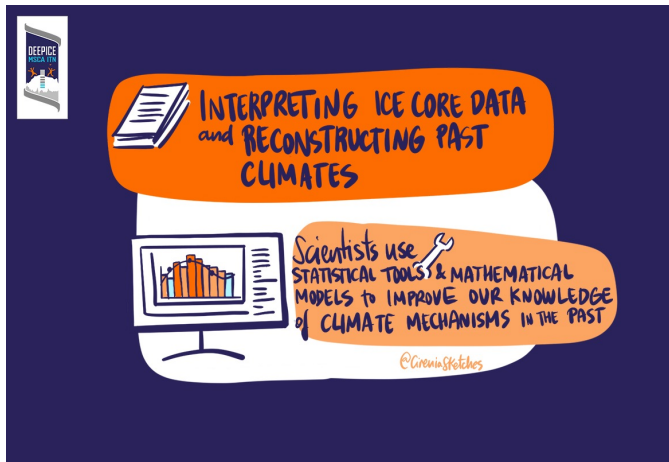
# Introduction

## Ice cores for teachers -

Past climate...



Future climate ?





# Introduction



## Ice cores for teachers – An educational kit

DEEPICE STORIES: INSIGHTS INTO ICE  
AND CLIMATE

Complementary resources

& ideas for classroom activities

A series of 15 short educational videos

A new series of 15 educational videos

@DEEPICE Project

**DEEPICE** stories  
Insights into ice and climate

DEEPICE MSCA ITN

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**ICE CORES: A NATURAL ARCHIVE TO RECONSTRUCT AND UNDERSTAND PAST CLIMATE CHANGES**

- Education in Past Climates:** Learning by studying ice cores (solidified snow) can help us understand past climates and how they have changed over time.
- Drilling Ice Cores to Unravel the Past:** Ice cores are drilled from ice sheets and glaciers. The ice is then melted and analyzed for various isotopes and gases.
- From Snow to Ice:** Snowflakes are made of water molecules. As snow accumulates, it is compressed into ice. The air is trapped in bubbles within the ice.
- Unlocking the Past:** Scientists use various techniques to analyze ice cores, including measuring isotopes and gases.
- Reconstructing Past Climates:** By analyzing the isotopes and gases in ice cores, scientists can reconstruct past climates and understand how they have changed over time.
- A Better Understanding of the Past = Better Prediction of the Future:** Understanding past climate changes helps us predict future climate changes.
- A Frozen Archive:** Ice cores provide a natural archive of information about the past.



**ISOTOPES**

Carbon-13	Carbon-12
6 Protons - red	6 Protons
6 Electrons - yellow	6 Neutrons
7 Neutrons - green	6 Electrons

# Introduction



## Ice cores for teachers –

An educational kit

DEEP

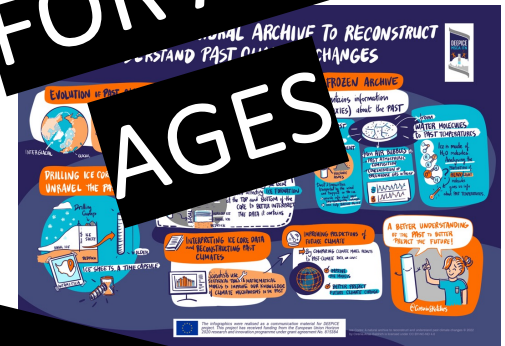
**GREAT TOPIC**

Complementary resources

& ideas for classroom activities

**FOR ALL**

**AGES**



**TO EDUCATE ABOUT**

@DEEPICE Project

**CLIMATE**

**DEEPICE**  
stories

**PLURI-**

**DISCIPLINARY**

**HANDS-ON**

**ACTIVITIES**

**FUN**

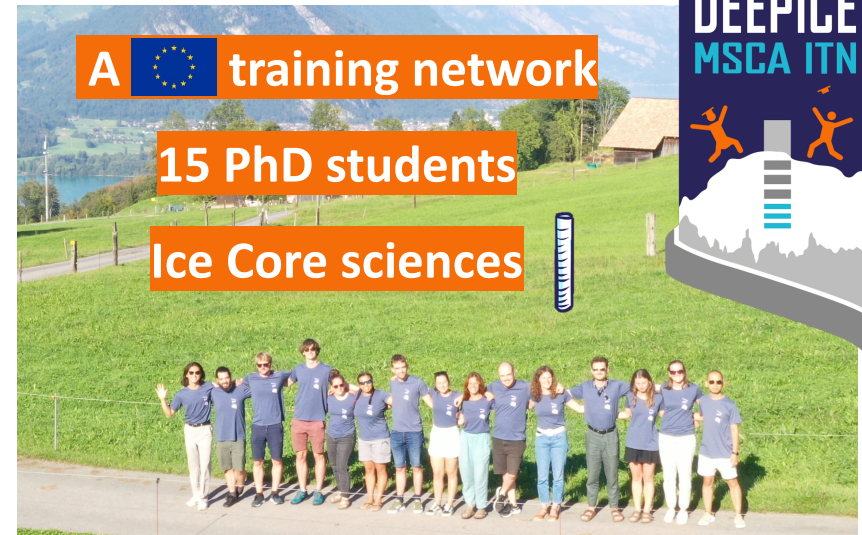
# Introduction

## Ice cores for teachers – DEEPICE Project



**KEY FACTS**

-  H2020 Marie Skłodowska-Curie Actions - Innovative Training Networks
-  10 beneficiaries  
11 partner organisations  
15 PhD students
-  11 countries
-  1 January 2021 - 31 December 2024
-  4 166 057,88 €



# Introduction

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## Ice cores for teachers – GIFT Workshop

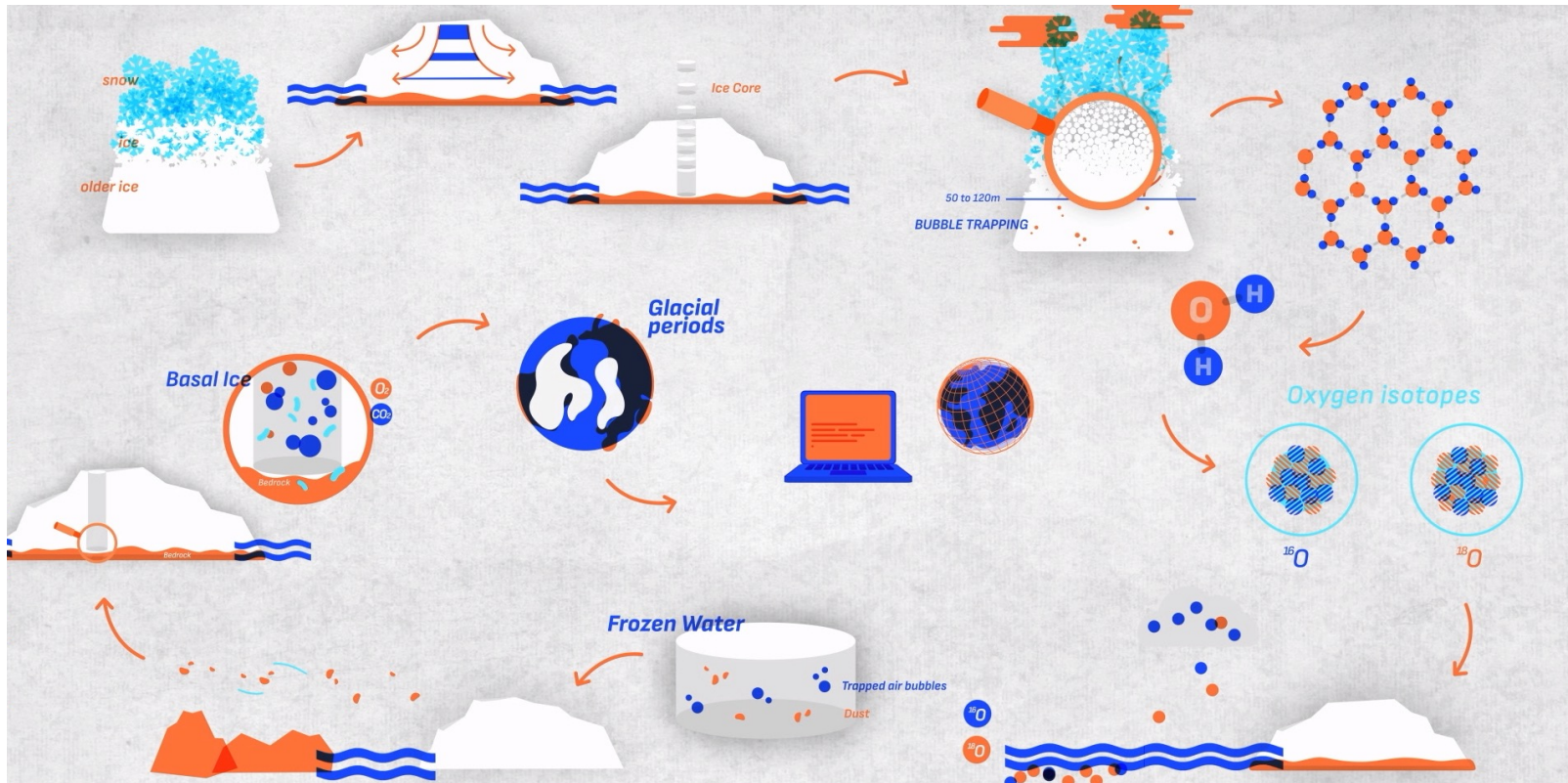
- 1. Presentation of the videos series (5 mn)**
2. Themed discussions (3 x 15mn) – 3 groups
3. Conclusion (5 mn)



# Introduction

## Ice cores for teachers – GIFT Workshop

### DEEPIECE STORIES: INSIGHTS INTO ICE AND CLIMATE



# Introduction

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## Ice cores for teachers –



# Introduction

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## Ice cores for teachers – GIFT Workshop

1. Presentation of the videos series (5 mn)
- 2. Themed discussions (3 x 15mn) – 3 groups**
3. Conclusion (5 mn)

# Thematic discussions

## Ice cores for teachers –

### GIFT Workshop

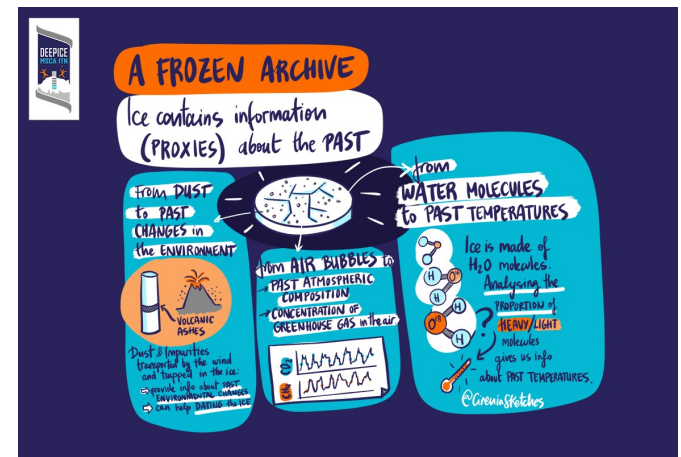


Themed discussions (3 x 15mn)

**TOPIC A :** What are ice sheets and ice cores ?

**TOPIC B :** What can ice cores tell us about greenhouse gases?

**TOPIC C :** What can ice cores tell us about the temperature?





# Conclusion

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## Ice cores for teachers – GIFT Workshop

1. Presentation of the videos series (5 mn)
2. Themed discussions (3 x 15mn) – 3 groups
- 3. Conclusion (5 mn)**

# Conclusion

## Ice cores for teachers – GIFT Workshop



IMPROVING PREDICTIONS of  
FUTURE CLIMATE

➔ By COMPARING CLIMATE MODEL RESULTS  
to PAST-CLIMATE DATA, we can:



✓ IMPROVE  
THE MODELS

✓ BETTER PREDICT  
FUTURE CLIMATE CHANGE

@GreniaSketches



A BETTER UNDERSTANDING  
OF THE PAST TO BETTER  
PREDICT THE FUTURE!



@GreniaSketches

# Conclusion



## Ice cores for teachers – GIFT Workshop

### AVAILABLE RESOURCES

### DEEPICE Infographics on DEEPICE website

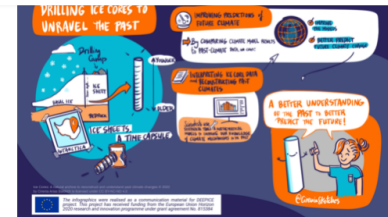
[https://deepice.cnrs.fr/wp-content/uploads/2022/05/DEEPICE LANDSCAPE FINAL CC.pdf](https://deepice.cnrs.fr/wp-content/uploads/2022/05/DEEPICE_LANDSCAPE_FINAL_CC.pdf)

### PAGES Magazine on ice core research

<https://pastglobalchanges.org/publications/pages-magazines/pages-magazine/137410>

### Other resources listed on DEEPICE Website

<https://deepice.cnrs.fr/communication-resources/>



Ice Core: A new series of 15 educational and awareness past global changes by Deepice Project is licensed under <https://creativecommons.org/licenses/by/4.0/> (CC BY). Download DEEPICE infographics in landscape format for printing in A4 or in French. These infographics on ice core editions can be used for educational and outreach activities as long as their use comply with the CC 4.0 license (Attribution-NonCommercial-NoDerivatives 4.0 International).

#### DEEPICE Factsheet

This factsheet gives the key information about DEEPICE project. Download it by clicking on the image.



#### Other educational resources

- Non-exhaustive list of educational resources on polar sciences, ice cores, Antarctica...
- Scientific Committee on Antarctic Research – Educational resources
- Discovering Antarctica – Climate change, past and future
- Polar Resource Book
- EducAPes education material
- AntarcticCladlers – Glaciers and Cladation in Antarctica and beyond
- Classroom Activity: creating ice cores – Table 1
- Classroom Activity: creating ice cores – Table 2
- Virtual classroom activities of glacioclimatology and ice cores
- Educational resources in the core sciences
- Antarctica: a new series of 15 educational videos

# Conclusion



## Ice cores for teachers – GIFT Workshop

### AVAILABLE RESOURCES

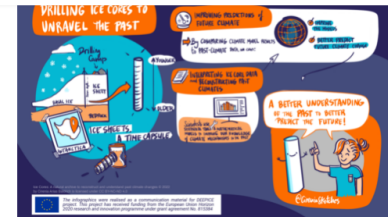
### DEEPIECE Video series on Youtube

[https://www.youtube.com/watch?v=4Lr\\_CGcUddU&list=PLYycEWz9lu3Rgeyy8pWingd-ai8oKg-io](https://www.youtube.com/watch?v=4Lr_CGcUddU&list=PLYycEWz9lu3Rgeyy8pWingd-ai8oKg-io)

### AVAILABLE IN A FEW WEEKS!

### Recap brochure of the workshop on DEEPIECE website

### Quizz related to the DEEPIECE videos series



Ice Core: A future archive to terrestrial and oceanic past climate change by Colin Jobbes is licensed under <https://creativecommons.org/licenses/by/4.0/> (CC BY 4.0) (CC BY 4.0)

Download DEEPIECE Infographics in landscape format by printing or clicking on the image.

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  - Polar Resource Book
  - Educators education material
  - AntarcticGlaciers – Glaciers and Glaciation in Antarctica and beyond
  - Classroom Activity: creating ice cores – Tabular 1
  - Classroom Activity: creating ice cores – Tabular 2
  - Various classroom activities of glaciologists and ice cores
  - Educational resources on ice core science
  - [www.icecores.org/researchers/](https://www.icecores.org/researchers/)

# Stay in touch



A new series of 15 educational videos

@DEEPICE Project

**DEEPICE** stories  
*Insights into ice and climate*

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DEEPICE MSCA ITN

The graphic features a central blue and black globe with the text 'DEEPICE stories' overlaid. The word 'DEEPICE' is in large, bold, blue letters, and 'stories' is in a smaller, white, sans-serif font. Below the globe, the tagline 'Insights into ice and climate' is written in a light blue, italicized font. The background is a light grey with faint yellow circular lines. In the top left corner is a red YouTube play button icon with the text '@DEEPICE Project' below it. In the top right corner is a QR code. In the bottom left corner is the European Union flag. In the bottom right corner is a smaller version of the DEEPICE MSCA ITN logo.

<https://deepice.cnrs.fr>

Contact us: [deepice@lsce.ipsl.fr](mailto:deepice@lsce.ipsl.fr)

✕ @deepice\_project

# Meet us

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**@EGU2024**

## **State-of-the-art in ice core sciences session**

- Orals: Wednesday 17 April, from 10:45am to 6pm, Room 0.49/50
- Poster: Thursday 18 April, 10:45am to 12:30pm, Hall X5

## **@Science is Wonderful Festival, Brussels, 24-25 April**

- The Antarctic lab, a trip back in time (Booth 13 – Thurs. & Fri.)
- « Rendez-vous en Antarctique » (Science show on Thurs. 9:15am)

## **@Etincelles du Palais de la Découverte, Paris, 4 May**

- Workshop « 1 chercheur, 1 manip » on ice cores

Only upon registration (opens 15 days in advance) here:

<https://billetterie.palais-decouverte.fr/>