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Newsletter 1
November 2021

DEEPICE Upcoming events

SAVE THE DATE!

17-18 March 2022, Copenhagen (Denmark)

DEEPICE 1st annual meeting & mid-term meeting

DEEPICE 1st annual meeting will take place on March, 17th 2022 at Niels Bohr Institute in Copenhagen.
Annual meetings enable DEEPICE participants to discuss the progress of the project and to interact with each other. They are also a platform for exchanges with the non-academic partners.

Participants: early-stage reasearchers, beneficiaries & partner organisations

DEEPICE Mid Term meeting will be organised on March, 18th 2022, also at Niels Bohr Institute in Copenhagen. This meeting will consist in a constructive dialogue between the network participants and the REA (Research Executive Agency) Project Officer. The scope of the meeting is to assess the fulfilment of all DEEPICE project's aspects (scientific, training, management, networking, etc.).

Participants: early-stage reasearchers, beneficiaries, partner organisations, REA Project officer.

More information about the meetings will be communicated by the beginning of 2022.

SAVE THE DATE!

20-26 March 2022
Finse (Norway)

DEEPICE Winter school on snow sciences

After attending ICAT (Ice Core Analysis Techniques) PhD School, DEEPICE students will head to Finse, Norway, to attend a winter school organised by the University of Bergen. This winter school will focus on snow-process sciences with theoretical and practical courses and exercises (Field campaign preparation, analysis of the snow pack, snow-Air exchange, field observations, water isotope measurements).

The school will also be open to external students (with a limited number of places) who are involved in ice core climate record interpretation. .

More information about the school and application procedure for external students can be found here.

DEEPICE Recent activities

DEEPICE Kick-off meeting in October 2021

DEEPICE Kick-off meeting took place in Gif-sur-Yvette (Paris Region, France) on the 14th of October 2021. This event was organised jointly with Beyond EPICA Science Consortia meeting, which also take place in Gif-sur-Yvette on the 12th and 13th of October 2021.

More than 60 scientists, early-career researchers and partners attended in-person the two meetings. This enabled the DEEPICE students to meet not only with their supervisors, co-supervisors and the whole DEEPICE network but also with other researchers from the ice core sciences community.

Courses on data management & ethics

After DEEPICE Kick-off meeting, 2 courses part of the DEEPICE training were organised for DEEPICE ESRs:

- 1 course on data management presenting open science principles and FAIR Data, as well as DEEPICE data management policy and Zenodo repository, by Julie Giovacchini (CNRS). Following this course, a short webinar on PANGAEA repository will be organised by the beginning of 2022.

- 1 course on the Antarctic Treaty and the ethical aspects related to field missions in Antarctica, by Anne Choquet (Institut Universitaire Européen de la Mer).

Updates on DEEPICE PhD projects

News from Geunwoo Lee (ESR 1)
PhD project: Geochemical characterisation of single dust particules in ice core

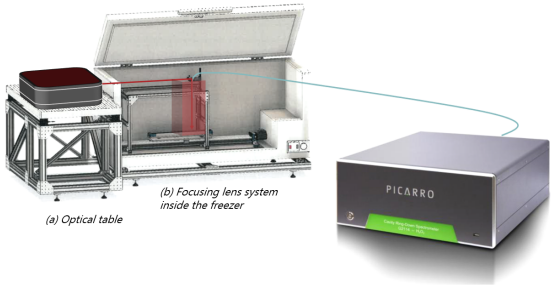
The clear objectives of my PhD research project, which started in August 2021, were established with personal career development plans, an exposé, and a Gantt chart. The first dataset was produced during the Greenland firn core CFA campaign. The dataset is going to be used to investigate anthropogenic effects on particles in ice cores. A desolvation unit will be installed in the current ICP-TOFMS system to improve its sensitivity. A secondment at TOFWERK, Thun is planned to start from the end of 2021, for a duration of 3 months.

News from Hanne Notø (ESR 2)
PhD project: Thermo-desorption PTR-MS for measuring organic compounds in deep ice

My project started in July 2021 and so far I have had some training in the lab and started working on developing and testing methods for analyzing organic compounds in ice cores. In July and August I learned my way around the lab and data processing procedures by measuring nanoplastics in ocean samples. My first secondment at TOFWERK was in November, where I began developing a method for analyzing organic compounds in ice cores. In the upcoming months I will continue with the optimization of the method and eventually I will measure organic compounds in snow and ice samples.

News from Eirini Malegiannaki (ESR 3)
PhD project: Laser ablation for water isotopic analysis with particular focus in spectral estimation for diffusion studies

During the first three months of my project, I worked on producing bubble-free artificial ice samples and focused on the laser ablation set up. The laser ablation on ice has two parts: (a) the optical table accommodates a High Energy Femtosecond laser operating at 1030 nm and the optics which guide the laser beam into (b) the focusing lens system, which is inside the freezer, up above a motorized stage where a tray, holding the ice sample, is mounted. Together with the people from the Electronics & Mechanics Workshop at the Niels Bohr Institute, we worked on the designing of an enclosure for the focusing system's optical elements which will be supplied with dry air flow during the experiments. The enclosure will be further developed with an adjustable tube which will guide the ablated material, mixed with the dry air, into the Cavity Ring Down Spectrometer for water isotope measurements. All the above set the scene for the first laser ablation experiments on ice and crater characterization, on our way to both understand the ablation mechanism and optimize the laser parameters in order to obtain efficient laser ablation sampling of ice.



Laser Ablation - CRDS system" or "Laser Ablation - Cavity Ring Down Spectroscopy system

News from Piers Larkman (ESR 4)
PhD project: Improvements and application of the laser techniques LA-ICP-MS for high

resolution non-destructive elemental analyses on ice cores

I started my work at Ca' Foscari University of Venice on the DEEPICE project on September 15th this year, arriving in Venice for the first time on October 1st. In the early stages of the project I have been understanding the scientific context of my work to help form a work plan to produce output that furthers the use of LA-ICP-MS in the context of ice core science. To lay the foundations of my future experiments, I have been working on a computational model which aims to predict empirical outputs of lab work that I will carry out in Venice and during my secondments.

News from Miguel Angel Sánchez Moreno (ESR 5)
PhD project: Developing an instrument to make continuous observations of the crystal size on a 1m polished surface of an ice core

I started my PhD project on the 1st of September 2021. During this first two months I have been learning about physics of ice and the state of the art in ice core science through a courses and workshops. During October, I visited the cold labs in AWI, Bremerhaven, to familiarize myself with the Microtome and Large Area Scanning Microscope (LASM) to set up a plan for the first lab work in early 2022. Until then, I will continue learning about ice properties and statistical methods to manage and analyze the LASM datasets.

News from Lison Soussaintjean (ESR 6)
PhD project: Quantification and correction of "in situ" production of N_2O in ice cores

I started to work on October 1st in the Climate and Environmental Physics division of the University of Bern, my PhD project consisting in understanding the processes of *in situ* production of nitrous oxide (N_2O) in ice cores. I have so far made a first literature review and I am writing a short report on the implications, research questions, and timeline of the project. The next step will be to prepare my secondment to the IGE-CNRS in Grenoble planned in May-June 2022 to analyze the isotopic composition of nitrate in dusty sections of Antarctic and Greenland ice cores from the last glacial period. The selected samples will first be analyzed in Bern for N_2O concentration and isotopic composition measurements.

News from Niklas Kappelt (ESR 8)
PhD project: ^{36}Cl in Antarctic ice cores - Developing a key dating tool and climate proxy

Since the start of my PhD in Lund in September, I participated to DEEPICE and Beyond EPICA meetings and attended a course about global elemental cycles and generally dived into literature by starting a book about radionuclides and reading articles about existing data and experiments concerning ^{36}Cl. I was also introduced to our laboratories and learned from a fellow PhD student how to prepare ice for ^{36}Cl measurements. With the finalisation of my personal carreer development plan I was also able to establish concrete research questions I would like to answer within my PhD studies.

News from Lisa Ardoin (ESR 9)
PhD project: Retrieval of the oldest paleoclimatic signal in basal ice, insights from a large-scale multi-parametric study

The start of my PhD project was driven by the reception of a new Gas Chromatographer (GC) that arrived at our lab on November 17th. So, during my first weeks I put effort in understanding the software to rule this instrument, to design a new extraction line and to optimize the data processing on the gas chromatographer that is already use in our lab. We build two new pumping stations and test it in order to assess a stable vacuum environment in our system for the arrival of the new GC. Now, we performed multiple measurements based on standard gas on our new instrument in order to estimate its detection limit and the reproducibility of the analyses.

News from Inès Ollivier (ESR 10)

PhD project: Interpretation of the water isotope climate signal on the east Antarctic plateau through continuous measurements of isotopic composition of water wapour, precipitation, surface snow and sub-surface snow

I have started my PhD project in early September and spent the first month on my academic secondment in LSCE, Paris. There, we prepared the upcoming field mission in Antarctica and for that I received a training on the instruments that will be deployed and maintained in the field, and we made some tests on them. I prepared my PhD plan for the University of Bergen and defined the research questions and tasks for the next year. The next upcoming activity is the 2-month field mission starting from November. I will be re-installing a water vapor analyzer and doing some snow sampling in Dome C in addition to some instrumental maintenance in Dumont d'Urville.

News from Romilly Harris-Stuart (ESR 11)

PhD project: Evolution of snow and air circulating in snow beyond the surface af Antarctic ice sheet

My project has a multitude of elements, with the goal of developing our understanding and modelling capability of gas trapping in the Antarctic firn during the transition into bubbly ice. This is of particular importance for accurately constructing a chronology of past atmospheres (gas age) compared to the local temperature chronology (ice age). For the first few weeks in November, I was able to go to Grenoble to have training in both the firn densification and Crocus models, which I will be working with a lot during the coming months. We will identify the influence of local insolation variability on surface snow metamorphism (Crocus model) and we then aim to parameterise this influence in the firn densification model.

News from Fyntan Shaw (ESR 12)

PhD project: Estimating and accounting for diffusion in deep ice using advanced statistical methods

I began working on my PhD project at AWI in Potsdam on the 15th of September 2021. I have spent the last two months developing my understanding of the diffusion process in ice and getting comfortable with spectral analysis in the programming language R. Currently I am studying a model for diffusion in the firn layer while continuing to improve my knowledge of spectral analysis and R. Over the next few months, I aim to modify this model to estimate the diffusion length in deep ice and apply it to some real data sets, perhaps some old Dome C data.

News from Qinggang Gao (ESR 13)

PhD project: Coupled atmosphere-ocean modelling: interpreting Antarctic deep ice Estimating and accounting for diffusion in deep ice using advanced statistical methods

I started my PhD study on 1 October at the British Antarctic Survey and the University of Cambridge, where I will investigate the water cycles, water tracers, and water isotopes in multiple climate models and observations. In the first month, I focused on literature review, attending courses and workshops, and discussion with my supervisors, then I got a brief overview of the research status, model limitations, available observations, and research challenges. Now I am clearer about the research objectives and plan with the great help of my supervisors.

News from Ailsa Chung (ESR 14)
PhD project: Combining an ice flow model with radar observations in the Dome C Area

The aim of my PhD is to use inverse methods to model the age of Antarctic ice around the Beyond EPICA Little Dome C drill site, and using radar observations to constrain it. I started my project in September by updating and improving the efficiency the existing 1D model and applying it with radar data which has already been processed. In December, I will on secondment to the British Antarctic Survey in order to select my own data from the Delores radar observations.

News from Daniel Gunning (ESR 15)
PhD project: Investigating the MPT from an Earth System perspective

I started my PhD in September and with the help of my supervisor I have been developing the plan for my project during the next 3 years. In addition, I have dedicated time to taking courses at the university to ground me in the subject area of paleoclimatology. The next steps will involve building a conceptual model to simulate the evolution of a northern and southern hemisphere ice sheets, driven by changes in sunlight intensity due to variations in the Earth's orbit around the Sun. This will test whether signals of ice sheet growth and melting can cancel out between the hemispheres and be concealed in ocean proxy records.

Recent communication & outreach activities

IPSL video about field missions in Antarctica featuring Inès Ollivier

Inès Ollivier has participated to a video made by IPSL (a French organisation of 9 laboratories conducting research in climate sciences, including LSCE).

This video was made to be understable by a lay audience and presents some of the field missions in Antarctica which involves the LSCE.

Inès Ollivier (ESR 10) will be in Antarctica for her PhD project from the beginning of December 2021 to January 2022.

Watch the video (in French) here.

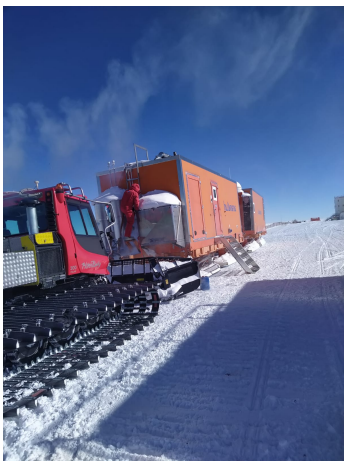
Other news from the community

Beyond EPICA: beginning of the 2021/22 field season!

After a field camp at Little Dome C was established during the 2019-20 season and the materials and equipment transported from Europe to Antarctica, the field season 2021-22 (November 2021-to-January 2022) started.

The Project Coordinator, Carlo Barbante, will participate in field activities this time with a team of 12 people aiming to finalize camp installation, set-up and preparation of the drilling area, along with drilling of the pilot hole, reaming of the hole and installation of the casing. The complete drill system is planned to be installed and tested towards the end of the season. The temporary storage cave at Little Dome C Camp is also planned to be completed during this field season.

Check out the weekly reports on Beyond EPICA website.



Credits: Panichi © PNRA/IPEV

Firn air pumping campaign at Concordia

Roxanne Jacob from LSCE is currently in Antarctica to set up a firn air pumping campaign with the support of Gregory Teste, Philippe Possenti and IPEV.

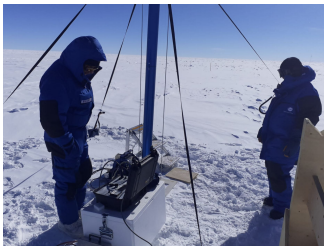
In the context of this campaign, firn air will be pumped for analyses of air isotopic and elemental composition in the open porosity in order to better understand and characterize thermal effect and close-off processes on the elemental and isotopic composition of the air.

This year, Roxanne will install an air pumping system at Concordia. It will pump air for a whole year on the top 20 m of the firn. To do so, 2 drillings will be realised and equipped with 3 tubes at different depth levels to pump the air in the firn (firn air will be pumped for analyses over 6 different depth levels: 3, 6, 9, 12, 15 and 18 m). In total, 1 sample per depth will be collected every 3 months during the whole year.

The 2 holes have already been drilled and the system is currently being installed before the samples collection.

In addition to this campaign, two firn air campaigns at D47 and LDC down to 100 m depth will take place in the season 2022-2023 with support of the ICORDA and KATABATIC project.

The data collected will be used and analysed by Romilly Harris-Stuart (ESR 11) whose PhD project focuses on the evolution of snow and air circulating in snow beyond the surface af Antarctic ice sheet.



Credits: Roxanne Jacob

ICYS online seminar series

The Ice Core Young Scientists ICYS want to bring your attention to the ongoing seminar series we have been hosting. The series was set up to provide a link between senior researchers and early-career researchers (ECRs) within the ice core community. ICYS is supported by the International Partnerships in Ice Core Sciences (IPICS) and organised by an ever-expanding group of ECRs, who are always keen for new members to help with planning and hosting seminars.

Please feel free to send an email to icecoreys@gmail.com if you are interested in joining the group. Moreover, if you or someone you know is interested in sharing new findings or wants to communicate their work to the ice core community, do not hesitate to email as we have availability for seminar speakers in the coming months.

More information can be found at the link below.

https://pastglobalchanges.org/science/end-aff/icys/seminar-series

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