

## Practical Information

### When:

2. 3. – 8. 3. 2025

### Where:

Hvanneyri, Iceland

### Costs:

Board and lodging ~ 710 €

Travel expenses – flight ticket

Insurance

Applicants can apply for Erasmus+

### Participants:

16 students:

### Lecturers:

Experts in polar and mountain regions

- Roman Juras
- Pavla Waldhauserová
- Leena Leppänen
- Ali Nadir Arslan
- Outi Meinander
- Jan Komárek
- Ingibjörg Jónsdóttir
- David Finger
- Daniele Stefano
- Maria Svavarsdóttir
- Vojtěch Moravec

### Applications deadline:

07. 02. 2025

Contact the organisers:

Roman Juras - [juras@fzp.czu.cz](mailto:juras@fzp.czu.cz)

Lukáš Pospíšil - [lukas@lbhi.is](mailto:lukas@lbhi.is) (Erasmus)

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For details visit the [web](#)



# POLAR WINTER SCHOOL

## About winter school

The Polar Winter School, set against the stunning backdrop of Hvanneyri, Iceland, offers an exceptional educational experience focused on the critical study of polar regions, which are currently facing dramatic changes due to climate change. This initiative, running from March 2nd to March 8th, 2025, aims to equip international university students with the knowledge and skills necessary to contribute to ongoing research efforts in these fragile environments.

### Why Study Polar Regions?

The Arctic, a focal point of global climate change research, is experiencing rapid environmental transformations that have far-reaching impacts on global climate systems, ecosystems, and human societies. These changes include melting glaciers, shrinking sea ice, altered ecosystems, and increasing air and ocean temperatures, all of which underscore the urgent need for comprehensive research and informed action.

### Learning Objectives of the Winter School

The Polar Winter School seizes the unique scientific infrastructure and natural environment of Svalbard to provide hands-on training in various disciplines related to climate change. The program is designed to foster the next generation of scientists equipped to tackle the challenges posed by these changes. Through thematic lectures, fieldwork, and practical training sessions, students will delve into critical topics such as air pollution, snow hydrology and physics, avalanche safety, and glaciology. These areas are pivotal for understanding the complex interactions and feedback mechanisms driving the Arctic's transformation.

## Collaborative Network

The Winter School is supported by a network of prestigious partners, including the

- [Agricultural University of Iceland](#) - Hvanneyri,
- [Faculty of Environmental Sciences](#) - CZU, Prague,
- [Reykjavik University](#), Reykjavik
- [University of Vaasa](#), Vaasa
- [Finnish Meteorological Institute](#), Helsinki
- [UArctic Thematic Networks on High Latitude Dust \(HLD\)](#),
- [Nordic Snow Network](#),
- [Summit Trade](#).

This collaboration ensures a rich educational experience, combining resources and expertise from across the scientific community.

## Thematic lectures & Training

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### Air pollution

Arctic air pollution comes from both natural and anthropogenic sources having direct and indirect impacts on climate. Dust can cover snow and glaciers and thus causes lowering of albedo and fasten melt. In situ measurements of aerosol in Iceland will allow the students to identify the particle types, sizes and concentrations. Gathered data will be analyzed and online models/remote sensing products will be used to determine the origin (sources) and long-range transport of the particulates in the Arctic. Models can be also verified comparing obtained in situ data with the available forecasts. Students will also analyze how air pollution can affect snow properties and glacier dynamics.

### Snow properties

Snow forms a very important part of the hydrological cycle and is also an important abiotic factor influencing energy flows in nature. Especially in the Arctic, snow is a key factor for all ecosystems, influencing river flows, groundwater supplies and dynamics of glaciers. Nowadays, less snow precipitation can be observed during the season and changing climate significantly affects the snow properties as well.

Snow supplies can significantly influence whether there is sufficient water or a drought in the summer. Snow microstructure and layering are important for interpretation of remote sensing observations as well as for avalanche safety. In addition, thick ice layers in the snowpack originating from rain-on-snow events, whose number is increasing in a warming climate, are crucial for herbivores preventing access to the food. Last but not least, the presence of snow is an important economic aspect, as many industries and sports are linked to it. Students in the course will learn how to measure basic snow properties, analyse them and understand the context with other disciplines, such as air pollution, glaciology, avalanche activity and ecological links between organisms. To be more specific, students will learn how to read snow profiles, analyse snow crystals, effect of terrain on snow properties and many more.

### Remote sensing

Remote sensing, particularly using drones, is a valuable tool for mapping snow and ice in polar regions. Drones can provide high-resolution imagery and data that can be used to monitor changes in ice cover, snow depth, and glacier movement. This information is crucial for understanding climate change, predicting sea-level rise, and supporting sustainable resource management in these fragile ecosystems. The lecture and fieldwork cover drone hardware and software introduction, flight mission planning, field data acquisition and its processing, focusing on microtopographical modelling.

### Snow hydrology and landscape

The current Landscape Architecture framework aims to recognize natural and cultural values in contemporary landscapes. Energy infrastructure must also be considered a necessary part of people's lives in an area. In this sense, integrating models and approaches among different disciplines allows a better integration of these structures within the landscapes in which they are embedded without fragmenting their systems. The case study of Andakill, a protected habitat near the AUI campus in Hvanneyri, is a cornerstone of educational and research activities. Recognized for its exceptional ecological value, Andakill's pristine landscapes are home to historic landmarks immortalized in Icelandic sagas and abundant renewable energy resources. This unique setting offers students opportunities to explore sustainable energy development while appreciating the interplay between nature and culture.

