



Graduate summer course

Greenhouse gas exchange across the sub-Arctic; simultaneous hands-on measurements and scaling at different sites

5 ECTS – 28 May-28 June 2024

The course introduces the concepts of scaling point measurements of GHG gas exchange to local scale using Remote Sensing with drones (UAV) for mapping. One of the aims of this course is to reduce teacher and student travel by air and use present days methods for joint teaching and joint data analysis between groups doing similar measurements at three different field locations, using file-sharing, on-line cooperation, and Jupyter Notebooks as virtual research environment (VRE). Therefore, participants are expected to use trains or buses, where possible, to get to the teaching campus and from there to the field site. The course includes an intensive field week from 10-14 June that will simultaneously take place at:

i) Stordalen, Abisko in Sweden, ii) Oulanka, Finland and iii) Laekur, W-Iceland. Those three sites have ongoing large-scale measurements of GHG exchange with eddy covariance technique and chamber measurements will be used during the week.

WHO CAN APPLY

Both advanced master level- and PhD students in Earth System sciences are invited to apply.

CREDITS and organizers

5 ECTS corresponding to three full working weeks. The course is part of the ABS project We belong funded by NordPlus higher Education (NPHE-2022/10074), and also supported by NOVA and EU project Greenfeedback

HOW TO APPLY

Apply for the course by filling out a short survey, including a motivation note at

<https://survey.mailing.lu.se/CourseApplyWB24>

Participation is limited to 3x7 students, assigned after selection.

APPLY BEFORE March 3, 2024!

The course deals with the processes that control states and flows of mass and energy between soil and vegetation and atmosphere in general and the exchange of Greenhouse Gases (GHG) in particular. The emphasis lies on interpretation of different measurement techniques and how the measurements can be scaled from point and local measurements to the large scale of land cover. Besides the above topic, practical skills trained in this course are data analysis with Jupyter Notebooks as VRE (virtual research environment).

Course schedule

The course is divided into three periods:

- 1) On-line introductory period is from 28th of May until 7th of June 2024 with lectures, discussion forums and exercises. The student workload will be ca. 4 working days.
- 2) The second period is the intensive fieldwork at one of the three locations during 10 to 14 of June. Travel to and from the field sites will be on 9th and 15th of June. The student workload will be 5-7 whole working days during this period.
- 3) The final period, again on-line, is from 24 to 28th of June with hands-on training, joint data analysis and reporting. The student workload will be 5 working days during this period.

Note: you will visit only one of the three measurement sites. The course will cover in principle costs for travel to the field site from the main campus within each country (Hvanneyri, Lund and Oulu), as well as the lodging during the intensive field week. It will be possible to apply for additional funding of travel costs if you have specific reasons that requires more travel (e.g. Iceland).

Application

The course has a maximum of 21 participants, distributed over the three field locations and a selection procedure will be applied if needed. Selection of students will be based on relevance, balanced geographical and gender distribution, and the need for long additional travel to the field site and home university being affiliated to partner institutions of the funding bodies of this course.

To apply for the course, use the form at: <https://survey.mailing.lu.se/CourseApplyWB24>

Prepare before filling out the form a short motivation why this course is important for you.

Deadline for the application is Sunday 3rd of March 2024.

Organisation and funding

The course is part of the ABS Nordic network (<https://www.atm.helsinki.fi/abs/>) project “*We belong - contributing to a sustainable development of international education*”, funded by NordPlus higher Education (NPHE-2022/10074), and the EU project Greenfeedback (*Greenhouse Gas Fluxes and Earth System Feedbacks*, EU HORIZON-RIA). The course is also supported by NOVA - The Nordic Forestry, Veterinary and Agricultural University Network, through Agricultural University of Iceland.

Course coordination:

The course is a free-standing graduate course at Lund University and Aarhus University and formally registered at the University of Oulu (course: NP00AS42), Agricultural University of Iceland (course: 08.36.02).

Course coordinators are:

Harry Lankreijer - Lund University (LU); Department of Physical Geography and Ecosystem science (Harry.Lankreijer@nateko.lu.se). **Bjarni D. Sigurdsson**- The Agricultural University of Iceland (AUI) Faculty of Environmental & Forest sciences (bjarni@lbhi.is)

Jussi Malila - University of Oulu (UO), Faculty of Science (jussi.malila@oulu.fi). **Lise-Lotte Sørensen** - Aarhus University (AU); Department of Environmental Science - Atmospheric Measurements (lls@envs.au.dk).