

# INAR

INSTITUTE FOR ATMOSPHERIC AND  
EARTH SYSTEM RESEARCH

# Science-oriented university education at INAR

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## Outline

- Programme level
- Course level
- Online education

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## MSc in atmospheric sciences

Physical Sciences

Chemistry

Forest Sciences

Environmental  
Sciences

Geosciences

Science Teacher



BSc programmes  
3 years, 180 ECTS

Other BSc  
programmes in UH,  
Finland and abroad:  
annual call in  
December-January

Master's programme in atmospheric sciences  
2 years, 120 ECTS

6 study tracks

Aerosol Physics

Atmospheric  
Chemistry and  
Analysis

Biogeochemical  
Cycles

Geophysics of  
the  
Hydrosphere

Remote Sensing

Meteorology

PhD programs (~50%), research & development and expert tasks (~50%)

The only degree  
programme in Finland  
giving the meteorologist  
qualification

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## PhD (Science / Agric. and For.)



Master's programme in  
atmospheric sciences

Other Master's programmes:  
Forest Sciences, Geology and  
geophysics, Theoretical and  
computational methods, Data science...

4 application periods per year for  
students with contact to a supervisor

Doctoral programme in  
atmospheric sciences

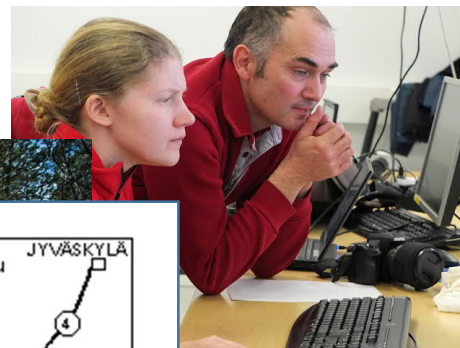
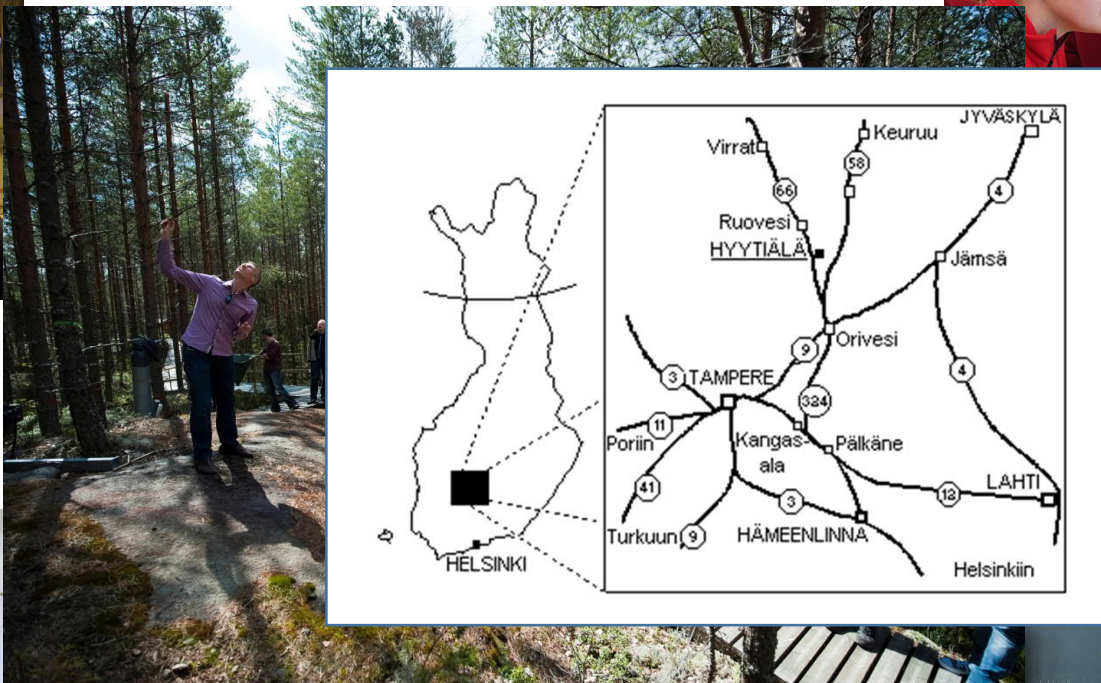
Other Universities in  
Finland and abroad

Annual call for letters of intent  
for students to get in contact  
with a supervisor

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## Intensive research-oriented courses



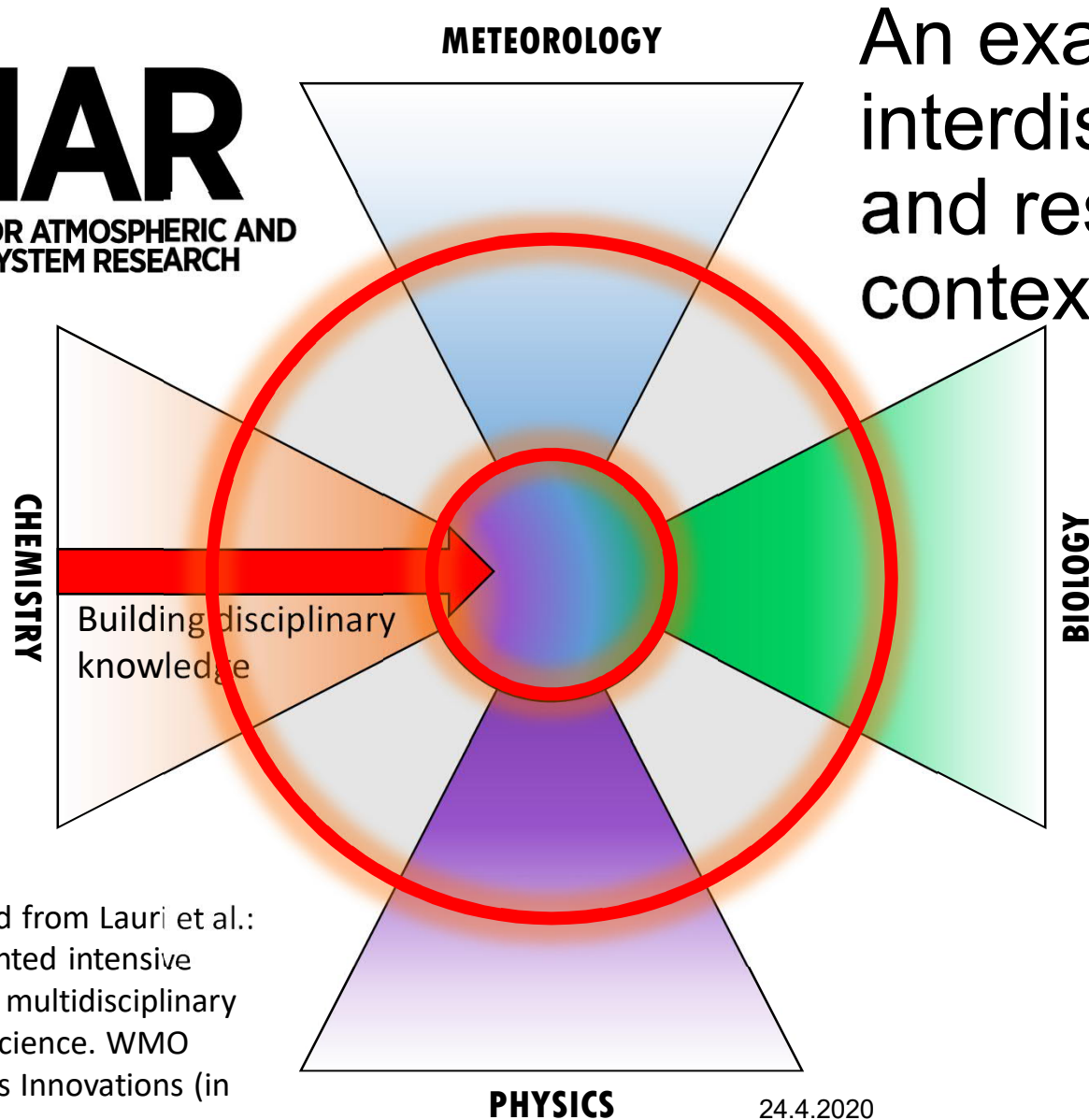
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## Learning on an intensive course

- Hyytiälä winter/autumn school (twice per year)
  - (Advanced) Analysis of Atmosphere-surface Interactions and Feedbacks
- 2017 winter school: a pre-course and an after-course survey to find out about students' assessment of their learning
  - Ruuskanen et al.: An Exploratory Study of the Learning of Transferable Skills in a Research-Oriented Intensive Course in Atmospheric Sciences. Sustainability 10:1385 (2018).
- Conclusions:
  - Students enjoyed multidisciplinary environment for learning
  - Students felt that they had learnt important skills during the course, most importantly data analysis
  - Real scientific questions and use of real data motivated the students a lot
- Note: there are several other research-oriented intensive courses available at INAR and by PEEEX
  - See <https://www.atm.helsinki.fi/peex/index.php/education>



## An example of interdisciplinary learning and research in a course context

- Building disciplinary knowledge by relying on what is learnt earlier (each triangle)
- Peer and horizontal learning between students and teacher(s) (outer circle)
- Building new knowledge requiring interdisciplinary approach (inner circle)

Figure adopted from Lauri et al.:  
Research-oriented intensive  
courses foster multidisciplinary  
atmospheric science. WMO  
Global Campus Innovations (in  
press)

## Online education MOOCs

- All disciplines needed to solve grand challenges
- Massive Open Online Courses (MOOC) provide an accessible tool for the international audience
- E.g. Lehtonen et al., 2018: A pedagogy of interconnectedness for encountering climate change as a wicked sustainability problem, *Journal of Cleaner Production*, 199, 860-867



# Online education MOOCs

- New Massive Open Online Courses (MOOC)
  - Climate.now (since 2016)
  - Leadership for Sustainable Change (since 2018)
  - Circular economy now (since 2018)
- All material **freely available**, also for teachers all over the world
- ECTS credits given only for those who participate the U. Helsinki course, others get a certificate
- Nordic funding for three additional courses 2019-2021
  - Climate change in the Arctic
  - Air quality in a changing world
  - Statistical tools for climate science

Online education  
MOOCs

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SUSTAINABLE CHANGE

