



# Studying Atmospheric and Cryospheric Sciences at Innsbruck

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In the center of Europe . . .



... at the heart of the Alps ...



... embedded in mountains ...



## . . . is THE place to study the atmosphere and cryosphere

- ▶ research-driven
- ▶ solid foundation in mathematics, physics, coding and data handling
- ▶ solid foundation in what drives weather, climate and the cryosphere
- ▶ become familiar with the tools to study the atmosphere and cryosphere: measurement platforms, numerical models, machine learning models, analytical methods
- ▶ globally unique combination of atmospheric and cryospheric science and focus on mountains
- ▶ English language: in PhD; in Master's; in all atmos courses in Bachelor
- ▶ international mix of students
- ▶ emphasis on sharing our results – open source software packages; open research data; collaboration with other institutions; public outreach

# Who we are

- ▶ ACINN - Institute of Atmospheric and Cryospheric Sciences at the University of Innsbruck [linkACINN](#)
- ▶ part of university wide research centers on Mountain Regions, and Scientific Computing, and at the core of the Climate-Cryosphere and Atmosphere research center
- ▶ ~ 50 staff
- ▶ 4 research groups
  - ▶ Atmospheric Dynamics
  - ▶ Atmospheric Turbulence first intl. conference on turbulence in Innsbruck - 100 ago
  - ▶ Atmospheric Physics and Chemistry
  - ▶ Ice and Climate one of the longest glacier mass balance series worldwide
- ▶ 4 study programs

# What we teach

- ▶ BSc in Atmospheric Sciences [linkUni](#) [linkACINN](#)
- ▶ MSc in Atmospheric and Cryospheric Sciences [linkUni](#) [linkACINN](#)
- ▶ MSc in Environmental Meteorology [linkTrento](#)
- ▶ PhD in Atmospheric Sciences [linkUni](#) [linkACINN](#)

# Bachelor in Atmospheric Sciences

- ▶ 3-year program – 30-50 new students annually
- ▶ great foundation: physics and math (new language for later self-study)
- ▶ core topics (atmosphere, climate and climate change) plus large freedom to tailor to you own interests (e.g. data science, machine learning)
- ▶ one of the only places to teach traditional and modern weather analysis and forecasting
- ▶ strong focus on data handling and coding skills -> employable outside the field
- ▶ become immersed in the language of science: English (all courses taught by our department)



# What you need to study in our Bachelor program

- ▶ enjoying to solve puzzles, to observe
- ▶ analytical thinking
- ▶ not shy of mathematics and physics - rather enjoying it
- ▶ high school diploma
- ▶ application by beginning of September, see [details](#)
- ▶ [details](#) of admission procedure

# Masters in Atmospheric and Cryospheric Sciences

- ▶ 2-year program – 15-20 new students per year with a wide range of backgrounds
- ▶ globally unique combination
- ▶ core subjects about atmosphere, climate, climate change, and cryosphere
- ▶ in English -> international mix of students with different backgrounds also in the fields of their bachelors
- ▶ international cohort
- ▶ strong focus on data handling and coding skills -> employable outside the field
- ▶ closely related to ongoing research in the groups
- ▶ opportunities to participate in field measurement campaigns and work in research and teaching assistant jobs
- ▶ thesis takes at least 6 months full time and is typically embedded in ongoing research activities

# What you need for our Master's Atmos/Cryo program

- ▶ any Bachelor degree with at least
  - ▶ 20 ECTS in mathematics
  - ▶ 12 ECTS in physics and/or chemistry
  - ▶ 2 ECTS in coding/computer science
- ▶ complete diploma documents for application
- ▶ application must be completed before the end of the first month of the semester
- ▶ **details** of admission procedure

# Master's in Environmental Meteorology

- ▶ 2-year program – 15-20 new students per year
- ▶ one of the few such programs globally
- ▶ focus on the environmental implications of atmospheric processes, e.g. air pollution, hydrology, risk assessment
- ▶ joint program (with double degree) between Universities of Trento (Italy) and Innsbruck
- ▶ international cohort (majority from Italy)
- ▶ first year in Trento, third semester in Innsbruck, thesis either in Trento or Innsbruck

# What you need for the Environmental Meteorology Master's

- ▶ apply at Trento within 2 time windows [linkTrento](#)
- ▶ Bachelor with at least 24 ECTS in mathematics/statistics; 24 in physics/engineering/earth sciences; 6 ECTS in chemistry
- ▶ statement of purpose
- ▶ pass an admission interview
- ▶ tuition (scholarships available)
- ▶ [details](#) of admission procedure

# PhD in Atmospheric Sciences

- ▶  $\geq$  3-year program – a handful new students per year
- ▶ closely interwoven with the current research topics at our institute in the fields of atmospheric dynamics/physics/chemistry/turbulence, ice & climate
- ▶ part of ongoing research projects
- ▶ mentoring by people from Innsbruck and external expert advisors

# What you need for the PhD in Atmospheric Sciences

- ▶ Master's degree in a related field
- ▶ being exceptionally independent, creative and persevering in their work and research
- ▶ a job as doctoral researcher in a funded project of one of the 4 research groups (30 hours paid by project; remaining hours self-funded for PhD)
- ▶ winning the competitive application process for one of these jobs
- ▶ application at the time of these job openings (i.e. not confined to semesters)

# International connections

- ▶ ERASMUS – a semester abroad (BSc, MSc) at Bergen, Berlin, Wageningen, Grenoble
- ▶ Trento (joint Masters)
- ▶ many universities and research centers (MSc, PhD)



# Measurement tool “box”

- ▶ Innsbruck Atmospheric Observatory IAO – high speed mass spectrometer plus other air chemistry sensors)
- ▶ I-Box – several turbulence measurement in complex topography in the Alps
- ▶ micrometeorology forest tower
- ▶ Hintereisferner: glacier monitoring lab with laser scanner
- ▶ remote sensors: several wind lidars, temperature-humidity profiler, ice radar
- ▶ in-situ: radio sonde, weather stations, mobile air quality measurement platforms, glacier mass balance tools

# Simulation tool box

- ▶ WRF and COSMO models for process simulations down to decameter meshes
- ▶ COSMO climate simulations down to 1 km mesh
- ▶ machine learning packages
- ▶ access to operational high-res forecasts from COSMO and ECMWF
- ▶ OGGM open global glacier model ACINN plays central role in its development

# What you will get at Innsbruck

- ▶ research-driven education
- ▶ solid foundation in mathematics, physics, coding and data handling
- ▶ solid foundation in what drives weather, climate and the cryosphere
- ▶ familiarity with the tools to study the atmosphere and cryosphere: measurement platforms, numerical models, machine learning models, analytical methods
- ▶ globally unique combination of atmospheric and cryospheric science and focus on mountains
- ▶ training in English language: in PhD; in Master's; in all atmos courses in Bachelor
- ▶ a wide network from the international mix of students
- ▶ emphasis on sharing our results – open source software packages; open research data; collaboration with other institutions; public outreach

# Want a visual impression?

Visit pages at our [website](#)  
or come see our place in person!

