Master of Science in Meteorology

Institute of Meteorology and Climate Research
The Institute of Meteorology and Climate Research (IMK) at the Karlsruhe Institute of Technology (KIT) is a dynamic institution with an excellent reputation for world-class research and high-quality education. The two-year MSc programme in Meteorology covers the whole breadth of atmospheric sciences from small-scale processes in clouds to long-term climate change, providing an excellent education closely aligned with the rich research portfolio of the institute.

And in Germany, this education comes at a very low tuition, particularly for students from the EU! In this programme you’ll learn in many different ways – through lectures, paper- or computer-based exercises, practical classes in the field and lab, team activities with fellow students and in your one-year independent research project. For example, one of the practical classes allows you to conduct your own experiments with one of the largest cloud chambers worldwide. Many of our students also work as paid research assistants, bringing them even closer to the multi-faceted research activities at IMK.

At KIT you will be taught by leading experts in the field of meteorology. Being one of the largest institutions for atmospheric research in Germany, we are in the unique situation of offering a wide spectrum of topics, each taught by an active researcher in the respective area. This is possible due to the fact that KIT is at the same time a classical federal state university and a research centre funded by the German government in the framework of the Helmholtz Association.

The Atmospheric Science programme of KIT was recently reviewed as “outstanding” by a team of international experts. Professor Corinna Hoose, for example, has been awarded a prestigious Consolidator Grant from the European Research Council for her work on microphysical processes in clouds. Professor Joaquim Pinto joined IMK in 2016 as an AXA Research Fund Chair awarded due to the relevance of our work to the insurance industry. My own research takes me to Africa where we investigate the important West African monsoon system. This includes field work, too, often involving students from the MSc Meteorology programme.

Karlsruhe is a great place to live and study. With more than 300,000 inhabitants Karlsruhe offers all cultural benefits of a city but is small enough to get everywhere by bicycle. Situated in the Upper Rhine valley, Karlsruhe is one of the sunniest and warmest places in Germany. The nearby Black and Palatinate Forests offer great daytrips for walking, cycling, skiing – and for observing the weather! Or visit the beautiful French Alsace region just across the river! Even if you cannot speak German, living in this international, welcoming and open-minded city should be no problem!

Come and join us!

Professor Peter Knippertz
Director, MSc Programme in Meteorology
After finishing my BSc degree in environmental science in Tübingen, I wanted to specialize in Atmospheric Physics. A perfect opportunity to do this was the Master programme in Meteorology at the KIT in Karlsruhe, with a wide range of courses on theoretical, applied and experimental topics as well as small classes providing close contact to professors and other scientists.

Niklas Wittkamp (MSc Student)

Application

**German applicants**
Submit your application at https://www.sle.kit.edu/vorstudium/bewerbung.php

Applications are processed by departmental commission only (typical duration 2 weeks).

**Applicants from the EU/EEA**
Submit your application at http://www.intl.kit.edu/istudies.

Applications are processed by International Student Office (IStO) and by departmental commission (typical duration 4–5 weeks).

**Applicants from non-EU/EEA countries**
Submit your application at http://www.intl.kit.edu/istudies.

Applications are processed by International Student Office (IStO) and by departmental commission (typical duration 4–5 weeks).

Please check visa regulations and keep in mind that obtaining a visa may take six to eight weeks. Note that tuition fees incur for this group.

Master of Science in Meteorology – The Degree Programme

Our two-year MSc degree programme contains 120 ECTS points distributed equally over four semesters. The first year consists of lectures, exercises and practicals (compulsory and elective) followed by an individual research project in Year 2.

**Components of the Climate System**
Lectures, course work, computer and modelling classes on individual components of the climate system (e.g. tropics, polar regions, ocean, middle atmosphere) and on climate dynamics and change.

**Atmospheric Processes**
Lectures and course work on cloud physics, radiation, aerosols, chemistry and energetics of the atmosphere.

**Experimental Meteorology**
Lectures and course work on individual measurement platforms (e.g. satellite, radar, lidar), advanced practical courses (cloud and aerosol chamber, remote sensing, surface energy balance, instrumented gliders) and a one-week excursion to observatories and labs.

**Specialization Phase**
Individually develop a chosen topic from the rich research portfolio of IMK into a full scientific concept (literature search, data acquisition, research strategy, data analysis).

**Master’s Thesis**
Building on the results from the Specialization Phase, further advance your own research project to finally write your Master’s Thesis.

**Elective 1**
Generic competences such as scientific writing, presentation, time management or languages (including a free German course).

**Elective 2**
Courses from other natural science or engineering disciplines (e.g. water sciences, geophysics).

**30 ECTS**
Lectures, course work, computer and modelling classes on numerical weather prediction, air pollution, meteorological hazards, energy meteorology and data analysis.

**30 ECTS**
Lectures and course work on individual measurement platforms (e.g. satellite, radar, lidar), advanced practical courses (cloud and aerosol chamber, remote sensing, surface energy balance, instrumented gliders) and a one-week excursion to observatories and labs.

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For more information check the Degree Programme section at our webpage http://www.imk-tro.kit.edu/english.
Our MSc graduates in Meteorology have a high level of employability across a wide spectrum of interesting and challenging jobs.

These include:

- Stay in research and become a PhD student, here at KIT or elsewhere. This is the next key step towards a career in academia.
- Research and development at public weather services or private weather companies
- Environmental consulting firms (e.g. building aerodynamics, air quality, wind park siting)
- Insurance sector (e.g. risk analysis, catastrophe modelling)
- Renewable energy sector (e.g. photovoltaic yield forecasting)
- Climate services, i.e. advising policymakers, businesses or the general public on climate change
- Data science

»Doing my PhD at the IMK-TRO institute, in the context of the transregional project “Waves to Weather”, has been an amazing opportunity for me to pursue a career in meteorology. The working environment here is very nice and diverse and every day I learn something new. The quality of teaching and research at German universities is definitely top-notch!«

Enrico Di Muzio (PhD researcher in Atmospheric Dynamics, Italy)
IMK consists of four different Departments, all involved to varying degrees in student education. The oldest, the Department for Troposphere Research (TRO), is located at both Campuses and contributes most to the Meteorology programmes. It operates the extensive mobile KITcube facility to measure atmospheric parameters in and above the boundary layer (see top right). KITcube has been used in international field campaigns in Arizona, Corsica, Israel and tropical Africa, often involving student research assistants from our MSc programme. TRO is also active in model development in close collaboration with the German Weather Service (DWD).

Two other IMK Departments are located at Campus North: The one for Atmospheric Trace Gases and Remote Sensing (ASF) investigates the complex links and feedbacks between climate change, natural variability, dynamics and transport, and atmospheric chemistry. Accurate measurements of atmospheric trace gases from various observational platforms (including satellites) provide the data required for modelling. The Department for Atmospheric Aerosol Research (AAF) focuses on the role of aerosols in the climate system, the hydrological cycle and the environment. AAF operates the renowned AIDA aerosol and cloud simulation chamber (see right), participates in field campaigns and performs numerical modelling experiments.

The fourth IMK Department for Atmospheric Environmental Research (IFU) is curiously located in Garmisch-Partenkirchen, at the foot of Germany’s highest mountain Zugspitze. Amongst many other topics, IFU conducts research on land-atmosphere exchanges, urban meteorology and renewable energy.

Students benefit from this rich research environment in many ways. The whole breadth of atmospheric sciences from small-scale processes in clouds to long-term climate change is taught by leading experts in their field. The MSc programme includes one year of free research, with students enjoying the freedom to choose their topic and supervisors from many different working groups. Many of our students also work as paid research and teaching assistants on a day-to-day basis or during specific field or lab campaigns.
There is nothing better than going to work at the IMK knowing that your job is what you wanted to do, with a beautiful atmosphere given by the colleagues you’re working with. Here in Karlsruhe I found kind of a second family.

Olimpia Bruno (PhD researcher in Cloud Physics, Italy)