The Institute for Energy and Climate Research, Troposphere (IEK-8), investigates the chemical and physical processes in the troposphere that impact the chemical composition of the atmosphere.

The German Federal Ministry of Transport and Digital Infrastructure (BMVI) supports the air quality related project ‘MesSBAR’, which develops and validates atmospheric pollutant measurements installed on highly automated unmanned aerial vehicles (UAV). The measured 4D-data of meteorological parameters and atmospheric aerosols, soot, NOx and O3 in polluted areas will be coupled to the EURAD-IM (European Air pollution Dispersion-Inverse Model, http://www.eurad.uni-koeln.de ) chemistry transport model for air quality forecasting and analyses.

Numerical air quality forecasts and analyses describe an initial and boundary value problem. 4D-var (four dimensional variational) data assimilation faces the challenge to optimize these values. However, the source of information is restricted to available observations. Especially in-situ measurements are mainly available as ground-based observations or they are installed on large flying platforms, such as air crafts or balloons. The application of UAV and swarms of drones for atmospheric measurements provides a novel, flexible, ad hoc applicable and individually controllable possibility to obtain detailed information on air pollution characteristics and their dispersion.

We are offering a

**2020D-024 - PhD position – Regional air quality assimilation of data monitored by unmanned aerial vehicles**

**Your Job:**
- Adaption of the EURAD-IM code for the assimilation of drone-based observations
- Highly resolved air quality forecasts and their evaluation related to consulting
measurement flight planning
• Drone campaign supporting simulations
• Implementation of an alert tool for air pollution threshold exceedance
• 4D-var analyses of drone campaigns using ground, drone and satellite based observations
• Investigation of the optimization potential of emission sources, their patterns and temporal variations
• Quantification of uncertainties, benefits and limitations of all data, methods and developments

Your Profile:
• M. Sc. degree in physics, mathematics, meteorology, or a related field with good final grade (German system equivalent 2.0 or better)
• Good knowledge in software development using FORTRAN90 and data processing and visualization with Python
• Strong interest in atmospheric physics and chemistry
• Excellent knowledge of written and oral German and English
• Outstanding organizational skills and the ability to work independently
• Very good cooperation and communication skills and ability to work as part of a team in an international and interdisciplinary environment

Of great advantage are:
• Experiences in numerical modelling
• Experiences on high performance computing (HPC)

Our Offer:
• Cooperation between IEK-8 and other partners outside the research centre provides an ideal fundament to combine competences across different disciplines (meteorology, environmental science, high performance computing, software development and data science
• An exciting, inter-disciplinary team at one of Europe’s largest research establishments
• Excellent scientific environment and technical facilitie – ideal conditions for successfully completing a doctoral degree
• Continuous scientific mentoring by your scientific advisor
• Further development of your personal strengths, e.g. via a comprehensive further training programme
• A 3 year contract with pay in line with 67.5 % of pay group 13 of the Collective Agreement for the Public Service (TVöD-Bund).
• Information on employment as a PhD student at Forschungszentrum Jülich can be found here http://www.fz-juelich.de/gp/Careers_Docs

Forschungszentrum Jülich promotes equal opportunities and diversity in its employment relations.

We also welcome applications from disabled persons.