
Department of Atmospheric Physics

Atmospheric physics, cloud and rain physics, atmospheric chemistry

Meteorology, thermodynamics, weather forecasting

Climate

Turbulence, deterministic chaos

Numerical modelling, climate modelling, air pollution modelling

Offer

We offer our experience, knowledge and advanced modeling techniques to suggest solutions to current problems in environmental physics focusing especially on atmospheric phenomena. In particular:

- Atmospheric thermodynamics, hydrodynamics, general fluid dynamics and circulation
- Synoptic meteorology, weather forecasting and numerical weather prediction
- Air quality, atmospheric chemistry, dispersion and transformation of air-pollution, modeling of air-pollution transport
- Climate system, modeling of climate, climate changes and evaluation of future development
- Middle atmospheric dynamics, ozone chemistry, gravity and planetary waves analysis
- Deterministic chaos and nonlinear processes in the atmosphere
- Atmospheric optics, acoustics, electricity, radiative processes, and cloud and precipitation physics

Expertise

- Atmospheric thermodynamics, hydrodynamics, general fluid dynamics and circulation
- Synoptic meteorology, weather forecasting and numerical weather prediction
- Air quality, atmospheric chemistry, dispersion and transformation of air-pollution, modeling of air-pollution transport
- Climate system, modeling of climate, climate changes and evaluation of future development
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Research Areas & Excellence

Systematic development of scholarship and science in the field of atmospheric physics and meteorology. As the only university department in the Czech Republic, we provide complex study of the atmosphere in correspondence with the World Meteorological Organization requirements.

We are oriented on topics of high societal impact. Our lectures and research interconnect students with specialized scientific subjects such as numerical modeling of physical and chemical processes in the atmosphere, weather prediction, climate change, fluid dynamics, air quality or turbulence.

Key Research Equipment

High performance computer cluster with 12 nodes, 24CPU units each – upgrade to a more powerful facility is underway.

Partners & Collaborations

Academic Partners

- Center National de Recherches Meteorologiques (CNRM), Meteo France, Toulouse: impact of aviation emissions on global climate and atmospheric chemistry
- Leipzig Institute for Meteorology, University of Leipzig: study of gravity waves localized forcing, numerical experiments with Middle and Upper Atmosphere model
- Laboratoire Atmosphères, Milieux, Observations Spatiales (LATMOS) in l'Institut Pierre Simon Laplace (IPSL): analysis of satellite observation of pollutants (O₃, CO, CH₂O) and comparison with model simulations
- Institute for Geophysics, Astrophysics and Meteorology (IGAM) of the University of Graz: analysis and usage of the GPS RO data, gravity waves study
- Institute for Atmospheric and Climate Science, ETH Zurich: climate modeling, solar cycle forcing

- Czech Technical University in Prague: numerical modeling, turbulent flow modeling
- Czech Hydrometeorological Institute: meteorology, air quality, weather prediction, numerical modeling, meteorological satellites
- Institutes of the Czech Academy of Sciences: Institute of Atmospheric Physics, Institute of Thermomechanics, Institute of Computer Science, Institute of Chemical Process Fundamentals, Global Change Research Institute

Industry Partners

- DIAMO, state enterprise, Czech Republic
- ČEZ, a. s., Czech Republic
- InMeteo s.r.o., Czech Republic

Main Recent Projects

- Development of the regional climate model for a very high resolution, GAP209/11/2405, 2011–2014
- Project UHI (Urban Heat Island) of OP Central Europe and ERDF, 2011–2014
- Global and regional climate model simulations in Central Europe in the 18th–20th centuries in comparison with observed and reconstructed climate, GAP209/11/0956, 2011–2015
- Direct eddy simulation in turbochargers via MILES-WBF method, TA04011437, 2014–2017
- Middle atmosphere effects of localized gravity wave forcing (MATELO), 16-01562J, 2016–2018
- Project URBI PRAGENSI „Urbanization of weather forecast, air quality prediction and climate scenarios for Prague

Are you interested in this expertise?

Please contact CPPT UK

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Experts and their Department

Assoc. Prof. RNDr. Petr Pišoft , Ph.D.

Department of Atmospheric Physics

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Klíčová slova

Fyzika atmosféry, fyzika oblaků a srážek, atmosférická chemie

Meteorologie, termodynamika, předpověď počasí

Klima

Turbulence, deterministický chaos