Jobbnorge ID: 275832
Deadline: 3/15/2025
Website: https://www.met.no/
Scope: Fulltime
Duration: Engagement

PhD positions

Calibrate the atmospheric component of NorESM to improve Global and Arctic climate projections for new emission scenarios

We offer one to two PhD positions for exploring new ways to optimally constrain the Norwegian Earth System model (NorESM) with atmospheric observations, so that climate change signals in Northern regions can be detected early and be understood in terms of relevant drivers and feedback mechanisms. New exciting opportunities that allow this to be studied are a more modular, easy-to-experiment-with NorESM, parameter perturbation ensembles, machine learning and longer modern climate data records.

Of particular interest is the change in the Arctic hydrological cycle, in trends of precipitation and snow cover, and in drought occurrence. These changes are considerably different in between NorESM versions and other CMIP6 models and are at the same time not well understood. Several factors require investigation, such as the sea surface temperature patterns in the North Atlantic, the air-sea exchange in a partly ice-covered region, the radiative balance leading to atmospheric cooling, atmospheric circulation and feedback strengths involving Arctic clouds and sea ice. The recent accelerated warming asks for thorough model testing with as much as possible anchoring in available climate data records from ground and satellites.

Calibrating the NorESM model for global scenario exploration in CMIP7 and associated MIPs requires further emphasis on the parametric uncertainty of the entire atmosphere component. Perturbed parameter ensembles (PPE), along with emulation and observations offer a new method to calibrate systematically the atmospheric model. Typical uncertain parameters to be included are those responsible for cloud formation, aerosol processes, mixing and turbulence. While these alone need careful selection, in addition the role of internal variability and couplings between earth system components pose challenges for the method, which require method refinement. The reward is both a better model and improved understanding of the climate system.

With a better calibrated model, both globally and in the Arctic, it will be possible to quantify improved confidence in next decade trends of precipitation and temperature, in particular in those of the Arctic. To quantify such improvements will have direct use for Nordic climate services.

Both PhD position shall contribute to the work planned in the NFR projects Budget and NorESM4CMIP7. Work shall also increase the general diagnostic capacity to evaluate NorESM via for example aeroval/pyaerocom and ADF(python) tools. The candidates are expected to participate also in the analysis of multi-model intercomparisons in CMIP7.

We seek PhD candidates with a strong background in data analysis and climate science. We are looking for ambitious students willing to explore new ways to deliver more reliable climate change projections. The candidates will be working with a state of the art Earth System Model, NorESM (The Norwegian Earth System Model), which is currently upgraded in the INES2 infrastructure project.

The PhD projects will benefit from our broad research activity on climate and earth system processes at MET Norway along with partners at the University of Oslo, CICERO, the Bjerknes Center in Bergen and internationally. The Norwegian Earth System Model (NorESM) development team is heavily involved in several CMIP7 projects and offers great opportunities for the successful candidate to contribute to a wider science community effort.

The work will be embedded in the highly interdisciplinary Division for Climate Modelling and Air Pollution within the Research and Development Department at the Norwegian Meteorological Institute. The candidate will be enrolled in the University of Oslo PhD program.

Applications will be evaluated according to the following criteria

- The MSc degree grades
  (in meteorology, geophysics, physics, mathematics or computer science)
- Competence in scientific programming
- Experience with earth system modelling (ESM); operation of models or analysis of data from ESM models
- Dissemination skills
- Familiarity with UNIX/LINUX, python, FORTRAN-90, version control, handling of binary data formats, (e.g. grib, netcdf, hdf)
- Applicants must be proficient in English, both written and spoken

Personal skills

- Strong motivation
- Ability to work independently, take initiative, and work problem oriented
- Analytic ability and academic approach to research
- Ability to work in a research group

Personal suitability will be given great importance.

Conditions

- Salary as PhD fellow, yearly gross income NOK 536.200 - 579.700 according to government rules.
- Membership in the governmental pension scheme (2% deducted from gross salary)
- The first 6 months are a mutual trial period

Diversity and positive discrimination

We believe that diversity is a strength, and want employees with different skills, subject combinations, work experience, gender, life experience and perspectives.We encourage all qualified candidates to apply for a job with us regardless of ethnic background, age or ability.

We practice positive discrimination, and will call at least one qualified applicant in each of these groups for an interview: applicants with a disability, immigrant background or gaps in the CV.To be considered in one or more of these categories, you must mark the appropriate category in your application.

Functional impairment: applicants who need accommodation in the workplace or in the working relationship.

Immigrant background: applicants who have themselves immigrated to Norway. Or who was born in Norway with two parents who both immigrated to Norway.

Gaps in CV: applicants who have had a break from work, education or training for a total of at least two years in the last five years due to e.g. physical or mental illness or injury, intoxication or punishment.

The ticks can be used for anonymised statistics or reporting purposes.

Publication of applicant lists for public sector positions is an important principle to ensure transparency. If you want your name to be excluded from the applicant list, you must ask for it yourself, and give us a reason. In order to be exempted from the public applicant list, your justification for exemption must outweigh the consideration of transparency in the applicant list. If your request is not accepted, you will have the opportunity to withdraw your application.

The application

The application with CV and other attachments is sent electronically via Jobbnorge.no. Attach certificates and all pages of diplomas. The documents must be in Norwegian, a Scandinavian language or English. Translations must be authorized. Before any employment, we will check the documents. In the case of foreign education, we ask that you attach an explanation of the grading system.

About us

The Norwegian Meteorological Institute warns the weather, monitors the climate and conducts socially critical research. We have provided critical meteorological services to Norwegian society for over 150 years. We ensure that rescue helicopters arrive safely, and that the emergency services are prepared for extreme weather and other dangerous weather. Our special services are used in the event of air pollution, oil spills, volcanic eruptions and nuclear accidents. Common to all our work is the main goal of securing lives and values. Every day, Yr.no is also part of the planning for people at home and abroad.

Modern meteorology requires the handling and analysis of enormous amounts of data, and offers great and exciting professional challenges.

We also have a research environment with around 140 researchers in weather, oceans, air quality and sump safety. We are today a leading international competence environment in warning and climate research with head office located in Oslo, and offices in Tromsø and Bergen. Among our partners you will find, among others, Avinor, BaneNor, the Norwegian Institute of Public Health, the Norwegian Directorate for Social Security and Emergency Preparedness (DSB), the Norwegian Armed Forces, the Norwegian Civil Aviation Authority and many more. You can read more about what we do at strategi.met.no

Additional information

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