

The Institute of Environmental Physics at the University of Bremen is offering - under the condition of job release – at the earliest possible date a

**2 PhD positions for 3-years (f/m/d)
German federal pay scale E13 TV-L (65 %)**

in the research area

Transregional Collaborative Research Centre TR 172

“(AC)3 – Arctic Amplification: Climate Relevant Atmospheric and Surface Processes and Feedback Mechanisms”

The time limitation is subject to the scientific qualification according to the Act of Academic Fixed-Term Contract, §2 (1) (WissZeitVG – Wissenschaftszeitvertragsgesetz). Therefore, candidates may only be considered if they dispose of the respective scope of qualification periods according to §2 (1) WissZeitVG.

The department “Remote Sensing” of the Institute of Environmental Physics (IUP) of the University of Bremen is among the leading scientific institutions in the area of satellite remote sensing of atmospheric trace and greenhouse gases and sea ice in polar regions.

(AC)³ is a joint collaborative research center of the Universities Leipzig, Cologne and Bremen together with the Alfred Wegener Institute for Polar and Marine Research, and the Leibniz Institute for Tropospheric Research. Besides an international first-class research environment, (AC)³ offers an Integrated Research Training Group with a structured Ph.D. program. (AC)³ is funded by the Deutsche Forschungsgemeinschaft – DFG. Find out more under www.ac3-tr.de.

Work content

PhD 1, project C01: Influence of spatial heterogeneity and temporal evolution of surface properties on radiative energy fluxes in the coupled atmosphere-sea ice-ocean system

Hypothesis: The spatial heterogeneity and temporal evolution of surface properties (sea ice types, snow, open ocean, melt ponds) have a major impact on radiative energy fluxes in the coupled Arctic climate system.

Satellite observations are used to evaluate surface albedo on larger spatial scales. The strongest changes in sea ice albedo is caused by melt ponds during summer. A melt pond and albedo satellite retrieval method will be adapted for current satellites like Sentinel-3. To quantify the changes of surface albedo and melt pond fraction, a long-term data series from current and previous satellite sensors will be developed and evaluated by in-situ observations during MOSAiC. The influence of spatial heterogeneities of surface properties on the radiative energy fluxes between ocean-sea ice-atmosphere will be evaluated, as well as how its temporal evolution from seasons to years affects radiative energy fluxes in different regions and ice regimes.

PhD 2, project D03: Interactions between atmosphere and sea ice-ocean in the Arctic

Hypothesis: Regional feedback processes between atmosphere and sea ice–ocean associated with leads and cyclones are critical mechanisms for Arctic amplification.

Satellite data will be used together with model simulation from project partners to answer how sea-ice conditions (e.g., lead fraction, ice roughness) impact the air-ice/ocean momentum and energy exchange, and the atmospheric boundary layer and circulation in the Arctic. An Arctic-wide data set of lead fraction and surface roughness will be developed by extending and addition to an existing Sentinel-1 SAR method and adding data from new SAR sensors. Daily lead statistics including shape and direction will be derived and validated by MOSAiC data and airborne campaigns. The satellite data will be used for model evaluation and re-parametrization of refreezing open-water leads. Finally, the impact of leads and surface roughness on atmosphere

(e.g., turbulent fluxes, surface energy budget, atmospheric stratification, clouds) and related feedbacks will be evaluated.

All positions will be part of the research group for “Remote Sensing of Polar Regions” under the supervision of Dr. Gunnar Spreen.

Requirements:

- M.Sc. degree or equivalent in physics, oceanography, meteorology, remote sensing, geophysics, or related fields.
- Skills in scientific computer programming (e.g., Python, IDL, Matlab or similar)
- A strong interest to work in the field of satellite remote sensing
- Expertise in polar or sea ice research will be viewed favorable.
- Excellent English language skills, both written and spoken.

Why should you apply?

If you are interested in

- working in climate research and on one of the most challenging research questions, the understanding of the Arctic climate system
- being part of an international and interdisciplinary team and yet are able to conduct independent research
- improving your skills in satellite remote sensing and think that it is one of the key tools to improve our climate system understanding
- being part of a cohort of about 30 Ph.D. students within a Research Training Group distributed over five of the top German climate research institutes
- experiencing the thriving and lively city of Bremen in north of Germany

The Institute of Environmental Physics (IUP) provides a stimulating, international, and pleasant work environment and is strongly involved in the international climate and space science community. The focus of our work is the investigation of the atmosphere, the cryosphere, and the oceans. We have state-of-the-art lab equipment, and high computational capacity, which is essential for the data processing of our satellite projects.

As the University of Bremen intends to increase the proportion of female employees in science, women are particularly encouraged to apply. Applicants with a migratory background are highly welcome. Disabled candidates will receive preferred consideration over mainly equally qualified contenders.

For more information please contact Dr. Gunnar Spreen (phone: +49-421-218-62158) (gunnar.spreen@uni-bremen.de).

Please note a related PhD position announcement “Heterogeneity of sea ice energy fluxes” at the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI); contact Dr. Marcel Nicolaus (Marcel.Nicolaus@awi.de, +49(471)4831-2905)

Please send applications including standard documentation (CV, copies of diplomas, letter of motivation) and names of at least two references with reference to **job advertisement number A42/20** until **18 March 2020** to

Universität Bremen
Institut für Umweltphysik
Dr. Gunnar Spreen
Otto-Hahn-Allee 1
D-28359 Bremen

or (as a single PDF file) by e-mail: gunnar.spreen@uni-bremen.de.

For applicants wishing to send your applicants by surface mail, please send us your application on plain paper (no folders) and do not send us original certificates as we are not able to return your applications.