UNIVERSITY OF HOHENHEIM

Faculty of Natural Sciences
Institute of Physics and Meteorology
Data Assimilation in the Earth System (120b)

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Academic PhD or Postdoctoral Position:
Satellite Data Assimilation into Coupled Land-Atmosphere Models

A full-time PhD / Postdoctoral position in satellite data assimilation into coupled land-atmosphere models is available at the Data Assimilation in the Earth System group, Institute of Physics and Meteorology (IPM), University of Hohenheim, Stuttgart (Germany). We are open for applicants that have already received a doctoral degree or candidates that wish to gain a doctoral degree with this position. A teaching task of 4 h/week (for PhD student) or 6 h/week (for Postdoc) is assigned to this position. The three year fixed-term contract (with possibility of extension) is paid according to TV-L E13 (100%). The earliest start date of the position is 01.05.2019.

Background:
Numerical models have contributed significantly to improve our understanding of the dynamics of the global water cycle. However, these models indicate limitations due to the uncertainty of input data, boundary conditions, parameterisation, and imperfect model structure. Earth Observation (EO) satellite missions provide invaluable estimates of atmospheric and hydrologic variables, which often cover the entire globe. From these EO missions, the Gravity Recovery And Climate Experiment (GRACE) and its follow-on mission (GRACE-FO) measurements can be used to estimate Terrestrial Water Storage Changes (TWSC), i.e. a vertical summation of surface and sub-surface water storage changes. In addition, various satellite missions provide multi-decadal Surface Soil Moisture (SSM) estimates, as well as Land Surface Temperature (LST). These missions include SMOS, SMAP, MODIS, and Sentinel, which typically measure electromagnetic radiance emitted by the Earth surface or sample waveforms returned from radar pulses. However, the relationship between the measured radiance or waveforms and the quantities of interest might be incredibly complex. Therefore, a strategic step for the Earth sciences involves merging data and models via data assimilation and model parameter calibration techniques that is the research focus of the Data Assimilation in the Earth System group.

Responsibilities:
- Conduct independent and collaborative research on multi-sensor data assimilation such as LST, SSM and TWSC
- Evaluate the impact of improved land surface states on short-to-medium range numerical weather predictions
- Participate in code development, e.g., to deal with different data structures for vectorisation and memory management (e.g., hybrid parallelisation: MPI, OpenMP/OpenACC to improve the parallelisation on large scale CPU machines)
- Prepare results for publications in peer-reviewed journals and for presentations at meetings and

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conferences
- Support the teaching activities in German and English (4 h/week for PhD student or 6 h/week for Postdoc)

Your Profile:
- Doctoral degree or high qualified MSc in Physics and Meteorology, Computational Physics, Geodesy, Civil Engineering, Applied Mathematics or a comparable discipline
- Profound skills in numerical modelling and parallel programming using state of the art software languages such as C(++), FORTRAN, Matlab/Octave, or Python are a requirement
- Knowledge of statistical and data processing techniques
- Experience with hydrological or atmospheric models (such as WRF) is desirable
- Strong interest in collaborative work
- Strong technical and organisational skills
- Passionate to present the results in highly-ranked peer reviewed science journals and at international conferences
- Good English and German skills (oral and written) are required

Our Offer:
- International, interdisciplinary working environment on an attractive research campus with in-house experts in weather, climate, and hydrological modelling, as well as data assimilation
- Use of excellent scientific and technical infrastructure
- Participation in project meetings and international conferences
- A comprehensive graduate school to develop research and teaching skills
- Opportunity to promote with the Dr. rer. nat. title
- Flexible working hours and various opportunities to reconcile work and family life

Application deadline: 15.03.2019

Please submit your application via the [University's online system](#) and enclose the following documents: Cover letter, Curriculum Vitae (including publications, presentations, and teaching activities), academic certificates, and a summary of your MSc / PhD thesis (1 page). In order to increase female staff in this field, we especially encourage women to apply for this position. Applications of persons with disabilities are very welcome. For academic enqueries please feel free to contact Jun.-Prof. Dr.-Ing. Maike Schumacher (email: maike.schumacher@uni-hohenheim.de, phone: +49 (0)711 459-23133).