Academic Postdoctoral Position

A full-time Postdoctoral position in satellite data assimilation into hydrological models is available at the Data Assimilation in the Earth System group, Institute of Physics and Meteorology (IPM), University of Hohenheim, Stuttgart (Germany). The position is part of the project "AssimEO - Calculation of the total water supply for plant production by assimilation of Earth observation data" in cooperation with the Research Center Jülich and funded by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt, DLR). The two and half year fixed-term contract is paid according to TV-L E13 (100%). The start date of the position is 01.11.2019.

Background:
Earth system models have contributed significantly to improve the understanding of the dynamics of the global water cycle. However, these models indicate limitations due to the uncertainty of input data, boundary conditions of the model, parameterisation for model simplifications, and imperfect model structure. Earth Observation (EO) satellite missions provide invaluable estimates of atmospheric, hydrological and biophysical 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. 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 remote sensing 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 SSM and TWSC,
- Estimate groundwater changes from GRACE and GRACE-FO by assimilation into a hydrological model and definition of adequate forward operators,
- Perform a multi-sensor data assimilation using the processed L- and P-band observations of the AssimEO project to determine near-surface and root-zone soil moisture,
- Analyse the data assimilation results with respect to the total water supply for plant production,
- 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 conferences.

Your Profile:
- Doctoral degree in Geodesy, Civil Engineering, Applied Mathematics, Computational Physics, Physics and Meteorology 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 and/or land surface models is desirable,
- Experience with processing of remote sensing products 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 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 infrastructure,
- Participation in project meetings and international conferences,
- Flexible working hours and various opportunities to reconcile work and family life.

Application deadline: 15.10.2019

Please submit your application via the University's online system (https://www.uni-hohenheim.de/en/job-openings?tx_unijobs_joboffers%5Bjoboffer%5D=1806&tx_unijobs_joboffers%5Baction%5D=show&tx_unijobs_joboffers%5Bcontroller%5D=Joboffer&cHash=72fc6ca9f348d315d596dbeb2fef1c3f) and enclose the following documents: Cover letter, Curriculum Vitae (including publications and presentations), academic certificates, and a summary of your 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).