

Open position at the optical remote sensing team of the CNRM laboratory (Météo-France/CNRS)

Position: *Research engineer / Early career researcher for the production and the analysis of satellite climate data records*

Application deadline: *September 15th, 2019*

Duration of contract: *12 months - up to 36 months subject to performance*

Start: *December 2019 - February 2020*

Context:

Surface albedo has been defined as an Essential Climate Variable (ECV) due to its impact on climate and its role as indicator of the environmental degradation. For example, changes of land cover may modify the albedo of the surface (aka, the quantity of energy reflected back to space), thus altering the energy balance of our planet. Surface albedo varies in space and time as a result of natural processes (snowfall, vegetation growth, etc.) and human activities (forest clearing, crop sowing/harvesting, etc.). Remote sensing from space offers the only viable tool of measuring and monitoring the global heterogeneity of the albedo of the Earth's surface.

The LSA-SAF program of EUMETSAT (<http://lsa-saf.eumetsat.int/>) provides reliable and up-to-date information on how our planet and its climate are changing to help decision makers define environmental policies and decide mitigation actions. The EUMETSAT/LSA-SAF project started in 1999 with research and development activities. The delivered operational products include land surface albedos, temperature, short-wave and long-wave downwelling radiation fluxes, and many others. After twenty years (1999-2019) of research, development, and progressive operational activities, Météo-France built on a strong expertise on satellite-based retrievals of the surface albedo and down-welling short-wave radiation variables. Based on that experience, we started in 2016 within the framework of the COPERNICUS/C3S_312 project to develop consistent surface albedo products from the 80's until now using multiple sensors from the past including the current generation of instruments. This will complete the LSA-SAF surface albedo archive over the past period. This work will lead in 2019 to more than 35 years of products characterizing the albedo properties of the surface and 15 years of short-wave downwelling radiation fluxes from different satellite sensors.

Objective:

The objective of the open position is to take care of the evolutions of the existing scientific algorithms for the retrieval of surface albedo from different sensors. The candidate will improve them up to state-of-art research and prepare their migrations for the next generation of European sensors. The candidate will take part of the scientific challenges to come owing to the next generation of European satellites and the emergence of artificial intelligence (benefits of using machine learning techniques). The candidate will contribute to analyzing the long term climate data records in order to detect potential trends and to quantifying the impact on climate. Finally, the candidate will also participate to the effort of putting the scientific code in open source in order to share our expertise with the rest of the remote sensing of the Earth community.

The successful candidate will join the remote sensing team of the CNRM (<http://www.umr-cnrm.fr/remote-sensing/>), which is the Météo-France research laboratory that contributes to the observation of land surfaces at the continental scale through spaceborne remote sensing techniques. Today the remote sensing team is composed of 7-8 people working on the retrieval of radiative properties of the Earth's surface in the visible and near infrared domains.

Required skills:

We will recruit a research engineer, or an early career researcher according to the quality of the received applications.

The position will be adapted to the qualification of the candidates. Candidates for a position as early career researcher should have relevant number of publications related to the topic. Candidates for a position as research engineer should have excellent IT skills (see here below).

The candidate holds a PhD in environmental science, environmental engineering, or a university degree in IT/mathematics. The ideal candidate should have less than 3 years of experience after her/his degree and skills in various domains:

- Experience with processing large volumes of data is required (environmental and climate observations).
- Knowledge on radiative transfer and retrieval of biophysical properties from satellite are needed. Experience in the field of remote sensing in the visible and near infrared domains will be highly appreciated. Theoretical knowledge and practical experience in machine learning techniques, and signal processing will be also highly appreciated. Solid background in physics, mathematics and statistics will also help.
- Preferred programming languages are python and Fortran. Knowledge of appropriate python packages is required, as well as HDF5 and NetCDF file formats. A good proficiency in linux command shell and software version tracking is required.
- A good level of English is necessary for reading and writing technical project documentations, as well as to participate to teleconferences.
- A scientific curiosity, autonomy, rigor in the interpretation of the results are necessary.

Practical aspects:

The candidate will be based at the CNRM laboratory in Toulouse (France). Toulouse is a vibrant city that is recognized world-wide for its space research institutes and space industry. The gross monthly salary will be between 3280 and 3890 euros commensurate with experience. This includes French social security (health insurance).

Application procedure:

Interested candidates should send the following documents by e-mail to Dr. Dominique Carrer (dominique.carrer@meteo.fr):

- Resume detailing experience in research, technical skills, scientific publications and proceedings
- Motivation letter explaining research motivations, or engineer interests, for the job
- The names and contact details of two referees