# Research engineer at CNRM (Météo-France/CNRS) for the retrieval of radiative properties at the Earth's surface from EUMETSAT satellite data

*Application deadline:* August 1st 2018
*Duration of contract:* 12 months (with possibility for renewal subject to performance)
*Start:* September-November 2018

**Context:**
Land surface albedo, or the ratio of the radiant flux reflected from the Earth's surface to the incident flux, has a notable impact on climate as a key forcing parameter controlling the planetary radiative energy budget. Albedo varies in space and time as a result of natural processes (snowfall, vegetation growth, etc.) and human activities (forest clearing, crop sewing/harvesting, etc.). Surface albedo is not an intrinsic property of the surface as it depends on the state of the atmosphere via the solar radiation incident on the surface. Remote sensing from space offers the only viable tool of measuring and monitoring the heterogeneity of the albedo of the Earth's surface as well as the incident solar radiation.

The EUMETSAT Satellite Application Facility on Land Surface Analysis (LSA-SAF, https://landsaf.ipma.pt/) provides reliable and up-to-date information on how our planet and its climate are changing to help decision makers to define environmental policies and decide mitigation actions. Since the early 2000s the LSA-SAF is disseminating in near real time biophysical variables retrieved from EUMETSAT satellites. This includes surface albedo and incident solar radiation, which are responsibility of the CNRM.

The objective of the open position is to take in charge the evolution of the existing physically-based retrieval algorithms in the current 5-year phase (2017-2022) of the LSA-SAF. The candidate will improve them for the retrieval of surface albedo and incident solar radiation from current satellites (MSG, Metop) and will prepare the processing of the new generation of EUMETSAT spacecrafts (MTG, Metop-SG). The candidate's responsabilities also include evaluating the potential of using new techniques such as machine learning or other state-of-art research, implementing them and comparing the outputs to other available products (satellite or ground truth).

The successful candidate will join the remote sensing team of the CNRM, which is the Météo-France research laboratory and contributes to the observation of land surfaces at the continental scale through spaceborne remote sensing techniques. Today the remote sensing team is composed of 6-7 people working on the retrieval of radiative properties of the Earth's surface and the overlaying atmospheric aerosols in the visible and near infrared domains.

**Required skills:**
The candidate must hold a PhD in optical remote sensing (or related field) with skills in various domains:
- Experience with processing great volumes of data, such as 10000x10000-pixel images, is required.
- 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. Solid background in physics, mathematics and statistics will also help.
- Preferred programming languages are python and Fortran. Knowledge of appropriate python packages will be appreciated, as well as HDF5 and NetCDF file formats. A minimal proficiency in linux is required.
- A good level of English is necessary for reading and writing technical and project documentation, as well as to participate to teleconferences within the LSA-SAF consortium.

*According to her/his abilities and interests, the candidate will also have the opportunity to participate in the research activities of the team and publicate his/her findings in scientific articles.*

**Practical aspects:**
The candidate will be based at the CNRM laboratory in Toulouse. Toulouse is a vibrant city that is recognized world-wide for its space research institutes and space industry. The net monthly salary will be between 2600 and 3200 euros commensurate with experience. The net salary includes French social security.

**Application procedure:**
Interested candidates should send the following documents by e-mail to Drs D. Carrer and X. Ceamanos (dominique.carrer@meteo.fr, xavier.ceamanos@meteo.fr):
- Resume detailing experience in research, technical skills, scientific publications and proceedings
- A sample of research publication or communication
- Motivation letter explaining research interests and motivation for the job
- The names and contact details of two referees