



## Scientist fellowship at CNRM (UMR 3589 – Météo-France/CNRS)

Applications are invited for a 24-month scientist fellowship starting in 3<sup>rd</sup> quarter of 2018, at Météo-France, in the Numerical Weather Prediction Research Group of the Centre National de Recherches Météorologiques (CNRM) in Toulouse (<http://www.umr-cnrm.fr/>) to work on the following subject :

### ***Assimilation of winds from the space lidar mission ADM-AEOLUS in the global numerical weather prediction model ARPEGE***

**Context:** Numerical Weather Prediction (NWP) models are assimilating many observations of various types on the atmosphere in order to improve their initial state and thereby providing better weather forecasts. The vast majority of observations in global models comes from satellites providing information on the vertical structure of the atmosphere in terms of temperature and water vapour. On the other hand, wind observations from spaceborne instruments represent only a tiny fraction of the data actually assimilated in NWP models (2 % in the Météo-France model ARPEGE). Moreover, they provide information at single levels : the ocean surfaces from scatterometers and the cloud top height from visible/infrared imagery. The ESA Earth Explorer Mission ADM-AEOLUS ([http://www.esa.int/Our\\_Activities/Operations/ADM-Aeolus\\_operations](http://www.esa.int/Our_Activities/Operations/ADM-Aeolus_operations)) to be launched in the second half of 2018 will lead, through an ultraviolet Doppler lidar, to wind profiles along the line of sight from the surface up to 30 km with a vertical resolution around 1000 m. Since it will be the first wind lidar in space for meteorology, its assimilation in NWP models presents a number of challenges, some of them will be addressed by the fellow.

**Work description:** The main activity of the post-doctoral fellow will be to : 1) Install and run a pre-processing chain in order to convert the raw measurements from the lidar, so-called « Level 1B » (uncorrected wind profiles obtained through molecular or aerosol/cloud backscatter), into « Level 2B » (averaged corrected winds under clear and cloudy conditions). The temperature and pressure corrections will consider short-range forecasts from the ARPEGE model along the satellite track. 2) Compare the lidar winds derived from this local L2B processor (<https://software.ecmwf.int/wiki/display/AEOL/Aeolus+Level-2B+Processor+Package>) against those to be produced operationally by the European Centre for Medium Range Weather Forecasts (ECMWF) 3) Perform data assimilation experiments including either Météo-France L2B winds or ECMWF L2B winds. 4) Exploit the results in terms of analysis and forecast scores, and provide conclusions on the interest of using a local L2 wind processor.

**Current status :** The data assimilation system of the Météo-France global model (four dimensional variational system) has been recently adapted in order to accomodate horizontal line of sight winds from the AEOLUS mission provided by the L2B processor installed at ECMWF.

**Required qualifications :** The candidate should be have a strong knowledge with FORTRAN programming langage, Linux environment and programming data analysis in Python. Experience in data assimilation and possibly atmospheric modelling and/or remote sensing of the atmosphere is desirable. Excellent written and oral communication skills in French and/or English langage are necessary.

**Required education :** Master, « Ingénieur », Ph. D.

**Practical information :** The successful applicant will be contracted by CNRS and will be based at the CNRM within the Numerical Weather Research group. The targeted starting date for this position is the **1<sup>st</sup> of September 2018**, with some flexibility (between July and December). The net salary will be between 1600 and 2000 € per month, depending on qualification and experience. The contract will be of one year renewable.

For full consideration, an application letter including a detailed statement of scientific interests, along with a curriculum vitae (including professional experience, publications and conferences, computer skills and language practices) and the names, telephone and email addresses of 2 referees should be sent by email before **15<sup>th</sup> of May 2018** to: jean-francois.mahfouf@meteo.fr and [christophe.payan@meteo.fr](mailto:christophe.payan@meteo.fr)

The final selection shall take place before mid June 2018

**Funding source :** TOSCA (CNES – French Space Agency)