

**Post-doctoral position in atmospheric boundary layer dynamics**  
**Analysis of BLLAST field experiment**  
**(12 months to 24 months)**

A postdoctoral position, funded by the French Agency ANR, is proposed by the Laboratoire d'Aérodologie (University of Toulouse and CNRS), at the instrumented site of Lannemezan (Centre de Recherches Atmosphériques, 65300 Campistrous, in Hautes-Pyrénées, France).

Laboratoire d'Aérodologie (<http://www.aero.obs-mip.fr>) is a research laboratory of University of Toulouse and CNRS, in the Observatoire Midi-Pyrénées (<http://www.obs-mip.fr/>).

Activities in this laboratory contribute to a better understanding of the atmospheric dynamics, thermodynamics, chemistry and microphysics, and of coastal oceanography.

**Topic:** Evolution of the vertical structure of the low troposphere during the late afternoon transition and decay of turbulence.

**Background:** The international BLLAST project (Boundary Layer Late Afternoon and Sunset Turbulence, <http://bllast.sedoo.fr>), aims to better understand the processes involved during the late afternoon transition (LAT), when the daytime well-mixed, convective boundary layer (CBL), decays to an intermittently turbulent "residual layer" overlying a shallower, stably stratified boundary layer.

A field experiment took place in summer 2011 in south of France, during which data were collected from various instruments, with intensified observations during the LAT: ground stations, sounding and tethered balloons, remote sensing (lidar, wind profilers,...), manned and unmanned aircraft.

The data collected during this experiment are now analyzed, and associated numerical simulation studies have started. The proposed post-doctoral position is an important contribution to the analysis of BLLAST dataset.

**Work plan:** The main objective is to focus on the evolution of the vertical structure during the late afternoon transition, both in term of the mean variables and of turbulence properties. The work plan is organized as follows:

- Understanding the multi-layering of the low troposphere during the late afternoon transition:  
The analysis will be based on observations and on modelling, in particular large eddy simulations (LES) of both observed and idealized situations. Specific measurements collected during BLLAST will be used for the analysis of the evolution of the mean structure and turbulence. In parallel, sensitivity tests on idealized and real-case large-eddy simulations will be carried out to evaluate the role on the vertical structure evolution of major atmospheric parameters including wind shear, entrainment, boundary-layer top inversion, large scale subsidence and advection.
- Improvement of boundary layer scaling and guidances for parameterisations:  
The first objective is to evaluate the capacity of the scaling laws (initially established for stationary conditions only) to account for the processes during the transition, and to test new scaling laws that can cover the transition from the mixed layer to the residual layer. The second objective is to analyze the performances and limitations of current boundary-layer parameterizations schemes used in 1-D or 3-D meso-scale models in the context of the afternoon

and evening transition, at a time when interactions between surface and turbulence processes, advection and radiation become significant but subtle.

The time spent on one or the other task described above will depend on the profile of the candidate, and advancement of his/her work.

### **Environment:**

The post-doctoral fellow will work within the boundary layer group (ANTEE group) of Laboratoire d'Aérodynamique. He/she will intensely collaborate with boundary layer experts of CNRM-GAME of Météo-France (MOANA group).

Also collaborations are expected with other groups participating to BLLAST, from the Netherlands, USA, Spain, Norway, Italy, Germany. Visits to some of them are envisaged during the contract, to work on specific studies with BLLAST collaborators.

### **Practical aspects:**

At the CRA (Centre de Recherches Atmosphériques) of Lannemezan, where the position is mainly based, the post-doctoral fellow will have the possibility to stay in a house situated within the instrumented site (335€/month).

Salary will depend on the previous experience, and may evolve along the contract, in agreement with legal and employer regulations, with a lower limit of 1900 € net pay.

The post-doctoral contract will be a 12-month contract, extendable to 24 months. It may start as soon as possible, and much preferably before 1<sup>st</sup> July 2013, but will remain open until the position is filled.

### **Qualifications:**

To be eligible, the candidates should have a Ph.D. in the field of Atmospheric physics, with skills in meteorological data analysis. Knowledge of atmospheric turbulence and boundary layer processes will be welcome. The successful candidate will have to work with meteorological observations and Large Eddy Simulations, in a Linux environment. He/she will be expected to attend international conferences and to publish his/her results in international peer-reviewed journals.

### **Applications:**

Candidates should submit, by email, a cover letter with a statement of research activities and interests, a CV, as well as the contact information for two referees to:

Marie Lothon, [marie.lothon@aero.obs-mip.fr](mailto:marie.lothon@aero.obs-mip.fr)  
Fabienne Lohou, [fabienne.lohou@aero.obs-mip.fr](mailto:fabienne.lohou@aero.obs-mip.fr)  
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