EMS Annual Meeting Abstracts
Vol. 8, EMS2011-612-4, 2011
11th EMS / 10th ECAM

Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

The Boundary Layer Late Afternoon and Sunset Turbulence 2011 field experiment

M. Lothon (1), F. Lohou (1), P. Durand (1), F. Couvreux (2), D. Legain (2), E. Pardyjak (3), J. Vilà-Guerau de Arellano (4), J. Reuder (5), D. Pino (6), P. Augustin (8), T. Aschenbrenner (9), A. van de Boer (4), J. Cuxart (10), A. Dabas (2), L. Fleury (11), F. Gibert (12), B. Gioli (13), O. Hartogensis (4), A. van den Kroonenberg (16), Y. Seity (2), and the BLLAST participants Team

(1) Laboratoire d'Aérologie, University of Toulouse, Toulouse, France (lotm@aero.obs-mip.fr, (33) 5-62-40-61-01), (2) Météo-France/GAME, CNRS URA-1357, Toulouse, France, (3) University of Utah, Salt Lake City, Utah, USA, (4) Wageningen university, Wageningen, The Netherlands, (5) University of Bergen, Bergen, Norway, (6) Technical University of Catalonia, Barcelona, Spain, (8) Laboratoire de Physico-Chimie de l'Atmosphère, Dunkerque, France, (9) Institute of Aerospace Systems, Technische Universität Braunschweig, Germany , (10) University of Balears, Spain, (11) Observatoire Midi-Pyrénées, University of Toulouse, Toulouse, France, (12) Laboratoire de Météorologie Dynamique, IPSL, Paris, France, (13) Ibimet CNR, Firenze, Italy, (16) University of Tübingen, Tübingen, Germany

BLLAST (Boundary Layer Late Afternoon and Sunset Turbulence) aims at better understanding the dynamical and thermodynamical processes that occur during the late afternoon in the lower troposphere. In direct contact with the Earth surface, the atmospheric boundary layer is governed by thermal and mechanical turbulence, with a strong diurnal cycle. The late afternoon transition, from the daytime dry convection to the night-time stable boundary layer, still raises a lot of issues and is poorly represented in the meteorological models. Yet, it plays an important role in the transport and diffusion of dusts and trace gases, like water vapour, carbon dioxide, pollutants...

How does the afternoon decay in the lower troposphere happen, when the heat from the sun starts to sharply decrease? How do the scales of motion and transport change ? What is the impact on trace gas transport? How are these processes properly represented in meteorological models?

An international group is working on those issues by use of observations and numerical simulations, in order to improve our understanding and representation of the turbulent processes of the boundary-layer late afternoon transition. The roles of surface heterogeneity, entrainment at the boundary layer top, radiative effects, advection and gravity waves are being studied.

Since there is a great lack of observations during this phase, a field campaign is planned in the vicinity of an instrumented tower of Laboratoire d'Aérologie, near the Pyrenees ridge in Southwest France, from 14 June to 8 July 2011. This experiment will put together complementary observational tools, in order to obtain an exhaustive description of the boundary-layer dynamical processes, its vertical structure, and the spatial variability related to surface heterogeneity. Continuous measurements (UHF radar and sodar wind profilers, lidars, ground stations), and intensive observations with aircraft, unmanned aerial vehicles, tethered balloons and radiosoundings will be used.

During the 2011 EMS, we will present the experimental strategy and set up, and the very first results from the experiment.