Boundary Layer Late Afternoon and Sunset Turbulence

BLLAST Newsletter August 2012

Brief report on the short meeting held during the 20th conference on Boundary-Layers and turbulence, 8-13 July 2012

1. Estimates of key variables

- *"Z_i" Mixed layer depth, Residual layer top, inversions…*

  P. Augustin has collected the estimates made from various sources: radiosoundings (F. Couvreux), SUMO (F. Couvreux), aerosol lidar (P. Augustin), UHF-site 1 (M. Lothon). Those first estimates are available on the database, for all IOP days.

- *Advection*

  Advection has been estimated from AROME and ARPEGE models (F. Couvreux) for two days: 20 June and 5 July. Due to a good agreement between the forecast models and the observations for vertical structure of the atmosphere, those models seem to give one reliable possibility for advection estimates.

- *Large scale subsidence*

  Large scale subsidence has been estimated from various observations (M. Lothon) and models (F. Couvreux and F. Guichard), for two days: 20 June and 5 July. The radiosoundings (descending or ascending sheets), the wind profiler (UHF site 1 vertical velocity above Zi), AROME, ARPEGE and ECMWF models were compared. There seem to be a marked diurnal cycle of the vertical velocity, likely linked with the nearby mountain. Although the estimates are very delicate to make, and associated with large errors, there is consistency from one way to the other. The estimates from simultaneous radiosoundings (I. Faloona) will be joined to previous estimates, as well as estimates deduced from the ML model analysis of some cases. More cases will be considered (1 and 2 July, 26 June in priority). Advection will be taken into account as much as possible in the estimates of the subsidence made from the observations, which has not been in current estimates.

2. Mesoscale model intercomparison

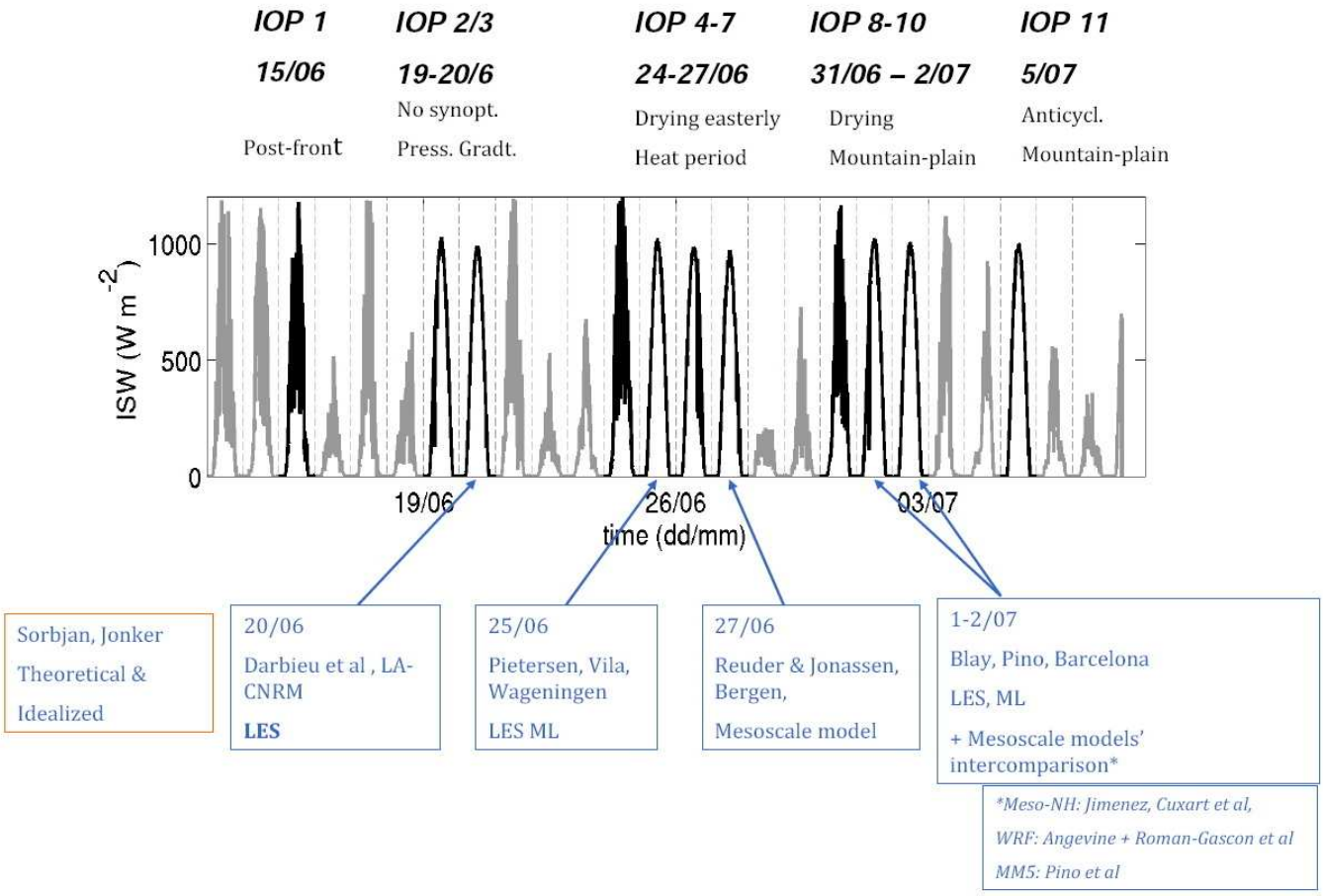
The discrepancies found in the previous intercomparison were based on land surface schemes that were not able to reproduce the observed surface and sensible heat fluxes, rather than on the various physical parameterizations of the models.

For these reasons, Wayne Angevine suggested to spin up the land surface schemes model during 3 years with fields from a global model analysis (radiative fluxes, fields at the first level) and precipitation data in France and Spain.

Second, Wayne Angevine (WRF) and David Pino (MM5) will perform the same simulation based on data from the AROME model, rather than on LSM or ECMWF data.

This should allow to prepare the LSM for the simulation of BLLAST IOPs, and analyze the variability of the results depending on parameterizations schemes of the physical processes.

3. Summary-sketch of ongoing case studies and simulations



4. Other topics

1. Data base / pictures

Many of the pictures taken in the field are available on the web now. And anyone is welcome to upload more pictures, with the same process as any other data (contact: L. Mastrorillo). The pictures will be accessible to BLLAST participants only.

2. Overview paper in the BAMS

The manuscript has been submitted at the end of June.

4. BLT conference, 8-13 July 2012.

There were many contributions of the BLLAST participants during the BLT. The abstracts, extended abstracts, posters and the records of the presentations are or will be available on the AMS-BLT website:

https://ams.confex.com/ams/20BLT18AirSea/webprogram/start.html

Contributions:

The Total Energy -- Mass Flux PBL scheme: Behavior in stable and transitional conditions, Angevine

Role of residual layer and large-scale phenomena on the evolution of the boundary layer, Blay etal

Representation of the Afternoon Transition in Numerical Weather Prediction Models: Evaluation with BLLAST Data, Couvreux et al

Turbulent kinetic energy decay in the late afternoon over heterogeneous surface, Darbieu et al

Large eddy simulations of boundary layer turbulence during late afternoon transition, Darbieu et al

High frequency ground temperature fluctuation in a Convective Boundary Layer, Garai et al

Afternoon transition turbulence decay revisited by Doppler Lidar, Gibert et al

A Dynamical System Approach to Mixed Layer Models with Interactive Surface Fluxes, Jonker et al

The Boundary Layer Late Afternoon and Sunset Turbulence 2011 field experiment, Lothon et al

On the role of large-scale forcings on the development of the atmospheric boundary layer during the BLLAST field campaign, Piertersen et al

Turbulence measurements with the micro-UAS SUMO - Technical developments and first applications, Reuder et al

Quantification of the effect of surface heterogeneity on scalar variance similarity, van de Boer et al

Wave-like Events detected from Microbarometers Measurements during BLLAST campaign, Román-Cascón et al

Pressure perturbations and multi-scale analysis in the atmospheric boundary layer at the afternoon and evening transition during the BLLAST campaign, Sastre et al

5. Next BLLAST workshop:

Planned around early summer 2013, in Bergen, Norway. A doodle will be submitted to the diffusion list to select an optimal 3-day window.