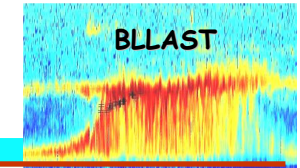


Overview of the surface measurements

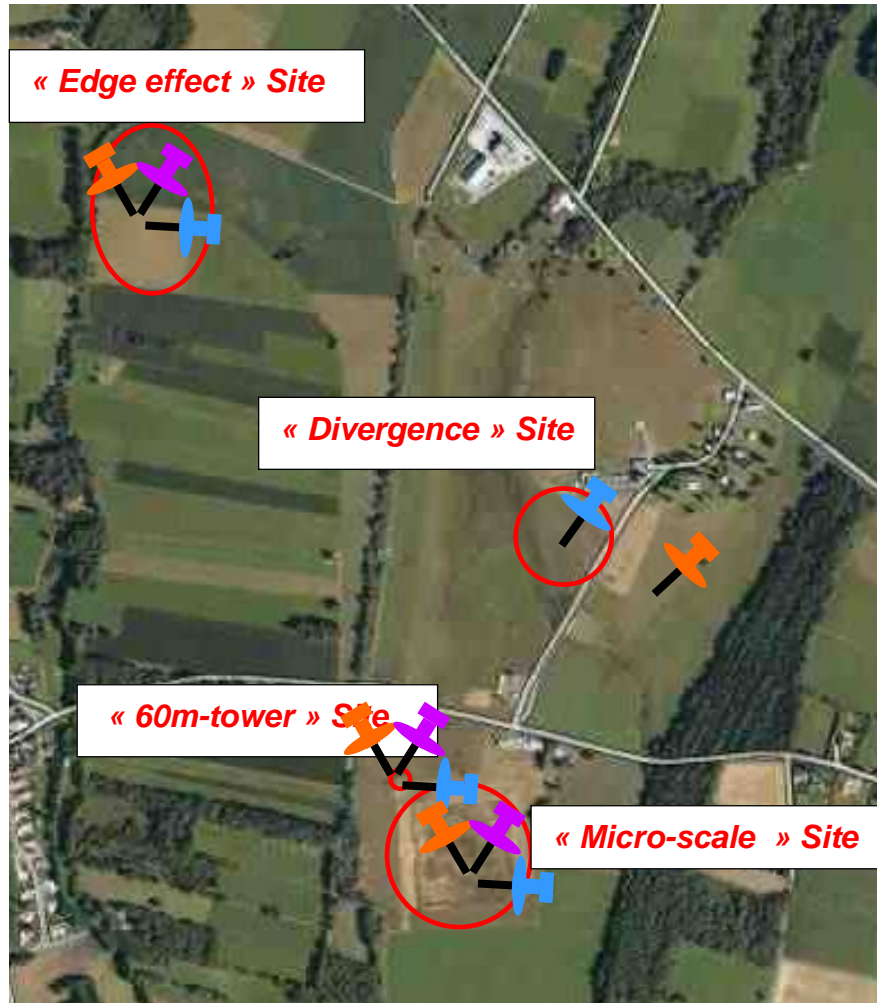
Fabienne Lohou, Daniel Alexander, Patrick Augustin, Joan Cuxart, Olivier De Coster, Anirban Garai, Oscar Hartogensis, Dominique Legain, Eric Pardyjak, Henk Pietersen, Jochen Reuder, Frédérique Saïd, Olivier Traullé, Anneke Van de Boer, Gert-Jan Steeneveld, Carlos Yague



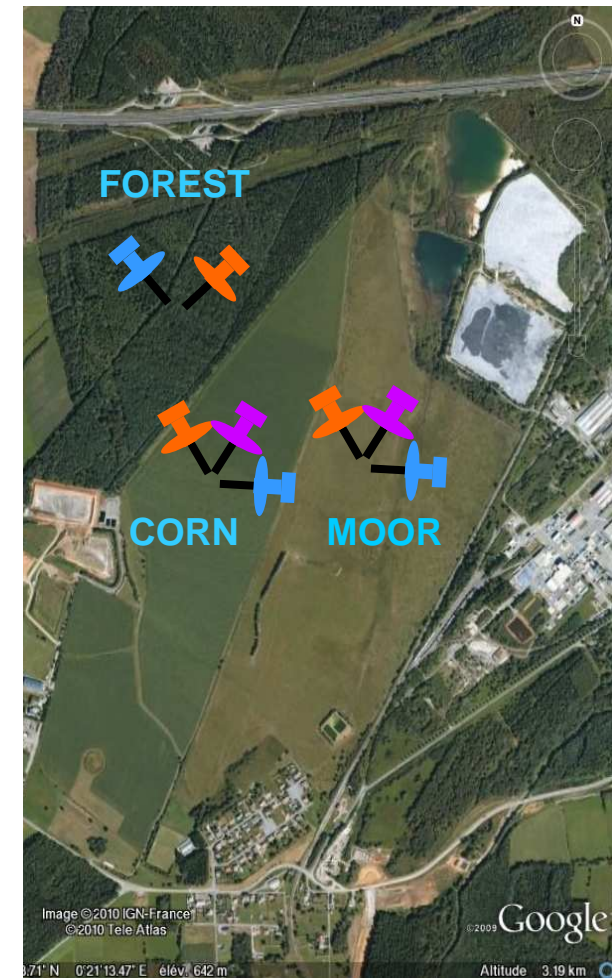
Meteorological parameters
Surface characteristics
Turbulent flux
Divergence tower
Microbarometer network (Mariano and Carlos)
Infra-red camera
Chemistry

-  Meteorological parameters (2 SW & LW, P, T, U, wind)
-  Surface Characteristics (SMC & ST & Ground heat flux)
-  Turbulence – Flux (T' , U' , r')

Site 1



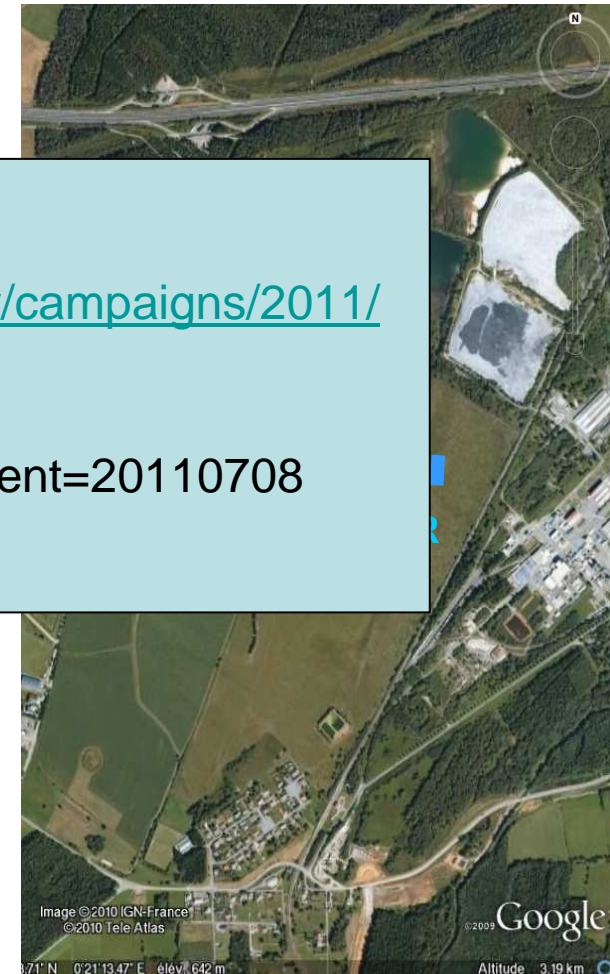
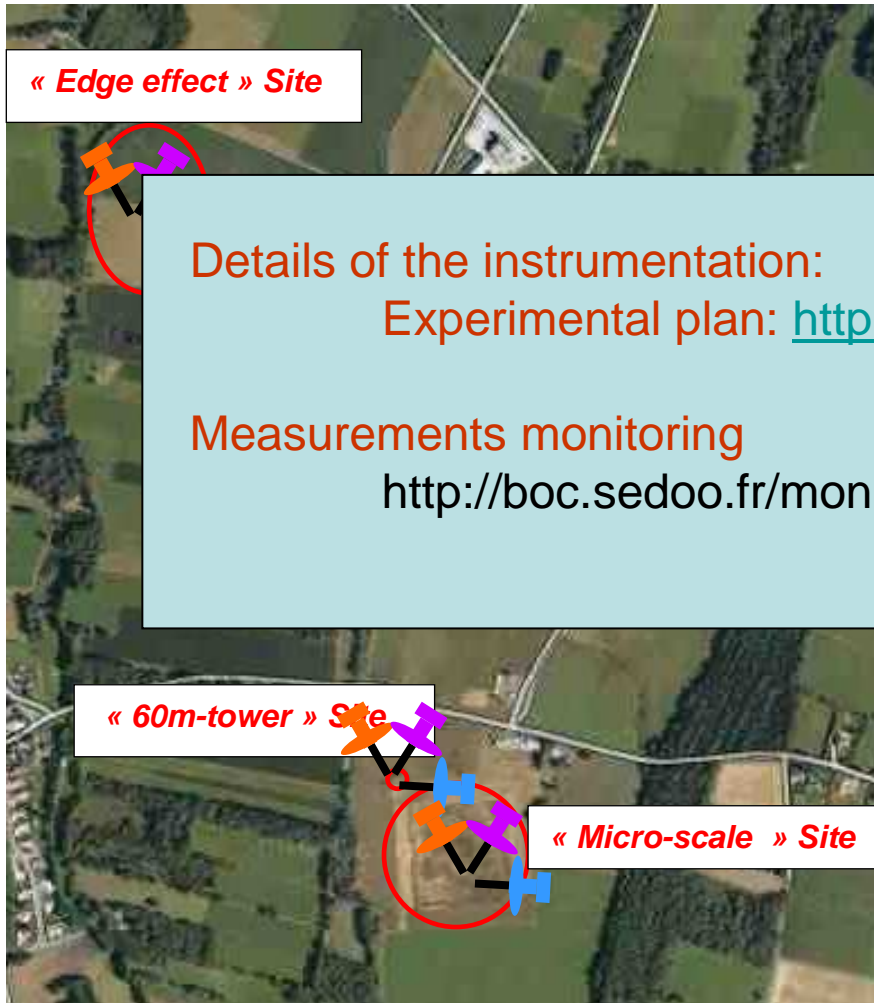
Site 2



-  Meteorological parameters (2 SW & LW, P, T, U, wind)
-  Surface Characteristics (SMC & ST & Ground heat flux)
-  Turbulence – Flux (T' , U' , r')

Site 1

Site 2



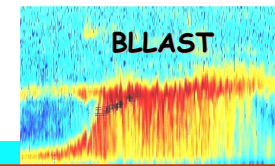
Details of the instrumentation:

Experimental plan: <http://bllast.sedoo.fr/campaigns/2011/>

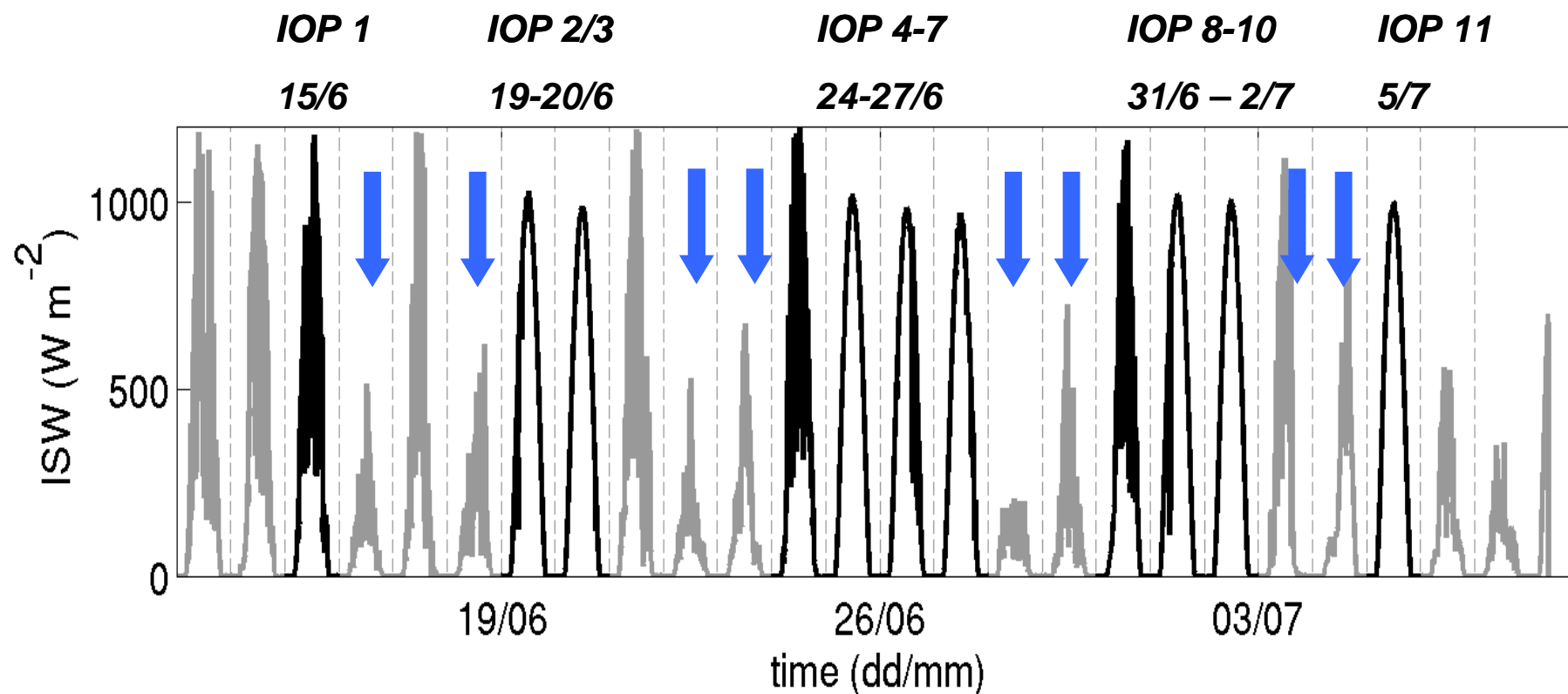
Measurements monitoring

<http://boc.sedoo.fr/monitoring.php?current=20110708>

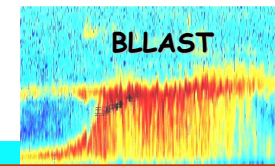
Meteorological overview at site 2



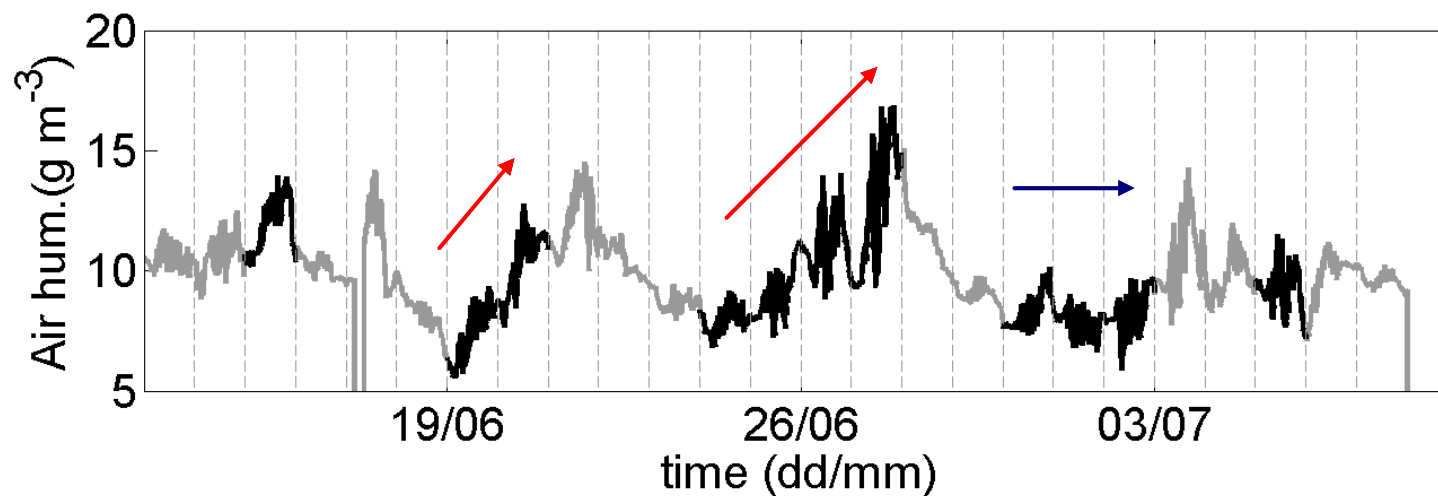
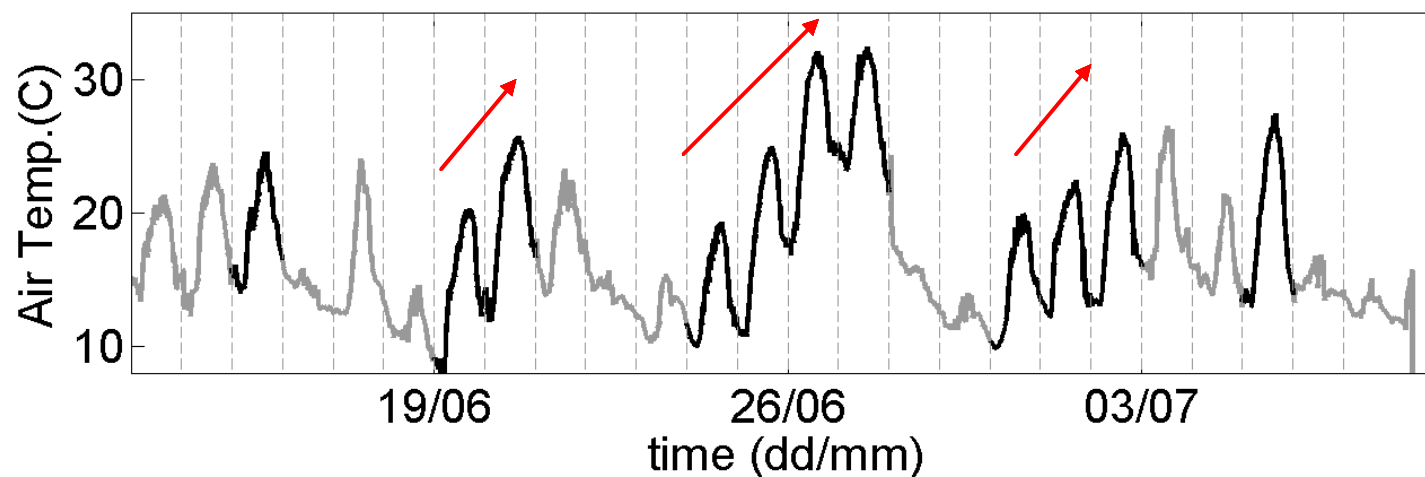
rain



Meteorological overview at site 2

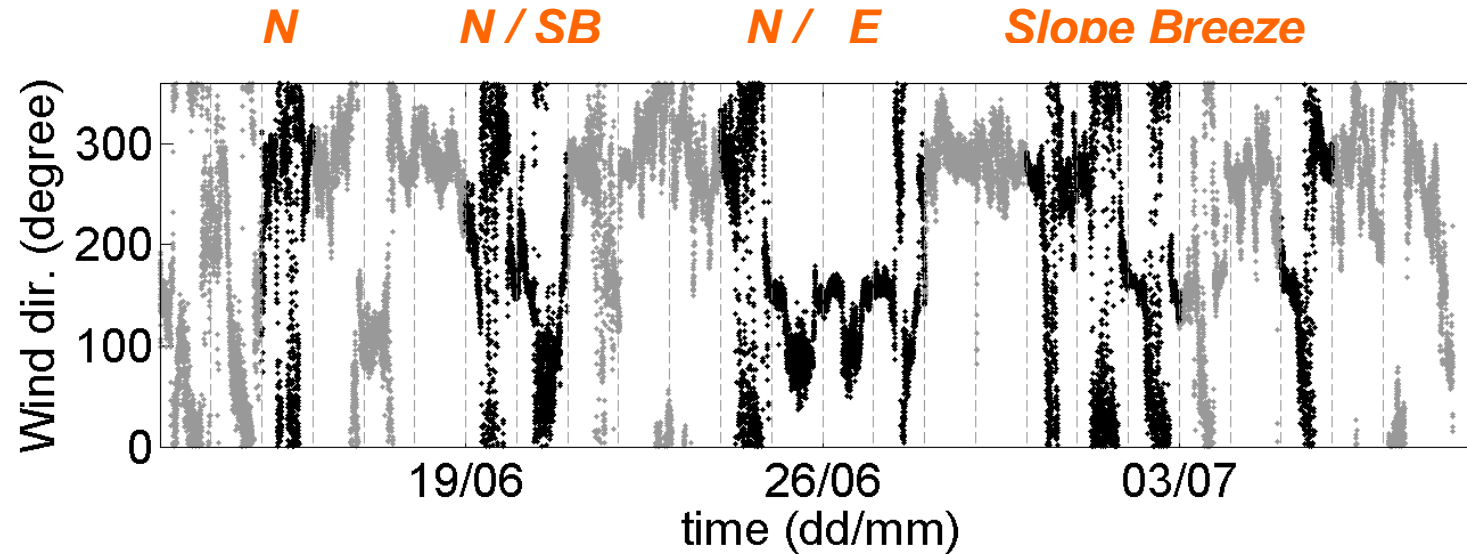
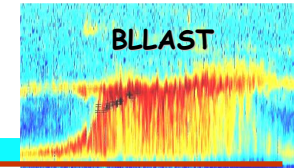


*Heat wave
26-27/6*

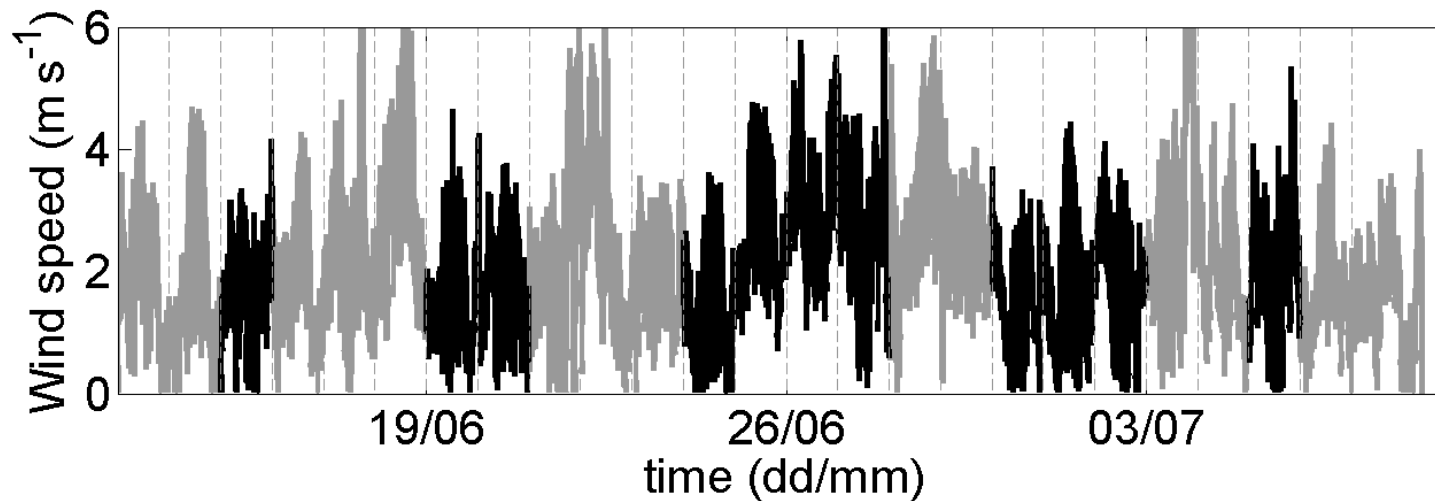


Firenze, 6-8/02

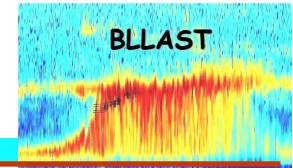
Meteorological overview at site 2



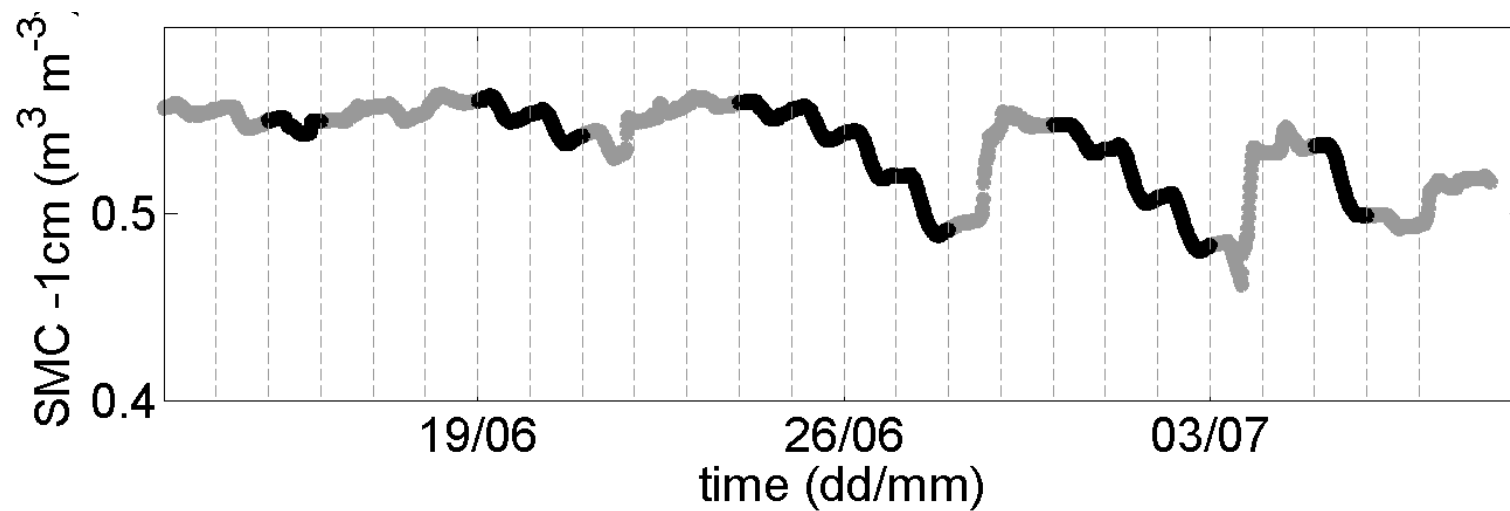
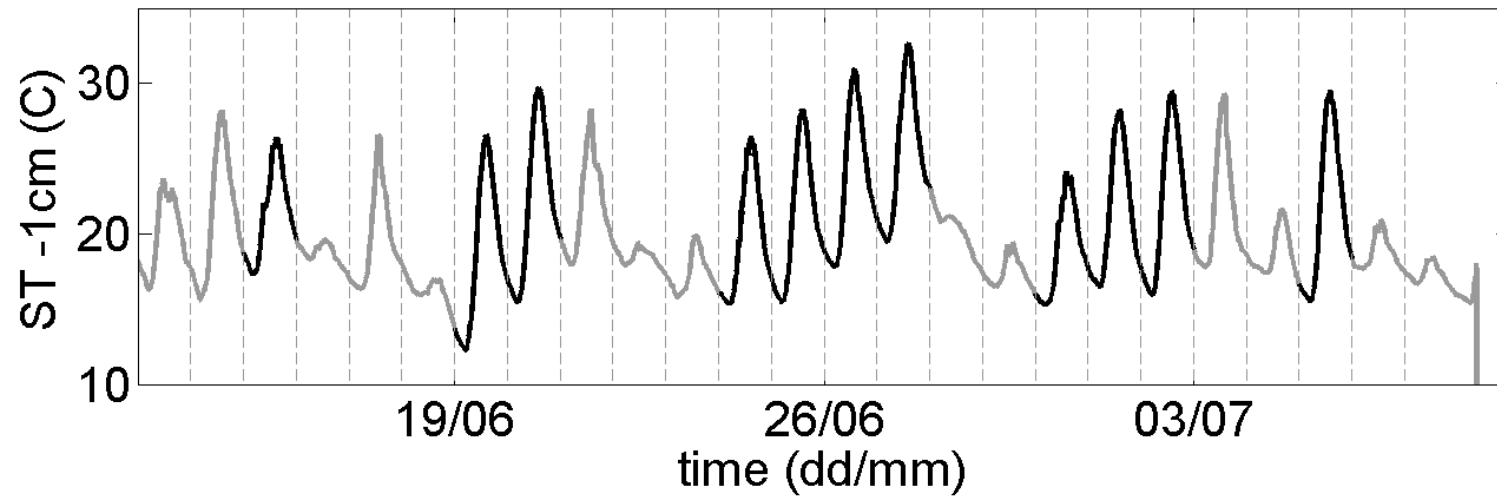
Low wind (< 4 m/s) at surface whatever the IOP



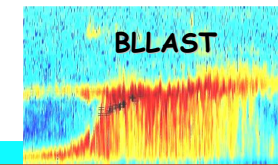
Surface characteristics (moor site)



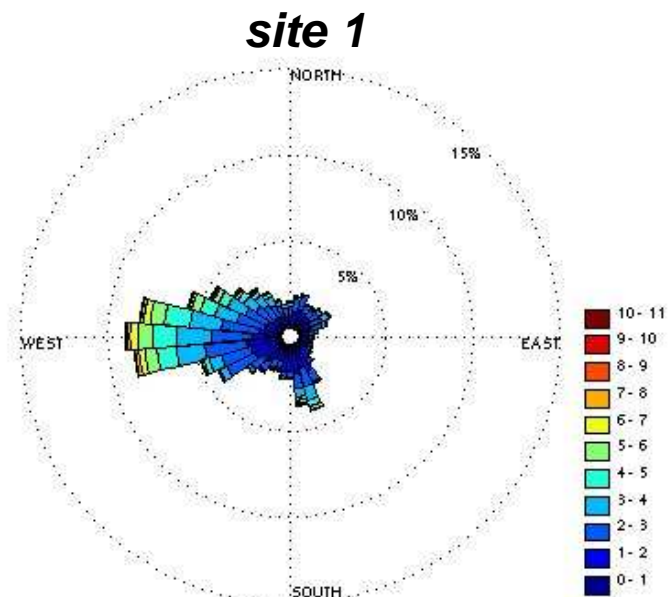
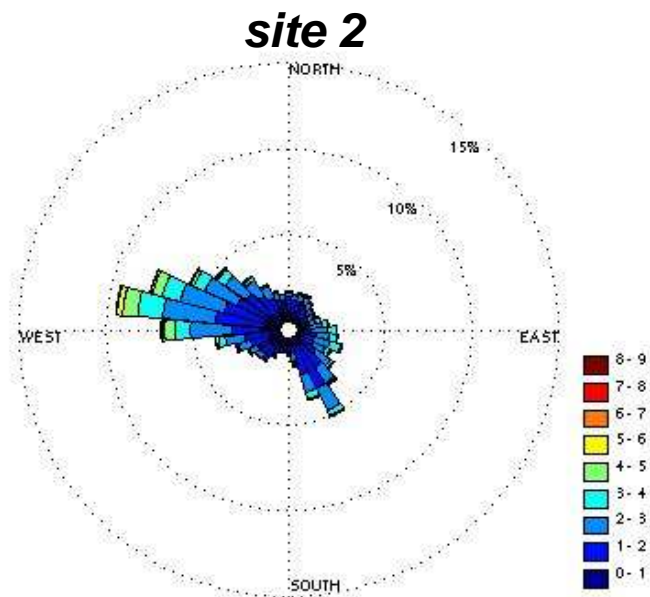
IOP 1 *IOP 2/3* *IOP 4-7* *IOP 8-10* *IOP 11*



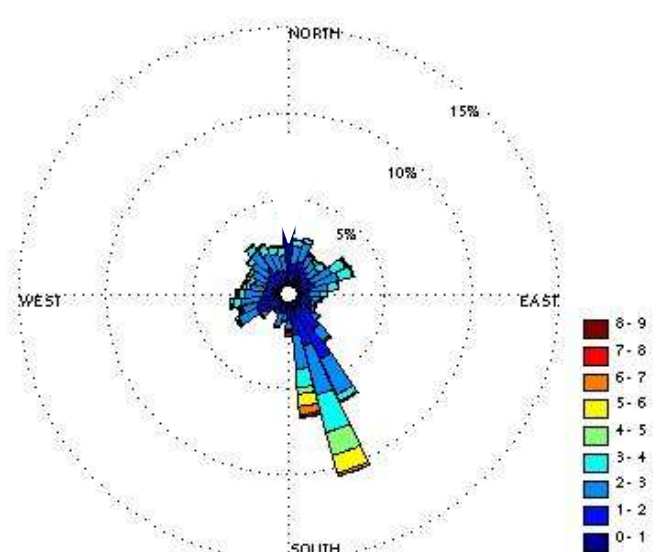
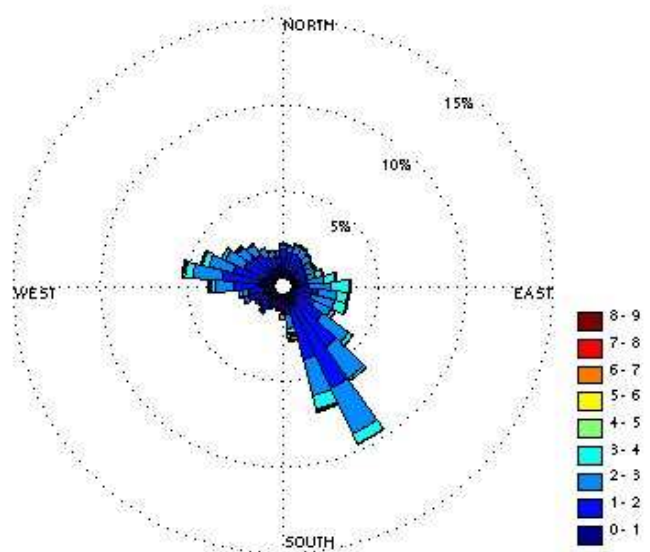
Wind conditions at site 1 and at site 2



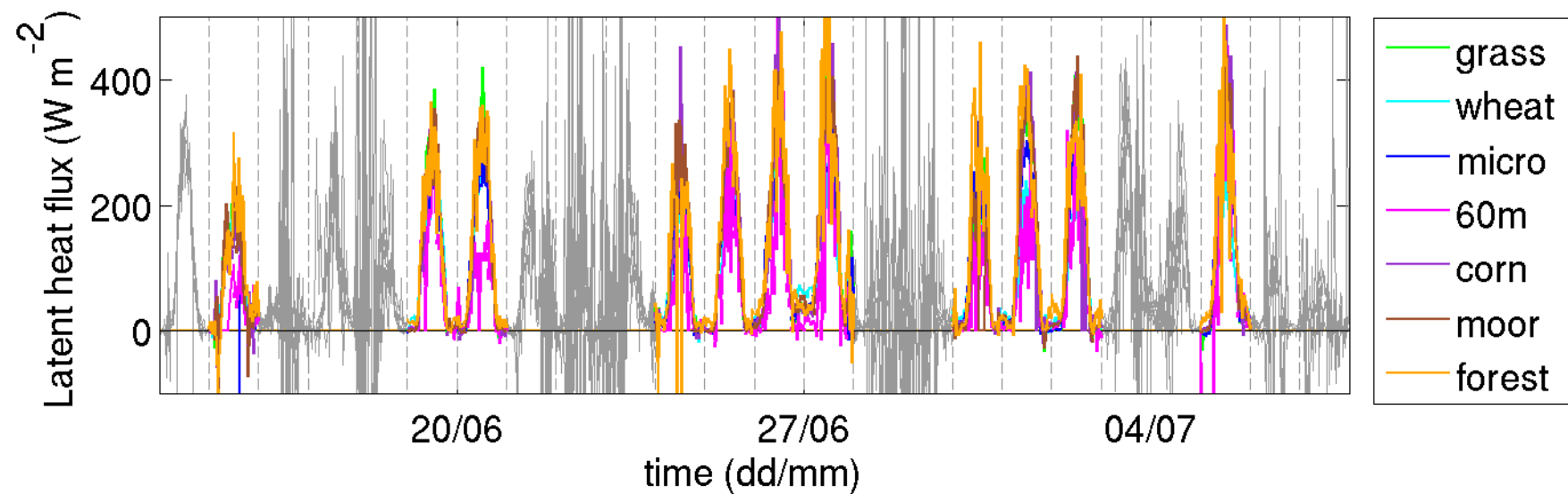
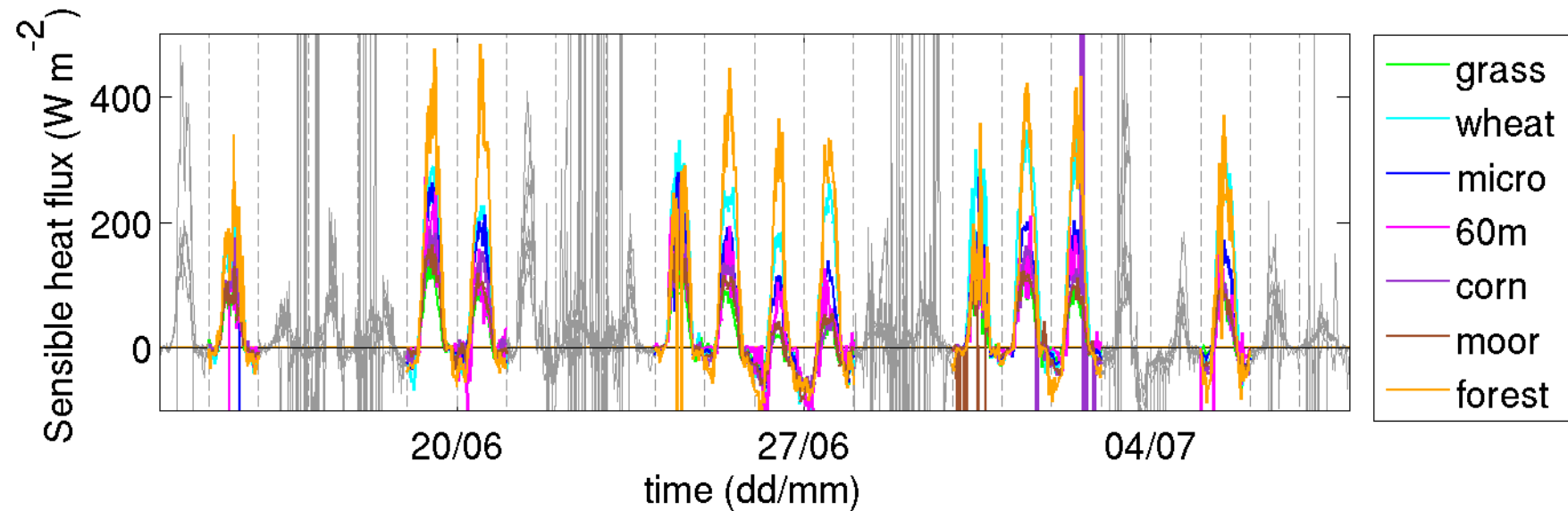
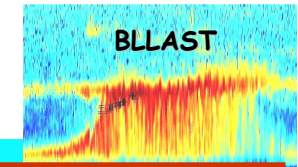
Whole
BLLAST



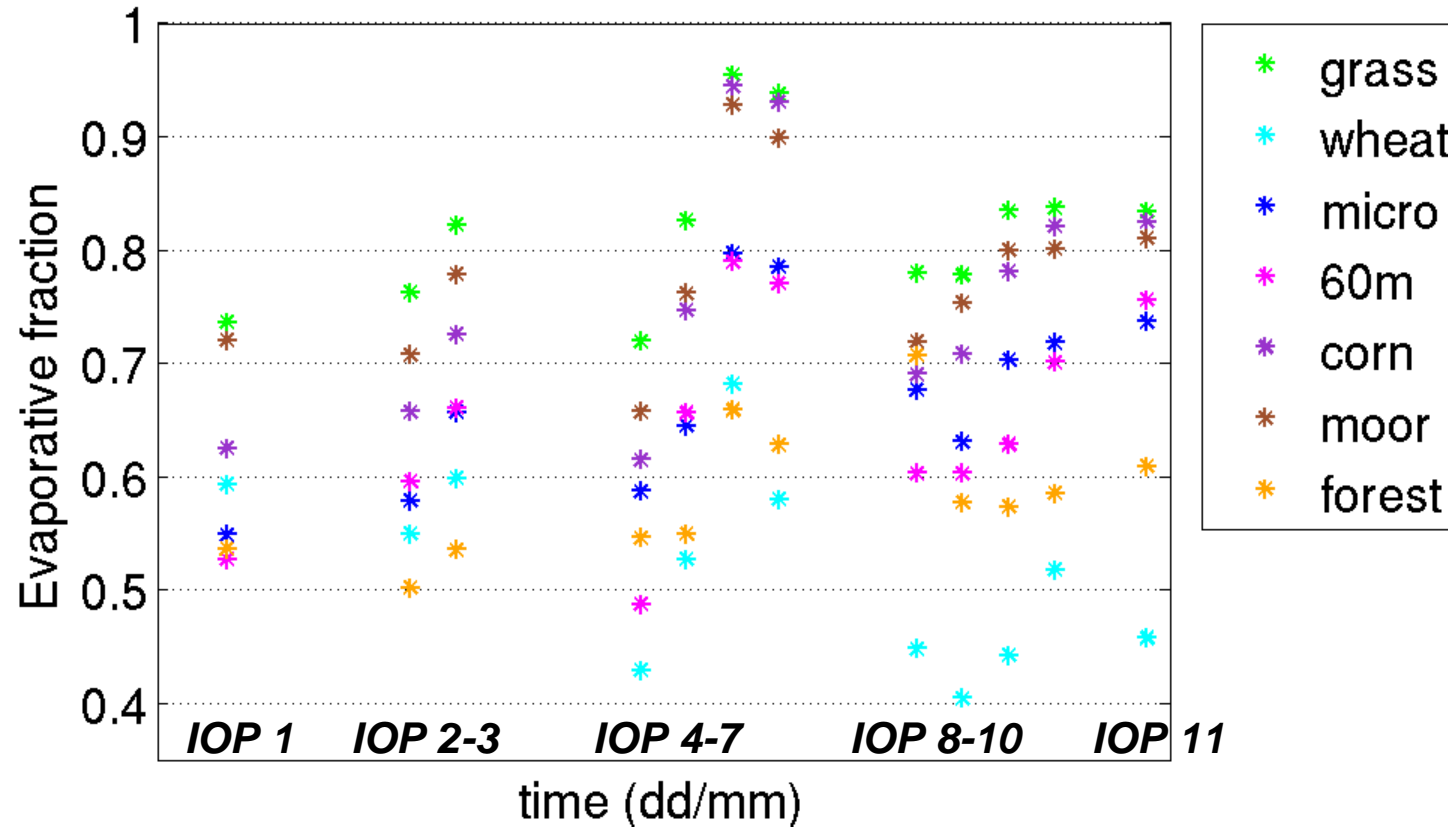
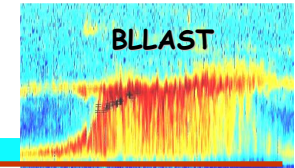
POIs



Turbulent flux: uniform process

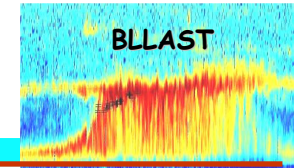


Evaporative fraction

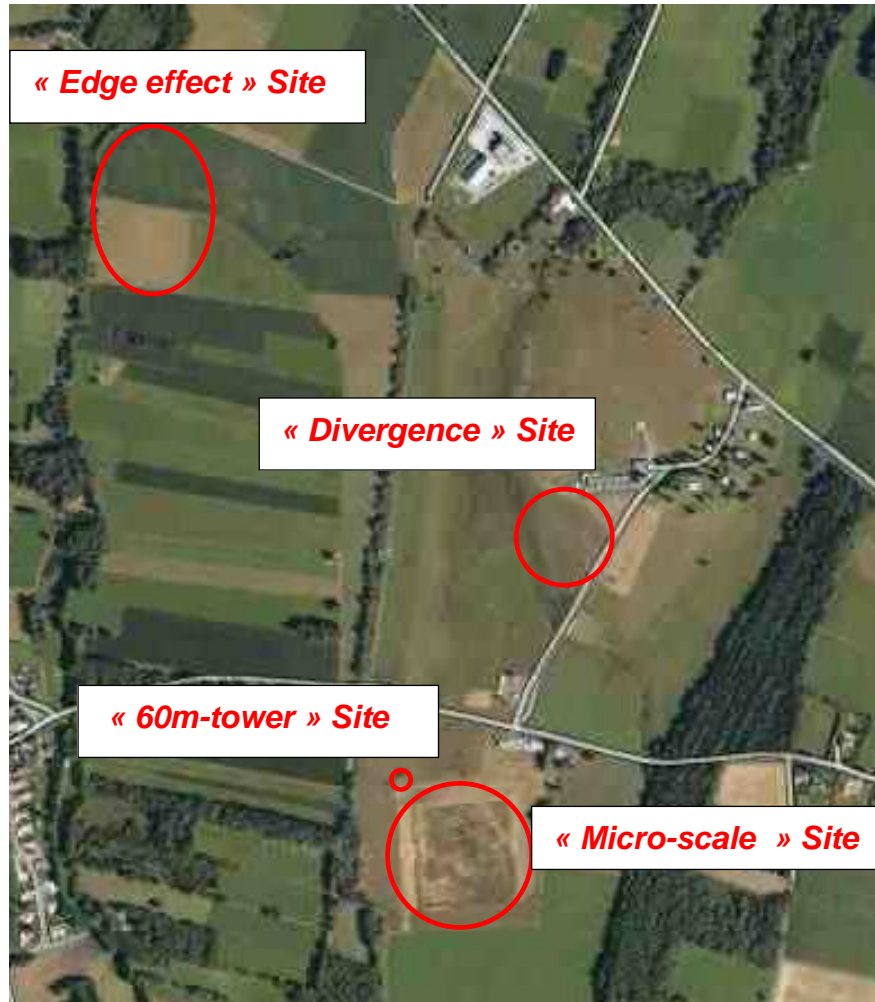


- Large range of EF covered by the 7 sites / Large evolution during IOPs 4-7
- Lower EF values for wheat and forest / Larger ones for grass, moor and corn.
- Good integration of the landscape heterogeneities by the EC station at 60 m high.

Divergence Tower

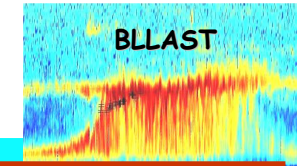


Site 1



To better understand the buildup and dynamics of the stable stratification and near surface flows during the evening transition period

Divergence Tower



Sonic Anemometers



Campbell Scientific CSAT 3
(U, V, W, T / 20Hz)

8,22 m
5,27 m
3,23 m
2,23 m

Kaio Denki
(U, V, W, T / 20Hz)
1,12 m
0,85 m



**9 Finewire thermocouples
from 0,091 m to 8,22 m**

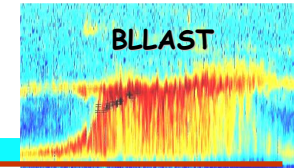


On IOP from 1800 LT to 1000 the next day.
The height measurement was retaken for each deployment and was measured to the *hard-packed* soil surface. Hence, the lowest thermocouple was just at the top of the “grass canopy”.

Cautions for Data Use

- The data from the lower Kaio Denko sonic is erroneous
- The fine wire temperature on the upper Kaio Denko is incorrect due to a faulty wire
- The fine wire thermocouples on all but the 5.27 and the 8.22 meter heights were removed from approximately 1800h to 1000h the next day local time due to beetles frequently swarming and breaking the wires
- The second Kaio Denko sonic anemometer that was added to the tower on 23June2011 consistently gave erroneous data

Microbarometers



Triangular array of 150m aprox.
Height: 1m a.g.l.

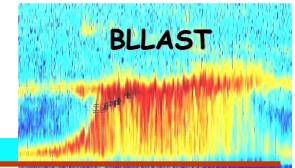
Sampling rate: 2 Hz

Resolution: 0.002 hPa

Objective: study small scale static pressure fluctuations produced in the PBL

Data availability: from 14 June to 8 July, except 16 June morning electrical cut-off

Firenze, 6-8/02



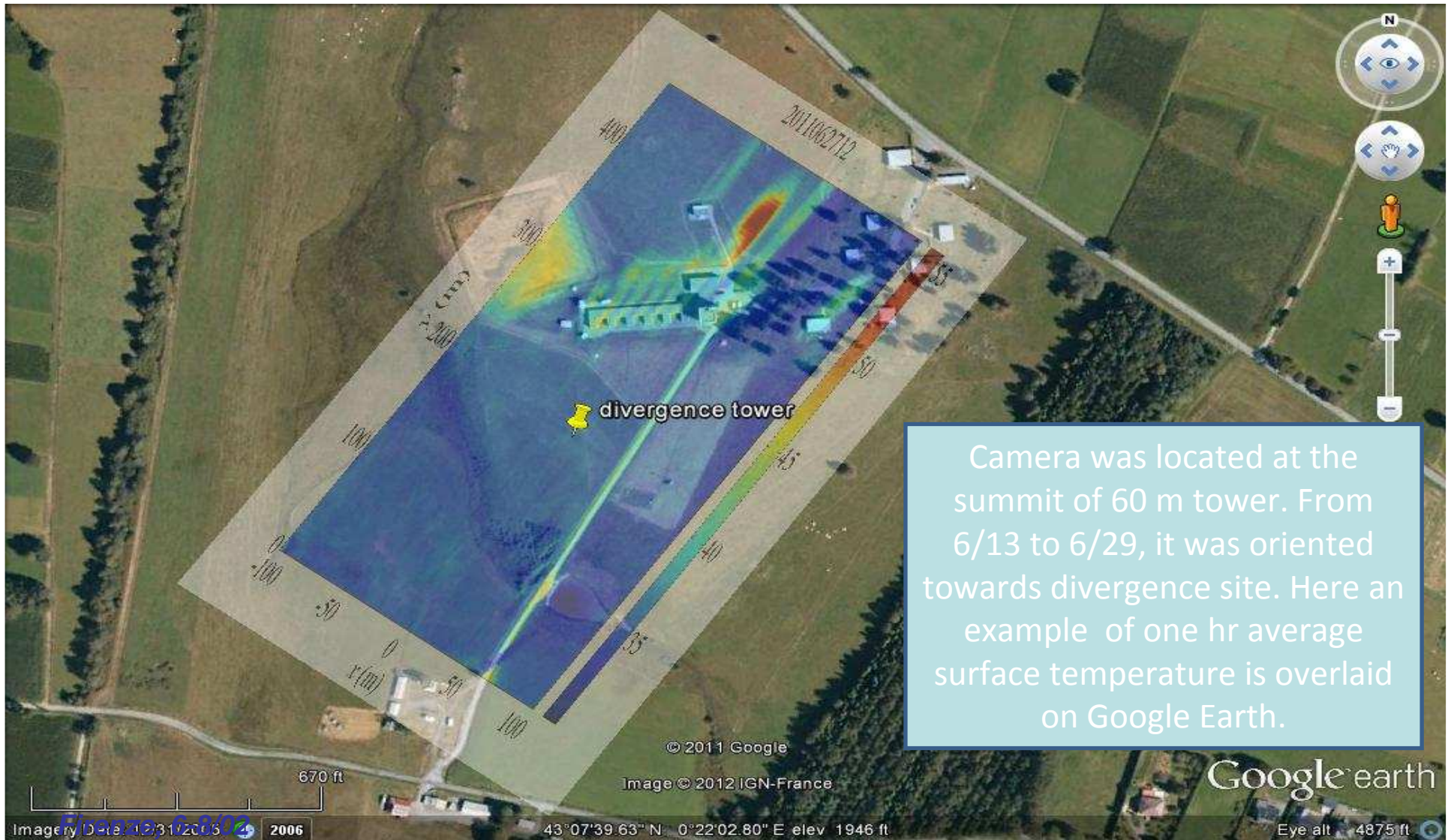
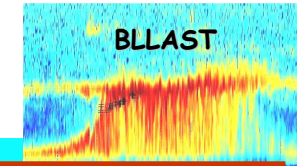
Infrared camera in BLLAST

Anirban Garai

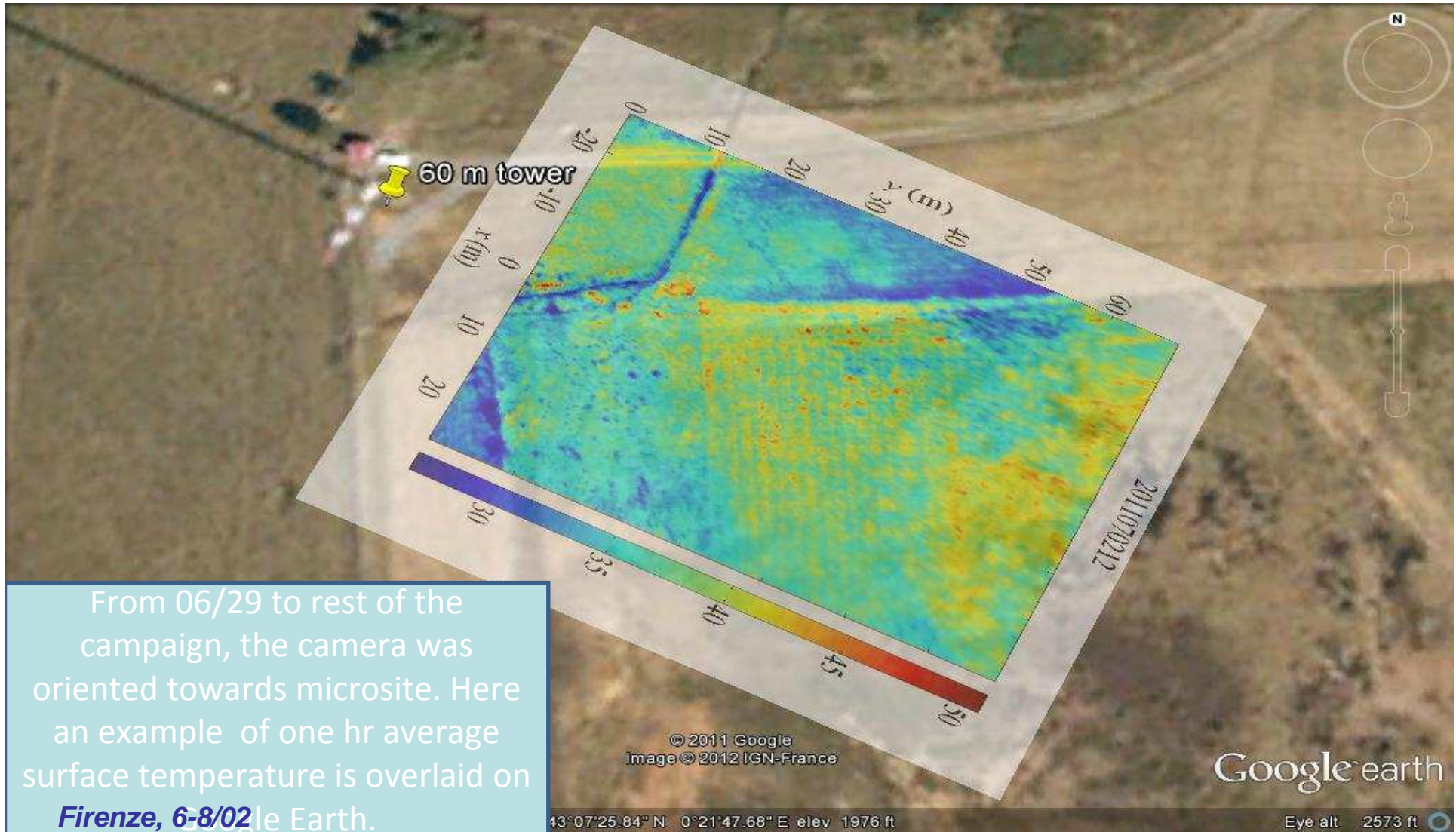
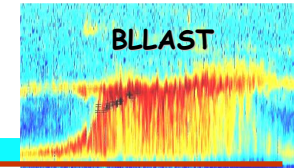
Jan Kleissl

University of California, San Diego

Camera orientation (06/13 to 06/29)

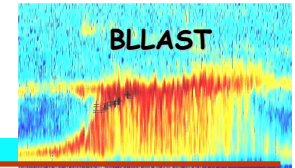


Camera orientation (06/29 to rest)



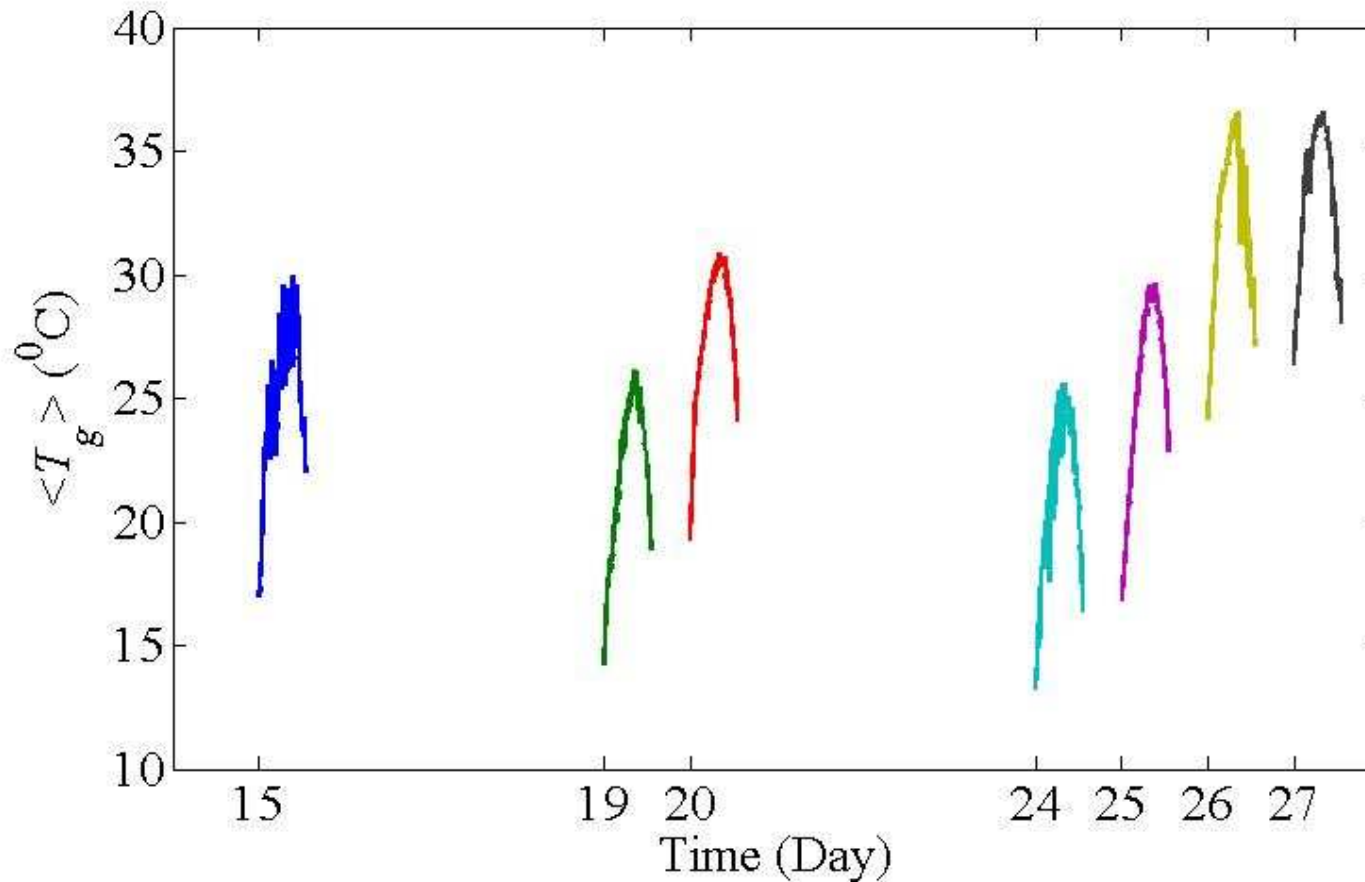
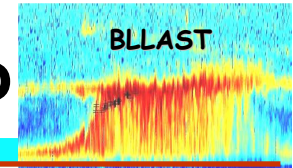
From 06/29 to rest of the campaign, the camera was oriented towards microsite. Here an example of one hr average surface temperature is overlaid on **Firenze, 6-8/02** Google Earth.

Camera data



- Frequency → 1 Hz
- Availability → 1 Hz, 5 min mean, 1 hr mean.
- Image size → 220 kB per image
- Remarks → During rain and dew, camera measured surface temperature is not reliable as water absorbs IR.
- Contact → Jan Kleissl
(jkleissl@ucsd.edu), Anirban Garai
(anagarai@ucsd.edu)

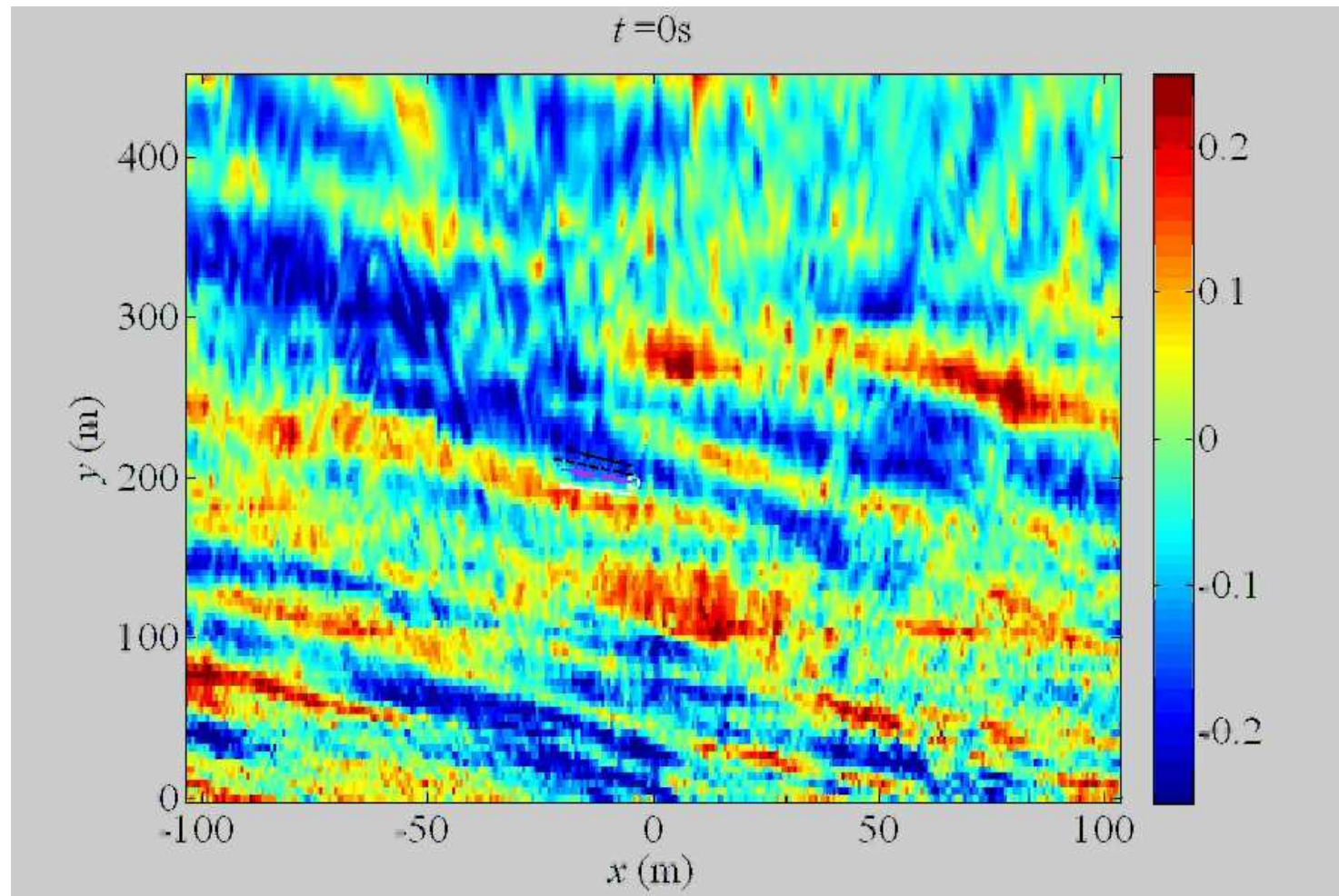
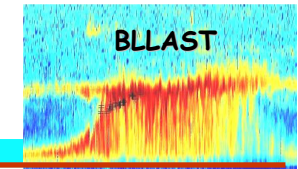
Mean surface temperature during IOP days at divergence site



Plot of 5 min mean surface temperature (0600-1900 UTC) at divergence site. Surface temperatures are calculated assuming surface emissivity

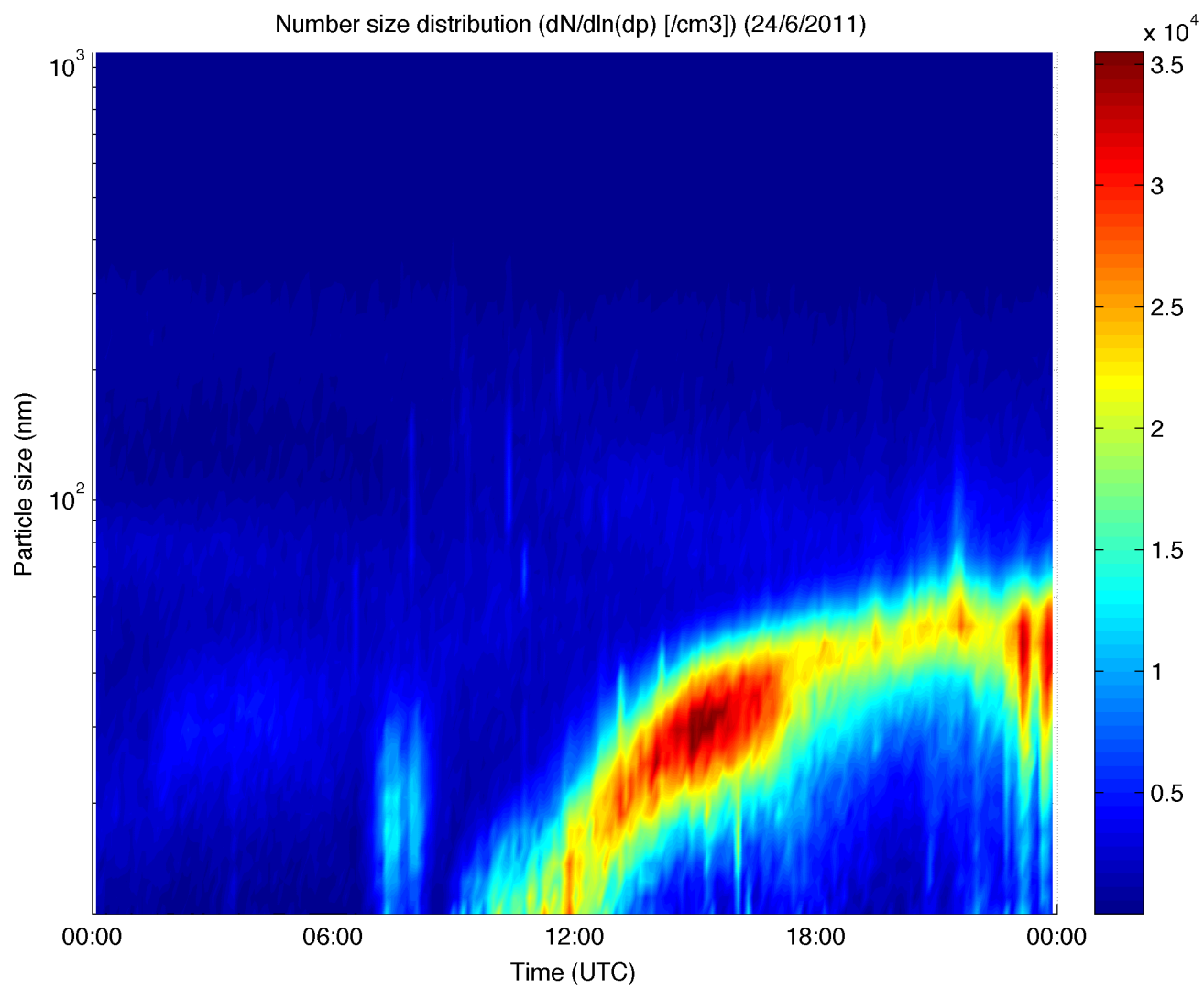
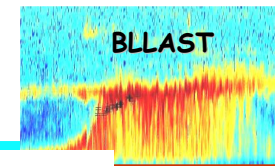
Turbulent structures

(06/27 0828-0830.5 UTC)



Turbulent structures in a convective boundary layer can be studied from high frequency surface temperature fluctuation. Here white circle is the position of the sonics.

Chemistry



Firenze, 6-8/02