

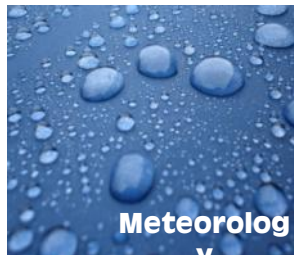
New Long Range Lidar for Airport Wind Profiling

WAKENET3-GREENWAKE-29-30 March 2010

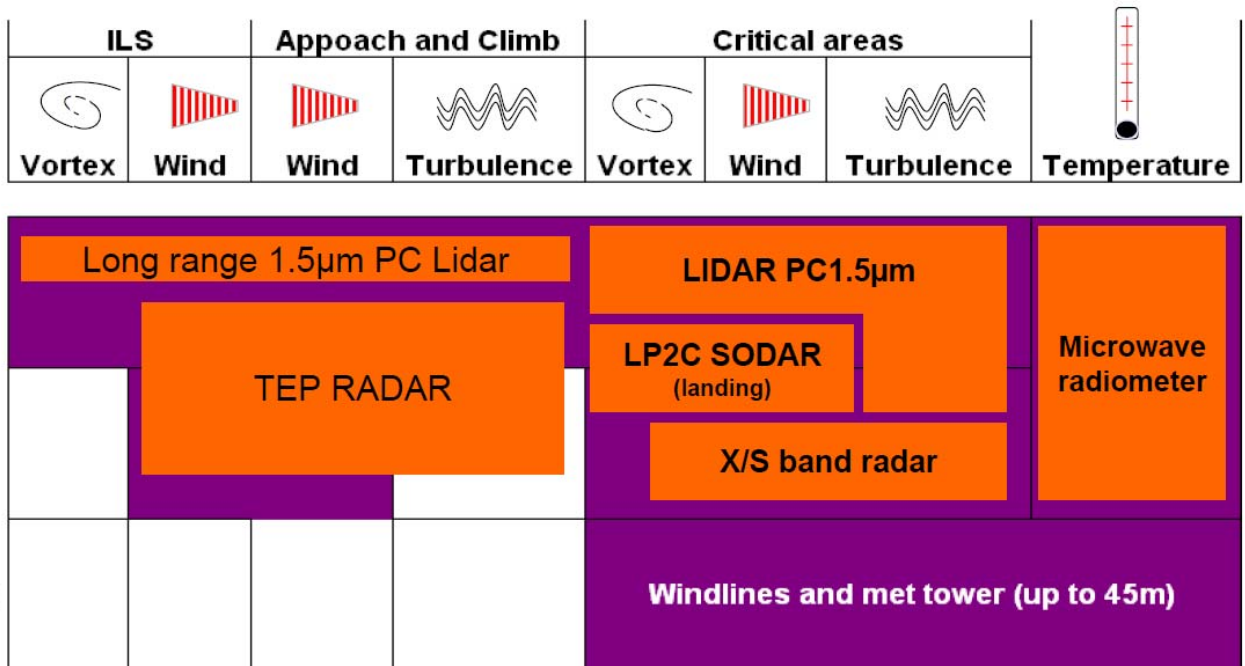
Jean-Pierre Cariou, Laurent Sauvage, Matthieu Boquet
LEOSPHERE SAS – Parc Club Université- Orsay- France



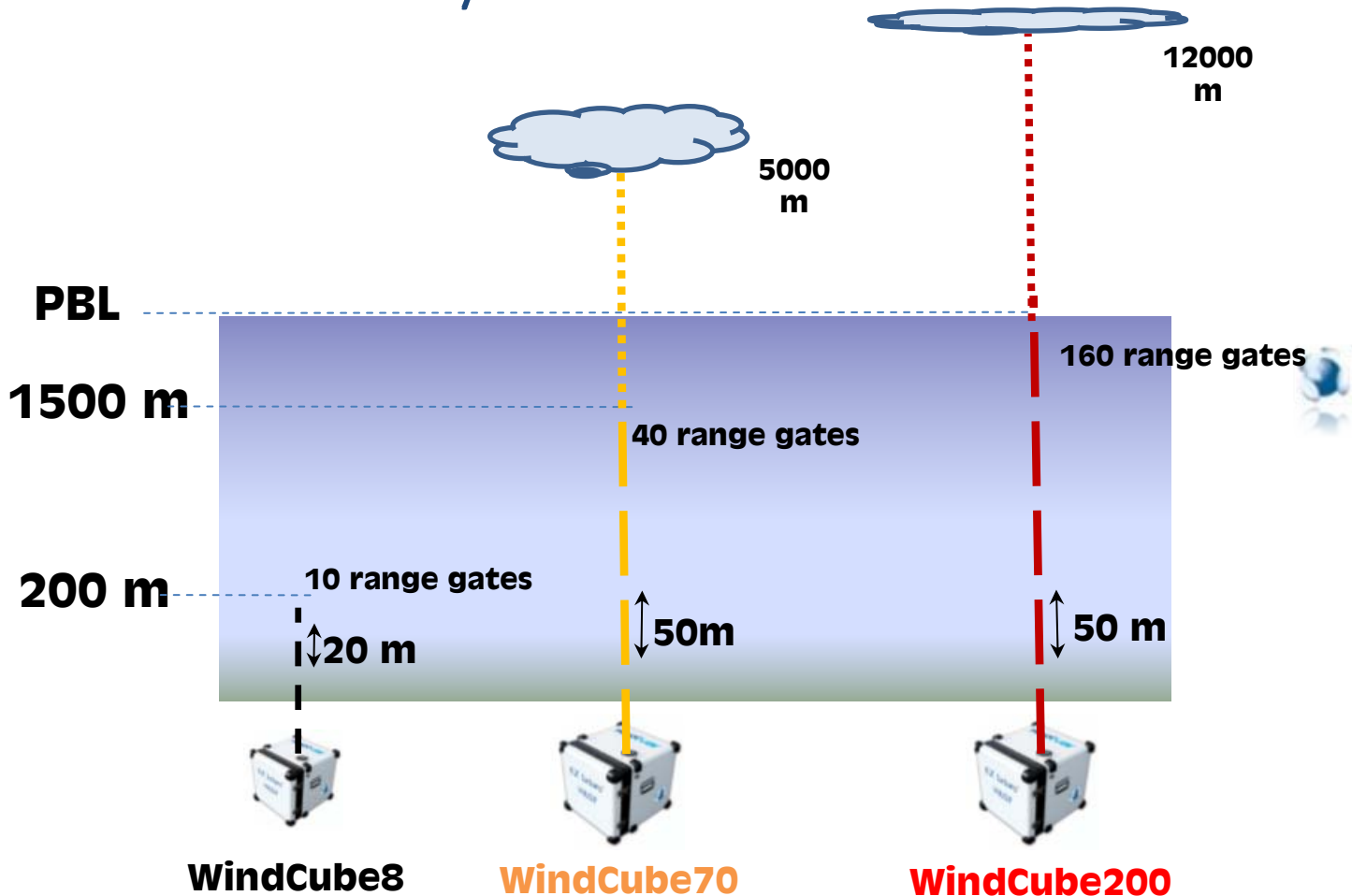
Lidar Environmental Observations



Technology package for airports



WindCube family



Functional specifications

Performances	WLS8	WLS70	WLS200
Range min - max	100 to 2000 m	100 to 2000 m	100 to 5000 m
Accumulation time	1 s	5 s	1 s
Data output frequency	1 Hz	0,1 Hz	0,25 Hz
Probed length	20 m	50 m	50 m
Number range gates	Up to 20	Up to 40	Up to 160
Scanning cone angle	30°	15°	15°
Speed accuracy	0,1 m/s	0,2 m/s	0,3 m/s
Speed range	0 to 50 m/s	0 to 100 m/s	0 to 100 m/s
Wind Direction accuracy	1,5°	1,5°	1,5°

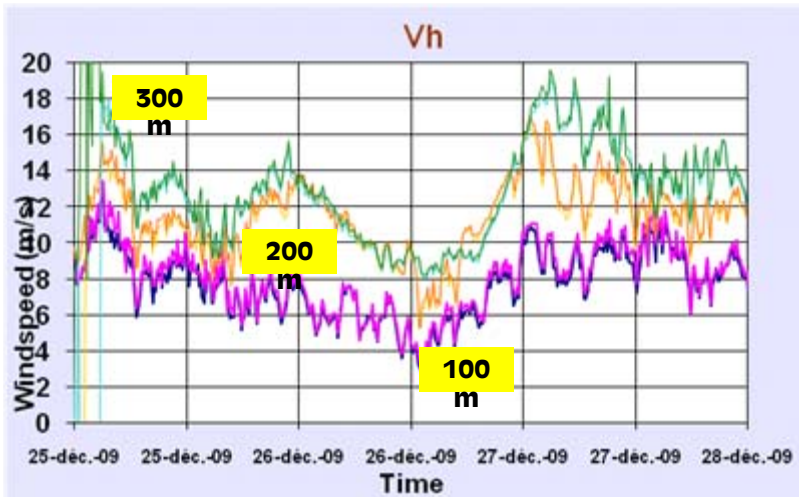


Validation campaigns of Windcube70

- **EUCAARI**, KNMI Cabauw, NL May 08
- Leosphere, ORSAY, Fr Aug 08
- **LUAMI**, Lindenberg, Ge Nov 08 - Jan 09
- **Airport, ROISSY CDG**, Fr Jan 09
- **NOAA** Howard Univ, Beltsville, MA, US Mars 09 - April 09
- **PNNL** , Richland,OR Jul 09
- Leosphere, ORSAY, Fr Jul 09
- **NASA Langley** Aug 09
- **MeteoSwiss**, Payern, CH Jul 09 - Oct 09
- **NOAA ESRL**, Boulder, CO, US Dec 09

WindCube70 vs WindCube8

- 4 days of benchmarking (24-28 dec '09)
- 500 STA files (10' average)
- Same place, orientation offset :5°
- WLS 8 : 40 to 300m step 20m, 1s update
- WLS70 : 100 to 1500m step 50m, 10s update



WLS70 during LUAMI campaign Lindenberg, Nov –Dec'08

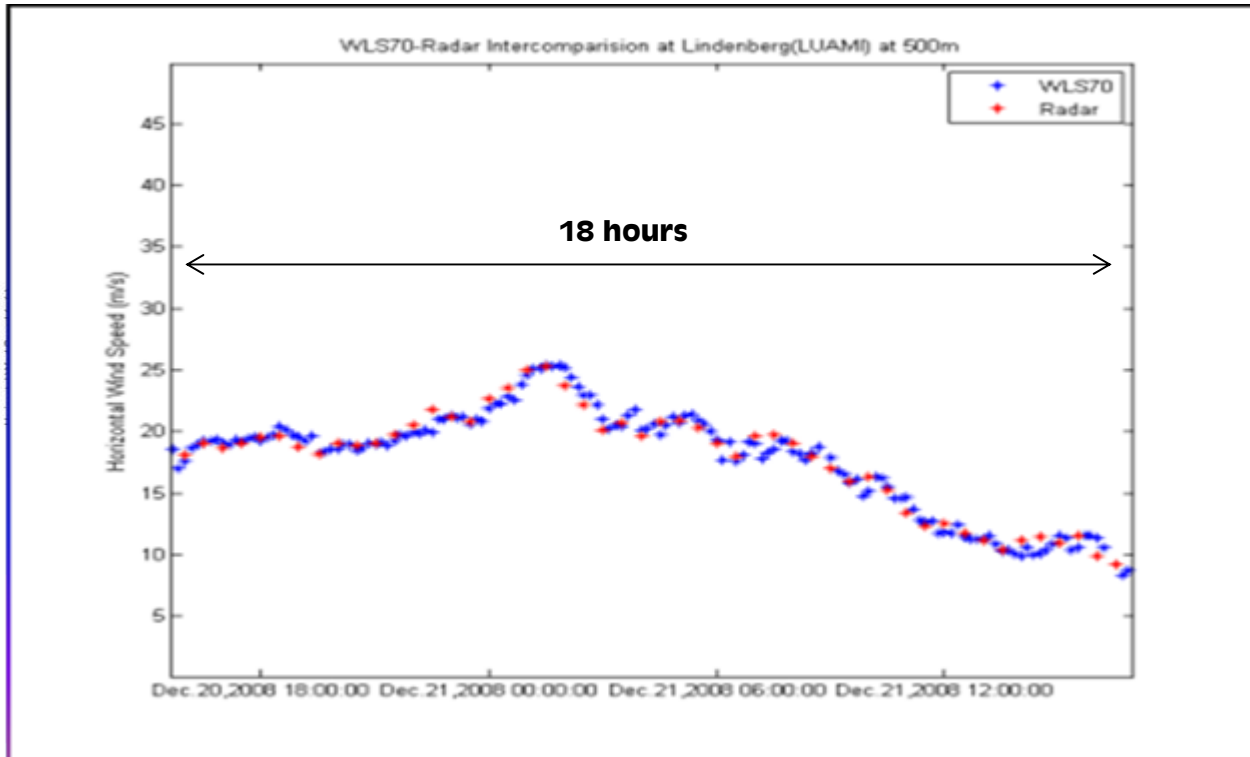
- Equipped with scanning device to retrieve the 3 wind components



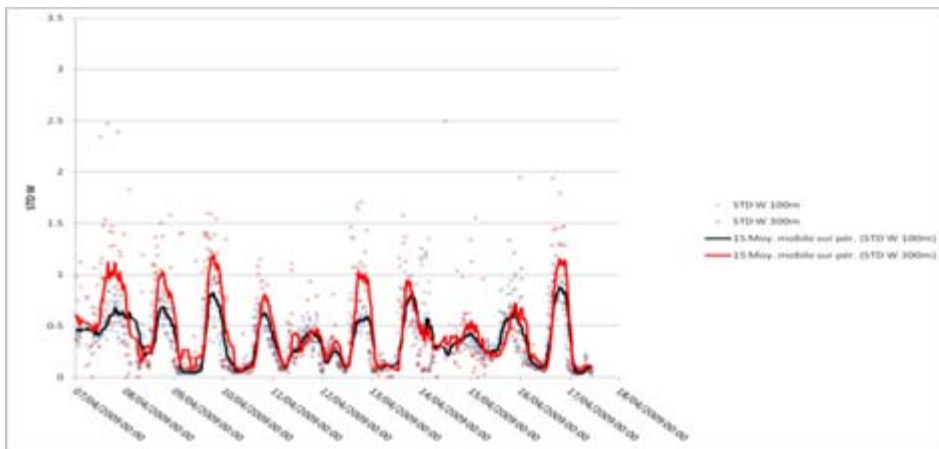
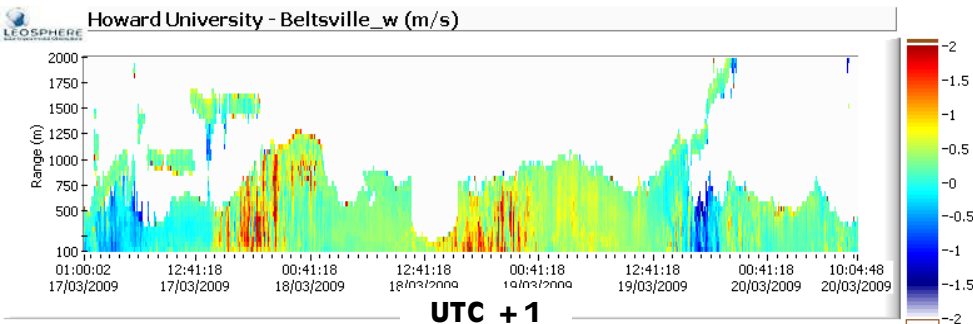
- Long range WLS70 to compare with sodar and radar on site (0.1-3km) for 2 months)

WLS70 vs Radar @ 500m

Horizontal Wind Speed

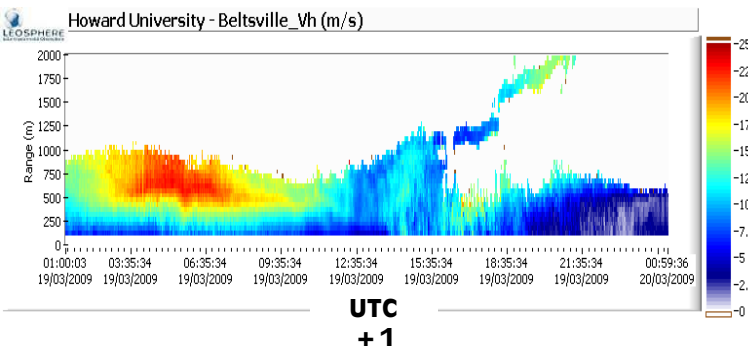


WLS70 at the Howard University, MD, (March April 09)

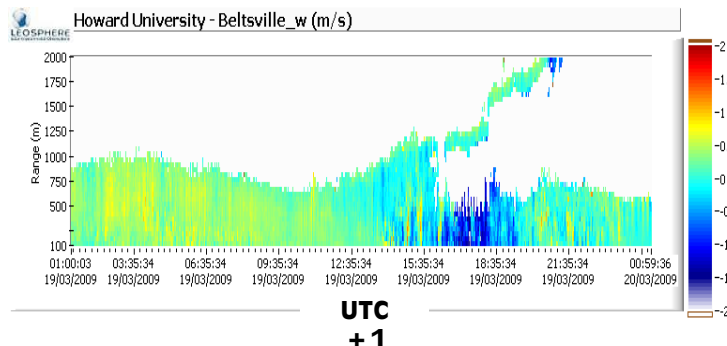


LLJ + rain front + change in wind direction

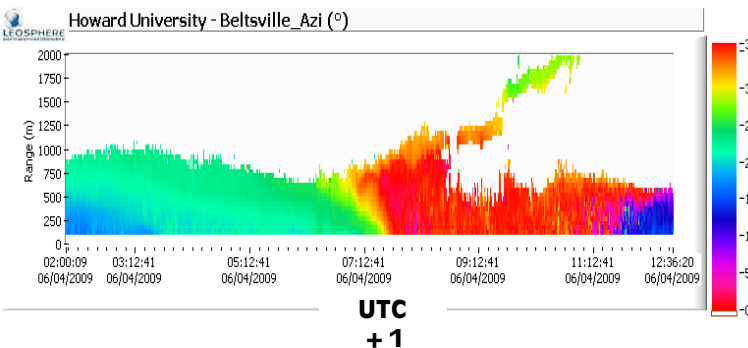
Horizontal Wind speed



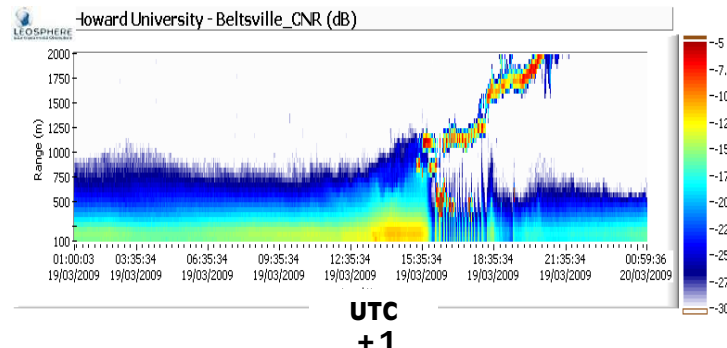
Vertical Wind speed



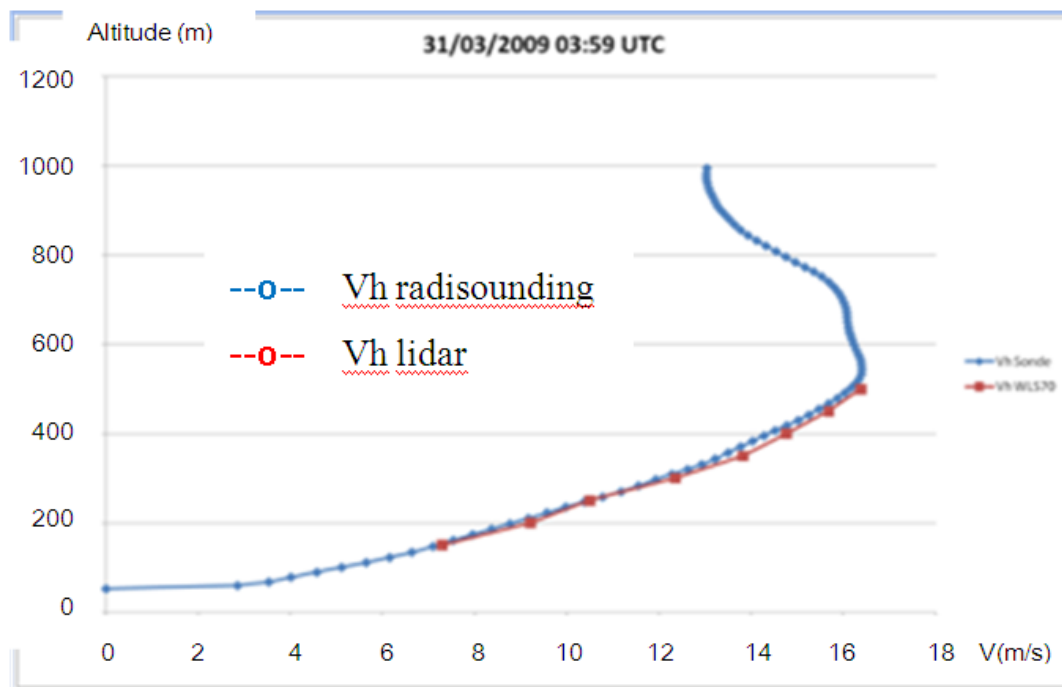
Wind direction



CNR

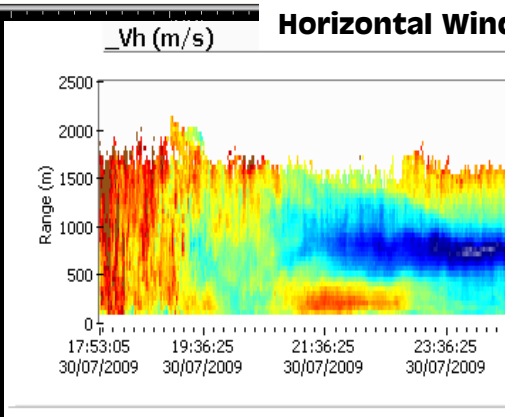


WLS70-Radiosounding inter-comparison (Beltsville, MD, US, March 09)

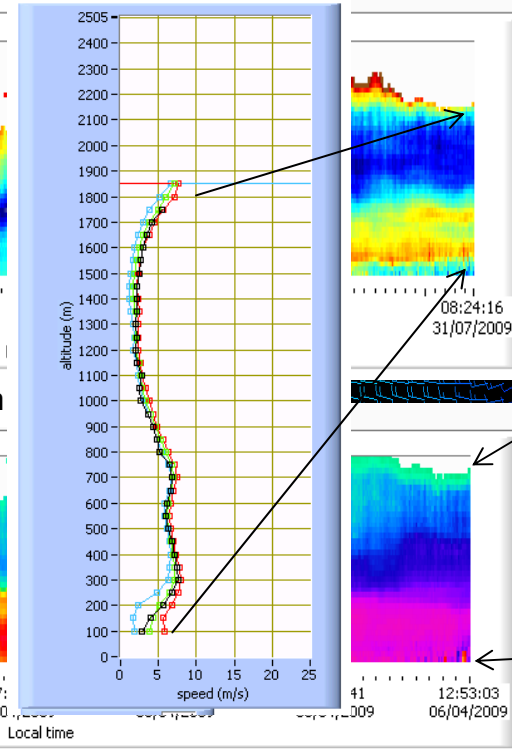


LEOSPHERE, Orsay, Fr – Wind velocity

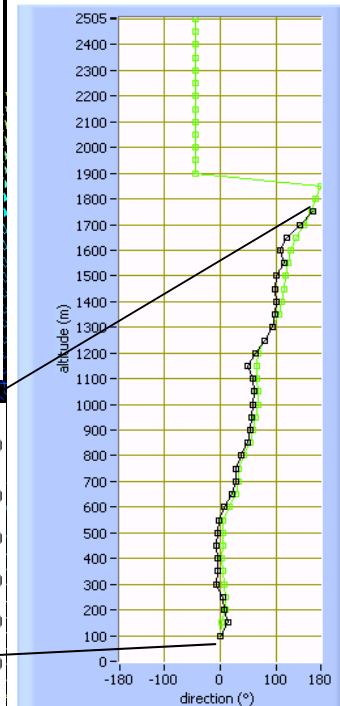
Horizontal Wind Speed



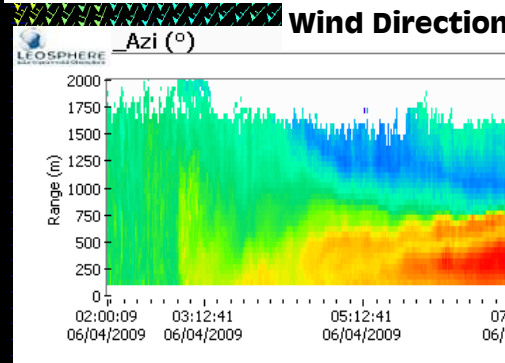
Horizontal Wind Speed Profile



Relative Wind Direction Profile



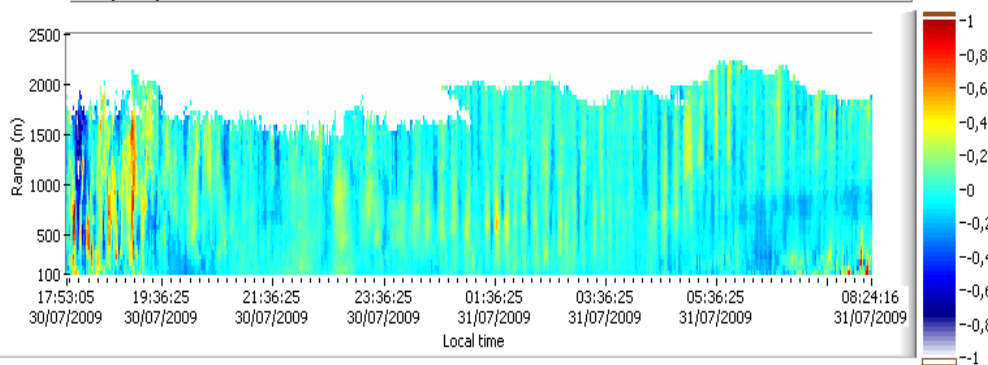
Wind Direction



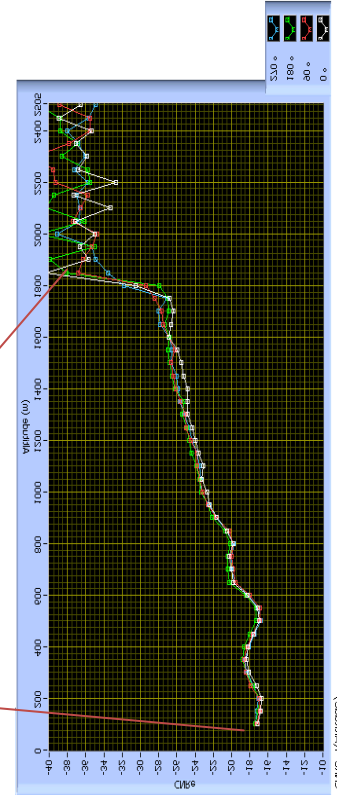
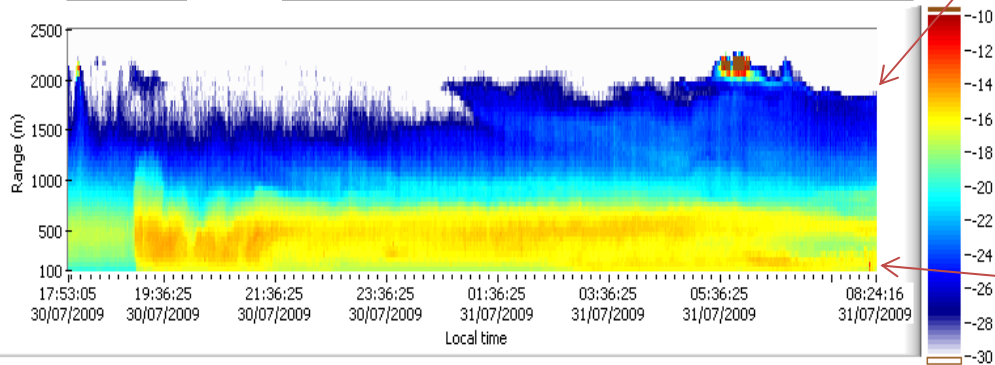
Local time

LEOSPHERE, Orsay, Fr – layers observation

_w (m/s) **Vertical Wind Speed**



_CNR (dB) **CNR**

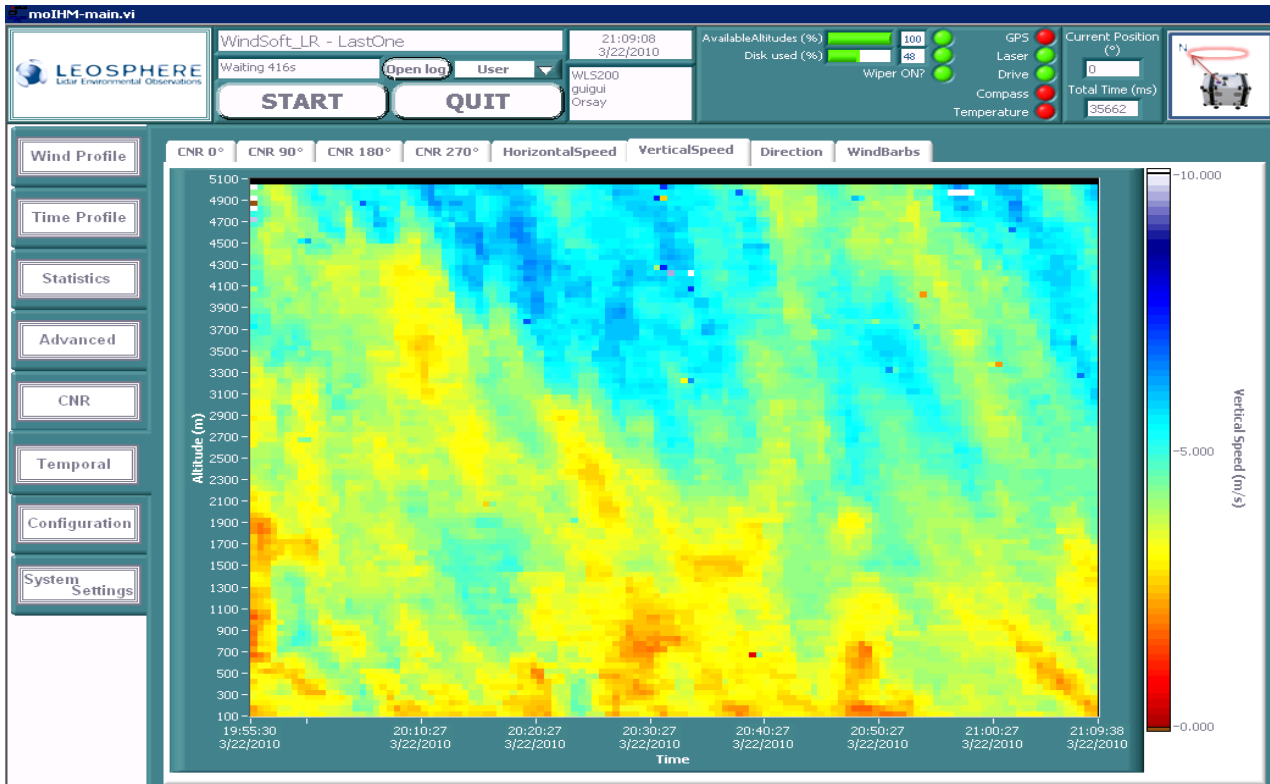


Windcube200

- **New laser amplifier**
- **New telescope** → **Range 5km (horizontal) in PBL**
- **Same size as Windcube70**



WindCube200 radial wind speed vs time



→ Time

Conclusion – Future work

- Leosphere offers a complete family of wind lidars for meteorology and airport safety applications
- *Windcube70* has been validated as wind profiler up to 2000m through numerous inter-comparison and field campaigns against other sensors
- *Windcube200* long range high rate lidar is now available for full PBL monitoring and wind monitoring along the glide up to 5000m
- *Windcube200S* will be developed in the next future for windshear detection and wake vortex monitoring with a hemispherical scanner

Thank you

www.leosphere.com



**LEOSPHERE is moving TODAY 29
March 2010 to new premises at
ORSAY, Parc Club Université.**

**Visit our Web site for updated
information :**

www.leosphere.com

