The PArisFOG field experiment :

Objectives and preliminary results

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PArisFOG project has been performed to study the life cycle of fog and low clouds in contínal environment

Objectives :

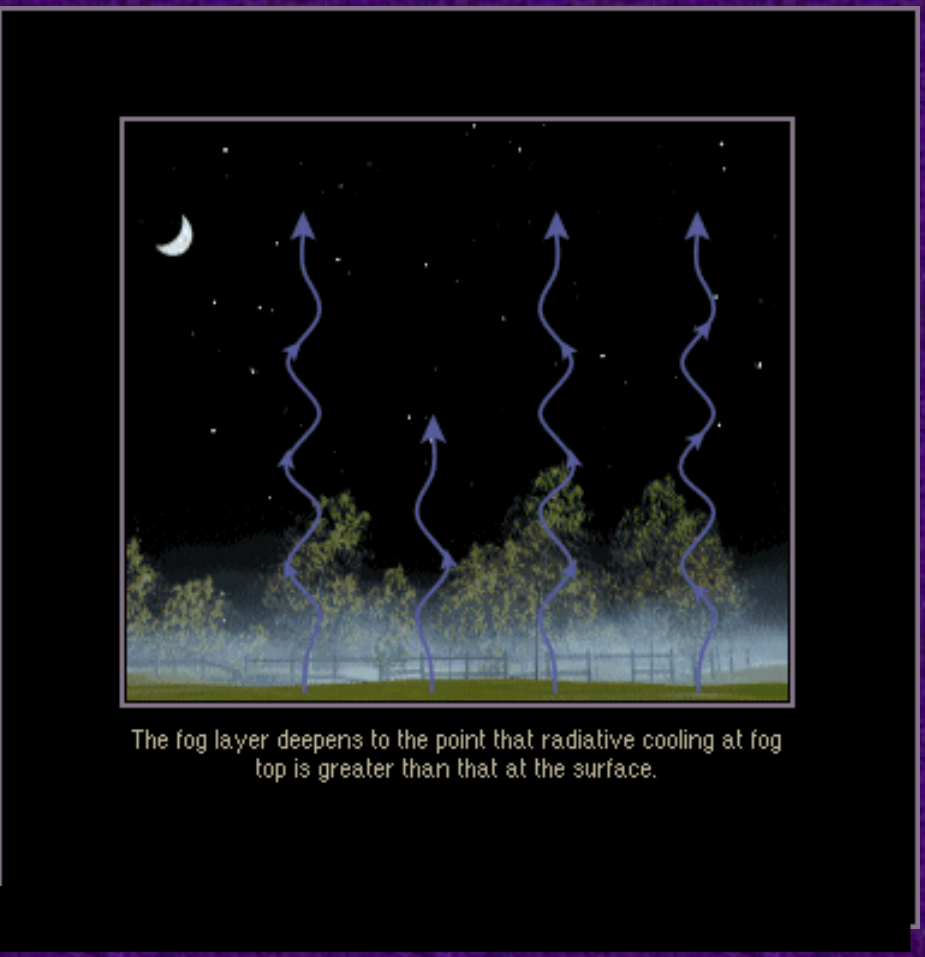
- *to provide observations on the whole processes taking place during the life cycle of fog : microphysical processes, turbulent processes and surfaces exchanges have been precisely documented;*

- *to characterize fog formation, evolution and dissipation;*

- *instrumented site involves heterogeneities at fine scale : all processes have been documented for various kind of surface conditions;*

- *to improve our ouderstanding and our ability to similate numerically the life cycle of fog in order to improve the operational numerical prediction of fog*

Several research laboratories and institutes (CEREA, ENPC, IPSL, LMD, SA, CETP, LSCE, LA, CNRM, …)
From October 15th 2006 to April 1st 2007
Location : Paris-Palaiseau / SIRTA



The fog layer deepens to the point that radiative cooling at fog top is greater than that at the surface.

Various processes can reduce the visibility: radiation fog, advection fog, stratus lowering, …

For continental areas, fog occurs predominantly during winter season, typically within stable boundary layers

Radiation fog formation is directly related to thermodynamical, radiative, microphysical processes as well as surface exhanges

Microphysics of fog dropplets can be very different, depending on the size and chimistry of aerosols : e.g. spectral shape is different for various foggy conditions

PArisFOG : instrumented site

Fog forecasting cannot be successful until a better understanding of small scale effects on its life cycle is provided

- heterogeneous area at fine scale (grassland, forest, lake, urban area)
- 4 instrumented areas
- from October 15th 2006 to April 1st 2007

2 meteorological towers

- T/Hu : 1, 2, 5, 10, 30m
- sonic anemometers : 10m, 30m
- LW and SW radiation fluxes : 1m, 30m

Remote sensors

ground measurements

SW/LW radiation fluxes

T / moisture down to –50cm

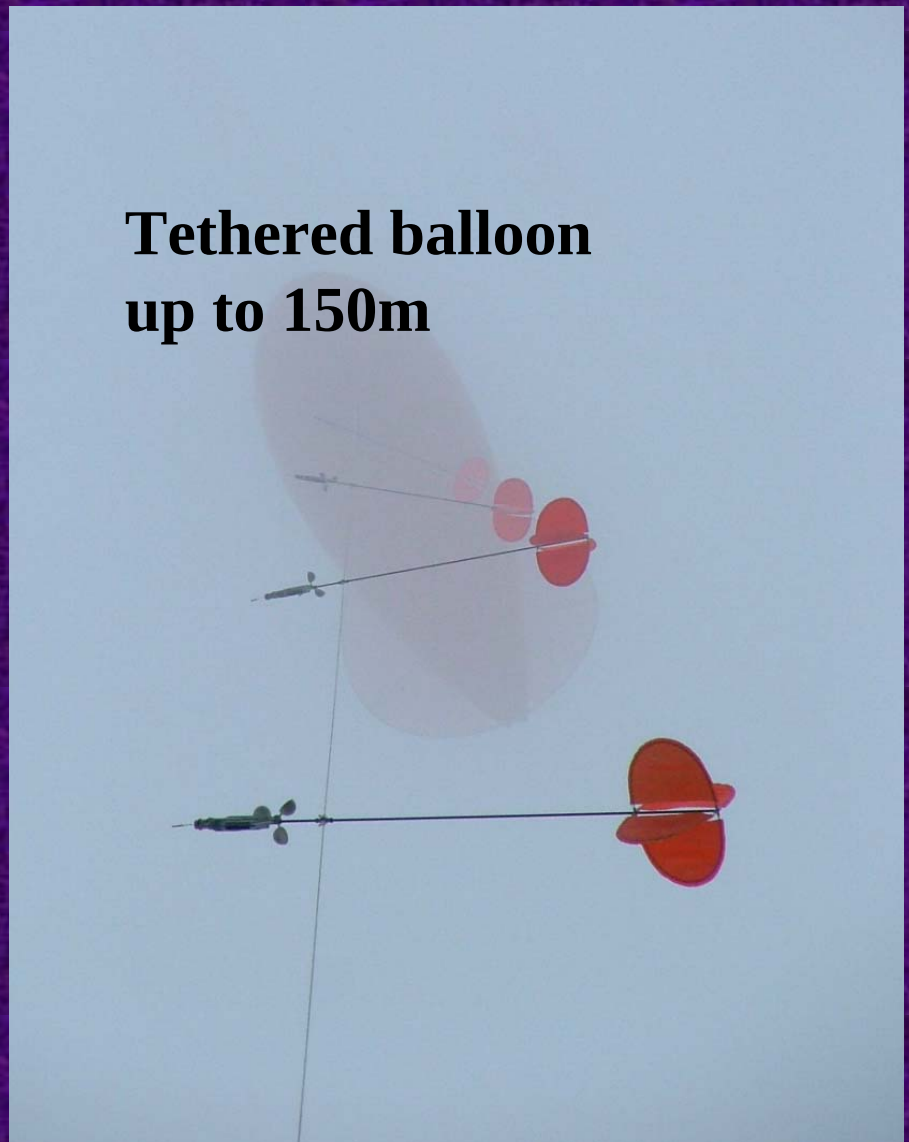
BOWEN : ground energy balance

microphysical measurements

- granulometric spectrum (aerosol + fog dropplets)
- optical properties
- chimical analysis

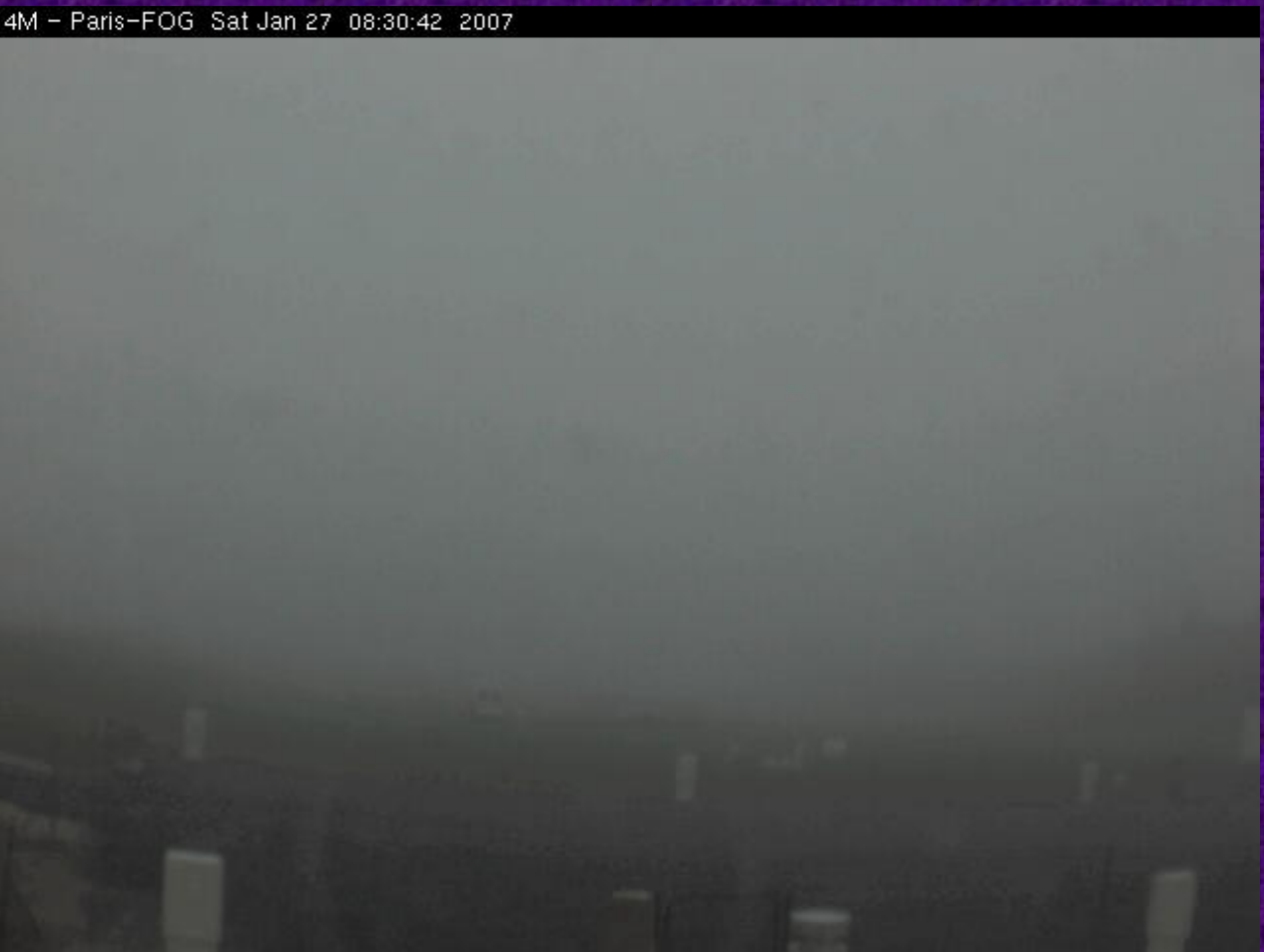
specific measurements during IOPs

- tethered ballon : 5 levels (T / Hu / wind, vertical velocity) up to 150m, during IOPs – data every 10s
- atmospheric soundings : every 3h during IOPs



dense fogs

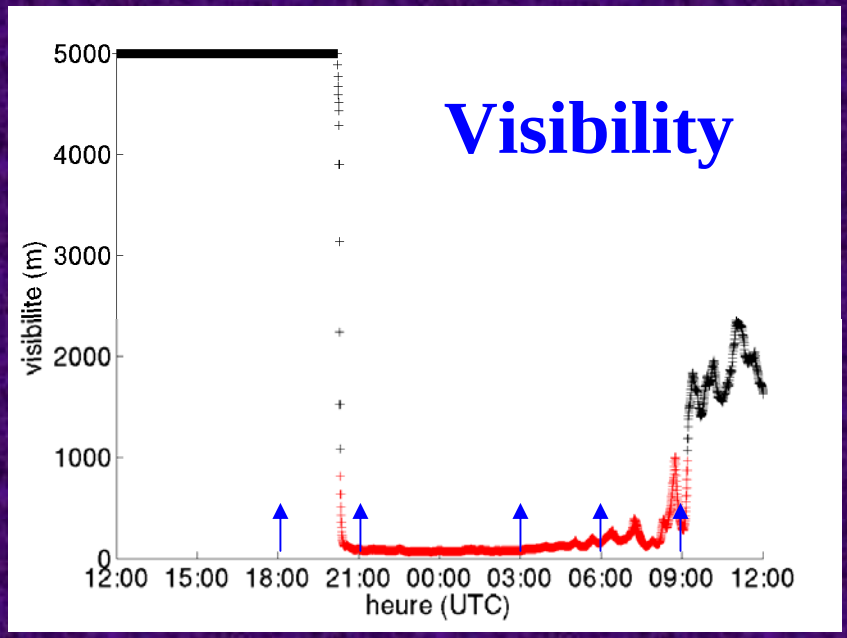
14 denses fog events have been documented, including radiation fog, stratus lowering and advection fog.

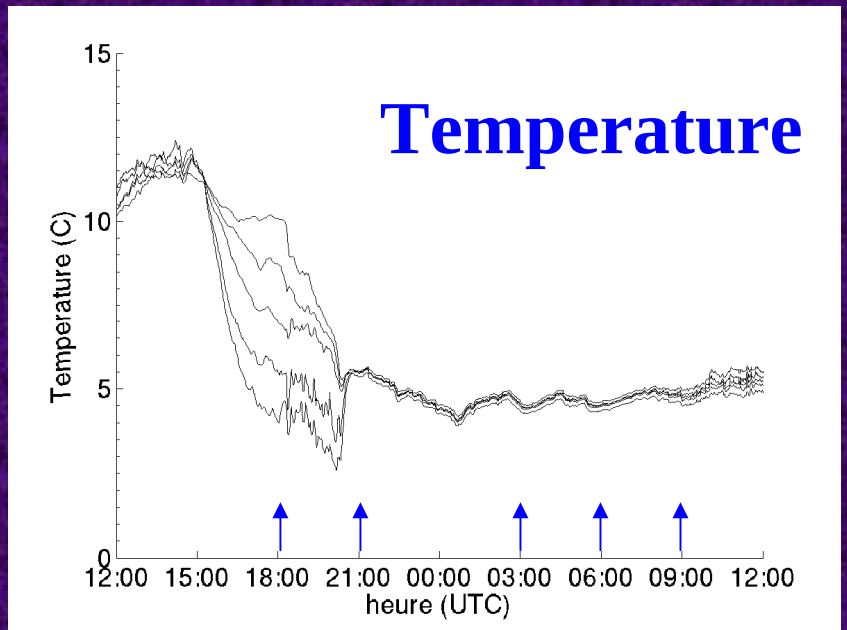


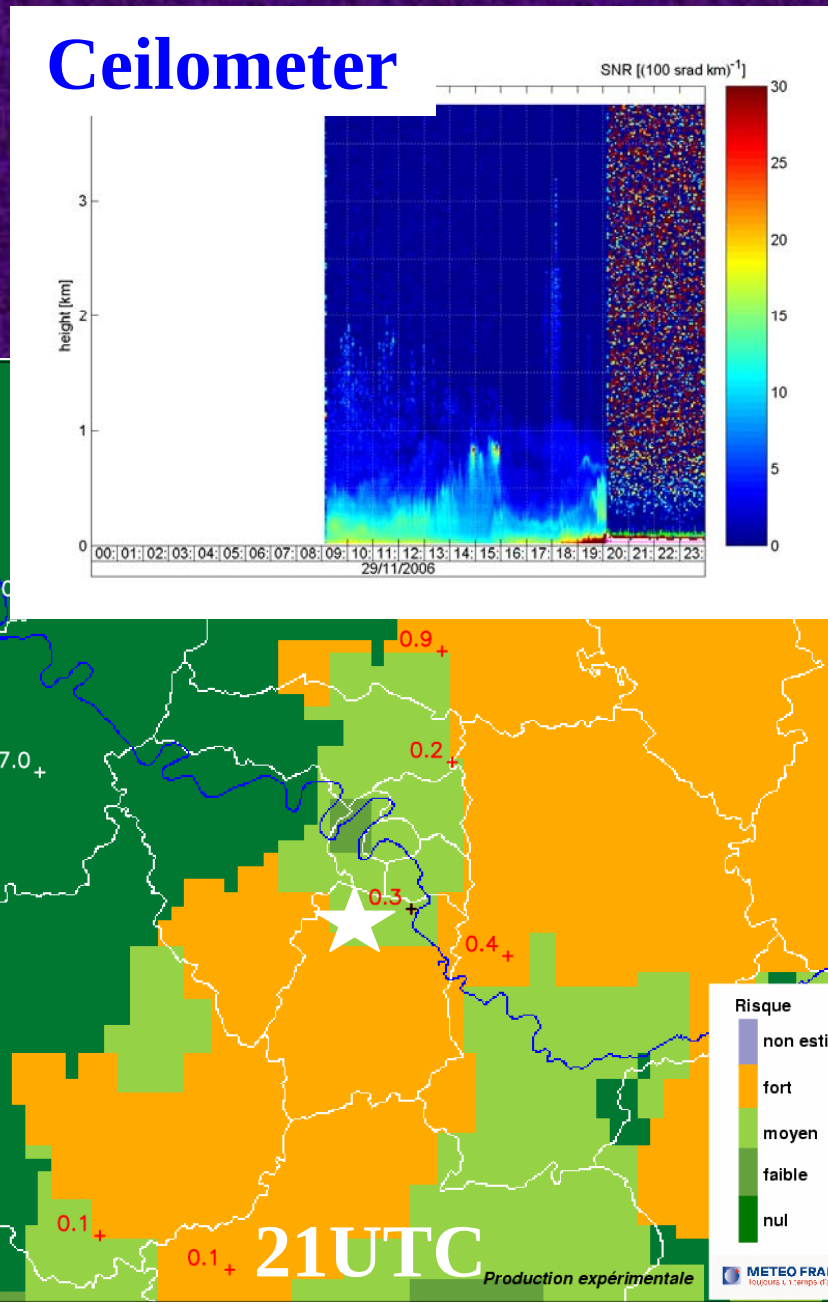
- 8 events have been documented with automatic instrumentations

- 6 IOPs (routine measurements + soundings + tethered ballon + chimical analysis)

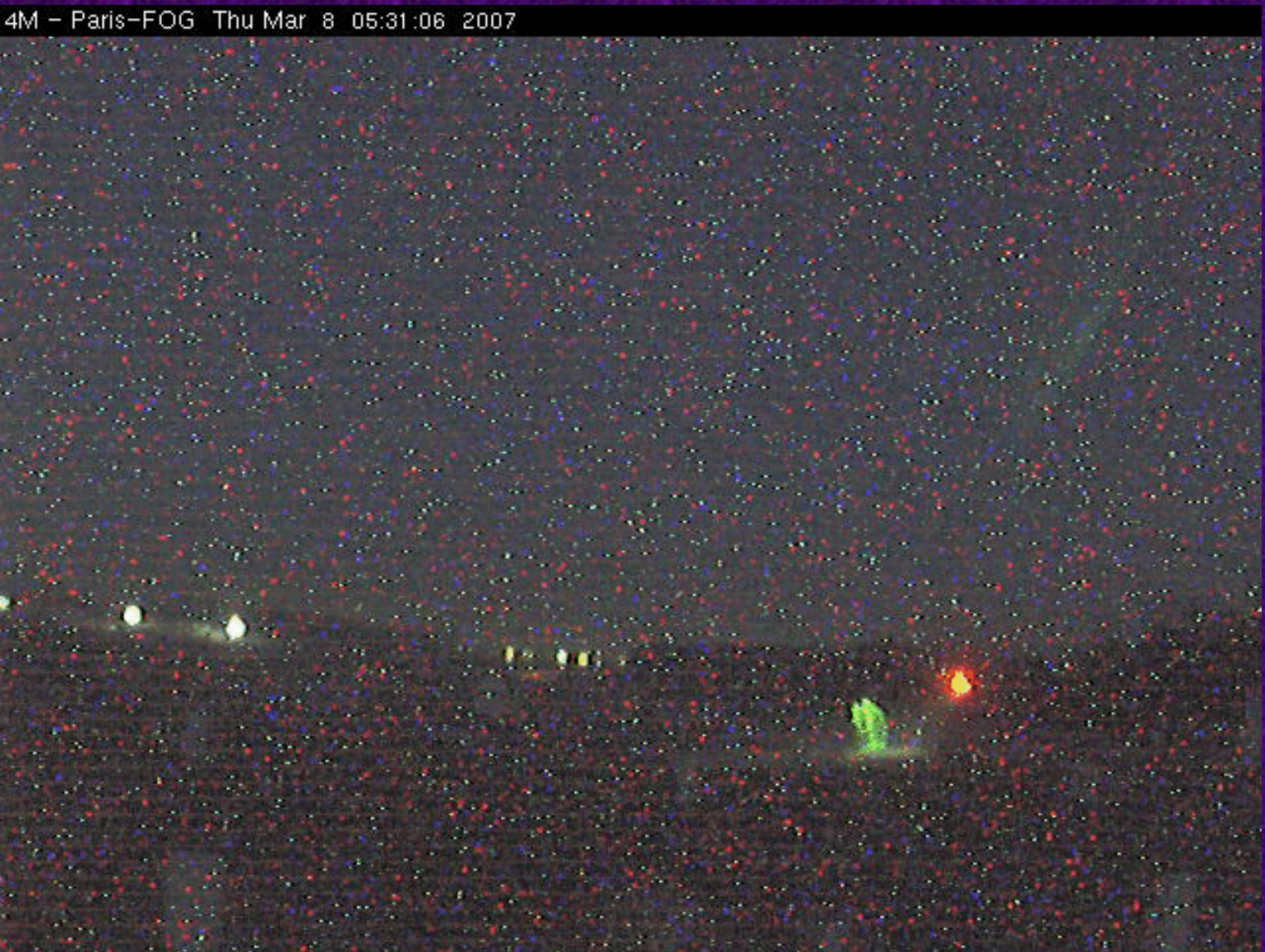
PArisFOG : POI1 (29-30 Novembre 2006)







stratus lowering



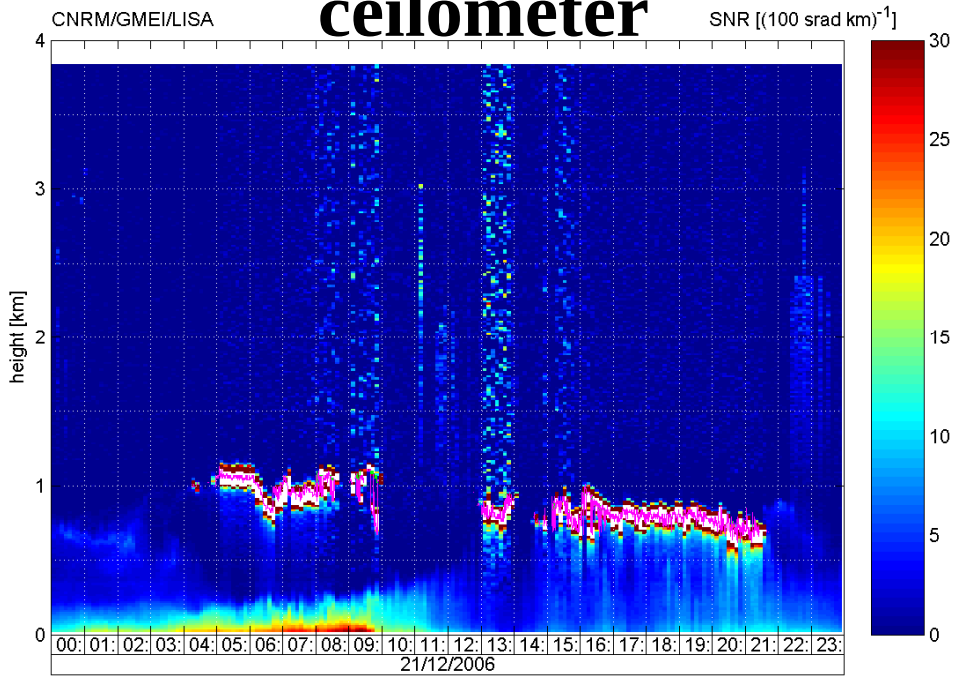
- good visibility (more than 10km) at the end of night
- advection of stratus
- stratus lowering : fog!
- sunny weather!

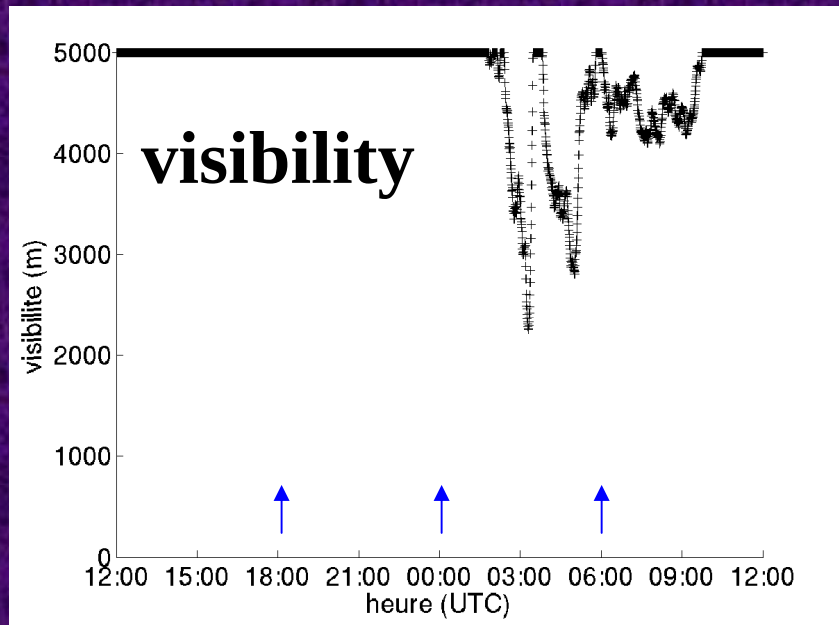
close to fog

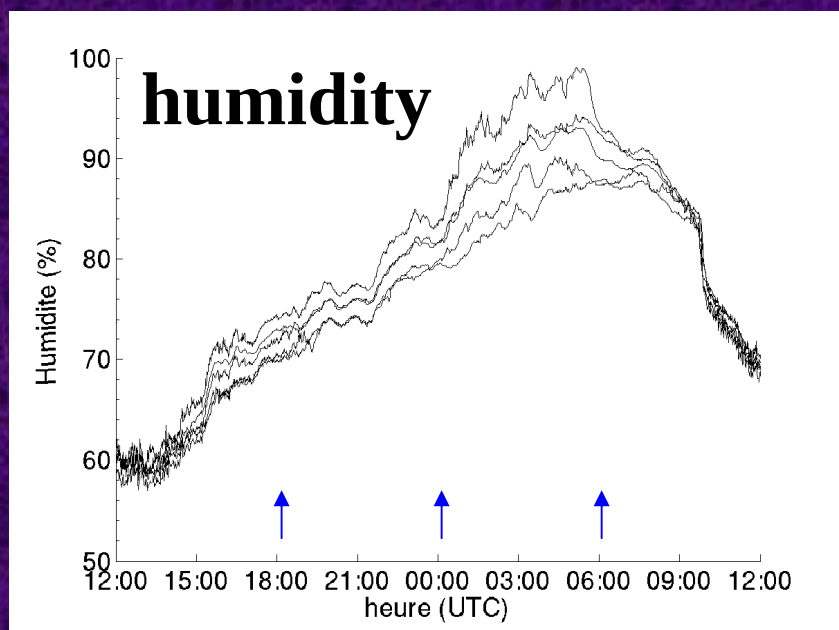
9 IOPs have been realized in conditions close to fog corresponding to various meteorological conditions :

- cloudy conditions
- very light wind
- moderate wind
- …!

PArisFOG : POI5 (20-21 Décembre 2006)







Close to fog formation at the end of the night :

- Humidity close to saturation
- 2000m horizontal visibility
- But … some stratocumulus at top of the residual boundary layer…

You can access the web site of PArisFOG filed experiment (in live!)

You can see documented cases on web site (quicklook) :

http://parisfog.sirta.fr

QUESTIONS!

Parameters	Instruments	area	
Meteorological measurements	Temperature + humidity at 1, 2, 5, 10, 30m	Z1 / Z3	routine
	Temperature + humidity + wind on tethered ballon up to 150m	**Z1**	**IOP**
	Soundings every 3h	**Z1**	**IOP**
Remote sensors	UHF wind profiler	Z1	routine
	Wind profiling Sodar	Z1 / Z3	routine
	Wind profiling X-Band Radar	Z1	routine
Turbulence	Ultra-sonic anemometers at 10m and 30m	Z1 / Z3	routine
Radiation	Up and Down SW and LW fluxes at 2m and 30m	Z1 / Z3	routine
	Bowen station at ground	Z1	routine
Microphysical measurements	Visibility	Z1	routine
	Ceilometer CT25K	Z1	routine
	Fog Dropplets : size + number (PALAS)	**Z1**	**IOP**
	Aerosol granulometric spectrum (GRIMM, SMPS)	Z1	routine
	Optical properties of aerosol (aethalometer, nephelometers)	Z1	routine