Airborne Measurement Platform (PMA LaMP/OPGC)

Plateforme de Mesure Aéroportée (PMA LaMP/OPGC)

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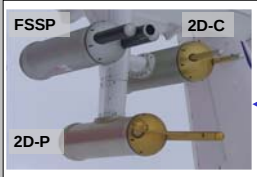
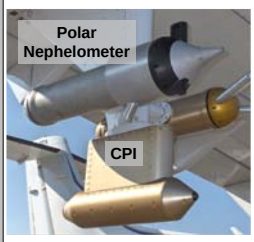
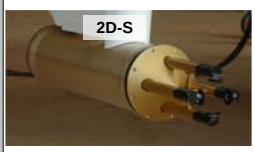




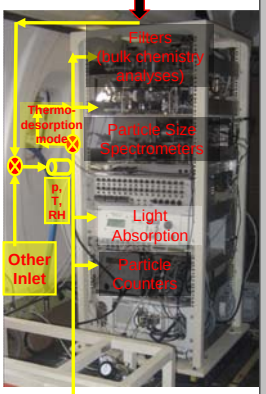


One of the **largest** set of airborne instruments for **Cloud** and **Aerosols** studies.

LaMP/OPGC Airborne Measurement Platform instruments have been operated on :
ATR 42 (SAFIRE)
Falcon 20 (SAFIRE and DLR)
Polar 2 and **Polar 5** (AWI)

PROBES TO BE IMPLEMENTED ON PMA
Polar Nephelometer 2nd Generation
(new electronics, additional diffusion angles)
LWC100
(Liquid Water Content)
CDP
(Particle by Particle Cloud Droplet Probe, 3 to 50 µm)
SID
(Small Ice Detector, 1 to 50 µm)

CVI
Cloud residual and water content sampling



+ Aerosol Mass Spectrometer Modified for Airborne Applications

Cloud Instrumentation	
Forward Single Scattering Probe (FSSP)	Cloud Droplet Size Spectrometer 16 channels, range 3 to 50 µm
2D-C (Cloud)	Cloud Particle Imaging Probes pixel 25 µm, range 25 to 800 µm
2D-P (Precipitation)	Cloud Particle Imaging Probes pixel 200 µm, range 200 to 6000 µm
Precipitation Imaging Probe (PIP)	New Precipitation Imaging Probe, pixel 100 µm, range 100 to 6200 µm
2D-S	Stereoscopic Imaging, pixel 10 µm, range 10 to 1280 µm
Cloud Particle Imager (CPI)	Size and Morphology of Hydrometeors, pixel 2.3 µm
Polar Nephelometer	Particle Diffusion Phase Function
PVM-100	Liquid Water Content and Effective Droplet Radius

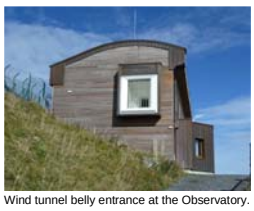
Aerosol Instrumentation	
PSAP	Aerosol Light Absorption
Optical Particle Counters (OPC)	Aerosol Size Spectrometer, range 0.1 to 10 µm
SMPS	Aerosol Size Spectrometer range 10 to 500 nm
Condensation Particle Counters (CPC)	Total Particle Counters (> 5 nm)
Cascade Impactors	Size Resolved Single Particle Elementary Composition
Aerosol Mass Spectrometer (AMS)	Size Resolved Particle Chemical Composition (Sulfate, Nitrate, Organics,…)
Lyman Alpha	Fast Water Vapor Content
Dew Point Chilled Mirror	Accurate Water Vapor Content

APPLICATIONS			
Campaign	**Studies**	**Location**	**Aircraft**
ASTAR	Aerosol-Cloud-Radiation Interactions	ARCTIC	POLAR 2
POLARCAT	Aerosol-Cloud-Radiation Interactions	ARCTIC	ATR 42
AMMA	West African Monsoon	WEST AFRICA	ATR 42 & FALCON 20
EUCAARI	Aerosol-Cloud-Radiation Interactions	THE NETHERLANDS	ATR 42
MEGAPOLI	Aerosol Studies	FRANCE	ATR 42
CIRCLE-2	Cirrus Cloud Experiment	WESTERN EUROPE	FALCON 20 (DLR)
IN11	Ice Crystal Formation	GERMANY	*AIDA Chamber*
CONCERT	Contrail and Cirrus Studies	WESTERN EUROPE	FALCON 20 (DLR)
SPICE	Antarctic Ice Crystal Characterization	SOUTH POLE	*Amundsen–Scott South Pole Station*
SORPIC	Cloud-Radiation Interactions	ARCTIC	POLAR 5
MEGHA-TROPIQUES	Tropical Clouds	WEST AFRICA	FALCON 20
MEGHA-TROPIQUES	Tropical Clouds	INDIA	FALCON 20
ML-CIRRUS	Radiative Impact of Cirrus	WESTERN EUROPE	FALCON 20 (DLR)
HYMEX	Precipitation, Cyclogenesis	FRANCE	ATR 42
CHARMEX	Aerosol Chemistry-Radiation	FRANCE	ATR 42

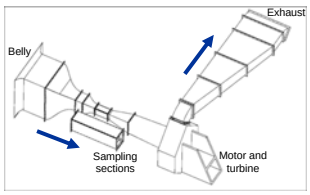
In red: potential experiments

- PMA is also operated for in-situ validation of active and passive remote sensing techniques (e.g. CALIPSO, CloudSat, Mégha-Tropiques …)
- High synergy of PMA measurements with cloud modeling tools utilized at LaMP (DESCAM, RAMS, WRF and ExMix)
- Collaborations with aeronautical industries (Airbus, Eurocopter, Dassault Aviation, …)

THE OPEN WIND TUNNEL FACILITY AT THE TOP OF THE PUY DE DOME (1465 m) in support of the Airborne Measurement Platform



Wind tunnel belly entrance at the Observatory.



Wind tunnel diagram.

Natural cloudy conditions (water droplets and/or ice crystals).

2 alternate sampling sections :
- 320 mm x 250 mm, airspeed up to 120 m/s
- 640 mm x 500 mm, airspeed up to 52 m/s

Applications :
- Cloud studies
- Airborne probe tests
- Ice shattering studies
- Natural icing conditions

Large sampling section (with the Cloud Particle Imager).

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http://wwwobs.univ-bpclermont.fr/atmos