






DABEX:

Comparisons of aerosol properties
measured by aircraft, ground and
satellite instrumentation

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- Ground sites:

- Niamey (ARM facility) 
- Banizoumbou (CIMELS+“super-site”) 
- Djougou (CIMELS+lidar, size dist, σ_{sp} , σ_{ab})
- Ilorin (CIMELS only ?) 

- BAe-146 aircraft 

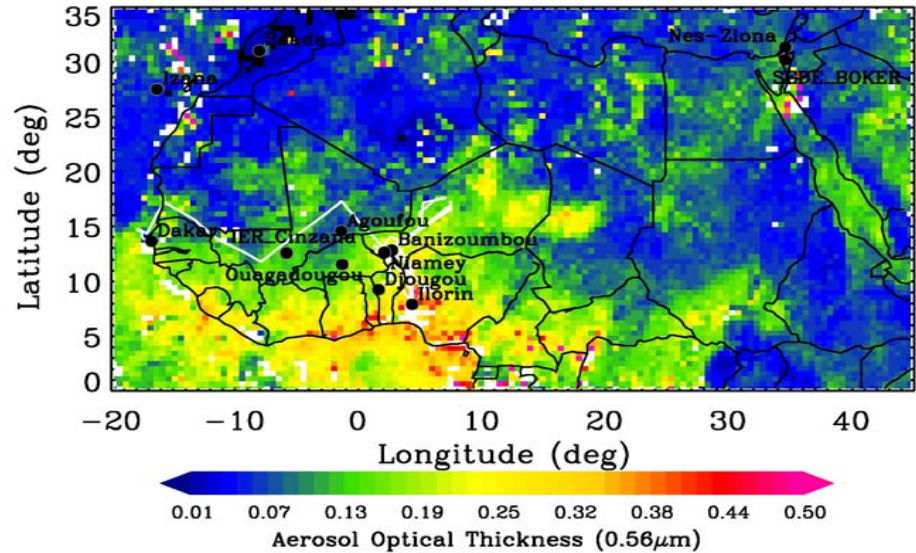
- ULA 

- Satellite instruments: MODIS, MISR, TOMS

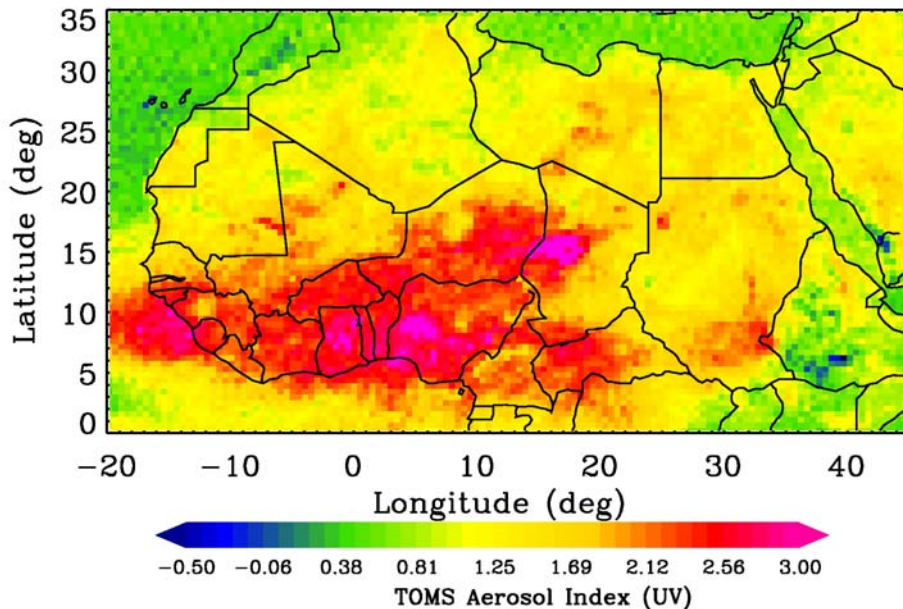
- Aerosol size distributions (*in-situ and remote sensing*)
- Aerosol chemistry (*in-situ*)
- Aerosol optical properties (*in-situ and remote sensing*)
 1. Single scattering albedo (scattering and absorption)
 2. Angstrom exponent
 3. Extinction optical depth

January 2006

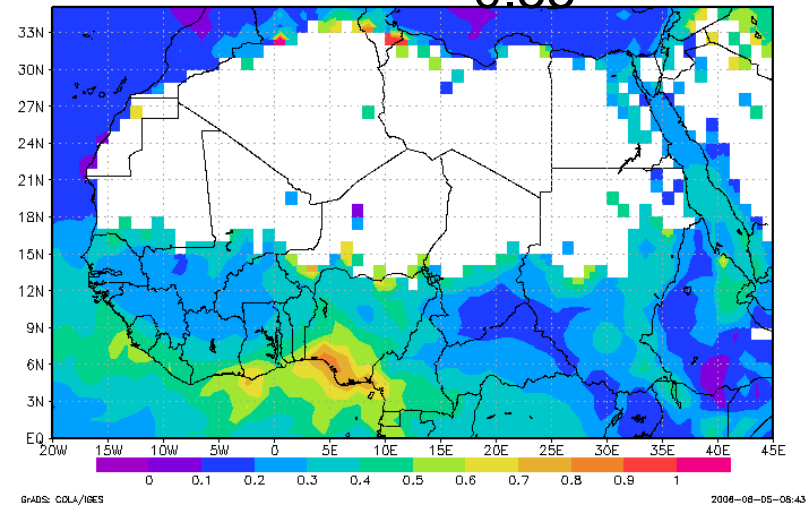
MISR $\tau_{0.55}$



TOMS Aerosol Index

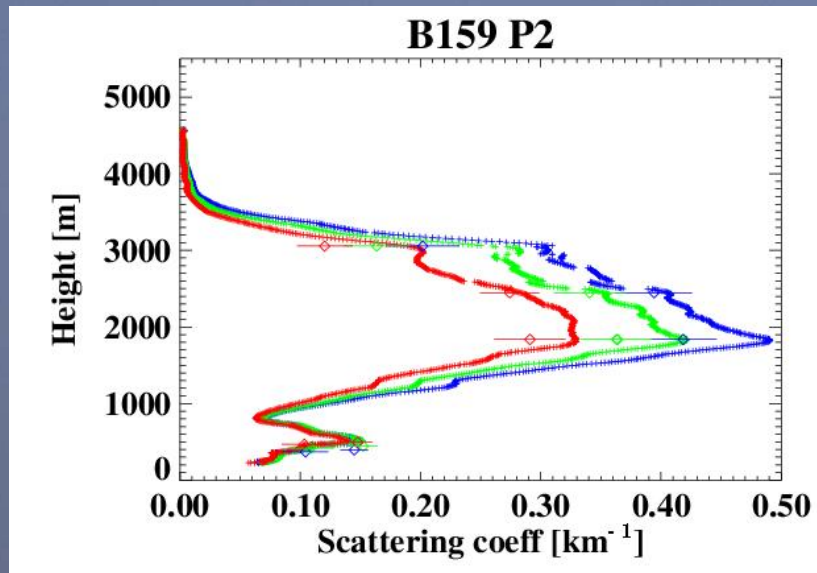


MODIS $\tau_{0.55}$

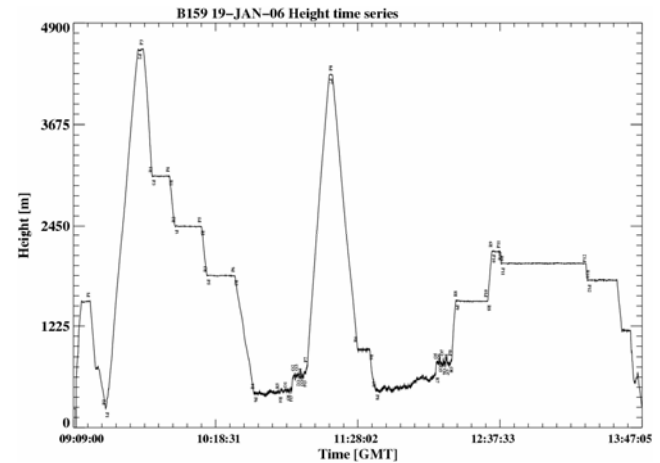
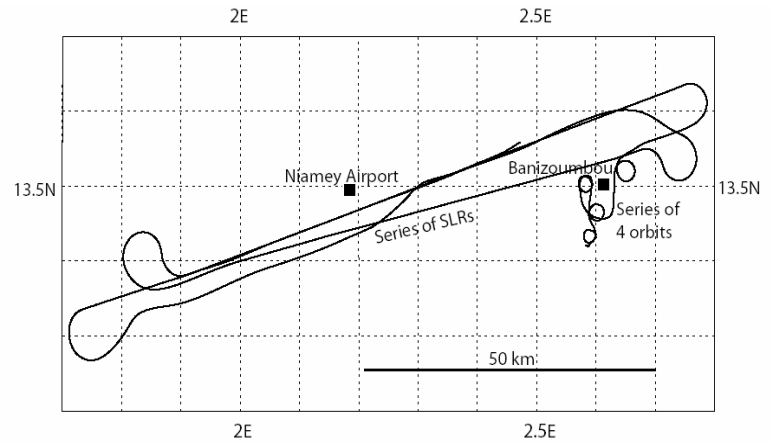
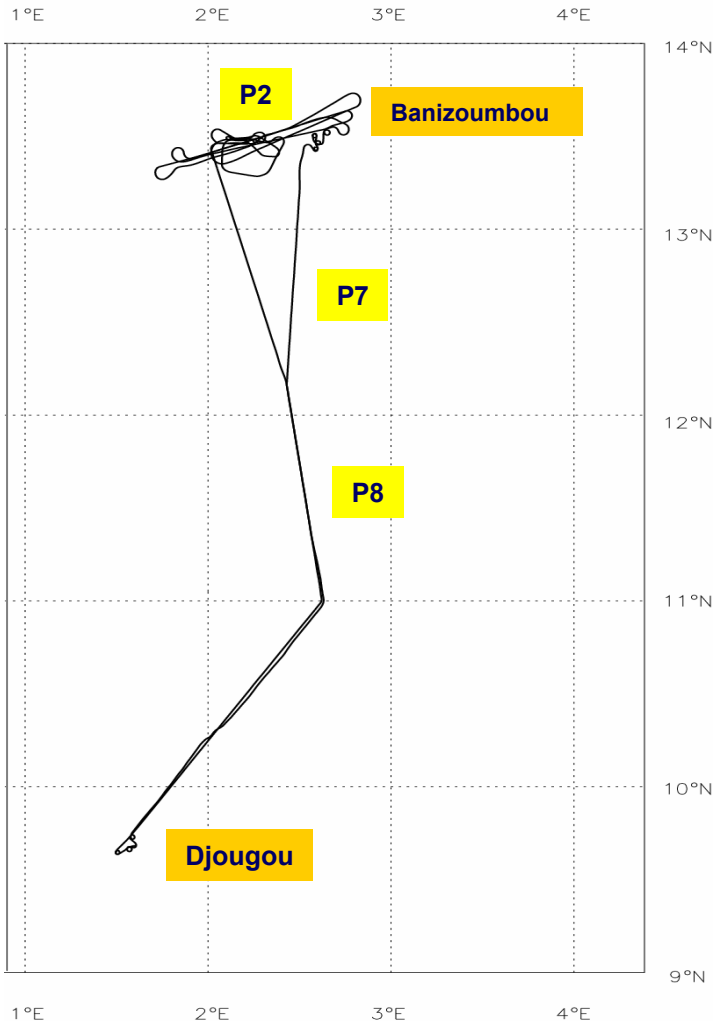


19th January 2006

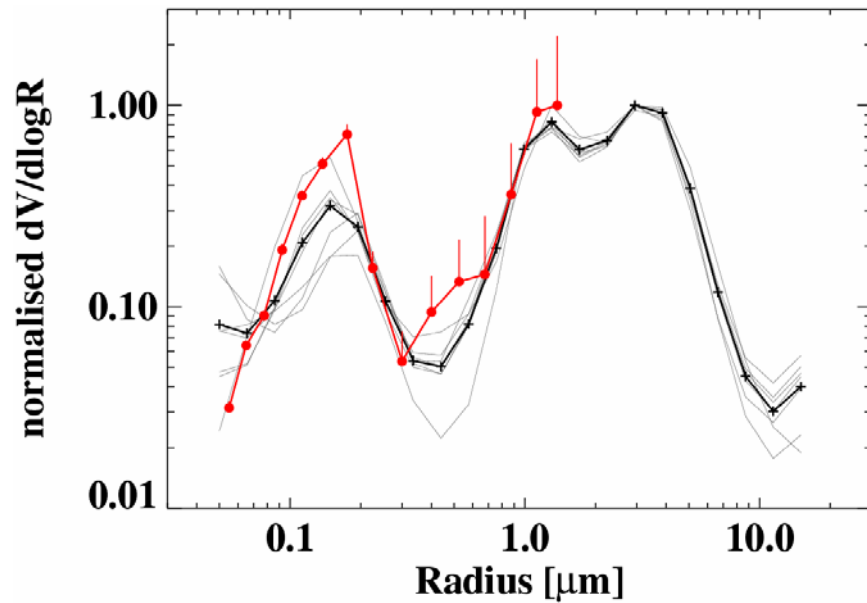
BAe-146 flight B159



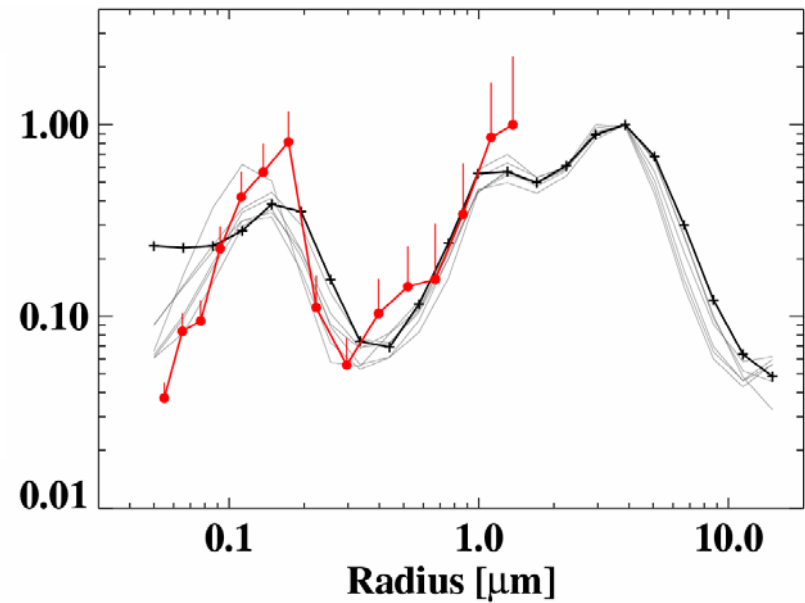
B159 19th January 2006 flight track



BAe-146 vs Banizoumbou

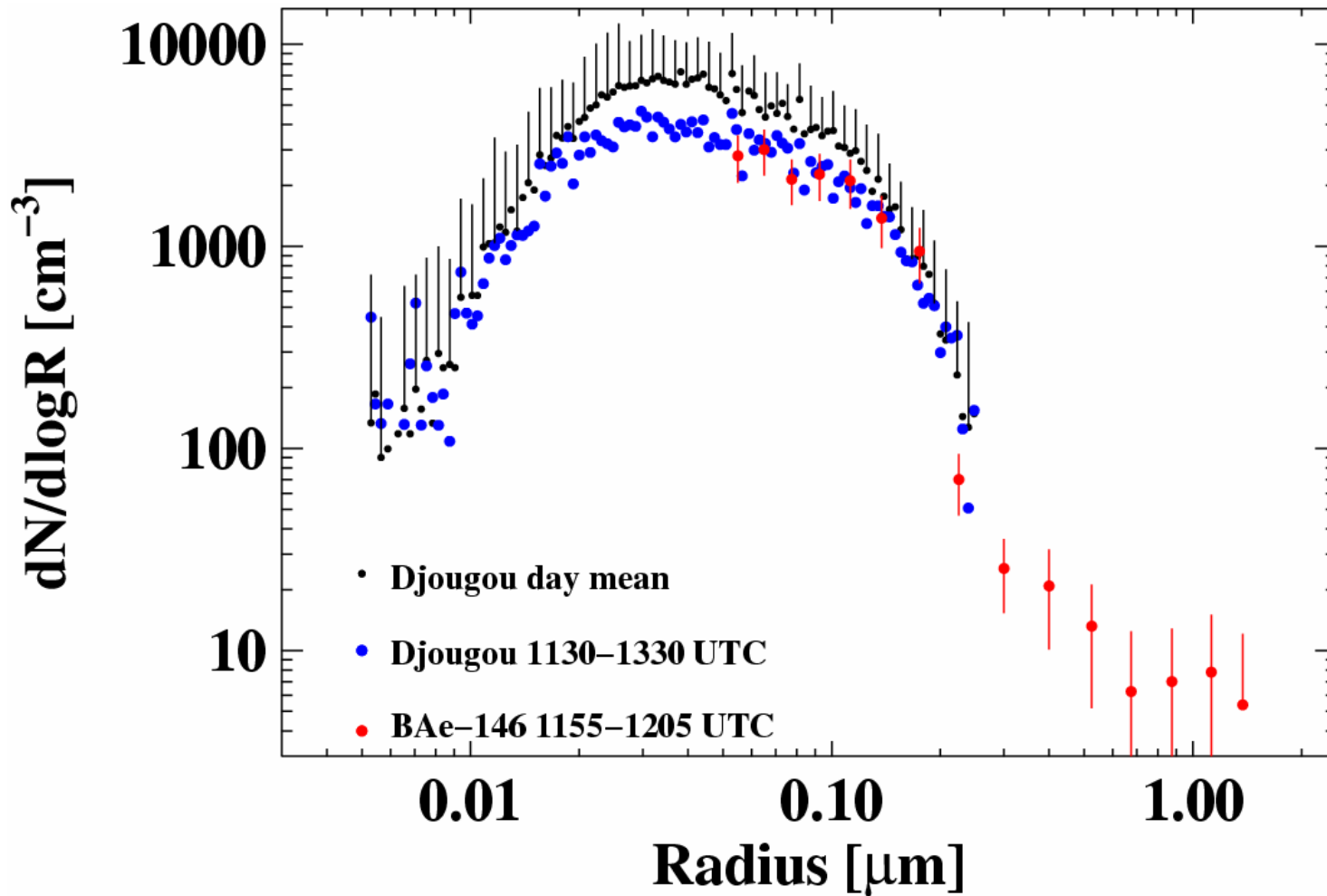


BAe-146 vs Djougou

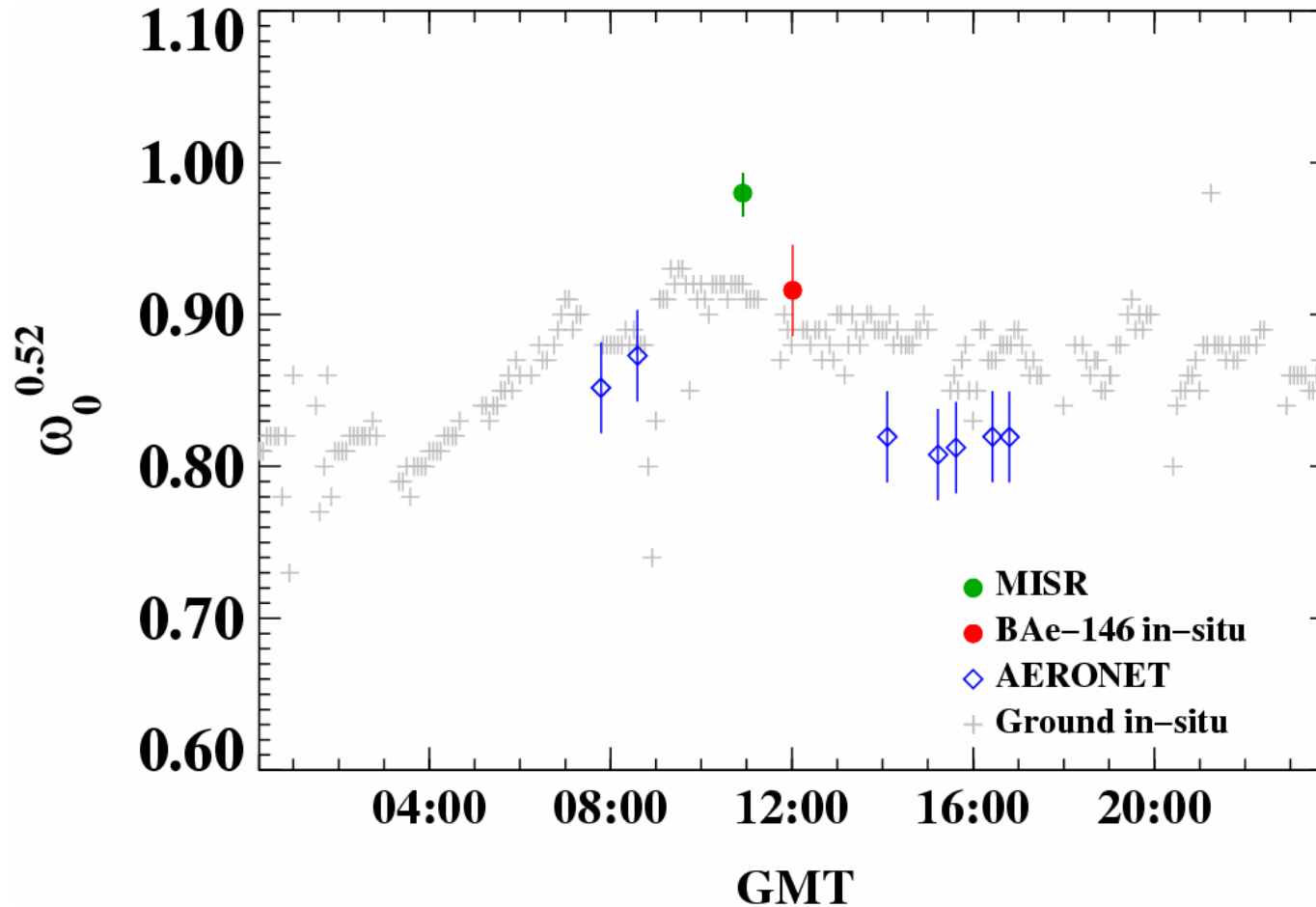


- B159 aircraft in-situ
- +— AERONET mean
- AERONET individual

19th January 2006 Djougou number size distributions: ground SMPS vs aircraft PCASP



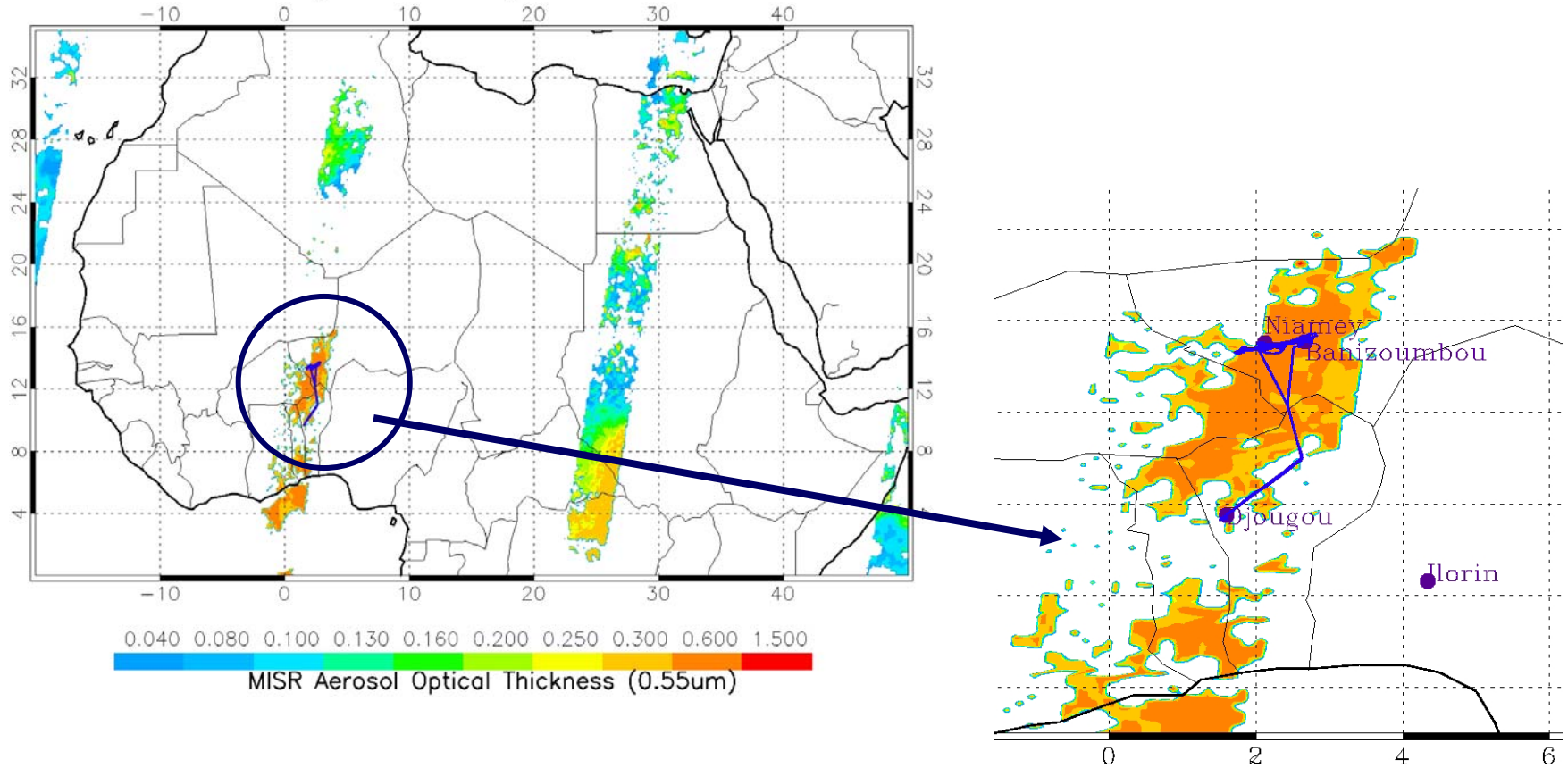
19th January 2006 single scatter albedo: over Djougou ground site

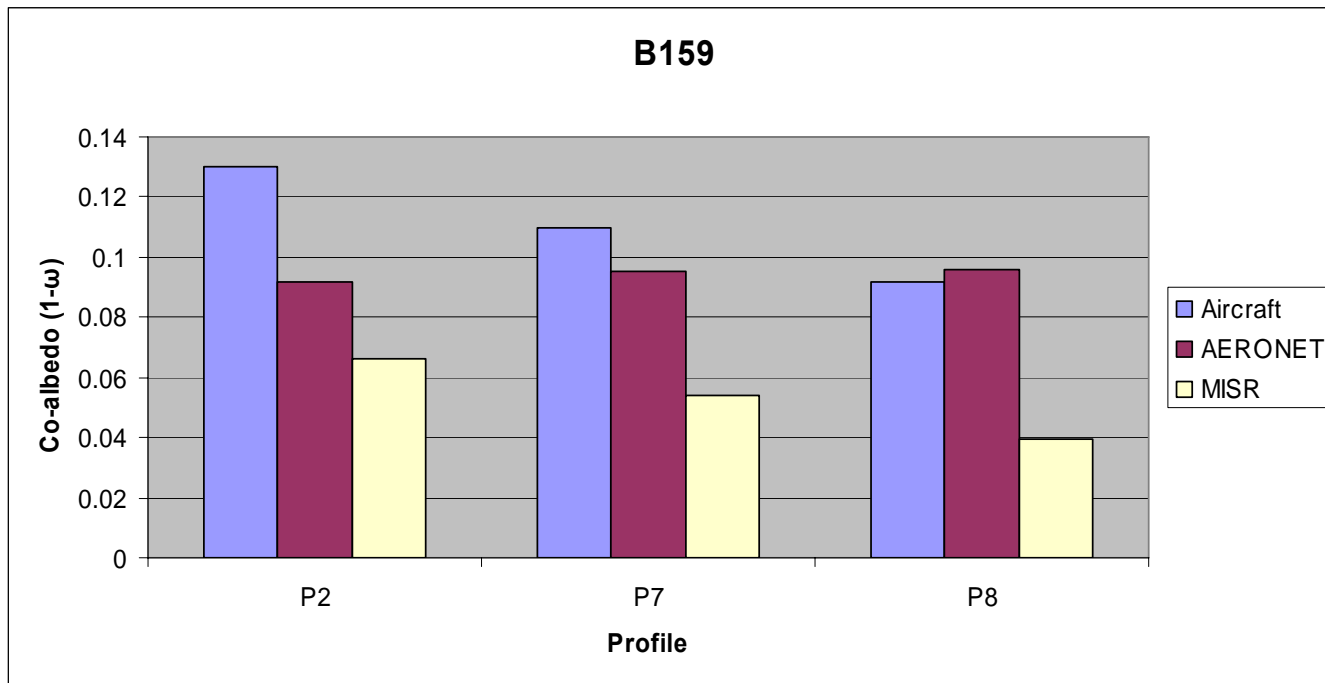


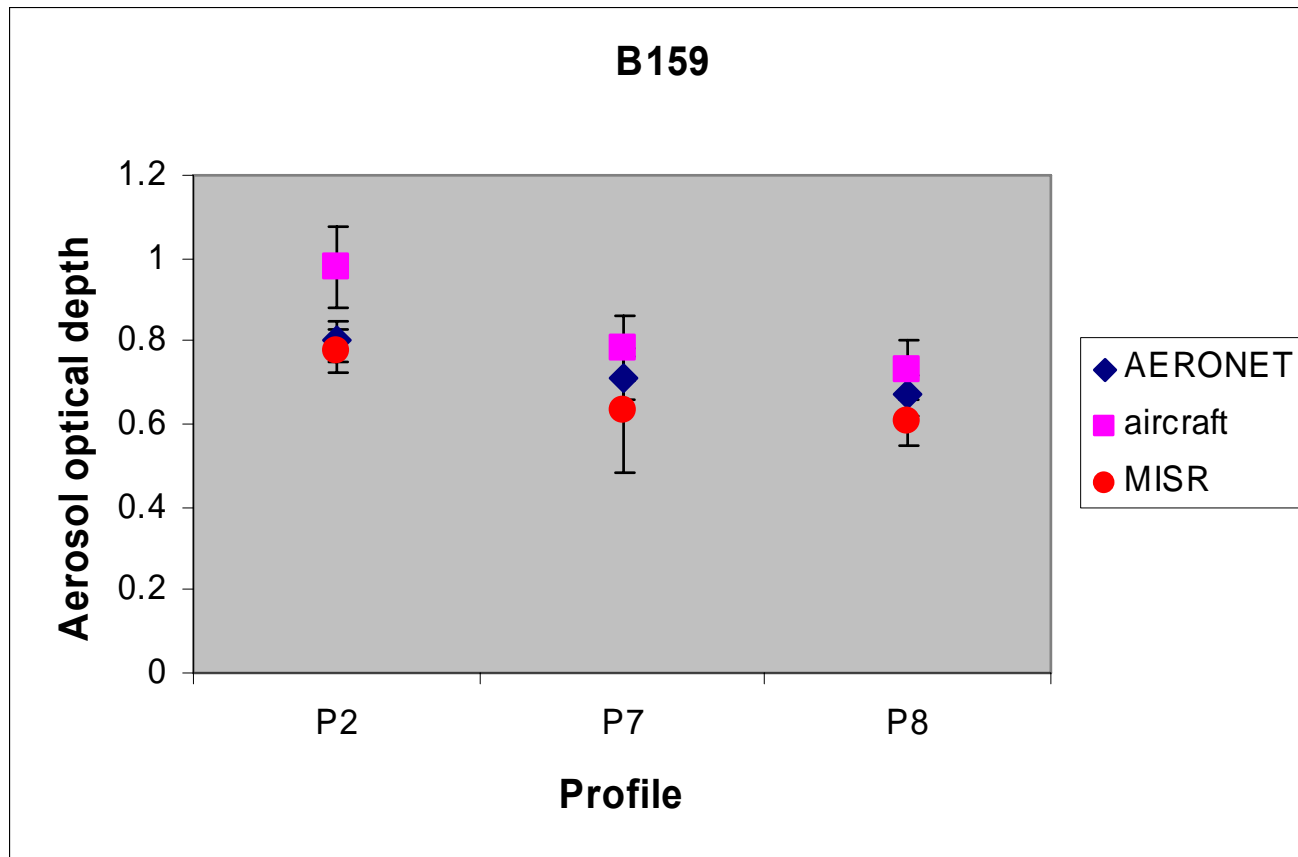
MISR-aircraft: 19th January 2006 Flight B159

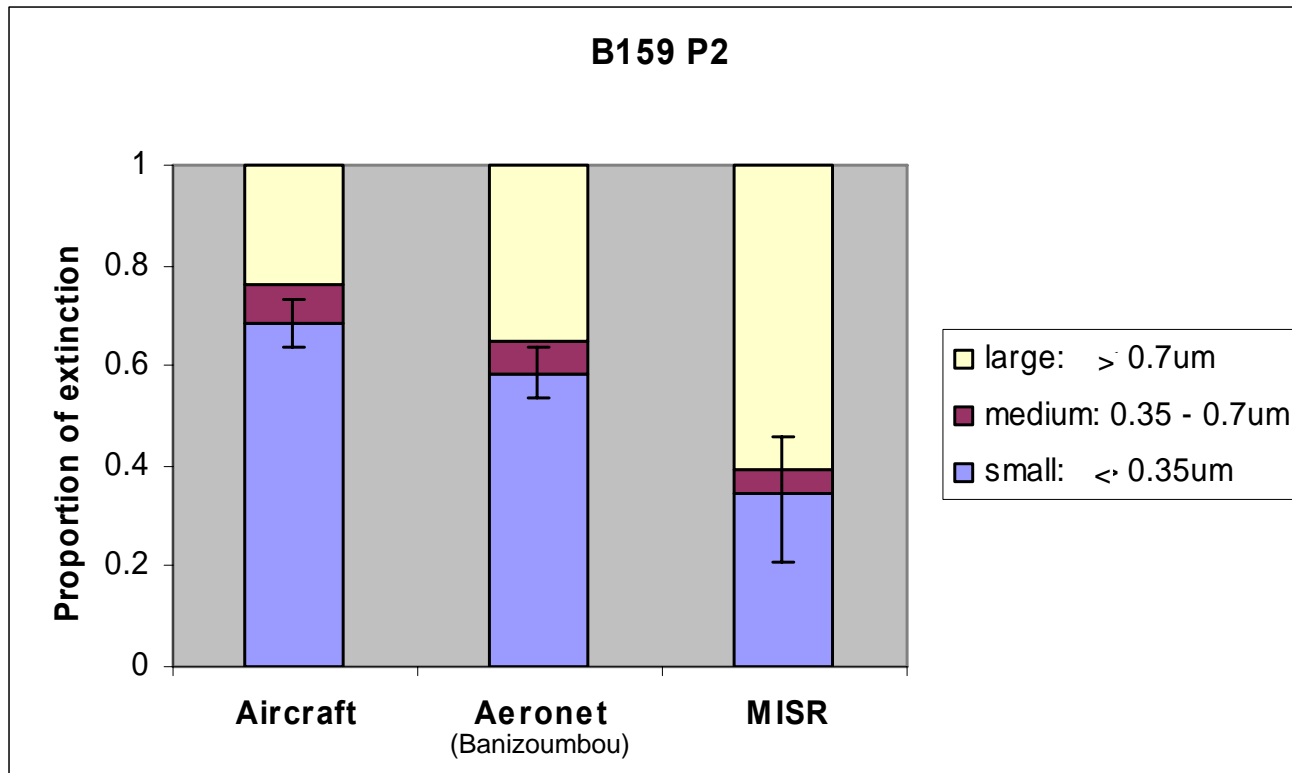


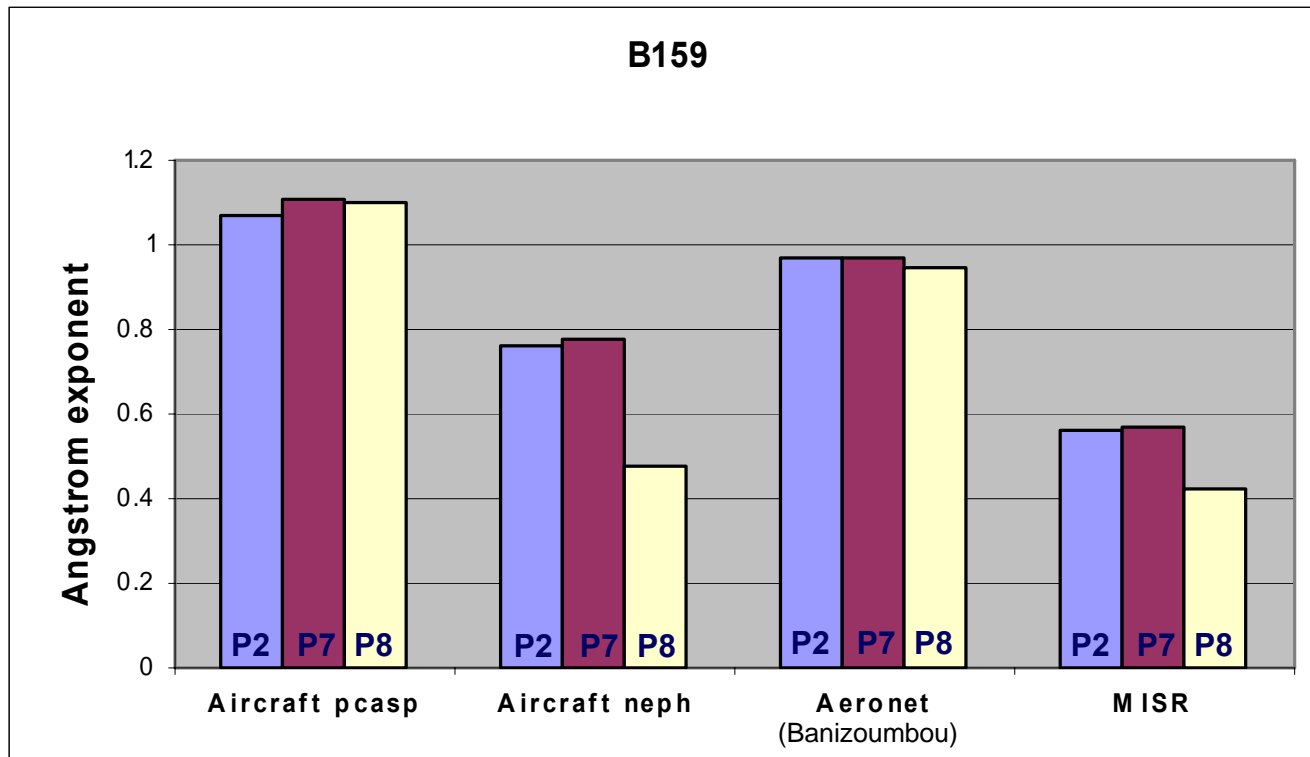
Track of Flight-159 during DABEX 2006:01:19





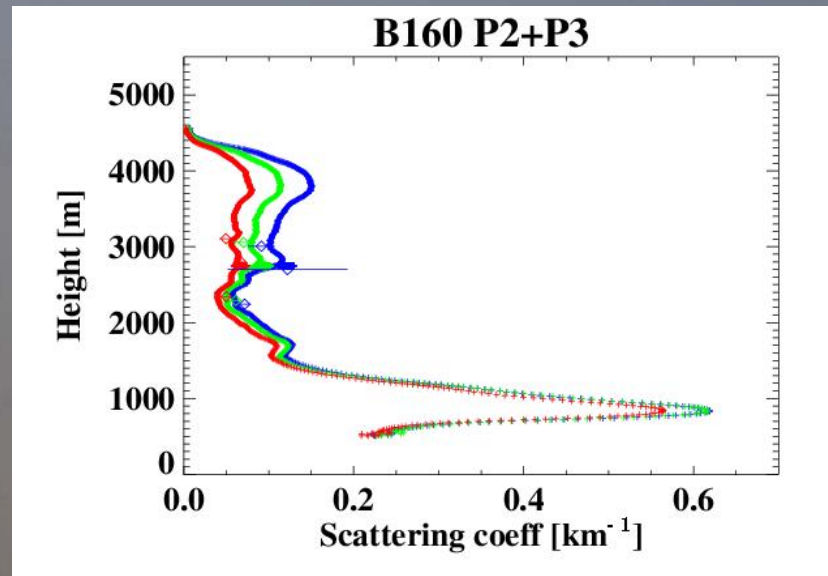




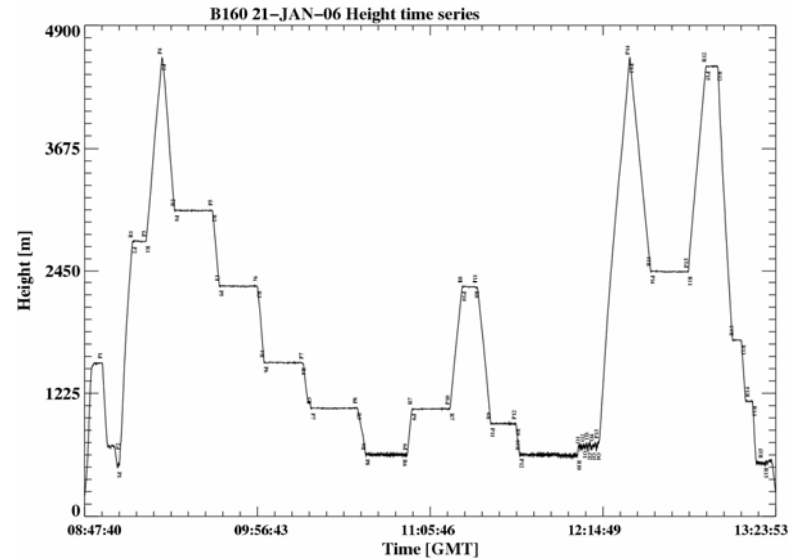
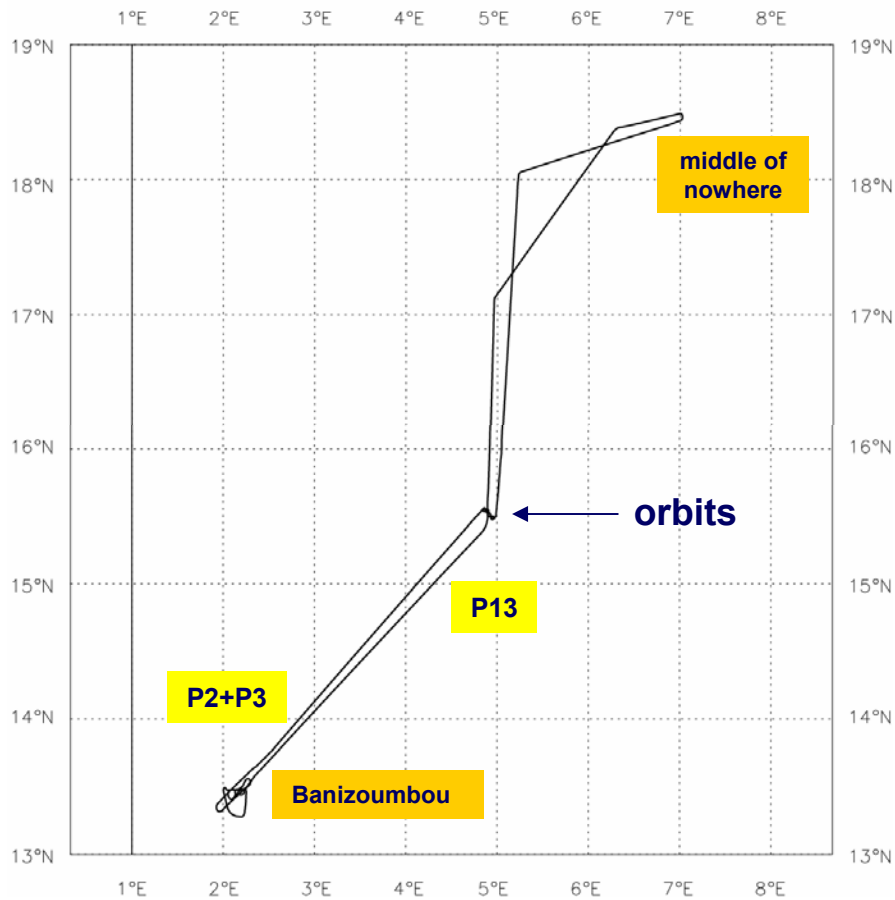


21st January 2006

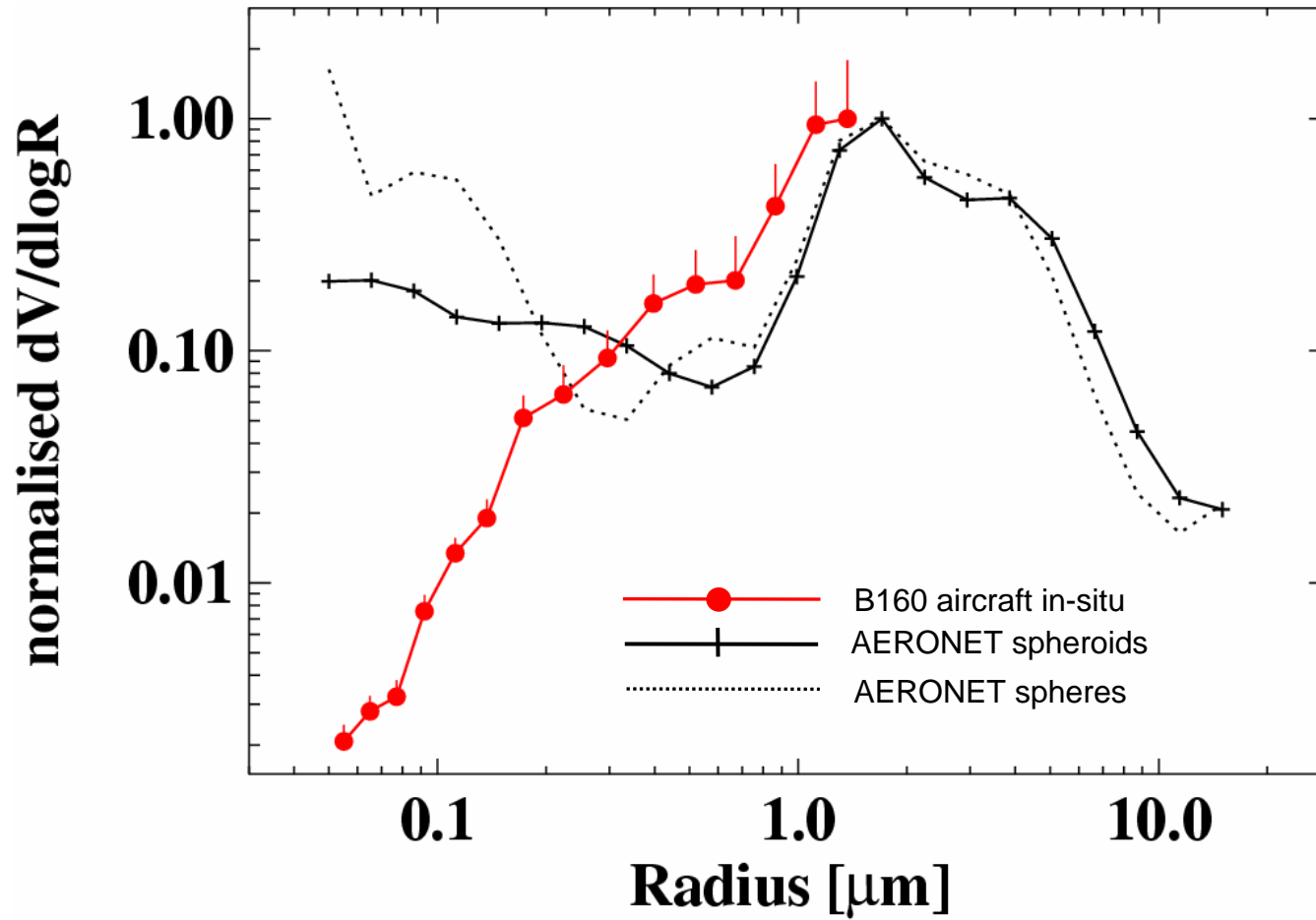
BAe-146 flight B160



B160 21st January 2006 flight track



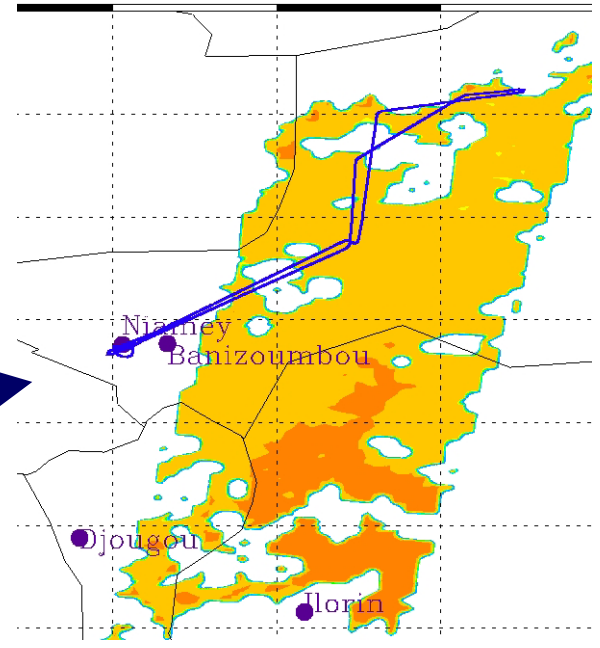
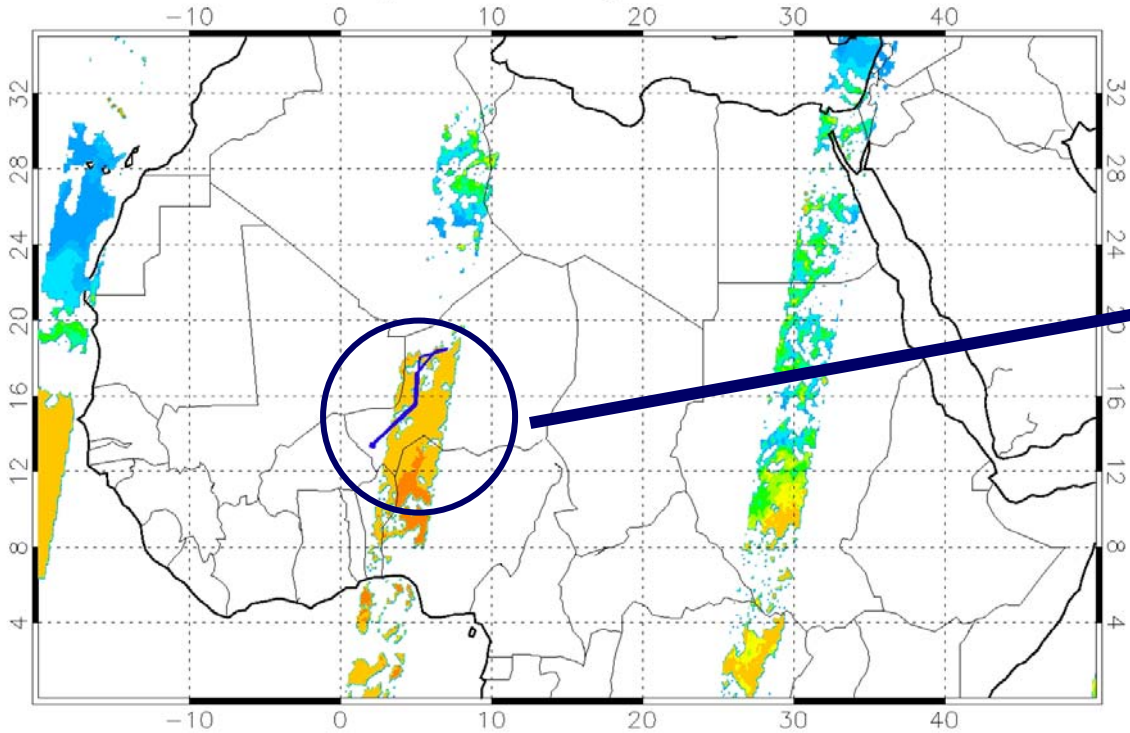
BAe-146 vs Banizoumbou SPHERES & SPHEROIDS



MISR-aircraft: 21st January 2006 Flight B160



Track of Flight-160 during DABEX 2006:01:21



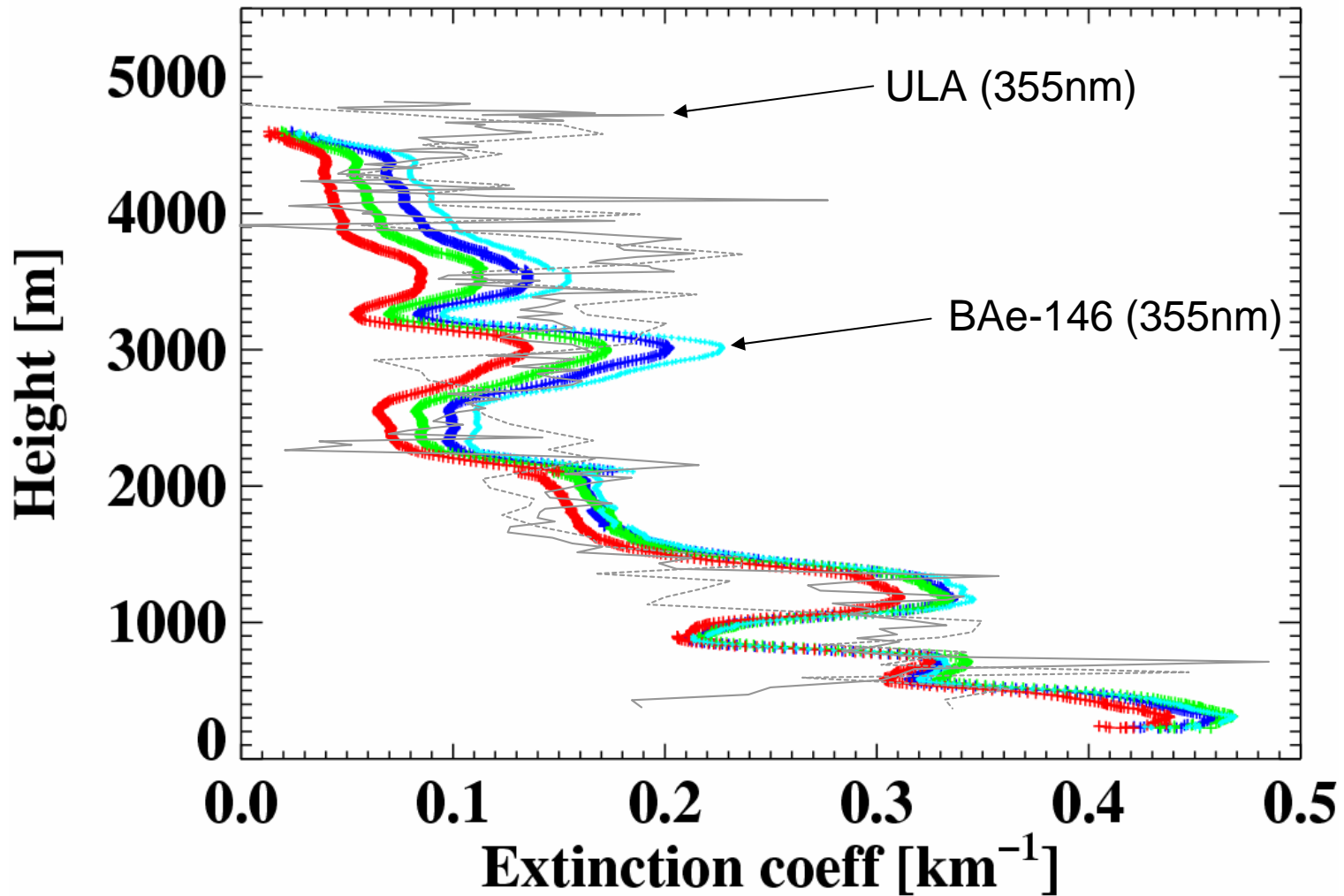
B160 21st January 2006: summary of optical properties



Profile	$\tau_{0.55}$			$\omega_0^{0.55}$			$\alpha_{0.55}$		
	Aircraft	MISR	CIMEL*	Aircraft	MISR	CIMEL	Aircraft	MISR	CIMEL*
P2+P3	0.88	0.44	0.53	0.92	0.96	0.95	0.47	0.63	0.81
P13	0.97	0.42	0.59	0.93	0.98	0.95	0.26	0.56	0.76

* Banizoumbou

B165 P1 0759–0813 UTC



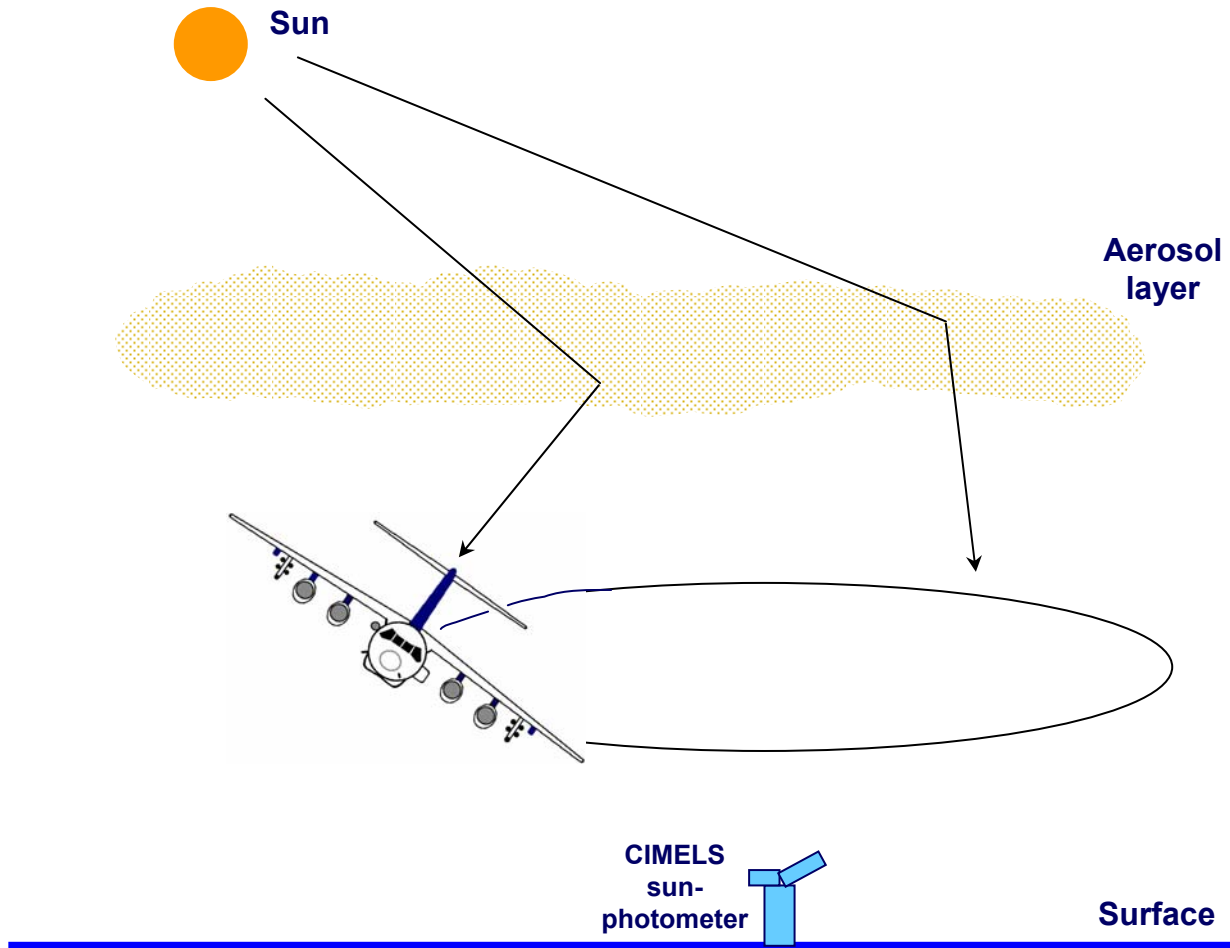
- B159 and B160 excellent 'golden day' case studies e.g. good MISR swath and aircraft track overlap, AERONET overpasses
- In-situ scattering and absorption measurements (ω_0) in good agreement between aircraft and Djougou ground site
- Aerosol size distributions in good agreement between aircraft in-situ and AERONET retrievals
- Aerosol size distribution in good agreement between aircraft in-situ and ground in-situ

- Optical depth comparisons between aircraft, AERONET and MISR are fairly good for B159, less so for B160
- Proportioning the optical depth into bins seems imbalanced for MISR
- Aerosol absorption in reasonable agreement between aircraft and AERONERT
- MISR derives too little absorption– large particle overestimate ?

The background of the slide features a light blue color with several horizontal, wavy bands of a slightly darker shade of blue, creating a sense of movement and depth.

Future work

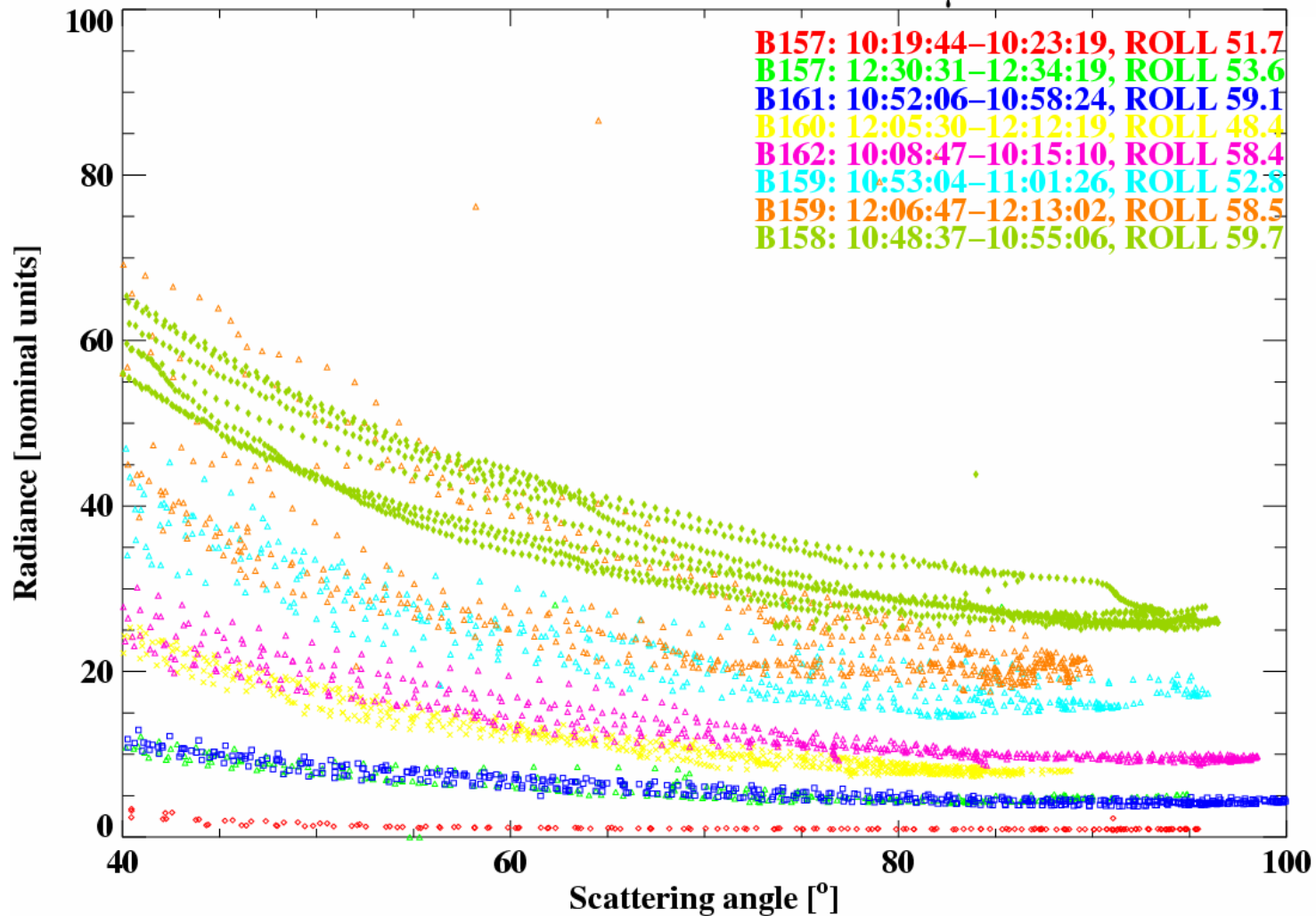
ORBITS



Short-wave Spectrometer (SWS)



SWS DABEX ORBITS at 0.87 μm



- SWS orbits and AERONET almucantar scans
- Use Dubovik algorithm to invert aircraft sky radiances to aerosol size distributions