

Fast-FSSP measurements

Frédéric Burnet, Jean-Louis Brenguier,
Thierry Bourriane and Jean-Michel Etcheberry

(CNRM/GAME, CNRS/Météo-France)

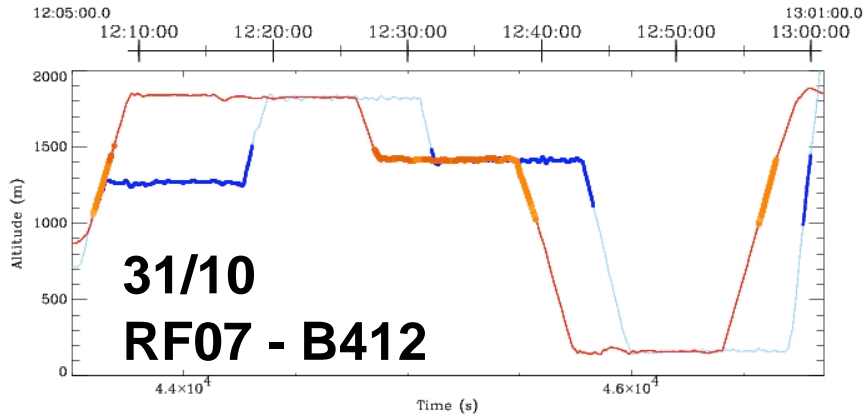
Second VOCALS meeting
July 12-14 2009, Seattle

Data Base overview

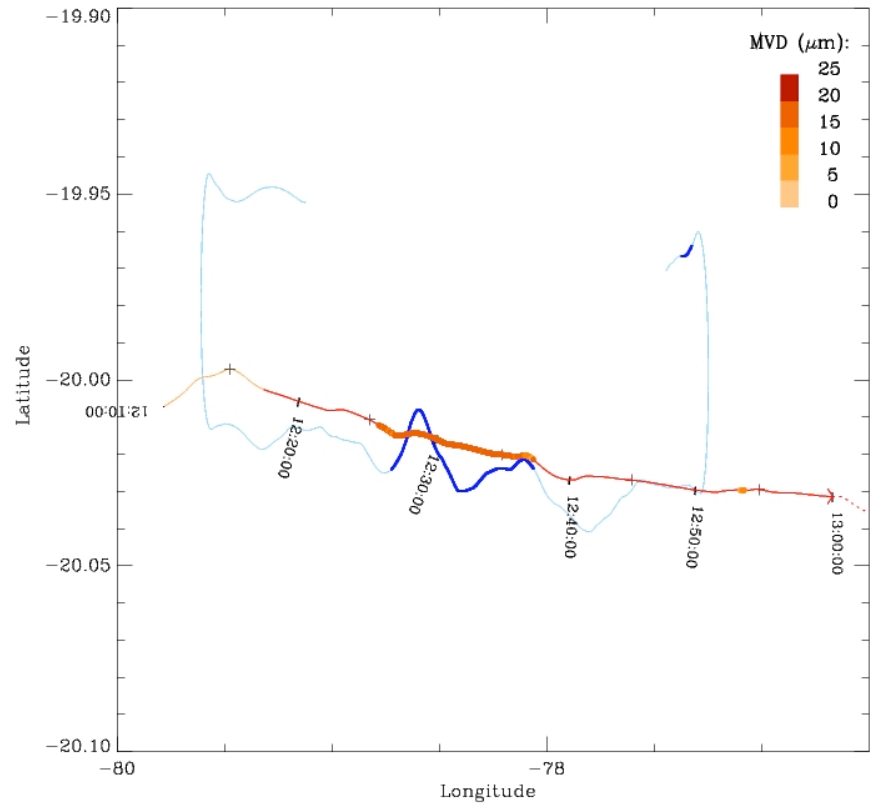
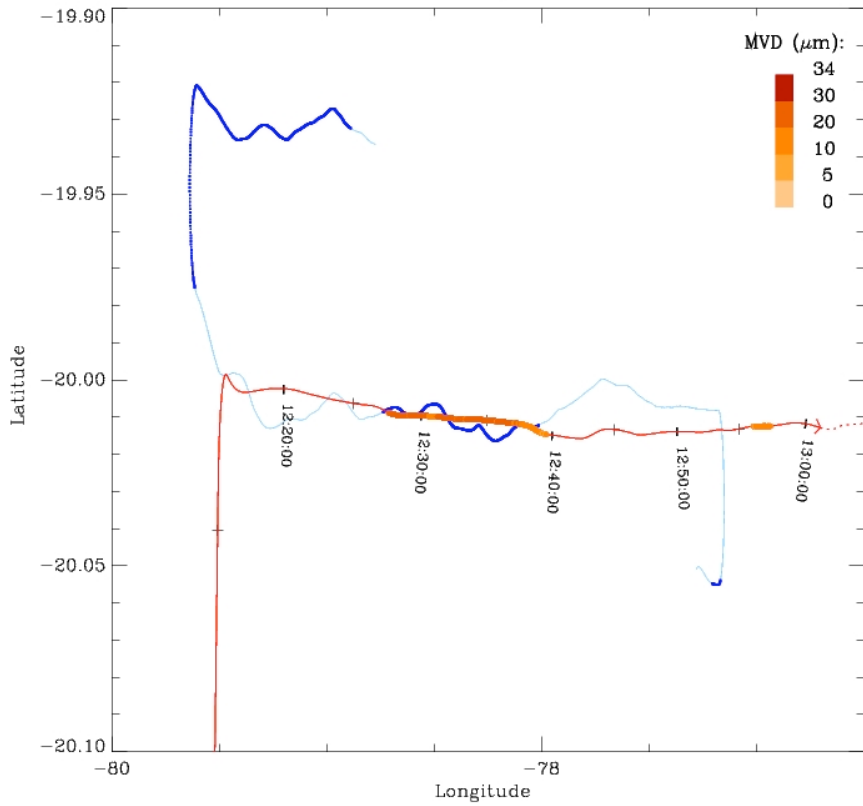
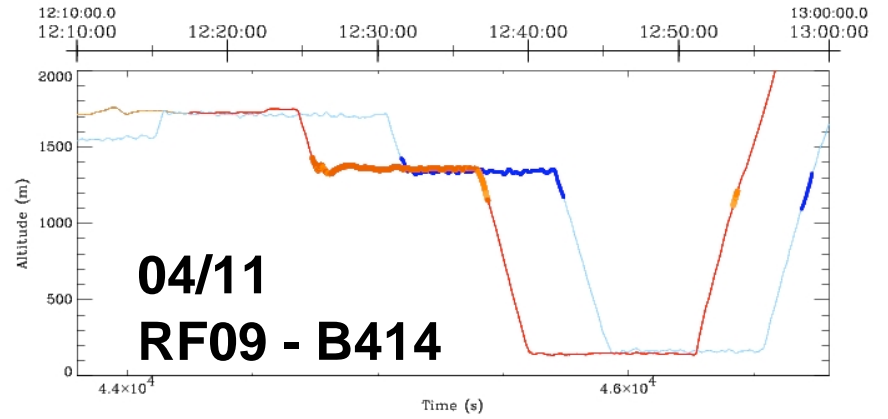
RF	date	Mission	Fast-FSSP data	Calibration
1	15-oct	buoy	incomplete & saturations	ca0802
2	18-oct	20 S		incomplete & sizing
3	21-oct	20 S		ca0802
4	23-oct	20 S		ca0802
5	25-oct	20 S		ca0802
6	26-oct	POC		ca0802
7	30-oct	POC		ca0802
8	02-nov	POC		ca0803
9	04-nov	POC /20 S	few minutes missing	ca0803
10	06-nov	20 S		ca0803
11	09-nov	Pollution	few minutes missing	ca0803
12	11-nov	Pollution		ca0804
13	13-nov	20 S		ca0804
14	15-nov	POC		ca0804

Intercomparison Flights

VOCALS RF07 - hc0827 at:060000.0R0001



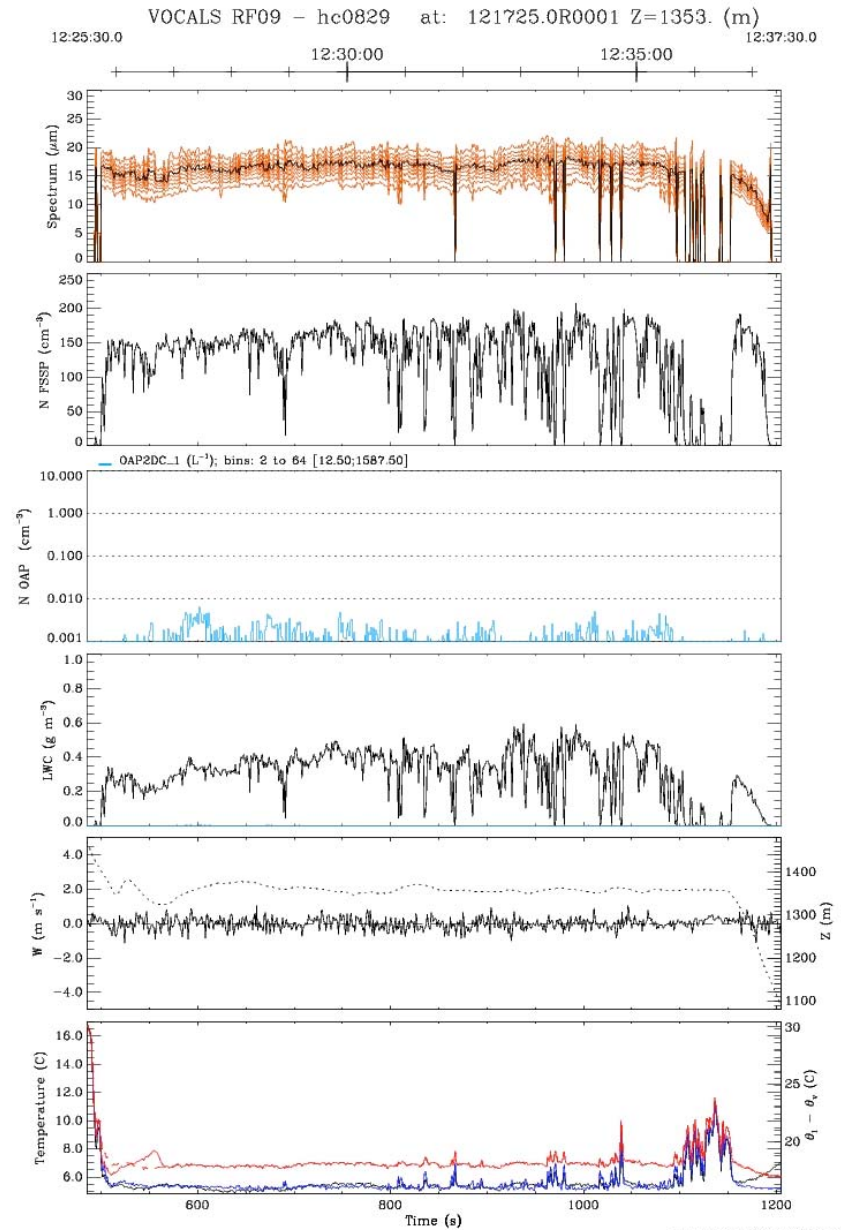
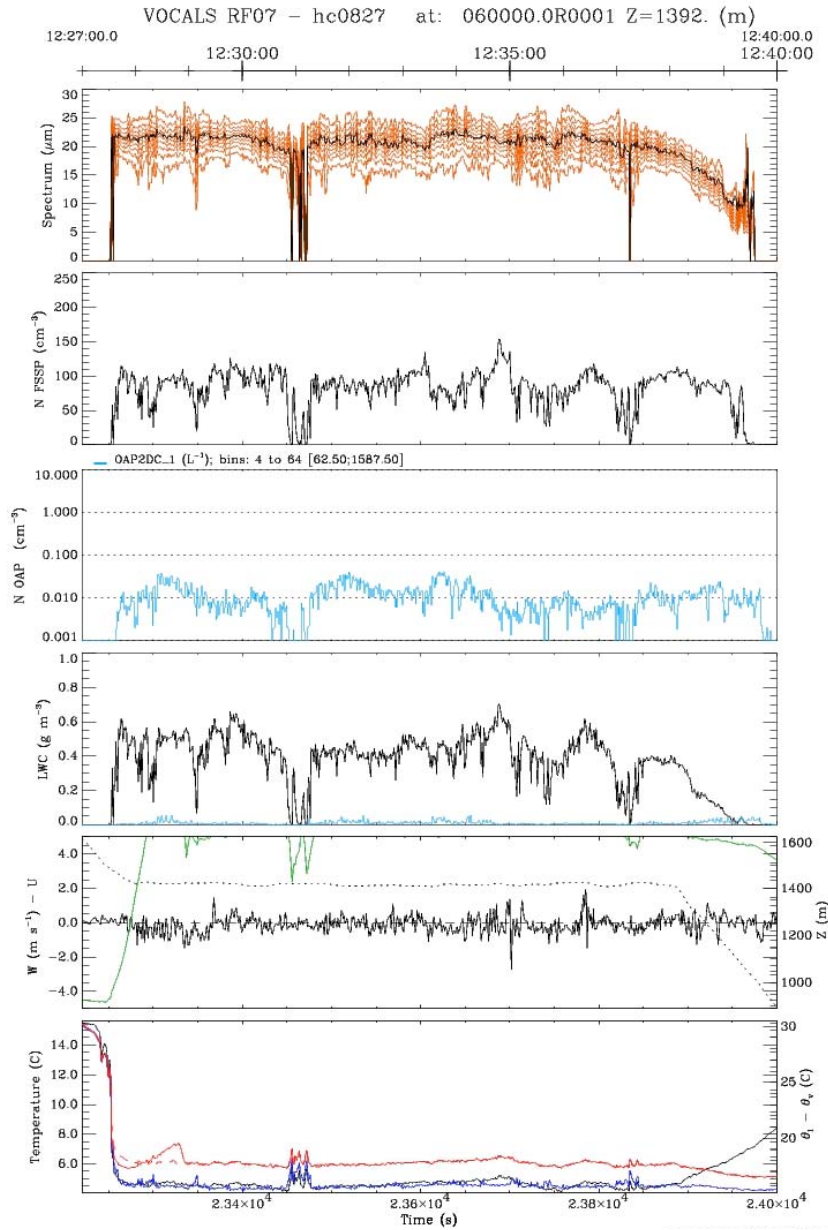
VOCALS RF09 - hc0829 at:121725.0R0001



Intercomparison Flights

31/10 - RF07

04/11 - RF09



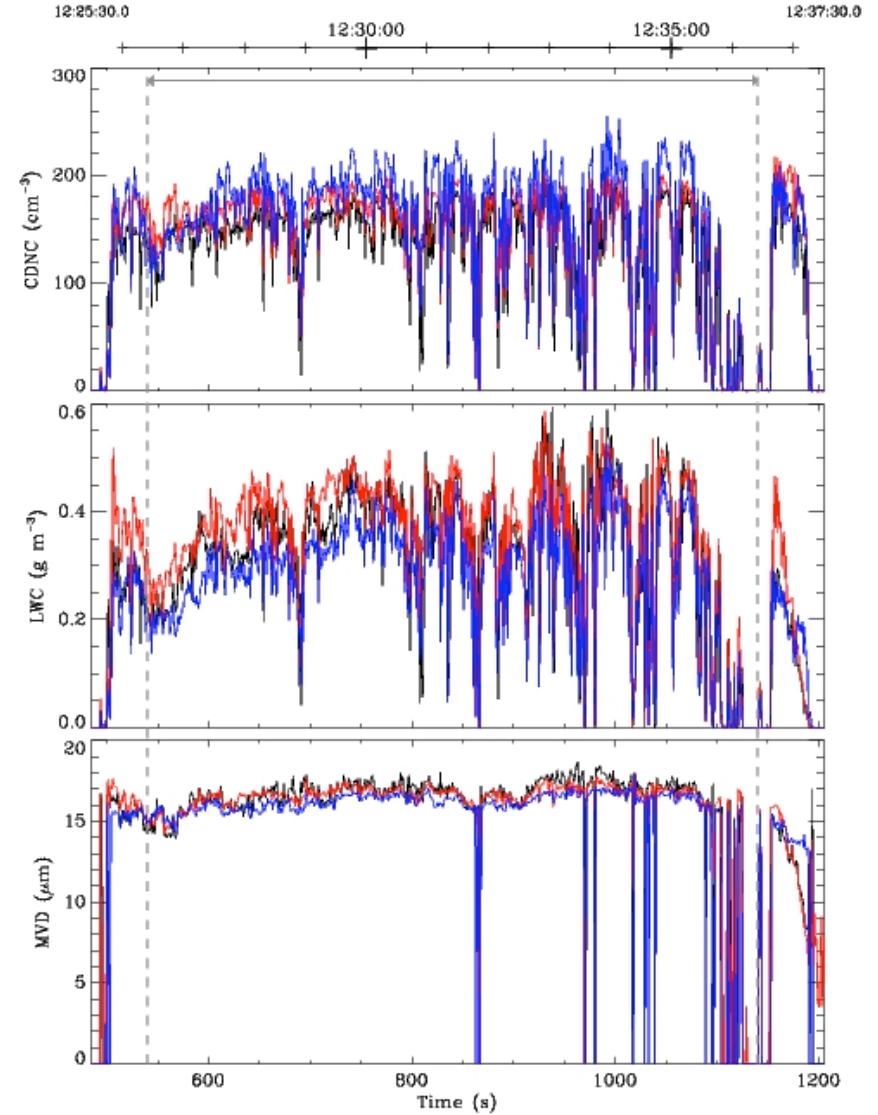
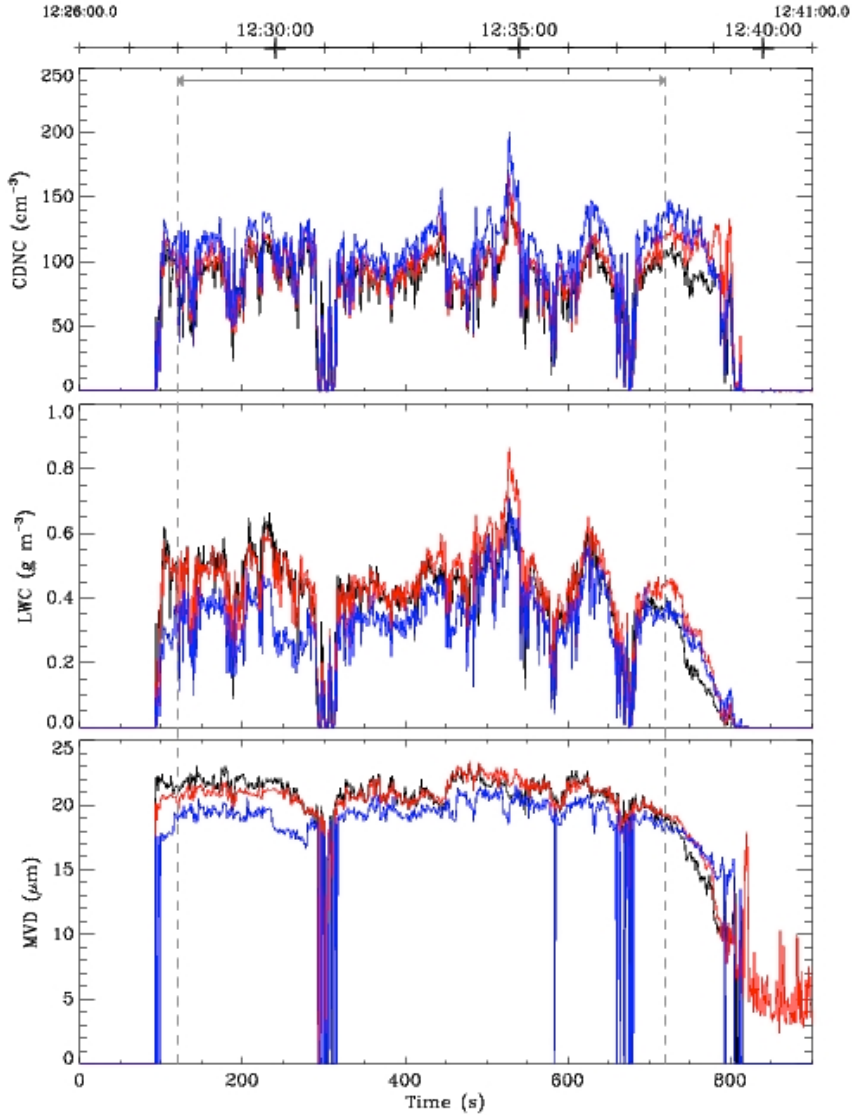
Intercomparison Flights

31/10 - RF07

04/11 - RF09

— Fast_hc [4.01;42.67]
— CDP_1 ; bins: 2 to 30 [1.75;50.39]
— FSSP RAW ; bins: 9 to 31 [11.68;38.70]

— Fast_hc [4.72;46.84]
— CDP_1 ; bins: 2 to 30 [2.94;52.67]
— FSSP RAW ; bins: 9 to 31 [11.68;38.70]

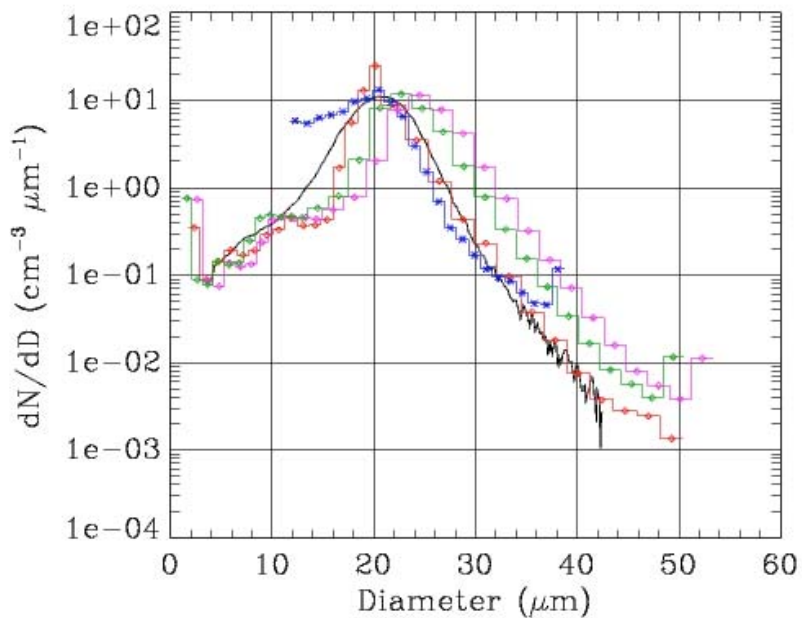


Intercomparison Flights

31/10 - RF07 & B412

VOCALS - 31/10/08

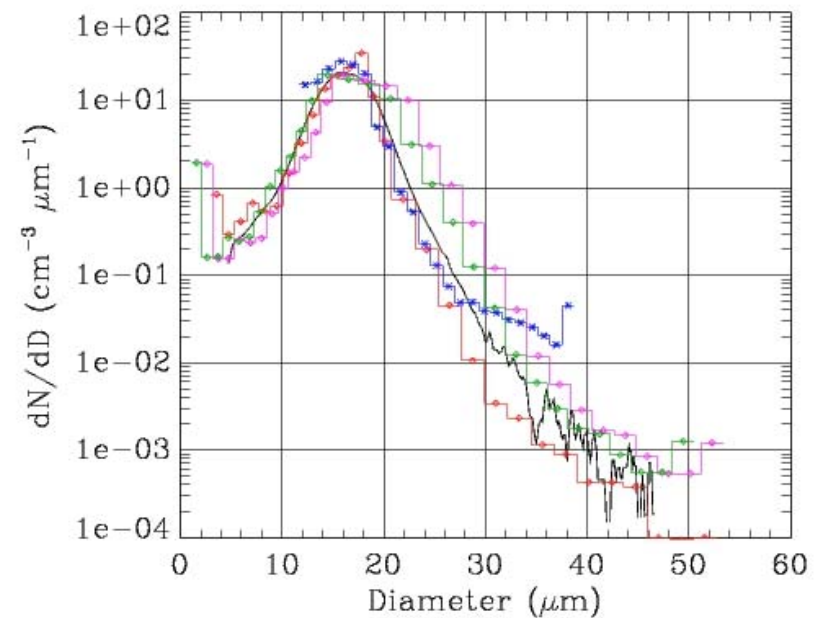
- RF07/122800.0 (600s) - Fast-FSSP [3.66;42.67]
- RF07/122800.0 (600s) - CDP_1 ; bins: 2 to 30 [1.75;50.39]
- RF07/122800.0 (600s) - FSSP ; bins: 9 to 31 [11.68;38.70]
- B412/123200.0 (600s) - CDP_1 ; bins: 1 to 30 [2.08;53.32]
- B412/123200.0 (600s) - CDP_r3_1 ; bins: 1 to 30 [1.09;50.44]



04/11 - RF09 & B414

VOCALS - 04/11/08

- RF09/122625.0 (600s) - Fast-FSSP [4.32;46.84]
- RF09/122625.0 (600s) - CDP_1 ; bins: 2 to 30 [2.94;52.67]
- RF09/122625.0 (600s) - FSSP ; bins: 9 to 31 [11.68;38.70]
- B414/123200.0 (600s) - CDP_1 ; bins: 1 to 30 [2.08;53.32]
- B414/123200.0 (600s) - CDP_r3_1 ; bins: 1 to 30 [1.09;50.44]

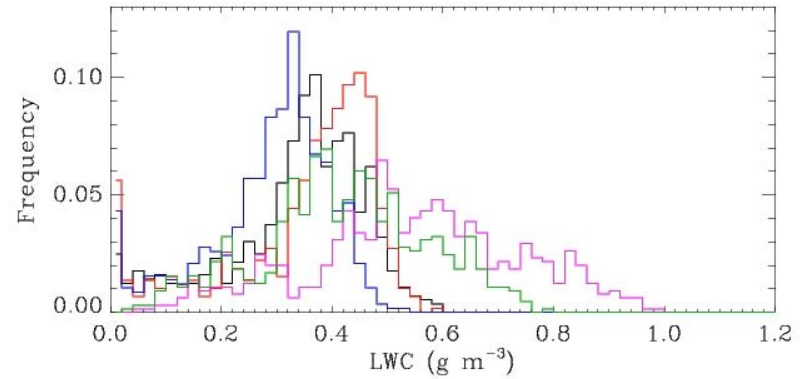
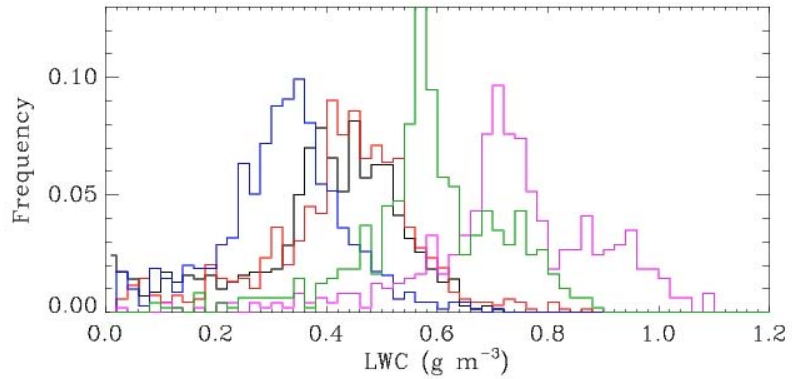
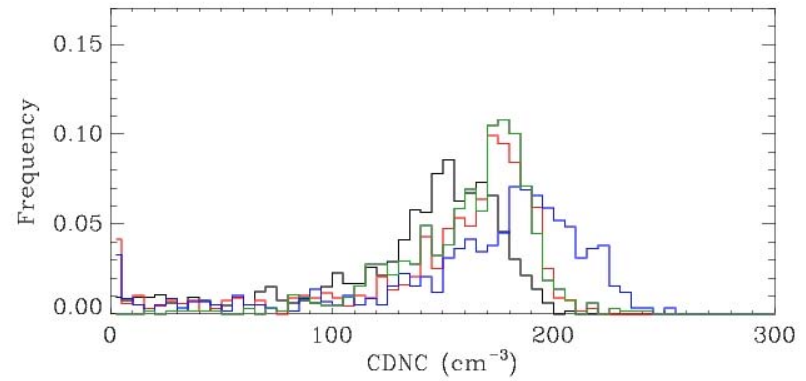
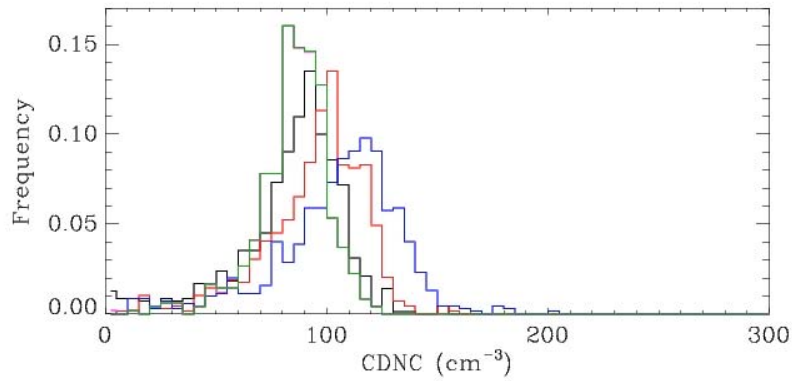
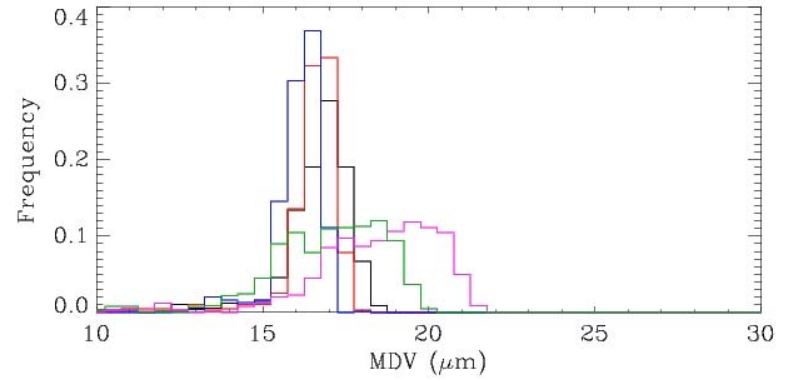
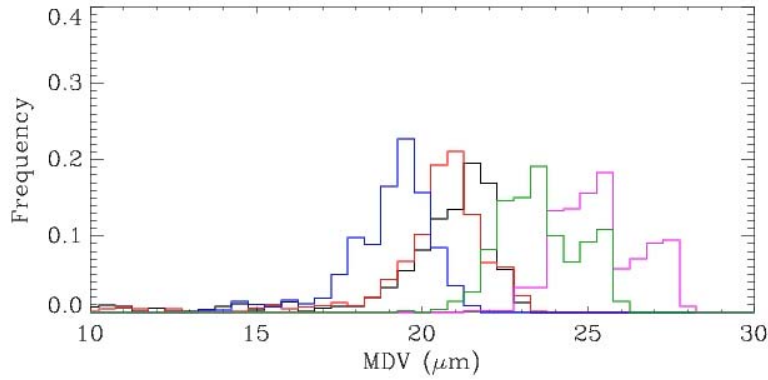


31/10 - RF07 & B412

04/11 - RF09 & B414

— RF07_Fast — RF07_CDP — RF07_Fssp — B412_CDP — B412_CDP_r3

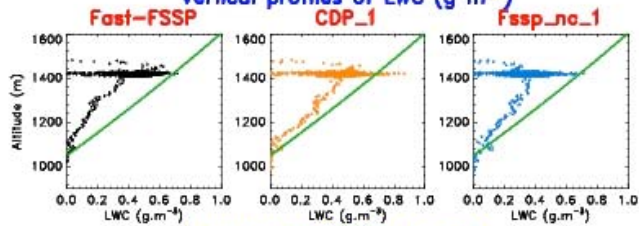
— RF09_Fast — RF09_CDP — RF09_Fssp — B414_CDP — B414_CDP_r3



Intercomparison Flights

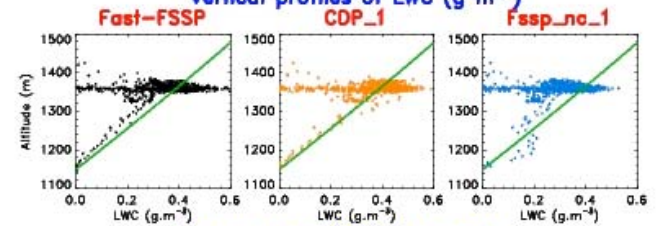
VOCALS - RF07 - hc0827 - 1 Hz

Vertical profiles of LWC (g m^{-3})

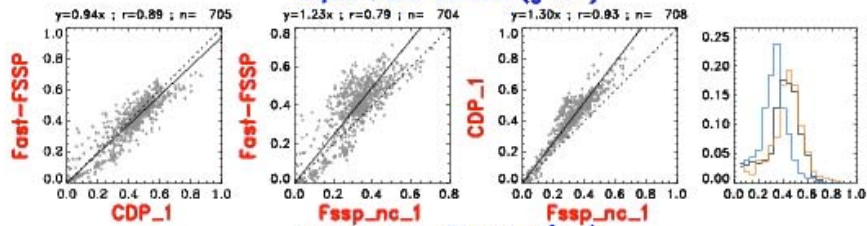


VOCALS - RF09 - hc0829 - 1 Hz

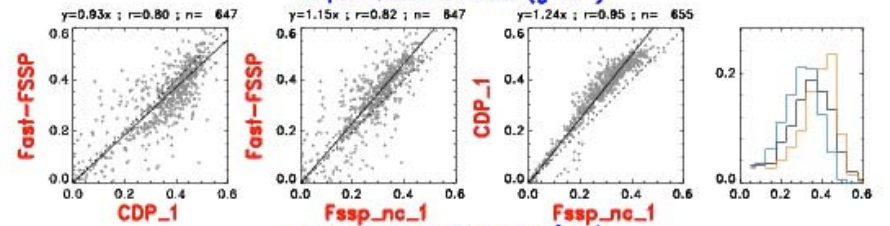
Vertical profiles of LWC (g m^{-3})



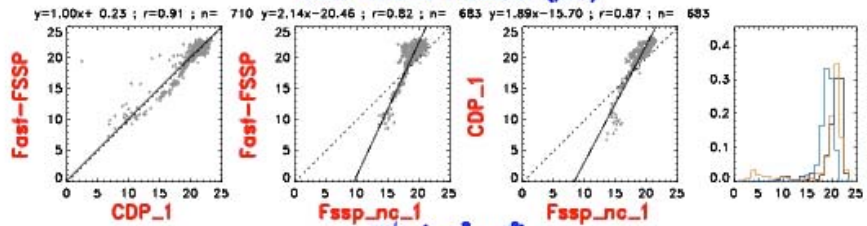
Liquid Water Content (g m^{-3})



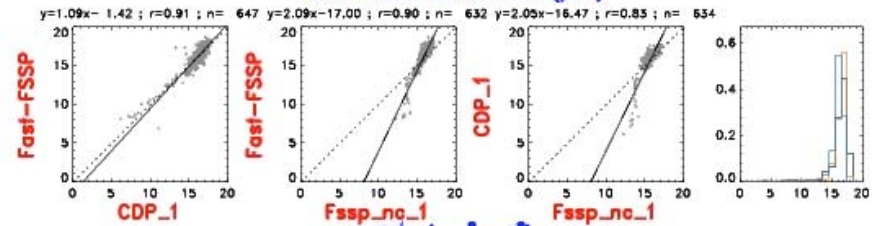
Liquid Water Content (g m^{-3})



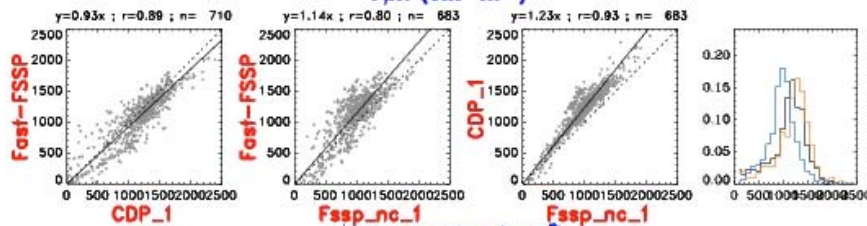
Mean Volume Diameter (μm)



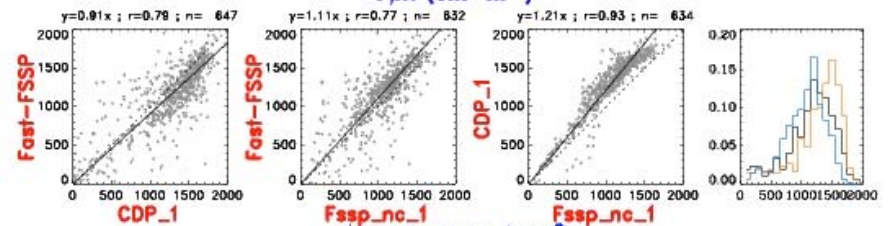
Mean Volume Diameter (μm)



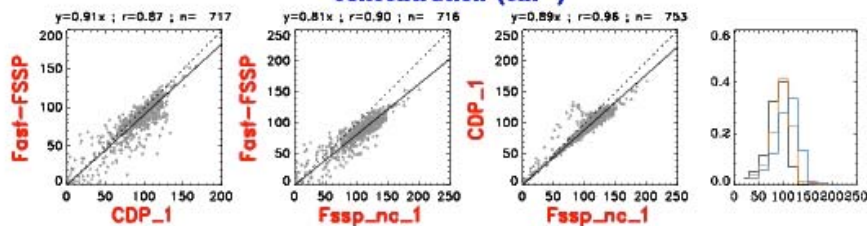
PSA ($\text{cm}^2 \text{m}^{-3}$)



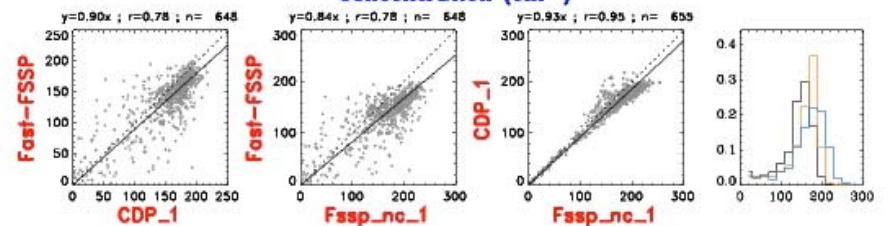
PSA ($\text{cm}^2 \text{m}^{-3}$)



Concentration (cm^{-3})

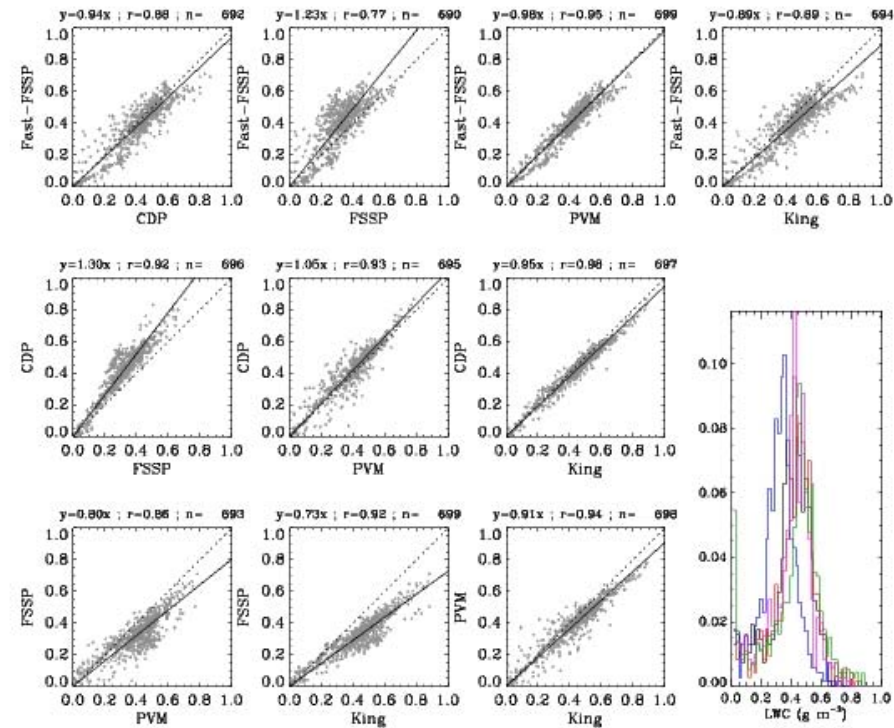
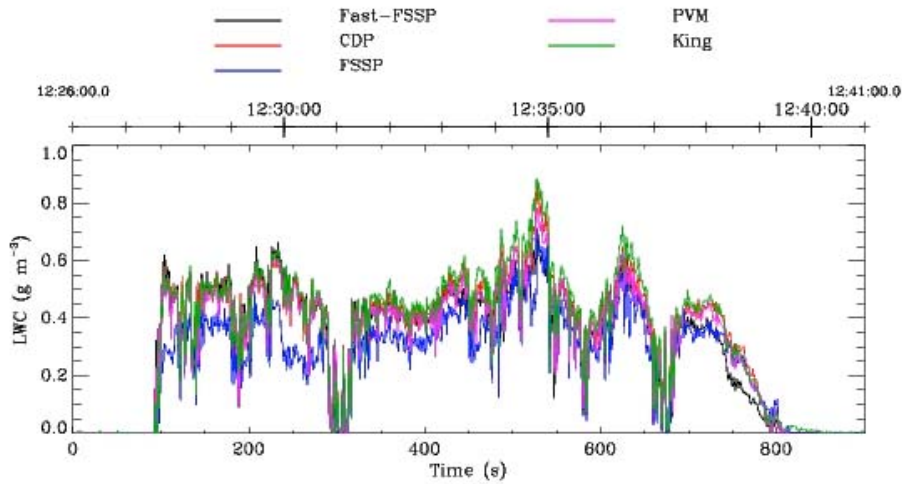


Concentration (cm^{-3})

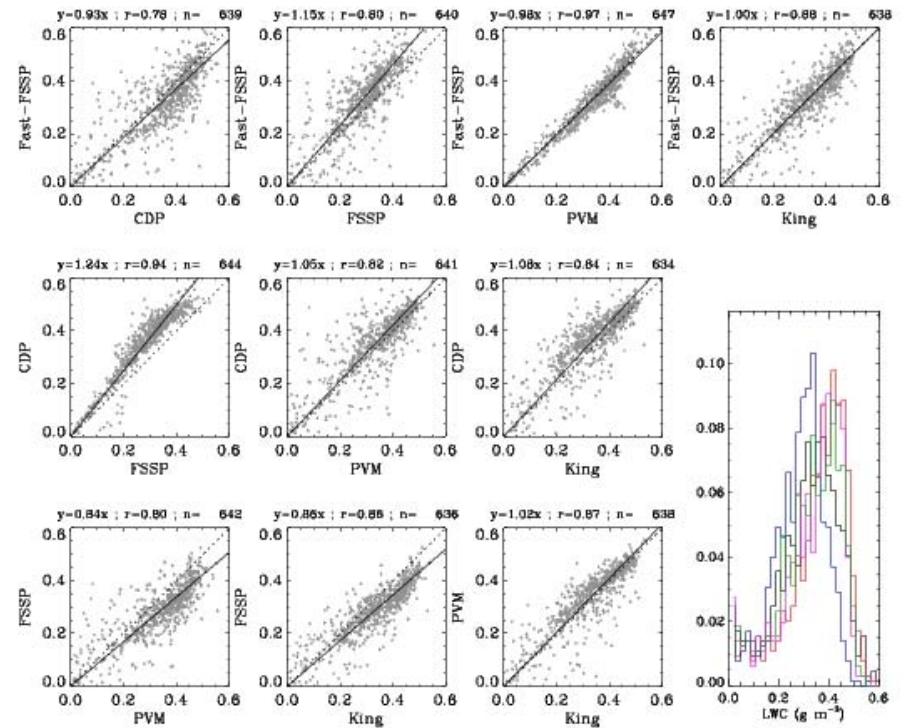
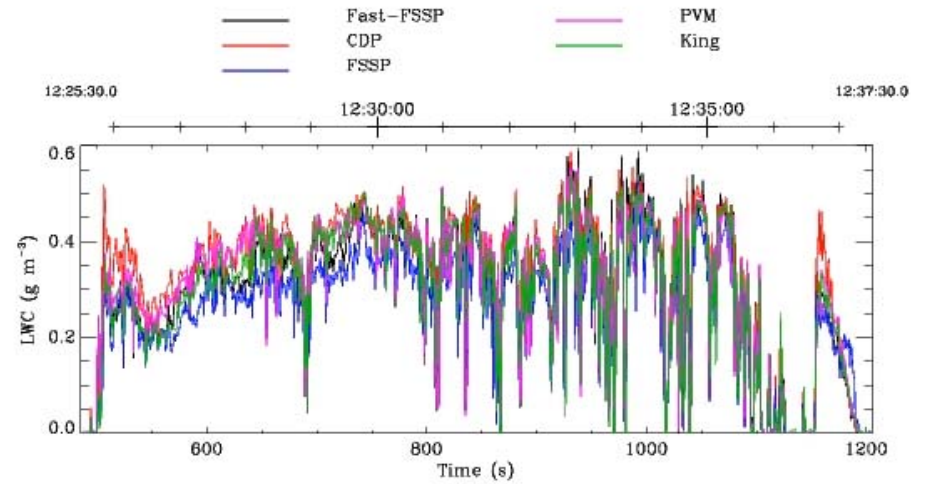


Intercomparison Flights

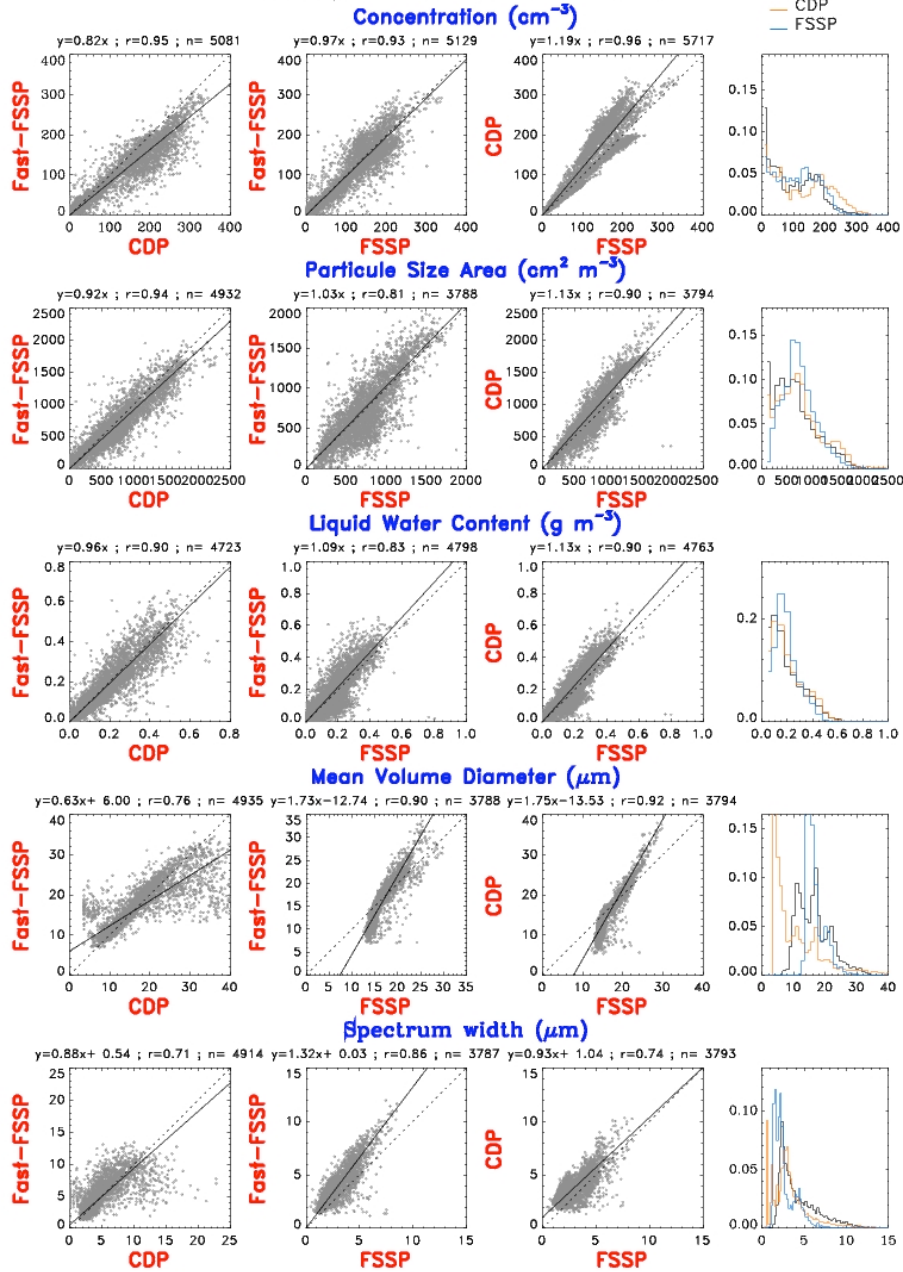
VOCALS - RF07 - hc0827 - 1 Hz



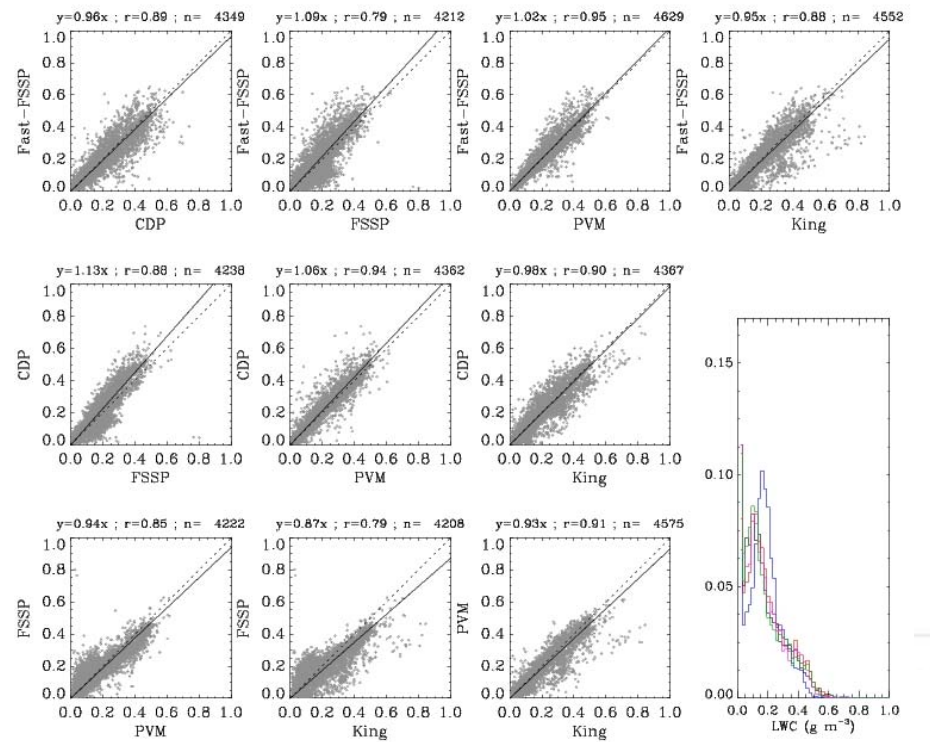
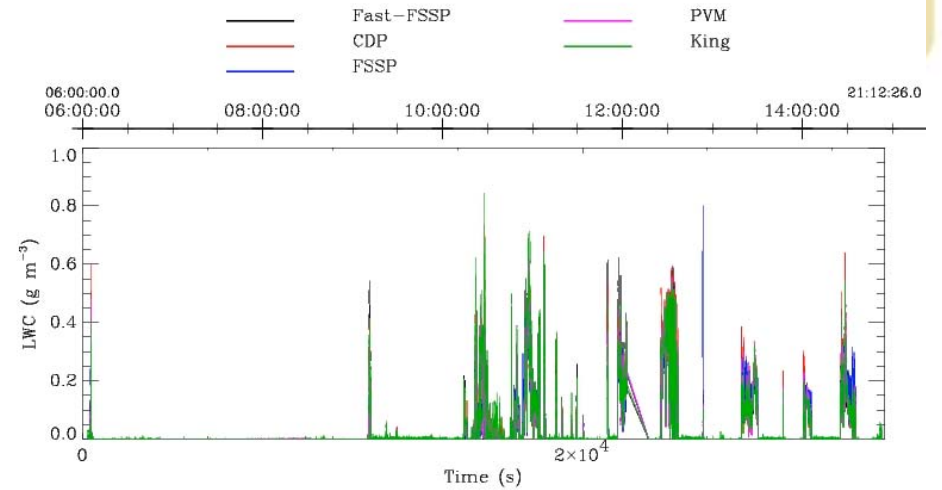
VOCALS - RF09 - hc0829 - 1 Hz



VOCALS - RF09 - hc0829 - 1 Hz



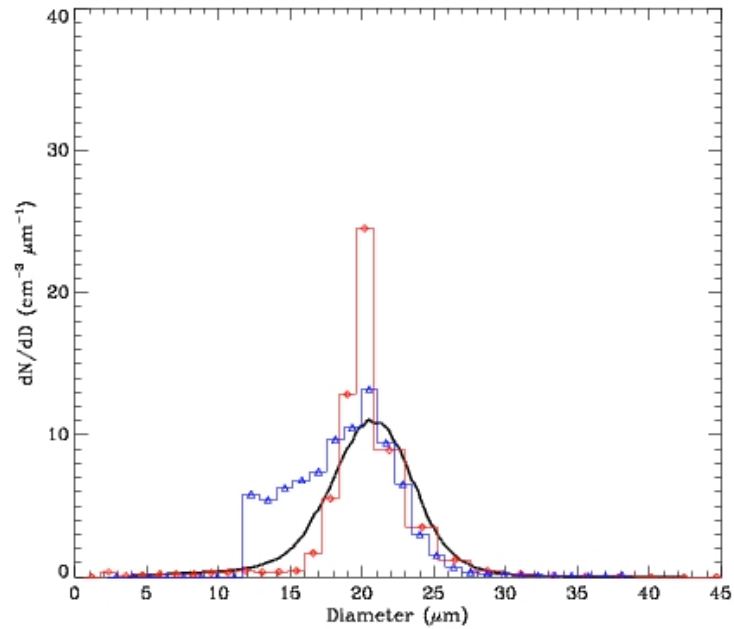
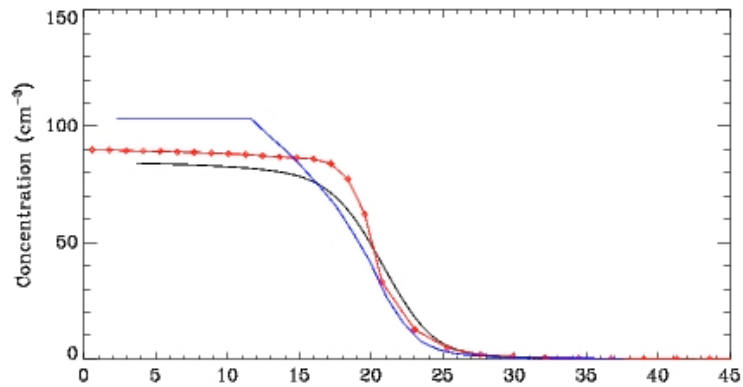
VOCALS - RF09 - hc0829 - 1 Hz



Intercomparison Flights

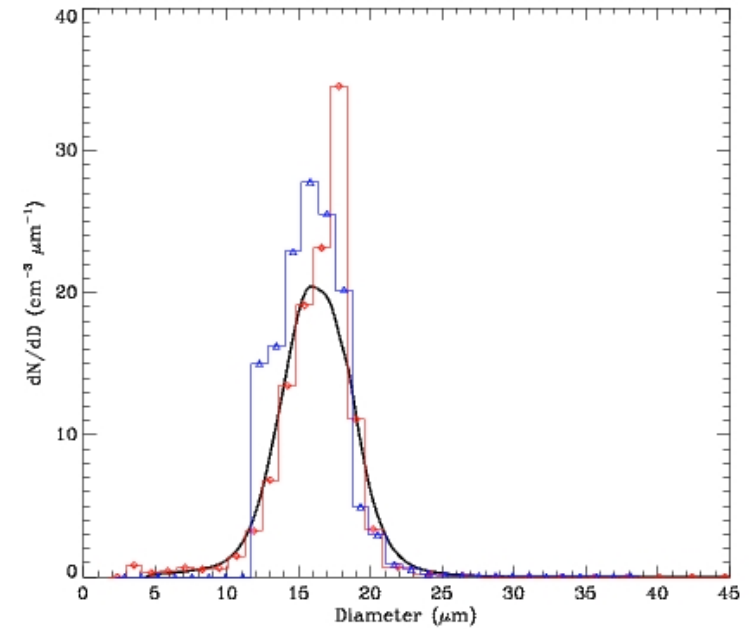
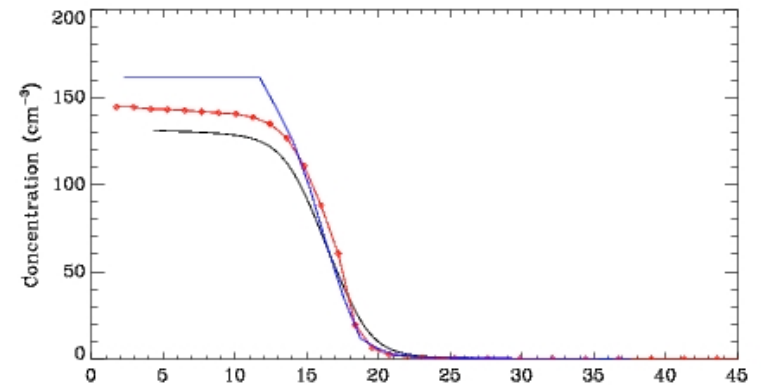
31/10 - RF07

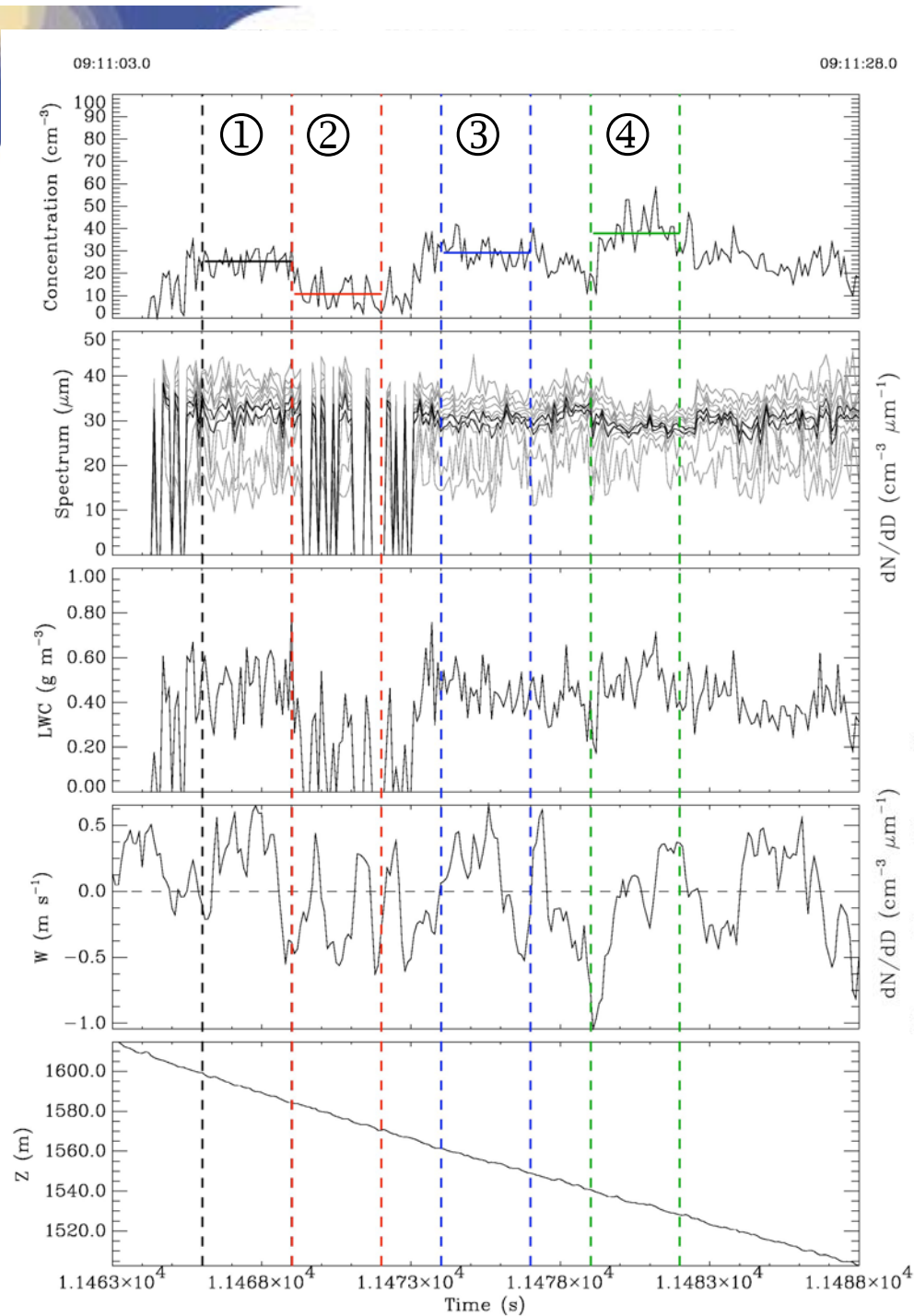
— Fast-FSSP [4.01;42.67]
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04/11 - RF09

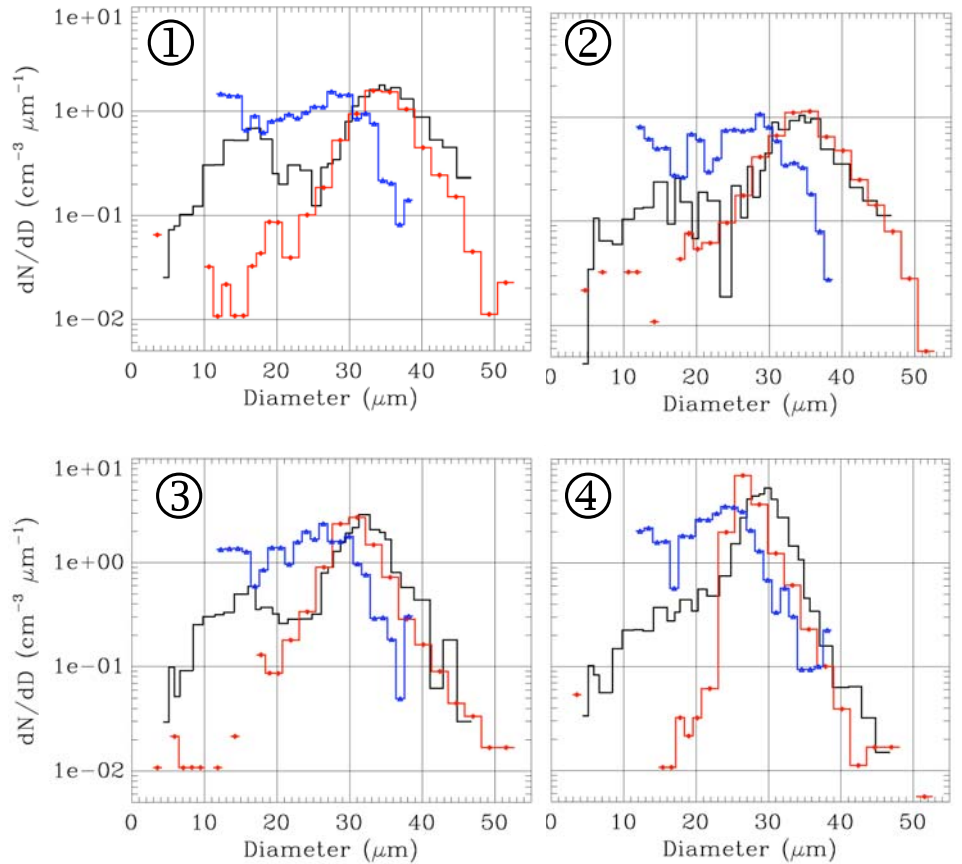
— Fast-FSSP [4.72;46.84]
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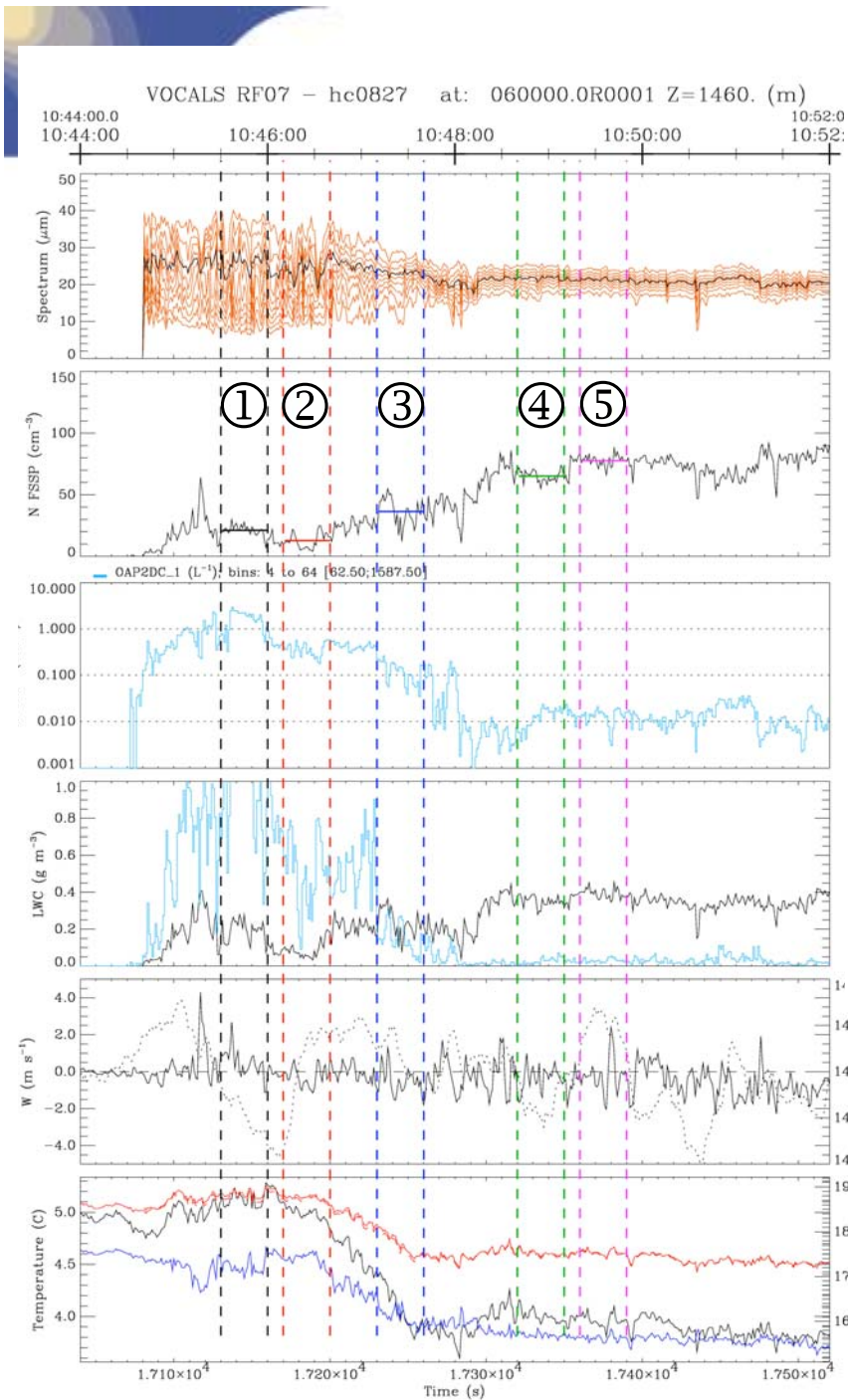




RF09 – P3d

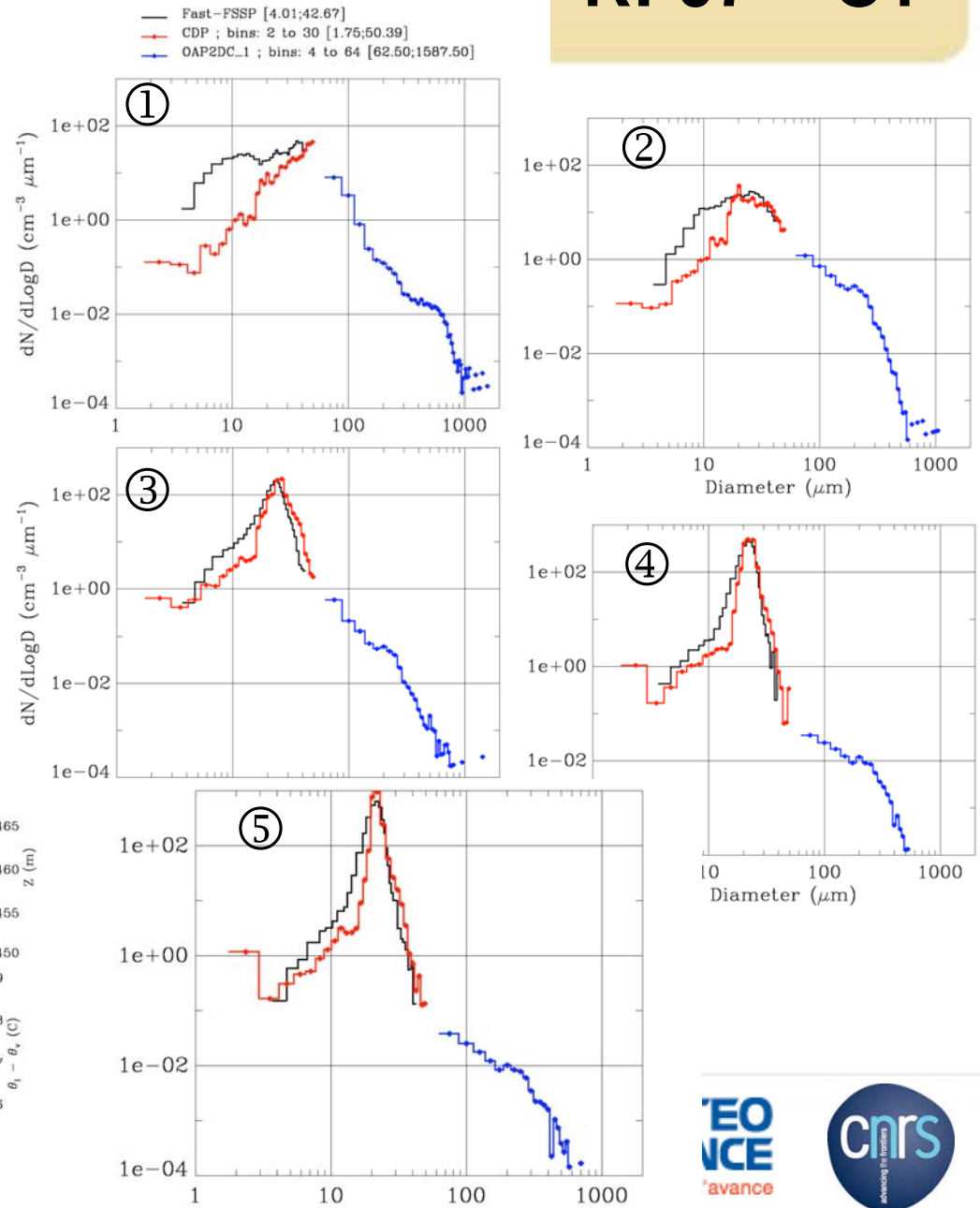
— Fast-FSSP [4.72;46.84]
 — CDP ; bins: 2 to 30 [2.94;52.67]
 — FSSP ; bins: 9 to 31 [11.68;38.70]





VOCALS RF07 - hc827 at: 104530.0D130000


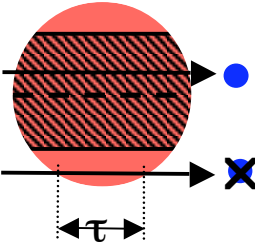
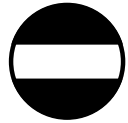
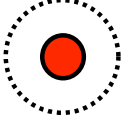
RF07 - C1



Summary

- There is **now** a good agreement between the different C130 probes except the FSSP-100
- Comparison with BAE146 CDP:
 - Agreement for droplet number concentration
 - But discrepancy for the size distributions
- What about the G1 intercomparison flights ?
- Are the CDP spectra too narrow ? (lab study)
- Release of the Fast-FSSP data base by the end of August

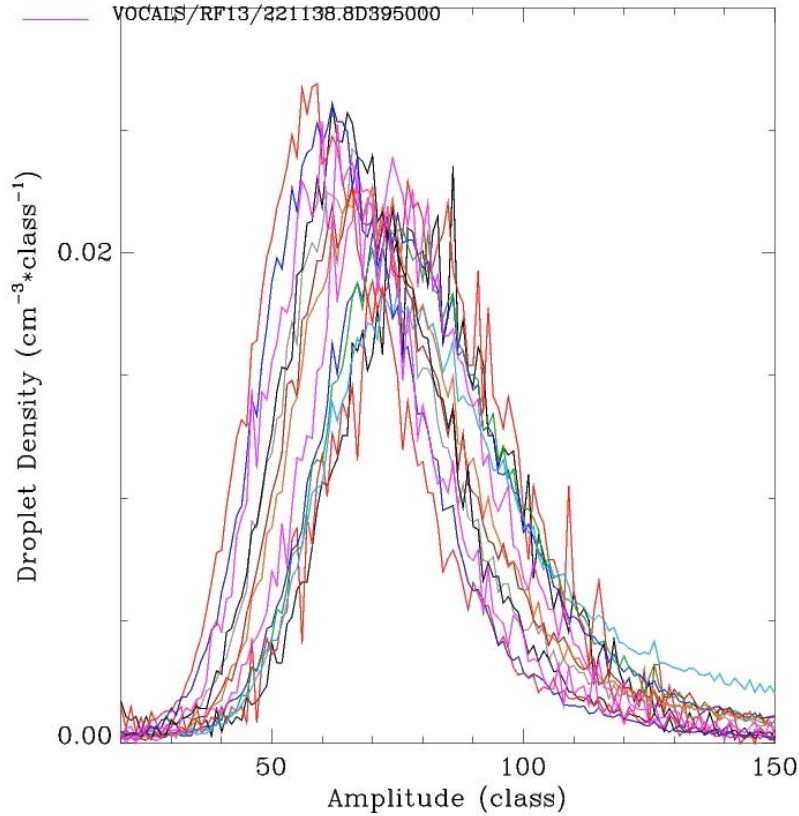
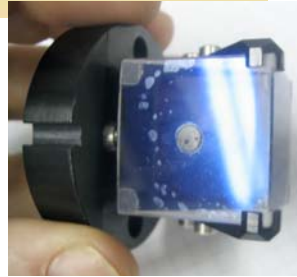
Fast-FSSP improvements

	FSSP-100	Fast-FSSP
Data	Spectrum at 25 Hz, - total strobe - total reset - activity	For each particle : <ul style="list-style-type: none"> • Amplitude max • Pulse duration • Elapsed time • DOF flag } 16 MHz
Size	15 or 32 bins	255 bins
DOF	1) Optical:  2) Electronic: pulse duration 	•Optical only: <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  SCMS-95 <i>slit</i> </div> <div style="text-align: center;">  ACE2-97 <i>smaller diode</i> </div> </div>



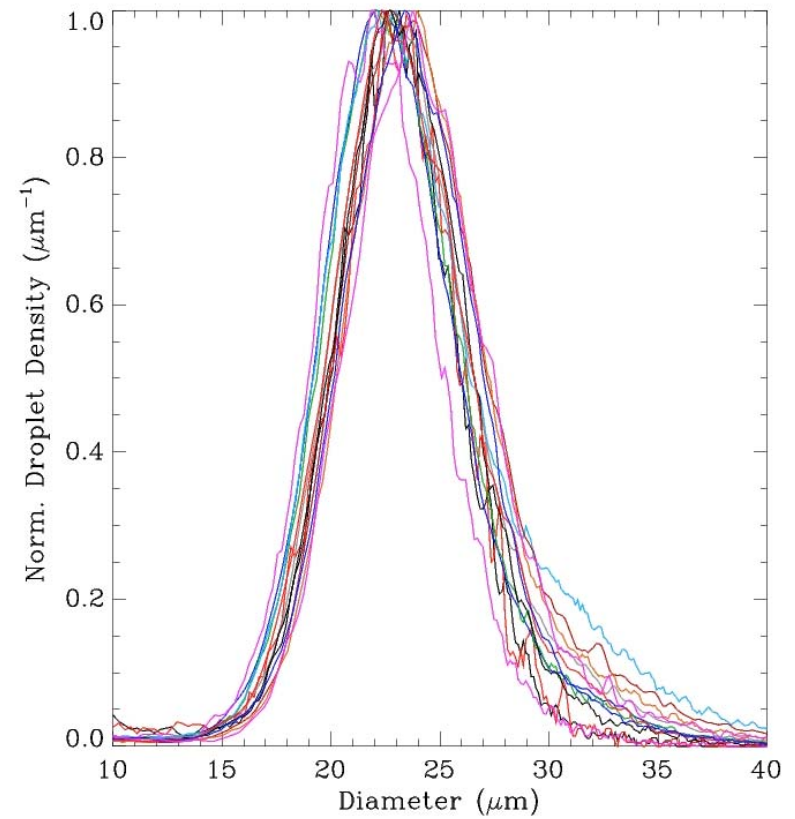
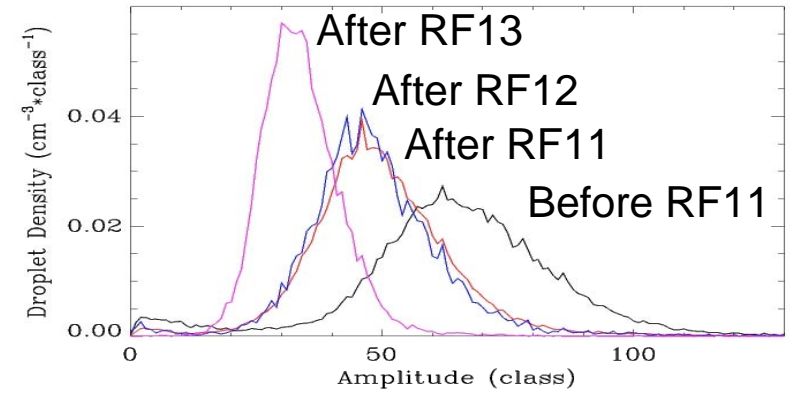
Fast-FSSP Calibration

- CALIB/ca0802/080130.1D345000
- VOCALS/po0823/173247.4D350000
- VOCALS/po0825/143953.9D3572000
- VOCALS/RF04/143247.7D390000
- VOCALS/RF06/153031.6D360000
- VOCALS/RF07/152307.8D350000
- VOCALS/RF08/153614.9D340000
- VOCALS/RF09/150553.1D345000
- VOCALS/RF10/143440.9D330000
- VOCALS/ca0803/132714.8D340000
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- VOCALS/ca0804/130009.4D3150000
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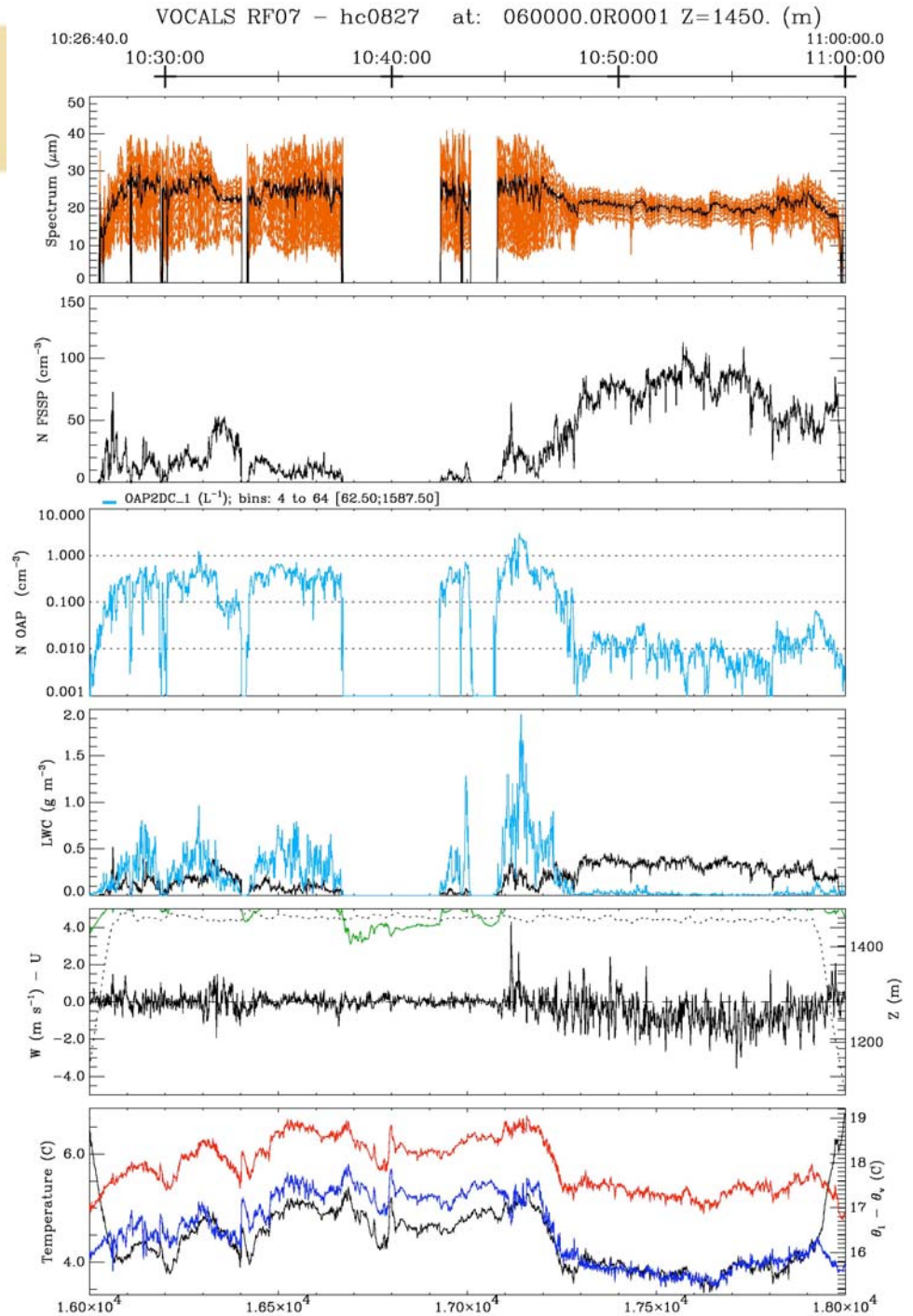
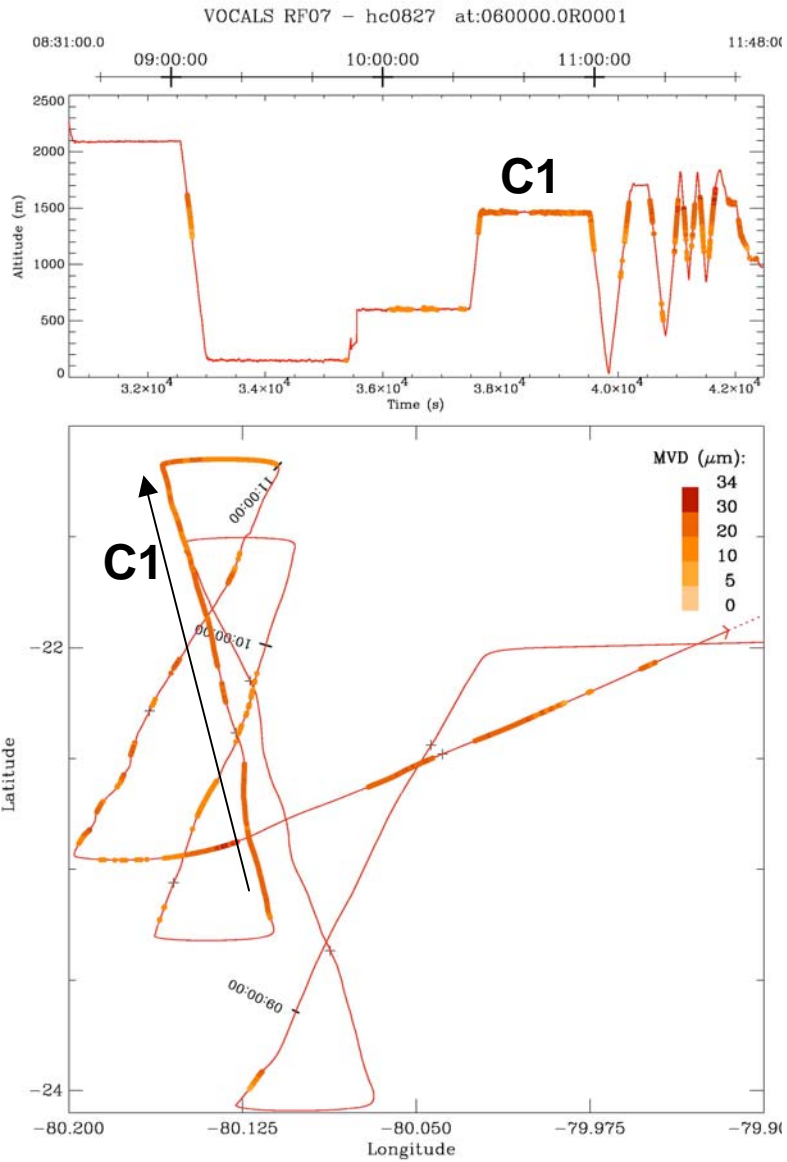


RICO

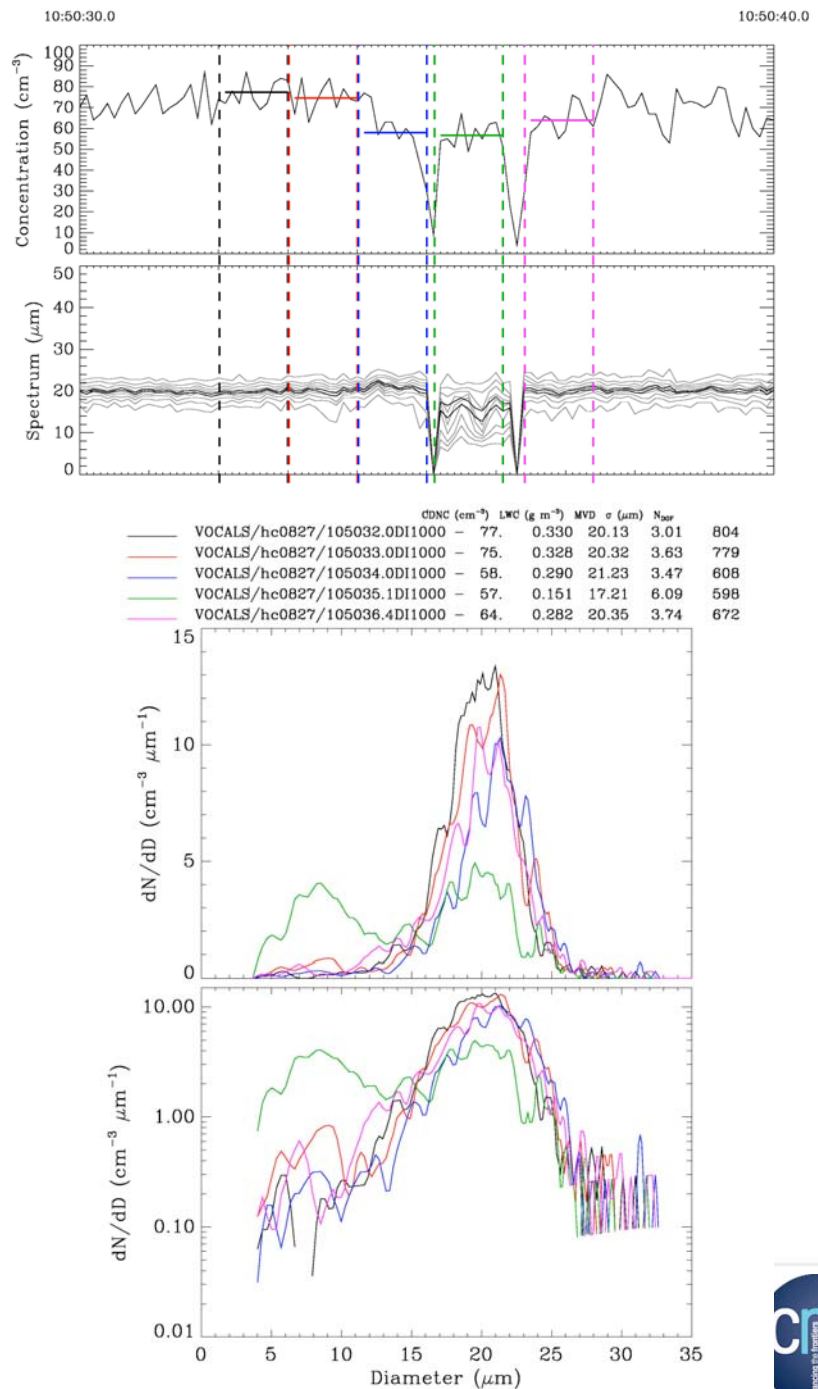
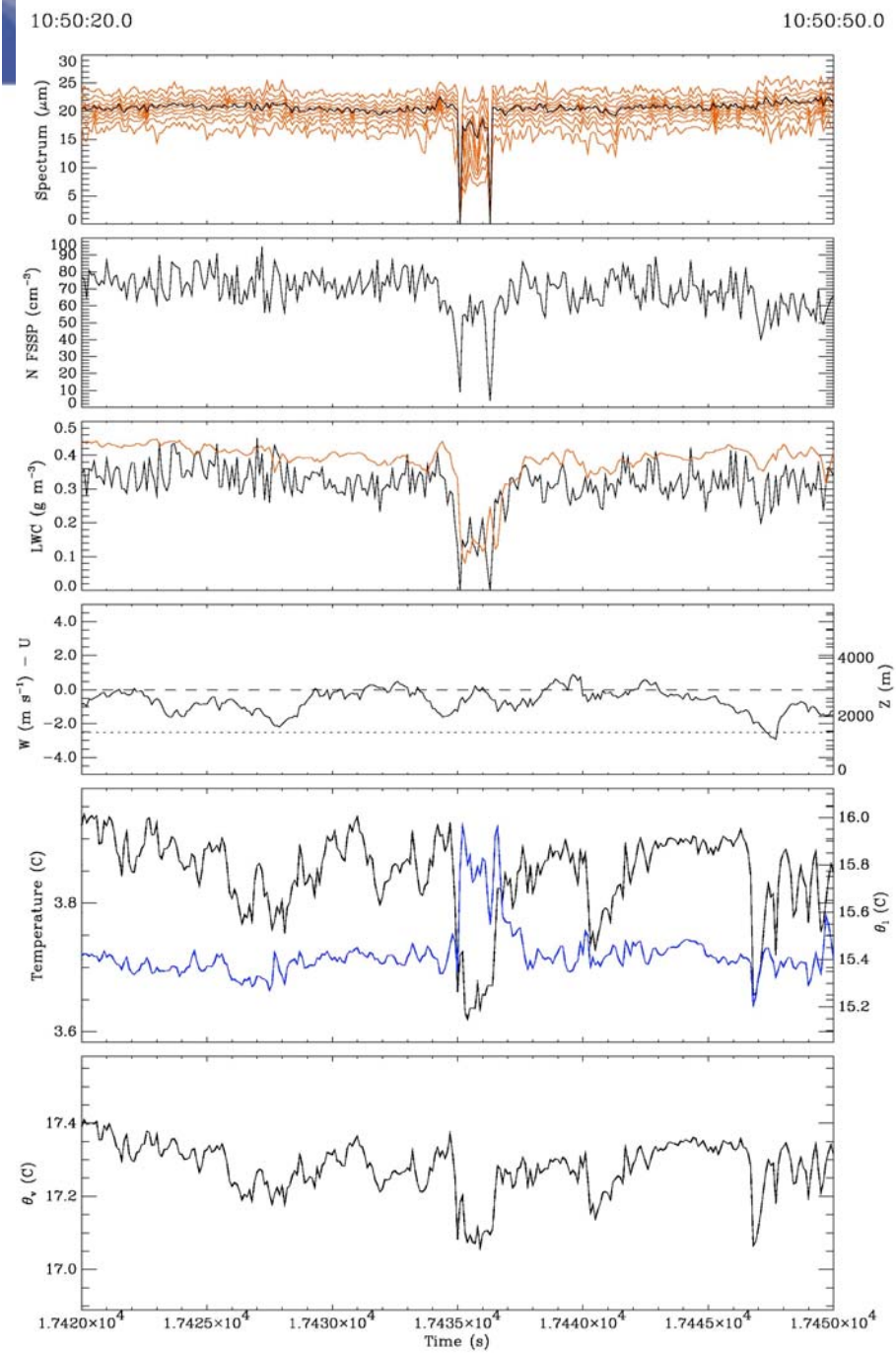
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- RICO/po0024/145757.2D3200000
- RICO/hc0502/224319.3D3600000
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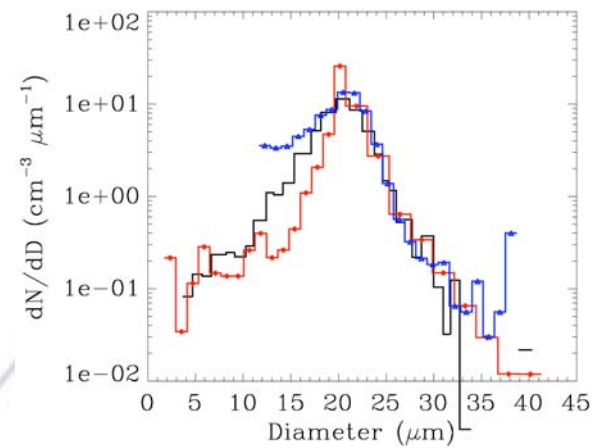
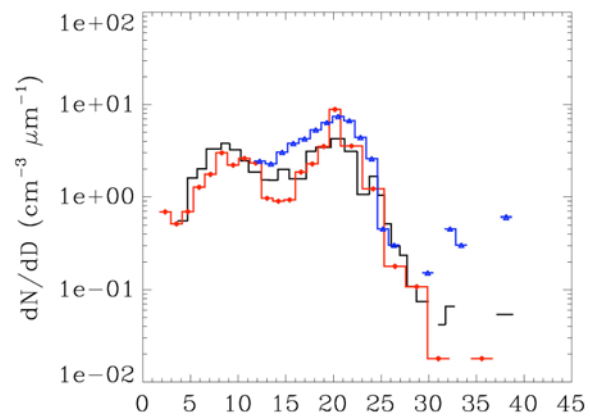
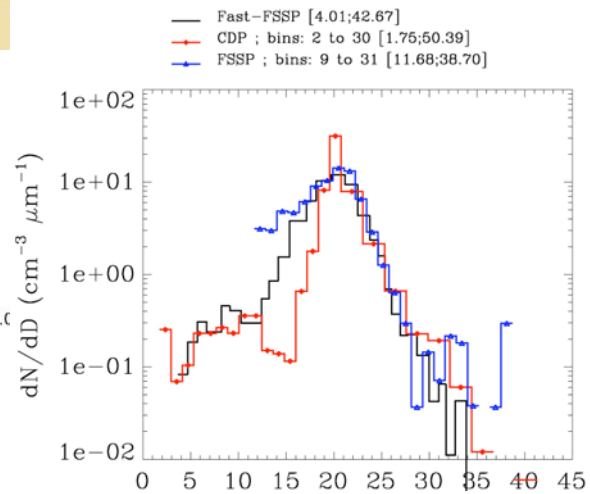
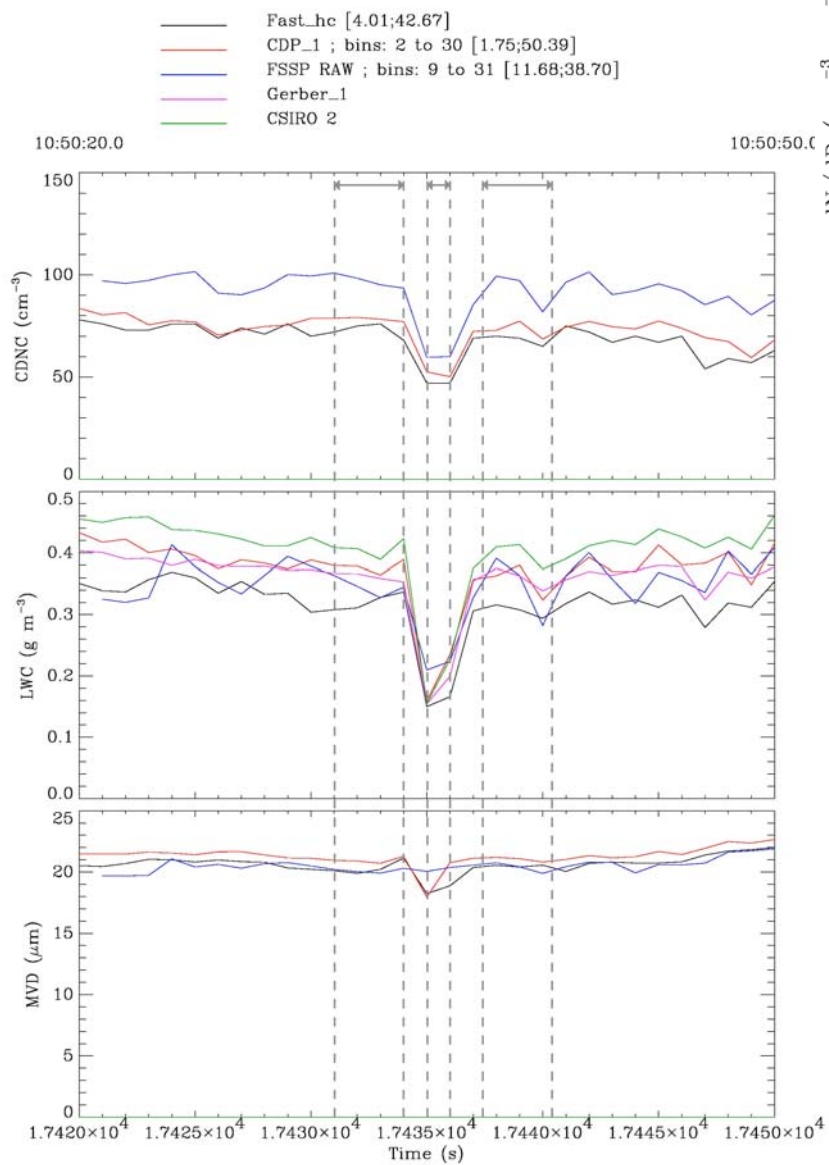
RF07 - POC



VOCALS RF07 - hc0827 at: 060000.0R0010 Z=1453. (m)



VOCALS RF07 - hc0827 at: 060000.0



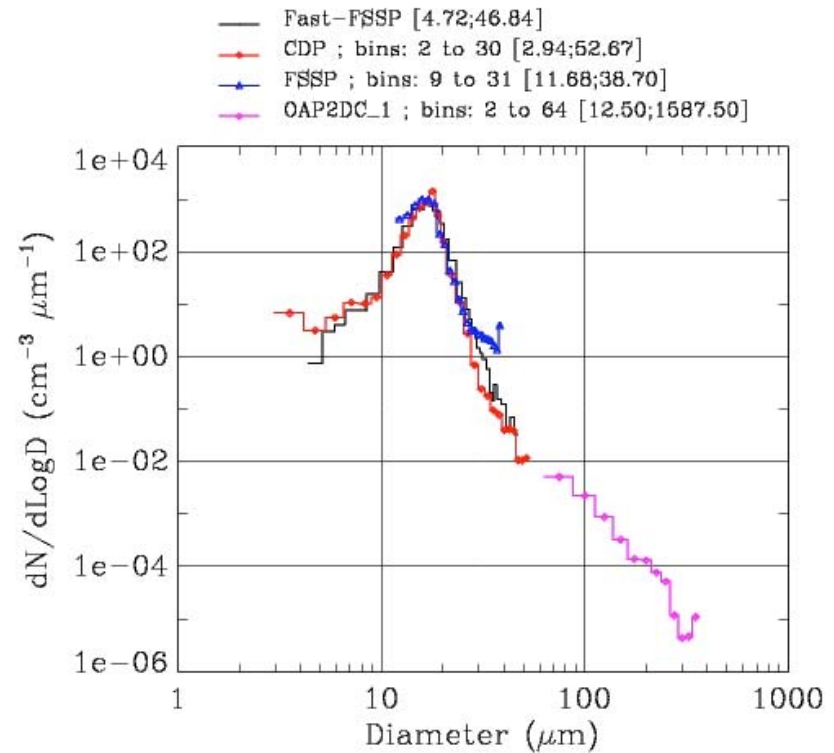
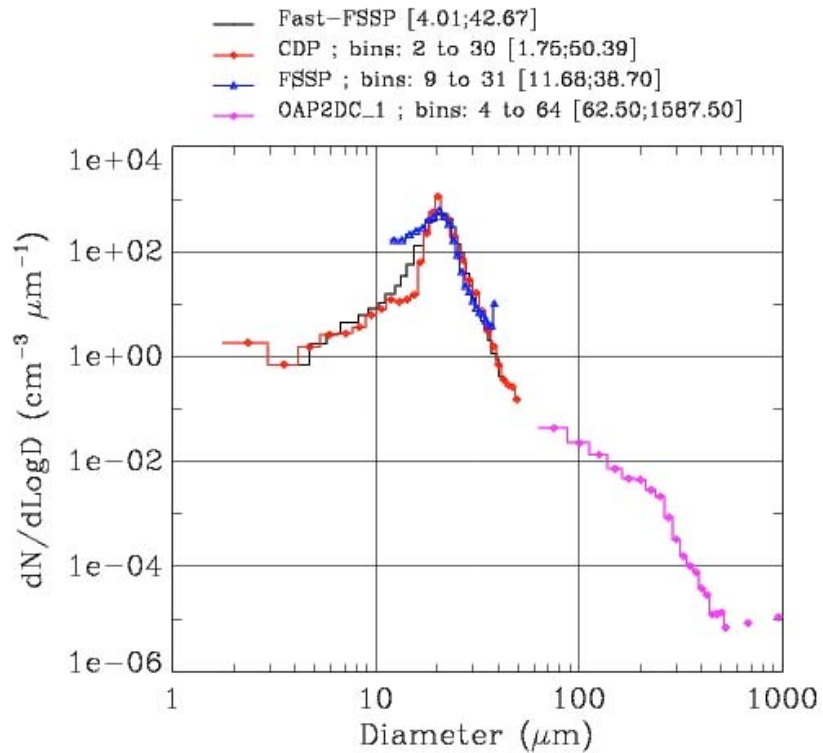
Intercomparison Flights

31/10 - RF07

04/11 - RF09

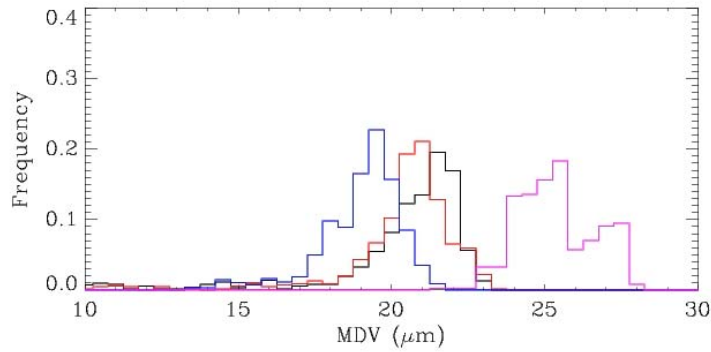
VOCALS RF07 - hc0827 at: 122800.0DI600000

VOCALS RF09 - hc0829 at: 122625.0DI600000





— RF07_Fast — RF07_CDP — RF07_Fssp — B412_CDP



— RF09_Fast — RF09_CDP — RF09_Fssp — B414_CDP

