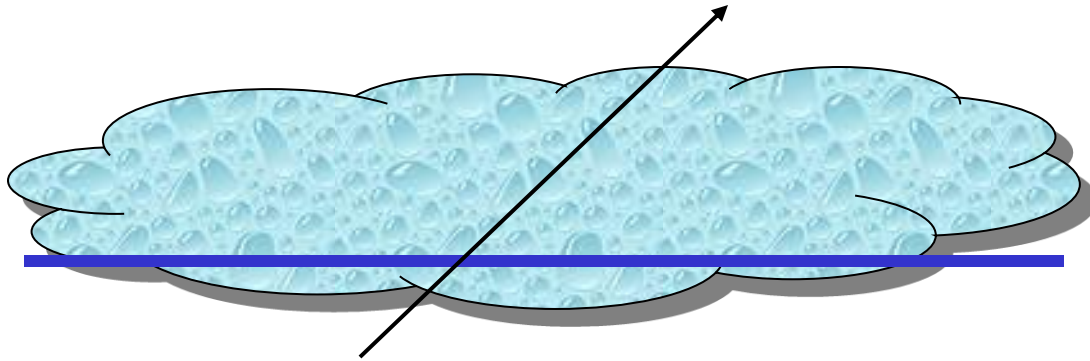
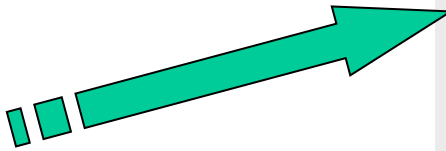


Adiabatic Sc model

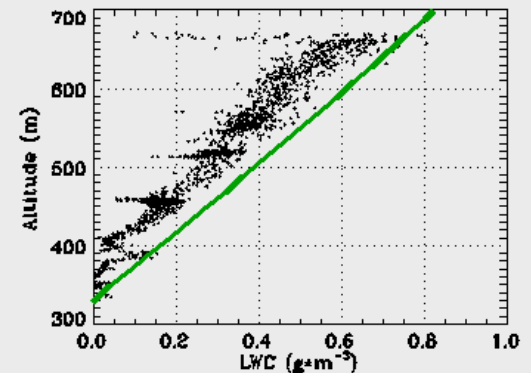
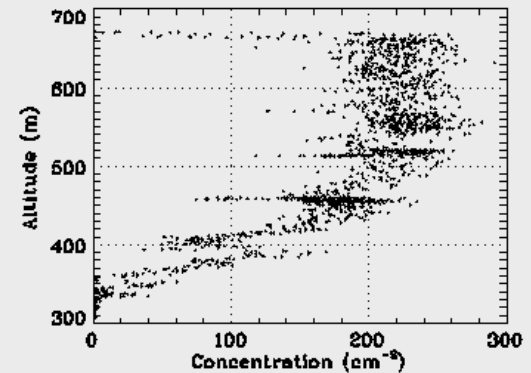
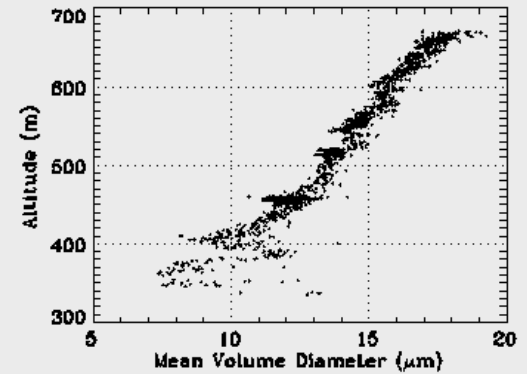
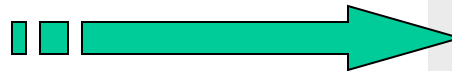


- Cloud Base constant = Z_b

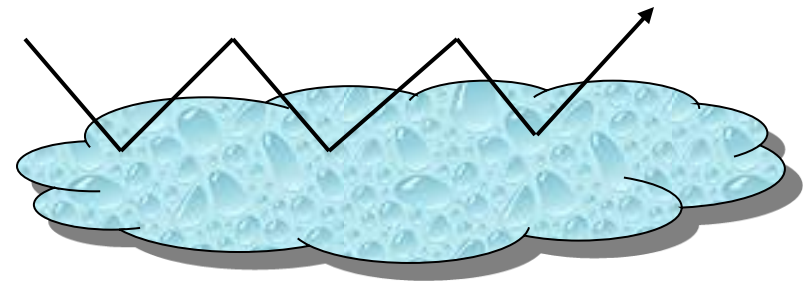
- CDNC constant = N_0



- $LWC_{ad} = C_w (Z - Z_b)$
 $= \frac{\pi}{6} \rho_w N_0 \Phi_v^3$



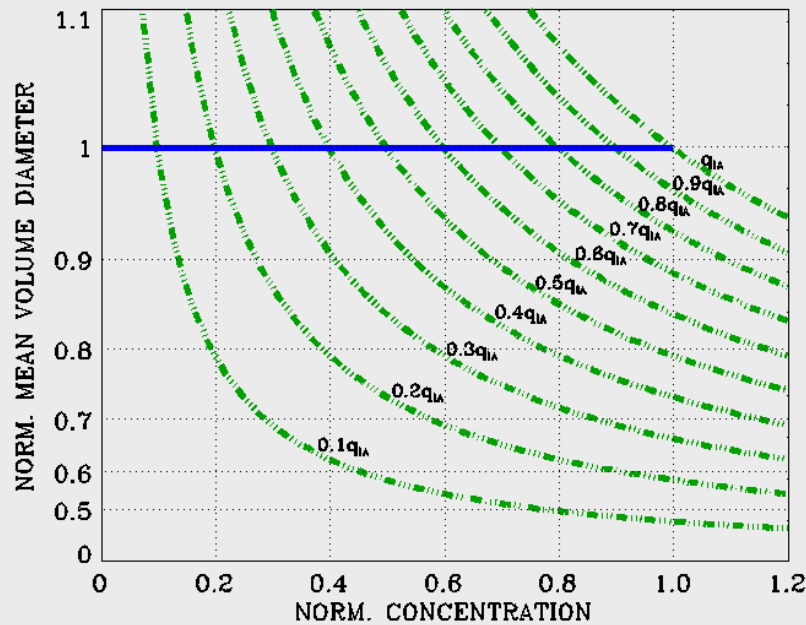
Entrainment - Mixing



Inhomogeneous

$N \searrow$ dilution + evaporation

Φ_V constant



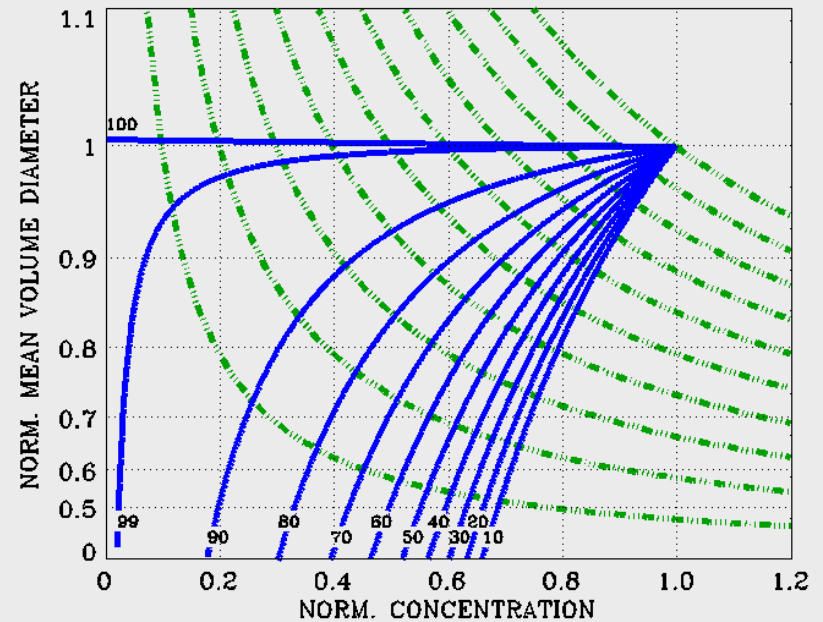
$$\frac{\Phi_V^3}{\Phi_{V0}^3}$$

N / N_0

Homogeneous

$N \searrow$ dilution only

$\Phi_V \searrow$ evaporation



N / N_0

$\Phi_{V0}(Zb)$? CB spatial variability

DYCOMS-II - Flight: hc0103

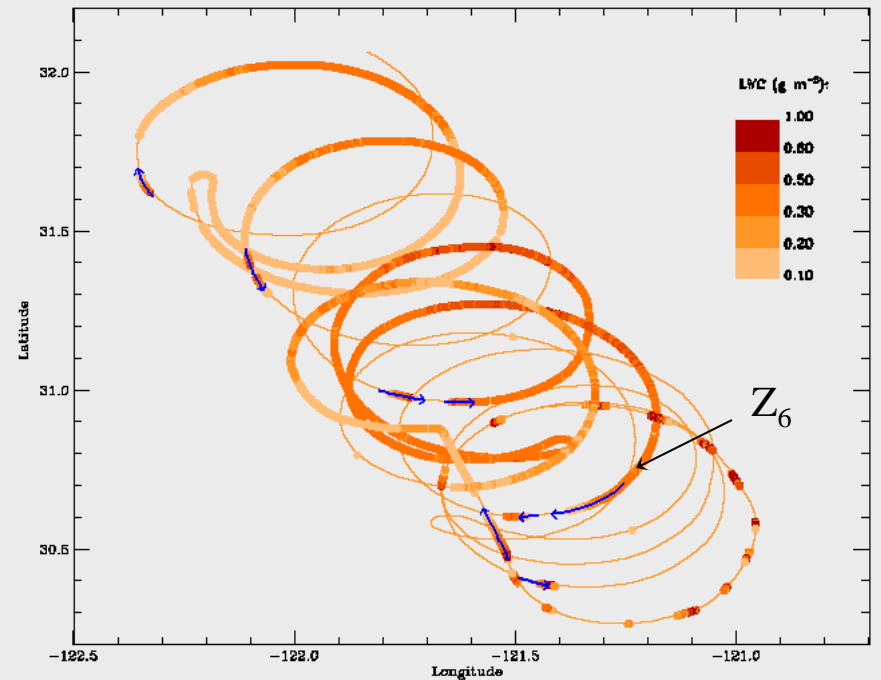
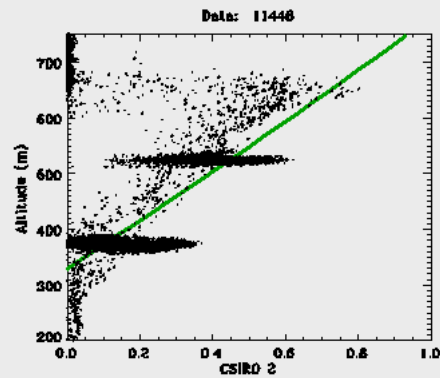
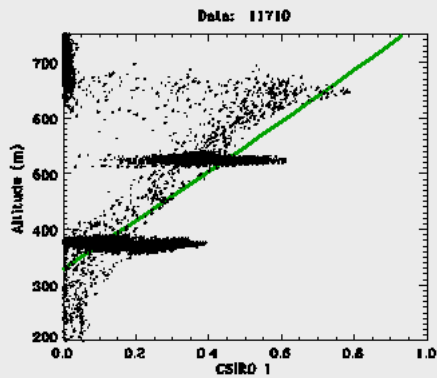
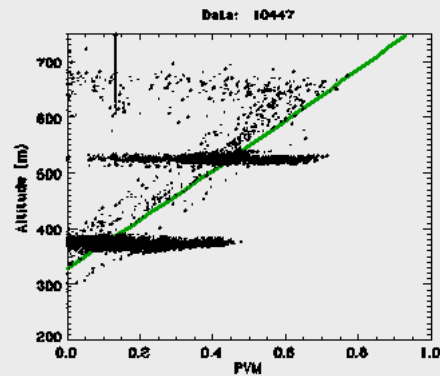
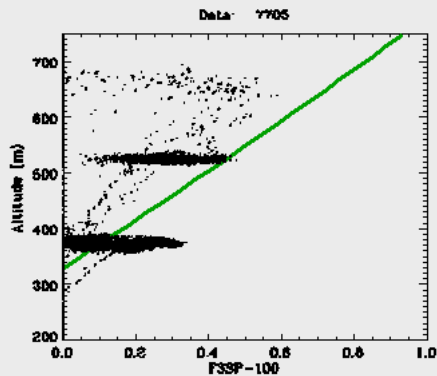
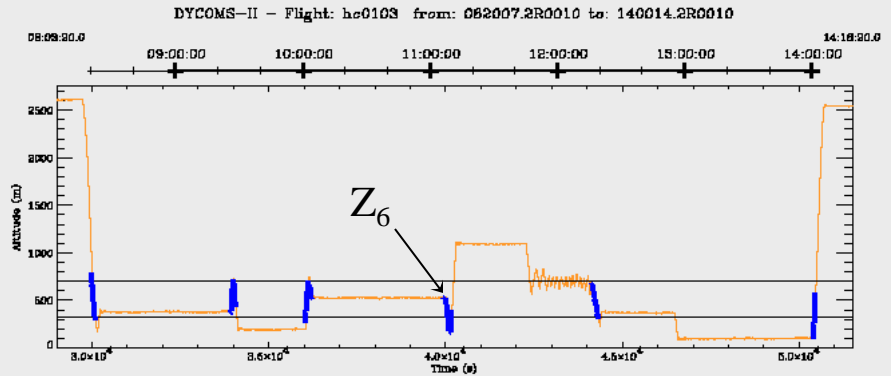
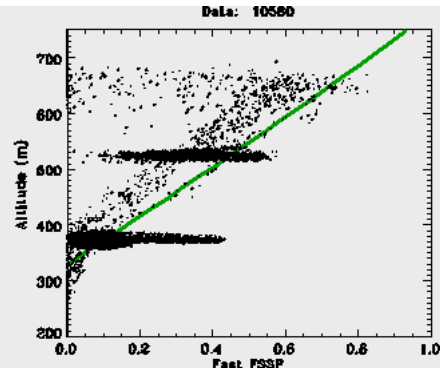
VERTICAL PROFILES
of LWC ($g \cdot m^{-3}$)

Base parameters:

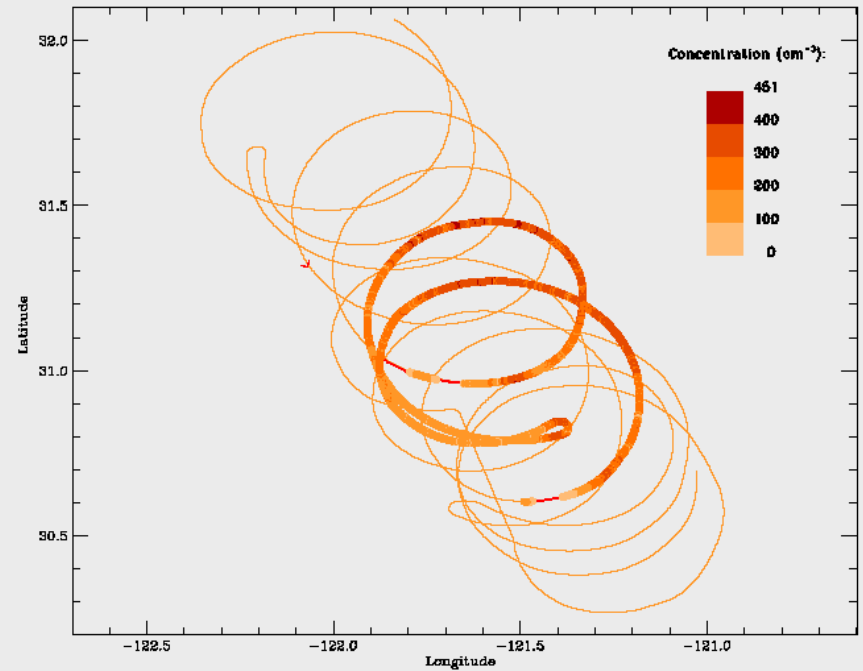
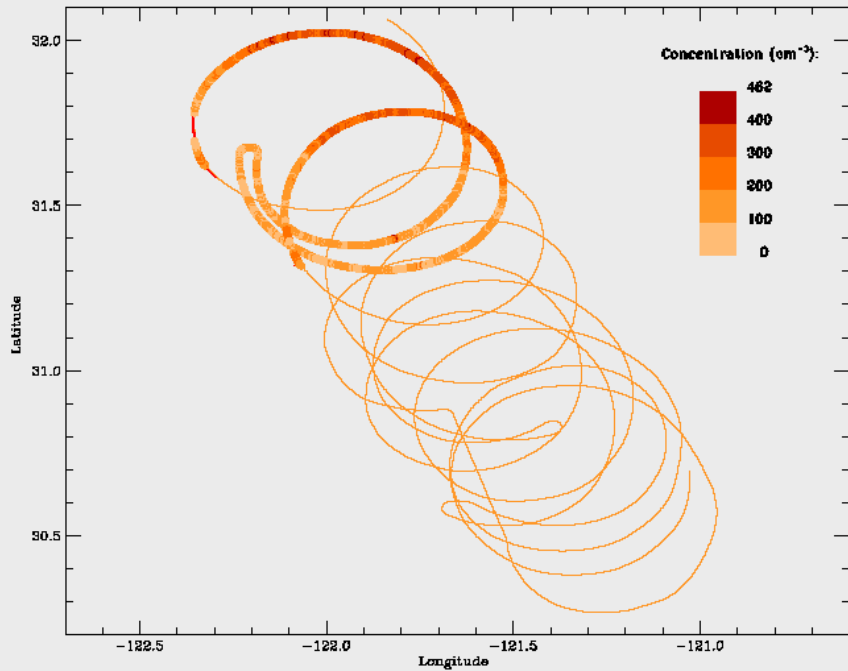
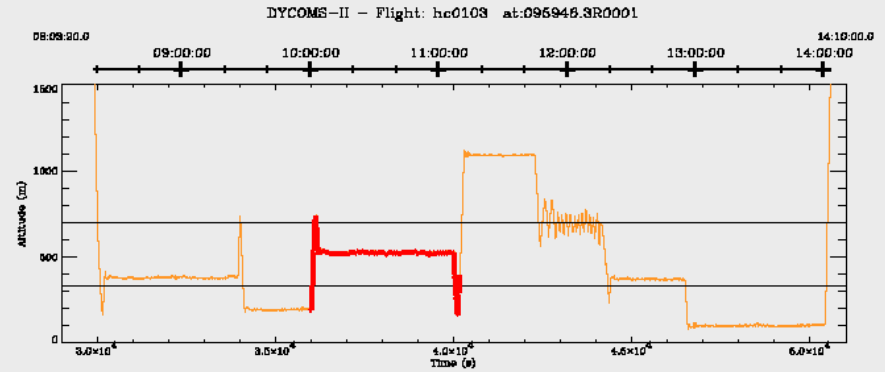
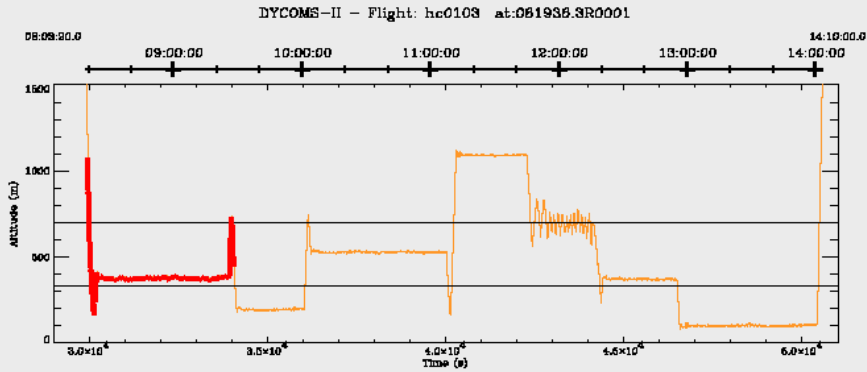
Z = 330. (m)

P = 980.0 (hPa)

T = 13.4 (C)

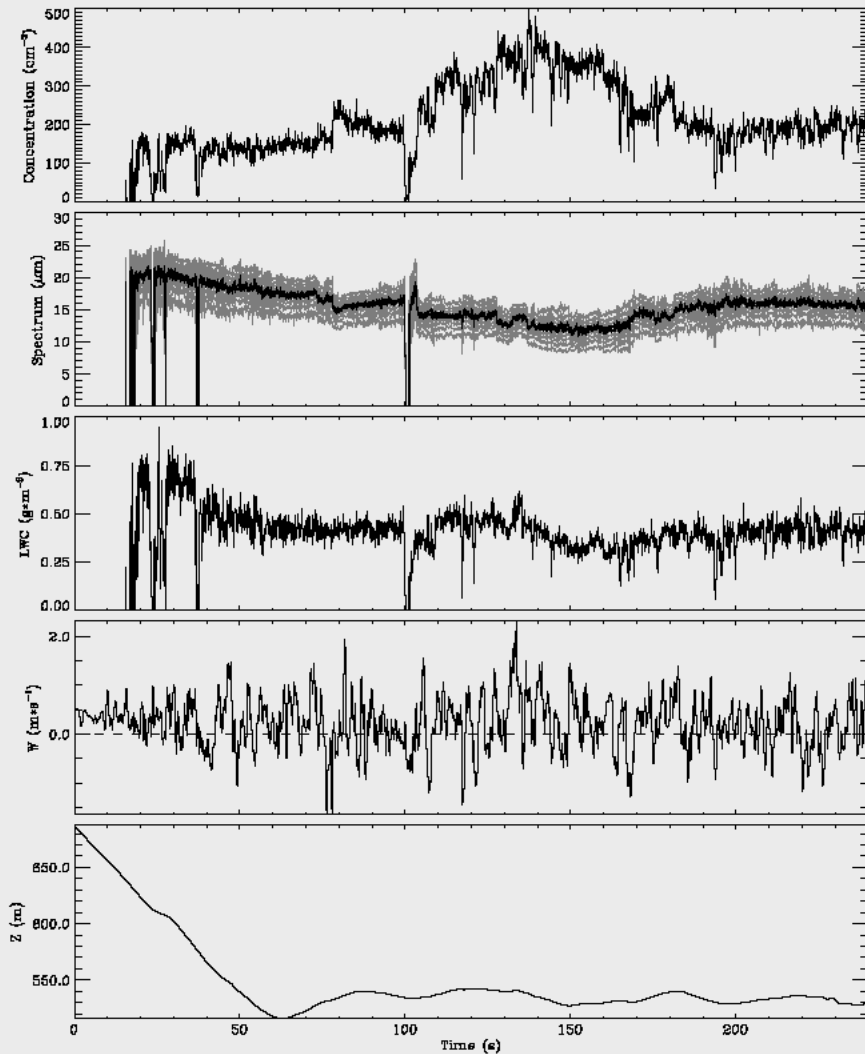


N_0 ? CDNC spatial variability



N_0 ? Effect of CDNC variability

DYCOMS-II - Flight: hc0103 at: 100250.1R0010

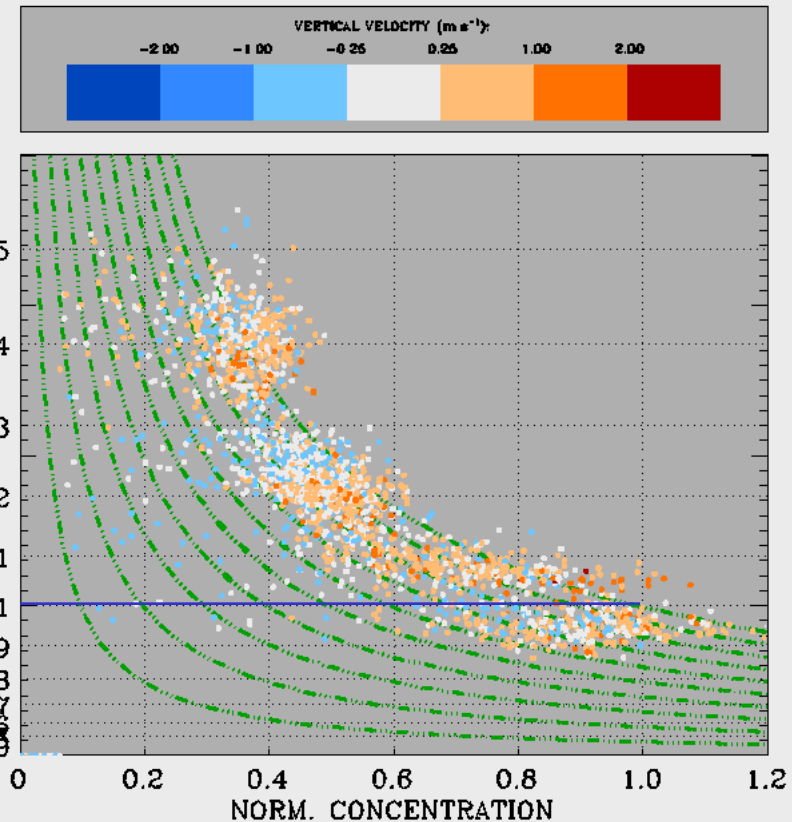


DYCOMS-II - Flight: hc0103 at: 100250.1R0010

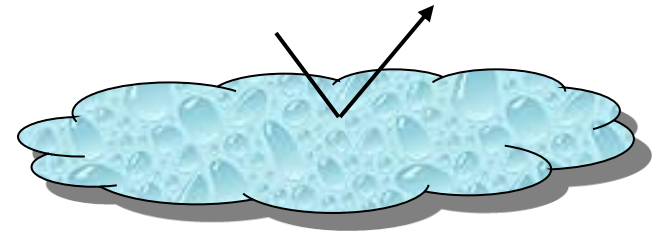
$N_0 = 400$ (cm^{-3})

Zb = 330. (m)

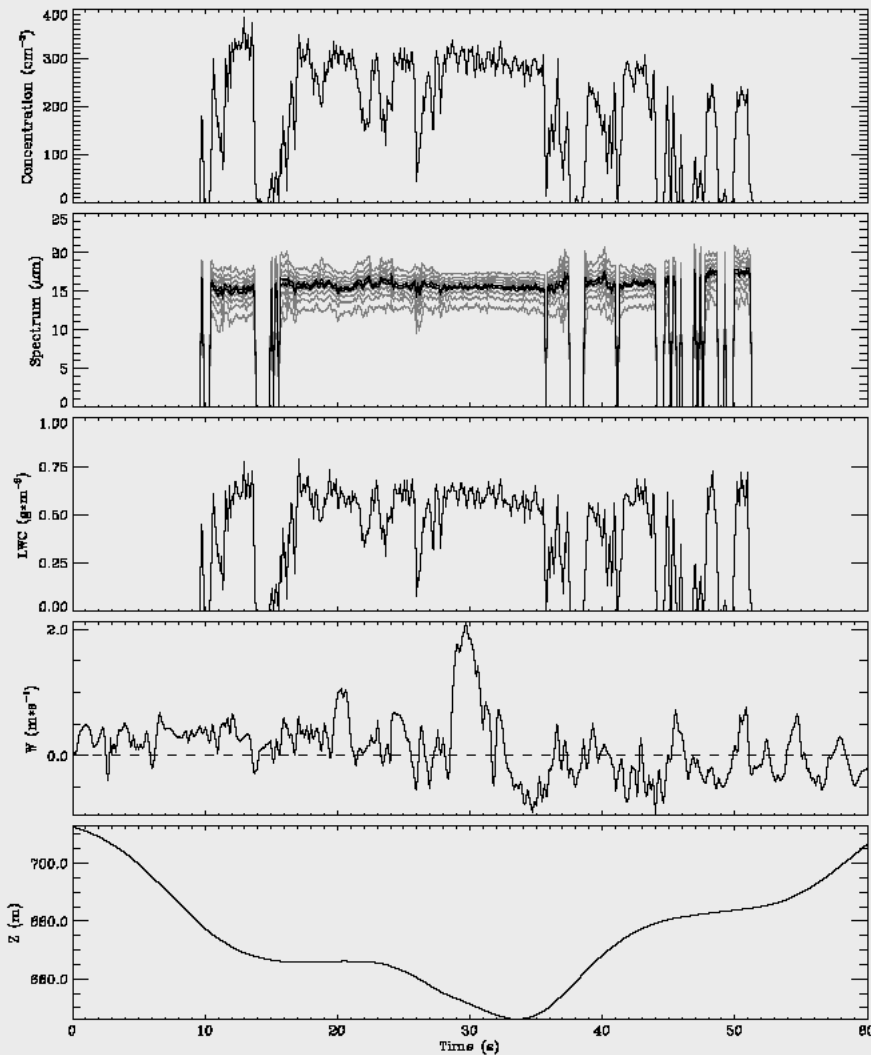
Ndata = 2200



Poirpoising section



DYCOMS-II - Flight: hc0103 at: 120704.8R0010

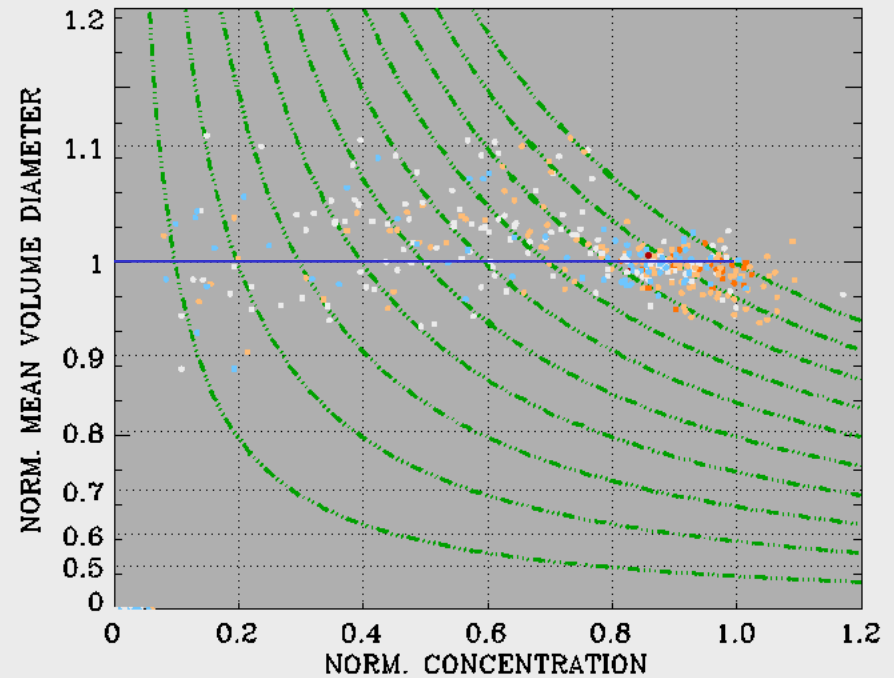
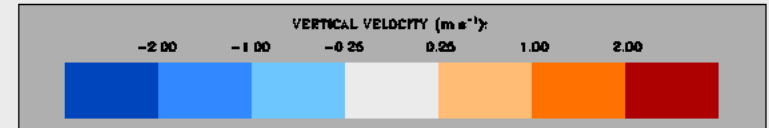


DYCOMS-II - Flight: hc0103 at: 120704.8R0010

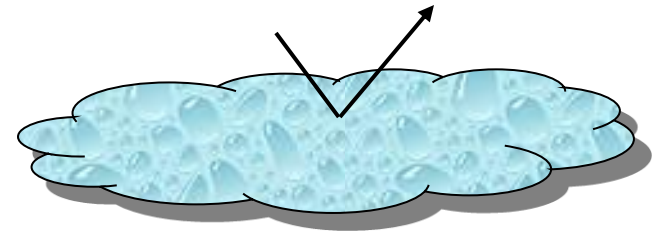
$N_0 = 320 \text{ (cm}^{-3}\text{)}$

$Z_b = 380. \text{ (m)}$

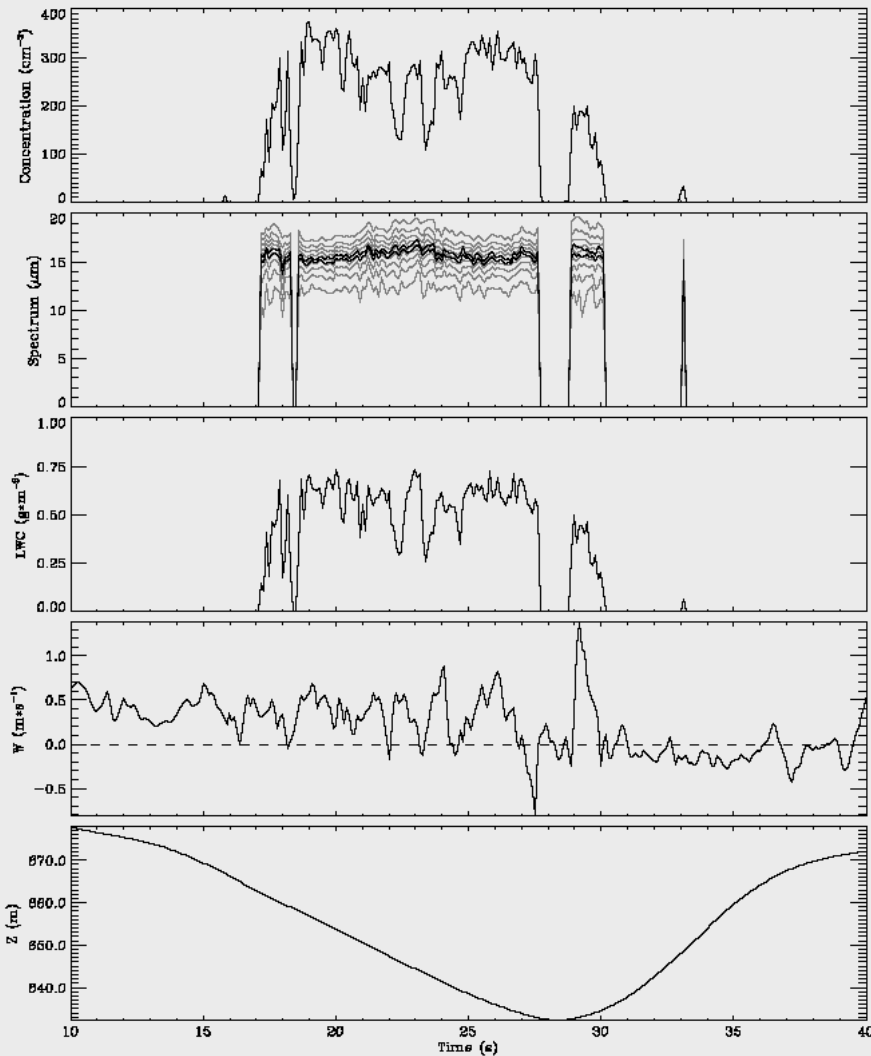
Ndata = 349



Poirpoising section



DYCOMS-II - Flight: hc0103 at: 120523.8R0010

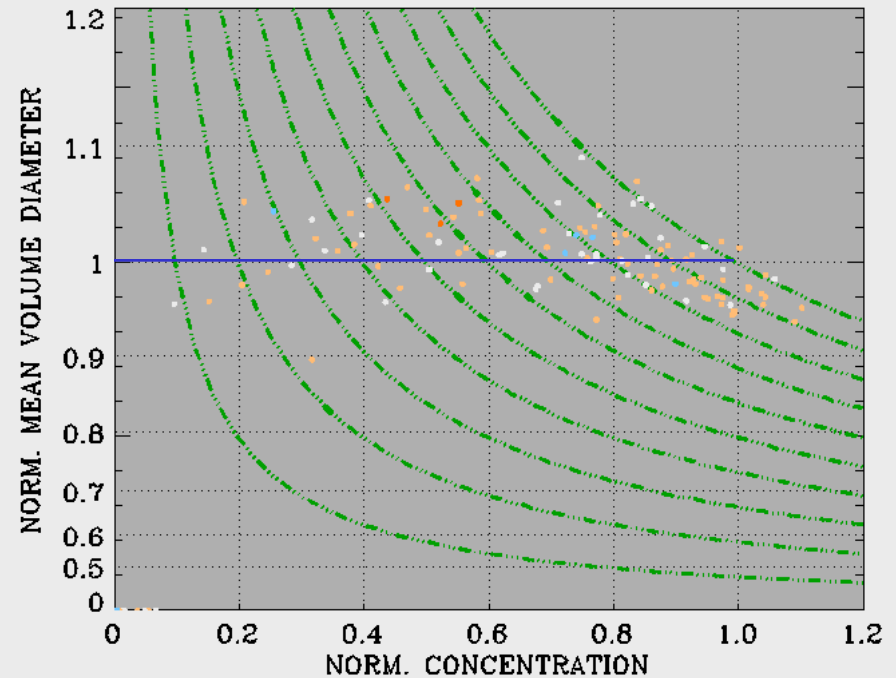
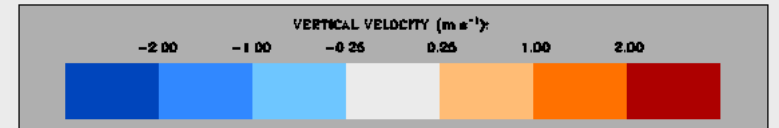


DYCOMS-II - Flight: hc0103 at: 120523.8R0010

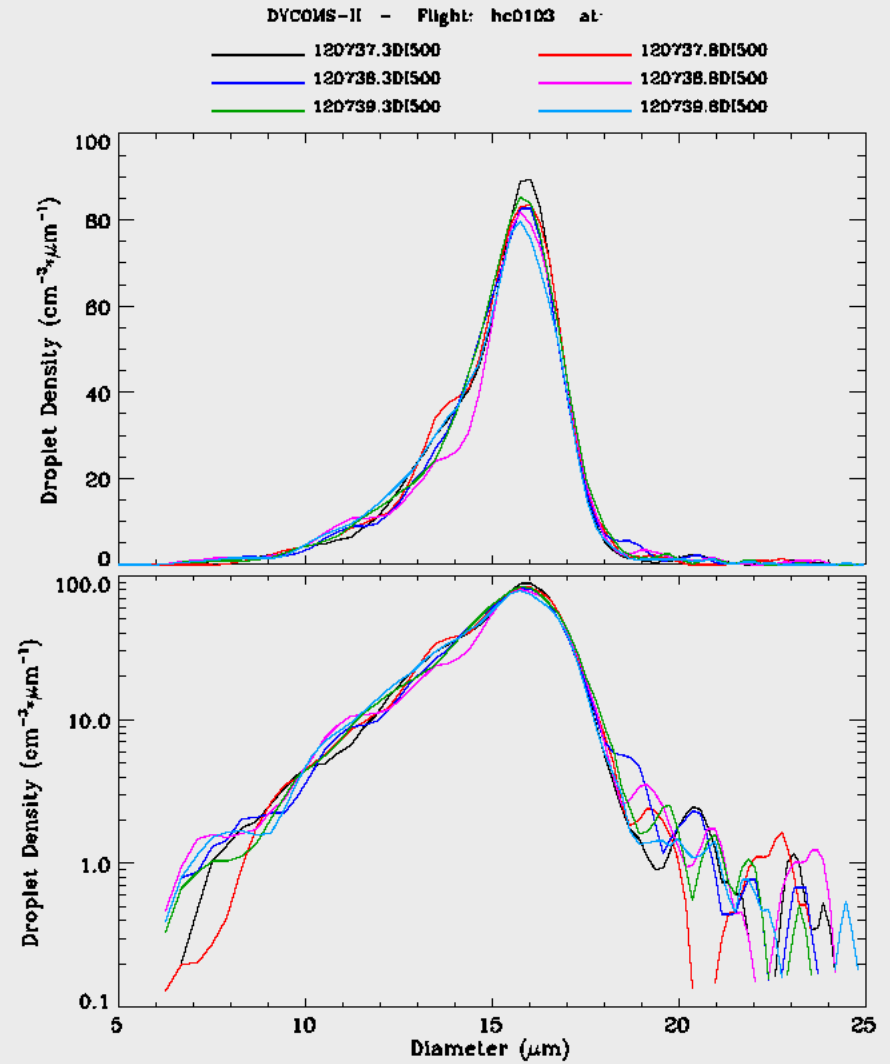
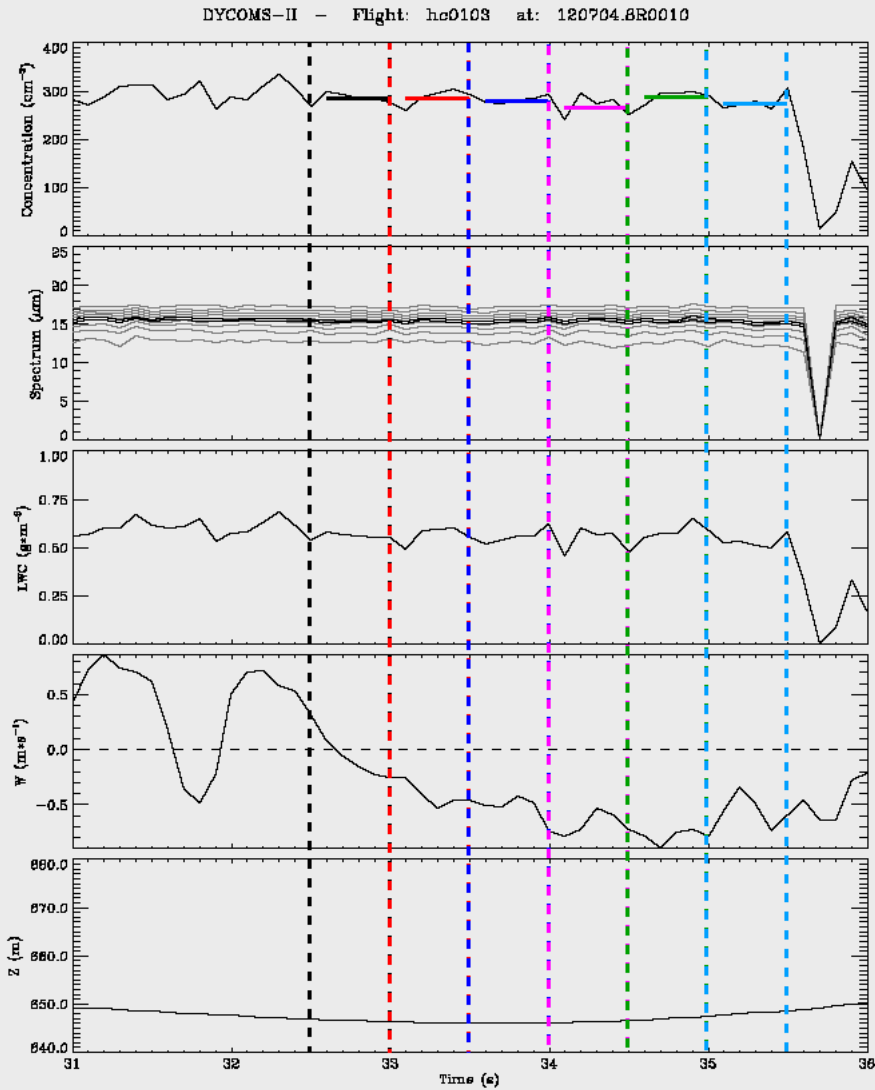
$N_0 = 340$ (cm^{-3})

$Z_b = 330.$ (m)

Ndata = 118

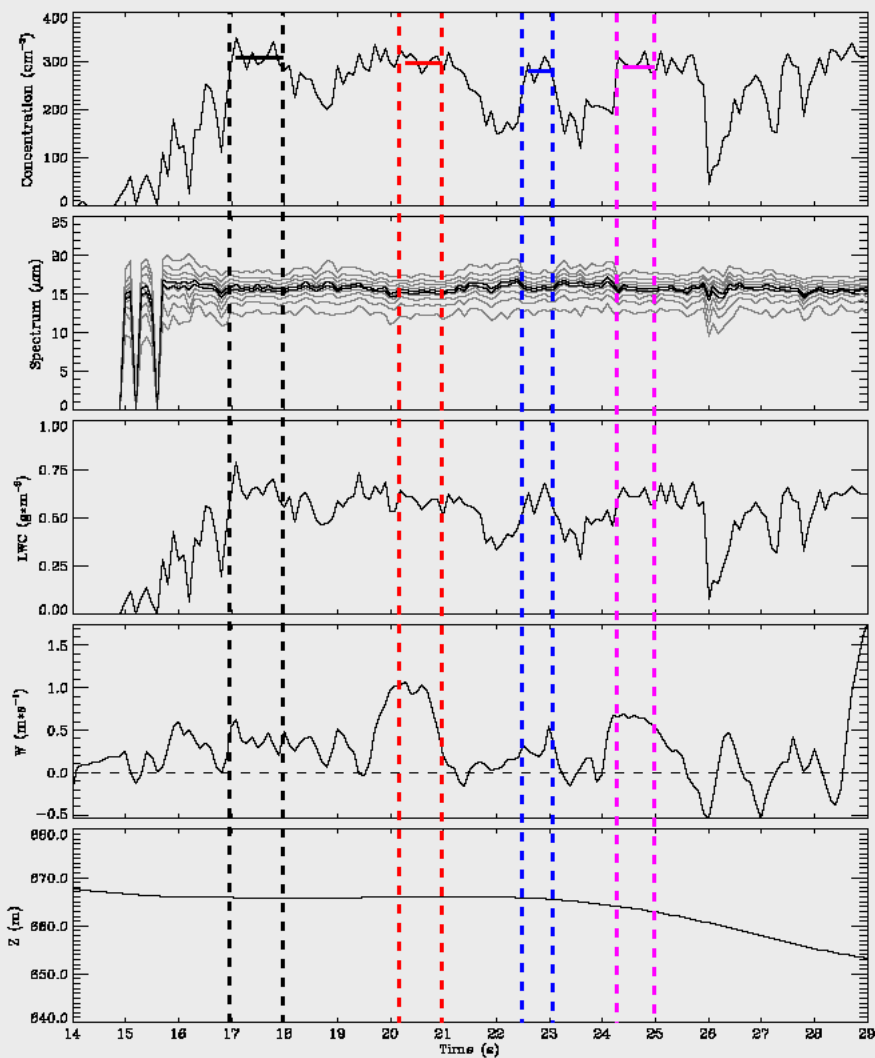


Spectra variability



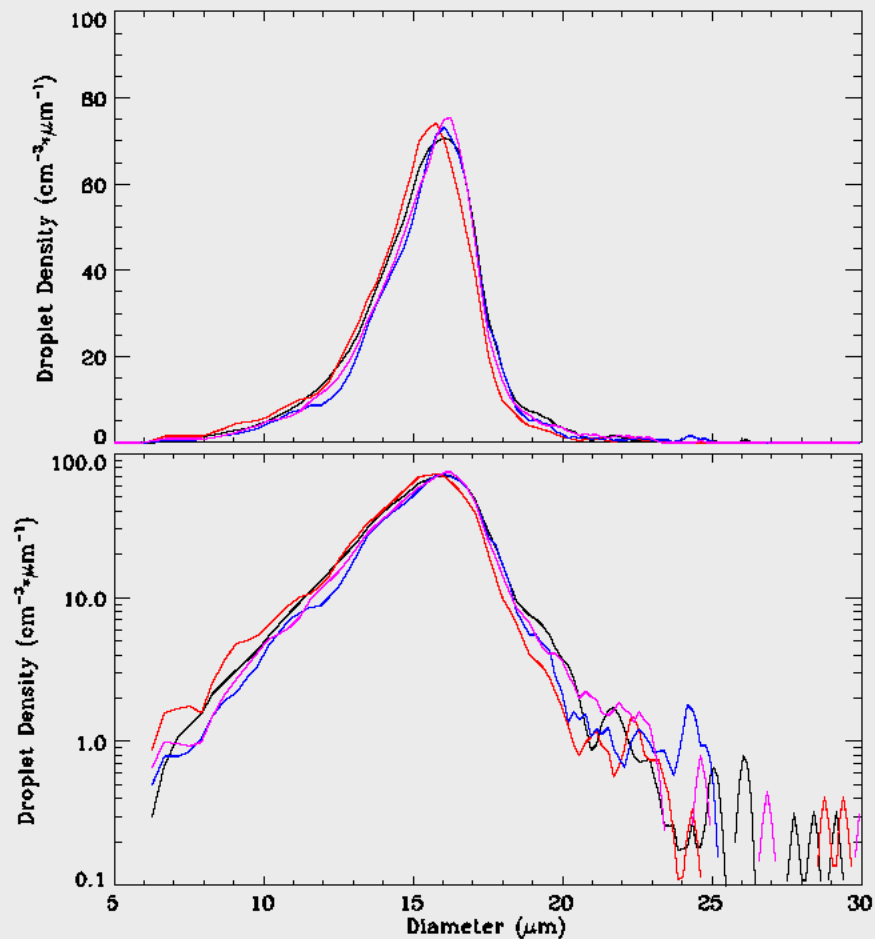
Cloud top structures

DYCOMS-II - Flight: hc0103 at: 120704.8R0010



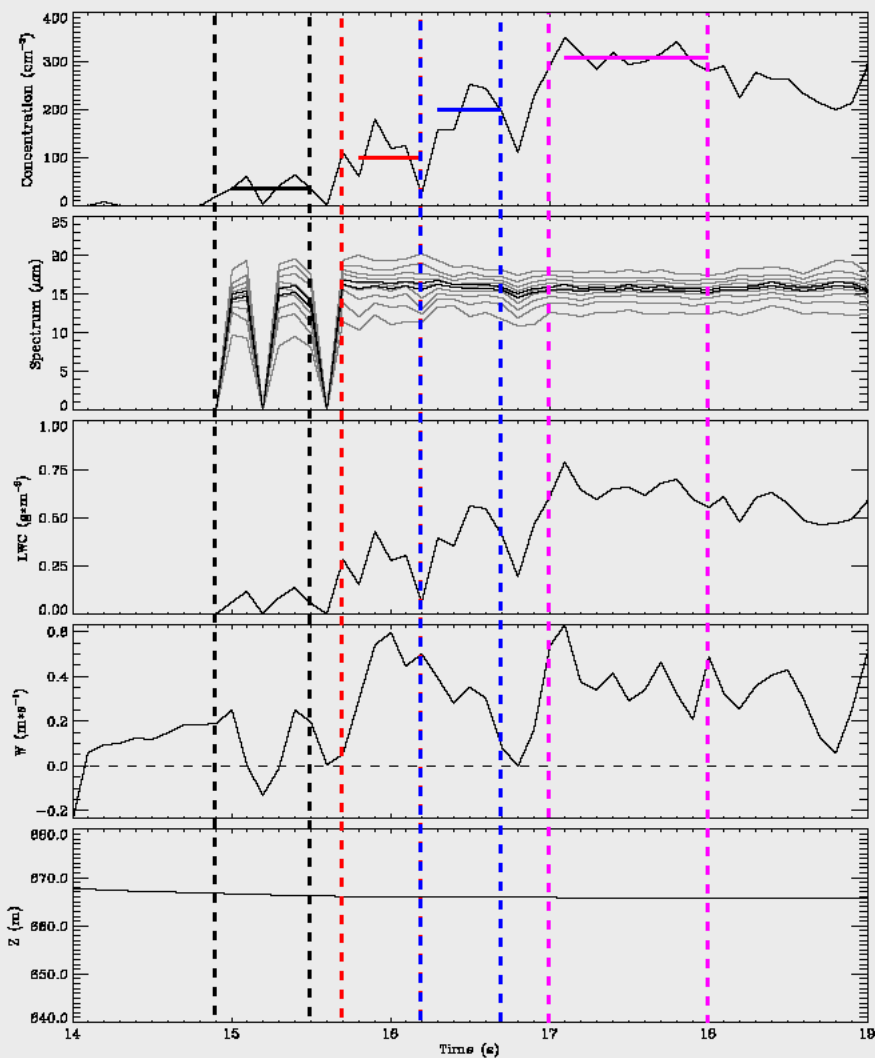
DYCOMS-II - Flight: hc0103 at:

— 120721.8D11000
— 120725.0D1800
— 120727.3D1800
— 120729.1D1700



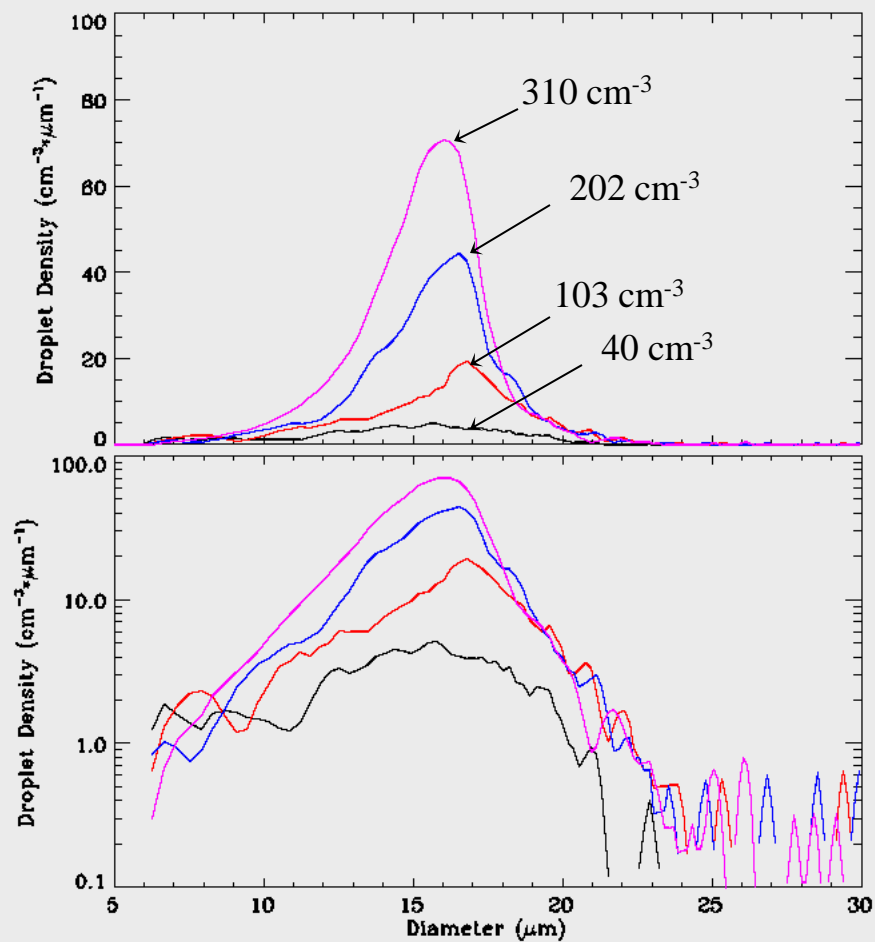
Mixing zone 1

DYCOMS-II - Flight: hc0103 at: 120704.8R0010

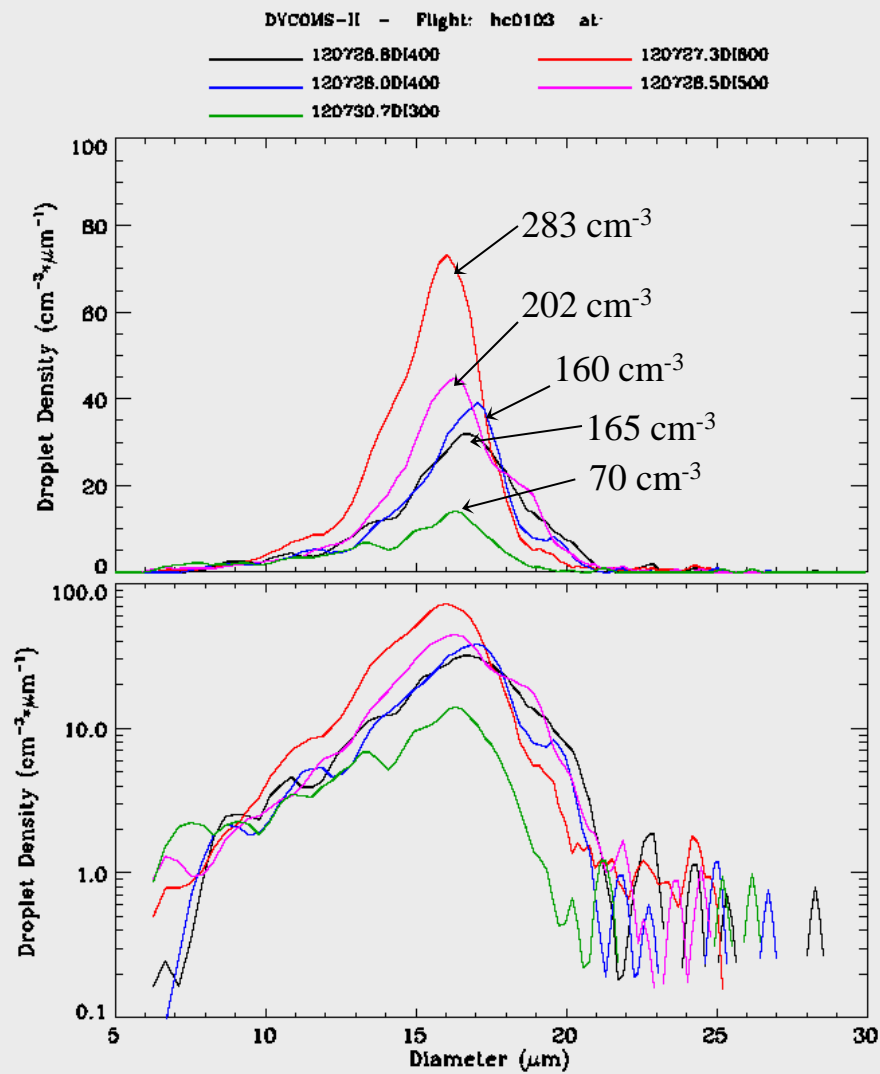
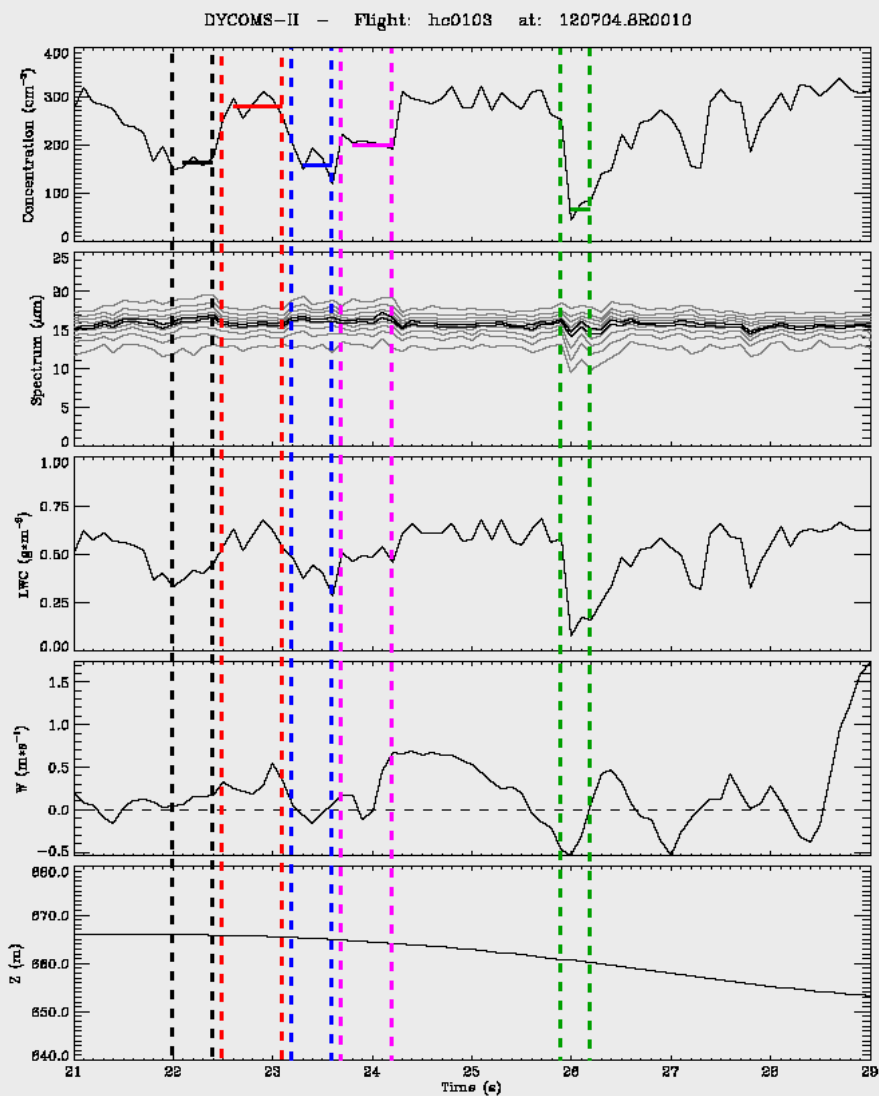


DYCOMS-II - Flight: hc0103 at:

— 120719.7D1800 — 120720.5D1500
— 120721.0D1500 — 120721.8D1000

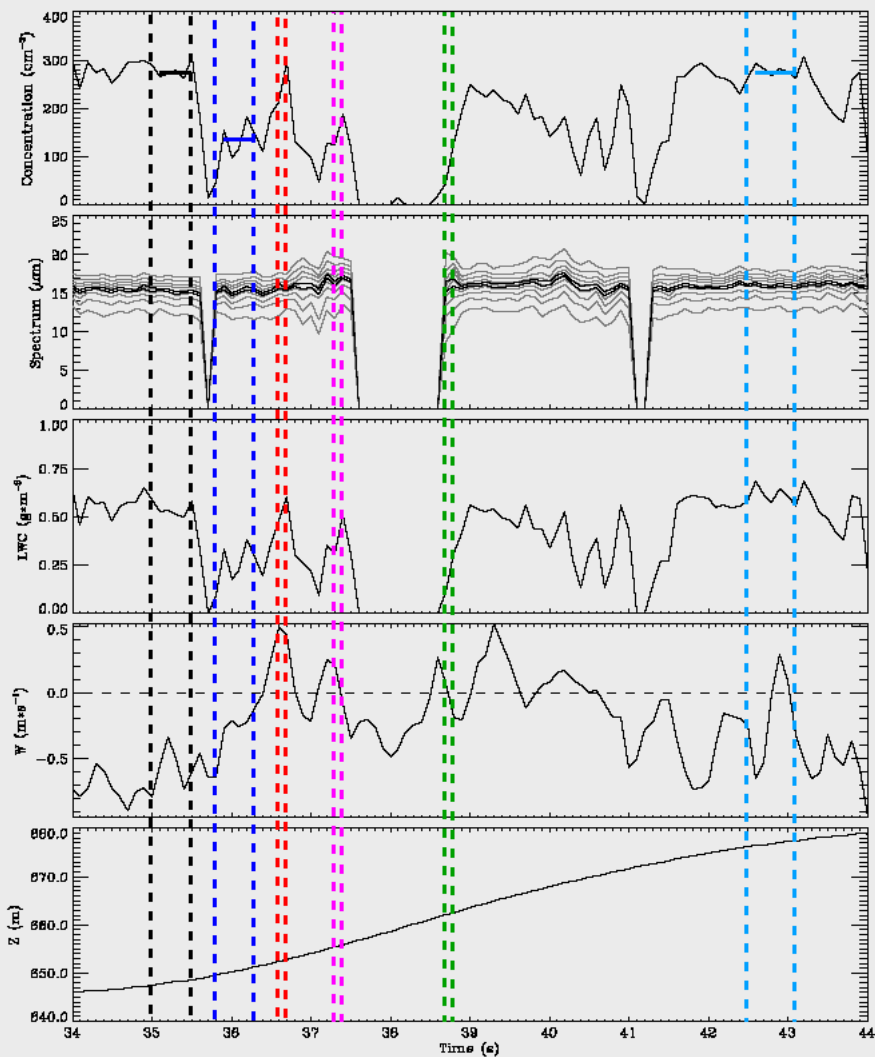


Mixing zone2



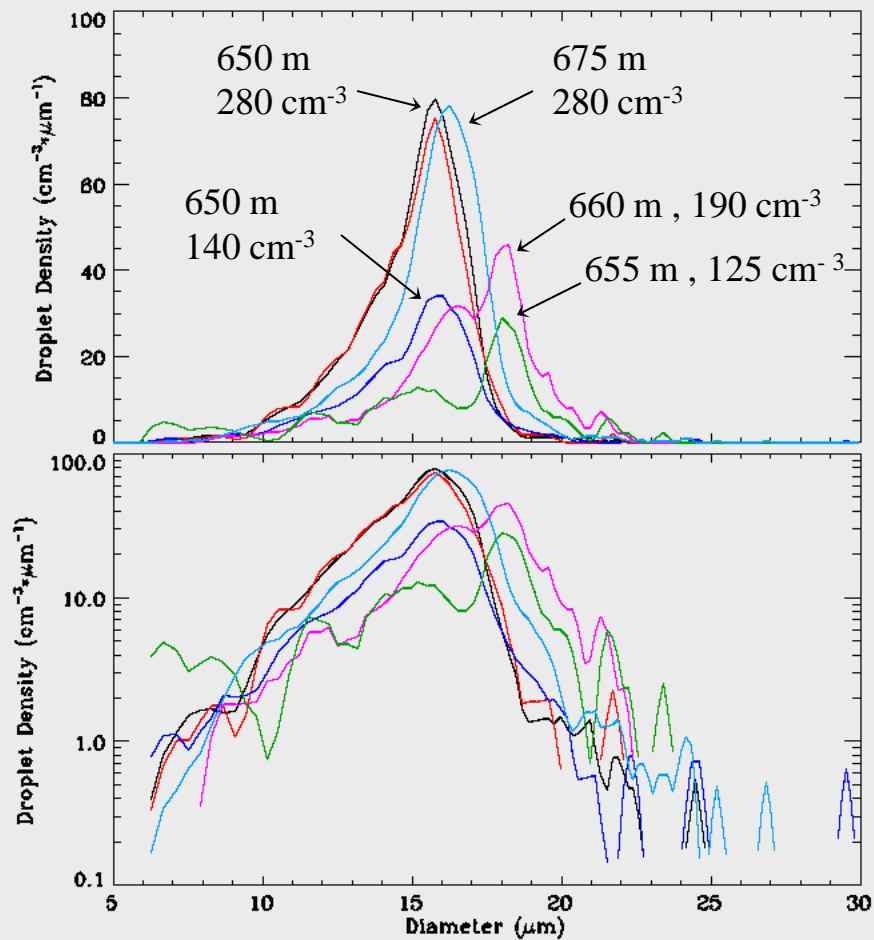
Mixing zone3

DYCOMS-II - Flight: hc0103 at: 120704.8R0010



DYCOMS-II - Flight: hc0103 at:

— 120739.8D1500 — 120740.1D1100
— 120740.8D1500 — 120742.1D1100
— 120743.5D1100 — 120747.3D1500



Conclusion - perspectives

- **Mixing diagram** with 10 Hz data (\cong 10 m spatial resolution)
 - ▶ LWC reduction entirely due to CDNC reduction at cst MVD
 \Rightarrow **Heterogeneous mixing**
(Dry air from FT is humidified by previous mixing events)
 - **Cloud top structure:**
 - ▶ quasi-adiabatic regions: $LWC \cong LWC_{ad}$
cst CDNC (N_o) and droplet spectrum
 - ▶ mixed regions : $0 < LWC < LWC_{ad}$
 $0 < N < N_o$
different spectra with { significant density of big droplets
variable density of small droplets
- \Rightarrow these features reflect different stages of the mixing process
- \hookrightarrow **Obj: document the statistics of these structures**