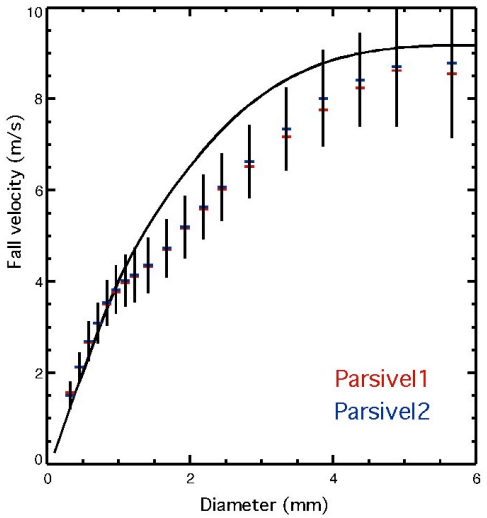
Parsivel (Laser Optical) Disdrometer

PI: Ali Tokay (JCET/UMBC, NASA/GSFC)

Measures size and fall velocity of hydrometeors
Present weather sensor
Sampling area: ~50 cm^2, varies with drop diameter
Number of size and velocity bins: 32 x 32 matrix
Drop size range: 0.06-24.5 mm
Velocity range: 0.05-20.8 m/sec
Operation period at Wallops Island: Spring 2002 - present
Manufacturer: OTT in Germany www.ott-hydrometry.de

Shortcomings

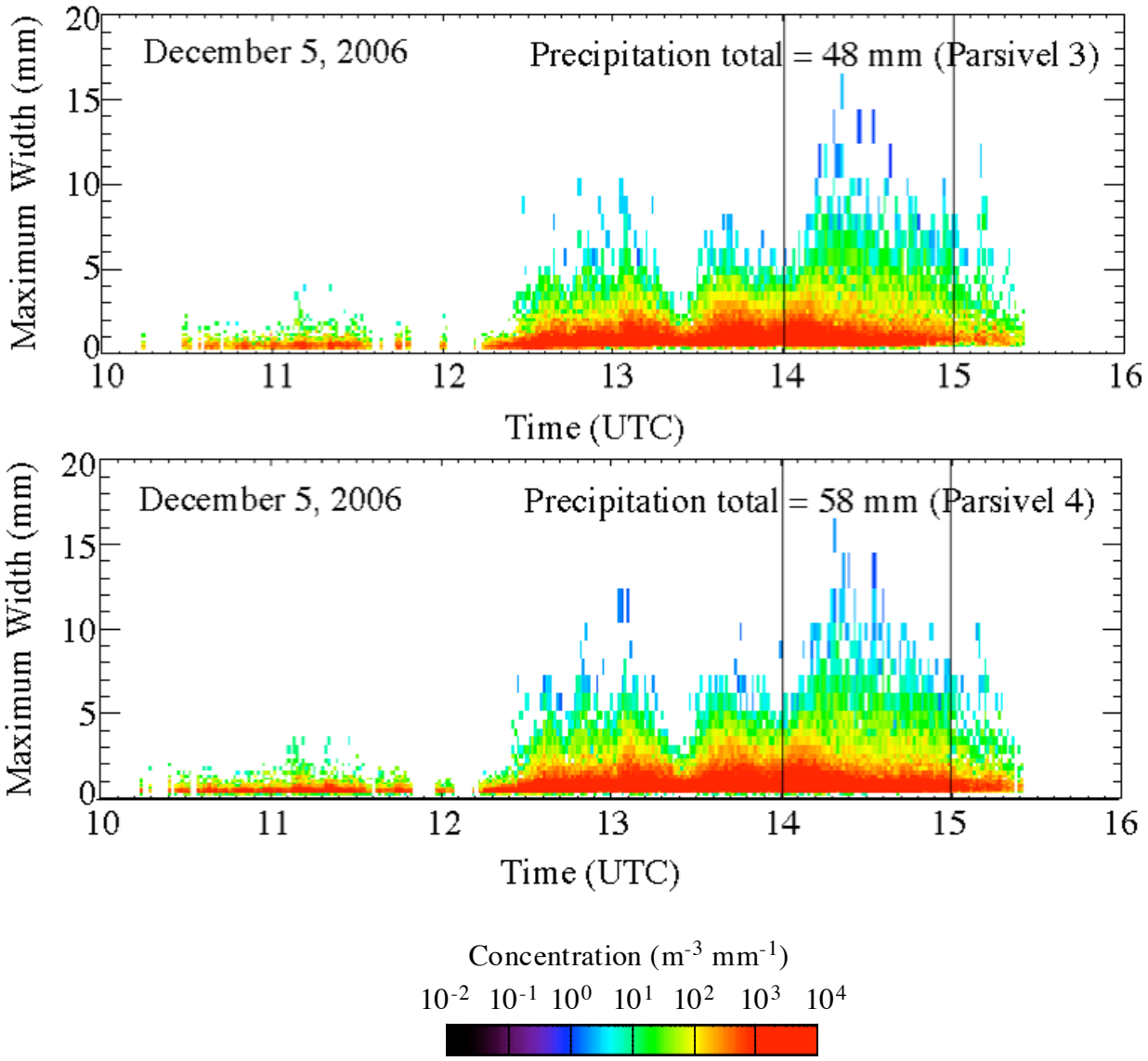
- Measures maximum diameter of the 1-D projection of the particle.
- Spurious drops - rain drops falling at velocities that differ ±50% from terminal fall speed are rejected.
- Spurious drops - two particle in the light sheet at the same time (raindrops larger than 8 mm are rejected).
- Fall velocities are underestimated at mid-size drops.
- Underestimates the drop concentration at diameters < 1 mm.
- Quantization error due to binning the observed maximum diameter and velocity.



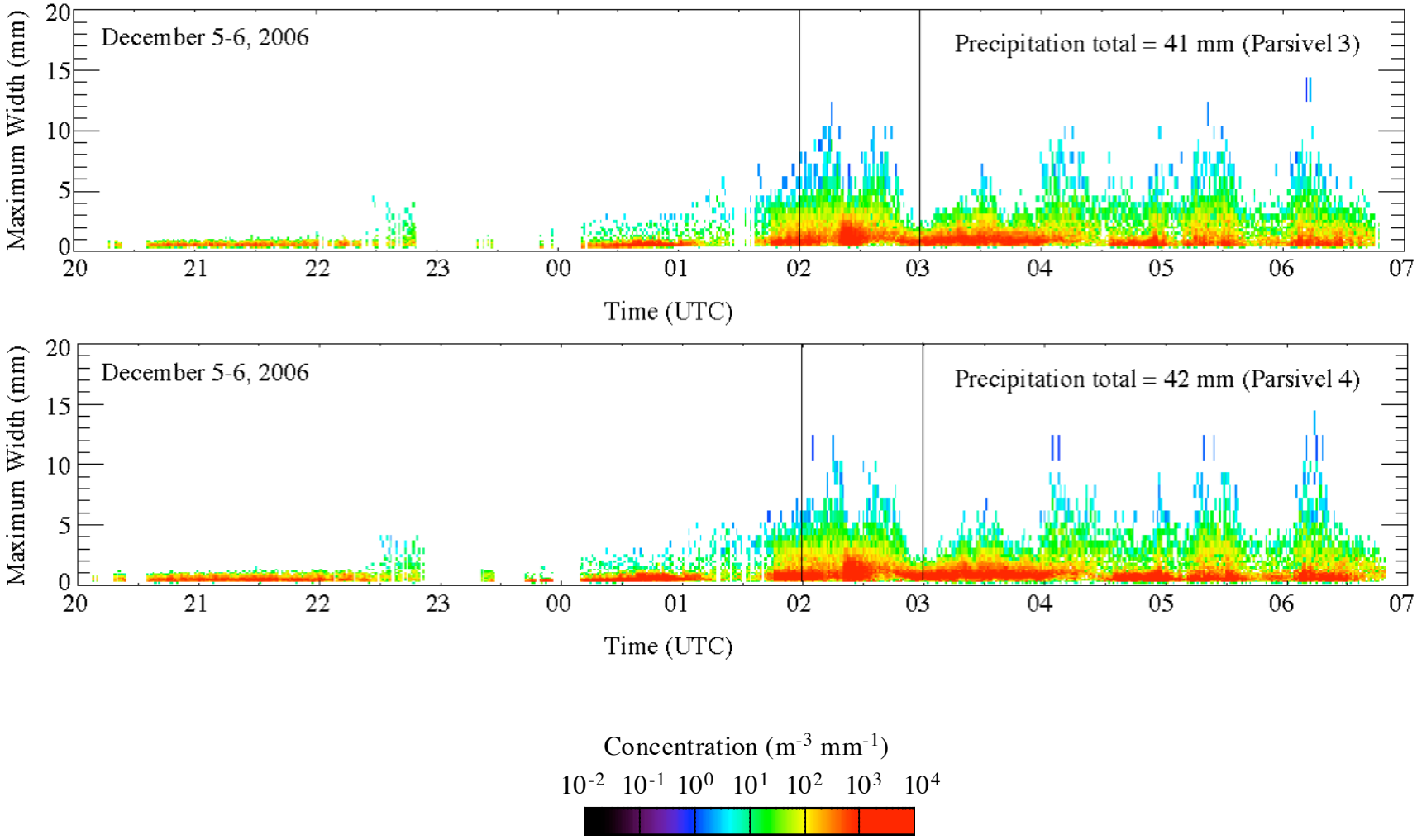
More Information: Loffler-Mang and Joss (2000), Loffler-Mang Blachak (2001)

C3vp Field Campaign
CARE Precipitation Observation Site

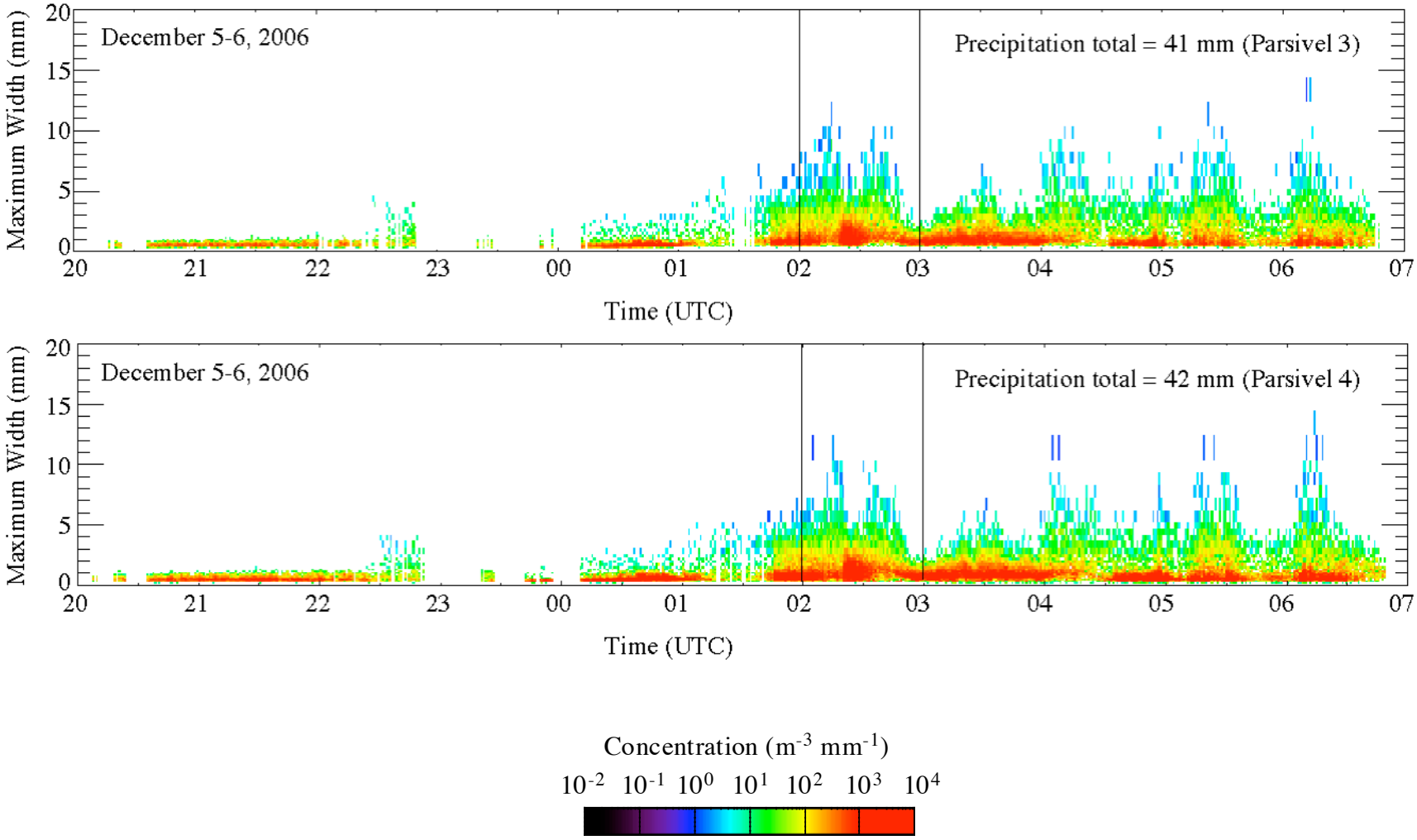
Case Study #1: December 5, 2006
Particle Size Distribution



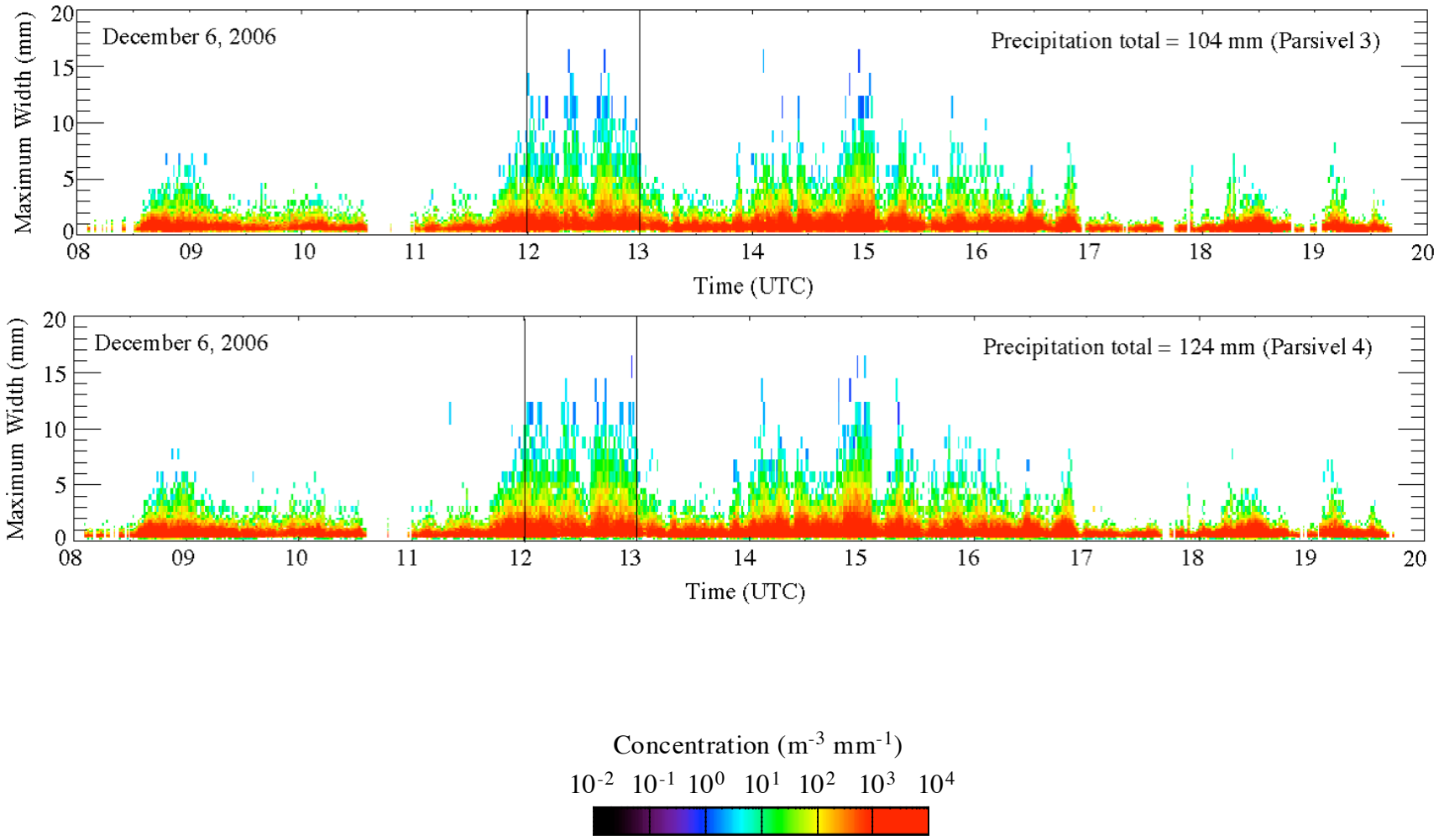
Case Study #2: December 5-6, 2006
Particle Size Distribution



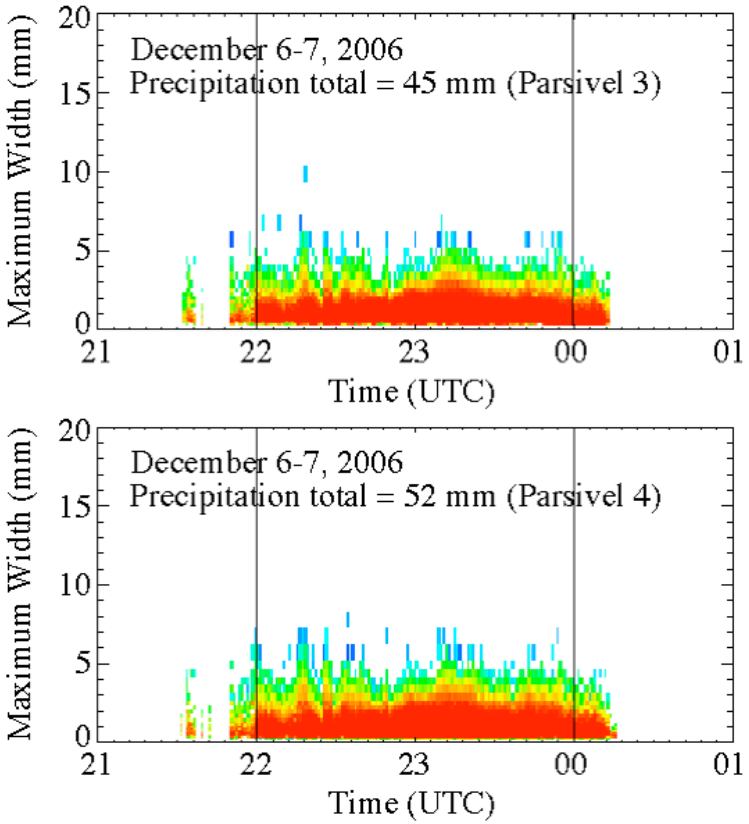
Case Study #2: December 5-6, 2006
Particle Size Distribution



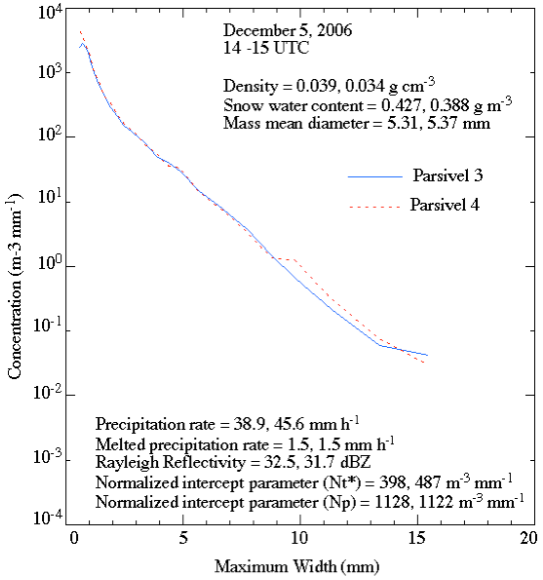
Case Study #3: December 6, 2006
Particle Size Distribution

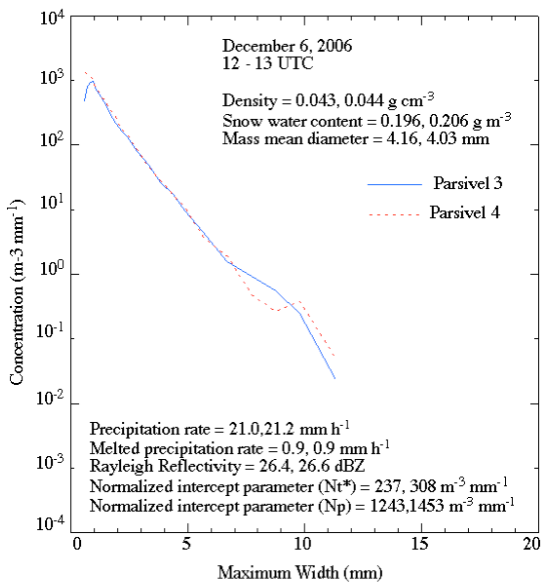


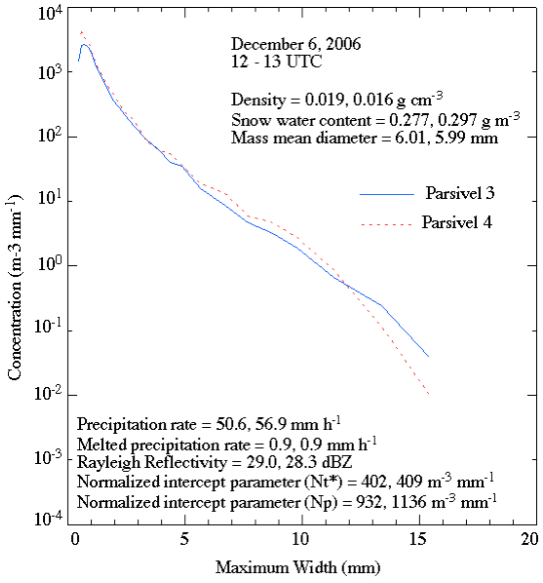
Case Study #4: December 6-7, 2006
Particle Size Distribution

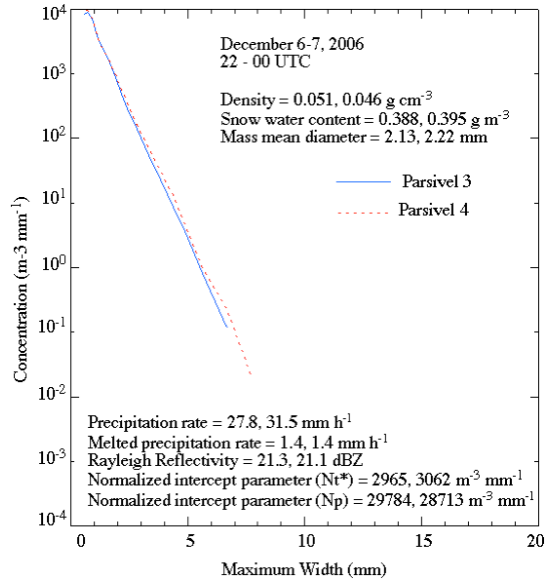


Case Study #1-4: December 5-7, 2006
Particle Composite Spectra









Case Study #1-4: December 5-7, 2006
Particle Mean Fall Velocity