

The ER-2 CLOUD PHYSICS LIDAR

what it is, what it does

Matthew McGill

Dennis Hlavka

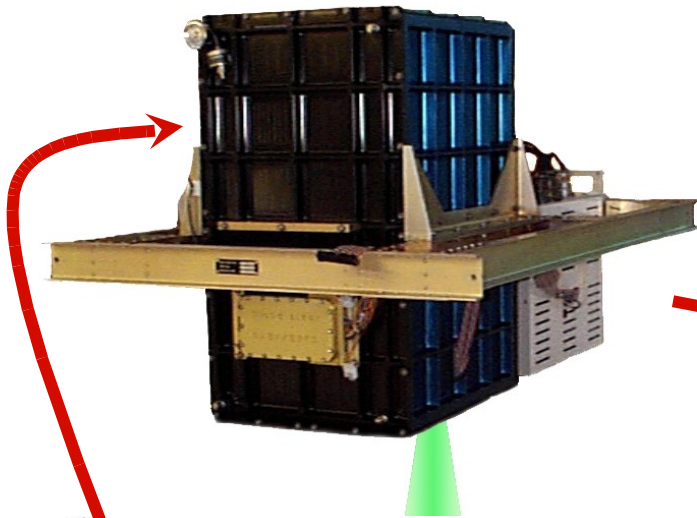
William Hart

Goddard Space Flight Center



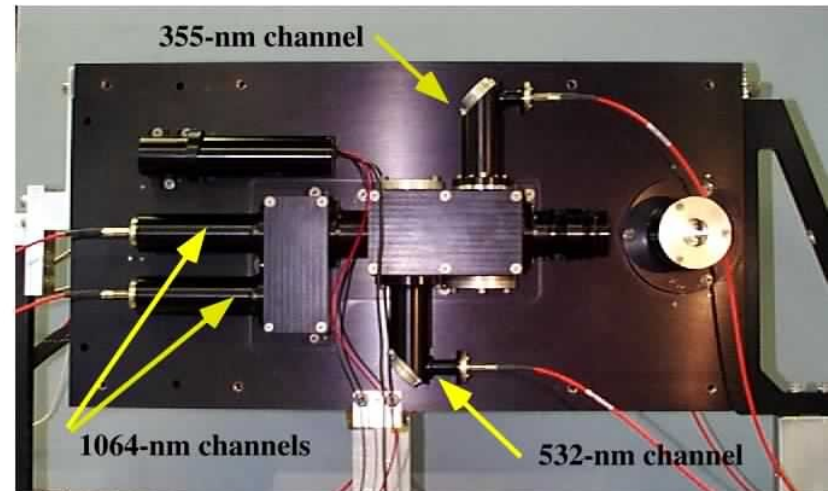
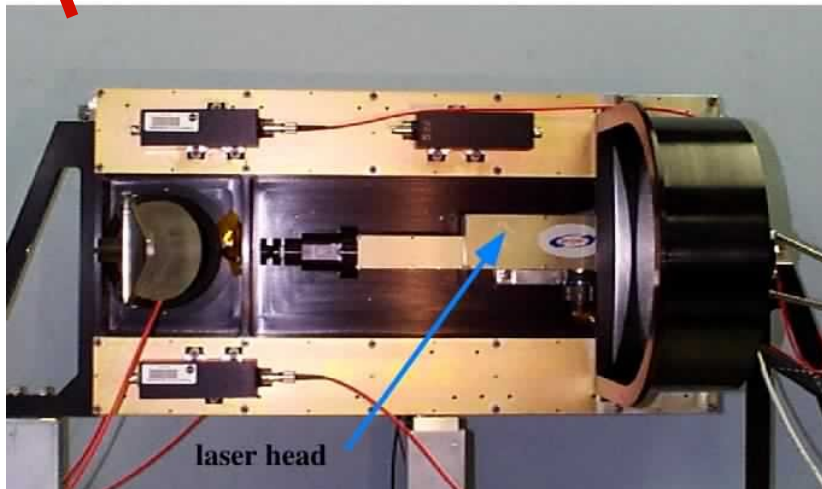
The Cloud Physics Lidar

CPL is a self-contained, autonomous backscatter lidar



a)

b)



CPL Data Products

- 1. Summary images for each flight.**
- 2. Layer boundaries for PBL, elevated aerosol layers, clouds.**
- 3. Optical properties, including**
 - layer optical depth (e.g., PBL, cirrus, total)**
 - layer extinction-to-backscatter ratio (S) used**
 - layer extinction profile**
 - layer transmission profile**
 - images for extinction and optical depth**
 - depolarization ratio (1064 nm only)**

All data products are 1 second averages produced from the raw 1/10 second data.

All data products are produced for each wavelength.

The CPL web site is: <http://cpl.gsfc.nasa.gov>

CPL data is always available on-line

Cloud Physics Lidar - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://cpl.gsfc.nasa.gov>

Cloud Physics Lidar Home Page

The ER-2 Cloud Physics Lidar
NASA's PREMIERE HIGH-ALTITUDE LIDAR SYSTEM

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Experiments

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NEW December 10, 2003: download the CPL movie of July 23 CRYSTAL-FACE cirrus anvil development and the movie of July 23 combined lidar-radar profiling. These are .mov files intended to be viewed with QuickTime.

Click here to download the lidar only movie (15 MB): [CPL movie](#)

Click here to download the combined lidar-radar movie (15 MB): [CPL-CRS movie](#)

NEW May 12, 2003: Extinction images are now available on-line for SAFARI, CRYSTAL, TX2002, and THORPEX. Click on EXTSEG in the experiment pages to view.

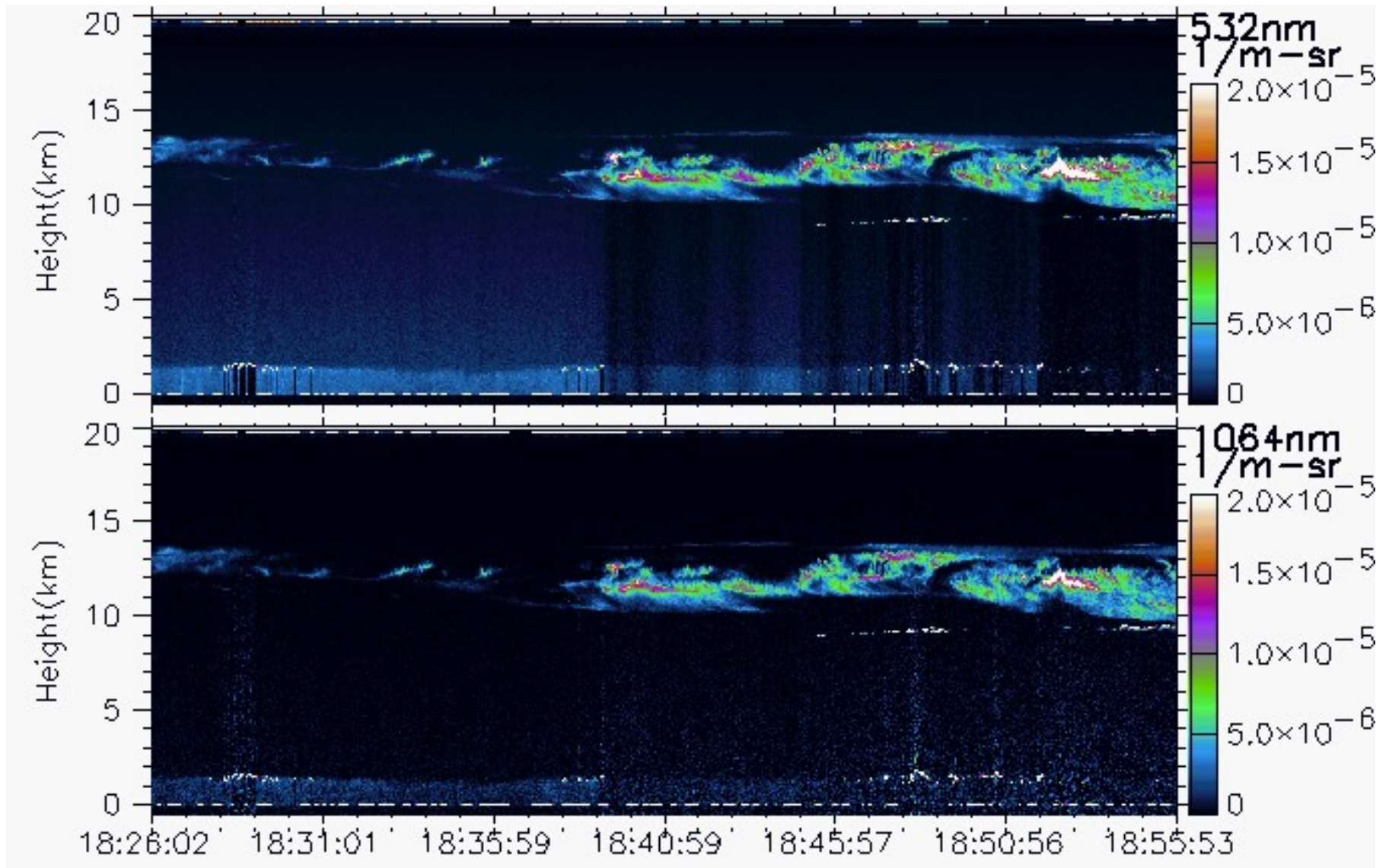
NEW: download the CPL poster from the February 24-28 CRYSTAL-FACE science team meeting: [CPL CRYSTAL poster](#)

Data available
by experiment

<http://cpl.gsfc.nasa.gov>

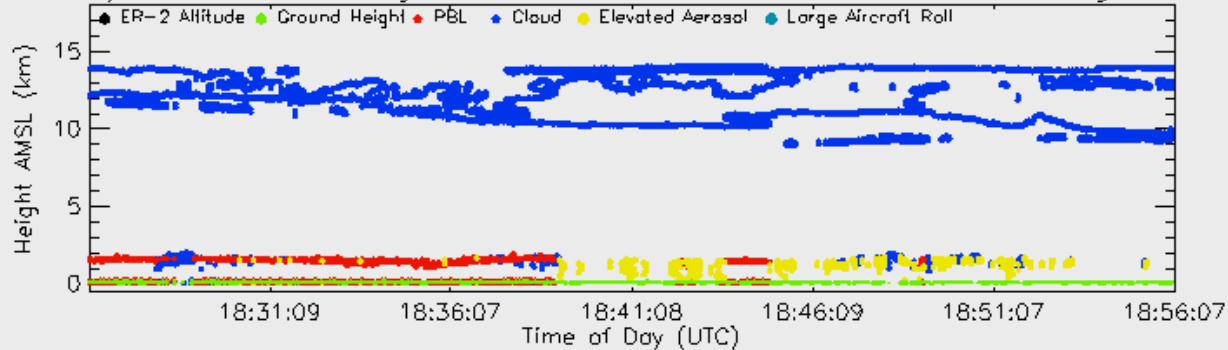
Example of CPL data

30-minute data segment, Nov 19, 2003

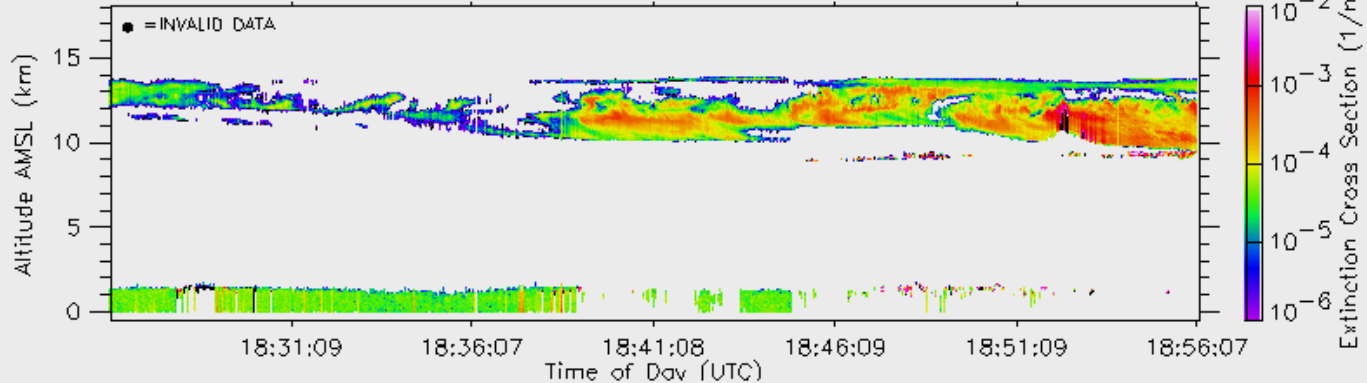


Example of higher level data products

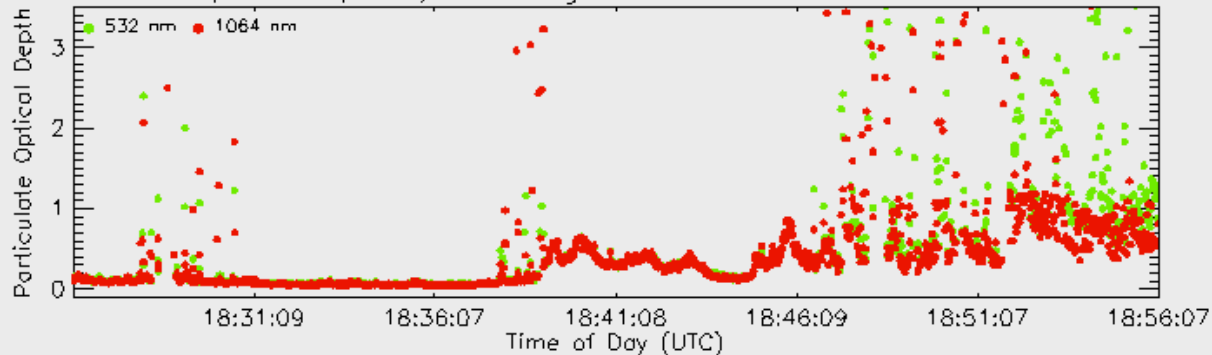
CPL Layer and Ground Heights ER-2 SORTIE= 04617 DATE= 19nov03 Segment= 05



CPL Extinction Retrieval for 19nov03 532nm

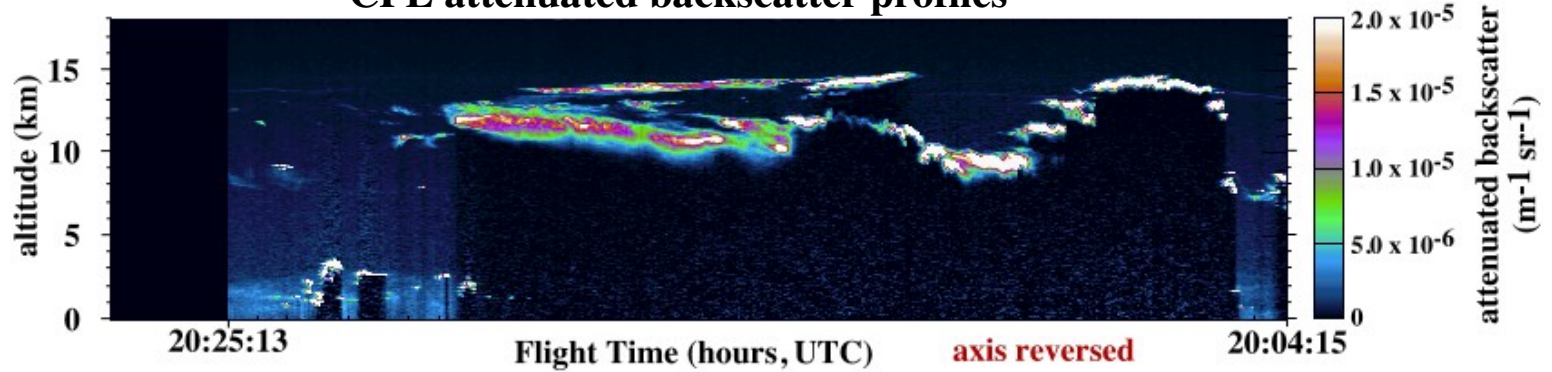


CPL Total Optical Depth by Wavelength ER-2 SORTIE= 04617 DATE= 19nov03

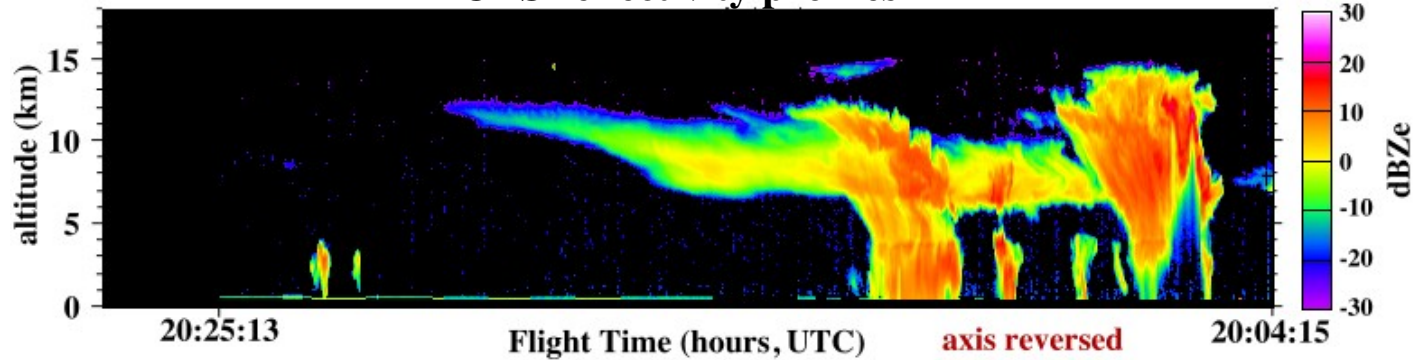


Combining the lidar and radar data shows the whole profile

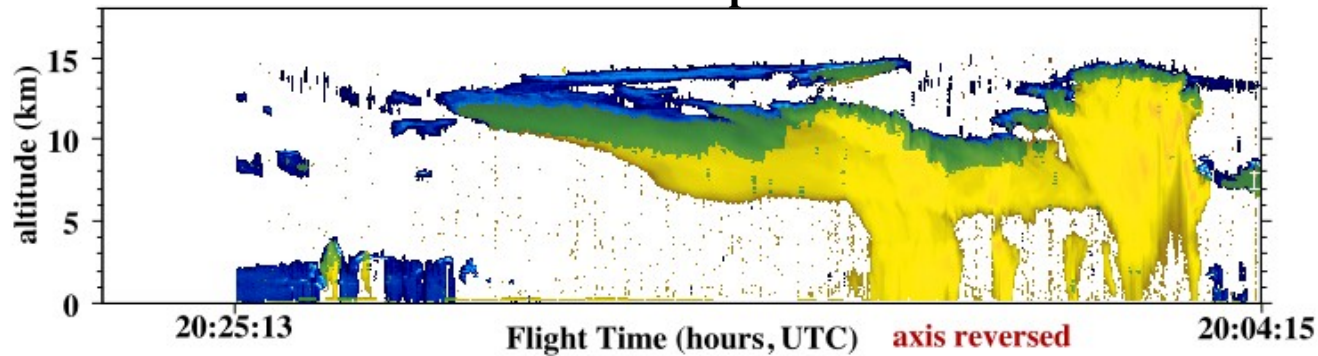
CPL attenuated backscatter profiles



CRS reflectivity profiles



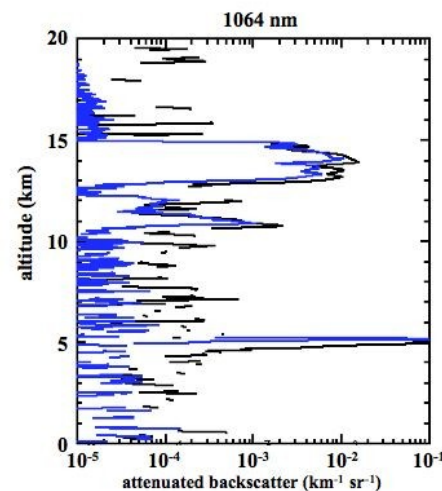
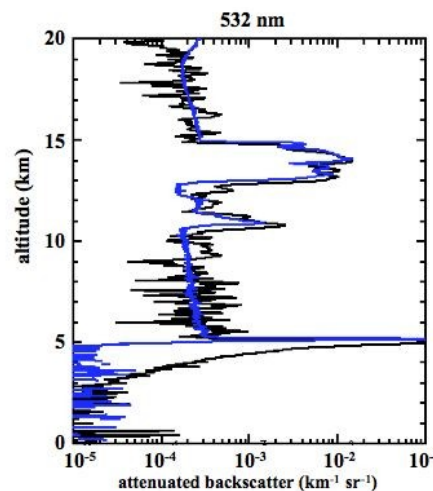
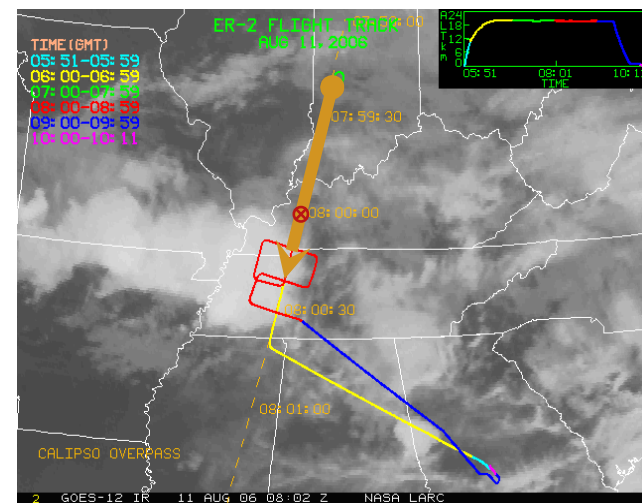
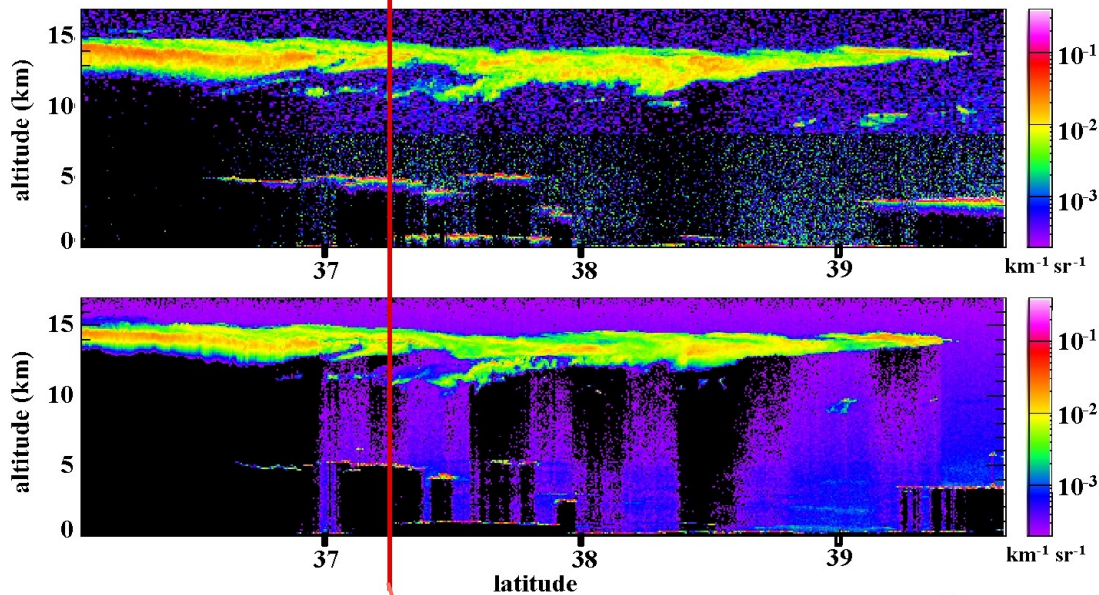
combined profiles



blue = lidar only; yellow = radar only; green = both

A primary CPL goal: CALIPSO validation

August 11, 2006 532 nm backscatter



Science and Validation goals during TC4

A primary goal for CPL is CALIPSO/A-Train validation.

Profiling cirrus, especially in conjunction with CRS and coordinated with the WB-57 in situ instruments, is an important goal for the instrument team.