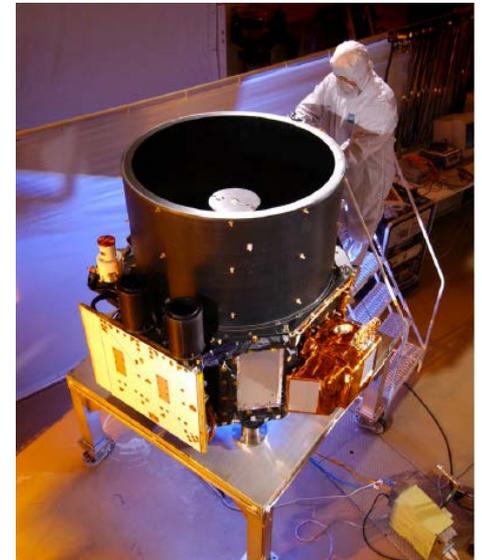


CALIPSO

David Winker

NASA Langley Research Center



Launched April 2006

Aerosat Constituting Meeting
Hamburg, 27 Sept 2013

CALIOP – Current Aerosol Activities & Priorities

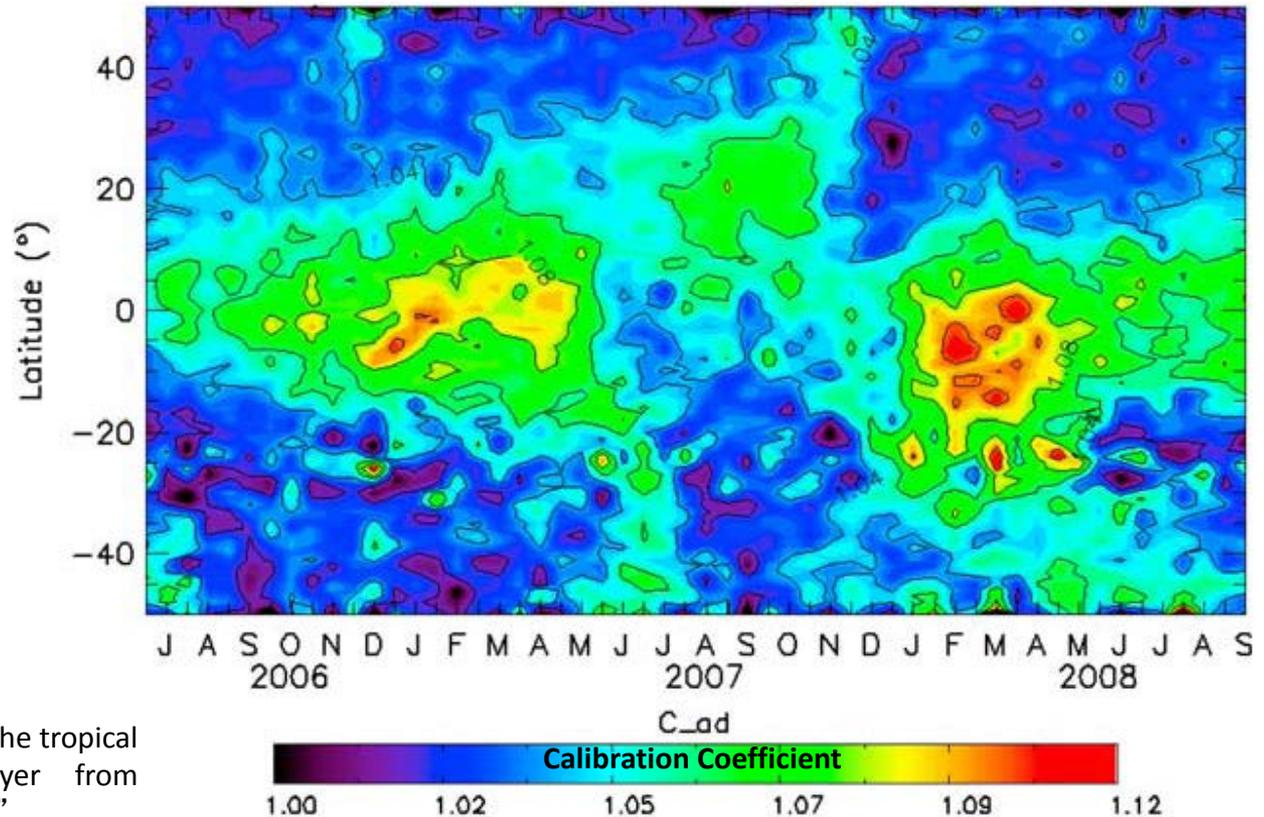
- **Current data products: Version 3**
- **Version 4 Level 1 data to be released beginning next month**
 - Reduction in biases from stratospheric aerosol in current calibration region
 - Better consistency between day and night calibrations
 - Elimination of latitudinal biases in 1064 calibration
 - Improved QC flags
- **Following release of Version 4 Level 1 product:**
 - Development of Version 4 Level 2 aerosol and cloud products
 - Update of current Level 3 aerosol beta product - to be released by end of this year as “Provisional”
 - Development of Level 3 stratospheric aerosol product

Version 3 Calibration Issues (1)

532 nm is calibrated via normalization between 30 – 34 km, *assumed free of aerosol*

Vernier, 2009 shows aerosol content leading to biases as large a 5-10% in the tropics

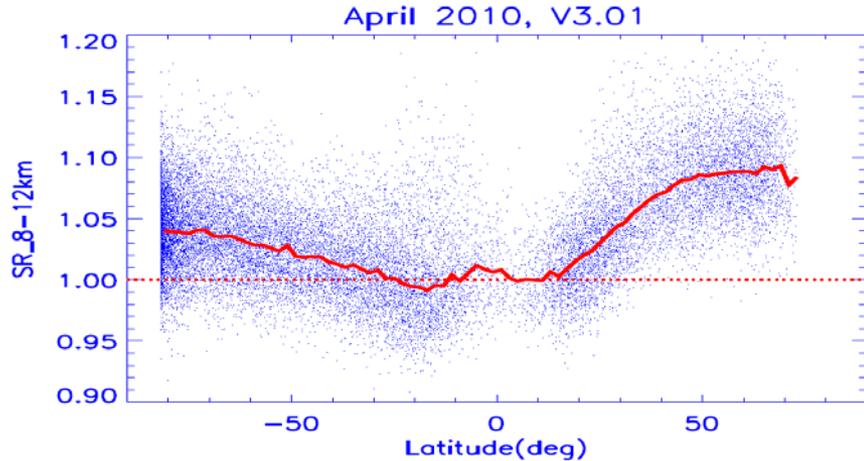
Version 4: moves calibration region up to 35-40 km



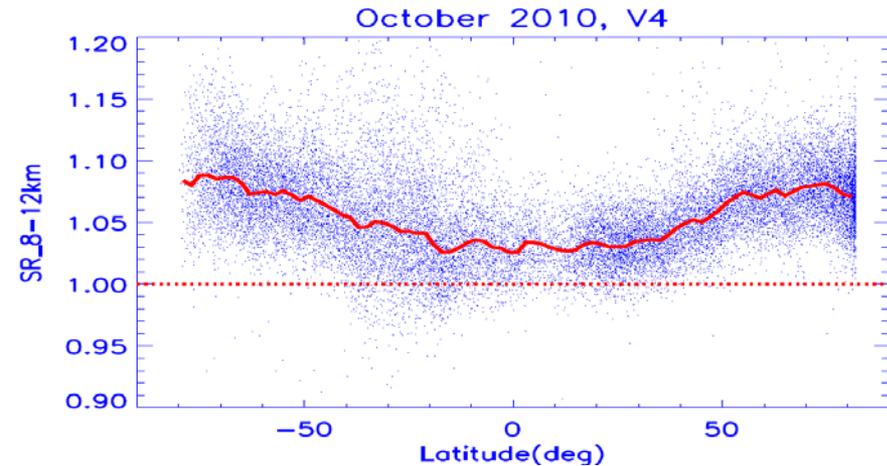
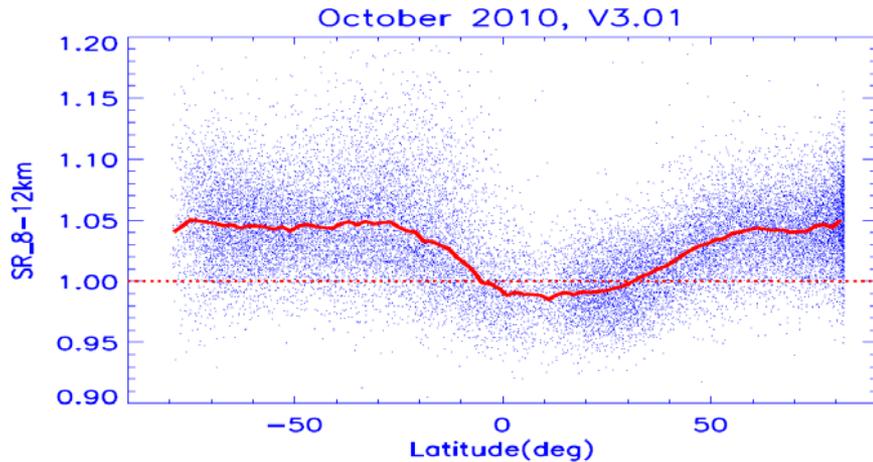
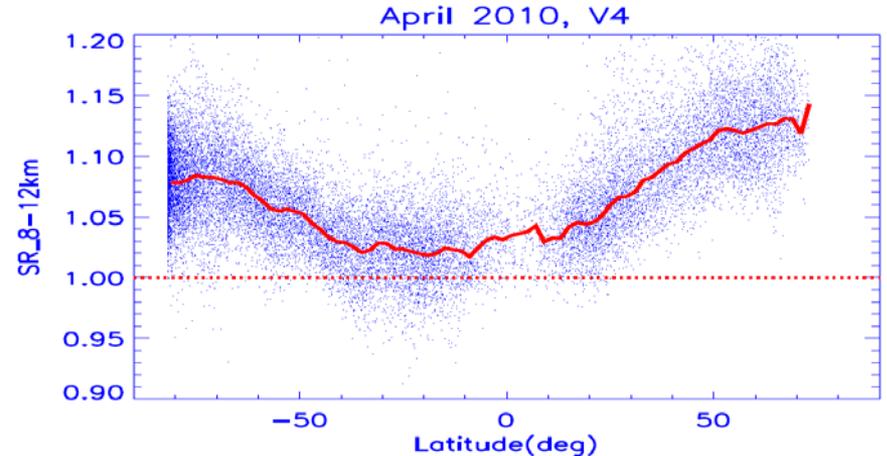
Vernier, et al, JGR, 2009: “The tropical stratospheric aerosol layer from CALIPSO lidar observations”

Clear-air scattering ratios, 8-12 km

Version 3



Version 4 prototype

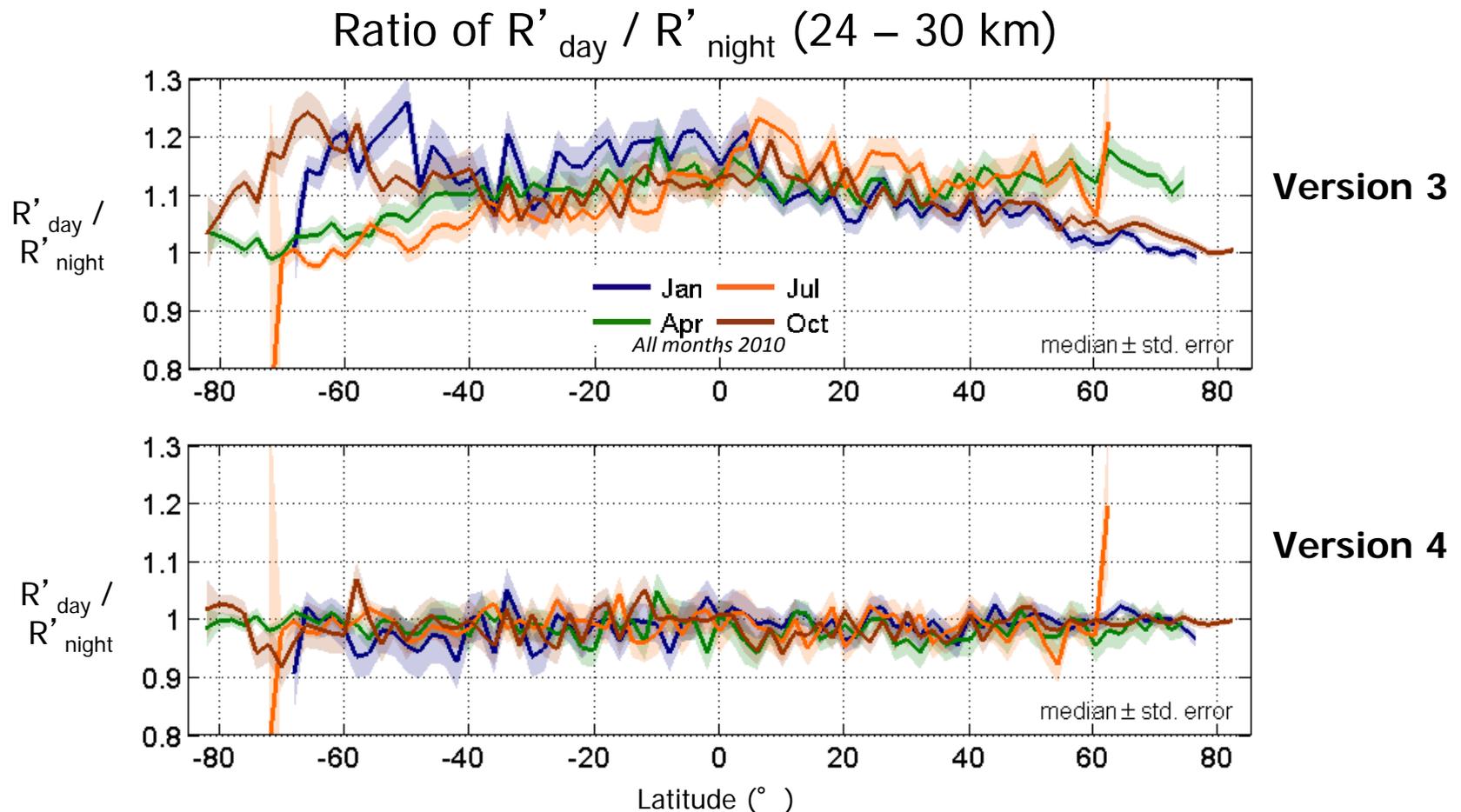


Clear air scattering ratio at 8-12 km should be > 1 everywhere. Values < 1 are non-physical.

Version 3 Calibration Issues (2)

Version 3: shows small but significant calibration biases between day and night

Version 4: daytime normalization scheme improved, day-night scattering ratios at 24-30 km are now consistent



Version 3 Calibration Issues (3)

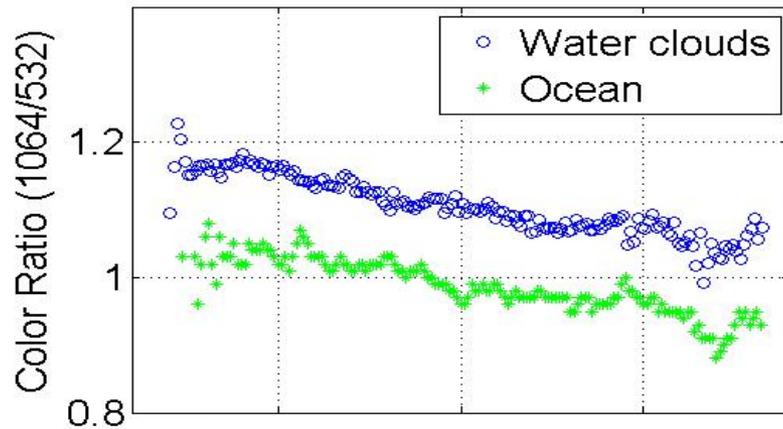
- **Calibration of 1064 nm channel** relies on transfer of 532 nm calibration via assumption that cirrus color ratio = 1

Color ratio = 1064 nm backscatter coeff \div 532 nm backscatter coeff.

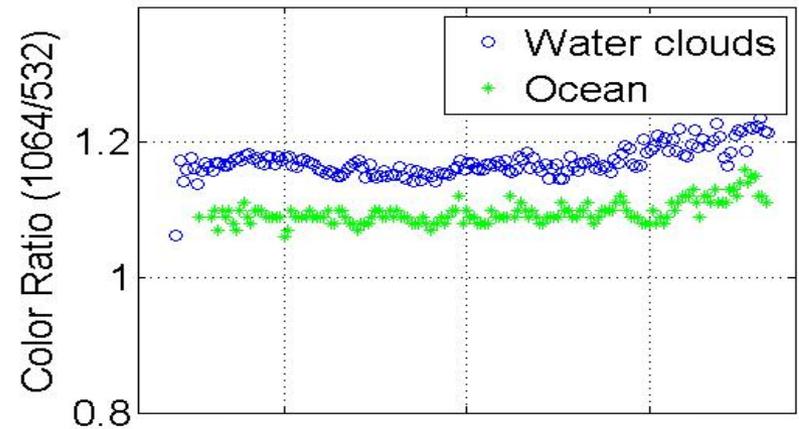
- Version 3 calibration algorithm not designed to accommodate ***intra-orbit calibration variations*** discovered after launch
- New scheme developed for ***Version 4 removes latitudinal trends***

Version 3 showed non-physical trends in water cloud and ocean surface color ratios
Version 4 scheme shows significant improvement

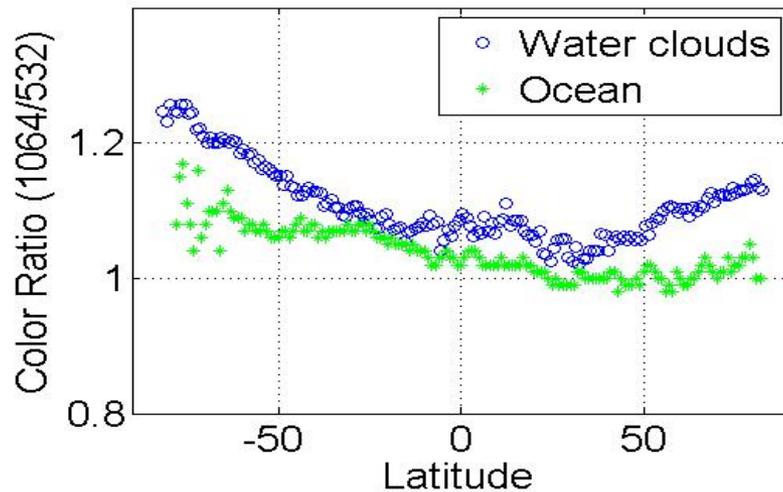
V3 October 2010 Night



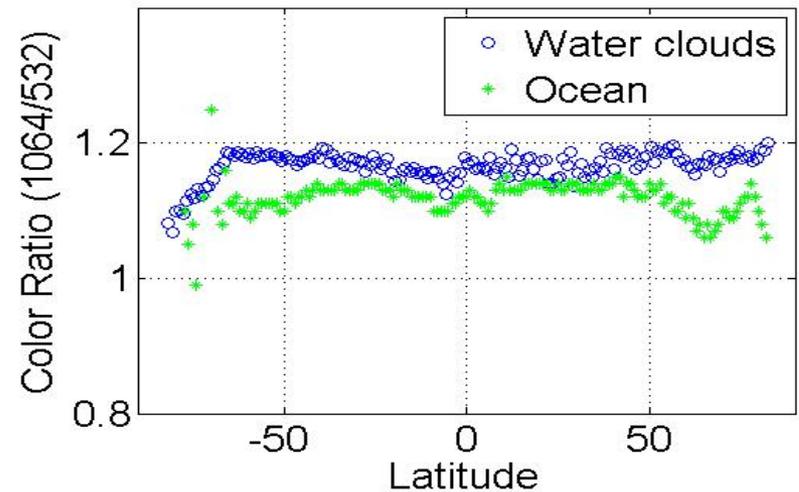
V4 October 2010 Night



V3 October 2010 Day



V4 October 2010 Day



Comments on initial AeroSat Terms of Reference

- **There are similarities between the objectives of Aerosat and CREW (Cloud Retrieval Evaluation Workshop)**
 - Contact CREW to benefit from their experience
 - For more information, contact Rob Roebeling (EumetSat)
- **The International Cooperative for Aerosol Prediction (ICAP) is a collaboration between operational forecast centers developing aerosol forecast capabilities and aerosol data providers.**
 - There is an overlap of interests (and participants) between AEROSAT and ICAP
 - Should discuss mutual interests, potential linkages and collaborations

Background information on CREW

see: <http://www.icare.univ-lille1.fr/crew/index.php/Welcome>

Three Cloud Retrieval Evaluation Workshops (CREW) have been held since 2006. Algorithms for cloud parameter retrievals were discussed at these workshops, with product comparisons facilitated by providing cloud parameter retrievals from different providers in a common database. This database comprises cloud parameter retrievals from SEVIRI, MODIS, AVHRR, POLDER and/or AIRS for a number of “golden days”. A very important integral part of the CREW workshops are the discussions on cloud parameter comparison and validation studies performed with the data from the common database. In this way knowledge is gained on the behavior of the different retrieval schemes for different cloud conditions.

The main recommendations of third CREW were to:

- Establish CREW as working group under the umbrella of an international forum;
- Address the focal points of the GEWEX-Cloud Assessment;
- Address research questions on level-2 cloud retrieval methods:
 - multiple layer cloud detection methods;
 - infrared-only cloud parameter retrieval methods;
 - microphysical properties of ice cloud models;
- Assessment of level-2 cloud property retrievals and their error estimates;
- Discuss level-2 aggregation approaches to improve level-3 cloud products;
- Enhance traceability and uniformity of level-3 cloud products;
- Establish sub-working groups addressing specific research topics;
- Involve other space agencies as well as participants from Asia and Australia

Collaboration w/ AEROSAT

- **CALIPSO interested and willing to participate**