Clouds from OMI

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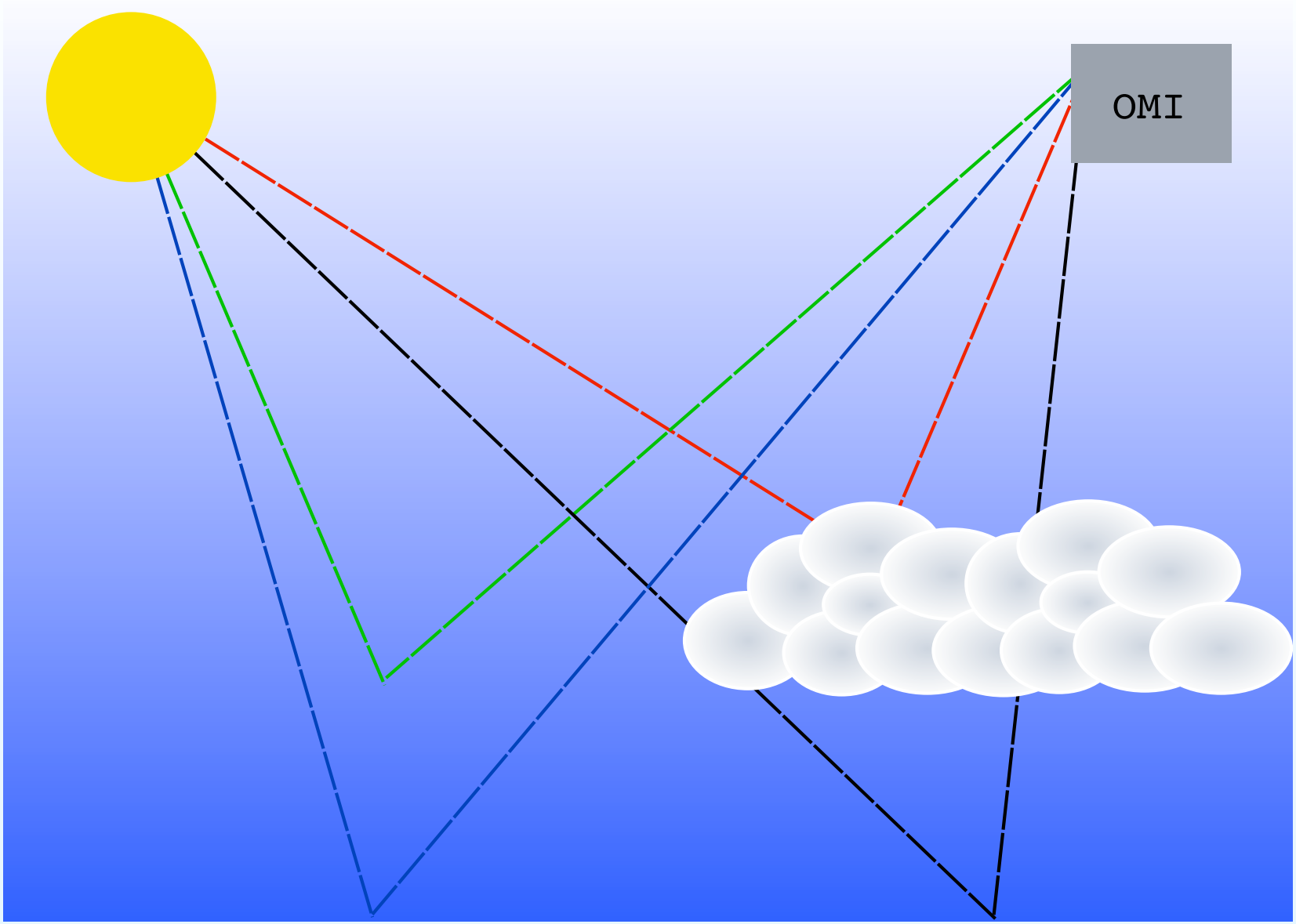
AK-CK Science meeting
June 17, 2009

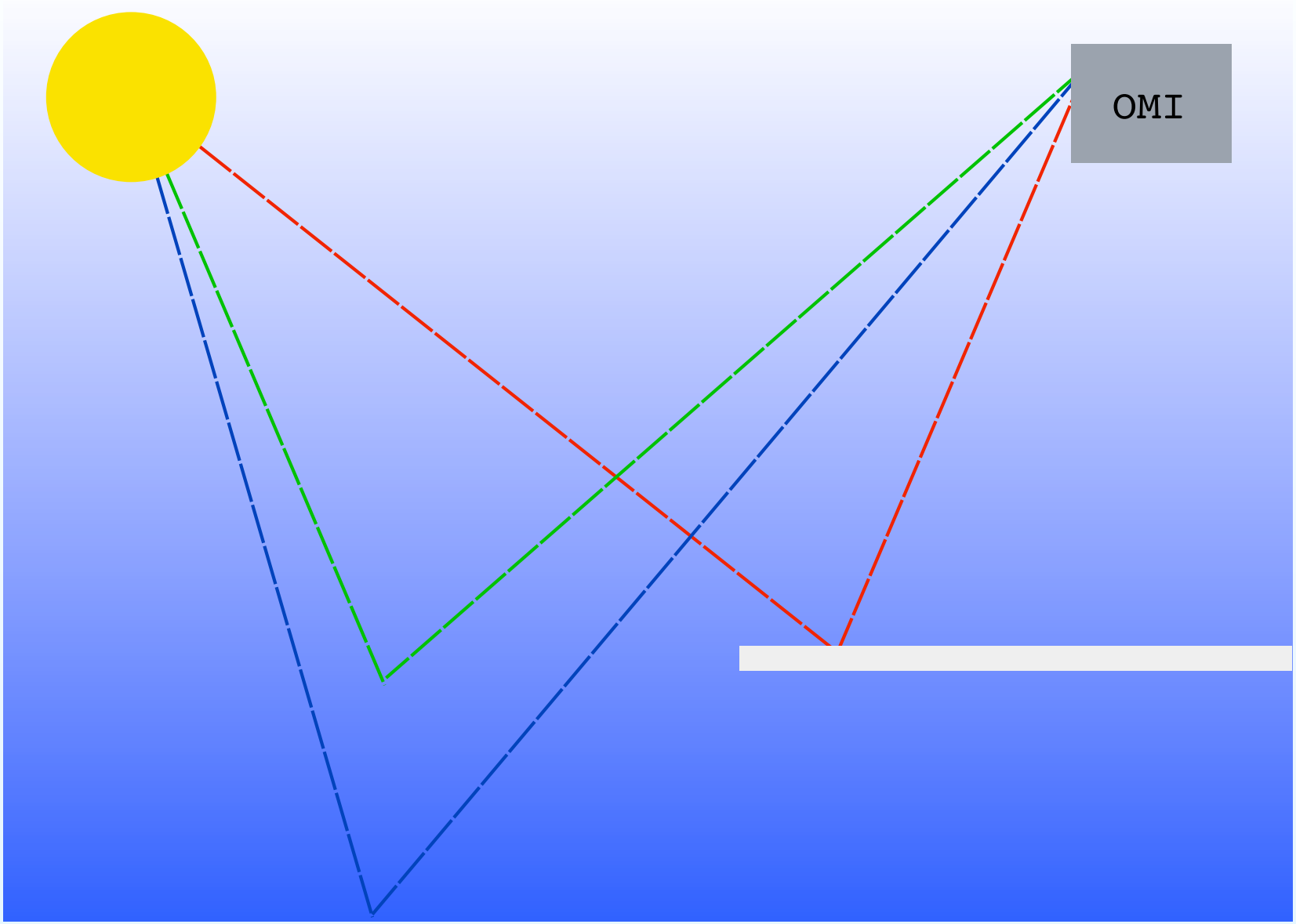
Overview

- Clouds and trace gases
- Clouds from different instruments
- Clouds from OMI
  - Clouds based on $O_2 - O_2$ absorption at 477 nm
  - Clouds based on rotational Raman scattering
  - Recent changes in OMCLDO2
  - Cloud trends?

Clouds and trace gases

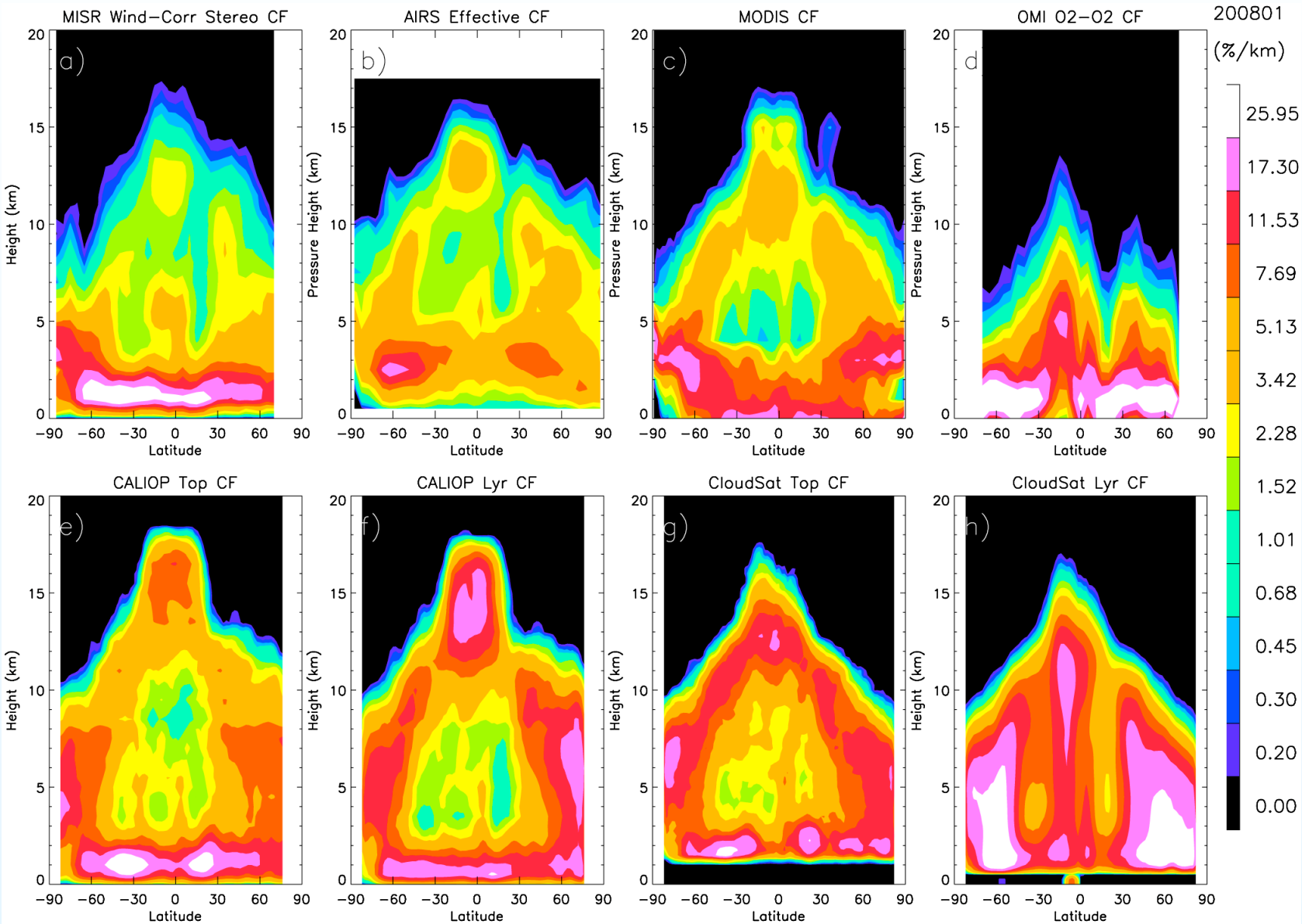


Clouds and trace gases

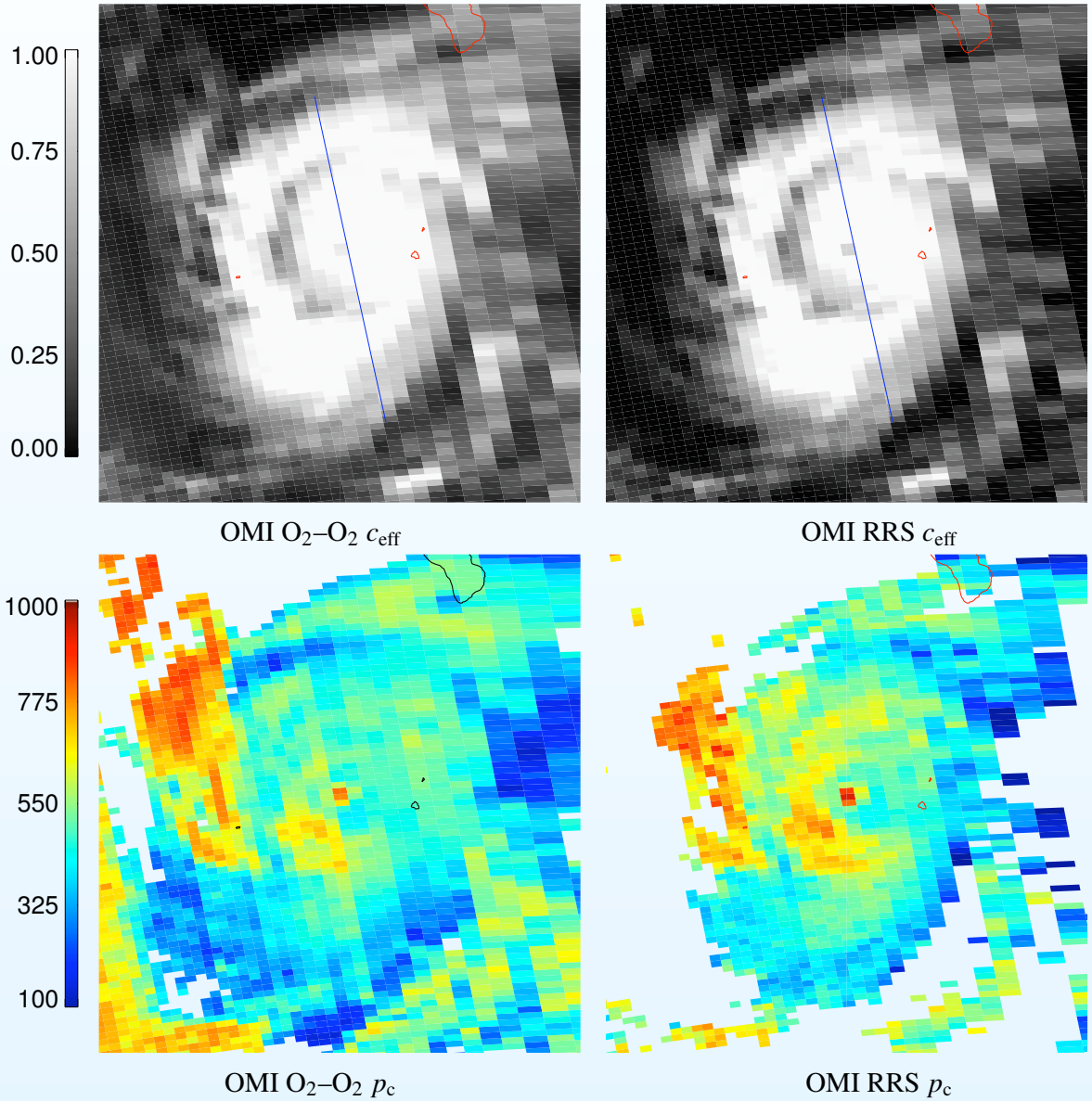


Clouds from different instruments

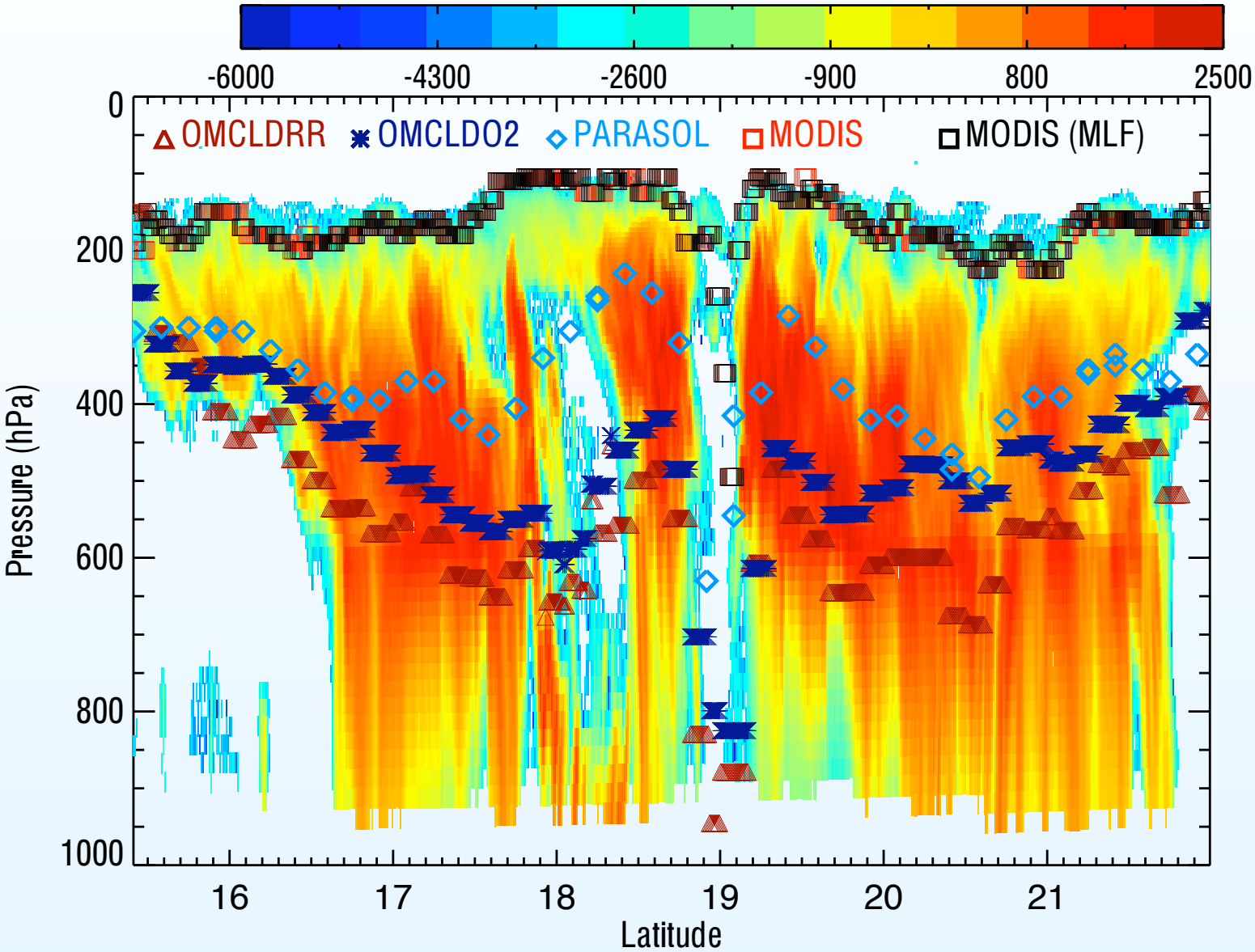
Passive or Active



Hurricane casestudy



IR or UV/VIS


-6000
-4300
-2600
-900
800
2500
OMCLDRR
OMCLDO2
PARASOL
MODIS
MODIS (MLF)
Pressure (hPa)
0
200
400
600
800
1000
16
17
18
19
20
21
Latitude

Clouds from OMI

Clouds from OMI: OMCLDO2

Two main fields in OMCLDO2

Cloud pressure

- Mostly determined from the depth of the $O_2 - O_2$ absorption at 477 nm
- The OMI cloud pressure is at approximately the mid-level of the cloud

Cloud fraction

- Mostly determined from the reflectance of the scene
- This is an *effective* cloud fraction

Be sure to filter the data according to the readme file

Clouds from OMI: OMCLDRR

Two main fields in OMCLDRR

Cloud pressure

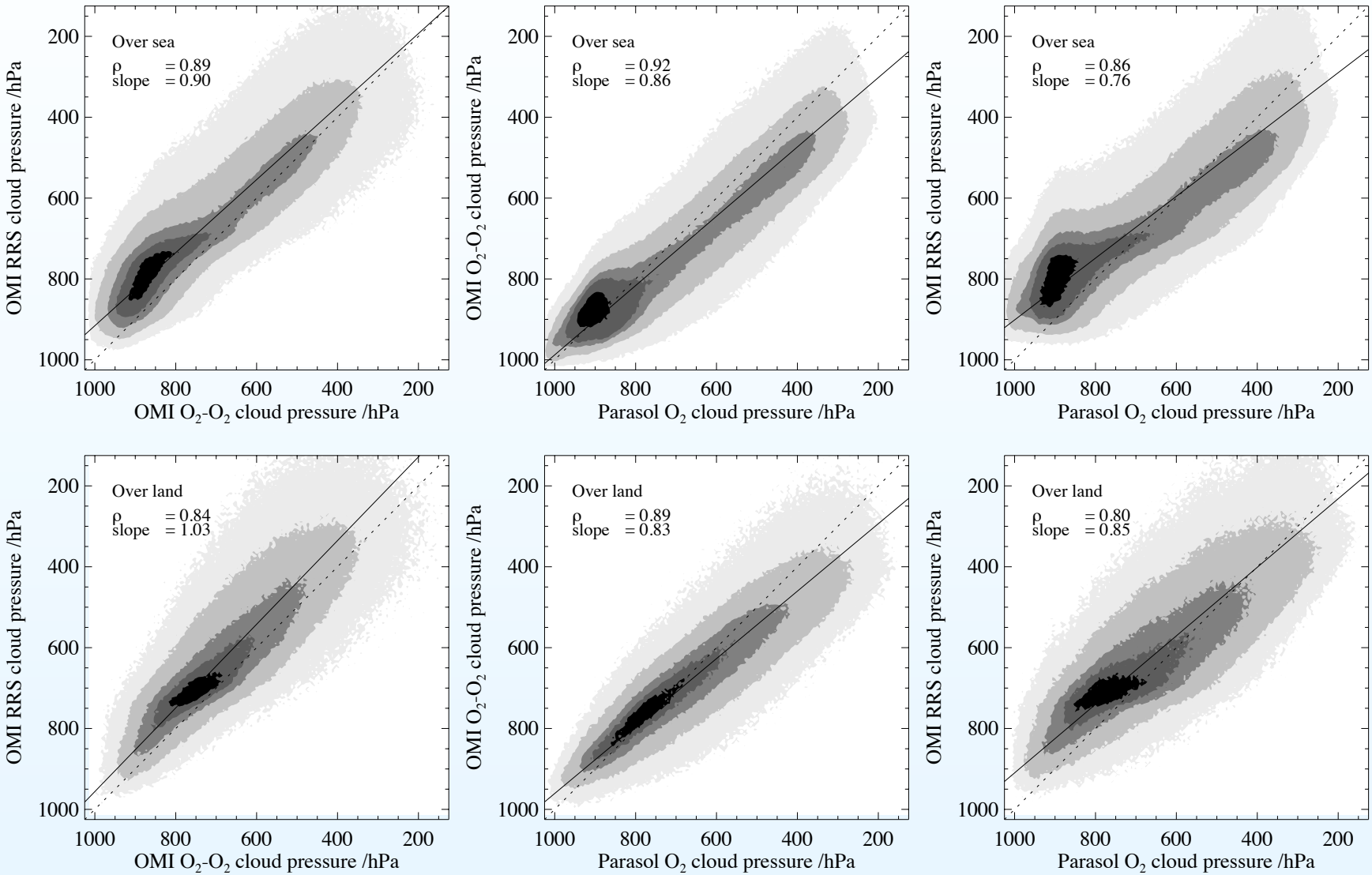
- Mostly determined from the amount of rotational Raman scattering at 354 nm
- Most OMCLDRR cloud pressures are close to those of OMCLDO2, but there are important differences.

Cloud fraction

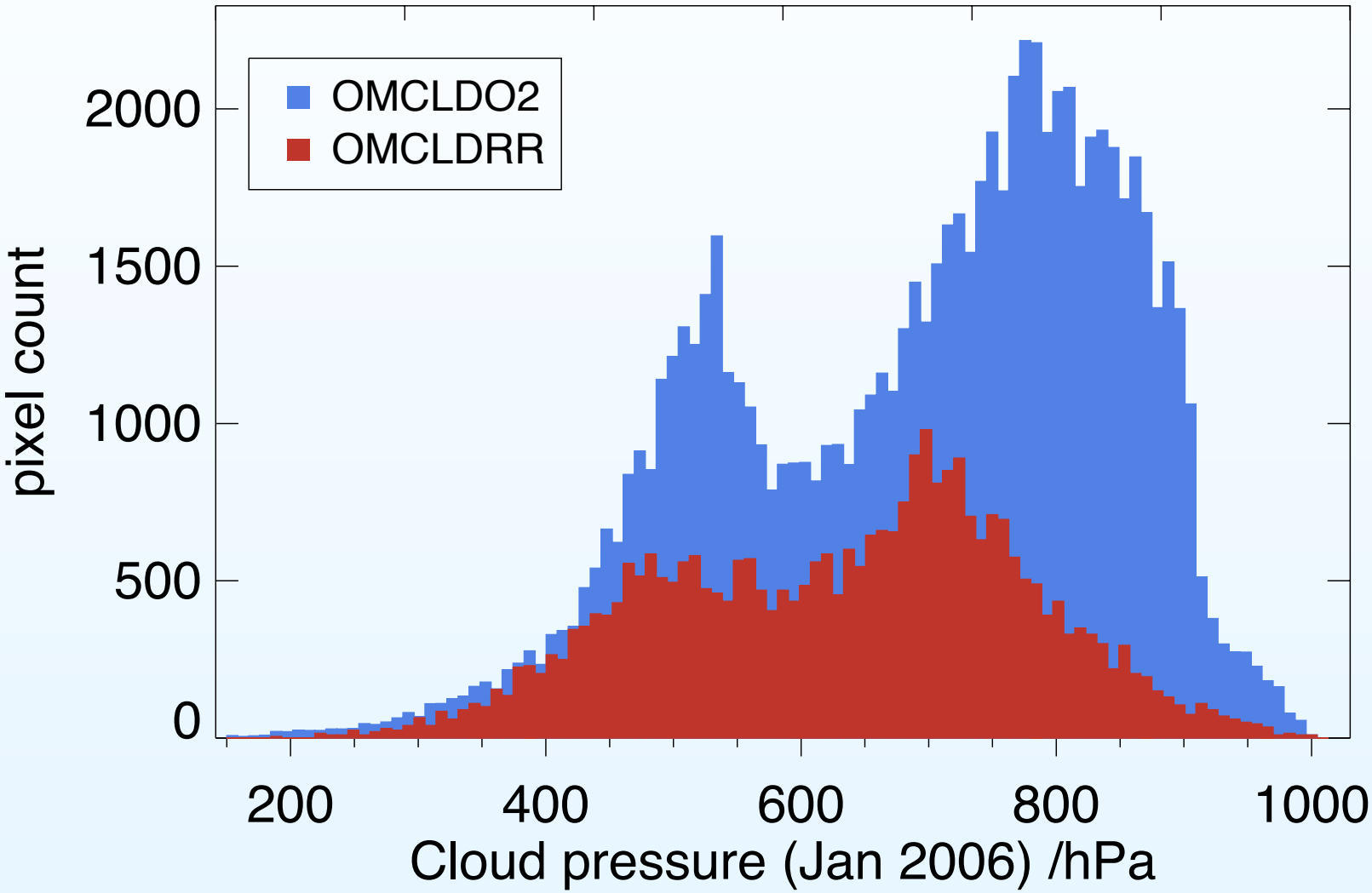
- Mostly determined from the reflectance of the scene
- This is an *effective* cloud fraction

Be *very* sure to filter the data according to the readme file

OMCLDO2, OMCLDRR, Parasol



OMCLDO2, OMCLDRR probablity distribution

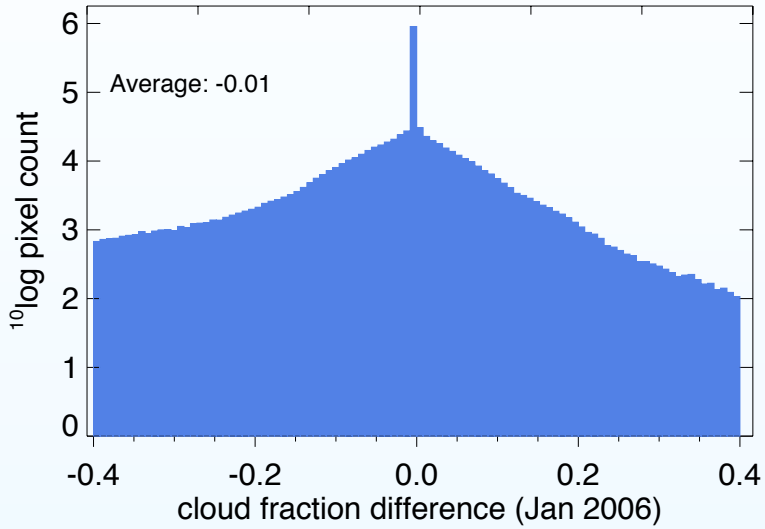


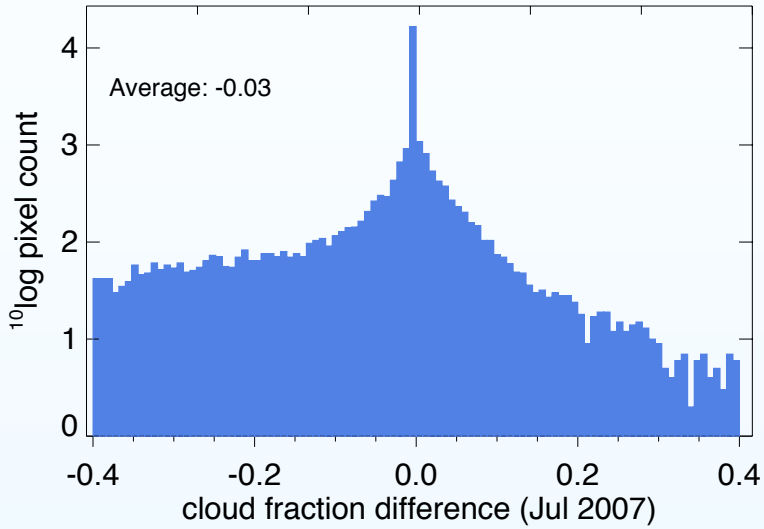
Recent changes in OMCLDO2

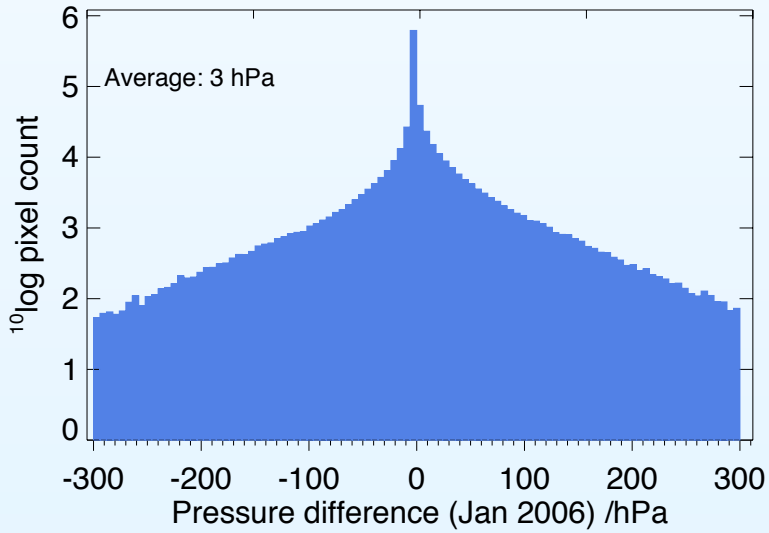
Recent changes in OMCLDO2

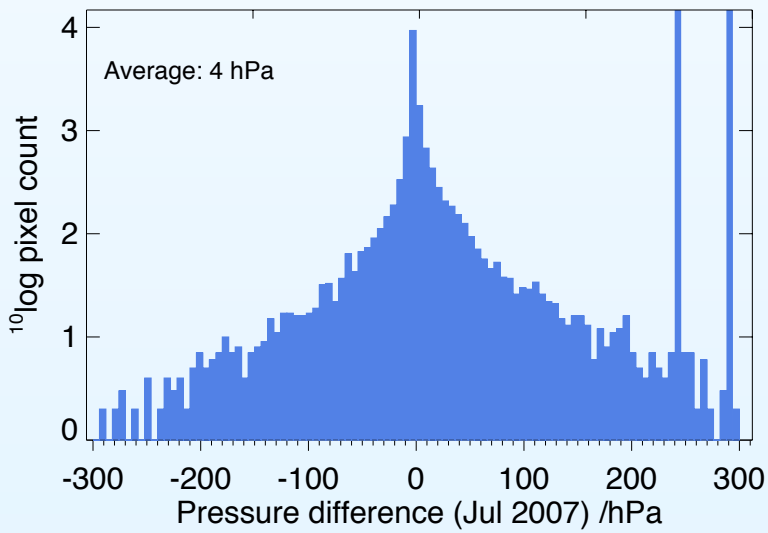
- Fit radiance wavelengths using Fraunhofer lines in L1B $\rightarrow$ L2
  - Addition prompted by the row anomaly
  - Applied to *all* rows, reduces noise on the retrieval
- New surface albedo database (based on OMI data)
  - Previously an unpublished mix of GOME/TOMS
  - Other products (OMDOAO3, OMAERO, OMNO2A) switched at the same time
  - This gives a break in the collection 3 dataset
- New fields added for row anomaly monitoring and flagging

Cloud differences (new – old)









OMI row anomaly

- Several viewing directions of OMI are affected by a ‘row anomaly’
- Four effects are identified:
  1. A blockage, reducing the radiance level
  2. Stray sunlight into the nadir port
  3. Stray earthshine, radiance outside the nominal field of view into the nadir port
  4. A wavelength shift due to inhomogeneous illumination of the spectral slit.
- Effect 4 is corrected for in L2, and soon L1B
- Effect 1 is under investigation

Only *part* of the OMI swath is affected, the rest of the OMI data is as good as ever.

Trends in OMI clouds?

Selection criteria

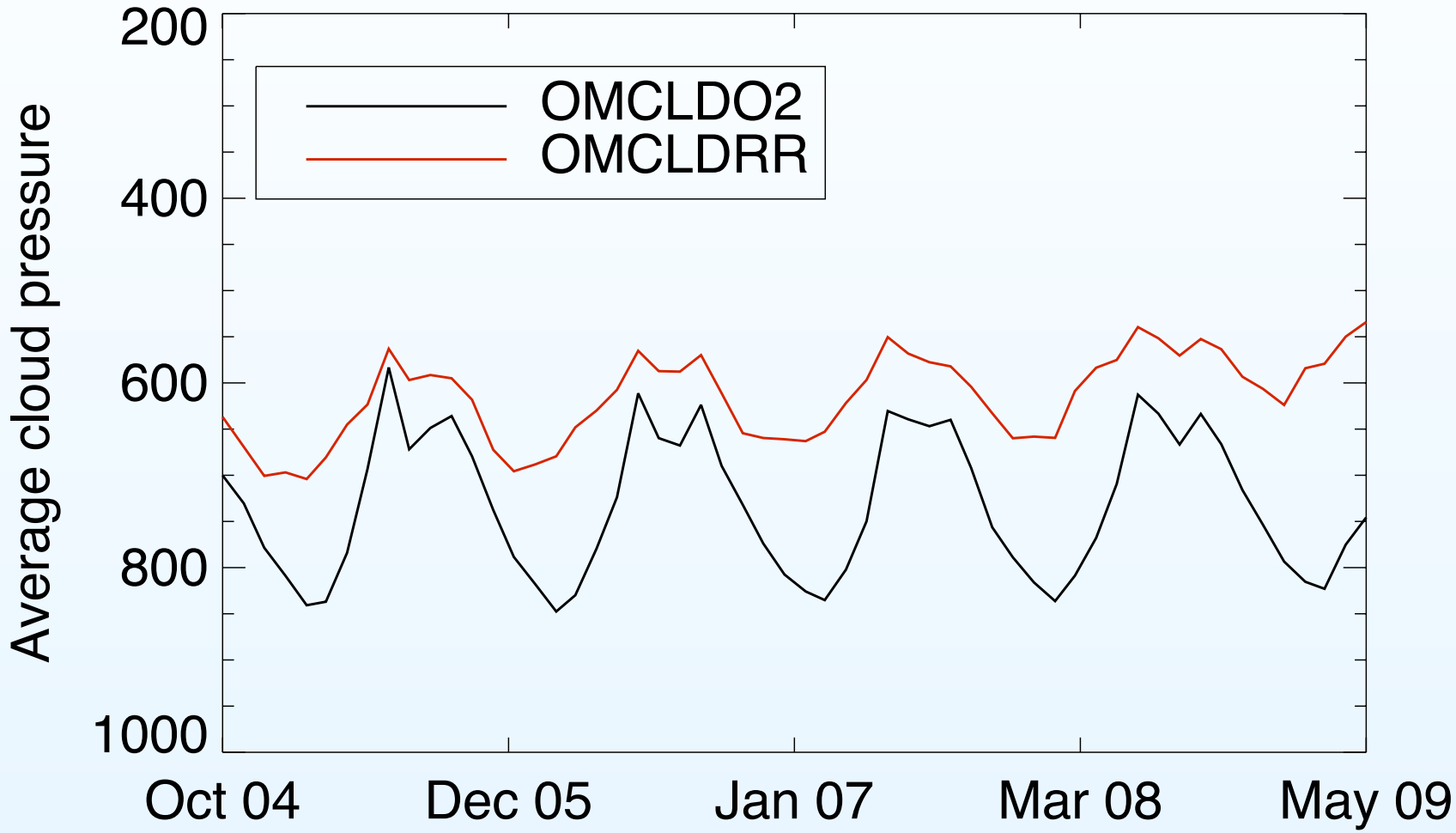
Selection criteria for the cloud pressure:

- Cloud fracion larger than 0.1
- no snow or ice at the surface
- between 60°S and 60°N

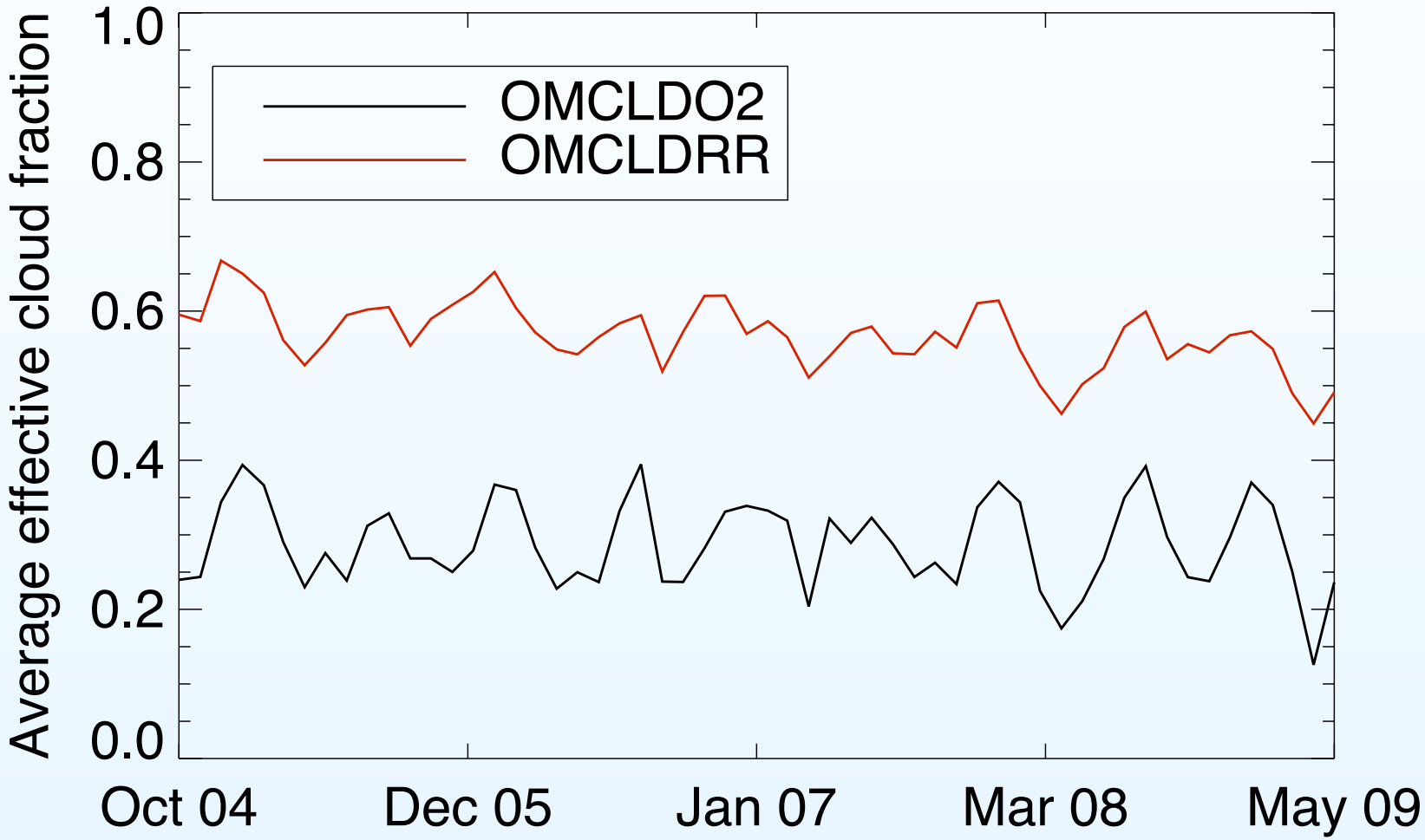
Selection criteria for the cloud fraction:

- no snow or ice at the surface
- between 60°S and 60°N

Cloud pressure history



Cloud fraction history



Conclusions

Conclusions and outlook

- OMI O_2-O_2 cloud properties are sensitive to different clouds than MODIS, MISR, CALIOP, SEVIRI, ...
- OMI O_2-O_2 cloud properties are designed to be compatible with FRESCO from GOME, SCIAMACHY, GOME-2

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- OMI Raman clouds display a trend of about -90 hPa over the OMI mission
- We think the new surface albedo is an improvement
- We are working on the OMI row anomaly