

12 Years of Cloud Characteristics from SEVIRI: The 2nd Edition of the CLAAS Dataset by CMSAF

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¹ DWD

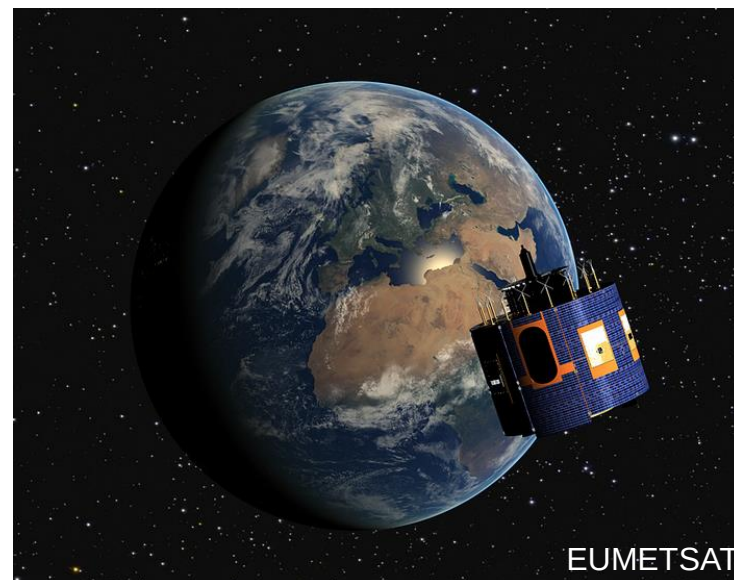
² KNMI

³ KIT

What is CLAAS-2?

CLoud property **dAtA**set using **SEVIRI** by CMSAF

SEVIRI: Passive infrared and visible imager
onboard Meteosat Second Generation (MSG)
geostationary satellites



Who Are We?

CM SAF – The EUMETSAT Satellite Application Facility on
Climate Monitoring



Koninklijk Nederlands
Meteorologisch Instituut
Ministerie van Infrastructuur en Milieu



The EUMETSAT
Network of
Satellite
Application
Facilities



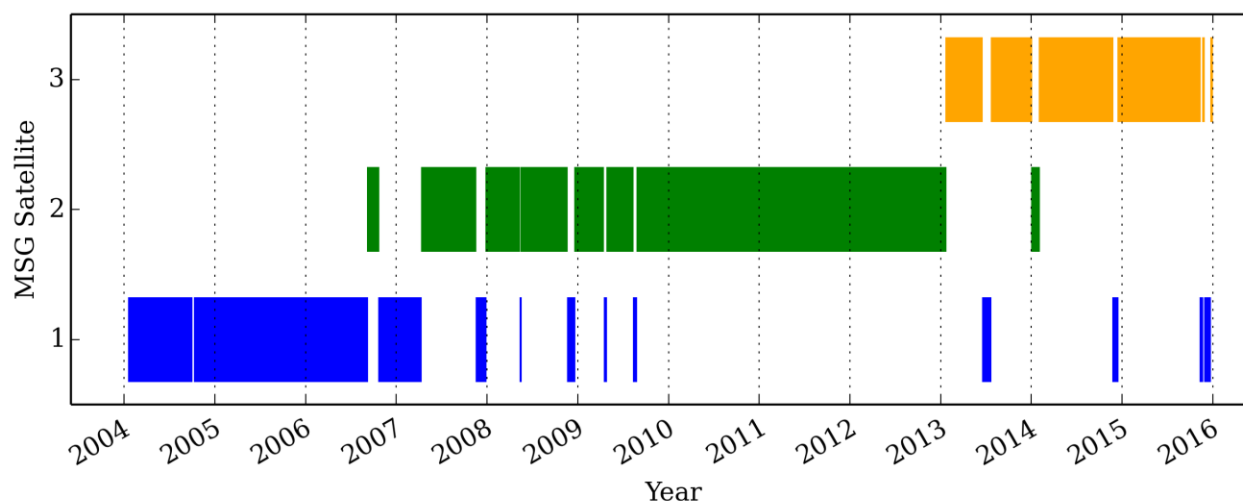
Deutscher Wetterdienst
Wetter und Klima aus einer Hand



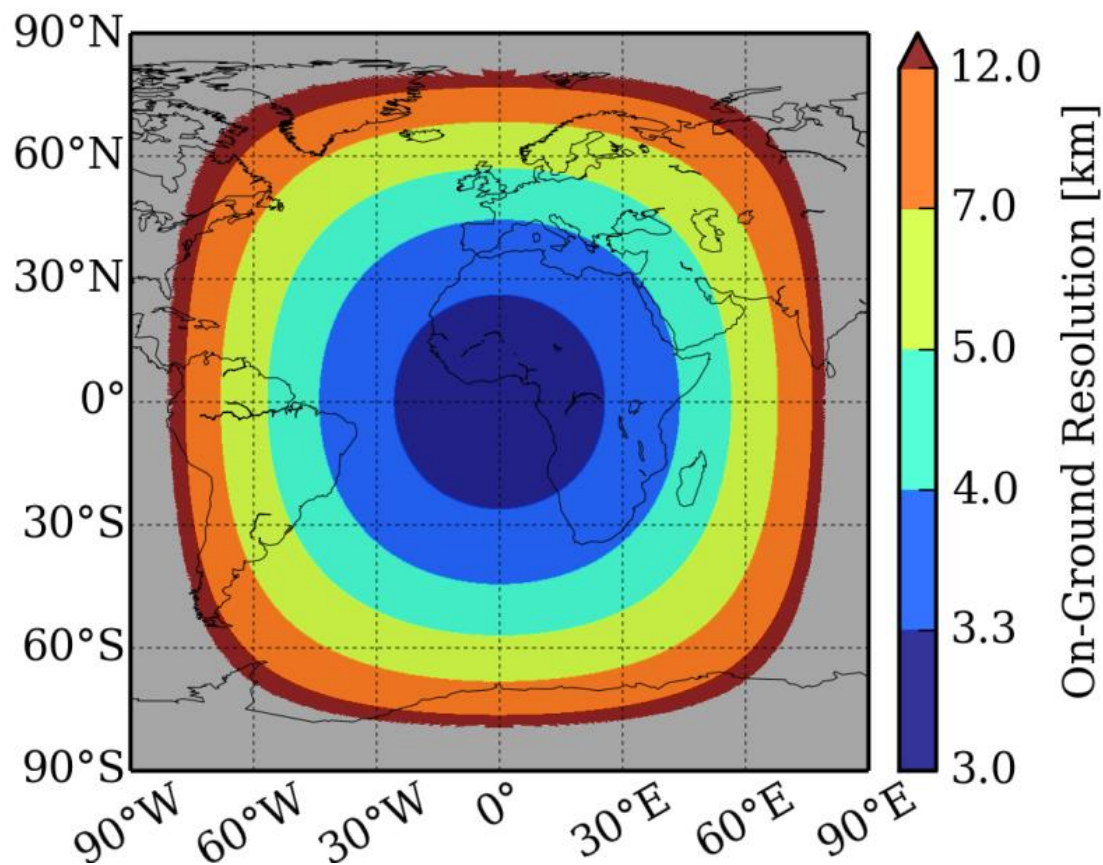
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

CLAAS-2: Facts

- ➔ Covers 2004-2015 using MSG1-3
- ➔ 15 minutes temporal and 3km nadir spatial resolution (orig. SEVIRI)
- ➔ Daily & Monthly averages on 0.05x0.05 degree grid
- ➔ *Freely available online in 2nd half of 2016: www.cmsaf.eu*



CLAAS-2: Spatial Coverage



CLAAS-2: Products

Level 2

- Cloud Mask
- Cloud Top Height, Pressure and Temperature
- Microphysical Properties:
 - Cloud Phase & Type, Cloud Optical Thickness, Effective Droplet Radius, Cloud Water Path

Level 3

- Daily + Monthly Mean
- Daily + Monthly Mean Diurnal Cycle
- Daily + Monthly Phase Histograms
- Joint Cloud Histograms (CTP vs COT)

CLAAS-2: Algorithms

Cloud Mask & Cloud Top Properties:

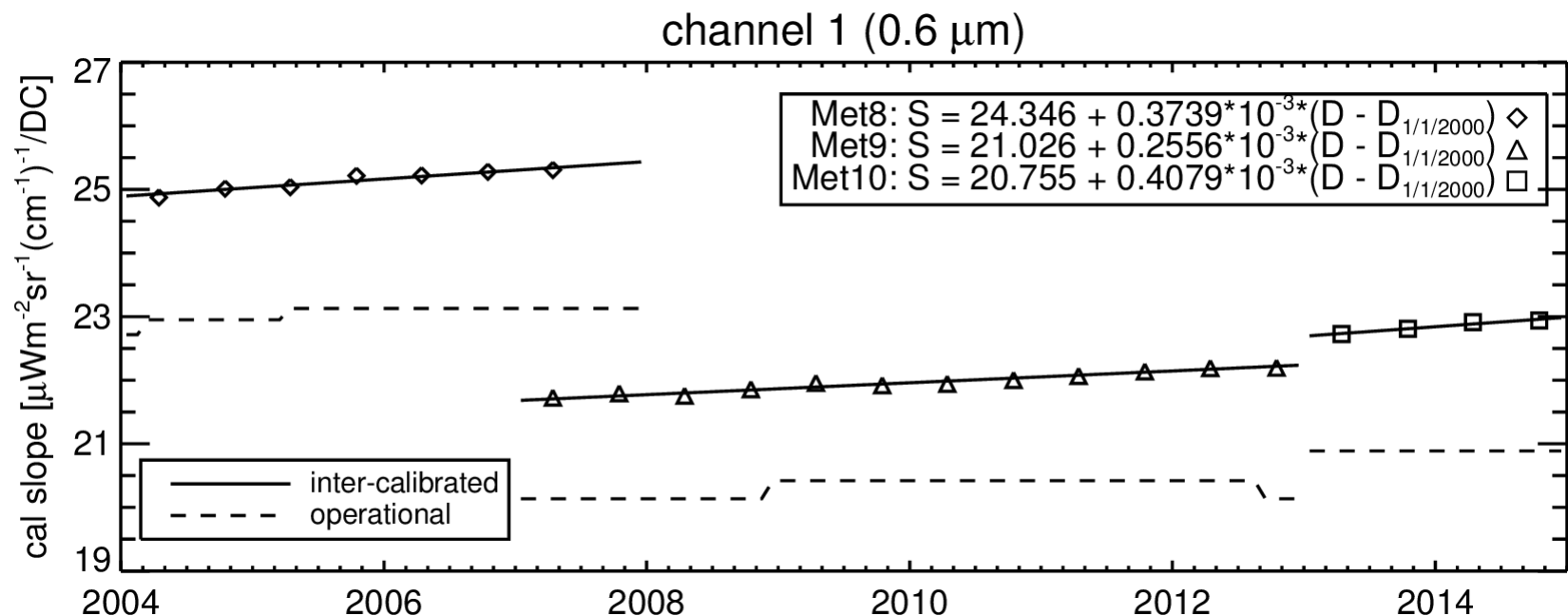
→ MSGv2012 by SAF on Nowcasting (Derrien & Le Gléau, 2005)

Microphysical Properties:

→ Inhouse CPP (Meirink et al, 2010)

CLAAS-2: Intercalibration of Solar Channels

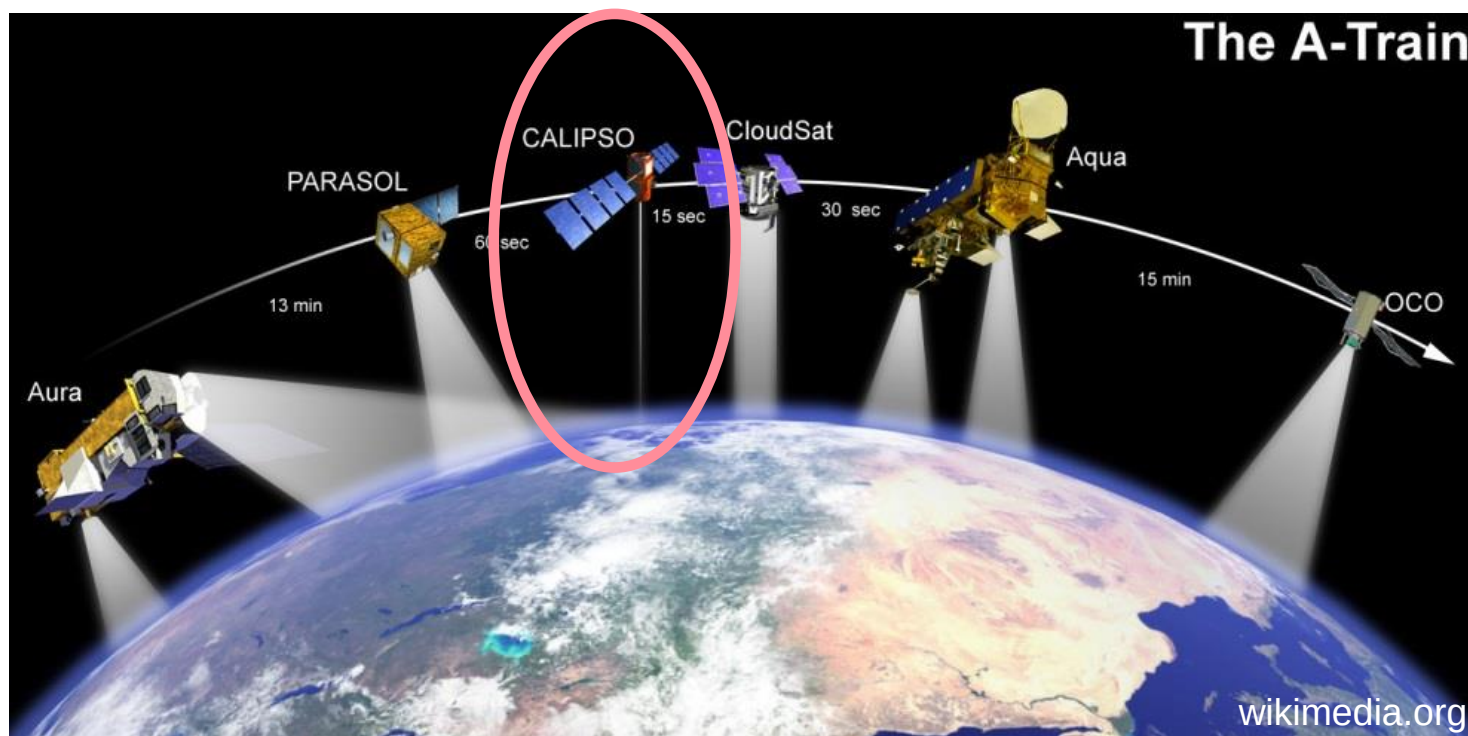
- ➔ Calibration Reference: SNOs with MODIS Aqua, Collection 6
- ➔ From counts (C) to Radiance (I): $I \sim S \cdot C$



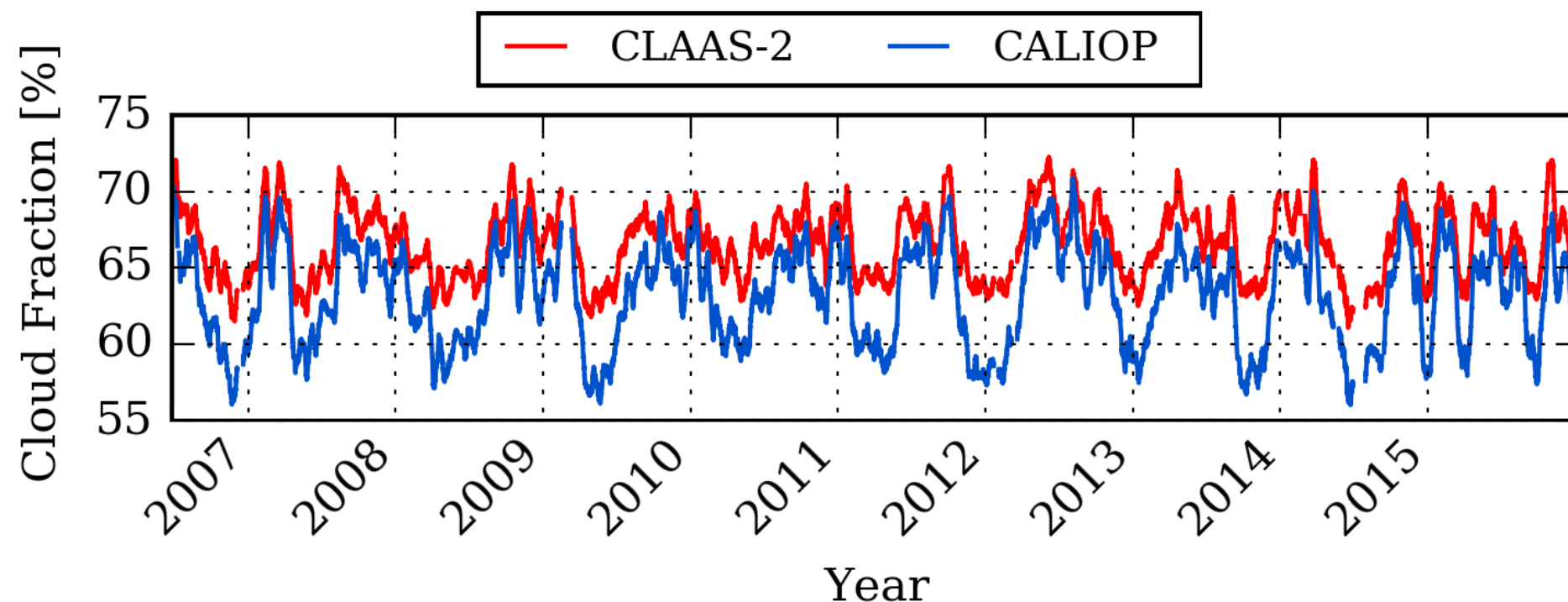
Meirink et al, 2013

Validation against CALIOP on CALIPSO

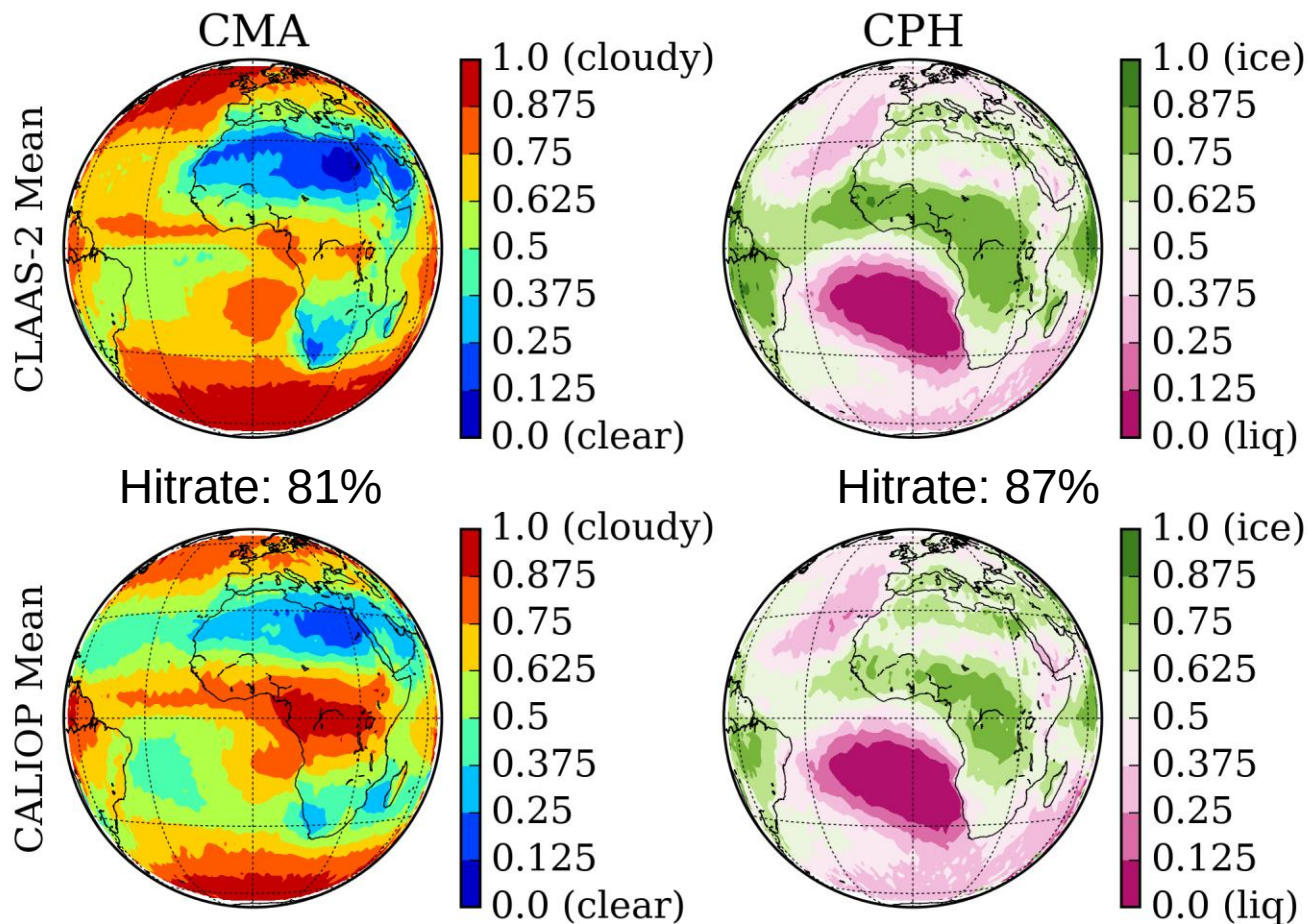
- Active LIDAR, very accurate
- 100 Million Matchups from 2006 to 2015



Validation against CALIOP on CALIPSO



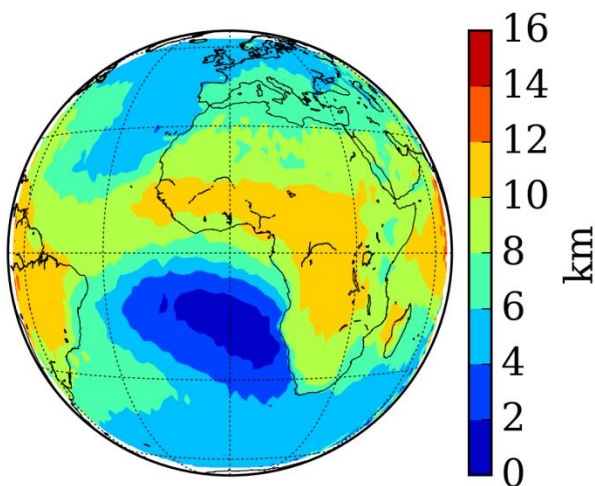
Validation against CALIOP on CALIPSO



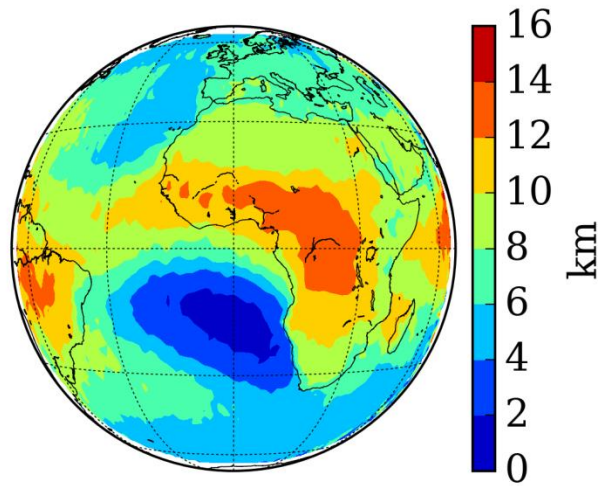
Validation against CALIOP on CALIPSO

→ Cloud Top Height

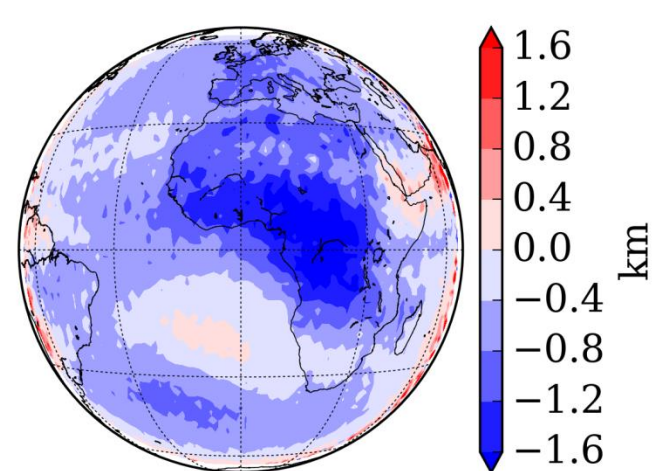
CLAAS-2



CALIOP

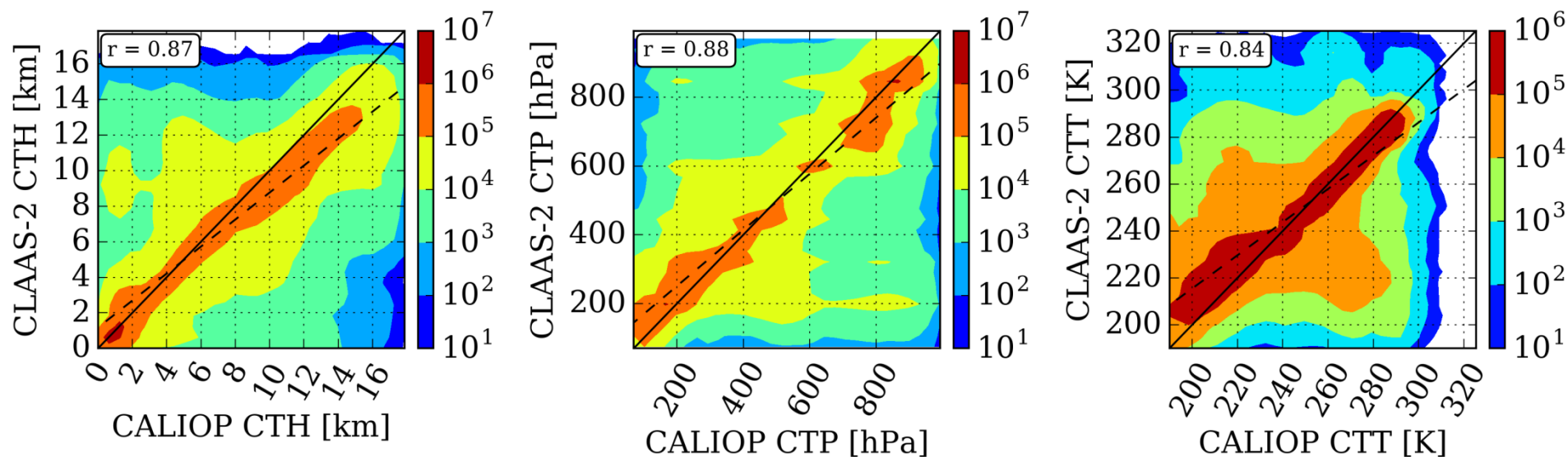


CLAAS - CALIOP

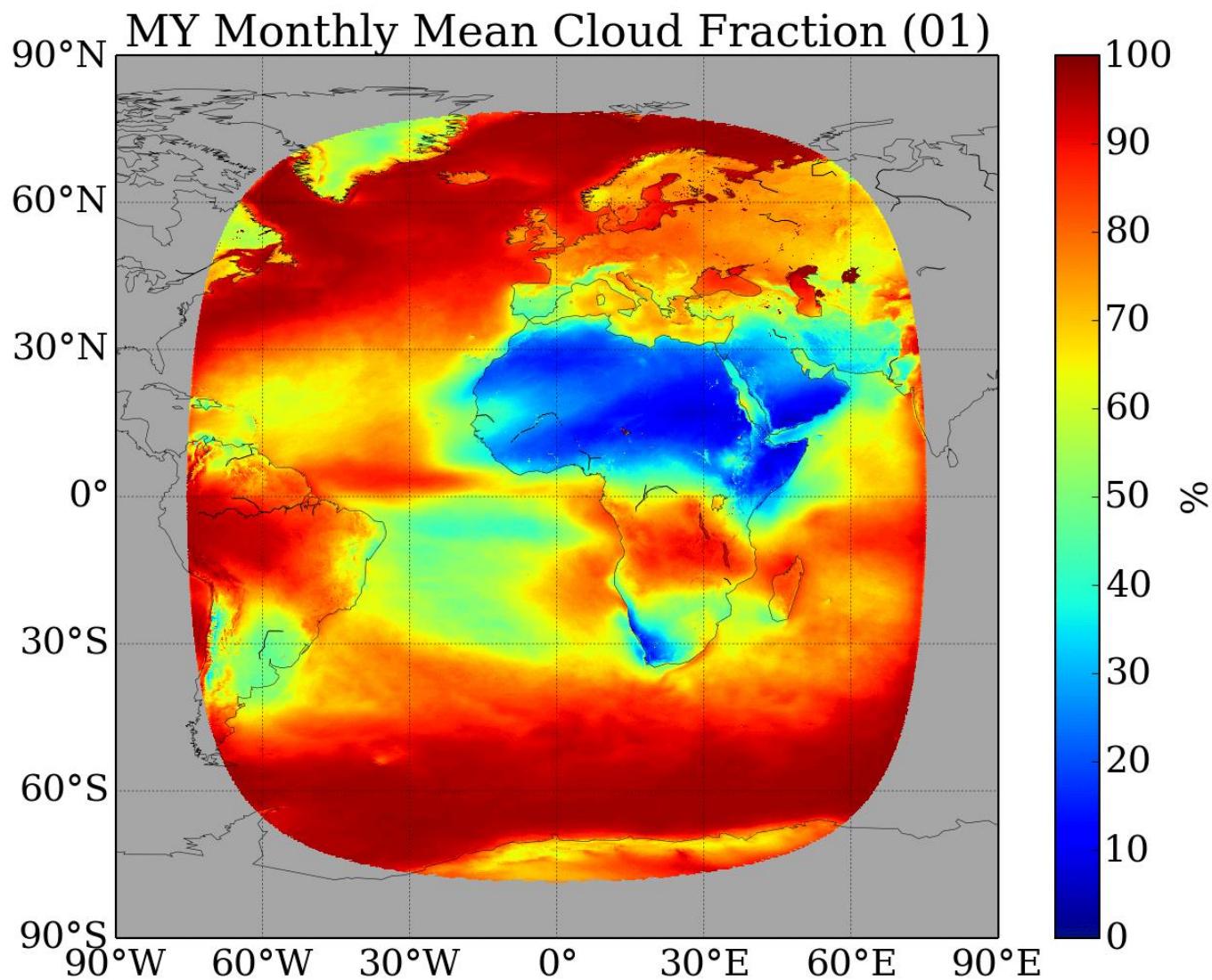


Validation against CALIOP on CALIPSO

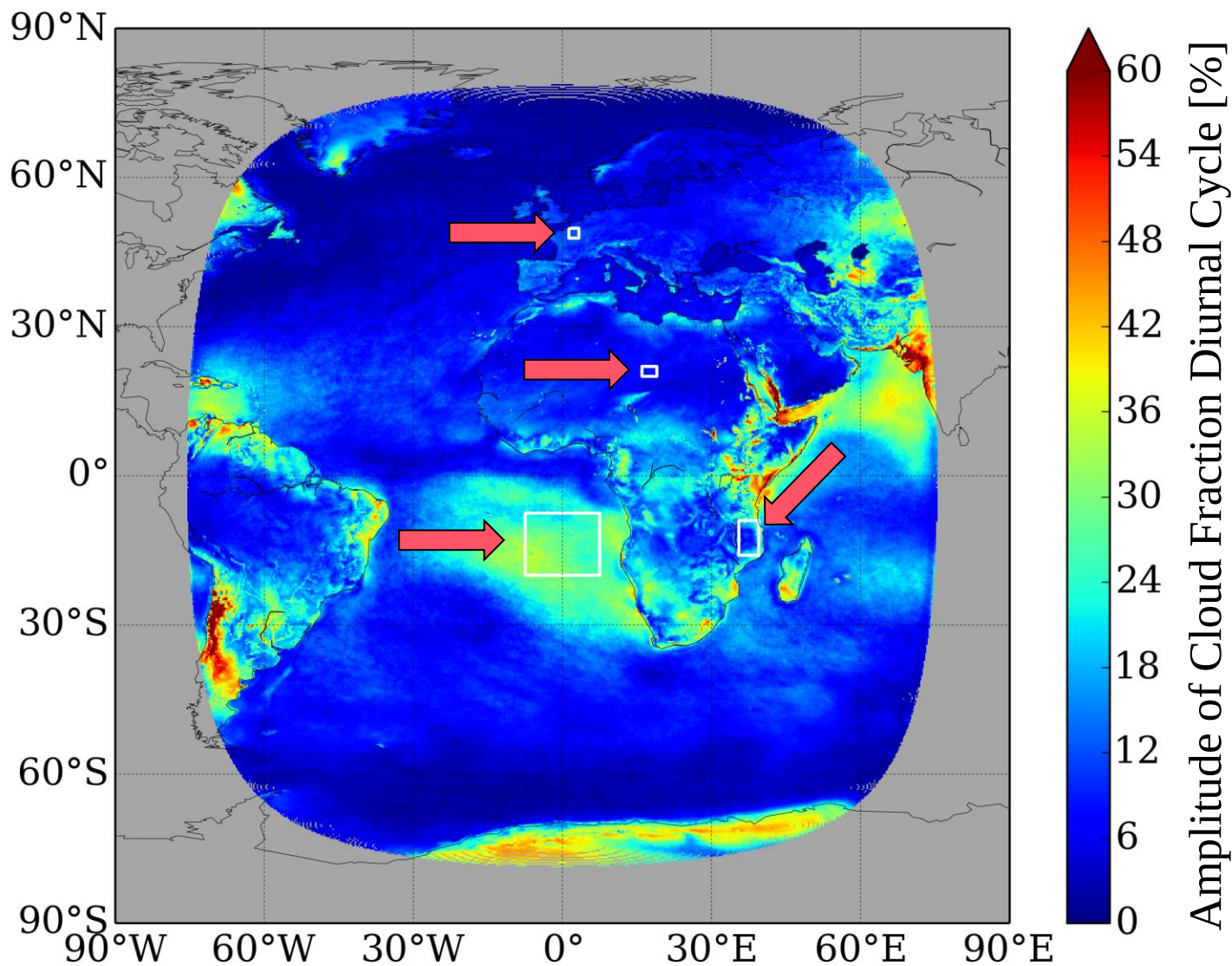
→ Correlation



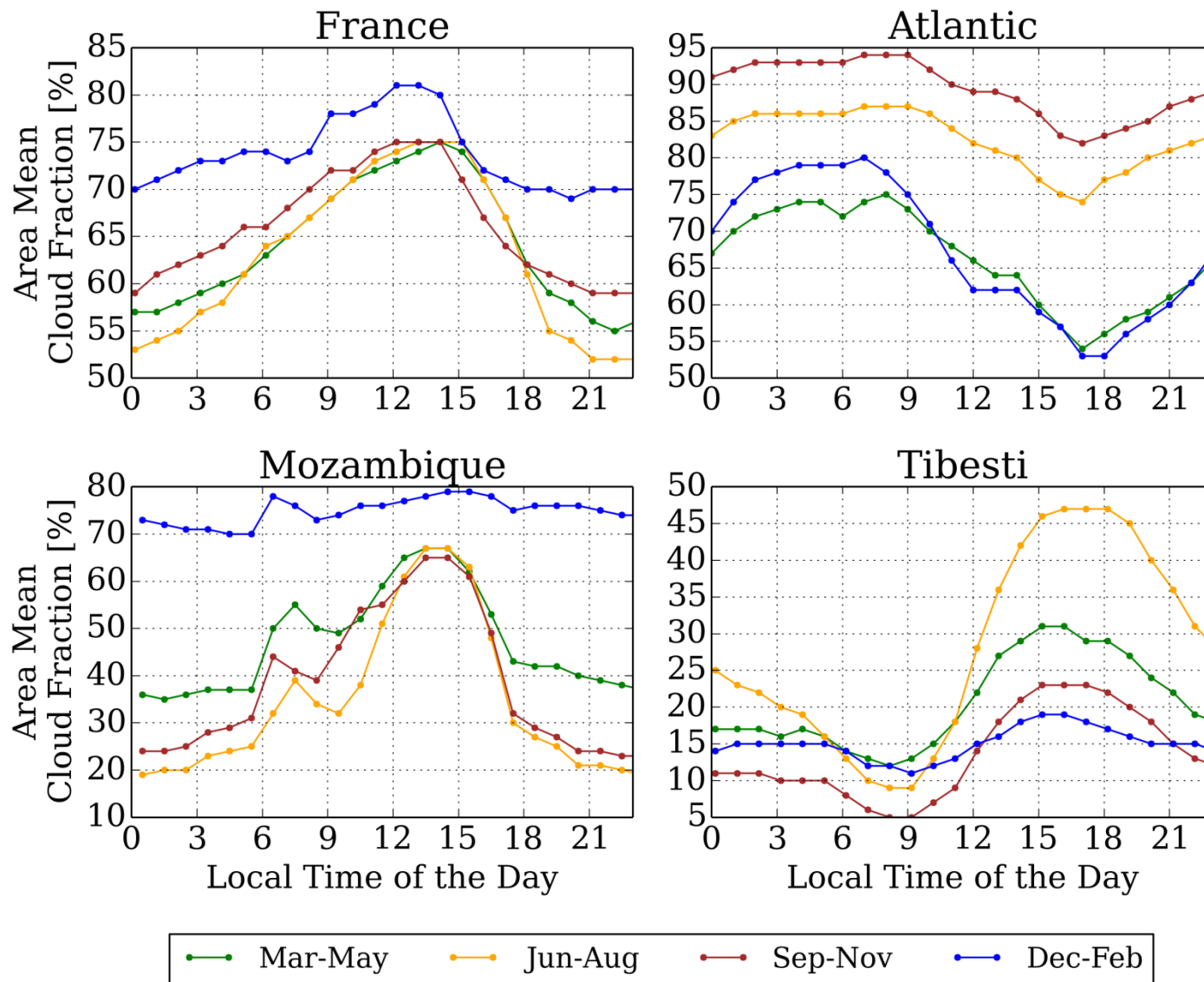
Application: ‚Climatologies‘



Application: Seasonal & Diurnal Cycles



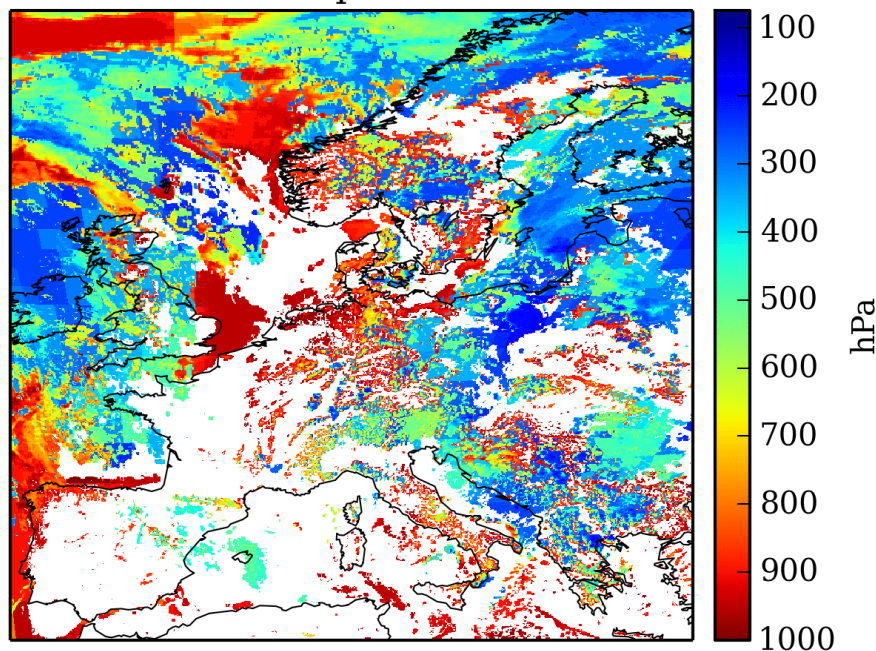
Application: Seasonal & Diurnal Cycles



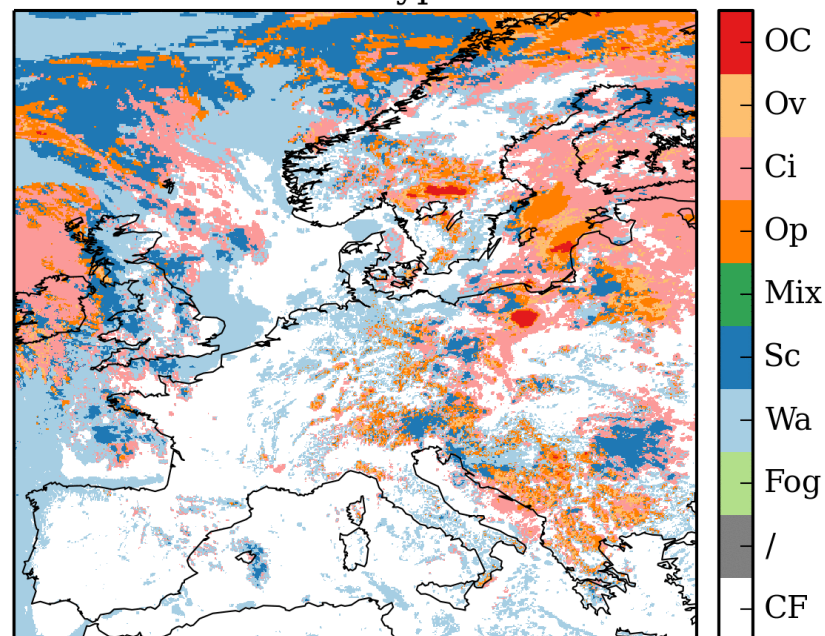
Application: Convection Studies

MSG2, 2009-07-01 10:00

Cloud Top Pressure



Cloud Type

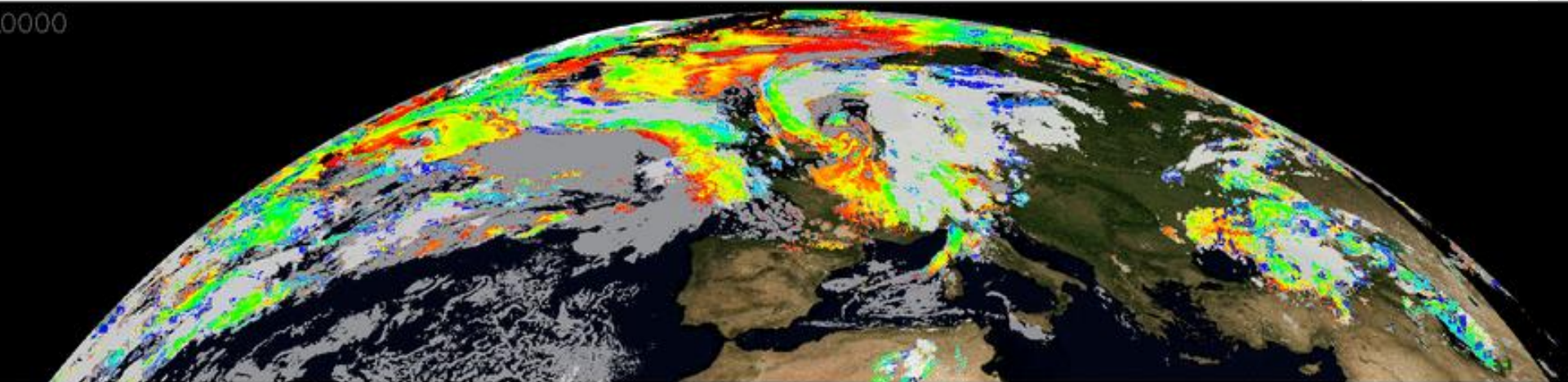


Application: Glaciation Studies

- ➔ Light Gray: Ice Clouds
- ➔ Dark Gray: Water Clouds with CTT > 0 degrees Celsius
- ➔ Coloured: Water Clouds with CTT < 0 degrees Celsius

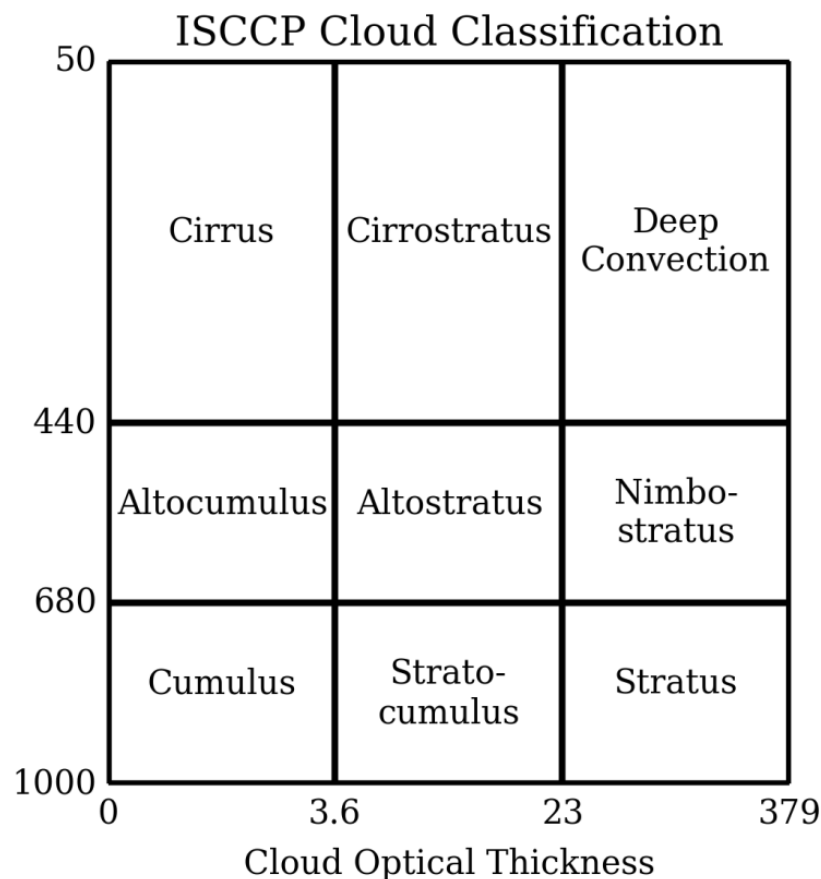
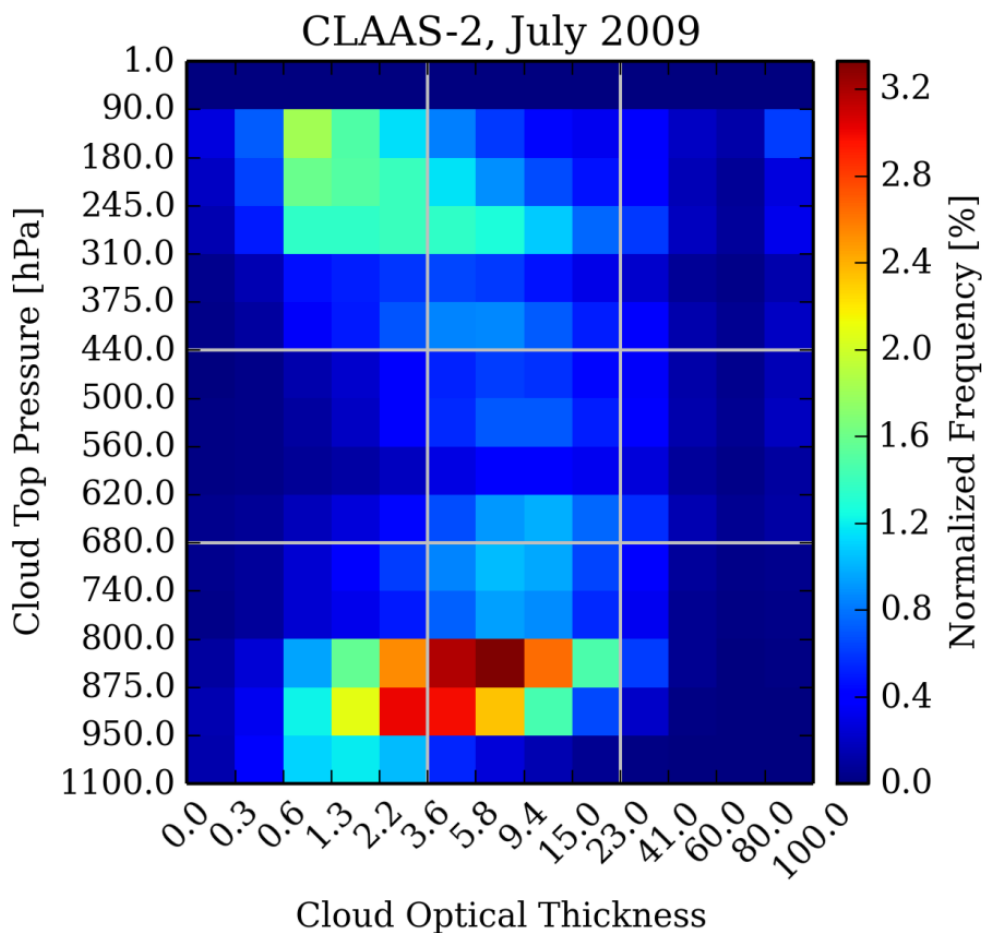


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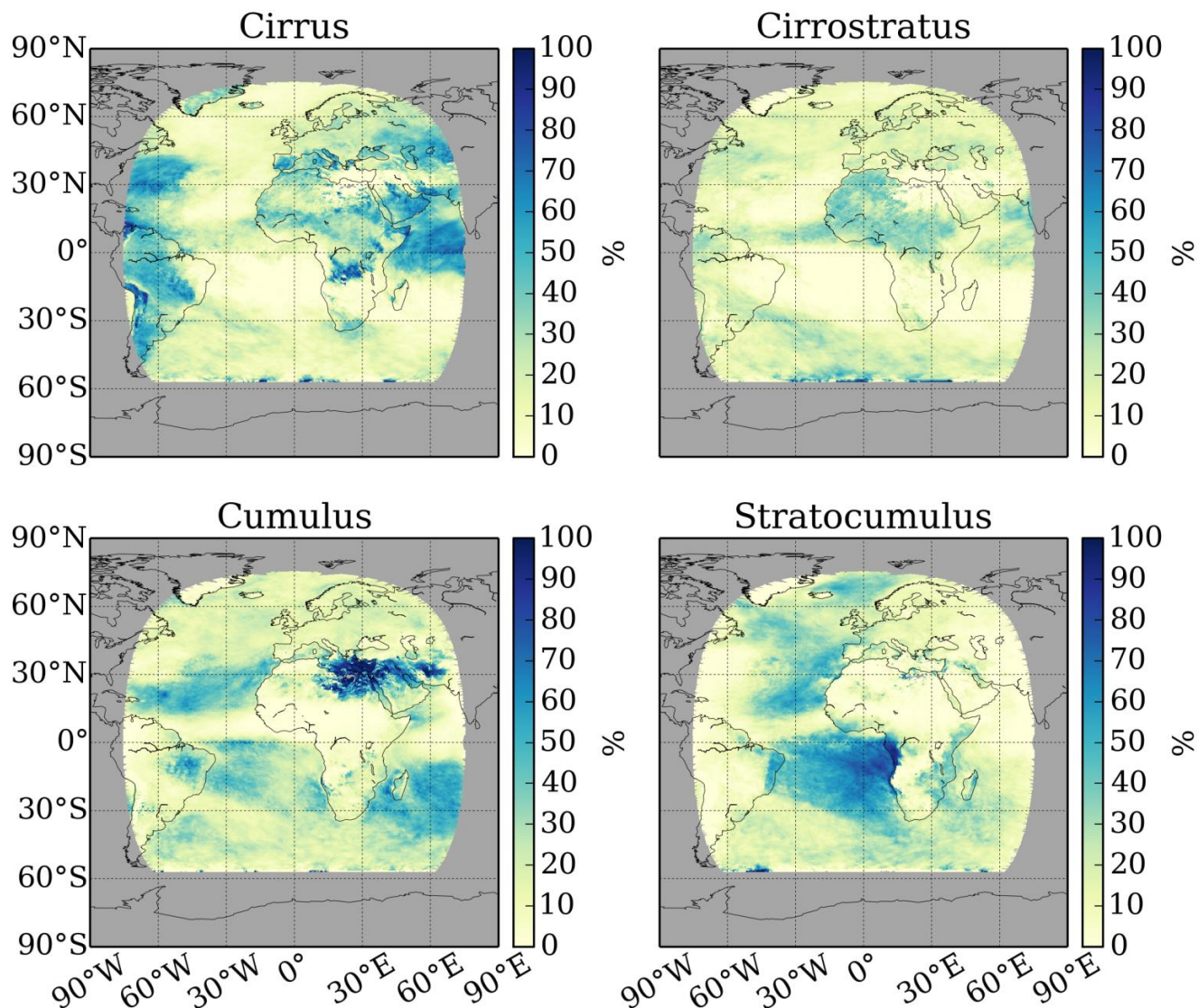


Courtesy of Corinna Hoose (KIT) & Martin Stengel (DWD)

Application: Cloud Type Distribution



Application: Cloud Type Distribution



Thank you!