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

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What is CLAAS-2?

CLoud property dAtAset 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
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](http://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 ($I$): $I \sim S \cdot C$

channel 1 (0.6 μm)

Met8: $S = 24.346 + 0.3739 \times 10^{-3} \times (D - D_{1/1/2000})$
Met9: $S = 21.026 + 0.2556 \times 10^{-3} \times (D - D_{1/1/2000})$
Met10: $S = 20.755 + 0.4079 \times 10^{-3} \times (D - D_{1/1/2000})$

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

[Graph showing cloud fraction percentage against years from 2007 to 2015 for CLAAS-2 (red) and CALIOP (blue).]
Validation against CALIOP on CALIPSO

**CMA**

Hitrate: 81%

**CPH**

Hitrate: 87%
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

Amplitude of Cloud Fraction Diurnal Cycle [%]
Application: Seasonal & Diurnal Cycles

France

Atlantic

Mozambique

Tibesti

Area Mean Cloud Fraction [%]

Local Time of the Day
Application: Convection Studies

MSG2, 2009-07-01 10:00

Cloud Top Pressure

Cloud Type

- OC
- Ov
- Ci
- Op
- Mix
- Sc
- Wa
- Fog
- /
- CF

hPa
Application: Glaciation Studies

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

Courtesy of Corinna Hoose (KIT) & Martin Stengel (DWD)
Application: Cloud Type Distribution

CLAAS-2, July 2009

Cloud Top Pressure [hPa]

Normalized Frequency [%]

Cloud Optical Thickness

ISCCP Cloud Classification

Cirrus
Cirrostratus
Deep Convection
Altocumulus
Altostratus
Nimbostratus
Cumulus
Stratocumulus
Stratus

Cloud Optical Thickness

Rossow & Schiffer (1999)
Application: Cloud Type Distribution
Thank you!