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# The CM SAF climate data records of cloud properties

The EUMETSAT Satellite Application Facility on Climate Monitoring (CM SAF) uses space-based observations from meteorological satellites to provide datasets of geophysical parameters suitable for climate analysis and monitoring. For this, recurring reprocessing efforts ensure enhancements in quality and stability of the datasets using latest retrieval developments and intercalibration information. Related to clouds, the CM SAF activities focus for the time being on datasets derived from passive imager measurements such as the 28-year record of AVHRR and the 8-year record of SEVIRI, as well as on the multi-decadal HIRS measurement record. This presentation will give an overview on the cloud property datasets derived in CM SAF.

## CLAAS

(cLoud property dAtAset using SEVIRI)

**Algorithms used:**

- NWC MSGv2010 (SATBD1, 2010)
- CPP (Roebeling et al., 2006)

**Technical specifications:**

Parameter	Units	Resolution	Temporal coverage
Cloud cover	%	0.25°	2002-2013
Cloud top height	km	0.25°	2002-2013
Cloud top pressure	hPa	0.25°	2002-2013
Cloud optical thickness	-	0.25°	2002-2013
Cloud phase	-	0.25°	2002-2013
Cloud particle path	-	0.25°	2002-2013
Low layer rain	mm	0.25°	2002-2013

**Product portfolio:**

Cloud products	SEVIRI disk	native resolution	SEVIRI disk, native grid
Functional Cloud Cover	✓	✓	✓
Cloud cover histograms	✓	✓	✓
Cloud top height, Temperature, Pressure	✓	✓	✓
Cloud optical thickness	✓	✓	✓
Cloud phase	✓	✓	✓
Cloud particle path	✓	✓	✓
Low layer rain	✓	✓	✓

**Dataset documentation & data access:**

- Stengel et al. (ACPD, 2014)
- DOI: 10.5676/EUM\_SAF\_CM/CLAAS/V001

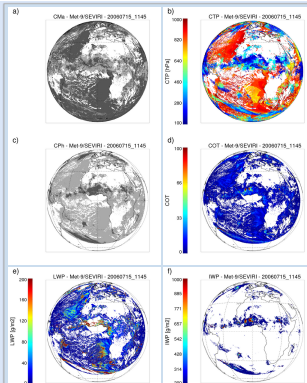


Fig.: CLAAS pixel-based products on native SEVIRI resolution (All figures in this section are taken from Stengel et al., 2013)

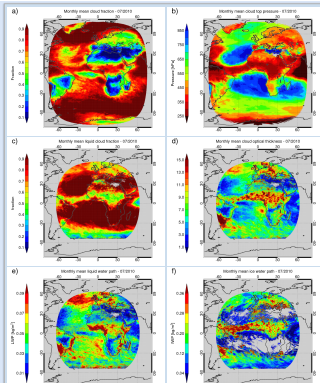


Fig.: CLAAS monthly mean cloud products on latlon grid (0.05°)

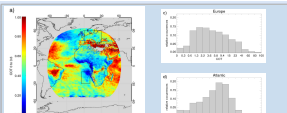


Fig.: CLAAS COT histograms for 2 selected reg. (right); converted to rel. occurrence of optically thin clouds (left)

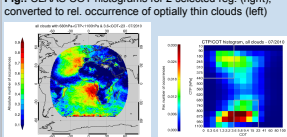


Fig.: CLAAS CTP-COT histograms (JCH) over full disk (right); converted to rel. occurrence of sc clouds (left)

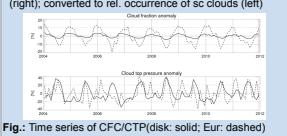


Fig.: Time series of CFC/CTP(disk: solid; Eur: dashed)

## CLARA-A1

(CM SAF cLoud, Albedo & RA radiation dataset - AVHRR-based, Edition 1)

**Algorithms used:**

- PPS (Dybbroe, et al., 2005a/b) v2010+patches
- CPP (Roebeling et al., 2006)

**Technical specifications:**

Parameter	Units	Resolution	Temporal coverage
Cloud cover	%	0.25°	1982-2009
Cloud top height, Temperature, Pressure	km/hPa	0.25°	1982-2009
Cloud optical thickness	-	0.25°	1982-2009
Cloud phase	-	0.25°	1982-2009
Cloud particle path	-	0.25°	1982-2009
Low layer rain	mm	0.25°	1982-2009

**Product portfolio:**

Cloud products	AVHRR	disk	latlon grid	Polar equal area grid
Functional Cloud Cover	✓	✓	✓	✓
Cloud cover histograms	✓	✓	✓	✓
Cloud top height, Temperature, Pressure	✓	✓	✓	✓
Cloud optical thickness	✓	✓	✓	✓
Cloud phase	✓	✓	✓	✓
Cloud particle path	✓	✓	✓	✓
Low layer rain	✓	✓	✓	✓

**Dataset documentation & data access:**

- Karlsson et al. (ACP, 2013)
- DOI: 10.5676/EUM\_SAF\_CM/CLARA\_AVHRR/V001

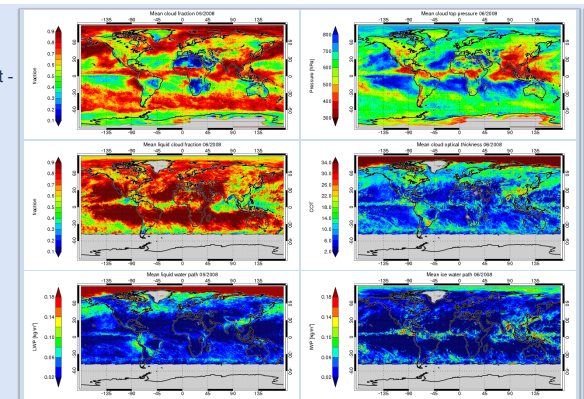


Fig.: CLARA-A1 monthly means of CFC, CTP, CPH, COT, LWP, IWP (from top left to bottom right). All data on latlon grid with 0.25° resolution.

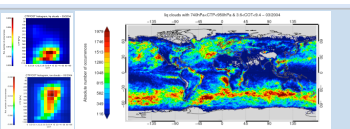


Fig.: CLARA-A1 CTP-COT histograms (JCH) aggregated over the full globe (left); and prepared to show abs. number of low liquid clouds.

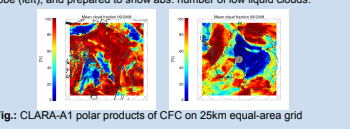


Fig.: CLARA-A1 polar products of CFC on 25km equal-area grid

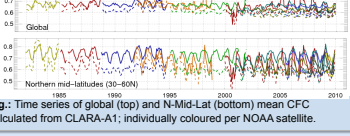
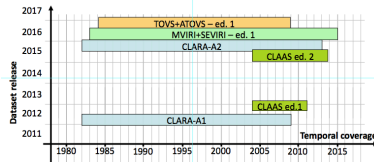


Fig.: Time series of global (top) and N-Mid-Lat (bottom) mean CFC calculated from CLARA-A1, individually coloured per NOAA satellite.

## Outlook

The CM SAF cloud property datasets will be updated in recurring reprocessing events. Releases of CLARA and CLAAS editions 2 are planned for 2015, then characterized by increased quality, revised product specifications and longer time periods.

Enhancements will for example be the 15 minute resolution in CLAAS ed.2 (1h in current version), or the provision of un-averaged, pixel-based information in globally gridded format (Level-2b) for CLARA-A2. These efforts are accompanied by developments of CLAAS and CLARA simulators for atmospheric models. Furthermore, the portfolio of CM SAF cloud datasets will be extended by a MVIRI-SEVIRI cloud cover dataset and by an (A)TOVS-based dataset for cloud cover and cloud-top pressure of high clouds.



## References:

Dybbroe, A. et al., 2005a: NWCSAF AVHRR cloud detection and analysis using dynamic thresholds and radiative transfer modeling - Part I: Algorithm description, J. Appl. Meteor., 44, pp. 39-54.

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Roebeling, R. et al. (2006). Cloud property retrievals for climate monitoring: Implications of differences between spinning enhanced visible and infrared imager (SEVIRI) on meteosat-8 and advanced very high resolution radiometer (AVHRR) on noaa-17. J. Geophys. Res., 111 (D20), 20 210.

SATBD (2010): Algorithm Theoretical Basis Document for "Cloud Products" (CMa-PGE01 v3.0, CT-PGE02 v2.0 & CTH-PGE03 v2.1) SAF/NWC/CDOP/MFL/SCI/ATBD/01, Issue 3, Rev. 0, 17 May 2010, available at NWCSAF

Stengel, M. et al.: CLAAS: the CM SAF cloud property dataset using SEVIRI, ACPD, 13, 26451-26487, doi:10.5194/acpd-13-26451-2013, 2013.

