

EUMETSAT Satellite Application Facility on Climate Monitoring

The EUMETSAT
Network of
Satellite
Application
Facilities




CDOP 2

Product Requirements Document

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Document Signature Table


	Name	Function	Signature	Date
Author	CM SAF Team			31.08.2016
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2.0	06/12/2012	SAF/CM/D WD/PRD	Approval of PRD 2.0 from CDOP2_SG2_D2
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2.2 draft	25/02/2014	SAF/CM/D WD/PRD	Include Results from RR 2.1, RR 2.3 and RR .2.7: Update of the following entries: <ul style="list-style-type: none"> • CM-23081, CM-23201, CM-23231 (RR 2.1) • CM-12001 (RR 2.3) • CM-12611, CM-12701, CM-45, CM-12801, CM-12811, CM-12821, CM-12901, CM-12911 (RR 2.7) • Integration of CM-21012 (CDOP2_SG5)
2.2	13/03/2014		<ul style="list-style-type: none"> • All changes of PRD 2.2 draft (dated 25. Feb. 2014) and: • Deletion of the following product entries (HOAPS second CDOP2 release): CM-12612, CM-12792, CM-12802, CM-12812, CM-12822, CM-12902, CM-12912 (CDOP2_SG5) • Correction of FCDR input identification in HOAPS 4.0 products (CM-12611, CM-12701, CM-12801, CM-12811, CM-12821, CM-12901, CM-12911

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2.5	23.02.2015		Approved by SG in writing (23.02.2015); CDOP2_SG6_D10
Draft 2.6	01.04.2015		Include the results from RR 2.13 and update of the following entry: CM-12002. (CDOP2_SG7_D3) Added a section on uncertainty characterization (acc. to RR2.2 Action 1)
2.6	17.04.2015		Approved by SG (17.04.2015, CDOP2_SG7_D4)
Draft 2.7	19.10.2015		Delete the following Products: (17.04.2015, CDOP2_SG7_D9): CM-23101 (17.04.2015, CDOP2_SG7_D10): CM-13011, CM-13031 (17.04.2015, CDOP2_SG7_D8 and in coordination with EUMETSAT secretariat): The following products remain in the PRD and will be released during CDOP-3: CM-11012 CM-11022, CM-11032, CM-11042, CM-11052, CM-11062
2.7	04.11.2015		Approved by SG (04.11.2015, CDOP2_SG7_D17)
Draft 2.8	04.07.2016		Deletion of CM-23721 (CDOP2_SG9_D7) Update of time length for CM-23011, CM-23921 (CDOP2_SG9_D7) Include a new Product (CM-23291) on direct radiation which is a composite CM-23232 and the direct surface incoming irradiance (CDOP2_SG8_D8) Include Abbreviation list (RR 2.2 Action 2)
2.8	01.08.2016		Approved by SG in writing (CDOP2_SG9_D11)
Draft 2.9	31.08.2016		Include new LST CDR CM-23931 and update of CM-23921 (acc. CDOP2_SG8_A10 and A11)

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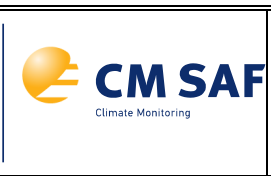
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1. Introduction

1.1. Purpose of the document

The Product Requirements Document (PRD) describes the products and services to be provided in the long-term, e.g. at the end of the CDOP-2 (2017). It describes the committed target for development and operations. It is the main reference document for all development related reviews and it provides information to users, what can be expected from the CM SAF after completion of planned developments.


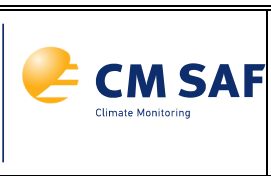
1.2. Applicable and Reference Documents

1.2.1. Applicable Documents

Reference	Title	Code
AD 1	Agreement between DWD and EUMETSAT on the Second CDOP of a CM SAF	SAF/CM/DWD/CDOP2/CoA_EUM
AD 2	Requirements Review Meteosat Shortwave Radiation Products (CM-23081, CM-23201, CM-23231)	SAF/CM/DWD/RR2.1 v 1.1 dated 05.07.2013
AD 3	Requirements Review FCDR SSMI/SSMIS dataset (CM-12001)	SAF/CM/DWD/RR/2.3 v.1.1 dated 18.12.2013
AD 4	Requirements Review (HOAPS release 4.0)	SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014
AD 5	Requirements Review (TOA Radiation)	SAF/CM/RMIB/GERB/RR/2.5 v. 1.2 dated 27.02.2014
AD-6	Requirements Review (CLAAS Ed.2)	SAF/CM/KNMI/RR2.4 v1.2 dated 13.06.2014
AD-7	Requirements Review (CLARA Ed. 2)	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014
AD-8	Requirements Review (TOA Radiation)	SAF/CM/CDOP2/RMIB/GERB/RR2.6 v 3.0, dated 24.12.2014
AD-9	Requirements Review (Upper Tropospheric humidity)	SAF/CM/UKMO/RR/2.14, v1.2, dated 15.01.2015
AD-10	Requirements Review (MVIRI/SEVIRI data set)	SAF/CM/DWD/RR28 v1.1, dated 15.01.2015
AD-11	Requirements Review (FDCR SMMR, SSMI, SSMIS)	SAF/CM/CDOP2/DWD/RR/2.13 v1.1, dated 19.02.2015
AD-12	Requirements Review 2.8 and 2.9 (CM-23921, CM-23931)	SAF/CM/CDOP2/DWD/RR/2.8, v1.3, dated 25.07.2016

1.2.2. Reference Documents

Reference	Title	Code
RD 1	CM SAF CDOP Service Specifications	SAF/CM/DWD/SeSp/1.8
RD 2	CM SAF CDOP2 Service Specifications	SAF/CM/DWD/SeSp/2.0

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Reference	Title	Code
RD 3	CM SAF CDOP2 Service Specifications	SAF/CM/DWD/SeSp/2.4

1.3. Definition of Terms

The following terms are used in this document and defined below.

“In development”: Products or software packages that are in development and not yet available to users.

“Demonstrational”: Products or software packages that are provided to users without any commitment on the quality or availability of the service, based on decision of the concerned SAF Steering Group to start dissemination to enable users to test these products and provide feedback.

“Pre-operational”: Products or software packages with documented limitations that is able to satisfy the majority of applicable requirements and/or have been considered by the relevant Steering Group suitable for distribution to users.


“Operational” Products or software packages with documented non-relevant limitations that largely satisfy the requirements applicable and/or have been considered by the relevant Steering Group mature enough for distribution to users.

“Released” Data sets that are made available to users, satisfying largely the applicable requirements, with documented characteristics, validations results and limitations, and that are considered by the relevant Steering Group mature enough for the targeted applications.

“Superseded” Products or software packages that have been (pre-) operationally provided to users but are not (pre-) operational anymore **because the information of same or superior quality and/or coverage is provided with another product** and considered by the relevant Steering Group as not useful for being produced. Note, the “superseded” products remain available for the users.

“Discontinued” Products or software packages that have been previously (pre-) operationally provided to users but are not (pre-) operational anymore and are considered by the relevant Steering Group as not useful for further production. Note, the “discontinued” products remain available for the users.

“Deleted” Products or software packages that have been previously planned or (pre-) operationally provided to users but are not planned or (pre-) operational anymore and are considered by the relevant Steering Group as not useful to be provided to users.

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1.4. Uncertainty characterisation

The CM SAF applies the following accuracy concept for its data set using three different metrics:


Mean error, Precision and Stability.

These are defined as follows:

Mean error: This measure should tell how close the parameter estimation is on average to a reference observation (representing the truth). The quantity is often referred to as the bias but for some applications the mean of the absolute error is more appropriate. The definition of the truth depends on the variable and the availability of references.

Precision: This measure should tell how individual parameter estimations are distributed relative to the mean error. The quantity used is the standard deviation of the error which is equivalent to the bias-corrected RMS error.

Stability: This measure should tell whether one or several accuracy metrics are stable or if they are changing over time. The CM SAF has chosen to monitor only the first metric here (the mean error) where criteria have been defined for the maximum changes being acceptable per decade for each product.


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2. Products and data sets

- PRD-1** CM SAF shall provide products and data sets during CDOP 2 as listed in the table of Annex A.
- PRD-2** CM SAF product and data set characteristics shall be according to the table of Annex A.
- PRD-3** For each product and data set, the following information shall be provided: Algorithm Theoretical Basis Document, Product User Manual, and Validation Report.


3. User Service

- PRD-4** The CM SAF products and data sets shall be archived and shall be made available to users.
- PRD-5** Availability to products and data sets shall be according to EUMETSAT data policy.
- PRD-6** User services shall be provided through the CM SAF homepage www.cmsaf.eu. The user service shall include information and documentation on the CM SAF products and data sets, information on how to contact the user help desk and shall allow to search the product catalogue and to order products and data sets.
- PRD-7** For the CM SAF operational product, the results of availability and quality control shall be reported in a CM SAF half-yearly Operations Report
- PRD-8** Requests from users for CM SAF archived products shall be processed during normal working hours. The user shall receive an answer to the request within one working day. The products shall be available to the user within 5 working days. In case of problems the user shall get a message about the delay.
- PRD-9** The CM SAF shall provide the current status of user requests and problems to the users
- PRD-10** The CM SAF products shall be delivered to users on common media as product files.
- PRD-11** To get access to the data, a single entry point for searching and ordering of products (Web User Interface, WUI) from the CM SAF main page shall be provided.
- PRD-12** The user shall have access to the product catalogue to check the


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availability of the products. Additionally example images and quick looks of the products shall be provided.

- PRD-13** The user shall be able to place orders and to get status information of already placed orders
- PRD-14** The registration and login of the user shall be mandatory to order CM SAF products.
- PRD-15** The user shall get a confirmation of the committed order via e-mail and shall receive another e-mail once the data have been prepared.
- PRD-16** The CM SAF shall prepare and perform a 'CM SAF User and Training Workshop'.
- PRD-17** The Help Desk User Support shall be based on a dedicated CM SAF web site, which shall act as the single entry point for the web users interface (WUI)..
- PRD-18** The Help Desk User Support shall provide information and services to CM SAF users, as well as to support the gathering of the feedback from users needed to improve the CM SAF services
- PRD-19** For user feedback a template for a user's problem report (UPR) shall be available on the web site in order to depict the problems he/she has with the CM SAF products, CM SAF operation or suggestions for improvements of the CM SAF system. The user shall receive a feedback on any problem that he/she has reported. He/she shall receive an answer to the request within five working days.
- PRD-20** The CM SAF shall provide sufficient manpower for ensuring a full availability of the Help Desk, based on working hours, five days a week service. Besides email the CM SAF Help Desk shall be accessible via mail and telephone.
- PRD-21** The central CM SAF WWW site shall be an operational element of the CM SAF, with a maximum of one interruption per week and with an interruption time of one working day as a maximum.
- PRD-22** The CM SAF shall provide the following mail box and FAQ (Frequently Asked Questions) list facility:
- Email-Box to the CM SAF users, to solve minor problems or to collect user's questions and requirement proposals
- Regularly updated FAQ list covering all aspects related to the CM SAF: access to products, products quality, performance, etc.
- PRD-23** The CM SAF WWW site for the CM SAF shall provide General information:
- CM SAF overview
 - Product description and examples
 - Links to production centres web sites, information on the quality of the products and quick looks, and relevant scientific information

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- PRD-24** The CM SAF WWW site for the CM SAF shall provide News :
- general announcement (product modifications, next seminars and workshops, Visiting Scientists activities, etc.), a form for the UPR (User's Problem Report)
- PRD-25** The CM SAF WWW site for the CM SAF shall provide links to other web sites (Meteorological Institutes, EUMETSAT, etc.)
- PRD-26** The CM SAF WWW site for the CM SAF shall provide a Web User Interface (WUI) which allows the user access to the products via an identification procedure
- PRD-27** The CM SAF WWW site for the CM SAF shall provide:
- Help desk service
 - Contact link
 - Frequently Asked Questions (FAQs)
- PRD-28** The CM SAF WWW site for the CM SAF shall provide Service messages:
- operational information (product unavailability, detected or expected anomalies, warnings etc.)
- PRD-29** The CM SAF WWW site for the CM SAF shall provide the log of changes concerning CM SAF products and data sets
- PRD-30** The CM SAF WWW site for the CM SAF shall provide CM SAF documents and reports
- PRD-31** The central CM SAF WWW site services shall be accessible to the general public.
- PRD-32** The access to CM SAF products shall require detailed user registration.
- PRD-33** The CM SAF shall provide a documentation access capability to view and download the following material:
- CM SAF product user manual
 - CM SAF algorithm theoretical baseline documents
 - CM SAF Validation Reports
 - CM SAF Operations Reports
 - Download facility for other documentation relevant to users of the CM SAF products;
 - Download training material of workshop
- PRD-34** CM SAF shall provide information on the meteorological scientific developments (e.g., papers published of CM SAF science team) on the CM SAF web page
- PRD-35** The CM SAF shall monitor the quality of the User Service in order to enable continuous improvements. The following parameters shall be taken into consideration:
- Problems reported by users and related to the User Service,
 - Compliance in solving or replying to user's problems in requested

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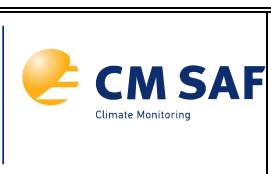
time

- Any potential useful metric value provided by the Leading Entity.

- PRD-36** The CM SAF shall make available the metadata of all CM SAF products and data sets to the EUMETSAT EO portal.
- PRD-37** The CM SAF shall provide a catalogue update through the UMARF Client. This catalogue will contain the metadata of the CM SAF products and data sets.
- PRD-38** The CM SAF shall provide the catalogue update offline via storage medium (CD) not later than 1 year after the availability of the CM SAF products and data sets.

4. List of TBDs and TBCs

Accuracy definitions CM SAF requirements have been revised in 2012 and all tbd's and Tbc's have been replaced by appropriate numbers and text.

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5. Targeted User Communities

This section shortly described the three main targeted application areas of CM SAF and outlines a few key indicators of each of these areas.

5.1. Global and regional climate studies

Satellite data has the potential to monitor a variety of key atmospheric variables to infer long term changes in the global and regional climate and also attempt to attribute the cause of the observed changes. For application for climate monitoring the data sets need to span at least several decades in order to be able to monitor climate change. Some satellite data sets already approach 30 years in length. However, though continually expanding, many data sets are still shorter than 20 years. Climate monitoring implies the most stringent requirements for satellite data to be applied, both in terms of stability of the measurement and in the minimum time period of the dataset. . GCOS specifies the requirements needed for climate monitoring (GCOS-154, 2011)

Global and regional atmospheric and ocean reanalyses are now being undertaken in a number of centres and are being increasingly used for climate applications. A key requirement for the data to be assimilated into these reanalyses is that they are uniformly processed without the discontinuities often seen in operational real time processed data sets caused by changes to operational processing of the instrument data. There are also stringent requirements on the stability of the measurements for long term climate monitoring.

For this application area and user group, it is expected that the CM SAF should meet mostly the “optimal accuracies”.

5.2. Global and regional climate modelling


Data sets of surface and top-of-the-atmosphere radiation budget, water vapour and temperature distribution, as well as data sets of cloud properties (e.g. fractional cover, top height, phase, microphysical properties etc.) provide an important constraint for climate models. Regional estimates of all these parameters are important for detection and attribution studies. A high temporal resolution of the observations to resolve the diurnal cycle of these parameters is important to analyse the underlying physical processes.

Regional climate modelling centres use satellite observations to evaluate regional coupled atmosphere ocean models.

The requirements on temporal stability of the satellite data sets for model evaluation are less stringent than for climate monitoring and analyses. The requirements on accuracy depend on the magnitude of the model error to be assessed. The time series required for these studies are typically for only a few years, although often specific periods of interest (e.g. El Nino and La Nina, major volcanic eruption etc.) are required.

The requirements for regional climate models evaluation are essentially the same as for global models with an increased requirement in terms of spatial and temporal sampling. Often data sets for specific periods of meteorological interest or coincident with major field campaigns will define the time periods. Mostly these field campaigns have a specific focus on processes (e.g. cloud interaction) in the climate systems and used to improve model parameterisations.

To serve this specific requirement it is therefore important to use the most recent and sophisticated satellite systems that are available as input for the generation of data sets. It is required for the model evaluation that the satellite data records are homogenized and are based on an inter-calibrated underlying satellite radiance record. Additionally, a specific requirement on satellite estimates of variables is that the retrieval scheme applied to satellite

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radiances should be as independent as possible from external NWP model input to avoid circular reasoning.

For this application area and user group, it is expected that the CM SAF should meet mostly the “target accuracies”.

5.3. Operational monitoring and infrastructure planning


Operational monitoring is defined as a continuum of provision, delivery and consumption of climate information and products. Operational monitoring should have the properties of being available, dependable, usable, credible, responsive, flexible and sustainable.

In contrast to the above described target areas, this area is covering the need of NMHSs to receive satellite based climate information in short- and medium-term latency in order to provide climate services to its users. This could be e.g. provision of maps with anomalies and extremes observed in the last months or year. Taking a long-term climatology as basis for this application are the requirements is on one hand on timeliness and on the other hand on consistency (e.g. for input data, algorithms).

In summary, Table 5-1 presents the anticipated accuracies for the different CM SAF target users. However, it is noted that there certainly exists less stringent requirements for some applications.

Table 5-1: Accuracies for different CM SAF target user.

Application area	Accuracies as defined in Section 6.1 and 6.2		
	Threshold	Target	Optimal
Global and regional climate studies			
Global and regional climate modeling			
Operational monitoring and infrastructure planning			

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6. Convention on CM SAF ID Numbering for CDOP 2

With start of CDOP 2 CM SAF uses for all **new** entries a

- four digit numbering system for all of products provided to the user in short time latency.
- five digit numbering system for all climate data sets.

The CM SAF identifiers from CDOP remain unchanged and have been integrated into this document from [AD-2]. The new scheme is flexible enough to integrate upcoming products and data sets in a coherent way. Also in principle, all existing entries from CDOP can be transferred into the new scheme.

The **four digit numbering system** for the short time latency CM SAF products is as follows: Digit #1 shows the operational satellite instrument family i.e. 5XXr for MSG based product, 6XXr for AVHRR based products.



The next two digits (#2,#3) describe the major physical groups (e.g. clouds) and the individual parameter within a group. For details see Table 6-2, Table 6-3, Table 6-4, and Table 6-5. The last digit is for all operational CM SAF products in this category 0 (r=0).

Table 6-1: Numbers for polar and geostationary satellite systems.

Polar satellites	Instruments									
1xxxr	AVHRR			SSM/SSMIS					TOVS/ATOVS	
	11xxr			12xxr					13xxr	
	Cld	SfcRad		FCDR	Prec.	Hum	Turb. Flux	Cld	hum	
	See Table 6-3 and Table 6-4			See Table 6-2	See Table 6-5			See Table 6-5		
	AMSU-B, MHS, SSM/T2, HIRS									
	14xxr									
	Humidity									
	See Table 6-5									
Geostat. Satellites	Instruments									
2xxxr	SEVIRI			Not used	MVIRI+MSG					
	21xxr			22xxr	23xxr					
	Cld	Aer.	Toa	Not used	cld	Aer	sfcrad	toa	hum	oth
	See Table 6-3 and Table 6-4			n/a	See Table 6-3, Table 6-4, and Table 6-5					

Table 6-2: Numbering for FCDR.

FCDR	
xx00r	FCDR

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The **five digit numbering system** for CM SAF data sets follows in principle the same rules as described above for CM SAF products.

The leading digit of the five numbering system describes the satellite instrument family, starting with 1 for polar satellite system, 2 for geostationary system (see Table 6-1).

The 2nd digit represents then the instrument(s) category used for the data set, as presented in Table 6-1. The next two digits represent the physical group and the individual parameter (see Table 6-2, Table 6-3, Table 6-4, and Table 6-5). This is followed by the last digit 'r' of the CM SAF identifier distinguishing between different releases of this parameter.

Table 6-3: Numbers for parameters in subgroup clouds and aerosols (0xx and 1xx).


Cloud		Aerosols	
xx01r	Cloud mask	xx10r	Aerosol optical depth
		xx12r – xx19r	Not used
xx02r	Joint Cloud Histograms		
xx03r	Cloud top level		
xx04r	Cloud phase		
xx05r	Liquid water path		
xx06r	Ice Water path		
xx07r	Not used		
xx08r	Cloud albedo		
xx09r	Not used		

Table 6-4: Numbering for parameter in subgroups radiation at surface and top of atmosphere (2xx and 3xx).

Surface Radiation		Toa Radiation	
xx20r	Solar incoming radiation	xx30r	Reflected solar flux
xx21r	Not used	xx31r	All sky reflected solar flux
xx22r	Surface albedo	xx32r	Clear sky reflected solar flux
xx23r	Direct solar irradiance	xx33r	Outgoing longwave radiation
xx24r	Spectral irradiance	xx34r	All sky outgoing longwave flux
xx25r	Outgoing longwave radiation	xx35r	Clear sky outgoing longwave flux
xx26r	Downwelling longwave radiation	xx36r – xx39r	Not used
xx27r – xx29r	Not used		

Table 6-5: Numbering for parameter in subgroups 6xx to 9xx.

Precipitation		Water vapour	
xx60r	Not used	xx70r	Total water vapour content
xx61r	Precipitation intensity	xx71r	Water vapour and temperature
xx62r – xx69r	Not used	xx72r	Free tropospheric humidity
		xx73r – xx79r	Not used
Evaporation and Fluxes		Other	
xx80r	Evaporation	xx90r	Near surface specif. humidity
xx81r	Latent heat flux	xx91r	Wind speed
xx82r	Freshwater flux	xx92r	Land surface temperature
xx83r-xx89r	Not used	xx93r-xx99r	Not used


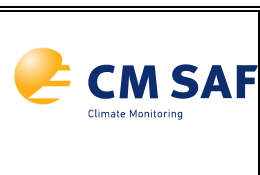
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7. Product Requirements for CM SAF products

This Section provides all entries of the product requirements for CM SAF products.

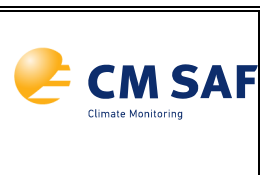
CM-02		Fractional Cloud Cover		CFC_SEVIRI
Type		Product		
Applications and users		* NMHSs & Government agencies * Private Sector and Public Sector		
Characteristics and Methods		Daily Mean & Monthly Mean Monthly Mean Diurnal Cycle		
Comments		The accuracy is defined as the mean error (i.e., defined in % cloud amount units) and precision is defined as the bias-corrected RMS error.		
Generation frequency		1 day, 1 month		
Input satellite data		SEVIRI		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM		offline
Accuracy				
Threshold		Target		Optimal
20% bias		10% bias		10% bias
40% bc-rms (MM)		20% bc-rms (MM)		15% bc-rms (MM)
45% bc-rms (DM)		25% bc-rms (DM)		20% bc-rms (DM)
Verification method		Comparisons to SYNOP data (results computed as areal means over the studied area)		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk	(15 km) ²			2 month

CM-03		Fractional Cloud Cover		CFC_AVHRR_Europe	
Type		Product			
Applications and users		* NMHSs & Government agencies * Private Sector & Public Sector			
Characteristics and Methods		Daily Mean & Monthly Mean			
Comments		The accuracy is defined as the mean error (i.e., defined in % cloud amount units) and precision is defined as the bias-corrected RMS error.			
Generation frequency		1 day, 1 month			
Input satellite data		AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
20% bias		10% bias		10% bias	
40% bc-rms (MM)		20% bc-rms (MM)		15% bc-rms (MM)	
45% bc-rms (DM)		25% bc-rms (DM)		20% bc-rms (DM)	
Verification method		Comparisons to MODIS data (results computed as areal means over the studied area)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Europe	(15 km) ²			2 month	

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CM-04		Fractional Cloud Cover		CFC_AVHRR_Arctic	
Type		Product			
Applications and users		* Climate Research * NMHSs			
Characteristics and Methods		Daily Mean Monthly Mean			
Comments		The accuracy is defined as the mean error (i.e., defined in % cloud amount units) and precision is defined as the bias-corrected RMS error.			
Generation frequency		1 day, 1 month			
Input satellite data		AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
30% bias		20% bias		15% bias	
40% bc-rms (MM)		30% bc-rms (MM)		20% bc-rms (MM)	
45% bc-rms (DM)		35% bc-rms (DM)		25% bc-rms (DM)	
Verification method		Primarily comparisons with SYNOP but complemented with consistency checks against MODIS and Cloudsat/CALIPSO datasets - possibly complemented with comparison to ARM site data and IPY observations			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness	
Arctic	(15 km) ²			2 month	

CM-14		Cloud Top		CTO_SEVIRI	
Type		Product			
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Contains: Daily Mean, Monthly Mean and Monthly Mean Diurnal Cycle for: Cloud Top Temperature (CTT) Cloud Top Height (CTH) Cloud Top Pressure (CTP)			
Comments		The Accuracy is defined as the Mean error and precision is defined as the Bias-corrected RMS error.			
Generation frequency		1 day, 1 month			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
CTH: 1200 m (bias), 3000 m (bc-rms) CTP: 90 hPa (bias), 120 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units		CTH: 800 m (bias), 1500 m (bc-rms) CTP: 45 hPa (bias), 70 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units		CTH: 500 m (bias), 1000 m (bc-rms) CTP: 30 hPa (bias), 50 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units	
Verification method		Comparisons to MODIS data (results computed as areal means over the studied area)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution		Timeliness
Meteosat disk	(15 km) ²				2 month

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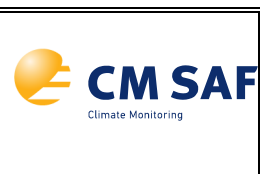
CM-15		Cloud Top		CTO_AVHRR_Europe	
Type		Product			
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Contains: Daily Mean and Monthly Mean for: Cloud Top Temperature (CTT) Cloud Top Height (CTH) Cloud Top Pressure (CTP)			
Comments					
Generation frequency		1 day, 1 month			
Input satellite data		AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
CTH: 1500 m (bias), 3000 m (bc-rms) CTP: 120 hPa (bias), 140 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units		CTH: 1000 m (bias), 1500 m (bc-rms) CTP: 80 hPa (bias), 100 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units		CTH: 800 m (bias), 3000 m (bc-rms) CTP: 50 hPa (bias), 70 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units	
Verification method		Comparisons to MODIS data (results computed as areal means over the studied area)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness		
Europe	(15 km) ²		2 month		

CM-16		Cloud Top		CTO_AVHRR_Arctic			
Type		Product					
Applications and users		* Climate Research * NMHSs					
Characteristics and Methods		Contains: Daily Mean and Monthly Mean for: Cloud Top Temperature (CTT) Cloud Top Height (CTH) Cloud Top Pressure (CTP)					
Comments		The Accuracy is defined as the Mean error and precision is defined as the Bias-corrected RMS error.					
Generation frequency		1 day, 1 month					
Input satellite data		AVHRR					
Dissemination							
Format		Means		Type			
HDF5		FTP, CD-ROM		offline			
Accuracy							
Threshold		Target		Optimal			
CTH: 1800 m (bias), 4000 m (bc-rms) CTP: 150 hPa (bias), 160 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units		CTH: 1200 m (bias), 2000 m (bc-rms) CTP: 110 hPa (bias), 130 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units		CTH: 1000 m (bias), 1500 m (bc-rms) CTP: 80 hPa (bias), 100 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units			
Verification method		Comparisons to MODIS data (results computed as areal means over the studied area)					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
Arctic		(15 km) ²				2 month	

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CM-33		Cloud Optical Thickness		COT_AVHRR_Europe	
Type		Product			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Daily Mean Monthly Mean			
Comments		The bias and rms are defined for the baseline area as relative difference to the comparative datasets.			
Generation frequency		1 day, 1 month			
Input satellite data		AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
bias: 40% rms: 70%		bias: 20% rms: 40%		bias: 10% rms: 30%	
Verification method		Comparisons to MODIS data.			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness	
Europe	(15 km) ²			2 month	

CM-37		Cloud Phase		CPH_AVHRR_Europe
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Daily Mean Monthly Mean		
Comments		The bias and rms are defined for the baseline area as absolute difference (of water cloud fraction) to the comparative datasets.		
Generation frequency		1 day, 1 month		
Input satellite data		AVHRR		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM		offline
Accuracy				
Threshold		Target		Optimal
bias: 0.1 rms: 0.2		bias: 0.05 rms: 0.1		bias: 0.02 rms: 0.05
Verification method		Comparisons to MODIS data.		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness	
Europe	(15 km) ²		2 month	

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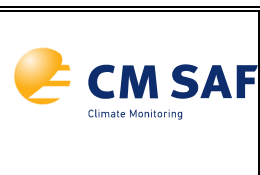
CM-42		Liquid Water Path		LWP_AVHRR_Europe	
Type		Product			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Daily Mean Monthly Mean			
Comments		The bias and rms are defined for the baseline area as relative difference to the comparative datasets.			
Generation frequency		1 day, 1 month			
Input satellite data		AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
bias: 40% rms: 70%		bias: 20% rms: 40%		bias: 10% rms: 30%	
Verification method		Comparisons to MODIS data			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness	
Europe	(15 km) ²			2 month	

CM-49		Surface incoming shortwave radiation		SIS_SEVIRI
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector		
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle		
Comments				
Generation frequency		1 day, 1 month		
Input satellite data		SEVIRI/GERB		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ² 25 W/m ² daily mean		10 W/m ² 20 W/m ² daily mean		8 W/m ² 15 W/m ² daily mean
Verification method		comparison with in-situ measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk	(15 km) ²			2 month

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CM-50		Surface incoming shortwave radiation		SIS_AVHRR_Europe	
Type		Product			
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Daily Mean Monthly Mean			
Comments		Due to the lower resolution in space-time, the daily means have a lower accuracy than the MSG based product			
Generation frequency		1 day, 1 month			
Input satellite data		AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
15 W/m ² 30 W/m ² daily mean		10 W/m ² 25 W/m ² daily mean		8 W/m ² 20 W/m ² daily mean	
Verification method		comparison with in-situ measurements			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness	
Europe	(15 km) ²			2 month	

CM-57		Surface Albedo		SAL_AVHRR_Europe
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Weekly Mean Monthly Mean		
Comments				
Generation frequency		1 week, 1 month		
Input satellite data		AVHRR		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM		offline
Accuracy				
Threshold		Target		Optimal
50% (relative)		25% (relative)		20% (relative)
Verification method		continuous validation at mast measurement sites & field campaigns		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness	
Europe	(15 km) ²		2 month	

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CM-59		Surface Albedo		SAL_AVHRR_Arctic
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Weekly Mean Monthly Mean		
Comments				
Generation frequency		1 week, 1 month		
Input satellite data		AVHRR		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM		offline
Accuracy				
Threshold		Target		Optimal
50% (relative)		25% (relative)		20% (relative)
Verification method		continuous validation at mast measurement sites & field campaigns		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness
Arctic	(15 km) ²			2 month

CM-104		Direct Irradiance at Surface		SID_SEVIRI
Type		Product		
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector		
Characteristics and Methods		Daily Mean Monthly Mean		
Comments				
Generation frequency		1 day, 1 month		
Input satellite data		SEVIRI		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM		offline
Accuracy				
Threshold		Target		Optimal
20 W/m ² 30 W/m ² daily mean		15 W/m ² 25 W/m ² daily mean		12 W/m ² 20 W/m ² daily mean
Verification method		comparison with in -situ measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk	(15 km) ²			2 month

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CM-114 MSG TOA Reflected solar Radiative Flux EDR			TRS
Type	Off-line Product		
Applications and users	* Climate Research * NMHSs		
Characteristics and Methods	daily mean, monthly mean, monthly mean diurnal cycle		
Comments	The accuracy for development targets is given as the RMS error.		
Generation frequency	1 day, 1 month		
Traceability of Requirements			
Input satellite data	SEVIRI, GERB, CERES		
Dissemination			
Format	Means	Type	
HDF5	FTP, CD-ROM,	offline	
Accuracy			
Threshold	Target	Optimal	
0.76 - 1.24 in ratio	0.88 - 1.12 in ratio	0.9 - 1.1 in ratio	
Verification method	Comparison to CERES, evaluated is the ratio of GERB/CERES. For data of Meteosat 8 comparison to GERB-like is used in the same fashion. Compared are temporal slots between 11 and 12 UTC only.		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk + Arctic	(45 km) ²	n/a	4 months

CM-116 MSG TOA Emitted Thermal Radiative Flux EDR		TET	
Type	Off-line Product		
Applications and users	* Climate Research * NMHSs		
Characteristics and Methods	daily mean, monthly mean, monthly mean diurnal cycle		
Comments	The accuracy for development targets is given as the RMS error.		
Generation frequency	1 day, 1 month		
Traceability of Requirements			
Input satellite data	SEVIRI, GERB, CERES		
Dissemination			
Format	Means	Type	
HDF5	FTP, CD-ROM	offline	
Accuracy			
Threshold	Target	Optimal	
0.88 - 1.12 in ratio	0.94 - 1.06 in ratio	0.96 - 1.04 in ratio	
Verification method	Comparison to CERES, evaluated is the ratio of GERB/CERES. For data of Meteosat 8 comparison to GERB-like is used in the same fashion. Compared are temporal slots between 11 and 12 UTC only.		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk + Arctic	(45 km) ²	n/a	4 months

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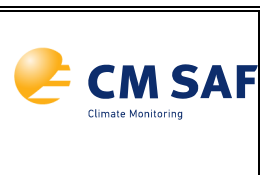
CM-122 ATOVS Vertically Integrated Water Vapour EDR		HTW_ATOVS_global	
Type	Off-line Product		
Applications and users	* NMHSs		
Characteristics and Methods	Daily, monthly means		
Comments	Replacement of retrieval scheme will be decided in the course of CDOP2 also considering user requests.		
Generation frequency	1 month		
Traceability of Requirements			
Input satellite data	ATOVS		
Dissemination			
Format	Means	Type	
HDF5	FTP, CD-ROM	offline	
Accuracy			
Threshold	Target	Optimal	
2 kg/m ² bias 5 kg/m ² rms	1.5 kg/m ² bias 3 kg/m ² rms	0.5 kg/m ² bias 1 kg/m ² rms	
Verification method	GUAN radiosondes		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Global	(90 km) ²	n/a	2 months

CM-131 ATOVS Layered Water Vapour and Temperature EDR				HLW_ATOVS_global	
Type		Off-line Product			
Applications and users		* Climate Research & * NMHSs			
Characteristics and Methods		Daily, monthly means, 5 layers			
Comments					
Generation frequency		1 month			
Traceability of Requirements					
Input satellite data		ATOVS			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
Temperature [K]			Temperature [K]		
layer	bias	rms	layer	bias	rms
1	1.5	3.0	1	0.5	2.0
2	1.0	3.0	2	0.5	2.0
3	1.0	3.0	3	0.5	2.0
4	1.0	3.0	4	0.5	2.0
5	1.0	3.0	5	0.5	2.0
Humidity [mm]			Humidity [mm]		
layer	bias	rms	layer	bias	rms
1	0.02	0.1	1	0.01	0.05
2	0.2	0.75	2	0.10	0.50
3	0.25	2	3	0.10	1.30
4	1.0	2.5	4	0.40	1.50
5	1.0	3.0	5	0.40	2.00
Temperature [K]			Temperature [K]		
layer	bias	rms	layer	bias	rms
1	0.2	1.0	1	0.2	1.0
2	0.2	1.0	2	0.2	1.0
3	0.2	1.0	3	0.2	1.0
4	0.2	1.0	4	0.2	1.0
5	0.2	1.0	5	0.2	1.0
Humidity [mm]			Humidity [mm]		
layer	bias	rms	layer	bias	rms
1	0.005	0.02	1	0.005	0.02
2	0.05	0.25	2	0.05	0.25
3	0.05	0.5	3	0.05	0.5
4	0.2	1.00	4	0.2	1.00
5	0.2	1.00	5	0.2	1.00
Verification method		GUAN radiosondes			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution		Timeliness
Global	(90 km) ²		n/a		2 months

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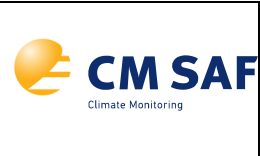
CM-137 ATOVS Specific Humidity and Temperature at Pressure Levels EDR			HSH_ATOVS_global																																																																																																																																																		
Type		Off-line Product																																																																																																																																																			
Applications and users		* Climate Research & NMHSs																																																																																																																																																			
Characteristics and Methods		Daily, monthly means, 6 layers																																																																																																																																																			
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<table><tr><th colspan="3">Temperature [K]</th></tr><tr><td>level</td><td>bias</td><td>rms</td></tr><tr><td>1</td><td>1.5</td><td>3.0</td></tr><tr><td>2</td><td>1.25</td><td>3.0</td></tr><tr><td>3</td><td>0.75</td><td>3.0</td></tr><tr><td>4</td><td>0.5</td><td>3.0</td></tr><tr><td>5</td><td>0.5</td><td>3.0</td></tr><tr><td>6</td><td>0.5</td><td>3.0</td></tr><tr><th colspan="3">Humidity [g/kg]</th></tr><tr><td>level</td><td>bias</td><td>rms</td></tr><tr><td>1</td><td>0.02</td><td>0.08</td></tr><tr><td>2</td><td>0.03</td><td>0.5</td></tr><tr><td>3</td><td>0.2</td><td>1.5</td></tr><tr><td>4</td><td>0.3</td><td>1.75</td></tr><tr><td>5</td><td>0.75</td><td>2.0</td></tr><tr><td>6</td><td>1.0</td><td>2.25</td></tr></table>		Temperature [K]			level	bias	rms	1	1.5	3.0	2	1.25	3.0	3	0.75	3.0	4	0.5	3.0	5	0.5	3.0	6	0.5	3.0	Humidity [g/kg]			level	bias	rms	1	0.02	0.08	2	0.03	0.5	3	0.2	1.5	4	0.3	1.75	5	0.75	2.0	6	1.0	2.25	<table><tr><th colspan="3">Temperature [K]</th></tr><tr><td>level</td><td>bias</td><td>rms</td></tr><tr><td>1</td><td>0.5</td><td>2.0</td></tr><tr><td>2</td><td>0.5</td><td>2.0</td></tr><tr><td>3</td><td>0.3</td><td>2.0</td></tr><tr><td>4</td><td>0.2</td><td>2.0</td></tr><tr><td>5</td><td>0.2</td><td>2.0</td></tr><tr><td>6</td><td>0.2</td><td>2.0</td></tr><tr><th colspan="3">Humidity [g/kg]</th></tr><tr><td>level</td><td>bias</td><td>rms</td></tr><tr><td>1</td><td>0.01</td><td>0.03</td></tr><tr><td>2</td><td>0.01</td><td>0.15</td></tr><tr><td>3</td><td>0.05</td><td>0.75</td></tr><tr><td>4</td><td>0.10</td><td>1.25</td></tr><tr><td>5</td><td>0.20</td><td>1.5</td></tr><tr><td>6</td><td>0.20</td><td>1.5</td></tr></table>		Temperature [K]			level	bias	rms	1	0.5	2.0	2	0.5	2.0	3	0.3	2.0	4	0.2	2.0	5	0.2	2.0	6	0.2	2.0	Humidity [g/kg]			level	bias	rms	1	0.01	0.03	2	0.01	0.15	3	0.05	0.75	4	0.10	1.25	5	0.20	1.5	6	0.20	1.5	<table><tr><th colspan="3">Temperature [K]</th></tr><tr><td>level</td><td>bias</td><td>rms</td></tr><tr><td>1</td><td>0.1</td><td>1.0</td></tr><tr><td>2</td><td>0.1</td><td>1.0</td></tr><tr><td>3</td><td>0.1</td><td>1.0</td></tr><tr><td>4</td><td>0.1</td><td>1.0</td></tr><tr><td>5</td><td>0.1</td><td>1.0</td></tr><tr><td>6</td><td>0.1</td><td>1.0</td></tr><tr><th colspan="3">Humidity [g/kg]</th></tr><tr><td>level</td><td>bias</td><td>rms</td></tr><tr><td>1</td><td>0.001</td><td>0.01</td></tr><tr><td>2</td><td>0.005</td><td>0.05</td></tr><tr><td>3</td><td>0.03</td><td>0.1</td></tr><tr><td>4</td><td>0.07</td><td>0.1</td></tr><tr><td>5</td><td>0.15</td><td>0.5</td></tr><tr><td>6</td><td>0.20</td><td>0.5</td></tr></table>		Temperature [K]			level	bias	rms	1	0.1	1.0	2	0.1	1.0	3	0.1	1.0	4	0.1	1.0	5	0.1	1.0	6	0.1	1.0	Humidity [g/kg]			level	bias	rms	1	0.001	0.01	2	0.005	0.05	3	0.03	0.1	4	0.07	0.1	5	0.15	0.5	6	0.20	0.5
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Spatial coverage	Spatial resolution		Vertical resolution	Timeliness																																																																																																																																																	
Global	(90 km) ²		n/a	2 months																																																																																																																																																	

CM-5010		SEVIRI Fractional Cloud Cover EDR		CFC_SEVIRI	
Type		Off-line Product			
Applications and users		* NMHSs * Government Agencies * Private Sector * Public Sector			
Characteristics and Methods		daily mean, monthly mean, monthly mean diurnal cycle			
Comments		This product will supersede CM-02			
Generation frequency		1 day, 1 month			
Traceability of Requirements					
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
20%	bias	10%	bias	10%	bias
40%	bc-rms (MM)	20%	bc-rms (MM)	15%	bc-rms (MM)
45%	bc-rms (DM)	25%	bc-rms (DM)	20%	bc-rms (DM)
Verification method		comparisons to SYNOP data (results computed as areal means over the studied area)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness		
Meteosat disk	(15 km) ²	n/a	5 days for daily means 5 days after the month for monthly means		

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CM-5030 SEVIRI Cloud Top Level EDR			CTO_SEVIRI
Type	Off-line Product		
Applications and users	NMHSs, Government Agencies, Private Sector, Public Sector		
Characteristics and Methods	daily mean, monthly mean, monthly mean diurnal cycle		
Comments	The Accuracy is defined as the Mean error and precision is defined as the Bias-corrected RMS error. This product will supersede CM-14		
Generation frequency	1 day, 1 month		
Traceability of Requirements			
Input satellite data	SEVIRI		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, WEB	offline	
Accuracy			
Threshold	Target	Optimal	
CTH: 1200 m (bias), 3000 m (bc-rms) CTP: 90 hPa (bias), 120 hPa (bc-rms) CTT: no specific requirement	CTH: 800 m (bias), 1500 m (bc-rms) CTP: 45 hPa (bias), 70 hPa (bc-rms) CTT: no specific requirement	CTH: 500 m (bias), 1000 m (bc-rms) CTP: 30 hPa (bias), 50 hPa (bc-rms) CTT: no specific requirement	
Verification method	comparisons to MODIS data (results computed as areal means over the studied area)		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk	(15 km) ²	n/a	5 days for daily means 5 days after the month for monthly means

CM-5210		SEVIRI Surface Incoming Shortwave Radiation EDR		SIS_SEVIRI
Type		Off-line Product		
Applications and users		* Climate Research * NMHSs, Government Agencies * Private Sector, Public Sector		
Characteristics and Methods		daily mean, monthly mean,		
Record length / Period		N/A		
Comments		This product will supersede CM-49		
Generation frequency		1 day, 1 month		
Traceability of Requirements				
Input satellite data		SEVIRI/GERB		
Dissemination				
Format		Means	Type	
Netcdf CF		FTP, WEB	offline	
Accuracy				
Threshold		Target	Optimal	
15 W/m ² 25 W/m ² daily mean		10 W/m ² 20 W/m ² daily mean	8 W/m ² 15 W/m ² daily mean	
Verification method		comparison with in-situ measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness	
Meteosat disk	(15 km) ²	n/a	5 days for daily means 5 days after the month for monthly means	

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CM-5230	SEVIRI Direct Irradiance at Surface EDR		SID_SEVIRI
Type	Off-line Product		
Applications and users	* NMHSs * Government Agencies * Private Sector * Public Sector		
Characteristics and Methods	daily means, monthly mean		
Comments	This product will supersede CM-104		
Generation frequency	1 day, 1 month		
Traceability of Requirements			
Input satellite data	SEVIRI		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, CD-ROM	offline	
Accuracy			
Threshold	Target	Optimal	
20 W/m ² 30 W/m ² daily mean	15 W/m ² 25 W/m ² daily mean	12 W/m ² 20 W/m ² daily mean	
Verification method	comparison with in-situ measurements		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk	(15 km) ²	n/a	5 days for daily means 5 days after the month for monthly means

CM-6010	AVHRR GAC Fractional Cloud Cover EDR		CFC_AVHRR_Global
Type	Off-line Product		
Applications and users	* NMHSs * Government Agencies, Private & public sector		
Characteristics and Methods	daily mean, monthly mean		
Comments	This product will supersede CM-03 and CM-04.		
Generation frequency	1 day, 1 month		
Traceability of Requirements			
Input satellite data	AVHRR-GAC		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, WEB	offline	
Accuracy			
Threshold	Target	Optimal	
Global: 20% bias 40% bc-rms (MM) 45% bc-rms (DM) Arctic: 30% bias 40% bc-rms (MM) 45% bc-rms (DM)	Global: 10% bias 20% bc-rms (MM) 25% bc-rms (DM) Arctic: 20% bias 30% bc-rms (MM) 35% bc-rms (DM)	Global: 10% bias 15% bc-rms (MM) 20% bc-rms (DM) Arctic: 15% bias 20% bc-rms (MM) 25% bc-rms (DM)	
Verification method	comparisons to MODIS data (results computed as areal means over the studied area)		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Global	(0.25) ² level3	n/a	5 days for daily means 5 days after the month for monthly means

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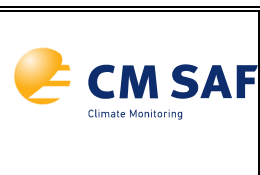
CM-6030		AVHRR GAC Cloud Top Level EDR		CTO_AVHRR_Global	
Type		Off-line Product			
Applications and users		* NMHSs & Government Agencies * Private Sector & Public Sector			
Characteristics and Methods		daily mean, monthly mean			
Comments		No specific requirement for CTT is set as it represents same information in different units. This product will supersede CM-15 and CM-16.			
Generation frequency		1 day, 1 month			
Requirements					
Input satellite data		AVHRR-GAC			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
Global: CTH: 1500 m (bias), 3000 m (bc-rms) CTP: 120 hPa (bias), 140 hPa (bc-rms) Arctic: CTH: 1800 m (bias), 4000 m (bc-rms) CTP: 150 hPa (bias), 160 hPa (bc-rms)		Global: CTH: 1000 m (bias), 1500 m (bc-rms) CTP: 80 hPa (bias), 100 hPa (bc-rms) Arctic: CTH: 1200 m (bias), 2000 m (bc-rms) CTP: 110 hPa (bias), 130 hPa (bc-rms)		Global: CTH: 800 m (bias), 3000 m (bc-rms) CTP: 50 hPa (bias), 70 hPa (bc-rms) Arctic: CTH: 1000 m (bias), 1500 m (bc-rms) CTP: 80 hPa (bias), 100 hPa (bc-rms)	
Verification method		comparisons to MODIS data (results computed as areal means over the studied area)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Global	(0.25) ² Level 3		n/a	5 days for daily means 5 days after the month for monthly means	

CM-6040		AVHRR GAC Cloud Phase EDR		CPH_AVHRR_Global	
Type		Off-line Product			
Applications and users		* Climate Research * NMHSs * Government Agencies			
Characteristics and Methods		daily mean, monthly mean			
Comments		The bias and rms are defined as absolute difference (of water cloud fraction) to the comparative datasets. This product will supersede CM-37.			
Generation frequency		1 day, 1 month			
Traceability of Requirements					
Input satellite data		AVHRR-GAC			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
bias: 0.1 rms: 0.2		bias: 0.05 rms: 0.1		bias: 0.03 rms: 0.05	
Verification method		comparisons to MODIS data			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Global	(0.25) ² level3		n/a	5 days for daily means 5 days after the month for monthly means	

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CM-6050		AVHRR GAC Liquid Water Path EDR		LWP_AVHRR_Global	
Type		Off-line Product			
Applications and users		* Climate Research * NMHSs & Government Agencies			
Characteristics and Methods		daily & monthly mean			
Comments		The bias and rms are defined as relative difference to the comparative datasets. This product will supersede CM-42. As additional data layers COT (CM-33) and REFF will be integrated into this product.			
Generation frequency		1 day, 1 month			
Traceability of Requirements					
Input satellite data		AVHRR-GAC			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
bias: 25% rms: 50%		bias: 10% rms: 25%		bias: 5% rms: 10%	
Verification method		comparisons to MODIS data			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Global	(0.25) ² level3		n/a	5 days for daily means 5 days after the month for monthly means	

CM-6060		AVHRR GAC Ice Water Path EDR		IWP_AVHRR_Global	
Type		Off-line Product			
Applications and users		* NMHSs * Government Agencies			
Characteristics and Methods		daily mean, monthly mean			
Comments					
Generation frequency		1 day, 1 month			
Traceability of Requirements					
Input satellite data		AVHRR-GAC			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
bias: 40% rms: 70%		bias: 25% rms: 50%		bias: 10% rms: 25%	
Verification method		• comparison with MODIS • comparison with Cloudsat/Calipso			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Global	(0.25) ² level3		n/a	5 days for daily means 5 days after the month for monthly means	

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CM-6210		AVHRR GAC Surface Incoming Shortwave Radiation EDR		SIS_AVHRR_Global	
Type		Off-line Product			
Applications and users		* NMHSs * Government Agencies * Private Sector * Public Sector			
Characteristics and Methods		daily mean, monthly mean			
Comments		This product will supersede CM-50.			
Generation frequency		1 day, 1 month			
Traceability of Requirements					
Input satellite data		AVHRR-GAC			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
15 W/m ² 30 W/m ² daily mean		10 W/m ² 25 W/m ² daily mean		8 W/m ² 20 W/m ² daily mean	
Verification method		comparison with in-situ measurements			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Global	(0.25) ²		n/a	5 days for daily means 5 days after the month for monthly means	

CM-6220		AVHRR GAC Surface Albedo EDR		SAL_AVHRR_Global	
Type		Off-line Product			
Applications and users		* NMHSs * Government Agencies			
Characteristics and Methods		weekly mean, monthly mean			
Comments		For polar areas products will be provided in EASE-grid. This product will supersede CM-57 and CM-59.			
Generation frequency		1 day, 1 month			
Traceability of Requirements					
Input satellite data		AVHRR-GAC			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
50 % (relative) (defined for flat land and for 90% of cases)		25 % (relative) (defined for flat land and for 90% of cases)		5 % relative or 0.005 absolute	
Verification method		continuous validation at mast measurement sites & field campaigns			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness		
Global	(0.25) ²	n/a	5 days after the week for weekly mean 5 days after the month for monthly means		


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8. Product Requirements for CM SAF data sets

This Section provides the entries of the product requirements for CM SAF data sets.


CM-05		Fractional Cloud Cover	CFC_AVHRR_global_DS
Type		Data set	
Applications and users		Climate Research, NMHSs & Government agencies, Private Sector & Public Sector	
Characteristics and Methods		Daily Mean, Monthly Mean	
Comments		Time series from 1982-2009. The accuracy is defined as the mean error (i.e., defined in % cloud amount units) and precision is defined as the bias-corrected RMS error.	
Generation frequency		N/A	
Input satellite data		AVHRR_GAC	
Dissemination			
Format	Means		Type
netcdf CF	FTP		offline
Accuracy			
Threshold		Target	Optimal
20%, 40% bias (mm, dm), 40%, 30% bc-rms (mm, dm)		10%, 15% bias (mm, dm); 20% bc-rms (mm, dm)	10% bias (mm, dm) 15% bc-rms (mm, dm)
Verification method		Comparisons with SYNOP, complemented with comparisons with MODIS, Cloudsat/CALIPSO	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Global	(0.25) ²	n/a	N/A

CM-06		Fractional Cloud Cover	CFC_SEVIRI_disk_DS
Type		Data set	
Applications and users		Climate Research, NMHSs, Government agencies, Private & Public Sector	
Characteristics and Methods		Level 2 hourly, Daily & Monthly Mean, Monthly Mean Diurnal Cycle	
Comments		Time series from 2004-2009 The accuracy is defined as the mean error (i.e., defined in % cloud amount units) and precision is defined as the bias-corrected RMS error.	
Generation frequency		N/A	
Input satellite data		SEVIRI	
Dissemination			
Format		Means	Type
netcdf CF (Level 3) hdf5 (level 2)		FTP	offline
Accuracy			
Threshold		Target	Optimal
20% bias		10% bias	10% bias
40% bc-rms (MM)		20% bc-rms (MM)	15% bc-rms (MM)
30% bias		15% bias	10% bias
40% bc-rms (DM)		20% bc-rms (DM)	15% bc-rms (DM)
Verification method		Primarily comparisons with SYNOP but complemented with consistency checks against MODIS and Cloudsat/CALIPSO datasets	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk	Pixel resolution. level 2 (0.05) ² level 3 (0.25) ² diurnal cycle	n/a	N/A

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CM-11		Joint Cloud Histograms		JCH_AVHRR_global_DS	
Type		Dataset			
Applications and users		* Climate Research			
Characteristics and Methods		Monthly histograms of Cloud top pressure and cloud optical depth. This product is a combination of COT (CM-34), CPH (CM-38) and CTO (CM-17) and depends on the accuracy of these products.			
Comments		Time series from 1982-2009.			
Generation frequency		N/A			
Input satellite data		CTO (CM-17), COT (CM-34), CPH (CM-38)			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
n/a		n/a		n/a	
Verification method					
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Global	(1°) ²		n/a	N/A	

CM-12		Joint Cloud Histograms		JCH_SEVIRI_disk_DS	
Type		Dataset			
Applications and users		* Climate Research			
Characteristics and Methods		Monthly histograms of Cloud top pressure and cloud optical depth This product is a combination of COT (CM-35), CPH (CM-39) and CTO (CM-18) and depends on the accuracy of these products.			
Comments		Time series from 2004-2009			
Generation frequency		N/A			
Input satellite data		CTO (CM-18), CPH (CM-39), COT (CM-35)			
Dissemination					
Format		Means		Type	
netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
N/a		N/a		N/a	
Verification method					
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk <72° satellite zenith angle	(0.25°) ²		n/a	N/A	

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CM-17 Cloud Top CTO_AVHRR_global_DS	
Type	Dataset
Applications and users	<ul style="list-style-type: none"> * Climate Research * NMHSs * Government agencies * Private Sector * Public Sector
Characteristics and Methods	Daily Mean and Monthly Mean for: Cloud Top Temperature (CTT) Cloud Top Height (CTH) Cloud Top Pressure (CTP)
Comments	Time series from 1982-2009. The Accuracy is defined as the Mean error and precision is defined as the Bias-corrected RMS error.
Generation frequency	N/A
Input satellite data	AVHRR_GAC
Dissemination	
Format	Means
netcdf CF	FTP
Accuracy	
Threshold	Target
CTH: 1800 m (bias), 4000 m (bc-rms) CTP: 150 hPa (bias), 160 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units	CTH: 1200 m (bias), 2000 m (bc-rms) CTP: 110 hPa (bias), 130 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units
Optimal	
CTH: 1000 m (bias), 1500 m (bc-rms) CTP: 80 hPa (bias), 100 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units	
Verification method	
Coverage, resolution and timeliness	
Spatial coverage	Spatial resolution
Global	(0.25) ²
Vertical resolution	Timeliness
n/a	N/A

CM-18 Cloud Top CTO_SEVIRI_DS	
Type	Dataset
Applications and users	* Climate Research, NMHSs, Government agencies, Private & Public Sector
Characteristics and Methods	Contains: Level2 hourly, Daily Mean, Monthly Mean and Monthly Mean Diurnal Cycle for: Cloud Top Temperature (CTT), Cloud Top Height (CTH), Cloud Top Pressure (CTP)
Comments	Time series from 2004-2009. The Accuracy is defined as the Mean error and precision is defined as the Bias-corrected RMS error.
Input satellite data	SEVIRI
Dissemination	
Format	Means
netcdf CF (Level 3) hdf5 (level 2)	FTP
Accuracy	
Threshold	Target
CTH: 1200 m (bias), 3000 m (bc-rms) CTP: 90 hPa (bias), 120 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units	CTH: 800 m (bias), 1500 m (bc-rms) CTP: 45 hPa (bias), 70 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units
Optimal	
CTH: 500 m (bias), 1000 m (bc-rms) CTP: 30 hPa (bias), 50 hPa (bc-rms) CTT: no specific requirement as it represents same information in different units	
Verification method	Validation against Cloudnet, Cloudsat/Calipso; comparison against MODIS
Coverage, resolution and timeliness	
Spatial coverage	Spatial resolution
Meteosat disk	Pixel resolution. level 2 (0.05) ² level 3 (0.25) ² diurnal cycle
Vertical resolution	Timeliness
	N/A

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CM-34		Cloud Optical Thickness		COT_AVHRR_global_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Daily Mean Monthly Mean			
Comments		Time series from 1982-2009. Bias and rms are defined for the globe; regionally larger differences may occur.			
Generation frequency		N/A			
Input satellite data		AVHRR_GAC			
Dissemination					
Format		Means		Type	
netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
20% decadal stab. bias: 30% rms: 50%		10% decadal stability bias: 15% rms: 30%		2% decadal stability bias: 5% rms: 10%	
Verification method		<ul style="list-style-type: none">• Comparison with MODIS (2000-2009)• Comparison with PATMOS-x• Comparison with ISCCP• Comparison with Cloudsat/Calipso (2007-2009)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness	
Global	(0.25°) ²	n/a		N/A	

CM-35		Cloud Optical Thickness		COT_SEVIRI_disk_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Level 2 hourly Daily Mean Monthly Mean Monthly Mean Diurnal Cycle			
Comments		Time series from 2004-2009. Bias and rms are defined for the Meteosat disk; regionally larger differences may occur.			
Generation frequency		N/A			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
netcdf CF (Level 3) hdf5 (level 2)		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
bias: 25% rms: 50%		bias: 10% rms: 25%		bias: 5% rms: 10%	
Verification method		Comparison with MODIS Comparison with Cloudsat/Calipso (2007-2009)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk <72° satellite zenith angle	Pixel resolution. level 2 (0.05) ² level 3 (0.25) ² diurnal cycle		n/a	N/A	

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CM-38		Cloud Phase		CPH_AVHRR_global_DS			
Type		Dataset					
Applications and users		* Climate Research * NMHSs * Government agencies					
Characteristics and Methods		Daily Mean Monthly Mean					
Comments		Time series from 1982-2009. Bias and rms are defined for the globe; regionally larger differences may occur.					
Generation frequency		N/A					
Input satellite data		AVHRR_GAC					
Dissemination							
Format		Means		Type			
netcdf CF		FTP		offline			
Accuracy							
Threshold		Target		Optimal			
0.08 decadal stab. bias: 0.1 rms: 0.2		0.03 decadal stability bias: 0.05 rms: 0.1		0.01 decadal stability bias: 0.03 rms: 0.05			
Verification method		• Comparison with MODIS (2000-2009) • Comparison with PATMOS-x • Comparison with ISCCP • Comparison with Cloudsat/Calipso (2007-2009)					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
Global		(0.25°)²		n/a		N/A	

CM-39		Cloud Phase		CPH_SEVIRI_disk_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		level 2 hourly Daily Mean Monthly Mean Monthly Mean Diurnal Cycle			
Comments		Time series from 2004-2009. Bias and rms are defined for the Meteosat disk; regionally larger differences may occur.			
Generation frequency		N/A			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
netcdf CF (Level 3) hdf5 (level 2)		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
bias: 0.1 rms: 0.2		bias: 0.05 rms: 0.1		bias: 0.03 rms: 0.05	
Verification method		• Comparison with MODIS • Comparison with Cloudsat/Calipso (2007-2009)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk <72° satellite zenith angle	Pixel resolution. level 2 (0.05)² level 3 (0.25)² diurnal cycle		n/a	N/A	

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CM-43		Liquid Water Path	LWP_AVHRR_global_DS
Type		Dataset	
Applications and users		* Climate Research * NMHSs * Government agencies	
Characteristics and Methods		Daily Mean Monthly Mean	
Comments		Time series from 1982-2009. Bias and rms are defined for the globe; regionally larger differences may occur.	
Generation frequency		N/A	
Input satellite data		AVHRR_GAC	
Dissemination			
Format		Means	Type
netcdf CF		FTP	offline
Accuracy			
Threshold		Target	Optimal
20% decadal stab. bias: 30% rms: 50%		10% decadal stability bias: 15% rms: 30%	2% decadal stability bias: 5% rms: 10%
Verification method		<ul style="list-style-type: none">• Comparison with satellite MWR retrieved LWP over ocean (e.g. LWP_HOAPS).• Comparison with MODIS (2000-2009).• Comparison with PATMOS-x• Comparison with ISCCP	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Global	(0.25°) ²	n/a	N/A

CM-44		Liquid Water Path	LWP_SEVIRI_disk_DS
Type	Dataset		
Applications and users	* Climate Research * NMHSs * Government agencies		
Characteristics and Methods	Level 2 hourly Daily Mean Monthly Mean Monthly Mean Diurnal Cycle		
Comments	Time series from 2004-2009. Bias and rms are defined for the Meteosat disk; regionally larger differences may occur.		
Generation frequency	N/A		
Input satellite data	SEVIRI		
Dissemination			
Format	Means	Type	
netcdf CF (Level 3) hdf5 (level 2)	FTP	offline	
Accuracy			
Threshold	Target	Optimal	
bias: 25% rms: 50%	bias: 10% rms: 25%	bias: 5% rms: 10%	
Verification method	• Comparison with satellite MWR retrieved LWP over ocean (e.g. LWP_HOAPS). • Comparison with MODIS.		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk <72° satellite zenith angle	Pixel resolution. level 2 (0.05)² level 3 (0.25)² diurnal cycle		N/A

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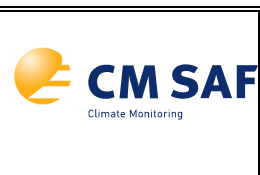
CM-45		Liquid Water Path		LWP_HOAPS			
Type		Dataset					
Applications and users		* Climate Research * NMHSs * Government agencies					
Characteristics and Methods		Equal angle grid: Spatial resolution: 0.5° Temporal resolution: 6-hour composite, monthly mean Retrieval based on NWP SAF 1D-Var with extensions from DFG/MiKlip/DFG Project					
Comments		Target time series covers 1987-2014. Accuracy numbers are given for global mean values. Regional larger deviations may occur.					
Traceability		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014					
Generation frequency		N/A					
Input satellite data		CM-12002 (SSMI/SSMIS FCDR R3)					
Dissemination							
Format		Means		Type			
NetCDF4 CF		FTP, CD-ROM		offline			
Accuracy							
Threshold		Target		Optimal			
decadal stability: 10 g/m ² bias: 25 g/m ² rms: 50 g/m ²		decadal stability: 5 g/m ² bias: 10 g/m ² rms: 25 g/m ²		decadal stability: 2 g/m ² bias: 5 g/m ² rms: 10 g/m ²			
Verification method		Comparison to LWP_SEVIRI and LWP_AVHRR products Comparison with corresponding MODIS products.					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
Global ice free ocean		0.5°				N/A	

CM-46		Ice Water Path		IWP_SEVIRI_disk_ds	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Level2 hourly Daily Mean, Monthly Mean, Monthly Mean Diurnal Cycle The time period covered will be 2004-2009			
Comments		The bias and rms are defined for the Meteosat disk as relative difference to the comparative datasets.			
Generation frequency		N/A			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
netcdf CF (Level 3) hdf5 (level 2)		FTP		Offline	
Accuracy					
Threshold		Target		Optimal	
bias: 40% rms: 70%		bias: 20% rms: 40%		bias: 10% rms: 30%	
Verification method		• Comparison with MODIS • Comparison with Cloudsat/CALIPSO			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	Timeliness
Meteosat disk <72° satellite zenith angle		Pixel resolution. level 2 (0.05)² level 3 (0.25)² diurnal cycle			n/a

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CM-47		Ice Water Path		IWP_AVHRR_Global_DS	
Type		dataset			
Applications and users		Climate Research			
Characteristics and Methods		daily mean, monthly mean The time period covered will be 1982-2009			
Comments		Time series from 1982-2009. Bias and rms are defined for the globe; regionally larger differences may occur.			
Generation frequency		N/A			
Input satellite data		AVHRR GAC			
Dissemination					
Format		Means		Type	
netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
8% decadal stability bias: 40% rms: 70%		5% decadal stability bias: 25% rms: 50%		2% decadal stability bias: 10% rms: 25%	
Verification method		<ul style="list-style-type: none">• comparison with CloudSat• comparison with PATMOS-X• comparison with MODIS• comparison with ISCCP			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Global	(0.25) ²		n/a	n/a	

CM-52		Surface incoming shortwave radiation		SIS_AVHRR_global_DS			
Type		Dataset					
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector					
Characteristics and Methods		Daily Mean Monthly Mean					
Comments		time series from 1989-2009					
Generation frequency		N/A					
Input satellite data		AVHRR_GAC					
Dissemination							
Format		Means		Type			
netcdf CF		FTP		offline			
Accuracy							
Threshold		Target		Optimal			
15 W/m ² 30 W/m ² daily mean		10 W/m ² 25 W/m ² daily mean		8 W/m ² 20 W/m ² daily mean			
Verification method		comparison with in-situ measurements					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
Global		(0.25°) ²		n/a		N/A	

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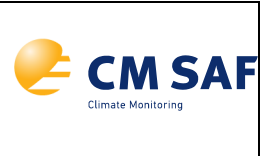
CM-53		Surface incoming shortwave radiation		SIS_SEVIRI_disk_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle			
Comments		time series from 2006-2011			
Generation frequency		N/A			
Input satellite data		SEVIRI/GERB			
Dissemination					
Format		Means		Type	
netcdf CF		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
15 W/m ² 25 W/m ² daily mean		10 W/m ² 20 W/m ² daily mean		8 W/m ² 15 W/m ² daily mean	
Verification method		comparison with in-situ measurements			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	
Timeliness					
Meteosat disk		(0.05°) ²		N/A	

CM-54		Surface incoming shortwave radiation		SIS_MVIRI_disk_DS
Type		Dataset		
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector		
Characteristics and Methods		Instantaneous Monthly Mean, Daily Mean		
Comments		time series from 1983-2005		
Generation frequency		N/A		
Input satellite data		MVIRI		
Dissemination				
Format		Means		Type
netcdf CF		FTP		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ² 25 W/m ² inst. & dm		10 W/m ² 20 W/m ² inst. & dm		8 W/m ² 15 W/m ² inst & dm
Verification method		comparison with in-situ measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk	Regular latitude longitude grid 0.03 x 0.03 degree			N/A

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CM-60		Surface Albedo		SAL_AVHRR_global_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Pentad Mean Monthly Mean			
Comments		time series from 1982-2009			
Generation frequency		N/A			
Input satellite data		AVHRR_GAC			
Dissemination					
Format		Means		Type	
netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
50% (relative)		25% (relative)		20% (relative)	
Verification method		validation at mast measurement sites & field campaigns			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Global	(0.25°) ²		n/a	N/A	

CM-61		Surface Albedo		SAL_SEVIRI_disk_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		pentad Mean Monthly Mean			
Comments		time series from 2004-2009			
Generation frequency		N/A			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
netcdf CF		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
50% (relative)		25% (relative)		20% (relative)	
Verification method		validation at mast measurement sites & field campaigns			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk	(0.05) ²			N/A	

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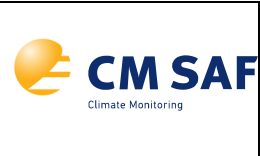
CM-67		Surface Net Shortwave Radiation		SNS_AVHRR_global_DS
Type		Dataset		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Monthly Mean		
Comments		time series from 1989-2009		
Generation frequency		N/A		
Input satellite data		AVHRR_GAC		
Dissemination				
Format		Means		Type
netcdf CF		FTP		offline
Accuracy				
Threshold		Target		Optimal
20 W/m ²		15 W/m ²		12 W/m ²
Verification method		calculated based on accuracy of SAL and SIS		
Coverage, resolution and timeliness				
Spatial coverage		Spatial resolution	Vertical resolution	Timeliness
Global		(0.25°) ²	n/a	N/A

CM-68		Surface Net Shortwave Radiation		SNS_SEVIRI_disk_DS
Type		Dataset		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Monthly Mean		
Comments		time series from 2006-2011		
Generation frequency		N/A		
Input satellite data		SEVIRI/GERB		
Dissemination				
Format		Means		Type
netcdf CF		FTP, CD-ROM		offline
Accuracy				
Threshold		Target		Optimal
20 W/m ²		15 W/m ²		12 W/m ²
Verification method		calculated based on accuracy of SAL and SIS		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness
Meteosat disk	(0.05°) ²			N/A

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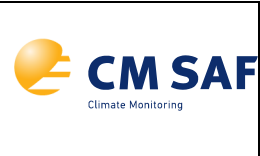
CM-69		Surface Net Shortwave Radiation		SNS_MVIRI_disk_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Monthly Mean			
Comments		time series from 1983-2005			
Generation frequency		N/A			
Input satellite data		MVIRI based solar radiation (CM-54) and the AVHRR GAC surface albedo (CM-60)			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
20 W/m ²		15 W/m ²		12 W/m ²	
Verification method		calculated based on accuracy of SAL and SIS			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	Timeliness
Meteosat disk		Regular latitude longitude grid 0.03 x 0.03 degree		n/a	N/A

CM-74		Surface Outgoing Longwave Radiation		SOL_AVHRR_global_DS
Type		Dataset		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Monthly Mean		
Comments		time series from 1989-2009		
Generation frequency		N/A		
Input satellite data		NWP (AVHRR_GAC)		
Dissemination				
Format		Means		Type
netcdf CF		FTP		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ²		10 W/m ²		8 W/m ²
Verification method		comparison with in-situ measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness	
Global	(0.25°) ²		N/A	

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CM-75 Surface Outgoing Longwave Radiation SOL_SEVIRI_disk_DS	
Type	Dataset
Applications and users	<ul style="list-style-type: none"> * Climate Research * NMHSs * Government agencies
Characteristics and Methods	Monthly Mean
Comments	time series from 2006-2011
Generation frequency	N/A
Input satellite data	NWP (SEVIRI)
Dissemination	
Format	Means Type
netcdf CF	FTP, CD-ROM offline
Accuracy	
Threshold	Target Optimal
15W/m ²	10 W/m ² 8 W/m ²
Verification method	comparison with in-situ measurements
Coverage, resolution and timeliness	
Spatial coverage	Spatial resolution Vertical resolution Timeliness
Meteosat disk	(0.05°) ² N/A

CM-81 Surface Downward Longwave Radiation SDL_AVHRR_global_DS	
Type	Dataset
Applications and users	<ul style="list-style-type: none"> * Climate Research * NMHSs * Government agencies
Characteristics and Methods	Monthly Mean
Comments	time series from 1989-2009
Generation frequency	N/A
Input satellite data	AVHRR_GAC
Dissemination	
Format	Means Type
netcdf CF	FTP offline
Accuracy	
Threshold	Target Optimal
15 W/m ²	10 W/m ² 8 W/m ²
Verification method	comparison with in-situ measurements
Coverage, resolution and timeliness	
Spatial coverage	Spatial resolution Vertical resolution Timeliness
Global	(0.25°) ² n/a N/A

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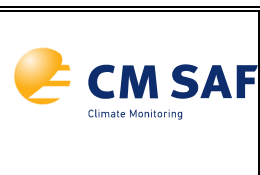
CM-82		Surface Downward Longwave Radiation		SDL_SEVIRI_disk_DS
Type		Dataset		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Monthly Mean		
Comments		time series from 2006-2011		
Generation frequency		N/A		
Input satellite data		SEVIRI		
Dissemination				
Format		Means		Type
netcdf CF		FTP, CD-ROM		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ²		10 W/m ²		8 W/m ²
Verification method		comparison with in-situ measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness	
Meteosat disk	(0.05°) ²		N/A	

CM-88		Surface Net Longwave Radiation		SNL_AVHRR_global_DS
Type		Dataset		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Monthly Mean		
Comments		time series from 1989-2009		
Generation frequency		N/A		
Input satellite data		AVHRR_GAC		
Dissemination				
Format		Means		Type
netcdf CF		FTP		offline
Accuracy				
Threshold		Target		Optimal
20 W/m ²		15 W/m ²		12 W/m ²
Verification method		calculated based on accuracy of SOL and SDL		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness	
Global	(0.25°) ²	n/a	N/A	

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CM-89		Surface Net Longwave Radiation		SNL_SEVIRI_disk_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Monthly Mean			
Comments		time series from 2006-20011			
Generation frequency		N/A			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
netcdf CF		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
20 W/m ²		15 W/m ²		12 W/m ²	
Verification method		calculated based on accuracy of SOL and SDL			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk	(0.05°) ²			N/A	

CM-95		Surface Radiation Budget		SRB_AVHRR_global_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Monthly Mean			
Comments		time series from 1989-2009			
Generation frequency		N/A			
Input satellite data		AVHRR_GAC			
Dissemination					
Format		Means		Type	
netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
25 W/m ²		20 W/m ²		15 W/m ²	
Verification method					
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness		
Global	(0.25°) ²	n/a	N/A		

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CM-96		Surface Radiation Budget		SRB_SEVIRI_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Monthly Mean			
Comments		time series from 2006-2011			
Generation frequency		N/A			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
netcdf CF		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
25 W/m ²		20 W/m ²		15 W/m ²	
Verification method					
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk	(0.05°) ²			N/A	

CM-100		Cloud Radiative Effect SW		CFS_AVHRR_global_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Monthly Mean			
Comments		time series from 1989-2009			
Generation frequency		N/A			
Input satellite data		AVHRR_GAC			
Dissemination					
Format		Means		Type	
netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
15 W/m ²		10 W/m ²		8 W/m ²	
Verification method		calculated from radiation products			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness	
Global	(0.25°) ²	n/a		N/A	

 The EUMETSAT Network of Satellite Application Facilities	 CM SAF Climate Monitoring	SAF on CLIMATE MONITORING CDOP 2 Product Requirements Document	Doc. No.: SAF/CM/DWD/PRD Issue: 2.9 Date: 09.09.2016
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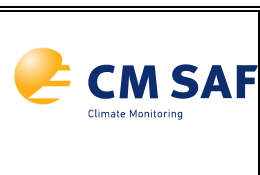
CM-101		Cloud Radiative Effect LW		CFL_AVHRR_global_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Monthly Mean			
Comments		time series from 1989-2009			
Generation frequency		N/A			
Input satellite data		AVHRR_GAC			
Dissemination					
Format		Means		Type	
netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
15 W/m ²		10 W/m ²		8 W/m ²	
Verification method		calculated from radiation products			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution	Vertical resolution	Timeliness	
Global		(0.25°) ²	n/a	N/A	

CM-102		Cloud Radiative Effect SW		CFS_SEVIRI_DS
Type		Dataset		
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector		
Characteristics and Methods		Monthly Mean		
Comments		time series from 2006-2011		
Generation frequency		N/A		
Input satellite data		SEVIRI/GERB		
Dissemination				
Format		Means		Type
netcdf CF		FTP, CD-ROM		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ²		10 W/m ²		8 W/m ²
Verification method		calculated from radiation products		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk	(0.05) ²			N/A

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CM-103		Cloud Radiative Effect LW		CFL_SEVIRI_DS
Type		Dataset		
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector		
Characteristics and Methods		Monthly Mean		
Comments		time series from 2006-2011		
Generation frequency		N/A		
Input satellite data		SEVIRI/GERB		
Dissemination				
Format		Means		Type
netcdf CF		FTP, CD-ROM		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ²		10 W/m ²		8 W/m ²
Verification method		calculated from radiation products		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk	(0.05°) ²			N/A

CM-105		Direct Irradiance at Surface		SID_SEVIRI_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Daily Mean Monthly Mean			
Comments		time series from 2006-2011			
Generation frequency		N/A			
Input satellite data		SEVIRI/GERB			
Dissemination					
Format		Means		Type	
netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
15 W/m ² 25 W/m ² daily mean		10 W/m ² 20 W/m ² daily mean		8 W/m ² 15 W/m ² daily mean	
Verification method		comparison with in-situ measurements			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution		Timeliness
Meteosat disk	(0.05°) ²				N/A

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CM-106		Direct Irradiance at Surface		SID_MVIRI_disk_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Instantaneous Monthly Mean, Daily Means			
Comments		time series from 1983-2005			
Generation frequency		N/A			
Input satellite data		MVIRI			
Dissemination					
Format		Means		Type	
netcdf CF		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
20 W/m ² 30 W/m ² inst. & dm		15 W/m ² 25 W/m ² inst. & dm		12 W/m ² 20 W/m ² inst. & dm	
Verification method		comparison with in-situ measurements			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk	Regular latitude longitude grid 0.03 x 0.03 degree			N/A	


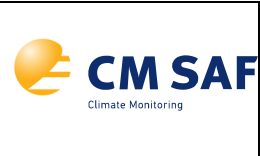
CM-107 Spectrally Resolved Irradiance SRI_MVIRI_SEVIRI_DS			
Type		Dataset	
Applications and users		* Solar energy community * Agriculture meteorology (e.g. PAR). * Medicine meteorology. * Climate community (system analysis)	
Characteristics and Methods		Daily and Monthly Mean.	
Comments		Time series 1991-2011	
Generation frequency		N/A	
Input satellite data		MVIRI continued with SEVIRI	
Dissemination			
Format		Means	Type
Netcdf CF		FTP	Offline
Accuracy			
Threshold		Target	Optimal
<15W/m ² *fraction of spectral band of SIS		<10W/m ² *fraction of spectral band of SIS	<8 W/m ² *fraction of spectral band of SIS
Verification method		Comparison with ground based data as far as available	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Spectral resolution	Timeliness
Meteosat disk	0.05° x 0.05°	20 ¹ Kato bands in VIS and NIR spectrum	N/A

¹ For definition of Kato bands see Kato et al. [1999].

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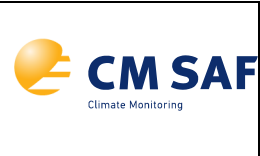
CM-109		Daylight		DAL_SEVIRI_DS			
Type		Dataset					
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector					
Characteristics and Methods		Daily Mean Monthly Mean					
Comments		time series from 2004-2009					
Generation frequency		N/A					
Input satellite data		SEVIRI/GERB					
Dissemination							
Format		Means		Type			
netcdf CF		FTP		offline			
Accuracy							
Threshold		Target		Optimal			
lux equivalent to 10 W/m ²		lux equivalent to 7 W/m ²		lux equivalent to 5 W/m ²			
Verification method		comparison with in-situ measurements					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
Meteosat disk		(0.05°) ²				N/A	

CM-110		Daylight		DAL_MVIRI_DS			
Type		Dataset					
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector					
Characteristics and Methods		Daily Mean Monthly Mean					
Comments		time series from 1983-2005					
Generation frequency		N/A					
Input satellite data		MVIRI					
Dissemination							
Format		Means		Type			
netcdf CF		FTP, CD-ROM		offline			
Accuracy							
Threshold		Target		Optimal			
lux equivalent to 10 W/m ²		lux equivalent to 7 W/m ²		lux equivalent to 5 W/m ²			
Verification method		comparison with in-situ measurements					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
Meteosat disk		Meteosat Pixel Resolution				N/A	

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CM-111		Cloud Albedo		CAL_MVIRI_DS			
Type		Dataset					
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector					
Characteristics and Methods		Instantaneous, Monthly Mean, Daily mean					
Comments		time series from 1983-2005					
Generation frequency		N/A					
Input satellite data		MVIRI					
Dissemination							
Format		Means		Type			
netcdf CF		FTP, CD-ROM		offline			
Accuracy							
Threshold		Target		Optimal			
0.15 0.2 inst. & dm		0.1 0.15 inst. & dm		0.05 0.15 inst. & dm			
Verification method		RTM studies using GERB TOA flux					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
Meteosat disk		Regular latitude longitude grid 0.03 x 0.03 degree				N/A	

CM-113		Reflected solar Radiative Flux at the Top of Atmosphere		TRS_merged_DS
Type		Dataset		
Applications and users		* Climate Research * NMHSs		
Characteristics and Methods		Daily mean Monthly Mean Monthly Mean Diurnal Cycle		
Comments		time series from 2004-2009 The accuracy is given as the RMS error.		
Generation frequency		N/A		
Input satellite data		GERB, SEVIRI, CERES		
Dissemination				
Format		Means		Type
netcdf CF		FTP		offline
Accuracy				
Threshold		Target		Optimal
0.76-1.24 in ratio		0.88-1.12 in ratio		0.9-1.1 in ratio
Verification method		GERB CERES intercomparison		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat Disk	(45 km) ²			N/A

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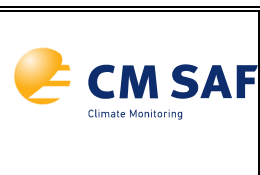
CM-115		Emitted Thermal Radiative Flux at the Top of Atmosphere		TET_merged_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs			
Characteristics and Methods		Daily mean Monthly Mean Monthly Mean Diurnal Cycle			
Comments		time series from 2004-2009 The accuracy is given as the RMS error.			
Generation frequency		N/A			
Input satellite data		GERB, SEVIRI, CERES			
Dissemination					
Format		Means		Type	
netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
0.88-1.12 in ratio		0.94-1.06 in ratio		0.96-1.04 in ratio	
Verification method		GERB CERES intercomparison			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	Timeliness
Global		(45 km) ²			N/A

CM-123	Vertically Integrated Water Vapour	HTW_ATOVS_global_DS	
Type	Dataset		
Applications and users	* Climate Research * NMHSs		
Characteristics and Methods	Daily Mean Monthly Mean		
Comments	Time series from 1999-2011 Accuracy numbers are given for global mean values. Regional larger deviations may occur. Also, if a single satellite is available only the quality may be reduced. Stability may be reduced because an FCDR for HIRS, AMSU-A and AMSU-B with original observing angle dependencies is not available.		
Generation frequency	N/A		
Input satellite data	ATOVS		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, CD-ROM	offline	
Accuracy			
Threshold	Target	Optimal	
TBD decadal stability 2 mm bias 5mm rms	0.26 % decadal stability 1 mm bias 3 mm rms	0.26 % decadal stability 0.18 % bias 1 mm rms	
Verification method	ground based measurements intersatellite comparison		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Global	(90 km) ²		N/A

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CM-127		Vertically Integrated Water Vapour		HTW_SSMI_global_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs			
Characteristics and Methods		Daily Mean Monthly Mean			
Comments		The time series covers 1987-2005 Accuracy numbers are given for global mean values. Regional larger deviations may occur. RELEASED			
Generation frequency		N/A			
Input satellite data		SSM/I			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
1 % decadal stability 2 kg m ⁻² bias 5 kg m ⁻² rms		0.26 % decadal stability 1 kg m ⁻² bias 2 kg m ⁻² rms		0.18 % decadal stability 0.5 kg m ⁻² bias 1 kg m ⁻² rms	
Verification method		ground based measurements intersatellite comparison			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
global ice free ocean	0.5°			N/A	

CM-132		Layered water vapour and temperature		HLW_ATOVS_global_DS	
Type		Dataset			
Applications and users		* Climate Research, NMHSs			
Characteristics and Methods		Daily Mean, Monthly Mean, 5 layers			
Comments		Time series from 1999-2011; Accuracy numbers are given for global mean values. Regional larger deviations may occur. Also, if a single satellite is available only the quality may be reduced. Stability may be reduced because an FCDR for HIRS, AMSU-A and AMSU-B with original observing angle dependencies is not available.			
Generation frequency		N/A			
Input satellite data		ATOVS			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, CD-ROM		offline	
Accuracy					
Threshold		Target		Optimal	
Temperature [K]		Temperature [K]		Temperature [K]	
layer	bias	rms	layer	bias	rms
1	1.5	3.0	1	0.5	2.0
2	1.0	3.0	2	0.5	2.0
3	1.0	3.0	3	0.5	2.0
4	1.0	3.0	4	0.5	2.0
5	1.0	3.0	5	0.5	2.0
Humidity [kg m ⁻²]		Humidity [kg m ⁻²]		Humidity [kg m ⁻²]	
layer	bias	rms	layer	bias	rms
1	0.02	0.1	1	0.01	0.05
2	0.2	0.75	2	0.10	0.50
3	0.25	2	3	0.10	1.30
4	1.0	2.5	4	0.40	1.50
5	1.0	3.0	5	0.40	2.00
Decadal stability: temperature: 0.5 K humidity: 4%		Decadal stability temperature: 0.25 K humidity:1%		Decadal stability temperature: 0.08 K humidity: 0.26%	
Verification method		ground based measurements, intersatellite comparison			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	
Global		(90 km) ²		N/A	


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CM-135		Layered water vapour		HLW_SEVIRI_disk_DS																																														
Type		Dataset																																																
Applications and users		* Climate Research * NMHSs																																																
Characteristics and Methods		Daily Mean Monthly Mean 3 layers																																																
Comments		Time series 2004-2009. DELETED following SG Decision (16. April 2013, CDOP2_SG3_D8); A product with global coverage and similar quality is available (CM-132)																																																
Generation frequency		N/A																																																
Input satellite data		SEVIRI																																																
Dissemination																																																		
Format		Means		Type																																														
Netcdf CF		FTP, CD-ROM		offline																																														
Accuracy																																																		
Threshold		Target		Optimal																																														
<table><tr><th colspan="3">Humidity [kg m⁻²]</th></tr><tr><td>layer</td><td>bias</td><td>rms</td></tr><tr><td>1</td><td>0.2</td><td>0.75</td></tr><tr><td>2</td><td>1</td><td>2.5</td></tr><tr><td>3</td><td>1</td><td>3</td></tr></table>		Humidity [kg m ⁻²]			layer	bias	rms	1	0.2	0.75	2	1	2.5	3	1	3	<table><tr><th colspan="3">Humidity [kg m⁻²]</th></tr><tr><td>layer</td><td>bias</td><td>rms</td></tr><tr><td>1</td><td>0.1</td><td>0.5</td></tr><tr><td>2</td><td>0.4</td><td>1.5</td></tr><tr><td>3</td><td>0.4</td><td>2</td></tr></table>		Humidity [kg m ⁻²]			layer	bias	rms	1	0.1	0.5	2	0.4	1.5	3	0.4	2	<table><tr><th colspan="3">Humidity [kg m⁻²]</th></tr><tr><td>layer</td><td>bias</td><td>rms</td></tr><tr><td>1</td><td>0.05</td><td>0.25</td></tr><tr><td>2</td><td>0.2</td><td>1</td></tr><tr><td>3</td><td>0.2</td><td>1</td></tr></table>		Humidity [kg m ⁻²]			layer	bias	rms	1	0.05	0.25	2	0.2	1	3	0.2	1
Humidity [kg m ⁻²]																																																		
layer	bias	rms																																																
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2	1	2.5																																																
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2	0.2	1																																																
3	0.2	1																																																
Verification method		ground based measurements intersatellite comparison																																																
Coverage, resolution and timeliness																																																		
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness																																														
Meteosat disk	(15 km) ²			N/A																																														

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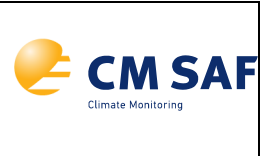
CM-138			Specific Humidity and Temperature at pressure levels			HSH_ATOVS_global_DS		
Type			Dataset					
Applications and users			* Climate Research, NMHSs					
Characteristics and Methods			Daily Mean, Monthly Mean, 6 levels					
Comments			Time series from 1999-2011. Accuracy numbers are given for global mean values. Regional larger deviations may occur. Also, if a single satellite is available only the quality may be reduced. Stability may be reduced because an FCDR for HIRS, AMSU-A and AMSU-B with original observing angle dependencies is not available.					
Generation frequency			N/A					
Input satellite data			ATOVS					
Dissemination								
Format			Means			Type		
Netcdf CF			FTP, CD-ROM			offline		
Accuracy								
Threshold			Target			Optimal		
Temperature [K]			Temperature [K]			Temperature [K]		
level	bias	rms	level	bias	rms	level	bias	rms
1	1.5	3.0	1	0.5	2.0	1	0.1	1.0
2	1.25	3.0	2	0.5	2.0	2	0.1	1.0
3	0.75	3.0	3	0.3	2.0	3	0.1	1.0
4	0.5	3.0	4	0.2	2.0	4	0.1	1.0
5	0.5	3.0	5	0.2	2.0	5	0.1	1.0
6	0.5	3.0	6	0.2	2.0	6	0.1	1.0
Humidity [g/kg]			Humidity [g/kg]			Humidity [g/kg]		
level	bias	rms	level	bias	rms	level	bias	rms
1	0.02	0.08	1	0.01	0.03	1	0.001	0.01
2	0.03	0.5	2	0.01	0.15	2	0.005	0.05
3	0.2	1.5	3	0.05	0.75	3	0.03	0.1

4	0.3	1.75	4	0.10	1.25	4	0.07	0.1
5	0.75	2.0	5	0.20	1.5	5	0.15	0.5
6	1.0	2.25	6	0.20	1.5	6	0.20	0.5
decadal stability temperature: 0.5 K humidity: 4%			decadal stability temperature: 0.08 K humidity: 1%			decadal stability temperature: 0.04 K humidity: 0.26%		
Verification method			ground based measurements intersatellite comparison					
Coverage, resolution and timeliness								
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness		
Global		(90 km) ²				N/A		

 The EUMETSAT Network of Satellite Application Facilities	 CM SAF Climate Monitoring	SAF on CLIMATE MONITORING CDOP 2 Product Requirements Document	Doc. No.: SAF/CM/DWD/PRD Issue: 2.9 Date: 09.09.2016
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CM-139		Free Tropospheric Humidity		FTH_Meteosat_disk_DS	
Type		Dataset			
Applications and users		* Climate Research			
Characteristics and Methods		3-hourly Monthly Mean			
Comments		Time series from 1983-2008. CSR data set will be released as auxiliary product LMD processed the CSR for the period July 1983 - June 2005, CM SAF from July 2005 - June 2008. The data set will not contain the METEOSAT-6 period (March 1997 – May 1998) and July 2005			
Traceability of Requirements					
Generation frequency		N/A			
Input satellite data		MVIRI, SEVIRI			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
decadal stability: 2% bias: 15% rms: 20%.		decadal stability: 1% bias: 4% rms: 9%		decadal stability: 0.26% bias: 2% rms: 5%	
Verification method		radiative transfer for clear sky radiances at reference sites and with the ARSA radiosondes data set			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution	Vertical resolution		Timeliness
Meteosat disk covering ±45° N/S and ±45° W/E		(0.625°) ²			N/A

CM-141		Near Surface Specific Humidity		NSH_HOAPS			
Type		Dataset					
Applications and users		* Climate Research * NMHSs					
Characteristics and Methods		Composite Monthly Mean					
Comments		Target time series covers 1987-2008. Accuracy numbers are given for global mean values. Regional larger deviations may occur.					
Traceability of Requirements		See section 10.1 for details.					
Generation frequency		N/A					
Input satellite data		SSM/I					
Dissemination							
Format		Means		Type			
Netcdf CF		FTP		offline			
Accuracy							
Threshold		Target		Optimal			
1 % decadal stability 15 % bias 20 % rms		0.5 % decadal stability 4 % bias 8 % rms		0.26 % decadal stability 2 % bias 5 % rms			
Verification method		Comparison to ship and buoy based measurements					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
global ice free ocean		0.5°		n/a		N/A	

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CM-142		Near Surface Wind Speed		SWS_HOAPS
Type		Dataset		
Applications and users		* Climate Research * NMHSs		
Characteristics and Methods		Composite Monthly Mean		
Comments		Target time series covers 1987-2008. Accuracy numbers are given for global mean values. Regional larger deviations may occur.		
Traceability of Requirements		See section 10.2 for details		
Generation frequency		N/A		
Input satellite data		SSM/I		
Dissemination				
Format		Means		Type
Netcdf CF		FTP		offline
Accuracy				
Threshold		Target		Optimal
0.2 m/s decadal stability 1 m/s bias 2.8 m/s rms		0.1 m/s decadal stability 0.6 m/s bias 2 m/s rms		0.04 m/s decadal stability 0.5 m/s bias 0.5 m/s rms
Verification method		Comparison to ship and buoy based measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
global ice free ocean	0.5°		n/a	N/A

CM-143		Latent Heat Fluxes		LHF_HOAPS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs			
Characteristics and Methods		Composite Monthly Mean			
Comments		Target time series covers 1987-2008. Accuracy numbers are given for global mean values. Regional larger deviations may occur.			
Traceability of Requirements		See section 10.3 for details			
Generation frequency		N/A			
Input satellite data		SSM/I			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
3 W/m ² decadal stability 22 W/m ² 30 % rms		0.8 W/m ² decadal stability 8 W/m ² 15 % rms		0.1 W/m ² decadal stability 5 W/m ² 10 % rms	
Verification method		Comparison to ship and buoy based measurements			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution		Timeliness
global ice free ocean	0.5°		N/A		N/A

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CM-144		Precipitation		PRE_HOAPS
Type		Dataset		
Applications and users		* Climate Research * NMHSs		
Characteristics and Methods		Composite Monthly Mean		
Comments		Target time series covers 1987-2008. Accuracy numbers are given for global mean values. Regional larger deviations may occur.		
Traceability of Requirements		See section 10.4 for details.		
Generation frequency		N/A		
Input satellite data		SSM/I		
Dissemination				
Format		Means		Type
Netcdf CF		FTP		offline
Accuracy				
Threshold		Target		Optimal
0.03 mm/d decadal stability 1.6 mm/d bias 2.25 mm/d rms		0.015 mm/d decadal stability 0.25 mm/d bias 0.5 mm/d rms		0.002 mm/d decadal stability 0.1 mm/d bias 0.2 mm/d rms
Verification method		Comparison to ship and buoy based measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
global ice free ocean	0.5°		n/a	N/A

CM-145		Evaporation		EVA_HOAPS
Type	Dataset			
Applications and users	* Climate Research * NMHSs			
Characteristics and Methods	Composite Monthly Mean			
Comments	Target time series covers 1987-2008. Accuracy numbers are given for global mean values. Regional larger deviations may occur.			
Traceability of Requirements	See section 10.5 for details.			
Generation frequency	N/A			
Input satellite data	SSM/I			
Dissemination				
Format	Means		Type	
Netcdf CF	FTP		offline	
Accuracy				
Threshold	Target		Optimal	
0.1 mm/d decadal stability 1 mm/d bias 1.4 mm/d rms	0.015 mm/d decadal stability 0.25 mm/d bias 0.5 mm/d rms		0.002 mm/d decadal stability 0.15 mm/d bias 0.3 mm/d rms	
Verification method	Comparison to ship and buoy based measurements			
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness	
global ice free ocean	0.5°		N/A	

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CM-146		Evaporation-Precipitation		EMP_HOAPS			
Type		Dataset					
Applications and users		* Climate Research * NMHSs					
Characteristics and Methods		Composite Monthly Mean					
Comments		Target time series covers 1987-2008. Accuracy numbers are given for global mean values. Regional larger deviations may occur.					
Traceability of Requirements		See section 10.6 for details.					
Generation frequency		N/A					
Input satellite data		SSM/I					
Dissemination							
Format		Means		Type			
Netcdf CF		FTP		offline			
Accuracy							
Threshold		Target		Optimal			
0.13 mm/d decadal stability 1.6 mm/d bias 2.3 mm/d rms		0.015 mm/d decadal stability 0.25 mm/d bias 0.5 mm/d rms		0.002 mm/d decadal stability 0.1 mm/d bias 0.2 mm/d rms			
Verification method		comparison to global river runoff data. Comparison to integrated water vapour.					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
global ice free ocean		0.5°				N/A	

CM-150		Microwave Radiance FCDR		FCDR_SSMI_global_DS	
Type		Dataset			
Applications and users		* NMS and reanalyses for assimilation * Validation of (climate) models * Basis for TCDR products (from CM SAF, OSI SAF) * Soil moisture community			
Characteristics and Methods		Brightness Temperatures, swath-based, imager channels of SSM/I			
Comments		The time series covers 1987-2008. Accuracy numbers are given for global mean values. Regional larger deviations may occur. Quality is applicable for ocean observations.			
Traceability of Requirements		See section 10.7 for details			
Generation frequency		N/A			
Input satellite data		SSM/I			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
bias: 1.25 K RMS: 3.1 K decadal stability: 0.2 K		bias: 1 K RMS: 1.5 K decadal stability: 0.08 K		bias: 0.5 K RMS: 0.3 K decadal stability: 0.03 K	
Verification method		intersatellite comparison (rms based on global monthly means)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution		Timeliness
global	Sensor resolution		n/a		N/A

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CM-11011 AVHRR GAC Fractional Cloud Cover TCDR R2		CFC_AVHRR_global_DS_R2
Type	Dataset	
Applications and users	Climate Research, NMHSs & Government Agencies, Private & Public Sector	
Characteristics and Methods	daily level2b files (per satellite in asc./desc. node), daily mean, monthly mean Method improvements concern mainly better detection of Cirrus and fractional low clouds in the sub-tropical region.	
Record length / Period	1982-2013	
Comments	The accuracy is defined as the mean error (i.e., defined in % cloud amount units) and precision is defined as the bias-corrected RMS error. For polar areas products will be provided in EASE-grid (5km for level2, 25 km for level3)).	
Traceability of Requirements	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014	
Input satellite data	AVHRR GAC	
Dissemination		
Format	Means	Type
Netcdf CF	FTP, Web	Offline
Accuracy		
Threshold	Target	Optimal
5% decadal stability bias 10%, 30% (mm, dm) bc-rms 40% (mm, dm)	2% decadal stability bias 5%, 15 %(mm, dm), bc-rms 20%(mm, dm)	1% decadal stability bias 2%, 10 %(mm, dm) bc-rms 10%, 15% (mm, dm)
Verification method	Primarily comparisons with SYNOP and Cloudsat/CALIPSO (2006-2013), consistency checks against MODIS, ISCCP and PATMOS-X. Validation results will be shown separately for Polar winter region (above 70° latitude in S/N Hemispheric winter) where results may have	

		some problems to meet the listed requirements during the Polar winter.	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Global	(0.05) ² level2b, (0.25) ² level3	n/a	N/A

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CM-11012	AVHRR GAC Fractional Cloud Cover TCDR R3	CFC_AVHRR_global_DS_R3	
Type	Dataset		
Applications and users	Climate Research, NMHSs & Government Agencies, Private & Public Sector		
Characteristics and Methods	daily level2b files (per satellite in asc./desc. node) daily mean, monthly mean		
Record length / Period	1982-2015		
Comments	The accuracy is defined as the mean error (i.e., defined in % cloud amount units) and precision is defined as the bias-corrected RMS error. For polar areas products will be provided in EASE-grid (5km for level2, 25 km for level3)). Product will be released in CDOP-3		
Traceability of Requir.			
Input satellite data	AVHRR GAC		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, Web	offline	
Accuracy			
Threshold	Target	Optimal	
5% decadal stability 20%, 30% bias (MM, DM) 40%, 40 bc-rms (MM, DM)	2% decadal stability 10%, 15 % bias (MM, DM) 20%,20 % bc-rms (MM,. DM)	1% decadal stability 5%, 10% bias (MM, DM) 10%, 15% bc-rms (MM,DM)	
Verification method	primarily comparisons with SYNOP, consistency checks against MODIS, Cloudsat/CALIPSO		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	(0.05) ² level2b (0.25) ² level3	n/a	N/A

CM-11021		Joint Cloud Histograms AVHRR GAC TCDR R2		JCH_AVHRR_global_DS_R2	
Type		Dataset			
Applications and users		* Climate Research			
Characteristics and Methods		Monthly histograms of Cloud top pressure and cloud optical depth. This product is a combination of COT (from CM-11051), CPH (CM-11041) and CTO (CM-11031) and depends on the accuracy of these products.			
Comments		Time series from 1982-2013.			
Generation frequency		SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014			
Input satellite data		CTO (CM-11031), COT (from CM-11051), CPH (CM-11041)			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP		offline	
Accuracy					
Threshold		Target		Optimal	
n/a		n/a		n/a	
Verification method					
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Global	(1°) ²		n/a	N/A	

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CM-11022 Joint Cloud Histograms AVHRR GAC TCDR R3				JCH_AVHRR_global_DS_R3
Type		Dataset		
Applications and users		* Climate Research		
Characteristics and Methods		Monthly histograms of Cloud top pressure and cloud optical depth. This product is a combination of COT (from CM-11052), CPH (CM-11042) and CTO (CM-11032) and depends on the accuracy of these products.		
Comments		Time series from 1982-2015 Product will be released in CDOP-3		
Traceability of Requirements				
Generation frequency		N/A		
Input satellite data		CTO (CM-11032), COT (from CM-11052), CPH (CM-11042)		
Dissemination				
Format		Means	Type	
Netcdf CF		FTP	offline	
Accuracy				
Threshold		Target	Optimal	
n/a		n/a	n/a	
Verification method				
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness	
Global	(1°) ²	n/a	N/A	

CM-11031 AVHRR GAC Cloud Top Level TCDR R2 CTO_AVHRR_global_DS_R2			
Type	Dataset		
Applications and users	Climate Research, NMHSs & Government Agencies, Private & Public Sector		
Characteristics and Methods	daily level2b files (per satellite in asc./desc. node), daily mean, monthly mean		
Record length / Period	1982-2013		
Comments	CTT: no specific requirement as it represents same information in different units		
Traceability of Requirements	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014		
Input satellite data	AVHRR GAC		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, Web	offline	
Accuracy			
Threshold	Target	Optimal	
CTH: 300 m decadal stability 1300 m (bias), 3000 m (bc-rms) CTP: 30 hPa dec. stab; 80 hPa (bias), 120 hPa (bc-rms)	CTH: 200m dec. sta., 800 m (bias), 1700 m (bc-rms) CTP: 20 hPa dec. stab; 50 hPa (bias), 100 hPa (bc-rms)	CTH: 150m dec.l sta., 500m (bias), 1100m (bc-rms) CTP: 15 hPa dec. stab; 30 hPa (bias), 80 hPa (bc-rms)	
Verification method	comparison with ISCCP, PATMOS-X, MODIS (2000-2013), Cloudsat/Calipso (2007-2013)		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Global	(0.05) ² level2b, (0.25) ² level3 polar areas in EASE-grid (5km for level2, 25 km for level3)).	n/a	N/A

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CM-11032		AVHRR GAC Cloud Top Level TCDR R3		CTO_AVHRR_global_DS_R3	
Type		Dataset			
Applications and users		Climate Research, NMHSs & Government Agencies, Private & Public Sector			
Characteristics and Methods		daily level2b files (per satellite in asc. & des. node) daily and monthly mean			
Record length / Period		1982-2015			
Comments		For CTT: no specific requirement as it represents same information in different units Product will be released in CDOP-3			
Traceability of Requirements					
Input satellite data		AVHRR GAC			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, Web		offline	
Accuracy					
Threshold		Target		Optimal	
CTH: 300 m decadal stability 1800 m (bias), 4000 m (bc-rms) CTP: 30 hPa dec. stab; 150 hPa (bias), 160 hPa (bc-rms)		CTH: 200m decadal stability; 1200 m (bias), 2000 m (bc-rms) CTP: 20 hPa dec. stab; 110 hPa (bias), 130 hPa (bc-rms)		CTH: 150m decadal stability, 1000m (bias), 1500m (bc-rms) CTP: 15 hPa dec. stab; 80 hPa (bias), 100 hPa (bc-rms)	
Verification method		comparison with ISCCP, PATMOS-X, MODIS (2000-2010), Cloudsat/Calipso (2007-2010)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
global	(0.05) ² level2b (0.25) ² level3		n/a	N/A	

CM-11041		AVHRR GAC Cloud Phase TCDR R2		CPH_AVHRR_global_DS_R2
Type		Dataset		
Applications and users		* Climate Research * NMHSs * Government Agencies		
Characteristics and Methods		daily level2b files (per satellite and ascending/descending node), daily mean, monthly mean		
Record length / Period		1982-2013		
Comments				
Traceability of Requirements		SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014		
Input satellite data		AVHRR GAC		
Dissemination				
Format		Means	Type	
Netcdf CF		FTP, Web	offline	
Accuracy				
Threshold		Target	Optimal	
0.05 decadal stability bias: 0.2 bc-rms: 0.4		0.02 decadal stability bias: 0.1 bc-rms: 0.2	0.01 decadal stability bias: 0.01 bc-rms: 0.1	
Verification method		comparison with ISCCP, PATMOS-X, MODIS (2000-2013), Cloudsat/Calipso (2007-2013)		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Global (day and night)	(0.05) ² level2b (0.25) ² level3 For polar areas products will be provided in EASE-grid (5km for level2, 25 km for level3)).		n/a	N/A

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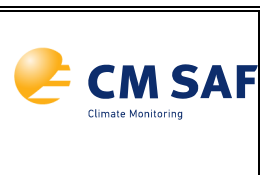
CM-11042 AVHRR GAC Cloud Phase TCDR R3 CPH_AVHRR_global_DS_R3			
Type		Dataset	
Applications and users		* Climate Research * NMHSs * Government Agencies	
Characteristics and Methods		daily level2b files (per satellite and ascending/descending node), daily mean, monthly mean	
Record length / Period		1982-2015	
Comments		For polar areas products will be provided in EASE-grid (5km for level2, 25 km for level3). Product will be released in CDOP-3	
Traceability of Requirements			
Input satellite data		AVHRR GAC	
Dissemination			
Format		Means	Type
Netcdf CF		FTP, Web	offline
Accuracy			
Threshold		Target	Optimal
0.05 decadal stability bias: 0.2 rms: 0.4		0.02 decadal stability bias: 0.1 rms: 0.2	0.01 decadal stability bias: 0.05 rms: 0.1
Verification method		<ul style="list-style-type: none">• comparison with ISCCP• comparison with MODIS (2000-2010)• comparison with Cloudsat/Calipso (2007-2010)• comparison with PATMOS-X	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	(0.05) ² level2b (0.25) ² level3	n/a	N/A

CM-11051		AVHRR GAC Liquid Water Path TCDR R2		LWP_AVHRR_global_DS_R2	
Type		Dataset			
Applications and users		Climate Research, NMHSs & Government Agencies, Private & Public Sector			
Characteristics and Methods		daily level2b files (per satellite in asc./desc. node), daily mean, monthly mean			
Record length / Period		1982-2013			
Comments		Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius). Accuracy requirements hold for global monthly mean all-sky LWP. Accuracies over the polar regions (very limited availability of daytime data and retrievals are made over snow/ice-covered conditions) are expected to be worse.			
Traceability of Requirements		SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014			
Input satellite data		AVHRR GAC			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, Web		offline	
Accuracy					
Threshold		Target		Optimal	
decadal stab: 5 gm ⁻² bias: 20 gm ⁻² bc-rms: 40 gm ⁻²		decadal stab: 3 gm ⁻² bias: 10 gm ⁻² bc-rms: 20 gm ⁻²		decadal stab: 1 gm ⁻² bias: 5 gm ⁻² bc-rms: 10 gm ⁻²	
Verification method		Validation with satellite-based MWR retrieved LWP over ocean, comparison with ISCCP, PATMOS-X, MODIS (2000-2013)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution		Timeliness
Global (daytime)	(0.05) ² level2b, (0.25) ² level3		n/a		N/A

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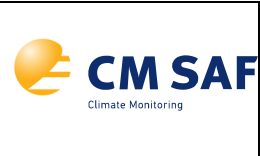
CM-11052 AVHRR GAC Liquid Water Path LWP_AVHRR_global_DS_R3 TCDR R3			
Type		Dataset	
Applications and users		Climate Research, NMHSs & Government Agencies, Private & Public Sector	
Characteristics and Methods		daily level2b files (per satellite and ascending/descending node), daily mean, monthly mean	
Record length / Period		1982-2015	
Comments		For polar areas products will be provided in EASE-grid (5km for level2, 25 km for level3). Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius) Product will be released in CDOP-3	
Traceability of Requirements			
Input satellite data		AVHRR GAC	
Dissemination			
Format		Means	Type
Netcdf CF		FTP, Web	offline
Accuracy			
Threshold		Target	Optimal
10 gm ⁻² decadal stab bias: 25 gm ⁻² rms: 50 gm ⁻²		5 gm ⁻² decadal stab bias: 10 gm ⁻² rms: 25 gm ⁻²	2 gm ⁻² decadal stab bias: 5 gm ⁻² rms: 10 gm ⁻²
Verification method		<ul style="list-style-type: none">• comparison with satellite-based MWR retrieved LWP over ocean (e.g. LWP_HOAPS)• comparison with PATMOS-X• comparison with MODIS (2000-2010), ISCCP	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	(0.05) ² level2b (0.25) ² level3	n/a	N/A

CM-11061		AVHRR GAC Ice Water Path TCDR R2		IWP_AVHRR_global_DS_R2	
Type		Dataset			
Applications and users		Climate Research, NMHSs & Government Agencies, Private & Public Sector			
Characteristics and Methods		daily level2b files (per satellite in asc./desc. node), daily mean, monthly mean			
Record length / Period		1982-2013			
Comments		Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius). Accuracy requirements hold for global monthly mean all-sky IWP. Accuracies over the polar regions (very limited availability of daytime data and retrievals are made over snow/ice-covered conditions) are expected to be worse.			
Traceability of Requirements		SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014			
Input satellite data		AVHRR GAC			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, Web		offline	
Accuracy					
Threshold		Target		Optimal	
decadal stab: 10 gm ⁻² bias: 40 gm ⁻² bc-rms: 80 gm ⁻²		decadal stab: 6 gm ⁻² bias: 20 gm ⁻² bc-rms: 40 gm ⁻²		decadal stab: 2 gm ⁻² bias: 10 gm ⁻² bc-rms: 20 gm ⁻²	
Verification method		Validation with Cloudsat/Calipso (2007-2013), comparison with ISCCP, PATMOS-X, MODIS (2000-2013)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness		
Global (daytime)	(0.05) ² level2b (0.25) ² level3	n/a	N/A		

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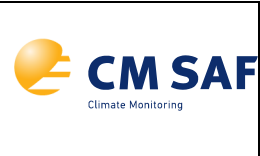
CM-11062 AVHRR GAC Ice Water Path TCDR R3 IWP_AVHRR_global_DS_R3			
Type		Dataset	
Applications and users		* Climate Research, NMHSs, Government Agencies	
Characteristics and Methods		daily level2b files (per satellite and ascending/descending node), daily mean, monthly mean	
Record length / Period		1982-2015	
Comments		For polar areas products will be provided in EASE-grid (5km for level2, 25 km for level3). Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius) Product will be released in CDOP-3	
Traceability of Requirements			
Input satellite data		AVHRR GAC	
Dissemination			
Format		Means	Type
Netcdf CF		FTP, Web	offline
Accuracy			
Threshold		Target	Optimal
20 gm ⁻² decadal stab bias: 40 gm ⁻² rms: 80 gm ⁻²		10 gm ⁻² decadal stab bias: 20 gm ⁻² rms: 50 gm ⁻²	4 gm ⁻² decadal stab bias: 10 gm ⁻² rms: 20 gm ⁻²
Verification method		• comparison with CloudSat & PATMOS-X • comparison with MODIS, ISCCP	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	(0.05) ² level2b (0.25) ² level3	n/a	N/A

CM-11201		AVHRR GAC Surface Incoming Shortwave Radiation TCDR R2		SIS_AVHRR_global_DS_R2	
Type			Dataset		
Applications and users			* Climate impact analysis (DWD,EURO4M,PIK) *Climate model evaluation and development (DWD,EURO4M) * Climate change analysis (WMO-RCC,EURO4M) * Development agencies (GTZ) * Agricultural planning and drought risk assessment (GTZ, Univ. Bologna) * Solar energy (JRC)		
Characteristics and Methods			monthly means, daily means		
Record length / Period			1982-2013		
Comments					
Traceability of Requirements			SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014		
Input satellite data			AVHRR GAC		
Dissemination					
Format			Means		Type
Netcdf CF			FTP, Web		offline
Accuracy					
Threshold			Target		Optimal
MAB 15 /30 W/m ² (monthly / daily), decadal stability 4 W/m ²			MAB: 10 /15 W/m ² (monthly / daily), decadal stability 2 W/m ²		MAB: 8 / 20 W/m ² (monthly / daily) decadal stability 1 W/m ²
Verification method			comparison with BSRN		
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
global	0.25x0.25 °		n/a	N/A	

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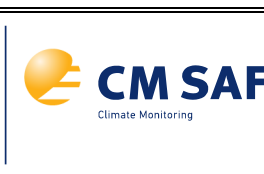
CM-11221	AVHRR GAC Surface Albedo TCDR R2	SAL_AVHRR_global_DS_R2
Type	Dataset	
Applications and users	* Climate Research * NMHSs * Government Agencies	
Characteristics and Methods	pentad mean, monthly mean Topography correction is carried out for both geolocation and radiometry based on high-resolution DEM from SRTM where available and GEOTOPO30 elsewhere. Dynamic aerosol correction is foreseen to be implemented based on indirect estimation of AOD at 550 nm from UV-band satellite measurements of the atmosphere. Detailed descriptions will be made available in the PUM and ATBD of CM-11221.	
Record length / Period	1982-2013	
Comments		
Traceability of Requirements	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014	
Input satellite data	AVHRR GAC	
Dissemination		
Format	Means	Type
Netcdf CF	FTP, Web	offline
Accuracy		
Threshold	Target	Optimal
25 % (relative) decadal stability 15 % (relative) (defined for 50% of non-mountainous cases)	20 % (relative) decadal stability 10 % (relative) (defined for 75% of non-mountainous cases)	5 % relative decadal stability 5 % relative or 0.005 absolute
Verification method	Comparison with surface measurements for different regions +comparisons with albedo estimations from other platforms	

Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	(0.25) ² level3 For polar areas products will be provided in EASE-grid (5km for level2, 25 km for level3).	n/a	N/A

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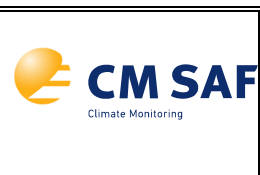
CM-11222		AVHRR GAC Surface Albedo TCDR R3		SAL_AVHRR_global_DS_R3	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government Agencies			
Characteristics and Methods		Pentad mean, monthly means			
Record length / Period		1982-2015			
Comments		For polar areas products will be provided in EASE-grid (5km for level2, 25 km for level3). Product will be released in CDOP-3			
Traceability of Requirements					
Input satellite data		AVHRR GAC			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, Web		offline	
Accuracy					
Threshold		Target		Optimal	
20 % (relative) decadal stability 30 % (relative) (defined for flat land for 90% of cases)		15% (relative) decadal stability 15 % (relative) (defined for flat land for 90% of cases)		2% relative decadal stability 5 % relative or 0.005 absolute	
Verification method		comparison with surface measurements for different regions			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
global	(0.25) ² level3		n/a	N/A	

CM-11251	AVHRR GAC Surface Outgoing Longwave Radiation TCDR R2		SOL_AVHRR_global_R2
Type	Dataset		
Applications and users	* Climate Monitoring and Analysis (EURO4M) * NWP & climate model validation (DWD, COSMO CLM)		
Characteristics and Methods	monthly means		
Record length / Period	1982-2013		
Comments			
Traceability of Requirements	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014		
Input satellite data	AVHRR GAC		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, Web	offline	
Accuracy			
Threshold	Target	Optimal	
Accuracy (MAB) 15 W/m², decadal stability 5 W/m²	Accuracy (MAB) 10 W/m², decadal stability 3 W/m²	Accuracy (MAB) 8 W/m², decadal stability 1 W/m²	
Verification method	comparison with BSEN		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	0.25x0.25 °	n/a	N/A

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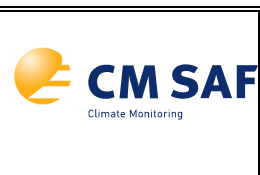
CM-11261	AVHRR GAC Surface Downwelling Longwave Radiation TCDR R2	SDL_AVHRR_global_DS_R2	
Type	Dataset		
Applications and users	* Climate Monitoring and Analysis (EURO4M) * NWP & climate model validation (DWD,COSMO CLM)		
Characteristics and Methods	monthly means		
Record length / Period	1982-2013		
Comments			
Traceability of Requirements	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014		
Input satellite data	AVHRR GAC		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, Web	Offline	
Accuracy			
Threshold	Target	Optimal	
Accuracy (MAB) 15 W/m ² , decadal stability 5 W/m ²	Accuracy (MAB) 10 W/m ² , decadal stability 3 W/m ²	Accuracy (MAB) 8 W/m ² , decadal stability 1 W/m ²	
Verification method	comparison with BSEN		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	0.25x0.25 °	n/a	N/A

CM-12001		Microwave Radiance FCDR R2		FCDR_SSMI_DS_R2	
Type		Dataset			
Applications and users		* NMS and reanalyses for assimilation * Validation of (climate) models * Basis for TCDR products (from CM SAF, OSI SAF) * Of interest to the soil moisture community			
Characteristics and Methods		swath-based product, imager channels similar to SSM/I			
Record length / Period		1987-2013			
Comments		Verification might not cover full period. Accuracy is given for global means. The SSM/I like FCDR also covers land areas. However, the viewing angle correction is not applied here, and due to likely larger temperature ranges the uncertainty might be increased.			
Traceability of Requirements		Ohring et al. 2005; SAF/CM/DWD/RR/2.3; v 1.1 dated 18.12.2013			
Input satellite data		SSM/I, SSMIS			
Dissemination					
Format		Means		Type	
Netcdf4 CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
accuracy: $k \leq 3$ (3 K), decadal stability:0.03K S t-test $S \geq 0.3\%$		accuracy: $k \leq 2$ (2 K), decadal stability: 0.03K t-test- $S \geq 5\%$		accuracy: $k \leq 1$ (1 K), decadal stability: 0.03 K t-test $S \geq 30\%$	
Verification method		Inter-sensor comparison			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
global	sensor resolution		n/a	N/A	

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CM-12002		Microwave Radiance FCDR R3		FCDR_SSMI_DS_R3	
Type		Dataset			
Applications and users		* NMS and reanalyses for assimilation * Validation of (climate) models * Basis for TCDR products (from CM SAF, OSI SAF) * Of interest to the soil moisture community			
Characteristics and Methods		swath-based product, imager channels similar to SSM/I			
Record length / Period		1979-2015			
Comments		The dataset contains existing unchanged elements from CM-150 (SSM/I) and CM-12001 (SSMIS). Additionally processed data: SSMIS temporal extension and SMMR full period with unchanged baseline algorithm. Verification might not cover full period. Consistency is given as the total uncertainty of global monthly means for differences to the selected reference. The SSM/I like FCDR also covers land areas. However, the viewing angle correction is not applied over land, and due to likely larger temperature ranges the uncertainty might be increased over land. SMMR quality might be reduced.			
Traceability of Requirements		Ohring et al. 2005; SAF/CM/DWD/RR/2.13; v1.1 dated 19.02.2015			
Input satellite data		SSM/I (CM-150), SSMIS (CM-12001), SMMR (Pafthfinder L1b)			
Dissemination					
Format		Means		Type	
Netcdf4 CF		FTP, WEB		offline	
Accuracy / Consistency					
Threshold		Target		Optimal	
Consistency: U ≤ 3K (k ≤ 3), Decadal stability: t _D ≤ 0.03K/dec, with t-test significance ≥ 0.3%		Consistency: U ≤ 2K (k ≤ 2), Decadal stability: t _D ≤ 0.03K/dec, with t-test significance ≥ 5%		Consistency: U ≤ 1K (k ≤ 1), Decadal stability: t _D ≤ 0.03K/dec, with t-test significance ≥ 30%	

Verification method		Reanalysis and/or ground-based observations and RT	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
global	sensor resolution	n/a	N/A

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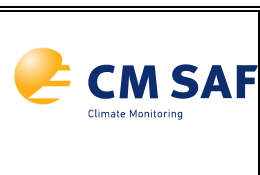
CM-12611		HOAPS Precipitation Intensity TCDR R2		PRE_HOAPS_DS_R2	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government Agencies * e.g. University of Reading (Reading, Great Britain), Rossby Centre (Norrköping, Sweden), Max Planck Institute for Meteorology (Hamburg, Germany)			
Characteristics and Methods		Equal angle grid: Spatial resolution: 0.5° Temporal resolution: 6-hour composite, monthly mean Retrieval based on NWP SAF 1D-Var and extensions from MiKlip/DFG Project			
Record length / Period		1987-2014			
Comments		as CM-12701			
Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014			
Input satellite data		CM-12002 (SSMI/SSMIS FCDR R3)			
Dissemination					
Format		Means		Type	
NetCDF4 CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
decadal stability: 0.034 mm/d bias: 0.6 mm/d rms: 1.0 mm/d		decadal stability: 0.02 mm/d bias: 0.30 mm/d rms: 0.50 mm/d		decadal stability: 0.004 mm/d bias: 0.15 mm/d rms: 0.25 mm/d	
Verification method		GPCP			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
global ice free ocean	0.5°		n/a	N/A	

CM-12701		HOAPS Vertically Integrated Water Vapour TCDR R2		HTW_SSMI_global_DS_R2			
Type		Dataset					
Applications and users		Climate Research, NMHSs, Government Agencies * e.g. Univ. of Reading, Rossby Centre, Max Planck Institute HH					
Characteristics and Methods		Equal angle grid: Spatial resolution: 0.5° Temporal resolution: 6-hour composite, monthly mean Retrieval based on NWP SAF 1D-Var and extensions from MiKlip/DFG Project					
Record length / Period		1987-2014					
Comments		Verification might not cover full period. Accuracy is given for global means. Temporal coverage depends on availability of SST. Stability is assessed through analysing anomaly trends against a reference when available.					
Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014					
Input satellite data		CM-12002 (SSMI/SSMIS FCDR R3)					
Dissemination							
Format		Means		Type			
NetCDF4 CF		FTP, WEB		offline			
Accuracy							
Threshold		Target		Optimal			
decadal stability: 0.40 kg/m ² bias: 3 kg/m ² rms: 5 kg/m ²		decadal stability: 0.20 kg/m ² bias: 1.4 kg/m ² rms: 2 kg/m ²		decadal stability: 0.08 kg/m ² bias: 1 kg/m ² rms: 1 kg/m ²			
Verification method		other satellite products and reanalyses					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
global ice free ocean		0.5°		n/a		N/A	

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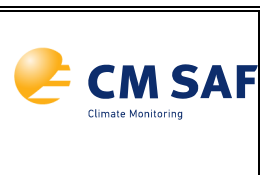
CM-12801		HOAPS Evaporation TCDR R2		EVA_HOAPS_DS_R2	
Type		Dataset			
Applications and users		* Climate Research, NMHSs, Government Agencies, University of Reading (Reading, Great Britain), Rossby Centre (Norrkoping, Sweden), Max Planck Institute for Meteorology (Hamburg, Germany)			
Characteristics and Methods		Equal angle grid: Spatial resolution: 0.5° Temporal resolution: 6-hour composite, monthly mean Input parameters from retrieval based on NWP SAF 1D-Var with extensions from MiKlip/DFG Project COARE Bulk Flux parameterization			
Record length / Period		1987-2014			
Comments		as CM-12701			
Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014			
Input satellite data		CM-12002 (SSMI/SSMIS FCDR R3)			
Dissemination					
Format		Means		Type	
NetCDF4 CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
decadal stability: 0.32 mm/d bias: 0.7 mm/d rms: 1.24 mm/d		decadal stability: 0.14 mm/d bias: 0.36 mm/d rms: 0.62 mm/d		decadal stability: 0.0043 mm/d bias: 0.09 mm/d rms: 0.53 mm/d	
Verification method		buoy and ship observations			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
global ice free ocean	0.5°		n/a	N/A	

CM-12811		HOAPS Latent Heat Fluxes TCDR R2		LHF_HOAPS_DS_R2	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government Agencies * e.g. University of Reading (Reading, Great Britain), Rossby Centre (Norrköping, Sweden), Max Planck Institute for Meteorology (Hamburg, Germany)			
Characteristics and Methods		Equal angle grid: Spatial resolution: 0.5° Temporal resolution: 6-hour composite, monthly mean Input parameters from retrieval based on NWP SAF 1D-Var with extensions from MiKlip/DFG Project COARE Bulk Flux parameterization			
Record length / Period		1987-2014			
Comments		as CM-12701			
Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014			
Input satellite data		CM-12002 (SSMI/SSMIS FCDR R3)			
Dissemination					
Format		Means		Type	
NetCDF4 CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
decadal stability: 9 W/m ² bias: 20 W/m ² rms: 35 W/m ²		decadal stability: 3.9 W/m ² bias: 10 W/m ² rms: 17 W/m ²		decadal stability: 0.12 W/m ² bias: 2.5 W/m ² rms: 15 W/m ²	
Verification method		buoy and ship observations			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness		
global ice free ocean	0.5°	n/a	N/A		

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CM-12821		HOAPS Freshwater flux TCDR R2		EMP_HOAPS_DS_R2	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government Agencies * e.g. University of Reading (Reading, Great Britain), Rossby Centre (Norrköping, Sweden), Max Planck Institute for Meteorology (Hamburg, Germany)			
Characteristics and Methods		Equal angle grid: Spatial resolution: 0.5° Temporal resolution: 6-hour composite, monthly mean Difference of evaporation (CM-12801) and precipitation (CM-12611)			
Record length / Period		1987-2014			
Comments		as CM-12701			
Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014			
Input satellite data		CM-12002 (SSMI/SSMIS FCDR R3)			
Dissemination					
Format		Means		Type	
NetCDF4 CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
decadal stability: 0.35 mm/d bias: 1.3 mm/ rms: 1.6 mm/d		decadal stability: 0.14 mm/d bias: 0.36 mm/d rms: 0.62 mm/d		decadal stability: 0.005 mm/d bias: 0.09 mm/d rms: 0.25 mm/d	
Verification method		combination of buoy and ship observations with GPCP			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness		
global ice free ocean	0.5°	n/a	N/A		

CM-12901		HOAPS Near Surface Specific Humidity TCDR R2		NSH_HOAPS_DS_R2	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government Agencies * e.g. University of Reading (Reading, Great Britain), Rossby Centre (Norrköping, Sweden), Max Planck Institute for Meteorology (Hamburg, Germany)			
Characteristics and Methods		Equal angle grid: Spatial resolution: 0.5° Temporal resolution: 6-hour composite, monthly mean Retrieval based on NWP SAF 1D-Var and extensions from MiKlip/DFG Project			
Record length / Period		1987-2014			
Comments		as CM-12701			
Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014			
Input satellite data		CM-12002 (SSMI/SSMIS FCDR R3)			
Dissemination					
Format		Means		Type	
NetCDF4 CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
decadal stability: 0.20 g/kg bias: 1.20 g/kg rms: 2.40 g/kg		decadal stability: 0.10 g/kg bias: 0.60 g/kg rms: 1.20 g/kg		decadal stability: 0.04 g/kg bias: 0.30 g/kg rms: 0.50 g/kg	
Verification method		buoy and ship observations			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
global ice free ocean	0.5°		n/a	N/A	

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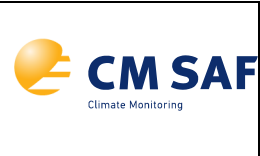
CM-12911			HOAPS Near Surface Wind Speed			SWS_HOAPS_DS_R2		
TCDR R2								
Type			Dataset					
Applications and users			* Climate Research					
			* NMHSs					
			* Government Agencies					
			* e.g. University of Reading (Reading, Great Britain), Rossby Centre (Norrkoping, Sweden), Max Planck Institute for Meteorology (Hamburg, Germany)					
Characteristics and Methods			Equal angle grid: Spatial resolution: 0.5° Temporal resolution: 6-hour composite, monthly mean Retrieval based on NWP SAF 1D-Var and extensions from MiKlip/DFG Project					
Record length / Period			1987-2014					
Comments			as CM-12701					
Traceability of Requirements			SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014					
Input satellite data			CM-12002 (SSMI/SSMIS FCDR R3)					
Dissemination								
Format			Means			Type		
NetCDF4 CF			FTP, WEB			offline		
Accuracy								
Threshold			Target			Optimal		
decadal stability: 0.24 m/s bias: 1 m/s rms: 1.6 m/s			decadal stability: 0.12 m/s bias: 0.60 m/s rms: 0.80 m/s			decadal stability: 0.03 m/s bias: 0.30 m/s rms: 0.50 m/s		
Verification method			buoy and ship observations					
Coverage, resolution and timeliness								
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness		
global ice free ocean		0.5°		n/a		N/A		

CM-21011 SEVIRI Fractional Cloud Cover ICDR CFC_SEVIRI_disk_DS_R2			
Type		Dataset	
Applications and users		Climate Research & NMHSs & Governm. Agencies	
Characteristics and Methods		level2 (full temporal resolution), daily mean, monthly mean, monthly mean diurnal cycle	
Record length / Period		2004-2014	
Comments		Contains as additional layer: cloud type	
Traceability of Requirements		SAF/CM/CDOP2/KNMI/RR 2.4 v 1.2 dated 13.06.2014	
Input satellite data		SEVIRI (reprocessed version)	
Dissemination			
Format		Means	Type
Netcdf CF (level 2 and 3)		FTP, WEB	offline
Accuracy			
Threshold		Target	Optimal
Level 2: Cloud POD > 85 %, Cloud FAR < 20 % Level 3: 20% (bias), 40% (bc-rms)		Level 2 Cloud POD > 90 %, Cloud FAR < 15 % Level 3: 10% bias, 20% bc-rms	Level : Cloud POD > 95 %, Cloud FAR < 10 % Level 3: 5% bias, 10% bc-rms
Verification method		Level 2: comparison against CALIPSO datasets, level 3: primarily comparisons with SYNOP but complemented with consistency checks against MODIS and Cloudsat/CALIPSO datasets	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk	Pixel resolution level 2 (0.05)² level 3 (0.25)² monthly mean diurnal cycle	n/a	N/A

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CM-21012 SEVIRI Fractional Cloud Cover ICDR CFC_SEVIRI_disk_DS_R3			
Type		Data record	
Applications and users		Climate Research & Climate Modelling	
Characteristics and Methods		level2 full temporal resolution	
Record length / Period		2004-2012	
Comments		Needed for a consistent LSA and OSI SAF CDR processing and based on LSA and OSI SAF requirements. Based on NWC SAF MSGv2012, time-dependent 15 min. processing	
Traceability of Requirements			
Input satellite data		SEVIRI (reprocessed version)	
Dissemination			
Format		Means	Type
Hdf5		FTP, WEB	offline
Accuracy			
Threshold		Target	Optimal
Cloud POD > 85 %		Cloud POD > 90%	Cloud POD > 95 %
Verification method		comparison against CALIPSO datasets	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk	Pixel resolution level 2	n/a	N/A

CM-21021 Joint Cloud Histograms		JCH_SEVIRI_disk_DS_R2	
Type	Dataset		
Applications and users	* Climate Research		
Characteristics and Methods	Monthly histograms of Cloud top pressure and cloud optical depth This product is a combination of COT (from CM-21051), CPH (CM-21041) and CTO (CM-21031) and depends on the accuracy of these products.		
Record length / Period	Time series from 2004-2014		
Traceability of requirements	SAF/CM/CDOP2/KNMI/RR2.4 v1.2, dated 13.06.2014		
Generation frequency	N/A		
Input satellite data	CTO (CM-21031), CPH (CM-21041), COT (from CM-21051)		
Dissemination			
Format	Means	Type	
netcdf CF	FTP	offline	
Accuracy			
Threshold	Target	Optimal	
N/a	N/a	N/a	
Verification method			
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk <84° satellite zenith angle	(0.25°) ²	n/a	N/A

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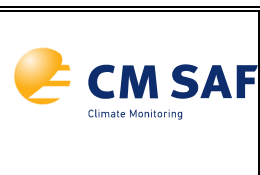
CM-21031 SEVIRI Cloud Top Level ICDR		CTO_SEVIRI_DS_R2	
Type	Dataset		
Applications and users	Climate Research, NMHSs & Government Agencies, Private & Public Sector		
Characteristics and Methods	Level2 (full temporal resolution), daily mean, monthly mean, monthly mean diurnal cycle, 1D histogram		
Record length	2004-2014		
Comments	Requirements are specified for CTH and CTP (as bias and bc-rms). No requirements are specified for CTT as this parameter represents the same information in different units.		
Traceability of Requirements	SAF/CM/CDOP2/KNMI/RR2.4 v1.2, dated 13.06.2014		
Input satellite data	SEVIRI (reprocessed version)		
Dissemination			
Format	Means	Type	
Netcdf CF (level 2 and 3)	FTP, WEB	offline	
Accuracy			
Threshold	Target	Optimal	
CTH: 1200 m (bias), 3000/4000 m (bc-rms, level 3/level 2) CTP: 90 hPa (bias), 120/200 hPa (bc-rms, level 3/ level 2)	CTH: 800 m (bias), 1500/2500 m (bc-rms, level 3/level 2) CTP: 45 hPa (bias), 70/110 hPa (bc-rms, level 3/level 2)	CTH: 500 m (bias), 1000/2000 m, (bc-rms, level 3/ level 2) CTP: 30 hPa (bias), 50/80 hPa (bc-rms, level 3/ level 2)	
Verification method	comparisons with MODIS retrievals as well as CloudSat/CALIPSO, EarthCARE will be considered		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timelines
Meteosat disk	Pixel resolution level 2 (0.05) ² level 3 (0.25) ² monthly mean diurnal cycle	n/a	N/A

CM-21041 SEVIRI Cloud Phase ICDR R2		CPH_SEVIRI_DS_R2	
Type	Dataset		
Applications and users	Climate Research, NMHSs & Government Agencies, Private & Public Sector		
Characteristics and Methods	level2 (full temporal resolution), daily mean, monthly mean, monthly mean diurnal cycle		
Record length / Period	2004-2014		
Comments			
Traceability of Requirements	SAF/CM/CDOP2/KNMI/RR24 v1.2 dated 13.06.2014		
Input satellite data	SEVIRI (reprocessed version)		
Dissemination			
Format	Means	Type	
Netcdf CF (lev 3), Hdf5 (lev 2)	FTP, WEB	offline	
Accuracy			
Threshold	Target	Optimal	
Level 2 POD_liq > 70 % FAR_liq < 35 % POD_ice > 60 % FAR_ice < 35 % Level 3 bias: 20 % bc-rms: 40 %	Level 2 POD_liq > 80 % FAR_liq < 20 % POD_ice > 80 % FAR_ice < 20 % Level 3 bias: 10 % bc-rms: 20 %	Level 2 POD_liq > 90 % FAR_liq < 10 % POD_ice > 90 % FAR_ice < 10 % Level 3 bias: 5 % bc-rms: 10 %	
Verification method	comparison with MODIS (2004-2014), comparison with Cloudsat/Calipso (2007-2014, level-2, selected months)		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk (day and night)	Pixel resolution level 2 (0.05) ² level 3 (0.25) ² monthly mean diurnal cycle	n/a	N/A

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CM-21051 SEVIRI Liquid Water Path ICDR		LWP_SEVIRI_DS_R2		
Type	Dataset			
Applications and users	Climate Research, NMHSs & Government Agencies, Private & Public Sector			
Characteristics and Methods	level2 (full temporal resolution), daily mean, monthly mean, monthly mean diurnal cycle, 1D histograms			
Record length / Period	2004-2014			
Comments	Contains as additional layers: COT (cloud optical thickness), REFF (particle effective radius), and H scene heterogeneity measure)			
Traceability of Requirements	SAF/CM/CDOP2/KNMI/RR24 v1.2 dated 13.06.2014			
Input satellite data	SEVIRI (reprocessed version)			
Dissemination				
Format	Means		Type	
Netcdf CF (level 3) Hdf5 (level 2)	FTP, WEB		offline	
Accuracy				
Threshold	Target		Optimal	
Level 2: bias: 20 gm ⁻² , bc-rms: 100 gm ⁻² Level 3: bias: 20 gm ⁻² bc-rms: 40 gm ⁻²	Level 2: bias: 10 gm ⁻² bc-rms: 50 gm ⁻² Level 3: bias: 10 gm ⁻² bc-rms: 20 gm ⁻²		Level 2: bias: 5 gm ⁻² , bc-rms: 20 gm ⁻² Level 3: bias: 5 gm ⁻² , bc-rms: 10 gm ⁻²	
Verification method	comparison with satellite-based MWR retrieved LWP over ocean (e.g. LWP_HOAPS), comparison with MODIS			
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk <84° satellite zenith angle	Pixel resolution level 2 (0.05) ² level 3 (0.25) ² monthly mean diurnal cycle		n/a	N/A

CM-21061 SEVIRI Ice Water Path ICDR R2		IWP_SEVIRI_DS_R2	
Type	Dataset		
Applications and users	Climate Research, NMHSs & Government Agencies, Private & Public Sector		
Characteristics and Methods	level2 (full temporal resolution), daily mean, monthly mean, monthly mean diurnal cycle, 1D histograms		
Record length / Period	2004-2014		
Comments	Contains as additional layers: COT (cloud optical thickness), REFF (particle effective radius) , and H _σ (scene heterogeneity measure)		
Traceability of Requirements	SAF/CM/CDOP2/RR/24 v1.2 dated 13.06.2014		
Input satellite data	SEVIRI (reprocessed version)		
Dissemination			
Format	Means	Type	
Netcdf CF (level 3) Hdf5 (level 2)	FTP, WEB	offline	
Accuracy			
Threshold	Target	Optimal	
Level 2: bias: 40 gm ⁻² bc-rms: 200 gm ⁻² Level 3: bias: 40 gm ⁻² bc-rms: 80 gm ⁻²	Level 2: bias: 20 gm ⁻² bc-rms: 100 gm ⁻² Level 3: bias: 20 gm ⁻² bc-rms: 40 gm ⁻²	Level 2: bias: 10 gm ⁻² bc-rms: 40 gm ⁻² Level 3: bias: 10 gm ⁻² bc-rms: 20 gm ⁻²	
Verification method	comparison with CloudSat (2007-2014, level-2, selected months), comparison with MODIS (2004-2014)		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk <84° satellite zenith angle	Pixel resolution level 2 (0.05) ² level 3 (0.25) ² monthly mean diurnal cycle	n/a	N/A

 The EUMETSAT Network of Satellite Application Facilities	 CM SAF Climate Monitoring	SAF on CLIMATE MONITORING CDOP 2 Product Requirements Document	Doc. No.: SAF/CM/DWD/PRD Issue: 2.9 Date: 09.09.2016
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CM-21101 SEVIRI Aerosol Optical Depth ICDR		AOD_SEVIRI_DS_R1	
Type	Dataset		
Applications and users	* Climate Research * NMHSs * Government Agencies * Aviation Sector		
Characteristics and Methods	Ocean and land clear sky only daytime and no sun glint daily and monthly means (internal at 15' repeat cycle) SEVIRI pixel resolution / averaging in 3x3 pixels boxes		
Record length / Period	2004-2014		
Comments	Heritage algorithms: Ocean: CDOP-1 Land: MPEF		
Traceability of Requirements			
Input satellite data	SEVIRI (reprocessed version)		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, WEB	offline	
Accuracy			
Threshold	Target	Optimal	
0.2 (mm), 0.5 (dm)	0.1 (mm), 0.2 (dm)	0.05 (mm) 0.1 (dm)	
Verification method	comparison with AERONET and future LIDAR network, intercomparison with MODIS. Accuracy is estimated at 1°x1° resolution.		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk	(9 km) ²	n/a	N/A

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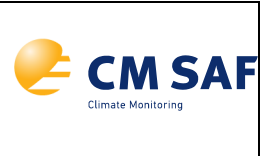
CM-21301	TOA Reflected Solar radiative flux ICDR		TRS_GERB_DS_R2
Type	Dataset		
Applications and users	* Climate Research * NMHSs		
Characteristics and Methods	Daily mean (dm), monthly mean (mm), monthly mean diurnal cycle (mmdc)		
Record length / Period	2004-2014		
Comments			
Traceability of Requirements	SAF/CM/RMIB/GERB/RR/2.5 v.1.2 dated 27.02.2014		
Input satellite data	GERB,SEVIRI (reprocessed version)		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, WEB	offline	
Accuracy			
Threshold	Target	Optimal	
8W/m ² (mm) 16W/m ² (dm & mmdc) Decadal stab. N/A	4W/m ² (mm) 8W/m ² (dm & mmdc) Decadal stab. < 2W/m ²	2W/m ² (mm) 4W/m ² (dm & mmdc) Decadal stab. < 0.3 W/m ²	
Verification method	GERB CERES intercomparison, Accuracy and stability estimated at 1° x 1° resolution		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk	(9 km) ²	n/a	N/A

CM-21321		TOA Reflected Solar Clear-Sky radiative flux ICDR		TRS_CS_GERB_DS_R2	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government Agencies			
Characteristics and Methods		Daily mean (dm), monthly mean (mm), monthly mean diurnal cycle (mmdc)			
Record length / Period		2004-2014			
Comments					
Traceability of Requirements		SAF/CM/RMIB/GERB/RR/2.5 v.1.2 dated 27.02.2014			
Input satellite data		GERB,SEVIRI (reprocessed version)			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
8W/m ² (mm) 16W/m ² (dm & mmdc) Decadal stab. N/A		4W/m ² (mm) 8W/m ² (dm & mmdc) Decadal stab. < 2W/m ²		2W/m ² (mm) 4W/m ² (dm & mmdc) Decadal stab. < 0.3 W/m ²	
Verification method		GERB CERES intercomparison, Accuracy and stability estimated at 1° x 1° resolution			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution	Vertical resolution	Timeliness	
Meteosat disk		(9 km) ²	n/a	N/A	

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CM-21331 TOA Emitted Thermal radiative flux ICDR		TET_GERB_DS_R2	
Type	Dataset		
Applications and users	* Climate Research * NMHSs		
Characteristics and Methods	Daily mean (dm), monthly mean (mm), monthly mean diurnal cycle (mmdc)		
Record length / Period	2004-2014		
Comments			
Traceability of Requirements	SAF/CM/RMIB/GERB/RR/2.5 v.1.2 dated 27.02.2014		
Input satellite data	GERB,SEVIRI (reprocessed version)		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, WEB	offline	
Accuracy			
Threshold	Target	Optimal	
4W/m ² (mm) 8W/m ² (dm & mmdc) Decadal stab. N/A	2W/m ² (mm) 4W/m ² (dm & mmdc) Decadal stab. < 2W/m ²	1W/m ² (mm) 2W/m ² (dm & mmdc) Decadal stab. < 0.3 W/m ²	
Verification method	GERB CERES intercomparison, Accuracy and stability estimated at 1° x 1° resolution		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Spatial coverage	Spatial resolution
Meteosat disk	(9 km) ²	Meteosat disk	(9 km) ²

CM-21351 TOA Emitted Thermal Clear-Sky radiative flux ICDR		TET_CS_GERB_DS_R2	
Type	Dataset		
Applications and users	* Climate Research * NMHSs		
Characteristics and Methods	Daily mean (dm), monthly mean (mm), monthly mean diurnal cycle (mmdc)		
Record length / Period	2004-2014		
Comments			
Traceability of Requirements	SAF/CM/RMIB/GERB/RR/2.5 v.1.2 dated 27.02.2014		
Input satellite data	GERB,SEVIRI (reprocessed version)		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, WEB	offline	
Accuracy			
Threshold	Target	Optimal	
4W/m ² (mm) 8W/m ² (dm & mmdc) Decadal stab. N/A	2W/m ² (mm) 4W/m ² (dm & mmdc) Decadal stab. < 2W/m ²	1W/m ² (mm) 2W/m ² (dm & mmdc) Decadal stab. < 0.3 W/m ²	
Verification method	GERB CERES intercomparison, Accuracy and stability estimated at 1° x 1° resolution		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Spatial coverage	Spatial resolution
Meteosat disk	(9 km) ²	Meteosat disk	(9 km) ²

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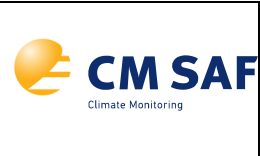
CM-23011	Meteosat Fractional Cloud Cover TCDR	CFC_MVIRI_SEVIRI_DS_R1
Type	Dataset	
Applications and users	* Automation, extension, homogenization and quality check of visual cloud observations: MeteoSwiss, DWD, all other NMHS in Europe and Africa * Validation of regional climate models (e.g. COSMO-CLM), especially the sub grid-scale cloud parameterization, diurnal cycle climatology * GCOS ECV	
Characteristics and Methods	Half-hourly (HM), daily (DM) and monthly means (MM)	
Record length / Period	1991-2015	
Comments	Accuracy requirements are given as absolute CFC values. They are mean requirements averaged over the full spatial and temporal dimensions of the dataset as defined in GCOS-154. The bias can be positive or negative (mean bias error).	
Traceability of Requirements	SAF/CM/DWD/RR28, v1.1 dated 15.01.2015	
Input satellite data	MVIRI/SEVIRI	
Dissemination		
Format	Means	Type
Netcdf CF	FTP, Web	offline
Accuracy		
Threshold	Target	Optimal
0.10 bias	0.05 bias	0.01 bias
0.25 bc-rms (MM)	0.20 bc-rms (MM)	0.15 bc-rms (MM)
0.35 bc-rms (DM)	0.30 bc-rms (DM)	0.25 bc-rms (DM)
0.05 dec stability	0.02 dec stability	0.01 dec stability
Verification method	Primarily comparisons with SYNOP and automated cloud detection (APCADA) based on BSRN data complemented with consistency checks against MODIS and Cloudsat/CALIPSO datasets	

Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk	(0.05°)²	n/a	N/A

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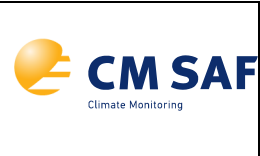
CM-23081		Meteosat Cloud Albedo TCDR		CAL_MVIRI_SEVIRI_DS_R1	
Type		Dataset			
Applications and users		* Climate impact analysis (DWD,EURO4M) * Climate model evaluation and development (DWD,EURO4M) * Climate change analysis (WMP-RCC,EURO4M) * Development agencies (GTZ) * Agricultural planning and drought risk assessment (GTZ) * Solar energy (JRC)			
Characteristics and Methods		hourly, daily and monthly means			
Record length / Period		1983-2012			
Comments		Processing chain exists at MeteoSwiss, integration to DWD system needed. Moreover, improvement of algorithms and used atmospheric input will be performed			
Traceability of Requirements		SAF/CM/DWD/RR2.1 v 1.1 dated 05.07.2013			
Input satellite data		MVIRI/SEVIRI (Rectified digital pixel counts)			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, Web		offline	
Accuracy					
Threshold		Target		Optimal	
0.15, decadal stab. 0.1		0.1, decadal stability 0.075		0.08, decadal stability 0.05	
Verification method		accuracy estimated based on derived SIS accuracy			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution	Vertical resolution	Timeliness	
Meteosat disk		(0.05°)²	n/a	N/A	

CM-23082 Meteosat Cloud Albedo TCDR				CAL_MVIRI_SEVIRI_DS_R2	
Type		Dataset			
Applications and users		* Climate impact analysis (DWD,EURO4M) * Climate model evaluation and development (DWD,EURO4M) * Climate change analysis (WMP-RCC,EURO4M) * Development agencies (GTZ) * Agricultural planning and drought risk assessment (GTZ) * Solar energy (JRC)			
Characteristics and Methods		30-min instantaneous,, daily and monthly means			
Record length / Period		1983-2015			
Comments		Processing chain exists at MeteoSwiss, integration to DWD system needed. More over, improvement of algorithms and used atmospheric input will be performed			
Traceability of Requirements		SAF/CM/DWD/RR28, v1.1 dated 15.01.2015			
Input satellite data		MVIRI/SEVIRI (Rectified digital pixel counts)			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, Web		offline	
Accuracy					
Threshold		Target		Optimal	
0.15, decadal stability 0.08		0.1, decadal stability 0.06		0.08, decadal stability 0.03	
Verification method		accuracy estimated based on derived SIS accuracy			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk	(0.05°)²		n/a	N/A	

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CM-23201		Meteosat Solar Surface Radiation TCDR		SIS_MVIRI_SEVIRI_DS_R1
Type		Dataset		
Applications and users		Climate impact analysis (DWD,EURO4M,PIK) Climate model evaluation and development (DWD, EURO4M) Climate change analysis (WMO-RCC,EURO4M) Development agencies (GTZ) agricultural planning and drought risk assessment (GTZ, Univ. Bologna);Solar energy (JRC,BSW,ISET)		
Characteristics and Methods		hourly, daily and monthly means		
Record length / Period		1983-2012		
Comments		improvement of algorithms and used atmospheric input will be performed		
Traceability of Requirements		SAF/CM/DWD/RR2.1 v 1.1 dated 05.07.2013		
Input satellite data		MVIRI/SEVIRI (Rectified digital pixel counts)		
Dissemination				
Format		Means	Type	
Netcdf CF		FTP, Web	offline	
Accuracy				
Threshold		Target	Optimal	
decadal stability 4 W/m ² Accuracy (MAB) 15 W/m ² ,		Dec. stab 2 W/m ² Acc. (MAB) 10 W/m ² ,	Dec. stab.1 W/m ² Acc. (MAB) 8 W/m ² ,	
Verification method		comparison with BSRN ground measurements		
Coverage, resolution and timeliness				
Spatial coverage		Spatial resolution	Vertical resolution	Timeliness
Meteosat disk		(0.05°) ²	n/a	N/A

CM-23202	Meteosat Solar Surface Radiation TCDR	SIS_MVIRI_SEVIRI_DS_R2	
Type	Dataset		
Applications and users	* Climate impact analysis (DWD,EURO4M) * Climate model evaluation and development (DWD,EURO4M) * Climate change analysis, Development agencies & Agricultural planning and drought risk assessment * Solar energy (JRC)		
Characteristics and Methods	30-min instantaneous,, daily and monthly means		
Record length / Period	1983-2015		
Comments			
Traceability of Requirements	SAF/CM/DWD/RR28, v1.1 dated 15.01.2015		
Input satellite data	MVIRI/SEVIRI (Rectified digital pixel counts)		
Dissemination			
Format	Means	Type	
Netcdf CF	FTP, Web	offline	
Accuracy			
Threshold	Target	Optimal	
Accuracy (MAB) 15 W/m²(monthly), 20 W/m²(daily), decadal stability 3W/m²	Accuracy (MAB) 8 W/m² (monthly) 15 W/m² (daily)decadal stability 1 W/m²	Accuracy (MAB) 5 W/m² (monthly), 12 W/m2 (daily) decadal stability 0.5 W/m²	
Verification method	comparison with BSRN ground measurements		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk	(0.05°)²	n/a	N/A

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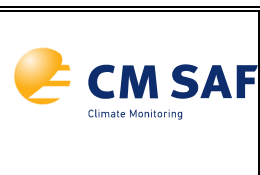
CM-23231		Meteosat Direct Normalised Irradiance TCDR		DNI_MVIRI_SEVIRI_DS_R1	
Type		Dataset			
Applications and users		Climate impact analysis, Climate model evaluation and development , Climate change Development agencies , Agricultural planning and drought risk assessment, Solar energy			
Characteristics and Methods		hourly, daily and monthly means			
Record length / Period		1983-2012			
Comments					
Traceability of Requirements		SAF/CM/DWD/RR2.1 v 1.1 dated 05.07.2013			
Input satellite data		MVIRI/SEVIRI (Rectified digital pixel counts)			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, Web		offline	
Accuracy					
Threshold		Target		Optimal	
Acc. (MAB) 20 W/m ² , decadal stab. 6 W/m ²		Accuracy (MAB) 15 W/m ² , decadal stability 4 W/m ²		Acc. (MAB) 12 W/m ² , decadal stab. 3 W/m ²	
Verification method		comparison with ground measurements			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk	(0.05°) ²		n/a	N/A	

CM-23291		Meteosat Surface Direct Irradiance TCDR		SDI_MVIRI_SEVIRI_DS_R1	
Type		Data Record			
Applications and users		Climate model evaluation and development, climate change analysis, agricultural planning and drought assessment, solar energy resource planning.			
Characteristics and Methods		30-min instantaneous, daily and monthly means			
Record length / Period		1983-2015			
Comments		Composed of Surface direct normalized irradiance (DNI) and surface direct radiation (SID)			
Traceability of Requirements		SAF/CM/DWD/RR28, v1.1 dated 15.01.2015			
Input satellite data		MVIRI/SEVIRI (Rectified digital pixel counts)			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, Web		Offline	
Accuracy					
Threshold		Target		Optimal	
Accuracy (MAB), DNI, SID 20 / 15 W/m ² (monthly) 30 / 25 W/m ² (daily) decadal stability 5 W/m ²		Accuracy (MAB), DNI, SID: 15 / 10 W/m ² (monthly) 25 / 20 W/m ² (daily) decadal stability 3 W/m ²		Accuracy (MAB), DNI SID: 12 / 8 W/m ² (monthly), 20 / 15 W/m ² (daily) decadal stability 2 W/m ²	
Verification method		comparison with BSRN ground measurements			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk	(0.05°) ²		n/a	N/A	


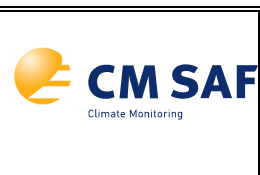
 	SAF on CLIMATE MONITORING CDOP 2 Product Requirements Document	Doc. No.: SAF/CM/DWD/PRD Issue: 2.9 Date: 09.09.2016
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CM-23241		Meteosat Spectral Resolved Irradiance TCDR		SRI_MVIRI_SEVIRI_DS_R1	
Type		Dataset			
Applications and users		* Climate change analysis (DMI) * Development agencies (GTZ) * Agricultural planning and drought risk assessment * Solar energy (JRC,ZSW)			
Characteristics and Methods		monthly means			
Record length / Period		1983-2015			
Comments					
Traceability of Requirements		SAF/CM/DWD/RR28, v1.1 dated 15.01.2015			
Input satellite data		MVIRI/SEVIRI (Rectified digital pixel counts)			
Dissemination					
Format		Means		Type	
Netcdf CF		Web		offline	
Accuracy					
Threshold		Target		Optimal	
Accuracy (MAB) of 15 W/m ² weighted with the relative contribution to the broadband spectra.		accuracy (MAB) 10 W/m ² weighted with the relative contribution to the broadband spectra		accuracy (MAB) 8 W/m ² weighted with the relative contribution to the broadband spectra	
Verification method		Comparison with ground based data as far as available			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk	(0.05°) ²		n/a	N/A	

CM-23311		TOA Reflected Solar All-Sky Radiative Flux		TRS_AS_MVIRI_GERB_SE VIRI_disk_DS	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government Agencies			
Characteristics and Methods		daily mean, monthly mean, monthly mean diurnal cycle			
Record length / Period		1982-2014			
Comments					
Traceability of Requirements		SAF/CM/CDOP2/RMIB/GERB/RR2.6, v3.0, dated 24.12.2014			
Input satellite data		MVIRI, SEVIRI (reprocessed CF version)			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
8 W/m ² (mm) 16 W/m ² (dm & mmdc) Bias : < 4 W/m ² stab. < 4W/m ² /decade		4W/m ² (mm) 8 W/m ² (dm & mmdc) Bias < 2 W/m ² stab. < 0.6 W/m ² /decade		2 W/m ² (mm) 4 W/m ² (dm & mmdc) Bias < 1 W/m ² stab. < 0.3 W/m ² /decade	
Verification method		comparison with CERES/AVHRR. Accuracy at 1°x1° resolution.			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	
Timeliness					
Meteosat disk		(0.05°) ²		n/a	
				N/A	

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CM-23341		TOA Emitted Thermal All-Sky Radiative Flux		TET_AS_MVIRI_GERB_S EVIRI_disk_DS_R1	
Type		Dataset			
Applications and users		* Climate Research * NMHSs * Government Agencies			
Characteristics and Methods		daily mean, monthly mean, monthly mean diurnal cycle			
Record length / Period		1982-2014			
Comments					
Traceability of Requirements		SAF/CM/CDOP2/RMIB/GERB/RR2.6, v3.0, dated 24.12.2014			
Input satellite data		MVIRI, SEVIRI (reprocessed CF version)			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, WEB		offline	
Accuracy					
Threshold		Target		Optimal	
4 W/m ² (mm) 8 W/m ² (dm & mmdc)		2W/m ² (mm) 4 W/m ² (dm & mmdc)		1 W/m ² (mm) 2 W/m ² (dm & mmdc)	
Bias < 4 W/m ²		Bias < 2 W/m ²		Bias < 1 W/m ²	
stab. < 4W/m ² /decade		stab. < 0.6 W/m ² /decade		stab. < 0.3 W/m ² /decade	
Verification method		comparison with CERES/HIRS dataset/AVHRR. .Accuracy at 1°x1° resolution.			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk	(0.05°) ²		n/a	N/A	

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CM-23921		Meteosat Statistical Land Surface Temperature TCDR		LSA_MVIRI_SEVIRI_DS_R1	
Type		Data record			
Applications and users		Climate monitoring of land surface fluxes: e.g. LSA SAF GLDAS/LIS, Climate monitoring of heat waves: e.g. ETH Zurich Switzerland, reinsurance companies such as SWISS RE Climate monitoring of crop health: e.g. AgroScope Switzerland, UNEP, reinsurance companies such as SWISS RE			
Characteristics and Methods		hourly (HM), daily (DM) and monthly means (MM)			
Record length / Period		1991-2015			
Comments		The method to derive LST is a statistical method and consistent with the operational LSA approach.			
Traceability of Requirements		SAF/CM/DWD/RR28, v1.3, dated 25.07.2016			
Input satellite data		MVIRI/SEVIRI			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, WEB		offline	
Accuracy					
Threshold ¹		Target ¹		Optimal ¹	
rms ² 4.0 K bias ³ 2.5 K dec stability ⁴ : 1.5 K		rms ² 2.5 K bias ³ 1.5 K dec stability ⁴ : 0.8 K		rms ² 1.0 K bias ³ 0.5 K dec stability ⁴ 0.2 K	
Verification method		Ground data (BSRN, FLUXNET and/or LSA SAF validation sites), radiance based validation and comparison with other satellite products			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Meteosat disk	(0.05°) ²		n/a	N/A	

¹The accuracy is conditional with a maximum of 1 K calibration error for Meteosat top-of-atmosphere brightness temperatures.

²RMS: bias corrected root mean square difference (precision)

³bias: bias or mean error (accuracy)

⁴dec. stability: decadal trend in bias compared to a reference data set (stability)

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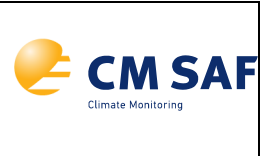
CM-23931 Meteosat Physical Land Surface LST_MVIRI_SEVIRI_DS Temperature TCDR _R1			
Type		Data record	
Applications and users		Regional climate model validation: e.g. COSMO-CLM, but also ECHAM Satellite-based retrieval of 2m air temperatures at a high spatial resolutions (Good 2015) Climate studies on elevation depending warming. The Mountain Research Group (Pepin et al. 2015) maintains several test fields within the Meteosat disk including a field at the Kilimanjaro. Diurnal LST Cycle: e.g. MeteoSwiss, DWD, ETH Zurich, MPI	
Characteristics and Methods		hourly (HM), daily (DM) and monthly means (MM)	
Record length / Period		1991-2015	
Comments			
Traceability of Requirements		SAF/CM/DWD/RR28, v1.3, dated 25.07.2016	
Input satellite data		MVIRI/SEVIRI	
Dissemination			
Format		Means	Type
Netcdf CF		FTP, WEB	offline
Accuracy			
Threshold ¹		Target ¹	Optimal ¹
rms ² 3.5 K bias ³ 1.8 K dec stability ⁴ 1.5 K		rms ² 2.0 K bias ³ 1.3 K dec stability ⁴ 0.8 K	rms ² 1.0 K bias ³ 0.5 K dec stability ⁴ 0.2 K
Verification method		Ground data (BSRN, FLUXNET and/or LSA SAF validation sites), radiance based validation and comparison with other satellite products	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Meteosat disk	(0.05°) ²	n/a	N/A

¹The accuracy is conditional with a maximum of 1 K calibration error for Meteosat top-of-atmosphere brightness temperatures.


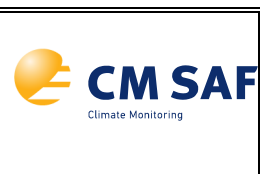
² RMS: bias corrected root mean square difference (precision)

³ bias: bias or mean error (accuracy)

⁴ dec. stability: decadal trend in bias compared to a reference data set (stability)

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CM-14711		Improved Water Vapour Analyses		WV_MW_global_DS_R1	
Type		Dataset			
Applications and users		Climate Modelling, CDR Generating entities, NMHSs Consider as input to the CMIP model inter-comparisons (Obs4MIP) which will be underway for the IPCC AR6.			
Characteristics and Methods		The data set will be the Jacobian weighted upper tropospheric relative humidity roughly in the layer between 500 and 200 hPa which is derived from the radiances as described in Buehler and John (2005). It will be compared with the same quantity from model fields using a satellite simulator approach (e.g., COSP). Daily mean - ascending and descending passes separated data will be provided.			
Record length / Period		1993 – 2013			
Comments		Comparison numbers for accuracy are global means.			
Traceability of Requirements		From WMO database, SAF/CM/UKMO/RR/2.14, v1.2, dated 15.01.2015			
Input satellite data		AMSU-B, MHS, SSM/T2, FCDRs for channel 12.			
Dissemination					
Format		Means		Type	
Netcdf CF		FTP, Web		offline	
Accuracy					
Threshold		Target		Optimal	
Bias: 15%		Bias: 10%		Bias: 5%	
Verification method		compare with reference in-situ data, e.g., GRUAN.			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
global	1x1°		n/a	N/A	

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9. Discontinued and superseded CM SAF products and data sets

This section provides the entries of all discontinued¹ and superseded² CM SAF products and data sets.

CM-01		Fractional Cloud Cover		CFC_SEVIRI_Europe	
Type		Product			
Applications and users		NMHSs, Government agencies, Private & Public Sector			
Characteristics and Methods		Daily Mean, Monthly Mean, Monthly Mean Diurnal Cycle			
Comments		PRODUCT SUPERSEDED BY CM-02			
Generation frequency		1 day, 1 month			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
20% bias		10% bias		10% bias	
40% bc-rms (MM)		20% bc-rms (MM)		15% bc-rms (MM)	
30% bias		15% bias		10% bias	
40% bc-rms (DM)		20% bc-rms (DM)		15% bc-rms (DM)	
Verification method		Comparisons to SYNOP data (results computed as areal means over the studied area)			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	
Europe		(15 km) ²		Timeliness	
				2 month	


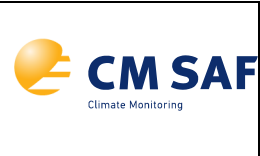
CM-07		Cloud Type		CTY_SEVIRI_Europe	
Type		Product			
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle			
Comments		PRODUCT SUPERSEDED BY CM-08			
Generation frequency		1 day, 1 month			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
HDF55		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
30% bias		15% bias		10% bias	
50% bc-rms (MM)		35% bc-rms (MM)		25% bc-rms (MM)	
40% bias		25% bias		15% bias	
50% bc-rms (DM)		35% bc-rms (DM)		25% bc-rms (DM)	
Verification method		Comparisons to MODIS data (results computed as areal means over the studied area)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Europe	(15 km) ²			N/A	

² For definition of term „superseded“ and „discontinued“ see section 1.3.

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CM-08		Cloud Type		CTY_SEVIRI
Type		Product		
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector		
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle		
Comments		The Accuracy is defined as the Mean error (i.e., defined in % cloud amount units – where CTY is given as the contribution to CFC) and precision is defined as the Bias-corrected RMS error. PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 day, 1 month		
Input satellite data		SEVIRI		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
30% bias		15% bias		10% bias
50% bc-rms (MM)		35% bc-rms (MM)		25% bc-rms (MM)
55% bc-rms (DM)		40% bc-rms (DM)		30% bc-rms (DM)
Verification method		Comparisons to MODIS data (results computed as areal means over the studied area)		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk	(15 km) ²			2 month

CM-09		Cloud Type		CTY_AVHRR_Europe	
Type		Product			
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Daily Mean Monthly Mean			
Comments		The Accuracy is defined as the Mean error (i.e., defined in % cloud amount units – where CTY is given as the contribution to CFC) and precision is defined as the Bias-corrected RMS error. PRODUCT DISCONTINUED (01.03.2012)			
Generation frequency		1 day, 1 month			
Input satellite data		AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
30% bias		15% bias		10% bias	
50% bc-rms (MM)		35% bc-rms (MM)		25% bc-rms (MM)	
55% bc-rms (DM)		40% bc-rms (DM)		30% bc-rms (DM)	
Verification method		Comparisons to MODIS data (results computed as areal means over the studied area)			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	
Europe		(15 km) ²		Timeliness	
				2 month	

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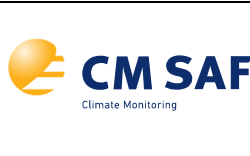
CM-10		Cloud Type		CTY_AVHRR_Arctic	
Type		Product			
Applications and users		* Climate Research * NMHSs			
Characteristics and Methods		Daily Mean Monthly Mean			
Comments		The Accuracy is defined as the Mean error (i.e., defined in % cloud amount units – where CTY is given as the contribution to CFC) and precision is defined as the Bias-corrected RMS error. PRODUCT DISCONTINUED (01.03.2012)			
Generation frequency		1 day, 1 month			
Input satellite data		AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
50% bias		25% bias		15% bias	
60% bc-rms (MM)		30% bc-rms (MM)		20% bc-rms (MM)	
65% bc-rms (DM)		35% bc-rms (DM)		25% bc-rms (DM)	
Verification method					
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution		Timeliness
Arctic	(15 km) ²				2 month

CM-13		Cloud Top Temperature	CTT_SEVIRI_Europe
Type	Product		
Applications and users	* NMHSs * Government agencies * Private Sector * Public Sector		
Characteristics and Methods	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle		
Comments	PRODUCT SUPERSEDED BY CM-14		
Generation frequency	1 day, 1 month		
Input satellite data	SEVIRI		
Dissemination			
Format	Means	Type	
HDF55	FTP, CD-ROM, Email	offline	
Accuracy			
Threshold	Target	Optimal	
4/6/10 K bias 6/9/13 K bc-rms (MM) 5/8/12 K bias 6/9/13 K bc-rms (DM)	2/3/5 K bias 5/7/9 K bc-rms (MM) 3/4/6 K bias 5/7/9 K bc-rms (DM)	1/2/4 K bias 3/4/6 K bc-rms (MM) 2/3/5 K bias 3/4/6 K bc-rms (DM)	
Verification method	no comparison needed		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Europe	(15 km) ²		N/A

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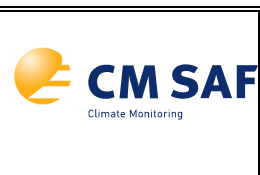
CM-19		Cloud Top Height		CTH_SEVIRI_Europe	
Type		Product			
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle			
Comments		PRODUCT SUPERSEDED BY CM-14			
Generation frequency		1 day, 1 month			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
HDF55		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
30% bias 3000m bc-rms (MM) 40% bias 3000m bc-rms (DM)		15% bias 1500m bc-rms (MM) 20% bias 1500m bc-rms (DM)		10% bias 1000m bc-rms (MM) 15% bias 1000m bc-rms (DM)	
Verification method		Comparisons to MODIS data (results computed as areal means over the studied area)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Europe	(15 km) ²			N/A	

CM-25		Cloud Top Pressure	CTP_SEVIRI_Europe
Type		Product	
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector	
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle	
Comments		PRODUCT SUPERSEDED BY CM-14	
Generation frequency		1 day, 1 month	
Input satellite data		SEVIRI	
Dissemination			
Format	Means		Type
HDF55	FTP, CD-ROM, Email		offline
Accuracy			
Threshold	Target		Optimal
60/90/110 hPa bias 90/120/140 hPa bc-rms (MM) 80/110/130 hPa bias 90/120/140 hPa bc-rms (DM)	30/45/55 hPa bias 50/70/85 hPa bc-rms (MM) 40/55/65 hPa bias 50/70/85 hPa bc-rms (DM)		20/30/35 hPa bias 40/50/60 hPa bc-rms (MM) 30/40/45 hPa bias 40/50/60 hPa bc-rms (DM)
Verification method	no comparison needed		
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Europe	(15 km) ²		N/A

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CM-31		Cloud Optical Thickness		COT_SEVIRI_Europe	
Type		Product			
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle			
Comments		PRODUCT SUPERSEDED BY CM-32			
Generation frequency		1 day, 1 month			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
HDF55		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
20% bias 50% precision (MM) 25% bias 50% precision (DM)		10% bias 20% precision (MM) 15% bias 20% precision (DM)		05% bias 15% precision (MM) 10% bias 15% precision (DM)	
Verification method		Comparisons to MODIS data (results computed as areal means over the studied area)			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Europe	(15 km) ²			N/A	

CM-32		Cloud Optical Thickness		COT_SEVIRI
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle		
Comments		The bias and rms are defined for the Meteosat disk as relative difference to the comparative datasets. PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 day, 1 month		
Input satellite data		SEVIRI		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
bias: 40% rms: 70%		bias: 20% rms: 40%		bias: 10% rms: 30%
Verification method		Comparisons to MODIS data.		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness
Meteosat disk	(15 km) ²			2 month

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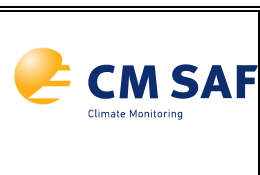
CM-36 Cloud Phase CPH_SEVIRI	
Type	Product
Applications and users	<ul style="list-style-type: none"> * Climate Research * NMHSs * Government agencies
Characteristics and Methods	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle
Comments	The bias and rms are defined for the Meteosat disk as absolute difference (of water cloud fraction) to the comparative datasets. PRODUCT DISCONTINUED (01.03.2012)
Generation frequency	1 day, 1 month
Input satellite data	SEVIRI
Dissemination	
Format	Means Type
HDF5	FTP, CD-ROM, Email offline
Accuracy	
Threshold	Target Optimal
bias: 0.1 rms: 0.2	bias: 0.05 rms: 0.1 bias: 0.02 rms: 0.05
Verification method	Comparisons to MODIS data.
Coverage, resolution and timeliness	
Spatial coverage	Spatial resolution Vertical resolution Timeliness
Meteosat disk	(15 km) ² 2 month

CM-40		Cloud Water Path	CWP_SEVIRI_Europe
Type		Product	
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector	
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle	
Comments		PRODUCT SUPERSED BY CM-41	
Generation frequency		1 day, 1 month	
Input satellite data		SEVIRI	
Dissemination			
Format		Means	Type
HDF55		FTP, CD-ROM, Email	offline
Accuracy			
Threshold		Target	Optimal
20 g/m ² bias 40 g/m ² precision (MM) 25 g/m ² bias 40 g/m ² precision (DM)		10 g/m ² bias 15 g/m ² precision (MM) 15 g/m ² bias 15 g/m ² precision (DM)	5 g/m ² bias 10 g/m ² precision (MM) 10 g/m ² bias 10 g/m ² precision (DM)
Verification method		Comparisons to MODIS data (results computed as areal means over the studied area)	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Europe	(15 km) ²		N/A

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CM-41		Liquid Water Path		LWP_SEVIRI
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle		
Comments		The bias and rms are defined for the Meteosat disk as relative difference to the comparative datasets. PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 day, 1 month		
Input satellite data		SEVIRI		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
bias: 40% rms: 70%		bias: 20% rms: 40%		bias: 10% rms: 30%
Verification method		Comparisons to MODIS data		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk	(15 km) ²			2 month

CM-48		Surface incoming shortwave radiation		SIS_SEVIRI_Europe	
Type		Product			
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle			
Comments		PRODUCT SUPERSED BY CM-49			
Generation frequency		1 day, 1 month			
Input satellite data		SEVIRI/GERB			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
15 W/m ² 25 W/m ² daily mean		10 W/m ² 20 W/m ² daily mean		8 W/m ² 15 W/m ² daily mean	
Verification method		comparison with in-situ measurements			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Europe	(15 km) ²			2 month	

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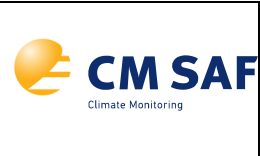
CM-51		Surface incoming shortwave radiation		SIS_merged
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector		
Characteristics and Methods		Merged product Monthly Mean		
Comments		PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 month		
Input satellite data		SEVIRI/GERB, AVHRR		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ²		10 W/m ²		8 W/m ²
Verification method		comparison with in-situ measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk and Northern Europe	(15 km) ²			2 month

CM-55		Surface Albedo		SAL_SEVIRI_Europe	
Type		Product			
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Weekly Mean Monthly Mean			
Comments		PRODUCT SUPERSED BY CM-56			
Generation frequency		1 week, 1 month			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
50% (relative)		25% (relative)		20% (relative)	
Verification method		continuous validation at mast measurement sites & field campaigns			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Europe	(15 km) ²			N/A	

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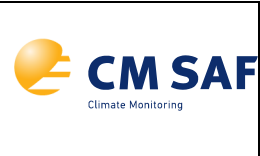
CM-56		Surface Albedo		SAL_SEVIRI
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Weekly Mean Monthly Mean		
Comments		PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 week, 1 month		
Input satellite data		SEVIRI		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
50% (relative)		25% (relative)		20% (relative)
Verification method		Continuous validation at mast measurement sites & field campaigns. Comparisons over Africa are very limited due to missing mast data. Comparisons to other satellite data are attempted. It is expected that the quality of SAL is not reduced except in desert regions.		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness
Meteosat disk	(15 km) ²			2 month

CM-58		Surface Albedo		SAL_merged			
Type		Product					
Applications and users		* Climate Research * NMHSs * Government agencies					
Characteristics and Methods		Merged Product Monthly Mean					
Comments		PRODUCT DISCONTINUED (01.03.2012)					
Generation frequency		1 month					
Input satellite data		SEVIRI, AVHRR					
Dissemination							
Format		Means		Type			
HDF5		FTP, CD-ROM, Email		offline			
Accuracy							
Threshold		Target		Optimal			
50% (relative)		25% (relative)		20% (relative)			
Verification method		Continuous validation at mast measurement sites & field campaigns of the components CM-57 and CM-56.					
Coverage, resolution and timeliness							
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness	
Meteosat disk, Northern Europe		(15 km) ²				2 month	

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CM-63				Surface Net Shortwave Radiation		SNS_SEVIRI_Europe	
Type		Product					
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector					
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle					
Comments		PRODUCT SUPERSED BY CM-64					
Generation frequency		1 day, 1 month					
Input satellite data		SEVIRI/GERB					
Dissemination							
Format		Means			Type		
HDF5		FTP, CD-ROM, Email			offline		
Accuracy							
Threshold		Target			Optimal		
20 W/m ² 30 W/m ² daily mean		15 W/m ² 25 W/m ² daily mean			12 W/m ² 20 W/m ² daily mean		
Verification method		calculated based on accuracies of SAL and SIS					
Coverage, resolution and timeliness							
Spatial coverage	Spatial resolution		Vertical resolution		Timeliness		
Europe	(15 km) ²				N/A		

CM-64		Surface Net Shortwave Radiation		SNS_SEVIRI	
Type		Product			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Daily Mean Monthly Mean Monthly Mean Diurnal Cycle			
Comments		PRODUCT DISCONTINUED (01.03.2012)			
Generation frequency		1 day, 1 month			
Input satellite data		SEVIRI/GERB			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
20 W/m ² 30 W/m ² daily mean		15 W/m ² 25 W/m ² daily mean		12 W/m ² 20 W/m ² daily mean	
Verification method		calculated based on accuracy of SAL and SIS			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	Timeliness
Meteosat disk		(15 km) ²			2 month

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CM-66		Surface Net Shortwave Radiation		SNS_merged	
Type		Product			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Merged product Monthly Mean			
Comments		PRODUCT DISCONTINUED (01.03.2012)			
Generation frequency		1 month			
Input satellite data		SEVIRI, AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
20 W/m ²		15 W/m ²		12 W/m ²	
Verification method		calculated based on accuracy of SAL and SIS			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	Timeliness
Meteosat disk, Northern Europe		(15 km) ²			2 month

CM-70		Surface Outgoing Longwave Radiation		SOL_SEVIRI_Europe
Type		Product		
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector		
Characteristics and Methods		Monthly Mean Monthly Mean Diurnal Cycle		
Comments		PRODUCT SUPERSED BY CM-71		
Generation frequency		1 day, 1 month		
Input satellite data		NWP (SEVIRI)		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ²		10 W/m ²		8 W/m ²
Verification method		comparison with in-situ measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Europe	(15 km) ²			N/A

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CM-71 Surface Outgoing Longwave Radiation SOL_SEVIRI	
Type	Product
Applications and users	<ul style="list-style-type: none"> * Climate Research * NMHSs * Government agencies
Characteristics and Methods	Monthly Mean Monthly Mean Diurnal Cycle
Comments	PRODUCT DISCONTINUED (01.03.2012)
Generation frequency	1 month
Input satellite data	NWP (SEVIRI)
Dissemination	
Format	Means Type
HDF5	FTP, CD-ROM, Email offline
Accuracy	
Threshold	Target Optimal
15 W/m ²	10 W/m ² 8 W/m ²
Verification method	comparison with in-situ measurements
Coverage, resolution and timeliness	
Spatial coverage	Spatial resolution Vertical resolution Timeliness
Meteosat disk	(15 km) ² 2 month

CM-72 Surface Outgoing Longwave Radiation SOL_AVHRR_Europe	
Type	Product
Applications and users	<ul style="list-style-type: none"> * Climate Research * NMHSs * Government agencies
Characteristics and Methods	Monthly Mean
Comments	PRODUCT DISCONTINUED (01.03.2012)
Generation frequency	1 month
Input satellite data	NWP (AVHRR)
Dissemination	
Format	Means Type
HDF5	FTP, CD-ROM, Email offline
Accuracy	
Threshold	Target Optimal
15 W/m ²	10 W/m ² 8 W/m ²
Verification method	comparison with in-situ measurements
Coverage, resolution and timeliness	
Spatial coverage	Spatial resolution Vertical resolution Timeliness
Europe	(15 km) ² 2 month

 <p>The EUMETSAT Network of Satellite Application Facilities</p>	<p>SAF on CLIMATE MONITORING</p> <p>CDOP 2 Product Requirements Document</p>	<p>Doc. No.: SAF/CM/DWD/PRD</p> <p>Issue: 2.9</p> <p>Date: 09.09.2016</p>
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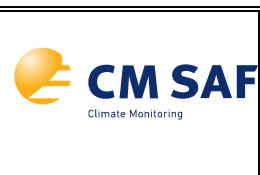
CM-73		Surface Outgoing Longwave Radiation		SOL_merged	
Type		Product			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Monthly Mean			
Comments		PRODUCT DISCONTINUED (01.03.2012)			
Generation frequency		1 month			
Input satellite data		NWP (SEVIRI, AVHRR)			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
15 W/m ²		10 W/m ²		8 W/m ²	
Verification method		comparison with in-situ measurements			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	Timeliness
Meteosat disk, Northern Europe		(15 km) ²			2 month

CM-77		Surface Downward Longwave Radiation		SDL_SEVIRI_Europe	
Type		Product			
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Monthly Mean Monthly Mean Diurnal Cycle			
Comments		PRODUCT SUPERSED BY CM-78			
Generation frequency		1 month			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
15 W/m ²		10 W/m ²		8 W/m ²	
Verification method		comparison with in-situ measurements			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Europe	(15 km) ²			N/A	

 <p>The EUMETSAT Network of Satellite Application Facilities</p>	<p>SAF on CLIMATE MONITORING</p> <p>CDOP 2 Product Requirements Document</p>	<p>Doc. No.: SAF/CM/DWD/PRD</p> <p>Issue: 2.9</p> <p>Date: 09.09.2016</p>
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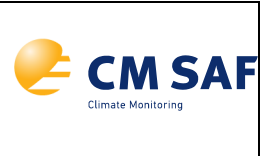
CM-78		Surface Downward Longwave Radiation		SDL_SEVIRI
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Monthly Mean Monthly Mean Diurnal Cycle		
Comments		PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 month		
Input satellite data		SEVIRI		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ²		10 W/m ²		8 W/m ²
Verification method		Comparison with in-situ measurements. Only a few reliable operational in-situ measurements are available in Africa. The target accuracy is based on the comparison at available stations and is not necessarily valid everywhere in Africa. However, it is not expected that the quality is greatly reduced over Africa.		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness
Meteosat disk	(15 km) ²			2 month

CM-79		Surface Downward Longwave Radiation		SDL_AVHRR_Europe
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Monthly Mean		
Comments		PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 month		
Input satellite data		AVHRR		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ²		10 W/m ²		8 W/m ²
Verification method		comparison with in-situ measurements		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Europe	(15 km) ²			2 month

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CM-80		Surface Downward Longwave Radiation		SDL_merged
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Merged product Monthly Mean		
Comments		PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 month		
Input satellite data		SEVIRI, AVHRR		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
15 W/m ²		10 W/m ²		8 W/m ²
Verification method		Comparison with in-situ measurements of components CM-79 and CM-78.		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk, Northern Europe	(15 km) ²			2 month

CM-84 Surface Net Longwave Radiation SNL_SEVIRI_Europe			
Type		Product	
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector	
Characteristics and Methods		Monthly Mean Monthly Mean Diurnal Cycle	
Comments		PRODUCT SUPERSED BY CM-85	
Generation frequency		1 month	
Input satellite data		SEVIRI	
Dissemination			
Format		Means	Type
HDF5	FTP, CD-ROM, Email		offline
Accuracy			
Threshold		Target	Optimal
20 W/m ²	15 W/m ²		12 W/m ²
Verification method		calculated based on accuracy of SOL and SDL	
Coverage, resolution and timeliness			
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness
Europe	(15 km) ²		N/A

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CM-85		Surface Net Longwave Radiation		SNL_SEVIRI
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Monthly Mean Monthly Mean Diurnal Cycle		
Comments		PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 month		
Input satellite data		SEVIRI		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
20 W/m ²		15 W/m ²		12 W/m ²
Verification method		calculated based on accuracy of SOL and SDL		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness
Meteosat disk	(15 km) ²			2 month

CM-86		Surface Net Longwave Radiation		SNL_AVHRR_Europe	
Type		Product			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Monthly Mean			
Comments		PRODUCT DISCONTINUED (01.03.2012)			
Generation frequency		1 month			
Input satellite data		AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
20 W/m ²		15 W/m ²		12 W/m ²	
Verification method		calculated based on accuracy of SOL and SDL			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Europe	(15 km) ²			2 month	

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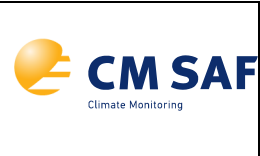
CM-87		Surface Net Longwave Radiation		SNL_merged	
Type		Product			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Merged product, Monthly Mean			
Comments		PRODUCT DISCONTINUED (01.03.2012)			
Generation frequency		1 month			
Input satellite data		SEVIRI, AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
20 W/m ²		15 W/m ²		12 W/m ²	
Verification method		calculated based on accuracy of SOL and SDL			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	Timeliness
Meteosat disk, Northern Europe		(15 km) ²			2 month

CM-91		Surface Radiation Budget		SRB_SEVIRI_Europe	
Type		Product			
Applications and users		* NMHSs * Government agencies * Private Sector * Public Sector			
Characteristics and Methods		Monthly Mean Monthly Mean Diurnal Cycle			
Comments		PRODUCT SUPERSED BY CM-92			
Generation frequency		1 month			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
25 W/m ²		20W/m ²		15 W/m ²	
Verification method					
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Europe	(15 km) ²			N/A	

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CM-92		Surface Radiation Budget		SRB_SEVIRI	
Type		Product			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Monthly Mean Monthly Mean Diurnal Cycle			
Comments		PRODUCT DISCONTINUED (01.03.2012)			
Generation frequency		1 month			
Input satellite data		SEVIRI			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
25 W/m ²		20W/m ²		15 W/m ²	
Verification method		Calculated based on accuracy of components			
Coverage, resolution and timeliness					
Spatial coverage		Spatial resolution		Vertical resolution	Timeliness
Meteosat disk		(15 km) ²			2 month

CM-93		Surface Radiation Budget		SRB_AVHRR_Europe	
Type		Product			
Applications and users		* Climate Research * NMHSs * Government agencies			
Characteristics and Methods		Monthly Mean			
Comments		PRODUCT DISCONTINUED (01.03.2012)			
Generation frequency		1 month			
Input satellite data		AVHRR			
Dissemination					
Format		Means		Type	
HDF5		FTP, CD-ROM, Email		offline	
Accuracy					
Threshold		Target		Optimal	
25 W/m ²		20W/m ²		15 W/m ²	
Verification method		Calculated based on accuracy of components			
Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution		Vertical resolution	Timeliness	
Europe	(15 km) ²			2 month	

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CM-94		Surface Radiation Budget		SRB_merged
Type		Product		
Applications and users		* Climate Research * NMHSs * Government agencies		
Characteristics and Methods		Merged product, Monthly Mean		
Comments		PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 month		
Input satellite data		SEVIRI, AVHRR		
Dissemination				
Format		Means		Type
HDF5		FTP, CD-ROM, Email		offline
Accuracy				
Threshold		Target		Optimal
25 W/m ²		20W/m ²		15 W/m ²
Verification method		Calculated based on accuracy of components		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness
Meteosat disk, Northern Europe	(15 km)			2 month

CM-112		Incoming Solar Radiative Flux at the top of Atmosphere		TIS_merged
Type		Product		
Applications and users		* Climate Research * NMHSs		
Characteristics and Methods		Daily mean Monthly Mean Monthly Mean Diurnal Cycle		
Comments		The accuracy is given as the (maximum absolute) bias. PRODUCT DISCONTINUED (01.03.2012)		
Generation frequency		1 day, 1 month		
Input satellite data		DIARAD/VIRGO		
Dissemination				
Format		Means		Type
HDF5		FTP		offline
Accuracy				
Threshold		Target		Optimal
5 W/m ²		1 W/m ²		0.5 W/m ²
Verification method		Intercomparison of absolute radiometers		
Coverage, resolution and timeliness				
Spatial coverage	Spatial resolution	Vertical resolution	Timeliness	
Meteosat disk, Northern Europe	(45 km) ²		4 month	

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10. Traceability of Requirements

This section gives additional information on the traceability of requirements beyond the text in the table of section 8.

10.1. CM-141 (Near surface specific humidity)

Bias and RMS product requirements are taken from WMO GCOS (2010) for “specific humidity profile – lower troposphere” and Saunders et al. (2010) for “water vapour profiles – lower troposphere (climate research)”.


For the requirement on decadal stability the following is considered: The functional relationship between saturation water vapour pressure and temperature expressed by the Clausius-Clapeyron equation leads to the expectation that specific humidity will increase by 7% per 1K increase of the global mean temperature. The IPCC AR-4 climate models give a range of 1.4 to 5.8 K (with a mean of 0.36 K) warming over the 21st century (Meehl et al., 2007). Transforming this with Clausius-Clapeyron to an increase of specific humidity, we arrive at some 2.52% increase per decade. The target and threshold product requirements are then determined by multiplying the expected water vapour change per change in temperature with the average and maximum expected temperature change and a factor of 0.2 as proposed in Ohring et al. (2005). Finally, the threshold product requirement is rounded.

10.2. CM-142 (Surface wind speed)

Bias product requirements are taken from WMO GCOS (2010). The RMS optimum and threshold product requirements are taken from JCOMM TR (2002). It is argued in JCOMM TR (2003) that in order to reach requirements on heat fluxes wind speed must be known with an accuracy of 0.5 m/s which is a “stringent requirement” and not expected to be met. The threshold RMS is the maximum RMS from their Table 1. The target RMS product requirement is a requirement for scatterometers (Dickinson et al., 2001 and Gelsthorpe et al., 2000). The optimum and target stability product requirement are determined by taking the trend values given in Thomas et al. (2008) and applying a factor of 0.2 (Ohring et al., 2005) and from GCOS-107, respectively. The threshold stability product requirement is determined by multiplying the target requirement with a factor of 2. Note that the GCOS-107 target stability requirement for upper air wind is 2 m/s.

10.3. CM-143 (Latent heat flux)

The optimum bias product requirement (LHF) is taken from Curry et al. (2004). The target and threshold bias product requirement are determined by wind and near surface specific humidity error propagation through the bulk aerodynamic formula – the target is defined by the maximum impact of the individual biases and the threshold by the sum of both impacts. The RMS optimum product requirement (LHF) is taken from JCOMM TR (2002). The RMS target and threshold product requirements are determined by applying a Student’s t-test using the bias product requirements and t values tabulated in von Storch and Zwiers (1999). Note that this approach would result in an optimum requirement of 11 W/m² what is very similar to the requirement given in JCOMM TR (2002). Roads et al. (2007) provides annual RMS values for the Water and Energy Budget Study variables, among them latent heat flux. An appropriate scaling of the annual RMS value results in an RMS=22.5 W/m². This is between the target and threshold product requirement. The optimum and target stability product requirements are determined

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based on trend estimates given in Yu and Weller (2007) and applying the Ohring et al. (2005) approach. The threshold stability requirement is estimated through error propagation from evaporation (see section 10.5 for user requirements related to evaporation).

10.4. CM-144 (Precipitation)

Bias product requirements are taken from WMO GCOS (2010), scaled to change units and rounded (from 0.08 to 0.1 mm/d and from 0.24 to 0.25 mm/d). The RMS product requirement are determined by applying a Student's t-test using the bias product requirements and t values tabulated in von Storch and Zwiers (1999). Roads et al. (2007) provided annual RMS values for the Water and Energy Budget Study variables, among them precipitation. An appropriate scaling of the annual RMS value results in an RMS=2.28 mm/d. This is slightly larger than our threshold product requirement. The optimum stability product requirement is taken from Ohring et al. (2005), again scaled to change units. The target stability product requirement is estimated by using the requirement given in GCOS-107 and an average global precipitation of 2.83 mm/d (Meehl et al., 2007). The threshold stability product requirement is determined by multiplying the target requirement with a factor of 2. Wentz et al. (2007) found that precipitation will increase by 7.4% per 1K increase of the global mean temperature. Transforming this as outlined for near surface specific humidity gives a requirement of 0.024 mm/d/decade which is similar to the product requirement.

10.5. CM-145 (Evaporation)



The bias product requirements for evaporation are determined from LHF requirements by applying error propagation. The RMS product requirements are determined by applying a Student's t-test as outlined above. Roads et al. (2007) provides annual RMS values for the Water and Energy Budget Study variables, among them evaporation. An appropriate scaling of the annual RMS value results in an RMS=0.76 mm/d. This is between the target and threshold product requirement. The optimum and target product requirement is identical to the corresponding precipitation requirement. The threshold is estimated from trend estimates given in Röckner et al. (2001) applying the Ohring et al. (2005) approach. Held and Soden (2006) state that evaporation might increase by 2% per 1K increase of the global mean temperature. Transforming this as outlined for near surface specific humidity gives a requirement of 0.006 to 0.009 mm/d/decade which is similar to the given product requirements.

10.6. CM-146 (E-P (freshwater flux))

The bias and stability product requirements for the freshwater flux are taken from precipitation and evaporation: for the optimum the minimum, for the target the maximum and for the threshold the sum of both requirements are used. Held and Soden (2006) derive an equation which links evaporation, precipitation and freshwater fluxes. Applying their equation and further proceed as outlined for near surface specific humidity gives a requirement of 0.006 mm/d/decade which is similar to the given product requirements. The RMS product requirements are determined by applying a Student's t-test as outlined above.

10.7. CM-150 (SSM/I FCDR)

The optimum and target as well as threshold product requirements are taken from MRD (2010) and Ohring et al. (2005), respectively. The optimum RMS product requirement is identical to the strongest noise requirements given in EPS-SG UR (2011). The average RMS in Table 2 in Amerault and Zou (2003) defines the target and the combined maximum RMS for SSM/I and the radiative transfer model, also given in Amerault and Zou (2003) the threshold product

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requirement. The optimum and target threshold product requirements are taken from Ohring et al. (2005). The threshold stability product requirement is determined by multiplying the target requirement with a factor of 2.

11. References

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12. List of abbreviations


Abbreviations	Meaning
AAPP	ATOVS and AVHRR Pre-processing Package
AERONET	AErosol RObotic NETwork
AIRS	Atmospheric InfraRed Sounder
AIX	Advanced Interactive eXecutive, operating system
AMSU-A	Advanced Microwave Sounding Unit-A
AMSU-B	Advanced Microwave Sounding Unit-B
AOD	Aerosol Optical Depth
ATBD	Algorithm Theoretical Basis Document
AQA	Annual Quality Assessment
ASDC	Atmospheric Science Data Center
ATOVS	Advanced TIROS Operational Vertical Sounder
AVHRR	Advanced Very High Resolution Receiver
bc-rms	bias corrected - root mean square deviation
BSRN	Baseline Surface Radiation Network
BSW	Bundesverband SolarWirtschaft (German Solar Industry Association)
BTR	Brightness Temperature Record
CAL	Cloud ALbedo
CALIPSO	Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations
CDOP	Continuous Development and Operations Phase
CDR	Climate Data Record
CERES	Clouds and Earth's Radiant Energy System
CFC	Fractional Cloud Cover
CFS	Cloud radiative eFfect Shortwave
CFL	Cloud radiative eFfect Longwave
CLAAS	CM SAF cLoud property dAtAset using SEVIRI
CLARA-A1	CM SAF cLoud, Albedo & RADIation data-et - AVHRR-based, Edition 1
Cld	Cloud products
CM	Climate Monitoring
CM SAF	Satellite Application Facility on Climate Monitoring
CoA	Cooperation Agreement
COARE	Coupled Ocean Atmosphere Response Experiment
COT	Cloud Optical Thickness
CPH	Cloud (Thermodynamic) PHase
CSR	Clear Sky Radiance
CTH	Cloud Top Height
CTO	Cloud TOP parameters
CTP	Cloud Top Pressure
CTT	Cloud Top Temperature
CTY	Cloud TYpe
CWP	Cloud (Liquid) Water Path
DAL	DAYLight
DEM	Digital Elevation Model
DIARAD	Dual Irradiance Absolute RADiometer
DMI	Danish Meteorological Institute
DOI	Digital Object Identifier
DRI	Delivery Readiness Inspection
DRR	Delivery Readiness Review
DWD	Deutscher Wetterdienst (German Meteorological Service)
EARS	EUMETSAT Advanced Retransmission Service
EASE-grid	Equal-Area Scalable Earth Grid

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Abbreviations	Meaning
ECMWF	European Centre for Medium-Range Weather Forecast
ECV	Essential Climate Variable
EDR	Environmental Data Record
EMP	Evaporation - Precipitation
EPS	Encapsulated Postscript
ERA	ECMWF Reanalysis
EUM	EUMETSAT
EUMETCast	EUMETSAT's Broadcast System for Environmental Data
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EUMETSAT EO	EUMETSAT Earth Observation
EURO4M	European Reanalysis and Observations for Monitoring
EVA	Evaporation
FAQ	Frequently Asked Questions
FAR	False Alarm Rate
FCDR	Fundamental Climate Data Record
FMI	Finnish Meteorological Institute
FTH	Free Tropospheric Humidity
ftp	file transfer protocol
GAC	Global Area Coverage
GB	Gigabyte
GCOS	Global Climate Observing System
GEOTOPO	Geotopography
GERB	Geostationary Earth Radiation Budget
GIZ	Deutschen Gesellschaft für Internationale Zusammenarbeit (German Association for International cooperation)
GME	Global Model Extended
GTS	Global Telecommunication System
GTZ	Gesellschaft für technische Zusammenarbeit (now: GIZ)
GUAN	GCOS Upper-Air Network
HDF5	Hierarchical Data Format 5
HIRS	High-resolution Infrared Radiation Sounder
HLW	Layered water vapour in 5 layers
HOAPS	The Hamburg Ocean Atmosphere Fluxes and Parameters from Satellite data
HSH	Specific humidity and temperature at 6 pressure levels
HTTP	HyperText Transfer Protocol
HTW	Vertical integrated water vapour information
IAPP	International ATOVS Processing Package
IBM	International Business Machines, International Board meeting
IFS	Interchange File Separator
IPCC AR4	Intergovernmental Panel on Climate Change Assessment Report 4
ISCCP	International Satellite Cloud Climatology Project
ISCT	Interdisciplinary Scientific Environmental Technology
IWP	Ice Water Path
JCH	Joint Cloud Histogram
JCOMM TR	Joint Technical Commission for Oceanography and Marine Meteorology Technical Report
JRC	Joint Research Centre
KNMI	Koninklijk Nederlands Meteorologisch Instituut (Royal Meteorological Institute of the Netherlands)
LE	Leading Entity
LHF	Latent Heat Flux
LIDAR	Light detection and ranging
LMD	Laboratory of Dynamic Meteorology
LSA SAF	Land Surface Analysis Satellite Applications Facility
LWP	Vertically integrated liquid water
MAB	Meteorological Airport Briefing
MAD	Mean Absolute Difference

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Abbreviations	Meaning
MAGIC	Mesoscale Atmospheric Global Irradiance Code
MARS	Meteorological Archival and Retrieval System
METEOSAT	Meteorological Satellite
MeteoSwiss	Meteorological Service of Switzerland
MetOp	Meteorological Operational Polar Satellite of EUMETSAT
MHS	Microwave Humidity Sounder
MiKlip	Medium Range Climate Prediction
MODIS	Moderate Resolution Imaging Spectroradiometer
MPEF	Meteorological Products Extraction Facility
MSG	Meteorological Satellite Second Generation
MVIRI	Meteosat Visible and InfraRed Imager
MWR	Microwave Radiometer or Millimeter Wave Radar
NCR	Non Conformance Report
netcdf	network common data form
NIR	Near-InfraRed
NMHS	National Meteorological and Hydrological Service
NOAA	National Oceanic & Atmospheric Administration
NSH	Near Surface Humidity
NWC SAF	SAF in Support to Nowcasting and Very Short Range Forecasting
NWP	Numerical Weather Prediction
OP	OPERational
OpsRep	Operations Report
OR	Operation Reviews
OSI SAF	Ocean and Sea Ice Satellite Application Facility
PA	Product Availability
PATMOS-x	Pathfinder Atmospheres Extended
PC	Product Completeness
PIK	Potsdam-Institut für Klimafolgenforschung (Potsdam Institute for Climate Impact Research)
PO	Pre-Operational
POD	Probability Of Detection
POES	Polar-orbiting Operational Environmental Satellites
PP	Project Plan
PPS	Polar Platform System
PRD	Product Requirement Document
PRE	Precipitation
PUM	Product User Manuals
Rad	surface Radiation product
RCC	Regional Climate Centre
RD	Reference Documents
REFF	Effective radius
RMIB	Royal Meteorological Institute of Belgium
RMS	Root mean square deviation
RR	Requirement Review
RT	Response Time
RTM	Radiative Transfer Model
SAF	Satellite Application Facility
SAL	Surface ALbedo
SARAH	Surface Solar Radiation Data Set - Heliosat
SCOPE CM	Sustained Coordinated Processing of Environmental satellite data for climate monitoring
SCR	System Change Reports
SDL	Surface Downward Long-Wave Radiation
SeSp	Service Specification
SEVIRI	Spinning Enhanced Visible and Infrared Imager
Sfc	Surface
SID	Surface Incoming Direct radiation

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Abbreviations	Meaning
SIS	Solar Incoming Surface radiation
SMAC	Simplified Method for Atmospheric Correction
SMHI	Swedish Meteorological and Hydrological Institute
SMMR	Scanning Multichannel Microwave Radiometer
SMR	Software Modification Report
SNL	Surface Net Long-wave radiation
SNS	Surface Net Short-wave radiation
SOL	Surface Outgoing Long-wave radiation
SPR	Software Problem Reports
SRB	Surface Radiation Budget
SRI	Spectral Resolved Irradiance
SS	Service Specification
SSMI	Special Sensor Microwave Image
SSMIS	Special Sensor Microwave Imager Sounder
SSM/I	Special Sensor Microwave Imager
SSM/T2	Special Sensor Microwave/Temperature & Humidity Profile
SST	Sea Surface Temperature
SW	SoftWare
SWS	near Surface Wind Speed
SYNOP	Surface synoptic observations
SZA	Sun Zenith Angle
tbc	To be continued
tbd	To be done
TCDR	Thematic Climate Data Record
TET	Emitted Thermal radioactive flux at the Top of the atmosphere
TIROS	Television InfraRed Observation Satellite
TIS	Incoming Solar radioactive flux at the Top of the atmosphere
TOA	Top Of the atmosphere product
TRS	Reflected Solar radioactive flux at the Top of the atmosphere
UHD	User Help Desk
UK MetOffice	National Weather Service of the United Kingdom
UMARF	Unified Meteorological Archive and Retrieval Facility
UPR	User Problem Report
USGS	U.S. Geological Survey
UTC	Universal Time Coordinated
VAL	VALidation report
VIRGO	Variability of solar IRradiance and Gravity Oscillations
VIS	VIsible Spectrum
VS	Visiting Scientist
Wap	Water vapour and temperature products
WCRP	World Climate Research Programme
WMO	World Meteorological Organisation
WMP-RCC	WCRP Modeling Panel Regional Climate Centre
WUI	Web User Interface
WWW	World Wide Web / World Weather Watch (WMO)