EUMETSAT Satellite Application Facility on Climate Monitoring



CDOP 2

Product Requirements Document

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SAF/CM/DWD/PRD



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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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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
- 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.

	Accuracies as defined in Section 6.1 and 6.2			
Application area	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								
	AVHRR SSMI/SSMI			IS				TOVS/ATOVS	
	1	1xxr			12xxr				xxr
	Cld	SfcRad	FCDR		Prec.	Hum	Turb. Flux	Cld	hum
1xxxr		Table 6-3 Table 6-4	See Table 6	6-2	See Table 6-5		See Table 6-5		
	AMSU-B, MHS, SSM/T2, HIRS			S					
	14xxr								
	Humidity								
	See Table 6-5								
Geostat. Satellites				Ins	strumen	its			
	S	EVIRI	Not used			M	IVIRI+MSG	3	
	2	21xxr	22xxr				23xxr		
2xxxr	Cld A	Aer. Toa	Not used	cld	Ae	r	sfcrad	toa h	um oth
		Table 6-3 Table 6-4	n/a	,	See Table 6-3, Table 6-4, and Table 6-5			e 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
XXUII	Cloud mask	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 -	Not used	
		xx39r	Not useu	
xx27r -	Not used			
xx29r				

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 an	d 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_SEV									
Туре	Product	Product							
Applications and users			Governmen ector and Pu						
Characteristics and Met	hods		& Monthly M an Diurnal C						
Comments	defined in 9	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 mo	onth						
Input satellite data		SEVIRI							
Dissemination									
Format		Means	5	Туре					
HDF5	FTP,	CD-ROM offline			e				
		Accu	racy	-					
Threshold		Target			Optimal				
20% bias 40% bc-rms (MM) 45% bc-rms (DM)	10% 20% 25%	bias bc-rms (M bc-rms (D	,	10% 15% 20%	bias bc-rms (MM) bc-rms (DM)				
Verification method		parisons to SYNOP data (results computed as areal as over the studied area)							
C	overa	ge, resoluti	on and tim	elines	s				
Spatial coverage Spati	al reso	olution	Vertical resolution		Timeliness				
Meteosat disk (15 k	m) ²				2 month				

CM-03	Frac	tiona	l Cloud Co	ver		CFC AVHRR Euro	ope	
Туре			Product					
Applications and	d use	rs		& Governm Sector & Pu				
Characteristics Methods	and		Daily Mea	n & Monthl	у Меа	an		
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 free	uency	/	1 day, 1 n	nonth				
Input satellite of	lata		AVHRR					
			Dis	seminatio	n			
Format			Means			Type		
HDF5		FTP,	CD-ROM offline					
				Accuracy				
Threshold			Target			Optimal		
20% bias 40% bc-rms 45% bc-rms			bc-rms	` ,	10% 15% 20%	bc-rms (MM)		
Verification me			MODIS da studied ar		esults computed as areal			
Coverage, resolution and timeliness								
Spatial coverage	Spat	Spatial resolution		Vertical resolution		Timeliness		
Europe	(15 k	(m) ²				2 month		



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CM-04 F	Fracti	ional	Cloud Co	ver	-	CFC_AVHRR_Arctic
Туре		Product				
Applications and	users	;	* Climate * NMHSs	Research		
Characteristics as Methods	nd		Daily Mear Monthly M			
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 frequ	ency		1 day, 1 m	nonth		
Input satellite da	ita		AVHRR			
Dissemination						
Format			Means		Туре	
HDF5	ı	FTP,	CD-ROM offline			
			A	ccuracy		
Threshold			Target		Optimal	
30% bias 40% bc-rms (N 45% bc-rms (D	MM)	20% 30% 35%	bias bc-rms (bc-rms (,	15% 20% 25%	bc-rms (MM)
Verification meth	consi datas - pos	arily comparisons with SYNOP but complemented with istency checks against MODIS and Cloudsat/CALIPSO sets are sibly complemented with comparison to ARM site data IPY observations				
	(Cove	rage, reso	olution and	d tim	eliness
Spatial coverage	Spatia	patial resolution		Vertical resolution		Timeliness
Arctic ((15 kr	m) ²				2 month

CM-14	Cloud	Тор			•	CTO_SEVIRI	
Туре			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						e Mean error and as-corrected RMS error.	
Generation freque	ency		1 day, 1 mo	onth			
Input satellite dat	a		SEVIRI	SEVIRI			
			Dissem	ination	T		
Format			Means		Туре		
HDF5		FTP,	CD-ROM off		offline	ffline	
			Accu	racy	ı		
Threshold			Target		Optimal		
CTP: 90 hPa (bias), 120 rms) hPa (bc-rms) CTT: no specific rms) requirement as it represents same rms)): 45 hPa (bias), 70 hPa (bc-): Tms) CTP: 30 hPa (birms)				
			parisons to MODIS data (results computed as areal as over the studied area)				
	C	overa	ge, resoluti	ion and tim	eline	ss	
Spatial coverage Spatial resol			olution	Vertical resolution		Timeliness	
Meteosat disk	(15 k	m)²				2 month	



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CM-15 Cloud Top CTO_AVHRR_Europ							
Type	Ciou	u rop	Product			CTO_AVIIKK_LUIOPE	
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 free	quency	/	1 day, 1 n	nonth			
Input satellite	data		AVHRR				
Dissemination							
Format			Means		Туре		
HDF5		FTP,	P, CD-ROM		offline		
			ı	Accuracy			
Threshold			Target		Optimal		
CTP: 120 hPa (bias), 140 hPa (bc-rms) CTP: CTT: no specific (bc-rr requirement as it CTT: represents same as it i		d: 1000 m (bias), 1500 m -rms) 2: 80 hPa (bias), 100 hPa -rms) The specific requirement the trepresents same remation 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 me	•	parisons to MODIS data (results s over the studied area)		sults computed as areal			
		Cove	erage, res	olution an	d tim	neliness	
Spatial coverage	Spat	ial res	solution	Vertical resolution		Timeliness	
Europe	(15 k	cm) ²				2 month	

CM 46	CI-					CTO AVUIDD 4	
CM-16	Clou	d Top				CTO_AVHRR_Arctic	
Туре			Product				
Applications and	d user	S	* Climate * NMHSs	Research			
Characteristics and Methods		Cloud Top Cloud Top	Contains: Daily Mean and Monthly Mean for: Cloud Top Temperature (CTT) Cloud Top Height (CTH) Cloud Top Pressure (CTP)				
Comments						the Mean error and Bias-corrected RMS error.	
Generation freq	uency	,	1 day, 1 m	nonth			
Input satellite o	ata		AVHRR				
Dissemination							
Format	mat		Means		Туре		
HDF5		FTP,	CD-ROM	-ROM offlin		ne	
			Α	ccuracy			
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 CTT: as it r		: 110 hPa (bias), 130 hPa		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 Comparison means ove						sults computed as areal	
		Cove	rage, resc	olution and	d time	eliness	
Spatial coverage	Spat	ial res	solution	Vertical resolution		Timeliness	
Arctic	(15 k	cm) ²				2 month	



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CM-33	COT_AVHRR_Europe							
Туре	=		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 freq	uency	/	1 day, 1 n	nonth				
Input satellite d	lata		AVHRR					
			Dis	seminatio	n			
Format			Means		Туре			
HDF5		FTP,	CD-ROM offline		offlin	e		
				Accuracy				
Threshold			Target			Optimal		
bias: 40% rms: 70%			20% 40%	bias: 10% rms: 30%				
Verification met	hod	Com	parisons to	parisons to MODIS data.				
	Coverage, resolution and timeliness							
Spatial coverage	Spat	ial resolution		Vertical resolution		Timeliness		
Europe	(15 k	(m) ²				2 month		

CM-37	Clou	CPH_AVHRR_Europe						
Туре			Product					
Applications and users			* Climate Research * NMHSs * Government agencies					
Characteristics a Methods	and		Daily Mear Monthly M					
Comments			absolute d	The bias and rms are defined for the baseline area as absolute difference (of water cloud fraction) to the comparative datasets.				
Generation freq	uenc	y	1 day, 1 month					
Input satellite d	ata		AVHRR					
			Dis	sseminatio	on			
Format			Means			Туре		
HDF5		FTP,	CD-ROM offlin		offlin	fline		
				Accuracy				
Threshold			Target		Optimal			
bias: 0.1 rms: 0.2		bias: rms:	0.05 0.1		bias: 0.02 rms: 0.05			
Verification met	hod	Com	parisons to	ns to MODIS data.				
	Coverage, resolution and timeliness							
Spatial coverage	Spat	ial resolution		Vertical resolution		Timeliness		
Europe	(15 k	km) ²				2 month		



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CM-42	Liqui	id Wa	ater Path		•	LWP_AVHRR_Europe			
Туре	_		Product	Product					
Applications and	d use	rs	* Climate * NMHSs * Governr	Research	cies				
Characteristics Methods	and		Daily Mea Monthly M						
Comments						ned for the baseline area as comparative datasets.			
Generation freq	uenc	y	1 day, 1 month						
Input satellite o	lata		AVHRR						
			Dis	sseminati	on				
Format			Means	5	Туре				
HDF5		FTP,	, CD-ROM			offline			
				Accuracy					
Threshold			Targe	t	Optimal				
bias: 40% rms: 70%			20% 40%		bias: 10% rms: 30%				
Verification met	thod	Com	parisons to MODIS data						
	Coverage, resolution and timeliness								
Spatial coverage	Spat	ial res	solution	Vertical resolution		Timeliness			
Europe	(15 k	(m) ²				2 month			

CM-49	Surfa radia		coming sho	rtwave		SIS_SEVIRI			
Туре	=		Product	Product					
Applications and u	ısers		* Climate R * NMHSs * Governme * Private Se * Public Sec	ent agencies ector					
Characteristics an	d Metl	nods	Daily Mean Monthly Me Monthly Me	an an Diurnal C	ycle				
Comments									
Generation freque	ency		1 day, 1 month						
Input satellite dat	а		SEVIRI/GEF	SEVIRI/GERB					
			Dissem	ination					
Format			Means		Туре				
HDF5		FTP,	CD-ROM c			offline			
			Accu	racy					
Threshold			Target			Optimal			
15 W/m ² 25 W/m ² daily me	an	10 W, 20 W,	/m² /m² daily me	ean		8 W/m ² 15 W/m ² daily mean			
Verification metho	od	comp	arison with i	n-situ meas	ureme	nts			
	Co	overa	ge, resoluti	on and tim	elines	s			
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness			
Meteosat disk	(15 k	m)²		_		2 month			



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CM-50	Surfa radia		ncoming s	hortwave	<u>.</u>	SIS_AVHRR_Europe		
Type	_		Product					
Applications and users			* NMHSs * Governn * Private S	* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector				
Characteristics Methods	and		Daily Mear Monthly M					
Comments				Due to the lower resolution in space-time, the daily means have a lower accuracy than the MSG based product				
Generation freq	uency	/	1 day, 1 m	nonth				
Input satellite d	ata		AVHRR					
			Dis	seminatio	n			
Format			Means			Туре		
HDF5		FTP,	, CD-ROM			offline		
		ı	Į.	Accuracy	ı			
Threshold			Targe	t		Optimal		
15 W/m ² 30 W/m ² daily r	nean	10 W 25 W		nean	8 W/ 20 W	m² //m² daily mean		
Verification met	hod	comp	parison with	n in-situ me	easure	ements		
		Cove	erage, res	olution an	d tim	eliness		
Spatial coverage	Spatial resolution		solution	Vertical resolution		Timeliness		
Europe	(15 k	(m) ²				2 month		

	•	•							
CM-57	Surfa	ace A	lbedo			SAL_AVHRR_Europe			
Type			Product						
Applications and	d user	rs	* Climate * NMHSs * Governn	Research nent agenc	es				
Characteristics a Methods	and		Weekly Me Monthly M						
Comments									
Generation freq	uency	/	1 week, 1	month					
Input satellite d	ata		AVHRR						
			Dis	seminatio	n				
Format			Means	5		Type			
HDF5		FTP,	, CD-ROM			offline			
			ļ	Accuracy					
Threshold			Targe	t	Optimal				
50% (relative)		25%	(relative)		20%	(relative)			
Verification met	hod		nuous valid paigns	dation at m	ast m	easurement sites & field			
	Coverage, resolution and timeliness								
Spatial coverage	Spati	ial res	solution	Vertical resolution		Timeliness			
Europe	(15 k	(m) ²				2 month			



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CM-59	Surfa	ace A	lbedo		•	SAL_AVHRR_Arctic	
Туре	-		Product				
Applications and	l user	S	* Climate * NMHSs * Governn	Research nent agenci	es		
Characteristics a Methods	and		Weekly Me Monthly M				
Comments							
Generation freq	uency	•	1 week, 1	month			
Input satellite d	ata		AVHRR				
			Diss	semination	1		
Format			Means	5		Туре	
HDF5		FTP,	CD-ROM		offline		
			Α	Accuracy			
Threshold			Targe	t	Optimal		
50% (relative)		25%	(relative)		20%	(relative)	
Verification met	nuous valic paigns	nuous validation at mast measurement sites & field aigns					
		Cove	rage, reso	lution and	l time	eliness	
Spatial coverage	Spat	ial res	solution	Vertical resolution		Timeliness	
Arctic	(15 k	(m) ²				2 month	

CM-104	Direc	t Irra	diance at S	urface		SID_SEVIRI		
Туре	=		Product					
Applications and (users		* NMHSs * Governme * Private Se * Public Se					
Characteristics an	ıd Metl	hods	Daily Mean Monthly Me	an				
Comments								
Generation freque	ency		1 day, 1 mo	onth				
Input satellite dat	:a		SEVIRI	SEVIRI				
			Dissem	ination				
Format			Means	3		Туре		
HDF5		FTP,	CD-ROM o			9		
			Accu	racy				
Threshold			Target		Optimal			
20 W/m² 30 W/m² daily me	ean	15 W 25 W	/m² /m² daily me	ean	12 W/m² 20 W/m² daily mean			
Verification method	od	comp	arison with i	n -situ meas	sureme	ents		
Coverage, resolution and timeliness								
Spatial coverage	rage Spatial res		olution	Vertical resolution		Timeliness		
Meteosat disk	(15 k	m)²				2 month		



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CM-114	SG TOA Ref		solar		TRS	
Туре		Off-line I	Product			
Applications	s and users	* Climate * NMHSs	e Research			
Characteris Methods	tics and	daily me	an, monthly me	ean,	monthly mean diurnal cycle	
Comments		The accu	•	pme	ent targets is given as the	
Generation	frequency	1 day, 1	month			
Traceability Requiremen						
Input satell	ite data	SEVIRI,	GERB, CERES			
		D	issemination			
Format		Means			Туре	
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.				
	Cove	rage, re	solution and	tin	neliness	
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness	
Meteosat disk + Arctic	(45 km) ²		n/a	4 n	nonths	

CM-116	SG TOA Em adiative Flu		ermal		TET		
Туре		Off-line l	Product				
Applications	and users	* Climat * NMHSs	e Research				
Characterist Methods	tics and	daily me	an, monthly me	ean,	monthly mean diurnal cycle		
Comments		The accu		pme	ent targets is given as the		
Generation	frequency	1 day, 1	month				
Traceability Requiremen							
Input satell	ite data	SEVIRI, GERB, CERES					
		D	issemination				
Format		Means			Type		
HDF5		FTP, CD-ROM			offline		
		I	Accuracy				
Threshold		Target			Optimal		
0.88 - 1.12 i	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.					
	Cove	erage, re	solution and	tin	neliness		
Spatial coverage	' Spatiai resoi		Vertical resolution	Tin	neliness		
Meteosat disk + Arctic	sk + (45 km) ²		n/a	4 n	nonths		



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(M-1))	TOVS Vertio	•	egrated		HTW_ATOVS_global		
Туре		Off-line	Product				
Applications	and users	* NMHS	S				
Characteris Methods	tics and	Daily, monthly means					
Comments					scheme will be decided in considering user requests.		
Generation	frequency	1 month	1				
Traceability Requirement							
Input satell	ite data	ATOVS					
		D	isseminatior	1			
Format		Means			Туре		
HDF5		FTP, CD-ROM			offline		
			Accuracy		<u> </u>		
Threshold		Target			Optimal		
2 kg/m² bia 5 kg/m² rm		1.5 kg/r 3 kg/m²			0.5 kg/m² bias 1 kg/m² rms		
Verification	method	GUAN ra	adiosondes				
	Cove	erage, re	solution and	l tin	neliness		
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness		
Global	(90 km) ²		n/a	2 r	nonths		

CM-131	Te		erature		Water V DR					HLW	_ATOVS	S_globa	
Туре					Off-line P	roc	duct						
Applicati	ons ar	nd	users		* Climate	Re	esearch 8	& * NMH	Ss				
Characte Methods	ristics	ar	nd		Daily, monthly means, 5 layers								
Commen	its												
Generati	on fre	qu	ency	1 month									
Traceabi Requiren													
Input sat	tellite	da	ta		ATOVS								
Dissemination													
Format					Means Type								
HDF5					FTP, CD-F	ROI	M, Email			offline			
Accuracy													
Threshol	d				Target			-		Optimal			
Temp	erat	ure	[K]		Tem	perature [K]				Temperature [K]			
layer	bias	:	rms		layer		bias	rms		layer	bias	rms	
11	1.	5	3.0		1	_	0.5	2.0		1	0.2	1.0	
2	1.	0	3.0		2		0.5	2.0		2	0.2	1.0	
3	1.	0	3.0		3		0.5	2.0		3	0.2	1.0	
4	1.	0	3.0		4		0.5	2.0		4	0.2	1.0	
5	1.	0	3.0		5		0.5	2.0		5	0.2	1.0	
Hum	nidity	[n	nm]		Hui	mie	dity [mr	n]		Hui	midity [n	nm]	
layer	bias	;	rms		layer		bias	rms		layer	bias	rms	
1	0.0	2	0.1		1		0.01	0.05		1	0.005	0.02	
2	0.	2	0.75		2	T	0.10	0.50		2	0.05	0.25	
3	0.2	5	2		3	T	0.10	1.30		3	0.05	0.5	
4	1.	0	2.5		4	T	0.40	1.50		4	0.2	1.00	
5	1.	0	3.0		5	T	0.40	2.00		5	0.2	1.00	
Verificati	on me	eth	od	ľ	GUAN rac	lios	sondes						
			C	οv	erage, r	es	olution	and tim	eli	ness			
Spatial coverage Spatial resolution					Vertical resolution				Timeliness				
coverage		-	icidi i cooi										



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	OVS Speciemperature				s EDR		н	OTA_H	VS_glob	a	
Туре			Off-line	Off-line Product							
Applications a	nd users		* Clima	ate R	esearch	& N	MHSs				
Characteristic	s and Metho	ds	Daily, r	mont	hly mea	ns,	6 layers				
Comments										_	
Generation from	equency		1 mont	:h						_	
Traceability o	f Requireme	nts									
Input satellite	•		ATOVS								
Input Sateme	dutu				nation						
For	mat			eans				Туре			
	illac	ETD					CCI	Туре			
HDF5		FIP,	CD-RC				offline			_	
				ccur							
Thres	shold		Та	arget				Optima			
Temperat			emperature [K]					perature]	
level bia		lev 1		ias 0.5	rms		level 1	bias 0.1	rms 1.0	4	
2 1.2		2		0.5	2.0	1	2	0.1	1.0	-	
3 0.7		3		0.3	2.0	1	3	0.1	1.0	1	
	.5 3.0			0.2	2.0	1	4	0.1	1.0	-	
	.5 3.0	-		0.2	2.0		5	0.1	1.0	1	
	.5 3.0	1		0.2	2.0	1	6	0.1	1.0	1	
Humidity				umidity [g/kg]				Humidity [g/kg]			
level bia		lev		ias	rms		level	bias	rms	1	
1 0.0	0.08	1	. 0	.01	0.03		1	0.001	0.01	1	
2 0.0	0.5	2	2 0	.01	0.15	1	2	0.005	0.05	1	
3 0	.2 1.5	3	3 0	.05	0.75	1	3	0.03	0.1	1	
	.3 1.75	4	0	.10	1.25		4	0.07	0.1	Ī	
5 0.7			0	.20	1.5		5	0.15	0.5	Ī	
6 1	.0 2.25	ϵ	5 0	.20	1.5		6	0.20	0.5	1	
Verification m	ethod	GUAI	N radios	onde	S						
	C	overag	je, reso	lutio	n and t	ime	liness				
Spatial coverage	n r	Vertical resolution Timeliness									
Global	(90 k	m)2		n/a 2 months							

	EVIRI Fract	ional Cl	oud Cover			CFC_SEVIRI		
Туре		Off-line	Product					
Applications	s and users	* Gover * Private	* NMHSs * Government Agencies * Private Sector * Public Sector					
Characterist Methods	tics and	daily me	ean, monthly n	nea	n, monthly	/ mean diurnal		
Comments		This pro	duct will super	rsed	le CM-02			
Generation	frequency	1 day, 1	month					
Traceability Requiremen								
Input satell	ite data	SEVIRI						
		D	issemination					
Format		Means			Type			
Netcdf CF		FTP, WE	В		offline			
			Accuracy					
Threshold		Target			Optimal			
40% b	ias c-rms (MM) c-rms (DM)	10% 20% 25%	bias bc-rms (MM bc-rms (DM		10% 15% 20%	bias bc-rms (MM) bc-rms (DM)		
Verification	method		sons to SYNOF eans over the			computed as		
	Cove	erage, re	solution and	tin	neliness			
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness			
Meteosat disk	(15 km) ²		n/a	5 d	5 days for daily means 5 days after the month for monthly means			



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CM- 5030	EVIRI Cloud	d Top Le	vel EDR		CTO_SEVIRI	
Туре		Off-line I	Product			
Applications	and users	NMHSs, Sector	Government Ag	jenc	cies, Private Sector, Public	
Characterist Methods	ics and	daily me	an, monthly me	ean,	monthly mean diurnal cycle	
Comments		precision		the	s the Mean error and B Bias-corrected RMS error. CM-14	
Generation	frequency	1 day, 1	month			
Traceability Requirement						
Input satellite data SEVIRI						
Dissemination						
Format		Means			Туре	
Netcdf CF		FTP, WEI	FTP, WEB		offline	
			Accuracy			
Threshold		Target			Optimal	
CTH: 1200 m m (bc-rms) CTP: 90 hPa hPa (bc-rms) CTT: no spec requirement	,,,	CTH: 800 m (bias), 1500 m (bc-rms) CTP: 45 hPa (bias), 70 hPa (bc-rms) CTT: no specific requirement		Pa	CTH: 500 m (bias), 1000 m (bc-rms) CTP: 30 hPa (bias), 50 hPa (bc-rms) CTT: no specific requirement	
Verification	method		sons to MODIS ver the studied		a (results computed as areal	
	Cov	erage, re	esolution and	tim	eliness	
Spatial coverage	Spatial resol	ution	Vertical resolution	Tin	neliness	
Meteosat disk	(15 km) ²		n/a	5 days for daily means 5 days after the month for monthly means		

	CIC CEVID						
Туре		Off-line I	Product				
Applications	s and users	* NMHS	e Research s, Government e Sector, Public				
Characteris Methods	tics and	daily me	an, monthly me	ean,			
Record leng	th / Period	N/A					
Comments		This prod	duct will supers	ede	CM-49		
Generation	frequency	1 day, 1	month				
Traceability Requirement							
Input satell	ite data	SEVIRI/0	GERB				
		D	issemination				
Format		Means			Type		
Netcdf CF		FTP, WEI	В		offline		
			Accuracy				
Threshold		Target			Optimal		
15 W/m² 25 W/m² da	ily mean	10 W/m ² 20 W/m ²	- ,		8 W/m² 15 W/m² daily mean		
Verification	method	comparis	son with in-situ	me	asurements		
	Cove	erage, re	solution and	tin	neliness		
Spatial coverage	Spatial reso	lution	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- SEVIRI Direct Irradiance at SID_SE 5230 Surface EDR							
Туре		Off-line I	Product				
Application	s and users	* NMHSs * Govern * Private * Public	nment Agencies Sector	5			
Characteris Methods	stics and	daily me	ans, monthly m	near	1		
Comments		This prod	duct will supers	ede	CM-104		
Generation	frequency	1 day, 1	month				
Traceability Requireme							
Input satel	lite data	SEVIRI	SEVIRI				
		D	issemination)			
Format		Means			Туре		
Netcdf CF		FTP, CD-ROM			offline		
			Accuracy				
Threshold		Target			Optimal		
20 W/m² 30 W/m² da	aily mean	15 W/m ² 25 W/m ²	2 daily mean		12 W/m² 20 W/m² daily mean		
Verification	method	comparis	son with in-situ	me	asurements		
	Cove	erage, re	solution and	tin	neliness		
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness		
Meteosat disk	Meteosat (15 km) ²		n/a	5 d	lays for daily m lays after the n onthly means		

	VHRR GAC	Fraction	al Cloud		CF	C_AVHRR	_Globa	
Туре		Off-line F	Off-line Product					
Applications	and users	* NMHSs * Govern	s nment Agencies	, Pri	ivate & pu	ıblic sector		
Characterist Methods	ics and	daily me	an, monthly me	ean				
Comments		This prod	duct will supers	ede	CM-03 an	d CM-04.		
Generation	frequency	1 day, 1	month					
Traceability Requiremen								
Input satelli	te data	AVHRR-GAC						
Dissemination								
Format		Means			Туре			
Netcdf CF		FTP, WEB			offline			
		-	Accuracy					
Threshold		Target			Optimal			
40% bo 45% bo Arctic: 30% bi 40% bo	cas c-rms (MM) c-rms (DM) as c-rms (MM) c-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% 15% 20% Arctic: 15% 20% 25%	bias bc-rms (Ml bc-rms (Dl bias bc-rms (Ml bc-rms (Dl	М) М)		
Verification	method	comparisons to MODIS data (results computed as areal means over the studied area)						
	Cov	erage, re	esolution and	tim	eliness			
Spatial coverage	Spatial resol	ution	Vertical resolution Tin		Timeliness			
Global			5 n/a 5		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_Globa								
Туре		Off-line I	Product					
Applications	and users		& Government Sector & Publ					
Characteris Methods	tics and	daily me	an, monthly me	ean				
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					
Requiremen	nts							
Input satell	ite data	AVHRR-0	GAC					
Dissemination								
Format		Means			Type			
Netcdf CF		FTP, WEB			offline			
		-	Accuracy					
Threshold		Target			Optimal			
m (bc-rms) CTP: 120 hPa hPa (bc-rms) Arctic:	(bias), 4000	m (bc-rm CTP: 80 l (bc-rms) Arctic: CTH: 120 m (bc-rm	nPa (bias), 100 h 10 m (bias), 200 1s) hPa (bias), 130	nPa 0	(bc-rms) CTP: 50 hPa (bias), 70 hPa (bc-rms) Arctic:			
Verification	method		sons to MODIS ver the studied		a (results computed as areal			
	Cove	erage, re	solution and	tin	neliness			
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness			
Global			n/a 5		5 days for daily means 5 days after the month for monthly means			

CM- 6040 A	VHRR GAC	Cloud Ph	nase EDR		CPH_AVHRR_Global	
Type		Off-line	Product			
Applications	s and users	* NMHS	e Research s nment Agencie	es		
Characteris Methods	tics and	daily me	ean, monthly n	nea	n	
Comments (of wat dataset			ne bias and rms are defined as absolute difference if water cloud fraction) to the comparative atasets. his product will supersede CM-37.			
Generation frequency 1 day,			ay, 1 month			
Traceability Requirement						
Input satell	ite data	AVHRR-	GAC			
		D	issemination			
Format		Means			Туре	
Netcdf CF		FTP, WE	FTP, WEB		offline	
		-	Accuracy			
Threshold		Target			Optimal	
bias: 0.1 rms: 0.2		bias: 0.0 rms: 0.1			bias: 0.03 rms: 0.05	
Verification	method	compari	sons to MODIS	S da	ita	
	Cove	erage, re	solution and	tin	neliness	
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness	
Global	(0.25) ² lev	el3	n/a	5 d	lays for daily means lays after the month for inthly means	



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	VHRR GAC	Liquid W	ater Path		LWP_AVHRR_Global		
Туре		Off-line	Product				
Application	s and users		e Research s & Governme	nt A	Agencies		
Characteris Methods	stics and	daily & r	monthly mean				
Comments		to the co This pro data lay	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 Requireme							
Input satel	lite data	AVHRR-	GAC				
		D	issemination)			
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	compari	sons to MODIS	S da	ta		
	Cove	erage, re	solution and	tin	neliness		
Spatial coverage	· Spanar resolu		Vertical resolution	Tin	neliness		
Global			n/a	5 d	ays for daily means ays after the month for nthly means		

CM- 6060 A	VHRR GAC	Ice Wate	er Path EDR		IWP_AVHRR_Global	
Туре		Off-line	Product			
Applications	and users	* NMHSs * Government Agencies				
Characteris Methods	tics and	daily mean, monthly mean				
Comments						
Generation	frequency	1 day, 1	month			
Traceability of Requirements						
Input satell	ite data	AVHRR-GAC				
		D	issemination			
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	Global (0.25) ² level3		n/a	5 days for daily means 5 days after the month for monthly means		



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	VHRR GAC hortwave R				SIS_AVHRR_Global	
Туре		Off-line	Product			
Applications	s and users	* NMHSs * Government Agencies * Private Sector * Public Sector				
Characteris Methods	tics and	daily me	ean, monthly r	nea	n	
Comments		This pro	duct will supe	rsec	le CM-50.	
Generation	frequency	1 day, 1	month			
Traceability of Requirements						
Input satell	ite data	AVHRR-	GAC			
		D	issemination			
Format		Means	5		Туре	
Netcdf CF		FTP, CD-ROM			offline	
			Accuracy			
Threshold		Target			Optimal	
15 W/m² 30 W/m² d	aily mean	10 W/m 25 W/m	² daily mean		8 W/m² 20 W/m² daily mean	
Verification	method	compari	son with in-sit	u m	easurements	
	Cove	erage, re	solution and	tin	neliness	
Spatial coverage	· ISpanal 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	VHRR GAC	Surface	Albedo EDR		SAL_AVHRR_Global		
Туре		Off-line	Product				
Application	s and users	* NMHS * Gover	s nment Agenci	es			
Characteris Methods	stics and	weekly i	mean, monthly	/ m	ean		
Comments		grid.	r polar areas products will be provided in EASE- d. is product will supersede CM-57 and CM-59.				
Generation	frequency	1 day, 1	month				
Traceability Requirement							
Input satel	lite data	AVHRR-	GAC				
		D	issemination)			
Format		Means			Туре		
Netcdf CF		FTP, WE	В		offline		
			Accuracy				
Threshold		Target			Optimal		
50 % (related) (defined for and for 90°			land and for 90%		5 % relative or 0.005 absolute		
Verification	method	continuo field car		at n	nast measurement sites &		
	Cove	erage, re	solution and	tin	neliness		
Spatial coverage	Spatial reso	olution	Vertical resolution	Tin	neliness		
Global	(0.25) ²	(0.25) ²		we 5 d	lays after the week for ekly mean lays after the month for onthly 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	Fractio	nal Clo	ud Cov	er		CF	C_AVHRR_global_DS	
Туре	Туре			Data set				
							& Government & Public Sector	
Characteristics	and Me	thods	Daily I	Mean, Mon	thly M	1ear	١	
Comments			define cloud	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 free	quency		N/A					
Input satellite	Input satellite data			AVHRR_GAC				
			Dissemination					
Format			Means			Туре		
netcdf CF		FTP			offline			
			Accuracy					
Thre	shold		Target				Optimal	
20%, 40% bias (30% bc-rms (mn), 40%,				10% bias (mm, dm) 15% bc-rms (mm, dm)		
Verification me	thod		Comparisons with SYNOP, complemented with comparisons with MODIS, Cloudsat/CALIPSO					
	Coverage,				time	line	ss	
Spatial coverage	Spatial	resolution	on	Vertical resolution		Timeliness		
Global	$(0.25)^{2}$	2		n/a	N/A		4	

CM-06	Fraction	onal Clo	ud Cover			CFC_SEVIRI_disk_D	
Туре			Data set	Data set			
Applications and users			Climate Ragencies,			Ss, Government lic Sector	
Characteristics	and Me	thods	Level 2 ho Mean Diur			Monthly Mean, Monthly	
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 freq	uency		N/A				
Input satellite d	lata		SEVIRI				
Dissemination							
Format			Means		Туре		
netcdf CF (Leve hdf5 (level 2)	l 3)	FTP			offline		
		-	Accura	Accuracy			
Threshold	d		Target		Optimal		
20% bias 40% bc-rms (30% bias 40% bc-rms (20% I	bias bc-rms (MN bias bc-rms (DN	•	10% 15% 10% 15%	bc-rms (MM) bias	
Verification met	y comparisons with SYNOP but complemented nsistency checks against MODIS and t/CALIPSO datasets						
	Co	verage,	resolutio	n and ti	melir	ness	
Spatial coverage	Spatia	l resoluti	on Vertical resolution		on	Timeliness	
Meteosat disk	(0.05)	esolution ² level 3 ² diurnal	ı. level 2 n/a			N/A	



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CM-11	Joint (Cloud	l Histogra	ams	•	JCH_AVHRR_global_DS		
Туре			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 fre	quency		N/A					
Input satellite	data		CTO (CM-17), COT (CM-34), CPH (CM-38)					
Dissemination								
Format		Means			Туре			
Netcdf CF FTP			0			offline		
Accuracy								
Threshol	Threshold		Target			Optimal		
n/a	n/a n/a		n			n/a		
Verification method								
Coverage, resolution and timeliness								
Spatial coverage	Spatial reso		Vertical resolution		1	Timeliness		
Global	(1°) ²			n/a		N/A		

CM-12 Joint Cloud		Histograms			JCH_SEVIRI_disk_DS		
Туре			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 fre	quency		N/A				
Input satellite data			CTO (CM-18), CPH (CM-39), COT (CM-35)				
Dissemination							
Format			Means		Туре		
netcdf CF FTP				offline			
Accuracy							
Threshold			Target		Optimal		
N/a N/a		N/a			N/a		
Verification method							
Coverage, resolution and timeliness							
Spatial coverage	Spatial resolu		ution	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							
Туре	Dataset						
Applications and users	* 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							
Input satellite data	AVHRR_G	VHRR_GAC					
	Dis	ssemination					
Format		Means	Type				
netcdf CF	FTP		offline				
		Accuracy					
Threshold		Target	Optimal				
CTH: 1800 m (bias), 4000 n (bc-rms) CTP: 150 hPa (bias), 160 hF (bc-rms) CTT: no specific requiremen as it represents same information in different units	m (bc-r CTP: 11 hPa (bc t CTT: nc as it rep	.0 hPa (bias), 130	as it represents same				
Verification method							
Coverage, resolution and timeliness							
Spatial coverage Spatial re	esolution	Vertical resolution Tin		meliness			
Global (0.25) ²		n/a	N/A				

CM-18 Clo	oud Top			сто_	SEVIRI_DS			
Туре		Dataset						
Applications and use	* 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			Туре				
netcdf CF (Level 3) hdf5 (level 2)	FTP	off			offline			
		Accuracy						
Threshold		Targe		Optimal				
CTH: 1200 m (bias), 3 (bc-rms) CTP: 90 hPa (bias), 12 (bc-rms) CTT: no specific requir as it represents same information in differen	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	Validation against Cloudnet, Cloudsat/Calipso; comparison against MODIS							
Coverage, resolution and timeliness								
Spatial coverage	Spatial r	esolution	Vertical resolution			Timeliness		
Meteosat disk	$(0.05)^2$	solution. level 2 level 3 diurnal cycle				N/A		



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CM-34	<u>Clo</u> u	d Op	tical Thic	kness		COT_AVHRR_global_DS		
Туре			Dataset	Dataset				
Applications an	d use	ers	* NMHSs	* Climate Research * NMHSs * Government agencies				
Characteristics Methods	and		Daily Mea Monthly N					
Comments				or the glob		009. Bias and rms are gionally larger differences		
Generation free	quen	СУ	N/A					
Input satellite data			AVHRR_GAC					
Dissemination								
Format			Means			Туре		
netcdf CF		FTP	C			ne		
				Accuracy				
Threshold			Target			Optimal		
20% decadal st bias: 30% rms: 50%	tab.	bias	ias: 15%			2% decadal stability bias: 5% rms: 10%		
Verification method		• Co • Co	omparison with MODIS (2000-2009) comparison with PATMOS-x comparison with ISCCP comparison with Cloudsat/Calipso (2007-2009)					
		Cove	erage, res	olution a	nd ti	meliness		
Spatial coverage	Spat	ial re	solution	Vertical resolution		Timeliness		
Global	(0.2	5°)2		n/a		N/A		

CM-35	Clou	d Op	tical Thickne	SS	CO	T_SEVIRI_disk_DS		
Туре			Dataset					
Applications an	d use	ers	* Climate Res * NMHSs * Governmen		cies			
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 free	uenc	У	N/A					
Input satellite of	lata		SEVIRI					
Dissemination								
Format			Means		Type			
netcdf CF (Leve hdf5 (level 2)	el 3)	FTP			offline			
			Accu	ıracy				
Threshold			Target		Optimal			
bias: 25% rms: 50%			: 10% 25%		bias: 5% rms: 10%			
Verification me	thod		parison with M parison with C	MODIS Cloudsat/Calipso (2007-2009)				
	(Cove	rage, resolut	ion an	d timelines	s		
Spatial coverage	Spatial resolution			Vertical resolution		Timeliness		
Meteosat disk <72° satellite zenith angle	(0.0	5)² le	lution. level 2 evel 3 eurnal cycle	n/a	N/A			



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CM-38	Clou	d Ph	ase			CPH_AVHRR_global_DS		
Type			Dataset					
Applications an	nd us	ers	* NMHSs	* Climate Research * NMHSs * Government agencies				
Characteristics Methods	and		Daily Mea Monthly N					
Comments						009. Bias and rms are defined larger differences may occur.		
Generation free	N/A							
Input satellite data			AVHRR_GAC					
Dissemination								
Format			Means	5		Туре		
netcdf CF		FTP		offl		ine		
				Accurac	у			
Threshold			Targe	t		Optimal		
0.08 decadal si bias: 0.1 rms: 0.2	tab.		decadal s : 0.05 : 0.1	tability	0.01 decadal stability bias: 0.03 rms: 0.05			
Verification e Comparison Comparison				with MODIS (2000-2009) with PATMOS-x with ISCCP with Cloudsat/Calipso (2007-2009)				
		Со	verage, r	esolution	and	timeliness		
Spatial coverage	Spat	ial re	solution	Vertical resolution		Timeliness		
Global	(0.2	5°)2		n/a		N/A		

CM-39	Clou	d Ph	ase	CPH_SEVIRI_disk_DS				
Type	-		Dataset					
Applications an	d use	ers	* NMHSs	* Climate Research * NMHSs * Government agencies				
Characteristics and Methods								
Comments			defined for th	Time series from 2004-2009. Bias and rms are defined for the Meteosat disk; regionally larger differences may occur.				
Generation free	quenc	У	N/A					
Input satellite	data		SEVIRI	SEVIRI				
Dissemination								
Format			Means		Type			
netcdf CF (Leve hdf5 (level 2)	el 3)	FTP			offline			
			Accu	racy				
Threshold			Target		Optimal			
bias: 0.1 rms: 0.2		bias: rms:	0.05 0.1		bias: 0.03 rms: 0.05			
Verification me	thod		mparison with mparison with	th MODIS th Cloudsat/Calipso (2007-2009)				
	(Cove	rage, resoluti	ion an	d timelines:	S		
Spatial coverage	Spatial resolution			Vertical resolution Tin		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_								
Type	-		Dataset					
Applications and users			* NMHSs	* Climate Research * NMHSs * Government agencies				
Characteristics Methods	and		Daily Mea Monthly N					
Comments				or the glob		009. Bias and rms are gionally larger differences		
Generation frequency			N/A					
Input satellite data			AVHRR_GAC					
Dissemination								
Format			Means			Туре		
netcdf CF		FTP		offline				
			-	Accuracy				
Threshold			Target			Optimal		
20% decadal s bias: 30% rms: 50%	tab.	bias	% decadal stability as: 15% as: 30%			2% decadal stability bias: 5% rms: 10%		
Verification method	in (e.g. LW mparison mparison	nparison with satellite MWR retrieved LWP over (e.g. LWP_HOAPS). nparison with MODIS (2000-2009). nparison with PATMOS-x nparison with ISCCP						
	(Cove	rage, res	olution ar	nd tin	neliness		
Spatial coverage	Spatial resolution			Vertical resolution		Timeliness		
Global	(0.2	5°)²		n/a		N/A		

CM-44	CM-44 Liquid Water Path LWP_SEVIRI_disk_								
Туре			Dataset	Dataset					
Applications and users			* NMHSs	* Climate Research * NMHSs * Government agencies					
Characteristics and Methods			Level 2 hourly Daily Mean Monthly Mean Monthly Mean		al Cycle				
Comments				e Mete	04-2009. Bias osat disk; regi ur.				
Generation free	quenc	У	N/A						
Input satellite	data		SEVIRI						
			Dissemi	natior	1				
Format			Means		Т	уре			
netcdf CF (Leve hdf5 (level 2)	el 3)	FTP			offline				
			Accur	асу					
Threshold			Target		Optimal				
bias: 25% rms: 50%			10% 25%		bias: 5% rms: 10%				
Verification me	thod	ocea	mparison with satellite MWR retrieved LWP over in (e.g. LWP_HOAPS). mparison with MODIS.						
	С	over	age, resolutio	on and	l timeliness				
Spatial coverage	Spat	ial re	vertic		al resolution	Timeliness			
Meteosat disk <72° satellite zenith angle	(0.0	5)² le	lution. level 2 vel 3 urnal cycle			N/A			



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CM-45	Liqui	d Water Path			LWP_HOAPS			
Туре	_	Dataset						
Applications and	users	* NMHSs	* Climate Research * NMHSs * Government agencies					
Characteristics ar Methods	nd	Temporal resolution Retrieval based on	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 are given for globa deviations may occ	ıl mean value		Accuracy numbers ional larger			
Traceability		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014						
Generation freque	ency	N/A						
Input satellite dat	a	CM-12002 (SSMI/S	SSMIS FCDR	R3)				
	Dissemination							
Format		Means	3	Туре				
NetCDF4 CF		FTP, CD-ROM		offline				
		Accura	су	_				
Threshold		Target		Optimal				
decadal stability: 10 g/m² bias: 25 g/m² rms: 50 g/m²		decadal stability: 5 bias: 10 g/m² rms: 25 g/m²	5 g/m²	decadal stability: 2 g/m² bias: 5 g/m² rms: 10 g/m²				
Verification metho	od	Comparison to LWP_SEVIRI and LWP_AVHRR products Comparison with corresponding MODIS products.						
	Cov	erage, resolution	and timel	iness				
Spatial coverage	Spati	al resolution	Vertical resolution		Timeliness			
Global ice free ocean	0.5°				N/A			

CM-46	Ice W	/at	er Path	•		IWP_SEVIRI_disk_ds	
Туре			Dataset				
Applications a	and use	ers	* Climate Rese * NMHSs * Government				
Characteristic Methods	s and		Level2 hourly Daily Mean, Monthly Mean, Monthly Mean Diurnal Cycle The time period covered will be 2004-2009				
Comments						for the Meteosat disk as parative datasets.	
Generation from	equen	СУ	N/A				
Input satellite data			SEVIRI				
Dissemination							
Format			Means			Type	
netcdf CF (Le hdf5 (level 2)		FT	P		Offline		
			Accı	ırac	у		
Threshold			Target		Optimal		
bias: 40% rms: 70%			: 20% : 40%	bias: 10% rms: 30%			
Verification method			omparison with I	MODIS Cloudsat/CALIPSO			
	(Cov	erage, resolut	ion	and timeli	ness	
Spatial coverage	Spatia	itial resolution			tical olution	Timeliness	
Meteosat disk <72° satellite zenith angle	(0.05)²	olution. level 2 evel 3 diurnal cycle			n/a	



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CM-47	Ice V	ater Pa	•	IWP_AVHRR_Global_DS					
Type	-		dataset						
Applications and users			Climate F	Research					
Characteristic Methods	s and			an, month period co		ean d will be 1982-2009			
Comments			defined f	Time series from 1982-2009. Bias and rms are defined for the globe; regionally larger differences may occur.					
Generation fre	equen	су	N/A						
Input satellite	data		AVHRR G	SAC					
	Dissemination								
Format	Format					Туре			
netcdf CF		FTP	of			ne			
			Ac	curacy					
Threshold	d		Target			Optimal			
8% decadal stability bias: 40% rms: 70%		5% dec bias: 25 rms: 50		lity	2% decadal stability bias: 10% rms: 25%				
Verification method	arison with CloudSat arison with PATMOS-X arison with MODIS arison with ISCCP								
	(Coverag	je, resolı	ition and	ltim	eliness			
Spatial coverage	Spati	al resolu	tion Vertical resolution		n	Timeliness			
Global	(0.25)2		n/a		n/a			

CM-52 Surface incoming shortwave SIS_AVHRR_global_									
Type	Dataset								
Applications and	* NMHS * Gover * Privat	* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector							
Characteristics ar Methods	Daily Me Monthly								
Comments	time ser	time series from 1989-2009							
Generation frequ	N/A								
Input satellite da	ta		AVHRR_GAC						
			Disse	mination)				
Format			Mear	าร	Туре				
netcdf CF		FTP	0			offline			
			Acc	curacy					
Threshold			Targe	et		Optimal			
15 W/m² 30 W/m² daily m	ean		N/m² N/m² dai	ily mean	8 W 20 V	8 W/m ² 20 W/m ² daily mean			
Verification meth	nparison with in-situ measurements								
	erage	e, resolution and tim			eliness				
Spatial coverage	Spati	al re	solution	Vertical resolution		Timeliness			
Global	(0.25	°) ²		n/a		N/A			



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CM-53	Surfa radia		ncoming	shortwa	ve	SIS_SEVIRI_disk_DS	
Туре	-		Dataset				
Applications and u		* NMHS: * Govern * Private	* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector				
Characteristics an	Monthly	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle					
Comments	time series from 2006-2011						
Generation freque	N/A						
Input satellite dat	a		SEVIRI/GERB				
			Dissen	nination			
Format			Means		Туре		
netcdf CF		FTP,	CD-ROM		offline		
			Accı	ıracy			
Threshold			Targe	et	Optimal		
15 W/m² 25 W/m² daily me	ean		V/m² V/m² dail	y mean	8 W/m² 15 W/m² daily mean		
Verification method	Verification method com				mea	surements	
	Coverage, resolution and timeliness						
Spatial coverage	Spatia	al res	volution Vertical resolution		1	Timeliness	
Meteosat disk	(0.05	°)²				N/A	

CM-54	Surf		ncoming short	wave	•	SIS_MVIRI_disk_DS		
Type			Dataset					
Applications and users			* NMHSs * Government * Private Secto	* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector				
Characteristics Methods	and		Instantaneous Monthly Mean,	Daily	Mear	1		
Comments			time series from	n 198	3-20	05		
Generation frequency			N/A					
Input satellite data			MVIRI					
Dissemination								
Format			Means		Туре			
netcdf CF		FTP	0			offline		
			Accurac	у				
Threshold			Target		Optimal			
15 W/m ² 25 W/m ² inst. dm	&		V/m² V/m² inst. & dm		8 W/m ² 15 W/m ² inst & dm			
Verification me	thod	com	parison with in-	situ m	neasui	rements		
	Со	vera	ge, resolution	and t	timel	iness		
Spatial coverage	Spat	ial re	solution	Verti resol	cal ution	Timeliness		
Meteosat disk	longi		atitude grid 0.03 x ee			N/A		



CDOP 2 Product Requirements Document

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CM-60	Surf	300 /	Albedo			SAL	AVHD	R global	DS
Туре	Juii	ace r	Dataset			JAL_	_AVIIKI	_globai	_03
Applications an	nd use	ers	* NMHSs	Research	icies				
Characteristics Methods	and		Pentad Me Monthly N						
Comments			time serie	es from 19	82-20	009			
Generation free	quen	СУ	N/A						
Input satellite	data		AVHRR_GAC						
			Diss	eminatio	n				
Format			Means	S		Туре			
netcdf CF		FTP		offline					
			A	Accuracy					
Threshold			Targe	t			Optim	al	
50% (relative)		25%	(relative)		20%	(rela	ative)		
Verification method			lation at m paigns	nast meası	ıreme	ent si	tes & fie	ld	
	C	over	age, reso	lution and	d tim	eline	ess		
Spatial coverage	Spat	ial re	solution	Vertical resolution	Timeliness				
Global	(0.2	5°)²		n/a		N/A			

CM-61	Surf	ace A	Albedo			SAL_	_SEVIRI	_disk_	_DS	
Туре	•		Dataset							
Applications an	d use	rs	* Climate * NMHSs * Governr	Research nent ageno	cies					
Characteristics Methods	and		pentad Me Monthly M							
Comments			time serie	time series from 2004-2009						
Generation free	quenc	У	N/A	N/A						
Input satellite	data		SEVIRI							
			Disse	mination						
Format			Means				Type			
netcdf CF		FTP,	CD-ROM	CD-ROM offline						
			Acc	curacy						
Threshold			Targe	t			Optimal			
50% (relative)		25%	(relative)		20%	(rela	itive)			
Verification me	thod		ation at m paigns	ast measur	emer	nt site	es & field			
	Co	vera	ge, resolı	ition and t	timel	ines	S			
Spatial coverage	Spat	ial re	solution	Vertical resolution		Time	eliness			
Meteosat disk	(0.0	5) ²				N/A				



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CM-67	Surfa Radia		let Shoi	twave		SNS_	_AVHRR	_global	_DS
Туре			Dataset						
Applications and u	users		* NMHS	te Resear Ss nment ag		es			
Characteristics an Methods	nd		Monthly	Mean					
Comments			time series from 1989-2009						
Generation freque	ency		N/A						
Input satellite dat	Input satellite data								
			Disse	emination	1				
Format			Means Type						
netcdf CF		FTP	offline						
			Ac	curacy					
Threshold			Targ	et			Optima	l.	
20 W/m ²		15 \	N/m²		12 V	V/m²			
Verification metho	bo	calc	ulated b	ased on a	ccura	acy of	SAL and	SIS	
	Cove	erag	e, resol	ution and	d tim	eline	ess		
Spatial coverage	Spatia	al re	solution	Vertical resolution	n	Timeliness			
Global	(0.25	°)²	•	n/a	•	N/A			

CM-68		ace N ation	let Shortv	vave		SNS_SEVIRI_disk_DS		
Type	•		Dataset					
Applications an	d use	rs	* Climate * NMHSs * Governr	Research	cies			
Characteristics Methods	and		Monthly M	lean				
Comments			time serie	time series from 2006-2011				
Generation frequency			N/A					
Input satellite of	data		SEVIRI/G	ERB				
			Diss	emination				
Format			Means Type			Туре		
netcdf CF		FTP,	CD-ROM offline			е		
			Ac	ccuracy				
Threshold			Targe	t		Optimal		
20 W/m ²		15 W	//m²		12 W	//m ²		
Verification me	thod	calcu	lated base	d on accur	асу о	f SAL and SIS		
	С	over	age, resol	ution and	time	eliness		
Spatial coverage	Spat	ial re	solution	Vertical resolution		Timeliness		
Meteosat disk	(0.0	5°)²				N/A		



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CM-69	Surfa Radia		et Shortwave		SNS	_MVIRI_disk_DS		
Type	<u>-</u>		Dataset					
Applications and u	sers		* Climate Resea * NMHSs * Government a * Private Sector * Public Sector	gei				
Characteristics and	d Meth	ods	Monthly Mean					
Comments			time series from	19	983-2005			
Generation freque	ncy		N/A					
Input satellite data		MVIRI based solar radiation (CM-54) and the AVHRR GAC surface albedo (CM-60)						
			Dissemination	1				
Format			Means		Туре			
Netcdf CF		FTP,	CD-ROM		offline	offline		
			Accuracy					
Threshold			Target			Optimal		
20 W/m ²		15 V	V/m²		12 W/m ²			
Verification metho	d	calc	ulated based on a	СС	uracy of S	AL and SIS		
	Cove	rage	, resolution and	l ti	meliness			
Spatial coverage	Spatia	al res	colution		ertical esolution	Timeliness		
Meteosat disk			citude longitude c 0.03 degree	n/	/a	N/A		

CM-74		ace C		Longwave	•	SOL_AVHRR_global_DS	
Туре	-		Dataset				
Applications an	d use	ers	* NMHSs	Research	cies		
Characteristics Methods	and		Monthly Mean				
Comments			time serie	es from 198	39-20	009	
Generation free	N/A	N/A					
Input satellite	data		NWP (AVI	HRR_GAC)			
			Diss	emination	1		
Format			Mean	Means Type			
netcdf CF		FTP			offlir	ne	
			Α	ccuracy			
Threshold			Targe	ŧt		Optimal	
15 W/m ²		10 V	V/m²		8 W/	m ²	
Verification me	thod	com	parison wit	th in-situ m	neasu	irements	
	C	over	age, reso	lution and	l tim	eliness	
Spatial coverage	Spat	ial re	solution	Vertical resolution		Timeliness	
Global	(0.2	5°)²	•			N/A	



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CM-75	Surfa Radia		utgoing	Longwav	е	SOL_	_SEVIRI_	_disk_	_DS
Туре	<u>-</u>		Dataset						
Applications and u	sers		* NMHSs	e Research Iment age	-				
Characteristics and	d Meth	ods	Monthly	Mean					
Comments			time seri	es from 20	006-2	2011			
Generation freque	Generation frequency				N/A				
Input satellite data	а		NWP (SE	VIRI)					
			Dissem	ination					
Format			Mean	Means Type					
netcdf CF		FTP,	, CD-ROM o			offline			
			Accu	ıracy					
Threshold			Targe	et		Optimal			
15W/m ²		10 V	V/m²		8 W,	/m²			
Verification metho	d	com	parison w	ith in-situ	mea	suren	nents		
	Cove	rage	, resolut	ion and ti	imeli	ness			
Spatial coverage	Spatia	ıl res	olution	Vertical resolution	1	Time	liness		
Meteosat disk	(0.05	²) ²				N/A		•	

CM-81	Surfa Radia		ownwa	rd Longwa	ave	SDL_AVHRR_global_DS		
Туре	Kaula	ition	Datase	t		-		
Applications and	users		* Climate Research * NMHSs * Government agencies					
Characteristics a Methods	nd		Monthly Mean					
Comments			time se	ries from 1	.989-2	2009		
Generation frequ		N/A						
Input satellite da		AVHRR	_GAC					
			Diss	emination	1			
Format			Mea	ns	s Type			
netcdf CF		FTP			offlin	е		
			Α	ccuracy				
Threshold			Targ	jet		Optimal		
15 W/m ²		10 V	V/m²		8 W/	m ²		
Verification meth	nod	com	parison	with in-situ	mea	surements		
	Cov	erag	e, reso	lution and	l time	eliness		
Spatial coverage	Spatia	al res	olution	Vertical resolution		Timeliness		
Global	(0.25	°) ²		n/a		N/A		



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CM-82				Longway	е	SDI	SEVIRI	diek	DS
CM-02	Radi	ation) -			3DL_	_SEVIKI	_uisk_	_D3
Type			Dataset						
Applications and	d use	rs	* NMHSs	* Climate Research* NMHSs* Government agencies					
Characteristics Methods	and		Monthly M	lean					
Comments			time serie	s from 200	6-20	11			
Generation freq	quenc	У	N/A						
Input satellite o	lata		SEVIRI						
			Disse	mination					
Format			Means			Type			
netcdf CF		FTP,	CD-ROM	offline					
			Ac	curacy					
Threshold			Targe	t			Optimal		
15 W/m ²		10 W	//m²		8 W/	m²			
Verification met	thod	comp	oarison wit	h in-situ m	easur	ement	S		
	С	overa	age, resol	ution and	time	liness			
Spatial coverage	Spat	ial res	solution	Vertical resolution		Timeli	ness		
Meteosat disk	(0.0	5°)²				N/A			

Type Dataset Applications and users * Climate Research * NMHSs * Government agencies Characteristics and Methods 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/m² 15 W/m² 12 W/m² Verification method calculated based on accuracy of SOL and SDL Coverage, resolution Imeliness Spatial coverage Global (0.25°)² n/a N/A										
* Climate Research * NMHSs * Government agencies Characteristics and Methods Comments Coverage, resolution Coverage Cover	СМ-88				wave		SNL_AVHRR_global_DS			
Applications and users * NMHSs * Government agencies Characteristics and Methods 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/m² Verification method Coverage, resolution and timeliness Spatial coverage Spatial resolution Vertical resolution Timeliness	Туре	_		Dataset						
Methods 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/m² 15 W/m² Verification method Coverage, resolution and timeliness Spatial coverage Spatial resolution Vertical resolution Timeliness	Applications ar	nd use	ers	* NMHSs	* NMHSs					
Generation frequency Input satellite data AVHRR_GAC Dissemination Format Means Type netcdf CF FTP offline Accuracy Threshold Target Optimal 20 W/m² 15 W/m² 12 W/m² Verification method Coverage, resolution and timeliness Spatial coverage Spatial resolution Vertical resolution Timeliness		and		Monthly Mean						
Input satellite data Dissemination	Comments			time serie	time series from 1989-2009					
Pormat Means Type netcdf CF FTP offline Accuracy Threshold Target Optimal 20 W/m² 15 W/m² 12 W/m² Verification method calculated based on accuracy of SOL and SDL Coverage, resolution and timeliness Spatial coverage Spatial resolution resolution Timeliness	Generation fre	quen	СУ	N/A						
Format Means Type netcdf CF FTP offline Accuracy Threshold Target Optimal 20 W/m² 15 W/m² 12 W/m² Verification method calculated based on accuracy of SOL and SDL Coverage, resolution and timeliness Spatial coverage Spatial resolution resolution Timeliness	Input satellite	data		AVHRR_G	AVHRR_GAC					
netcdf CF FTP offline Accuracy Threshold Target Optimal 20 W/m² 15 W/m² 12 W/m² Verification method calculated based on accuracy of SOL and SDL Coverage, resolution and timeliness Spatial coverage Spatial resolution resolution Timeliness				Dis	seminatio	n				
Threshold Target Optimal 20 W/m² 15 W/m² 12 W/m² Verification method calculated based on accuracy of SOL and SDL Coverage, resolution and timeliness Spatial coverage Spatial resolution resolution Timeliness	Format			Means			Туре			
Threshold Target Optimal 20 W/m² 15 W/m² 12 W/m² Verification method calculated based on accuracy of SOL and SDL Coverage, resolution and timeliness Spatial coverage Spatial resolution Vertical resolution Timeliness	netcdf CF		FTP	offline			ne			
20 W/m² 15 W/m² 12 W/m² Verification method calculated based on accuracy of SOL and SDL Coverage, resolution and timeliness Spatial coverage Spatial resolution Vertical resolution Timeliness				P	Accuracy					
Verification method calculated based on accuracy of SOL and SDL Coverage, resolution and timeliness Spatial coverage Spatial resolution Vertical resolution Timeliness	Threshold			Targe	t		Optimal			
Coverage, resolution and timeliness Spatial coverage Spatial resolution Spatial resolution Spatial resolution Spatial resolution Spatial resolution Spatial resolution Timeliness	20 W/m ²		15 V	V/m²		12 V	V/m²			
Spatial coverage Spatial resolution Vertical resolution Timeliness		Verification calculated				curacy of SOL and SDL				
coverage Spatial resolution resolution Timeliness		rage, resc	age, resolution and timeliness							
Global (0.25°) ² n/a N/A	•	Spat	ial re	solution		1	Timeliness			
	Global	(0.2	5°)²		n/a		N/A			



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CM-89	Surf	ace N	let Longw	ave Radia	tion	SNL	_SEVIRI	_disk_	_DS	
Туре	-		Dataset							
Applications an	d use	rs	* Climate * NMHSs * Governr	Research	cies					
Characteristics Methods	and		Monthly M	Monthly Mean						
Comments			time serie	es from 2006-20011						
Generation free	quenc	У	N/A							
Input satellite	data		SEVIRI							
			Diss	eminatior)					
Format			Means	5		Type				
netcdf CF		FTP,	CD-ROM	offline						
			Α	ccuracy						
Threshold			Targe	t		C	Optimal			
20 W/m ²		15 W	//m²		12 W	//m²				
Verification me	thod	calcu	ılated base	d on accur	acy o	f SOL an	d SDL			
	(Cove	age, reso	lution and	l time	eliness				
Spatial coverage	Spat	ial res	solution	Vertical resolution		Timelin	ess			
Meteosat disk	(0.0	5°)²				N/A				

CM-95	Surfa	ce R	adiation	Budget		SRB_	_AVHRR_	_global_	_DS	
Туре	-		Dataset							
Applications and u	sers		* NMHS	e Researc s nment age		S				
Characteristics and	d Meth	ods	Monthly	Mean						
Comments			time series from 1989-2009							
Generation freque	ncy		N/A	N/A						
Input satellite data	a		AVHRR_	GAC						
			Disse	mination						
Format			Mean	IS			Type			
netcdf CF		FTP	offline							
			Ac	curacy						
Threshold			Targe	et			Optimal			
25 W/m ²		20 V	N/m²		15 V	V/m ²				
Verification metho	d									
	Cov	erag	je, resolution and timeliness							
Spatial coverage	Spatia	al res	solution	olution Vertical resolution		Timeliness				
Global	(0.25	°) ²		n/a		N/A				



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CM-96	Surfa	ice Ra	adiation Bu	ıdget	•	SRB_SEVIRI_DS		
Туре	-		Dataset	Dataset				
Applications and	users		* Climate I * NMHSs * Governm	Research nent agencie	es			
Characteristics a Methods	nd		Monthly Me	Monthly Mean				
Comments			time series	from 2006	-2011			
Generation frequ	iency		N/A					
Input satellite da	ata		SEVIRI	SEVIRI				
			Dissem	ination				
Format			Means			Туре		
netcdf CF		FTP,	CD-ROM		e			
			Accu	racy				
Threshold			Targe	t	Optimal			
25 W/m ²		20 W	//m²		15 W	/m²		
Verification meth	nod				•			
	Co	verag	e, resoluti	on and tim	SS			
Spatial coverage	Spati	al res	olution	Vertical resolution		Timeliness		
Meteosat disk	(0.05	o) ²				N/A		

CM-100	Cloud	Rac	liative E	ffect SW		CFS_	_AVHRR	_global	_DS			
Туре	-		Dataset	Dataset								
Applications and u	* NMHS	nment age Sector		s								
Characteristics an	d Meth	ods	Monthly	Monthly Mean								
Comments			time ser	ies from 1	.989-	2009	1					
Generation freque	Generation frequency					N/A						
Input satellite dat	a		AVHRR_	GAC								
			Disse	mination								
Format			Means				Type					
netcdf CF		FTP	offl			ne						
			Accuracy									
Threshold			Targe	et		Optimal						
15 W/m ²		10 V	V/m²		8 W,	W/m²						
Verification method	ulated from radiation products											
	Cove	rage	e, resolution and timeliness									
Spatial coverage	Spatia	ıl res	olution	Vertical resolution Timeliness								
Global	(0.259	P) ²		n/a		N/A						



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CM-101	Cloud	Rad	liative E	ffect LW		CFL	AVHRR	_global	_DS
Type	-		Dataset						
Applications and users			* NMHS * Gover * Private	* Climate Research* NMHSs* Government agencies* Private Sector* Public Sector					
Characteristics an	d Meth	ods	Monthly	Mean					
Comments			time ser	ies from 1	989-	2009)		
Generation freque	ency		N/A	N/A					
Input satellite dat	a		AVHRR_	GAC					
			Dissei	mination					
Format			Means Type						
netcdf CF		FTP	offline						
			Acc	uracy					
Threshold			Targe	et		Optimal			
15 W/m ²		10 V	V/m²		8 W,	/m²			
Verification metho	ulated from radiation products								
Coverage, resolution and tin							ss		
Spatial coverage	Spatia	al res	solution	Vertical resolution		Timeliness			
Global	(0.25	°) ²		n/a		N/A			

CM-102	Cloud	d Rad	iative Effe	ct SW		CFS_SEVIRI_DS			
Туре	-		Dataset	Dataset					
Applications and	users		* NMHSs * Governm * Private S	* Climate Research* NMHSs* Government agencies* Private Sector* Public Sector					
Characteristics a Methods	nd		Monthly Me	Monthly Mean					
Comments			time series	time series from 2006-2011					
Generation frequ	iency		N/A						
Input satellite da	ata		SEVIRI/GE	RB					
			Dissem	Dissemination					
Format			Means			Туре			
netcdf CF		FTP,	P, CD-ROM offline			е			
			Accı	ıracy					
Threshold			Targe	t		Optimal			
15 W/m ²		10 W	/m²		8 W/	/m²			
Verification meth	nod	calcu	lated from i	radiation pro	oducts				
	Co	vera	ge, resolution and timeliness			ess			
Spatial coverage	Spati	al res	olution	Vertical resolution		Timeliness			
Meteosat disk	(0.05	i) ²				N/A			



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CM-103	Cloud	d Rad	iative Effe	ct LW	•	CFL_SEVIRI_DS		
Type	-		Dataset					
Applications and users			* NMHSs * Governm * Private S	* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector				
Characteristics a Methods	ind		Monthly Me	ean				
Comments			time series	from 2006	-2011			
Generation frequ	iency		N/A					
Input satellite da	ata		SEVIRI/GERB					
			Dissem	ination				
Format			Means			Туре		
netcdf CF		FTP,	CD-ROM offline			е		
			Accu	ıracy				
Threshold			Targe	t		Optimal		
15 W/m ²		10 W	V/m ² 8 W			/m²		
Verification meth	nod	calcu	llated from radiation products					
	Co	vera	ge, resolut	ion and tin	ess			
Spatial coverage	Spati	al res	olution	Vertical resolution		Timeliness		
Meteosat disk	(0.05	5°)²			•	N/A		

CM-105	Direc	t Irra	diance at	Surface		SID_SEVIRI_D			
Туре	-		Dataset	Dataset					
Applications and users			* NMHSs * Governm * Private S	* Climate Research* NMHSs* Government agencies* Private Sector* Public Sector					
Characteristics a Methods	nd		Daily Mean Monthly Me						
Comments			time series	from 2006	-2011				
Generation frequ	ency		N/A	N/A					
Input satellite da	ita		SEVIRI/GE	RB					
			Dissemir	ation					
Format			Means			Туре			
netcdf CF		FTP	offline			e			
			Accura	асу					
Threshold			Target	į		Optimal			
						W/m² 5 W/m² daily mean			
Verification meth	od	comp	arison with	in-situ mea	suren	nents			
	Cov	erage	, resolution and timeline			S			
Spatial coverage	Spati	al res	olution	Vertical resolution		Timeliness			
Meteosat disk	(0.05	5°) ²	<u></u>			N/A			



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CM-106	Dire	ct Irr	adiance at Surf	ace	SID	_MVIRI	_disk_	_DS		
Туре	-		Dataset							
Applications and	Applications and users			rch genc	ies					
Characteristics Methods	and		Instantaneous Monthly Mean, Daily Means							
Comments			time series from	198	3-2005					
Generation freq	uency	/	N/A							
Input satellite d	lata		MVIRI							
			Disseminati	on						
Format			Means		Type					
netcdf CF		FTP,	CD-ROM offline							
			Accuracy							
Threshold			Target		Optimal					
20 W/m ² 30 W/m ² inst. 8	k dm	15 W 25 W	//m² //m² inst. & dm	12 W/m ² 20 W/m ² inst. & dm						
Verification met	hod	com	parison with in-situ measurements							
	Co	vera	ge, resolution a	nd t	imelines	5				
Spatial coverage	Spat	ial res	solution	Vert	tical olution	Timeline	SS			
Meteosat disk			titude longitude x 0.03 degree			N/A				

CM-107	Spec	trally I	Resolv	ed Irrad	iance	SRI	_MVIRI	_SEVIRI	_DS	
Туре			Datas	et						
Applications and users			* Agri * Med	ar energy culture m licine met nate comr	eteoro eorolo	logý (gy.	-	•		
Characteristics ar	nd Met	thods	Daily	and Mont	nly Me	an.				
Comments			Time	series 199	91-201	1				
Generation freque	ency		N/A							
Input satellite da	Input satellite data					SEVIF	RI			
			Diss	Dissemination						
Format			Mean	Means			Type			
Netcdf CF		FTP		Offline	е					
			Accuracy							
Threshold			Targe		Optimal					
<15W/m²*fractionspectral band of 5			•	action of d of SIS		//m²*fraction of spectral of SIS				
Verification meth	od	Compa	arison	with grou	nd bas	ed dat	ta as far	as availa	ble	
	Co	verage	e, reso	lution ar	ıd tim	elines	ss			
Spatial coverage	Spati	al reso	lution	Spectral resolution		Timeliness				
Meteosat disk	k 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].



CDOP 2 Product Requirements Document

CM-109	Dayli	ght			•	DAL_SEVIRI_DS			
Туре	=		Dataset	Dataset					
Applications and users			* Climate I * NMHSs * Governm * Private S * Public Se	nent agencie Sector	es				
Characteristics a Methods	nd			Daily Mean Monthly Mean					
Comments			time series	from 2004	-2009				
Generation frequ	iency		N/A	N/A					
Input satellite da	ita		SEVIRI/GE	RB					
			Dissem	ination					
Format			Means			Туре			
netcdf CF		FTP	offline						
			Accu	racy					
Threshold			Targe	t		Optimal			
lux equivalent to W/m ²	ux equivalent to 10 lux eq			7 W/m ²	quivalent to 5 W/m²				
Verification meth	nod	comp	parison with in-situ measurements						
	Cov	e, resolution and timelin			ess				
Spatial coverage	Spati	al res	olution	Vertical resolution		Timeliness			
Meteosat disk	(0.05	°) ²				N/A			

CM-110	Dayli	ght			•	DAL_MVIRI_DS				
Туре	-		Dataset	Dataset						
Applications and users			* Climate F * NMHSs * Governm * Private S * Public Se	ent agencie ector	es					
Characteristics a Methods	nd		Daily Mean Monthly Me							
Comments			time series	from 1983-	-2005					
Generation frequ	ency		N/A	N/A						
Input satellite da	ita		MVIRI							
			Dissem	ination						
Format			Means	5		Туре				
netcdf CF		FTP,	CD-ROM offline			е				
			Accu	racy						
Threshold			Targe	t	Optimal					
lux equivalent to W/m ²	10	lux e	quivalent to 7 W/m² lux equiv			quivalent to 5 W/m²				
Verification method comp			arison with	in-situ mea	surem	nents				
	Co	verag	ge, resoluti	ion and tin	neline	ess				
Spatial coverage	Spatia	al res	olution	Vertical resolution		Timeliness				
Meteosat disk	Meteo Resol		ixel			N/A				



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CM-111	Cloud	l Albe	edo		•	CAL_MVIRI_DS			
Туре	•		Dataset	Dataset					
Applications and users			* Climate Resea * NMHSs * Government a * Private Sector * Public Sector	gencies					
Characteristics a Methods	nd		Instantaneous, Monthly Mean, [Instantaneous, Monthly Mean, Daily mean					
Comments			time series from	1983-2005	,				
Generation frequ	ency		N/A						
Input satellite da	ita		MVIRI						
			Disseminati	on					
Format			Means			Type			
netcdf CF		FTP,	CD-ROM	of	fline				
			Accuracy						
Threshold			Target		Optimal				
0.15 0.2 inst. & dm		0.1 0.15	inst. & dm	0.05 0.15 inst. & dm					
Verification meth	od	RTM	studies using GE						
	Co	verag	ge, resolution a	nd timeline	ess	3			
Spatial coverage	Spati	al res	olution	Vertical resolution		Timeliness			
Meteosat disk			itude longitude 0.03 degree			N/A			

CM-113			solar Radia Atmosphe		at	TRS_merged_DS		
Туре			Dataset	Dataset				
Applications and	users		* Climate F * NMHSs	Research				
Characteristics a Methods	nd		Monthly Me	Daily mean Monthly Mean Monthly Mean Diurnal Cycle				
Comments				from 2004 cy is given		e RMS error.		
Generation frequ	ency		N/A	N/A				
Input satellite da	ita		GERB, SEV	IRI, CERES				
			Dissemi	Dissemination				
Format			Means			Type		
netcdf CF		FTP	offline			е		
			Accu	racy				
Threshold			Targe	t		Optimal		
0.76-1.24 in ratio	0	0.88-	-1.12 in rati	0	0.9-1	-1.1 in ratio		
Verification meth	od	GERE	3 CERES inte	ercompariso	n			
	Cov	/erag	e, resolution and timelines			SS		
Spatial coverage	Spati	al res	olution	Vertical resolution		Timeliness		
Meteosat Disk	(45 k	m) ²				N/A		



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					•		
CM-115			hermal Rac f Atmosphe		TET_merged_DS		
Type	-		Dataset				
Applications and	users		* Climate F * NMHSs	Research			
Characteristics a Methods	nd		Daily mear Monthly Me Monthly Me		Cycle		
Comments				from 2004		e RMS error.	
Generation frequ	iency		N/A				
Input satellite da	ita		GERB, SEV	IRI, CERES			
			Dissem				
Format			Means			Type	
netcdf CF		FTP	offline			e	
			Accu	racy			
Threshold			Targe	t		Optimal	
0.88-1.12 in rati	0	0.94	-1.06 in ratio 0.96-			-1.04 in ratio	
Verification meth	nod	GERE	3 CERES inte	ercompariso	n		
	Co	verag	je, resolution and timeli		eline	SS	
Spatial coverage	Spati	al res	olution	Vertical resolution		Timeliness	
Global	(45 k	m) ²	•			N/A	

CM-123 Vertically Integrated Water HTW_ATOVS_global_									
Туре			Dataset						
Applications and	d use	ers	* Climate * NMHSs	Research					
Characteristics a Methods	and		Daily Mea Monthly N						
Comments	Accuracy Regional I satellite is Stability r AMSU-A	larger devi s available may be rec	are gi iation only duced B wit	ven for global mean values. s may occur. Also, if a single the quality may be reduced. l because an FCDR for HIRS, th original observing angle					
Generation freq	СУ	N/A							
Input satellite d	lata		ATOVS						
			Dis	sseminati	on				
Format			Means			Type			
Netcdf CF		FTP,	, CD-ROM c			offline			
Threshold			Targe	t		Optimal			
TBD decadal stability 0.26 % decadal 1 mm bias 3 mm rms				al stability	0.18	% decadal stability % bias n rms			
Verification method	nd based i satellite co		ents						
Coverage,				olution a	nd ti	meliness			
Spatial coverage	Spat	ial re	solution	Vertical resolution		Timeliness			
Global (bal (90 km) ²					N/A			



CDOP 2 Product Requirements Document

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CM-127	Verti Vapo	-	/ Integrat	ed Water		HTW_SSMI_global_DS		
Туре	-		Dataset					
Applications and users			* Climate * NMHSs	Research				
Characteristics Methods	and		Daily Mea Monthly M					
Comments			numbers a	are given fo arger devia	or glo	87-2005 Accuracy obal mean values. s may occur.		
Generation free	quenc	у	N/A					
Input satellite data			SSM/I	SSM/I				
			Disse	emination				
Format			Means			Туре		
Netcdf CF		FTP,	CD-ROM offline			ne		
			Ac	ccuracy				
Threshold	d		Targ	get		Optimal		
1 % decadal st 2 kg m ⁻² bias 5 kg m ⁻² rms	ability	1 1	kg m ⁻² bias			18 % decadal stability 5 kg m ⁻² bias kg m ⁻² rms		
			ound based measureme ersatellite comparison			•		
	age, resol	ution and	time	eliness				
Spatial coverage	Spat	ial re	solution	Vertical resolution		Timeliness		
global ice free ocean 0.5°						N/A		

CM-132	2	-		ed wate erature	r vap	ou	r and		HLW_A	TOVS_g	lobal_ DS
Туре					Data	Dataset					
Applicati	ons and i	users			* Clir	* Climate Research, NMHSs					
Characte	eristics ar	nd Meth	าด	ods	Daily	Mea	an, Mon	thly Mear	n, 5 layers		
Commer	nts				global Also, i reduce HIRS,	mea if a s ed. S AMS	an values single sate Stability n SU-A and	. Regional ellite is ava nay be red	Accuracy nu larger deviat ailable only th uced because vith original c	tions may on the quality m e an FCDR f	ccur. nay be for
Generati	eneration frequency										
Input sa	tellite dat	a			ATOVS						
					Diss	em	ination				
1	Format				Means	5			Тур	e	
Netcdf C	F		F	TP, CD-R			offline				
					Α	ccu	racy				
TI	nreshold			•	Targe	t			Optir	mal	
Tem	perature	[K]	П	Tem	peratu	re [K]	Te	emperature	[K]	
layer	bias	rms	Ц	layer	bias		rms	layer	bias	rms	
1	1.5	3.0		1		0.5	2.0	1	0.2	1.0	
2	1.0	3.0		2		0.5	2.0	2	0.2	1.0	
3	1.0	3.0		3		0.5	2.0	3	0.2	1.0	
4	1.0	3.0		4		0.5	2.0	4	0.2	1.0	
5	1.0	3.0	Н	5		0.5	2.0	5	0.2	1.0	
	idity [kg		H		dity [l				midity [kg		
layer	bias 0.02	rms	Н	layer	bias		rms	layer	bias	rms	
2	0.02	0.1 0.75		2		01	0.05	2	0.005	0.02 0.25	
3	0.25	0.75	-	3		10	1.30	3	0.05	0.23	
4	1.0	2.5		4		40	1.50	4	0.03	1.00	
5	1.0	3.0		5		40	2.00	5	0.2	1.00	
Decadal s		5.0	ш	Decadal stab		31.13					
	t ure : 0.5 k	(t	emperatur numidity:1	re: 0.25 K temperature: 0.08 K						
Verificati	ion meth	bd	ç	ground bas	sed m	eası	urement	s, intersa	itellite com	parison	
Coverage					e, resolution and timeliness						
Spatial coverage Spatial resolution				tion Vertical resolution Timeliness							
Global (90 km) ² N/A											



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CM-135 I	Layered w	ater vapoi	ur	•	HLW_SEVIRI_disk_DS			
Туре		Dataset						
Applications and	d users	* Climate * NMHSs	Research					
Characteristics a Methods	and	,	Daily Mean Monthly Mean 3 layers					
Comments		DELETED 2013, CD	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 freq	uency	N/A	N/A					
Input satellite d	ata	SEVIRI	SEVIRI					
		Disse	mination					
Format		Mean	S	Туре				
Netcdf CF	FTP	, CD-ROM	CD-ROM offline					
		Ac	curacy					
Threshold		Targe	t	Optimal				
Humidity [kg layer bias 1 0.2 2 1 3 1	rms lay 0.75 2.5	umidity [kg ver bias 1 0.1 2 0.4 3 0.4	m ⁻²] rms 0.5 1.5	laye 1 2 3	0.05 0.25 0.2 1			
Verification met		und based i rsatellite co		ents				
	Cover	ge, resolution and tin			liness			
Spatial coverage	Vertical resolution			Timeliness				
Meteosat disk				N/A				



CDOP 2 Product Requirements Document

CM-138	8		ific Hur peratur s				HSI	I_ATOV	S_globa	ıl_DS	
Type				Dataset							
Applica	tions ar	nd users	;	* Clim	ate Res	ea	rch, NN	ИНSs			
Charact	teristics	and Me	ethods	Daily I	Mean, M	lon	thly Me	ean, 6 le	vels		
Comme	ents			number Region if a sin quality Stabili for HII	ers are g nal large ngle sate may b ty may RS, AMS ving ang	giv er d elli e r be SU-	en for deviation to its available de la december de	ons may vailable o l. ed becau	ean valu occur. Al only the se an FC with orig	DR	
Genera	tion fre	quency		N/A							
Input s	atellite	data		ATOVS	5						
				Dissen	ninatio	n					
	Format			Means Type					е		
Netcdf	CF		FTP, CE	D-ROM		offline					
				Acc	Accuracy						
Т	hreshol	d		Target	<u>-</u>			Optin	nal		
Temp	eratur	е [К]	Temr	eratur	е [К]	T	Tem	peratur	e [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						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							
Humi	idity [g	/kg]	Humi	idity [g	j/kg]		Hum	idity [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	I	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	
decada	l stabilit	У	decada	l stabil	ity	deca	dal	stability		
tempe	rature:	0.5 K	tempe	rature	: 0.08	tem	per	ature: 0	.04 K	
humid	ity: 4%		K			humidity: 0.26%				
		humidity:1%								
Verifica	tion me	thod	-		measur comparis		ts			
Coverage, resolution ar						d tim	elin	ess		
Spatial coverage	ge	Spati	ial resolu	ition	Vertical resolutio	n	Tim	eliness		
Global		(90 k	(m) ²			•	N/A		•	



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CM-139 Free T	roposi	pheric Hun	nidity	FTH_	Meteosat_	_disk_C)S		
Туре	[Dataset							
Applications and users	*	k Climate Re	esearch						
Characteristics and Methods		3-hourly Monthly Mea	ın						
Comments	(L]	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	1	N/A							
Input satellite data	ľ	MVIRI, SEVIRI							
		Dissemi	ination						
Format		Means			Type				
Netcdf CF	FTP	offline							
		Accu	racy	-					
Threshold		Target		Optimal					
decadal stability: 2% bias: 15% rms: 20%.	decad bias: 4 rms: 9		1%	decadal stability: 0.26% bias: 2% rms: 5%					
Verification method		ive transfer and with the				rence			
Co	verag	e, resoluti	on and	timeliness	3				
Spatial coverage		Spatial resolution	Vertica resolut	•	Timeliness				
Meteosat disk covering N/S and ±45° W/E	±45°	(0.625°)²			N/A				

CM-141	Near	Surfa	ce Specific	Humidity		NSH_HOAPS		
Type	-		Dataset					
Applications and users			* Climate R * NMHSs	* Climate Research * NMHSs				
Characteristics an	ıd Met	hods	Composite Monthly Me	an				
Comments			Accuracy nu		given f	7-2008. For global mean Jions may occur.		
Traceability of Re	quiren	nents	See section	10.1 for de	tails.			
Generation freque	ency		N/A					
Input satellite dat	:a		SSM/I					
			Dissemir	ation				
Format			Means			Туре		
Netcdf CF		FTP			offline	е		
			Accuracy					
Threshold			Target		Optimal			
1 % decadal stab 15 % bias 20 % rms	ility	0.5 % 4 % l 8 % r		ability	0.26 2 % b 5 % r			
Verification method	od	Comp	arison to sh	ip and buoy	based	measurements		
	Cov	erage	e, resolutio	n and time	liness			
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness		
global ice free ocean	0.5°			n/a		N/A		



CDOP 2 Product Requirements Document

CM-142	Near	Surfa	ace Wind Sp	peed		SWS_HOAPS		
Туре			Dataset	Dataset				
Applications and u	Applications and users			lesearch				
Characteristics an	d Met	hods	Composite Monthly Me	an				
Comments				umbers are	giver	987-2008. In for global mean ations may occur.		
Traceability of Re	quiren	nents	See section	10.2 for d	etails			
Generation freque	ency		N/A					
Input satellite dat	а		SSM/I	SSM/I				
			Dissemir	nation				
Format			Means			Туре		
Netcdf CF		FTP	offline			е		
			Accuracy					
Threshold			Targe	t	Optimal			
0.2 m/s decadal s 1 m/s bias 2.8 m/s rms	tabilit	0.0	1 m/s decada 5 m/s bias m/s rms	al stability	0.5 m	m/s decadal stability n/s bias n/s rms		
Verification method	mparison to	ship and b	uoy ba	ased measurements				
	erag	e, resolutio	n and tim	elines	SS			
Spatial coverage	Spatia	al res	olution	Vertical resolution		Timeliness		
global ice free ocean	0.5°			n/a		N/A		

CM-143	Latent	Heat	Fluxes			LHF_	_HOAPS	
Туре	•		Dataset					
Applications and u	ısers		* Climate Research * NMHSs					
Characteristics an	Characteristics and Methods							
Comments			Accuracy nu	series cove imbers are q ional larger	given f	or global		
Traceability of Re	quireme	nts	See section	10.3 for de	tails			
Generation freque	ency		N/A					
Input satellite dat	SSM/I	SSM/I						
			Disseminat	ion				
Format			Means			Type		
Netcdf CF		FTP	offline					
		1	Accuracy	1	1			
Threshold			Target	-	Optimal			
3 W/m² decadal s 22 W/m² 30 % rms	stability	0.8 W 8 W/r 15 %		0.1 W stabil 5 W/r 10 %	n ^ź	adal		
Verification method Com			parison to sh	ip and buoy	based	measure	ments	
	Cove	rage,	resolution a	and timelin	ess			
Spatial coverage	Spatial	resolu	tion	Vertical resolution		Timeline	SS	
global ice free ocean	0.5°			N/A		N/A		



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CM-144 Precipitation PRE_HOAPS									
Туре		Dataset							
Applications and u	Applications and users			* Climate Research * NMHSs					
Characteristics an	d Met	hods	Composite Monthly Me	an					
Comments				ımbers a	re gi	ven f	7-2008. or global mean ions may occur.		
Traceability of Red	quiren	nents	See section	10.4 for	deta	ils.			
Generation freque	ency		N/A						
Input satellite dat		SSM/I							
			Dissemin	Dissemination					
Format			Means				Type		
Netcdf CF		FTP	offline			9			
		1	Accuracy						
Threshold			Target			Optimal			
0.03 mm/d decad stability 1.6 mm/d bias 2.25 mm/d rms	al	stabil 0.25	ity stabi mm/d bias 0.1 r			ility mm/	m/d decadal d bias d rms		
Verification metho	Comp	arison to sh	ip and bu	uoy b	ased	measurements			
	erage	e, resolution and tim		melii	ness				
Spatial coverage	Spatia	al resc	Vertical resolution		on		Timeliness		
global ice free ocean	0.5°			n/a			N/A		

CM-145	CM-145 Evaporation EVA_HOA									
Type	-		Dataset							
Applications and lisers			* Climate Research * NMHSs							
Characteristics an	d Met	hods	Composite Monthly Me	an						
Comments			Accuracy nu	Target time series covers 1987-2008. Accuracy numbers are given for global mean values. Regional larger deviations may occur.						
Traceability of Re	quiren	nents	See section	10.5 for det	tails.					
Generation freque	ency		N/A							
Input satellite dat	a		SSM/I							
			Dissemin	ation						
Format			Means	;		Туре				
Netcdf CF		FTP	offlin			е				
			Accura	асу						
Threshold			Target		Optimal					
0.1 mm/d decada stability 1 mm/d bias 1.4 mm/d rms	I	lity stabil mm/d bias 0.15			2 mm/d decadal ity mm/d bias nm/d rms					
Verification method	od	Comp	arison to sh	ip and buoy	based	measurements				
	Cov	erage	e, resolutio	n and timel	iness					
Spatial coverage	Spatia	al resc	olution	Vertical resolution		Timeliness				
global ice free ocean	0.5°					N/A				



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CM-146	Evap	oratio	n-Precipita	tion		EMP_	HOAPS		
Type	-		Dataset	Dataset					
Applications and users			* Climate R * NMHSs	* Climate Research * NMHSs					
Characteristics an	nd Met	hods	Composite Monthly Me	an					
Comments			Accuracy nu	Target time series covers 1987-2008. Accuracy numbers are given for global mean values. Regional larger deviations may occur.					
Traceability of Re	quiren	nents	See section	10.6 for de	tails.				
Generation freque	ency		N/A						
Input satellite dat	a		SSM/I	SSM/I					
			Dissemir	nation					
Format			Means		Type				
Netcdf CF		FTP	offline						
			Accura	Accuracy					
Threshold			Target		Optimal				
0.13 mm/d decad stability 1.6 mm/d bias 2.3 mm/d rms	lal	stabil 0.25	ity stabil mm/d bias 0.1 m			! mm/d deca ity nm/d bias nm/d rms	ıdal		
Verification method	od		arison to glo		off da	ta. Compari	son to		
	Coverage, resolution and timeliness								
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness			
global ice free ocean	0.5°					N/A			

CM-150	Microwa	ve l	Rad	iance FC	DR		FCDR_SSMI_global_DS		
Туре				Dataset					
Applications	and user	S		* NMS and reanalyses for assimilation * Validation of (climate) models * Basis for TCDR products (from CM SAF, OSI SAF) * Soil moisture community					
Characteris	tics and M	etho	ods		ess Tempera channels of		res, swath-based, M/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 Requir	eme	ents	See section 10.7 for details					
Generation	frequency	,		N/A					
Input satelli	te data			SSM/I					
				Dissemination					
Format		Mea	ans				Туре		
Netcdf CF		FTP)	offline			fline		
				Acc	uracy				
Threshold		Т	Γarge	et		O	Optimal		
bias: 1.25 k RMS: 3.1 K decadal sta		R	RMS				bias: 0.5 K RMS: 0.3 K decadal stability: 0.03 K		
				rsatellite comparison (rms based on global thly means)					
	Co	ver	age	, resolution and tin			liness		
Spatial coverage	Spatial r	esol	utior	1	Vertical resolution		Timeliness		
global	Sensor r	esolı	utior	า	n/a	N/A			



CDOP 2 Product Requirements Document

CM- 11011 AVHRR GAC Fract	ional Cloud Cover TCDR R2	CFC_AVHRR_g lobal_DS_R2				
Туре	Dataset					
Applications and users	Climate Research, NMHSs & Go Agencies, Private & Public Secto					
Characteristics and Methods	daily level2b files (per satellite node), daily mean, monthly me Method improvements concern detection of Cirrus and fraction the sub-tropical region.	ean mainly better				
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	nts 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) bruss 10%, 15% (mm, dm)					
Verification method Primarily comparisons with SYNOP and Cloudsat/CALIPSO (2006-2013), consistency checks against MODIS, ISCCP and PATMOS-: Validation results will be shown separately f Polar winter region (above 70° latitude in S/ 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	1	Vertical resolution	Timeliness				
Global	(0.05) ² level2b, (0.25) ² level3		n/a	N/A				



CDOP 2 Product Requirements Document

CM- 11012	AVHRR GAC Fra Cover TCDR R3		nal (Cloud	CFC_A	VHRR_global_DS_R3	
Type	-	Dat	aset				
Applicatio	ns and users			Research, N s, Private &		Government Sector	
Character Methods	istics and			el2b files (p an, monthly		lite in asc./desc. node)	
Record le	ngth / Period	198	2-20	15			
Comment	:S	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 polareas products will be provided in EASE-grid (5km for level2, 25 km for level3)). Product will be released in CDOP-3					
Traceabili	ty of Requir.						
Input sate	ellite data	AVI	AVHRR GAC				
			Diss	emination			
Format		Mea	ins		Type		
Netcdf CF	:	FTP, Web				offline	
			A	ccuracy			
Threshold			Target			Optimal	
20%, 30%	lal stability % bias (MM, DM) 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			imarily comparisons with SYNOP, consistency ecks against MODIS, Cloudsat/CALIPSO				
Coverage, resolution and timeliness						ess	
Spatial coverage	Spatial resolutio	n		Vertical resolution Timelin		ess	
global	(0.05) ² level2b (0.25) ² level3			n/a	N/A		

(M=11()1	CM-11021 Joint Cloud Histograms AVHRR GAC TCDR R2 JCH_AVHRR_global_DS_F								
Type		Dataset							
Applications	and users	* Climat	e Researd	ch					
Characteristic Methods	cs and	cloud op This prod CM-1105 11031) a	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 ser	ies from	19	82-2013.				
Generation fr	requency	SAF/CM/	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014						
Input satellit	e data		CTO (CM-11031), COT (from CM-11051), CPH (CM-11041)						
		Dis	seminati	ioi	1				
Form	at	Mea	ins	Туре					
Netcdf CF		FTP		offline					
		, ,	Accuracy	,					
Thresh	old	Targ	get		Optimal				
n/a		n/a		n/a					
Verification n	nethod								
Coverage, resolution and timeliness									
Spatial coverage	I Spanar resolution		Vertical resolution		Timeliness				
Global	(1°) ²		n/a		N/A				



CDOP 2 Product Requirements Document

	Joint Clo	ud Histor	ırame				
(M=111)	AVHRR G	_	<u> </u>		JCH_AVHRR_global_DS_R3		
Type		Dataset	Pataset				
Applications	and users	* Climat	e Researc	h			
Characteristic Methods	cs and	cloud op This pro CM-110! 11032)	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			ries from I will be rel		82-2015 used in CDOP-3		
Traceability of Requirement							
Generation fr	requency	N/A	N/A				
Input satellit	e data		CTO (CM-11032), COT (from CM-11052), CPH (CM-11042)				
		Dis	Dissemination				
Form	at	Mea	ans	Туре			
Netcdf CF		FTP		of	fline		
			Accuracy				
Thresh	old	Tar	get		Optimal		
n/a		n/a		n/	'a		
Verification n	nethod						
	Cove	rage, res	olution a	nc	l timeliness		
Spatial coverage	· ISDALIAL FES		vertical resolutio		Timeliness		
Global	(1°) ²		n/a		N/A		

CM- AVHRR GAC Cloud Top Level CTO_AVHRR_global_DS_R2									
Type	-	Dataset							
Applicatio	ns and users		e Research, es, Private 8						
Character Methods	istics and		vel2b files (daily mean,						
Record le	ngth / Period	1982-2	013						
Comment	S		o specific red nformation i				t represents ts		
Traceabili Requirem		SAF/CN	1/DWD/RR2	.2 v1	1.1date	ed 1	.7.06.2014		
Input sate	ellite data	AVHRR	GAC						
		Dis	seminatio	n					
Format		Means			Type				
Netcdf CF		FTP, W	eb	offline					
			Accuracy						
Threshold		Targ	Target			Op	Optimal		
stability 1 3000 m (CTP: 30 h	hPa (bias), 120 hPa (bc- hPa (bias), 100					o m (bc- 1100m (b ec. stab; 50 CTP: 15 h			
Verification	n method		rison with IS 2013), Cloud						
	Covera	ge, res	olution and	d tin	neline	ss			
Spatial coverage	Spatial resolution	on	_	Vertical resolution			Timeliness		
Global	(0.05)² level2b polar areas in E level2, 25 km f	ASE-gri	d (5km for	n/a			N/A		



CDOP 2 Product Requirements Document

CM- 11032	AVHRR GAC TCDR R3	Clou	ıd To	p Level	сто	_AVHRR_global_DS_R3	
Туре	-		Data	Dataset			
Application	ns and users			ate Research icies, Private		HSs & Government ublic Sector	
Characteri	stics and Meth	nods		level2b files) daily and n		satellite in asc. & des. nly mean	
Record ler	gth / Period		1982	2-2015			
Comments	5		repre	For CTT: no specific requirement as it represents same information in different units Product will be released in CDOP-3			
Traceabilit	y of Requirem	ents					
Input sate	llite data		AVHRR GAC				
			Dis	semination			
Format		Mear	าร			Туре	
Netcdf CF		FTP,	Web			offline	
			Accuracy				
Threshold		Tai	rget			Optimal	
CTH: 300 m decadal CT stability 1800 m (bias), 4000 m (bc-rms) 20 CTP: 30 hPa dec. stab; 150 hPa (bias), 160 hPa 11			TH: 200m decadal ability; 1200 m (bias), 100 m (bc-rms) TP: 20 hPa dec. stab; 100 hPa (bias), 130 hPa c-rms)			CTH: 150m decadal stability, 1000m (bias), 1500m (bc-rms) CTP: 15 hPa dec. stab; 80 hPa (bias), 100 hPa (bc-rms)	
Verification	n method		son with ISC Cloudsat/Cali		PATMOS-X, MODIS (2000- 2007-2010)		
Coverage				, resolution and time		eliness	
Spatial coverage	Shariai resollition			Vertical resolution	Timeliness		
global	(0.05) ² level (0.25) ² level			n/a	N/A		

CM- 11041	AVHRR GAO	Cloud Phase	TCDR (CPH_AVHRR_global_DS_R			
Туре		Dataset					
Application	ns and users	* Climate Rese * NMHSs * Government					
Characteri Methods	stics and	daily level2b file ascending/desc		lite and), daily mean, monthly mean			
Record len	gth / Period	1982-2013					
Comments	5						
Traceabilit Requireme		SAF/CM/DWD/F	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014				
Input sate	llite data	AVHRR GAC					
		Disser	mination				
Format		Means		Туре			
Netcdf CF		FTP, Web		offline			
		Accuracy					
Threshold		Target		Optimal			
0.05 decado bias: 0.2 bc-rms: 0.	dal stability 4	0.02 decadal st bias: 0.1 bc-rms: 0.2	ability	0.01 decadal stability bias: 0.01 bc-rms: 0.1			
Verification	n method	comparison wit 2013), Cloudsa		TMOS-X, MODIS (2000- 007-2013)			
	Co	verage, resolu	tion and tin	neliness			
Spatial coverage	Spatial reso	lution	Vertical resolution	Timeliness			
Global (day and night)	will be provi	l3 eas products ded in EASE- or level2, 25	n/a	N/A			



CDOP 2 Product Requirements Document

CM- 11042	AVHRR GAC	Cloud Ph	ase TCDR	СРН	I_AVHRR_global_DS_R3		
Type	<u>-</u>	Dataset					
Application	ns and users	* NMHSs	ate Research Ss ernment Agencies				
Characteris Methods	stics and		2b files (per /descending		lite and e), daily mean, monthly		
Record len	gth / Period	1982-201	5				
Comments	•	grid (5km	areas produc ofor level2, 2 ill be release	25 kn			
Traceabilit Requireme	•						
Input sate	llite data	AVHRR GA	AC .				
		Dis	semination				
Format		Means			Туре		
Netcdf CF		FTP, Web			offline		
			Accuracy				
Threshold		Target			Optimal		
0.05 decade bias: 0.2 rms: 0.4	dal stability	0.02 decade bias: 0.1 rms: 0.2	dal stability		0.01 decadal stability bias: 0.05 rms: 0.1		
Verification	n method	compariscomparis	 comparison with ISCCP comparison with MODIS (2000-2010) comparison with Cloudsat/Calipso (2007-20: comparison with PATMOS-X 				
	Cove	erage, res	olution and	time	eliness		
Spatial coverage	Spatial resol	ution	Vertical resolution	Tim	eliness		
global	(0.05) ² leve (0.25) ² leve		n/a	N/A			

CM- AVHRR GAC Liquid Water Path 11051 TCDR R2 LWP_AVHRR_global_DS_R2							
Туре	_	Data	set				
Application	ns and users		Climate Research, NMHSs & Government Agencies, Private & Public Sector				
Characteri	stics and Methods		level2b files (per mean, monthly m	satellite in asc./desc. node), nean			
Record ler	igth / Period	1982	2-2013				
Comments	5	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 sate	llite data	AVHRR GAC					
		D	issemination				
Format		Means		Туре			
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)				
	Coverag	ge, resolution and tim		eliness			
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 Liq TCDR R3	uid Wa	ater Path	LWP_	AVHRR_global_DS_R3	
Туре		Datase	:t			
Applicatio	ns and users		e Research, e & Public Se		& Government Agencies,	
Character Methods	ristics and		evel2b files (ling/descend		ellite and de), daily mean, monthly	
Record le	ngth / Period	1982-2	2015			
Comment	s	For polar areas products will be provided in EAS grid (5km for level2, 25 km for level3). Contains as additional layers: COT (cloud optic thickness) and REFF (particle effective radius) Product will be released in CDOP-3			km for level3). ers: COT (cloud optical icle effective radius)	
Traceabili Requirem	•					
Input sate	ellite data	AVHRR GAC				
		Dis	seminatio	n		
Format		Means			Туре	
Netcdf CF		FTP, Web			offline	
		P	Accuracy		-	
Threshold	I	Target			Optimal	
10 gm ⁻² d bias: 25 g rms: 50 g	ecadal stab gm ⁻² gm ⁻²	bias: 1	decadal st 10 gm ⁻² 25 gm ⁻²	2 gm ⁻² decadal stab bias: 5 gm ⁻² rms: 10 gm ⁻²		
Verification method LWP o com			comparison with satellite-based MWR retrieved WP over ocean (e.g. LWP_HOAPS) comparison with PATMOS-X comparison with MODIS (2000-2010), ISCCP			
	Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	1	Vertical resolution	Timeliness		
global	(0.05) ² level2b (0.25) ² level3		n/a	N/A		

CM- AVHRR GAC Ice Water Path 11061 TCDR R2 IWP_AVHRR_global_DS_R2						
Туре		Dataset				
Application	ns and users		esearch, NMF Public Sector		k Government Agencies,	
Characteri Methods	stics and		2b files (per n, monthly m		lite in asc./desc. node),	
Record len	gth / Period	1982-2013	3			
Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius). Accuracy requirements hold for global monthly m all-sky IWP. Accuracies over the polar regions (ve limited availability of daytime data and retrievals made over snow/ice-covered conditions) are expet to be worse.					le effective radius). I for global monthly mean r the polar regions (very ne data and retrievals are	
Traceabilit Requireme		SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014				
Input sate	llite data	AVHRR GAC				
		Di	sseminatio	n		
Format		Means			Туре	
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	n method		Validation with Cloudsat/Calipso (2007-2013), comparison with ISCCP, PATMOS-X, MODIS (2000-2013)			
	Cov	erage, re	solution and	d tim	neliness	
Spatial coverage	Spatial resol	Vertical		eliness		
Global (daytime)	(0.05) ² leve (0.25) ² leve		n/a	N/A		



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CM- 11062	AVHRR GAC Ice	Water Pat	h TCDR R3	IWI	P_AVHRR_global _DS_R3			
Type	•	Dataset						
Application	* Climate Research, NMHSs, Governme Agencies							
Characteri	stics and Methods	ascending,	daily level2b files (per satellite and ascending/descending node), daily mean, monthly mean					
Record ler	ngth / Period	1982-2015						
Comments	5	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						
Traceabilit	raceability of Requirements							
Input sate	llite data	AVHRR GA	AVHRR GAC					
		Dissemin	ation					
Format		Means			Type			
Netcdf CF		FTP, Web		offline				
		Accura	есу					
Threshold		Target		Optimal				
20 gm ⁻² de bias: 40 g rms: 80 gr		10 gm ⁻² de bias: 20 g rms: 50 gr	ecadal stab m ⁻² m ⁻²	4 gm ⁻² decadal stab bias: 10 gm ⁻² rms: 20 gm ⁻²				
• comparison with CloudSat & PA • comparison with MODIS, ISCCP								
	Coverage,	resolutio	n and timelir	ness				
Spatial coverage	Spatial resolution		Vertical resolution	Tim	eliness			
global	(0.05) ² level2b (0.25) ² level3		n/a N/A					

CM- AVHRR GAC Surface Incoming SIS_AVHRR_global_DS_R 11201 Shortwave Radiation TCDR 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)				
Character	istics and Metho	ds	monthly r	neans, daily	mear	ns	
Record ler	ngth / Period		1982-2013	3			
Comment	S						
Traceabilit	ty of Requireme	nts	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014				
Input sate	ellite data		AVHRR GAC				
			Dissemination				
Format			Means			Туре	
Netcdf CF			FTP, Web offline				
			Accui	racy			
Threshold			Target			Optimal	
MAB 15 /3 (monthly / decadal sta	y / daily), (monthly /			: 10 /15 W/m² MAB: 8 / 20 W/m² (monthly / daily), dal stability 2 W/m² decadal stability 1 W/m²			
Verificatio	n method		comparison with BSRN				
Coverage, resolution and time					elines	SS	
Spatial coverage	Spatial resolution	on		Vertical resolution	Time	eliness	
global	0.25x0.25 °			n/a	N/A		



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CM- AVHRR GAG 11221 TCDR R2	SAI AVHDD global DS D2							
Туре	Dataset							
Applications and users	* Climate Research * NMHSs * Government Agencies							
pentad mean, monthly mean Topography correction is carried out for both geolocation and radiometry based on high-resol DEM from SRTM where available and GEOTOPO elsewhere. Dynamic aerosol correction is forese be implemented based on indirect estimation of at 550 nm from UV-band satellite measurement the atmosphere. Detailed descriptions will be m available in the PUM and ATBD of CM-11221.								
Record length / Period	cord 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	Туре						
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 difference 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				



CDOP 2 Product Requirements Document

CM- AVHRR GAC Surface Albedo SAL_AVHRR_global_DS_R3 11222 TCDR R3						
Type	Dataset					
Applications and users	* Climate Research * NMHSs * Government Agencies					
Characteristics and Methods	Pentad me	ean, monthly	mea	ins		
Record length / Period	1982-2015	5				
Comments	grid (5km	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 GA	AVHRR GAC				
	Dis	semination				
Format	Means			Туре		
Netcdf CF	FTP, Web			offline		
		Accuracy				
Threshold	Target		Optimal			
decadal stability stability 30 % (relative) 15 % (r		for flat land for		2% relative decadal stability 5 % relative or 0.005 absolute		
Verification method	compariso regions	mparison with surface measurements for different gions				
Cove	erage, res	olution and	time	eliness		
Spatial coverage Spatial resolution	ution	Vertical resolution	Time	eliness		
global (0.25) ² leve	el3	n/a	N/A			

CM- AVHRR GAC	· Curtaco (Jutasina				
	AVHRR GAC Surface Outgoing SOL_AVHRR_global_R2 Longwave Radiation TCDR R2					
Type	Dataset					
Applications and users				nalysis (EURO4M) dation (DWD, COSMO		
Characteristics and Methods	monthly m	neans				
Record length / Period	1982-2013	3				
Comments						
Traceability of Requirements	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014					
Input satellite data	AVHRR GAC					
	Dis	semination				
Format	Means			Туре		
Netcdf CF	FTP, Web			offline		
		Accuracy				
Threshold	Target			Optimal		
Accuracy (MAB) 15 W/m², decadal stability 5 W/m²		(MAB) 10 W/n ability 3 W/m	Accuracy (MAB) 8 W/m², decadal stability 1 W/m²			
Verification method	comparison with BSEN					
Coverage, resolution and timeliness						
Spatial coverage Spatial resol	Spatial resolution		Timeliness			
global 0.25x0.25 °		n/a	N/A	N/A		



CDOP 2 Product Requirements Document

Doc. No.: SAF/CM/DWD/PRD Issue: 2.9

CM- 11261	AVHRR GAC Downwellin Radiation T	g Longwa	ve SDI	A\	/HRR_global_DS_R2	
Type		Dataset				
Application	s and users	* Climate Monitoring and Analysis (EURO4M) * NWP & climate model validation (DWD,COSMO CLM)				
Characteris Methods	stics and	monthly m	neans			
Record len	gth / Period	1982-2013	3			
Comments						
Traceability Requireme	•	SAF/CM/DWD/RR2.2 v1.1dated 17.06.2014				
Input satel	lite data	AVHRR GAC				
		Dis	semination			
Format		Means			Туре	
Netcdf CF		FTP, Web			Offline	
		ı	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	n method	comparison with BSEN				
	Cove	erage, reso	olution and	time	eliness	
Spatial coverage	Spatial resol	ution	Vertical resolution	Tim	eliness	
global	0.25x0.25 °		n/a	N/A		

CM- 12001	Microwaye Radiance FCDR R2 FCDR SSMT DS R2							
Type		Dataset						
Application	s 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						
Characteris	tics and Methods	swath-ba	ased product, ir	nag	er channels similar to SSM/I			
Record leng	gth / Period	1987-20	13					
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 satell	ite data	SSM/I, SSMIS						
		Dis	semination					
Format		Means			Туре			
Netcdf4 CF		FTP, WEB			offline			
		A	Accuracy					
Threshold		Target			Optimal			
accuracy: $k \le 3$ (3 K), decadal stability:0.03K S t-test S $\ge 0.3\%$		accuracy: k ≤2 (2 K), decadal stability: 0.03K t-test- S ≥5%			accuracy: k ≤1 (1 K), decadal stability: 0.03 K t-test S ≥30%			
Verification	method	Inter-sensor comparison						
Coverage, resolution and timeliness					liness			
Spatial coverage	Spatial resolution	1	Vertical resolution	Tin	neliness			
global	sensor resolution		n/a	N/A	/A			



CDOP 2 Product Requirements Document

Doc. No.: SAF/CM/DWD/PRD

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CM- 12002 Microwave Radia	nce FCDR R3	FCDR_SSMI_DS_R3	
Туре	Dataset		
Applications and users	* NMS and reanalyses for a * Validation of (climate) mo * Basis for TCDR products (* Of interest to the soil moi	odels from CM SAF, OSI SAF)	
Characteristics and Methods	swath-based product, imag	er 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). Addition processed data: SSMIS temporal extension and SMMR full period with unchanged baseline algorith 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 la 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	
Consitency: $U \le 3K \ (k \le 3)$, $Decadal \ stability: t_D \le 0.03K/dec, with t-test significance \ge 0.3\%$	Consistency: $U \le 2K \ (k \le 2)$, Decadal stability: $t_D \le 0.03K/dec$, with t-test significance $\ge 5\%$	Consistency: $U \leq 1K \ (k \leq 1),$ Decadal stability: $t_D \leq 0.03K/dec, \ with$ t-test significance $\geq 30\%$	

Verification method		Reanaly	sis and/or gro	und-based observations and RT		
	Coverage, resolution and timeliness					
Spatial coverage	Spatial resolution	1	Vertical resolution	Timeliness		
global	sensor resolution		n/a	N/A		



CDOP 2 Product Requirements Document

Doc. No.: SAF/CM/DWD/PRD

Issue: **2.9**

	DDF HOADS OF DO								
Туре		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)							
Characterist Methods	tics and	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 leng	th / Period	1987-20	14						
Comments		as CM-12	2701						
Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014							
Input satelli	te data	CM-12002 (SSMI/SSMIS FCDR R3)							
		D	issemination						
Format		Means			Type				
NetCDF4 CF		FTP, WEB			offline				
			Accuracy						
Threshold		Target			Optimal				
decadal stab 0.034 mm/d bias: 0.6 mm rms: 1.0 mm	n/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							
	Cove	rage, re	solution and	tin	neliness				
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness				
global ice free ocean	0.5°		n/a	N/A					

CM- HOAPS Vertically Integrated HTW_SSMI_global_DS_R2									
Туре		Dataset							
Applications an users	d			Government Agencies * e.g. entre, Max Planck Institute HH					
Characteristics Methods	and	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	1	1987-20	14						
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 of	data	CM-12002 (SSMI/SSMIS FCDR R3)							
			Dissemination						
Format		Means		Туре					
NetCDF4 CF		FTP, WEI	3	offline					
		-	Accuracy						
Threshold		Target		Optimal					
decadal stability 0.40 kg/m ² bias: 3 kg/m ² rms: 5 kg/m ²	:	decadal s 0.20 kg/ bias: 1.4 rms: 2 k	m² · kg/m²	decadal stability: 0.08 kg/m² bias: 1 kg/m² rms: 1 kg/m²					
Verification me	thod	other sat	cellite products and	reanalyses					
	Co	verage,	resolution and	timeliness					
Spatial coverage	Spat		Vertical resolution	Timeliness					
global ice free ocean	0.5°		n/a	N/A					



CDOP 2 Product Requirements Document

Doc. No.: SAF/CM/DWD/PRD Issue: 2.9

CM- 12801 H	OAPS Evap	oration [*]	TCDR R2		EVA_HOAPS_DS_R2		
Туре		Dataset					
Applications	and users	Universit Centre (* Climate Research, NMHSs, Government Agencies, University of Reading (Reading, Great Britain), Rossby Centre (Norrkoping, Sweden), Max Planck Institute for Meteorology (Hamburg, Germany)				
Characterist Methods	ics and	Equal angle grid: Spatial resolution: 0.5° Temporal resolution: 6-hour composite, monthly Input parameters from retrieval based on NWP S. Var with extensions from MiKlip/DFG Project COARE Bulk Flux parameterization					
Record leng	th / Period	1987-20	14				
Comments		as CM-12	2701				
Traceability Requiremen		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014					
Input satelli	te data	CM-12002 (SSMI/SSMIS FCDR R3)					
		D	issemination				
Format		Means			Type		
NetCDF4 CF		FTP, WEI	В		offline		
		I	Accuracy				
Threshold		Target			Optimal		
0.32 mm/d bias: 0.7 mn	decadal stability: 0.32 mm/d bias: 0.7 mm/d rms: 1.24 mm/d		stability: n/d 66 mm/d 2 mm/d		decadal stability: 0.0043 mm/d bias: 0.09 mm/d rms: 0.53 mm/d		
Verification	method	buoy and	d ship observati	ions			
	Cove	erage, re	solution and	tin	neliness		
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness		
global ice free ocean	0.5°		n/a	N/A	4		

CM- HOAPS Latent Heat Fluxes TCDR 12811 R2 LHF_HOAPS_DS_R2									
Туре		Dataset							
Applications	and users	* NMHSs * Govern * e.g. Ur Rossby C	* Climate Research * NMHSs * Government Agencies * e.g. University of Reading (Reading, Great Britain), Rossby Centre (Norrkoping, Sweden), Max Planck Institute for Meteorology (Hamburg, Germany)						
Characterisi Methods	tics and	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 leng	th / Period	1987-20	14						
Comments		as CM-12701							
Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014							
Input satell	te data	CM-12002 (SSMI/SSMIS FCDR R3)							
		D	issemination						
Format		Means			Туре				
NetCDF4 CF		FTP, WEB			offline				
			Accuracy						
Threshold		Target			Optimal				
decadal stab 9 W/m² bias: 20 W/r rms: 35 W/r	n²	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	d ship observati	ions					
	Cove	erage, re	solution and	tin	neliness				
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness				
global ice free ocean	0.5°		n/a	N/A	4				



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CM- 12821 H	OAPS Fresh	water f	lux TCDR R2		EMP_HOAPS_DS_R2		
Туре		Dataset					
Applications	s and users	* NMHSs * Govern * e.g. Un Rossby (nment Agencies niversity of Rea Centre (Norrkop	ding oing	g (Reading, Great Britain), , Sweden), Max Planck Hamburg, Germany)		
Characteris Methods	tics and	Equal angle grid: Spatial resolution: 0.5° Temporal resolution: 6-hour composite, monthly mean Difference of evaporation (CM-12801) and precipitation (CM-12611)					
Record leng	th / Period	1987-20	14				
Comments		as CM-12701					
Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014					
Input satell	ite data	CM-12002 (SSMI/SSMIS FCDR R3)					
		D	issemination				
Format		Means			Type		
NetCDF4 CF		FTP, WEB			offline		
		,	Accuracy				
Threshold		Target			Optimal		
decadal stab 0.35 mm/d bias: 1.3 mr rms: 1.6 mn	, n/	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	combina	tion of buoy an	d sh	nip observations with GPCP		
	Cove	erage, re	solution and	tin	neliness		
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness		
global ice free ocean	0.5°		n/a	N/A	4		

	OAPS Near		Specific		NSH_HOAPS_DS_R		
Туре		Dataset					
Application	s and users	* NMHSs * Govern * e.g. Ur Rossby C	* Climate Research * NMHSs * Government Agencies * e.g. University of Reading (Reading, Great Britain), Rossby Centre (Norrkoping, Sweden), Max Planck Institute for Meteorology (Hamburg, Germany)				
Characteris Methods	tics and	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 leng	gth / Period	1987-20	14				
Comments		as CM-12701					
Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014					
Input satel	lite data	CM-12002 (SSMI/SSMIS FCDR R3)					
		D	issemination				
Format		Means			Туре		
NetCDF4 CF	:	FTP, WEB			offline		
			Accuracy				
Threshold		Target			Optimal		
0.20 g/kg bias: 1.20 g	decadal stability: 0.20 g/kg bias: 1.20 g/kg rms: 2.40 g/kg		stability: g 60 g/kg 60 g/kg	decadal stability: 0.04 g/kg bias: 0.30 g/kg rms: 0.50 g/kg			
Verification	method	buoy and	buoy and ship observations				
	Cove	erage, re	solution and	tin	neliness		
Spatial coverage	Spatial reso	olution	Vertical resolution	Timeliness			
global ice free ocean	0.5°		n/a	N/A	Δ.		



CDOP 2 Product Requirements Document

	OAPS Near CDR R2	Surface	Wind Speed		SWS_HOAPS_DS_R2		
Туре		Dataset	Dataset				
Applications	s 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)					
Characteris Methods	tics and	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 leng	th / Period	1987-20	14				
Comments		as CM-12	2701				
	Traceability of Requirements		SAF/CM/DWD/RR/2.7 v.1.2 dated 24.02.2014				
Input satell	ite data	CM-12002 (SSMI/SSMIS FCDR R3)					
		D	issemination				
Format		Means			Type		
NetCDF4 CF		FTP, WEB			offline		
			Accuracy				
Threshold		Target			Optimal		
decadal stab 0.24 m/s bias: 1 m/s rms: 1.6 m/	,	decadal stability: 0.12 m/s bias: 0.60 m/s rms: 0.80 m/s			/s decadal stability: 0.03 m/s bias: 0.30 m/s rms: 0.50 m/s		
Verification	method	buoy and ship observations					
	Cove	erage, re	solution and	tin	neliness		
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness		
global ice free ocean	0.5°		n/a	N/A			

CM-21011 S	EVIRI Fract	ional C	Cloud Cove	er ICDR CFC	_SEVIRI_disk_DS_R2		
Туре			Dataset				
Applications a	nd users		Climate R Agencies	esearch & NM	HSs & Governm.		
Characteristic	s and Method	ds			solution), daily mean, , mean diurnal cycle		
Record length	/ Period		2004-201	4			
Comments			Contains a	as additional la	ayer: cloud type		
Traceability of	f Requiremer	nts	SAF/CM/C 13.06.201		RR 2.4 v 1.2 dated		
Input satellite	data		SEVIRI (re	eprocessed ve	ersion)		
		[Dissemina	tion			
Format			Means		Туре		
Netcdf CF (lev	vel 2 and 3)		FTP, WEB		offline		
			Accurac	су			
Threshold		Target			Optimal		
Level 2: Clou %, Cloud FAF Level 3: 20% 40% (bc-rms)	R < 20 % (bias),	Cloud	2 Cloud POD > 90 %, FAR < 15 % 3: 10% bias, 20% s Level : Cloud POD > 95 %, Cloud FAR < 19 % Level 3: 5% bias, 10% bc-rms				
Verification m	ethod	3: prin	2: comparison against CALIPSO datasets, level marily comparisons with SYNOP but emented with consistency checks against 5 and Cloudsat/CALIPSO datasets				
	Cove	rage, r	esolution	and timeline	ess		
Spatial coverage	Spatial reso	lution		Vertical resolution	Timeliness		
Meteosat disk	Pixel resolut (0.05) ² leve (0.25) ² mor diurnal cycle	el 3 nthly m		n/a	N/A		



CDOP 2 Product Requirements Document

Doc. No.: SAF/CM/DWD/PRD Issue: 2.9

CM-21012 S	EVIRI Fract	ional Cloud	Cover ICDR	CF	C_SEVIRI_disk_DS_R3			
Туре		Data record	Data record					
Applications a	nd users	Climate Rese	earch & Climate	Mode	elling			
Characteristics Methods	s and	level2 full te	mporal resolutio	n				
Record length	/ Period	2004-2012						
Comments		and based o	n LSA and OSI S	AF re	d OSI SAF CDR processing equirements. , time-dependent 15 min.			
Traceability of Requirements	:							
Input satellite	data	SEVIRI (reprocessed version)						
		Diss	emination					
Format		Means			Туре			
Hdf5		FTP, WEB offline			offline			
		Ac	ccuracy					
Threshold		Target			Optimal			
Cloud POD > 8	5 %	Cloud POD >	90%		Cloud POD > 95 %			
Verification m	ethod	comparison	against CALIPSO	data	asets			
	Cove	rage, reso	lution and tim	elin	ess			
Spatial coverage	Spatial reso	lution	Vertical resolution	Tin	neliness			
Meteosat disk	Pixel resoluti	on level 2	n/a	N/A	Α			

CM-21021 Join	t C	loud	Histogr	ams	•	JCH_	SEVIRI	_disk_	_DS_	R2
Туре			Dataset							
Applications and u	user	S	* Climat	e Researd	ch					
Characteristics and Methods		cloud op This prod CM-2105 21031) a	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 / P	erio	d	Time ser	ies from	2004	1-2014	4			
Traceability of requirements			SAF/CM/ 13.06.20	'CDOP2/K)14	NMI	/RR2.	4 v1.2, c	lated		
Generation freque	ency	,	N/A							
Input satellite dat	a		CTO (CM-21031), CPH (CM-21041), COT (from CM-21051)							
			Diss	eminati	on					
Format			Mean	Means Type		9				
netcdf CF		FTP		offline						
			А	ccuracy						
Threshold			Targe	et		Optimal				
N/a		N/a			N/a					
Verification metho	bd									
	Со	vera	ige, reso	lution a	nd ti	imelir	ness			
Spatial coverage		Spatial resolution		Vertical resolution		Timeliness				
Meteosat disk <84° satellite zenith angle	(0.	25°)	2	n/a		N/A				



CDOP 2 Product Requirements Document

CM-21031 S	EVIRI	Cloud Top Level ICDR CTO_SEVIRI_DS_R					DS_R2	
Type		Datas	et					
Applications an users	d		Climate Research, NMHSs & Government Agencies, Private & Public Sector					es,
Characteristics Methods	and		Level2 (full temporal resolution), daily mean, mont mean, monthly mean diurnal cycle, 1D histogram					
Record length		2004-	-2014					
Comments		and b this p	rements are specified for CTH and CTP (as bias c-rms). No requirements are specified for CTT as arameter represents the same information in ent units.				CTT as	
Traceability of Requirements		SAF/CM/CDOP2/KNMI/RR2.4 v1.2, dated 13.06.20				2014		
Input satellite of	lata	SEVIR	I (reprocessed ve	rsion)				
Dissemination								
Format			Means		Type			
Netcdf CF (level	2 and 3	3)	FTP, WEB o		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)		, ;	1500/2500 m (bc-rms, level 3/level 2) rms, level CTP: 45 hPa (bias), 70/110 hPa (bc-rms, level 50/80 hF		TH: 500 m ()000/2000 m ns, level 3/ TP: 30 hPa (b)/80 hPa (b vel 3/ level	i, (l lev (bia c-rr	oc- el 2) is),	
Verification method			comparisons with MODIS retrievals as well as CloudSat/CALIPSO, EarthCARE will be considered					
	Co	verag	e, resolution ar	nd timel	ine	ss		
Spatial coverage	Spatial reso		olution		Vertical resolution		Tir s	nelines
Meteosat disk	Pixel resolut (0.05)² leve				n/a		N/	Α

CM-21041 SEVIR	RI Cloud P	ha	se ICDR R2		CPH_SEV	IRI_DS_R	
Туре		Di	ataset				
Applications and use	rs		imate Research, ivate & Public Se		& Governmer	nt Agencies,	
Characteristics and N	1ethods		vel2 (full tempora onthly mean, mo				
Record length / Perio	d	20	004-2014				
Comments							
Traceability of Requi	rements	S	AF/CM/CDOP2/KN	IMI/RR	24 v1.2 dated	13.06.2014	
Input satellite data		SI	EVIRI (reprocesse	ed vers	ion)		
			Dissemination				
Format			Means		Туре		
Netcdf CF (lev 3), Ho	lf5 (lev 2)	FTP, WEB		offline			
			Accuracy		•		
Threshold			arget		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	e,	resolution and t	timelir	ness		
Spatial coverage	Spatial re	sol	ution	Vertica	al resolution	Timeliness	
Meteosat disk (day (0.05) ² le		nonthly mean		n/a		N/A	



CDOP 2 Product Requirements Document

CM-21051 SE	VIRI Li	quid \	Water Path ICDR	L	.WP_S	SEVIRI_DS_R2		
Туре			Dataset	Dataset				
Applications and	d users		Climate Research, NMHSs & Government Agencies, Private & Public Sector					
Characteristics	and Meth	nods	level2 (full temporal resolution), daily mean, monthly mean, monthly mean diurnal cycle, 1D histograms					
Record length /	Period		2004-2014					
Comments			Contains as additional lathickness), REFF (particular scene heterogeneity me	le effe	ective i			
Traceability of F	Requirem	ents	SAF/CM/CDOP2/KNMI/F 13.06.2014	RR24 \	/1.2 da	ated		
Input satellite of	lata		SEVIRI (reprocessed version)					
Dissemination								
Format			Means Type					
Netcdf CF (leve Hdf5 (level 2)	l 3)		FTP, WEB off			ne		
			Accuracy					
Threshold		Targe	et	Optin				
Level 2: bias: bc-rms: 100 gn Level 3: bias: bc-rms: 40 gm	m ⁻² bc-r 20 gm ⁻² Leve		l 2: bias: 10 gm ⁻² ms: 50 gm ⁻² l 3: bias: 10 gm ⁻² ms: 20 gm ⁻²	rms: 20 g		oias: 5 gm ^{-2,} bc-		
			parison with satellite-based MWR retrieved LWP ocean (e.g. LWP_HOAPS), comparison with MODIS					
	Co	verag	e, resolution and time	elines	s			
Spatial coverage	Spatial	al resolution			cal ution	Timeliness		
Meteosat disk <84° satellite zenith angle	$(0.05)^2$	Pixel resolution level 2 (0.05)² level 3 (0.25)² monthly mean diurnal cycle				N/A		

CM-21061 SEVIR	I Ice	Wat	er Path ICDR	R2	IWP_SEVIRI_DS_R2	
Туре			Dataset			
Applications and user	rs		Climate Rese Agencies, Pri		8 & Government 2 Sector	
Characteristics and M	1etho	ds			lution), daily mean, nean diurnal cycle, 1D	
Record length / Perio	d		2004-2014			
Comments				EFF (particle	ers: COT (cloud optical effective radius) , and measure)	
Traceability of Requir	reme	nts	SAF/CM/CDO	P2/RR/24 v1	2 dated 13.06.2014	
Input satellite data			SEVIRI (repro	cessed vers	ion)	
Dissemination						
Format			Means		Туре	
Netcdf CF (level 3) Hdf5 (level 2)			FTP, WEB		offline	
		,	Accuracy	/		
Threshold		Targ	et		Optimal	
bc-rms: 200 gm ⁻² bc-rr Level 3: bias: 40 gm ⁻² Level			ll 2: bias: 20 gm ⁻² rms: 100 gm ⁻² ll 3: bias: 20 gm ⁻² 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	
			parison with CloudSat (2007-2014, level-2, cted months), comparison with MODIS (2004-			
	Cove	erage	, resolution a	and timelin	ess	
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	



CDOP 2 Product Requirements
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CM-21101 SEVIRI Aer	osol Optical De	pth	,	AOD_SEVIRI_DS_R1			
Туре	Dataset						
Applications and users	* NMHSs * Government A	* Climate Research * NMHSs * Government Agencies * Aviation Sector					
Characteristics and Methods	daily and month	1					
Record length / Period	2004-2014						
Comments	Heritage algorith	Heritage algorithms: Ocean: CDOP-1 Land: MPEF					
Traceability of Requirements							
Input satellite data	SEVIRI (reproce	ssed versio	n)				
	Dissemir	nation					
Format	Means		Туре				
Netcdf CF	FTP, WEB		offline				
	Accur	асу	•				
Threshold	Target		Opti	mal			
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.						
Cove	erage, resolutio	n and tim	eline	ess			
Spatial coverage	Spatial resolution	Vertical		Timeliness			
Meteosat disk	(9 km) ²	n/a		N/A			
	_			-			



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CM- TOA Reflected 21301 ICDR	d Solar radiativ	e flux		TRS_GERB_DS_R2		
Туре	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	' ISAE/UW/RWIB/GERB/RR// S V I / DATED // U/ /UI/					
Input satellite data	GERB,SEVIRI (re	processed v	ersion)		
Dissemination						
Format	Means		Type			
Netcdf CF	FTP, WEB			offline		
	Accui	racy				
Threshold	Target		Optimal			
8W/m² (mm) 16W/m² (dm & mmdc) Decadal stab. N/A	4W/m² (mm) 8W/m² (dm & m Decadal stab. <		2W/m² (mm) 4W/m² (dm & mmdc) Decadal stab. < 0.3 W/m²			
Verification method	GERB CERES inte estimated at 1° >			uracy and stability		
Cov	erage, resoluti	on and tim	eline	ess		
Spatial coverage	Spatial resolution	Vertical resolution		Timeliness		
Meteosat disk	(9 km) ²	n/a		n/a		N/A

CM- TOA Reflect 21321 radiative flu	ed Solar Clear-S	Sky	TF	RS_CS_GERB_DS_R2		
Туре	Dataset					
Applications and users	* Climate Research * NMHSs * Government Agencies					
Characteristics and Methods	Daily mean (dm diurnal cycle (m		mean	(mm), monthly mean		
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 (re	eprocessed	versio	n)		
	Dissemi	nation				
Format	Means		Туре			
Netcdf CF	FTP, WEB		offlin	fline		
	Accui	асу				
Threshold	Target		Opti	mal		
8W/m² (mm) 16W/m² (dm & mmdc) Decadal stab. N/A	4W/m² (mm) 8W/m² (dm & m Decadal stab. <		2W/m² (mm) 4W/m² (dm & mmdc) Decadal stab. < 0.3 W/m²			
Verification method	GERB CERES intercomparison, Accuracy and stability estimated at 1° x 1° resolution					
Cov	erage, resolutio	on and tim	eline	ess		
Spatial coverage	Spatial resolution	Vertical		Timeliness		
Meteosat disk	(9 km) ²	n/a	N/A			



CDOP 2 Product Requirements Document

CM- TOA Emitted 21331 flux ICDR	Thermal radiat	tive		TET_GERB_DS_R2		
Туре	Dataset					
Applications and users	* Climate Resear * NMHSs	ch				
Characteristics and Methods	Daily mean (dm) diurnal cycle (mr		nean (mm), monthly mean		
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 (re	processed v	ersion	1)		
Dissemination						
Format	Means		Туре			
Netcdf CF	FTP, WEB		offline			
	Accui	racy				
Threshold	Target		Optimal			
4W/m² (mm) 8W/m² (dm & mmdc) Decadal stab. N/A	2W/m² (mm) 4W/m² (dm & m Decadal stab. < 1		1W/m² (mm) 2W/m² (dm & mmdc) Decadal stab. < 0.3 W/m²			
Verification method	GERB CERES inte estimated at 1° >			uracy and stability		
Cov	erage, resoluti	on and tim	eline	ess		
Spatial coverage	Spatial resolution	Spatial coverage		Spatial resolution		
Meteosat disk	(9 km) ²	Meteosat d	isk	(9 km) ²		

CM- TOA Emitted 21351 radiative flux	Thermal Clear	-Sky	TI	ET_CS_GERB _DS_R2		
Туре	Dataset	Dataset				
Applications and users	* Climate Resea * NMHSs	rch				
Characteristics and Methods	Daily mean (dm diurnal cycle (m		nean	(mm), monthly mean		
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			
	Accui	racy				
Threshold	Target		Optimal			
4W/m² (mm) 8W/m² (dm & mmdc) Decadal stab. N/A	2W/m² (mm) 4W/m² (dm & m Decadal stab. <		1W/m² (mm) 2W/m² (dm & mmdc) Decadal stab. < 0.3 W/m²			
Verification method	GERB CERES int estimated at 1°			curacy and stability		
Cove	erage, resoluti	on and tin	nelin	ess		
Spatial coverage	Spatial resolution	Spatial coverage		Spatial resolution		
Meteosat disk	(9 km) ²	Meteosat d	isk	(9 km) ²		



CDOP 2 Product Requirements Document

CM- Meteosat F 23011 TCDR	ractional Cloud Cover CFC	MVIRI_SEVIRI_DS_R1				
Туре	Dataset					
Applications and users	check of visual cloud observa all other NMHS in Europe and * Validation of regional clima CLM), especially the sub grid	* 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 0.25 bc-rms (MM) 0.35 bc-rms (DM) 0.05 dec stability	0.05 bias 0.20 bc-rms (MM) 0.30 bc-rms (DM) 0.02 dec stability	0.01 bias 0.15 bc-rms (MM) 0.25 bc-rms (DM) 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 C Albedo TCD			CAL_MVIRI_SEVIRI_DS_R1			
Type	Dataset	Dataset					
Applications and users	* Climate r (DWD,EUR * Climate c * Developr * Agricultu	* 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, dai	ly and monthl	y me	eans			
Record length / Period	1983-2012						
Comments	system nee	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/D	SAF/CM/DWD/RR2.1 v 1.1 dated 05.07.2013					
Input satellite data	MVIRI/SEV	IRI (Rectified	digit	al pixel counts)			
	÷	Dissemina	ation	1			
Format	Means			Туре			
Netcdf CF	FTP, Web			offline			
		Accura	су				
Threshold	Target			Optimal			
0.15, decadal stab. 0.1	0.1, decad	al stability 0.0	75	0.08, decadal stability 0.05			
Verification method	accuracy e	accuracy estimated based on derived SIS accuracy					
	Coverage	e, resolution	and	d timeliness			
•	Spatial resolution	Vertical resolution	Timeliness				
Meteosat disk	(0.05°)²	n/a	N/A				

CM-23082	Meteosat C	Cloud Albedo TCDR						_R2
Туре	-	Dataset						
Applications	s 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)						
Characteris Methods	tics and	30-min ins	tantaneous,,	daily	and mont	hly means	;	
Record leng	th / 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 perform					ned	
Traceability Requirement		SAF/CM/DWD/RR28, v1.1 dated 15.01.2015						
Input satell	ite data	MVIRI/SEVIRI (Rectified digital pixel counts)						
		Dis	semination					
Format		Means			Type			
Netcdf CF		FTP, Web			offline			
		Į.	Accuracy					
Threshold		Target			Optimal			
0.15, decada 0.08	al stability	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 resol	ution	Vertical resolution	Timeliness				
Meteosat disk	(0.05°)²		n/a	N/A				



CDOP 2 Product Requirements Document

CM-23201	at Solar Su on TCDR	urface SIS_	MVIF	RI_SEVIRI_DS_R1		
Type	Dataset	Dataset				
Applications and users	Climate m (DWD, EU Climate ch Developm agricultura assessmer	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, da	ily and monthly	mea	ns		
Record length / Period	1983-2012	2				
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)					
	Dissemi	nation				
Format	Means			Type		
Netcdf CF	FTP, Web			offline		
	Accur	асу				
Threshold	Target		Opt	imal		
decadal stability 4 W/m² Accuracy (MAB) 15 W/m²,	Dec. stab Acc. (MAB	2 W/m²) 10 W/m²,	Dec. stab.1 W/m² Acc. (MAB) 8 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			

	STE MUTDI CEVIDI DE DO								
Туре		Dataset	Dataset						
Applications	s 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)							
Characteris Methods	tics and	30-min ins	tantaneous,,	daily	and monthly means				
Record leng	jth / Period	1983-2015							
Comments									
Traceability Requirement		SAF/CM/DWD/RR28, v1.1 dated 15.01.2015							
Input satell	ite data	MVIRI/SEV	IRI (Rectified	digit	al pixel counts)				
		Dis	semination						
Format		Means		Туре					
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/m ² (monthly), 12 W/m2 (daily) decadal stability 0.5 W/m ²				
Verification	method	comparisor	n with BSRN g	roun	d measurements				
	Cov	erage, res	olution and	time	liness				
Spatial coverage	Spatial resolu	ition	Vertical resolution	Time	eliness				
Meteosat disk	(0.05°)²		n/a	N/A					



CDOP 2 Product Requirements Document

	DNT MUTDI CEVIDI DE DI									
Type		Dataset								
Application	s and users	Climate impact analysis, Climate model evaluation and development , Climate change Development agencies , Agricultural planning and drought risk assessment, Solar energy								
Characteris Methods	stics and	hourly, da	ily and mont	hly n	neans					
Record len	gth / Period	1983-2012	2							
Comments										
Traceability Requireme	•	SAF/CM/DWD/RR2.1 v 1.1 dated 05.07.2013								
Input satel	lite data	MVIRI/SE\	VIRI (Rectifie	d dig	gital pixel counts)					
		Dis	semination							
Format		Means			Type					
Netcdf CF		FTP, Web			offline					
			Accuracy							
Threshold		Target			Optimal					
) 20 W/m², ab. 6 W/m²	Accuracy (MAB) 15 W/m², decadal stability 4 W/m²			Acc. (MAB) 12 W/m², decadal stab. 3 W/m²					
Verification	method	compariso	n with groun	d me	easurements					
Coverage, resolution and timeliness										
Spatial coverage	Spatial resol	ution	Vertical resolution	Time	eliness					
Meteosat disk	(0.05°) ²	.05°)²		N/A						

	Shi Muthi Sevidi ne bi										
Туре		Data Rec	ord								
Applicatio	ns and users	climate c agricultui	Climate model evaluation and development, climate change analysis, agricultural planning and drought assessment, solar energy resource planning.								
Character Methods	istics and	30-min ir	nstantaneou	s, dai	ily and monthly means						
Record lei	ngth / Period	1983-201	15								
Comment	S	Composed of Surface direct normalized irr (DNI) and surface direct radiation (SID)									
Traceabili Requirem		SAF/CM/D	SAF/CM/DWD/RR28, v1.1 dated 15.01.2015								
Input sate	ellite data	MVIRI/SE	VIRI (Recti	fied d	igital pixel counts)						
		Dis	seminatio	n							
Format		Means			Туре						
Netcdf CF		FTP, Web			Offline						
			Accuracy								
Threshold		Target			Optimal						
Accuracy (MAB), DNI, SID 20 / 15 W/m² (monthly) 30 / 25 W/m² (daily) decadal stability 5 W/m²		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/m² (monthly), 20 / 15 W/m² (daily) decadal stability 2 W/m²						
Verificatio	n method	compariso	on with BSRN	l grou	nd measurements						
_	Cove	rage, res	olution and	d tim	eliness						
Spatial coverage	Spatial resolu	tion	Vertical resolution	Time	liness						
Meteosat disk	(0.05°)²		n/a	N/A							



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CM- 23241	Meteosat S Irradiance		esolved	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)				
Characteri Methods	stics and	monthly n	neans			
Record ler	ngth / Period	1983-201	5			
Comments	5					
Traceabilit Requireme	•	SAF/CM/D	WD/RR28, v1	.1 da	ated 15.01.2015	
Input sate	llite data	MVIRI/SEVIRI (Rectified digital pixel counts)				
		Dis	semination)		
Format		Means			Туре	
Netcdf CF		Web			offline	
		ı	Accuracy			
Threshold		Target		Optimal		
Accuracy (MAB) of 15 W/m² weighted with the relative contribution to the broadband spectra.		accuracy (MAB) 10 W/m² weighted with the relative contribution to the broadband spectra			accuracy (MAB) 8 W/m² weighted with the relative contribution to the broadband spectra	
Verificatio	n method	Comparison with ground based data as far as available				
	Cove	erage, res	olution and	l tim	eliness	
Spatial coverage Spatial resolution		lution	Vertical resolution	Time	eliness	
Meteosat disk	(0.05°) ²		n/a	N/A		

		Reflected Solar A	II-SI	ky	TRS_AS_MVIRI_GERB_SE VIRI_disk_DS		
Туре		Dataset					
Applications and users	•	* Climate Research * NMHSs * Government Agencies					
Characterist and Method		daily mean, mont	daily mean, monthly mean, monthly mean diurnal cycle				
Record leng Period	th /	1982-2014					
Comments							
Traceability Requiremen					RR2.6, v3.0, dated		
Input satellite data MVIRI, SEVIRI (reprocessed CF version)					CF version)		
		Diss	semi	nation			
Format		Means Ty		Type	/ре		
Netcdf CF		FTP, WEB offline					
		A	ccu	racy			
Threshold		Target O		Optima	Optimal		
8 W/m² (mm) 16 W/m² (dm & mmdc) Bias : < 4 W/m² stab. < 4W/m²/decade		8 W/m² (dm & mmdc) 4 W/m Bias < 2 W/m² Bias <		4 W/m ² Bias < 1	W/m² (mm) W/m² (dm & mmdc) as < 1 W/m² ab. < 0.3 W/m²/decade		
Verification method		comparison with resolution.	CERI	ES/AVHF	RR. Accuracy at 1°x1°		
		Coverage, reso	luti	on and	timeliness		
Spatial coverage	Spa	tial resolution Vertical resolution Timeliness			Timeliness		
Meteosat disk	(0.0	n/a N/A			N/A		



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CM- TOA Emitted Thermal All-Sky TET_AS_MVIRI_GERB_S 23341 Radiative Flux EVIRI_disk_DS_R1										
Туре		Dataset								
Applications	and users	* Climate Research * NMHSs * Government Agencies								
Characteris Methods	tics and	daily me diurnal d		neai	n, monthly mean					
Record leng	th / Period	1982-20)14							
Comments										
Traceability Requiremen		SAF/CM, 24.12.2	, ,	/GEI	RB/RR2.6, v3.0, dated					
Input satell	ite data	MVIRI, S	SEVIRI (reprod	ess	ed CF version)					
Dissemination										
Format		Means			Туре					
Netcdf CF		FTP, WE	В		offline					
			Accuracy							
Threshold		Target			Optimal					
4 W/m² (mn 8 W/m² (dm		2W/m² (4 W/m²	mm) (dm & mmdc)		1 W/m² (mm) 2 W/m² (dm & mmdc)					
Bias < 4 W/	m²	Bias < 2	W/m²		Bias < 1 W/m²					
stab. < 4W/	m²/decade	stab. < 0	0.6 W/m²/deca	de	stab. < 0.3 W/m²/decade					
Verification	method		son with CERE y at 1°x1° reso		IRS dataset/AVHRR.					
_	Cover	age, res	olution and t	ime	eliness					
Spatial coverage	Spatial reso	lution	Vertical resolution	Tim	neliness					
Meteosat disk	(0.05°)²		n/a	N/A						



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CM- 23921	Meteosat S Surface Ter			LSA	_MVIRI_SEVIRI_DS_R1		
Туре	-	Data record	d				
Application	s and users	GLDAS/LIS Climate mo Switzerland Climate mo	s, onitoring of he d, reinsurance onitoring of cr	eat w e com op he	urface fluxes: e.g. LSA SAF aves: e.g. ETH Zurich apanies such as SWISS RE ealth: e.g. AgroScope ce companies such as		
Characteris Methods	stics and	hourly (HM	I), daily (DM)	and i	monthly means (MM)		
Record len	gth / Period	1991-2015					
Comments		The method to derive LST is a statistical method and consistent with the operational LSA approach.					
Traceability Requireme		SAF/CM/DWD/RR28, v1.3, dated 25.07.2016					
Input satel	lite data	MVIRI/SEV	'IRI				
		Dis	ssemination				
Format		Means		Туре			
Netcdf CF		FTP, WEB			offline		
		1	Accuracy				
Threshold ¹		Target ¹			Optimal ¹		
rms ² 4.0 K bias ³ 2.5 K dec stabilit		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	n method	Ground data (BSRN, FLUXNET and/or LSA SAF validat sites), radiance based validation and comparison with other satellite products					
	Co	verage, res	olution and	time	liness		
Spatial coverage	Spatial resolu	ution	Vertical resolution	Time	eliness		
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 P Temperatur		nd Surface	LST	_MVIRI_SEVIRI_DS _R1		
Туре	-	Data recor	Data record				
Applications a	nd 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 Methods	s and	hourly (HM), daily (DM)	and ı	monthly means (MM)		
Record length	/ Period	1991-2015					
Comments							
Traceability of Requirements	Traceability of Requirements		SAF/CM/DWD/RR28, v1.3, dated 25.07.2016				
Input satellite	data	MVIRI/SEVIRI					
		Dissemination					
Format		Means			Туре		
Netcdf CF		FTP, WEB			offline		
		Acc	uracy				
Threshold ¹		Target ¹			Optimal ¹		
rms ² 3.5 K bias ³ 1.8 K dec stability ⁴ 1	rms ² 3.5 K bias ³ 1.8 K dec stability ⁴ 1.5 K		y ⁴ 0.8 K	rms ² 1.0 K bias ³ 0.5 K dec stability ⁴ 0.2 K			
Verification me	ethod	Ground data (BSRN, FLUXNET and/or LSA SAF validation sites), radiance based validation and comparison with other satellite products					
	Covera	ge, resolu	tion and time	eline	ess		
Spatial coverage	' Snatial recollition		Vertical resolution Time		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 Impro	oved Water ses	Vapour	WV_MW_global_DS_R1				
Туре	Dataset	Dataset					
	Climate NMHSs	Modelling, CI	DR Generating entities,				
Applications and user	comparis	•	he CMIP model inter- P) which will be underway				
The data set will be the Jacobian weighted tropospheric relative humidity roughly in the layer between 500 and 200 hPa which is defrom the radiances as described in Buehler John (2005). It will be compared with the squantity from model fields using a satellite simulator approach (e.g., COSP). Daily me ascending and descending passes separated data will be provided.							
Record length / Perio	d 1993 –	1993 - 2013					
Comments	Compari means.	Comparison numbers for accuracy are global means.					
Traceability of Requir	ements	From WMO database, SAF/CM/UKMO/RR/2.14, v1.2, dated 15.01.2015					
Input satellite data	AMSU-B	AMSU-B, MHS, SSM/T2, FCDRs for channel 12.					
	•	emination					
Format	Means		Туре				
Netcdf CF	FTP, We	b	offline				
	A	ccuracy					
Threshold	Target		Optimal				
Bias: 15%	Bias: 10	%	Bias: 5%				
Verification method	compare GRUAN.	compare with reference in-situ data, e.g., GRUAN.					
Cov	erage, reso	lution and ti	meliness				
Spatial coverage Spatial r	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		
Туре	Produ	Product					
			Ss, Governr Sector	nent a	agencies, Private &		
Characteristics and Methods			Mean, Mon al Cycle	thly N	lean, Monthly Mean		
Comments		PROD	DUCT SUPI	ERSE	DED BY CM-02		
Generation freque	ncy	1 day	, 1 month				
Input satellite dat	1	SEVIE	RI				
Dissemination							
Format		Means			Type		
HDF5	FTP, CD-	ROM, E	ROM, Email offline				
		Acc	curacy				
Threshold		Targe	t Optimal		Optimal		
20% bias 40% bc-rms (M 30% bias 40% bc-rms (Dl	1) 20% bo	ias c-rms (ias c-rms (` ,	10% 15% 10% 15%	bc-rms (MM) bias		
Verification metho	~ .		SYNOP dat studied ar	•	sults computed as areal		
	Coverage,	resolu	ition and t	imeli	ness		
Spatial coverage S	atial resolut	ion	Vertical resolution		Timeliness		
Europe (1	5 km) ²				2 month		

 $^{^{\}rm 2}$ For definition of term "superseded" and "discontinued" see section 1.3.

CM-07	Cloud	d Typ	е			CTY_	_SEVIRI_	_Europe	
Type			Product						
Applications and users			* NMHSs * Governn * Private S * Public Se		ies				
Characteristics a Methods	and		Monthly M	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle					
Comments			PRODUCT	SUPERSE	DED	BY CM	I-08		
Generation freq	uency	1 day, 1 month							
Input satellite d	ata		SEVIRI	SEVIRI					
	Dissemination								
Format			Means				Туре		
HDF55		FTP,	CD-ROM, Email offline						
			Acc	curacy					
Threshold			Targe	t		Optimal			
30% bias 50% bc-rms (40% bias 50% bc-rms (` ′	15% 35% 25% 35%	bc-rms (bias	` ,	25% 15%	10% bias 25% bc-rms (MM) 15% bias 25% bc-rms (DM)			
Verification met		parisons to MODIS data (results computed as areal as over the studied area)							
	Co	vera	ge, resolu	ition and t	imel	iness			
Spatial coverage	Spati	al res	solution	Vertical resolution		Timelir	ness		
Europe	(15 k	m) ²				N/A			



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CM-08	Cloud Type		•		CTY_SEVIRI		
Туре		Product					
Applications and (ısers	* NMHSs * Governme * Private Se * Public Sec					
Characteristics ar	d Methods	Daily Mean Monthly Me Monthly Me	an an Diurnal C	ycle			
Comments		defined in 9 is given as precision is error.	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 freque	ency	1 day, 1 mo	onth				
Input satellite dat	a	SEVIRI					
		Dissemina	ation				
Format		Means			Type		
HDF5	FTP,	CD-ROM, Em	nail	offline	е		
		Accura	су				
Threshold		Target			Optimal		
30% bias 50% bc-rms (M 55% bc-rms (D				10% 25% 30%	bias bc-rms (MM) bc-rms (DM)		
Verification metho		parisons to MODIS data (results computed as means over the studied area)					
	Coverage	, resolution	and timeli	ness			
Spatial coverage	Spatial reso	olution	Vertical resolution		Timeliness		
Meteosat disk	(15 km) ²				2 month		

CM-09	Cloud	Тур	e			CTY_AVHRR_Europe		
Type	=		Product	Product				
Applications and users			* NMHSs * Governm * Private S * Public So		ies			
Characteristics a Methods	and		Daily Mear Monthly M					
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 freq	uency		1 day, 1 m	nonth				
Input satellite d	ata		AVHRR					
			Disse	mination				
Format			Means			Туре		
HDF5	F	FTP,	CD-ROM, Email offline			е		
			Acc	curacy				
Threshold			Targe	t	Optimal			
30% bias 50% bc-rms (55% bc-rms ((MM)	15% 35% 40%	bc-rms (10% 25% 30%	bc-rms (MM)		
Verification met			parisons to MODIS data (results computed as areal as over the studied area)					
	Coverage, resolution and timeliness							
Spatial coverage	Snafial rec			olution Vertical resolution		Timeliness		
Europe	(15 kr	m) ²				2 month		



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CM-10 CI	loud Typ	e			CTY_AVHRR_Arctic		
Туре		Product	Product				
Applications and u	ısers	* Climate * NMHSs	* 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 freque	ency	1 day, 1 m	1 day, 1 month				
Input satellite data	a	AVHRR					
		Dissem	ination				
Format		Means			Type		
HDF5	FTP,	CD-ROM, Email offli			ne		
		Accu	ıracy				
Threshold		Targe	t	Optimal			
50% bias 60% bc-rms (MI 65% bc-rms (DI	,	bc-rms (,	15% 20% 25%			
Verification metho	od						
Coverage, resolution and timeliness							
Spatial coverage S	I Spanal res		vertical resolution		Timeliness		
Arctic (1	15 km) ²	-			2 month		

CM-13	Clou	d Top	Tempera	ture		CTT_SEVIRI_Europe		
Туре			Product					
Applications and users			* NMHSs * Governn * Private S * Public Se		ies			
Characteristics Methods	and		Monthly M	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle				
Comments			PRODUCT	SUPERSE	DED	BY CM-14		
Generation fre	quency	/	1 day, 1 m	nonth				
Input satellite	data		SEVIRI	SEVIRI				
			Disse	mination				
Format			Means			Туре		
HDF55		FTP,	CD-ROM, Email offline			е		
			Acc	curacy				
Threshold	d		Targe	t		Optimal		
(MM) 5/7/ 5/8/12 K bias 3/4/		5 K bias 9 K bc-rms (MM) 6 K bias 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 me	thod	no co	omparison i	mparison needed				
	C	vera	ige, resolu	ition and t	imel	ness		
Spatial coverage	Spat	ial res	solution	Vertical Tresolution		Timeliness		
Europe	(15 k	(m) ²				N/A		



CDOP 2 Product Requirements Document

CM-19	Cloud	d Top	Height			CTH_SEVIRI_Europe		
Туре	=		Product					
Applications and users			* NMHSs * Governm * Private S * Public Se		ies			
Characteristics Methods	Monthly M	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle						
Comments			PRODUCT	SUPERSE	DED	BY CM-14		
Generation freq	uency	1	1 day, 1 m	nonth				
Input satellite d	ata		SEVIRI	SEVIRI				
Dissemination								
Format			Means	5		Туре		
HDF55		FTP,	CD-ROM, Email offlir			e		
			Acc	curacy				
Threshold			Targe	t	Optimal			
30% bias 3000m bc-rms (MM) 40% bias 3000m bc-rms (DM)		20%	m bc-rms	` '	15%	m bc-rms (MM)		
Verification met	hod			parisons to MODIS data (results computed as areal as over the studied area)				
	Co	vera	ıge, resolι	ition and t	timel	iness		
Spatial coverage	Spati	al res	solution	Vertical resolution		Timeliness		
Europe	(15 k	(m) ²				N/A		

CM-25	Clou	d Top	Pressure			CTP_SEVIR	I_Europe	
Туре			Product					
Applications and	user	rs	* Private S	* NMHSs * Government agencies * Private Sector * Public Sector				
Characteristics and Methods			Monthly M	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle				
Comments			PRODUCT	SUPERSE	DED	BY CM-14		
Generation frequency			1 day, 1 m	nonth				
Input satellite data			SEVIRI					
			Dissen	nination				
Format			Means	5		Type		
HDF55		FTP,	CD-ROM, Email offline					
			Acc	uracy				
Threshold			Targe	t	Optimal			
bc-rms (MM) 80/110/130 hPa bias 90/120/140 hPa 50/7		50/7 (MM) 40/5	10/55/65 hPa bias 50/70/85 hPa bc-rms		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 meth	no co	mparison	omparison needed					
	Co	verag	ge, resolut	tion and ti	meli	ness		
Spatial coverage	Spati	ial resolution		Vertical resolution		Timeliness		
Europe	(15 k	رس ۱2				N/A		



CDOP 2 Product Requirements Document

CM-31	Cloud	d Opt	ical Thick	ness		COT	_SEVIRI	_Europe
Туре	-		Product					
Applications and	d user	* NMHSs * Governm * Private S * Public S		ies				
Characteristics Methods	and	Monthly M	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle					
Comments			PRODUCT	SUPERSE	DED	BY C	M-32	
Generation freq	uency	,	1 day, 1 n	nonth				
Input satellite d	lata		SEVIRI	SEVIRI				
			Disser	nination				
Format			Means			Type		
HDF55		FTP,	CD-ROM, Email off			e		
			Acc	uracy				
Threshold			Targe	t	Optimal			
20% bias 50% precision (MM) 25% bias 50% precision (DM)		10% 20% 15% 20%	precision bias	` '	05% 15% 10% 15%	pre bia:	cision (MI	
Verification met	hod		parisons to MODIS data (results computed as means over the studied area)					
	Co	vera	ge, resolu	tion and t	imeli	ness		
Spatial coverage	Shafiai resc			Vertical resolution		Timeliness		
Europe	(15 k	m) ²				N/A		

CM-32	Cloud	l Opti	cal Thickne	ess	•	COT_SEVIRI		
Туре			Product	Product				
Applications and u	users		* Climate R * NMHSs * Governme	esearch ent agencies	i			
Characteristics an	hods		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 freque	ency		1 day, 1 mo	onth				
Input satellite dat	a		SEVIRI					
			Dissemina	ation				
Format			Means		Туре			
HDF5		FTP,	CD-ROM, Em	nail	offline			
			Accura	су				
Threshold			Target			Optimal		
bias: 40% rms: 70%		bias: rms:				bias: 10% rms: 30%		
Verification method	od	Comp	parisons to MODIS data.					
	Coverage, resolution and timeliness							
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness		
Meteosat disk	(15 k	m) ²			•	2 month		



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CM-36	Cloud	l Phas	se		•	CPH_SEVIRI		
Type	-		Product	Product				
Applications and (users		* Climate R * NMHSs * Governme	esearch ent agencies	i			
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 freque	ency		1 day, 1 mo	onth				
Input satellite dat	a		SEVIRI					
			Dissemina	tion				
Format			Means		Type			
HDF5		FTP,	CD-ROM, Em	nail	offline			
			Accurac	су				
Threshold			Target			Optimal		
bias: 0.1 rms: 0.2		bias: rms:			bias: 0.02 rms: 0.05			
Verification method	bd	Comp	parisons to MODIS data.					
	Cove	rage,	resolution	and timeli	ness			
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness		
Meteosat disk	(15 k	m)²				2 month		

CM-40	Clou	d Wa	ter Path			CWP	SEVIRI	Europe		
Туре			Product							
Applications and users			* NMHSs * Governm * Private S * Public So		cies					
Characteristics Methods	and		Monthly M	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle						
Comments			PRODUCT	SUPERSI	ED B	CM-	41			
Generation freq	uenc	у	1 day, 1 n	nonth						
Input satellite o	lata		SEVIRI	SEVIRI						
Dissemination										
Format			Means			Type				
HDF55		FTP,	CD-ROM, E	CD-ROM, Email o		e				
			Acc	uracy						
Threshold			Targe	t	Optimal					
(MM) 15 g 25 g/m ² bias 15 g			/m ² precision (MM) 10 /m ² bias 10			5 g/m ² bias 10 g/m ² precision (MM) 10 g/m ² bias 10 g/m ² precision (DM)				
Verification met	thod			parisons to MODIS data (results computed as means over the studied area)						
	Co	vera	ge, resolu	tion and t	imeli	iness				
Spatial coverage	Spat	ial re	solution	Vertical resolution		Timel	iness			
Europe	(15 l	cm) ²				N/A		·		



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CM-41	Liqui	d Wat	er Path			LWP_SEVIRI		
Type	-		Product					
Applications and (users		* Climate R * NMHSs * Governme	esearch	5			
Characteristics and Methods				Daily Mean Monthly Mean Monthly Mean Diurnal Cycle				
Comments			disk as rela datasets.	The bias and rms are defined for the Meteosat disk as relative difference to the comparative datasets. PRODUCT DISCONTINUED (01.03.2012)				
Generation freque	ency		1 day, 1 mo	1 day, 1 month				
Input satellite dat	:a		SEVIRI					
			Dissemin	ation				
Format			Means		Type			
HDF5		FTP,	CD-ROM, Em	nail	offline			
			Accura	су				
Threshold			Target			Optimal		
bias: 40% rms: 70%	5.45.				bias: 10% rms: 30%			
Verification metho	od	Comp	parisons to MODIS data					
	Coverage, resolution and timeliness							
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness		
Meteosat disk	(15 k	m) ²				2 month		

CM-48	Surfa radia		ncoming s	hortwave		SIS_SEVIRI_Europe		
Type	<u>-</u>		Product	Product				
Applications and users			* Private 9	* NMHSs * Government agencies * Private Sector * Public Sector				
Characteristics and Methods			Daily Mean Monthly M Monthly M		ıl Cyc	le		
Comments			PRODUCT	SUPERSE	ED BY	′ CM-49		
Generation frequency			1 day, 1 month					
Input satellite d	lata		SEVIRI/GERB					
			Disse	mination				
Format			Means			Type		
HDF5		FTP,	CD-ROM, Email offline			е		
			Ac	curacy				
Threshold			Targe	t		Optimal		
15 W/m ² 25 W/m ² daily mean	m ² daily 10 V			nean	- ,	8 W/m² 15 W/m² daily mean		
Verification met	thod	com	parison witl	h in-situ m	easur	ements		
	C	overa	ge, resolu	ution and	timel	iness		
Spatial coverage	Spat	ial res	Solution Vertical resolution			Timeliness		
Europe	(15 k	cm)²				2 month		



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CM-51	Surfa radia		coming sho	rtwave	•	SIS_merged		
Туре	_		Product					
Applications and	users		* NMHSs * Governme * Private Se	* Climate Research * NMHSs * Government agencies * Private Sector * Public Sector				
Characteristics ar	nd Met	hods	Merged pro Monthly Me					
Comments			PRODUCT	DISCONTI	NUED	(01.03.2012)		
Generation freque	ency		1 month	1 month				
Input satellite dat	ta		SEVIRI/GEF	RB, AVHRR				
			Dissemina	tion				
Format			Means Type			Type		
HDF5		FTP,	CD-ROM, Email offline			е		
			Accurac	:y				
Threshold			Target			Optimal		
15 W/m ²		10 W	/m²		8 W/ı	8 W/m ²		
Verification method	bd	comp	arison with in-situ measurements					
	Cove	rage,	resolution	and timeling	ness			
Spatial coverage	Spati	al reso	olution	Vertical resolution		Timeliness		
Meteosat disk and Northern Europe	(15 k	m)²				2 month		

CM-55	Surfa	ace A	lbedo			SAL_SEVIRI	_Europe	
Type	_		Product					
Applications and users			* NMHSs * Governn * Private S * Public Se		es			
Characteristics and Methods				Weekly Mean Monthly Mean				
Comments			PRODUCT	SUPERSE	D BY	′ CM-56		
Generation freq	uency	/	1 week, 1	1 week, 1 month				
Input satellite d	lata		SEVIRI	SEVIRI				
			Disse	mination				
Format			Means			Type		
HDF5		FTP,	CD-ROM, Email offline					
			Acc	curacy				
Threshold			Targe	t		Optimal		
50% (relative)		25%	(relative)		20%	20% (relative)		
Verification met	:hod		nuous validation at mast measurement sites & field paigns				es & field	
	Co	overa	ge, resolu	ition and t	imel	iness		
Spatial coverage	Spat	ial res	vertical resolution			Timeliness		
Europe	(15 k	(m) ²				N/A		



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CM-56	Surfa	ce All	bedo			SAL_SEVIRI		
Type			Product	Product				
Applications and users			* NMHSs	* Climate Research * NMHSs * Government agencies				
Characteristics and	d Met	hods	Weekly Mea Monthly Me					
Comments			PRODUCT	DISCONTIN	NUED	(01.03.2012)		
Generation freque	ncy		1 week, 1 n	nonth				
Input satellite data	а		SEVIRI					
Dissemination								
Format			Means	<u> </u>	Туре			
HDF5		FTP,	CD-ROM, Email offlir			е		
			Accura	су				
Threshold			Target			Optimal		
50% (relative)		25%	(relative)		20%	(relative)		
Verification method field of limite other that t			nuous validation at mast measurement sites & campaigns. Comparisons over Africa are very d due to missing mast data. Comparisons to satellite data are attempted. It is expected he quality of SAL is not reduced except in t regions.					
	Cove	erage	, resolution	and timeli	ness			
Spatial coverage	Spatial resolution			Vertical resolution		Timeliness		
Meteosat disk	(15 k	m)²				2 month		

CM-58	Surfa	ce Al	bedo	<u>, </u>		SAL merged	
Туре	-		Product	Product			
Applications and users			* NMHSs	* Climate Research * NMHSs * Government agencies			
Characteristics an	nd Met	hods	Merged Pro Monthly Me				
Comments			PRODUCT	DISCONTI	NUED	(01.03.2012)	
Generation freque	ency		1 month				
Input satellite dat	:a		SEVIRI, AV	HRR			
			Dissemin	ation			
Format			Means			Туре	
HDF5		FTP,	CD-ROM, Email offline			е	
			Accura	су			
Threshold			Target	į.	Optimal		
50% (relative)		25%	(relative)		20%	20% (relative)	
Verification method	od		nuous validation at mast measurement sites & field aigns of the components CM-57 and CM-56.				
	Cov	erage	, resolution	and timel	iness		
Spatial coverage	Spati	al reso	olution	Vertical resolution		Timeliness	
Meteosat disk, Northern Europe	(15 km) ²					2 month	



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CM-63	Surfa	ace N	let Shortw	ave Radia	tion	SNS	SEVIRI	_Europe	
Туре	=		Product						
Applications and users			* NMHSs * Governm * Private S * Public Se		ies				
Characteristics and Methods			Monthly M	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle					
Comments			PRODUCT	SUPERSE	D BY	CM-6	4		
Generation frequency			1 day, 1 m	nonth					
Input satellite d	ata		SEVIRI/GERB						
			Disse	mination					
Format			Means			Туре			
HDF5		FTP,	CD-ROM, Email offline						
			Acc	curacy					
Threshold			Targe		Optimal				
20 W/m ² 30 W/m ² daily r	nean	15 W 25 W		12 W/m² 20 W/m² daily mean					
Verification met	hod	calcu	lated base	d on accura	acies (of SAL	and SIS		
	Co	overa	ıge, resolι	ition and t	timel	iness			
Spatial coverage	Spat	ial res	solution	Vertical resolution		Timeliness			
Europe	(15 k	cm) ²				N/A			

CM-64	Surfa	ce Ne	t Shortway	e Radiatio	n	SNS_SEVIRI	
Туре	-		Product				
Applications and (users		* Climate R * NMHSs * Governme	esearch ent agencies	3		
Characteristics an	nd Met	hods	Daily Mean Monthly Mean Monthly Mean Diurnal Cycle				
Comments			PRODUCT	DISCONTI	NUED	(01.03.2012)	
Generation freque	ency		1 day, 1 mo	onth			
Input satellite dat	a		SEVIRI/GERB				
			Dissemina	tion			
Format			Means	•	Type		
HDF5		FTP,	CD-ROM, Em	nail offline			
			Accurac	:у			
Threshold			Target			Optimal	
20 W/m ² 30 W/m ² daily me	ean	15 W 25 W	/m² /m² daily me	ean	12 W/m ² 20 W/m ² daily mean		
Verification metho	od	calcu	lated based on accuracy of SAL and SIS				
Coverage, resolution and timeliness							
Spatial coverage	Spati	al reso	olution	Vertical resolution		Timeliness	
Meteosat disk	(15 k	m) ²				2 month	



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CM-66	Surfa	ce Ne	et Shortway	e Radiatio	n	SNS_	merged	
Туре	-		Product	Product				
Applications and users			* Climate R * NMHSs * Governme	esearch	1			
Characteristics and Methods			Merged pro Monthly Me					
Comments			PRODUCT	DISCONTI	NUED	(01.03.2	012)	
Generation freque	ency		1 month					
Input satellite dat	a		SEVIRI, AVHRR					
Dissemination								
Format			Means			Type		
HDF5		FTP,	CD-ROM, Email			offline		
			Accura	су				
Threshold			Target	Optimal		I		
20 W/m ²		15 W	/m²		12 W	/m²		
Verification method	od	calcu	lated based	on accuracy	of SA	L and SIS		
	Cov	erage	, resolution	n and timel	iness			
Spatial coverage	Spati	al reso	olution	Vertical resolution		Timelines	S	
Meteosat disk, Northern Europe	(15 k	m)²				2 month		

CM-70		ace C	outgoing L	ongwave		SOL_SEVIRI_Europe		
Type	-		Product					
Applications and users			* NMHSs * Governm * Private S * Public Se		ies			
Characteristics and Methods			Monthly M Monthly M	ean ean Diurna	ıl Cyc	le		
Comments			PRODUCT	SUPERSE	ED BY	′ CM-71		
Generation frequency			1 day, 1 month					
Input satellite d	lata		NWP (SEVIRI)					
			Disser	nination				
Format			Means		Туре			
HDF5		FTP,	CD-ROM, E	Email	offline			
			Acc	uracy				
Threshold			Targe	t		Optimal		
15 W/m ²		10 W	//m²		8 W/	W/m²		
Verification met	hod	com	oarison with	h in-situ me	easur	ements		
Coverage, resolution and timeliness								
Spatial coverage	Spat	ial res	solution	Vertical resolution		Timeliness		
Europe	(15 k	cm) ²				N/A		



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Туре	Radia	ition	Product	Product				
Applications and	users		* Climate R * NMHSs * Governme	esearch ent agencies				
Characteristics ar	nd Met	hods	Monthly Me Monthly Me	an an Diurnal C	Cycle			
Comments			PRODUCT	DISCONTIN	NUED	(01.03.2012)		
Generation freque	ency		1 month					
Input satellite dat	a		NWP (SEVII	NWP (SEVIRI)				
			Dissemina	tion				
Format			Means			Туре		
HDF5		FTP,	CD-ROM, Em	nail	offline			
			Accurac	у				
Threshold			Target			Optimal		
15 W/m ²		10 W	/m²		1/W 8	m²		
Verification method	od	comp	parison with in-situ measurements					
	Cove	rage,	resolution	and timelin	ness			
Spatial coverage	Spatia	al resc	olution	Vertical resolution		Timeliness		
Meteosat disk	(15 k	m)²				2 month		

		ace O	utgoing L	ongwave		SOL_AVHRR_Europe		
Туре			Product	Product				
Applications and users			* Climate * NMHSs * Governn	Research nent agenc	ies			
Characteristics and Methods			Monthly M	ean				
Comments			PRODUCT	DISCONT	ΓΙΝU	ED (01.03.2012)		
Generation frequency			1 month					
Input satellite d	ata		NWP (AVHRR)					
			Disse	mination				
Format			Means			Туре		
HDF5		FTP,	CD-ROM, Email offline			е		
			Acc	curacy				
Threshold			Targe	t		Optimal		
15 W/m ²		10 W	//m²		8 W/	m ²		
Verification met	hod	comp	parison with	n in-situ me	easure	ements		
	Coverage, resolution and timeliness							
Spatial coverage	Spati	ial res	vertical resolution			Timeliness		
Europe	(15 k	(m) ²				2 month		



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CM-73	Surfa Radia		itgoing Lon	igwave		SOL_merged	
Туре	=		Product				
Applications and users			* Climate Research * NMHSs * Government agencies				
Characteristics an	d Met	hods	Monthly Me	an			
Comments	PRODUCT	DISCONTI	NUED	(01.03.2012)			
Generation freque	ency		1 month				
Input satellite dat	a		NWP (SEVIRI, AVHRR)				
Dissemination							
Format			Means	5	Туре		
HDF5		FTP,	CD-ROM, En	ROM, Email offline			
			Accurac	су			
Threshold			Target		Optimal		
15 W/m ²		10 W	/m²		8 W/ı	8 W/m ²	
Verification method	od	comp	arison with	in-situ meas	ureme	ents	
	Cove	rage,	resolution	and timeli	ness		
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness	
Meteosat disk, Northern Europe	(15 k	m)²				2 month	

	-					· · · · · · · · · · · · · · · · · · ·		
CM-77	Surfa Radia			Longwav	е	SDL_SEVIRI_Europe		
Туре			Product	Product				
Applications and	d user	s	* NMHSs * Governr * Private S * Public S		ies			
Characteristics a Methods	and		Monthly M Monthly M	ean ean Diurna	ıl Cyc	le		
Comments			PRODUCT	SUPERSE	D BY	′ CM-78		
Generation freq	uency	1	1 month	1 month				
Input satellite d	ata		SEVIRI					
			Disse	mination				
Format			Means	5		Type		
HDF5		FTP,	CD-ROM, Email o			offline		
			Acc	curacy				
Threshold			Targe	t		Optimal		
15 W/m ²		10 W	//m²		8 W/	m²		
Verification met	hod	com	oarison witl	h in-situ me	easur	ements		
	Co	overa	ıge, resolι	ition and t	timel	iness		
Spatial coverage	Spati	ial res	solution Vertical resolution			Timeliness		
Europe	(15 k	(m) ²				N/A		



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CM-78	Surfa Radia		wnward Lo	ongwave		SDL_SEVIRI		
Type	=		Product	Product				
Applications and (users		* Climate R * NMHSs * Governme	esearch ent agencies				
Characteristics ar	nd Met	hods	Monthly Me Monthly Me	an an Diurnal C	cycle			
Comments			PRODUCT	DISCONTIN	NUED	(01.03.2012)		
Generation freque	ency		1 month					
Input satellite dat	a		SEVIRI	SEVIRI				
			Dissemina	ation				
Format			Means			Type		
HDF5		FTP,	CD-ROM, Email			е		
			Accura	су				
Threshold			Target		Optimal			
15 W/m ²		10 W	/m²		8 W/m ²			
Verification metho	od	operat target station	parison with in-situ measurements. Only a few reliable tional in-situ measurements are available in Africa. The accuracy is based on the comparison at available as and is not necessarily valid everywhere in Africa. Ever, it is not expected that the quality is greatly reduced Africa.					
	Cov	erage	, resolution	and timeli	ness			
Spatial coverage	Spati	al reso	olution	Vertical resolution		Timeliness		
Meteosat disk	(15 k	m)²				2 month		

CM-79		ace D	ownward	Longwave	e	SDL_AVHRR_Europe			
Type	<u>-</u>		Product	Product					
Applications and	d user	rs	* Climate * NMHSs * Governn	Research nent agenc	ies				
Characteristics and Methods	and		Monthly M	ean					
Comments			PRODUCT	DISCON	INU	ED (01.03.2012)			
Generation freq	uency	/	1 month	1 month					
Input satellite d	lata		AVHRR	AVHRR					
			Disse	mination					
Format			Means			Туре			
HDF5		FTP,	CD-ROM, Email of			ffline			
			Acc	curacy					
Threshold			Targe	t		Optimal			
15 W/m ²		10 W	//m²		8 W/	/m²			
Verification met	hod	comp	parison with	n in-situ me	easure	ements			
Coverage, resolution and timeliness						iness			
Spatial coverage	· Spatial res		vertical resolution			Timeliness			
Europe	(15 k	km)²			•	2 month			



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CM-80	Surfa Radia		ownward Lo	ongwave		SDL_merged		
Туре	_		Product	Product				
Applications and users			* Climate R * NMHSs * Governm	esearch	i			
Characteristics an	d Met	hods	Merged pro Monthly Me					
Comments			PRODUCT	DISCONTI	NUED	(01.03.2012)		
Generation freque	ency		1 month					
Input satellite data			SEVIRI, AVHRR					
Dissemination								
Format			Means	5		Туре		
HDF5		FTP,	CD-ROM, Email o			offline		
			Accurac	су				
Threshold			Target	t	Optimal			
15 W/m ²		10 W	/m²		8 W/m ²			
Verification method	od	Comp	parison with in-situ measurements of ponents CM-79 and CM-78.					
	Cove	rage,	resolution	and timeli	ness			
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness		
Meteosat disk, Northern Europe	(15 k	m)²				2 month		

CM-84 S	Surfa	ace N	et Longw	ave Radia	tion	SNL_	SEVIRI_	_Europe	
Type			Product	Product					
Applications and users			* NMHSs * Governn * Private S * Public Se		ies				
Characteristics a Methods		Monthly M Monthly M	ean ean Diurna	al Cyc	le				
Comments			PRODUCT	SUPERSI	ED BY	Y CM-8	35		
Generation frequ	/	1 month	1 month						
Input satellite da	ata		SEVIRI						
			Disser	mination					
Format			Means	Туре					
HDF5		FTP,	CD-ROM, Email		offline				
			Acc	uracy					
Threshold			Targe	t	Optimal				
20 W/m ²		15 W	//m²		12 W	12 W/m ²			
Verification meth	nod	calcu	lated base	d on accura	acy of	f SOL a	nd SDL		
	Co	vera	ge, resolu	tion and t	imeli	iness			
Spatial coverage	Spati	al res	solution	Vertical resolution		Timeli	ness		
Europe ((15 k	(m) ²				N/A			



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CM-85	Surfa	ce Ne	t Longwav	e Radiation	· I	SNL_SEVIRI		
Туре	-		Product	Product				
Applications and	users		* Climate R * NMHSs * Governme	esearch				
Characteristics ar	nd Met	hods	Monthly Me Monthly Me	an an Diurnal C	Cycle			
Comments			PRODUCT	DISCONTI	NUED	(01.03.2012)		
Generation freque	ency		1 month					
Input satellite dat	a		SEVIRI					
			Dissemin	ation				
Format			Means	5		Type		
HDF5		FTP,	CD-ROM, En	nail	offline			
			Accura	су				
Threshold			Targe	t		Optimal		
20 W/m ²		15 W	/m²		12 W/m ²			
Verification method	od	calcul	lated based	on accuracy	of SO	L and SDL		
Coverage, resolution and timeliness								
Spatial coverage	Spati	al resc	olution	Vertical resolution		Timeliness		
Meteosat disk	(15 k	m)²				2 month		

CM-86	Surfa	ace N	et Longwa	ave Radiat	tion	SNL	_AVHRR	_Europe	
Туре	-		Product						
Applications and	Applications and users			Research	ies				
Characteristics Methods	and		Monthly M	ean					
Comments			PRODUCT	DISCONT	rinu	ED (01	.03.201	2)	
Generation freq	uency	/	1 month						
Input satellite d	lata		AVHRR						
			Disse	mination					
Format			Means				Type		
HDF5		FTP,	CD-ROM, Email offline			е			
			Acc	curacy					
Threshold			Targe	Target			Optimal		
20 W/m ²		15 W	//m²		12 W	//m²			
Verification met	hod	calcu	lated base	lated based on accuracy of SOL and SDL					
Coverage, resolution and timeliness									
Spatial coverage	Spatial res		solution	Vertical resolution		Timeli	ness		
Europe	(15 k	(m) ²	•			2 mon	th	•	



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CM-87	Surfa	ce Ne	et Longwav	e Radiation	1	SNL_merged		
Туре	-		Product	Product				
Applications and users			* Climate R * NMHSs * Governm	Research ent agencies	5			
Characteristics ar	nd Met	hods	Merged pro Monthly Me					
Comments			PRODUCT	DISCONTI	NUED	(01.03.2012)		
Generation freque	ency		1 month					
Input satellite dat	:a		SEVIRI, AVHRR					
			Dissemina	tion				
Format			Means	5		Type		
HDF5		FTP,	CD-ROM, Email offline			е		
			Accurac	су				
Threshold			Targe	t	Optimal			
20 W/m ²		15 W	/m²		12 W	/m²		
Verification method	od	calcu	lated based on accuracy of SOL and SDL					
	Coverage, resolution and timeliness							
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness		
Meteosat disk, Northern Europe	(15 km) ²					2 month		

CM-91	Surfa	ace R	adiation E	Budget		SRB_	_SEVIRI	_Europe	
Type	-		Product						
Applications and	d user	rs	* NMHSs * Governn * Private S * Public S		ies				
Characteristics Methods	and			Monthly Mean Monthly Mean Diurnal Cycle					
Comments			PRODUCT	SUPERSE	D BY	′ CM-	92		
Generation freq	uency	/	1 month						
Input satellite d	ata		SEVIRI	SEVIRI					
			Disser	nination					
Format			Means	Туре					
HDF5		FTP,	CD-ROM, E	Email	offline				
			Acc	uracy					
Threshold			Targe	t		Optimal			
25 W/m ²		20W,	/m²		15 W	//m²			
Verification met	hod								
Coverage, resolution and timeliness									
Spatial coverage	Spat	ial res	solution	Vertical resolution		Timeliness			
Europe	(15 k	cm)²				N/A			



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CM-92	Surfa	ce Ra	diation Bud	dget	•	SRB_SEVIRI		
Туре	_		Product	Product				
Applications and (users		* Climate R * NMHSs * Governme	esearch ent agencies	i			
Characteristics an	nd Met	hods	Monthly Me Monthly Me	an an Diurnal C	Cycle			
Comments			PRODUCT	DISCONTI	NUED	(01.03.2012)		
Generation freque	ency		1 month	1 month				
Input satellite dat	a		SEVIRI					
			Dissemina	tion				
Format			Means	•		Туре		
HDF5		FTP,	CD-ROM, Email offlir			9		
			Accurac	су				
Threshold			Target		Optimal			
25 W/m ²		20W/	m²		15 W,	15 W/m ²		
Verification method	od	Calcu	lated based on accuracy of components					
	Coverage, resolution and timeliness							
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness		
Meteosat disk	(15 k	m) ²			•	2 month		

CM-93	Surfa	ace R	adiation E	Budget		SRB	AVHRR	_Europe	
Туре	<u>-</u>		Product						
Applications and	Applications and users			Research nent agenc	ies				
Characteristics Methods	and		Monthly M	ean					
Comments			PRODUCT	DISCON	ΓINU	ED (01	.03.201	2)	
Generation freq	uency	,	1 month						
Input satellite d	lata		AVHRR						
			Disse	mination					
Format			Means				Туре		
HDF5		FTP,	CD-ROM, Email offlin			line			
			Acc	curacy					
Threshold			Targe	t		C	ptimal		
25 W/m ²		20W	/m²		15 W/m ²				
Verification met	Verification method Calculated bas					d on accuracy of components			
Coverage, resolution and timeliness									
Spatial coverage	' ISpatial res		vertical resolution			Timelii	ness		
Europe	(15 k	(m) ²			•	2 mon	th		



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CM-94	Surfa	ce Ra	diation Bu	dget	•	SRB_merged	
Туре	_		Product				
Applications and users			* Climate R * NMHSs * Governm	Research ent agencies	6		
Characteristics ar	nd Met	hods	Merged pro Monthly Me				
Comments			PRODUCT	DISCONTI	NUED	(01.03.2012)	
Generation freque	ency		1 month				
Input satellite dat	a		SEVIRI, AVHRR				
			Dissemina	ition			
Format			Means	5		Type	
HDF5		FTP,	CD-ROM, Email offline			е	
			Accura	су			
Threshold			Targe	t	Optimal		
25 W/m ²		20W/	′m²		15 W	'/m²	
Verification method	od	Calcu	lated based o	n accuracy of	compo	nents	
	Cove	rage,	resolution	and timeli	ness		
Spatial coverage	Spatia	al reso	olution	Vertical resolution		Timeliness	
Meteosat disk, Northern Europe	(15 k	m)				2 month	

	_						
CM-112 Incoming Solar Radiative Flux at the top of Atmosphere TIS_merge						TIS_merged	
Туре			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				
			Dissemin	ation			
Format		Means				Туре	
HDF5 FT		FTP	ТР			offline	
			Accura	су			
Threshold		Target			Optimal		
5 W/m ²		1 W/m ²		0.5 W/m ²			
Verification method Inte		Inter	comparison of absolute radiometers				
Coverage, resolution and timeliness							
Spatial coverage	Spatial reso		olution	Vertical resolution		Timeliness	
Meteosat disk, Northern Europe						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.

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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
2011	(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
СТО	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 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 EUMETSAT
EUM	
EUMETCAT	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
	Deutschen Gesellschaft für Internationale Zusammenarbeit
GIZ	(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
ISET	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
١٠	mean / medical 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 MPEF	Moderate Resolution Imaging Spectroradiometer
MSG	Meteorological Products Extraction Facility
	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 Surface Downword Long Wove Rediction
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 Image 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)
	Trans True Trois Transit Traces (True)