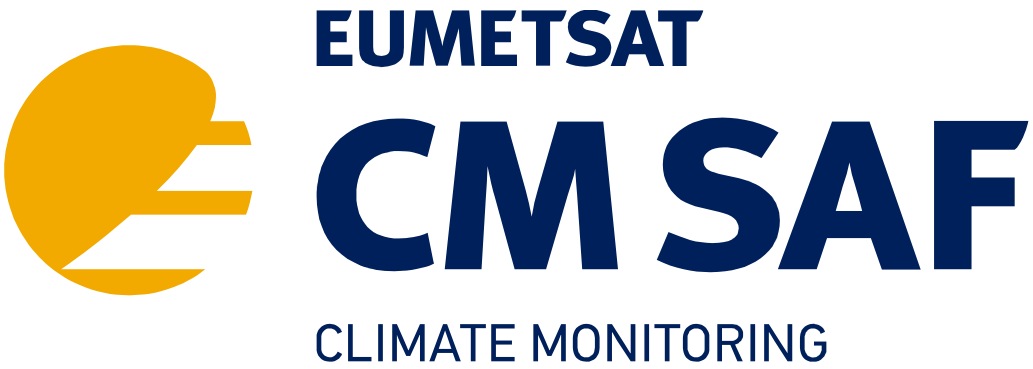
EUMETSAT Satellite Application Facility on Climate Monitoring



CDOP-3

Product Requirements Document

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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-3 (2022). 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 Third CDOP of a CM SAF	SAF/CM/DWD/CDOP3/CoA_EUM

1.2.2. Reference Documents

Reference	Title	Code
RD 1	CM SAF CDOP-3 Service Specifications	SAF/CM/DWD/SeSp/3.0
RD 2	International vocabulary of metrology – Basic and general concepts and associated terms (VIM), 3rd edition	JCGM 200:2012
RD 3	The concept of essential climate variables in support of climate research, applications, and policy. Bulletin of the American Meteorological Society, September 2014, 1432–1443	Bojinski et al. (2014)
RD 4	Guideline for the Generation of Satellite-based Datasets and Products meeting GCOS Requirements	GCOS-128
RD 5	The Global Observing System for Climate: Implementation Needs	GCOS-200
RD 6	M. Dowell, P. Lecomte, R. Husband, J. Schulz, T. Mohr, Y. Tahara, R. Eckman, E. Lindstrom, C. Wooldridge, S. Hilding, J. Bates, B. Ryan, J. Lafeuille, and S. Bojinski, 2013: Strategy Towards an Architecture for Climate Monitoring from Space.	Dowell et al. (2013)

1.3. Definition of Terms

1.3.1. Data Records definitions

CM SAF follows here RD 6.

“Data record”: A data record is a time series of measurements of a geophysical variable which has e.g. insufficient length and/or limitation in, e.g. consistency, continuity. A data record will evolve to a CDR once the limitations have been solved.

“Climate Data Record”: A Climate Data Record (CDR) is a time series of measurements of sufficient length, consistency, and continuity to determine climate variability and change. It goes together with the requirement to base any thematic climate data records on fundamental climate data records.

“Fundamental Climate Data Record”: The term “Fundamental Climate Data Record” (FCDR) is used to denote a long-term satellite data record, involving a series of instruments, with potentially changing measurement approaches, but with overlaps and calibrations sufficient to allow the generation of homogeneous products providing a measure of the independent variable that is accurate and stable enough for climate monitoring. FCDRs include the ancillary data used to calibrate them.

“Thematic Climate Data Record”: Thematic Climate Data Records (TCDR) are geophysical variables derived from the FCDRs, specific to various disciplines, and often generated by blending satellite observations, in situ data, and model output.

“Interim Climate Data record”: An Interim Climate Data Records (ICDR) denotes a regularly updated TCDR in shorter time latency with an algorithm and processing system as consistent as possible to the generation of reference TCDR. An ICDR is usually based on the latest available inter-calibration and requires a different validation approach.

“Essential Climate Variable”: Essential Climate Variables (ECVs) are geophysical variables that are currently feasible for global implementation and have a high impact on the requirements of the UNFCCC. This definition and a list of ECVs is given in RD-5. ECV’s have been identified based on the criteria of relevance, feasibility and cost effectiveness (RD-3).

“Environmental data record”: Environmental Data Records (EDRs) are time-tagged earth-located geophysical parameters produced from the sensor data. Often EDR’s are derived in low to medium latency to satellite sensor data, not fulfilling highest climate requirements.

1.3.2. Product status definitions

The following terms are used in this document and defined below. A product, data record or software changes its status based on SG decisions which are usually connected with performed external product reviews.

“committed”: Products or software packages that are committed for CDOP-3 and related work has not started yet.

“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.

“Authorized” Data records that having passed the full review cycle and are considered by the relevant Steering Group mature enough for the targeted applications to be made available to users, but not yet available to the users.

“Released” Data records 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, data records 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**. Note, existing “superseded” products, data records or software remain available for the users.

“Discontinued” Products, data records or software packages that have been previously (pre-) operationally provided to users but are not (pre-) operational anymore and are not further produced. Note, existing “discontinued” products, data records, or software remain available for the users.

“Deleted” Products, data records or software packages that have been previously planned or (pre-) operationally provided to users but are not planned or (pre-) operational and are not provided to users anymore.

1.3.3. Definition of uncertainty

The CM SAF applies the following accuracy concept for its data record using three different metrics following RD 2 and RD 5:

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.
The CM SAF quantifies the accuracy in terms of *bias* or *mean absolute deviation.*

Precision: The VIM (RD 2) states that precision is the “closeness of agreement between indications or measured quantity values obtained by replicate measurements on the same or similar objects under specified conditions. Measurement precision is usually expressed numerically by measures of imprecision, such as standard deviation, variance, or coefficient of variation under the specified conditions of measurement.“.
This measure should tell how individual parameter estimations are distributed relative to the mean error. The quantity used in CM SAF to express the precision is the standard deviation of the error which is equivalent to the *bias-corrected root mean square difference (bc-rms)*.

Stability: This measure should tell whether one or several accuracy metrics are stable or if they are changing over a longer period (usually a decade is taken). The CM SAF has chosen to monitor only the first metric here (the mean error (bias)) where the decadal trend is compared to a reference data record.

1.3.4. Definition of Validation, verification and evaluation

tbd

2. Generic Products and Data Record requirements

PRD-D-1 CM SAF shall provide products and data records during CDOP-3 as listed in Annex A

PRD-D-2 CM SAF product and data record characteristics shall be according to the tables of Annex A

PRD-D-3 For each product and data record, the following information shall be provided: Algorithm Theoretical Basis Document, Product User Manual, and Validation Report.

PRD-D-4 The CM SAF shall assess the compliance with the GCOS-143 (RD-4) guidelines and shall make the assessment available via the web page and in the associated user documentation.

3. Generic User Service requirements

PRD-U-1 The CM SAF products and data records shall be archived and shall be made available to users.

PRD-U-2 Availability to products and data records shall be according to EUMETSAT data policy.

PRD-U-3 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 records, information on how to contact the user help desk and shall allow to search the product catalogue and to order products and data records.

PRD-U-4 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-U-5 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-U-6 The CM SAF shall provide the current status of user requests and problems to the users

PRD-U-7 The CM SAF products shall be delivered to users on common media as product files.

PRD-U-8 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-U-9 The user shall have access to the product catalogue to check the availability of the products. Additionally example images and quick looks of the products shall be provided.

PRD-U-10 The user shall be able to place orders and to get status information of already placed orders

PRD-U-11 The registration and login of the user shall be mandatory to order CM SAF products.

PRD-U-12 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-U-13 The CM SAF shall prepare and perform a 'CM SAF User and Training Workshop'.

PRD-U-14 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-U-15 The Help Desk User Support shall provide information and services to CM SAF users, as well as to support the gathering of the feedback from users needed to improve the CM SAF services

PRD-U-16 For user feedback a dedicated web page 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-U-17 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-U-18 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-U-19 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-U-20 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

PRD-U-21 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-U-22 The CM SAF WWW site for the CM SAF shall provide links to other web sites (Meteorological Institutes, EUMETSAT, etc.)

PRD-U-23 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-U-24 The CM SAF WWW site for the CM SAF shall provide:
- Help desk service
- Contact link
- Frequently Asked Questions (FAQs)

PRD-U-25 The CM SAF WWW site for the CM SAF shall provide Service messages:
- operational information (product unavailability, detected or expected anomalies, warnings etc.)

PRD-U-26 The CM SAF WWW site for the CM SAF shall provide the log of changes concerning CM SAF products and data records

PRD-U-27 The CM SAF WWW site for the CM SAF shall provide CM SAF documents and reports

PRD-U-28 The central CM SAF WWW site services shall be accessible to the general public.

PRD-U-29 The access to CM SAF products shall require detailed user registration.

PRD-U-30 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-U-31 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-U-32 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 time
- Any potential useful metric value provided by the Leading Entity.

PRD-U-33 The CM SAF shall make available the metadata of all CM SAF data records to the EUMETSAT EO portal.

PRD-U-34 The CM SAF shall provide a catalogue update to EUMETSAT secretariat. This catalogue will contain the metadata of the CM SAF data records.

PRD-U-35 The CM SAF shall provide the catalogue update not later than 3 months after the release of the CM SAF data records.

4. List of TBDs and TBCs

Section 1.3.4 Definition of validation, evaluation and verification to be included for PRD 3.1

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 records need to span at least several decades in order to be able to monitor climate change. Some satellite data records already approach 30 years in length However, though continually expanding, many data records 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 data record. GCOS specifies the requirements needed for climate monitoring (GCOS-154, 2011, recently updated in 2016).
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 records 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.

Some CDR's from CM SAF are designed for this application area and user group. It is expected that CM SAF should meet mostly the "optimal accuracies".

5.2. Global and regional climate modelling

Data records of surface and top-of-the-atmosphere radiation budget, water vapour and temperature distribution, as well as data records 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 records 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.
However, 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 records 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 records. For this application area, it is often required 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 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 CM SAF should meet mostly the “target accuracies”.

5.3. Operational climate monitoring

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 climate monitoring			

6. Overview of Released Data Records

During previous SAF phases the CDRs as listed in Table 6-1 have been released from CM SAF and are available to the user.

Table 6-1: List of released CDR's until start of CDOP-3.

Family name	CM SAF identifier	DOI reference
Global Climate Data Records		
Fundamental Climate Data Record of SSM/I Brightness Temperatures	CM-150	10.5676/EUM_SAF_CM/FCDR_SSMI/V001
Fundamental Climate Data Record of SSM/I / SSMIS Brightness Temperatures	CM-12001	10.5676/EUM_SAF_CM/FCDR_MWI/V002
Fundamental Climate Data Record of Micro-wave Imager Radiances	CM-12002	10.5676/EUM_SAF_CM/FCDR_MWI/V003
Vertically Integrated Water Vapour from SSM/I	CM-127	10.5676/EUM_SAF_CM/HTW_SSMI/V001
Hamburg Ocean Atmosphere Parameters and Fluxes from Satellite Data HOAPS 3.2	CM-141, CM-142, CM-143, CM-144, CM-145, CM-146	10.5676/EUM_SAF_CM/HOAPS/V001
Vertically integrated water vapour, humidity and temperature at pressures levels and layers from ATOVS	CM-123, CM-132, CM-138	10.5676/EUM_SAF_CM/WVT_ATOVS/V001
CLARA-A1: CM SAF Clouds, Albedo and Radiation dataset from AVHRR data Edition 1	CM-05, CM-11, CM-17, CM-34, CM-38, CM-43, CM-47, CM-52, CM-60, CM-67, CM-74, CM-81, CM-88, CM-95, CM-100, CM-101	10.5676/EUM_SAF_CM/CLARA_AVHRR/V001
CLARA-A2: CM SAF Clouds,	CM-11011, CM-11021 CM-11031, CM-11041	10.5676/EUM_SAF_CM/CLARA_AVHRR/V002

Family name	CM SAF identifier	DOI reference
Albedo and Radiation dataset from AVHRR data Edition 2	CM-11051, CM-11061 CM-11201, CM-11221 CM-11251, CM-11261	
Regional Climate Data Records		
CLAAS: CM SAF CLoud property dAtAset using SEVIRI Edition 1	CM-06, CM-12, CM-18, CM-35, CM-39, CM-44, CM-46, CM-53, CM-61, CM-67, CM-68, CM-75, CM-82, CM-89, CM-96, CM-102, CM-103, CM-107	10.5676/EUM_SAF_CM/CLAAS/V001
CLAAS-2: CM SAF CLoud property dAtAset using SEVIRI	CM-21011, CM-21021 CM-21031, CM-21041 CM-21051, CM-21061	10.5676/EUM_SAF_CM/CLAAS/V002
SEVIRI cloud mask dataset Edition 1	CM-21012	10.5676/EUM_SAF_CM/CMA_SEVIRI/V001
CM SAF Surface Radiation MVIRI Data Set 1.0	CM-54 CM-106 CM-111	10.5676/EUM_SAF_CM/RAD_MVIRI/V001
CM SAF Meteosat Surface Radiation Day-light Data Set 1.0	CM-109 CM-110	10.5676/EUM_SAF_CM/DAL_MVIRI_SEVIRI/V001
Surface Solar Radiation Data Set - Heliosat (SARAH) - Edition 1	CM-23081 CM-23201 CM-23231	10.5676/EUM_SAF_CM/SARAH/V001
CM SAF TOA Radiation "GERB" dataset Edition 1	CM-113 CM-115	10.5676/EUM_SAF_CM/TOA_GERB/V001
CM SAF TOA Radiation MVIRI/SEVIRI data record Edition 1	CM-23311 CM-23341	10.5676/EUM_SAF_CM/TOA_MET/V001
Free Tropospheric Humidity from METEOSAT	CM-139	10.5676/EUM_SAF_CM/FTH_METEOSAT/V001

7. List of abbreviations

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

Abbreviations	Meaning
ECV	Essential Climate Variable
EDR	Environmental Data Record
EMP	Evaporation - Precipitation
EPS	Encapsulated Postscript
ERA	ECMWF Reanalysis
EUM	EUMETSAT
EUMETCast	EUMETSAT's Broadcast System for Environmental Data
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EUMETSAT EO	EUMETSAT Earth Observation
EURO4M	European Reanalysis and Observations for Monitoring
EVA	Evaporation
FAQ	Frequently Asked Questions
FAR	False Alarm Rate
FCDR	Fundamental Climate Data Record
FMI	Finnish Meteorological Institute
FTH	Free Tropospheric Humidity
ftp	file transfer protocol
GAC	Global Area Coverage
GB	Gigabyte
GCOS	Global Climate Observing System
GEOTOPO	Geotopography
GERB	Geostationary Earth Radiation Budget
GIZ	Deutschen Gesellschaft für Internationale Zusammenarbeit (German Association for International cooperation)
GME	Global Model Extended
GTS	Global Telecommunication System
GTZ	Gesellschaft für technische Zusammenarbeit (now: GIZ)
GUAN	GCOS Upper-Air Network
HDF5	Hierarchical Data Format 5
HIRS	High-resolution Infrared Radiation Sounder
HLW	Layered water vapour in 5 layers
HOAPS	The Hamburg Ocean Atmosphere Fluxes and Parameters from Satellite data
HSH	Specific humidity and temperature at 6 pressure levels
HTTP	HyperText Transfer Protocol
HTW	Vertical integrated water vapour information
IAPP	International ATOVS Processing Package
IBM	International Business Machines, International Board meeting
IFS	Interchange File Separator
IPCC AR4	Intergovernmental Panel on Climate Change Assessment Report 4
ISCCP	International Satellite Cloud Climatology Project
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
MAGIC	Mesoscale Atmospheric Global Irradiance Code

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

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

8. Annex A: Product Requirements for CM SAF products and data records

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

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CM-02 Fractional Cloud Cover CFC_SEVIRI

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Others: NWP

Application areas

Dissemination information

Distribution format

L3:HDF5

Generation frequency

1 day; 1 month

Generation timeliness

2 month

Spatio-temporal information

Spatial coverage

L3: MSG disk (CM SAF definition)

Spatial resolution

L3: HORIZONTAL-(15 km)^2

Temporal resolution

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage

start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	20%	10%	10%
PRECISION	bc-rms	45%	25%	20%
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	20%	10%	10%
PRECISION	bc-rms	40%	20%	15%
Fractional Cloud Cover - Monthly Mean diurnal-cycle				
ACCURACY	bias	20%	10%	10%
PRECISION	bc-rms	40%	20%	15%

Verification

Comparisons to SYNOP data (results computed as areal means over the studied area)

Comment:

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.

CM-03 Fractional Cloud Cover CFC_AVHRR_Europe

Type
Product

Input satellite data
Operational Satellite: AVHRR

Application areas

Dissemination information

Distribution format
L3:HDF5

Generation frequency
1 day; 1 month

Generation timeliness
2 month

Spatio-temporal information

Spatial coverage
L3: Initial MSG Europe

Spatial resolution
L3: HORIZONTAL-(15 km) ²

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bc-rms	45%	25%	20%
PRECISION	bias	20%	10%	10%
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bc-rms	40%	20%	15%
PRECISION	bias	20%	10%	10%

Verification

comparisons to MODIS data (results computed as areal means over the studied area)

Comment:

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.

CM-04 Fractional Cloud Cover CFC_AVHRR_Arctic

Type
Product

Input satellite data
Operational Satellite: AVHRR

Application areas
Climate Research

Dissemination information

Distribution format
L3:HDF5

Generation frequency
1 day; 1 month

Generation timeliness
2 month

Spatio-temporal information

Spatial coverage
L3: Arctic

Spatial resolution
L3: HORIZONTAL-(15 km) ²

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	30%	20%	15%
PRECISION	bc-rms	45%	35%	25%
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	30%	20%	15%
PRECISION	bc-rms	40%	30%	20%

Verification

Primarily comparisons with SYNOP but complemented with consistency checks against MODIS and Cloudsat/CALIPSO datasets;
- possibly complemented with comparison to ARM site data and IPY observations

Comment:

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.

CM-104 Direct Irradiance at Surface SID_SEVIRI

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas

Dissemination information

Distribution format
L3:HDF5

Generation frequency
1 day; 1 month

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG disk (CM SAF definition)

Spatial resolution
L3: HORIZONTAL-(15 km)²

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Direct Irradiance at Surface - Daily Mean				
ACCURACY	MAB	30 W/m²	25 W/m²	20 W/m²
Direct Irradiance at Surface - Monthly Mean				
ACCURACY	MAB	20 W/m²	15 W/m²	12 W/m²

Verification
comparison with in -situ measurements

Comment:

CM-11012 AVHRR GAC Fractional Cloud Cover TCDR R3 — CFC_AVHRR_global_DS_R3

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

N/A

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: Global

Spatial resolution

L3: HORIZONTAL-$(0.25)^2$

L3: VERTICAL-n/a

Temporal resolution

L3: Daily Mean

L3: Monthly Mean

Temporal coverage

start: 01.01.1978

end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	30%	15%	10%
PRECISION	bc-rms	40%	20%	15%
STABILITY	decadal	5%	2%	1%
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	20%	10%	5%
PRECISION	bc-rms	40%	20%	10%
STABILITY	decadal	5%	2%	1%

Verification

primarily comparisons with SYNOP;
consistency checks against MODIS and Cloudsat/CALIPSO datasets

Comment:

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)).
daily level2b files (per satellite in asc./desc. node)
Time series from 1978-2019.

CM-11022 Joint Cloud Histograms AVHRR GAC TCDR R3 — JCH_AVHRR_global_DS_R3

Type
Dataset

Input satellite data
CM-SAF Product: CM-11032
CM-SAF Product: CM-11042
CM-SAF Product: CM-11052
Others: ECMWF

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(1°)^2$
L3: VERTICAL-n/a

Temporal resolution
L3: Monthly Histogram

Temporal coverage
start: 01.01.1978
end: 31.12.2019

Uncertainty characteristics	Threshold	Target	Optimum
Joint Cloud Histograms - Monthly Histogram			
	N/A	N/A	N/A

Verification

Comment:
Time series from 1978-2019.

CM-11032 AVHRR GAC Cloud Top Level TCDR R3 CTO_AVHRR_global_DS_R3

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC
Others: ECMWF

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.05)^2$ level2b;$(0.25)^2$ level3
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Daily Mean
L3: Monthly Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.1978
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Hight - Daily Mean				
ACCURACY	bias	1800 m	1200 m	1000 m
PRECISION	bc-rms	4000 m	2000 m	1500 m
STABILITY	decadal	300 m	200 m	150 m
Cloud Top Hight - Monthly Mean				
ACCURACY	bias	1800 m	1200 m	1000 m
PRECISION	bc-rms	4000 m	2000 m	1500 m
STABILITY	decadal	300 m	200 m	150 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	150 hPa	110 hPa	80 hPa
PRECISION	bc-rms	160 hPa	130 hPa	100 hPa
STABILITY	decadal	30 hPa	20 hPa	15 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias	150 hPa	110 hPa	80 hPa
PRECISION	bc-rms	160 hPa	130 hPa	100 hPa
STABILITY	decadal	30 hPa	20 hPa	15 hPa

Verification

comparison with ISCCP;
comparison with MODIS (2000-2010);
comparison with Cloudsat/Calipso (2007-2010);
comparison with PATMOS-X

Comment:

For CTT: no specific requirement as it represents same information in different units.
Time series from 1978-2019.

CM-11042 AVHRR GAC Cloud Phase TCDR R3 CPH_AVHRR_global_DS_R3

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

N/A

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: Global

Spatial resolution

L3: HORIZONTAL-$(0.05)^2$ level2b;$(0.25)^2$ level3

L3: VERTICAL-n/a

Temporal resolution

L3: Daily Mean

Temporal coverage

start: 01.01.1978

end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Phase - Daily Mean				
ACCURACY	bias	0.2	0.1	0.01
PRECISION	rms	0.4	0.2	0.05
STABILITY	decadal	0.05	0.02	0.1

Verification

comparison with ISCCP;
comparison with MODIS (2000-2010);
comparison with Cloudsat/Calipso (2007-2010);
comparison with PATMOS-X

Comment:

For polar areas products will be provided in EASE-grid (5km for level2, 25 km for level3).
Time series from 1978-2019.

CM-11052 AVHRR GAC Liquid Water Path TCDR R3 LWP_AVHRR_global_DS_R3

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

N/A

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: Global

Spatial resolution

L3: HORIZONTAL-$(0.05)^2$

L3: VERTICAL-n/a

Temporal resolution

L3: Daily Mean

L3: Monthly Mean

Temporal coverage

start: 01.01.1978

end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Liquid Water Path - Daily Mean				
ACCURACY	bias	25 g/m²	10 g/m²	5 g/m²
PRECISION	rms	50 g/m²	25 g/m²	10 g/m²
STABILITY	decadal	10 g/m²	5 g/m²	2 g/m²

Verification

comparison with satellite-based MWR retrieved LWP over ocean (e.g. LWP_HOAPS);
comparison with PATMOS-X;
comparison with MODIS (2000-2010);
comparison with ISCCP

Comment:

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).
Time series from 1978-2019.

CM-11062 AVHRR GAC Ice Water Path TCDR R3 IWP_AVHRR_global_DS_R3

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

N/A

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: Global

Spatial resolution

L3: HORIZONTAL-$(0.25)^2$

L3: VERTICAL-n/a

Temporal resolution

L3: Daily Mean

Temporal coverage

start: 01.01.1978

end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Ice Water Path - Daily Mean				
ACCURACY	bias	40 g/m²	20 g/m²	10 g/m²
PRECISION	rms	80 g/m²	50 g/m²	20 g/m²
STABILITY	decadal	20 g/m²	10 g/m²	4 g/m²

Verification

comparison with CloudSat/CALIPSO (2007-2010);
comparison with PATMOS-X;
comparison with MODIS (2000-2010);
comparison with ISCCP

Comment:

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).
Time series from 1978-2019.

CM-11202 AVHRR GAC Surface Incoming Solar Radiation TCDR R2 SIS_AVHRR_global_R2

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Climate Change Analysis
Climate Impact Analysis
Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25)^2$

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.1978
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	4 W/m²	2 W/m²	1 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean				
ACCURACY	MAB	30 W/m²	15 W/m²	20 W/m²
STABILITY	decadal	4 W/m²	2 W/m²	1 W/m²

Verification
comparison with BSRN

Comment:
Time series from 1978-2019.

CM-11222 AVHRR GAC Surface Albedo TCDR R3 SAL_AVHRR_global_DS_R3

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC
Others: AOD
Others: cloud mask
Others: co-ordinates
Others: DEM
Others: land cover information
Others: ozone
Others: water vapour

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25)^2$
L3: VERTICAL-n/a

Temporal resolution
L3: Monthly Mean
L3: Pentad Mean

Temporal coverage
start: 01.01.1978
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Surface Albedo - Monthly Mean				
ACCURACY	bias	15 % (relative)	10 % (relative)	5 % relative or 0.00
STABILITY	decadal	20 % (relative)	15% (relative)	2% relative

Verification
comparison with surface measurements for different regions

Comment:

For polar areas products will be provided in EASE-grid (25 km for level3).
Target and Threshold Accuracies are defined for flat land for 90% of cases.
Time series from 1978-2019.

CM-11223 AVHRR GAC White sky surface Albedo TCDR R1 SAW_R1_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC
Others: AOD
Others: cloud mask
Others: co-ordinates
Others: DEM
Others: land cover information
Others: ozone
Others: water vapour

Application areas
Climate Research

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global
L3: Global

Spatial resolution
L2: -
L3: HORIZONTAL-0.25°
L3: VERTICAL-N/A
L2: HORIZONTAL-0.25°

Temporal resolution
L2: Monthly Mean
L3: Monthly Mean
L2: Pentad Mean
L3: Pentad Mean

Temporal coverage
start: 01.01.1978
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
White sky surface Albedo - Monthly Mean				
ACCURACY	bias	50% relative (define	25% relative (defin	5% relative or 0.00
PRECISION				tbd
STABILITY	decadal	20% relative	15% relative	5% relative
White sky surface Albedo - Pentad Mean				
ACCURACY	bias	50% relative (define	25% relative (defin	5% relative or 0.00
PRECISION				tbd
STABILITY	decadal	20% relative	15% relative	2% relative

Verification

comparison with surface measurements for different regions

Comment:

Time series from 1978-2019.

CM-11224 AVHRR GAC Blue sky surface Albedo TCDR R1 SAB_R1_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC
Others: AOD
Others: cloud mask
Others: co-ordinates
Others: DEM
Others: land cover information
Others: ozone
Others: water vapour

Application areas
Climate Research

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global
L3: Global

Spatial resolution
L2: VERTICAL-N/A
L3: HORIZONTAL-0.25°
L3: VERTICAL-N/A
L2: HORIZONTAL-0.25°

Temporal resolution
L2: Monthly Mean
L3: Monthly Mean
L2: Pentad Mean
L3: Pentad Mean

Temporal coverage
start: 01.01.1978
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Blue sky surface Albedo - Monthly Mean				
ACCURACY	bias	50 % relative (defin	25 % relative (defi	5 % relative or 0.00
PRECISION				tbd
STABILITY	decadal	20 % relative	15% relative	2% relative
Blue sky surface Albedo - Pentad Mean				
ACCURACY	bias	50 % relative (defin	25 % relative (defi	5 % relative or 0.00
PRECISION				tbd
STABILITY	decadal	20 % relative	15% relative	2% relative

Verification

comparison with surface measurements for different regions

Comment:

Time series from 1978-2019.
The acuracy value is defined for flat land for 90% of cases.

CM-11262 AVHRR GAC Surface Downwelling Longwave Radiation TCDR R2 SDL_R2_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Cimate Monitoring
Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-0.25²

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.1978
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Surface Downwelling Longwave Radiation - Daily Mean				
ACCURACY	MAB	25 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	1 W/m²
Surface Downwelling Longwave Radiation - Monthly Mean				
ACCURACY	MAB	25 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	1 W/m²

Verification
comparison with BSRN

Comment:
Time series from 1978-2019.

CM-11272 AVHRR GAC Surface Radiation Budget TCDR R1 — SRB_R1_CLARA_3_TCDR

Type
Dataset

Input satellite data
CM SAF Product: CM-11262
CM-SAF Product: CM-11251

Application areas
Cimate Monitoring
Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-0.25²

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.1978
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Surface Radiation Budget - Daily Mean				
ACCURACY	MAB	15 W/m²	20 W/m²	15 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	1 W/m²
Surface Radiation Budget - Monthly Mean				
ACCURACY	MAB	15 W/m²	20 W/m²	15 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	1 W/m²

Verification
comparison with BSRN

Comment:
Time series from 1978-2019.

CM-11312 AVHRR GAC ToA Reflected Shortwave Flux TCDR R1 RSF_R1_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC
Operational Satellite: NPP VIIRS

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-0.25°

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.1978
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Reflected Shortwave Flux - Daily Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	1 W/m²
Reflected Shortwave Flux - Monthly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	1 W/m²

Verification

Comparison with CERES, ERBE CDRs.
Comparison with CM SAF GERB CDR (CM-21301) and MVIRI/SEVIRI ToA Radiation CDR (CM-23311)

Comment:

Time series from 1978-2019.

CM-11342 AVHRR GAC ToA Outgoing Longwave Radiation TCDR R1 OLR_R1_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC
Operational Satellite: NPP VIIRS

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: -

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.1978
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Outgoing Longwave Radiation - Daily Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	1 W/m²
Outgoing Longwave Radiation - Monthly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	1 W/m²

Verification

Comparison with CERES, ERBE and HIRS OLR CDRs.
Comparison with CM SAF GERB CDR (CM-21331) and MVIRI/SEVIRI ToA Radiation CDR (CM-23341)

Comment:

Time series from 1978-2019.

CM-12003 Microwave Radiance FCDR R4 BTR_R4_MWAVE_FCDR

Type
Dataset

Input satellite data
Operational Satellite: SMMR
Operational Satellite: SSM/I
Operational Satellite: SSMIS

Application areas
Climate Modelling and Evaluation
Reanalyses for Assimilation

Dissemination information

Distribution format
L1:NetCDF4

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L1: Global

Spatial resolution
L1: HORIZONTAL-sensor resolution
L1: -

Temporal resolution
L1: Instantaneous (none)

Temporal coverage
start: 01.01.1979
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Brightness Temperature - Instantaneous (none)				
ACCURACY	bias	U<=3K (k<=3)	U<=2K (k<=2)	U<=1K (k<=1)
STABILITY	decadal	tD<=0.03K/dec	tD<=0.03K/dec	tD<=0.03K/dec

Verification
inter-sensor comparison

Comment:
Significance level for stability: Threshold >=30%, Target >=5%, Optimum >=0.3%

CM-12053 HOAPS Liquid Water Path R3 LWP_R3_HOAPS4_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AMSR-E
Operational Satellite: AVHRR/(A)ATSR
Operational Satellite: GMI
Operational Satellite: SSM/I
Operational Satellite: SSMIS
Operational Satellite: TMI

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°

Temporal resolution
L3: Hourly 6 hourly composite
L3: Monthly Mean

Temporal coverage
start: 09.07.1987
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Liquid Water Path - Hourly 6 hourly composite				
ACCURACY	bias	25 g/m²	10 g/m²	5 g/m²
PRECISION	rms	50 g/m²	25 g/m²	10 g/m²
STABILITY	decadal	10 g/m²	5 g/m²	2 g/m²
Liquid Water Path - Monthly Mean				
ACCURACY	bias	25 g/m²	10 g/m²	5 g/m²
PRECISION	rms	50 g/m²	25 g/m²	10 g/m²
STABILITY	decadal	10 g/m²	5 g/m²	2 g/m²

Verification
other satellite products

Comment:

CM-12613 HOAPS Precipitation Intensity TCDR R3 PRE_R3_HOAPS4_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AMSR-E
Operational Satellite: AVHRR/(A)ATSR
Operational Satellite: GMI
Operational Satellite: SSM/I
Operational Satellite: SSMIS
Operational Satellite: SST from AVHRR
Operational Satellite: TMI

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°

Temporal resolution
L3: Hourly 6 hourly composite
L3: Monthly Mean

Temporal coverage
start: 09.07.1987
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Percepitation - Hourly 6 hourly composite				
ACCURACY	bias	0.6 mm/d	0.3 mm/d	0.15 mm/d
PRECISION	rms	1 mm/d	0.5 mm/d	0.25 mm/d
STABILITY	decadal	0.04 mm/d	0.02 mm/d	0.004 mm/d
Percepitation - Monthly Mean				
ACCURACY	bias	0.6 mm/d	0.3 mm/d	0.15 mm/d
PRECISION	rms	1 mm/d	0.5 mm/d	0.25 mm/d
STABILITY	decadal	0.04 mm/d	0.02 mm/d	0.004 mm/d

Verification
GPCP

Comment:

CM-12703 HOAPS Vertically Integrated Water Vapour TCDR R3 — HTW_R3_HOAPS4_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AMSR-E
Operational Satellite: GMI
Operational Satellite: SSM/I
Operational Satellite: SSMIS
Operational Satellite: SST from AVHRR
Operational Satellite: TMI

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: -

Temporal resolution
L3: Hourly 6 hourly composite
L3: Monthly Mean

Temporal coverage
start: 09.07.1987
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Vertically Integrated Water Vapour - Hourly 6 hourly composite				
ACCURACY	bias	3 kg/m²	1.4 kg/m²	1 kg/m²
PRECISION	rms	5 kg/m²	2 kg/m²	1 kg/m²
STABILITY	decadal	0.4 kg/m²	0.2 kg/m²	0.08 kg/m²
Vertically Integrated Water Vapour - Monthly Mean				
ACCURACY	bias	3 kg/m²	1.4 kg/m²	1 kg/m²
PRECISION	rms	5 kg/m²	2 kg/m²	1 kg/m²
STABILITY	decadal	0.4 kg/m²	0.2 kg/m²	0.08 kg/m²

Verification
Other satellite products and reanalyses

Comment:

CM-12803 HOAPS Evaporation TCDR R3 EVA_R3_HOAPS4_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AMSR-E
Operational Satellite: AVHRR/(A)ATSR
Operational Satellite: GMI
Operational Satellite: SSM/I
Operational Satellite: SSMIS
Operational Satellite: SST from AVHRR
Operational Satellite: TMI

Application areas
Climate Research

Dissemination information
Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information
Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°

Temporal resolution
L3: Hourly 6 hourly composite
L3: Monthly Mean

Temporal coverage
start: 09.07.1987
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Evaporation - Hourly 6 hourly composite				
ACCURACY	bias	0.7 mm/d	0.36 mm/d	0.09 mm/d
PRECISION	rms	1.24 mm/d	0.62 mm/d	0.53 mm/d
STABILITY	decadal	0.32 mm/d	0.14 mm/d	0.0043 mm/d
Evaporation - Monthly Mean				
ACCURACY	bias	0.7 mm/d	0.36 mm/d	0.09 mm/d
PRECISION	rms	1.24 mm/d	0.62 mm/d	0.53 mm/d
STABILITY	decadal	0.32 mm/d	0.14 mm/d	0.0043 mm/d

Verification
buoy and ship observations

Comment:

CM-12813 HOAPS Latent Heat Fluxes TCDR R3 LHF_R3_HOAPS4_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AMSR-E
Operational Satellite: AVHRR/(A)ATSR
Operational Satellite: GMI
Operational Satellite: SSM/I
Operational Satellite: SSMIS
Operational Satellite: SST from AVHRR
Operational Satellite: TMI

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°

Temporal resolution
L3: Hourly 6 hourly composite
L3: Monthly Mean

Temporal coverage
start: 09.07.1987
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Latent Heat Fluxes - Hourly 6 hourly composite				
ACCURACY	bias	20 W/m²	10 W/m²	2.5 W/m²
PRECISION	rms	35 W/m²	17 W/m²	15 W/m²
STABILITY	decadal	9 W/m²	3.9 W/m²	0.12 W/m²
Latent Heat Fluxes - Monthly Mean				
ACCURACY	bias	20 W/m²	10 W/m²	2.5 W/m²
PRECISION	rms	35 W/m²	17 W/m²	15 W/m²
STABILITY	decadal	9 W/m²	3.9 W/m²	0.12 W/m²

Verification
buoy and ship observations

Comment:

CM-12823 HOAPS Freshwaterflux TCDR R3 EMP_R3_HOAPS4_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AMSR-E
Operational Satellite: AVHRR/(A)ATSR
Operational Satellite: GMI
Operational Satellite: SSM/I
Operational Satellite: SSMIS
Operational Satellite: SST from AVHRR
Operational Satellite: TMI

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: -0.5°

Temporal resolution
L3: Hourly 6 hourly composite
L3: Monthly Mean

Temporal coverage
start: 09.07.1987
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Evaporation-Precipitation - Hourly 6 hourly composite				
ACCURACY	bias	1.3 mm/d	0.36 mm/d	0.09 mm/d
PRECISION	rms	1.6 mm/d	0.62 mm/d	0.25 mm/d
STABILITY	decadal	0.35 mm/d	0.14 mm/d	0.005 mm/d
Evaporation-Precipitation - Monthly Mean				
ACCURACY	bias	1.3 mm/d	0.36 mm/d	0.09 mm/d
PRECISION	rms	1.6 mm/d	0.62 mm/d	0.25 mm/d
STABILITY	decadal	0.35 mm/d	0.14 mm/d	0.005 mm/d

Verification
combination of buoy and ship observations with GPCP

Comment:

CM-12903 HOAPS Near Surface Specific Humidity TCDR R3 NSH_R3_HOAPS4_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AMSR-E
Operational Satellite: AVHRR/(A)ATSR
Operational Satellite: GMI
Operational Satellite: SSM/I
Operational Satellite: SSMIS
Operational Satellite: SST from AVHRR
Operational Satellite: TMI

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°

Temporal resolution
L3: Hourly 6 hourly composite
L3: Monthly Mean

Temporal coverage
start: 09.07.1987
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Near Surface Specific Humidity - Hourly 6 hourly composite				
ACCURACY	bias	0.3 g/kg	0.6 g/kg	1.2 g/kg
PRECISION	rms	2.4 g/kg	1.2 g/kg	0.5 g/kg
STABILITY	decadal	0.2 g/kg	0.1 g/kg	0.04 g/kg
Near Surface Specific Humidity - Monthly Mean				
ACCURACY	bias	1.2 g/kg	0.6 g/kg	0.3 g/kg
PRECISION	rms	2.4 g/kg	1.2 g/kg	0.5 g/kg
STABILITY	decadal	0.2 g/kg	0.1 g/kg	0.04 g/kg

Verification
buoy and ship observations

Comment:

CM-12913 HOAPS Near Surface Wind Speed TCDR R3 SWS_R3_HOAPS4_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AMSR-E
Operational Satellite: AVHRR/(A)ATSR
Operational Satellite: GMI
Operational Satellite: SSM/I
Operational Satellite: SSMIS
Operational Satellite: SST from AVHRR
Operational Satellite: TMI

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°

Temporal resolution
L3: Hourly 6 hourly composite
L3: Monthly Mean

Temporal coverage
start: 09.07.1987
end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Near Surface Wind Speed - Hourly 6 hourly composite				
ACCURACY	bias	1 m/s	0.6 m/s	0.3 m/s
PRECISION	rms	1.6 m/s	0.8 m/s	0.5 m/s
STABILITY	decadal	0.24 m/s	0.12 m/s	0.03 m/s
Near Surface Wind Speed - Monthly Mean				
ACCURACY	bias	1 m/s	0.6 m/s	0.3 m/s
PRECISION	rms	1.6 m/s	0.8 m/s	0.5 m/s
STABILITY	decadal	0.24 m/s	0.12 m/s	0.03 m/s

Verification
buoy and ship observations

Comment:

CM-13013 Cirrus Cloud Amount TCDR R1 CCA_R1_ALLTOVS_TCDR

Type
Dataset

Input satellite data
Operational Satellite: HIRS
Operational Satellite: MetOp
Operational Satellite: NOAA

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(1°)^2$

Temporal resolution
L3: Monthly Mean

Temporal coverage
start: 01.01.1980
end: 31.12.2013

Uncertainty characteristics		Threshold	Target	Optimum
Cirrus Cloud Amount - Monthly Mean				
ACCURACY	bias	20%	10%	5%
PRECISION	bc-rms	40%	20%	10%
STABILITY	decadal	10%	4%	2%

Verification
comparisons with MODIS, CLARA and Cloudsat/CALIPSO data records

Comment:

CM-13033 Sounding Cloud Top Level TCDR R1 CTO_R1_ALLTOVS_TCDR

Type
Dataset

Input satellite data
Operational Satellite: HIRS
Operational Satellite: MetOp
Operational Satellite: NOAA

Application areas
Climate Modelling and Evaluation
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(1°)^2$

Temporal resolution
L3: Monthly Mean

Temporal coverage
start: 01.01.1980
end: 31.12.2013

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Level - Monthly Mean				
ACCURACY	bias	2, (7) km	1, (5) km	0.5, (3) km
PRECISION	bc-rms	3, (6) km	2, (4) km	1, (3) km
STABILITY	decadal	0.6 km	0.4 km	0.3 km

Verification
comparisons with MODIS, CLARA and Cloudsat/CALIPSO data records

Comment:
Accuracy and precision are defined for first number low and mid clouds and the second number (in brackets) for high clouds.

CM-14 Cloud Top CTO_SEVIRI

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Others: NWP

Application areas

Dissemination information

Distribution format

L3:HDF5

Generation frequency

1 day; 1 month

Generation timeliness

2 month

Spatio-temporal information

Spatial coverage

L3: MSG disk (CM SAF definition)

Spatial resolution

L3: -

Temporal resolution

L3: Daily Mean

L3: Daily Mean

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

L3: Monthly Mean diurnal-cycle

L3: Monthly Mean diurnal-cycle

Temporal coverage

start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Hight - Daily Mean				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Hight - Monthly Mean				
ACCURACY	bias	1200 m	800 hPa	500 m
PRECISION	bc-rms	3000m	1500 m	1000 m
Cloud Top Hight - Monthly Mean diurnal-cycle				
ACCURACY	bias	1200 m	800 hPa	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
PRECISION	bc-rms	120 hPa	70 hPa	50 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
PRECISION	bc-rms	120 hPa	70 hPa	50 hPa
Cloud Top Pressure - Monthly Mean diurnal-cycle				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
PRECISION	bc-rms	120 hPa	70 hPa	50 hPa
Cloud Top Temperature - Daily Mean				
PRECISION	bc-rms	120 hPa	1500 m	1000 m
Cloud Top Temperature - Monthly Mean				
PRECISION	bc-rms	120 hPa	1500 m	1000 m
Cloud Top Temperature - Monthly Mean diurnal-cycle				
PRECISION	bc-rms			1000 m

Verification

Comment:

The Accuracy is defined as the Mean error and precision is defined as the Bias-corrected RMS error.
For the CTT accuracy no specific requirement as it represents same information in different units.

CM-14711 Improved Water Vapour Analyses WV_MW_global__DS_R1

Type
Dataset

Input satellite data
Operational Satellite: AMSU-B
Operational Satellite: FCDR
Operational Satellite: HIRS
Operational Satellite: MHS
Operational Satellite: SSM/T2
Others: ERA Interim

Application areas
Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-1x1°
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean

Temporal coverage
start: 01.01.1993
end: 31.12.2013

Uncertainty characteristics		Threshold	Target	Optimum
Improved Water Vapour Analyses - Daily Mean				
ACCURACY	bias	15 %	10 %	5 %

Verification
compare with reference in-situ data, e.g., GRUAN.

Comment:
All the input data are at EUMETSAT CF.

The data set will be the Jacobian weighted upper tropospheric relative humidity roughly in the layer between 500 and 200 hPa which is derived from the radiances as described in Buehler and John (2005). It will be compared with the same quantity from model fields using a satellite simulator approach (e.g., COSP).
update after RR 2.14, SAF/CM/UKMO/RR2.14 v 1.2 dated 15.01.2015

CM-14712 Global Upper Tropospheric Humidity R233 UTH_R2_WVGLOB_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AMSU-B
Operational Satellite: ATMS
Operational Satellite: MHS
Operational Satellite: MWHS FCDR
Operational Satellite: SSM/T2

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage

Spatial resolution
L3: HORIZONTAL-(1°)²

Temporal resolution
L3: Daily Mean

Temporal coverage
start: 01.01.1992
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Upper Tropospheric Humidity - Daily Mean				
ACCURACY	bias	15 %	10 %	5 %

Verification
Compare with reference in-situ data, e.g. GRUAN

Comment:

CM-15	Cloud Top	CTO_AVHRR_Europe

Type
Product

Input satellite data
Operational Satellite: AVHRR
Others: NWP

Application areas

Dissemination information

Distribution format
L3:HDF5

Generation frequency
1 day; 1 month

Generation timeliness
2 month

Spatio-temporal information

Spatial coverage
L3: Initial MSG Europe

Spatial resolution
L3: HORIZONTAL-(15 km) ^{2}

Temporal resolution
L3: Daily Mean
L3: Daily Mean
L3: Daily Mean
L3: Monthly Mean
L3: Monthly Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Hight - Daily Mean				
ACCURACY	bias	1500 m	1000 m	800 m
PRECISION	bc-rms	3000 m	1500 m	3000 m
Cloud Top Hight - Monthly Mean				
ACCURACY	bias	1500 m	1000 m	800 m
PRECISION	bc-rms	3000 m	1500 m	3000 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	120 hPa	80 hPa	50 hPa
PRECISION	bc-rms	140 hPa	100 hPa	70 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias	120 hPa	80 hPa	50 hPa
PRECISION	bc-rms	140 hPa	100 hPa	70 hPa

Verification

comparisons to MODIS data (results computed as areal means over the studied area)

Comment:

For the CTT accuracy no specific requirement as it represents same information in different units.

CM-16 Cloud Top CTO_AVHRR_Arctic

Type
Product

Input satellite data
Operational Satellite: AVHRR

Others: NWP

Application areas
Climate Research

Dissemination information

Distribution format

L3:HDF5

Generation frequency

2 months

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: Arctic

Spatial resolution

L3: HORIZONTAL-(15 km) ²

Temporal resolution

L3: Daily Mean

L3: Daily Mean

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean

L3: Monthly Mean

Temporal coverage

start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Hight - Daily Mean				
ACCURACY	bias	1800 m	1200 m	1000 m
PRECISION	bc-rms	4000 m	2000 m	1500 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	150 hPa	110 hPa	80 hPa
PRECISION	bc-rms	160 hPa	130 hPa	100 hPa

Verification
Comparisons to MODIS data (results computed as areal means over the studied area)

Comment:

The Accuracy is defined as the Mean error and precision is defined as the Bias-corrected RMS error.
CTT: no specific uncertainty requirements as it represents same information as CTO and CTH in different units.

CM-21012 SEVIRI Fractional Cloud Cover ICDR CFC_SEVIRI_disk_DS_R3

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI
Others: ECMWF

Application areas
Climate Modelling and Evaluation
Climate Research

Dissemination information

Distribution format

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage

Spatial resolution

Temporal resolution

Temporal coverage
start: 01.01.2014
end: 31.12.2012

Verification

Comment:
This product is derived within the FA with LSA and OSI SAF which replaced the RR and PCR [RH, May 2016]

CM-21014 SEVIRI Fractional Cloud Cover TCDR — CFC_R4_CLAAS_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Modelling and Evaluation

Climate Research

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L2: HORIZONTAL-pixel resolution

L3: HORIZONTAL-MM (0.05°)²/MMDC (0.25°)²

Temporal resolution
L3: Daily Mean

L2: Instantaneous (none)

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.2004

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	20 %	10 %	5 %
PRECISION	bc-rms	40 %	20 %	10 %
Fractional Cloud Cover - Instantaneous (none)				
ACCURACY	POD	85 %	90 %	95 %
PRECISION	FAR	20 %	15 %	10 %
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	20 %	10 %	5 %
PRECISION	bc-rms	40 %	20 %	10 %
Fractional Cloud Cover - Monthly Mean diurnal-cycle				
ACCURACY	bias	20 %	10 %	5 %
PRECISION	bc-rms	40 %	20 %	10 %

Verification

Level 2 validation against Calipso/EarthCARE
Lever 3 validation against SYNOP plus evaluation against MODIS

Comment:

CM-21023 SEVIRI Joint Cloud histogram TCDR R3 JCH_R3_CLAAS_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Monthly Histogram

Temporal coverage
start: 01.01.2004
end: 31.12.2020

Uncertainty characteristics	Threshold	Target	Optimum
Joint Cloud Histograms - Monthly Histogram			
ACCURACY	N/A	N/A	N/A

Verification
L3 comparisons with MODIS

Comment:

CM-21033 SEVIRI Cloud Top Level TCDR R3 CTO_R3_CLAAS_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: MSG full disk (includes Europe, Afrika, Atlantic Ocean)
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L3: Monthly Histogram
L3: Monthly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.2004
end: 31.12.2020

Verification
L3 comparison with MODIS
L2 validation against Calipso/EarthCARE

Comment:

CM-21043 SEVIRI Cloud Phase TCDR R3 CPH_R3_CLAAS_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: MSG full disk (includes Europe, Afrika, Atlantic Ocean)
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-MM (0.05°)²

Temporal resolution
L3: Daily Mean
L2: Instantaneous (none)
L3: Monthly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.2004
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Phase - Instantaneous (none)				
ACCURACY	POD (liquid)	70 %	80 %	90%
ACCURACY	POD (ice)	60 %	80 %	90 %
PRECISION	FAR (liquid)	35 %		10 %
PRECISION	FAR (ice)	35 %	20 %	10 %
PRECISION				
Cloud Phase - Monthly Mean				
ACCURACY	bias	20 %	10 %	5 %
PRECISION	bc-rms	40 %	20 %	10 %
Cloud Phase - Monthly Mean diurnal-cycle				
ACCURACY	bias	20 %	10 %	5 %
PRECISION	bc-rms	40 %	20 %	10 %

Verification

L3 comparison with MODIS
L2 validation against Calipso / EarthCARE

Comment:

CM-21053 SEVIRI Liquid Water Path TCDR R3 LWP_R3_CLAAS_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: MSG full disk (includes Europe, Afrika, Atlantic Ocean)
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L2: Instantaneous (none)
L3: Monthly Histogram
L3: Monthly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.2004
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Liquid Water Path - Daily Mean				
ACCURACY	bias	20 g/m²	10 g/m²	2 g/m²
PRECISION	bc-rms	40 g/m²	20 g/m²	10 g/m²
Liquid Water Path - Instantaneous (none)				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	bc-rms	40 g/m²	20 g/m²	10 g/m²
Liquid Water Path - Monthly Histogram				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	bc-rms	40 g/m²	20 g/m²	10 g/m²
Liquid Water Path - Monthly Mean				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	bc-rms	40 g/m²	20 g/m²	10 g/m²
Liquid Water Path - Monthly Mean diurnal-cycle				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	bc-rms	40 g/m²	20 g/m²	10 g/m²

Verification

L3 comparison with satellite-based MWR retrieved LWP over ocean (e.g. UW LWP climatology)
L3 comparison with MODIS

Comment:

Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius)

CM-21063 SEVIRI Ice Water Path TCDR R3 IWP_R3_CLAAS_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean

L2: Instantaneous (none)

L3: Monthly Histogram

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.2004

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Ice Water Path - Daily Mean				
ACCURACY	bias	40 g/m²	20 g/m²	10 g/m²
PRECISION	bc-rms	80 g/m²	40 g/m²	20 g/m²
Ice Water Path - Instantaneous (none)				
ACCURACY	bias	40 g/m²	20 g/m²	10 g/m²
PRECISION	bc-rms	200 g/m²	100 g/m²	40 g/m²
Ice Water Path - Monthly Histogram				
ACCURACY	bias	40 g/m²	20 g/m²	10 g/m²
PRECISION	bc-rms	80 g/m²	40 g/m²	
Ice Water Path - Monthly Mean				
ACCURACY	bias	40 g/m²	20 g/m²	10 g/m²
PRECISION	bc-rms	80 g/m²	40 g/m²	20 g/m²
Ice Water Path - Monthly Mean diurnal-cycle				
ACCURACY	bias	40 g/m²	20 g/m²	10 g/m²
PRECISION	bc-rms	80 g/m²	40 g/m²	20 g/m²

Verification

L2/L3 comparison with CloudSat / EarthCARE
L3 comparison with MODIS

Comment:

Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius)

CM-23011 Meteosat Fractional Cloud Cover TCDR — CFC_MVIRI_SEVIRI_DS_R1

Type
Dataset

Input satellite data
Operational Satellite: MVIRI

Operational Satellite: SEVIRI

Application areas
Climate Modelling and Evaluation

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

N/A

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution

L3: HORIZONTAL-$(0.05°)^2$

L3: VERTICAL-n/a

Temporal resolution

L3: 30 min Mean

L3: Daily Mean

L3: Monthly Mean

Temporal coverage

start: 01.01.1991

end: 31.12.2015

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - 30 min Mean				
ACCURACY	bias	0.1	0.05	0.01
PRECISION	bc-rms	0.35	0.3	0.25
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	0.1	0.05	0.01
PRECISION	bc-rms	0.35	0.3	0.25
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	0.1	0.05	0.01
PRECISION	bc-rms	0.25	0.2	0.15

Verification

primarily comparisons with Synop but complemented with consistancy checks against MODIS and Cloudsat/CALIPSO datasets

Comment:

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). Values for accuracies given in absolute units.
Modified length of data record set from 1983 to 1990, CDOP2_SG9_D7

update after RR2.8/2.9 SAF/CM/DWD/RR2.8 v 1.1 dated 15.01.2015

CM-23012 Meteosat Fractional Cloud Cover TCDR — CFC_R2_METLAND_TCDR

Type
Dataset

Input satellite data
Operational Satellite: MVIRI
Operational Satellite: SEVIRI

Application areas
Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution

Temporal resolution
L3: Daily Mean
L3: Hourly Mean
L3: Monthly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.1991
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	0.1	0.05	0.01
PRECISION	bc-rms	0.35	0.3	0.25
STABILITY	decadal	0.05	0.02	0.01
Fractional Cloud Cover - Hourly Mean				
ACCURACY	bias	0.1	0.05	0.01
STABILITY	decadal	0.05	0.02	0.01
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	0.1	0.05	0.01
PRECISION	bc-rms	0.25	0.2	0.15
STABILITY	decadal	0.05	0.02	0.01
Fractional Cloud Cover - Monthly Mean diurnal-cycle				
ACCURACY	bias	0.1	0.05	0.01
PRECISION	bc-rms	0.25	0.2	0.15
STABILITY	decadal	0.05	0.02	0.01

Verification

primarily comparisons with IR Radiometry (APCADA) at BSRN stations, combined with QA checked SYNOP measurements

Comment:

CM-23082 Meteosat Cloud Albedo TCDR CAL_MVIRI_SEVIRI_DS_R2

Type
Dataset

Input satellite data
Operational Satellite: MVIRI
Operational Satellite: SEVIRI

Application areas
Climate Change Analysis
Climate Impact Analysis
Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-(0.05°)²
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Instantaneous Frequency
L3: Monthly Mean

Temporal coverage
start: 01.01.1983
end: 31.12.2015

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Albedo - Daily Mean				
ACCURACY	MAB	0.15	0.1	
ACCURACY	bias			0.08
STABILITY	decadal	0.08	0.06	0.03
Cloud Albedo - Instantaneous Frequency				
ACCURACY	MAB	0.15	0.1	0.08
STABILITY	MAB	0.08		
STABILITY	decadal		0.06	0.03
Cloud Albedo - Monthly Mean				
ACCURACY	MAB	0.15	0.1	0.08
STABILITY	decadal	0.08	0.06	0.03

Verification

accuracy estimated based on derived SIS accuracy

Comment:

update after RR2.8/2.9 SAF/CM/DWD/RR2.8 v 1.1 dated 15.01.2015

CM-23083 Meteosat Cloud Albedo TCDR R3 CAL_R3_SARAH_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: MVIRI
Operational Satellite: SEVIRI

Application areas
Climate Change Analysis
Climate Impact Analysis
Climate Modelling and Evaluation

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: MSG full disk (includes Europe, Afrika, Atlantic Ocean)
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L2: HORIZONTAL-$(0.05°)^2$
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L2: Instantaneous (none)
L3: Monthly Mean

Temporal coverage
start: 01.01.1983
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Albedo - Daily Mean				
ACCURACY	bias	0.08	0.06	0.03
STABILITY	decadal	0.15	0.1	0.08
Cloud Albedo - Instantaneous (none)				
ACCURACY	bias	0.08	0.06	0.03
STABILITY	decadal	0.15	0.1	0.08
Cloud Albedo - Monthly Mean				
ACCURACY	bias	0.08	0.06	0.03
STABILITY	decadal	0.15	0.1	0.08

Verification

accuracy estimated based on derived SIS accuracy

Comment:

CM-23202 Meteosat Solar Surface Radiation TCDR — SIS_MVIRI_SEVIRI_DS_R2

Type
Dataset

Input satellite data
Operational Satellite: MVIRI

Operational Satellite: SEVIRI

Application areas
Climate Change Analysis

Climate Impact Analysis

Climate Modelling and Evaluation

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

N/A

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution

L3: HORIZONTAL-(0.05°)²

L3: VERTICAL-n/a

Temporal resolution

L3: Daily Mean

L3: Instantaneous Frequency

L3: Monthly Mean

Temporal coverage

start: 01.01.1983

end: 31.12.2015

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Mean				
ACCURACY	MAB	20 W/m²	15 W/m²	12 W/m²
STABILITY	decadal	3 W/m²	1 W/m²	0.5 W/m²
Surface Incoming Shortwave Radiation - Instantaneous Frequency				
ACCURACY	MAB	20 W/m²	15 W/m²	12 W/m²
STABILITY	decadal	3 W/m²	1 W/m²	0.5 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean				
ACCURACY	MAB	15 W/m²	8 W/m²	5 W/m²
STABILITY	decadal	3 W/m²	1 W/m²	0.5 W/m²

Verification
comparison with BSRN ground measurments

Comment:

update after RR2.8/2.9 SAF/CM/DWD/RR2.8 v 1.1 dated 15.01.2015

CM-23203 Meteosat Solar Surface Radiation TCDR R3 — SIS_R3_SARAH_3_TCDR

Type
Dataset

Input satellite data
CM-SAF Product: CM-23012

Operational Satellite: MVIRI

Operational Satellite: SEVIRI

Application areas
Climate Change Analysis

Climate Impact Analysis

Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-(0.05°)²

Temporal resolution
L3: Daily Mean

L2: Instantaneous (none)

L3: Monthly Mean

Temporal coverage
start: 01.01.1983

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	3 W/m²	1 W/m²	0.05 W/m²
Surface Incoming Shortwave Radiation - Instantaneous (none)				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	3 W/m²	1 W/m²	0.05 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	3 W/m²	1 W/m²	0.05 W/m²

Verification

comparison with BSRN ground measurments

Comment:

CM-23241	Meteosat Spectral Resolved Irradiance TCDR	SRI_MVIRI_SEVIRI_DS_R1

Type
Dataset

Input satellite data
Operational Satellite: MVIRI
Operational Satellite: SEVIRI

Application areas
Climate Change Analysis

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$
L3: VERTICAL-n/a

Temporal resolution
L3: Monthly Mean

Temporal coverage
start: 01.01.1983
end: 31.12.2015

Uncertainty characteristics		Threshold	Target	Optimum
Spectral Resolved Irradiance - Monthly Mean				
ACCURACY	MAB	15 W/m^2	10 W/m^2	8 W/m^2

Verification
comparison with ground based data as far as available;

Comment:
Accuracy weighted with the relative contribution to the broadband spectra.
update after RR2.8/2.9 SAF/CM/DWD/RR2.8 v 1.1 dated 15.01.2015

CM-23253 Meteosat Daylight TCDR R2 DAL_R2_SARAH_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: MVIRI
Operational Satellite: SEVIRI

Application areas
Climate Change Analysis
Climate Impact Analysis
Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L3: Instantaneous Frequency
L3: Monthly Mean

Temporal coverage
start: 01.01.1983
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Direct Normalised Irradiance - Daily Mean				
ACCURACY	MAB	10 W/m²	7 W/m²	5 W/m²
STABILITY	decadal	4 W/m²	3 W/m²	2 W/m²
Direct Normalised Irradiance - Monthly Mean				
ACCURACY	MAB	10 W/m²	7 W/m²	5 W/m²
STABILITY	decadal	4 W/m²	3 W/m²	2 W/m²

Verification
comparison with BSRN ground measurments

Comment:

CM-23271 Meteosat Surface Radiation budget TCDR R1 — SRB_R1_METLAND_TCDR

Type
Dataset

Input satellite data
Operational Satellite: FCDR

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage

Spatial resolution
L3: HORIZONTAL-(0.05°)²

Temporal resolution
L3: Daily Mean
L3: Hourly Mean
L3: Monthly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.1983
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Surface Radiation Budget - Daily Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	1 W/m²
STABILITY	decadal	3 W/m²	1 W/m²	0.05 W/m²
Surface Radiation Budget - Hourly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	1 W/m²
STABILITY	decadal	0.05 W/m²	0.02 W/m²	0.01 W/m²
Surface Radiation Budget - Monthly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	1 W/m²
STABILITY	decadal	3 W/m²	1 W/m²	0.05 W/m²
Surface Radiation Budget - Monthly Mean diurnal-cycle				
ACCURACY	MAB	15 W/m²	10 W/m²	1 W/m²
STABILITY	decadal	3 W/m²	1 W/m²	0.05 W/m²

Verification
comparison with BSRN and FLUXNET

Comment:

CM-23273 Meteosat Photosynthetic Active Radiation TCDR R1 — PAR_R1_SARAH_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.1983
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Photosynthetic Active Radiation - Daily Mean				
ACCURACY	MAB	20 %	10 %	5 %
Photosynthetic Active Radiation - Monthly Mean				
ACCURACY	MAB	20 %	10 %	5 %

Verification
comparison with available ground measurements

Comment:

CM-23283 Meteosat Sunshine Duration TCDR R1 SDU_R1_SARAH_3_TCDR

Type
Dataset

Input satellite data
CM-SAF Product: CM-23083
Operational Satellite: MVIRI
Operational Satellite: SEVIRI

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: -

Temporal resolution
L3: Daily Sum
L3: Monthly Sum

Temporal coverage
start: 01.01.1983
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Sunshine duration - Daily Sum				
ACCURACY	MAB	30 h	20 h	10 h
STABILITY	decadal	0.8 h	0.5 h	0.3 h
Sunshine duration - Monthly Sum				
ACCURACY	MAB	2.0 h	1.5 h	1.0 h
STABILITY	decadal	0.8 h	0.5 h	0.3 h

Verification
comparison with available ground measurements

Comment:

CM-23291 Meteosat Surface Direct Irradiance TCDR — SDI_MVIRI_SEVIRI_DS_R1

Type
Dataset

Input satellite data
Operational Satellite: MVIRI

Operational Satellite: SEVIRI

Application areas
Agricultural planning

Climate Modelling and Evaluation

Drought risk assessment

Solar energy

Dissemination information

Distribution format

L2:NetCDF4

L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage

L2: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution

L2: HORIZONTAL-$(0.05°)^2$

L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution

L2: 30 min (none)

L2: 30 min (none)

L3: Daily Mean

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean

Temporal coverage

start: 01.01.1983

end: 31.12.2015

Uncertainty characteristics		Threshold	Target	Optimum
Direct Irradiance at Surface - 30 min (none)				
ACCURACY	MAB	25 W/m²	20 W/m²	15 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Irradiance at Surface - Daily Mean				
ACCURACY	MAB	25 W/m²	20 W/m²	15 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Irradiance at Surface - Monthly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Normalised Irradiance - 30 min (none)				
ACCURACY	MAB	30 W/m²	25 W/m²	20 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Normalised Irradiance - Daily Mean				
ACCURACY	MAB	30 W/m²	25 W/m²	20 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Normalised Irradiance - Monthly Mean				
ACCURACY	MAB	20 W/m²	15 W/m²	12 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²

Verification

comparison with BSRN ground measurements

Comment:

CM-23293 Meteosat Surface Direct Irradiance SARAH-3 TCDR R2 — SDI_R2_SARAH_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: MVIRI

Operational Satellite: SEVIRI

Application areas
Agricultural planning

Climate Modelling and Evaluation

Drought risk assessment

Solar energy

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L2: HORIZONTAL-$(0.05°)^2$

L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L2: 30 min (none)

L2: 30 min (none)

L3: Daily Mean

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean

Temporal coverage
start: 01.01.1983

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Direct Irradiance at Surface - 30 min (none)				
ACCURACY	MAB	25 W/m²	20 W/m²	15 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Irradiance at Surface - Daily Mean				
ACCURACY	MAB	25 W/m²	20 W/m²	15 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Irradiance at Surface - Monthly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Normalised Irradiance - 30 min (none)				
ACCURACY	MAB	30 W/m²	25 W/m²	20 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Normalised Irradiance - Daily Mean				
ACCURACY	MAB	30 W/m²	25 W/m²	20 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Normalised Irradiance - Monthly Mean				
ACCURACY	MAB	20 W/m²	15 W/m²	12 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²

Verification

comparison with BSRN ground measurements

Comment:

CM-23722 Meteosat Free Tropospheric Humidity TCDR R3 FTH_R3_METLAND_TCDR

Type
Dataset

Input satellite data
Operational Satellite: MVIRI
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: METEOSAT disk (45S-45N, 45W-45E)

Spatial resolution

Temporal resolution
L3: Hourly Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.1983
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Free Tropospheric Humidity - Hourly Mean				
ACCURACY	bias	20 %	5 %	2%
PRECISION	rms	28 %	10 %	5%
STABILITY	decadal	2%	1%	0.3 %
Free Tropospheric Humidity - Monthly Mean				
ACCURACY	bias	20 %	5 %	2%
PRECISION	rms	28 %	10 %	5 %
STABILITY	decadal	2%	1%	0.3 %

Verification
radiosondes and other satellite products

Comment:

CM-23811 Latent and Sensible Heat Flux TCDR R1 LEH_R1_METLAND_TCDR

Type
Dataset

Input satellite data
Others: Reanalysis

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage

Spatial resolution
L3: HORIZONTAL-(0.05°)²

Temporal resolution
L3: Daily Mean
L3: Hourly Mean
L3: Monthly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.1983
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Latent and Sensible Hear Flux - Monthly Mean				
STABILITY	decadal	6 W/m²	2 W/m²	0.3 W/m²

Verification
Comparison with potential evapotranspiration over well watered areas; comparison with FLUXNET; water budget closure studies over large basins

Comment:

CM-23921	Meteosat Land Surface Temperature TCDR	LST_MVIRI_SEVIRI_DS_R1

Type
Dataset

Input satellite data
Operational Satellite: MVIRI
Operational Satellite: SEVIRI

Application areas
Cimate Monitoring
Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Hourly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.1991
end: 31.12.2015

Uncertainty characteristics		Threshold	Target	Optimum
Land Surface Temperature - Daily Mean				
ACCURACY	bias	2.5 K	1.5 K	0.5 K
PRECISION	rms	4.0 K	2.5 K	
PRECISION	bc-rms			1.0 K
STABILITY	decadal	2.5 K	2.0 K	1.0 K
Land Surface Temperature - Hourly Mean				
ACCURACY	bias		1.5 K	0.5 K
PRECISION	rms	4.0 K	2.5 K	
PRECISION	bc-rms			1.0 K
STABILITY	decadal	2.5 K	2.0 K	1.0 K
Land Surface Temperature - Monthly Mean diurnal-cycle				
ACCURACY	bias	2.5 K	1.5 K	0.5 K
PRECISION	rms	4.0 K	2.5 K	
PRECISION	bc-rms			1.0 K
STABILITY	decadal	2.5 K	2.0 K	1.0 K

Verification

Ground data (BSRN, FLUXNET and/or LSA SAF validation sites), radiance based validation and comparison with other satellite products

Comment:

update after RR2.8/2.9 SAF/CM/DWD/RR2.8 v 1.1 dated 15.01.2015.
modified length of data record set from 1983 to 1990, CDOP2_SG9_D7
(Note: The accuracy is conditional with a maximum of 1 K calibration error for Meteosat top-of-atmosphere brightness temperatures.)

CM-23922	Meteosat Land Surface Temperature TCDR R2	LST_MVIRI_SEVIRI_DS_R1

Type
Dataset

Input satellite data
Others: Reanalysis

Application areas
ECHAM
ECHAM
The Mountain Research Group (Pepin et al. 2015)

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L3: Hourly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.1991
end: 31.12.2015

Uncertainty characteristics		Threshold	Target	Optimum
Land Surface Temperature - Hourly Mean				
ACCURACY	bias	2.5 K	1.5 K	0.5 K
PRECISION	rms	4 K	2.5 K	1 K
STABILITY	decadal	2.5 K	2 K	1 K
Land Surface Temperature - Monthly Mean diurnal-cycle				
ACCURACY	bias	2.5 K	1.5 K	0.5 K
PRECISION	rms	4 K	2.5 K	1 K
STABILITY	decadal	2.5 K	2 K	1 K

Verification
comparison with LSA SAF validation stations and lake surface temperature meaurements

Comment:

CM-23931	Meteosat Physical Land Surface Temperature TCDR	LST_MVIRI_SEVIRI_DS_R1

Type
Dataset

Input satellite data
Operational Satellite: MVIRI
Operational Satellite: SEVIRI

Application areas
ECHAM
ECHAM
The Mountain Research Group (Pepin et al. 2015)

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Hourly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.1991
end: 31.12.2015

Uncertainty characteristics	Threshold	Target	Optimum
Land Surface Temperature - Daily Mean			
rms	3.5 K	2.0 K	1.0 K
decadal	1.5 K	0.8 K	0.2 K
bias	1.8 K	1.3 K	0.5 K
Land Surface Temperature - Hourly Mean			
rms	3.5 K	2.0 K	1.0 K
decadal	1.5 K	0.8 K	0.2 K
bias	1.8 K	1.3 K	0.5 K
Land Surface Temperature - Monthly Mean diurnal-cycle			
rms	3.5 K	2.0 K	1.0 K
decadal	1.5 K	0.8 K	0.2 K
bias	1.8 K	1.3 K	0.5 K

Verification

Ground data (BSRN, FLUXNET and/or LSA SAF validation sites), radiance based validation and comparison with other satellite products

Comment:

update after RR2.8/2.9 SAF/CM/DWD/RR2.8 v 1.1 dated 15.01.2015.
modified length of data record set from 1983 to 1990, CDOP2_SG9_D7
(Note: The accuracy is conditional with a maximum of 1 K calibration error for Meteosat top-of-atmosphere brightness temperatures.)

CM-25611 Global Precipitation Rate TCDR R1 PRE_R1_PGLOBAL_TCDR

Type
Dataset

Input satellite data
Operational Satellite: BT

Operational Satellite: CSU

Operational Satellite: MWI data from X-CAL

Operational Satellite: MWS FCDR

Operational Satellite: SSM/I

Operational Satellite: SSMIS

Others: FCDR IOGEO EUM

Application areas

Dissemination information

Distribution format

L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: Global

Spatial resolution

L3: HORIZONTAL-$(1°)^2$

Temporal resolution

L3: Daily Mean

L3: Monthly Mean

Temporal coverage

start: 01.01.2002

end: 31.12.2019

Uncertainty characteristics		Threshold	Target	Optimum
Percepitation - Daily Mean				
ACCURACY	bias	1 mm/d	0.3 mm/d	0.15 mm/d
PRECISION	rms	2 mm/d	0.5 mm/d	0.25 mm/d
STABILITY	decadal	0.06 mm/d	0.02 mm/d	0.004 mm/d
Percepitation - Monthly Mean				
ACCURACY	bias	1 mm/d	0.3 mm/d	0.15 mm/d
PRECISION	rms	2 mm/d	0.5 mm/d	0.25 mm/d
STABILITY	decadal	0.06 mm/d	0.02 mm/d	0.004 mm/d

Verification
other satellite products, oceanRAIN, radar

Comment:

processing elements are CM SAF, H SAF and MT/CNRS heritage

CM-33 Cloud Optical Thickness COT_AVHRR_Europe

Type
Product

Input satellite data
Operational Satellite: AVHRR

Application areas
Climate Research

Dissemination information

Distribution format
L3:HDF5

Generation frequency
1 day; 1 month

Generation timeliness
2 month

Spatio-temporal information

Spatial coverage
L3: Initial MSG Europe

Spatial resolution
L3: HORIZONTAL-(15 km) ²

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Optical Thickness - Daily Mean				
ACCURACY	bias	40%	20%	10%
PRECISION	rms	70%	40%	30%
Cloud Optical Thickness - Monthly Mean				
ACCURACY	bias	40%	20%	10%
PRECISION	rms	70%	40%	30%

Verification

? comparison with MODIS

Comment:

The bias and rms are defined for the baseline area as relative difference to the comparative datasets.

CM-37 Cloud Phase CPH_AVHRR_Europe

Type
Product

Input satellite data
Operational Satellite: AVHRR

Application areas
Climate Research

Dissemination information

Distribution format
L3:HDF5

Generation frequency
1 day ; 1 month

Generation timeliness
2 month

Spatio-temporal information

Spatial coverage
L3: Initial MSG Europe

Spatial resolution
L3: HORIZONTAL-(15 km) ²

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Phase - Daily Mean				
ACCURACY	bias	0.1	0.05	0.02
PRECISION	rms	0.2	0.1	0.05
Cloud Phase - Monthly Mean				
ACCURACY	bias	0.1	0.05	0.02
PRECISION	rms	0.2	0.1	0.05

Verification
comparisons to MODIS data

Comment:
The bias and rms are defined for the baseline area as absolute difference (of water cloud fraction) to the comparative datasets.

CM-42 Liquid Water Path LWP_AVHRR_Europe

Type
Product

Input satellite data
Operational Satellite: AVHRR

Application areas
Climate Research

Dissemination information

Distribution format
L3:HDF5

Generation frequency
1 day; 1 month

Generation timeliness
2 month

Spatio-temporal information

Spatial coverage
L3: Initial MSG Europe

Spatial resolution
L3: HORIZONTAL-(15 km) ^{2}

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Liquid Water Path - Daily Mean				
ACCURACY	bias	40%	20%	10%
PRECISION	rms	70%	40%	30%
Liquid Water Path - Monthly Mean				
ACCURACY	bias	40%	20%	10%
PRECISION	rms	70%	40%	30%

Verification
comparisons to MODIS data

Comment:
The bias and rms are defined for the baseline area as relative difference to the comparative datasets.

CM-49 Surface Incoming Shortwave Radiation — SIS_SEVIRI

Type
Product

Input satellite data
Operational Satellite: GERB

Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format

L3:HDF5

Generation frequency

1 day; 1 month

Generation timeliness

2 month

Spatio-temporal information

Spatial coverage

L3: MSG disk (CM SAF definition)

Spatial resolution

L3: -

Temporal resolution

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage

start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Mean				
ACCURACY	MAB	25 W/m²	20 W/m²	15 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean diurnal-cycle				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²

Verification
comparison with in-situ measurements

Comment:

CM-50 Surface Incoming Shortwave Radiation — SIS_AVHRR_Europe

Type
Product

Input satellite data
Operational Satellite: AVHRR

Application areas
Climate Research

Dissemination information

Distribution format
L3:HDF5

Generation frequency
1 day; 1 month

Generation timeliness
2 month

Spatio-temporal information

Spatial coverage
L3: Initial MSG Europe

Spatial resolution
L3: HORIZONTAL-(15 km) ²

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Mean				
ACCURACY	MAB	30 W/m²	25 W/m²	20 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²

Verification
comparison with in-situ measurements

Comment:
Due to the lower resolution in space-time, the daily means have a lower accuracy than the MSG based product

CM-5010 SEVIRI Fractional Cloud Cover CLAAS-2 ICDR R1 CFC_SEVIRI_ICDR_R1

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Others: NWP

Application areas

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

1 day; 1 month

Generation timeliness

5 days

Spatio-temporal information

Spatial coverage

L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution

L3: HORIZONTAL-0.05° x 0.05°

L3: VERTICAL-n/a

Temporal resolution

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage

start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	20%	10%	5%
PRECISION	bc-rms	45%	25%	15%
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	20%	10%	5%
PRECISION	bc-rms	40%	20%	10%
Fractional Cloud Cover - Monthly Mean diurnal-cycle				
ACCURACY	bias	20%	10%	5%
PRECISION	bc-rms	40%	20%	10%

Verification

comparisons to SYNOP data (results computed as areal means over the studied area)

Comment:

This product will supersede CDOP CM-02. This product provides the ICDR based on the CLAAS-2 CFC data record (CM-21011).

CM-5011 SEVIRI Fractional Cloud Cover ICDR CFC_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas

Dissemination information

Distribution format

L2:NetCDF4

L3:NetCDF4

Generation frequency

1 day; 1 month

Generation timeliness

5 days

Spatio-temporal information

Spatial coverage

L2: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution

L3: HORIZONTAL-$(0.05°)^2$

L3: -

Temporal resolution

L3: Daily Mean

L2: Instantaneous (none)

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage

start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	20%	10%	5%
PRECISION	bc-rms	40%	20%	10%
Fractional Cloud Cover - Instantaneous (none)				
ACCURACY	POD	85 %	90 %	95 %
PRECISION	bc-rms	20 %	15 %	10 %
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	20%	10%	5%
PRECISION	bc-rms	40%	20%	10%
Fractional Cloud Cover - Monthly Mean diurnal-cycle				
ACCURACY	bias	20%	10%	5%
PRECISION	bc-rms	40%	20%	10%

Verification

L2 validation against Calipso / EarthCARE
L3 validation against SYNOP plus evaluation against MODIS

Comment:

This product supersedes CDOP2 CM-5010 after release of CLAAS-3

CM-5021 SEVIRI Joint Cloud histogram ICDR JCH_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean), > 72° satellite zenith angle

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Monthly Histogram

Temporal coverage
start:
end:

Uncertainty characteristics	Threshold	Target	Optimum
Joint Cloud Histograms - Monthly Histogram			
ACCURACY	N/A	N/A	N/A

Verification
L3 comparisons with MODIS

Comment:
This product provides the ICDR based on the CLAAS-3 JCH data record (CM-21021).

CM-5030 SEVIRI Cloud Top Level CLAAS-2 ICDR R1 CTO_SEVIRI_ICDR_R1

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Others: NWP

Application areas

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-(0.05°) ²

L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean

L3: Daily Mean

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

L3: Monthly Mean diurnal-cycle

L3: Monthly Mean diurnal-cycle

Temporal coverage
start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Hight - Daily Mean				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Hight - Monthly Mean				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Hight - Monthly Mean diurnal-cycle				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
PRECISION	bc-rms	120 hPa	70 hPa	50 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
PRECISION	bc-rms	120 hPa	70 hPa	50 hPa
Cloud Top Pressure - Monthly Mean diurnal-cycle				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
PRECISION	bc-rms	120 hPa	70 hPa	50 hPa

Verification

comparisons to MODIS data (results computed as areal means over the studied area)

Comment:

The Accurracy is defined as the Mean error and precision is defined as the Bias-corrected RMS error.
This product will supersede CM-14. This product provides the ICDR based on the CLAAS-2 CTO data record (CM-21031).

CM-5031 SEVIRI Cloud Top Level ICDR CTO_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas

Dissemination information

Distribution format

L2:NetCDF4

L3:NetCDF4

Generation frequency

1 day; 1 month

Generation timeliness

5 days

Spatio-temporal information

Spatial coverage

L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution

L3: HORIZONTAL-(0.05°)

Temporal resolution

L3: Daily Mean

L3: Daily Mean

L3: Daily Mean

L2: Instantaneous (none)

L2: Instantaneous (none)

L3: Monthly Mean

L3: Monthly Mean

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

L3: Monthly Mean diurnal-cycle

L3: Monthly Mean diurnal-cycle

Temporal coverage

start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Hight - Daily Mean				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Hight - Instantaneous (none)				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	4000 m	2500 m	2000 m
Cloud Top Hight - Monthly Mean				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Hight - Monthly Mean diurnal-cycle				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
PRECISION	bc-rms	120 hPa	70 hPa	50 hPa
Cloud Top Pressure - Instantaneous (none)				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
PRECISION	bc-rms	200 hPa	110 hPa	80 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
PRECISION	bc-rms	120 hPa	70 hPa	50 hPa
Cloud Top Pressure - Monthly Mean diurnal-cycle				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
PRECISION	bc-rms	120 hPa	70 hPa	50 hPa

Verification

L3 comparison with MODIS
L2 validation against Calipso/EarthCARE

Comment:

This product supersedes CDOP2 CM-5030 after release of CLAAS-3

CM-5041 SEVIRI Cloud Phase ICDR CPH_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: METEOSAT disk (70S-70N, 70W-70E), < 72° satellite zenith angle
L3: METEOSAT disk (70S-70N, 70W-70E), < 72° satellite zenith angle

Spatial resolution
L2: HORIZONTAL-N/A
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L2: Instantaneous (none)
L3: Monthly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Phase - Daily Mean				
ACCURACY	bias	20 %	10 %	5 %
PRECISION	rms	40 %	20 %	10 %
Cloud Phase - Instantaneous (none)				
ACCURACY	POD (liquid)	> 70 %	> 80 %	> 90 %
ACCURACY	POD (ice)	> 60 %	> 80 %	> 90 %
PRECISION	FAR (liquid)	< 35 %	< 20 %	< 10 %
PRECISION	FAR (ice)	< 35 %	< 20 %	< 10 %
Cloud Phase - Monthly Mean				
ACCURACY	bias	20 %	10 %	5 %
PRECISION	bc-rms	40 %	20 %	10 %
Cloud Phase - Monthly Mean diurnal-cycle				
ACCURACY	bias	20 %	10 %	5 %
PRECISION	bc-rms	40 %	20 %	10 %

Verification

L3 comparison with MODIS
L2 validation against Calipso / EarthCARE

Comment:

This product provides the ICDR based on the CLAAS-3 CPH data record (CM-21043).

CM-5051 SEVIRI Liquid Water Path ICDR LWP_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: METEOSAT disk (70S-70N, 70W-70E)
L3: METEOSAT disk (70S-70N, 70W-70E), < 72° satellite zenith angle

Spatial resolution
L2: HORIZONTAL-N/A
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L2: Instantaneous (none)
L3: Monthly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Liquid Water Path - Daily Mean				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	rms	40 g/m²		
PRECISION	bc-rms		20 g/m²	10 g/m²
Liquid Water Path - Instantaneous (none)				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	bc-rms	100 g/m²	50 g/m²	20 g/m²
Liquid Water Path - Monthly Mean				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	rms	40 g/m²		
PRECISION	bc-rms		20 g/m²	10 g/m²
Liquid Water Path - Monthly Mean diurnal-cycle				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	rms	40 g/m²		
PRECISION	bc-rms		20 g/m²	10 g/m²

Verification

L3 comparison with satellite-based MWR retrieved LWP over ocean (e.g. UW LWP climatology)
L3 comparison with MODIS

Comment:

This product provides the ICDR based on the CLAAS-3 LWP data record (CM-21053).

CM-5061 SEVIRI Ice Water Path ICDR IWP_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: METEOSAT disk (70S-70N, 70W-70E)
L3: METEOSAT disk (70S-70N, 70W-70E), < 72° satellite zenith angle

Spatial resolution
L2: HORIZONTAL-N/A
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L2: Instantaneous (none)
L3: Monthly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Ice Water Path - Daily Mean				
ACCURACY	bias	40 g/m²	20 g/m²	10 g/m²
PRECISION	bc-rms	80 g/m²	40 g/m²	20 g/m²
Ice Water Path - Instantaneous (none)				
ACCURACY	bias	40 g/m²	20 g/m²	10 g/m²
PRECISION	bc-rms	200 g/m²	100 g/m²	40 g/m²
Ice Water Path - Monthly Mean				
ACCURACY	bias	40 g/m²	20 g/m²	10 g/m²
PRECISION	bc-rms	80 g/m²	40 g/m²	20 g/m²
Ice Water Path - Monthly Mean diurnal-cycle				
ACCURACY	bias	40 g/m²	20 g/m²	10 g/m²
PRECISION	bc-rms	80 g/m²	40 g/m²	20 g/m²

Verification

L2/L3 comparison with CloudSat / EarthCARE
L3 comparison with MODIS

Comment:

This product provides the ICDR based on the CLAAS-3 IWP data record (CM-21063).

CM-5210	SEVIRI Surface Incoming Shortwave Radiation SARAH-2 IDCR R1	SIS_SEVIRI_ICDR_R1

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-(0.05°) ²
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Mean				
ACCURACY	MAB	20 W/m²	15 W/m²	12 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean				
ACCURACY	MAB	15 W/m²	8 W/m²	5 W/m²

Verification
comparison with in-situ measurements

Comment:
This product will supersede CM-49. This product provides the ICDR based on the SARAH-2 SIS data record (CM-23202).

CM-5211 SEVIRI Surface Incoming Shortwave Radiation ICDR SIS_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L3: Monthly Mean
L3: Monthly Mean diurnal-cycle

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Mean				
ACCURACY	MAB	25 W/m²	20 W/m²	15 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean diurnal-cycle				
	MAB	15 W/m²		
ACCURACY	MAB		10 W/m²	8 W/m²

Verification
comparison with in-situ measurements

Comment:
This product supersedes CDOP2 CM-5210

CM-5230 SEVIRI Direct Irradiance at Surface SARAH-2 ICDR R1 SDI_SEVIRI_ICDR_R1

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-(0.05°) ²
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Daily Mean
L3: Monthly Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Direct Irradiance at Surface - Daily Mean				
ACCURACY	MAB	25 W/m²	20 W/m²	15 W/m²
Direct Irradiance at Surface - Monthly Mean				
ACCURACY	MAB	15 W/m²	10 W/m²	8 W/m²
Direct Normalised Irradiance - Daily Mean				
ACCURACY	MAB	30 W/m²	25 W/m²	20 W/m²
Direct Normalised Irradiance - Monthly Mean				
ACCURACY	MAB	20 W/m²	15 W/m²	12 W/m²

Verification
comparison with in -situ measurments

Comment:

This product will supersede CM-104. This product provides the ICDR based on the SARAH-2 SDI data record (CM-23291). Composed of surface direct normalized irradiance (DNI) and surface direct radiation (SID).

CM-5251 Meteosat Daylight ICDR DAL_R2_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Change Analysis
Climate Impact Analysis
Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Daylight - Daily Mean				
ACCURACY	MAB	10 W/m²	7 W/m²	5 W/m²
STABILITY	decadal	4 W/m²	3 W/m²	2 W/m²
Daylight - Monthly Mean				
ACCURACY	MAB	12 W/m²	7 W/m²	5 W/m²
STABILITY	decadal	4 W/m²	3 W/m²	2 W/m²

Verification
comparison with available ground measurements

Comment:
This product provides the ICDR based on the SARAH 3 DAL data record (CM-23253).

CM-5271 Meteosat Photosynthetic Active Radiation ICDR — PAR_R1_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Photosynthetic Active Radiation - Daily Mean				
ACCURACY	MAB	20 %	10 %	5 %
Photosynthetic Active Radiation - Monthly Mean				
ACCURACY	MAB	20 %	10 %	5 %

Verification
comparison with available ground measurements

Comment:
This product provides the ICDR based on the SARAH 3 PAR data record (CM-23273).

CM-5281 Meteosat Sunshine Duration ICDR SDU_R1_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$

Temporal resolution
L3: Daily Sum
L3: Monthly Sum

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Sunshine duration - Daily Sum				
ACCURACY	MAB	15 h	10 h	8 h
STABILITY	decadal	5 h	3 h	2 h
Sunshine duration - Monthly Sum				
ACCURACY	MAB	15 h	10 h	8 h
STABILITY	decadal	5 h	3 h	2 h

Verification
comparison with available ground measurements

Comment:
This product provides the ICDR based on the SARAH 3 SDU data record (CM-23283).

CM-5291 SEVIRI Surface Direct Irradiance ICDR R2 — SDI_R2_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: MSG full disk (includes Europe, Afrika, Atlantic Ocean)

Spatial resolution
L3: HORIZONTAL-(0.05°) ²
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Daily Mean
L3: Monthly Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Direct Irradiance at Surface - Daily Mean				
ACCURACY	MAB	25 W/m²	20 W/m²	15 W/m²
Direct Irradiance at Surface - Monthly Mean				
ACCURACY	MAB	5 W/m²	10 W/m²	8 W/m²
Direct Normalised Irradiance - Daily Mean				
ACCURACY	MAB	30 W/m²	25 W/m²	20 W/m²
Direct Normalised Irradiance - Monthly Mean				
ACCURACY	MAB	20 W/m²	15 W/m²	12 W/m²

Verification
comparison with BSRN in -situ measurments

Comment:
This product provides the ICDR based on the SARAH-2 SDI data record (CM-23291). Composed of surface direct normalized irradiance (DNI) and surface direct radiation (SID).

CM-57 Surface Albedo SAL_AVHRR_Europe

Type
Product

Input satellite data
Operational Satellite: AVHRR
Others: AOD
Others: cloud mask
Others: co-ordinates
Others: DEM
Others: ice mask
Others: land cover information
Others: ozone
Others: water vapour

Application areas
Climate Research

Dissemination information

Distribution format
L3:HDF5

Generation frequency
1 week, 1 month

Generation timeliness
2 month

Spatio-temporal information

Spatial coverage
L3: CM SAF baseline area (70N-80N, 0E-60E)

Spatial resolution
L3: HORIZONTAL-(15 km) ²

Temporal resolution
L3: Monthly Mean
L3: Weekly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Albedo - Monthly Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	20 % (relative)
Surface Albedo - Weekly Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	20 % (relative)

Verification
continuous validation at mast measurement sites & field campaigns of the components CM-57 and CM-56.

Comment:

CM-59 Surface Albedo SAL_AVHRR_Arctic

Type
Product

Input satellite data
Operational Satellite: AVHRR
Others: AOD
Others: cloud mask
Others: co-ordinates
Others: DEM
Others: ice mask
Others: land cover information
Others: ozone
Others: water vapour

Application areas
Climate Research

Dissemination information

Distribution format
L3:HDF5

Generation frequency
1 week; 1 month

Generation timeliness
2 month

Spatio-temporal information

Spatial coverage
L3: Arctic

Spatial resolution
L3: HORIZONTAL-(15 km) ²

Temporal resolution
L3: Monthly Mean
L3: Weekly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Albedo - Monthly Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	20 % (relative)
Surface Albedo - Weekly Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	20 % (relative)

Verification
continuous validation at mast measurement sites & field campaigns

Comment:
n.d.

CM-6010 AVHRR GAC Fractional Cloud Cover EDR — CFC_AVHRR_Global

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Others: NWP

Application areas

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25)^2$ level3

L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean

L3: Monthly Mean

Temporal coverage
start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias (global)	20%	10%	10%
ACCURACY	bias (arctic)	30%	20%	15%
PRECISION	bc-rms (global)	45%	25%	20%
PRECISION	bc-rms (artic)	45%	35%	25%
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias (global)	20%	10%	10%
ACCURACY	bias (arctic)	30%	20%	15%
PRECISION	bc-rms (global)	40%	20%	15%
PRECISION	bc-rms (artic)	40%	30%	20%

Verification
comparisons to MODIS data (results computed as areal means over the studied area)

Comment:

This product will supersede CM-03 and CM-04.;
Polar areas in EASY grid (25 km)

CM-6011 AVHRR GAC Fractional Cloud Cover ICDR — CFC_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC
Others: NWP

Application areas

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-(0.25°)²

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias (global)	20 %	10 %	10 %
ACCURACY	bias (arctic)	30 %	20 %	15 %
PRECISION	bc-rms (global)	45 %	25 %	20 %
PRECISION	bc-rms (artic)	45 %	35 %	25 %
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias (global)	20%	10 %	10 %
ACCURACY	bias (arctic)	30%	20 %	15 %
PRECISION	bc-rms (global)	40%	20 %	15 %
PRECISION	bc-rms (artic)	40%	30 %	20 %

Verification

Comparisons with SYNOP, Cloudsat/CALIPSO, EarthCARE
Validation results will be shown separately for Polar winter region (above 70° latitude in S/N Hemispheric winter) where results may have some problems to meet the listed requirements.

Comment:

This product supersedes CDOP2 CM-6010.
This product provides the ICDR based on the CLARA-A3 CFC data record (CM-11012).

CM-6021 AVHRR GAC Joint cloud histogram ICDR JCH_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
CM-SAF Product: CM-11031
CM-SAF Product: CM-11061

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(1.0)^2$

Temporal resolution
L3: Monthly Histogram

Temporal coverage
start:
end:

Uncertainty characteristics	Threshold	Target	Optimum
Joint Cloud Histograms - Monthly Histogram			
	N/A	N/A	N/A

Verification

comparison with ISCCP
comparison with MODIS (2000-2010)
comparison with Cloudsat/Calipso (2007-2010)
comparison with PATMOS-X

Comment:

This product provides the ICDR based on the CLARA-A3 JCH data record (CM-11022).

CM-6030 AVHRR GAC Cloud Top Level EDR CTO_AVHRR_Global

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Others: NWP

Application areas

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

5 days for DM, 5 days after the month

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: Global

Spatial resolution

L3: HORIZONTAL-$(0.25)^2$ level 3

L3: VERTICAL-n/a

Temporal resolution

L3: Daily Mean

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean

Temporal coverage

start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Hight - Daily Mean				
ACCURACY	bias (global)	1500 m	1000 m	800 m
ACCURACY	bias (arctic)	1800 m	1200 m	1000 m
PRECISION	bc-rms (artic)	4000 m	2000 m	1500 m
PRECISION	bc-rms (global)	3000 m	1500 m	3000 m
Cloud Top Hight - Monthly Mean				
ACCURACY	bias (arctic)	1800 m	1200 m	1000 m
ACCURACY	bias (global)	1500 m	1000 m	800 m
PRECISION	bc-rms (global)	3000 m	1500 m	3000 m
PRECISION	bc-rms (artic)	4000 m	2000 m	1500 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias (global)	120 hPa	80 hPa	50 hPa
ACCURACY	bias (arctic)	150 hPa	110 hPa	80 hPa
PRECISION	bc-rms (artic)	160 hPa	130 hPa	100 hPa
PRECISION	bc-rms (global)	140 hPa	100 hPa	70 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias (arctic)	150 hPa	110 hPa	80 hPa
ACCURACY	bias (global)	120 hPa	80 hPa	50 hPa
PRECISION	bc-rms (global)	140 hPa	100 hPa	70 hPa
PRECISION	bc-rms (artic)	160 hPa	130 hPa	100 hPa

Verification

comparisons to MODIS data (results computed as areal means over the studied area)

Comment:

No specific requirements for CTT is set as it represents same information in different units.This product will supersede CM-15 and CM-16.;
This product provides the ICDR based on the CLARA-A2 CTO data record (CM-11031).
Polar areas in EASY grid (25 km)

CM-6031 AVHRR GAC Cloud Top Level ICDR CTO_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Others: NWP

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Daily Mean
L3: Daily Mean
L3: Monthly Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Hight - Daily Mean				
ACCURACY	bias	1000 m	700 m	450 m
PRECISION	bc-rms	2500 m	1500 m	900 m
STABILITY	decadal	250 m	150 m	100 m
Cloud Top Hight - Monthly Mean				
ACCURACY	bias (arctic)	1000 m	700 m	450 m
PRECISION	bc-rms	2500 m	1500 m	900 m
STABILITY	decadal	250 m	150 m	100 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	60 hPa	40 hPa	20 hPa
PRECISION	bc-rms	100 hPa	80 hPa	70 hPa
STABILITY	decadal	25 hPa	15 hPa	10 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias	60 hPa	40 hPa	20 hPa
PRECISION	bc-rms	100 hPa	80 hPa	70 hPa
STABILITY	decadal	25 hPa	15 hPa	10 hPa

Verification

comparison with Cloudsat/Calipso, EarthCARE; consistency checks with PATMOS-x, MODIS

Comment:

This product supersedes CDOP2 CM-6030.
This product provides the ICDR based on the CLARA-A3 CTO data record (CM-11032).

CM-6040 AVHRR GAC Cloud Phase EDR CPH_AVHRR_Global

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
1 day, 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25)^2$ level3
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Phase - Daily Mean				
ACCURACY	bias	0.1	0.05	0.03
PRECISION	rms	0.2	0.1	0.05
Cloud Phase - Monthly Mean				
ACCURACY	bias	0.1	0.05	0.03
PRECISION	rms	0.2	0.1	0.05

Verification
comparisons to MODIS data

Comment:
The bias and rms are differend as absolute difference (of water cloud fraction) to the comparative datasets.;This product will supersede CM_37.
This product provides the ICDR based on the CLARA-A2 CFC data record (CM-11041).

CM-6041 AVHRR GAC Cloud Phase EDR CPH_AVHRR_Global

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency
1 day, 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Phase - Daily Mean				
ACCURACY	bias	0.2	0.1	0.01
PRECISION	rms	0.4	0.2	0.1
Cloud Phase - Monthly Mean				
ACCURACY	bias	0.2	0.1	0.01
PRECISION	rms	0.4	0.2	0.1

Verification

comparison with Cloudsat/Calipso, EarthCARE; consistency checks with PATMOS-x, MODIS

Comment:

This product supersedes CDOP2 CM-6040.
This product provides the ICDR based on the CLARA-A3 CPH data record (CM-11042).

CM-6050 AVHRR GAC Liquid Water Path EDR LWP_AVHRR_Global

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25)^2$ level3
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Liquid Water Path - Daily Mean				
ACCURACY	bias	25%	10%	5%
PRECISION	rms	50%	25%	10%
Liquid Water Path - Monthly Mean				
ACCURACY	bias	25%	10%	5%
PRECISION	rms	50%	25%	10%

Verification
comparisons to MODIS data

Comment:
The bias and rms are defined as relative difference to the comparative datasets.
This product supersede CM-42. As additional data layers COT (CM-33) and REF Fwill be integrated into this product.;
This product provides the ICDR based on the CLARA-A2 LWP data record (CM-11051).

CM-6051 AVHRR GAC Liquid Water Path ICDR LWP_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: -

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Liquid Water Path - Daily Mean				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	bc-rms	40 g/m²	20 g/m²	10 g/m²
Liquid Water Path - Monthly Mean				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	bc-rms	40 g/m²	20 g/m²	10 g/m²

Verification

comparison with satellite-based MWR retrieved LWP over ocean, consistency checks with PATMOS-x, MODIS

Comment:

This product supersedes CDOP2 CM-6050.
This product provides the ICDR based on the CLARA-A3 LWP data record (CM-11052).

CM-6060 AVHRR GAC Ice Water Path EDR IWP_AVHRR_Global

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
1 day; 1month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25)^2$ level3
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Ice Water Path - Daily Mean				
ACCURACY	bias	40%	25%	10%
PRECISION	rms	70%	50%	25%
Ice Water Path - Monthly Mean				
ACCURACY	bias	40%	25%	10%
PRECISION	rms	70%	50%	25%

Verification

- comparison with MODIS
- comparison with Cloudsat/Calipso

Comment:

This product provides the ICDR based on the CLARA-A2 IWP data record (CM-11061).

CM-6061 AVHRR GAC Ice Water Path ICDR AVHRR GAC Ice Water Path ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Ice Water Path - Daily Mean				
ACCURACY	bias	40 %	20 %	10 %
PRECISION	bc-rms	80 %	40 %	20 %
Ice Water Path - Monthly Mean				
ACCURACY	bias	40 %	20 %	10 %
PRECISION	bc-rms	80 %	40 %	20 %

Verification
comparison with Cloudsat (DARDAR), EarthCARE; consistency checks with PATMOS-x, MODIS

Comment:
This product provides the ICDR based on the CLARA-A3 CAF data record (CM-11062).

CM-6210 AVHRR GAC Surface Incoming Shortwave Radiation EDR — SIS_AVHRR_Global

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25)^2$
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics	Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Mean			
ACCURACY	30 W/m²	25 W/m²	20 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean			
ACCURACY	15 W/m²	10 W/m²	8 W/m²

Verification

comparison with in-situ measurements

Comment:

This product supersede CM-50.
This product provides the ICDR based on the CLARA-A2 SIS data record (CM-11211).

CM-6211 AVHRR GAC Surface Incoming Shortwave Radiation ICDR — SIS_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics	Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Mean			
ACCURACY	30 W/m²	25 W/m²	20 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean			
ACCURACY	15 W/m²	10 W/m²	8 W/m²

Verification
comparison with in-situ measurements

Comment:
This product supersedes CDOP2 CM-6210.
This product provides the ICDR based on the CLARA-A3 SIS data record (CM-11212).

CM-6220 AVHRR GAC Surface Albedo EDR SAL_AVHRR_Global

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC
Others: AOD
Others: cloud mask
Others: co-ordinates
Others: DEM
Others: ice mask
Others: land cover information
Others: ozone
Others: water vapour

Application areas

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
1 day; 1 month

Generation timeliness
5 day

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25)^2$
L3: VERTICAL-n/a

Temporal resolution
L3: Monthly Mean
L3: Pentad Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Albedo - Monthly Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	5 % (relative) or 0.0
Surface Albedo - Pentad Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	5 % (relative) or 0.0

Verification
continuous validation at mast measurement sites & field campaigns

Comment:

This product supersede CM-57 and CM-59.
For polar areas products will be provided in EASE-grid (25 km).
Accuracy is defined for flat land for 90% of cases.
This product provides the ICDR based on the CLARA-A2 SAL data record (CM-11221).

CM-6221 AVHRR GAC Surface Albedo ICDR SAL_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Monthly Mean
L3: Weekly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Albedo - Monthly Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	5 % (relative) or 0.0
STABILITY	decadal	20%	15 %	2 %
Surface Albedo - Weekly Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	5 % (relative) or 0.0
STABILITY	decadal	20 %	15 %	2 %

Verification
continuous validation at mast measurement sites & field campaigns

Comment:
This product supersedes CDOP2 CM-6220
This product provides the ICDR based on the CLARA-A3 SAL data record (CM-11222).

CM-6223 AVHRR GAC White sky surface Albedo ICDR SAW_R1_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Monthly Mean
L3: Pentad Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Albedo - Monthly Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	5 % (relative) or 0.0
STABILITY	decadal	20 %	15 %	2 %
Surface Albedo - Pentad Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	5 % (relative) or 0.0
STABILITY	decadal	20 %	15 %	2 %

Verification
comparison with surface measurements for different regions

Comment:
This product provides the ICDR based on the CLARA-A3 SAW data record (CM-11223).

CM-6224 AVHRR GAC Blue sky surface Albedo ICDR SAB_R1_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Monthly Mean
L3: Pentad Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Albedo - Monthly Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	5 % (relative) or 0.0
STABILITY	decadal	20 %	15 %	2 %
Surface Albedo - Pentad Mean				
ACCURACY	bias	50 % (relative)	25 % (relative)	5 % (relative) or 0.0
STABILITY	decadal	20 %	15 %	2 %

Verification
comparison with surface measurements for different regions

Comment:
This product provides the ICDR based on the CLARA-A3 SAB data record (CM-11224).

CM-6321 AVHRR GAC ToA Longwave Flux ICDR — OLR_R1_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Monthly Mean
L3: Weekly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Outgoing Longwave Radiation - Monthly Mean				
ACCURACY	bias	50 %	25 %	5 % (relative) or 0.0
STABILITY	decadal	20 %	15 %	2 %
Outgoing Longwave Radiation - Weekly Mean				
ACCURACY	bias	50 %	25 %	
STABILITY	decadal	20 %	15 %	
STABILITY	bias			5 % (relative) or 0.0

Verification
continuous validation at mast measurement sites & field campaigns

Comment:
This product provides the ICDR based on the CLARA-A3 JCH data record (CM-11342).

CM-6331 AVHRR GAC Reflected Shortwave Flux ICDR RSF_R1_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution
L3: Monthly Mean
L3: Weekly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Reflected Shortwave Flux - Monthly Mean				
ACCURACY	bias	50 %	25 %	5 % (relative) or 0.0
STABILITY	decadal	20 %	15 %	2 %
Reflected Shortwave Flux - Weekly Mean				
ACCURACY	bias	50 %	25 %	5 % (relative) or 0.0
STABILITY	decadal	20 %	15 %	2 %

Verification
continuous validation at mast measurement sites & field campaigns

Comment:
This product provides the ICDR based on the CLARA-A3 RSF data record (CM-11312).