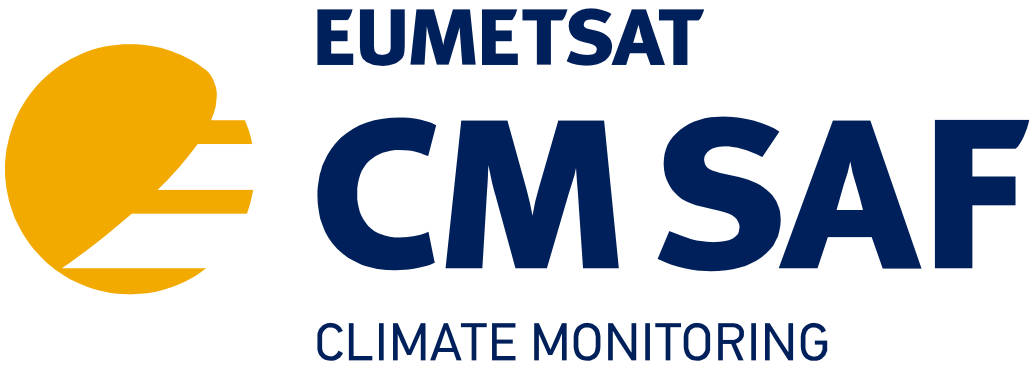
EUMETSAT Satellite Application Facility on Climate Monitoring



CDOP-3

Product Requirements Document

Reference Number:	**SAF/CM/DWD/PRD**
Issue/Revision Index:	**3.8**
Date:	**08.12.2021**

Document Signature Table

	Name	Function	Signature	Date
Author	CM SAF Team			30.11.2021
Editor	Marc Schröder	Science Coordinator		30.11.2021
Approval	Steering Group	CDOP3_SG10_D9		08.12.2021
Release	Rainer Hollmann	Project Manager		08.12.2021

Document Change Record

Issue/ Revision	Date	DCN No.	Changed Pages/Paragraphs
Draft 3.0	01/11/2017	SAF/CM/DWD/PRD	Draft version for Steering Group Approval, Major changes w.r.t. version 2.11 from CDOP-2: - Deleted all entries with status superseded, discontinued - Integrated all entries with status released before 28.02.2017 in new table providing an overview of CDRs - Update of User requirements: new numbering, added PRD-D-4 as new requirement - Update of Service requirements: new numbering to distinguish between generic user service and generic product requirements; modified PRD-U-16, PRD-U-33, PRD-U34, PRD-U-35. - Included new CDOP-3 entries from CDOP-3 proposal - New record length for all CLARA-A3 PRD entries: 1978-2019. - Included CM-5291 as composite of CM-5231 and CM-5241 (following logic of SG decision to combine direct and direct normalized Irradiance); deletion of CM-5231, CM-5241. - Included CM-23293 as composite of CM-23233 and CM-23223 (following logic of SG decision to combine direct and direct normalized Irradiance); deletion of CM-23223, CM-23233.
3.0	10/11/2017	SAF/CM/DWD/PRD	Implementation of SG feedback (CDOP3_SG2_A4): - Deleted references to RR documents. - Added CM-23283 (sunshine duration) - Added references for definitions. Approval of SG: CDOP3_SG2_D4
Draft 3.1	24/04/2018	SAF/CM/DWD/PRD	Implementation of updates: - CM-23083, CM-23203, CM-23293, CM-23253, CM-23273, CM-23283 following the RR 3.8 review (CDOP3_SG4_D6) Implementation of CDOP3_SG3_D6:

Issue/ Revision	Date	DCN No.	Changed Pages/Paragraphs
			- Inclusion of additional ICDRs. CM-5210, CM-5280 - Inclusion new PRD entries for the extension of SARAH-2 (CM-23085, CM-23205, CM-23245, CM-23283, CM-23295). - Inclusion of new PRD entries for the extension of CLAAS-2 (CM-21015, CM-21025, CM-21035, CM-21045, CM-21055, CM-21065). - Inclusion of new PRD entries for the extension of CLARA-A2 (CM-11015, CM-11025, CM-11035, CM-11045, CM-11055, CM-11065, CM-11205, CM-11225, CM-11255, CM-11265).
Draft 3.2	22.06.2018		- Baselined CM-12003 (CDOP3_SG4_D5)
3.2	16.07.2018		Approved version (CDOP3_SG4_D10)
Draft 3.3	21.01.2019		Update of PRD entries - Update of PRD entries (HECTOR, RR 3.3): CM-13013, CM-13033 (CDOP3_SG4_D14) - Update of PRD entries (HOAPS 5.0, RR 3.4): CM-12613, CM-12703, CM-12803, CM-12813, CM-12823, CM-12903, CM-12913, CM-12053; (CDOP3_SG4_D15) - Update of PRD (CLAAS-3, RR 3.7): CM-21014, CM-21023, CM-21033, CM-21043, CM-21053, CM-21063, (CDOP3_SG4_D19)
Draft 3.4	31.01.2019		- update of PRD entries: CM-21014, CM-21023, CM-21033, CM-21043, CM-21053, CM-21063 (comments not fully included, formatting issues) - update of PRD entries: CM-13013, CM-13033: deleted Level2b entries, formatting issues, comments not fully included
3.4	13.02.2019		Approved version (CDOP3_SG5_D2)
Draft 3.5	27.11.2019		Implementation of RR 3.2 results (CDOP3_SG5_D13) and update of PRD entries: CM-11012, CM-11022, CM-11032, CM-11042, CM-11052, CM-11062, CM-11202, CM-11222, CM-11223, CM-11224, CM-11262, CM-11272, CM-11312, CM-11342 Implementation of RR 3.5 (CDOP3_SG5_D14) and update of entry: CM-25611 Implementation of RR 3.9 results (CDOP3_SG5_D15) and update of entries: CM-23012, CM-23271, CM-23722, CM-23811, CM-23922

Issue/ Revision	Date	DCN No.	Changed Pages/Paragraphs
3.5	20.03.2020		Typo corrections; approval by SG (CDOP3_SG6_D7)
Draft 3.6	14.04.2020		Implementation of RR 3.6 results and update of entry CM-14712 (CDOP3_SG6_D4); Changed end date to 31.12.2020 for the following entries (CDOP3_SG5_D8): - microwave FCDR (CM-12003) - HOAPS 5.0 TCDR family (CM-12613, CM-12703, CM-12803, CM-12813, CM-12823, CM-12903, CM-12913, CM-12053) Correction of typos: - (daily vs Monthly) for CM-11205. - Deleted EASE Grid format for the following products (CM-11042, CM-11045, CM-11052, CM-11055, CM-11062, CM-11065)
3.6	02.07.2020		Approval by SG (CDOP3_SG7_D12)
Draft 3.7	24.08.2020		Include a new PRD entry for the ESA-EUMETSAT joint water vapour products CM-15701
3.7	19.10.2020		Approval by SG (CDOP3_SG8_D4) with typo corrections for CM-11222 and CM-11225 and added/corrected entries for CM-15701
Draft 3.8	30.11.2021		Typo correction: monthly histograms (CM-21033, CM-21053, CM-21063) time range: CM-14712, missing grid: CM-6051, time average: CM-6221 (pentad mean instead of weekly mean), CM-6321, CM-6331 (daily mean instead of pentad mean)Distribution format for L2 added: CM-23203 Changed “Instantaneous: Frequency” into “Instantaneous: (none)”: CM-23253 MVIRI added as input: CM-23273 Changed “30 min” into “Instantaneous: (none)”: CM-23293 L3 spatial resolution added: CM-21043 Implemented changes according to review board report for PCR3.2 (CDOP3_SG10_D4): CM-11012, CM-11022, CM-11032, CM-11042, CM-11052, CM-11062, CM-11223, CM-11224, CM-11262, CM-11272 Hector removed from PRD: CM-13013, CM-13033 (CDOP3_SG10_D7)
3.8	08.12.2021		Approval by SG (CDOP3_SG10_D9)

Distribution List

Internal Distribution		
Name		**No. Copies**
DWD Archive		1
CM SAF Team		1
External Distribution		
Company	**Name**	**No. Copies**
EUMETSAT		1
CM SAF Steering Group		1

Public document

Table of Contents

List of Tables

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/3.7
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.* For Level-2 data also the *KSS (Hanssen-Kuipers Skill Score)* is used.

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 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 remain 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
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)
KSS	Hanssen-Kuipers Skill Score
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.

This page is intentionally left blank

CM-11012 AVHRR GAC Fractional Cloud Cover TCDR R3 — CFC_R3_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Private Sector

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF-CF

L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global

L3: Global

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

L3: VERTICAL-n/a

L2: HORIZONTAL-$(0.05)^2$

Temporal resolution
L2: Daily (none)

L3: Daily Mean

L3: Monthly Mean

Temporal coverage
start: 10.01.1978

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily (none)				
ACCURACY	bias	10	5 %	1 %
PRECISION	KSS	0.5	0.6	0.8
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	bc-rms	20 %	10 %	5 %
STABILITY	decadal	5 %	2 %	0.5 %
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	bc-rms	20 %	10 %	5 %
STABILITY	decadal	5%	2%	0.5 %

Verification

primarily comparisons with SYNOP and CALIPSO-CALIOP;
consistency checks against MODIS C6.1, ISCCP-H, ESA-CLOUD-CCI v3 and PATMOS-x version 6. For L2b comparisons will be made with SNO-matched CALIPSO-CALIOP 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.
For polar areas, level3 products will also be provided in EASE-grid (25 km).
All level3 products contain merged fields from all satellites ("AVPOS"). The monthly mean level3 products on a global grid additionally contain fields for each individual active satellite.

CM-11015 AVHRR GAC Fractional Cloud Cover TCDR R2 continued — CFC_R2_CLARA_TCDR_CND

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Cimate Monitoring
Private Sector
Public Sector and Government Agencies
Reanalyses for Assimilation

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global
L3: Global

Spatial resolution
L3: HORIZONTAL-$(0.25)^2$
L3: VERTICAL-n/a
L2: HORIZONTAL-$(0.05)^2$

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

Temporal coverage
start: 01.01.2016
end: 31.12.2018

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily (none)				
STABILITY	decadal	5 %		
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	10 %	5 %	2 %
PRECISION	bc-rms	40 %	20 %	10 %
STABILITY	decadal	5 %	2 %	1 %

Verification

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

Comment:

-Extension of CM-11011 (CLARA_A2) untill start of ICDR continuation (CM-6010)

-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 (25 km for level3).
-Stability (uncertainties) is being considered for the whole datarecord.

CM-11022 Joint Cloud Histograms AVHRR GAC TCDR R3 — JCH_R3_CLARA_3_TCDR

Type
Dataset

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

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: 10.01.1978
end: 31.12.2020

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

Verification

Comment:
No specific verification as this product is being composed of validated CM SAF products (Cloud Top, Cloud Optical Thickness, and Cloud Phase).
The product contains merged fields from all satellites ("AVPOS") and fields from each individual satellite.

CM-11025 AVHRR GAC Joint Cloud Histograms TCDR R2 continued — JCH_R2_CLARA_TCDR_CND

Type
Dataset

Input satellite data
CM-SAF Product: CM-11031

CM-SAF Product: CM-11041

CM-SAF Product: CM-11051

Application areas
Climate Research

Dissemination information

Distribution format

L3:NetCDF4

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: 01.01.2016

end: 31.12.2018

Uncertainty characteristics	Threshold	Target	Optimum
Joint Cloud Histograms - Monthly Histogram			
	n/a	n/a	n/a

Verification

Comment:

-Extension of CM-11021 (CLARA_A2)

- No specific verification as this product is being composed of validated CM SAF products (Cloud Top, Cloud Optical Thickness, and Cloud Phase)

CM-11032 AVHRR GAC Cloud Top Level TCDR R3 — CTO_R3_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Dissemination information

Distribution format
L2:NetCDF-CF

L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global

L3: Global

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

L3: VERTICAL-n/a

L2: HORIZONTAL-$(0.05)^2$

Temporal resolution
L2: Daily Mean

L2: Daily Mean

L3: Daily Mean

L3: Daily Mean

L3: Monthly Histogram

L3: Monthly Mean

L3: Monthly Mean

Temporal coverage
start: 10.01.1978

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Height - Daily Mean				
ACCURACY	bias	1800 m	800 m	500 m
PRECISION	bc-rms	4000 m	2400 m	1500 m
STABILITY	decadal	400 m	270 m	150 m
Cloud Top Height - Monthly Mean				
ACCURACY	bias	1300 m	800 m	500 m
PRECISION	bc-rms	3000 m	1600 m	1200 m
STABILITY	decadal	400 m	270 m	150 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	100 hPa	45 hPa	20 hPa
PRECISION	bc-rms	170 hPa	140 hPa	70 hPa
STABILITY	decadal	15 hPa	30 hPa	5 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias	100 hPa	45 hPa	20 hPa
PRECISION	bc-rms	110 hPa	85 hPa	50 hPa
STABILITY	decadal	30 hPa	15 hPa	5 hPa

Verification

comparison with ISCCP;
comparison with MODIS;
comparison with Cloudsat/Calipso;
comparison with PATMOS-X
comparison with ESA-CLOUD-CCI v3

Comment:

For CTT: no specific requirement as it represents same information in different units.
L2 and L3: CTO includes cloud top pressure (CTP), cloud top height (CTH) and cloud top temperature (CTT)
L3: logarithmically averaged CTP (in addition to linear average).
For polar areas, level3 products will also be provided in EASE-grid (25 km).
All level3 products contain merged fields from all satellites ("AVPOS"). The monthly mean level3 products on a global grid additionally contain fields for each individual active satellite.
No accuracy/precision/stability requirements are given for the monthly histograms as these histograms represent a collection of Level-2 data for which the requirements are already formulated.

CM-11035 AVHRR GAC Cloud Top Level TCDR R2 continued — CTO_R2_CLARA_TCDR_CND

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Dissemination information

Distribution format

L2:NetCDF4

L3:NetCDF4

Generation frequency

n/a

Generation timeliness

Spatio-temporal information

Spatial coverage

L2: Global

L3: Global

Spatial resolution

L3: HORIZONTAL-$(0.25)^2$

L3: VERTICAL-n/a

L2: HORIZONTAL-$(0.05)^2$

Temporal resolution

L2: Daily (none)

L3: Daily Mean

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean

Temporal coverage

start: 01.01.2016

end: 31.12.2018

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Height - Daily (none)				
ACCURACY	bias			
Cloud Top Height - Daily Mean				
ACCURACY	bias	1300 m	800 m	500 m
PRECISION	bc-rms	3000 m	1700 m	1100 m
STABILITY	decadal	300 m	200 m	150 m
Cloud Top Height - Monthly Mean				
ACCURACY	bias	1300 m	800 m	500 m
PRECISION	bc-rms	3000 m	1700 m	1100 m
STABILITY	decadal	300 m	200 m	150 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	80 hPa	50 hPa	30 hPa
PRECISION	bc-rms	120 hPa	100 hPa	80 hPa
STABILITY	decadal	30 hPa	20 hPa	15 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias	80 hPa	50 hPa	30 hPa
PRECISION	bc-rms	120 hPa	100 hPa	80 hPa
STABILITY	decadal	30 hPa	20 hPa	15 hPa

Verification

comparison with MODIS;
comparison with Cloudsat/Calipso;
comparison with PATMOS-X

Comment:

-Extension of CM-11031 (CLARA_A2) untill start of ICDR continuation (CM-6030)

- CTT: no specific requirement as it represents same information in different units
-Stability (uncertainties) is being considered for the whole datarecord.

CM-11042 AVHRR GAC Cloud Phase TCDR R3 CPH_R3_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Dissemination information

Distribution format
L2:NetCDF-CF

L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global

L3: Global

Spatial resolution
L2: VERTICAL-n/a

L3: HORIZONTAL-$(0.25)^2$

L3: VERTICAL-n/a

L2: HORIZONTAL-$(0.05)^2$

Temporal resolution
L2: Daily (none)

L3: Daily Mean

L3: Monthly Mean

Temporal coverage
start: 10.01.1978

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Phase - Daily (none)				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	KSS	0.5	0.6	0.8
Cloud Phase - Daily Mean				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	bc-rms	20 %	10 %	5 %
STABILITY	decadal	5 %	2 %	0.5 %
Cloud Phase - Monthly Mean				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	bc-rms	20 %	10 %	5 %
STABILITY	decadal	5 %	2 %	0.5 %

Verification

comparison with ISCCP;
comparison with MODIS;
comparison with Cloudsat/Calipso;
comparison with PATMOS-X
comparison with ESA-CLOUD-CCI v3

Comment:

Additional layers: CPH for daytime and nighttime L2b contains extended cloud phase with more categories (supercooled, overlap, cirrus, ..).
Bias and bc-rmsd are expressed in absolute units (% liquid clouds relative to all clouds).
All level3 products contain merged fields from all satellites ("AVPOS"). The monthly mean level3 products on a global grid additionally contain fields for each individual active satellite.

CM-11045 AVHRR GAC Cloud Phase TCDR R2 continued — CPH_R2_CLARA_TCDR_CND

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global

L3: Global

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

L3: VERTICAL-n/a

L2: HORIZONTAL-$(0.05)^2$

Temporal resolution
L2: Daily (none)

L3: Daily Mean

L3: Monthly Mean

Temporal coverage
start: 01.01.2016

end: 31.12.2018

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Phase - Daily (none)				
ACCURACY	bias	0.2	0.1	0.01
PRECISION	bc-rms	0.4	0.2	0.1
STABILITY	decadal	0.05	0.02	0.01
Cloud Phase - Daily Mean				
ACCURACY	bias	0.2	0.1	0.01
PRECISION	bc-rms	0.4	0.2	0.1
STABILITY	decadal	0.05	0.02	0.01
Cloud Phase - Monthly Mean				
ACCURACY	bias	0.2	0.1	0.01
PRECISION	bc-rms	0.4	0.2	0.1
STABILITY	decadal	0.05	0.02	0.01

Verification

comparison with MODIS;
comparison with Cloudsat/Calipso;
comparison with PATMOS-X

Comment:

-Extension of CM-11041 (CLARA_A2) untill start of ICDR continuation (CM-6040)

-Stability (uncertainties) is being considered for the whole datarecord.

CM-11052 AVHRR GAC Liquid Water Path TCDR R3 LWP_R3_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Private Sector

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF-CF

L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global

L3: Global

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

L3: VERTICAL-n/a

L2: HORIZONTAL-$(0.05)^2$

Temporal resolution
L2: Daily (none)

L3: Daily Mean

L3: Monthly Histogram

L3: Monthly Mean

Temporal coverage
start: 10.01.1978

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Liquid Water Path - Daily (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 - Daily Mean				
ACCURACY	bias	20 g/m²	10 g/m²	5 g/m²
PRECISION	bc-rms	60 g/m²	30 g/m²	15 g/m²
STABILITY	decadal	6 g/m²	3 g/m²	1 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
STABILITY	decadal	6 g/m²	3 g/m²	1 g/m²

Verification

comparison with satellite-based MWR retrieved LWP over ocean (e.g. AMSR-E);
comparison with PATMOS-X;
comparison with MODIS;
comparison with ISCCP
comparison with ESA-CLOUD-CCI v3;

Comment:

Contains as additional layers: COT (cloud optical thickness), and CRE (particle effective radius), .and CDNC (cloud droplet number concentration). CDNC only for instruments with 3.7 micron channel active during daytime.
LWP averaged over cloudy sky and all sky.
All level3 products contain merged fields from all satellites ("AVPOS"). The monthly mean level3 products on a global grid additionally contain fields for each individual active satellite.
No accuracy/precision/stability requirements are given for the monthly histograms as these histograms represent a collection of Level-2 data for which the requirements are already formulated.

CM-11055 AVHRR GAC Liquid Water Path TCDR R2 continued — LWP_R2_CLARA_TCDR_CND

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Private Sector

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global

L3: Global

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

L3: VERTICAL-n/a

L2: HORIZONTAL-$(0.05)^2$

Temporal resolution
L2: Daily (none)

L3: Daily Mean

L3: Monthly Mean

Temporal coverage
start: 01.01.2016

end: 31.12.2018

Uncertainty characteristics		Threshold	Target	Optimum
Liquid Water Path - Daily (none)				
ACCURACY	bias			
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
STABILITY	decadal	5 g/m²	3 g/m²	1 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
STABILITY	decadal	5 g/m²	3 g/m²	1 g/m²

Verification

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

Comment:

-Extension of CM-11051 (CLARA_A2) untill start of ICDR continuation (CM-6050)

- Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius)
-Stability (uncertainties) is being considered for the whole datarecord.

CM-11062 AVHRR GAC Ice Water Path TCDR R3 — IWP_R3_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Private Sector

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF-CF

L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global

L3: Global

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

L3: VERTICAL-n/a

L2: HORIZONTAL-$(0.05)^2$

Temporal resolution
L2: Daily Mean

L3: Daily Mean

L3: Monthly Histogram

L3: Monthly Mean

Temporal coverage
start: 10.01.1978

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	200 g/m²	60 g/m²	40 g/m²
STABILITY	decadal	12 g/m²	6 g/m²	2 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
STABILITY	decadal	12 g/m²	6 g/m²	2 g/m²

Verification

comparison with CloudSat/CALIPSO;
comparison with PATMOS-X;
comparison with MODIS;
comparison with ISCCP
comparison with ESA-CLOUD-CCI v3;

Comment:

Contains as additional layers: COT (cloud optical thickness) and CRE (particle effective radius).
IWP averaged over cloudy sky and all sky
COT expressed as linear and logarithmic average.
All level3 products contain merged fields from all satellites ("AVPOS"). The monthly mean level3 products on a global grid additionally contain fields for each individual active satellite.
No accuracy/precision/stability requirements are given for the monthly histograms as these histograms represent a collection of Level-2 data for which the requirements are already formulated.

CM-11065 AVHRR GAC Ice Water Path TCDR R2 continued — IWP_R2_CLARA_TCDR_CND

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Private Sector

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global

L3: Global

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

L3: VERTICAL-n/a

L2: HORIZONTAL-$(0.05)^2$

Temporal resolution
L2: Daily (none)

L3: Daily Mean

L3: Monthly Mean

Temporal coverage
start: 01.01.2016

end: 31.12.2018

Uncertainty characteristics		Threshold	Target	Optimum
Ice Water Path - Daily (none)				
ACCURACY	bias			
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
STABILITY	decadal	10 g/m²	6 g/m²	2 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
STABILITY	decadal	10 g/m²	6 g/m²	2 g/m²

Verification

comparison with MODIS;
comparison with Cloudsat/Calipso;
comparison with PATMOS-X

Comment:

-Extension of CM-11061 (CLARA_A2) untill start of ICDR continuation (CM-6060)

-Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius)
-Stability (uncertainties) is being considered for the whole datarecord.

CM-11202 AVHRR GAC Surface Incoming Solar Radiation TCDR R3 SIS_R3_CLARA_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Climate Change Analysis
Climate Impact Analysis
Climate Modelling and Evaluation
Public Sector and Government Agencies

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: 10.01.1978
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Mean				
ACCURACY	MAB	18 W/m²	15 W/m²	10 W/m²
STABILITY	decadal	2 W/m²	1 W/m²	0.5 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean				
ACCURACY	MAB	9 W/m²	5 W/m²	3 W/m²
STABILITY	decadal	2 W/m²	1 W/m²	0.5 W/m²

Verification
comparison with BSRN

Comment:

CM-11205 AVHRR GAC Surface Incoming Solar Radiation TCDR R2 continued — SIS_R2_CLARA_TCDR_CND

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: Reanalysis

Application areas
Climate Change Analysis

Climate Impact Analysis

Climate Modelling and Evaluation

Public Sector and Government Agencies

Dissemination information

Distribution format

L3:NetCDF4

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: 01.01.2016

end: 31.12.2018

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

Verification
comparison with BSRN

Comment:

-Extension of CM-11201 (CLARA_A2) untill start of ICDR continuation (CM-6210)

-Stability (uncertainties) is being considered for the whole datarecord.

CM-11222 AVHRR GAC Surface Albedo TCDR R3 — SAL_R3_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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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: 10.01.1978
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Surface Albedo - Monthly Mean				
ACCURACY	bias	20 % rel.	15 % rel.	5 % rel. or 0.005 abs.
PRECISION	bc-rms	0.15	0.10	
STABILITY	decadal	15 % rel.	10% rel.	2% rel.
Surface Albedo - Pentad Mean				
ACCURACY	bias	20 % rel.	15 % rel.	5 % rel. or 0.005 abs.
PRECISION	bc-rms	0.10	0.05	
STABILITY	decadal	15% rel.	10 % rel.	2% rel.

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.
Accuracy-Optimum: 5% or 0.005 absolute

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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

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

Temporal resolution
L3: Monthly Mean
L3: Pentad Mean

Temporal coverage
start: 10.01.1978
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Blue sky surface Albedo - Pentad Mean				
ACCURACY	bias	50 % rel.	25 %	5 %
PRECISION	bc-rms	0.15	0.10	0.05
STABILITY	decadal	20 % rel.	15 % rel.	2 % rel.
White sky surface Albedo - Monthly Mean				
ACCURACY	bias	50 % rel.	25 %	5 %
PRECISION	bc-rms	0.15	0.10	0.05
STABILITY	decadal	20 % rel.	15 % rel.	2 % rel.

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.
Accuracy-Optimum: 5% or 0.005 absolute.

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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

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

Temporal resolution
L3: Monthly Mean
L3: Pentad Mean

Temporal coverage
start: 10.01.1978
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Blue sky surface Albedo - Monthly Mean				
ACCURACY	bias	50 % relative (defin	25 % relative (defi	5 % relative or 0.005 abso
PRECISION	bc-rms	0.15	0.01	0.05
STABILITY	decadal	20 % rel.	15 % relative	2% relative
Blue sky surface Albedo - Pentad Mean				
ACCURACY	bias	50 % relative (defin	25 % relative (defi	5 % relative or 0.005 abso
PRECISION	bc-rms	0.15	0.01	0.05
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.
Accuracy-Optimum: 5% or 0.005 absolute.

CM-11225 AVHRR GAC Surface Albedo TCDR R2 continued — SAL_R2_CLARA_TCDR_CND

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
Others: wind speed

Application areas
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L3:NetCDF4

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: 01.01.2016
end: 31.12.2018

Uncertainty characteristics		Threshold	Target	Optimum
Surface Albedo - Monthly Mean				
ACCURACY	bias	25 % rel.	20 % rel.	5 % rel. or 0.005 abs.
STABILITY	decadal	15 % rel.	10 % rel.	5 % rel.
Surface Albedo - Pentad Mean				
ACCURACY	bias	25 % rel.	20 % rel.	5 % rel. Or 0.005 abs.
STABILITY	decadal	15 % rel.	10 % rel.	5 % rel.

Verification

comparison with surface measurements for different regions

Comment:

-Extension of CM-11221 (CLARA_A2) untill start of ICDR continuation (CM-6220)

For polar areas products will be provided in EASE-grid (5km for level2, 25 km for level3).
Target and Threshold Accuracies are defined for flat land for 90% of cases.
-Stability (uncertainties) is being considered for the whole datarecord.

CM-11255 AVHRR GAC Surface Outgoing Longwave Radiation TCDR R2 continued — SOL_R2_CLARA_TCDR_CND

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: Reanalysis

Application areas
Cimate Monitoring

Climate Modelling and Evaluation

Dissemination information

Distribution format

L3:NetCDF4

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

Temporal coverage

start: 01.01.2016

end: 31.12.2018

Uncertainty characteristics		Threshold	Target	Optimum
Surface Outgoing Longwave - 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 BSEN

Comment:
-Extension of CM-11251 (CLARA_A2)

-Stability (uncertainties) is being considered for the whole datarecord.

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: Monthly Mean

Temporal coverage
start: 10.01.1978
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Surface Downwelling Longwave Radiation - Monthly Mean				
ACCURACY	MAB	8 W/m²	5 W/m²	3 W/m²
STABILITY	decadal	2 W/m²	1 W/m²	0.5 W/m²

Verification
comparison with BSRN

Comment:

CM-11265 AVHRR GAC Surface Downwelling Longwave Radiation TCDR R2 continued — SDL_R2_CLARA_TCDR_CND

Type
Dataset

Input satellite data
Operational Satellite: AVHRR GAC

Others: Reanalysis

Application areas
Cimate Monitoring

Climate Modelling and Evaluation

Dissemination information

Distribution format

L3:NetCDF4

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

Temporal coverage

start: 01.01.2016

end: 31.12.2018

Uncertainty characteristics		Threshold	Target	Optimum
Surface Downwelling 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 BSEN

Comment:
-Extension of CM-11261 (CLARA_A2)

-Stability (uncertainties) is being considered for the whole datarecord.

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: Monthly Mean

Temporal coverage
start: 10.01.1978
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Surface Radiation Budget - Monthly Mean				
ACCURACY	MAB	8 W/m²	5 W/m²	3 W/m²
STABILITY	decadal	2 W/m²	1 W/m²	0.5 W/m²

Verification
comparison with BSRN

Comment:

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
Climate Research

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: 10.01.1978

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Reflected Shortwave Flux - Daily Mean				
ACCURACY	MAB	16 W/m²	8 W/m²	4 W/m²
STABILITY	decadal	4 W/m²	0.6 W/m²	0.3 W/m²
Reflected Shortwave Flux - Monthly Mean				
ACCURACY	MAB	8 W/m²	4 W/m²	2 W/m²
STABILITY	decadal	4 W/m²	0.6 W/m²	0.3 W/m²

Verification
Comparison with CERES (EBAF,SYN), reanalysis (ERA5), ISCCP-DF, GEWEX-SRB
Comparison with CM SAF GERB CDR (CM-21301) and MVIRI/SEVIRI ToA Radiation CDR (CM-23311)

Comment:
(*) Uncertainty is expressed as Mean Absolute Bias; however, if needed these requirements can still be converted (RMSE=MAB*1.2533 assuming normal distribution)

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
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: 10.01.1978

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Outgoing Longwave Radiation - Daily Mean				
ACCURACY	MAB	16 W/m²	8 W/m²	4 W/m²
STABILITY	decadal	4 W/m²	0.6 W/m²	0.2 W/m²
Outgoing Longwave Radiation - Monthly Mean				
ACCURACY	MAB	8 W/m²	4 W/m²	2 W/m²
STABILITY	decadal	4 W/m²	0.6 W/m²	0.2 W/m²

Verification

Comparison with CERES (EBAF,SYN), reanalysis (ERA5), HIRS OLR, ISCCP-DF, GEWEX-SRB
Comparison with CM SAF GERB CDR (CM-21331) and MVIRI/SEVIRI ToA Radiation CDR (CM-23341)

Comment:

(*) Uncertainty is expressed as Mean Absolute Bias; however, if needed these requirements can still be converted (RMSE=MAB*1.2533 assuming normal distribution).

CM-12002 SSMI/SSMIS FCDR R3 FCDR_SSMI_DS_R3

Type
Dataset

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

Application areas
Basis for TCDR products
Climate Modelling and Evaluation
Reanalyses for Assimilation

Dissemination information

Distribution format
L2:NetCDF4

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: Global

Spatial resolution
L2: HORIZONTAL-sensor resolution
L2: VERTICAL-n/a

Temporal resolution
L2: Instantaneous (none)

Temporal coverage
start: 01.01.1979
end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Brightness Temperature - Instantaneous (none)				
STABILITY	decadal	td <= 0.003 K/dec	td <= 0.003 K/dec	td <= 0.003 K/dec
STABILITY	bias	U <= 3 K (k <=3)	U <= 2 K (k <=2)	U <= 1 K (k <=1)
STABILITY		0.3%	5%	30%

Verification
ground-based observations and/or reanalysis and RT

Comment:

Verification might not cover full period. Accuracy is given for global means. The SSM/I like FCDR also covers land areas. However, the viewing angle correction is not applied here, and due to likely larger temperature ranges the uncertainty might be increased. SMMR quality might be reduced.

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: 31.12.2020

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_HOAPS5_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
National Meteorological and/or Hydrological Services
Private Sector
Public Sector and Government Agencies

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: 31.12.2020

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

Verification

MAC-LWP

Comment:

Validation might not cover full period. Accuracy is given for global means. Temporal coverage depends on availabitlity of SST. Stability is assessed through analysing anomaly trends against a reference when available.
update after RR 3.4, SAF/CM/DWD/RR/3.4; v 1.1 dated 28.08.2018

CM-12611 HOAPS Precepitation Intensity TCDR R2 PRE_HOAPS_DS_R2

Type
Dataset

Input satellite data
CM-SAF Product: CM-12002

Application areas
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°
L3: VERTICAL-n/a

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

Temporal coverage
start: 09.07.1987
end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Percepitation - Daily 6 hourly composite				
ACCURACY	bias	0.6 mm/d	0.30 mm/d	0.15 mm/d
PRECISION	bc-rms	1.0 mm/d	0.5 mm/d	0.25 mm/d
STABILITY	decadal	0.034 mm/d	0.02 mm/d	0.004 mm/d
Percepitation - Monthly Mean				
ACCURACY	bias	0.6 mm/d	0.30 mm/d	0.15 mm/d
PRECISION	bc-rms	1.0 mm/d	0.5 mm/d	0.25 mm/d
STABILITY	decadal	0.034 mm/d	0.02 mm/d	0.004 mm/d

Verification
GPCP

Comment:

SCM-12701
update after RR 2.7, SAF/CM/DWD/RR/2.7; v 1.1 dated 24.02.2014

CM-12613 HOAPS Precipitation Intensity TCDR R3 PRE_R3_HOAPS5_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: 31.12.2020

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	bc-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	bc-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:

Validation might not cover full period. Accuracy is given for global means. Temporal coverage depends on availabitlity of SST. Stability is assessed through analysing anomaly trends against a reference when available.
update after RR 3.4, SAF/CM/DWD/RR/3.4; v 1.1 dated 28.08.2018

CM-12701 HOAPS Vertically Integrated Water Vapour TCDR R2 — HTW_SSMI_global_DS_R2

Type
Dataset

Input satellite data
CM-SAF Product: CM-12002

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

N/A

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: Global, ice free ocean

Spatial resolution

L3: HORIZONTAL-0.5°

L3: VERTICAL-n/a

Temporal resolution

L3: Daily 6 hourly composite

L3: Monthly Mean

Temporal coverage

start: 09.07.1987

end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Vertically Integrated Water Vapour - Daily 6 hourly composite				
ACCURACY	bias	3 kg/m²	1.4 kg/m²	1 kg/m²
PRECISION	bc-rms	5 kg/m²	2 kg/m²	1 kg/m²
Vertically Integrated Water Vapour - Monthly Mean				
ACCURACY	bias	3 kg/m²	1.4 kg/m²	1 kg/m²
PRECISION	bc-rms	5 kg/m²	2 kg/m²	1 kg/m²
STABILITY	decadal	1%	0.5%	0.26%

Verification
other satellite products and reanalyses

Comment:

Verification might not cover full period. Accuracy is given for global means. Temporal coverage depends on availabitlity of SST. Stability is assessed through analysing anomaly trends against a reference when available.
update after RR 2.7, SAF/CM/DWD/RR/2.7; v 1.1 dated 24.02.2014

CM-12703 HOAPS Vertically Integrated Water Vapour TCDR R3 — HTW_R3_HOAPS5_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
National Meteorological and/or Hydrological Services

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: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Vertically Integrated Water Vapour - Hourly 6 hourly composite				
ACCURACY	bias	3 kg/m²	1.4 kg/m²	0.6 kg/m²
PRECISION	bc-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	0.6 kg/m²
PRECISION	bc-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

Merged mircrowave REMSS

Comment:

Validation might not cover full period. Accuracy is given for global means. Temporal coverage depends on availabitlity of SST. Stability is assessed through analysing anomaly trends against a reference when available.
update after RR 3.4, SAF/CM/DWD/RR/3.4; v 1.1 dated 28.08.2018

CM-12801 HOAPS Vertically Integrated Water Vapour TCDR R3 — EVA_HOAPS_DS_R2

Type
Dataset

Input satellite data
CM-SAF Product: CM-12002

Application areas
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°
L3: VERTICAL-n/a

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

Temporal coverage
start: 09.07.1987
end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Evaporation - Daily 6 hourly composite				
ACCURACY	bias	0.7 mm/d	0.36 mm/d	0.09 mm/d
PRECISION	bc-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	bc-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:

as CM-12701
update after RR 2.7, SAF/CM/DWD/RR/2.7; v 1.1 dated 24.02.2014

CM-12803 HOAPS Evaporation TCDR R3 EVA_R3_HOAPS5_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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Evaporation - Hourly 6 hourly composite				
ACCURACY	bias	0.7 mm/d	0.35 mm/d	0.09 mm/d
PRECISION	bc-rms	1.3 mm/d	0.7 mm/d	0.53 mm/d
STABILITY	decadal	0.32 mm/d	0.07 mm/d	0.004 mm/d
Evaporation - Monthly Mean				
ACCURACY	bias	0.7 mm/d	0.35 mm/d	0.09 mm/d
PRECISION	bc-rms	1.3 mm/d	0.7 mm/d	0.53 mm/d
STABILITY	decadal	0.32 mm/d	0.07 mm/d	0.004 mm/d

Verification

NOCS

Comment:

Validation might not cover full period. Accuracy is given for global means. Temporal coverage depends on availabitlity of SST. Stability is assessed through analysing anomaly trends against a reference when available.
update after RR RR 3.4, SAF/CM/DWD/RR/3.4; v 1.1 dated 28.08.2018

CM-12811 HOAPS Latent Heat Fluxes TCDR R2 LHF_HOAPS_DS_R2

Type
Dataset

Input satellite data
CM-SAF Product: CM-12002

Application areas
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°
L3: VERTICAL-n/a

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

Temporal coverage
start: 09.07.1987
end: 31.12.2014

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

Verification
buoy and ship observations

Comment:

as CM-12701
update after RR 2.7, SAF/CM/DWD/RR/2.7; v 1.1 dated 24.02.2014

CM-12813 HOAPS Latent Heat Fluxes TCDR R3 LHF_R3_HOAPS5_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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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: 31.12.2020

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	bc-rms	35 W/m²	20 W/m²	15 W/m²
STABILITY	decadal	9 W/m²	2 W/m²	0.12 W/m²
Latent Heat Fluxes - Monthly Mean				
ACCURACY	bias	20 W/m²	10 W/m²	2.5 W/m²
PRECISION	bc-rms	35 W/m²	20 W/m²	15 W/m²
STABILITY	decadal	9 W/m²	2 W/m²	0.12 W/m²

Verification

NOCS

Comment:

Validation might not cover full period. Accuracy is given for global means. Temporal coverage depends on availabitlity of SST. Stability is assessed through analysing anomaly trends against a reference when available.
update after RR 3.4, SAF/CM/DWD/RR/3.4; v 1.1 dated 28.08.2018

CM-12821 HOAPS Fresh Water Flux TCDR R2 EMP_HOAPS_DS_R2

Type
Dataset

Input satellite data
CM-SAF Product: CM-12002

Application areas
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°
L3: VERTICAL-n/a

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

Temporal coverage
start: 09.07.1987
end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Evaporation-Precipitation - Daily 6 hourly composite				
ACCURACY	bias	1.3 mm/d	0.36 mm/d	0.09 mm/d
PRECISION	bc-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	bc-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:

as CM-12701
update after RR 2.7, SAF/CM/DWD/RR/2.7; v 1.1 dated 24.02.2014

CM-12823 HOAPS Freshwaterflux TCDR R3 EMP_R3_HOAPS5_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: -0.5°

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

Temporal coverage
start: 09.07.1987
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Evaporation-Precipitation - Hourly 6 hourly composite				
ACCURACY	bias	1.3 mm/d	0.35 mm/d	0.09 mm/d
PRECISION	bc-rms	1.6 mm/d	0.7 mm/d	0.25 mm/d
STABILITY	decadal	0.36 mm/d	0.07 mm/d	0.004 mm/d
Evaporation-Precipitation - Monthly Mean				
ACCURACY	bias	1.3 mm/d	0.35 mm/d	0.09 mm/d
PRECISION	bc-rms	1.6 mm/d	0.7 mm/d	0.25 mm/d
STABILITY	decadal	0.36 mm/d	0.07 mm/d	0.004 mm/d

Verification

combination of IFREMER with GPCP

Comment:

Validation might not cover full period. Accuracy is given for global means. Temporal coverage depends on availabitlity of SST. Stability is assessed through analysing anomaly trends against a reference when available.
update after RR 3.4, SAF/CM/DWD/RR/3.4; v 1.1 dated 28.08.2018

CM-12901 HOAPS Near Surface Specific Humidity TCDR R2 NSH_HOAPS_DS_R2

Type
Dataset

Input satellite data
CM-SAF Product: CM-12002

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

N/A

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: Global, ice free ocean

Spatial resolution

L3: HORIZONTAL-0.5°

L3: VERTICAL-n/a

Temporal resolution

L3: Daily 6 hourly composite

L3: Monthly Mean

Temporal coverage

start: 09.07.1987

end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Near Surface Specific Humidity - Monthly Mean				
ACCURACY	bias	1.2 g/kg	0.6 g/kg	0.3 g/kg
PRECISION	bc-rms	2.4 g/kg	1.20 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:
as CM-12701
update after RR 2.7, SAF/CM/DWD/RR/2.7; v 1.1 dated 24.02.2014

CM-12903 **HOAPS Near Surface Specific Humidity TCDR R3** **NSH_R3_HOAPS5_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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Near Surface Specific Humidity - Hourly 6 hourly composite				
ACCURACY	bias	1.2 g/kg	0.6 g/kg	0.3 g/kg
PRECISION	bc-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	bc-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

NOCS

Comment:

Validation might not cover full period. Accuracy is given for global means. Temporal coverage depends on availabitlity of SST. Stability is assessed through analysing anomaly trends against a reference when available.
update after RR 3.4, SAF/CM/DWD/RR/3.4; v 1.1 dated 28.08.2018

CM-12911 HOAPS Near Surface Wind Speed TCDR R2 SWS_HOAPS_DS_R2

Type
Dataset

Input satellite data
CM-SAF Product: CM-12002

Application areas
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°
L3: VERTICAL-n/a

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

Temporal coverage
start: 09.07.1987
end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Near Surface Wind Speed - Monthly Mean				
ACCURACY	bias	1 m/s	0.6 m/s	0.5 m/s
PRECISION	bc-rms	2.8 m/s	2 m/s	0.5 m/s
STABILITY	decadal	0.2 m/s	0.1 m/s	0.04 m/s

Verification
buoy and ship observations

Comment:
as CM-12701
update after RR 2.7, SAF/CM/DWD/RR/2.7; v 1.1 dated 24.02.2014

CM-12913 HOAPS Near Surface Wind Speed TCDR R3 — SWS_R3_HOAPS5_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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Near Surface Wind Speed - Hourly 6 hourly composite				
ACCURACY	bias	1 m/s	0.6 m/s	0.2 m/s
PRECISION	bc-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	0.2 m/s
PRECISION	bc-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

NOCS

Comment:

Validation might not cover full period. Accuracy is given for global means. Temporal coverage depends on availabitlity of SST. Stability is assessed through analysing anomaly trends against a reference when available.
update after RR 3.4, SAF/CM/DWD/RR/3.4; v 1.1 dated 28.08.2018

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
Basis for TCDR products
Climate Modelling and Evaluation
National Meteorological and/or Hydrological Services

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 R2** **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
Climate Impact Analysis
Climate Modelling and Evaluation
Climate Research
Reanalyses for Assimilation

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

Temporal coverage
start: 01.07.1994
end: 31.12.2018

Uncertainty characteristics		Threshold	Target	Optimum
Upper Tropospheric Humidity - Daily Mean				
ACCURACY	bias	5 %	1 %	< 1 %
PRECISION	bc-rms	2 %	1 %	< 1 %
STABILITY	decadal	1 %/dec	0.1 %/dec	< 0.1 %/dec

Verification
Comparison with ERA-5 or equivalent reanalysis

Comment:

Further verification using high-quality in situ data, e.g. GRUAN radiosonde networt, may be used. However, these data are spatially sparse and cannot provide true global validation.
Data will be seperated in 12 hourly interval
Details for Input Satellite Data:
AMSU-B (NOAA-15, -16, -17)
ATMS (S-NPP, NOAA-20)
MHS (MetOp-A, -B)
MHS (NOAA-18, -19)
MWHS-1 (FY-3B)
MWHS-2 (FY-3C)
SSM/T2 (DMSP F11, F12, F14, F15)

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: METEOSAT full disk (includes Europe, Afrika, Atlantic Ocean)

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

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$ /$(0.25°)^2$md

L3: VERTICAL-n/a

L2: HORIZONTAL-$(3\ km)^2$

Temporal resolution
L3: Daily Mean

L2: Instantaneous (none)

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 19.01.2004

end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	bc-rms	20 %	10 %	5 %
STABILITY	decadal	5 %/dec	2 %/dec	0.5 %/dec
Fractional Cloud Cover - Instantaneous (none)				
ACCURACY	KSS	0.5	0.6	0.8
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	bc-rms	20 %	10 %	5 %
STABILITY	decadal	5 %/dec	2 %/dec	0.5 %/dec
Fractional Cloud Cover - Monthly Mean diurnal-cycle				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	bc-rms	20 %	10 %	5 %
STABILITY	decadal	5 %/dec	2 %/dec	0.5 %/dec

Verification

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

Comment:

Bias and bc-rmsd are expressed in absolute units (% CFC)
Additional data layers: L3: CFC for high, middle and low clouds, CFC for daytime and nighttime

CM-21015 SEVIRI Fractional Cloud Cover ICDR R2 continued — CFC_R2_CLAAS_ICDR_CND

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Others: ECMWF

Application areas
Climate Research

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

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

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

Spatial resolution
L3: HORIZONTAL-$(0.05)^2/(0.25)^2$md

L3: VERTICAL-n/a

L2: HORIZONTAL-pixel resolution

Temporal resolution
L2: Daily Mean

L3: Daily Mean

L2: Monthly Mean

L2: Monthly Mean diurnal-cycle

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.2016

end: 31.12.2017

Uncertainty characteristics		Threshold	Target	Optimum
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	20 %	10 %	5 %
STABILITY	decadal	40 %	20 %	10 %
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	20 %	10 %	5 %
STABILITY	decadal	40 %	20 %	10 %
Fractional Cloud Cover - Monthly Mean diurnal-cycle				
ACCURACY	bias	20 %	10 %	5 %
STABILITY	decadal	40 %	20 %	10 %

Verification

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

Comment:

-Extension of CM-21011 (CLAAS 2) untill start of ICDR continuation (CM-5010)

-Stability (uncertainties) is being considered for the whole datarecord.

CM-21023 SEVIRI Joint Cloud histogram TCDR R3 JCH_R3_CLAAS_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Modelling and Evaluation

Climate Research

Dissemination information

Distribution format

L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage

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

Spatial resolution

L3: HORIZONTAL-$(0.25°)^2$

Temporal resolution

L3: Monthly Histogram

Temporal coverage

start: 01.02.2004

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:

The JCH product aggregates information from CTO (CM-21033), cloud optical thickness (in CM-21053 and CM-21063), and CPH (CM-21043). Its accuracy depends on the accuracy of these products.

JCH is restricted to satellite and solar zenith angle < 84°

CM-21025 SEVIRI Joint Cloud Histograms TCDR R2 continued — JCH_R2_CLAAS_TCDR_CND

Type
Dataset

Input satellite data
CM-SAF Product: CM-21031
CM-SAF Product: CM-21041
CM-SAF Product: CM-21051

Application areas
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

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

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

Temporal resolution
L3: Monthly Histogram

Temporal coverage
start: 01.01.2016
end: 31.12.2017

Uncertainty characteristics	Threshold	Target	Optimum
Joint Cloud Histograms - Monthly Histogram			
ACCURACY	n/a	n/a	n/a

Verification

Comment:
-Extension of CM-21021 (CLAAS 2)

- No specific verification as this product is being composed of validated CM SAF products (Cloud Top, Cloud Optical Thickness, and Cloud Phase)
-Stability (uncertainties) is being considered for the whole datarecord.

CM-21033 SEVIRI Cloud Top Level TCDR R3 CTO_R3_CLAAS_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Modelling and Evaluation
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

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

Spatial resolution
L2: HORIZONTAL-(3 km)²
L3: HORIZONTAL-(0.05°)²; (0.25°)²

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

Temporal coverage
start: 19.01.2004
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Height - Daily Mean				
ACCURACY	bias	1600 m	800 m	270 m
PRECISION	bc-rms	3200 m	1600 m	530 m
STABILITY	decadal	530 m/dec	270 m/dec	90 m/dec
Cloud Top Height - Instantaneous (none)				
ACCURACY	bias	1600 m	800 m	270 m
PRECISION	bc-rms	4800 m	2400 m	800 m
Cloud Top Height - Monthly Mean				
ACCURACY	bias	1600 m	800 m	270 m
PRECISION	bc-rms	3200 m	1600 m	530 m
STABILITY	decadal	530 m/dec	270 m/dec	90 m/dec
Cloud Top Height - Monthly Mean diurnal-cycle				
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	90 hPa	45 hPa	15 hPa
PRECISION	bc-rms	180 hPa	90 hPa	30 hPa
STABILITY	decadal	30 hPa/dec	15 hPa/dec	5 hPa/dec
Cloud Top Pressure - Instantaneous (none)				
ACCURACY	bias	90 hPa	45 hPa	15 hPa
PRECISION	bc-rms	270 hPa	135 hPa	45 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias	90 hPa	45 hPa	15 hPa
PRECISION	bc-rms	180 hPa	90 hPa	30 hPa
STABILITY	decadal	30 hPa/dec	15 hPa/dec	5 hPa/dec
Cloud Top Pressure - Monthly Mean diurnal-cycle				

Verification

L3 comparison with MODIS
L2 validation against Calipso/EarthCARE

Comment:

update after RR3.7, SAF/CM/CDOP3/KNMI/RR37, V1.1, dated 30.11.2018
monthly mean diurnal cycle (mmdc) on $(0.25°)^2$ grid
Accuracy requirements are provided only for CTP and CTH.
Addional data layers
L2 and L3: CTO includes cloud top pressure (CTP), cloud top height (CTH) and cloud top temperature (CTT)
L3: logarithmically averaged CTP (in addition to linear average)
L3: CTO for daytime and nighttime, CTO for liquid and ice clouds

CM-21035 SEVIRI Cloud Top Level ICDR R2 continued — CTO_R2_CLAAS_ICDR_CND

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: METEOSAT disk (CM SAF definition)

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

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

L3: VERTICAL-n/a

L2: HORIZONTAL-$(0.05)^2$

Temporal resolution
L2: Daily Mean

L2: Daily Mean

L2: Daily Mean

L3: Daily Mean

L3: Daily Mean

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean

L3: Monthly Mean

Temporal coverage
start: 01.01.2016

end: 31.12.2017

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Top Height - Daily Mean				
ACCURACY	bias	1200 m	800 m	500 m
STABILITY	decadal	3000 m	1500 m	1000 m
Cloud Top Height - Monthly Mean				
ACCURACY	bias	1200 m	800 m	500 m
STABILITY	decadal	3000 m	1500 m	1000 m
Cloud Top Pressure - Daily Mean				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
STABILITY	decadal	120 hPa	70 hPa	50 hPa
Cloud Top Pressure - Monthly Mean				
ACCURACY	bias	90 hPa	45 hPa	30 hPa
STABILITY	decadal	120 hPa	70 hPa	50 hPa
Cloud Top Temperature - Daily Mean				
ACCURACY	bias			
STABILITY	decadal			
Cloud Top Temperature - Monthly Mean				
ACCURACY	bias			
STABILITY	decadal			

Verification

comparisons with MODIS retrievals but CloudSat/CALIPSO/EarthCARE will be considered

Comment:

-Extension of CM-21031 (CLAAS 2) untill start of ICDR continuation (CM-5030)

- Uncertainty of CTT: no specific requirements (represents same information in different units)
- Stability (uncertainties) is being considered for the whole datarecord.

CM-21043 SEVIRI Cloud Phase TCDR R3 CPH_R3_CLAAS_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Modelling and Evaluation
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

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

Spatial resolution
L3: HORIZONTAL-$(0.25°)^2$;$(0.05)^2$
L3: -
L2: HORIZONTAL-$(3\ km)^2$

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

Temporal coverage
start: 19.01.2004
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Phase - Daily Mean				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	bc-rms	20 %	10 %	5 %
STABILITY	decadal	5 %/dec	2 %/dec	0.5 %/dec
Cloud Phase - Instantaneous (none)				
ACCURACY	KSS	0.5	0.6	0.8
Cloud Phase - Monthly Mean				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	bc-rms	20 %	10 %	5 %
STABILITY	decadal	5 %/dec	2 %/dec	0.5 %/dec
Cloud Phase - Monthly Mean diurnal-cycle				
ACCURACY	bias	10 %	5 %	1 %
PRECISION	bc-rms	20 %	10 %	5 %
STABILITY	decadal	5 %/dec	2 %/dec	0.5 %/dec

Verification

L3 comparison with MODIS
L2 validation against Calipso

Comment:

monthly mean diurnal cycle (mmdc) on $(0.25°)^2$ grid
Bias and bc-rmsd are expressed in absolute units (% liquid clouds relative to all clouds)
Additional data layers:
L2 and L3: extended cloud phase with more categories, such as `supercooled?, `opaque_ice?, and `overlap?
L3: CPH for daytime and nighttime

CM-21045 SEVIRI Cloud Phase ICDR R2 continued — CPH_R2_CLAAS_ICDR_CND

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

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

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

Spatial resolution
L3: HORIZONTAL-$(0.05)^2/(0.25)^2$md

L3: VERTICAL-n/a

L2: HORIZONTAL-pixel resolution

Temporal resolution
L3: Daily Mean

L2: Instantaneous (none)

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.2016

end: 31.12.2017

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Phase - Daily Mean				
ACCURACY	bias	0.2	0.1	0.05
PRECISION	bc-rms	0.4	0.2	0.1
Cloud Phase - Instantaneous (none)				
ACCURACY	bias	0.2	0.1	0.05
PRECISION	bc-rms	0.4	0.2	0.1
Cloud Phase - Monthly Mean				
ACCURACY	bias	0.2	0.1	0.05
PRECISION	bc-rms	0.4	0.2	0.1
Cloud Phase - Monthly Mean diurnal-cycle				
ACCURACY	bias	0.2	0.1	0.05
PRECISION	bc-rms	0.4	0.2	0.1

Verification

comparison with MODIS;
comparison with Cloudsat/Calipso

Comment:

-Extension of CM-21041 (CLAAS 2)

-Stability (uncertainties) is being considered for the whole datarecord.

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

National Meteorological and/or Hydrological Services

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

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

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

Spatial resolution
L2: HORIZONTAL-(3 km)²

L3: HORIZONTAL-(0.05°)²; (0.25°)²

Temporal resolution
L3: Daily Mean

L2: Instantaneous (none)

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 19.01.2004

end: 31.12.2020

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
STABILITY	decadal	6 g/m² dec	3 g/m² dec	1 g/m² dec
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	bc-rms	40 g/m²	20 g/m²	10 g/m²
STABILITY	decadal	6 g/m² dec	3 g/m² dec	1 g/m² dec
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
STABILITY	decadal	6 g/m² dec	3 g/m² dec	1 g/m² dec

Verification

L2: validation against passive microwave LWP (e.g. AMSR-E)
L3: comparison with passive microwave data records, comparison with MODIS

Comment:

monthly mean diurnal cycle (mmdc) on (0.25°)² grid
LWP is restricted to satellite and solar zenith angle < 84°

Addtional data layer:
L2 and L3: cloud optical thickness (COT) and , particle effective radius from wavelengths 1.6 and 3.9 ?m (CRE), and cloud droplet number concentration (CDNC)
L2 and L3: scene heterogeneity (H?)
L3: logarithmically averaged COT (in addition to linear average)
L3: LWP averaged over all sky (in addition to cloudy sky average)

CM-21055 SEVIRI Liquid Water Path ICDR R2 continued — LWP_R2_CLAAS_ICDR_CND

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

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

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

Spatial resolution
L3: HORIZONTAL-$(0.05)^2/(0.25)^2$md

L3: VERTICAL-n/a

L2: HORIZONTAL-Pixel resolution

Temporal resolution
L3: Daily Mean

L2: Instantaneous (none)

L3: Monthly Histogram

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.2016

end: 31.12.2017

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 - 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

comparison with satellite-based MWR retrieved LWP over ocean (e.g. LWP_HOAPS);
comparison with MODIS

Comment:

-Extension of CM-21051 (CLAAS 2)

- Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius)
-Stability (uncertainties) is being considered for the whole datarecord.

CM-21063 SEVIRI Ice Water Path TCDR R3 IWP_R3_CLAAS_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Modelling and Evaluation
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

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

Spatial resolution
L2: HORIZONTAL-(3 km)²
L3: HORIZONTAL-(0.05°)²; (0.25°)²

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

Temporal coverage
start: 19.01.2004
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
STABILITY	decadal	12 g/m² dec	6 g/m² dec	2 g/m² dec
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
STABILITY	decadal	12 g/m² dec	6 g/m² dec	2 g/m² dec
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
STABILITY	decadal	12 g/m² dec	6 g/m² dec	2 g/m² dec

Verification

L2: validation against DARDAR (Cloudsat/CALIPSO)
L3: comparison with MODIS

Comment:

monthly mean diurnal cycle (mmdc) on (0.25°)² grid
IWP is restricted to satellite and solar zenith angle < 84°

Additional data layers:
L2 and L3: cloud optical thickness (COT) and particle effective radius from wavelengths 1.6 and 3.9 ?m (CRE)
L2: scene heterogeneity (H?)
L3: logarithmically averaged COT (in addition to linear average)
L3: IWP averaged over all sky (in addition to cloudy sky average)

CM-21065 SEVIRI Ice Water Path ICDR R2 continued — IWP_R2_CLAAS_ICDR_CND

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Others: ECMWF

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Public Sector and Government Agencies

Dissemination information

Distribution format

L2:NetCDF4

L3:NetCDF4

Generation frequency

n/a

Generation timeliness

Spatio-temporal information

Spatial coverage

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

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

Spatial resolution

L3: HORIZONTAL-$(0.05)^2/(0.25)^2$md

L3: VERTICAL-n/a

L2: HORIZONTAL-pixel resolution

Temporal resolution

L3: Daily Mean

L2: Instantaneous (none)

L3: Monthly Histogram

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage

start: 01.01.2016

end: 31.12.2017

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	20 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

comparison with CloudSat;
comparison with MODIS

Comment:

-Extension of CM-21061 (CLAAS 2)

- Contains as additional layers: COT (cloud optical thickness) and REFF (particle effective radius)
- Stability (uncertainties) is being considered for the whole datarecord.

CM-21101 SEVIRI Aerosol Optical Depth ICDR AOD_SEVIRI_DS_R1

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Aviation Sector
Climate Research
National Meteorological and/or Hydrological Services
Private Sector
Public Sector and Government Agencies

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

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

Spatial resolution
L3: HORIZONTAL-(9 km)²
L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.2004
end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Aerosol Optical Depth - Daily Mean				
ACCURACY	bias	0.5	0.2	0.1
Aerosol Optical Depth - Monthly Mean				
ACCURACY	bias	0.2	0.1	0.05

Verification
comparison with AERONET and future LIDAR network;
intercomparison with MODIS;
accuracy is estimated at 1°x1° resolution;

Comment:

Ocean and land clear sky
only daytime and no sun glint
daily and monthly means (internal at 15' repeat cycle)
SEVIRI pixel resolution / averaging in 3x3 pixels boxes
Heritage_algorithms: Ocean: CDOP-1
Land: MPEF
chkpt meeting summer 2015; CDOP2_SG5_D5 (23.07.2014;MW)

CM-21301 TOA Reflected solar Radiative Flux TRS_merged_DS_R2

Type
Dataset

Input satellite data
Operational Satellite: GERB
Operational Satellite: GERB-L2 TOA Fluxes
Operational Satellite: SEVIRI

Application areas
Climate Research
National Meteorological and/or Hydrological Services

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

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

Spatial resolution
L3: HORIZONTAL-(9 km) ²
L3: VERTICAL-n/a

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

Temporal coverage
start: 01.01.2004
end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Reflected solar Radiative Flux - Daily Mean				
ACCURACY	bias	16 W/m²	8 W/m²	4 W/m²
STABILITY	decadal	N/A	< 2 W/m²	< 1 W/m²
Reflected solar Radiative Flux - Monthly Mean				
ACCURACY	bias	8 W/m²	4 W/m²	2 W/m²
STABILITY	decadal	N/A	< 2 W/m²	< 1 W/m²
Reflected solar Radiative Flux - Monthly Mean diurnal-cycle				
ACCURACY	bias	16 W/m²	8 W/m²	4 W/m²
STABILITY	decadal	N/A	< 2 W/m²	< 1 W/m²

Verification

GERB CERES intercomparison accuracy is estimated at 1°x1° resolution

Comment:

updated according to RR 2.5

CM-21321 TOA Reflected Solar Clear-Sky Radiative Flux TRS_CS_merged_DS_R2

Type
Dataset

Input satellite data
Operational Satellite: GERB
Operational Satellite: GERB-L2 TOA Fluxes
Operational Satellite: SEVIRI

Application areas
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

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

Spatial resolution
L3: HORIZONTAL-(9 km) ²
L3: VERTICAL-n/a

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

Temporal coverage
start: 01.01.2004
end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Reflected solar Radiative Flux - Daily Mean				
ACCURACY	decadal	N/A	< 2 W/m²	< 0.3 W/m²
ACCURACY	bias	16 W/m²	8 W/m²	4 W/m²
Reflected solar Radiative Flux - Monthly Mean				
ACCURACY	decadal	N/A	< 2 W/m²	< 0.3 W/m²
ACCURACY	bias	8 W/m²	4 W/m²	2 W/m²
Reflected solar Radiative Flux - Monthly Mean diurnal-cycle				
ACCURACY	decadal	N/A	< 2 W/m²	< 0.3 W/m²
ACCURACY	bias	16 W/m²	8 W/m²	4 W/m²

Verification

comparison with CERES accuracy is estimated at 1°x1° resolution;

Comment:

CM-21331 TOA Emitted Thermal Radiative Flux TET_merged_DS_R2

Type
Dataset

Input satellite data
Operational Satellite: GERB-L2 TOA Fluxes

Operational Satellite: SEVIRI

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

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

Spatial resolution
L3: HORIZONTAL-(9 km) [2]

L3: VERTICAL-n/a

Temporal resolution
L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage
start: 01.01.2004

end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Emitted Thermal Radiative Flux at the top of atmosphere - Daily Mean				
ACCURACY	bias	8 W/m²	4 W/m²	2 W/m²
STABILITY	decadal	< 4 W/m²	<2 W/m²	< 1 W/m²
Emitted Thermal Radiative Flux at the top of atmosphere - Monthly Mean				
ACCURACY	bias	4 W/m²	2 W/m²	1 W/m²
STABILITY	decadal	< 4 W/m²	< 2 W/m²	< 1 W/m²
Emitted Thermal Radiative Flux at the top of atmosphere - Monthly Mean diurnal-cycle				
ACCURACY	bias	8 W/m²	4 W/m²	2 W/m²
STABILITY	decadal	< 4 W/m²	< 2 W/m²	< 1 W/m²

Verification

GERB CERES intercomparison
accuracy is estimated at 1°x1° resolution

Comment:

CM-21351 TOA Emitted Thermal Clear-Sky Radiative Flux TET_CS_GERB-SEVIRI_disk_DS_R1

Type
Dataset

Input satellite data
Operational Satellite: GERB

Operational Satellite: GERB-L2 TOA Fluxes

Operational Satellite: SEVIRI

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

N/A

Generation timeliness

Spatio-temporal information

Spatial coverage

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

Spatial resolution

L3: HORIZONTAL-(9 km) ²

L3: VERTICAL-n/a

Temporal resolution

L3: Daily Mean

L3: Monthly Mean

L3: Monthly Mean diurnal-cycle

Temporal coverage

start: 01.01.2004

end: 31.12.2014

Uncertainty characteristics		Threshold	Target	Optimum
Emitted Thermal Radiative Flux at the top of atmosphere - Daily Mean				
ACCURACY	bias	8 W/m²	4 W/m²	2 W/m²
STABILITY	decadal	N/A	2 W/m²	0.3 W/m²
Emitted Thermal Radiative Flux at the top of atmosphere - Monthly Mean				
ACCURACY	bias	4 W/m²	2 W/m²	1 W/m²
STABILITY	decadal	N/A	2 W/m²	0.3 W/m²
Emitted Thermal Radiative Flux at the top of atmosphere - Monthly Mean diurnal-cycle				
ACCURACY	bias	8 W/m²	4 W/m²	2 W/m²
STABILITY	decadal	N/A	2 W/m²	0.3 W/m²

Verification

comparison with CERES;

Comment:

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

National Meteorological and/or Hydrological Services

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: METEOSAT 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

National Meteorological and/or Hydrological Services

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

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

Spatial resolution
L3: -

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
Fractional Cloud Cover - Daily Mean				
ACCURACY	bias	0.05	0.03	0.01
PRECISION	bc-rms	0.25	0.3	0.15
STABILITY	decadal	0.03	0.02	0.003
Fractional Cloud Cover - Hourly Mean				
ACCURACY	bias	0.05	0.03	0.01
PRECISION	bc-rms	0.35		0.25
STABILITY	decadal	0.03	0.02	0.003
Fractional Cloud Cover - Monthly Mean				
ACCURACY	bias	0.05	0.03	0.01
PRECISION	bc-rms	0.15	0.1	0.05
STABILITY	decadal	0.03	0.02	0.003
Fractional Cloud Cover - Monthly Mean diurnal-cycle				
ACCURACY	bias	0.05	0.03	0.01
PRECISION	bc-rms	0.15	0.1	0.05
STABILITY	decadal	0.03	0.02	0.003

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: METEOSAT 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	0.08
STABILITY	decadal	0.08	0.06	0.03
Cloud Albedo - Instantaneous Frequency				
ACCURACY	MAB	0.15	0.1	0.08
STABILITY	decadal	0.08	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: METEOSAT full disk (includes Europe, Afrika, Atlantic Ocean)

L3: METEOSAT 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	20 %	10 %	8 %
STABILITY	decadal	8 %	6 %	3 %
Cloud Albedo - Instantaneous (none)				
ACCURACY	bias	30 %	15 %	10 %
STABILITY	decadal	8 %	6 %	3 %
Cloud Albedo - Monthly Mean				
ACCURACY	bias	10 %	8 %	5 %
STABILITY	decadal	8 %	6 %	3 %

Verification

accuracy estimated based on derived SIS accuracy

Comment:

CM-23085 Meteosat Cloud Albedo TCDR R2 continued — CAL_R2_SARAH_TCDR_CND

Type
Dataset

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
n/a

Generation timeliness

Spatio-temporal information

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

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

Temporal resolution
L2: 30 min (none)
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.2016
end: 31.12.2017

Uncertainty characteristics		Threshold	Target	Optimum
Cloud Albedo - 30 min (none)				
ACCURACY	MAB	0.15	0.1	0.08
STABILITY	decadal	0.08	0.06	0.03
Cloud Albedo - Daily Mean				
ACCURACY	MAB	0.15	0.1	0.08
STABILITY	decadal	0.08	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:

-Extension of CM-23082 (SARAH 2)

-Stability (uncertainties) is being considered for the whole datarecord.

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: METEOSAT 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
L2:NetCDF4
L3:NetCDF4

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: METEOSAT 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	12 W/m²	11 W/m²	10 W/m²
STABILITY	decadal	1 W/m²	0.5 W/m²	0.3 W/m²
Surface Incoming Shortwave Radiation - Instantaneous (none)				
ACCURACY	MAB	20 W/m²	15 W/m²	12 W/m²
STABILITY	decadal	1 W/m²	0.5 W/m²	0.3 W/m²
Surface Incoming Shortwave Radiation - Monthly Mean				
ACCURACY	MAB	5 W/m²	4 W/m²	3 W/m²
STABILITY	decadal	1 W/m²	0.5 W/m²	0.3 W/m²

Verification

comparison with BSRN ground measurments

Comment:

CM-23205 Meteosat Solar Surface Radiation TCDR R2 continued — SIS_R2_SARAH_TCDR_CND

Type
Dataset

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
n/a

Generation timeliness

Spatio-temporal information

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

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

Temporal resolution
L2: 30 min (none)
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start: 01.01.2016
end: 31.12.2017

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - 30 min (none)				
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 - 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 - 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:

-Extension of CM-23202 (SARAH 2)

-Stability (uncertainties) is being considered for the whole datarecord.

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: METEOSAT 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.

CM-23245 Meteosat Spectral Resolved Irradiance TCDR R2 continued — SRI_R2_SARAH_TCDR_CND

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Change Analysis

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: METEOSAT 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: 01.01.2016
end: 31.12.2017

Uncertainty characteristics		Threshold	Target	Optimum
Spectral Resolved Irradiance - Monthly Mean				
ACCURACY	bias	15 W/m²	10 W/m²	8 W/m²

Verification
comparison with ground based data as far as available;

Comment:
-Extension of CM-23241 (SARAH 2)

-Accuracy weighted with the relative contribution to the broadband spectra.
-Stability (uncertainties) is being considered for the whole datarecord.

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
L2:NetCDF-CF
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: METEOSAT full disk (includes Europe, Afrika, Atlantic Ocean)
L3: METEOSAT 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
Daylight - Daily Mean				
ACCURACY	MAB	5 W/m²	4 W/m²	3 W/m²
STABILITY	decadal	1 W/m²	0.5 W/m²	0.3 W/m²
Daylight - Instantaneous (none)				
ACCURACY	MAB	10 W/m²	8 W/m²	5 W/m²
STABILITY	decadal	1 W/m²	0.5 W/m²	0.3 W/m²
Daylight - Monthly Mean				
ACCURACY	MAB	2 W/m²	1.5 W/m²	1 W/m²
STABILITY	decadal	1 W/m²	0.5 W/m²	0.3 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
Climate Modelling and Evaluation

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

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

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	30 W/m²	25 W/m²	5 W/m²
Surface Radiation Budget - Hourly Mean				
ACCURACY	MAB	45 W/m²	35 W/m²	1 W/m²
Surface Radiation Budget - Monthly Mean				
ACCURACY	MAB	20 W/m²	15 W/m²	4 W/m²
STABILITY	decadal	2 W/m²	1 W/m²	0.2 W/m²
Surface Radiation Budget - Monthly Mean diurnal-cycle				
ACCURACY	MAB	20 W/m²	15 W/m²	4 W/m²
STABILITY	decadal	2 W/m²	1 W/m²	0.2 W/m²

Verification

comparison with BSRN and FLUXNET

Comment:

The defined stability refers to the WMO normal period 1991-2020.

CM-23273 Meteosat Photosynthetic Active Radiation TCDR R1 — PAR_R1_SARAH_3_TCDR

Type
Dataset

Input satellite data
Operational Satellite: MVIRI

Operational Satellite: SEVIRI

Application areas
Cimate Monitoring

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

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

L3: METEOSAT 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
Photosynthetic Active Radiation - Daily Mean				
ACCURACY	MAB	20 W/m²	15 W/m²	10 W/m²
STABILITY	decadal	1 W/m²	0.5 W/m²	0.3 W/m²
Photosynthetic Active Radiation - Instantaneous (none)				
ACCURACY	MAB	30 W/m²	20 W/m²	15 W/m²
STABILITY	decadal	1 W/m²	0.5 W/m²	0.3 W/m²
Photosynthetic Active Radiation - Monthly Mean				
ACCURACY	MAB	10 W/m²	8 W/m²	5 W/m²
STABILITY	decadal	1 W/m²	0.5 W/m²	0.3 W/m²

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
Cimate Monitoring

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

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

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

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	1.5 h	1 h	0.75 h
STABILITY	decadal	10 %	5 %	1 %
Sunshine duration - Monthly Sum				
ACCURACY	MAB	20 h	15 h	10 h
STABILITY	decadal	10 %	5 %	1 %

Verification
comparison with available ground measurements

Comment:

CM-23285 Meteosat Sunshine Duration TCDR R2 continued — SDU_R2_SARAH_TCDR_CND

Type
Dataset

Input satellite data
Operational Satellite: SEVIRI

Application areas
Cimate Monitoring

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency
n/a

Generation timeliness

Spatio-temporal information

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

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

Temporal resolution
L3: Daily Sum
L3: Monthly Sum

Temporal coverage
start: 01.01.2016
end: 31.12.2017

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	0.5	0.3

Verification
comparison with available ground measurements

Comment:
-Extension of CM-23283 (SARAH 2) until start of IDCR continuation (CM-5280)

-Stability (uncertainties) is being considered for the whole datarecord.

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: METEOSAT full disk (includes Europe, Afrika, Atlantic Ocean)

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

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

Temporal resolution
L3: Daily Mean
L3: Daily Mean
L2: Instantaneous (none)
L2: Instantaneous (none)
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 - Daily Mean				
ACCURACY	MAB	18 W/m²	15 W/m²	12 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Irradiance at Surface - Instantaneous (none)				
ACCURACY	MAB	40 W/m²	30 W/m²	20 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Irradiance at Surface - Monthly Mean				
ACCURACY	MAB	8 W/m²	7 W/m²	5 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Normalised Irradiance - Daily Mean				
ACCURACY	MAB	34 W/m²	30 W/m²	25 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Normalised Irradiance - Instantaneous (none)				
ACCURACY	MAB	50 W/m²	40 W/m²	30 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²
Direct Normalised Irradiance - Monthly Mean				
ACCURACY	MAB	17 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-23295 Meteosat Surface Direct Irradiance TCDR R2 continued — SDI_R2_SARAH_TCDR_CND

Type
Dataset

Input satellite data
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
n/a

Generation timeliness

Spatio-temporal information

Spatial coverage
L2: METEOSAT full disk (includes Europe, Afrika, Atlantic Ocean)
L3: METEOSAT 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: 01.01.2016
end: 31.12.2017

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	15 W/m²	10 W/m²	8 W/m²
STABILITY	decadal	5 W/m²	3 W/m²	2 W/m²

Verification

comparison with BSRN ground measurements

Comment:

-Extension of CM-23291 (SARAH 2) until start of IDCR continuation (CM-5230)

-Stability (uncertainties) is being considered for the whole datarecord.

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

National Meteorological and/or Hydrological Services

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: METEOSAT disk (45S-45N, 55W-55E)

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

Temporal resolution
L3: Hourly Sample

L3: Monthly Mean

Temporal coverage
start: 01.01.1983

end: 31.12.2020

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

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

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

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

Temporal resolution
L3: Daily Mean
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 Heat Fluxes - Daily Mean				
ACCURACY	bias	<(0.4xLE_obs +20)	<(0.2xLE_obs +10)	<(0.1xLE_obs) W/m²
PRECISION	bc-rms	<(0.4xLE_obs +30)	<(0.2xLE_obs +15)	<(0.1xLE_obs) W/m²
Latent Heat Fluxes - Hourly Mean				
ACCURACY	bias	60 W/m²	30 W/m²	2 W/m²
PRECISION	bc-rms	tbd	tbd	tbd
Latent Heat Fluxes - Monthly Mean				
ACCURACY	bias	40 W/m²	20 W/m²	1 W/m²
PRECISION	bc-rms	tbd	tbd	tbd
STABILITY	decadal	6 W/m²	2 W/m²	0.3 W/m²
Latent Heat Fluxes - Monthly Mean diurnal-cycle				
ACCURACY	bias	60 W/m²	30 W/m²	2 W/m²
PRECISION	bc-rms	tbd	tbd	tbd

Verification

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

Comment:

Uncertanty characterisation is defined in relation to observation:
LE_obs: observation of latent heat flux
H_obs: observation of sensible heat flux

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: METEOSAT 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	bc-rms	4.0 K	2.5 K	1.0 K
STABILITY	decadal	2.5 K	2.0 K	1.0 K
Land Surface Temperature - Hourly Mean				
ACCURACY	bias	2.5 K	1.5 K	0.5 K
PRECISION	bc-rms	4.0 K	2.5 K	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	bc-rms	4.0 K	2.5 K	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_R2_METLAND_TCDR**

Type
Dataset

Input satellite data
CM-SAF Product: CM-23012
Operational Satellite: MVIRI
Operational Satellite: SEVIRI
Others: Reanalysis

Application areas
COSMO-CLIM
DWD
ECHAM
ECHAM
ETH Zurich Switzerland (Institute for atmospheric and climate science)
MeteoSwiss
MPI
The Mountain Research Group (Pepin et al. 2015)

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

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

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

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

Temporal coverage
start: 01.01.1983
end: 31.12.2020

Uncertainty characteristics		Threshold	Target	Optimum
Land Surface Temperature - Hourly Sample				
ACCURACY	bias	1.5 K	1 K	0.5 K
PRECISION	bc-rms	2.5 K	1.5 K	1 K
STABILITY	decadal	1 K	0.3 K	0.1 K
Land Surface Temperature - Monthly Mean diurnal-cycle				
ACCURACY	bias	1.5 K	1 K	0.5 K
PRECISION	bc-rms	1.5 K	1 K	0.5 K
STABILITY	decadal	1 K	0.3 K	0.1 K

Verification

comparison with LSA SAF validation stations

Comment:

The uncertainty characteristics refer to clear sky LST.
The defined stability refers to the period 1991 to 2020.

CM-23931 Meteosat Physical Land Surface Temperature TCDR — LST_PHYS_MVIRI_SEVIRI_DS_R1

Type
Dataset

Input satellite data
Operational Satellite: MVIRI

Operational Satellite: SEVIRI

Application areas
COSMO-CLIM

DWD

ECHAM

ECHAM

ETH Zurich Switzerland (Institute for atmospheric and climate science)

MeteoSwiss

MPI

The Mountain Research Group (Pepin et al. 2015)

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: METEOSAT 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	1.8 K	1.3 K	0.5 K
PRECISION	bc-rms	3.5 K	2.0 K	1.0 K
STABILITY	decadal	1.5 K	0.8 K	0.2 K
Land Surface Temperature - Hourly Mean				
ACCURACY	bias	1.8 K	1.3 K	0.5 K
PRECISION	bc-rms	3.5 K	2.0 K	1.0 K
STABILITY	decadal	1.5 K	0.8 K	0.2 K
Land Surface Temperature - Monthly Mean diurnal-cycle				
ACCURACY	bias	1.8 K	1.3 K	0.5 K
PRECISION	bc-rms	3.5 K	2.0 K	1.0 K
STABILITY	decadal	1.5 K	0.8 K	0.2 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
* Climate Research
Climate Modelling and Evaluation
Drought risk assessment

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	bc-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	bc-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-45 Liquid Water Path LWP_HOAPS

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
National Meteorological and/or Hydrological Services
Private Sector
Public Sector and Government Agencies

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global, ice free ocean

Spatial resolution
L3: HORIZONTAL-0.5°

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

Temporal coverage
start: 01.01.1987
end: 31.12.2008

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

Verification

MAC-LWP

Comment:

Validation might not cover full period. Accuracy is given for global means. Temporal coverage depends on availabitlity of SST. Stability is assessed through analysing anomaly trends against a reference when available.
update after RR 2.7, SAF/CM/DWD/RR/2.7; v 1.1 dated 24.02.2014

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
National Meteorological and/or Hydrological Services

Dissemination information

Distribution format

L3:NetCDF-CF

Generation frequency

1 day; 1 month

Generation timeliness

5 days

Spatio-temporal information

Spatial coverage

L3: METEOSAT 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).
Dissemination EUMETCast

CM-5011 SEVIRI Fractional Cloud Cover ICDR CFC_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas
Cimate Monitoring

Climate Modelling and Evaluation

Climate Research

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

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

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

Spatial resolution
L3: HORIZONTAL-$(0.05°)^2$; $(0.25°)^2$

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 Modelling and Evaluation
Climate Research

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: METEOSAT 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
National Meteorological and/or Hydrological Services

Dissemination information

Distribution format
L3:NetCDF-CF

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: METEOSAT 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 Height - Daily Mean				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Height - Monthly Mean				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Height - 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
Cimate Monitoring

Climate Modelling and Evaluation

Climate Research

Dissemination information

Distribution format
L2:NetCDF4

L3:NetCDF4

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

Spatial coverage
L3: METEOSAT 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 Height - Daily Mean				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Height - Instantaneous (none)				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	4000 m	2500 m	2000 m
Cloud Top Height - Monthly Mean				
ACCURACY	bias	1200 m	800 m	500 m
PRECISION	bc-rms	3000 m	1500 m	1000 m
Cloud Top Height - 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
Cimate Monitoring

Climate Modelling and Evaluation

Climate Research

National Meteorological and/or Hydrological Services

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	bc-rms	40%	20%	10%
Cloud Phase - Instantaneous (none)				
ACCURACY	POD (liquid)	>70%	>80%	5%
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
Cimate Monitoring

Climate Modelling and Evaluation

Climate Research

National Meteorological and/or Hydrological Services

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	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	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	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:

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
Cimate Monitoring

Climate Modelling and Evaluation

Climate Research

National Meteorological and/or Hydrological Services

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
National Meteorological and/or Hydrological Services
Private Sector
Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF4
L3:NetCDF-CF

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

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

Spatial resolution
L3: HORIZONTAL-(0.05°) ²
L3: VERTICAL-n/a
L2: HORIZONTAL-(0.05)²

Temporal resolution
L2: 30 min (none)
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start:
end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - 30 min (none)				
ACCURACY	MAB	50 W/m²	30 W/m²	20 W/m²
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).
Dissemination EUMETCast

CM-5211 SEVIRI Surface Incoming Shortwave Radiation ICDR SIS_SEVIRI_ICDR

Type
Product

Input satellite data
Operational Satellite: SEVIRI

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Private Sector

Public Sector and Government Agencies

Dissemination information

Distribution format

L3:NetCDF4

Generation frequency

Generation timeliness

Spatio-temporal information

Spatial coverage

L3: METEOSAT 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				
ACCURACY	MAB	15 W/m²	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
National Meteorological and/or Hydrological Services

Private Sector

Public Sector and Government Agencies

Dissemination information

Distribution format
L2:NetCDF-CF

L3:NetCDF-CF

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

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

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

Spatial resolution
L3: HORIZONTAL-(0.05°) ²

L3: VERTICAL-n/a

L2: 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:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Direct Irradiance at Surface - 30 min (none)				
ACCURACY	MAB	80 W/m²	60 W/m²	40 W/m²
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 - 30 min (none)				
ACCURACY	MAB	100 W/m²	80 W/m²	60 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 SEVIRI 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: METEOSAT 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 SEVIRI Photosynthetic Active Radiation ICDR PAR_R1_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: METEOSAT 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-5280 Meteosat Sunshine Duration ICDR R1 SDU_R1_SARAH_2_ICDR

Type
Product

Input satellite data
CM-SAF Product: CM-5210

Operational Satellite: SEVIRI

Application areas
Cimate Monitoring

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

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

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

L3: VERTICAL-n/a

Temporal resolution
L3: Daily Sum

L3: Monthly Sum

Temporal coverage
start:

end:

Uncertainty characteristics		Threshold	Target	Optimum
Surface Incoming Shortwave Radiation - Daily Sum				
ACCURACY	MAB	30 h	20 h	10 h
Surface Incoming Shortwave Radiation - Monthly Sum				
ACCURACY	MAB	2.0 h	1.5 h	1.0 h

Verification
comparison with available ground measurements

Comment:
Dissemination EUMETCast

CM-5281 SEVIRI Sunshine Duration ICDR SDU_R1_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: METEOSAT 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
National Meteorological and/or Hydrological Services
Private Sector
Public Sector and Government Agencies

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency
1 day; 1 month

Generation timeliness
5 days

Spatio-temporal information

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

Spatial resolution
L3: HORIZONTAL-(0.05°) [2]

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-6010 AVHRR GAC Fractional Cloud Cover ICDR R1 — CFC_R2_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Others: NWP

Application areas
National Meteorological and/or Hydrological Services

Private Sector

Public Sector and Government Agencies

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
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 EASE grid (25 km)
This product provides the ICDR based on the CLARA-A2 CFC data record (CM-11011).

CM-6011 AVHRR GAC Fractional Cloud Cover ICDR R2 — CFC_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Others: NWP

Application areas
National Meteorological and/or Hydrological Services

Private Sector

Public Sector and Government Agencies

Dissemination information

Distribution format

L2:NetCDF-CF

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
comparison with Cloudsat/Calipso
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 ICDR R1 CTO_R2_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Others: NWP

Application areas
National Meteorological and/or Hydrological Services

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 Height - 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 Height - 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 R2 CTO_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Others: NWP

Application areas
National Meteorological and/or Hydrological Services

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 Height - 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 Height - 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 ICDR R1 CPH_R2_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Public Sector and Government Agencies

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	bc-rms	0.2	0.1	0.05
Cloud Phase - Monthly Mean				
ACCURACY	bias	0.1	0.05	0.03
PRECISION	bc-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 ICDR R2 CPH_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Climate Research
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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	bc-rms	0.4	0.2	0.1
Cloud Phase - Monthly Mean				
ACCURACY	bias	0.2	0.1	0.01
PRECISION	bc-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 ICDR R1 **LWP_R2_AVHRR_GAC_ICDR**

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Public Sector and Government Agencies

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	bc-rms	50%	25%	10%
Liquid Water Path - Monthly Mean				
ACCURACY	bias	25%	10%	5%
PRECISION	bc-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 R2 LWP_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
Climate Research

National Meteorological and/or Hydrological Services

Public Sector and Government Agencies

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 ICDR R1 IWP_R2_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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-$(0.25)^2$
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	bc-rms	70%	50%	25%
Ice Water Path - Monthly Mean				
ACCURACY	bias	40%	25%	10%
PRECISION	bc-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 R2 IWP_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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 data record (CM-11062).

CM-6210 AVHRR GAC Surface Incoming Shortwave Radiation ICDR R1 SIS_R2_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
National Meteorological and/or Hydrological Services
Private Sector
Public Sector and Government Agencies

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	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:
This product supersedes 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 R2 SIS_R3_AVHRR_GAC_ICDR

Type
Product

Input satellite data
Operational Satellite: AVHRR GAC

Application areas
National Meteorological and/or Hydrological Services
Private Sector
Public Sector and Government Agencies

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	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:
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 ICDR R1 SAL_R2_AVHRR_GAC_ICDR

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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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 % rel.	25 % rel.	5 % rel. or 0.005 abs.
Surface Albedo - Pentad Mean				
ACCURACY	bias	50 % rel.	25 % rel.	5 % rel. or 0.005 abs.

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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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 % rel.	25 % rel.	5 % rel. or 0.005 abs.
STABILITY	decadal	20% rel.	15 % rel.	2 % rel.
Surface Albedo - Pentad Mean				
ACCURACY	bias	50 % rel.	25 % rel.	5 % rel. or 0.005 abs.
STABILITY	decadal	20 % rel.	15 % rel.	2 % rel.

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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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 % rel.	25 % rel.	5 % rel. or 0.005 abs.
STABILITY	decadal	20 % rel.	15 % rel.	2 % rel.
Surface Albedo - Pentad Mean				
ACCURACY	bias	50 % rel.	25 % rel.	5 % rel. or 0.005 abs.
STABILITY	decadal	20 % rel.	15 % rel.	2 % rel.

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
National Meteorological and/or Hydrological Services
Public Sector and Government Agencies

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 % rel.	25 % rel.	5 % rel. or 0.005 abs.
STABILITY	decadal	20 %	15 %	2 %
Surface Albedo - Pentad Mean				
ACCURACY	bias	50 % rel.	25 % rel.	5 % rel. or 0.005 abs.
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
Cimate Monitoring

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
Outgoing Longwave Radiation - Daily Mean				
ACCURACY	bias	50 %	25 %	5 % rel. or 0.005 abs.
STABILITY	decadal	20 %	15 %	
STABILITY	bias			2 %
Outgoing Longwave Radiation - Monthly Mean				
ACCURACY	bias	50 %	25 %	5 % rel. or 0.005 abs.
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 OLR 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
Cimate Monitoring

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
Reflected Shortwave Flux - Daily Mean				
ACCURACY	bias	50 %	25 %	5 % rel. or 0.005 abs.
STABILITY	decadal	20 %	15 %	2 %
Reflected Shortwave Flux - Monthly Mean				
ACCURACY	bias	50 %	25 %	5 % rel. or 0.005 abs.
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).

CM-15701 MW and NIR Based Vertically Integrated Water Vapour TCDR R1 HTW_R1_COMBI1_TCDR

Type
Product

Input satellite data
Operational Satellite: AMSR-E
Operational Satellite: SSM/I
Operational Satellite: SSMIS
Operational Satellite: SST from AVHRR
Operational Satellite: TMI
Others: MERIS
Others: MODIS
Others: OLCI

Application areas
Climate Change Analysis
Climate Impact Analysis
Climate Research
National Meteorological and/or Hydrological Services

Dissemination information

Distribution format
L3:NetCDF4

Generation frequency
N/A

Generation timeliness

Spatio-temporal information

Spatial coverage
L3: Global

Spatial resolution
L3: -0.05° (MW oversampled, 0.5° (NIR averaged)

Temporal resolution
L3: Daily Mean
L3: Monthly Mean

Temporal coverage
start: 01.07.2002
end: 31.12.2017

Uncertainty characteristics		Threshold	Target	Optimum
Vertically Integrated Water Vapour - Daily Mean				
ACCURACY	bias	3 kg/m²	1 kg/m²	0.3 kg/m²
PRECISION	rms	5 kg/m²	3 kg/m²	0.3 kg/m²
STABILITY	decadal	0.7 kg/m²	0.2 kg/m²	0.08 kg/m²
Vertically Integrated Water Vapour - Monthly Mean				
ACCURACY	bias	3 kg/m²	1 kg/m²	0.3 kg/m²
PRECISION	rms	5 kg/m²	3 kg/m²	0.3 kg/m²
STABILITY	decadal	0.7 kg/m²	0.2 kg/m²	0.08 kg/m²

Verification

Comparisons to merged microwave, TMI data (both from REMSS) and ERA5 over global, ice-free oceans, global comparisions to AIRS, ERA5 and ESA DUE GlobVapour and G-VAP like intercomparisons

Comment:

The combined MW and NIR product was generated by the ESA Water_Vapour_cci project. The ATBD for NIR retrievals and the combination of MW and NIR data, NIR data and other NIR related elements are considered as given.
Microwave imager measurements are processed with HOAPS software within CM SAF.
Verification data might not cover the full period. Uncertainty charatceristics are given for global monthly means. Stability is assessed through analysing trends of differences against the reference (merged microwave and AIRS).