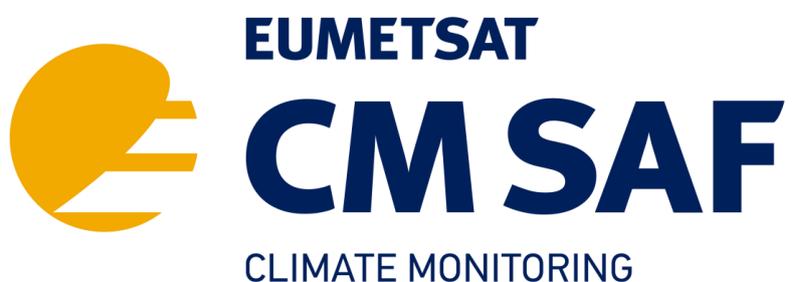


**EUMETSAT Satellite Application Facility on Climate Monitoring**



**Product User Manual**

**ICDR AVHRR, based on CLARA-A2 methods**

**Surface Radiation**

**Surface Incoming Shortwave Radiation**

**CM-6210**

Reference Number:  
Issue/Revision Index:  
Date:

SAF/CM/DWD/ICDR/CLARA/RAD/PUM  
2.1  
01.02.2021

### Document Signature Table

|                 | Name                               | Function                                  | Signature | Date                     |
|-----------------|------------------------------------|---|-----------|--------------------------|
| <b>Author</b>   | Jörg Trentmann                     | CM SAF scientist                          |           | 13/11/2020<br>29/01/2021 |
| <b>Editor</b>   | Rainer Hollmann<br>Johannes Kaiser | Science Coordinator<br>Operations Manager |           | 01/02/2021               |
| <b>Approval</b> | Steering Group                     |   |           |                          |
| <b>Release</b>  | Rainer Hollmann                    | Project Manager                           |           |                          |

### Distribution List

| Internal Distribution |            |
|-----------------------|------------|
| Name                  | No. Copies |
| DWD Archive           | 1          |
| CM SAF Team           | 1          |

| External Distribution |      |            |
|-----------------------|------|------------|
| Company               | Name | No. Copies |
| PUBLIC                |      | 1          |

### Document Change Record

| Issue/ Revision | Date       | DCN No.                        | Changed Pages/Paragraphs                         |
|-----------------|------------|--------------------------------|--|
| 2.0             | 20/11/2020 | SAF/CM/DWD/ICDR/CLARA/RAD /PUM | First official version for review                |
| 2.1             | 01/02/2021 | SAF/CM/DWD/ICDR/CLARA/RAD /PUM | Update to implement the review comments and RIDs |

|   |   |  |
|---|---|--|
|  | <b>Product User Manual<br/>ICDR AVHRR<br/>Surface Radiation</b> | Doc. No: SAF/CM/DWD/ICDR/CLARA/RAD/PUM<br>Issue: 2.1<br>Date: 20.11.2020 |
|---|---|--|

|  |  |  |   |
|--|--|--|---|
|  |  |  | Layout revision and barrier free conversion |
|--|--|--|---|

### Applicable documents

| Reference | Title                                | Code               |
|-----------|--------------------------------------|--------------------|
| AD 1      | CM SAF Product Requirements Document | SAF/CM/DWD/PRD/3.7 |

### Reference Documents

| Reference | Title  | Code                              |
|-----------|--|-----------------------------------|
| RD 1      | Validation Report<br>ICDR AVHRR, based on CLARA-A2 methods<br>Surface Radiation                    | SAF/CM/DWD/ICDR/CLARA/RAD/VAL/2.1 |
| RD 2      | Algorithm Theoretical Basis Document<br>ICDR AVHRR, based on CLARA-A2 methods<br>Surface Radiation | SAF/CM/DWD/ICDR/CLARA/RAD/PUM/2.1 |

**Table of Content**

The EUMETSAT SAF on Climate Monitoring (CM SAF) ..... 6

1 Introduction ..... 8

2 Product definitions ..... 9

2.1 Parameter Retrievals ..... 10

2.1.1 Surface incoming shortwave radiation ..... 10

2.2 General limitations and recommendations ..... 11

3 Data format description ..... 12

3.1 Data file contents ..... 12

4 Data ordering via the Web User Interface (WUI)..... 16

4.1 Product ordering process ..... 16

4.2 Contact User Help Desk staff ..... 16

4.3 User Problem Report ..... 16

4.4 Service Messages / log of changes..... 16

5 Feedback ..... 17

5.1 User feedback..... 17

5.2 Specific requirements for future products..... 17

5.3 User Workshops ..... 17

6 Copyright and Disclaimer ..... 18

6.1 Copyright ..... 18

6.2 Acknowledgement and Identification ..... 18

6.3 Re-distribution of CM SAF data ..... 18

7 References ..... 19

8 Glossary..... 20

## List of Tables

**Table 2-1:** Summary of the accuracy of the CM SAF ICDR AVHRR surface solar radiation data set. ... 9

**Table 3-1:** Global NetCDF attributes ..... 13

**Table 3-2:** Potential attributes assigned to variables. .... 14

## List of Figures

**Figure 2-1:** Monthly mean surface Irradiance (SIS) for June 2019 from the CM SAF ICDR AVHRR. ..11

## The EUMETSAT SAF on Climate Monitoring (CM SAF)

In 2000 the EUMETSAT Member States amended the EUMETSAT convention to affirm that the EUMETSAT mandate is also to “contribute to the operational monitoring of the climate and the detection of global climatic changes”. Already in 1999, recognizing the importance of climate monitoring with satellites, EUMETSAT established within its Satellite Application Facility (SAF) network a dedicated centre, the SAF on Climate Monitoring (CM SAF, <http://www.cmsaf.eu>).

The consortium of CM SAF currently comprises the Deutscher Wetterdienst (DWD) as host institute, and the partners from the Royal Meteorological Institute of Belgium (RMIB), the Finnish Meteorological Institute (FMI), the Royal Meteorological Institute of the Netherlands (KNMI), the Swedish Meteorological and Hydrological Institute (SMHI), the Meteorological Service of Switzerland (MeteoSwiss), the Meteorological Service of the United Kingdom (UK MetOffice), and the Centre National de la Recherche Scientifique (CNRS). Since the beginning in 1999, the EUMETSAT Satellite Application Facility on Climate Monitoring (CM SAF) has developed and will continue to develop capabilities for a sustained generation and provision of Climate Data Records (CDR’s) derived from operational meteorological satellites.

In particular the generation of long-term data sets is pursued. The ultimate aim is to make the resulting data sets suitable for the analysis of climate variability and potentially the detection of climate trends. CM SAF works in close collaboration with the EUMETSAT Central Facility and liaises with other satellite operators to advance the availability, quality and usability of Fundamental Climate Data Records (FCDRs) as defined by the Global Climate Observing System (GCOS). As a major task the CM SAF utilizes FCDRs to produce Thematic Climate Data Records (TCDRs) for Essential Climate Variables (ECVs) as defined by GCOS. Thematically, the focus of CM SAF is on ECVs associated with the global energy and water cycle.

Another essential task of CM SAF is to produce data records that can serve applications related to the new Global Framework of Climate Services initiated by the WMO World Climate Conference-3 in 2009. CM SAF is supporting climate services at national meteorological and hydrological services (NMHSs) with long-term data records, i.e. FCDRs and TCDRs, but also with data records produced close to real time that can be used to prepare monthly/annual updates of the state of the climate, i.e. Interim Climate Data Records (ICDRs). Both types of products together allow for a consistent description of mean values, anomalies, variability and potential trends for the chosen ECVs. CM SAF ECV data sets also serve the improvement of climate models both at global and regional scale.

As an essential partner in the related international frameworks, in particular WMO SCOPE-CM (Sustained COordinated Processing of Environmental satellite data for Climate Monitoring), the CM SAF - together with the EUMETSAT Central Facility, assumes the role as main implementer of EUMETSAT’s commitments in support to global climate monitoring. This is achieved through:

- Application of highest standards and guidelines as lined out by GCOS for the satellite data processing,
- Processing of satellite data within a true international collaboration benefiting from developments at international level and pollinating the partnership with own ideas and standards,
- Intensive validation and improvement of the CM SAF climate data records,
- Taking a major role in data set assessments performed by research organisations such as WCRP. This role provides the CM SAF with deep contacts to research organizations that form a substantial user group for the CM SAF CDRs,

- Maintaining and providing an operational and sustained infrastructure that can serve the community within the transition of mature CDR products from the research community into operational environments.

A catalogue of all available CM SAF products is accessible via the CM SAF webpage, [www.cmsaf.eu](http://www.cmsaf.eu). Here, detailed information about product ordering, add-on tools, sample programs and documentation is provided

## 1 Introduction

This CM SAF Product User Manual provides information on the CM SAF ICDR AVHRR, based on CLARA-A2 methods, surface radiation data set.

This document provides a brief description of the data definition, technical details of the satellite retrieval, information on the accuracy and the limitation of the data sets, as well as information on the data format and access. Further details on the implementation of the retrieval processing chain and algorithm descriptions are available in the Algorithm Theoretical Basis Document [RD 2]. Basic accuracy requirements are defined in the product requirements document [AD 1]. A detailed validation of the ICDR AVHRR surface solar radiation is available in the Validation Report [RD 1].

## 2 Product definitions

The CM SAF ICDR AVHRR surface solar radiation data set from AVHRR satellite observations provides global coverage. The instantaneous AVHRR observations are used to derive the spatio-temporal averaged data sets. The products are available as monthly and daily averages on a regular latitude/longitude grid with a spatial resolution of  $0.25^\circ \times 0.25^\circ$  degrees. The temporal provision of this data set starts on 1 January 2019 and is being continued with a timeliness of 5 days.

The product covered by this document is:

- Surface Incoming Shortwave Radiation (CM-6210, see ATBD [RD 2])

Table 2-1 presents a summary of the accuracy of the CM SAF ICDR AVHRR surface solar radiation data set. For more information on the validation strategy and more detailed accuracy information, the reader is referred to the corresponding validation report [RD 1].

The product has been developed and evaluated with respect to the requirement goals defined in the PRD [AD 1]. The finally achieved product accuracies are described in the validation report [RD 1]. Of specific interest here are requirements as outlined by the Global Climate Observing System (GCOS) community and issued by the United Nations World Meteorological Organisation (WMO) in December 2011.

**Table 2-1:** Summary of the accuracy of the CM SAF ICDR AVHRR surface solar radiation data set.

| Data Set | Threshold / Target / Optimal<br>Accuracies in W/m <sup>2</sup> | Dataset Accuracy<br>in W/m <sup>2</sup> |
|----------|--|---|
| SIS      | 15 / 10 / 8 (monthly averages)                                 | 11                                      |
|          | 30 / 25 / 20 (daily averages)                                  | 23                                      |

|   |   |  |
|---|---|--|
|  | <b>Product User Manual<br/>ICDR AVHRR<br/>Surface Radiation</b> | Doc. No: SAF/CM/DWD/ICDR/CLARA/RAD/PUM<br>Issue: 2.1<br>Date: 20.11.2020 |
|---|---|--|

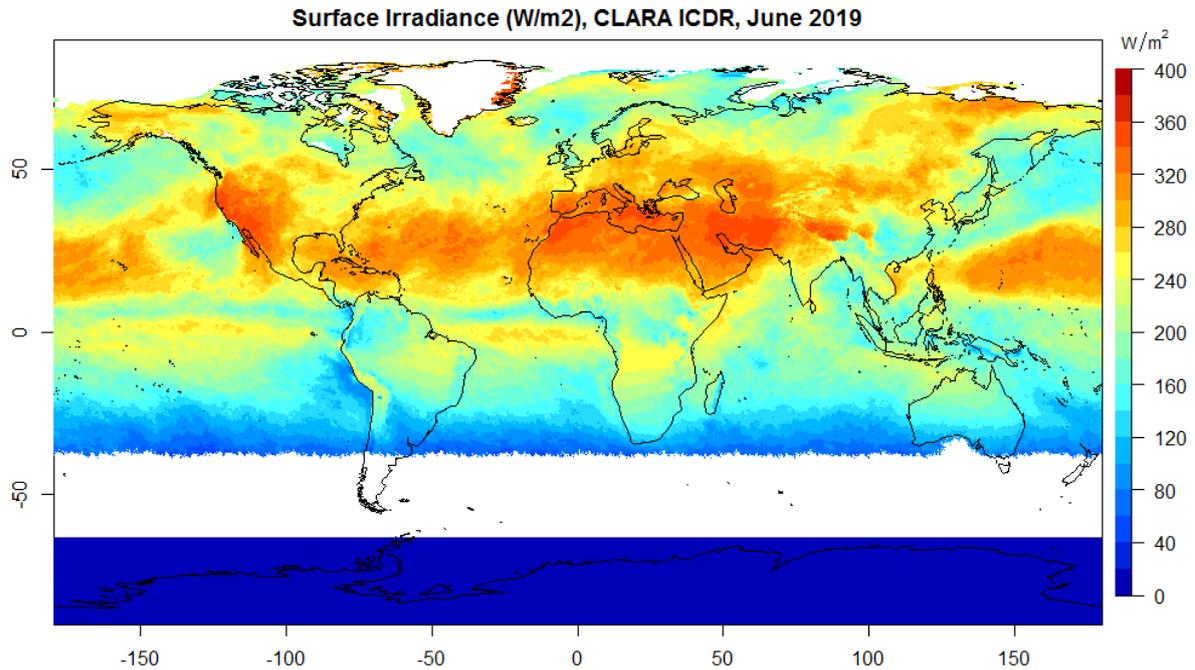
## 2.1 Parameter Retrievals

Here a brief overview of the retrieval methods used to generate the CM SAF ICDR AVHRR surface radiation data sets is given. More detailed information can be found in the ATBD [RD 2].

### 2.1.1 Surface incoming shortwave radiation

The retrieval of the surface incoming solar radiation is based on the method presented in *Mueller et al.*, (2009). As auxiliary data sources, the integrated water vapour from the operational ECMWF analysis, aerosol information from the GADS/OPAC data base (*Hess et al.*, 1998) and the surface albedo from the SARB/CERES team (<https://ceres.larc.nasa.gov/data/general-product-info/>) are used. The applied surface albedo and aerosol information are based on climatologies, which might have an impact on a potential trend in the resulting CLARA-A2.1 SIS. The cloud detection provided by the Nowcasting SAF software (PPSv2014) is used to distinguish between cloudy- and clear-sky pixels. Pixels classified as cloud-contaminated by the PPS Software are considered cloudy in the surface solar radiation retrieval. For clear-sky pixels, no additional satellite information is required to calculate the surface incoming solar radiation using the Mesoscale Atmospheric Global Irradiance Code (MAGIC, <http://gnu-magic.sourceforge.net/>). For cloudy pixels, look-up tables are used to assign the atmospheric transmissivity to the measured albedo at the top-of-the-atmosphere. The transmissivity can be directly converted to the surface incoming solar radiation. The temporal averaging of the instantaneous retrieval results on the pixel level is conducted following the method of *Möser and Raschke* (1984), which takes into account the diurnal cycle of the solar radiation. At least 20 instantaneous observations need to be available in each grid box to calculate the daily average; monthly averages are only generated when at least 20 valid daily mean values are available.

More details on the retrieval and the specific limitations are given in the ATBD [RD 2]. Based on the limited set of available validation data, the overall accuracy of the CM SAF ICDR AVHRR SIS data set has been estimated to be 11 W/m<sup>2</sup> for the monthly mean data and 23 W/m<sup>2</sup> for the daily averages. Further information on the accuracy of the product is contained in the validation report [RD 1].



**Figure 2-1:** Monthly mean surface Irradiance (SIS) for June 2019 from the CM SAF ICDR AVHRR.

Figure 2-1 presents an illustrative example of the CM SAF ICDR AVHRR SIS data set. Shown is the monthly mean surface irradiance for June 2019.

## 2.2 General limitations and recommendations

Here, general limitations of the application of the CM SAF ICDR AVHRR surface radiation data set are presented. More specific limitations and shortcomings set can be found in the ATBD [RD 2].

The calculation of daily averages of the surface incoming shortwave radiation requires at least 20 observations to be available in each grid box. The sun synchronous orbit of the NOAA satellites does not allow a high temporal coverage in lower latitudes. Hence, especially during times when only few AVHRR satellites are in orbit, the calculation of daily averages (and subsequently monthly averages) is only possible at higher latitudes, resulting in large areas of missing data over the tropical regions.

In addition, the solar irradiance is only estimated for satellite observations at solar zenith angles lower than 80°, resulting in regions without daily and subsequently without monthly data, in particular at higher latitudes. For latitudes in polar winter the surface irradiance is set to zero.

Due to the reduced accuracy of the satellite-derived data, no data of the surface solar irradiance is provided in snow-covered areas.

|   |   |  |
|---|---|--|
|  | <b>Product User Manual</b><br><b>ICDR AVHRR</b><br><b>Surface Radiation</b> | Doc. No: SAF/CM/DWD/ICDR/CLARA/RAD/PUM<br>Issue: 2.1<br>Date: 20.11.2020 |
|---|---|--|

### 3 Data format description

CM SAF's climate monitoring ICDR AVHRR surface solar radiation product are provided as NetCDF (Network Common Data Format) files (<https://www.unidata.ucar.edu/software/netcdf/>). The data files are created following NetCDF Climate and Forecast (CF) Metadata Convention version 1.5 (<http://cf-pcmdi.llnl.gov/>) and NetCDF Attribute Convention for Dataset Discovery version 1.0.

For data processing and conversion to formats, CM SAF recommends the usage of the climate data operators (CDO), available under GNU Public License (GPL) from MPI-M (<https://www.mpimet.mpg.de/~cdo>).

#### 3.1 Data file contents

A common NetCDF file consists of dimensions, variables, and attributes. These components can be used together to capture the meaning of data and relations among data. All CM SAF ICDR AVHRR surface radiation products files are built following the same design principles.

##### **Each data file contains the following coordinate variables:**

*time*

start of averaging/composite time period[days counted from 1970-01-01]

*time\_bnds*

two-dimensional array defining the averaging/composite time period [days counted from 1970-01-01]

*latitude*

geographical latitude of grid-box centre [degree\_north]

*longitude*

geographical longitude of grid-box centre [degree\_east]

##### **Each data file contains a subset of the following 3-dimensional variables:**

*SIS*

grid box mean value of the surface solar irradiance

*SIS\_nobs*

total number of observations counted during the average/composite period,

*SIS\_stdv*

standard variation

Each file extracted from the CM SAF database has one record of the dimension (time, lat, lon) with the time dimension as the record dimension. This allows it to concatenate the individual records into an aggregated file. Global attributes are summarized in Table 3-1 and possible variable attributes in Table 3-2.

**Table 3-1:** Global NetCDF attributes.

| Name                      | Description  |
|---------------------------|--|
| title                     | dataset title  |
| Conventions               | conventions followed, "CF-1.6, ACDD-1.3" for all files               |
| Metadata_Convention       | conventions followed, "Unidata Dataset Discovery v1.0" for all files |
| institution               | institution where the data was produced                              |
| creator_url               | URL contact information for the creator of the data                  |
| creator_email             | email contact information for the creator of the data                |
| references                | references that describe the data or methods used to produce it      |
| source                    | original data source   |
| cdm_data_type             | data type, "grid" for all files                                      |
| filename                  | original filename  |
| time_coverage_start       | temporal coverage start of the data [ISO8601 date]                   |
| time_coverage_end         | temporal coverage end of the data [ISO8601 date]                     |
| time_coverage_duration    | temporal coverage duration of the data [ISO8601 duration]            |
| geospatial_lat_units      | latitude attributes unit   |
| geospatial_lat_resolution | latitude grid resolution   |
| geospatial_lat_min        | latitude bounding box minimum  |
| geospatial_lat_max        | latitude bounding box maximum  |
| geospatial_lon_units      | longitude attributes unit  |
| geospatial_lon_resolution | longitude grid resolution  |
| geospatial_lon_min        | longitude bounding box minimum                                       |

| Name                           | Description  |
|--------------------------------|--|
| geospatial_lon_max             | longitude bounding box maximum                                 |
| cmsaf_gac_major_version_number | CM SAF GAC major release version                               |
| cmsaf_gac_minor_version_number | CMSAF GAC minor release version                                |
| cmsaf_parameter_id             | CM SAF product identifier                                      |
| cmsaf_parameter_code           | CM SAF product name  |
| intercalibration               | intercalibration version applied                               |
| date_created                   | date on which the data was created [ISO8601 date]              |
| history                        | provides an audit trail for modifications to the original data |

**Table 3-2:** Potential attributes assigned to variables.

| Name          | Description   |
|---------------|---|
| long_name     | long descriptive name   |
| standard_name | standard name that references a description of a variable's content in the CF standard name table   |
| units         | physical unit [udunits standards]   |
| valid_min     | smallest valid value of a variable  |
| valid_max     | largest valid value of a variable   |
| scale_factor  | The data are to be multiplied by this factor after it is read.  |
| add_offset    | This number is to be added to the data after it is read. If scale_factor is present, the data are first scaled before the offset is added.              |
| _FillValue    | This number represent missing or undefined data. Missing values are to be filtered before scaling.  |
| missing_data  | This number represent missing or undefined data. Missing values are to be filtered before scaling. Contains the same value as the _FillValue-attribute. |

| <b>Name</b>  | <b>Description</b>   |
|--------------|--|
| cell_methods | method used to derive data that represents cell values following the CF Convention |

---

## 4 Data ordering via the Web User Interface (WUI)

The internet address <http://wui.cmsaf.eu> allows direct access to the CM SAF data ordering interface. On this webpage a detailed description how to use it for product search and ordering is given. We refer the user to this description since it is the central and most up to date documentation. However, some of the key features and services are briefly described in the following sections.

Further user service including information and documentation about CM SAF and the CM SAF products are available from the CM SAF home page (<http://www.cmsaf.eu>).

### 4.1 Product ordering process

You need to be registered and logged in to order products. A login is provided upon registration, all products are delivered free of charge (Please note the copyright disclaimer given in section 6.1). After the selection of the product, the desired way of data transfer can be chosen. This is either via a temporary https/sftp server (the default setting), or by CD/DVD or email. Each order will be confirmed via email, and the user will get another email once the data have been prepared. If the https/sftp data transfer was selected, this second email will provide the information on how to access the ftp server. All personal data is handled according to EU's Personal Data Protection Regulation.

### 4.2 Contact User Help Desk staff

In case of questions the contact information of the User Help Desk (e-mail address [contact.cmsaf@dwd.de](mailto:contact.cmsaf@dwd.de)) are available via the CM SAF home webpage ([www.cmsaf.eu](http://www.cmsaf.eu)) or the home page of the Web User Interface (<http://wui.cmsaf.eu>).

### 4.3 User Problem Report

Users of CM SAF products and services are encouraged to provide feedback on the CM SAF product and services to the CM SAF team. Users can either contact the User Help Desk (see section 5.2) or use the "User Problem Report" page. A link to the "User Problem Report" is available either from the CM SAF home page ([www.cmsaf.eu](http://www.cmsaf.eu)) or the Web User Interface home page (<http://wui.cmsaf.eu>).

### 4.4 Service Messages / log of changes

Service messages and a log of changes are also accessible from the CM SAF home webpage (<http://www.cmsaf.eu>) and provide useful information on product status, versioning and known deficiencies.

## 5 Feedback

### 5.1 User feedback

Users of CM SAF products and services are encouraged to provide feedback on the CM SAF product and services to the CM SAF team. We are keen to learn of what use the CM SAF data are. So please feedback your experiences as well as your application area of the CM SAF data.

EUMETSAT CM SAF is an user driven service and is committed to consider the needs and requirements of its users in the planning for product improvements and additions. Please provide your feedback e.g. to our User Help Desk (e-mail address [contact.cmsaf@dwd.de](mailto:contact.cmsaf@dwd.de)).

### 5.2 Specific requirements for future products

Beside your general feedback you are cordially invited to provide your specific requirements on future products for your applications. Please provide your requirements e.g. to our staff or via our User Help Desk (e-mail address [contact.cmsaf@dwd.de](mailto:contact.cmsaf@dwd.de)).

### 5.3 User Workshops

CM SAF is organizing on regular basis training workshops in order to facilitate the use of our data. Furthermore through our regular (approximately every four years) user's workshop we revisit our product baseline. Your participation in any of these workshops is highly appreciated. Please have a look at on the CM SAF home web page ([www.cmsaf.eu](http://www.cmsaf.eu)) to get the latest news on upcoming events.

|   |   |  |
|---|---|--|
|  | <b>Product User Manual</b><br><b>ICDR AVHRR</b><br><b>Surface Radiation</b> | Doc. No: SAF/CM/DWD/ICDR/CLARA/RAD/PUM<br>Issue: 2.1<br>Date: 20.11.2020 |
|---|---|--|

## 6 Copyright and Disclaimer

The user of CM SAF data agrees to respect the following regulations:

### 6.1 Copyright

All intellectual property rights of the CM SAF products belong to EUMETSAT. The use of these products is granted to every interested user, free of charge. If you wish to use these products in publications, presentations, web pages etc., *EUMETSAT's copyright credit must be shown by displaying the words "copyright (year) EUMETSAT" on each of the products used.*

### 6.2 Acknowledgement and Identification

When exploiting EUMETSAT/CM SAF data you are kindly requested to acknowledge this contribution accordingly and make reference to the CM SAF, e.g. by stating "The work performed was done (i.a.) by using data from EUMETSAT's Satellite Application Facility on Climate Monitoring (CM SAF)". It is highly recommended to clearly identify the product version used. An effective way to do this is the citation of CM SAF data records via the digital object identifier (doi). All information can be retrieved through (<http://www.cmsaf.eu/DOI>).

The DOI for this data set is provided on the title page of this document.

### 6.3 Re-distribution of CM SAF data

Please do not re-distribute CM SAF data to 3rd parties. The use of the CM SAF products is granted free of charge to every interested user, but we have an essential interest to know how many and what users the CM SAF has. This helps to ensure of the CM SAF operational services as well as its evolution according to users needs and requirements. Each new user shall register at CM SAF in order to retrieve the data.

## 7 References

Dee, D., et al. (2011), The ERA-Interim reanalysis: configuration and performance of the data assimilation system, *Quarterly Journal of the Royal Meteorological Society*, 137(656), 553-597.

Hess, M., P. Koepke, and I. Schult (1998), Optical properties of aerosols and clouds: The software package OPAC, *Bulletin of the American Meteorological Society*, 79(5), 831-844.

Möser, W., and E. Raschke (1984), Incident solar radiation over Europe estimated from METEOSAT data, *Journal of Climate and Applied Meteorology*, 23(1), 166-170.

Mueller, R., C. Matsoukas, A. Gratzki, H. Behr, and R. Hollmann (2009), The CM-SAF operational scheme for the satellite based retrieval of solar surface irradiance - A LUT based eigenvector hybrid approach, *Remote Sensing of Environment*, 113(5), 1012-1024.

## 8 Glossary

|             |   |
|-------------|---|
| ACDD        | Attribute Convention for Data Discovery                                 |
| ATBD        | Algorithm Theoretical Baseline Document                                 |
| AVHRR       | Advanced Very High Resolution Receiver                                  |
| CD          | Compact Disk  |
| CDO         | Climate Data Operator   |
| CDR         | Climate Data Record   |
| CERES       | Clouds and the Earth's Radiant Energy System                            |
| CF          | Climate and Forecast  |
| CLARA-A     | CM SAF cloud, Albedo and Radiation products, AVHRR based                |
| CM SAF      | Satellite Application Facility on Climate Monitoring                    |
| CNRS        | Centre National de la Recherche Scientifique                            |
| DOI         | Digital Object Identifier   |
| DVD         | Digital Versatile Disk  |
| DWD         | Deutscher Wetterdienst (German MetService)                              |
| ECMWF       | European Centre for Medium Range Forecast                               |
| ECV         | Essential Climate Variable  |
| ERA         | ECMWF Re-analysis   |
| ERA-Interim | Second ECMWF Re-Analysis dataset  |
| EUMETSAT    | European Organisation for the Exploitation of Meteorological Satellites |
| FCDR        | Fundamental Climate Data Record   |
| FMI         | Finnish Meteorological Institute  |
| FTP         | File Transfer Protocol  |
| GAC         | Global Area Coverage (NOAA)   |
| GADS        | Global Aerosol Data Set   |
| GCOS        | Global Climate Observing System   |
| GFCS        | Global Framework of Climate Services                                    |
| GNU         | General Public License  |
| GPL         | GNU Public License  |

|              |   |
|--------------|---|
| ICDR         | Interim Climate Data Record   |
| IWV          | integrated water vapour   |
| KNMI         | Royal Netherlands Meteorological Institute  |
| LUT          | Look-up Tables  |
| MAGIC        | Mesoscale Atmospheric Global Irradiance Code  |
| MeteoSwiss   | National Weather Service of Switzerland   |
| MPI          | Max-Planck Institute  |
| MPI-M        | Max-Planck Institute for Meteorology  |
| NetCDF       | Network Common Data Format  |
| NMHS         | National Meteorological and Hydrological Service  |
| NOAA         | National Oceanic & Atmospheric Administration   |
| OPAC         | Optical Properties of Aerosols and Clouds   |
| PPS          | Polar Platform System   |
| PRD          | Product Requirement Document  |
| PUM          | Product User Manual   |
| RAD          | Radiation   |
| RMIB         | Royal Meteorological Institute of Belgium   |
| SAF          | Satellite Application Facility  |
| SARB         | Surface and Atmospheric Radiation Budget  |
| SAL          | Surface Albedo  |
| SCOPE CM     | Sustained Coordinated Processing of Environmental satellite data for Climate Monitoring |
| SIS          | Surface Incoming Shortwave Radiation  |
| SMHI         | Swedish Meteorological and Hydrological Institute                                       |
| TOA          | Top of the Atmosphere   |
| UK MetOffice | United Kingdom Meteorological Office  |
| UPR          | User Problem Report   |
| URL          | Uniform Resource Locator  |
| VAL          | Validation Report   |
| WCRP         | WMO World Climate Research Programme  |

WMO World Meteorological Organisation

WUI Web User Interface