EUMETSAT

Cloud Mask Product: Product Guide

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Document Change Record

Issue / Revision	*Date*	*DCN. No*	*Summary of Changes*
1	06/10/2010		Initial product document.
1A	21/08/2015		Added graphics to support product in MSG. Added section on algorithm. Product review by field expert.

Table of Contents

1 PRODUCT DESCRIPTION

The Cloud Mask (CLM) product is an image-based GRIB Edition 2-encoded product which indicates the presence of clouds and non-static surface types (snow/ice cover) on a pixel basis for every repeat cycle. The CLM product is derived from an internal classified image product, which is based on pixel-based cloud analysis retrieval. Within the encoding of the product the pixels are identified as one of the following:

- Clear sky over water
- Clear sky over land
- Cloud

If any of the classifications above are not possible, the product assigns this category:

- No data (meaning off the Earth disc, no scene identified)

The classification is derived directly from the scenes analysis of the original image. The CLM product is similar to the Cloud Analysis Image Product (CLAI), but it contains simplified information since it merely distinguishes between clear and cloudy pixels rather than the detailed scenes type information offered by CLAI. However, it is full resolution–CLAI is at 3 × 3 pixel resolution–but without an excessive file size (3.45 MB). The main use of the product is in support of Nowcasting applications, where it frequently serves as a basis for other cloud products, and the remote sensing of continental and ocean surfaces.

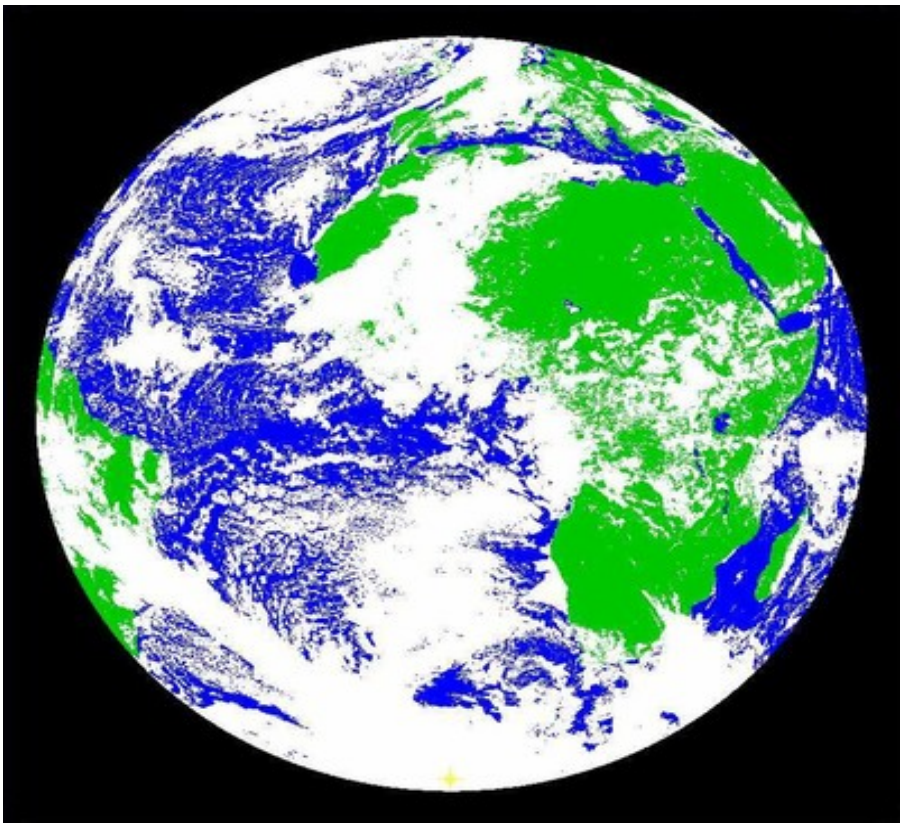

Figure 1: Cloud mask product over full Earth disk.

2 PRODUCT SPECIFICATIONS

Category	*Specification*
Product abbreviation	CLM
Applications and users	Nowcasting applications
Input satellite data	Scenes type and quality flag from the scenes analysis data
Product Distribution	• EUMETCast • Direct • EUMETSAT Data Centre
Product Area	• Full earth scanning (FES) area • RSS Area
Product Resolution	Pixel
Product Distribution Frequency	*Full Earth Scanning Area* • EUMETCast: every 15 minutes for the 00:00, 00:15, 00:30, …23:45 UTC products • EUMETSAT Data Centre: every 15 minutes for the 00:00, 00:15, 00:30, …23:45 UTC products • Direct: every 15 minutes for the 00:00, 00:15, 00:30, …23:45 UTC products
Product Format	• GRIB2 format
Product Size	*Full Earth Scanning Area:* 3.45 MB (fixed) *Rapid Scanning Service Area:* 3.45 MB (fixed)
Resolution	3 km × 3 km pixel resolution

2.1 Known Operational Limitations

There are no known operational limitations.

2.2 Product History and gaps in coverage

Version	*Date*	*Description*
1.0	14/5/98	CLM Baseline
1.1	31/8/98	Clarification of the option of the CLM.
1.2	9/9/2002	Redefinition of CLM content, and change of format to GRIB Edition 2. See EUM/MSG/ECP/328.

3 BASIC STRUCTURE OF THE ALGORITHM

3.1 Cloud Mask Product generation

The value for the *cloud mask* is generated as follows:

Scenes type is...	*Cloud mask is set to...*
cloudy	cloud
clear with sunglint	clear sky over water
snow/ice over land	clear sky over land
snow/ice over water	clear sky over water
water	clear sky over water
one of the surface types	clear sky over land
no scenes identified, missing input data	no data

3.2 Outputs

The following data are produced for the cloud mask product for every pixel in the form of a GRIB Edition-2 encoded product.

Parameter	*Mnemonic*	*Units*	*Min*	*Max*	*Prec*	*Acc*	*To*
Cloud Mask	cloud_mask	-	0	3	1	1	CLM

The parameter value is defined in code table 4.217 of GRIB Edition 2. A specific entry (7) was added to code table 4.2 (Product Discipline 3, Parameter Category 0) to specify cloud mask data.

Parameter	*Value*	*Meaning*
Cloud Mask	0	Clear sky over water
	1	Clear sky over land
	2	Cloud
	3	No data

3.3 Automatic Quality Control (AQC)

Not required as already performed as part of Scenes Analysis processing

3.4 Product Limitations Identified

The quality of the product is impacted by the following limitations:

- The ECMWF temperature and humidity fields are not interpolated in time and space. This means that for all pixels within each segment the same temperature and humidity profile for the period for which the forecast has same validity time. This may lead to artificial straight lines in the display of the product;

- The Meteosat-7 calibration (IR and WV) has a bias when compared to Meteosat Second Generation or IASI calibrations. The IR channel calibration especially is about 2 K too cold, which impacts the cloud detection;
- Within the MTP MPEF algorithms, a 10 level ECMWF temperature profile is used for the determination of e.g. the atmospheric correction, impacting the cloud detection especially in the lower troposphere.

4 REFERENCES

Type	*Document Name*	*Reference*
Algorithm Specification	ATBD for Cloud Mask and Cloud Analysis Product	EUM/MTG/DOC/10/0542
Product Validation	Cloud Mask Product Validation	EUM/TSS/DOC/13/706263

Online Resources and Assistance

All of the reference documents listed above are in the EUMETSAT Technical Documents page.

www.eumetsat.int > Satellites > Technical Documents > Meteosat Services
> 0° Meteosat Meteorological Products

To register for data delivery from this product, go to the Data Registration page on the EUMETSAT web page:

www.eumetsat.int > Data > Data Delivery > Data Registration

GRIB (**GRI**dded **B**inary) is the WMO standard binary format for exchanging gridded data. GRIB Edition 2 is an extension of GRIB, with a much higher degree of flexibility and expandability. For complete details on the format, see the WMO web page:

http://www.wmo.int/pages/prog/www/WMOCodes.html

Information about the service status of EUMETSAT satellites and the data they deliver is this EUMETSAT web page:

www.eumetsat.int > Data > Service Status

To get answers to questions about data delivery, registration or documentation, contact the EUMETSAT User Service Help Desk:

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