EPS-SG MWI-ICI Level 2 Product Format Specification

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Change Record

Version	Date	DCN. No	Description of Changes
V1	15 December 2014	N/A	Initial version
V1A	6 March 2015	N/A	Updated version considering comments
V1B	18 September 2015	N/A	Updated version taking into account latest version of GPFS and processing updates.
V1C	9 November 2015	EUM-EPSSG-DCR-145	Update of the Applicable and Reference Documents List
V2A	13 January 2017	EPSG_DCR_541	Updated number of samples based on update of processing specifications. Removed sub-sampling of geolocation variables. Updated flags considering update of retrieval algorithms Updated instrument modes Updated Group Name Data lwp and iwp and Group Name quality_information Updated Group Name quality Attributes and Variables Updated product size Removed XML dump. Updated XML file.
V2B	28 September 2017		Sections 4.2.3.1.3: Updated Manoeuvre Information according to GPFS update. Updated XML according to changes in document Updated global attributes in XML file description
V2C	23 January 2018	EPSG_DCR_885	Section 4.2.3.3.1: added the value "MWI_ICI_L2" for the processor_name attribute. Removed "PROCESSOR_FULL_NAME" from the source attribute. Various sections: The minimum value for time variables referred to the 2020-01-01 epoch (sensing_start/end_time, gap_start/end_time, manoeuvre_start/end_time, etc.) are allowed to be negative. Value set as maximum value with negative sign. Appendix A: harmonized XML description. Update of the TBC/TBD Table Various sections: put n_scan (scan index) as first index of all variables for consistency with

Version	Date	DCN. No	Description of Changes
			PGS.
V3	1 April 2020	EPSG_DCR_1629	Update of Signature Table. Update of product name following GPFS V3D naming convention update. Tables associated to Attributes and dimensioning that are not used have been removed (to close TBD) in multiple sections. Minor update of group satellite Dimensions and Variables following GPFS V3D. Update of processing attribute Table (Section 4.2.3.3.1) with updated references. Updated number of samples of MWI lwp to 155 and of ICI iwp to 220 per scan. Section 4.2.4.1: Update of group lwp common attributes and dimensions to close TBDs. Update of variable type and scale factors. Refined retrieval diagnostic variables as tcwv_diagnostic_retrieval and tcwv_retrieval error to close TBC. Section 4.2.4.2: Update of group iwp common attributes to close TBD (Section 4.2.4.2.1). Update of group iwp common dimensions. Update to type and scale factors of variables. Removed variables ice_habit, ice_habit_probability, retrieved_diagnostic_variables (moved to Output Auxiliary File to close TBD), and clear_sky_flag (see Section 4.2.4.2.3). Section 4.2.4.1: Grouped value_of_cost_function_Jb and value_of_cost_function_Jo in one variable value_of_cost_function_J. Removed mwi_geolocation_quality_flag, mwi_channel_quality_flag Added mwi_quality_flag and lwp_retrieval_flag as per Table 19 and Table 20. Section 4.2.4.3.2: Removed nr_of_channels_used, retrieved_weights_flag, n1, n2, SR (now in Auxiliary Output file). Removed ici_geolocation_quality_flag and ici_channel_quality_flag. Added iwp_retrieval_flag and ici_quality_flag Table 24 and Table 25. Specified channel_mask as per Table 23. Section 4.2.4.4: Added mci_processing_flag and 1dvar processing_flag in Group: processing_flag. Added Group Dimensions accordingly. Update of dimensions, attributes and variables

Version	Date	DCN. No	Description of Changes
			Group quality according to GPFS. Update of overall_quality_flag_mwi_lwp_product and overall_quality_flag_ici_iwp_product to account for degraded conditions in Section 4.2.5. Updated Appendix A, updated data size estimation (reduction of size of 4 Mb) and Table 35. Updated Appendix B XML according to V3 changes.
V3A	11 November 2020	EPSSG_DCR_1925	Minor corrections to align status: satellite Variables to GPFS V3D. Corrected name of root attributes sensing_start_time_utc and sensing_end_time_utc according to GPFS. Add note to manoeuvre information and manoeuvre_items to be included only in case of manoeuvre. Updated product format version Table. Update of XML to reflect changes of current document. Update of bit settings of overall_quality_flag to remove flagging of degraded static auxiliary files. Minor update of bit settings of 1dvar_processing_flag Update of bit setting of mci_processing_flag and iwp_retrieval_flag.

Table of Contents

1 INTRODUCTION

1.1 Purpose and Scope

This document describes the Format Specification for the multi-sensor Level 2 (L2) product generated from the EPS-SG Microwave Imager (MWI) and the EPS-SG Ice Cloud Imager (ICI) Level 1B (L1B) data. These L2 products are generated centrally by the EPS-SG Ground Segment at the EUMETSAT Headquarters. This document specifies the detailed format of the MWI-ICI L2 product in agreement with the format and naming conventions set out in the Generic Product Format Specification [GPFS] applicable to all EPS-SG products.

This document addresses the native format of the product generated in the EPS-SG Ground Segment, which is netCDF-4 as specified in [GPFS]. Other user formats will be specified elsewhere.

The specific Product Format Specification contains all the specific NetCDF details, including specific metadata. The common groups and metadata are defined in the [GPFS].

1.2 Relation to other documents

The EPS-SG MWI-ICI Level 2 Product Format Specification [MWIICI-L2-PFS] is a System document in the System Specification Tree. It is called up in [SRD], [OGSRD], MWI-ICI L2 Product Generation Specification [MWIICI-L2-PGS] and EPS-SG System and Ground Segment documents including ICDs IRDs wishing to convey information about the MWI-ICI Level 2 product format and content.

This document is derived from and compliant to [GPFS] for generic product format and naming conventions applicable to all EPS-SG products.

1.3 Applicable Documents

ID	Title	Reference
[GPFS]	EPS-SG Generic Product Format Specification (GPFS)	EUM/LEO-EPSSG/SPE/13/702108
[MCSD]	EPS-SG Mission Conventions and Standards Document	EUM/LEO-EPSSG/STD/14/745221
[DEV]	Development Logic for EPS-SG L0-L1-L2 Processing Specifications	EUM/LEO-EPSSG/TEN/14/763159
[HQ-BAS]	EPS-SG Data and Products Generation, Archiving and Dissemination Baseline at EUMETSAT HQ	EUM/LEO-EPSSG/SPE/15/819557

1.4 Reference Documents

ID	Title	Reference
[SRD]	EPS-SG System Requirements Document	EUM/LEO-EPSSG/SPE/13/735903
[OGSRD]	EPS-SG Overall Ground Segment Requirements Document	EUM/LEO-EPSSG/REQ/13/725156
[MWIICI-L2-PGS]	EPS-SG MWI-ICI Level 2 Product Generation Specification	EUM/LEO-EPSSG/SPE/14/756739
[MWIICI-L2-ADS]	EPS-SG MWI-ICI Level 2 Auxiliary Data Specification	EUM/LEO-EPSSG/SPE/14/771728
[MWI-L1B-PGS]	EPS-SG MWI Level 1B Product Generation Specification	EUM/LEO-EPSSG/SPE/14/746864
[ICI-L1B-PGS]	EPS-SG ICI Level 1B Product Generation Specification	EUM/LEO-EPSSG/SPE/14/756250
[L0PFS]	EPS-SG L0 Product Format Specification	EUM/LEO-EPSSG/SPE/13/703928

1.5 Acronyms

The definition of conventions, terms and abbreviations applicable to the EPS-SG programme can be found in [MCSD]. Abbreviations specific to this document are listed in the following table.

Acronym	Definition
AOI	Area Of Interest
BRC	Basic Repeat Cycle
CDF	Cumulative (probability) Density Function
EPS-SG	EUMETSAT Polar System – Second Generation
GPFS	Generic Product Format Specification
ICI	Ice Cloud Imager
IWP	Ice Water Path
LWP	Liquid Water Path
MCI	Monte Carlo Integration
MWI	Microwave Imager
NetCDF	Network Common Data Form
NRT	Near Real Time
TBC	To Be Confirmed
TBD	To Be Defined
TBW	To Be Written
TOD	True of Date
TCWV	Total Column Water Vapour

Acronym	Definition
UTC	Universal Time Coordinated
WMO	World Meteorological Organization
XML	eXtensible Markup Language
XSD	XML Schema Definition

1.6 Conventions and Terminology

Generic conventions and terminology used in this document for EPS-SG products are those described in the [GPFS]. Generic terms and definitions applicable to the EPS-SG Programme can be found in [MCSD].

1.6.1 Meaning of Table Headings

Element Name	Description
Filename	**The name of the product (following naming convention described in [GPFS]).**
Product ID	**The Product identifier of the product (global attribute: Productidentifier as described in the [GPFS]).**
Product Description	**A summary as defined in the relevant product format specification (global attribute: product_description described in the [GPFS]).**
Format	**Native format of the product (i.e. netCDF-4).**
Size	**Estimated size of the product (Mbyte/Orbit).**
Duration	**Duration of product disseminated to the user (To be defined during Phase C)**
Group Name	**The name of the NetCDF group**
Variable Name	**The name of NetCDF variable.**
Attribute Name	**The name of NetCDF attribute (see also http: www.unidata.ucar.edu software netcdf docs netcdf Attribute-Conventions.html)** **Attributes may be global or related to a group instead of a variable; in this case they must appear before dimensions.**
Dimension Name	**The name of NetCDF dimension.**
Description	**Description of the element; for a variable the description must coincide with its "long_name" attribute.**
Range or value	**Range or value of variables, or value of dimensions or attributes, must match the "valid_min", "valid_max", or "valid_range" attributes.**
Unit	**Unit type of variables or attributes, must coincide with "units" attribute.**
Data Type or Type	**Type of variables or attributes as defined in NetCDF Users Guide, not used for dimensions.**

Dimension	**Dimensions of the variables or attributes, in the same order than storage and with one dimension per line. Dimensions must be always defined before variables.**
Usage	**Usage of the product:** - **Internal: Product/Data is for use within the EPS-SG system. It is not made available to the end-users.** - **User: the product is disseminated to the end-users.**

1.7 Document structure

Section Number	Title	Content
1	Introduction	The Scope and Purpose of the PFS document is described in this section, along with Open Issues, Assumptions, Applicable and Reference documents.
2	INSTRUMENTS OVERVIEW	A description of the main features and characteristics of MWI and ICI is provided in this section, along with its acquisition modes generating data to be processed in the Ground Segment.
3	EPS-SG MWI-ICI Level 2 Product Overview	A high-level overview on the MWI-ICI Level 2 Product structure is presented in this section. The Product Tree and the Product Naming convention are also specified here.
4	EPS-SG MWI-ICI Level 2 Product Detailed Format	The format of each MWI-ICI Level 2 Product (detailed description of the NetCDF Data Files of each product) is described in this section.
5	Product Format Version Control	This section is aimed to describe the product format version control number for each product described in this document.
APP A	Size of EPS-SG MWI-ICI Level 2 product	In this section the size of each MWI-ICI Level 2 Product is provided.
APP B	XML Description of EPS-SG MWI-ICI L2 Product Format	The .xml schemas for the MWI-ICI Level 2 Product are provided in this section.

2 INSTRUMENTS OVERVIEW

The Microwave Imager (MWI) and the Ice Cloud Imager (ICI) are conically scanning passive imagers collecting radiation coming from the Earth by means of a rotating offset parabolic reflector antenna and feed-horn cluster rotating together. The rotation of the slanted antennas allows conical scans with constant incidence angles of about 53°.

2.1 MWI

The MWI frequencies cover the spectral range from 18 GHz up to 183 GHz. The MWI will provide continuity of measurements for some heritage microwave imager channels but will also include additional sets of channels in the 50-55 GHz and the 118 GHz bands. A more detailed description of the main features and characteristics of the MWI instrument is provided in the MWI L1B Product Generation Specification Document [MWI-L1B-PGS]. The [MWI-L1B-PGS] document also describes in detail the acquisition modes generating data to be processed in the Ground Segment.

2.2 ICI

The ICI instrument is a passive conical scanner radiometer capable of measuring thermal radiance emitted by the Earth, at high spatial resolution in specified spectral bands in the microwave and sub-mm region of the electromagnetic spectrum covering the frequency range from 183 GHz to 664 GHz. For more details the reader is referred to the [ICI-L1B-PGS]. The [ICI-L1B-PGS] document also describes in detail the acquisition modes generating data to be processed in the Ground Segment.

3 EPS-SG MWI-ICI LEVEL 2 PRODUCT OVERVIEW

The MWI-ICI Level 2 product is generated centrally by the EPS-SG Ground Segment at the EUMETSAT Headquarters.

3.1 Product List

The list of variables included in the MWI-ICI Level 2 Product is presented in Table 1.

Product ID	Product Description	Usage	Mission type
MSP-02-LIW	MWI-ICI Level 2 Product providing cloud and atmospheric parameters	User	Global/ Regional

Table 1: EPS-SG MWI-ICI Level 2 Product List.

3.2 Naming Convention

The naming convention of EPS-SG products complies with the naming convention specified in [GPFS] for all EPS-SG Ground Segment products generated in native format.

The product name of the MWI-ICI L2 Product is according to the following convention:

(pflag) '_' (productidentifier) '_' (oflag) '_' (originator) '_' (YYYYMMDDhhmmss) '_' (freeformat)

Where freeformat contains a number of product name fields separated by the underscore symbol "_" and explained in [GPFS].

4 EPS-SG MWI-ICI LEVEL 2 PRODUCT DETAILED FORMAT

4.1 Overall Structure of EPS-SG MWI-ICI L2 Product

All EPS-SG product types generated by the EPS-SG Ground Segment are NetCDF-4 files complying with the generic structure and data model set out in the [GPFS].

The high-level structure of the MWI-ICI L2 product is presented in Figure 1 and consists of a *root* group, holding global attributes defined in the [GPFS] and the following sub-groups: *status, data* and *quality*.

Considering that the MWI-ICI L2 product is a collection of multi-sensor products, in the group "*status*" information is provided both on MWI and ICI. Moreover, for the same reason, the Data Group contains the "*lwp*" (Liquid Water Path) group and the "*iwp*" (Ice Water Path) group.

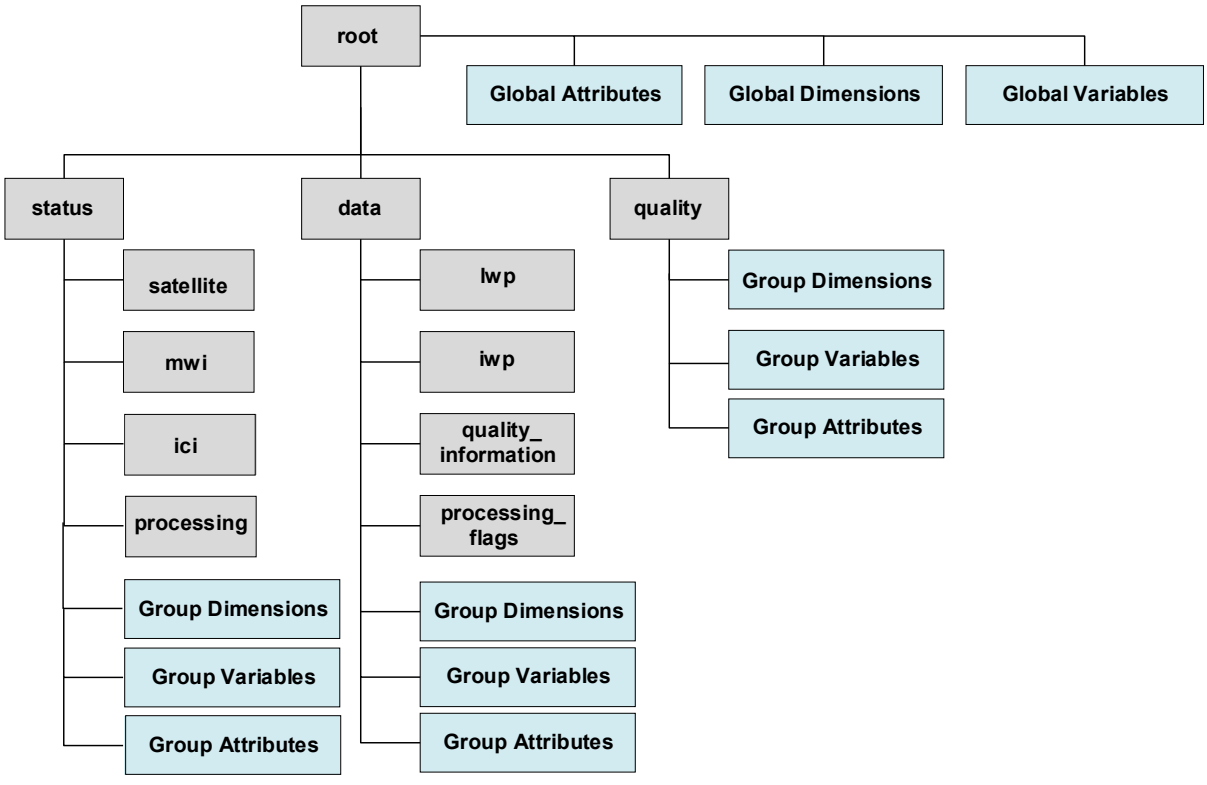

Figure 1: Overall Structure of the EPS-SG MWI-ICI L2 Product.

4.2 MWI-ICI L2 Product

This section describes the detailed content of the NetCDF file, including groups, attributes, variables and dimensions applicable to the MWI-ICI L2 product.

4.2.1 Product Summary Sheet

The table below provides a summary for the MWI-ICI L2 product. The filename in Table 2 is defined according to the conventions described in the [GPFS] and presented in Section 3.2.

Filename	**W_XX-EUMETSAT-Darmstadt,SAT,SGB[1-3]-MSP-02-LIW_C_EUMT_YYYYMMDDhhmmss___YYYYMMDDhhmmss_YYYYMMDDhhmmss_O_N____.nc**
Product ID	*MSP-02-LIW*
Product Description	Cloud and atmospheric properties derived from MWI and ICI measurements
Format	netCDF-4
Size (MBytes orbit)	85.00 (see Appendix A)
Duration	To be defined in Phase C

Table 2: MWI-ICI L2 product summary sheet.

4.2.2 Group Name: root

4.2.2.1 Attributes (global)

Table 3 describes the global attributes for MWI-ICI L2 product in accordance with [GPFS].

Attribute Name	Type	Meaning and or value
Conventions	NC_STRING	e.g.“CF-1.6”
metadata_conventions	NC_STRING	e.g. “Unidata Dataset Discovery v1.0”
product_name	NC_STRING	Product name as set out in Section 3.2
Title	NC_STRING	MWI-ICI Level 2 Product providing cloud and atmospheric parameters
summary	NC_STRING	Product Summary
Doi	NC_STRING	Digital Object Identifier
keywords	NC_STRING	“MWI, ICI, Level 2, EPS-SG, polar meteorological satellite, Metop-SG, Liquid Water Path, Ice Water Path”
History	NC_STRING	(“original generated product” | “aggregated product” | “sub-setted product”)
institution	NC_STRING	“EUMETSAT”
spacecraft	NC_STRING	Metop-SG B satellites: “SGB”[1-3]
instrument	NC_STRING	”MSP”
product_level	NC_STRING	Product processing level “2” = geolocated geophysical variables

Attribute Name	Type	Meaning and or value
Type	NC_STRING	Character string providing an indication of the type of product: type: LIW — Meaning: Liquid/ice water paths
mission_type	NC_STRING	(“Global” | “Regional” | “Local”)
disposition_mode	NC_STRING	Identification of the type of processing (“Test” | “Commissioning” | “Operational” | “Validation”) Test = Test data Commissioning = Produced during commissioning Operational = expected quality as per requirements based on fully performed validation Validation = During validation of a new processor version during routine operations
sensing_start_time_utc	NC_STRING	UTC time of start of sensing data formatted in CF date and time format with ms precision
sensing_end_time_utc	NC_STRING	UTC time of end of sensing data formatted in CF date and time format with ms precision
environment	NC_STRING	(“Operational” | “Validation” | ” Integration & Verification” | “Development” | ”Engineering”)
references	NC_STRING	“www.eumetsat.int”
orbit_start	NC_UINT	Absolute orbit number at sensing_start_time_utc
orbit_end	NC_UINT	Absolute orbit number at sensing_end_time_utc

Table 3: Global Attributes for the MWI-ICI L2 product.

4.2.2.2 Dimensions (global)

No common global dimensions are currently envisaged.

4.2.2.3 Variables (global)

No common global variables are currently envisaged.

4.2.3 Group Name: status

This section describes the status Group for the MWI-ICI L2 Product.

4.2.3.1 Group Name: satellite

4.2.3.1.1 satellite: Attributes

No satellite Group Attributes are currently envisaged.

4.2.3.1.2 satellite: Dimensions

Table **4** describes the Satellite Group Dimensions *for the MWI-ICI L2* Product.

Dimension name=	Comment	Dimension length=
manoeuvre_items	Number of manoeuvres occurring between product start and end. **Note: (included only in case of manoeuvre)**	”” 0 ≤ N

Table 4: Group satellite: Dimensions for MWI-ICI L2 product.

4.2.3.1.3 satellite: Variables

Table 5 describes the Satellite Group variables for the MWI-ICI L2 product with their specific attributes. The Cartesian Orbit State Vector fields contain the Cartesian Orbit State Vector in the Earth-Fixed ([EARTH+FIXED]) reference frame as defined in the EPS-SG Mission Conventions Document [MCSD].

Variables Name	Description	Type	Unit	Range or Value	Dimension
Orbit Parameters					
epoch_time_utc	Epoch time in UTC of the orbital elements	NC_DOUBLE	seconds since 2020-01-01 00:00:00.000	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Epoch time in UTC of the orbital elements	
units	Physical units	NC_STRING		seconds since 2020-01-01 00:00:00.000	
Valid_min	Valid minimum value	NC_DOUBLE		-1.e9	
Valid_max	Valid maximum value	NC_DOUBLE		1.e9	
_FillValue	fill value	NC_DOUBLE		-9.e9	
semi_major_axis	Semi major axis of the orbit at epoch time [TOD]	NC_DOUBLE	m	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Semi major axis of the orbit at epoch time [TOD]	
units	Physical units	NC_String		m	

Variables Name	Description	Type	Unit	Range or Value	Dimension
Valid_min	Valid minimum value	NC_DOUBLE		7.19e6	
Valid_max	Valid maximum value	NC_DOUBLE		7.20e6	
_FillValue	fill value	NC_DOUBLE		-9.e6	
eccentricity	Eccentricity of the orbit at epoch time [TOD]	NC_DOUBLE		Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Eccentricity of the orbit at epoch time [TOD]	
units	Physical units	NC_STRING			
Valid_min	Valid minimum value	NC_DOUBLE		0.1160e-2	
Valid_max	Valid maximum value	NC_DOUBLE		0.1170e-2	
_FillValue	fill value	NC_DOUBLE		-9.e2	
inclination	Inclination of the orbit at epoch time [TOD]	NC_DOUBLE	degrees	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Inclination of the orbit at epoch time [TOD]	
units	Physical units	NC_STRING		degrees	
Valid_min	Valid minimum value	NC_DOUBLE		98.65	
Valid_max	Valid maximum value	NC_DOUBLE		98.75	
_FillValue	fill value	NC_DOUBLE		-99.	
perigee_argument	Argument of perigee of the orbit at epoch time [TOD]	NC_DOUBLE	degrees	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Argument of perigee of the orbit at epoch time [TOD]	
units	Physical units	NC_STRING		degrees	
Valid_min	Valid minimum value	NC_DOUBLE		0.	
Valid_max	Valid maximum value	NC_DOUBLE		360.	
_FillValue	fill value	NC_DOUBLE		-999.	
right_ascension	Right ascension of the orbit at epoch time [TOD]	NC_DOUBLE	degrees	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Right ascension of the orbit at epoch time [TOD]	
units	Physical units	NC_STRING		degrees	

Variables Name	Description	Type	Unit	Range or Value	Dimension
Valid_min	Valid minimum value	NC_DOUBLE		0.	
Valid_max	Valid maximum value	NC_DOUBLE		360.	
_FillValue	fill value	NC_DOUBLE		-999.	
mean_anomaly	Mean anomaly of the orbit at epoch time [TOD]	NC_DOUBLE	degrees	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Mean anomaly of the orbit at epoch time [TOD]	
units	Physical units	NC_STRING		degrees	
Valid_min	Valid minimum value	NC_DOUBLE		0.	
Valid_max	Valid maximum value	NC_DOUBLE		360.	
_FillValue	fill value	NC_DOUBLE		-999.	
earth_sun_distance_ratio	Ratio of current Earth-Sun distance to Mean Earth-Sun distance	NC_DOUBLE		Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Ratio of current Earth-Sun distance to Mean Earth-Sun distance	
units	Physical units	NC_STRING			
Valid_min	Valid minimum value	NC_DOUBLE		0.983	
Valid_max	Valid maximum value	NC_DOUBLE		1.017	
_FillValue	fill value	NC_DOUBLE		-999.	
Location Summary					
subsat_latitude_start	Latitude of sub-satellite point at start of the product	NC_DOUBLE	degrees_north	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Latitude of sub-satellite point at start of the product	
units	Physical units	NC_STRING		degrees_north	
Valid_min	Valid minimum value	NC_DOUBLE		-90.	
Valid_max	Valid maximum value	NC_DOUBLE		90.	
_FillValue	fill value	NC_DOUBLE		-99.	
subsat_longitude_start	Longitude of sub-satellite point at start of the product	NC_DOUBLE	degrees_east	Valid_min to Valid_max	1

Variables Name	Description	Type	Unit	Range or Value	Dimension
long_name	Description of variable	NC_STRING		Longitude of sub-satellite point at start of the product	
units	Physical units	NC_STRING		degrees_east	
Valid_min	Valid minimum value	NC_DOUBLE		0.	
Valid_max	Valid maximum value	NC_DOUBLE		360.	
_FillValue	fill value	NC_DOUBLE		-999.	
subsat_latitude_end	Latitude of sub-satellite point at end of the product	NC_DOUBLE	degrees_north	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Latitude of sub-satellite point at end of the product	
units	Physical units	NC_STRING		degrees_north	
Valid_min	Valid minimum value	NC_DOUBLE		-90.	
Valid_max	Valid maximum value	NC_DOUBLE		90.	
_FillValue	fill value	NC_DOUBLE		-99.	
subsat_longitude_end	Longitude of sub-satellite point at end of the product	NC_DOUBLE	degrees_east	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Longitude of sub-satellite point at end of the product	
units	Physical units	NC_STRING		degrees_east	
Valid_min	Valid minimum value	NC_DOUBLE		0.	
Valid_max	Valid maximum value	NC_DOUBLE		360.	
_FillValue	fill value	NC_DOUBLE		-999.	
State Vector and Attitude parameters					
state_vector_time_utc	Time of the state vector and attitude items	NC_DOUBLE	seconds since 2020-01-01 00:00:00.000	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Time of the state vector and attitude items	
units	Physical units	NC_STRING		seconds since 2020-01-01 00:00:00.000	

Variables Name	Description	Type	Unit	Range or Value	Dimension
Valid_min	Valid minimum value	NC_DOUBLE		-1.e9	
Valid_max	Valid maximum value	NC_DOUBLE		1.e9	
_FillValue	fill value	NC_DOUBLE		-9.e9	
x_position	X position of the orbital state vector [EARTH+FIXED)	NC_DOUBLE	m	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		X position of the orbital state vector [EARTH+FIXED)	
units	Physical units	NC_STRING		m	
Valid_min	Valid minimum value	NC_DOUBLE		-7.2e6	
Valid_max	Valid maximum value	NC_DOUBLE		7.2e6	
_FillValue	fill value	NC_DOUBLE		-9.e6	
y_position	Y position of the orbital state vector [EARTH+FIXED)	NC_DOUBLE	m	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Y position of the orbital state vector [EARTH+FIXED)	
units	Physical units	NC_STRING		m	
Valid_min	Valid minimum value	NC_DOUBLE		-7.2e6	
Valid_max	Valid maximum value	NC_DOUBLE		7.2e6	
_FillValue	fill value	NC_DOUBLE		-9.e6	
z_position	Z position of the orbital state vector [EARTH+FIXED)	NC_DOUBLE	m	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Z position of the orbital state vector [EARTH+FIXED)	
units	Physical units	NC_STRING		m	
Valid_min	Valid minimum value	NC_DOUBLE		-7.2e6	
Valid_max	Valid maximum value	NC_DOUBLE		7.2e6	
_FillValue	fill value	NC_DOUBLE		-9.e6	
x_velocity	X velocity of the orbital state vector [EARTH+FIXED)	NC_DOUBLE	m/s	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		X velocity of the orbital state vector [EARTH+FIXED)	
units	Physical units	NC_STRING		m/s	

Variables Name	Description	Type	Unit	Range or Value	Dimension
Valid_min	Valid minimum value	NC_DOUBLE		-8.e3	
Valid_max	Valid maximum value	NC_DOUBLE		8.e3	
_FillValue	fill value	NC_DOUBLE		-9.e3	
y_velocity	Y velocity of the orbital state vector [EARTH+FIXED)	NC_DOUBLE	m/s	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Y velocity of the orbital state vector [EARTH+FIXED)	
units	Physical units	NC_STRING		m/s	
Valid_min	Valid minimum value	NC_DOUBLE		-8.e3	
Valid_max	Valid maximum value	NC_DOUBLE		8.e3	
_FillValue	fill value	NC_DOUBLE		-9.e3	
z_velocity	Z velocity of the orbital state vector [EARTH+FIXED)	NC_DOUBLE	m/s	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Z velocity of the orbital state vector [EARTH+FIXED)	
units	Physical units	NC_STRING		m/s	
Valid_min	Valid minimum value	NC_DOUBLE		-8.e3	
Valid_max	Valid maximum value	NC_DOUBLE		8.e3	
_FillValue	fill value	NC_DOUBLE		-9.e3	
yaw_error	Yaw attitude error	NC_DOUBLE	degrees	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Yaw attitude error	
units	Physical units	NC_STRING		degrees	
Valid_min	Valid minimum value	NC_DOUBLE		0.	
Valid_max	Valid maximum value	NC_DOUBLE		360.	
_FillValue	fill value	NC_DOUBLE		-999.	
roll_error	Roll attitude error	NC_DOUBLE	degrees	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		Roll attitude error	
units	Physical units	NC_STRING		degrees	
Valid_min	Valid minimum value	NC_DOUBLE		0.	
Valid_max	Valid maximum value	NC_DOUBLE		360.	
_FillValue	fill value	NC_DOUBLE		-999.	
pitch_error	Pitch attitude error	NC_DOUBLE	degrees	Valid_min to Valid_max	1

Variables Name	Description	Type	Unit	Range or Value	Dimension
long_name	Description of variable	NC_STRING		Pitch attitude error	
units	Physical units	NC_STRING		degrees	
Valid_min	Valid minimum value	NC_DOUBLE		0.	
Valid_max	Valid maximum value	NC_DOUBLE		360.	
_FillValue	fill value	NC_DOUBLE		-999.	
Leap Second Information					
leap_second_time_utc	UTC time of occurrence of a leap second in this product (if leap second occurred in the product time window); it represents the time after the leap second occurrence (i.e. midnight of day after the leap second; no leap second results in 0)"	NC_DOUBLE	seconds since 2020-01-01 00:00:00	Valid_min to Valid_max	1
long_name	Description of variable	NC_STRING		UTC time of occurrence of a leap second in this product (if leap second occurred in the product time window); it represents the time after the leap second occurrence (i.e. midnight of day after the leap second; no leap second results in 0)"	
units	Physical units	NC_STRING		seconds since 2020-01-01 00:00:00	
Valid_min	Valid minimum value	NC_DOUBLE		-1.e9	
Valid_max	Valid maximum value	NC_DOUBLE		1.e9	
_FillValue	fill value	NC_DOUBLE		-9.e9.	

Variables Name	Description	Type	Unit	Range or Value	Dimension
leap_second_value	Value of leap second in product (1, 0, or −1) 1 = increment, **-1 = decrement**	NC_SHORT	seconds	-1 to 1	1
long_name	Description of variable	NC_STRING		Value of leap second in product (1, 0, or −1)	
units	Physical units	NC_STRING		seconds	
Valid_min	Valid minimum value	NC_SHORT		-1	
Valid_max	Valid maximum value	NC_SHORT		1	
_FillValue	fill value	NC_SHORT		-999	
Manoeuvre Information (included only in case of manoeuvre)					
manoeuvre_occurence	Occurrence of manoeuvres between start and end times of the product (1 or 2) 1 = in-plane manoeuvre occurred 2 = out-of-plane manoeuvre occurred	NC_BYTE	-	1 or 2	manoeuvre_items
long_name	Description of variable	NC_STRING		**Occurrence of manoeuvres between start and end times of the product (1 or 2)**.	
Valid_min	Valid minimum value	NC_BYTE		1	
Valid_max	Valid maximum value	NC_BYTE		2	
_FillValue	fill value	NC_BYTE		-9	
manoeuvre_start_time_utc	UTC time of start of manoeuvre	NC_DOUBLE	seconds since 2020-01-01 00:00:0 0.000	Valid_min to Valid_max	manoeuvre_items

Variables Name	Description	Type	Unit	Range or Value	Dimension
long_name	Description of variable	NC_STRING		UTC time of start of manoeuvre	
units	Physical units	NC_STRING		seconds since 2020-01-01 00:00:00.000	
Valid_min	Valid minimum value	NC_DOUBLE		-1.e9	
Valid_max	Valid maximum value	NC_DOUBLE		1.e9	
_FillValue	fill value	NC_DOUBLE		-9.e9	
manoeuvre_end_time_utc	UTC time of end of manoeuvre	NC_DOUBLE	seconds since 2020-01-01 00:00:00.000	Valid_min to Valid_max	manoeuvre_items
long_name	Description of variable	NC_STRING		UTC time of end of manoeuvre	
units	Physical units	NC_STRING		seconds since 2020-01-01 00:00:00.000	
Valid_min	Valid minimum value	NC_DOUBLE		-1.e9	
Valid_max	Valid maximum value	NC_DOUBLE		1.e9	
_FillValue	fill value	NC_DOUBLE		-9.e9	

Table 5: Group satellite: Variables for MWI-ICI L2 product.

4.2.3.2 Group Name: instrument

4.2.3.2.1 Group Name: mwi

4.2.3.2.1.1 mwi: Attributes

No Group Attributes are foreseen for the Group instrument/mwi of the MWI-ICI L2 product.

4.2.3.2.1.2 mwi: Dimensions

This section describes the MWI Group Dimensions. Table 6 describes the Dimensions of the Group instrument/mwi for the MWI-IC L2 Product.

Dimension name=	Comment	Dimension length=
mode_items	Number of modes the instrument assumed during product duration	„„ 1 ≤ N

Table 6: Group mwi: Dimensions for MWI-ICI L2 Product.

4.2.3.2.1.3 mwi: Variables

This section describes the instrument status group variables for the MWI-ICI L2 Product with their specific attributes. Colours are used to differentiate variable and attributes: variables in light blue and attributes in white with name right-aligned.

Variables Name	Description	Type	Unit	Range or Value	Dimension
mode_start_time_utc	Start time of the mode	NC_DOUBLE	"seconds since 2020-01-01 00:00:00.000"	Valid_min to Valid_max	mode_items
long_name	Description of variable	NC_STRING		"Start time of the mode"	
units	Physical units	NC_STRING		"seconds since 2020-01-01 00:00:00.000"	
Valid_min	Valid minimum value	NC_DOUBLE		-1.e9	
Valid_max	Valid maximum value	NC_DOUBLE		1.e9	
_FillValue	Fill value	NC_DOUBLE		-9.e9	

Variables Name	Description	Type	Unit	Range or Value	Dimension
mode_end_time_utc	End time of the mode	NC_DOUBLE	"seconds since 2020-01-01 00:00:0 0.000"	Valid_min to Valid_max	mode_items
long_name	Description of variable	NC_STRING		"End time of the mode"	
units	Physical units	NC_STRING		"seconds since 2020-01-01 00:00:00.000"	
Valid_min	Valid minimum value	NC_DOUBLE		-1.e9	
Valid_max	Valid maximum value	NC_DOUBLE		1.e9	
_FillValue	Fill value	NC_DOUBLE		-9.e9	
instrument_mode	Name of the instrument mode assumed	NC_STRING		Valid modes are provided in [L0PFS]	mode_items
long_name	Description of variable	NC_STRING		"Name of the instrument mode assumed"	
_FillValue	Fill value	NC_STRING		"UNDEFINED MODE"	

Table 7: Group mwi: Variables for MWI-ICI L2 product.

4.2.3.2.2 Group Name: ici

4.2.3.2.2.1 ici: Attributes

No Group Attributes are foreseen for the Group instrument/ici of the MWI-ICI L2 product.

4.2.3.2.2.2 ici: Dimensions

This section describes the ICI Group Dimensions. Table 8 describes the Dimensions of the Group instrument/ici for the MWI-IC L2 product.

Dimension name=	Comment	Dimension length=
mode_items	Number of modes the instrument assumed during product duration	„„ 1 ≤ N

Table 8: Group ici: Dimensions for MWI-ICI L2 product.

4.2.3.2.2.3 ici: Variables

This section describes the instrument status group variables for the MWI-ICI L2 product with their specific attributes. Colours are used to differentiate variable and attributes: variables in light blue and attributes in white with name right-aligned.

Variables Name	Description	Type	Unit	Range or Value	Dimension
mode_start_time_utc	Start time of the mode	NC_DOUBLE	"seconds since 2020-01-01 00:00:00.000"	Valid_min to Valid_max	mode_items
long_name	Description of variable	NC_STRING		Start time of the mode	
units	Physical units	NC_STRING		"seconds since 2020-01-01 00:00:00.000"	
Valid_min	Valid minimum value	NC_DOUBLE		-1.e9	
Valid_max	Valid maximum value	NC_DOUBLE		1.e9	
_FillValue	Fill value	NC_DOUBLE		-9.e9	
mode_end_time_utc	End time of the mode	NC_DOUBLE	"seconds since 2020-01-01 00:00:00.000"	Valid_min to Valid_max	mode_items
long_name	Description of variable	NC_STRING		End time of the mode	
units	Physical units	NC_STRING		"seconds since 2020-01-01 00:00:00.000"	
Valid_min	Valid minimum value	NC_DOUBLE		-1.e9	
Valid_max	Valid maximum value	NC_DOUBLE		1.e9	
_FillValue	Fill value	NC_DOUBLE		-9.e9	
instrument_mode	Name of the instrument mode assumed	NC_STRING		Valid modes are provided in [L0PFS]	mode_items
long_name	Description of variable	NC_STRING		"Name of the instrument mode assumed"	
_FillValue	Fill value	NC_STRING		"UNDEFINED MODE"	

Table 9: Group ici: Variables for MWI-ICI L2 product.

4.2.3.3 Group Name: processing

4.2.3.3.1 processing: Attributes

This section describes the Processing Group Attributes for the MWI-ICI L2 Product.

Attribute Name	Description	Type	Range or Value
processor_name	"Name of the product processor"	NC_STRING	MWI_ICI_L2
processor_version	"Version number of the processor"	NC_STRING	"v[n]"
processing_mode	Processing mode in which the product was generated: ("NRT" | "Reprocessing")	NC_STRING	"NRT" or "Reprocessing"
format_version	Product format version control number	NC_STRING	Refer to Table 33 of Section 5
pgs_reference_and_version	Reference and version of the PGS	NC_STRING	"EUM/LEO-EPSSG/SPE/14/756739 v[n]"
pfs_reference_and_version	Reference and version of the PFS	NC_STRING	"EUM/LEO-EPSSG/SPE/14/771724 v[n]"
atbd_iwp_reference_and_version	Reference and version of the IWP ATBD	NC_STRING	"SAF/NWC/LEO-EPSSG/ATBD/IWP-ICI v[n]"
atbd_lwp_reference_and_version	Reference and version of the LWP ATBD	NC_STRING	"EUM/LEO-EPSSG/SPE/13/686218 v[n]"

Attribute Name	Description	Type	Range or Value
Source	A scalar string as particularised in the relevant product format specification, containing an array of bracketed strings of the form specified as follows: (AUXILIARY_DATA_NAME)* (INPUT_PRODUCT_NAME)* where the asterisks indicate zero or more instances Note 1: it is intended that users of the product can determine from the source attribute the version of the processing software and algorithm and the configuration data used to create the product, as well as the products that were inputs to its creation.	NC_STRING	Input Data – ICI-1B-RAD MWI-1B-RAD Input Auxiliary Data – MSP_02_AUX_CNF_ MSP_02_AUX_RTT_ MSP_02_AUX_EMS_ _____AUX_NWP_ _____AUX_NWPA _____AUX_BESD _____AUX_ECM_ _____AUX_SEIC

Table 10: Group processing: Attributes for MWI-ICI L2 product.

4.2.3.3.2 processing: Dimensions

No common processing group dimensions are currently envisaged for the MWI-ICI L2 Product.

4.2.3.3.3 processing: Variables

This section describes the Variables of the Group processing for the MWI-ICI L2 product, with their specific attributes as given in Table 11.

Variable	Type	Meaning	Attribute

name=			**name="units"** **value=**
Creation Time Information shape=1			
creation_time_utc	NC_DOUBLE	"UTC time at the start of the product creation"	"seconds since 2020-01-01 00:00:00.000"

Table 11: Group processing: Variables for MWI-ICI L2 product.

4.2.4 Group Name: Data

4.2.4.1 Group Name: lwp

4.2.4.1.1 lwp: Attributes

No common Group Attributes of the group lwp are currently foreseen.

4.2.4.1.2 lwp: Dimensions

This section describes the Dimensions for the Group lwp, as reported in Table 12.

Dimension Name	Description	Range or Value
mwi_n_scan	Number of scans	[0-9999] [TBC]
mwi_n_samples	Number of samples	155 [TBC]

Table 12: Group LWP: Dimensions for MWI-ICI L2 product.

4.2.4.1.3 lwp: Variables

The lwp Group Variables for the MWI-ICI LWP product are described in Table 13with their specific attributes. Colours are used to differentiate variable and attributes: variables in light blue and attributes in white with name right-aligned in *italics*.

Variables Name	Description	Type	Range or Value	Dimension
mwi_time_start_scan_utc	UTC time of start of Earth view	NC_DOUBLE	See valid_min and valid_max	mwi_n_scan
long_name	Description of variable	NC_STRING	UTC time of start of Earth view scan	
units	Physical units	NC_STRING	seconds since 2020-01-01 00:00:00.000	
valid_min	Valid minimum value	NC_DOUBLE	-1.e9	
valid_max	Valid maximum value	NC_DOUBLE	1.e9	
_FillValue	Fill value	NC_DOUBLE	-9.e9	
mwi_latitude	Sample geodetic latitude	NC_INT	See valid_min and valid_max	mwi_n_scan, mwi_n_samples
long_name	Description of variable	NC_STRING	“mwi geodetic latitude”	
units	Physical units	NC_STRING	“degrees_north”	

Variables Name	Description	Type	Range or Value	Dimension
scale_factor	Scale factor applied	NC_FLOAT	10-4	
add_offset	Offset applied	NC_FLOAT	0.0	
valid_min	Valid minimum value	NC_INT	-900000	
valid_max	Valid maximum value	NC_INT	900000	
_FillValue	Fill value	NC_INT	-2^{31}	
mwi_longitude	Sample geodetic longitude	NC_INT	See valid_min and valid_max	mwi_n_scan, mwi_n_samples
long_name	Description of variable	NC_STRING	"mwi geodetic longitude"	
units	Physical units	NC_STRING	"degrees_east"	
scale_factor	Scale factor applied	NC_FLOAT	10-4	
add_offset	Offset applied	NC_FLOAT	0.0	
valid_min	Valid minimum value	NC_INT	-1800000	
valid_max	Valid maximum value	NC_INT	1800000	
_Fill_value	Fill value	NC_INT	-2^{31}	
surface_type	Surface type	NC_UBYTE	See valid_min and valid_max	mwi_n_scan, mwi_n_samples
long_name	Description of variable	NC_STRING	"Surface type. 0 = open water, 1 = land/coast, 2 = sea ice."	
valid_min	Valid minimum value	NC_UBYTE	0	
valid_max	Valid maximum value	NC_UBYTE	2	
_FillValue	Fill value	NC_UBYTE	255	
liquid_water_path	Liquid water path	NC_INT	See valid_min and valid_max	mwi_n_scan, mwi_n_samples
long_name	Description of variable	NC_STRING	"Liquid Water Path"	
units	Physical units	NC_STRING	"kg m-2"	
scale_factor	Scale factor applied	NC_DOUBLE	1e-08	
add_offset	Offset applied	NC_DOUBLE	0.0	
valid_min	Valid minimum value	NC_INT	-1.e+08	
valid_max	Valid maximum value	NC_INT	10.e+08	
_FillValue	Fill value	NC_INT	-2^{31}	
liquid_water_path_retrieval_error	Liquid water path retrieval error	NC_USHORT	See valid_min and valid_max	mwi_n_scan, mwi_n_samples

Variables Name	Description	Type	Range or Value	Dimension
long_name	Description of variable	NC_STRING	"Liquid Water Path retrieval error"	
units	Physical units	NC_STRING	"kg·m-2"	
scale_factor	Scale factor applied	NC_DOUBLE	3.051851e-05	
add_offset	Offset applied	NC_DOUBLE	0.0	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	65534	
_FillValue	Fill value	NC_USHORT	65535	
tcwv_diagnostic_retrieval	*Diagnostic total column water vapour retrieval*	NC_USHORT	See valid_min and valid_max	mwi_n_scan, mwi_n_samples
long_name	Description of variable	NC_STRING	"Retrieval diagnostic total column water vapour"	
units	Physical units	NC_STRING	"kg·m-2"	
scale_factor	Scale factor applied	NC_FLOAT	0.00115	
add_offset	Offset applied	NC_FLOAT	0.0	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	65534	
_FillValue	Fill value	NC_USHORT	655345	
tcwv_diagnostic_retrieval_error	*Diagnostic total column water vapour retrieval error*	NC_USHORT	See valid_min and valid_max	mwi_n_scan, mwi_n_samples
long_name	Description of variable	NC_STRING	"Diagnostic total column water vapour retrieval error"	
units	Physical units	NC_STRING	"kg·m-2"	
scale_factor	Scale factor applied	NC_FLOAT	0.00115	
add_offset	Offset applied	NC_FLOAT	0.0	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	65534	
_FillValue	Fill value	NC_USHORT	65535	

Table 13: Group lwp: Variables for MWI-ICI L2 product.

4.2.4.2 Group Name: iwp

4.2.4.2.1 iwp: Attributes

This section describes the Attributes of the Group iwp. Common group attributes are provided in Table 14.

Attribute Name	Type	Meaning and or value
probability_values_of_error_estimate	NC_STRING	"±1 sigma, 5% and 95% confidence levels, [0.05 0.16 0.84 0.95]"

Table 14: Group iwp: Attributes for MWI-ICI L2 product.

4.2.4.2.2 iwp: Dimensions

This section describes the Dimensions for the Group IWP, as reported in Table 15.

Dimension Name	Description	Range or Value
ici_n_scan	Number of scans	[0-9999] [TBC]
ici_n_samples	Number of samples for all channels	220 [TBC]
n_err	number of probability values for error cdf estimate	4

Table 15: Group iwp: Dimensions for MWI-ICI L2 product.

4.2.4.2.3 iwp: Variables

The iwp Group Variables for the MWI-ICI CWP product are described in Table *16* with their specific attributes. Colours are used to differentiate variable and attributes: variables in light blue and attributes in white with name right-aligned in *italics*.

Variables Name	Description	Type	Range or Value	Dimension
ici_time_start_scan_utc	UTC time of start of Earth view	NC_DOUBLE	See valid_min and valid_max	ici_n_scan
long_name	Description of variable	NC_STRING	UTC time of start of Earth view scan	
units	Physical units	NC_STRING	seconds since 2020-01-01 00:00:00.000	
valid_min	Valid minimum value	NC_DOUBLE	-1.e9	
valid_max	Valid maximum value	NC_DOUBLE	1.e9	
_FillValue	Fill value	NC_DOUBLE	-9.e9	
ici_latitude	Sample geodetic latitude	NC_INT	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"ici geodetic latitude"	
units	Physical units	NC_STRING	"degrees_north"	
scale_factor	Scale factor applied	NC_FLOAT	10^{-4}	

Variables Name	Description	Type	Range or Value	Dimension
add_offset	Offset applied	NC_FLOAT	0.0	
valid_min	Valid minimum value	NC_INT	-900000	
valid_max	Valid maximum value	NC_INT	900000	
_Fill_value	Fill value	NC_INT	-2^{31}	
ici_longitude	Sample geodetic longitude	NC_INT	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"ici geodetic longitude"	
units	Physical units	NC_STRING	"degrees_east"	
scale_factor	Scale factor applied	NC_FLOAT	10^{-4}	
add_offset	Offset applied	NC_FLOAT	0.0	
valid_min	Valid minimum value	NC_INT	-1800000	
valid_max	Valid maximum value	NC_INT	1800000	
_Fill_value	Fill value	NC_INT	-2^{31}	
surface_type	Surface type	NC_UBYTE	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"Surface type. 0 = open water; 1 = land; 2 = sea ice; 3 = snow; 4 = mixed."	
valid_min	Valid minimum value	NC_UBYTE	0	
valid_max	Valid maximum value	NC_UBYTE	4	
_FillValue	Fill value	NC_UBYTE	255	
mean_ice_mass_ _latitude	latitude of the mean ice mass height	NC_SHORT	See valid_min and valid_max	ici_n_scan, ici_n_samples
units	Physical units	NC_STRING	"degrees_north"	
long_name	Description of variable	NC_STRING	"latitude of the mean ice mass height"	
scale_factor	Scale factor applied	NC_DOUBLE	0.00274665	
add_offset	Offset applied	NC_DOUBLE	0.0	
valid_min	Valid minimum value	NC_SHORT	-32767	
valid_max	Valid maximum value	NC_SHORT	32767	
_Fill_value	Fill value	NC_SHORT	-32768	
mean_ice_mass_ _longitude	longitude of the mean ice mass height	NC_SHORT	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"longitude of the mean ice mass height"	
units	Physical units	NC_STRING	"degrees_east"	
scale_factor	Scale factor applied	NC_DOUBLE	0.0054933	
add_offset	Offset applied	NC_DOUBLE	0.0	
valid_min	Valid minimum value	NC_SHORT	-32767	
valid_max	Valid maximum value	NC_SHORT	32767	
_Fill_value	Fill value	NC_SHORT	-32768	

Variables Name	Description	Type	Range or Value	Dimension
ice_water_path	ice water path	NC_UINT	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"Ice Water Path"	
units	Physical units	NC_STRING	"kg·m-2"	
scale_factor	Scale factor applied	NC_DOUBLE	1.e-7	
add_offset	Offset applied	NC_DOUBLE	0.0	
valid_min	Valid minimum value	NC_UINT	0	
valid_max	Valid maximum value	NC_UINT	1.e+9	
_FillValue	Fill value	NC_UINT	2^{32}-1	
ice_water_path_retrieval_error	ice water path retrieval error	NC_UINT	See valid_min and valid_max	ici_n_scan, ici_n_samples, n_err
long_name	Description of variable	NC_STRING	"Ice Water Path retrieval error"	
units	Physical units	NC_STRING	"kg·m-2"	
scale_factor	Scale factor applied	NC_DOUBLE	1.e-7	
add_offset	Offset applied	NC_DOUBLE	0.0	
valid_min	Valid minimum value	NC_UINT	0	
valid_max	Valid maximum value	NC_UINT	1.e+7	
_FillValue	Fill value	NC_UINT	2^{32}-1	
mean_particle_diameter	Mean particle diameter	NC_USHORT	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"mean particle diameter"	
units	Physical units	NC_STRING	"m"	
scale_factor	Scale factor applied	NC_DOUBLE	1.e-7	
add_offset	Offset applied	NC_DOUBLE	0.0	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	65534	
_FillValue	Fill value	NC_USHORT	65535	
mean_particle_diameter_error	mean particle diameter retrieval error	NC_USHORT	See valid_min and valid_max	ici_n_scan, ici_n_samples, n_err
long_name	Description of variable	NC_STRING	"mean particle diameter retrieval error"	
units	Physical units	NC_STRING	"m"	
scale_factor	Scale factor applied	NC_DOUBLE	1.e-7	
add_offset	Offset applied	NC_DOUBLE	0.0	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	65534	
_FillValue	Fill value	NC_USHORT	65535	
mean_ice_mass_height	mean ice mass height	NC_USHORT	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"mean ice mass height"	
units	Physical units	NC_STRING	"m"	
scale_factor	Scale factor applied	NC_FLOAT	1.0	

Variables Name	Description	Type	Range or Value	Dimension
add_offset	Offset applied	NC_FLOAT	0.0	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	20000	
_FillValue	Fill value	NC_USHORT	65535	
mean_ice_mass_ height_error	mean ice mass height retrieval error	NC_USHORT	See valid_min and valid_max	ici_n_scan, ici_n_samples, n_err
long_name	Description of variable	NC_STRING	“mean ice mass height retrieval error ”	
units	Physical units	NC_STRING	“m”	
scale_factor	Scale factor applied	NC_FLOAT	1.0	
add_offset	Offset applied	NC_FLOAT	0.0	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	20000	
_FillValue	Fill value	NC_USHORT	65535	

Table 16: Group iwp: Variables for MWI-ICI L2 product.

4.2.4.3 Group Name: quality_information

4.2.4.3.1 Group Name: lwp_quality_information

4.2.4.3.1.1 lwp_quality_information: Attributes

No common Group Attributes of the group lwp_quality_information are currently foreseen.

4.2.4.3.1.2 lwp_quality_information: Dimensions

This section describes the Group Dimensions of the group lwp_quality_information.

Dimension Name	Description	Range or Value
mwi_n_scan	Number of scans	[0-9999] [TBC]
mwi_n_samples	Number of samples	155 [TBC]
n_j	Dimension of available values of cost functions	2

Table 17: Group lwp_quality_information: Dimensions for MWI-ICI L2 product.

4.2.4.3.1.3 lwp_quality_information: Variables

This section shall describe the LWP Quality Information Group Variables for the MWI-ICI L2 Product with their specific attributes as described in Table 18. Colours are used to differentiate variable and attributes: variables in light blue and attributes in white with name right-aligned.

Variables Name	Description	Type	Range or Value	Dimension
value_of_cost_function_J	Initial and final values of cost function – observations plus background	NC_INT	See valid_min and valid_max	mwi_n_scan, mwi_n_samples, n_j
long_name	Description of variable	NC_STRING	"Initial and final values of cost function - observations plus background"	
units	Physical units	NC_STRING	""	
scale_factor	Scale factor applied	NC_FLOAT	1.e-4	
add_offset	Offset applied	NC_FLOAT	0.0	
valid_min	Valid minimum value	NC_INT	0	
valid_max	Valid maximum value	NC_INT	11000000	
_FillValue	Fill value	NC_INT	2^{31}-1	
1dvar_number_of_iterations	Number of 1D-Var iterations	NC_UBYTE	See valid_min and valid_max	mwi_n_scan, mwi_n_samples

Variables Name	Description	Type	Range or Value	Dimension
long_name	Description of variable	NC_STRING	"Number of 1D-Var iterations"	
units	Physical units	NC_STRING	"-"	
valid_min	Valid minimum value	NC_UBYTE	0	
valid_max	Valid maximum value	NC_UBYTE	30	
_FillValue	Fill value	NC_UBYTE	255	
mwi_quality_flag	*MWI data quality flag. See Table 19.*	NC_USHORT	See valid_min and valid_max	mwi_n_scan, mwi_n_samples
long_name	Description of variable	NC_STRING	"MWI data quality flag"	
units	Physical units	NC_STRING	" "	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	65534	
_FillValue	Fill value	NC_USHORT	65535	
lwp_retrieval_flag	*LWP retrieval quality flag. See Table 20.*	NC_UBYTE	See valid_min and valid_max	mwi_n_scan, mwi_n_samples
long_name	Description of variable	NC_STRING	"LWP retrieval quality flag"	
units	Physical units	NC_STRING	" "	
valid_min	Valid minimum value	NC_UBYTE	0	
valid_max	Valid maximum value	NC_UBYTE	254	
_FillValue	Fill value	NC_UBYTE	255	

Table 18: *Group lwp_quality_information : Variables for MWI-ICI L2 product.*

Table 19 details the individual bit settings of the mwi_quality_flag variable of the lwp_quality_information Group Variables for the MWI-ICI L2 Product.

mwi_quality_flag	
Bit	**Meaning**
0	Brightness temperatures of at least one MWI channel are missing for the pixel
1	The remapping of brightness temperatures of at least one MWI channel is degraded because remapping weights sum is below threshold
2	Brightness temperatures of at least one MWI channel are degraded
3	Brightness temperature NEΔT of at least one MWI channel used in the retrieval is above threshold
4	Radiometric calibration of at least one MWI channel used in the retrieval is degraded
5	MWI scan is degraded
6	geolocation of MWI channels is erroneous or degraded
7	Moon intrusion or degraded moon correction for at least one channel
8	Sun glint angle below threshold for at least one MWI channel
9	RFI correction applied for MWI-1
10-15	To be set

Table 19: Values of mwi_quality_flag of the lwp_quality_information.

Table 20 details the individual bit settings of the lwp_retrieval_flag variable of the lwp_quality_information Group Variables for the MWI-ICI L2 Product.

lwp_retrieval_flag	
Bit	**Meaning**
0	LWP retrieval is missing, degraded or not performed for the footprint.
1	LWP retrieval is degraded for the footprint.
2	LWP retrieval is missing for the footprint because 1D-Var does not converge or is not performed (e.g. footprint not over open water, screened for precipitation or because first Guess-Observation TB departures outside the limits)
3	LWP retrieval is not performed because the footprint is not on open water.
4	LWP retrieval is not performed because of precipitation screening.
5-7	To be set

Table 20: Values of lwp_retrieval_flag of the lwp_quality_information.

4.2.4.3.2 Group Name: iwp_quality_information

4.2.4.3.2.1 iwp_quality_information: Attributes

No common Group Attributes of the Group iwp_quality_information are currently foreseen.

4.2.4.3.2.2 iwp_quality_information: Dimensions

This section describes the Group Dimensions of the Group iwp_quality_information.

Dimension Name	Description	Range or Value
ici_n_scan	Number of scans	[0-9999] [TBC]
ici_n_samples	Number of samples	220 [TBC]

Table 21: Group iwp_quality_information: Dimensions for MWI-ICI L2 product.

4.2.4.3.2.3 iwp_quality_information: Variables

This section shall describe the iwp_quality_information Variables for the MWI-ICI L2 Product with their specific attributes as described in Table 22. Colours are used to differentiate variable and attributes: variables in light blue and attributes in white with name right-aligned.

Variables Name	Description	Type	Range or Value	Dimension
channel_mask	Mask of channels used in the retrieval. See Table 23.	NC_USHORT	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"Mask of channels used in the retrieval"	
units	Physical units	NC_STRING	" "	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	65534	
_FillValue	Fill value	NC_USHORT	65535	
ici_quality_flag	ICI data quality flag. See Table 24.	NC_USHORT	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"ICI data quality flag"	
units	Physical units	NC_STRING	" "	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	65534	
_FillValue	Fill value	NC_USHORT	65535	
iwp_retrieval_flag	IWP retrieval quality flag. See Table 25.	NC_UBYTE	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"IWP retrieval quality flag"	
units	Physical units	NC_STRING	" "	
valid_min	Valid minimum value	NC_UBYTE	0	
valid_max	Valid maximum value	NC_UBYTE	254	
_FillValue	Fill value	NC_UBYTE	255	

Table 22: Group iwp_quality_information: Variables for MWI-ICI L2 product.

Table 23 details the individual bit settings of the channel_mask variable of the iwp_quality_information Group Variables for the MWI-ICI L2 Product.

channel_mask	
Bit	**Meaning**
0	Channel ICI-1 used for retrieval
1	Channel ICI-2 used for retrieval
2	Channel ICI-3 used for retrieval
3	Channel ICI-4V used for retrieval
4	Channel ICI-4H used for retrieval
5	Channel ICI-5 used for retrieval
6	Channel ICI-6 used for retrieval
7	Channel ICI-7 used for retrieval
8	Channel ICI-8 used for retrieval
9	Channel ICI-9 used for retrieval
10	Channel ICI-10 used for retrieval
11	Channel ICI-11V used for retrieval

12	Channel ICI-11H used for retrieval
13-15	To be set

Table 23: Values of channel_mask of the iwp_quality_information.

Table 24 details the individual bit settings of the ici_quality_flag variable of the iwp_quality_information Group Variables for the MWI-ICI L2 Product.

ici_quality_flag	
Bit	**Meaning**
0	Brightness temperatures of at least one ICI channel used in the retrieval are missing for the pixel
1	Degraded remapping due to remapping weights sum below threshold
2	Brightness temperatures of at least one ICI channel used in the retrieval are degraded
3	Brightness temperature NEΔT of at least one ICI channel used in the retrieval is above threshold
4	Radiometric calibration of at least one ICI channel used in the retrieval is degraded
5	ICI scan is degraded
6	geolocation of ICI channels is erroneous or degraded
7	Moon intrusion or degraded moon correction for at least one channel
8	Sun glint angle below threshold for at least one ICI channel
9-15	To be set

Table 24: Values of ici_quality_flag of the iwp_quality_information.

Table 25 details the individual bit settings of the iwp_retrieval_flag variable of the iwp_quality_information Group Variables for the MWI-ICI L2 Product.

iwp_retrieval_flag	
Bit	**Meaning**
0	Retrieval of good quality for the footprint if bit is 0. Set to 1 if the IWP retrieval is degraded, missing or not performed because of clear sky conditions
1	IWP retrieval is of degraded quality for the footprint
2	IWP retrieval is missing for the footprint
3	IWP retrieval is not performed because of clear sky conditions
4-7	To be set

Table 25: Values of iwp_retrieval_flag of the iwp_quality_information.

4.2.4.4 Group Name: processing_flags

4.2.4.4.1 Processing_flags: Dimensions

This section describes the Group Dimensions of the Group processing_flags.

Dimension Name	Description	Range or Value
mwi_n_scan	Number of scans	[0-9999] [TBC]
mwi_n_samples	Number of samples	155 [TBC]
ici_n_scan	Number of scans	[0-9999] [TBC]
ici_n_samples	Number of samples	220 [TBC]

Table 26: Group processing_flags: Dimensions for MWI-ICI L2 product.

4.2.4.4.2 Processing_flags: Variables

This section describes the processing_flags Group Variables for the MWI-ICI L2 Product product with their specific attributes as given in Table 27.

Variables Name	Description	Type	Range or Value	Dimension
1dvar_processing_flag	*1D-Var processing flag. See Table 28.*	NC_USHORT	See valid_min and valid_max	mwi_n_scan, mwi_n_samples
long_name	Description of variable	NC_STRING	"1D-Var processing flag"	
units	Physical units	NC_STRING	" "	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	65534	
_FillValue	Fill value	NC_USHORT	65535	
mci_processing_flag	*MCI processing flag. See Table 29.*	NC_USHORT	See valid_min and valid_max	ici_n_scan, ici_n_samples
long_name	Description of variable	NC_STRING	"Monte Carlo integration processing flag"	
units	Physical units	NC_STRING	" "	
valid_min	Valid minimum value	NC_USHORT	0	
valid_max	Valid maximum value	NC_USHORT	65534	
_FillValue	Fill value	NC_USHORT	65535	

Table 27: Group processing_flags: Variables for MWI-ICI L2 product.

Table 28 details the individual bit settings of the 1dvar_processing_flag variable of the lwp_quality_information Group Variables for the MWI-ICI L2 Product.

1dvar_processing_flag	
Bit	**Meaning**

0	Observation is screened for land, sea-ice or precipitation
1	Observation-First Guess association failed
2	First Guess with excessive snow or with temperature/humidity outside the limits
3	Error occurs during radiative transfer simulations
4	First Guess-Observation TB departures outside the limits
5	Static bias correction applied
6	1D-Var minimization failed because of NaN in the increment vector
7	1D-Var minimization failed because the maximum number of iterations has been reached
8	Error occurs in the evaluation of B-matrix eigenvalues (in case of preconditioning)
9	1D-Var minimization reached because the state vector did not change by more than the threshold
10	1D-Var minimization reached because the cost function did not change by more than the threshold
11	A minimum of the cost function is reached, but the convergence criteria are not verified
12-15	To be set

Table 28: Values of 1dvar_processing_flag of the Group processing_flags.

Table 29 details the individual bit settings of the mci_processing_flag variable of the iwp_quality_information Group Variables for the MWI-ICI L2 Product.

mci_processing_flag	
Bit	**Meaning**
0	Use of more channels is allowed for heavy clouds
1	Montecarlo Integration is not performed on clear-sky cases.
2	Filter depending on surface properties is applied when selecting states from database.
3	Surface land emissivity is set to constant value
4	Missing sea ice information
5	All channels were used for retrieval
6	Channels have been removed to find weight match in the database
7	Increase of error variance applied to find weight match in the database
8	Number of removed channels larger than three
9	Number of removed channels larger than seven
10	Only one channel used in the retrieval
11	ICI channel brightness temperatures used in the retrieval were of degraded quality
12	Additional channel selection functionality leads to finding not enough states
13	Observation-NWP association failed
14	Error occurred during radiative transfer simulations
15	Not enough channels from the initial channel selection

Table 29: Values of mci_processing_flag of the Group processing_flags.

4.2.5 Group Name: quality

4.2.5.1 quality: Attributes

Table 30 describes the Quality Group Attributes for the MWI-ICI L2 Product.

Attribute name=	Type	Meaning and or value
overall_quality_flag_mwi_lwp_product	NC_USHORT	"0" if LWP product overall quality is OK Individual bits of the flag are set to indicate degraded conditions, the first four bits are set in case of: Bit 0: Missing MWI L1B product Bit 1: LWP Data gap(s) Bit 2: Corrupted MWI L1B product Bit 3: MWI instrument anomaly Bit 4: Missing or degraded auxiliary data Bit 5: degraded manoeuvre Bit 6: Missing or degraded NWP data Bit 7: Missing or degraded NWP error standard deviations Bit 8: Missing or degraded Sea-Ice mask Bit 9-15 can be set
overall_quality_flag_ici_iwp_product	NC_USHORT	"0" if IWP product overall quality is OK Individual bits of the flag are set to indicate degraded conditions, the first four bits are set in case of: Bit 0: Missing ICI L1B product Bit 1: IWP Data gap(s) Bit 2: Corrupted ICI L1B product Bit 3: Instrument anomaly Bit 4: missing or degraded auxiliary data Bit 5: degraded manoeuvre Bit 6: Missing or degraded NWP data Bit 7: Missing or degraded Sea-Ice mask Bit 8-15 can be set

Table 30: Group Quality: Attributes for MWI-ICI L2 product.

4.2.5.2 quality: Dimensions

This section describes the quality Statistics Group Dimensions for the MWI-ICI-L2 Product.

Dimension Name	Description	Range or Value
gap_items_mwi_lwp	Number of MWI LWP data gaps indentified during product duration. Note: it will not appear in the Product if overall_quality_flag_mwi_lwp_product bit 1 equals 0.	"" 1 ≤ N
gap_items_ici_iwp	Number of ICI IWP data gaps indentified during product duration. Note: it will not appear in the Product if overall_quality_flag_ici_iwp_product bit 1 equals 0.	"" 1 ≤ N

Table 31: Group quality: Dimensions for MWI-ICI L2 Product.

4.2.5.3 quality: Variables

This section describes the quality Group Variables for the MWI L1B radiance product with their specific attributes as given in Table 32.

Variable name=	Data Type type=	Attribute name="long_name" value=	Attribute name="units" value=
Product Duration shape=1			
duration_of_mwi_lwp_product	NC_DOUBLE	"Entire duration of the MWI LWP product"	"s"
duration_of_mwi_lwp_data_present	NC_DOUBLE	"Amount of MWI LWP data present in the product"	"s"
duration_of_mwi_lwp_data_missing	NC_DOUBLE	"Amount of MWI LWP data missing in the product"	"s"
duration_of_mwi_lwp_data_degraded	NC_DOUBLE	"Amount of MWI LWP data degraded in the product"	"s"
duration_of_ici_iwp_product	NC_DOUBLE	"Entire duration of the ICI IWP product"	"s"

duration_of_ici_iwp data_present	NC_DOUBLE	"Amount of ICI IWP data present in the product"	"s"
duration_of_ici_iwp data_missing	NC_DOUBLE	"Amount of ICI IWP data missing in the product"	"s"
duration_of_ici_iwp data_degraded	NC_DOUBLE	"Amount of ICI IWP data present in the product"	"s"
Gaps Information shape=gap_items_mwi_lwp			
gap_mwi_lwp_start_time_utc	NC_DOUBLE	"MWI LWP gap start time in UTC". Note: it will not appear in the Product if overall_quality_flag_mwi_lwp_product bit 1 equals 0.	seconds since 2020-01-01 00:00:00.000
gap_mwi_lwp_end_time_utc	NC_DOUBLE	"MWI LWP gap end time in UTC". Note: it will not appear in the Product if overall_quality_flag_mwi_lwp_product bit 1 equals 0.	seconds since 2020-01-01 00:00:00.000
Gaps Information shape=gap_items_ici_iwp			
gap_ici_iwp_start_time_utc	NC_DOUBLE	"ICI IWP gap start time in UTC". Note: it will not appear in the Product if overall_quality_flag_ici_iwp_product bit 1 equals 0.	seconds since 2020-01-01 00:00:00.000
gap_ici_iwp_end_time_utc	NC_DOUBLE	"ICI IWP gap end time in UTC". Note: it will not appear in the Product if overall_quality_flag_ici_iwp_product bit 1 equals 0.	seconds since 2020-01-01 00:00:00.000

Table 32: Group Quality Statistics: Variables for MWI-ICI L2 Product.

5 PRODUCT FORMAT VERSION CONTROL

This section provides Product Format Version Control Numbers for the MWI-ICI L2 Product defined within this document. This version is reflected in the following global attribute present in each EPS-SG mission product centrally generated as described in the **[GPFS]**:

Product ID	Product Format Version Control Number (format_version)	Product Format Specification Issue (pfs_ reference_and_version)	Generic Product Format Specification Issue (gpfs_ reference_and_version)
MWI-ICI L2 PRODUCT	***0.0***	***1.B***	***1.F***
MSP-02-LIW	***1.0***	***1.C***	***1.L***
MSP-02-LIW	***2.0***	***2A***	***2A***
MSP-02-LIW	***2.3***	***2C***	***3B***
MSP-02-LIW	***3.0***	***3***	***3D***
MSP-02-LIW	***3.0***	***3A***	***3D***

Table 33: Record Format Version Numbers.

APPENDIX A SIZE OF EPS-SG MWI-ICI LEVEL 2 PRODUCT

This appendix provides an estimated size of the EPS-SG MWI-ICI Level 2 product size (in Mbytes orbit, 1 Mbytes=10^6 bytes) of the EPS-SG MWI-ICI Level 2 product, given in Table 34. The number of samples per scan for MWI (155, TBC) and ICI (220, TBC) due to the fact that LWP and IWP are currently envisaged on separate MWI and ICI footprint samples after remapping in order to perform the L2 retrievals. The assumed size of the considered parameters (in bytes) is presented in Table 35.

Mean duration D of one orbit was assumed to be (in minutes):

D=R·Day_minutes/N_orbits

With R: Repeat cycle (29 days); Day_minutes: Number of minutes per day (1440 minutes), N_orbits: number of orbits in a repeat cycle (412).

Thus D=101.36 minutes/orbit.

With a scan every 1.33 s (scanning at 45 RPM) this implies 4573 scans per orbit. This value is considered in the size estimation.

Product ID	Product Description	Size (MB Orbit)
MSP-02-LIW	MWI-ICI Level 2 Product MWI-ICI Level 2 Product providing cloud and atmospheric parameters	85.00

Table 34: Size of the MWI-ICI Level 2 Product.

parameter	samples per scan	bytes	presented values for each sample	bytes*samples* presented values
Time UTC (MWI scan)	1	8	1	8
MWI Geodetic latitude	155	4	1	620
MWI Geodetic longitude	155	4	1	620
surface_type	155	1	1	155
Liquid Water Path	155	4	1	620
LWP error estimate	155	2	1	310
tcwv diagnostic retrieval	155	2	1	310
tcwv diagnostic retrieval error	155	2	1	310
value of cost function J	155	4	2	1240
1dvar number of iterations	155	1	1	155
1dvar processing flag	155	2	1	310
mwi_quality_flag	155	2	1	310
Time UTC (ICI scan)	1	8	1	8
ICI Geodetic latitude	220	4	1	880
ICI Geodetic longitude	220	4	1	880
surface_type	220	1	1	220
Z_{mean} latitude	220	2	1	440
Z_{mean} longitude	220	2	1	440
Ice Water Path	220	4	1	880
IWP error estimate	220	4	4	3520
mean particle size D_{mean}	220	2	1	440
D_{mean} error estimate	220	2	4	1760
mean ice mass height	220	2	1	440
Z_{mean} error estimate	220	2	4	1760
channel mask	220	2	1	440
ici_quality_flag	220	2	1	440
iwp_retrieval_flag	220	1	1	440
mci_processing_flag	220	2	1	440

Table 35: Assumed size of the MWI-ICI Level 2 Product variables

APPENDIX B XML DESCRIPTION OF EPS-SG MWI-ICI L2 PRODUCT FORMAT

The XML description of the NetCDF-4 EPS-SG MWI-ICI L2 product is attached in the file EPS-SG-MSP-L02-LIW_30_01.xml:

EPS-SG-MSP-L02-LI
W_30_1A.xml

The associated EPS-SG Product XML schema definition file is available in the [GPFS] document.

The following table presents the TBDs affecting the current version of the document.

ID	Section	Title	Text
TBD-1.-	~~Multiple Sections~~	~~Retrieval_variables_and quality_information~~	~~Technical details on algorithms included in this version, and more specifically the algorithm for the Ice Water Path, have changed from previous version. As such, some output variables are TBD, and additional variables may be possible.~~
TBD-2.	~~Multiple Sections~~	~~Data size~~	~~Data size is preliminary, based on estimated number of samples and on preliminary assessment of output variables. It is also driven by the current need to use two different grids for the various products.~~
TBD-3.-	~~Multiple Sections~~	~~Attributes and dimensions~~	~~Attributes and dimensions for some groups are TBD~~

The following table presents the TBCs affecting the current version of the document.

ID	Section	Title	Text
~~TBC-1.~~	~~Multiple Sections~~	~~IWP retrieval~~	~~Considering the level of maturity of the IWP retrieval algorithm, (see TBD-1) some variables are TBC.~~
TBC-2.	Multiple sections	Number of L2 product samples	Number of L2 product samples is TBC. It is also driven by the current need to use two different grids for the MWI and ICI derived parameters.
~~TBC-3.~~	~~4.2.4.1.3 4.2.4.2.3~~	~~Extra diagnostic variables~~	~~retrieval_diagnostic_variables are currently TBC.~~
TBC-4.	4.2.4.3 4.2.4.4 4.2.5	Quality information	quality flags and quality variable attributes may be refined following further prototype testing.