GOME-2 Level 1 Product Format Specification

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Change Record

Version	***Date***	***DCR* No.*** *if applicable*	***Description of Changes***
Issue 2 Revision 0	25/05/1999		First Issue
Issue 2 Draft B	23/07/1999		Addressed RIDs
Issue 3 Draft A	03/07/2000	EUM.EPS.SYS.DCN.031	Incorporate change in EPS Generic Product Specification, Issue 3
Issue 4 Draft A	15/11/2000		LEO/C/TP Add GTS Product section Simplified document layout Updated contents with respect to RD-1
Issue 4 Draft B			LEO/C/TP Removed items redundant with GPFS Updated signature table Removed GTS section – covered by PGS document Added Generic Record Header details Removed Footer records in line with latest GPFS update
Issue 5 Rev 0	01/06/2001		Issue for CGS PDR
Issue 5 Rev 1	13/06/2001		Revised issue for CGS PDR Updated signature table
Issue 5 Rev 3 Draft	19/12/2001		Harmonisation with PGS: (details see first page of annex)
Issue 6:0	17/05/2002		Harmonisation with GOME-2 PGS Issue 6:0. Section on Enumerated Variables added. For further details see the Annex to this document.
Issue 6:1	31/05/2002	EUM.EPS.SYS.DCR.02.120	Typographical errors corrected. For further details see the Annex to this document.
Issue 6:2	14/06/2002	EUM.EPS.SYS.DCR.02.132	Occurrence rates for VIADR-1a-Dark and VIADR-1a-Spec are now variable.

Version	*Date*	*DCR* No.* *if applicable*	*Description of Changes*
			Section on Generic Record Header: Details on MDR start/stop time added. Table 7 (enumerated variables) expanded. Among the new enumerated variables are those for channel number (1 to 6) and band number (1 to 10). Sections on Associated Data Records (2.3.7, 2.4.7) removed, as ADRs have been deleted from Generic PFS (as from version 6.0, Feb 2002). Generic Record Header subclass IDs updated. Typographical errors corrected. For further details see the Annex to this document
Issue 6:3	03/09/2002	EUM.EPS.SYS.DCR.02.161	Record Format Version Control added Further changes detailed in the Annex to this document
Issue 6:4	27/03/2003	EUM.EPS.SYS.DCR.03.077	Separate scaling factors for FPA and PMD wavelength coefficients. GIADR-Channels, GIADR-1a-Bands, GIADR-1b-Bands: Bands/channels merged into single GIADR. Accordingly, occurrence information changed to once per product. For further details see the Annex to this document.
Issue 6:5	12/03/2004	EUM.EPS.SYS.DCR.04.007	Record subclasses for GEADR defined. Clarification on record ordering added in section “Occurrence information”. Reference to PFS Variable name APPLIED_CAL_STEPS added to first column of Table 9 enumerated variables. For further details see the Revision History in the Annex to this document.
Issue 7:0	19/03/2004	EUM.EPS.SYS.DCR.04.024	Section 2.1 Form
		MoM EPS-APS-MN-1907	Storage of arrays of Variable Scale Factor Integers clarified.
		DJO-GOME-SPR-115	Table 9: Enumerated Variables PCD_BASIC: F_OLD_CAL_DATA values altered to allow addition of values in the case that more than one of the in-flight calibration data are older than a specified threshold.
Issue 7:1	09/03/2006	EUM.EPS.SYS.DC	

Version	*Date*	*DCR* No.* *if applicable*	*Description of Changes*
		R.06.030 8	
		EUM.EPS .AR.1758	Table 1: Level 1a GEADR Subclasses Updated to be consistent with PPF implementation. Table 3: Level 1a VEADR Subclasses Added to be consistent with PPF implementation. Table 6: Level 1b GEADR Subclasses Updated to be consistent with PPF implementation. Occurrence Information Updated to be consistent with PPF implementation
		DJO.SPR .GOME.1 34 & MO-DCP-ESA-GO-002 EUM.EPS .NCR.125 4 & MO-DCP-ESA-GO-008	Annex: Scaling factor for VIADR-1a-Spec field POLY_COEFF_PMD changed from 3 to 0 to avoid overflow. Obsolete remark removed. Criteria for which generic quality flag DEGRADED-PROC_MDR will be raised have been reduced to prevent unnecessary operator warnings.
Issue 7:2	19/01/2007	EUM.SYS .DCR.07. 0345 Associate d GOME-2 PPF AR EUM.EPS .AR.7020	Annex: Fields GOOD_FIT and FINAL_CHI_SQUARE from the compound variable CLOUD, both previously u-integer2 have been combined so that GOOD_FIT is no longer written to the product and FINAL_CHI_SQUARE becomes integer4. The size and structure of the product does not change, only the use of these specific 4 bytes. Additionally the scaling factor for FINAL_CHI_SQUARE has been reduced from 6 to 5. These changes were necessary to accomodate the dynamic range of FINAL_CHI_SQUARE which was not possible using u-integer2. The scaling factors for E_FIT_1 and E_FIT_2 have been changed to be 1 and 4 respectively to accommodate the range of values experienced with in-flight data. The flag F_HOT no longer causes DEGRADED_PROC_MDR to be raised as hot pixels occur regularly in the SAA due to particle bombardment and are filtered out by on-ground processing where necessary. The instrument is not degraded as such. Occurence rate of VEADR and VIADR records updated to take account of improved logic of in-flight calibration data usage.

Version	*Date*	*DCR* No.* *if applicable*	*Description of Changes*
Issue 7:3	11/01/2008	EPS_AB_DCR_EUM_32 Associated AR's EUM.EPS.AR.9064 & EUM.EPS.AR.9103	Annex: VIADR-1a-SPEC updated to replace the polynomial coefficients describing the FPA and PMD spectral calibration with the complete spectral grid in both cases. Field PCD_SPEC: N_ITERATIONS changed to be SHIFT_PER_WINDOW with size unchanged. Record GIADR-1b-PMDBandDef added on user request.
Issue 7:4	01/04/2008	EPS_AB_DCR_EUM_39	Possible values for enumerated variable PCD_BASIC: F_OLD_CAL_DATA listed in Table 11 expanded.
V8A	11/09/2008		Migrated into Hummingbird. Body contents copied into standard template and reformatted, This version is effectively the same as Issue 7.4 with only editorial updates made: Use of bookmarks for document references and auto-referencing of these in body text. 'Section 6 Annex' retitled Appendix A and link inserted to Annex Excel file in Hummingbird. Various typo corrections and standardisations.
V9	01/07/2010	EPS_AB_ECP_474	Update on Section 2.3.2.1 Table 1 and Section 2.4.2.1 Table 6 on level 1A and 1B GEADR sub-classes; likewise in tables in Sections 3.1, 3.2 & 5. Added enumerated values to PCD_BASIC_F_OLD_CAL_DATA and new entries for SCAN_DIRECTION in Table 11. GEADR-1a-Timecorrelation and GEADR-1a-Orbit changed to VEADRs for both level 1A and B. GEADR-1a-CorrectionFactor changed to VEADR-1a-CorrectionFactor. Annex: Changes to PCD_BASIC in Compounds: increased read-out numbers predominantly by changing variable type to bitstring. GEO_EARTH_ACTUAL: compound field added for scan-direction index. Added field to BAND_P compound: UNCORR_RAD provides PMD-P and PMD_S read-outs which are not corrected for the instrument sensitivity to polarisation. UNCORR_ERR_RAD provides the corresponding error. MDR-1b-Earthshine: Introduction of new GEO_EARTH_ACTUAL_[#] fields where # is from 1 to 10 and corresponds to the unique integration time index. Their field dimension is given by N_UNIQUE_INT and GEO_REC_LENGTH. CHANNEL_READOUT_SEQ field added in GIADR-Channel for detector pixel read-out sequence direction. Two cloud parameter fields CLOUD_PMD_1 and CLOUD_PMD_2 added in CLOUD compound for PMD derived cloud parameters. MDR level 0 GHR start and stop time have been added as additional fields to the ISP and ISP_HEAD compounds.

Version	***Date***	***DCR* No.*** *if applicable*	***Description of Changes***
v9A	04/03/2011	ODT_DCR_241	Annex: MDR-1a-Other: Version number should be 2. Corrected in this version. Compounds: Updated Flag descriptors in PCD_BASIC. Updated CLOUD parameter description to add the reference BAND readouts Types: Positions of GEO_SUN and GEO_MOON swapped to put into correct alphabetic order.
V9B – V9D	21/03/2012	Associated AR EUM/EPS/AR/13781.4	Correct GOME-2 PFS v9 to report correctly on occurrence rates for GIADR files. Occurrence rate changed from “once per product” to “maximum twice per product” for all GIADR files.
V10 - V10A	05/05/2017 06/12/2017		Updates related to FRESCO+v2 (KNMI) and Fraunhofer lines spectral calibration algorithm (PPF 7.0.0)
V10B	25/01/2021		Moved to new docx template

****DCR = Document Change Request***

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1 INTRODUCTION

1.1 Scope

This document is the Global Ozone Monitoring Experiment-2 (GOME-2) Level 1 Product Format Specification.

The generic product format specification used by this document is defined in the EPS Generic Product Format Specification [AD-1]. The conventions used by this document are defined in the EPS Product Conventions Document [AD-3].

The structure and content of the products will be developed in the course of further EPS system design and nothing in this document (including the Annex) shall be taken as restricting this development of the product structures, the product or field sizes, or the time during processing at which content will be inserted into the structure of the product.

1.2 Applicable Documents

	Document Title	**Reference**
AD-1	EPS Generic Product Format Specification	EPS/GGS/SPE/96167
AD-2	EPS Ground Segment GOME-2 Level 1 Product Generation Specification	EPS/SYS/SPE/990011
AD-3	EPS Product Conventions Document	EPS/SYS/TEN/990007

1.3 Reference Documents

	Document Title	**Reference**
RD-1	GOME-2 Level 1 Product Format Specification - Annex	EPS.MIS.SPE.97232.ANX

1.4 Document Structure

The document is organised in the following sections, including the introduction:

- Section 1 describes the scope of the document;
- Section 2 details the product formats for Level 1a and 1b products;
- Section 3 details the occurrence rates of the various records within the Level 1a or 1b product;
- Section 4 lists the enumerated variables used within the level and their possible values and associated meanings;
- Section 5 provides a history of version numbers for the records defined within the document;
- Appendix A links to detailed tables describing the record formats.

2 STRUCTURE OF GOME-2 LEVEL 1 PRODUCTS FORMAT

2.1 Form

The product format for both GOME-2 Level 1a and 1b products is based on the generic product format as described in [AD-1]. This document details the instrument- and level-specific additions required for GOME-2 Level 1a and 1b products.
An array of Variable Scale Factor Integers shall be stored as an array of the compound data type, and not as an array of scale factors followed by an array of the integer type (the second solution being suggested but not strictly required in [AD-1]).

2.2 Generic Record Header Fields

All generic record header fields of the instrument- or level-specific records defined in this document shall have an INSTRUMENT_GROUP value of GOME (see [AD-1]).
The RECORD_SUBCLASS shall have the value 1 if there is only one record defined for the record class. For record classes with more than one subclass, RECORD_SUBCLASS is defined in the tables below.
The RECORD_START_TIME for a Measurement Data Record (both Level 1a and Level 1b) shall be the UTC time corresponding to the first scan position in this record, i.e., $t_{\psi,0}$ as determined in Module Determine UTC Time Grid. The RECORD_END_TIME for a Measurement Data Record (both Level 1a and Level 1b) shall be the UTC time corresponding to the last scan position in this record, i.e., $t_{\psi,64}$ as determined in Module Determine UTC Time Grid (see [AD-2]).

2.3 Level 1a

2.3.1 Secondary Product Header Record

The Level 1a SPHR is detailed in [RD-1] (Appendix A). Note that the SPHR is common to both the Level 1a and Level 1b products.

2.3.2 Global External Auxiliary Data Record

The auxiliary datasets to be referenced by a GEADR shall include those auxiliary datasets used by the GOME-2 PGF but not written into the GOME-2 Level 1a product. This comprises for Level 0 to 1a processing initialisation datasets, pre-flight calibration key datasets, orbit datasets and correction factor datasets as detailed in [AD-2]. The referencing format is to be defined by ASPI.
There are three subclasses of GEADR for the Level 1a Product.

2.3.2.1 Record Subclasses

Subclass	*Description*	*Subclass ID*
GEADR-Static	Surface elevation (topography) and land-sea mask required for Level 1a processing (STA file)	3
GEADR-Initialisation	Initialisation parameters (INS file)	7
GEADR-KeyData	Pre-flight calibration key data (CAL file)	8

Table 1: Level 1a GEADR Subclasses.

2.3.3 Global Internal Auxiliary Data Record

There are four subclasses of GIADR for the Level 1a Product. These are detailed in [RD-1] (Appendix A).

2.3.3.1 Record Subclasses

Subclass	*Description*	*Subclass ID*
GIADR-1a-Bands	Level 1a band definition parameters	1
GIADR-1a-Steps	Level 0 to 1a applicable calibration steps	2
GIADR-1a-MME	Müller Matrix Elements	3
GIADR-Channels	Definition of wavelength (and corresponding pixel) ranges for valid data (also used in Level 1b)	4

Table 2: Level 1a GIADR Subclasses.

2.3.4 Variable External Auxiliary Data Record

There are four subclasses of VEADR for the Level 1a Product.

2.3.4.1 Record Subclasses

Subclass	*Description*	*Subclass ID*
VEADR-InFlightCal	In-flight calibration data (IFC file)	1
VEADR-1a-CorrectionFactor	Degradation correction factors (COR file)	2
VEADR-TimeCorrelation	Time correlation information (OBT file)	3
VEADR-Orbit	Orbit state vector (OSV file)	4

Table 3: Level 1a VEADR Subclasses.

2.3.5 Variable Internal Auxiliary Data Record

There are five subclasses of VIADR for the Level 1a Product. These are detailed in [RD-1] (Appendix A).

2.3.5.1 Record Subclasses

Subclass	*Description*	*Subclass ID*
VIADR-1a-Dark	Dark signal parameters	1
VIADR-1a-PPG	Pixel-to-Pixel Gain parameters	2
VIADR-1a-Etalon	Etalon parameters	3
VIADR-1a-Spec	Spectral calibration parameters	4
VIADR-SMR	Solar Mean Reference spectrum parameters (also used in Level 1b)	5
VIADR-1a-Spec-SMR	Spectral calibration parameters derived with Fraunhofer algorithm	6
VIADR-1a-DPM	Dead pixel mask derived from WSL or Dark measurements	7

Table 4: Level 1a VIADR Subclasses.

2.3.6 Measurement Data Record

There are five subclasses of MDR for the Level 1a product. They are detailed in [RD-1] (Appendix A).

2.3.6.1 Record Subclasses

Subclass	*Description*	*Subclass ID*
MDR-1a-Earthshine	Earthshine measurements	1
MDR-1a-Calibration	Calibration measurements (except sun and moon)	2
MDR-1a-Sun	Sun measurements	3
MDR-1a-Moon	Moon measurements	4
MDR-1a-Other	Other instrument modes	5

Table 5: Level 1a MDR Subclasses.

Note: the integration period for an MDR is variable, and consequently the size of the MDR-1a-Earthshine, MDR-1a-Calibration, MDR-1a-Sun and MDR-1a-Moon records is variable.

2.4 Level 1b

2.4.1 Secondary Product Header Record

The Level 1b SPHR is detailed in [RD-1] (Appendix A). Note that the SPHR is common to both the Level 1a and Level 1b products.

2.4.2 Global External Auxiliary Data Record

The auxiliary datasets to be referenced by a GEADR shall include those auxiliary datasets used by the GOME-2 PGF but not written into the GOME-2 Level 1b product. This comprises for Level 1a to 1b processing the initialisation datasets, static auxiliary datasets and pre-flight calibration key datasets as detailed in [AD-2]. The referencing format is to be defined by ASPI.
There are three subclasses of GEADR for the Level 1b Product.

2.4.2.1 Record Subclasses

Subclass	*Description*	*Subclass ID*
GEADR-Static	Surface elevation (topography) plus transmittance database, surface reflectance database and TOMS UV reflectance database required for Level 1b cloud algorithm (STA file)	3
GEADR-Initialisation	Initialisation parameters (INS file)	7
GEADR-KeyData	Pre-flight calibration key data (CAL file)	8

Table 6: Level 1b GEADR Subclasses.

2.4.3 Global Internal Auxiliary Data Record

There are four subclasses of GIADR for the Level 1b Product. These are detailed in [RD-1] (Appendix A). Note that although the *format* of GIADR-1a-Steps and GIADR-1b-Steps is the same, separate records are used because the assignment to individual calibration steps is different between Level 1a and Level 1b, i.e., calibration step number *N* has a different meaning in Level 1a and Level 1b. Therefore the *content* of GIADR-1a-Steps and GIADR-1b-Steps will be different.

2.4.3.1 Record Subclasses

Subclass	*Description*	*Subclass ID*
GIADR-Channels	Definition of wavelength (and corresponding pixel) ranges for valid data (also used in Level 1a)	4
GIADR-1b-Bands	Level 1b band definition parameters	5
GIADR-1b-Steps	Level 1a to 1b applicable calibration steps	6
GIADR-1b-PMDBandDef	PMD band definition information	7

Table 7: Level 1b GIADR Subclasses.

2.4.4 Variable External Auxiliary Data Record

There is one subclass of VEADR for the Level 1b Product.

2.4.4.1 Record Subclasses

Subclass	*Description*	*Subclass ID*
VEADR-InFlightCal	In-flight calibration data (IFC file)	1
VEADR-TimeCorrelation	Time correlation information (OBT file)	3
VEADR-Orbit	Orbit state vector (OSV file)	4

Table 8: Level 1b VEADR Subclasses.

2.4.5 Variable Internal Auxiliary Data Record

There is one subclass of VIADR for the Level 1b Product. Note that this subclass, VIADR-SMR, is common to both the Level 1a and 1b products. This is detailed in [RD-1] (Appendix A).

2.4.5.1 Record Subclasses

Subclass	*Description*	*Subclass ID*
VIADR-SMR	Solar Mean Reference spectrum parameters (also used in Level 1a)	5

Table 9: Level 1b VIADR Subclasses.

2.4.6 Measurement Data Record

There are four subclasses of MDR for the Level 1b product. They are detailed in [RD-1] (Appendix A).

2.4.6.1 Record Subclasses

Subclass	*Description*	*Subclass ID*
MDR-1b-Earthshine	Earthshine measurements	6
MDR-1b-Calibration	Calibration measurements (except sun and moon)	7
MDR-1b-Sun	Sun measurements	8
MDR-1b-Moon	Moon measurements	9

Table 10: Level 1b MDR Subclasses.

Note: the integration period for an MDR is variable, and consequently the size of the MDR-1b-Earthshine, MDR-1b-Calibration, MDR-1b-Sun, and MDR-1b-Moon records is variable.

3 OCCURRENCE INFORMATION

An example timeline illustrating the variability of the occurrence rate and size of the records identified is given in [AD-2]. Note that the tables below do NOT define the order of records within the product. The record order is defined by the EPS Generic Product Format Specification [AD-1].

3.1 Level 1a Product

Record	*Occurrence*
MPHR	Once per product
SPHR	Once per product
GEADR-Static	Once per product
GEADR-Initialisation	Once per product
GEADR-KeyData	Once per product
GIADR-1a-Bands	Maximum twice per product
GIADR-1a-Steps	Maximum twice per product
GIADR-1a-MME	Maximum twice per product
GIADR-Channels	Maximum twice per product
VEADR-InFlightCal	Variable occurrence rate.
VEADR-1a-CorrectionFactor	Once per product
VEADR-TimeCorrelation	Maximum twice per product
VEADR-Orbit	Maximum twice per product
VIADR-1a-Dark	Variable occurrence rate. To be filled with those Dark signal corrections to be used subsequently during the processing of the complete Level 1b product.
VIADR-1a-PPG	Variable occurrence rate. To be filled with those PPG corrections to be used subsequently during the processing of the complete Level 1b product.
VIADR-1a-Etalon	Variable occurrence rate. To be filled with those Etalon corrections to be used subsequently during the processing of the complete Level 1b product.
VIADR-1a-Spec	Variable occurrence rate. To be filled with those spectral calibration parameters to be used subsequently during the processing of the complete Level 1b product.
VIADR-1a-Spec-SMR	Same as VIADR-1a-Spec
VIADR-1a-DPM	Maximum once per product
VIADR-SMR	Maximum twice per product
MDR-1a-Earthshine	Variable occurrence rate / variable size
MDR-1a-Calibration	Variable occurrence rate / variable size
MDR-1a-Sun	Variable occurrence rate / variable size
MDR-1a-Moon	Variable occurrence rate / variable size
MDR-1a-Other	Variable occurrence rate

Table 11: Occurrence of level 1a records.

3.2 Level 1b Product

Record	*Occurrence*
MPHR	Once per product
SPHR	Once per product
GEADR-Static	Once per product
GEADR-Initialisation	Once per product
GEADR-KeyData	Once per product
GIADR-Channels	Maximum twice per product
GIADR-1b-Bands	Maximum twice per product
GIADR-1b-Steps	Maximum twice per product
GIADR-1b-PMDBandDef	Maximum twice per product
VEADR-InFlightCal	Variable occurrence rate.
VEADR-TimeCorrelation	Maximum twice per product
VEADR-Orbit	Maximum twice per product
VIADR-SMR	Maximum twice per product
MDR-1b-Earthshine	Variable occurrence rate / variable size
MDR-1b-Calibration	Variable occurrence rate / variable size
MDR-1b-Sun	Variable occurrence rate / variable size
MDR-1b-Moon	Variable occurrence rate / variable size

Table 12: Occurrence of level 1b records.

4 ENUMERATION VARIABLES

The following tables list the enumeration variables used in the GOME-2 Level 1a and 1b products. For all variables listed their possible values and associated meanings are given. A reference to equivalent variable names used in [AD-2] is also provided.

PFS Variable Name	*Description and Equivalent Variable Name in [AD2]*	*Value*	*Description of Value*	*Equivalent Name for Value in [AD2]*
CHANNEL_ NUMBER	Channel number	1	Main FPA channel 1	N/A
		2	Main FPA channel 2	
		3	Main FPA channel 3	
		4	Main FPA channel 4	
		5	PMD channel p	
		6	PMD channel s	
BAND_NUMBER	Band number (do not confuse with PMD bands)	1	Main FPA band 1a	N/A
		2	Main FPA band 1b	
		3	Main FPA band 2a	
		4	Main FPA band 2b	
		5	Main FPA band 3	
		6	Main FPA band 4	
		7	PMD p blocks CDE	
		8	PMD s blocks CDE	
		9	PMD p block B	
		10	PMD s block B	
PMD_READOUT	PMD readout mode *PMD_readout*	0	Nominal	*nominal*
		1	Solar	*solar*
		2	Calibration	*calibration*
		3	Various (PMD read-out mode changes within a scan)	*various*
PMD_TRANSFER	PMD transfer mode *PMD_transfer*	1	Band + Raw	*band + raw*
		2	Band + Mixed	*band + mixed*
		3	Raw transfer	*raw*
		4	Various (PMD transfer mode changes within a scan)	*various*
OBSERVATION_ MODE	Observation mode *Mode*	0	Nadir	*Nadir_scan*
		1	North pole scanning	*Nth_pole_scan*
		2	South pole scanning	*Sth_pole_scan*
		3	Other scanning	*Other_scan*
		4	Nadir static	*Nadir_static*
		5	Other static	*Other_static*
		6	Dark	*Dark*
		7	LED	*LED*
		8	WLS	*WLS*

PFS Variable Name	*Description and Equivalent Variable Name in [AD2]*	*Value*	*Description of Value*	*Equivalent Name for Value in [AD2]*
		9	SLS	*SLS*
		10	SLS over diffuser	*SLS_diff*
		11	Sun	*Sun*
		12	Moon	*Moon*
		13	Idle	*Idle*
		14	Test	*Test*
		15	Dump	*Dump*
		16	Invalid	*Invalid*
APPLIED_CAL_ STEPS	Calibration steps, Level 1a	Calibration steps applied in the processing are reported in GIADR-1a-Steps in two-dimensional boolean arrays. The first dimension corresponds to enumerated variable OBSERVATION_MODE. For the second dimension, an enumerated variable with values defined by the corresponding algorithm numbers (i.e., *N* for algorithm A2.*N*) in [**Error! Reference source not found.**] shall be used.		
APPLIED_CAL_ STEPS	Calibration steps, Level 1b	As Calibration steps, Level 1a, with *N* for algorithm A3.*N*.		
PCD_DARK F_DARK_MISS PCD_PPG F_PPG_MISS PCD_ETALON F_ETALON_MISS	Flag indicating that missing mean *Dark/LED/WLS* calibration mode measurements have been filled by interpolation or that one complete channel/ band is missing	0	no missing pixels	*no_missing*
		1	missing pixels filled by interpolation	*some_missing*
		2	complete channel/ band missing	*all_missing*
PCD_PPG PPG_BACK	Switch for selection of backup source (WLS) in case of LED failure *PPG_back*	0	LED	*LED*
		1	WLS backup	*WLS*
PCD_ETALON ETALON_BACK	Switch for selection of backup source (SMR) in case of WLS failure *Eta_back*	0	WLS	*WLS*
		1	SMR backup	*Sun*
PCD_ETALON ETALON_ALGO	Etalon correction algorithm selection *Eta_a*lgo	0	Algorithm option 1	*Algo1*
		1	Algorithm option 2	*Algo2*
PCD_BASIC F_SUNGLINT	Flag indicating risk of sun-glint	0	no risk	*NoRisk*
		1	low risk	*LowRisk*
		2	high risk	*HighRisk*
OUTPUT_ SELECTION	Switch indicating whether to calculate the absolutely calibrated radiance or a sun-normalised radiance *SunNor*m	0	Absolutely calibrated radiance	*AbsRad*
		1	Sun normalised radiance	*NormRad*
		0	Successful fit	*success*

PFS Variable Name	*Description and Equivalent Variable Name in [AD2]*	*Value*	*Description of Value*	*Equivalent Name for Value in [AD2]*
CLOUD FAIL_FLAG	Fail flag for cloud parameter fitting *CloudFail*	1	R out of range	*reflectivity_out_of_range*
		2	θ_0 out of range	*solar_zenith_out_of_range*
		3	θ out of range	*satellite_zenith_out_of_range*
		4	Fit did not converge	*no_conver-gence*
		5	Missing input data	*missing_input*
CLOUD FIT_MODE	Flag indicating cloud fitting mode *FitMode*	0	Default fitting for c and z_c	*cloud*
		1	Snow/ice mode for A and z	*snow_ice*
PCD_BASIC F_OLD_CAL_ DATA	Flag to indicate that in-flight auxiliary calibration data in use in the Level 0 to 1 processing is older or outside a user-specified validity range. Given are the decimal values of the most significant bit. Note that multiple bits can be set at a time.	0	No in-flight auxiliary calibration data is old	N/A
		1	Dark signal correction old	
		2	PPG correction old	
		4	Spectral calibration parameters old	
		8	Etalon correction old	
		16	SMR old	
		32	Missing dark signal	
		64	Missing spectral cali-bration	
		128	Missing other	
		2^y	Bad dark signal (either missing or old) in band 0...9 with y=8,9,...17 respectively	
SCAN_DIRECTION	Flag to indicate the direction of scanning per read-out.	0	other	N/A
		1	forward	
		2	backward	

Table 13: Enumerated variables used in the GOME-2 PFS.

5 RECORD FORMAT VERSION CONTROL

This section provides version numbers for the records defined within this document.

Notes:

1. In PFS Issue 6:4, records GIADR-1a-Bands, GIADR-1b-Bands, GIADR-Channels and VIADR-1a-Spec were changed, but their format version number was erroneously kept at 1 instead of being updated to 2. This error has been corrected.
2. Format version 2 for records MDR-1b-* was used as an intermediate version between PFS Issues 6:4 and 6:5. Therefore, format version 3 is used for these records from Issue 6:5 on.
3. From PFS Issue 10, records MDR-1a-Earthshine and MDR-1b-Earthshine have been given a new version number as their type PCD_EARTH has changed (new item APPLIED_SPECCAL added).

Record Subclass	*Format Version Number*	*Issue Defined*
SPHR	2	6.5
GEADR-TimeCorrelation	1	6.5
GEADR-Orbit	1	6.5
GEADR-Static	1	7.1
GEADR-Initialisation	1	6.5
GEADR-KeyData	1	6.5
GEADR-1a-CorrectionFactor	1	6.5
GIADR-1a-Bands	2	6.4
GIADR-1a-Steps	1	6.2 (CDR)
GIADR-1a-MME	2	6.5
GIADR-Channels	3	9
VEADR-InFlightCal	1	7.1
VIADR-1a-Dark	1	6.2 (CDR)
VIADR-1a-PPG	1	6.2 (CDR)
VIADR-1a-Etalon	1	6.2 (CDR)
VIADR-1a-Spec	4	7.3
VIADR-1a-Spec-SMR	1	10
VIADR-SMR	2	10
VIADR-1a-DPM	1	10
MDR-1a-Earthshine	4	10
MDR-1a-Calibration	4	10
MDR-1a-Sun	4	10
MDR-1a-Moon	4	10
MDR-1a-Other	3	10
GIADR-1b-Bands	2	6.4
GIADR-1b-PMDBandDef	1	7.3
GIADR-1b-Steps	1	6.2 (CDR)
MDR-1b-Earthshine	6	10
MDR-1b-Calibration	5	10
MDR-1b-Sun	5	10
MDR-1b-Moon	5	10

Table 14: Record Format Version Numbers.

APPENDIX A DETAILED SPECIFICATION OF GOME LEVEL 1 DATA RECORDS

The detailed format specifications for all the internal variables and Measurement Data Records in GOME Level 1 products is reported in the spreadsheet Annex [RD-1].
You can get a copy of this document if needed, asking the Helpdesk for EUMETSAT Document Reference EPS.MIS.SPE.97232.ANX.