

































































	INTERNAL POINTER RECORD (MDR Subclass B)		T1	T6
	INTERNAL POINTER RECORD (MDR DUMMY)		T1	T6
	INTERNAL POINTER RECORD (MDR Subclass A)		T1	T6
	INTERNAL POINTER RECORD (MDR Subclass B)		T1	T6
GLOBAL AUXILIARY DATA SECTION	GLOBAL INTERNAL AUXILIARY DATA RECORD	SUBCLASS A	T1	T6
	GLOBAL INTERNAL AUXILIARY DATA RECORD	SUBCLASS B	T1	T6
	GLOBAL INTERNAL AUXILIARY DATA RECORD	SUBCLASS A	T1	T6
	GLOBAL INTERNAL AUXILIARY DATA RECORD	SUBCLASS B	T1	T6
	GLOBAL INTERNAL AUXILIARY DATA RECORD	SUBCLASS C	T1	T6
VARIABLE AUXILIARY DATA SECTION	VARIABLE INTERNAL AUXILIARY DATA RECORD	SUBCLASS A	T1	T6
	VARIABLE INTERNAL AUXILIARY DATA RECORD	SUBCLASS B	T1	T3
	VARIABLE INTERNAL AUXILIARY DATA RECORD	SUBCLASS B	T3	T6
	VARIABLE INTERNAL AUXILIARY DATA RECORD	SUBCLASS C	T1	T5
	VARIABLE INTERNAL AUXILIARY DATA RECORD	SUBCLASS C	T5	T6
	VARIABLE INTERNAL AUXILIARY DATA RECORD	SUBCLASS A	T1	T2
	VARIABLE INTERNAL AUXILIARY DATA RECORD	SUBCLASS A	T2	T4
	VARIABLE INTERNAL AUXILIARY DATA RECORD	SUBCLASS A	T4	T6
	VARIABLE INTERNAL AUXILIARY DATA RECORD	SUBCLASS B	T1	T6
	VARIABLE INTERNAL AUXILIARY DATA RECORD	SUBCLASS C	T1	T6
BODY SECTION	MEASUREMENT DATA RECORD	SUBCLASS A	T1	T2
	MEASUREMENT DATA RECORD	SUBCLASS B	T2	T3
	MEASUREMENT DATA RECORD	DUMMY	T3	T4
	MEASUREMENT DATA RECORD	SUBCLASS A	T4	T5
	MEASUREMENT DATA RECORD	SUBCLASS B	T5	T6

**Table 6-2: Generalised schematic of the generic product format**

### 6.3.1.2 Granularity of the EPS products

The Full EPS product is produced by processing a dump of data. This is the product size used to archive in the EUMETSAT Data Centre.

In addition, the Regional EPS product is a full product that has been passed through a geographical filter. This may happen, for example, during the retrieval of the product from the Data Centre.

Finally, a Product Dissemination Unit (PDU) is the near-real-time dissemination of the full product, and it is typically of 3 minutes. A PDU is often referred to as product ‘granule’.

The EPS Generic Product Format has been defined to apply to any length of sensing. That means that the same generic format described above applies to a 3-minute duration granule, half an orbit or a full dump of data. The length in time of the product is contained in the MPHR.











[http://www.eumetsat.int/idcplg?IdcService=GET\\_FILE&dDocName=ZIP\\_EPS\\_ATOVS\\_CALIB\\_PARS&RevisionSelectionMethod=LatestReleased](http://www.eumetsat.int/idcplg?IdcService=GET_FILE&dDocName=ZIP_EPS_ATOVS_CALIB_PARS&RevisionSelectionMethod=LatestReleased).

They may also be available in the product as per table below.

Parameter	Location in product
$\gamma$	GIADR_RADIANCE.CH{3B,4,5}_CENTRAL_WAVENUMBER
A	GIADR_RADIANCE.CH{3B,4,5}_CONSTANT1
B	GIADR_RADIANCE.CH{3B,4,5}_CONSTANT2_SLOPE

**Table 6-7: Location of coefficients for radiance-temperature conversion**

#### 6.4 The HDF format

The contents and formats of the individual fields of the AVHRR Level 1b HDF5 products are the same as for the EPS native format. The organisation of the data is different. Typically, the EPS native format presents each scan and corresponding parameters as one complete sequence, stored in a Measurement Data Record (MDR), which is successively repeated until the whole swath is completed. In conversion to HDF5 the measurement values and associated parameters are grouped into separate arrays.

Detailed format descriptions are provided in [RD21]. The products retrieved from the EUMETSAT Data Centre have the same name as the original EPS formatted ones, with the extension appended: '.h5' for HDF5 formatted products, '.nat' for products in the native EPS format. Tools to read HDF formats are TBD, but it is intended that the products can be read using standard HDF libraries. For more information on HDF5 formats in general, see the [HDF5 webpages](#).















## 11 RECORD DESCRIPTION OF THE AVHRR LEVEL 1B PRODUCT

This AVHRR/3 1B description corresponds to the AVHRR/3 PFS [RD12] Issue v7C (PFV 10.0) and to the Generic PFS [RD11] Issue v7D.

Note that the following description is applicable to AVHRR/3 Level 1b products from both Metop and NOAA. In order to be able to generate the record size and offset information in the table describing the MDR-1b record, a number of Earth views and navigation points per scan has been assumed, consistent with the highest possible values corresponding to the Metop full sampling rate and navigation processing. The MDR-1b for the NOAA product will of course be smaller, corresponding to the relevant dimensions of the input GAC data.

These assumed values are given at the end of this section as [NE](#) and [NP](#). However, in order to interpret the products, the user must use the correct dimension information for the product contained in the SPHR record, as described below.

In the tables below, coloured items have the following meanings:

-  Compound data type, which consists of at least two basic or other compound data types. The name of the compound data type is shown first, followed by a list of the items contained within it.
-  Dimension parameter for variable product fields.

### Summary of Product Format Version record contents history

	PFV = 10.0
Record name	Record version
mphr	2
sphr	3
giadr-radiance	3
giadr-analog	
mdr-1b	4

If more than one version of a record exists, all versions are described below.

### Contents:

- MPHR ( name 'mphr', class 1, subclass 0, version 2 )
- SPHR ( name 'sphr', class 2, subclass 0, version 3 )
- GIADR ( name 'giadr-radiance', class 5, subclass 1, version 3 )
- GIADR ( name 'giadr-analog', class 5, subclass 2, version 2 )
- MDR ( name 'mdr-1b', class 8, subclass 2, version 4 )

Certain record types with formats common to all products (IPR, DMDR, GEADR, VEADR) are not included below, since they are not relevant to the average user. If required, details of these records can be found in the Generic PFS [RD11].

### 11.1 MPHR ( name 'mphr', class 1, subclass 0, version 2 )

Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
RECORD_HEADER	Generic Record Header			1	1	1	1	REC_HEAD	20	20	0
Product Details											
PRODUCT_NAME	Complete name of the product			1	1	1	1	string	67	100	20
PARENT_PRODUCT_NAME_1	Name of the parent product from which this product has been produced. For Level 0 products, this field is filled with lower case x's.			1	1	1	1	string	67	100	120

Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
PARENT_PRODUCT_NAME_2	Name of the parent product from which this product has been produced. For Level 0 products or products for which this is not appropriate, this field is filled with lower case x's.			1	1	1	1	string	67	100	220
PARENT_PRODUCT_NAME_3	Name of the parent product from which this product has been produced. For Level 0 products or products for which this is not appropriate, this field is filled with lower case x's.			1	1	1	1	string	67	100	320
PARENT_PRODUCT_NAME_4	Name of the parent product from which this product has been produced. For Level 0 products or products for which this is not appropriate, this field is filled with lower case x's.			1	1	1	1	string	67	100	420
<a href="#">INSTRUMENT_ID</a>	Instrument identification			1	1	1	1	enumerated	4	37	520
<a href="#">INSTRUMENT_MODEL</a>	Instrument Model identification			1	1	1	1	enumerated	3	36	557
<a href="#">PRODUCT_TYPE</a>	Product Type			1	1	1	1	enumerated	3	36	593
<a href="#">PROCESSING_LEVEL</a>	Processing Level Identification			1	1	1	1	enumerated	2	35	629
<a href="#">SPACECRAFT_ID</a>	Spacecraft identification			1	1	1	1	enumerated	3	36	664
SENSING_START	UTC Time of start of sensing data in this object (PDU, ROI or Full Product)			1	1	1	1	time	15	48	700
SENSING_END	UTC Time of end of sensing data in			1	1	1	1	time	15	48	748

Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
	this object (PDU, ROI or Full Product)										
SENSING_START_THEORETICAL	Theoretical UTC Time of start of sensing data in the dump from which this object is derived. This data is the predicted start time at the MPF level.			1	1	1	1	time	15	48	796
SENSING_END_THEORETICAL	Theoretical UTC Time of end of sensing data in the dump from which this object is derived. This data is the predicted end time at the MPF level.			1	1	1	1	time	15	48	844
<a href="#">PROCESSING_CENTRE</a>	Processing Centre Identification			1	1	1	1	enumerated	4	37	892
PROCESSOR_MAJOR_VERSION	Processing chain major version number			1	1	1	1	uinteger	5	38	929
PROCESSOR_MINOR_VERSION	Processing chain minor version number			1	1	1	1	uinteger	5	38	967
FORMAT_MAJOR_VERSION	Dataset Format Major Version number			1	1	1	1	uinteger	5	38	1005
FORMAT_MINOR_VERSION	Dataset Format Minor Version number			1	1	1	1	uinteger	5	38	1043
PROCESSING_TIME_START	UTC time of the processing at start of processing for the product			1	1	1	1	time	15	48	1081
PROCESSING_TIME_END	UTC time of the processing at end of processing for the product			1	1	1	1	time	15	48	1129
<a href="#">PROCESSING_MODE</a>	Identification of the mode of processing			1	1	1	1	enumerated	1	34	1177

Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
<a href="#">DISPOSITION_MODE</a>	Identification of the disposition mode			1	1	1	1	enumerated	1	34	1211
<a href="#">RECEIVING_GROUND_STATION</a>	Acquisition Station Identification			1	1	1	1	enumerated	3	36	1245
RECEIVE_TIME_START	UTC time of the reception at CDA for first Data Item			1	1	1	1	time	15	48	1281
RECEIVE_TIME_END	UTC time of the reception at CDA for last Data Item			1	1	1	1	time	15	48	1329
ORBIT_START	Start Orbit Number, counted incrementally since launch			1	1	1	1	uinteger	5	38	1377
ORBIT_END	Stop Orbit Number			1	1	1	1	uinteger	5	38	1415
ACTUAL_PRODUCT_SIZE	Size of the complete product		bytes	1	1	1	1	uinteger	11	44	1453
<b>ASCENDING NODE ORBIT PARAMETERS</b>											
STATE_VECTOR_TIME	Epoch time (in UTC) of the orbital elements and the orbit state vector. this corresponds to the time of crossing the ascending node for ORBIT_START		UTC	1	1	1	1	longtime	18	51	1497
SEMI_MAJOR_AXIS	Semi major axis of orbit at time of the ascending node crossing.		mm	1	1	1	1	integer	11	44	1548
ECCENTRICITY	Orbit eccentricity at time of the ascending node crossing	10 <sup>-6</sup>		1	1	1	1	integer	11	44	1592
INCLINATION	Orbit inclination at time of the ascending node crossing	10 <sup>-3</sup>	deg	1	1	1	1	integer	11	44	1636
PERIGEE_ARGUMENT	Argument of perigee at time of the ascending node crossing	10 <sup>-3</sup>	deg	1	1	1	1	integer	11	44	1680
RIGHT_ASCENSION	Right ascension at time of the	10 <sup>-3</sup>	deg	1	1	1	1	integer	11	44	1724

Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
	ascending node crossing										
MEAN_ANOMALY	Mean anomaly at time of the ascending node crossing	10 <sup>3</sup>	deg	1	1	1	1	integer	11	44	1768
X_POSITION	X position of the orbit state vector in the orbit frame at ascending node	10 <sup>3</sup>	m	1	1	1	1	integer	11	44	1812
Y_POSITION	Y position of the orbit state vector in the orbit frame at ascending node	10 <sup>3</sup>	m	1	1	1	1	integer	11	44	1856
Z_POSITION	Z position of the orbit state vector in the orbit frame at ascending node	10 <sup>3</sup>	m	1	1	1	1	integer	11	44	1900
X_VELOCITY	X velocity of the orbit state vector in the orbit frame at ascending node	10 <sup>3</sup>	m/s	1	1	1	1	integer	11	44	1944
Y_VELOCITY	Y velocity of the orbit state vector in the orbit frame at ascending node	10 <sup>3</sup>	m/s	1	1	1	1	integer	11	44	1988
Z_VELOCITY	Z velocity of the orbit state vector in the orbit frame at ascending node	10 <sup>3</sup>	m/s	1	1	1	1	integer	11	44	2032
EARTH_SUN_DISTANCE_RATIO	Earth-Sun distance ratio - ratio of current Earth-Sun distance to Mean Earth-Sun distance			1	1	1	1	integer	11	44	2076
LOCATION_TOLERANCE_RADIAL	Nadir Earth location tolerance radial		m	1	1	1	1	integer	11	44	2120
LOCATION_TOLERANCE_CROSSTRACK	Nadir Earth location tolerance cross-track		m	1	1	1	1	integer	11	44	2164
LOCATION_TOLERANCE_ALONGTRACK	Nadir Earth location tolerance along-track		m	1	1	1	1	integer	11	44	2208
YAW_ERROR	Constant Yaw attitude error	10 <sup>3</sup>	deg	1	1	1	1	integer	11	44	2252
ROLL_ERROR	Constant Roll attitude error	10 <sup>3</sup>	deg	1	1	1	1	integer	11	44	2296

Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
PITCH_ERROR	Constant Pitch attitude error	10 <sup>3</sup>	deg	1	1	1	1	integer	11	44	2340
LOCATION SUMMARY											
SUBSAT_LATITUDE_START	Latitude of sub-satellite point at start of the data set	10 <sup>3</sup>	Deg	1	1	1	1	integer	11	44	2384
SUBSAT_LONGITUDE_START	Longitude of sub-satellite point at start of the data set	10 <sup>3</sup>	Deg	1	1	1	1	integer	11	44	2428
SUBSAT_LATITUDE_END	Latitude of sub-satellite point at end of the data set	10 <sup>3</sup>	Deg	1	1	1	1	integer	11	44	2472
SUBSAT_LONGITUDE_END	Longitude of sub-satellite point at end of the data set	10 <sup>3</sup>	Deg	1	1	1	1	integer	11	44	2516
Leap Second Information											
LEAP_SECOND	Occurrence of Leap second within the product. Field is set to -1, 0 or +1 dependent upon occurrence of leap second and direction.			1	1	1	1	integer	2	35	2560
LEAP_SECOND.UTC	UTC time of occurrence of the Leap Second (If no leap second in the product, value is null)			1	1	1	1	time	15	48	2595
Record counts											
TOTAL_RECORDS	Total count of all records in the product			1	1	1	1	uinteger	6	39	2643
TOTAL_MPHR	Total count of all MPHRS in product (should always be 1!)			1	1	1	1	uinteger	6	39	2682
TOTAL_SPHR	Total count of all SPHRs in product (should be 0 or 1 only)			1	1	1	1	uinteger	6	39	2721
TOTAL_IPR	Total count of all IPRs in the			1	1	1	1	uinteger	6	39	2760

Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
	product										
TOTAL_GEADR	Total count of all GEADRs in the product			1	1	1	1	uinteger	6	39	2799
TOTAL_GIADR	Total count of all GIADRs in the product			1	1	1	1	uinteger	6	39	2838
TOTAL_VEADR	Total count of all VEADRs in the product			1	1	1	1	uinteger	6	39	2877
TOTAL_VIADR	Total count of all VIADRs in the product			1	1	1	1	uinteger	6	39	2916
TOTAL_MDR	Total count of all MDRs in the product			1	1	1	1	uinteger	6	39	2955
Record Based Generic Quality Flags											
COUNT_DEGRADED_INST_MDR	Count of MDRs with degradation due to instrument problems			1	1	1	1	uinteger	6	39	2994
COUNT_DEGRADED_PROC_MDR	Count of MDRs with degradation due to processing problems			1	1	1	1	uinteger	6	39	3033
COUNT_DEGRADED_INST_MDR_BLOCKS	Count of the number of blocks of MDRs degraded due to degraded instrument			1	1	1	1	uinteger	6	39	3072
COUNT_DEGRADED_PROC_MDR_BLOCKS	Count of the number of blocks of MDRs degraded due to degraded processing			1	1	1	1	uinteger	6	39	3111
Time Based Generic Quality Flags											
DURATION_OF_PRODUCT	The duration of the product in milliseconds		ms	1	1	1	1	uinteger	8	41	3150
MILLISECONDS_OF_DATA_PRESENT	The total amount of data present in		ms	1	1	1	1	uinteger	8	41	3191



Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
	the product										
MILLISECONDS_OF_DATA_MISSING	The total amount of data missing from the product		ms	1	1	1	1	uinteger	8	41	3232
Regional Product Information											
<a href="#">SUBSETTED_PRODUCT</a>	Set when product has been subset (e.g. geographically subset using a region of interest filter). Implies the presence of one or more EUMETSAT Data Centre GIADRs in GAD section for product retrieved from Data Centre.			1	1	1	1	boolean	1	34	3273
										Total: 3307	

## 11.2 SPHR ( name 'sphr', class 2, subclass 0, version 3 )

Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
RECORD_HEADER	Generic Record Header			1	1	1	1	REC_HEAD	20	20	0
QUALITY											
<a href="#">SRC_DATA_QUAL</a>	Flag to specify which combination of auxiliary data is used for the scenes analysis.			1	1	1	1	bitfield ( 2 )	16	49	20
VARIABLE_PARAMETERS											
EARTH_VIEWS_PER_SCANLINE	Number of Earth views per scanline (2048 for Full, 409 for GAC data)			1	1	1	1	integer	5	38	69

Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
NAV_SAMPLE_RATE	Rate of sampling the navigation data (angular relation and earth location). For Full data every 40th or 20th Earth view. For GAC data every 8th or 4th Earth view			1	1	1	1	integer	3	36	107
Total: 143											

### 11.3 GIADR ( name 'giadr-radiance', class 5, subclass 1, version 3 )

Name	Description	Scaling factor	Units	Dim1	Dim2	Dim3	Dim4	Type	Type size	Field size	Offset
RECORD_HEADER	Generic Record Header			1	1	1	1	REC_HEAD	20	20	0
RADIANCE_CONVERSION											
<a href="#">RAMP_CALIBRATION_COEFFICIENT</a>	Ramp/Auto Calibration Indicators Bit Field			1	1	1	1	bitfield ( 2 )	2	2	20
YEAR_RECENT_CALIBRATION	Year of Most Recent Solar Channel Calibration (e.g. 1999)		yr	1	1	1	1	uinteger2	2	2	22
DAY_RECENT_CALIBRATION	Day of Year of Most Recent Solar Channel Calibration (e.g. 365)		day	1	1	1	1	uinteger2	2	2	24
PRIMARY_CALIBRATION_ALGORITHM_ID	Primary Calibration Algorithm ID			1	1	1	1	uinteger2	2	2	26











































































































