

GSICS Product Format Templates

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1 INTRODUCTION

1.1 Purpose

The purpose of this document is to define the format templates of GSICS products developed at EUMETSAT.

1.2 Scope

The format templates defined have been developed with the GSICS Research and Data Working Groups.

For compatibility for tools developed for these formats that follow these templates and general usability, it is recommended that comparable products from other GPRCs should adopt these format templates in the development of their GSICS products.

1.3 Applicable Documents

AD-1 NetCDF Creation Guidelines; Best Practises, EUM/OPS/STD/11/3120 Conventions and Applicable Standards

1.4 Reference Documents

RD-1 This document is synchronised with the GSICS Wiki¹.

1.5 Document Structure

Section 1 General information

Section 2 Overview

Section 3 Product Format Templates.

1.6 Acronyms

GSICS Global Space-based Inter-Calibration Systems

GCC GSICS Coordination Centre

GPPA GSICS Procedure for Product Acceptance

¹ See: <https://gsics.nesdis.noaa.gov/wiki/Development/NetcdfConvention>

2 OVERVIEW

2.1 GSICS Products

GSICS products provide the calibration corrections data for ‘monitored’ satellite instruments. These are derived by inter-calibration methods that compare a reference satellite instrument with well-known calibration characteristics with collocated observations from the ‘monitored’ instrument. This ensures consistency between the products of the different instruments.

This section provides an overview of the currently available GSICS product format templates. New templates are added when demonstration versions of the GSICS products become available.

For readability, format templates are presented using the NetCDF Common Data Language (CDL) without the ‘data’ section.

2.2 Available GSICS Product Format Templates

The following table provides the current set of format templates applicable to a GSICS product type.

GSICS Product Type	Format Template Name
GEO-LEO Infra-Red Products	GEO-LEO-IR Template

3 GSICS PRODUCT FORMAT DEFINITIONS

3.1 GEO-LEO Infra-Red Format Template

3.1.1 Attributes

Format Name	GEO-LEO-IR Template
Format Attributes	NetCDF Version 4 – Classic Data Model
Version	1.0

3.1.2 GEO-LEO-IR Template Definition

Example values are provided in the definition to help users on how to populate the template when creating their GSICS product. Constant values are indicated in **BOLD**.

netcdf GEO-LEO-IR Template

```
{
  // Global Attributes - General
  :Conventions = "CF-1.6";

  :Metadata_Conventions = "Unidata Dataset Discovery v1.0";

  :standard_name_vocabulary = "CF Standard Name Table (Version 19, 22 March 2012)";

  :project = "Global Space-based Inter-Calibration System <http://gsics.wmo.int>";

  :title = "GSICS MSG1+SEVIRI vs MetOpA+IASI GSICS Real-Analysis Correction";

  :summary = "Coefficients of the GSICS Correction for the infrared channels of a GEOstationary imager using a LEO hyperspectral reference instrument";

  :keywords = "GSICS, satellite, remote sensing, inter-calibration, reanalysis correction, GEO-LEO-IR, MSG1+SEVIRI, MetOpA+IASI, infrared"; // reanalysis correction can be replaced by near real time correction

  :references = "http://www.eumetsat.int/Home/Main/DataProducts/Resources/index.htm"; // Documentation URL

  :institution = "EUMETSAT";

  :license = "Calibration information delivered as a GSICS operational product is generated in accordance with GSICS principles and practices. GSICS operational and demonstration products may be used and redistributed freely. Scientific publications using GSICS operational or demonstration products should however acknowledge both GSICS and the relevant producer organization. There is no warranty on the data express or implied, including warranties of merchantability and fitness for a particular purpose, or any assumed legal liability for the accuracy, completeness, or usefulness, of this information. The user of the data do so at their own risk.";

  :naming_authority = "int.eumetsat.gsics";

  :creator_name = "EUMETSAT - European Organisation for the Exploitation of Meteorological Satellites";
  :creator_email = "ops@eumetsat.int";
  :creator_url = "http://www.eumetsat.int";
}
```

```
:wmo_data_category = 30S; // type short:
:wmo_international_data_subcategory = 5S; // type short: NRTC – 4, RAC – 5

:local_data_subcategory = 1; // type short: 1 = GEOLEOIR

// Global Attributes – geospatial
:geospatial_lat_min = -90f; // type float
:geospatial_lat_max = 90f; // type float
:geospatial_lon_min = -180f; // type float
:geospatial_lon_max = 180f; // type float
:geospatial_lat_units = “degrees_north”;
:geospatial_lon_units = “degrees_east”;

// Global Attributes – Data Versioning
:processing_level = “demonstration/v03.02.01”;

// Global Attributes – Instrument References
:reference_instrument = “MetOpA IASI”; // SATELLITE INSTRUMENT
:monitored_instrument = “MSG1 SEVIRI”; // SATELLITE INSTRUMENT

// Global Attributes – Identifiers, Dates and Times
:date_created = “2012-05-08T15:14:13Z”;
:date_modified = “2012-05-08T23:30:36Z”;

:history = “2008-06-01T20:45:00Z icesi_match_file_nc collocation_criteria=v0.3;
2008-06-01T20:45:00Z icesi_collocate v0.3 collocation_criteria=v0.3;
2008-06-01T20:45:00Z icesi_convolve v0.1 SRF=v1.95;
2008-06-01T20:45:00Z icesi_analyse v0.2 filter=0;
2012-05-08T15:14:13Z icesi_output v03.02.01 filter=0 corr=RAC”; // History example

:id = “W_XX-EUMETSAT-Darmstadt,SATCAL+RAC,MSG2+SEVIRI-
MetOpA+IASI_C_EUMG_20080601000000_demo_03.nc ”; // Filename

:time_converage_start = “2008-06-01T00:00:00Z ”;
:time_converage_end = “2012-04-24T24:00:00Z ”;

// Global Attributes – Plotting Tool Attributes – Option 1
:planck_function_constant_c1 = 1.19104e-5f; // type float – MSG SEVIRI
:planck_function_constant_c1_unit = “mW(cm^-1)^-4 m^-2 sr^-1”; // unit
:planck_function_constant_c2 = 1.43877f; // type float – MSG SEVIRI
:planck_function_constant_c2_unit = “K cm”; // unit

:radiance_to_brightness_conversion_formula = “tb=((c2 * wnc)/LN(1.+(c1 * wnc^3)/radiance)-
beta)/alpha”; // tb – temperature brightness, c1, c2 are the Planck_function_constants
:brightness_to_radiance_conversion_formula = “radiance=(c1 * wnc^3) / ((EXP(c2 * wnc/
(alpha*tb+beta))-1)”; // tb – temperature brightness, c1, c2 are the Planck_function_constants

// Global Attributes – Not defined in the GSICS NetCDF conventions
:window_period = “P14D”; // Used for smoothing daily correction coefficients.
:comment = “Use the RAC with the time closest to the time of interest. Take great caution when applying it
at a date where this difference is greater than the window_period.”;
:number_of_times = 1298; // type int: info on number of time measurements in this product.
:readMeDocURL = “http://www.eumetsat.int/Home/Main/DataProducts/Calibration/Inter-calibration”;
:wmo_reference_instrument_code = “001 002”; // WMO codes for satellite and instrument
:wmo_monitored_instrument_code = “003 004”; // WMO codes for satellite and instrument
```

dimensions:

```
chan = 8; // Example number of MSG IR channels
chan_strlen = 5; // Maximum length of the channel strings
validity = 2;
date = UNLIMITED;
```

variables:

```
float wnc(chan);
:long_name = "channel central frequency of channel as wavenumber";
:units = "cm^-1";
:valid_min = 545.0f; // float
:valid_max = 2760.0f; // float
:_FillValue = -999999.0f // float

float beta(chan);
:long_name = "radiance to brightness temperature conversion coefficient beta";
:units = "K";
:valid_min = 0.0010f; // float
:valid_max = 100.0f; // float
:_FillValue = -999999.0f // float

float alpha(chan);
:long_name = "radiance to brightness temperature conversion coefficient alpha";
:units = "1";
:valid_min = 0.99f; // float
:valid_max = 1.0f; // float
:_FillValue = -999999.0f // float

char channel_name(chan, chan_strlen);
:long_name = "MSG2+SEVIRI Channel Name";

float central_wavelength(chan);
:standard_name = "radiation_wavelength";
:long_name = "MSG2+SEVIRI Wavelength of Channel Centre";
:units = "m";
:valid_min = 3.0E-6f; // float
:valid_max = 1.5E-5f; // float
:_FillValue = -999999.0f // float

double date(date);
:standard_name = "time";
:long_name = "date of evaluation";
:units = "seconds since 1970-01-01T00:00:00Z";
:calendar = "gregorian";
:bounds = "validity_period";

double validity_period(date, validity);
:standard_name = "time";
:long_name = "correction validity period";
:units = "seconds since 1970-01-01T00:00:00Z";
:calendar = "gregorian";
```



```
float slope(date, chan);
:long_name = "regression slope";
:units = "1";
:valid_min = -2.0f; // float
:valid_max = 2.0f; // float
:_FillValue = -999999.0f // float
```

```
float slope_se(date, chan);
:long_name = "standard error of regression slope";
:units = "1";
:valid_min = -2.0f; // float
:valid_max = 2.0f; // float
:_FillValue = -999999.0f // float
```

```
float offset(date, chan);
:long_name = "regression offset";
:units = "mW m-2 sr-1(cm-1)-1";
:valid_min = -200.0f; // float
:valid_max = 200.0f; // float
:_FillValue = -999999.0f // float
```

```
float offset_se(date, chan);
:long_name = "standard error of regression offset";
:units = "mW m-2 sr-1(cm-1)-1";
:valid_min = -200.0f; // float
:valid_max = 200.0f; // float
:_FillValue = -999999.0f // float
```

```
float covariance(date, chan);
:long_name = "regression coefficients covariance";
:units = "mW m-2 sr-1(cm-1)-1";
:valid_min = -200.0f; // float
:valid_max = 200.0f; // float
:_FillValue = -999999.0f // float
```

```
float std_scene_tb(chan);
:long_name = "brightness temperature of standard scene";
:units = "K";
:valid_min = 230.0f; // float
:valid_max = 290.0f; // float
:_FillValue = -999999.0f // float
```

```
float std_scene_tb_bias(date, chan);
:long_name = "brightness temperature bias for standard scene";
:units = "K";
:valid_min = -10.0f; // float
:valid_max = 10.0f; // float
:_FillValue = -999999.0f // float
```

```
float std_scene_tb_bias_se(date, chan);
:long_name = "standard error of brightness temperature bias for standard scene";
:units = "K";
:valid_min = -10.0f; // float
:valid_max = 10.0f; // float
:_FillValue = -999999.0f // float
```

```
int number_of_collocations(date, chan);
  :long_name = "number of collocations used to calculate correction";
  :units = "1";
  :valid_min = 1; // int
  :valid_max = 2147483647; // int
  :_FillValue = -999999// int

// Non standard variable
byte alert(date);
  :long_name = "alert for changes within window";
  :units = "1";
}
```