argo data management

Argo data management
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# BGC-Argo merged profile file processing and format on Coriolis GDAC

Version 1.0

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ARGO

part of the integrated global observation strategy

**BGC-Argo merged profile file processing and format for the Coriolis GDAC**

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# Table of contents

# History of the document

| Version | Date | Comment |
|---|---|---|
| 0.1 | 15/01/2018 | JP Rannou : creation of the document |
| 0.2 | 07/03/2018 | JP Rannou : updated according to “Argo merged profile version 2” specifications |
| 1.0 | 18/06/2018<br>21/06/2018 | JP Rannou : version describing the first sample files generated by Coriolis GDAC<br>H Bittig: review of the document |
| | | |

# Reference documents

| Reference# | Title | Link |
|---|---|---|
| RD1 | Argo user’s manual | http://dx.doi.org/10.13155/29825 |
| | | |

# 1 Introduction

In 2014, Argo data management team decided to split core-Argo profiles and non-core-Argo profiles into two distinct profile files (C-File and B-File).

Both files have the same N_PROF dimension and, for each N_PROF, pressure values of the C-file are duplicated into the B-File.

A core-Argo profile file (C-File) contains the Core parameters provided by a float: pressure, temperature, salinity and conductivity.

The additional parameters are managed in a BGC-Argo data file (B-File). Two types of additional parameters are concerned: 'intermediate' parameters (provided by the float sensors) and BGC parameters (directly sampled by the float sensors or computed, at the DAC level, from Core and 'intermediate' parameters).

For a given float cycle and direction, the merged profile combines into one merged file (M-File) the Core and the BGC parameters. The M-File is generated by the GDAC, from the C-File and B-File provided by the DACs.

**M-profile version 1**

In version 1, the M-Profile is created from a concatenation of Core and BGC parameters (i.e. 'intermediate' parameters are ignored) along the common PRES axis of each N_PROF. Thus M-profile file has the same number of N_PROF arrays as the original C-File and B-File.

**M-profile version 2**

In version 2, the M-Profile is the merging of all N_PROF arrays of M-Profile version 1 into a single one.

Thus, in such M-Profile file:

- N_PROF = 1
- N_PARAM is equal to the number of Core and BGC parameters

The standard Argo profile structure is still used in M-Profile file: <PARAM> measurements are stored in a <PARAM>(N_PROF, N_LEVELS) array. However, as N_PROF = 1, we can consider that measurements are reported in a simple "matrix" of N_PARAM * N_LEVELS dimension: one column for each Core and BGC parameter, one level for each valid distinct pressure. The PRES vertical synthetic axis contains the sorted set of all valid distinct pressures. A valid pressure has a QC flag of '1', '2', '5' or '8' ('good', 'probably good', 'changed' or 'estimated' value). The number of valid distinct pressures is equal to N_LEVELS.

Each parameter value having a non-valid pressure is ignored.

A pressure value may have more than one value for a parameter (for example, BGC sensors may report specific Core parameter values that has been used to compute reported BGC parameter values). If the parameter is a Core-parameter, the value of the Core profile is selected. Otherwise, the first value of an ordered set (see "N_PROF priority" below) of the original N_PROF arrays is selected.

This document details the processing steps used to generate **version 2** of merged profile data from Argo profile data. It also describes the format of the NetCDF files produced by the Coriolis GDAC to store these merged profile data.

# 2 Data processing

Input data mainly come from Argo mono-profile C and B files. Additionnal data (time of measurements when available) are also retrieved from Argo trajectory C and B files.

## 2.1 Processing steps

For each cycle, these profile and trajectory data are processed along the following steps.

### 2.1.1 Step#1: gather available data

The profile data are retrieved from the C and B mono-profile files:

- Only BGC parameters are considered in B mono-profile files (i.e. 'intermediate' parameters are ignored),
- When available, 'pumped' and 'unpumped' parts of original profiles are concatenated together (to create a (possibly reduced) n_prof number of profiles).

These n_prof data sets are first ordered according to the 'N_PROF priority' rules provided below, then gathered in a **unique array** (one line for each level of the original n_prof profile and one column for each parameter).

### 2.1.2 Step#2: preserve only 'good' pressure levels

Only pressure with valid levels are preserved in the data array. The levels with PRES_ADJUSTED_QC (or PRES_QC, depending on PRES data mode) set to '4' are removed preserving only levels with QC flag of '1', '2', '5' or '8' ('good', 'probably good', 'changed' or 'estimated' value).

### 2.1.3 Step#3: add time measurement

Some float type and version provide the time of (some or all) profile level measurements.

These times are retrieved from the C and B trajectory files and added in a new column of the **unique data array**.

### 2.1.4 Step#4: align measurements on identical pressure levels

The pressure axis is created from a sorted set of PRES_ADJUSTED (or PRES, depending on PRES data mode) unique values.

Parameter measurements (and associated times) are then aligned on the defined pressure axis.

## 2.2 Miscellaneous information

### 2.2.1 Management of SCIENTIFIC_CALIB_* information

SCIENTIFIC_CALIB_EQUATION, SCIENTIFIC_CALIB_COEFFICIENT, SCIENTIFIC_CALIB_COMMENT and SCIENTIFIC_CALIB_DATE are retrieved from original C and B profile files.

When 'pumped' and 'unpumped' parts of original profiles are available in a file, only the SCIENTIFIC_CALIB_* information of the lower N_PROF index is preserved.

### 2.2.2 NetCDF format of M-PROF files

Multi-profile files are generated in NetCDF4 classic model format. All stored parameters are compressed with a deflation level set to 4.

## 2.3 N_PROF priority

The primary sampling scheme profile (N_PROF = 1) has highest priority. All other profiles are sorted in alphabetical order of their concatenated, alphabetically ordered <parameter_sensor> names.

E.g., for a profile with

| N_PROF | PARAMETER_SENSOR |
|---|---|
| 1 | 'CTD_PRES' 'CTD_TEMP' 'CTD_PSAL' |
| 2 | 'CTD_PRES' 'OPTODE_DOXY' |
| 3 | 'CTD_PRES' 'RADIOMETER_DOWN_IRR380' 'RADIOMETER_DOWN_IRR412' 'RADIOMETER_DOWN_IRR490' 'RADIOMETER_PAR' |
| 4 | 'BACKSCATTERINGMETER_BBP700' 'CTD_PRES' 'FLUOROMETER_CDOM' 'FLUOROMETER_CHLA' |
| 5 | 'CTD_PRES' 'TRANSMISSOMETER_CP' |

the parameter sensor names would be concatenated to

| N_PROF | PARAMETER_SENSOR |
|---|---|
| 1 | 'CTD_PRES_CTD_TEMP_CTD_PSAL' |
| 2 | 'CTD_PRES_OPTODE_DOXY' |
| 3 | 'CTD_PRES_RADIOMETER_DOWN_IRR380_RADIOMETER_DOWN_IRR412_ RADIOMETER_DOWN_IRR490_RADIOMETER_PAR' |
| 4 | 'BACKSCATTERINGMETER_BBP700_CTD_PRES_FLUOROMETER_CDOM_ FLUOROMETER_CHLA' |
| 5 | 'CTD_PRES_TRANSMISSOMETER_CP' |

which gives the N_PROF priority as 1 > 4 > 2 > 3 > 5.

# 3 Description of the merged profile format (version 2)

The merged profile data are stored in M mono-profile and multi-profile NetCDF files.

The format of the M profile file is based on the Argo B profile one (see Argo user's manual [RD1]).

## 3.1 Global attributes

global attributes:
:title = "Argo float vertical profile"
:institution = "CORIOLIS"
:source = "Argo float"
:history = "2018-01-17T13:27:58Z creation (software version 1.0)"
:references = "http://www.argodatamgt.org/Documentation"
:user_manual_version = "1.0"
:Conventions = "Argo-3.1 CF-1.6"
:featureType = "trajectoryProfile"

| Global attribute name | Definition |
|---|---|
| title | A succinct description of what is in the dataset. |
| institution | Specifies where the original data was produced. |
| source | The method of production of the original data. If it was model-generated, source should name the model and its version, as specifically as could be useful. If it is observational, source should characterize it (e.g., "surface observation" or "radiosonde"). |
| history | Provides an audit trail for modifications to the original data. Well-behaved generic NetCDF filters will automatically append their name and the parameters with which they were invoked to the global history attribute of an input NetCDF file. We recommend that each line begin with a timestamp indicating the date and time of day that the program was executed. |
| references | Published or web-based references that describe the data or methods used to produce it. |
| comment | Miscellaneous information about the data or methods used to produce it. |
| user_manual_version | The version number of the user manual |
| Conventions | The conventions supported by this file, blank separated |
| featureType | The NetCDF CF feature type. |

## 3.2 Dimensions and definitions

| Name | Value | Definition |
|---|---|---|
| DATE_TIME | DATE_TIME = 14; | This dimension is the length of an ASCII date and time value.<br>Date_time convention is : YYYYMMDDHHMISS<br>YYYY : year<br>MM : month<br>DD : day<br>HH : hour of the day (as 0 to 23)<br>MI : minutes (as 0 to 59)<br>SS : seconds (as 0 to 59)<br>Date and time values are always in universal time coordinates (UTC).<br>Examples :<br>20010105172834 : January 5th 2001 17:28:34<br>19971217000000 : December 17th 1997 00:00:00 |
| STRING256<br>STRING64<br>STRING32<br>STRING8<br>STRING4<br>STRING2 | STRING256 = 256;<br>STRING64 = 64;<br>STRING32 = 32;<br>STRING8 = 8;<br>STRING4 = 4;<br>STRING2 = 2; | String dimensions from 2 to 256. |
| N_PROF | N_PROF = <int value>; | Number of profiles contained in the file.<br>It is always 1 in the mono-profile files.<br>In the multi-profile files there is one N_PROF for each descending or ascending profile. |
| N_PARAM | N_PARAM = <int value>; | Maximum number of parameters measured or calculated for a pressure sample.<br>This dimension depends on the data set.<br>Examples :<br>(pressure, temperature) : N_PARAM = 2<br>(pressure, temperature, salinity) : N_PARAM = 3<br>(pressure, temperature, conductivity, salinity) : N_PARAM = 4 |
| N_LEVELS | N_LEVELS = <int value>; | Maximum number of pressure levels contained in a profile.<br>This dimension depends on the data set.<br>Example : N_LEVELS = 100 |
| N_CALIB | N_CALIB = <int value>; | Maximum number of calibrations performed on a profile.<br>This dimension depends on the data set.<br>Example : N_CALIB = 10 |

## 3.3 General information on the profile file

This section contains information about the whole file.

| Name | Definition | Comment |
|---|---|---|
| DATA_TYPE | char DATA_TYPE(STRING32);<br>DATA_TYPE:long_name = "Data type";<br>DATA_TYPE:conventions = "Argo reference table 1";<br>DATA_TYPE:_FillValue = " "; | This field contains the type of data contained in the file.<br>The list of acceptable data types is in the reference table 1.<br>Example :<br>Argo merged profile version 2 |
| FORMAT_VERSION | char FORMAT_VERSION(STRING4);<br>FORMAT_VERSION:long_name = "File format version";<br>FORMAT_VERSION:_FillValue = " "; | File format version<br>Example : “3.1” |
| HANDBOOK_VERSION | char HANDBOOK_VERSION(STRING4);<br>HANDBOOK_VERSION:long_name = "Data handbook version";<br>HANDBOOK_VERSION:_FillValue = " "; | Version number of the data handbook.<br>This field indicates that the data contained in this file are managed according to the policy described in the Argo data management handbook.<br>Example : “1.0” |
| REFERENCE_DATE_TIME | char REFERENCE_DATE_TIME(DATE_TIME);<br>REFERENCE_DATE_TIME:long_name = "Date of reference for Julian days";<br>REFERENCE_DATE_TIME:conventions = "YYYYMMDDHHMISS";<br>REFERENCE_DATE_TIME:_FillValue = " "; | Date of reference for julian days.<br>The recommended reference date time is “19500101000000” : January 1st 1950 00:00:00 |
| DATE_CREATION | char DATE_CREATION(DATE_TIME);<br>DATE_CREATION:long_name = "Date of file creation"; | Date and time (UTC) of creation of this file. |

| | | |
|---|---|---|
| | DATE_CREATION:conventions = "YYYYMMDDHHMISS";<br>DATE_CREATION:_FillValue = " "; | Format : YYYYMMDDHHMISS<br>Example :<br>20011229161700 : December 29th 2001 16 :17 :00 |
| DATE_UPDATE | char DATE_UPDATE(DATE_TIME);<br>DATE_UPDATE:long_name = "Date of update of this file";<br>DATE_UPDATE:conventions = "YYYYMMDDHHMISS";<br>DATE_UPDATE:_FillValue = " "; | Date and time (UTC) of update of this file.<br>Format : YYYYMMDDHHMISS<br>Example :<br>20011230090500 : December 30th 2001 09 :05 :00 |

## 3.4 General information for each profile

This section contains general information on each profile.

Each item of this section has a N_PROF (number of profiles) dimension. Note that N_PROF=1 in each mono-profile file.

| Name | Definition | Comment |
|---|---|---|
| PLATFORM_NUMBER | char PLATFORM_NUMBER(N_PROF, STRING8);<br>PLATFORM_NUMBER:long_name = "Float unique identifier";<br>PLATFORM_NUMBER:conventions = "WMO float identifier : A9IIIII";<br>PLATFORM_NUMBER:_FillValue = " "; | WMO float identifier.<br>WMO is the World Meteorological Organization.<br>This platform number is unique.<br>Example : 6900045 |
| PROJECT_NAME | char PROJECT_NAME(N_PROF, STRING64);<br>PROJECT_NAME:long_name = "Name of the project";<br>PROJECT_NAME:_FillValue = " "; | Name of the project which operates the profiling float that performed the profile.<br>Example : “GYROSCOPE” (EU project for ARGO program) |
| PI_NAME | char PI_NAME (N_PROF, STRING64);<br>PI_NAME:long_name = "Name of the principal investigator";<br>PI_NAME:_FillValue = " "; | Name of the principal investigator in charge of the profiling float.<br>Example : Yves Desaubies |
| STATION_PARAMETERS | char STATION_PARAMETERS(N_PROF, N_PARAM, STRING64);<br>STATION_PARAMETERS:long_name = "List of available parameters for the station";<br>STATION_PARAMETERS:conventions = "Argo reference table 3";<br>STATION_PARAMETERS:_FillValue = " "; | List of parameters contained in this profile.<br>The parameter names are listed in reference table 3.<br>Examples : TEMP, PSAL, CNDC<br>TEMP : temperature<br>PSAL : practical salinity<br>CNDC : conductvity |
| CYCLE_NUMBER | int CYCLE_NUMBER(N_PROF);<br>CYCLE_NUMBER:long_name = "Float cycle number";<br>CYCLE_NUMBER:conventions = "0...N, 0 : launch cycle (if exists), 1 : first complete cycle";<br>CYCLE_NUMBER:_FillValue = 99999; | Float cycle number.<br>See §1.6: float cycle definition. |
| DIRECTION | char DIRECTION(N_PROF);<br>DIRECTION:long_name = "Direction of the station profiles";<br>DIRECTION:conventions = "A: ascending profiles, D: descending profiles";<br>DIRECTION:_FillValue = " "; | Type of profile on which measurement occurs.<br>A : ascending profile<br>D : descending profile |
| DATA_CENTRE | char DATA_CENTRE(N_PROF, STRING2);<br>DATA_CENTRE:long_name = "Data centre in charge of float data processing";<br>DATA_CENTRE:conventions = "Argo reference table 4";<br>DATA_CENTRE:_FillValue = " "; | Code for the data centre in charge of the float data management.<br>The data centre codes are described in the reference table 4.<br>Example : “ME" for MEDS |
| PARAMETER_DATA_MODE | char PARAMETER_DATA_MODE(N_ PROF, N_PARAM);<br>PARAMETER_DATA_MODE:long_name = "Delayed mode or real time data";<br>PARAMETER_DATA_MODE:conventions = "R : real time; D : delayed mode; A : real time with adjustment"; | Describe the data mode of the individual parameter :<br>R : real time data<br>D : delayed mode data<br>A : real time data with adjusted values |

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| | PARAMETER_DATA_MODE:_FillValue = " "; | |
| PLATFORM_TYPE | char PLATFORM_TYPE(N_PROF, STRING32);<br>PLATFORM_TYPE:long_name = "Type of float";<br>PLATFORM_TYPE:conventions = "Argo reference table 23";<br>PLATFORM_TYPE:_FillValue = " "; | Type of float listed in reference table 23.<br>Example: SOLO, APEX, PROVOR, ARVOR, NINJA |
| FLOAT_SERIAL_NO | char FLOAT_SERIAL_NO(N_PROF, STRING32);<br>FLOAT_SERIAL_NO:long_name = "Serial number of the float";<br>FLOAT_SERIAL_NO:_FillValue = " "; | Serial number of the float.<br>Example 1679 |
| FIRMWARE_VERSION | char FIRMWARE_VERSION(N_PROF, STRING32);<br>FIRMWARE_VERSION:long_name = "Instrument firmware version";<br>FIRMWARE_VERSION:_FillValue = " "; | Firmware version of the float.<br>Example : "013108" |
| WMO_INST_TYPE | char WMO_INST_TYPE(N_PROF, STRING4);<br>WMO_INST_TYPE:long_name = "Coded instrument type";<br>WMO_INST_TYPE:conventions = "Argo reference table 8";<br>WMO_INST_TYPE:_FillValue = " "; | Instrument type from WMO code table 1770.<br>A subset of WMO table 1770 is documented in the reference table 8.<br>Example :<br>846 : Webb Research float, Seabird sensor |
| JULD | double JULD(N_PROF);<br>JULD:long_name = "Julian day (UTC) of the station relative to REFERENCE_DATE_TIME";<br>JULD:standard_name = "time";<br>JULD:units = "days since 1950-01-01 00:00:00 UTC";<br>JULD:conventions = "Relative julian days with decimal part (as parts of day)";<br>JULD:resolution = X;<br>JULD:_FillValue = 999999.;<br>JULD:axis = "T"; | Julian day of the profile.<br>The integer part represents the day, the decimal part represents the time of the profile.<br>Date and time are in Universal Time.<br>The julian day is relative to REFERENCE_DATE_TIME.<br>Example :<br>18833.8013889885 : July 25 2001 19:14:00 |
| JULD_QC | char JULD_QC(N_PROF);<br>JULD_QC:long_name = "Quality on date and time";<br>JULD_QC:conventions = "Argo reference table 2";<br>JULD_QC:_FillValue = " "; | Quality flag on JULD date and time.<br>The flag scale is described in the reference table 2.<br>Example :<br>1: the date and time seems correct. |
| JULD_LOCATION | double JULD_LOCATION(N_PROF);<br>JULD_LOCATION:long_name = "Julian day (UTC) of the location relative to REFERENCE_DATE_TIME";<br>JULD_LOCATION:units = "days since 1950-01-01 00:00:00 UTC";<br>JULD_LOCATION:conventions = "Relative julian days with decimal part (as parts of day)";<br>JULD_LOCATION:resolution = X;<br>JULD_LOCATION:_FillValue = 999999.; | Julian day of the location of the profile.<br>The integer part represents the day, the decimal part represents the time of the profile.<br>Date and time are in Universal Time.<br>The julian day is relative to REFERENCE_DATE_TIME.<br>Example :<br>18833.8013889885 : July 25 2001 19:14:00 |
| LATITUDE | double LATITUDE(N_PROF);<br>LATITUDE:long_name = "Latitude of the station, best estimate";<br>LATITUDE:standard_name = "latitude";<br>LATITUDE:units = "degree_north";<br>LATITUDE:_FillValue = 99999.;<br>LATITUDE:valid_min = -90.;<br>LATITUDE:valid_max = 90.;<br>LATITUDE:axis = "Y"; | Latitude of the profile.<br>Unit : degree north<br>This field contains the best estimated latitude.<br>The latitude value may be improved in delayed mode.<br>The measured locations of the float are located in the trajectory file.<br>Example : 44.4991 : 44° 29' 56.76'' N |
| LONGITUDE | double LONGITUDE(N_PROF);<br>LONGITUDE:long_name = "Longitude of the station, best estimate";<br>LONGITUDE:standard_name = "longitude";<br>LONGITUDE:units = "degree_east";<br>LONGITUDE:_FillValue = 99999.;<br>LONGITUDE:valid_min = -180.;<br>LONGITUDE:valid_max = 180.;<br>LONGITUDE:axis = "X"; | Longitude of the profile.<br>Unit : degree east<br>This field contains the best estimated longitude.<br>The longitude value may be improved in delayed mode.<br>The measured locations of the float are located in the trajectory file.<br>Example : 16.7222 : 16° 43' 19.92'' E |
| POSITION_QC | char POSITION_QC(N_PROF);<br>POSITION_QC:long_name = "Quality on | Quality flag on position.<br>The flag on position is set according to |

| | | |
|---|---|---|
| | position (latitude and longitude)";<br>POSITION_QC:conventions = "Argo reference table 2";<br>POSITION_QC:_FillValue = " ";" | (LATITUDE, LONGITUDE) quality.<br>The flag scale is described in the reference table 2.<br>Example: 1: position seems correct. |
| POSITIONING_SYSTEM | char POSITIONING_SYSTEM(N_PROF, STRING8);<br>POSITIONING_SYSTEM:long_name = "Positioning system";<br>POSITIONING_SYSTEM:_FillValue = " "; | Name of the system in charge of positioning the float locations from reference table 9.<br>Examples : ARGOS |
| PROFILE_<PARAM>_QC | char PROFILE_<PARAM>_QC(N_PROF);<br>PROFILE_<PARAM>_QC:long_name = "Global quality flag of <PARAM> profile";<br>PROFILE_<PARAM>_QC:conventions = "Argo reference table 2a";<br>PROFILE_<PARAM>_QC:_FillValue = " "; | Global quality flag on the PARAM profile.<br>PARAM is among the STATION_PARAMETERS.<br>The overall flag is set to indicate the percentage of good data in the profile as described in reference table 2a.<br>Example :<br>PROFILE_TEMP_QC = A : the temperature profile contains only good values<br>PROFILE_PSAL_QC = C : the salinity profile contains 50% to 75% good values |
| CONFIG_MISSION_NUMBER | int CONFIG_MISSION_NUMBER(N_PROF);<br>CONFIG_MISSION_NUMBER:long_name = " Unique number denoting the missions performed by the float";<br>CONFIG_MISSION_NUMBER:conventions = "1...N, 1 : first complete mission";<br>CONFIG_MISSION_NUMBER:_FillValue = 99999; | Unique number of the mission to which this profile belongs.<br>See note on floats with multiple configurations §2.4.6.1.<br>Example : 1 |

## 3.5 Measurements for each profile

This section contains information on each level of each profile.
Each variable in this section has a N_PROF (number of profiles), N_LEVELS (number of pressure levels) dimension.

| Name | Definition | Comment |
|---|---|---|
| <PARAM> | float <PARAM>(N_PROF, N_LEVELS);<br><PARAM>:long_name = "<X>";<br><PARAM>:standard_name = "<X>";<br><PARAM>:_FillValue = <X>;<br><PARAM>:units = "<X>";<br><PARAM>:valid_min = <X>;<br><PARAM>:valid_max = <X>;<br><PARAM>:C_format = "<X>";<br><PARAM>:FORTRAN_format = "<X>";<br><PARAM>:resolution = <X>; | <PARAM> contains the original values of a parameter listed in reference table 3.<br><X> : this field is specified in the reference table 3. |
| <PARAM>_QC | char <PARAM>_QC(N_PROF, N_LEVELS);<br><PARAM>_QC:long_name = "quality flag";<br><PARAM>_QC:conventions = "Argo reference table 2";<br><PARAM>_QC:_FillValue = " "; | Quality flag applied on each <PARAM> values.<br>The flag scale is specified in table 2. |
| <PARAM>_ADJUSTED | float <PARAM>_ADJUSTED(N_PROF, N_LEVELS);<br><PARAM>_ADJUSTED:long_name = "<X>";<br><PARAM>_ADJUSTED:standard_name = "<X>";<br><PARAM>_ADJUSTED:_FillValue = <X>;<br><PARAM>_ADJUSTED:units = "<X>";<br><PARAM>_ADJUSTED:valid_min = <X>;<br><PARAM>_ADJUSTED:valid_max = <X>;<br><PARAM>_ADJUSTED:C_format = "<X>";<br><PARAM>_ADJUSTED:FORTRAN_format = "<X>";<br><PARAM>_ADJUSTED:resolution= <X>; | <PARAM>_ADJUSTED contains the adjusted values derived from the original values of the parameter.<br><X> : this field is specified in the reference table 3.<br>**<PARAM>_ADJUSTED is mandatory.**<br>When no adjustment is performed, the FillValue is inserted. |
| <PARAM>_ADJUSTED_QC | char <PARAM>_ADJUSTED_QC(N_PROF, N_LEVELS);<br><PARAM>_ADJUSTED_QC:long_name = "quality flag";<br><PARAM>_ADJUSTED_QC:conventions = "Argo reference table 2";<br><PARAM>_ADJUSTED_QC:_FillValue = " "; | Quality flag applied on each <PARAM>_ADJUSTED values.<br>The flag scale is specified in reference table 2.<br>**<PARAM>_ADJUSTED_QC is mandatory.**<br>When no adjustment is performed, the |

| | | |
|---|---|---|
| | | FillValue is inserted. |
| <PARAM>_ADJUSTED_ERROR | float <PARAM>_ADJUSTED_ERROR(N_PROF, N_LEVELS);<br><PARAM>_ADJUSTED_ERROR:long_name = "Contains the error on the adjusted values as determined by the delayed mode QC process";<br><PARAM>_ADJUSTED_ERROR:_FillValue = <X>;<br><PARAM>_ADJUSTED_ERROR:units = "<X>";<br><PARAM>_ADJUSTED_ERROR:C_format = "<X>";<br><PARAM>_ADJUSTED_ERROR:FORTRAN_format = "<X>";<br><PARAM>_ADJUSTED_ERROR:resolution= <X>; | <PARAM>_ADJUSTED_ERROR<br>Contains the error on the adjusted values as determined by the delayed mode QC process.<br><X> : this field is specified in the reference table 3.<br>**<PARAM>_ADJUSTED_ERROR is mandatory.**<br>When no adjustment is performed, the FillValue is inserted. |

Note that <PARAM> could be one of the C or B Argo parameters listed in http://www.argodatamgt.org/content/download/30910/209488/file/argo-parameters-list-core-and-b.xlsx.

Additionnaly, when available, the time of the measurements level is stored in a dedicated parameter: 'JULD_LEVEL'.

| | | |
|---|---|---|
| JULD_LEVEL | double JULD_LEVEL(N_PROF, N_LEVELS);<br>JULD_LEVEL:long_name = "Julian day (UTC) of each profile level measurement relative to REFERENCE_DATE_TIME";<br>JULD_LEVEL:standard_name = "time";<br>JULD_LEVEL:_FillValue = 999999.;<br>JULD_LEVEL:units = "days since 1950-01-01 00:00:00 UTC"; | Julian day (UTC) of each profile level measurement relative to REFERENCE_DATE_TIME |

### 3.5.1 Calibration information for each profile

This section contains calibration information for each parameter of each profile.

Each item of this section has a N_PROF (number of profiles), N_CALIB (number of calibrations), N_PARAM (number of parameters) dimension.

| Name | Definition | Comment |
|---|---|---|
| PARAMETER | char PARAMETER(N_PROF, N_CALIB, N_PARAM, STRING256);<br>PARAMETER:long_name = "List of parameters with calibration information";<br>PARAMETER:conventions = "Argo reference table 3";<br>PARAMETER:_FillValue = " "; | Name of the calibrated parameter. The list of parameters is in reference table 3.<br>Example : PSAL |
| SCIENTIFIC_CALIB_EQUATION | char SCIENTIFIC_CALIB_EQUATION(N_PROF, N_CALIB, N_PARAM, STRING256);<br>SCIENTIFIC_CALIB_EQUATION:long_name = "Calibration equation for this parameter";<br>SCIENTIFIC_CALIB_EQUATION:_FillValue = " "; | Calibration equation applied to the parameter.<br>Example :<br>Tc = a1 * T + a0 |
| SCIENTIFIC_CALIB_COEFFICIENT | char SCIENTIFIC_CALIB_COEFFICIENT(N_PROF, N_CALIB, N_PARAM, STRING256);<br>SCIENTIFIC_CALIB_COEFFICIENT:long_name = "Calibration coefficients for this equation";<br>SCIENTIFIC_CALIB_COEFFICIENT:_FillValue = " "; | Calibration coefficients for this equation.<br>Example :<br>a1=0.99997 , a0=0.0021 |
| SCIENTIFIC_CALIB_COMMENT | char SCIENTIFIC_CALIB_COMMENT(N_PROF, N_CALIB, N_PARAM, STRING256);<br>SCIENTIFIC_CALIB_COMMENT:long_name | Comment about this calibration<br>Example :<br>The sensor is not stable |

| | | |
|---|---|---|
| | = "Comment applying to this parameter calibration";<br>SCIENTIFIC_CALIB_COMMENT:_FillValue = " "; | |
| SCIENTIFIC_CALIB_DATE | char SCIENTIFIC_CALIB_DATE (N_PROF N_CALIB, N_PARAM, DATE_TIME)<br>SCIENTIFIC_CALIB_DATE:long_name = "Date of calibration";<br>SCIENTIFIC_CALIB_DATE:conventions = "YYYYMMDDHHMISS";<br>SCIENTIFIC_CALIB_DATE:_FillValue = " "; | Date of the calibration.<br>Example : 20011217161700 |

## 3.6 File localization and naming

### 3.6.1 Coriolis GDAC M profile files localization

In demonstration mode, the GDAC M-profiles are available from:

- ftp://ftp.ifremer.fr/ifremer/argo/etc/argo-synthetic-profile

The demonstration mode is performed on Coriolis GDAC only, with a daily update.

In the future operational mode, the M-profiles will be continuously updated on both GDACs.

### 3.6.2 M profile files naming convention

The produced merged files comply with the following naming conventions.

#### 3.6.2.1 Mono profile data files

M<R/D><FloatID>_<XXX><D>.nc

where:

- <FloatID> is the float WMO number,
- <R/D> indicates Real-Time data (R) or Delayed-Mode data (D). D is used if at least one parameter of the file is in delayed mode,
- <XXX> is the cycle number,
- <D> is added for descending profile (default is ascending profile).

Example: MR6901439_001D.nc

#### 3.6.2.2 Multi profile data files

<FloatID>_Mprof.nc

where:

- <FloatID> is the float WMO number.

Example: 6901439_Mprof.nc