

GOSUD

DATA FORMAT TSG

Version 2.0

November 28th 2012

Table of content

| | |
|--|----|
| <i>History</i> | 4 |
| <i>1. Overview of the format</i> | 5 |
| <i>2. Description of the thermosalinometer format</i> | 6 |
| 2.1. Data file dimensions..... | 6 |
| 2.2. Global attributes: meta-data..... | 7 |
| 2.3. Measurements | 9 |
| 2.3.1. Variables describing installation of TSG..... | 9 |
| 2.3.2. Variables describing installation of Temperature sensor at intake (TINT)..... | 11 |
| 2.3.3. Coordinates for TSG/TINT: | 12 |
| 2.3.4. Data series 1 main TSG: | 14 |
| 2.3.5. Data series 2: Ocean Temperature from the water intake | 18 |
| 2.3.6. Data series 3 : external data | 20 |
| <i>3. Reference tables</i> | 22 |
| 3.1. Reference table 1 : Thermosalinometer (TSG) type | 22 |
| 3.2. Reference table 2 : Temperature sensor at intake (TINT) type | 22 |
| 3.3. Reference table 3 : PROCESSING STATES | 22 |
| 3.4. Reference table 4 : QUALITY FLAGS..... | 23 |
| 3.5. Reference table 5 : Parameter code table | 23 |
| 3.6. Reference table 6 : Water sample (bottle) type | 24 |
| 3.7. Reference table 7 : Data centres and institutions codes | 24 |

History

| Version | Date | Comment |
|----------|------------|---|
| 1.0 | 11/09/2005 | F. Gaillard/L. Petit de la Villéon creation of the document based on GOSUD data management user's manual (T. Carval) |
| 1.1 | 11/29/2005 | FG/LPdV: revision after ORE-SSS technical meeting |
| 1.2 | 12/01/2005 | T. Carval : parameter naming conventions : <PARAM>_XXX where XXX = TSG, WS, TINT |
| 1.3 | 01/17/2006 | F. Gaillard, D. Mathias, correction after producing the 2000-2004 files. |
| 1.4 | 07/07/2008 | C. Lagadec, J.Grelet, F. Gaillard : integration in processing CORIOLIS/IRD |
| 1.5 | 24/02/2009 | J.Grelet: add data centres table add dimension STRING8 remove dimension DAYD_WS and change NOCOEF_CAL to 6 in § 2.1 correct dimension for SSTP_QC in §2.3.5 and LATX_EXT § 2.3.6 add new variables _CONV for calibration coefficients used to store coefficients names |
| 1.6 | 12/17/2009 | J. Grelet: use <PARAM> for all description of variables attribute and remove <> when field is not a template Change attribute missing_value with default_value Add global attribute DATE_TINT, CONVENTIONS and TYPE_POSITION And some corrections to agree NetCDF file, add variable attributes standard_name and coordinate |
| | 01/12/2010 | J. Grelet: Set date with English convention in history Remove FillValue for <PARAM>_CALCOEFF_CONV, <PARAM>_LINCOEFF_CONV and SSPS_EXT_BOTTLE |
| | 02/05/2010 | J.Grelet: add variable SSPS_STD (sea surface salinity standard deviation) |
| 2.0 beta | 09/28/2011 | J. Grelet: add in comment for SSPS: units = PSS.78 (Practical Salinity Scale) Update table 3.3 Processing states in English Add reference table 4 in some _QC comment Add global attributes title and history |
| 2.0 | 11/28/2012 | J.Grelet, M Kreiger Minors compliance updates on variables attribute description |

1. Overview of the format

This document aims at defining a common format for thermo-salinometer (TSG) data. This format is meant for the data exchange and processing. It should hold both real time and delayed mode data and various levels of resolution or processing.

The data sets found in the file are:

- General information on the file, the platform and the TSG installation
- Data series from the main TSG

And, whenever available:

- Data series from the Temperature sensor at water intake
- Data from salinity sample analysis

In the case of real time data, some variables may be missing. The file is updated as new data and information come in.

For delayed mode use, the data center is expected to provide a file that corresponds to a unique installation period of a thermo-salinometer on one ship. All available information must have been entered, in particular those referring to the calibration and water sample analysis. The group in charge of the validation will complement the file with the 'corrected' data series.

2. Description of the thermosalinometer format

2.1. Data file dimensions

| Name | Definition | Comment |
|---|--|---|
| DAYD | | Number of recorded measurements for the main TSG series |
| DAYD_EXT | | Number of recorded measurements for external data |
| NCOEF_CAL | NCOEF_CAL = 7 | Number of calibration coefficients |
| NCOEF_LIN | NCOEF_LIN = 2 | Number of drift correction coefficients (linear) |
| STRING256 STRING14 STRING8 STRING4 | STRING256 = 256; STRING14 = 14; STRING8 = 8; STRING4 = 4; | String dimensions. |
| N1 | N1 = 1; | |

2.2. Global attributes: meta-data

| Name | Definition | Comment |
|---------------------------|-----------------------------------|---|
| TITLE | TITLE = TSG GOSUD | A description of the dataset |
| CYCLE_MESURE | CYCLE_MESURE = <char value>; | Cruise name or travel number Example : EGEE6 or PAST0601 |
| PROJECT_NAME | PROJECT_NAME = <char value>; | Name of the project which operates the TSG line. Example : ORE-SSS |
| PLATFORM_NAME | PLATFORM_NAME = <char value>; | Ship name Example : Pourquoi Pas ? |
| SHIP_CALL_SIGN | SHIP_CALL_SIGN = <char value>; | Ship call sign Example : FABB |
| SHIP_MMSI | SHIP_CALL_MMSI = <char value>; | Ship MMSI (ASN) number Example : 227 222 00 |
| DATE_TSG | DATE_TSG = <char value>; | Date of TSG installation : yyyymmddDDHHMMSS |
| TYPE_TSG | TYPE_TSG = <char value>; | Described in reference table 1 Example : SBE21 |
| NUMBER_TSG | NUMBER_TSG= <char value>; | (serial number, ex: 2250) |
| DATE_TINT | DATE_TINT = <char value> | Date of TINT installation |
| TYPE_TINT | TYPE_TINT= <char value>; | Temperature sensor at intake. Described in reference table 2 Ex: SBE3 |
| NUMBER_TINT | NUMBER_TINT= <char value>; | (serial number, ex: ????) |
| DATA_TYPE | DATA_TYPE = <char value>; | This field describes the type of data contained in the file. Example : TRAJECTORY, PROFIL or TIME_SERIE |
| DATA_MODE | DATA_MODE = <char value>; | Indicates if the file contains real time or delayed mode data. R : real time data D : delayed mode data |
| SAMPLING_PERIOD | SAMPLING_PERIOD = <char value>; | Sampling period in seconds: 6 to 3600 |
| DATE_START | DATE_START = <char value>; | Date of first measurements : yyyymmddHHMMSS |
| DATE_END | DATE_END = <char value> | Date of last measurements : yyyymmddHHMMSS |
| SOUTH_LATX | | South limit of measurements |
| NORTH_LATX | | North limit of measurements |
| WEST_LONX | | West limit of measurements |
| EAST_LONX | | East limit of measurements |
| FORMAT_VERSION | FORMAT_VERSION = <char value>; | File format version : 1.6 for this format |
| CONVENTIONS | CONVENTIONS = <char value>; | GOSUB 1.6, CF1.4 |
| DATE_CREATION | DATE_CREATION = <char value>; | Date and time (UTC) of creation of this file. Format : yyyymmddHHMMSS Example : 20011229161700 : December 29 th 2001 16:17:00 |
| DATE_UPDATE (optional) | DATE_UPDATE = <char value>; | Date and time (UTC) of update of this file. Format : yyyymmddHHMMSS Example : 20011230161700 : December 30 th 2001 16:17:00 |
| DATA_RESTRICTIONS | DATA_RESTRICTIONS = <char value>; | Restriction on use for these data. Example : "NONE" |
| CITATION | CITATION = <char value>; | The citation should be used for publications. Example : "These data were collected and made freely available by the International Gosud Project and the national programmes that contribute to it." |
| COMMENT | COMMENT = <char value>; | |
| PI_NAME | PI_NAME = <char value>; | Name of the principal investigator in charge of the TSG line. Example : GENAVIR |
| DATA_CENTRE | DATA_CENTRE = <char value>; | Code for the data centre (2 char) The data centre codes are described in the reference table 7 Example : IF for Ifremer, France |
| DATA_ACQUISITION | DATA_ACQUISITION = <char value>; | Acquisition data centre Example : SHOM, IRD, GENAVIR, CNRS ... |
| PROCESSING_CENTRE | PROCESSING_CENTRE = <char value>; | Processing data centre Example : |

| | | |
|-------------------|-----------------------------------|---|
| | | ORE-SSS, CORIOLIS/IRD, CORIOLIS/SISMER |
| PROCESSING_STATES | PROCESSING_STATES = <char value>; | Described in reference table 3 |
| WS_TYPE | WS_TYPE = <char value> | Model of water sample bottle Default : NA Example: OSIL Described in reference table 6 |
| TYPE_POSITION | TYPE_POSITION = <char value>; | Example: GPS, GPS DIFFERENTIAL, ARGOS, INTERPOLATE, MANUAL, NONE, UNKNOW |
| HISTORY | HISTORY = <char value>; | Provides an audit trail for modifications to the original data |

2.3. Measurements

2.3.1. Variables describing installation of TSG

| Name | Definition | Comment |
|-------------------|--|---|
| SSPS_DEPH | float SSPS_DEPH (N1); <PARAM>:long_name = "Nominal depth of water intake for salinity measurement"; <PARAM>:units = "meter"; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 100.f; <PARAM>:resolution = 0.1f; <PARAM>:format = "%6.3f"; <PARAM>:_FillValue = 99999.f; | Ex: SSPS_DEPH = 8.0 |
| SSPS_DEPH_MIN | float SSPS_DEPH_MIN (N1); <PARAM>:long_name = "Minimum depth of water intake for salinity measurement"; <PARAM>:units = "meter"; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 100.f; <PARAM>:resolution = 0.1f; <PARAM>:format = "%6.3f"; <PARAM>:_FillValue = 99999.f; | Ex: SSPS_DEPH_MIN = 6.0 |
| SSPS_DEPH_MAX | float SSPS_DEPH_MAX (N1); <PARAM>:long_name = "Maximum depth of water intake for salinity measurement"; <PARAM>:units = "meter"; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 100.f; <PARAM>:resolution = 0.1f; <PARAM>:format = "%6.3f"; <PARAM>:_FillValue = 99999.f; | Ex: SSPS_DEPH_MAX = 10.0 |
| CNDC_CALCOEF | double CNDC_CALCOEF(NCOEF_CAL); <PARAM>:long_name = "Conductivity calibration coefficients"; <PARAM>_FillValue = 99999.; | Calibration coefficients are real value date is in julian day from REFERENCE_DATE_TIME |
| CNDC_CALCOEF_CONV | char CNDC_CALCOEF_CONV(NCOEF_CAL, STRING8); <PARAM>:long_name = "Conductivity calibration coefficients convention"; | Calibration coefficient convention is an enumeration of coefficients name Ex: " 'date', 'a', 'b', 'c', 'd', 'm', 'cpcor' " or " 'date', 'g', 'h', 'i', 'j', 'cpcor', 'ctcor' " |
| CNDC_LINCOEF | double CNDC_LINCOEF(NCOEF_LIN); <PARAM>:long_name = "Conductivity linear drift correction coefficients"; <PARAM>_FillValue = 99999.; | Calibration coefficients are real value date is in julian day from REFERENCE_DATE_TIME |
| CNDC_LINCOEF_CONV | char CNDC_LINCOEF_CONV(NCOEF_LIN, STRING8); <PARAM>:long_name = "Conductivity linear drift correction coefficients convention"; | Calibration coefficient convention is an enumeration of coefficients name Ex: " 'date', 'slope', 'offset' " |
| SSJT_CALCOEF | double SSJT_CALCOEF(NCOEF_CAL); <PARAM>:long_name = "Temperature calibration coefficients"; <PARAM>_FillValue = 99999.; | Calibration coefficients are real value date is in julian day from REFERENCE_DATE_TIME |
| SSJT_CALCOEF_CONV | char SSJT_CALCOEF_CONV(NCOEF_CAL, STRING8); <PARAM>:long_name = "Temperature calibration coefficients convention"; | Calibration coefficient convention is an enumeration of coefficients name Ex: " 'date', 'a', 'b', 'c', 'd', 'f0' " or " 'date', 'g', 'h', 'i', 'j', 'f0' " |
| SSJT_LINCOEF | double SSJT_LINCOEF(NCOEF_LIN); <PARAM>:long_name = "Temperature linear drift correction coefficients"; <PARAM>_FillValue = 99999.; | Calibration coefficients are real value date is in julian day from REFERENCE_DATE_TIME |

| | | |
|-------------------|--|--|
| SSJT_LINCOEF_CONV | char SSJT_LINCOEF_CONV (NCOEF_LIN, STRING8); <PARAM> :long_name = "Temperature linear drift correction coefficients convention"; | Calibration coefficient convention is an enumeration of coefficients name Ex: " 'date', 'slope', 'offset' " |
|-------------------|--|--|

2.3.2. Variables describing installation of Temperature sensor at intake (TINT)

| Name | Definition | Comment |
|-------------------|--|---|
| SSTP_DEPH | float SSTP_DEPH (N1); <PARAM>:long_name = "Nominal depth of water intake for Temperature measurement"; <PARAM>:units = "meter"; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 100.f; <PARAM>:resolution = 0.1f; <PARAM>:format = "%6.3f"; <PARAM>:_FillValue = 99999.f; | Ex: SSTP_DEPH = 8.0 |
| SSTP_DEPH_MIN | float SSTP_DEPH_MIN (N1); <PARAM>:long_name = "Minimum depth of water intake for Temperature measurement "; <PARAM>:units = "meter"; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 100.f; <PARAM>:resolution = 0.1f; <PARAM>:format = "%6.3f"; <PARAM>:_FillValue = 99999.f; | Ex: SSTP_DEPH_MIN = 6.0 |
| SSTP_DEPH_MAX | float SSTP_DEPH_MAX (N1); <PARAM>:long_name = "Maximum depth of water intake for Temperature measurement "; <PARAM>:units = "meter"; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 100.f; <PARAM>:resolution = 0.1f; <PARAM>:format = "%6.3f"; <PARAM>:_FillValue = 99999.f; | Ex: SSTP_DEPH_MAX = 10.0 |
| SSTP_CALCOEF | double SSTP_CALCOEF(NCOEF_CAL); <PARAM>:long_name = "Temperature calibration coefficients"; <PARAM>:_FillValue = 99999.; | Calibration coefficients are real value date is in julian day from REFERENCE_DATE_TIME |
| SSTP_CALCOEF_CONV | char SSTP_CALCOEF_CONV(NCOEF_CAL,STRING8); <PARAM>: long_name = " Temperature calibration coefficients convention"; | Calibration coefficient convention is an enumeration of coefficients name Ex: " 'date', 'a','b','c','d','f0' Or " 'date','g','h','l','j','f0'" |
| SSTP_LINCOEF | double SSTP_LINCOEF(NCOEF_LIN); <PARAM> :long_name = "Temperature linear drift correction coefficients"; <PARAM> :_FillValue = 99999.; | Calibration coefficients are real value date is in julian day from REFERENCE_DATE_TIME |
| SSTP_LINCOEF_CONV | char SSTP_LINCOEF_CONV (NCOEF_LIN,STRING8); <PARAM> :long_name = "Temperature linear drift correction coefficients convention "; | Calibration coefficient convention is an enumeration of coefficients name Ex: " 'date','slope', 'offset' " |

2.3.3. Coordinates for TSG/TINT:

| Name | Definition | Comment |
|---------------------|--|--|
| DATE | char DATE (DAYD,STRING14); <PARAM>:long_name = "Date of main instrument measurement"; <PARAM>:conventions = "yyyymmddHHMMSS"; <PARAM>:coordinate = "DAYD"; | This is the original data describing the date, it must not be lost |
| DAYD | double DAYD(DAYD); <PARAM>:long_name = "Decimal julian day (UTC) of each measurement"; <PARAM>:standard_name = "time"; <PARAM>:units = "days since REFERENCE_DATE_TIME"; <PARAM>:conventions = "Relative julian days with decimal part (as parts of the day)"; <PARAM>:_FillValue = 99999.; <PARAM>:valid_min = 0.; <PARAM>:valid_max = 36600.; <PARAM>:format = "%11.5f"; <PARAM>:axis = "T"; <PARAM>:epic_code = 601.; <PARAM>:coordinate = "DAYD"; | Julian day of the measurement since REFERENCE_DATE_TIME. The integer part represents the day, the decimal part represents the time of the measurement. Date and time are in universal time coordinate. Example : 18833.80140 : July 25 2001 19:14:00 |
| LATX | float LATX(DAYD); <PARAM>:long_name = "Latitude of each measurement"; <PARAM>:standard_name = "latitude"; <PARAM>:units = "degree_north"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -90.f; <PARAM>:valid_max = 90.f; <PARAM>:format = "%+8.4f"; <PARAM>:axis = "Y"; <PARAM>:epic_code = 500.f; <PARAM>:coordinate = "DAYD"; | Latitude of the measurement (decimal). Example : 44.4991 for 44° 29' 56.76" N |
| LONX | float LONX (DAYD); <PARAM>:long_name = "Longitude of each measurement"; <PARAM>:standard_name = "longitude"; <PARAM>:units = "degree_east"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -180.f; <PARAM>:valid_max = 180.f; <PARAM>:format = "%+9.4f"; <PARAM>:axis = "X"; <PARAM>:epic_code = 501.f; <PARAM>:coordinate = "DAYD"; | Longitude of the measurement (decimal). Example : 16.7222 for 16° 43' 19.92" E |
| POSITION_QC | byte POSITION_QC(DAYD) <PARAM>:long_name=quality flag of position <PARAM>:valid_min = 0b; <PARAM>:valid_max = 9b; <PARAM>:default_value = 0b; <PARAM>:format = "%1d"; <PARAM>:coordinate = "DAYD"; | Quality flag applied on the position of the measurement. The flag scale is specified in reference table 4 . If variable not exist, it is set at default_value during creation |
| SPDC | float SPDC (DAYD); <PARAM>:long_name = "Ship speed computed from navigation"; <PARAM>:units = "knots"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 50.f; <PARAM>:format = "%6.1f"; <PARAM>:resolution = 0.1f; <PARAM>:coordinate = "DAYD"; | Ship speed from GPS (SOG - Speed Over Ground). If SOG not available, derived from last position |
| REFERENCE_DATE_TIME | char REFERENCE_DATE_TIME(STRING14) <PARAM>:conventions="yyyymmddHHMMSS" <PARAM>:long_name = "Origine of time" | Reference date for julian days origin The recommended reference data time is "19500101000000" : January 1 st 1950 00:00:00 |

2.3.4. Data series 1 main TSG:

1) Measured variables

| Name | Definition | Comment |
|------------------------|--|---|
| PRES (optional) | float PRES (DAYD); <PARAM>:long_name = "Sea pressure in TSG"; <PARAM>:standard_name = "sea_water_pressure"; <PARAM>:units = "decibar=10000 pascals"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 10.f; <PARAM>:resolution = 0.1f; <PARAM>:format = "%6.1f"; <PARAM>:coordinate = "DAYD"; | Pressure inside TSG, this is an indication that pump is working properly |
| FLOW (optional) | float FLOW (DAYD); <PARAM>:long_name = "Measuring flow in the TSG inlet"; <PARAM>:units = "l/min"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 100.f; <PARAM>:resolution = 0.1f; <PARAM>:format = "%6.1f"; <PARAM>:coordinate = "DAYD"; | Water pump discharge measurement in the TSG inlet, this is an indication that pump is working properly |
| CNDC | float CNDC (DAYD); <PARAM>:long_name = "Electrical conductivity"; <PARAM>:standard_name = "sea_water_electrical_conductivity"; <PARAM>:units = "S/meter"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 7.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Conductivity measured by TSG. This data may have been reduced with a median (recommended) or a mean |
| CNDC_STD (optional) | float CNDC_STD(DAYD); <PARAM>:long_name = "Conductivity standard deviation"; <PARAM>:units = "S/ meter "; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 7.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Standard deviation of conductivity measured by TSG for data which have been reduced (with a mean or median) |
| CNDC_CAL (optional) | float CNDC_CAL(DAYD); <PARAM>:long_name = "Conductivity calibrated "; <PARAM>:standard_name = "sea_water_electrical_conductivity"; <PARAM>:units = "S/meter"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 7.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Conductivity calibrated using linearization coefficients |

| | | |
|-----------------------------|--|---|
| CNDC_FREQ (optional) | float CNDC_FREQ(DAYD); <PARAM>:long_name = "Sensor Conductivity Frequency"; <PARAM>:units = "Hz"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 20000.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%9.3f"; <PARAM>:coordinate = "DAYD"; | Sensor Conductivity Frequency measured by TSG |
| SSJT | float SSJT(DAYD); <PARAM>:long_name = "Water jacket temperature"; <PARAM>:units = "degree_Celsius"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -1.5f; <PARAM>:valid_max = 38.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Temperature within TSG or water jacket temperature. Warning: this is not the ocean SST temperature It is used for salinity computation. The reduction applied is the same as for conductivity. Temperature scale is ITS-90 |
| SSJT_QC | byte SSJT_QC(DAYD); <PARAM>:long_name = "Water jacket temperature quality flag"; <PARAM>:valid_min = 0b; <PARAM>:valid_max = 9b; <PARAM>:default_value = 0b; <PARAM>:format = "%1d"; <PARAM>:coordinate = "DAYD"; | Quality flag applied on water jacket temperature values. The flag scale is specified in reference table 4 . If variable not exist, it is set at default_value during creation |
| SSJT_STD (optional) | float SSJT_STD(DAYD); <PARAM>:long_name = "Water jacket temperature standard deviation "; <PARAM>:units = "degree_Celsius"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -1.5f; <PARAM>:valid_max = 38.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Water jacket temperature standard deviation for data which have been reduced (with a mean or median) |
| SSJT_CAL (optional) | float SSJT_CAL(DAYD); <PARAM>:long_name = "Water jacket temperature calibrated"; <PARAM>:units = "degree_Celsius"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -1.5f; <PARAM>:valid_max = 38.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Water jacket temperature calibrated using linearization coefficients |
| SSJT_FREQ (optional) | float SSJT_FREQ(DAYD); <PARAM>:long_name = "Water jacket sensor temperature frequency"; <PARAM>:units = "Hz"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 20000.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%9.3f"; <PARAM>:coordinate = "DAYD"; | Frequency of water jacket temperature sensor |
| SSJT_ADJUSTED (optional) | float SSJT_ADJUSTED(DAYD); <PARAM>:long_name = " Water jacket temperature adjusted"; <PARAM>:units = "degree_Celsius"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -1.5f; <PARAM>:valid_max = 38.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Adjusted water jacket temperature with external data (ARGO, CTD, XBT,...) |

| | | |
|-----------------------------------|---|--|
| SSJT_ADJUSTED_ERROR (optional) | float SSJT_ADJUSTED_ERR(DAYD); <PARAM>:long_name = "Error on adjusted water jacket Temperature"; <PARAM>:units = "degree_Celsius"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -1.5f; <PARAM>:valid_max = 38.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Error on adjusted water jacket temperature with external data |
| SSJT_ADJUSTED_QC (optional) | byte SSJT_ADJUSTED_QC(DAYD); <PARAM>:long_name = "water jacket temperature quality flag"; <PARAM>:valid_min = 0b; <PARAM>:valid_max = 9b; <PARAM>:default_value = 0b; <PARAM>:format = "%1d"; <PARAM>:coordinate = "DAYD"; | Quality flag applied on adjusted water jacket temperature values. The flag scale is specified in reference table 4 . If variable not exist, it is set at default_value during creation |
| SSJT_ADJUSTED_HIST (optional) | Char SSJT_ADJUSTED_HIST(STRING256) <PARAM>:long_name = " Water jacket temperature adjusted processing history" | Water jacket temperature inside TSG adjusted processing history |

2) Ocean salinity deduced from SSJT and CNDC from TSG

| | | |
|-----------------------------------|--|---|
| SSPS | float SSPS(DAYD); <PARAM>:long_name = "Sea surface salinity"; <PARAM>:standard_name = "sea_surface_salinity"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 40.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Sea Surface Salinity (SSS) deduced from conductivity and water jacket temperature. This is the Ocean surface salinity. units = PSS.78 (Practical Salinity Scale) |
| SSPS_QC | byte SSPS_QC(DAYD); <PARAM>:long_name = "Sea surface salinity quality flag"; <PARAM>:valid_min = 0b; <PARAM>:valid_max = 9b; <PARAM>:default_value = 0b; <PARAM>:format = "%1d"; <PARAM>:coordinate = "DAYD"; | Quality flag applied on sea surface salinity values. The flag scale is specified in reference table 4 . If variable not exist, it is set at default_value during creation |
| SSPS_STD (optional) | float SSPS_STD(DAYD); <PARAM>:long_name = " Sea surface salinity standard deviation"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 40.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Standard deviation of sea surface salinity measured by TSG in case when CNDC_STD not available |
| SSPS_CAL (optional) | float SSPS_CAL(DAYD); <PARAM>:long_name = "Sea surface salinity calibrated"; <PARAM>:standard_name = "sea_surface_salinity"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 40.f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Sea surface salinity calibrated deduced from conductivity and water jacket temperature |
| SSPS_ADJUSTED (optional) | float SSPS_ADJUSTED(DAYD); <PARAM>:long_name = "Sea surface salinity adjusted"; <PARAM>:standard_name = "sea_surface_salinity"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 40.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Sea surface salinity adjusted with external data (ARGO, CTD, XBT,...) |
| SSPS_ADJUSTED_ERROR (optional) | float SSPS_ADJUSTED_ERROR(DAYD); <PARAM>:long_name = "Error on sea surface salinity adjusted"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 40.f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Error on sea surface salinity adjusted with external data |
| SSPS_ADJUSTED_QC (optional) | byte SSPS_ADJUSTED_QC(DAYD); <PARAM>:long_name = "Sea surface salinity adjusted quality flag"; <PARAM>:valid_min = 0b; <PARAM>:valid_max = 9b; <PARAM>:default_value = 0b; <PARAM>:format = "%1d"; <PARAM>:coordinate = "DAYD"; | Quality flag applied on adjusted sea surface salinity The flag scale is specified in reference table 4 . If variable not exist, it is set at default_value during creation |
| SSPS_ADJUSTED_HIST | char SSPS_ADJUSTED_HIST(STRING256) <PARAM>:long_name = "Sea surface salinity adjusted processing history" | Sea surface salinity adjusted processing history |

2.3.5. Data series 2: Ocean Temperature from the water intake

| Name | Definition | Comment |
|-----------------------------------|---|--|
| SSTP (optional) | float SSTP(DAYD); <PARAM>:long_name = "Sea surface temperature"; <PARAM>:standard_name = "sea_surface_temperature"; <PARAM>:units = "degree_Celsius"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -1.5f; <PARAM>:valid_max = 38.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Sea Surface Temperature (SST) measured at intake with external instrument (TINT_TYPE, TINT_NUMBER) This is ocean surface temperature. |
| SSTP_QC (optional) | byte SSTP_QC(DAYD); <PARAM>:long_name = " Sea surface temperature quality flag"; <PARAM>:valid_min = 0b; <PARAM>:valid_max = 9b; <PARAM>:default_value = 0b; <PARAM>:format = "%1d"; <PARAM>:coordinate = "DAYD"; | Quality flag applied on sea surface temperature values. The flag scale is specified in reference table 4 . If variable not exist, it is set at default_value during creation |
| SSTP_CAL (optional) | float SSTP_CAL(DAYD); <PARAM>:long_name = "Sea surface temperature Calibrated"; <PARAM>:standard_name = "sea_surface_temperature"; <PARAM>:units = "degree_Celsius"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -1.5f; <PARAM>:valid_max = 38.f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Sea surface temperature calibrated |
| SSTP_FREQ (optional) | float SSTP_FREQ(DAYD); <PARAM>:long_name = "Sea surface temperature frequency"; <PARAM>:units = "Hz"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 20000.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%9.3f"; <PARAM>:coordinate = "DAYD"; | Frequency of external temperature sensor, used for SST measurement |
| SSTP_ADJUSTED (optional) | float SSTP_ADJUSTED(DAYD); <PARAM>:long_name = "Sea surface temperature adjusted"; <PARAM>:standard_name = "sea_surface_temperature"; <PARAM>:units = «degree_Celsius»; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -1.5f; <PARAM>:valid_max = 38.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Sea surface temperature adjusted |
| SSTP_ADJUSTED_ERROR (optional) | float SSTP_ADJUSTED_ERROR(DAYD); <PARAM>:long_name = "Error on sea surface temperature adjusted "; <PARAM>:units = «degree_Celsius»; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -1.5f; <PARAM>:valid_max = 38.f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD"; | Error on sea surface temperature adjusted |

| | | |
|--------------------------------|---|--|
| SSTP_ADJUSTED_QC (optional) | byte SSTP_ADJUSTED_QC(DAYD); <PARAM>:long_name = "Sea Surface Temperature adjusted quality flag"; <PARAM>:valid_min = 0b; <PARAM>:valid_max = 9b; <PARAM>:default_value = 0b; <PARAM>:format = "%1d"; <PARAM>:coordinate = "DAYD"; | Quality flag applied on sea surface temperature adjusted. The flag scale is specified in reference table 4 . If variable not exist, it is set at default_value during creation |
| SSTP_ADJUSTED_HIST | Char SSTP_ADJUSTED_HIST(STRING256) <PARAM>:long_name = "Sea surface temperature adjusted processing history" | Sea surface temperature adjusted processing history |

2.3.6. Data series 3 : external data

| Name | Definition | Comment |
|-------------|--|--|
| DATE_EXT | char DATE_EXT (DAYD_EXT,STRING14); <PARAM>:long_name = "Date of each external data measurement"; <PARAM>:conventions = "yyyymmddHHMMSS"; <PARAM>:coordinate = "DAYD_EXT"; | This is the original data describing the date, it must not be lost |
| DAYD_EXT | double DAYD_EXT(DAYD_EXT); <PARAM>:long_name = "Decimal julian day (UTC) of external data measurement"; <PARAM>:standard_name = "time"; <PARAM>:units = "days since REFERENCE_DATE_TIME "; <PARAM>:conventions = "Relative julian days with decimal part (as parts of the day)"; <PARAM>:_FillValue = 99999.; <PARAM>:valid_min = 0.; <PARAM>:valid_max = 36600.; <PARAM>:format = "%11.5f"; <PARAM>:axis = "T"; <PARAM>:epic_code = 601.; <PARAM>:coordinate = "DAYD_EXT"; | Julian day of the measurement since REFERENCE_DATE_TIME. The integer part represents the day, the decimal part represents the time of the measurement. Date and time are in universal time coordinate. Example : 18833.80140 : July 25 2001 19:14:00 |
| LATX_EXT | float LATX_EXT(DAYD_EXT); <PARAM>:long_name = "Latitude of each external data measurement"; <PARAM>:standard_name = "latitude"; <PARAM>:units = "degree_north"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -90.f; <PARAM>:valid_max = 90.f; <PARAM>:format = "%+8.4f"; <PARAM>:axis = "Y"; <PARAM>:epic_code = 500.f; <PARAM>:coordinate = "DAYD_EXT"; | Latitude of the measurement (decimal). Example : 44.4991 for 44° 29' 56 N |
| LONX_EXT | float LONX_EXT(DAYD_EXT); <PARAM>:long_name = "Longitude of each external data measurement "; <PARAM>:standard_name = "longitude"; <PARAM>:units = "degree_east"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -180.f; <PARAM>:valid_max = 180.f; <PARAM>:format = "%+9.4f"; <PARAM>:axis = "X"; <PARAM>:epic_code = 501.f; <PARAM>:coordinate = "DAYD_EXT"; | Longitude of the measurement (decimal). Example : 16.7222 for 16° 43' 19 E |
| SSTP_EXT | float SSTP_EXT (DAYD_EXT); <PARAM>:long_name = "Sea surface temperature from external data"; <PARAM>:standard_name = "sea_surface_temperature"; <PARAM>:units = "degree_Celsius"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = -1.5f; <PARAM>:valid_max = 38.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD_EXT"; | Sea Surface Temperature (SST) from external data instrument (ARGO, CTD, XBT) |
| SSTP_EXT_QC | byte SSTP_EXT_QC(DAYD_EXT); <PARAM>:long_name = " Sea surface temperature from external data quality flag"; <PARAM>:valid_min = 0b; <PARAM>:valid_max = 9b; <PARAM>:_default_value = 0b; <PARAM>:format = "%1d"; <PARAM>:coordinate = "DAYD_EXT"; | Quality flag applied on external sea surface temperature data values. The flag scale is specified in reference table 4 . If variable not exist, it is set at default_value during creation |

| | | |
|-------------------|--|--|
| SSTP_EXT_TYPE | Char:SSPS_EXT_TYPE(DAYD_EXT,STRING4) <PARAM>:long_name = "Type of external sea surface temperature data origin"; <PARAM>:coordinate = "DAYD_EXT"; | Example :ARGO, CTD, XBT |
| SSPS_EXT | float SSPS_EXT (DAYD_EXT); <PARAM>:long_name = "Sea surface salinity from external data"; <PARAM>:standard_name = "sea_surface_salinity"; <PARAM>:_FillValue = 99999.f; <PARAM>:valid_min = 0.f; <PARAM>:valid_max = 40.f; <PARAM>:resolution = 0.001f; <PARAM>:format = "%6.3f"; <PARAM>:coordinate = "DAYD_EXT"; | Sea Surface Salinity (SSS) from external data instrument (WS,ARGO,CTD, XBT) |
| SSPS_EXT_QC | byte SSPS_EXT_QC(DAYD_EXT); <PARAM>:long_name = " Sea surface salinity from external data quality flag"; <PARAM>:valid_min = 0b; <PARAM>:valid_max = 9b; <PARAM>:default_value = 0b; <PARAM>:format = "%1d"; <PARAM>:coordinate = "DAYD_EXT"; | Quality flag applied on external sea surface salinity data values The flag scale is specified in reference table 4 . If variable not exist, it is set at default_value during creation |
| SSPS_EXT_TYPE | Char:SSPS_EXT_TYPE(DAYD_EXT,STRING4) <PARAM>:long_name = "Type of external sea surface salinity data origin"; <PARAM>:coordinate = "DAYD_EXT"; | Example :WS (Water Sample), ARGO, CTD, XBT, ... |
| SSPS_EXT_ANALDATE | char SSPS_EXT_ANALDATE(DAYD_EXT,STRING14); <PARAM>:long_name = "Date of water sample surface salinity analysis"; <PARAM>:conventions = "yyymmddHHMMSS" <PARAM>:coordinate = "DAYD_EXT"; | Date of sea surface salinity water sample analysis |
| SSPS_EXT_BOTTLE | char SSPS_EXT_BOTTLE(DAYD_EXT,STRING4); <PARAM>:long_name = "Sea surface salinity bottles numbers" <PARAM>:coordinate = "DAYD_EXT"; | The ID numbers of the sea surface salinity sampling bottles Example; 0001 or B12 |

3. Reference tables

3.1. Reference table 1 : Thermosalinometer (TSG) type

| Name |
|-------|
| SBE21 |
| SBE45 |
| UNKNO |

3.2. Reference table 2 : Temperature sensor at intake (TINT) type

| Name |
|-------|
| SBE38 |
| SBE3S |
| TQP |
| UNKNO |
| NA |

3.3. Reference table 3 : PROCESSING STATES

| Code | Libellé |
|------------|---|
| 0A | RAW DATA |
| 0B | AUTOMATIC QUALITY CONTROL |
| 0C | NOT RECOMMEND |
| 1A | CLIMATOLOGY CONTROL |
| 1B | APPLICATION OF QUALITY CODE AFTER VISUAL INSPECTION |
| 1C | VALIDED BY PI |
| 2A | NOT RECOMMEND |
| 2B | NOT RECOMMEND |
| 2B+ | CALIBRATED DATA |
| 2C | NOT RECOMMEND |
| 2C+ | CALIBRATED DATA VALIDATED BY PI |
| 3A | NON RECOMMANDE |
| 3B | CALIBRATED REDUCED DATA |
| 3C | GRIDDED REDUCED DATA |

3.4. Reference table 4 : QUALITY FLAGS

| n | Meaning |
|---|---|
| 0 | No QC was performed |
| 1 | Good data |
| 2 | Probably good data |
| 3 | Bad data that are potentially correctable |
| 4 | Bad data |
| 5 | Value changed |
| 6 | Harbour |
| 7 | Not used |
| 8 | Interpolated value |
| 9 | Missing value |

3.5. Reference table 5: Parameter code table

| Code | Parameter Long name | Unit | Valid min | Valid max | Fortran Format resolution | Fill value |
|-------------|---|-------------------|--------------|--------------|------------------------------|---------------|
| LATX | Latitude | Decimal degree | -90 | 90 | %+8.4f | 99999 |
| LONX | Longitude | Decimal degree | -180 | 180 | %+9.4f | 99999 |
| DAYD | Decimal Julian day time | Decimal day | 0.0 | 3660.0 | %9.5f | 99999 |
| SPDC | Ship speed computed from navigation | Meter/second | 0 | 90 | %6.3f | 99999 |
| PRES | Sea pressure | decibar | 0 | 6500 | %6.1f | 99999 |
| DEPH | Depth below sea surface | meter | 0 | 6000 | %6.1f | 99999 |
| PSAL | Practical salinity | PSU | 33 | 37 | %6.3f | 99999 |
| CNDC | Electrical conductivity | S/m | 3 | 7 | %5.3f | 99999 |
| SSJT | Sea surface water jacket temperature | Celsius degree | -1.5 | 38 | %6.3f | 99999 |

| | | | | | | |
|-------------|--------------------------------|----------------|------|----|-------|-------|
| SSPS | Sea surface practical salinity | PSU | | | %6.3f | 99999 |
| SSTP | Sea surface temperature | Celsius degree | -1.5 | 38 | %6.3f | 99999 |

3.6. Reference table 6: Water sample (bottle) type

| Name |
|------|
| ARGO |
| CTD |
| OSIL |
| UNKN |
| WS |
| XBT |
| XCTD |
| NA |

3.7. Reference table 7: Data centres and institutions codes

| Code | Description |
|-----------|---|
| AO | AOML, USA |
| BO | BODC, United Kingdom |
| CI | Institute of Ocean Sciences, Canada |
| CS | CSIRO, Australia |
| GE | BSH, Germany |
| GT | GTS : used for data coming from WMO GTS network |
| HZ | CSIO, China Second Institute of Oceanography |
| IF | Ifremer, France |
| IN | INCOIS, India |
| JA | JMA, Japan |
| JM | Jamstec, Japan |
| KM | KMA, Korea |
| ME | MEDS, Canada |
| NA | NAVO, USA |
| PM | PMEL, USA |
| RU | Russia |

| | |
|-----------|---|
| SI | SIO, Scripps, USA potentially correctable |
| SP | Spain |
| UW | University of Washington, USA |
| IR | IRD, France |