GOSUD

GOSUD

DATA FORMAT TSG

Version 3.1

May 17th 2023

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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 TIME_WS and change NOCOEF_CAL to 6 in § 2.1 correct dimension for SSTP_QC in §2.3.5 and LATITUDE_EXT § 2.3.6 add new variables _CONV for calibration coefficients used to store coefficients names
1.6	12/17/2009 01/12/2010 02/05/2010	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 J. Grelet: Set date with English convention in history Remove FillValue for <PARAM>_CALCOEFF_CONV, <PARAM>_LINCOEFF_CONV and SSPS_EXT_BOTTLE 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 variable attributes « description »
3.0	01/16/2013	J.Grelet, M Kreiger, Loic Petit de la Villéon Minors updates on global attributes « comments »

		Add NKE-STPS in TYPE_TSG table 1 Merge GOSUD format to 3.0 between TSG-QC and CORIOLIS
3.01	06/18/2013	J.Grelet, M Kreiger Remove date field from <PARAM>_LINCOEF variable
3.1	17/05/2023	L. Drouineau: format update to DSG (Discrete Sampling Geometries) LATX => LATITUDE LONX => LONGITUDE DAYD => TIME DAYD_EXT => TIME_EXT remove variable REFERENCE_DATE_TIME TIME units: "days since 1950-01-01T00:00:00Z"

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 centre 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
TIME		Number of recorded measurements for the main TSG series
TIME_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 : SO-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, format : yyyymmddDDHHMMSS
TYPE_TSG	TYPE_TSG = <char value>;	Thermosalinograph model number Described in reference table 1 Example : SBE21 or SBE45
NUMBER_TSG	NUMBER_TSG= <char value>;	Thermosalinograph serial number. Example: 2250
DATE_TINT	DATE_TINT = <char value>	Date of TINT installation, format: yyyymmddHHMMSS
TYPE_TINT	TYPE_TINT= <char value>;	Temperature sensor at intake. Described in reference table 2 Example: SBE38
NUMBER_TINT	NUMBER_TINT= <char value>;	Intake temperature sensor serial number. Example: 3940
DATA_TYPE	DATA_TYPE = <char value>;	This field describes the type of data contained in the file. Example : TRAJECTORY, PROFILE or TIME-SERIES
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 (UTC), format: yyyymmddHHMMSS
DATE_END	DATE_END = <char value>	Date of last measurements (UTC), format: yyyymmddHHMMSS
SOUTH_LATITUDE		South limit of measurements
NORTH_LATITUDE		North limit of measurements
WEST_LONGITUDE		West limit of measurements
EAST_LONGITUDE		East limit of measurements
FORMAT_VERSION	FORMAT_VERSION = <char value>;	GOSUD file format version, example: 3.0
CONVENTIONS	CONVENTIONS = = <char value>;	GOSUD NetCDF file format conventions, example: CF1.8, GOSUD 3.0
DATE_CREATION	DATE_CREATION = <char value>;	Date and time (UTC) of creation of this file. Format : yyyymmddHHMMSS Example : 20011229161700 : December 29th 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 30th 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>;	Comment.
PI_NAME	PI_NAME = <char value>;	Name of the principal investigator in charge of the TSG line.
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 : SO-SSS, CORIOLIS,TSG_RECHERCHE, ...
PROCESSING_STATES	PROCESSING_STATES = <char value>;	Described in reference table 3
WS_TYPE	WS_TYPE = <char value>	Model of water sample bottle

		Default : NA, Not Available Example: OSIL Described in reference table 6
TYPE_POSITION	TYPE_POSITION = <char value>;	Description of navigation system Example: GPS, GPS DIFFERENTIAL, ARGOS, INTERPOLATE, MANUAL, NONE, UNKNOW
HISTORY	HISTORY = <char value>;	Provides an audit trail for modifications to the original data
featureType	:featureType = "trajectory";	Use of Discrete Sampling Geometries from cf convention

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 1950-01-01T00:00:00Z
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','l','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 calibration date is update from CNDC_CALCOEF
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: " '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 1950-01-01T00:00:00Z
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','l','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 calibration date is update from SSJT_CALCOEF
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: " '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 1950-01-01T00:00:00Z
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','I','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 calibration date is update from SSTP_CALCOEF
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: " 'slope', 'offset' "

2.3.3. Coordinates for TSG/TINT:

Name	Definition	Comment
DATE	char DATE (TIME,STRING14); <PARAM>:long_name = "Date of main instrument measurement"; <PARAM>:conventions = "yyyymmddHHMMSS"; <PARAM>:coordinate = "TIME LATITUDE LONGITUDE";	This is the original data describing the date, it must not be lost
TIME	double TIME(TIME); <PARAM>:long_name = "Decimal julian day (UTC) of each measurement"; <PARAM>:standard_name = "time"; <PARAM>:units = "days since 1950-01-01T00:00:00Z"; <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 = "TIME LATITUDE LONGITUDE";	Julian day of the measurement since 1950-01-01T00:00:00Z. 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
LATITUDE	float LATITUDE(TIME); <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 = "TIME LATITUDE LONGITUDE";	Latitude of the measurement (decimal). Example : 44.4991 for 44° 29' 56.76'' N
LONGITUDE	float LONGITUDE (TIME); <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 = "TIME LATITUDE LONGITUDE";	Longitude of the measurement (decimal). Example : 16.7222 for 16° 43' 19.92'' E
POSITION_QC	byte POSITION_QC(TIME) <PARAM>:long_name=quality flag of position <PARAM>:valid_min = 0b; <PARAM>:valid_max = 9b; <PARAM>:default_value = 0b; <PARAM>:format = "%1d"; <PARAM>:coordinate = "TIME LATITUDE LONGITUDE";	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 (TIME); <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 = "TIME LATITUDE LONGITUDE";	Ship speed from GPS (SOG - Speed Over Ground). If SOG not available, derived from last position

2.3.4. Data series 1 main TSG:

1) Measured variables

Name	Definition	Comment
PRES (optional)	float PRES (TIME); <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 = "TIME LATITUDE LONGITUDE";	Pressure inside TSG, this is an indication that pump is working properly
FLOW (optional)	float FLOW (TIME); <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 = "TIME LATITUDE LONGITUDE";	Water pump discharge measurement in the TSG inlet, this is an indication that pump is working properly
CNDC	float CNDC (TIME); <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 = "TIME LATITUDE LONGITUDE";	Conductivity measured by TSG. This data may have been reduced with a median (recommended) or a mean
CNDC_STD (optional)	float CNDC_STD(TIME); <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 = "TIME LATITUDE LONGITUDE";	Standard deviation of conductivity measured by TSG for data which have been reduced (with a mean or median)
CNDC_CAL (optional)	float CNDC_CAL(TIME); <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 = "TIME LATITUDE LONGITUDE";	Conductivity calibrated using linearization coefficients

CNDC_FREQ (optional)	float CNDC_FREQ(TIME); <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 = "TIME LATITUDE LONGITUDE";	Sensor Conductivity Frequency measured by TSG
SSJT	float SSJT(TIME); <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 = "TIME LATITUDE LONGITUDE";	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(TIME); <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 = "TIME LATITUDE LONGITUDE";	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(TIME); <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 = "TIME LATITUDE LONGITUDE";	Water jacket temperature standard deviation for data which have been reduced (with a mean or median)
SSJT_CAL (optional)	float SSJT_CAL(TIME); <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 = "TIME LATITUDE LONGITUDE";	Water jacket temperature calibrated using linearization coefficients
SSJT_FREQ (optional)	float SSJT_FREQ(TIME); <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 = "TIME LATITUDE LONGITUDE";	Frequency of water jacket temperature sensor
SSJT_ADJUSTED (optional)	float SSJT_ADJUSTED(TIME); <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 = "TIME LATITUDE LONGITUDE";	Adjusted water jacket temperature with external data (ARGO, CTD, XBT,...)

SSJT_ADJUSTED_ERROR (optional)	float SSJT_ ADJUSTED _ERR(TIME); <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 = "TIME LATITUDE LONGITUDE";	Error on adjusted water jacket temperature with external data
SSJT_ADJUSTED_QC (optional)	byte SSJT_ADJUSTED_QC(TIME); <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 = "TIME LATITUDE LONGITUDE";	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(TIME); <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 = "TIME LATITUDE LONGITUDE";	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(TIME); <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 = "TIME LATITUDE LONGITUDE";	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(TIME); <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 = "TIME LATITUDE LONGITUDE";	Standard deviation of sea surface salinity measured by TSG in case when CNDC_STD not available
SSPS_CAL (optional)	float SSPS_CAL(TIME); <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 = "TIME LATITUDE LONGITUDE";	Sea surface salinity calibrated deduced from conductivity and water jacket temperature
SSPS_ADJUSTED (optional)	float SSPS_ADJUSTED(TIME); <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 = "TIME LATITUDE LONGITUDE";	Sea surface salinity adjusted with external data (ARGO, CTD, XBT,...)
SSPS_ADJUSTED_ERR OR (optional)	float SSPS_ADJUSTED_ERROR(TIME); <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 = "TIME LATITUDE LONGITUDE";	Error on sea surface salinity adjusted with external data
SSPS_ADJUSTED_QC (optional)	byte SSPS_ADJUSTED_QC(TIME); <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 = "TIME LATITUDE LONGITUDE";	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(TIME); <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 = "TIME LATITUDE LONGITUDE";	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(TIME); <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 = "TIME LATITUDE LONGITUDE";	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(TIME); <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 = "TIME LATITUDE LONGITUDE";	Sea surface temperature calibrated
SSTP_FREQ (optional)	float SSTP_FREQ(TIME); <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 = "TIME LATITUDE LONGITUDE";	Frequency of external temperature sensor, used for SST measurement
SSTP_ADJUSTED (optional)	float SSTP_ADJUSTED(TIME); <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 = "TIME LATITUDE LONGITUDE";	Sea surface temperature adjusted
SSTP_ADJUSTED_ERROR (optional)	float SSTP_ ADJUSTED _ERROR(TIME); <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 = "TIME LATITUDE LONGITUDE";	Error on sea surface temperature adjusted

SSTP_ADJUSTED_QC (optional)	byte SSTP_ADJUSTED_QC(TIME); <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 = "TIME LATITUDE LONGITUDE";	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 (TIME_EXT,STRING14); <PARAM>:long_name = "Date of each external data measurement" <PARAM>:conventions = "yyyymmddHHMMSS" <PARAM>:coordinate = "TIME_EXT";	This is the original data describing the date, it must not be lost
TIME_EXT	double TIME_EXT(TIME_EXT); <PARAM>:long_name = "Decimal julian day (UTC) of external data measurement"; <PARAM>:standard_name = "time"; <PARAM>:units = "days since 1950-01-01T00:00:00Z"; <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 = "TIME_EXT";	Julian day of the measurement since 1950-01-01T00:00:00Z. 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
LATITUDE_EXT	float LATITUDE_EXT(TIME_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 = "TIME_EXT";	Latitude of the measurement (decimal). Example : 44.4991 for 44° 29' 56 N
LONGITUDE_EXT	float LONGITUDE_EXT(TIME_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 = "TIME_EXT";	Longitude of the measurement (decimal). Example : 16.7222 for 16° 43' 19 E
SSTP_EXT	float SSTP_EXT (TIME_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 = "TIME_EXT";	Sea Surface Temperature (SST) from external data instrument (ARGO, CTD, XBT)
SSTP_EXT_QC	byte SSTP_EXT_QC(TIME_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 = "TIME_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(TIME_EXT,STRING4) <PARAM>:long_name = "Type of external sea surface temperature data origin"; <PARAM>:coordinate = "TIME_EXT";	Example :ARGO, CTD, XBT

SSPS_EXT	float SSPS_EXT (TIME_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 = "TIME_EXT";	Sea Surface Salinity (SSS) from external data instrument (WS,ARGO,CTD, XBT)
SSPS_EXT_QC	byte SSPS_EXT_QC(TIME_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 = "TIME_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(TIME_EXT,STRING4) <PARAM>:long_name = "Type of external sea surface salinity data origin"; <PARAM>:coordinate = "TIME_EXT";	Example :WS (Water Sample), ARGO, CTD, XBT, ...
SSPS_EXT_ANALDATE	char SSPS_EXT_ANALDATE(TIME_EXT,STRING14); <PARAM>:long_name = "Date of water sample surface salinity analysis"; <PARAM>:conventions = "yyyymmddHHMMSS" <PARAM>:coordinate = "TIME_EXT";	Date of sea surface salinity water sample analysis
SSPS_EXT_BOTTLE	char SSPS_EXT_BOTTLE(TIME_EXT,STRING4); <PARAM>:long_name = "Sea surface salinity bottles numbers" <PARAM>:coordinate = "TIME_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
NKE-STPS
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 date
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
LATITUDE	Latitude	Decimal degree	-90	90	%+8.4f	99999
LONGITUDE	Longitude	Decimal degree	-180	180	%+9.4f	99999
TIME	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
UNKN0
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