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DELAYED MODE QUALITY CONTROL OF ARGO DATA FROM DAC CORIOLIS

FLOAT WMO 6900701

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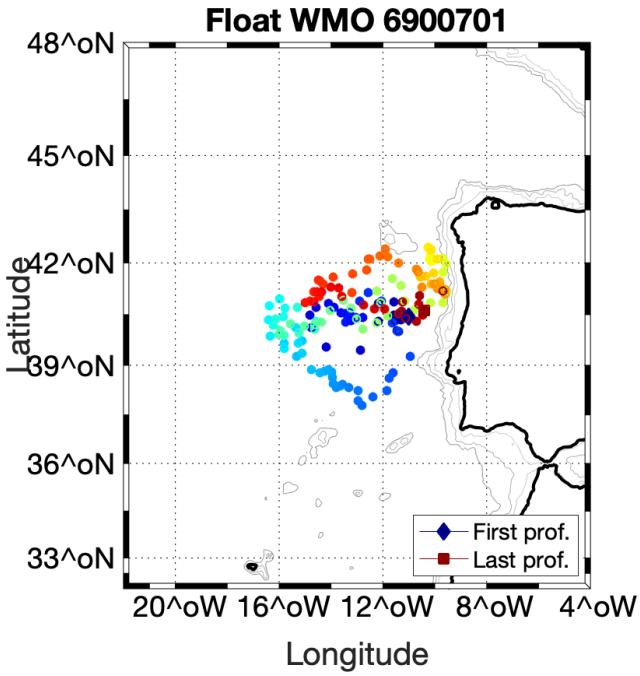
14 janvier 2019



1 General Presentation

Platform Number	6900701
DAC	IF-CORIOLIS
Float Status	Inactive
Project	GOODHOPE
Deployment Platform	RV Polarstern
Institution	IFREMER, France
Name of the PI	Sabrina SPEICH
Platform Model	ARVOR (844)
Serial number	OIN-08-AR-001
Sensor type	SeaBird - SBE41-CP
Positionning System	ARGOS
Format Version	3.1

Table 1 – Float characteristics.

Deepest pressure in ascending profile (m)	2000
Parking depth (m)	1000
Cycle time (hours)	240
Deployment date	2011/11/01
Deployment position	long = -11.11 , lat = 40.48
Last studied cycle number	153
last studied cycle date	2016/01/01
last studied cycle position	long = -10.41 , lat = 41

Table 2 – Programmation and evolution.

2 Trajectory, positions and dates

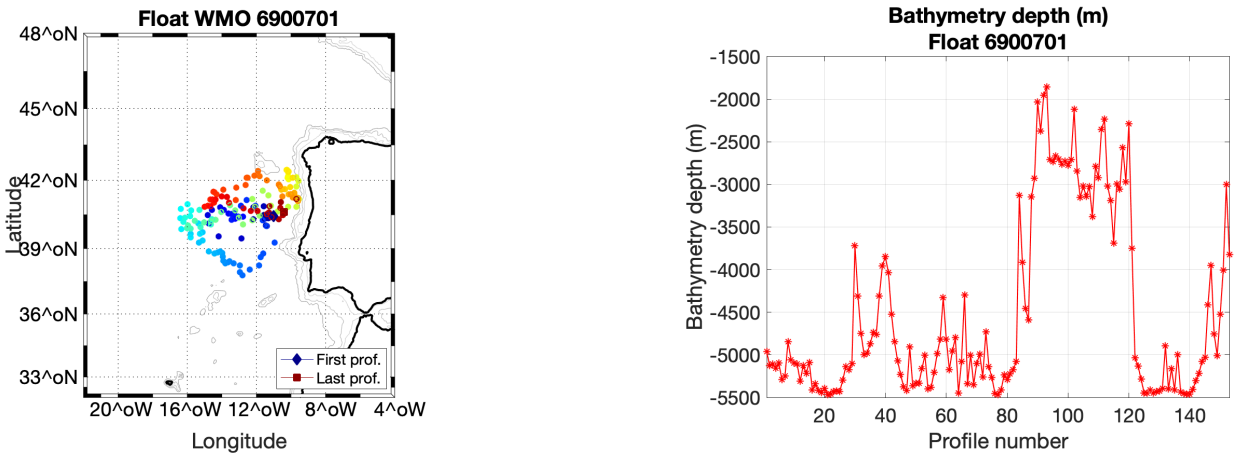


FIGURE 1 – (left) : Profiles position, (right) : bathymetry depth function of cycle number.

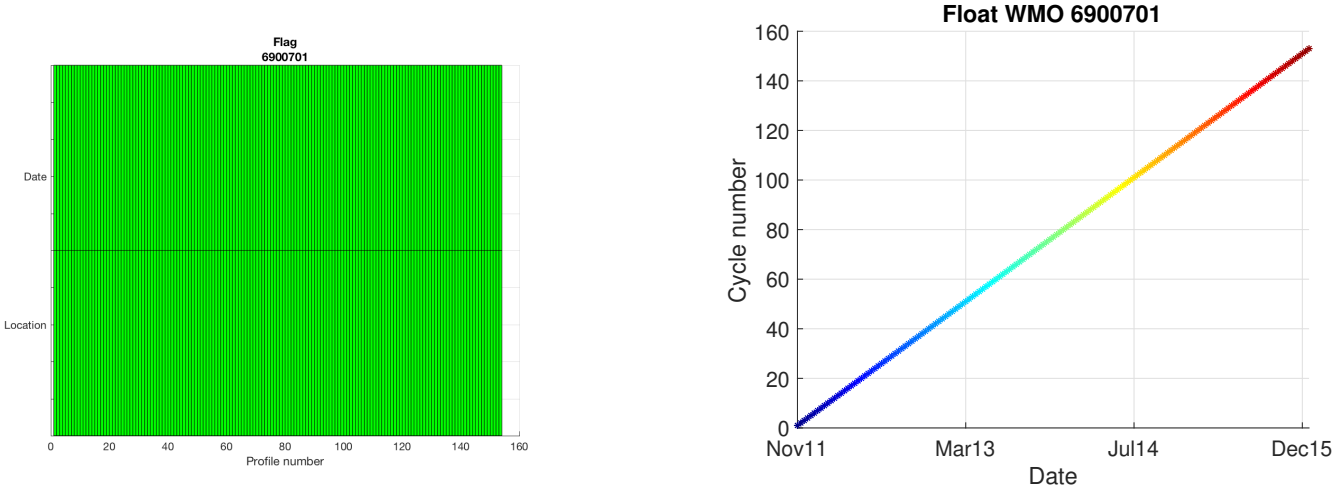


FIGURE 2 – (left) : flags on profiles positions and dates.
(right) : relationship between cycle number, date and color.

3 Informations on Meta-Data

NAME
ANOMALY
BATTERY_PACKS
CONTROLLER_BOARD_TYPE_SECONDARY
CONTROLLER_BOARD_SERIAL_NO_SECONDARY
SPECIAL_FEATURES
FLOAT_OWNER
OPERATING_INSTITUTION
CUSTOMISATION
STARTUP_DATE
STARTUP_DATE_QC
DEPLOYMENT_CRUISE_ID
END_MISSION_DATE
END_MISSION_STATUS
CONFIG_MISSION_COMMENT
PREDEPLOYMENT_CALIB_COMMENT

Table 3 – Missing on Meta Data.

4 Quality check on basic parameters

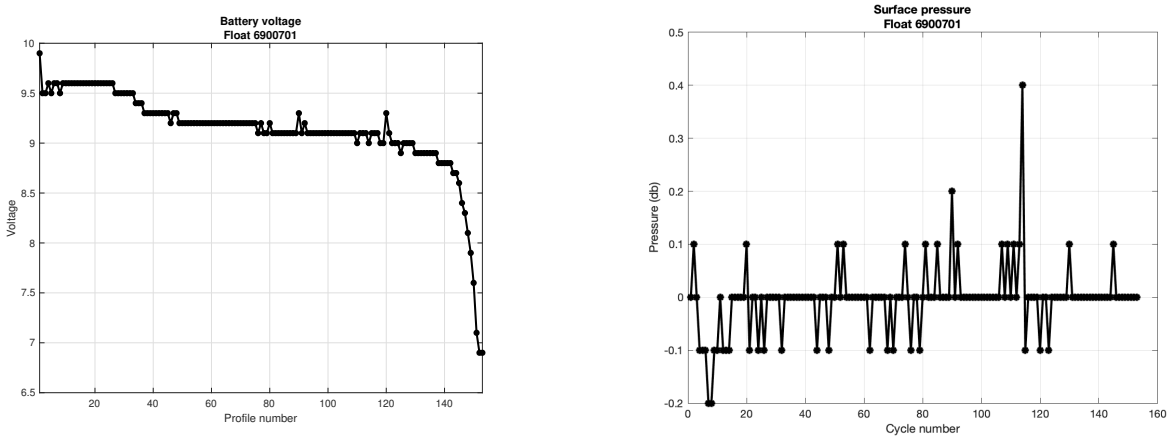


FIGURE 3 – (left) : battery voltage - (right) : surface pressure from technical files.

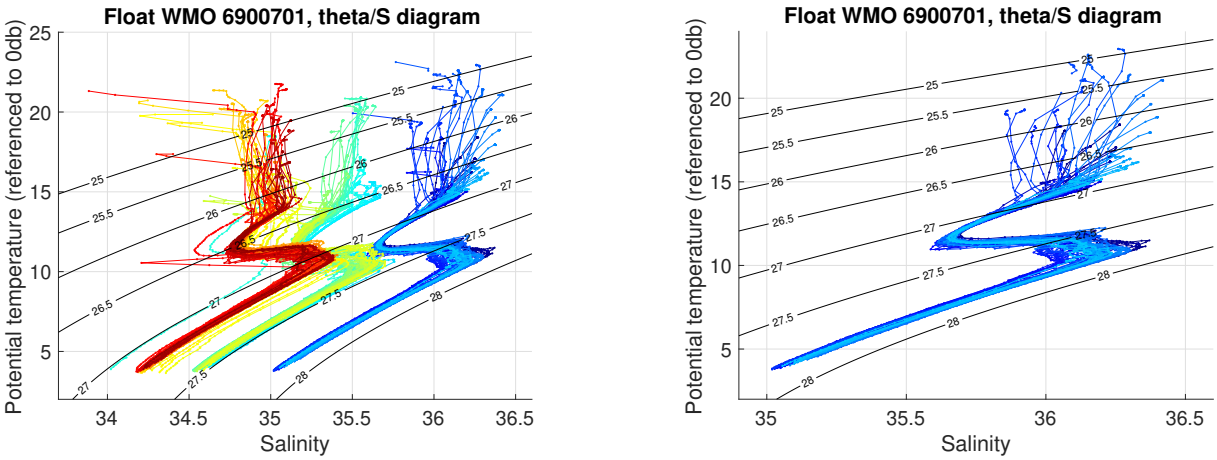


FIGURE 4 – θ/S diagrams.
(left panel) Flags are not taken into account.
(right panel) Quality flags are taken into account.

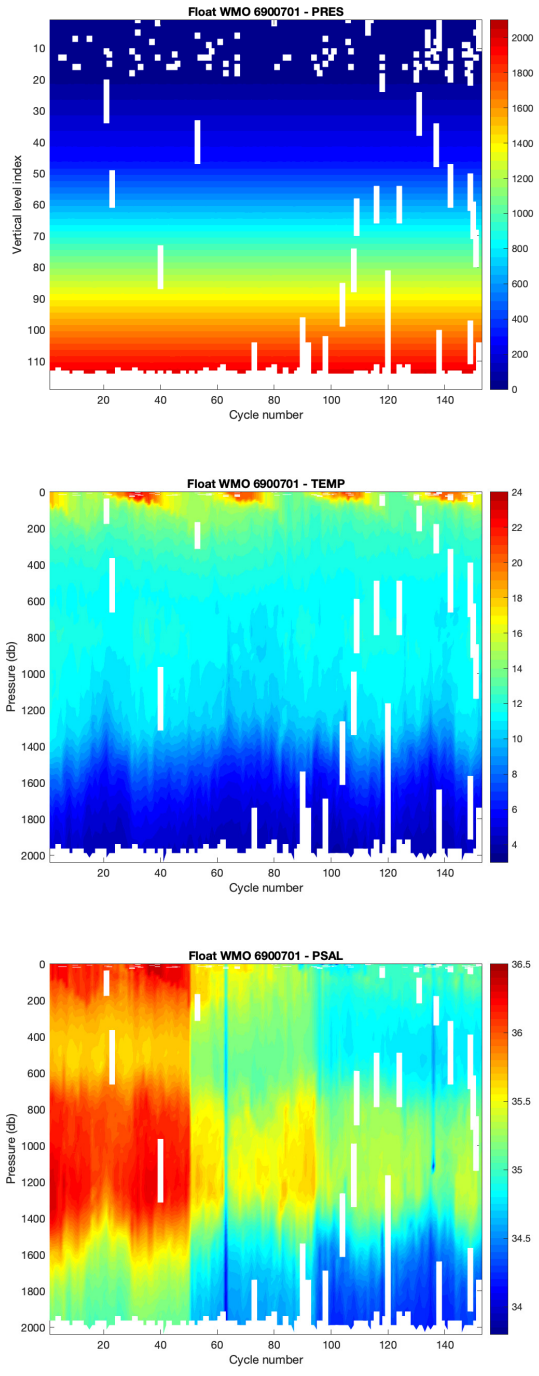


FIGURE 5 – Sections of pressure (top), temperature (middle) and salinity (bottom) section along the float trajectory. Quality flags are not taken into account.

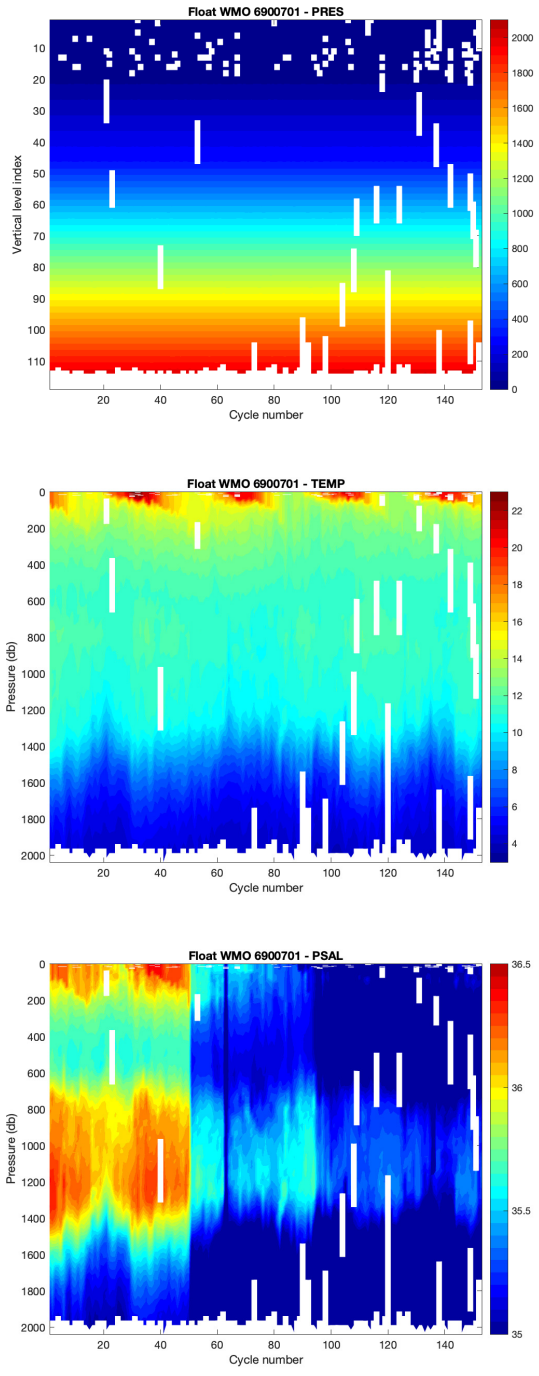


FIGURE 6 – Sections of pressure (top), temperature (middle) and salinity (bottom) section along the float trajectory. Quality flags are taken into account.

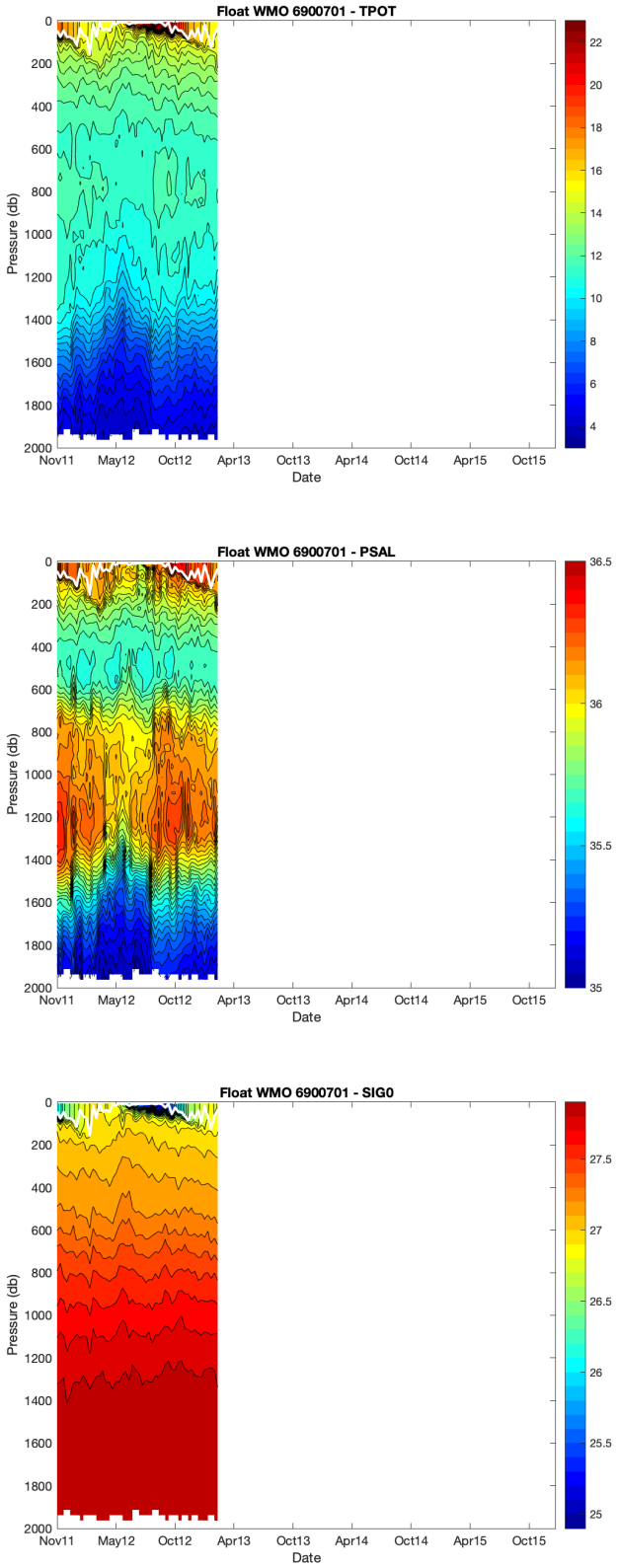


FIGURE 7 – Sections of pressure (top), temperature (middle) and salinity (bottom) section along the float trajectory. Quality flags are taken into account.

5 QC flag checks and interesting profiles

Cycle	Parameter	Vertical level	Old flag	New flag	Comments
all cycles	PSAL	the first ones	4	4	suspicious data
51-153	PSAL	16-887 dbar	3	3	drift in salinity

TABLE 4 – Float #WMO 6900701. Cycles [0A-153A] : summary of the modifications of the real-time Qc flags and of the interesting or suspicious data

Comments :

The resolution is equal to 10 dbar from the surface to 500 dbar, then 25 dbar from 500 to 2000 dbar. Salinity data between 0 and 10 dbar are acquired when the pump of the CTD is turned off, and may be thus suspicious.

6 Cycle 51 : comparison to the nearest Argo (OW) profiles.

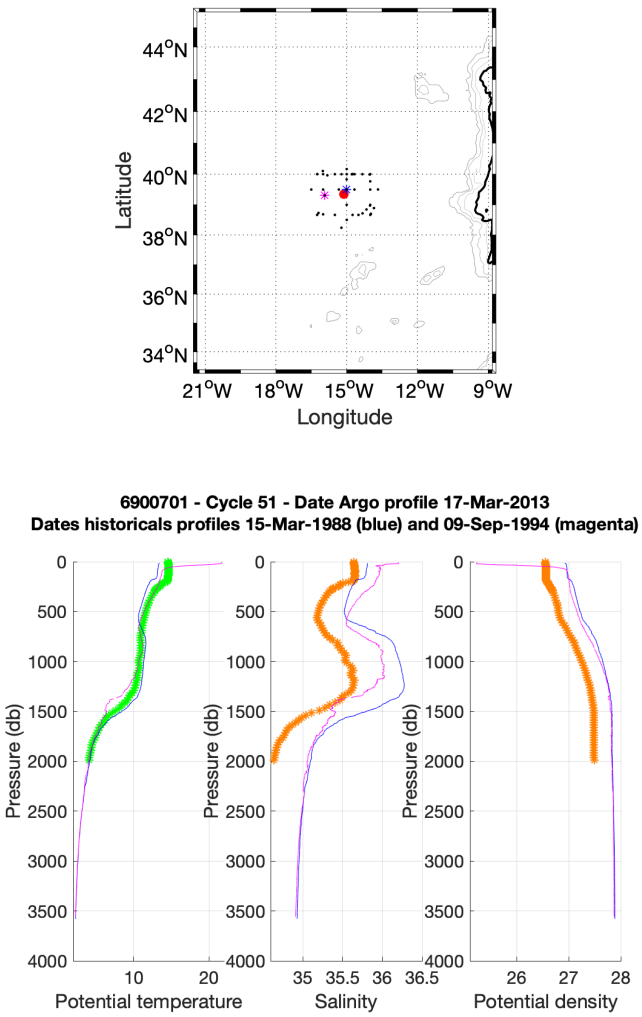


FIGURE 8 – Float 6900701, cycle 51 - **(Upper panel)** Position of the Argo profile (red) and of the nearest Argo profiles (black). The nearest Argo profile in time is in magenta while the nearest Argo profile in space is in blue. **(Lower panels)** Temperature, salinity and potential density as function of pressure for the Argo profile (stars) and for the nearest Argo profile in time (magenta line) and for the nearest ARGO profile in space (blue line). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue for a QC=2 ; orange for a QC=3 and red for a QC=4).

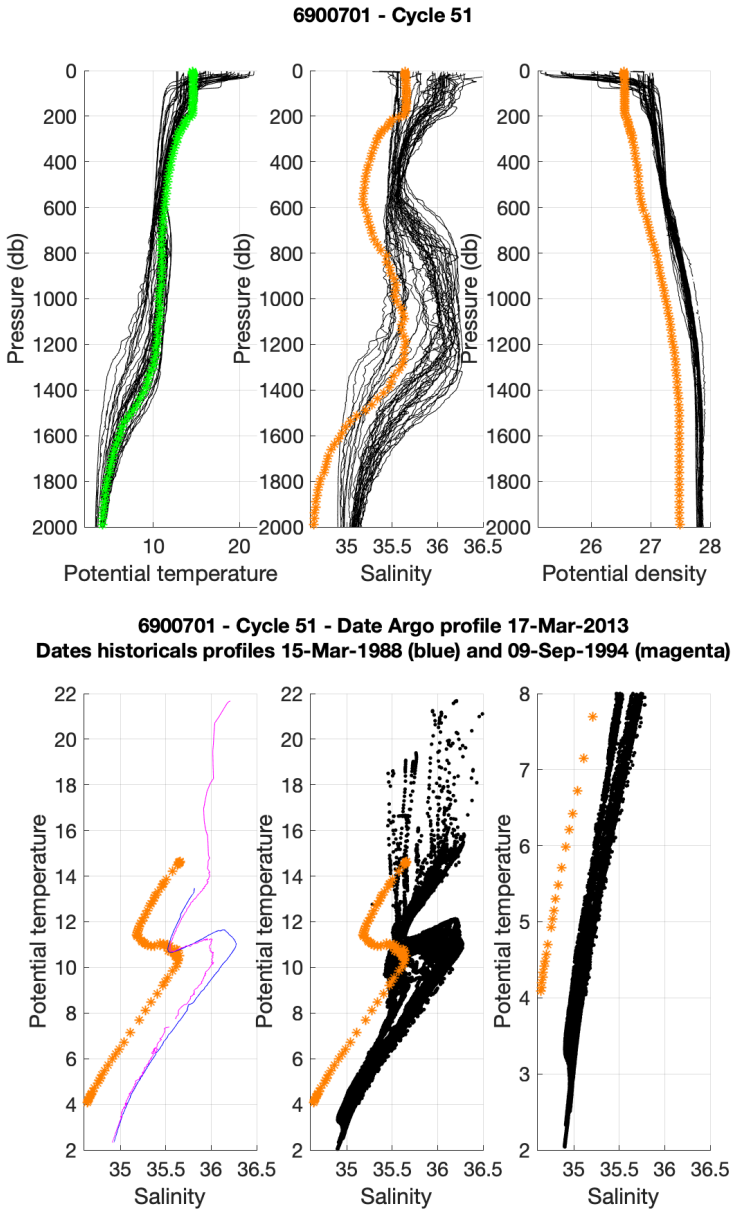


FIGURE 9 – Float 6900701, cycle 51 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue for a QC=2 ; orange for a QC=3 and red for a QC=4). **(Upper panels)** Temperature (left panel), salinity (middle panel) and potential density (right panel) as function of pressure. **(Lower panels)** θ/S diagrams.

7 Cycle 153 : comparison to the nearest Argo (OW) profiles.

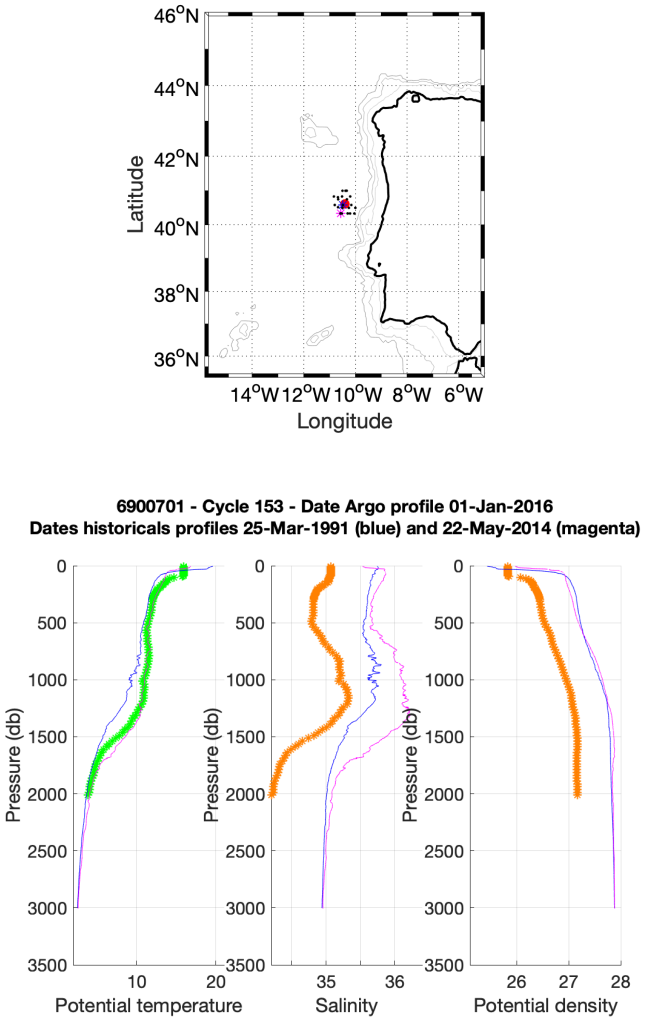


FIGURE 10 – Float 6900701, cycle 153 - **(Upper panel)** Position of the Argo profile (red) and of the nearest Argo profiles (black). The nearest Argo profile in time is in magenta while the nearest Argo profile in space is in blue. **(Lower panels)** Temperature, salinity and potential density as function of pressure for the Argo profile (stars) and for the nearest Argo profile in time (magenta line) and for the nearest ARGO profile in space (blue line). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue for a QC=2 ; orange for a QC=3 and red for a QC=4).

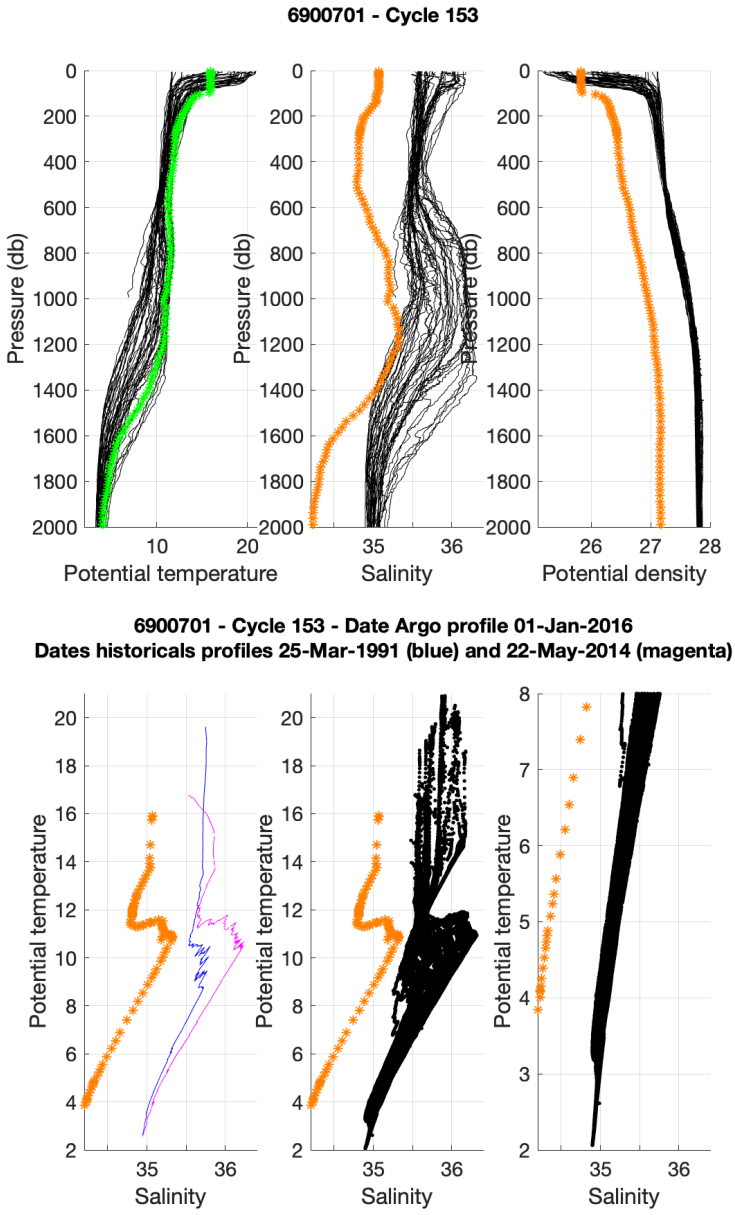


FIGURE 11 – Float 6900701, cycle 153 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue for a QC=2 ; orange for a QC=3 and red for a QC=4). **(Upper panels)** Temperature (left panel), salinity (middle panel) and potential density (right panel) as function of pressure. **(Lower panels)** θ/S diagrams.

8 Pressure Calibration :

ARVOR float with $PRES\_SurfaceOffsetCorrectedNotResetnegative\_1cBarResolution\_dBar$ i.e. correction on-board, no need to do DM adjustment in pressure.

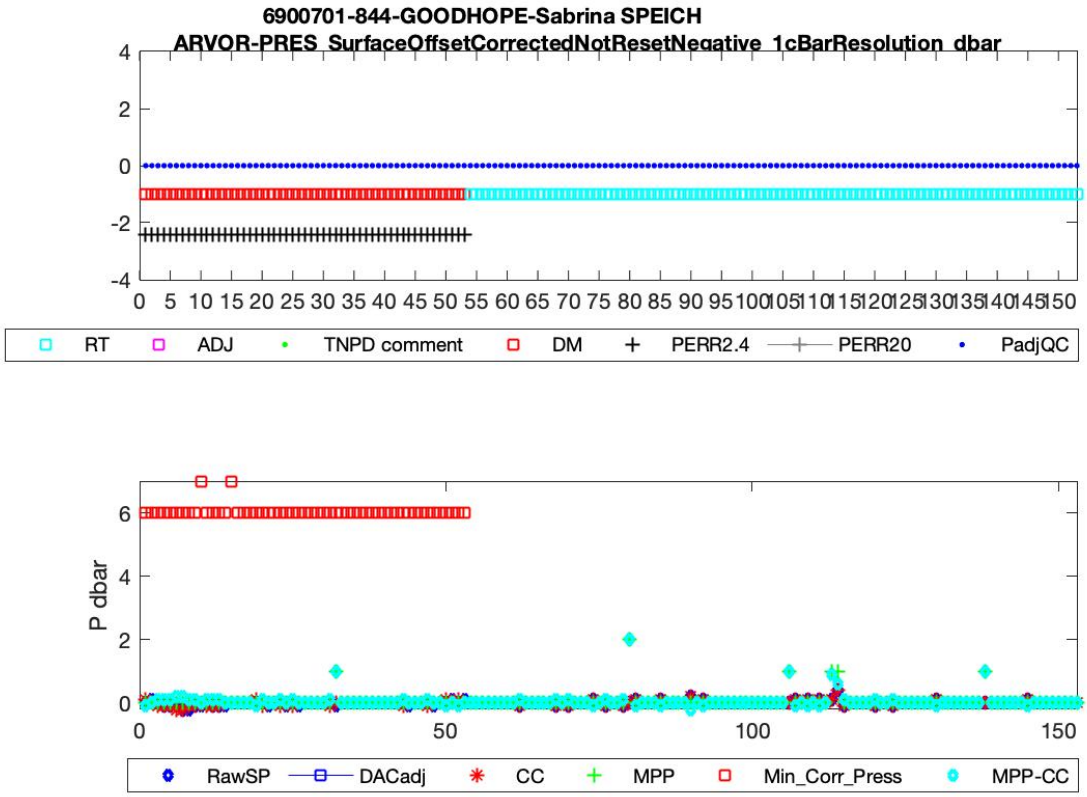


FIGURE 12 – Surface pressure time serie for float 6900701. Legend : blue diamonds : Raw Surface Pressure ; blue squares : DAC adjustment (if DM exist) ; red points : calculated correction CC ; green diamonds with the minimal profile pressure value (MPP) ; pink squares : corrected minimal surface pressure ; cyan diamonds : $MPP - CC$

9 OW method, configuration _ctdandargo

We confirm a drift in salinity from cycle 51 to the last one.
We set the calseries only for this interval, and thus conclude that the salinity data are correct from cycle 1 to cycle 50.

CONFIG_MAX_CASTS	300
MAP_USE_PV	0
MAP_USE_SAF	0
MAPSCALE_LONGITUDE_LARGE	8
MAPSCALE_LONGITUDE_SMALL	4
MAPSCALE_LATITUDE_LARGE	4
MAPSCALE_LATITUDE_SMALL	2
MAPSCALE_PHI_LARGE	0.5
MAPSCALE_PHI_SMALL	0.1
MAPSCALE_AGE	10
MAP_P_EXCLUDE	1000
MAP_P_DELTA	250

Table 5 – Mapping parameters.

breaks	none
max_breaks	4
calseries	[ones(1,50) 0*ones(1,n-50)]
use_percent_gt	0.5

Table 6 – Calibration parameters.

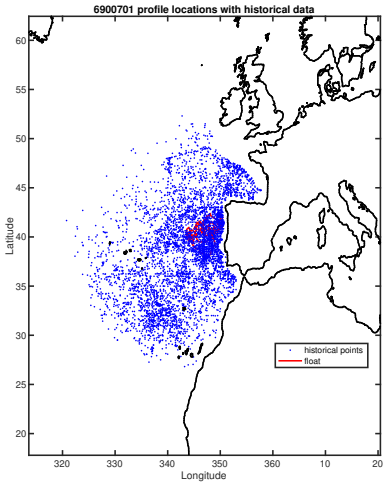


Figure 13 – Position of the historical and float data.

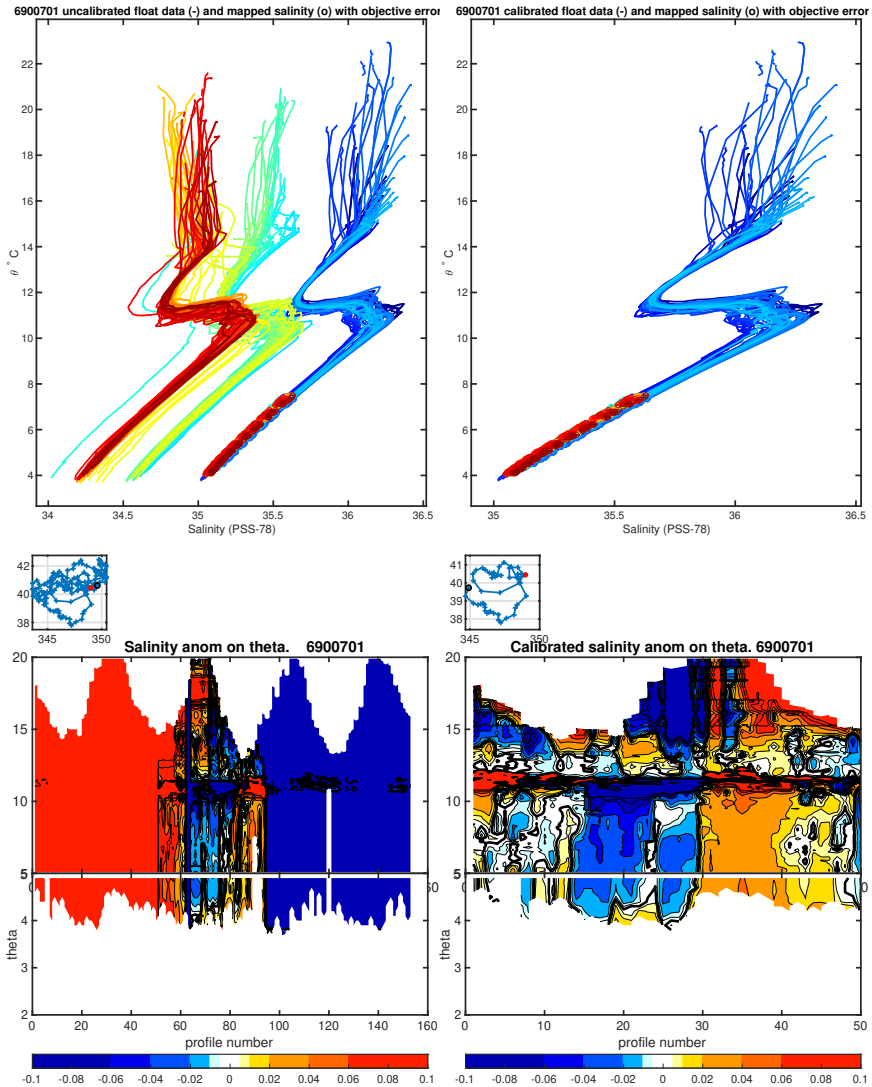


FIGURE 14 – **(top panel)** : Comparison of the θ/S diagram of the float with the historial database. (left) raw data. (right) corrected data using the OW correction.
(bottom panel) : Salinity anomaly. (left) raw data. (right) corrected data using the OW correction.

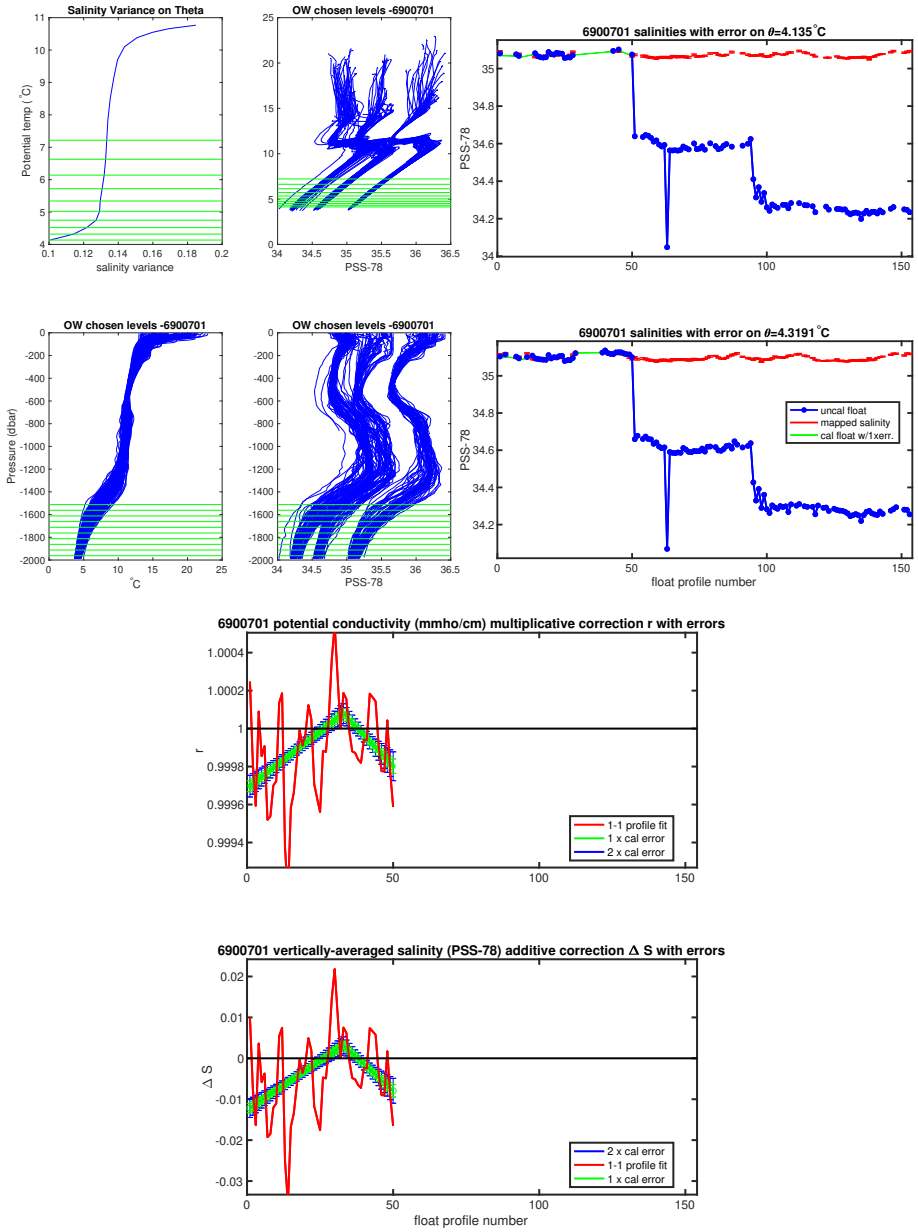


FIGURE 15 – (top left) : θ- levels chosen for the calibration. (top right) : comparison, on various θ levels, between the float data and the historical data interpolated at the float position. (bottom) : Correction proposed by the OW method.