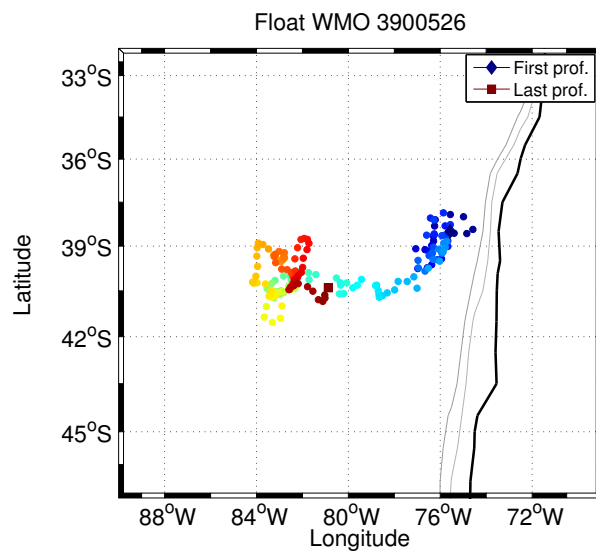


## Delayed Mode Quality Control Float #WMO 3900526 - DAC Coriolis

by Carole Saout-Grit - **GlazeO**<sup>1</sup>

update : **January 19, 2013**



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# 1 Presentation :

<b>Platform Number</b>	3900526
<b>DAC</b>	IF-CORIOLIS
<b>Float Status</b>	Active
<b>Project</b>	CORIOLIS-FLOPS
<b>Deployment Platform</b>	XXXX
<b>Institution</b>	IFREMER, France
<b>Name of the PI</b>	G.Eldin
<b>Platform Model</b>	PROVOR CTS-3 (841)
<b>Serial number</b>	OIN-05-S3-24
<b>Sensor type</b>	SeaBird
<b>Positioning System</b>	ARGOS

Table 1: Float characteristics.

<b>Deepest pressure in ascending profile (m)</b>	2000
<b>Parking depth (m)</b>	1000
<b>Cycle time (hours)</b>	240
<b>Deployment date</b>	2008/03/16
<b>Deployment position</b>	long = -75.36 , lat = -38.49
<b>Last studied cycle number</b>	163
<b>last studied cycle date</b>	2012/09/03
<b>last studied cycle position</b>	long = -80.87 , lat = -40

Table 2: Programming and evolution.

## 2 Trajectory, positions and dates :

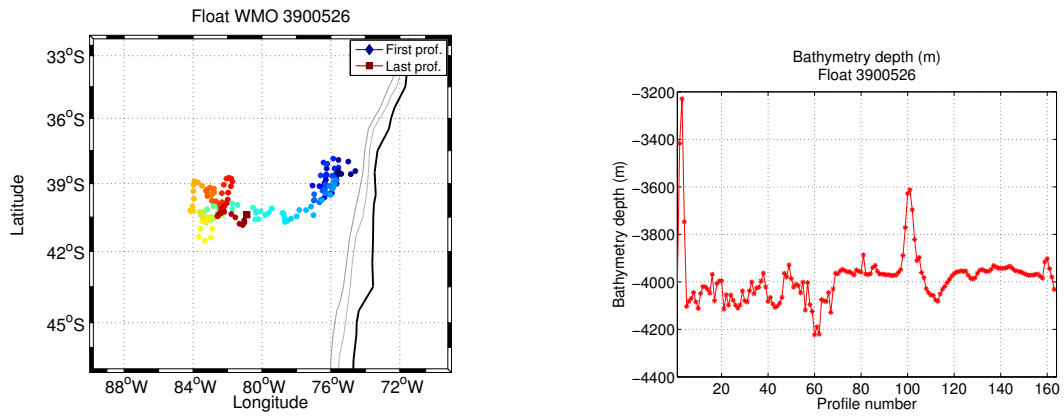


Figure 1: (left) : Profiles position, (right) : bathymetry depth function of cycle number.

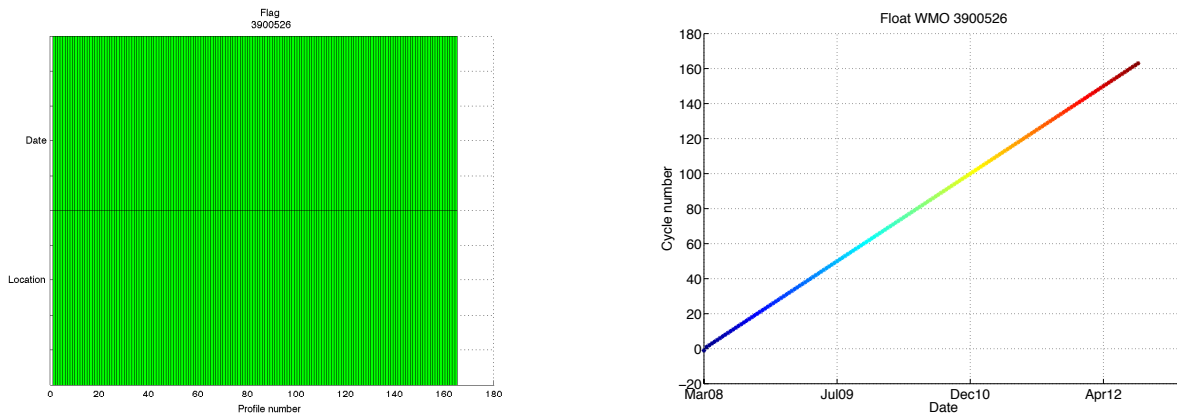


Figure 2: (left) : flags on profiles positions and dates.  
(right) : relationship between cycle number, date and color.

### 3 Quality check on basic parameters :

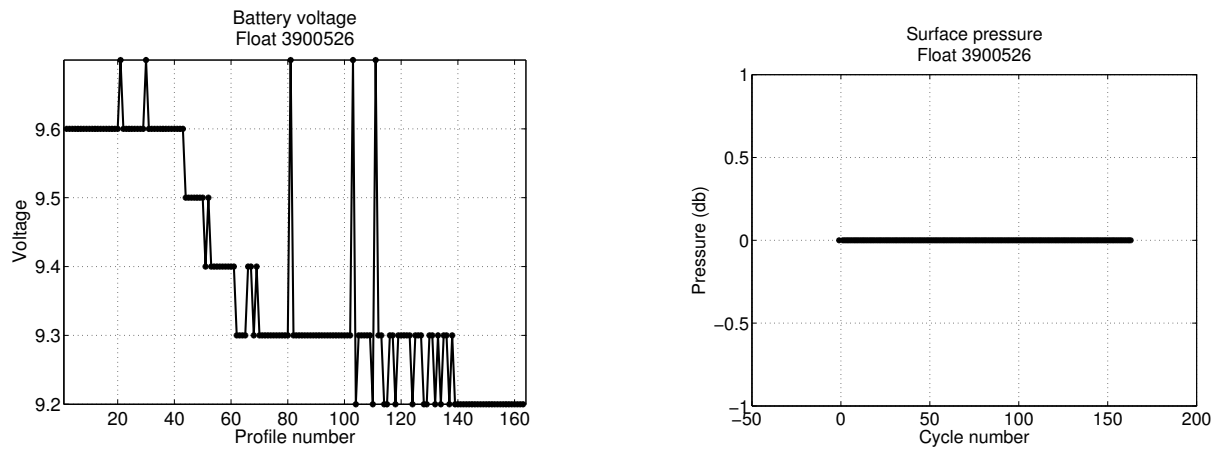


Figure 3: (left) : battery voltage - (right) : surface pressure from technical files.

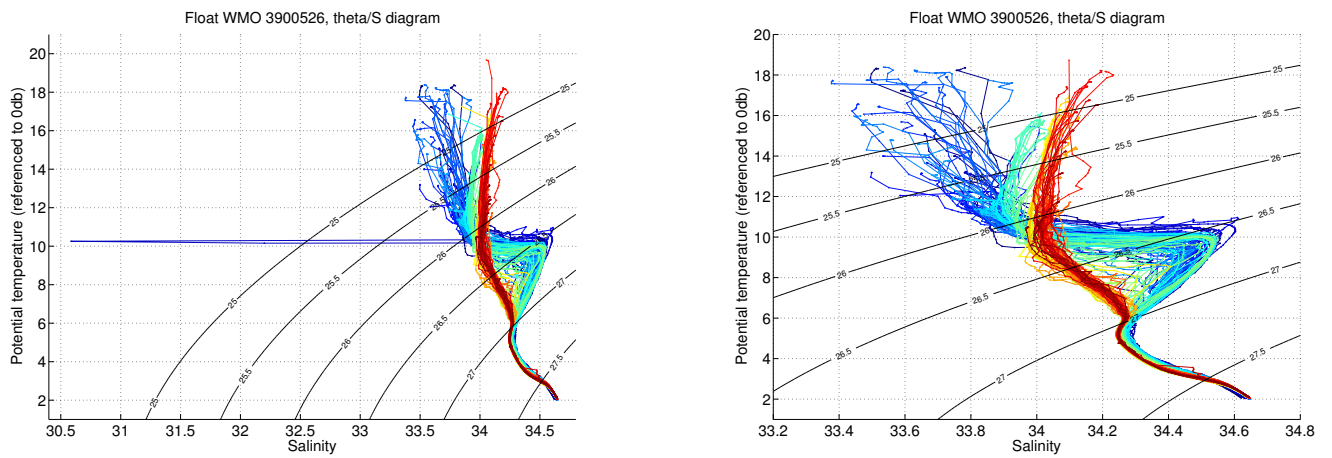


Figure 4:  $\theta/S$  diagrams.  
(left panel) Flags are not taken into account.  
(right panel) Quality flags are taken into account.

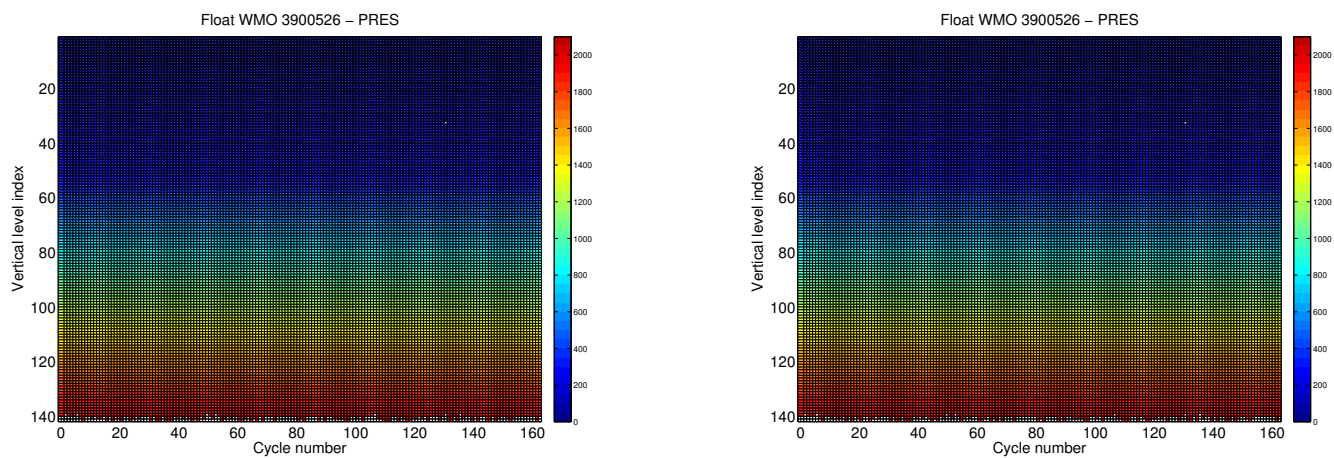


Figure 5: Pression as fonction of cycle number and vertical level index along the float trajectory.  
 (left panel) : Quality flags are not taken into account.  
 (right panel) : Quality flags are taken into account.

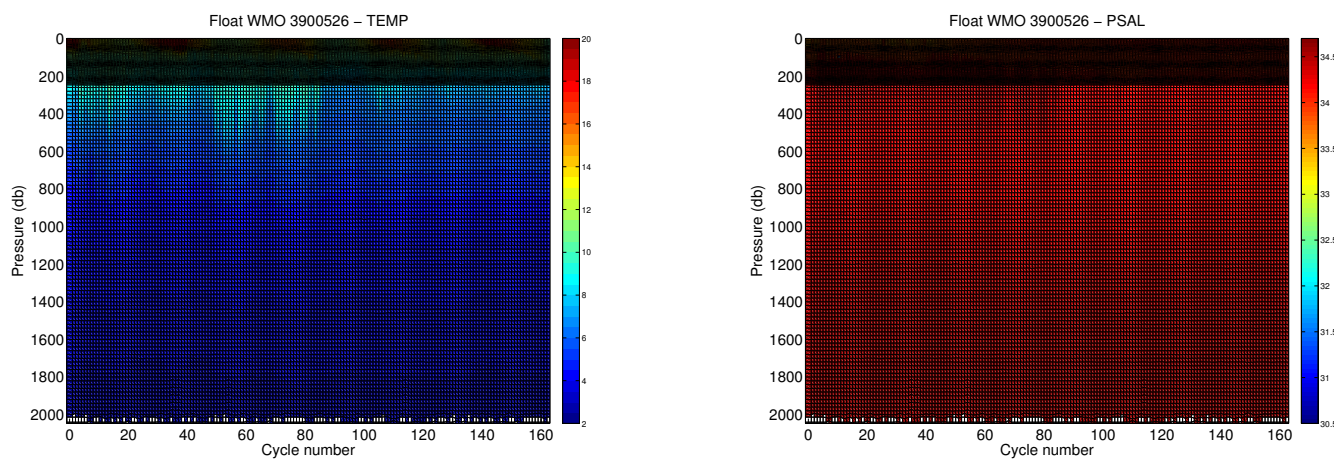


Figure 6: Temperature (left panel) and salinity (right panel) section along the float trajectory. Quality flags are not taken into account.

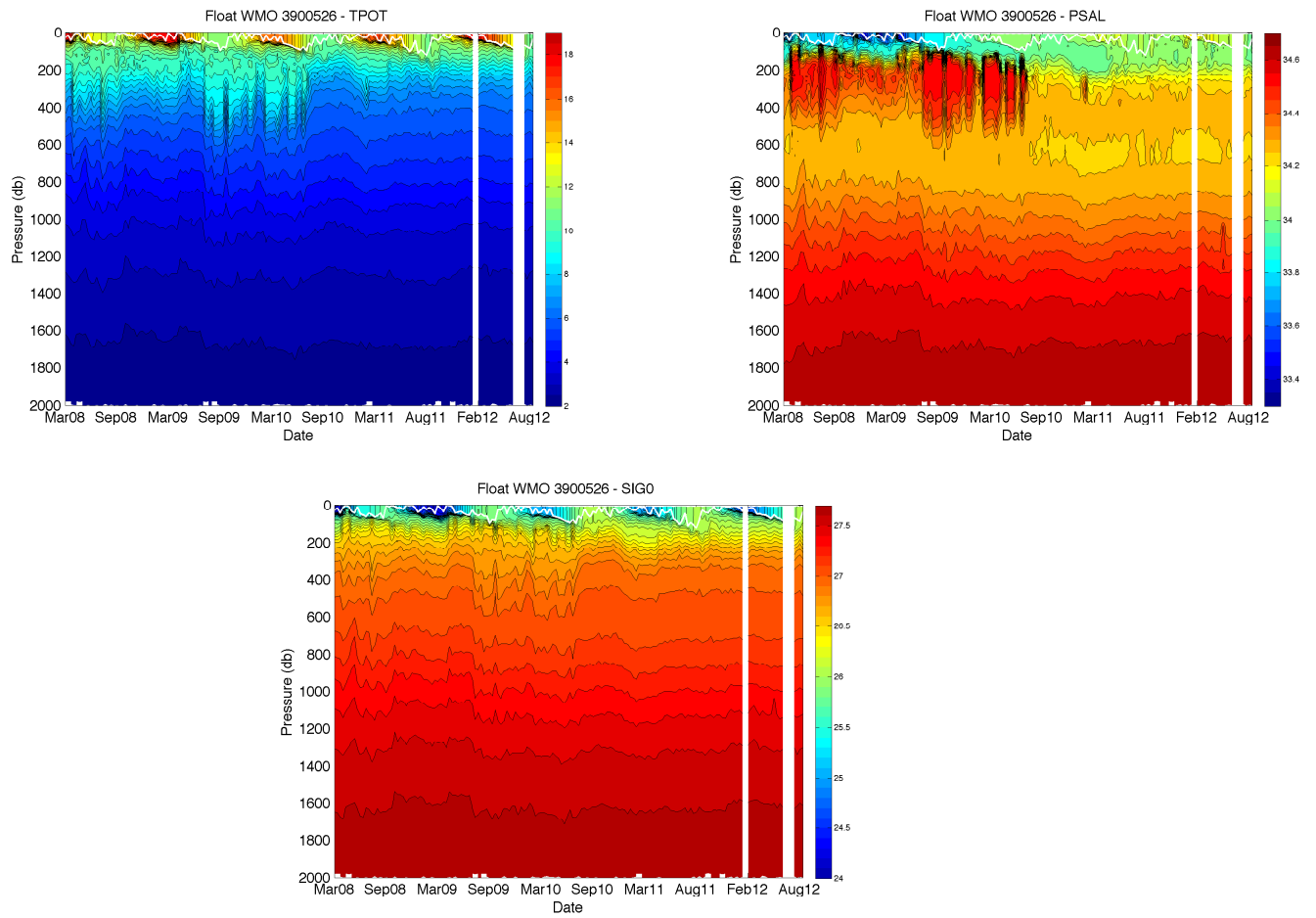


Figure 7: Sections along the float trajectory, interpolated on standard levels, with quality flags taken into account.

(Top panel) : for temperature and salinity.

(Bottom panel) : for potential density.

## 4 DMQC summary:

Cycle	Parameter	Vertical level	Old flag	New flag	Comments
1	TEMP/ PSAL	0 dbar	4	4	untrustable data
3	TEMP/ PSAL	144, 163 to 169 dbar	4	4	two density inversions
10	PSAL	93 to 108 dbar	4	4	spike in PSAL
46	PSAL	218 dbar	4	4	inverted point
61	TEMP/ PSAL	140 and 144 dbar	4	4	density inversion
	PSAL	124 to 134 dbar	4	4	density inversion
64 to 163 (except cyc. 133)	PSAL	levels 1 and 2	4	4	untrustable data
69	PSAL	0 and 3 dbar	4	4	untrustable data
	PSAL	163 to 382 dbar	3	Qc(S)=4 at 183 dbar only	restore Qc(S)=1 ev.w.else
85,102,147	TEMP/ PSAL	levels 1 and 2	4	4	untrustable data
114	PRES	2047 dbar	4	4	but why not flag 3 other points at 2001, 2016 and 2042 dbar ?
120	PSAL	281 dbar	3	1	density is ok
143,157,158,159	PSAL	levels 1 and 2	4	4	untrustable data
	PSAL	all levels below	3	1	profile is ok

Table 3: Profiles 0 to 163 for float #WMO 3900526 with flags 3 or 4, and proposition of modifications.

### Comments :

This float has been controled in delayed-mode in 2010 for its profiles from 0 to 67, and flags on its profiles 1, 3, 10, 46 and 61 have been yet modified.

For this Provov-CTS3, the resolution is equal to 10 dbar from the surface to 800 dbar, then 25 dbar from 800 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.

## 5 Cycle 69 : comparison to the nearest Argo (OW) profiles.

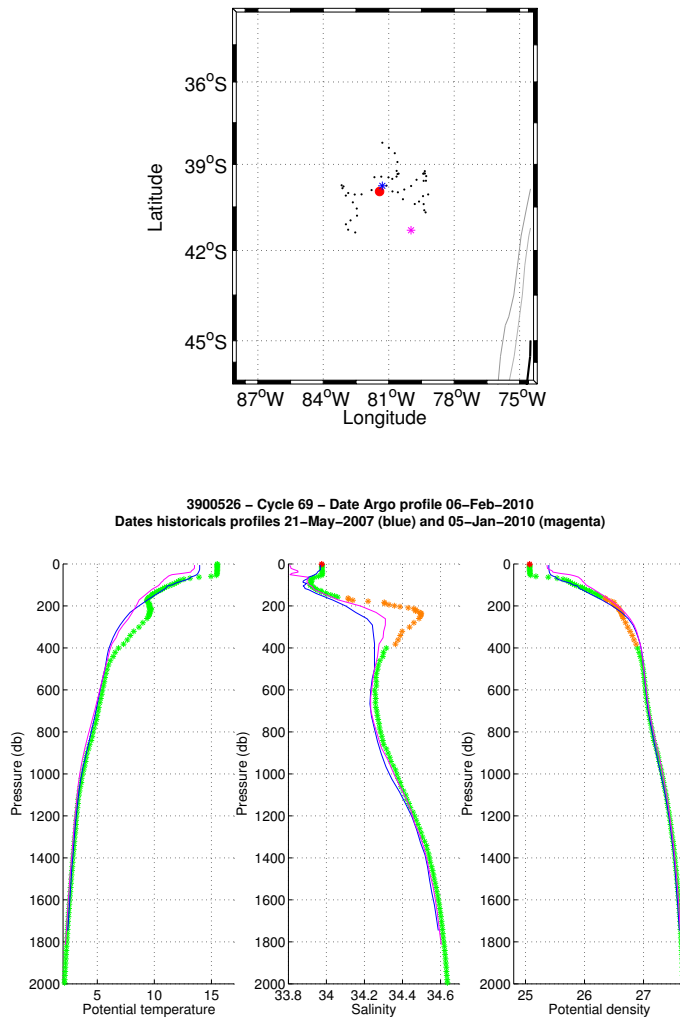


Figure 8: Float 3900526, cycle 69 - **(Upper panel)** Position of the Argo profile (red) and of the nearest ARGO profiles (black). The nearest ARGO profile in time is in magenta while the nearest ARGO profile in space is in blue. **(Lower panels)** Temperature, salinity and potential density as function 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).



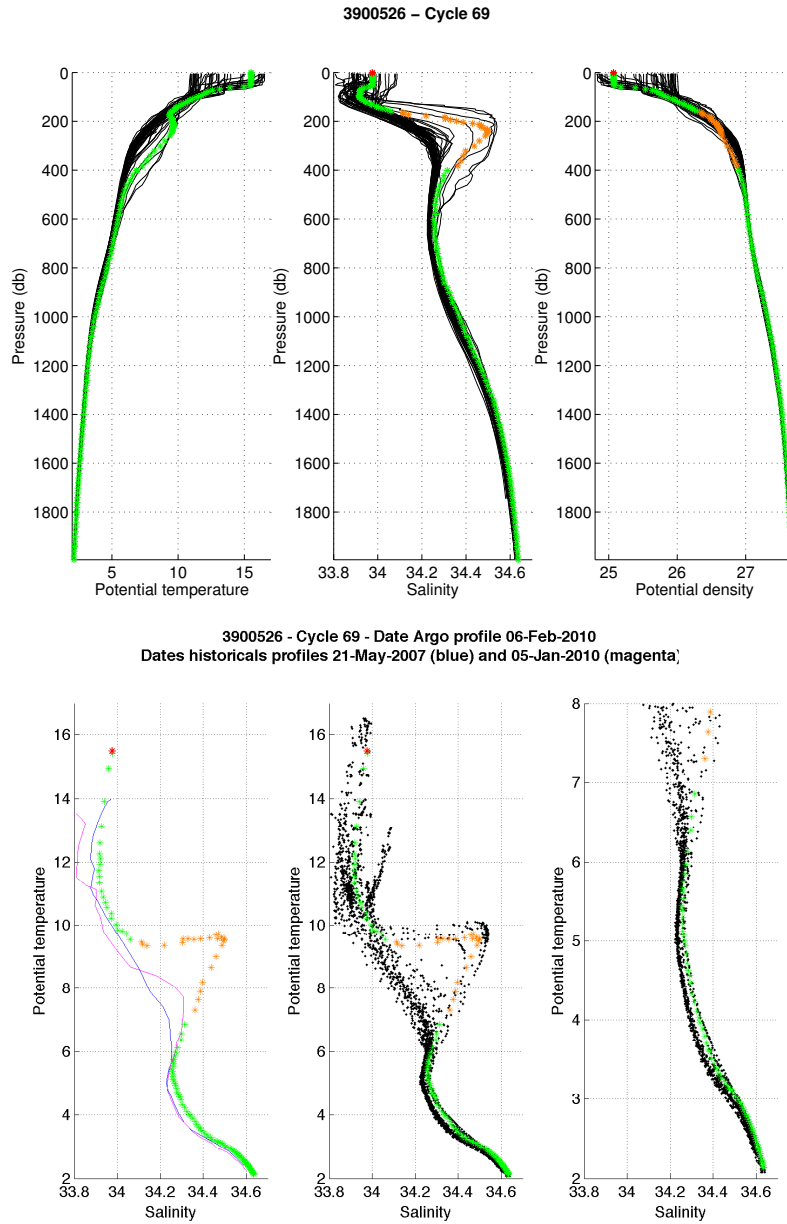


Figure 9: Float 3900526, cycle 69 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue 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)**  $\theta/S$  diagrams.

## 6 Cycle 85 : comparison to the nearest Argo (OW) profiles.

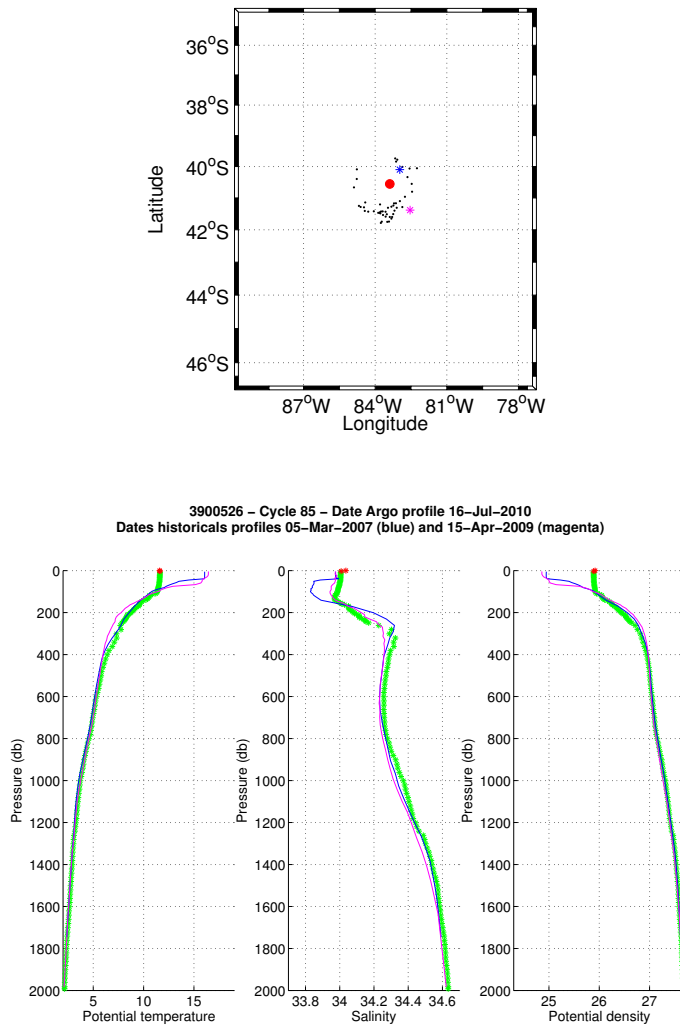


Figure 10: Float 3900526, cycle 85 - (**Upper panel**) Position of the Argo profile (red) and of the nearest ARGO profiles (black). The nearest ARGO profile in time is in magenta while the nearest ARGO profile in space is in blue. (**Lower panels**) Temperature, salinity and potential density as function 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).

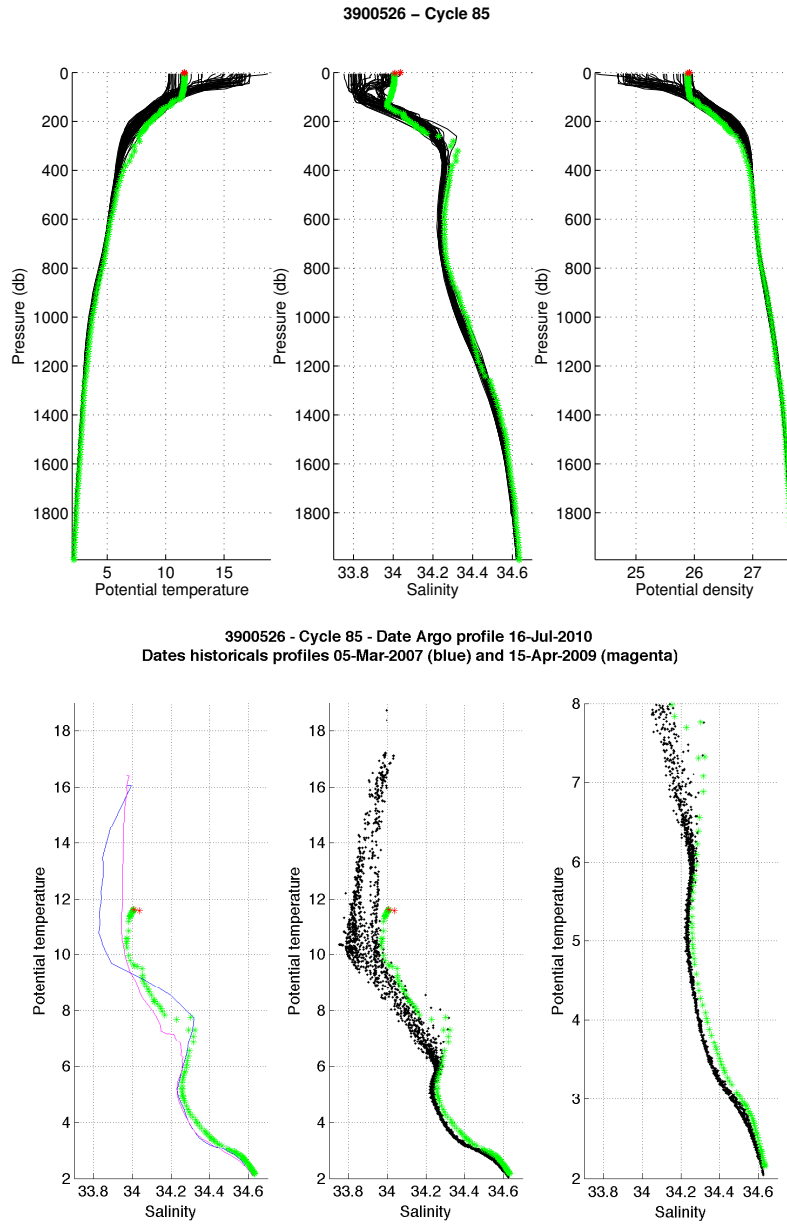


Figure 11: Float 3900526, cycle 85 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue 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**)  $\theta/S$  diagrams.

## 7 Cycle 102 : comparison to the nearest Argo (OW) profiles.

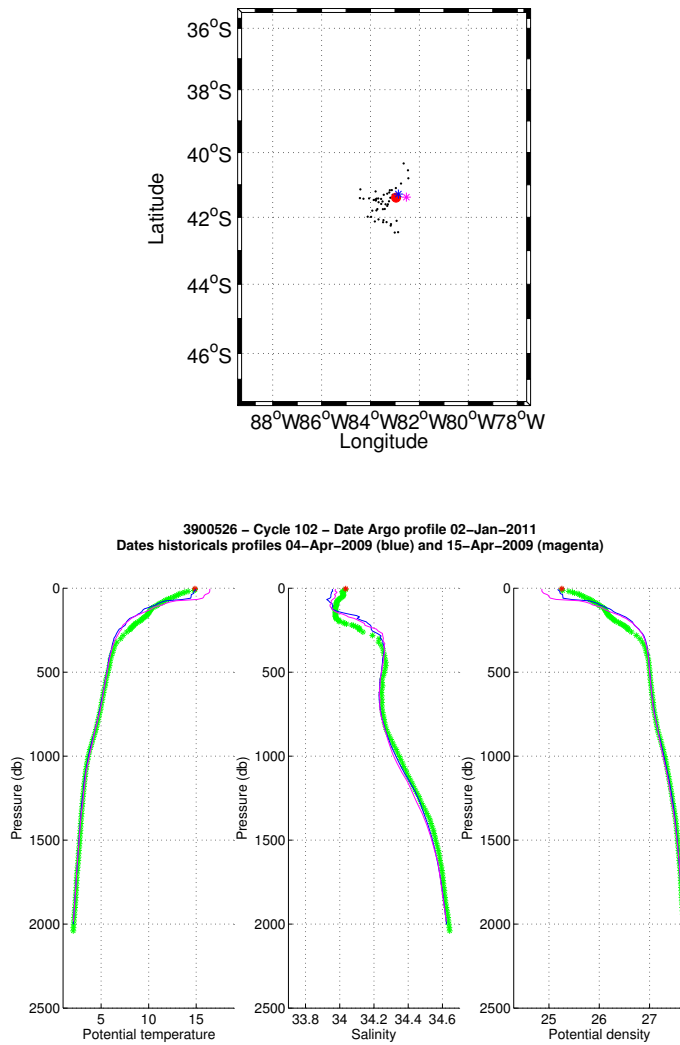


Figure 12: Float 3900526, cycle 102 - (**Upper panel**) Position of the Argo profile (red) and of the nearest ARGO profiles (black). The nearest ARGO profile in time is in magenta while the nearest ARGO profile in space is in blue. (**Lower panels**) Temperature, salinity and potential density as function 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).

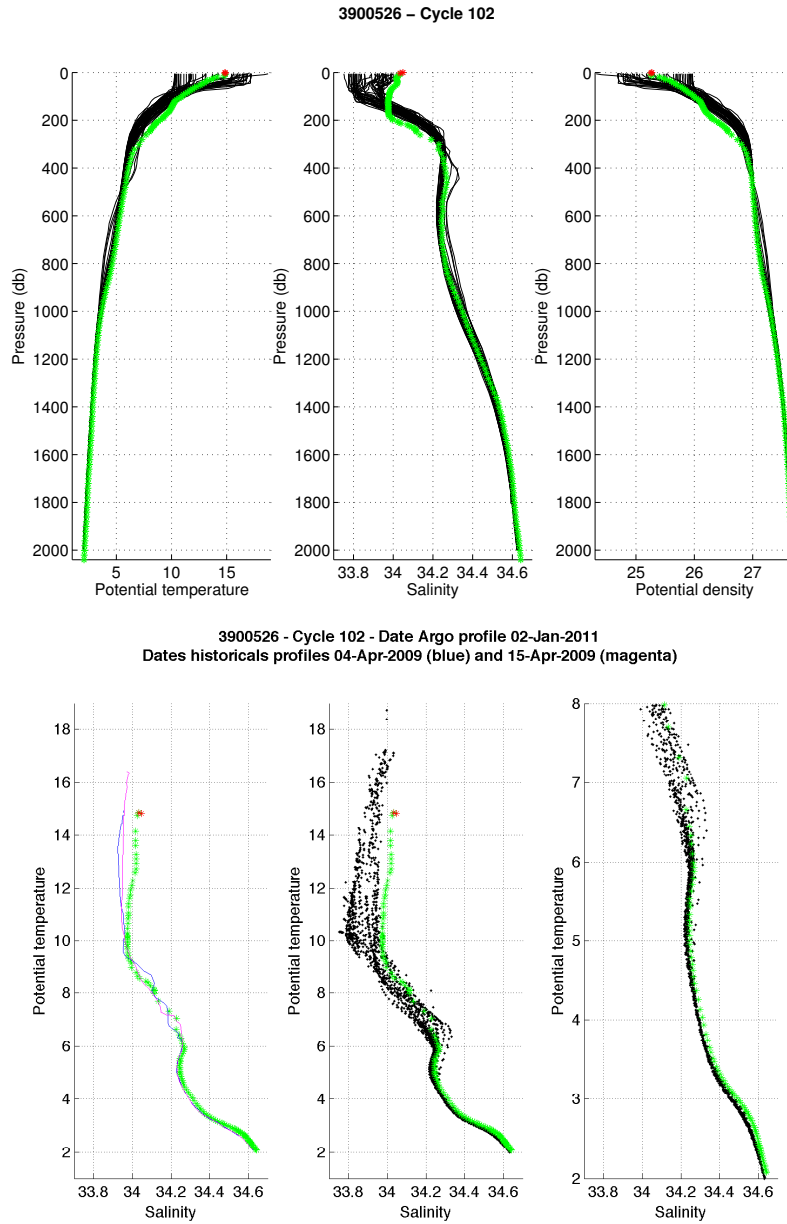


Figure 13: Float 3900526, cycle 102 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue 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)**  $\theta/S$  diagrams.

## 8 Cycle 114 : comparison to the nearest Argo (OW) profiles.

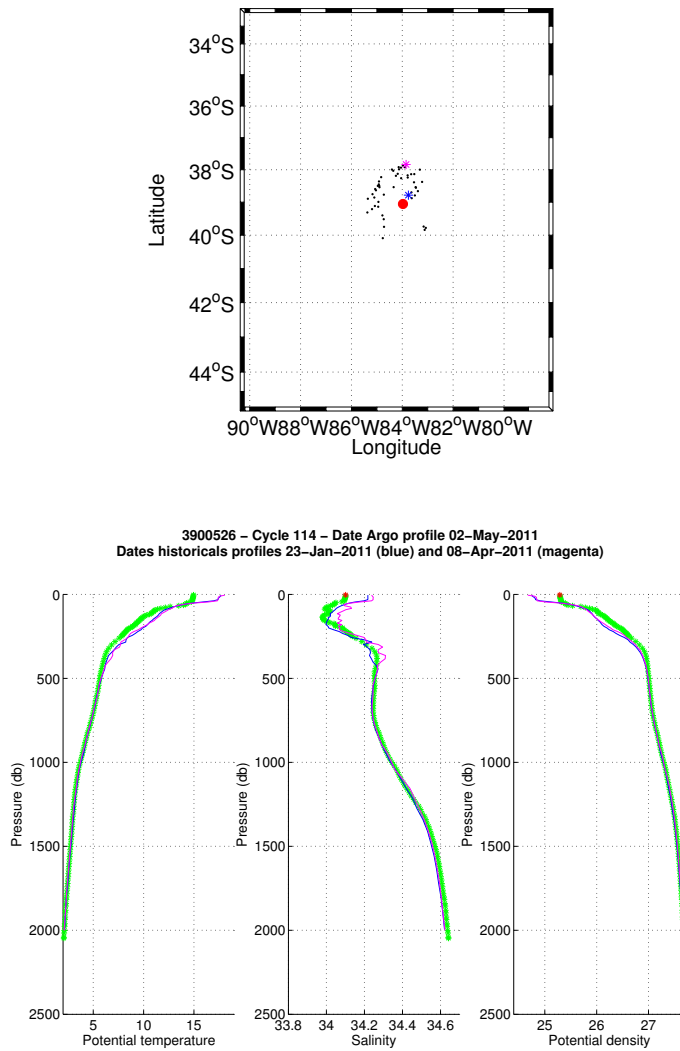


Figure 14: Float 3900526, cycle 114 - (**Upper panel**) Position of the Argo profile (red) and of the nearest ARGO profiles (black). The nearest ARGO profile in time is in magenta while the nearest ARGO profile in space is in blue. (**Lower panels**) Temperature, salinity and potential density as function 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).

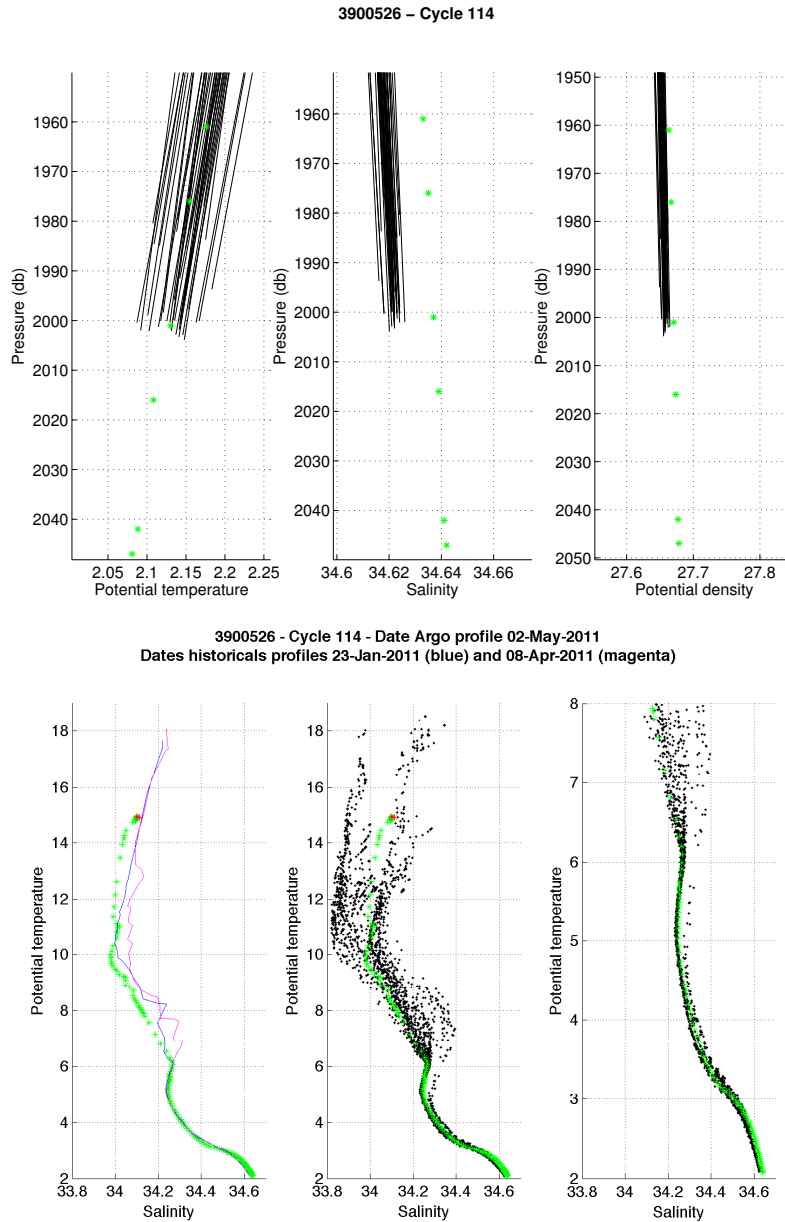


Figure 15: Float 3900526, cycle 114 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue 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)**  $\theta/S$  diagrams.

## 9 Cycle 120 : comparison to the nearest Argo (OW) profiles.

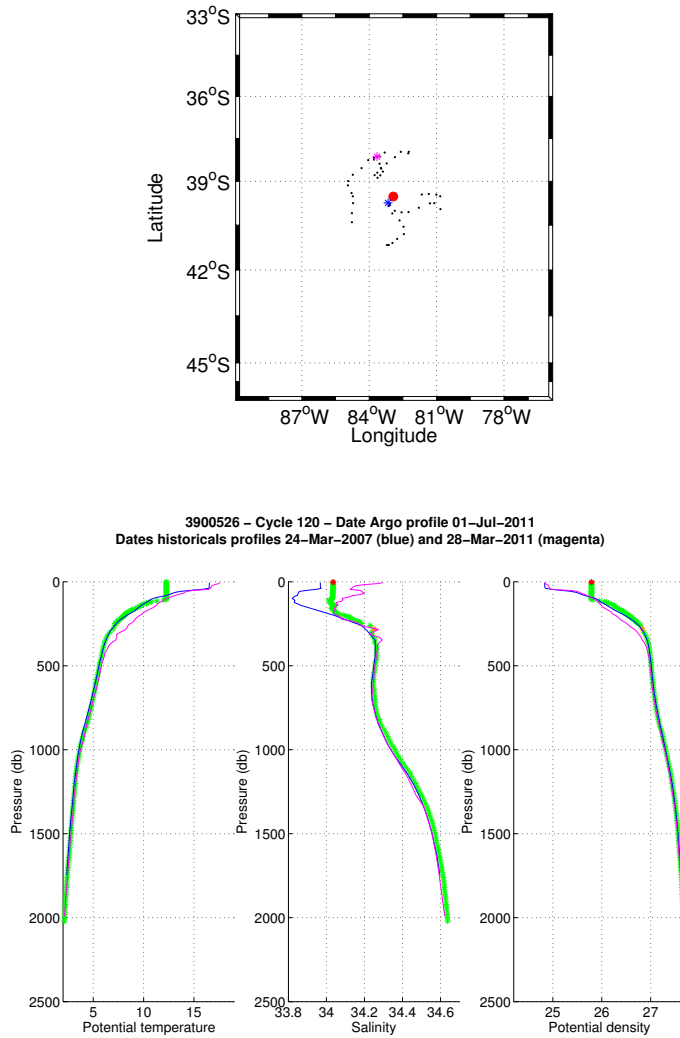


Figure 16: Float 3900526, cycle 120 - **(Upper panel)** Position of the Argo profile (red) and of the nearest ARGO profiles (black). The nearest ARGO profile in time is in magenta while the nearest ARGO profile in space is in blue. **(Lower panels)** Temperature, salinity and potential density as function 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).



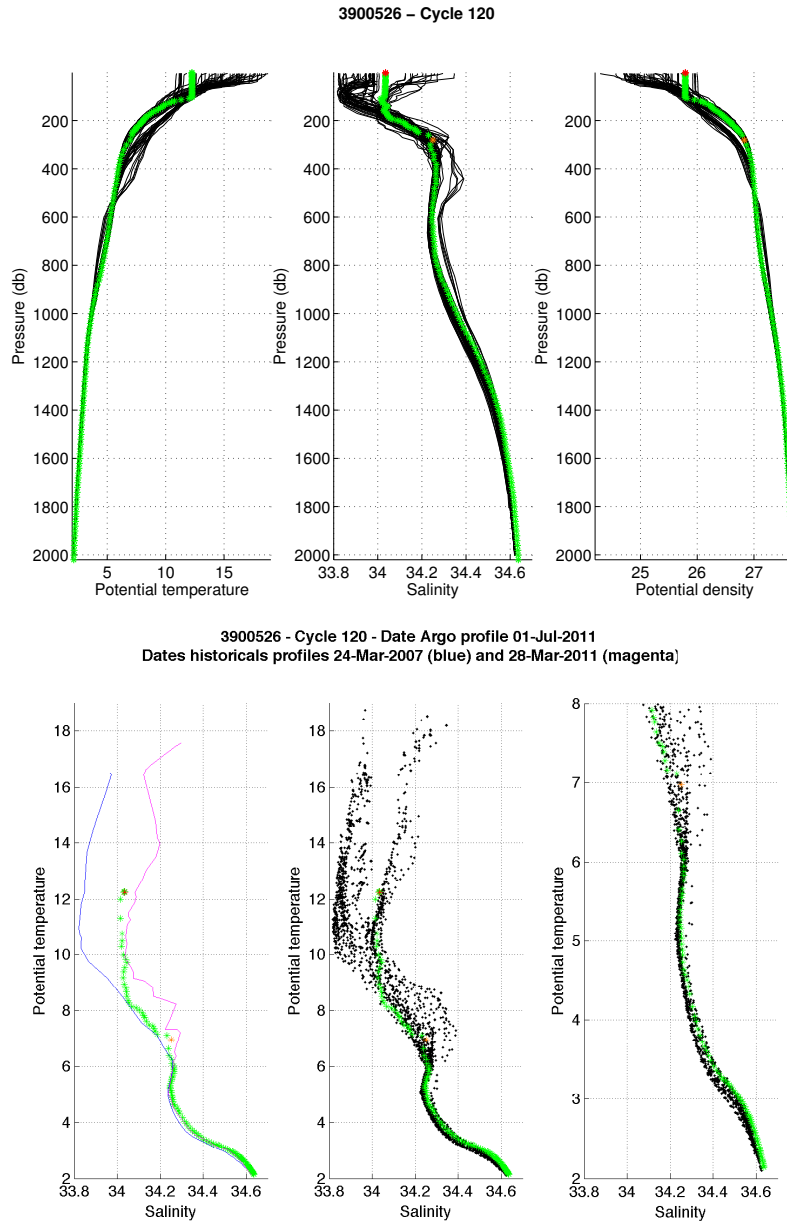


Figure 17: Float 3900526, cycle 120 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue 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)**  $\theta/S$  diagrams.

## 10 Cycle 143 : comparison to the nearest Argo (OW) profiles.

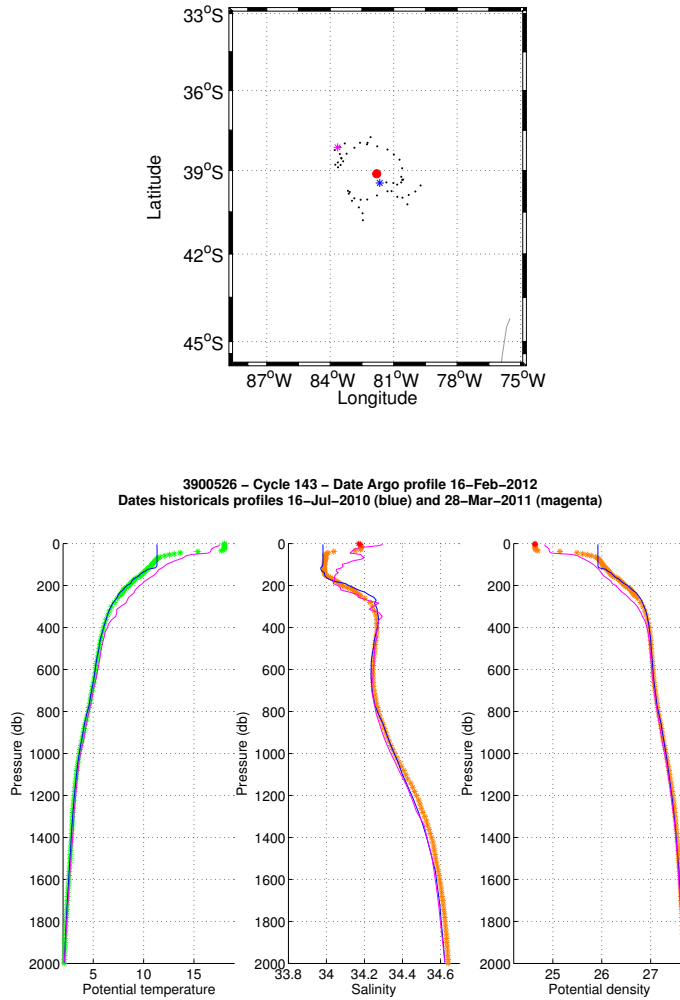


Figure 18: Float 3900526, cycle 143 - **(Upper panel)** Position of the Argo profile (red) and of the nearest ARGO profiles (black). The nearest ARGO profile in time is in magenta while the nearest ARGO profile in space is in blue. **(Lower panels)** Temperature, salinity and potential density as function 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).

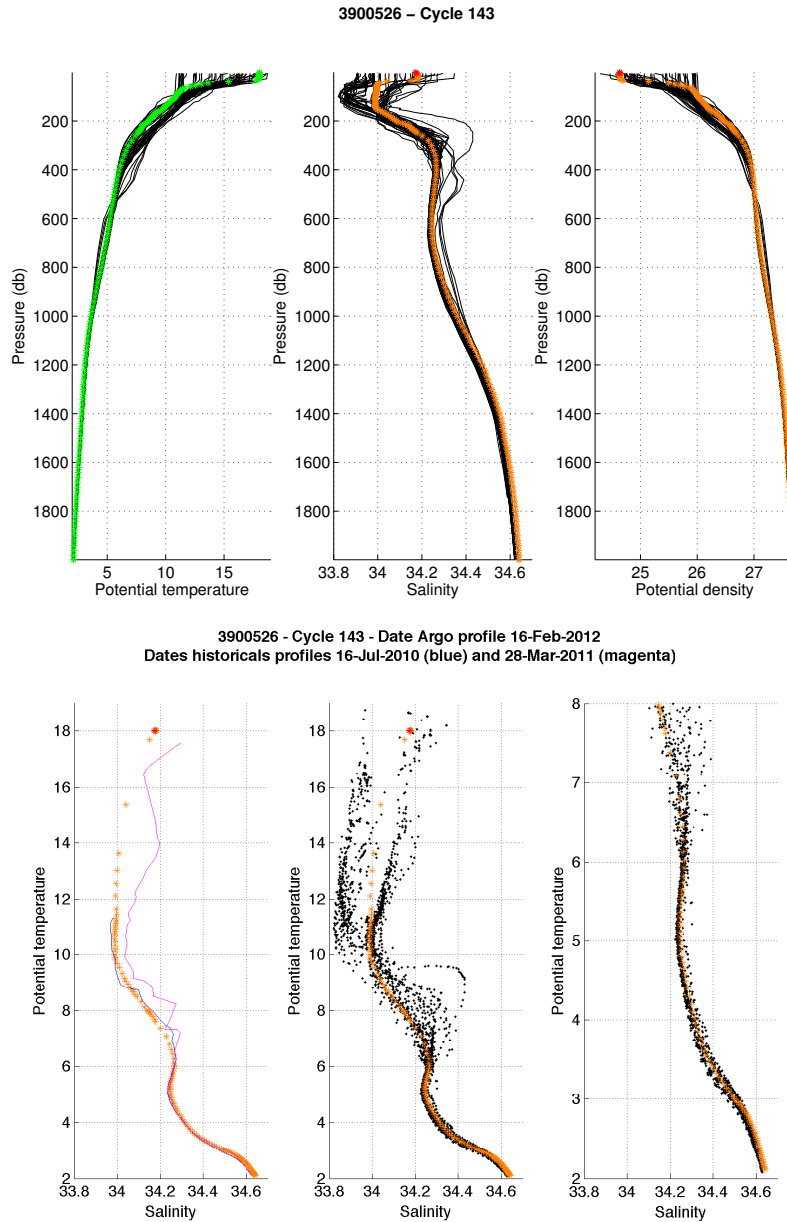


Figure 19: Float 3900526, cycle 143 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue 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)**  $\theta/S$  diagrams.

# 11 Cycle 147 : comparison to the nearest Argo (OW) profiles.

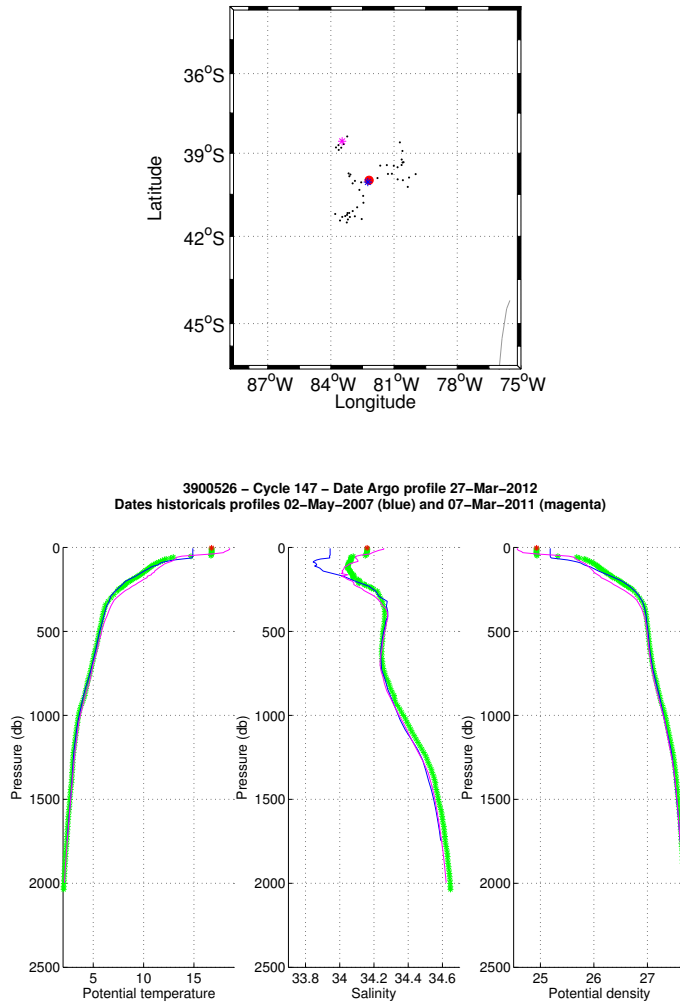


Figure 20: Float 3900526, cycle 147 - (**Upper panel**) Position of the Argo profile (red) and of the nearest ARGO profiles (black). The nearest ARGO profile in time is in magenta while the nearest ARGO profile in space is in blue. (**Lower panels**) Temperature, salinity and potential density as function 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).

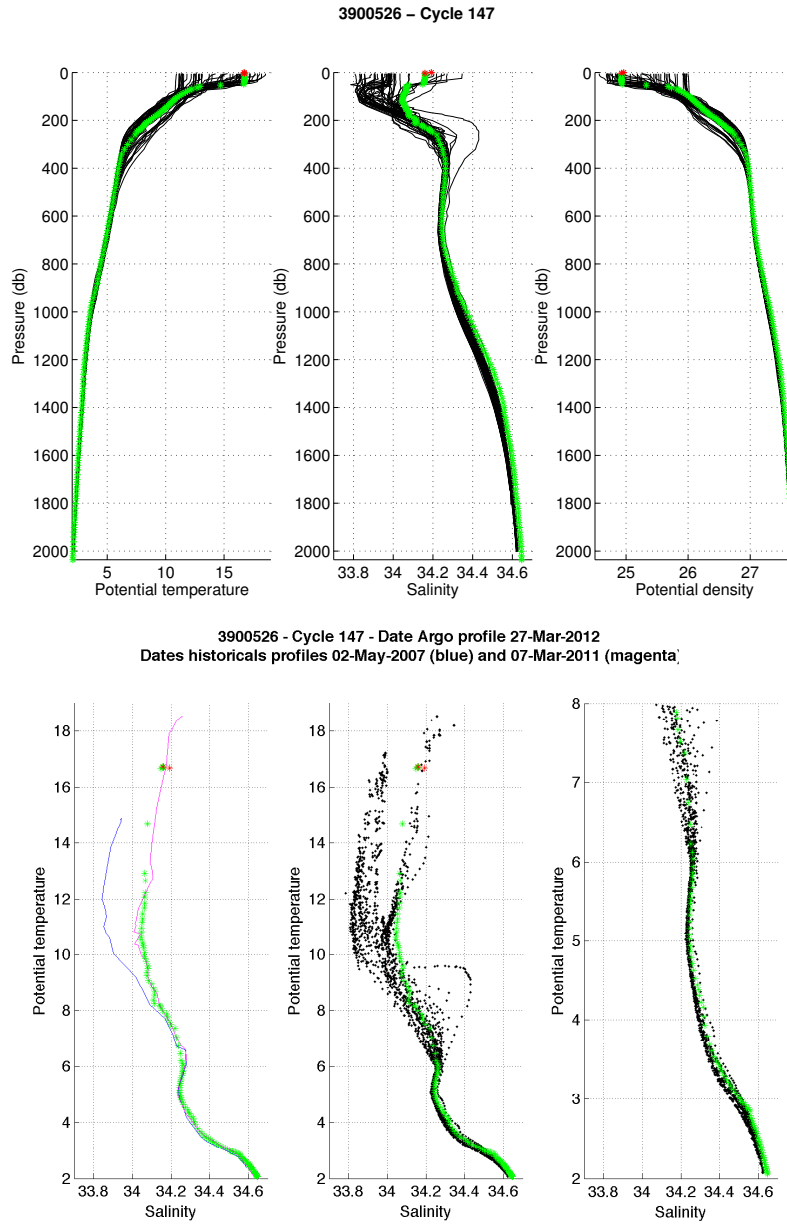


Figure 21: Float 3900526, cycle 147 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue 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)**  $\theta/S$  diagrams.

## 12 Cycle 157 : comparison to the nearest Argo (OW) profiles.

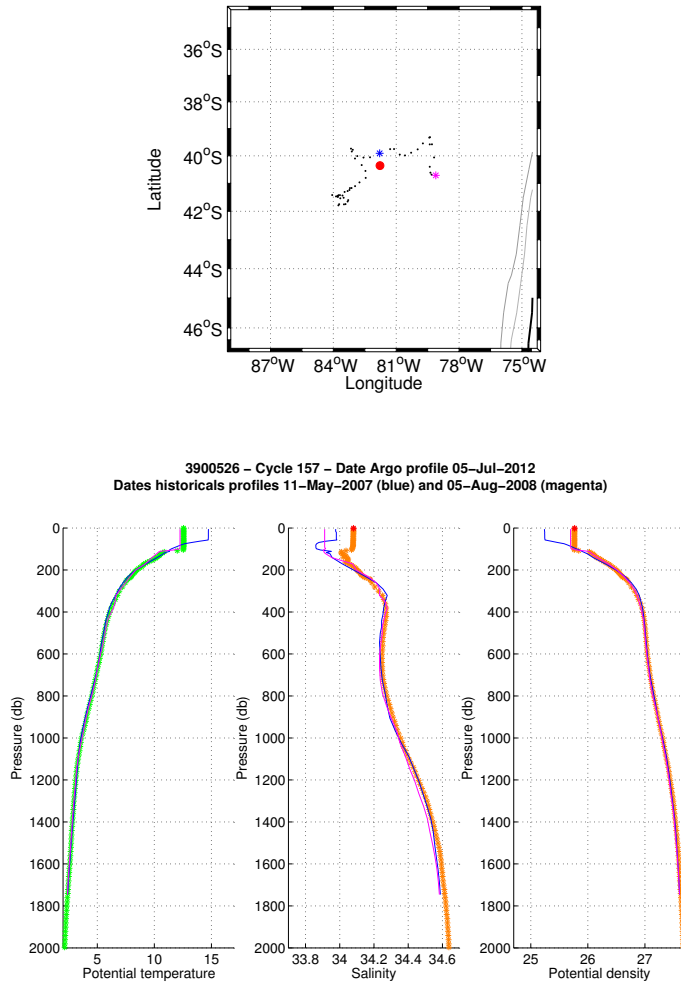


Figure 22: Float 3900526, cycle 157 - (**Upper panel**) Position of the Argo profile (red) and of the nearest ARGO profiles (black). The nearest ARGO profile in time is in magenta while the nearest ARGO profile in space is in blue. (**Lower panels**) Temperature, salinity and potential density as function 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).

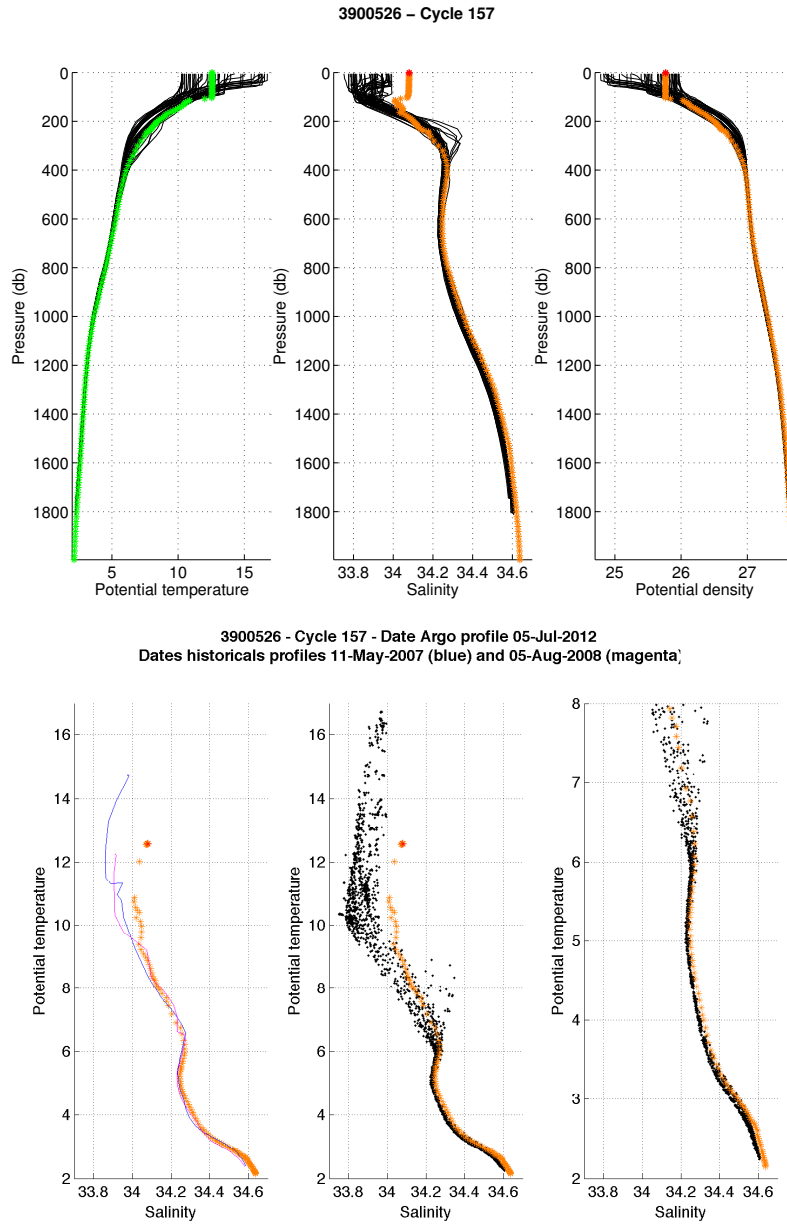


Figure 23: Float 3900526, cycle 157 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue 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)**  $\theta/S$  diagrams.

### 13 Cycle 158 : comparison to the nearest Argo (OW) profiles.

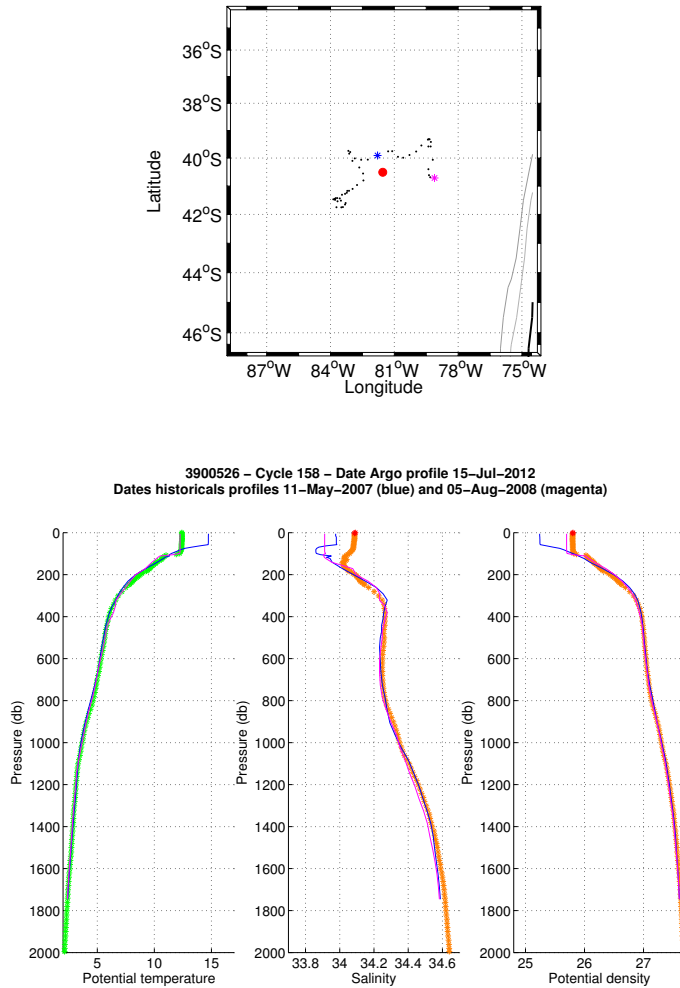


Figure 24: Float 3900526, cycle 158 - (**Upper panel**) Position of the Argo profile (red) and of the nearest ARGO profiles (black). The nearest ARGO profile in time is in magenta while the nearest ARGO profile in space is in blue. (**Lower panels**) Temperature, salinity and potential density as function 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).



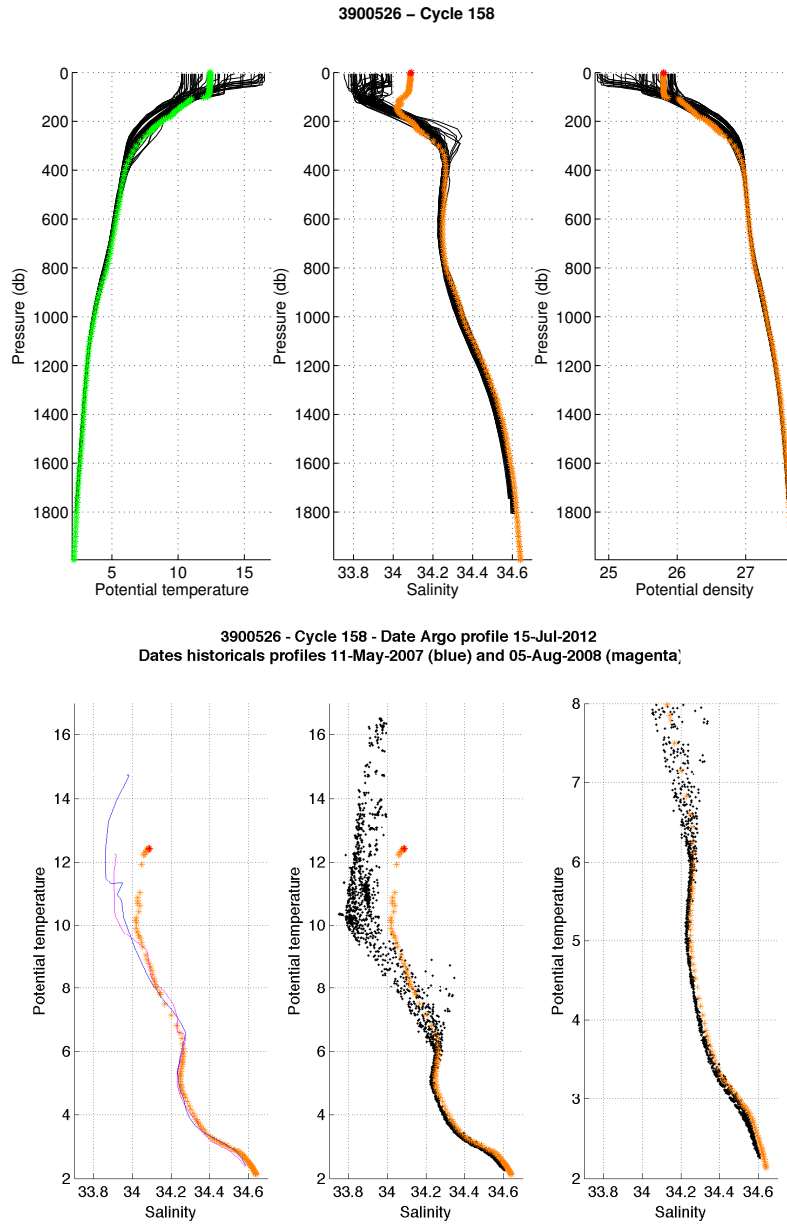


Figure 25: Float 3900526, cycle 158 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue 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)**  $\theta/S$  diagrams.

## 14 Cycle 159 : comparison to the nearest Argo (OW) profiles.

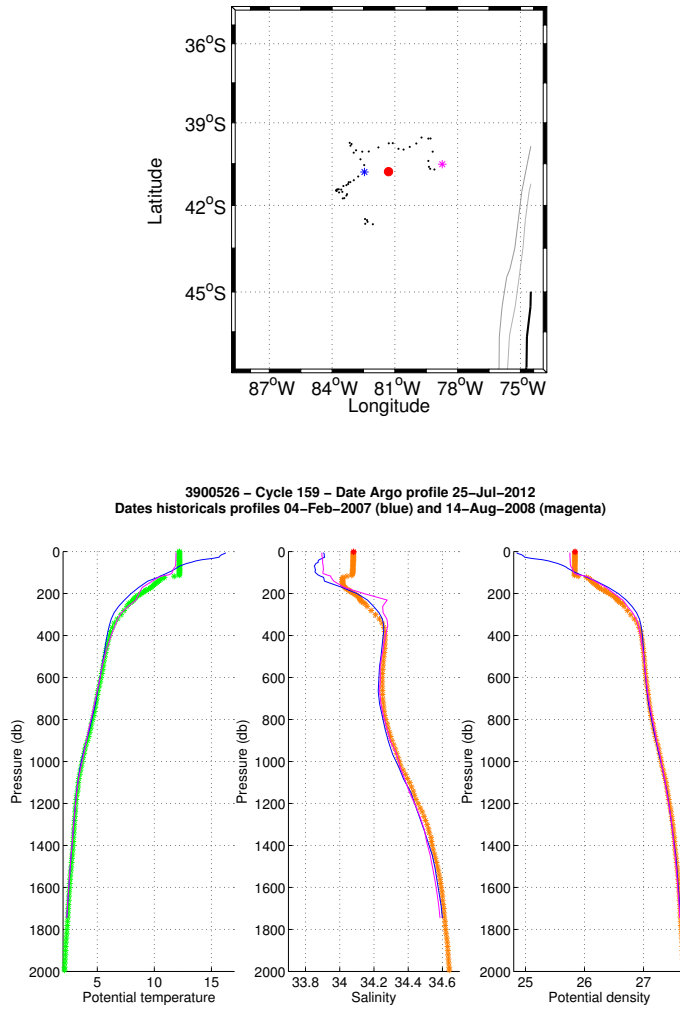


Figure 26: Float 3900526, cycle 159 - **(Upper panel)** Position of the Argo profile (red) and of the nearest ARGO profiles (black). The nearest ARGO profile in time is in magenta while the nearest ARGO profile in space is in blue. **(Lower panels)** Temperature, salinity and potential density as function 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).

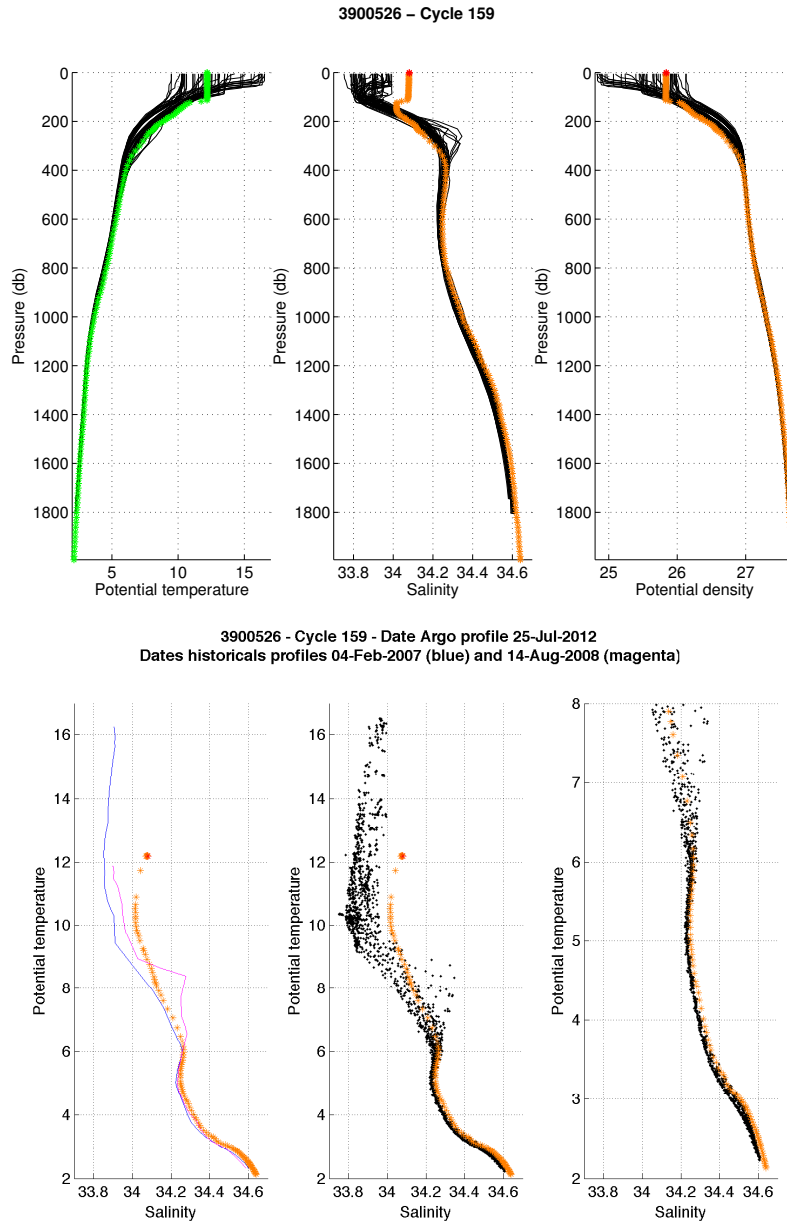


Figure 27: Float 3900526, cycle 159 : The Argo profile (stars) is compared to the nearest ARGO profiles (black line) and to two specific profiles : the nearest profile in time (magenta) and the nearest profile in space (blue). The color of the Argo profile represents the QC flag (green for a QC=1 ; blue 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)**  $\theta/S$  diagrams.

## 15 Salinity correction from OW method :

CONFIG_MAX_CASTS	300
MAP_USE_PV	1
MAP_USE_SAF	0
MAPSCALE_LONGITUDE_LARGE	3
MAPSCALE_LONGITUDE_SMALL	2
MAPSCALE_LATITUDE_LARGE	2
MAPSCALE_LATITUDE_SMALL	1
MAPSCALE_PHI_LARGE	0.25
MAPSCALE_PHI_SMALL	0.05
MAPSCALE_AGE	10
MAP_P_EXCLUDE	1000
MAP_P_DELTA	250

breaks	none
max_breaks	0
use_percent_gt	0.5

Table 5: Calibration parameters.

Table 4: Mapping parameters.

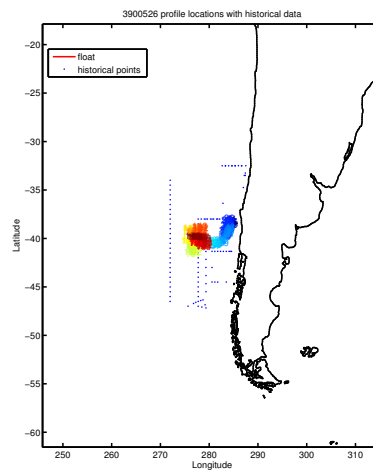


Figure 28: Position of the historical and float data.

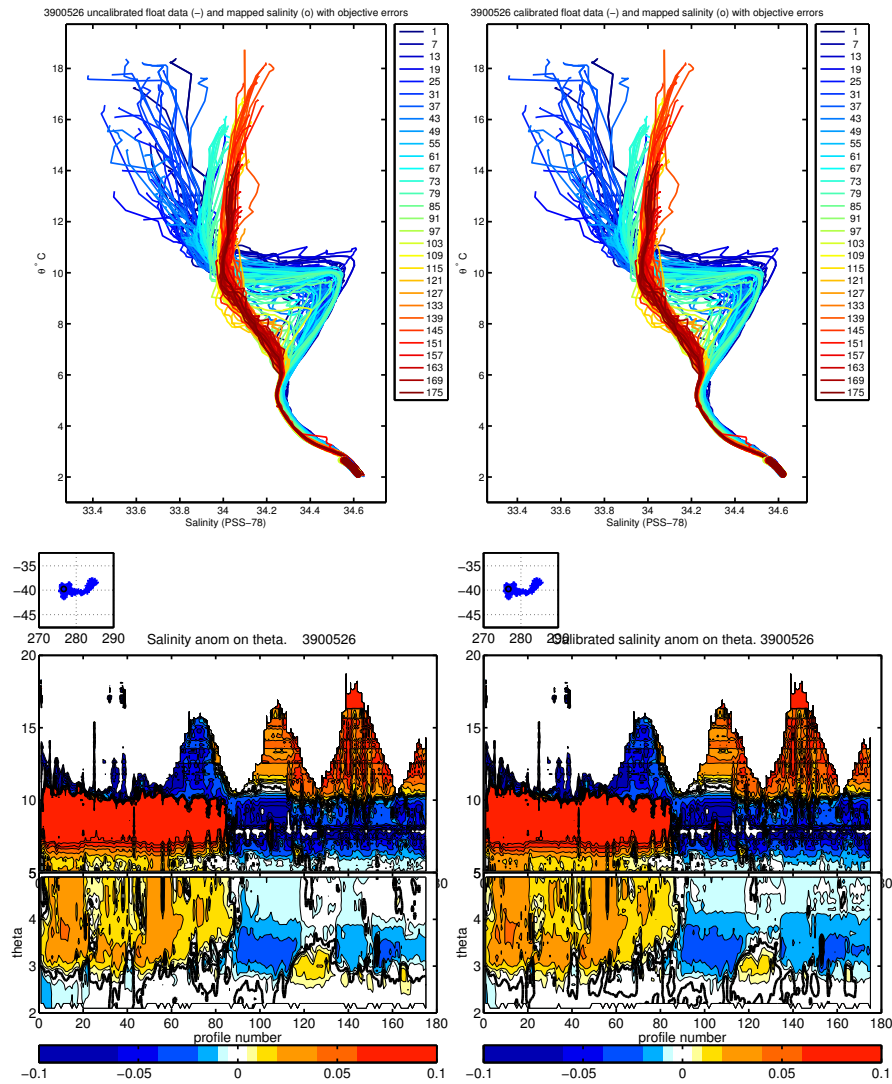


Figure 29: **(top panel)** : Comparison of the  $\theta/S$  diagram of the float with the historial database. (left) raw data. (right) corrected data using the OW correction.  
**(bottom panel)** : Salinity anomaly. (left) raw data. (right) corrected data using the OW correction.

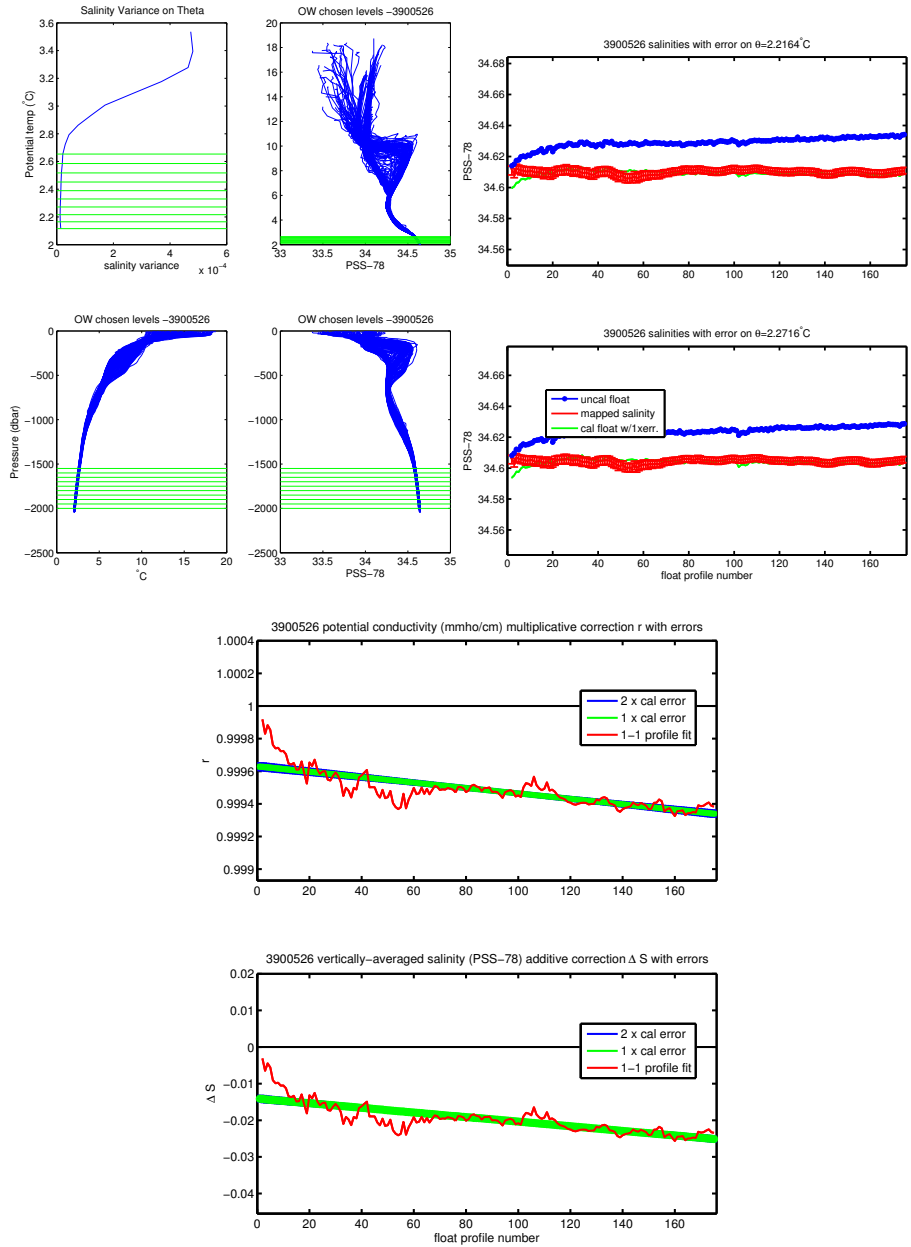


Figure 30: (top left) :  $\theta$ - levels chosen for the calibration. (top right) : comparison, on various  $\theta$  levels, between the float data and the historical data interpolated at the float position. (bottom): Correction proposed by the OW method.