Laboratoire d'Océanographie Physique et Spatiale
UMR6523 – CNRS-IFREMER-IRD-UBO
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OXYGEN CORRECTION OF OVIDE ARGO DATA FLOATS WMO 5902299 AND 5902305

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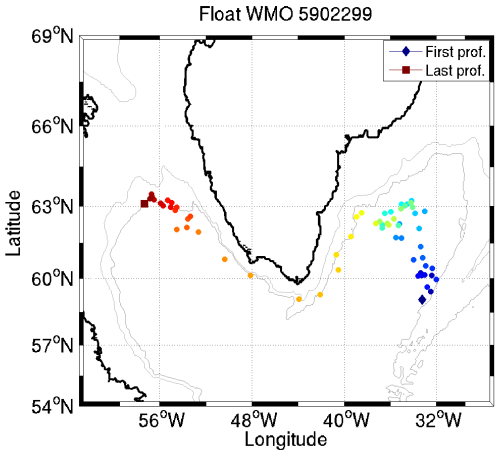
June 2017

Reference : Internal report **LOPS/17-26**

OXYGEN CORRECTION OF OVIDE ARGO DATA
FLOAT WMO 5902299
Internal Report LOPS/17-26

C. Lagadec - V. Thierry

June 29, 2017



The Delayed mode Quality Control for Salinity ans Temperature report is archived (bilan_5902299.pdf).

1 Float 5902299 : Oxygen correction with LOCODOX

Number	Deployment (cycle OD) cycle OD	Last cycle 63A
Provor WMO 5902299	26/06/2010 17h25	
CTS3-DO 9	N 59.03825 W 33.185717	

Date of DOXY control	Float status	Last cycle
May 2017	DEAD	26/03/2012
Coriolis transmission		15/05/2017

Table 1: Status of the float

This software is used to correct Oxygen data (parameter DOXY) contained in the files BR(real time) and/or BD(Delayed Mode) associated to files R (Real Time T/S) and/or D(Delayed Mode T/S).

PI suggests : The Oxygen corrections have been done only when Salinity and Temperature were available in Delayed Mode (D files). Theorically, the corrections should be done from adjusted values (TEMP and PSAL). However, when there is a few bad values in salinity (of about few tens of PSU), and if there is no bias in salinity (OW method), PSAL data can be used instead of PSAL_ADJUSTED, because the impact of those values on the oxygen correction is not significant.

To correct Oxygen data, LOCODOX software gives 3 choices to work :

- from a reference profile
- from WOA climatology
- from in air measurements

The reference profile for this float is the station 72 of Ovide 2010 cruise.

LOPS options are :

Options	Choice
Unit DOXY	Mumol/kg
Suppress hooks	YES
Drift correction with	PRES
Vertical scale	PRES
Apply drift correction	NO
Correction using : PSAT/DOXY	PSAT
kind of error	RELATIVE

Table 2: LOCODOX Options

Applied DOXY correction

PSAT=f(DOXY); PSAT_ADJUSTED=A*PSAT+B;DOXY_ADJUSTED=f(PSAT_ADJUSTED) with A=1.165; B=-6.892

Percent saturation corrected as a linear function of PSAT; Comparison to a single reference profile (isobaric match as in Takeshita et al. (2013)) on cycle 0; PSAT converted from DOXY and DOXY_ADJUSTED converted from PSAT_ADJUSTED.

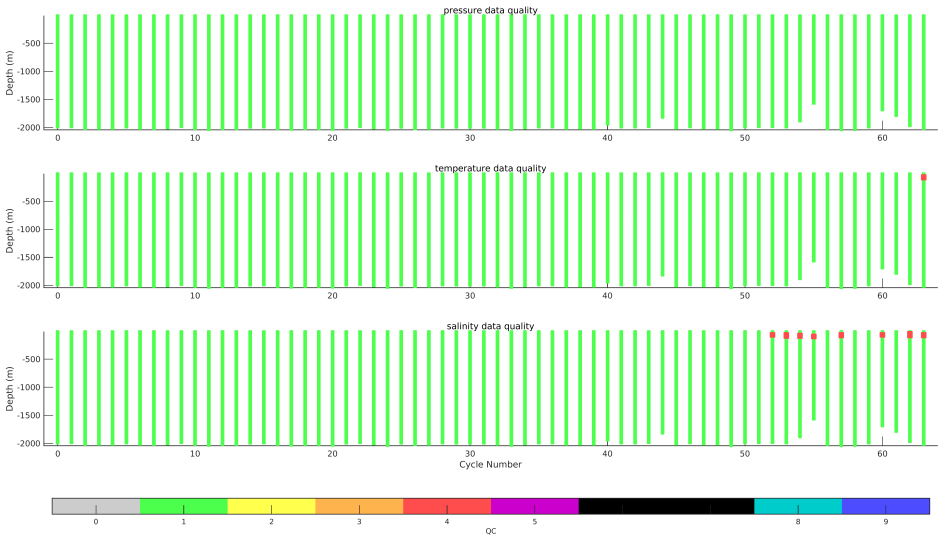


Figure 1: QC controls of Pressure, Temperature and Salinity. No bias in salinity for this float. Correction done with PSAL.

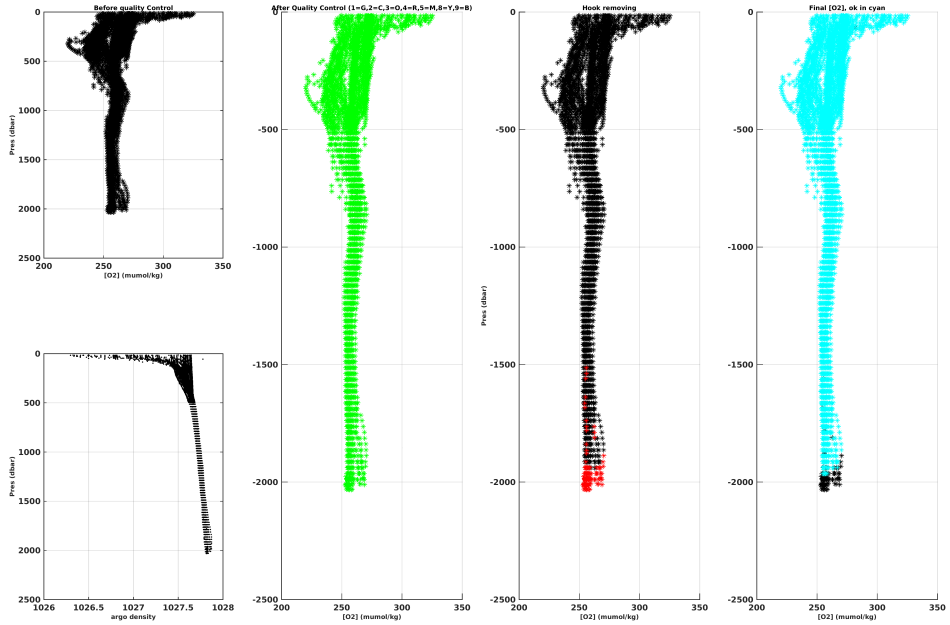


Figure 2: The first 50 meters from the bottom are suppressed because data are incertain; Only data in cyan are taken for the correction.

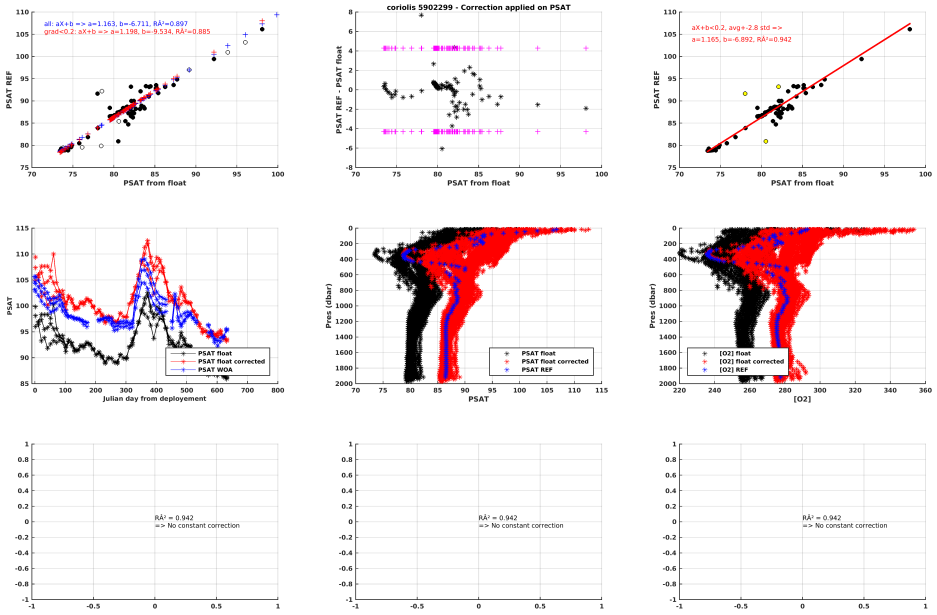


Figure 3: Plots produced by LOCODOX

Float 5902299 was corrected based on a comparison of the first ascending profile of the float with an in situ reference profile acquired at float deployment. The correction is done in considering the percentage of saturation (PSAT).

Upper panels : The three panels show the regression between the Argo profile and the reference profile.

Middle left panels : PSAT in the upper 10m from the raw data (black curve) and the corrected data (red curves). PSAT estimated from the World Ocean Atlas at the float position is also provided for comparison (blue curves).

Middle center panel : PSAT values from the raw data (black curves), the adjusted data (red curves) and the reference profile (blue curve).

Middle right panel : Same as the center panel but for dissolved oxygen concentration value (DOXY et DOXY_ADJUSTED) in mumol/kg.

Lower panels : Same as the middle panels but when LOCODOX proposes a constant correction.

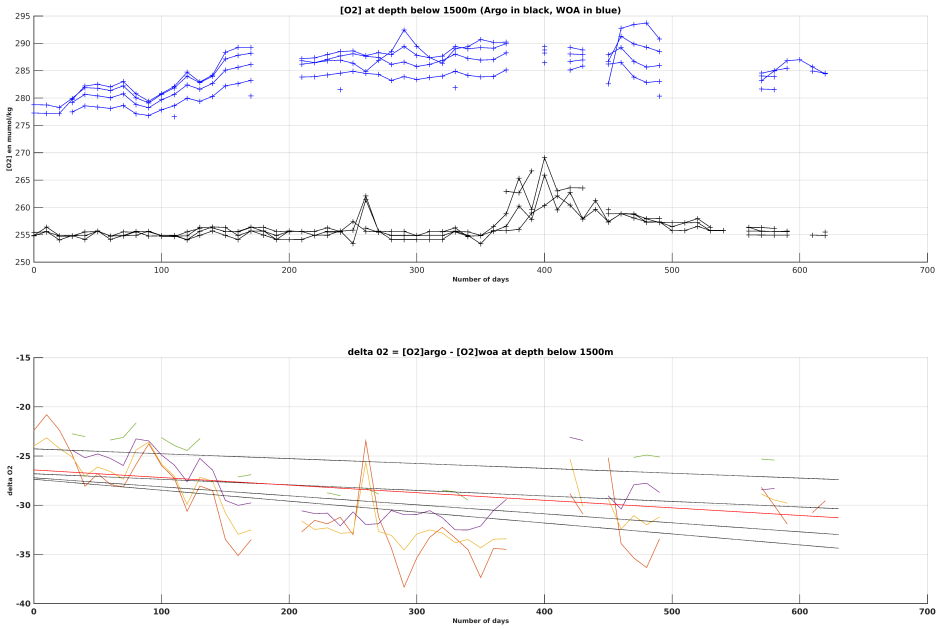


Figure 4: Comparison in the deeper levels (below 1500m) between the float data and WOA data interpolated at the float position (horizontal and vertical). The temporal evolution of the difference is used to estimate a possible sensor drift.

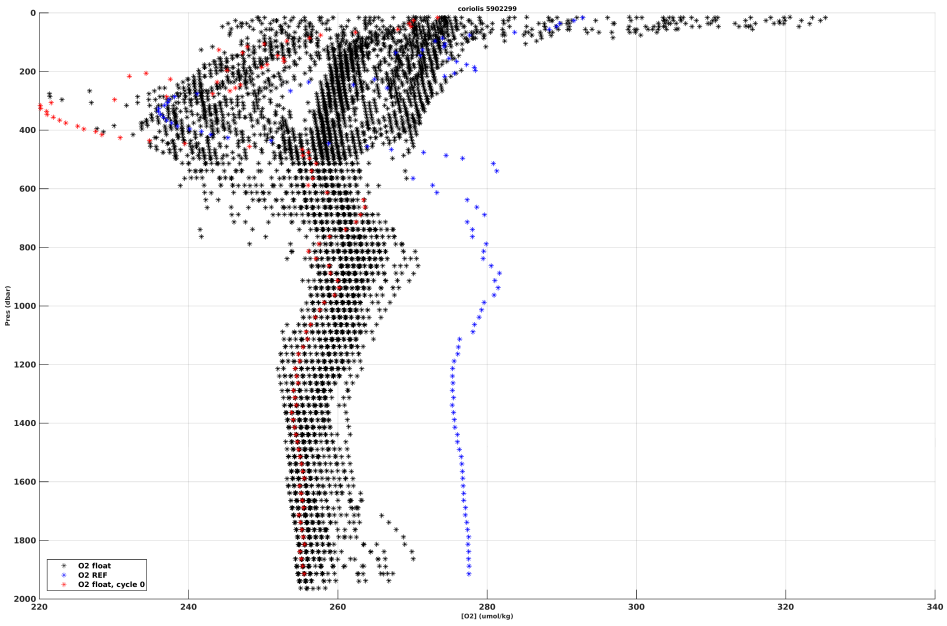


Figure 5: Profiles float 5902299 (black), O2 hydro reference (blue), O2 float cycle 0 (red)

1.1 Corrected data float

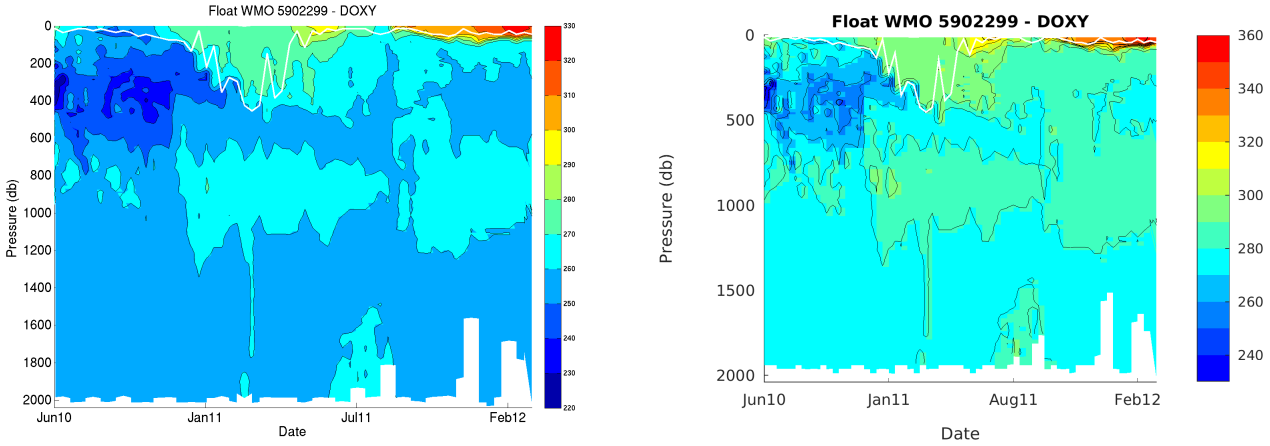


Figure 6: Oxygen section along the float trajectory (interpolated on standard levels). Quality flags are taken into account. Left plot: Raw data - Right plot : corrected data

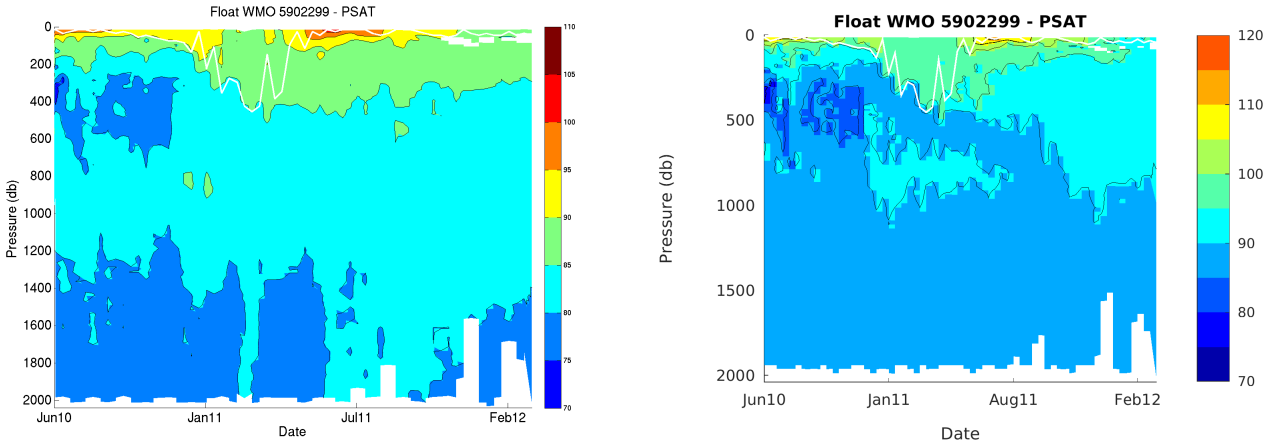


Figure 7: PSAT section along the float trajectory (interpolated on standard levels). Quality flags are taken into account. Left plot: Raw data - Right plot : corrected data

1.2 Examples of corrected profiles with LOCODOX

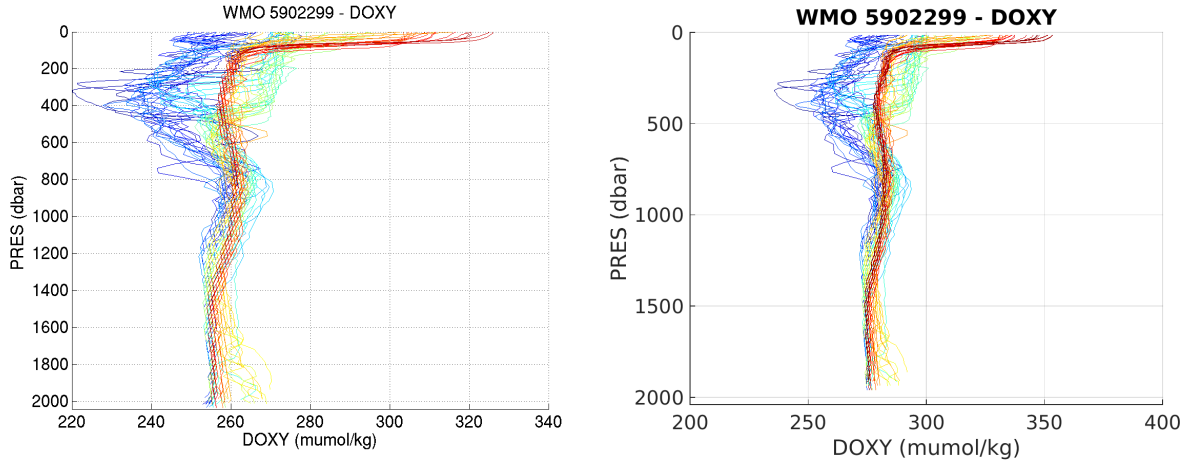


Figure 8: Oxygen profiles. Left plot: Raw data - Right plot : corrected data

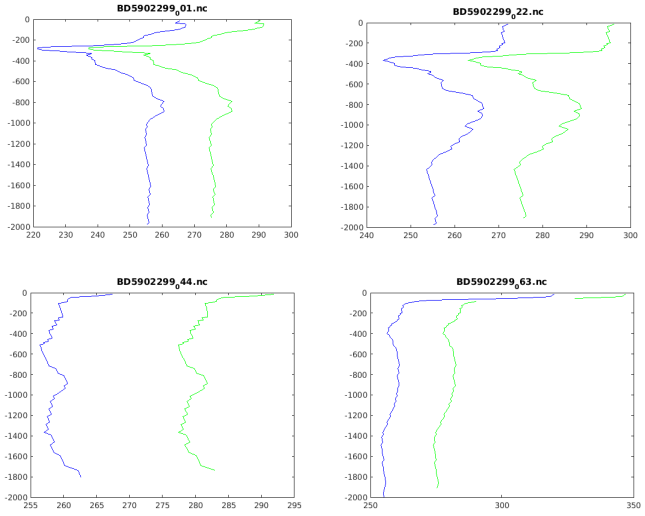
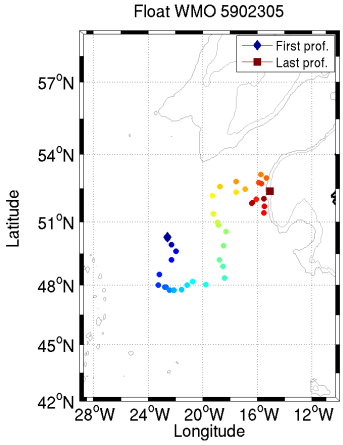


Figure 9: Float 5902299 : Corrected profiles in green

OXYGEN CORRECTION OF OVIDE ARGO DATA
FLOAT WMO 5902305

C. Lagadec - V. Thierry

June 29, 2017



The Delayed mode Quality Control for Salinity ans Temperature report is archived (bilan_5902305.pdf).

1 Float 5902305 : Oxygen correction with LOCODOX

Number	Deployment (cycle OD) cycle OD	Last cycle 38
Provor WMO 5902305	20/06/2010 14h29	
CTS3-DO 9	N 50.2766 W 22.602	

Date of DOXY control	Float status	Last cycle
May 2017	DEAD	07/07/2011
Coriolis transmission		02/05/2017

Table 1: Status of the float

This software is used to correct Oxygen data (parameter DOXY) contained in the files BR(real time) and/or BD(Delayed Mode) associated to files R (Real Time T/S) and/or D(Delayed Mode T/S).

PI suggests : The Oxygen corrections have been done only when Salinity and Temperature were available in Delayed Mode (D files). Theorically, the corrections should be done from adjusted values (TEMP and PSAL). However, when there is a few bad values in salinity (of about few tens of PSU), and if there is no bias in salinity (OW method), PSAL data can be used instead of PSAL_ADJUSTED, because the impact of those values on the oxygen correction is not significant.

To correct Oxygen data, LOCODOX software gives 3 choices to work :

- from a reference profile
- from WOA climatology
- from in air measurements

The reference profile for this float is the station 42 of Ovide 2010 cruise.

LOPS options are :

Options	Choice
Unit DOXY	Mumol/kg
Suppress hooks	YES
Drift correction with	PRES
Vertical scale	PRES
Apply drift correction	NO
Correction using : PSAT/DOXY	PSAT
kind of error	RELATIVE

Table 2: LOCODOX Options

Applied DOXY correction

PSAT=f(DOXY); PSAT_ADJUSTED=A*PSAT+B;DOXY_ADJUSTED=f(PSAT_ADJUSTED) with A=1.165; B=-6.892

Percent saturation corrected as a linear function of PSAT; Comparison to a single reference profile (isobaric match as in Takeshita et al. (2013)) on cycle 0; PSAT converted from DOXY and DOXY_ADJUSTED converted from PSAT_ADJUSTED.

There is no QC flag superior to 2 in Pressure, Temperature and Salinity, so there is no QC controls plot. There is no bias in salinity for this float. The correction has been done with PSAL.

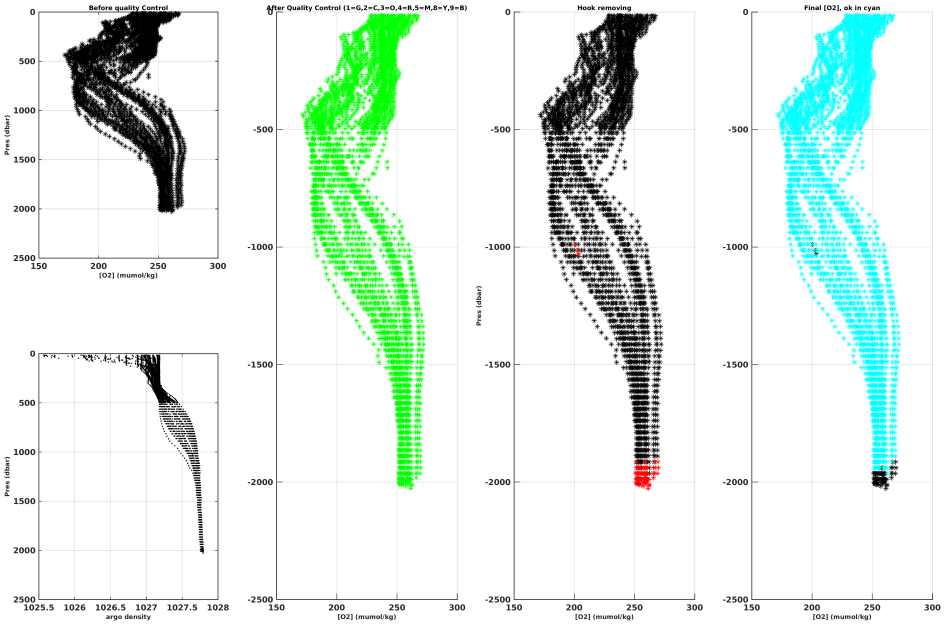


Figure 1: The first 50 meters from the bottom are suppressed because data are incertain; Only data in cyan are taken for the correction.

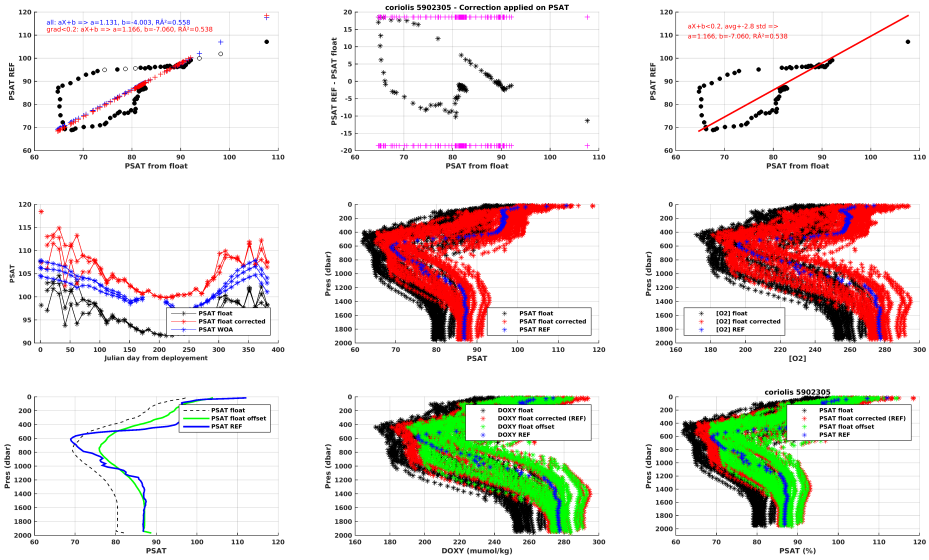


Figure 2: Plots produced by LOCODOX

Float 5902305 was corrected based on a comparison of the first ascending profile of the float with an in situ reference profile acquired at float deployment. The correction is done in considering the percentage of saturation (PSAT).

Upper panels : The three panels show the regression between the Argo profile and the reference profile.

Middle left panels : PSAT in the upper 10m from the raw data (black curve) and the corrected data (red curves). PSAT estimated from the World Ocean Atlas at the float position is also provided for comparison (blue curves).

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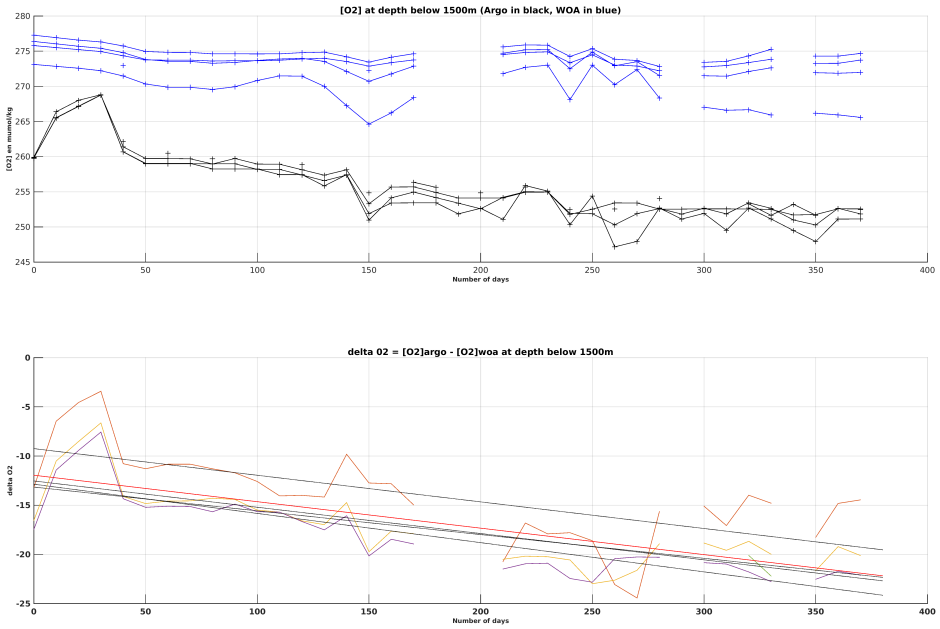

Figure 3: Comparison in the deeper levels (below 1500m) between the float data and WOA data interpolated at the float position (horizontal and vertical). The temporal evolution of the difference is used to estimate a possible sensor drift.

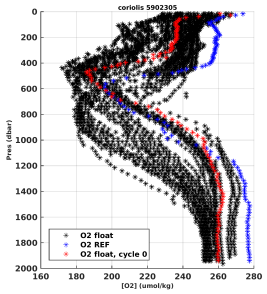

Figure 4: Profiles float 5902305 (black), O2 hydro reference (blue), O2 float cycle 0 (red)

1.1 Corrected data float

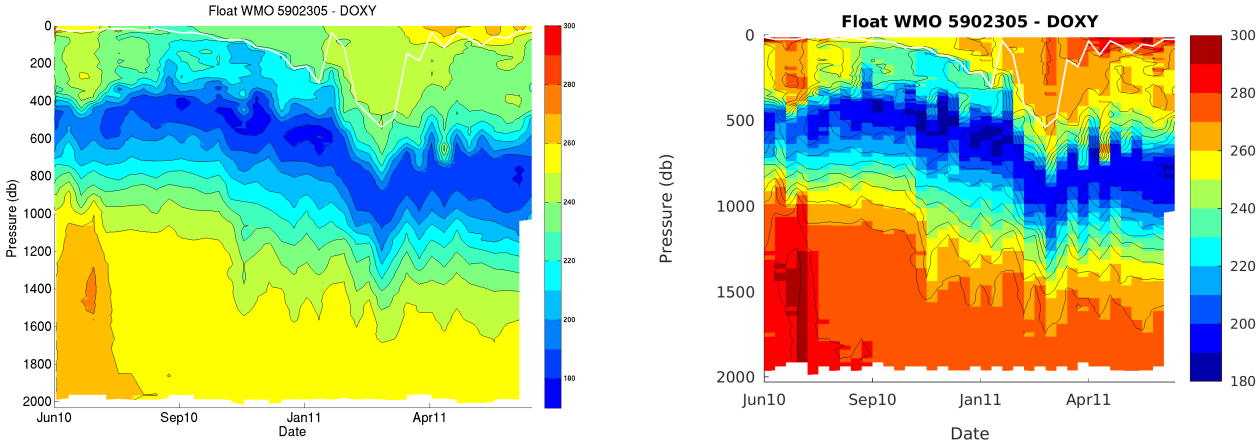

Figure 5: Oxygen section along the float trajectory (interpolated on standard levels). Quality flags are taken into account. Left plot: Raw data - Right plot : corrected data

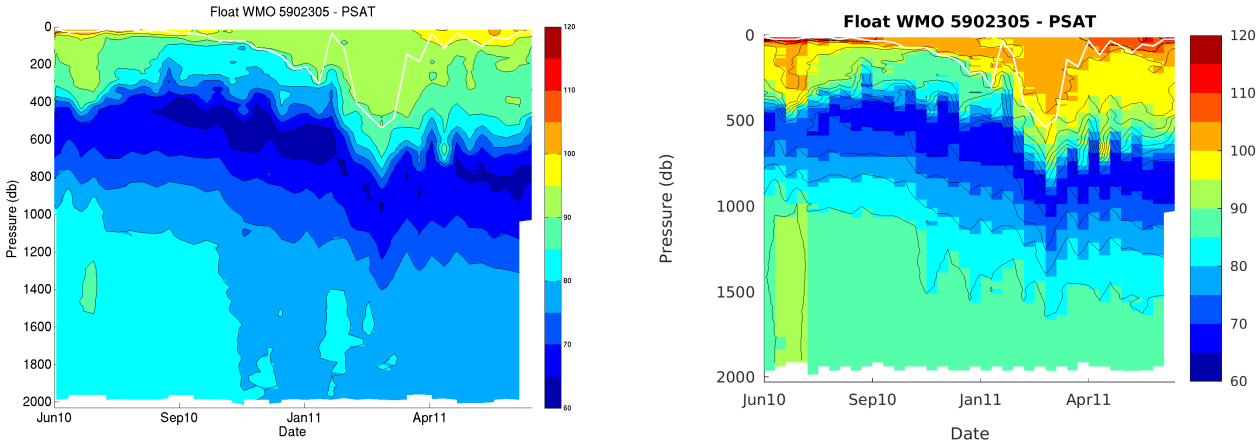

Figure 6: PSAT section along the float trajectory (interpolated on standard levels). Quality flags are taken into account. Left plot: Raw data - Right plot : corrected data

1.2 Examples of corrected profiles with LOCODOX

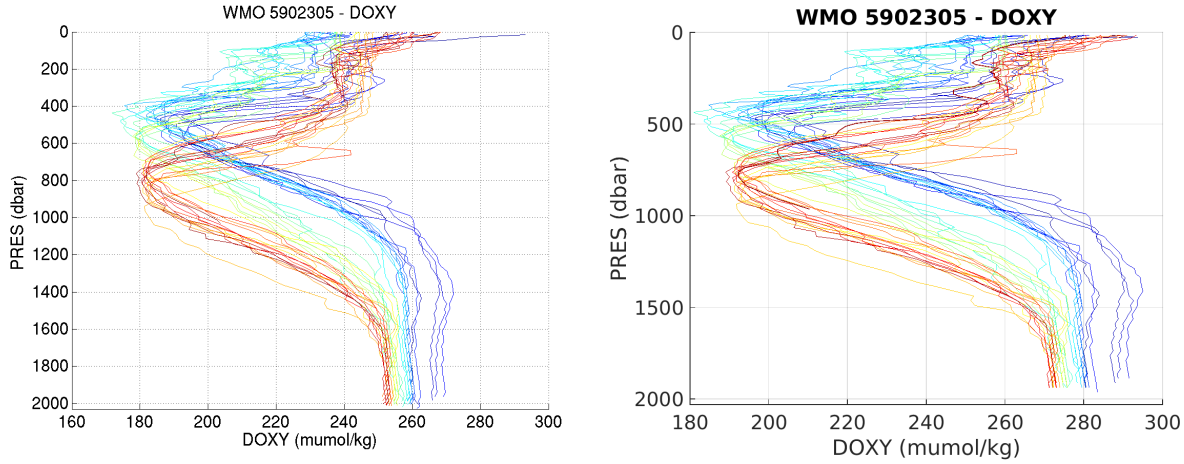

Figure 7: Oxygen profiles. Left plot: Raw data - Right plot : corrected data

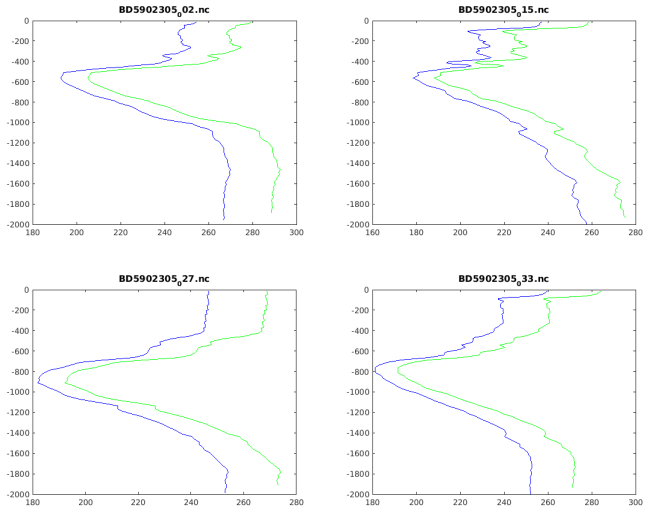

Figure 8: Float 5902305 : Corrected profiles in green