DOXY meeting : RT adjustment 20/11/20

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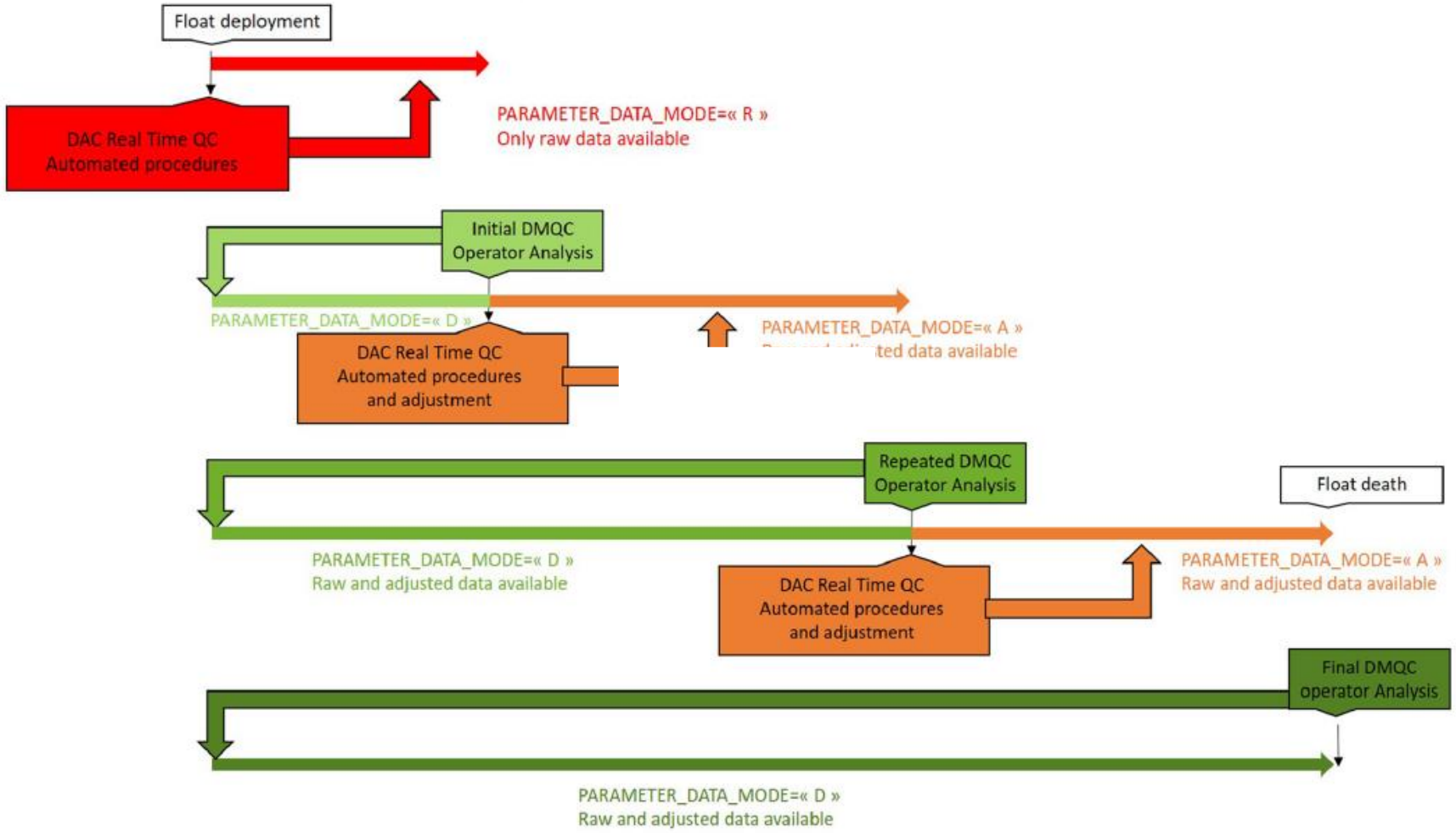
Real time adjustment procedure set up by DAC Coriolis

To improve DOXY quality in real time



Bittig et al. 2019

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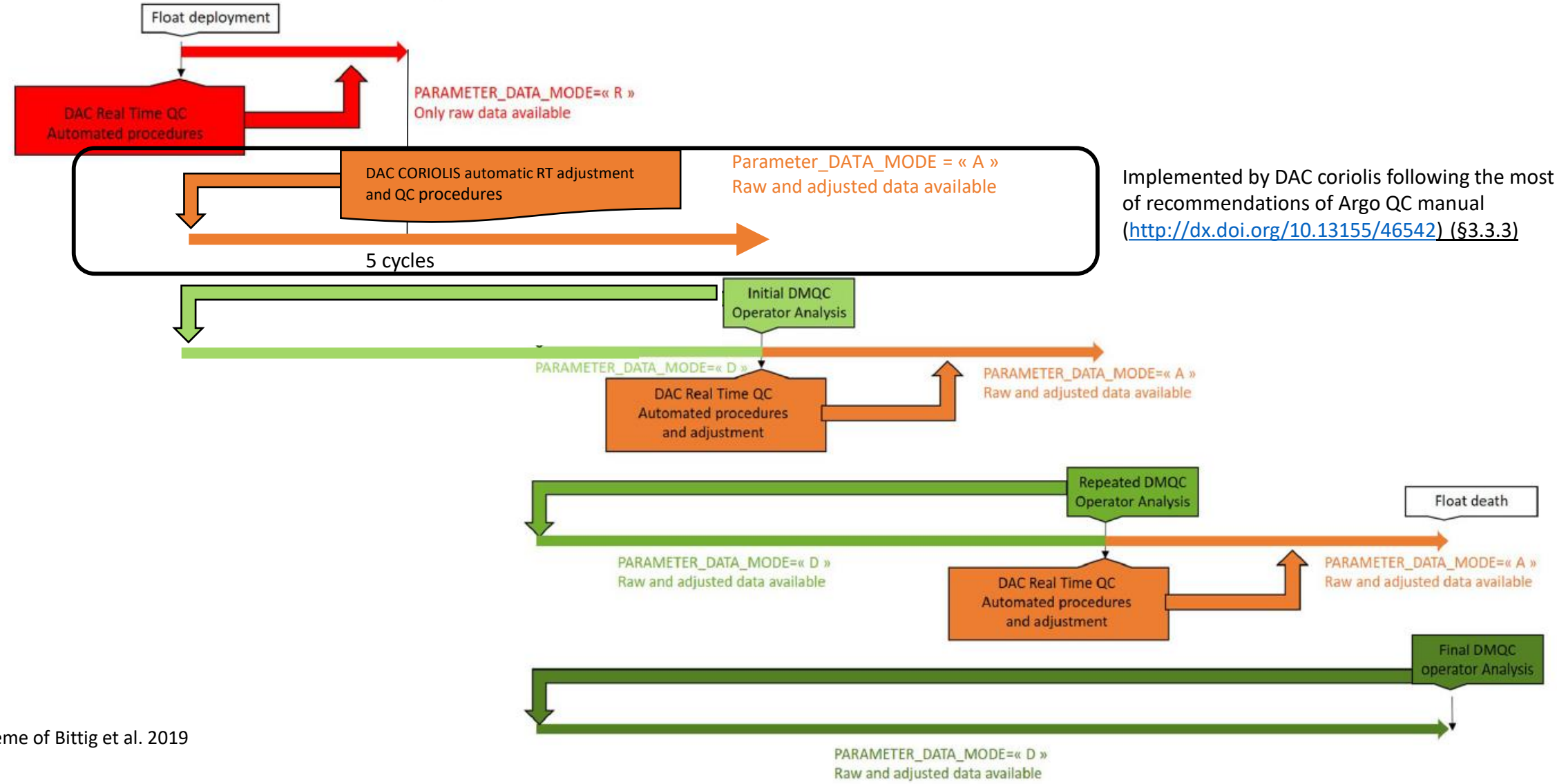


Implemented by DAC coriolis following the most of recommendations of Argo QC manual (http://dx.doi.org/10.13155/46542) (§3.3.3)

Modified scheme of Bittig et al. 2019

Real time adjustment procedure set up by DAC Coriolis

Method if no previous delayed-mode adjustment is available

(https://doi.org/10.13155/76709)

- **Method # 1**: Adjustment by comparison of in water float data to WOA based on PSAT or PPOX

- **Description** : Gain estimated from the comparison between in water PSAT or PPOX from float and PSAT or PPOX from WOA climatology at most in the upper 20 dbar of the water column. WOA PPOX is computed from WOA PSAT and from TEMP and PSAL float data at the atmospheric pressure of 1 atm.

DOXY_ADJUSTED = DOXY .* G

G (gain factor) = median(gi)

gi = (PPOX_woa/PPOX_DOXY_float)cycle i

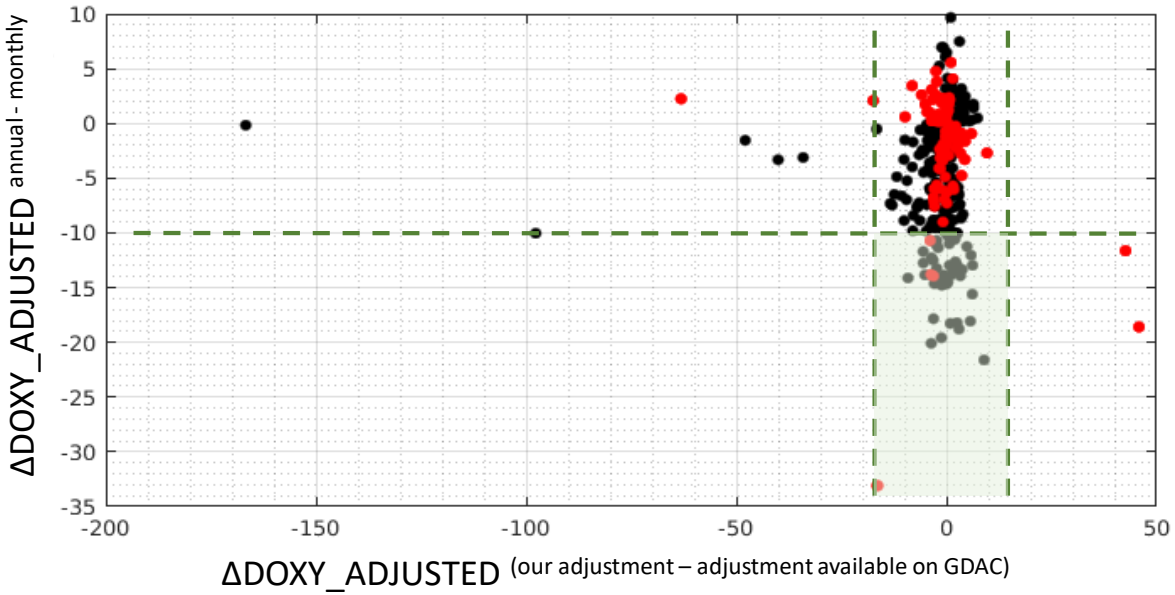
With PPOX_woa{PSAT_woa,TEMP_float,PSAL_float,Patm = 1atm}
PPOX_float{MOLAR_DOXY_float,TEMP_float,PSAL_float,Patm = 1atm}

Real time adjustment procedure set up by DAC Coriolis

Method if no previous delayed-mode adjustment is available (https://doi.org/10.13155/76709)

- **Parametrization**

Climatology	WOA18 PSAT objectively analyzed mean
Climatology resolution	monthly



- From annual WOA
- From monthly WOA

Added values for the correction with monthly climatology

Real time adjustment procedure set up by DAC Coriolis

Method if no previous delayed-mode adjustment is available

(https://doi.org/10.13155/76709)

- **Parametrization**

Climatology	WOA18 PSAT objectively analyzed mean
Climatology resolution	monthly
Climatology level	1 (depth = 0 m)
Profiles for G estimation	5st ascending profiles from cycle 2(and before cycle 20) with valid data (DOXY_QC & PSAL_QC~4, TEMP_QC and PRES_QC ~3 & 4) measured in the 10 first dbar (or 20 dbar) without profiles in greylist /under ice/ badly porsitioned

- **O_2 quantity conversion**

  SCOR WG 142 recommendations (#RD5)

Real time adjustment procedure set up by DAC Coriolis

When do we choose not to apply? Which criteria used to apply

- **Go / No Go threshold is equal to PPOX_ADJUSTED_ERROR fixed at 10 mbar by default for RT adjustment**

1. Which climatology used ?
2. At what depth?

➔ Float data set = All Argo-O_2 floats in delayed mode from the dac coriolis

➔ Climatology : 2 mapped data products

a) clim1 = the mapped O_2 product GlodapV2.2016b
(to be totally independent from the gain estimation)

b) clim2 = the annual mapped O_2 product WOA18

➔ Level tested

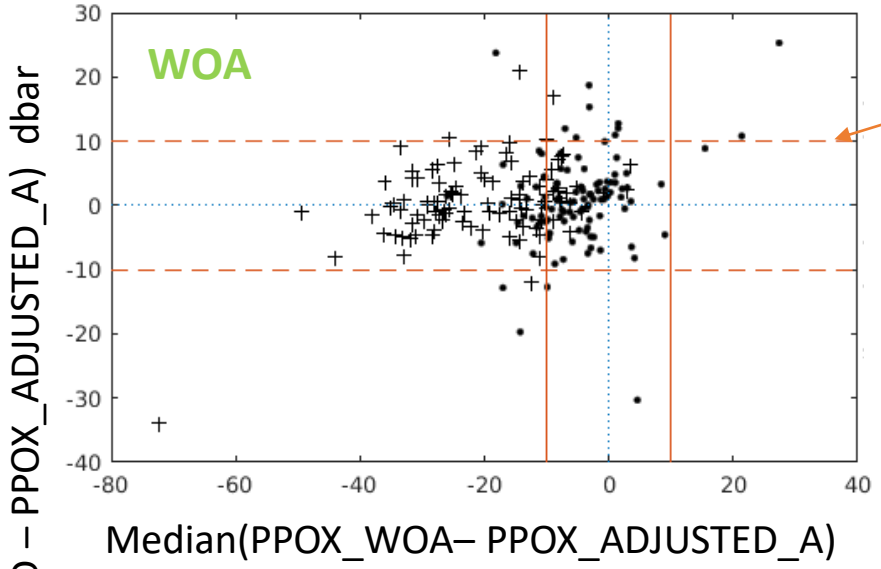
a) surface (10 dbar)

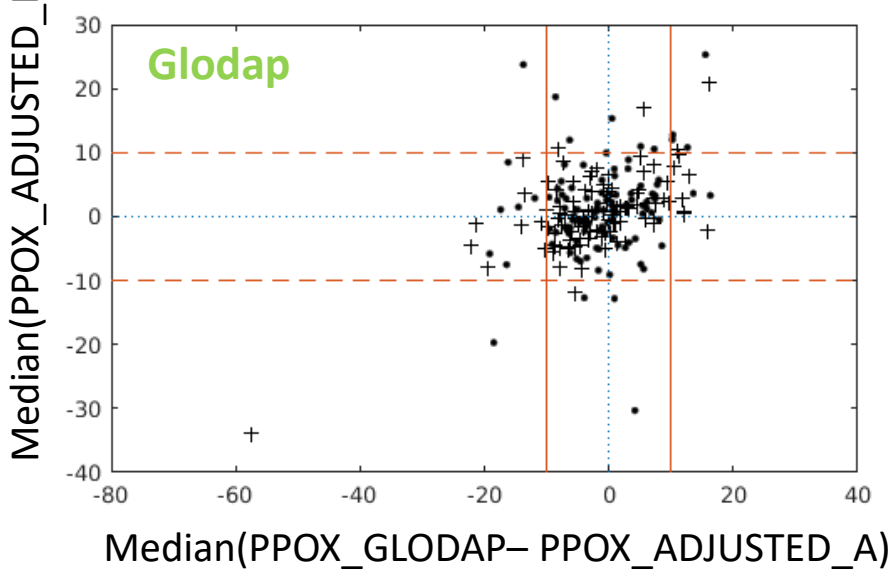
b) 900 dbar

➔ Criteria tested <u>on the 5 profiles used for gain estimation</u> and using ppox_adjusted

Real time adjustment procedure set up by DAC Coriolis

When do we choose not to apply? Which criteria used to apply



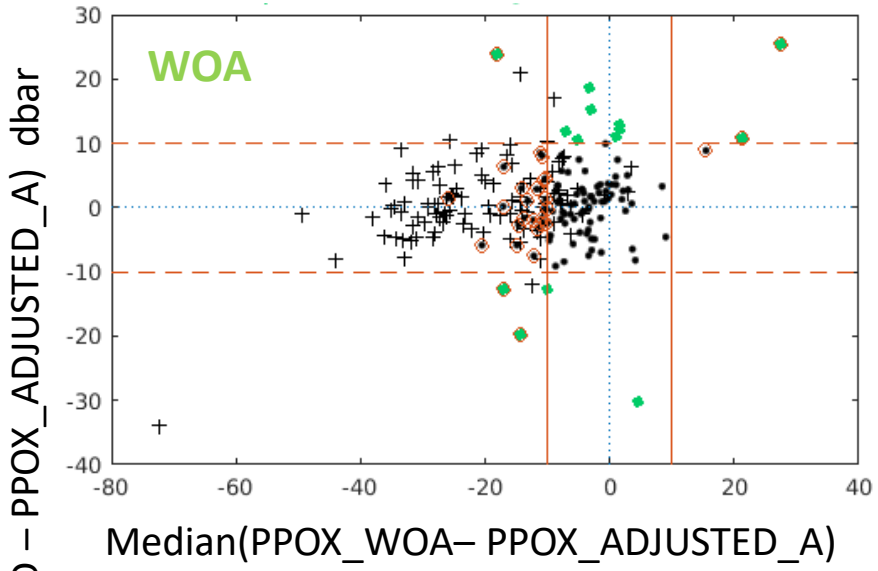


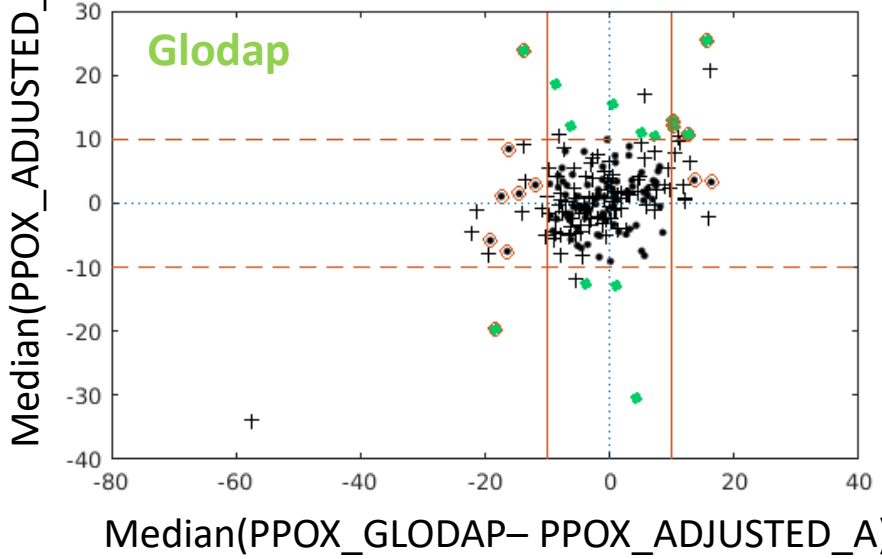
Thresholds of 10 dbar

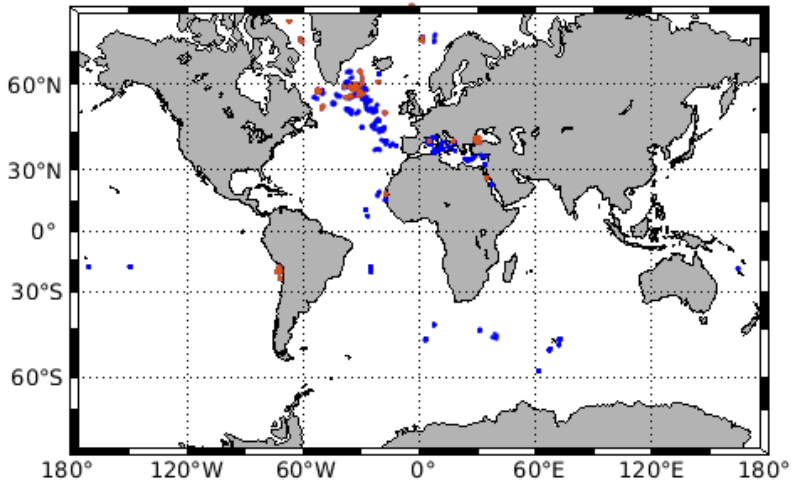
+ Surface
• 900 dbar

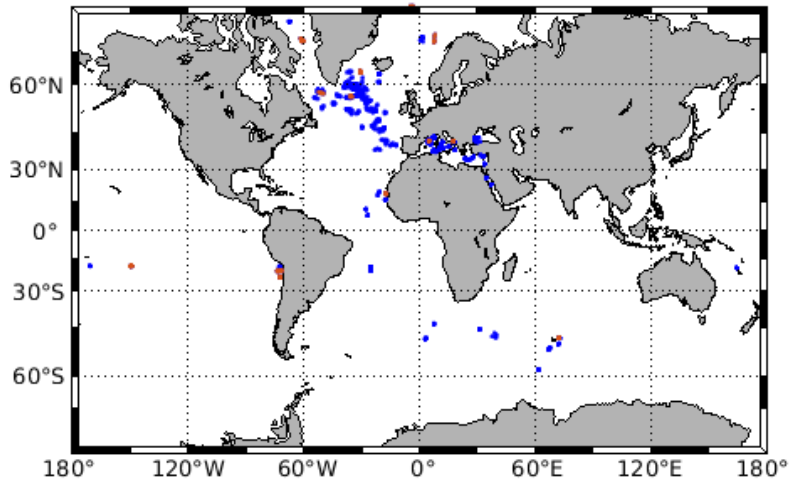
Real time adjustment procedure set up by DAC Coriolis

When do we choose not to apply? Which criteria used to apply









+ Surface
● 900 dbar

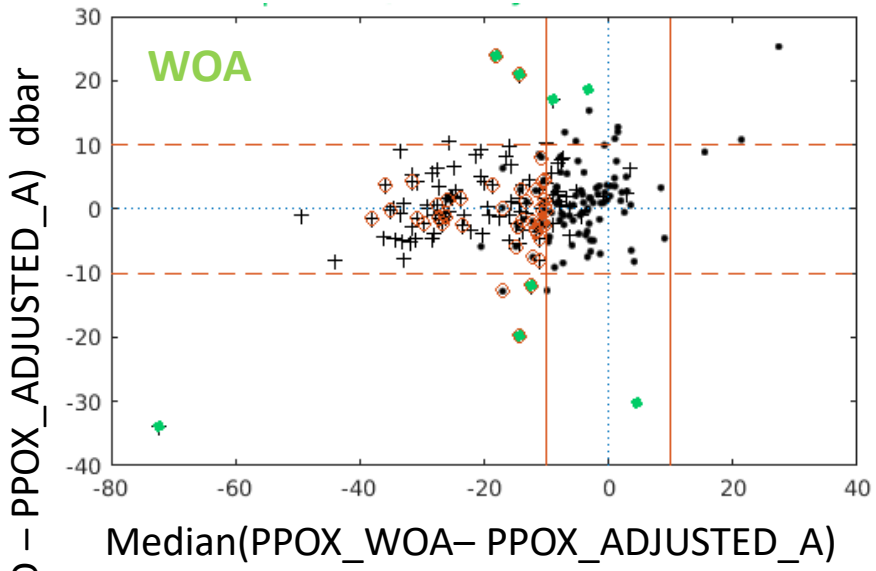
● position of floats tested
● No Go

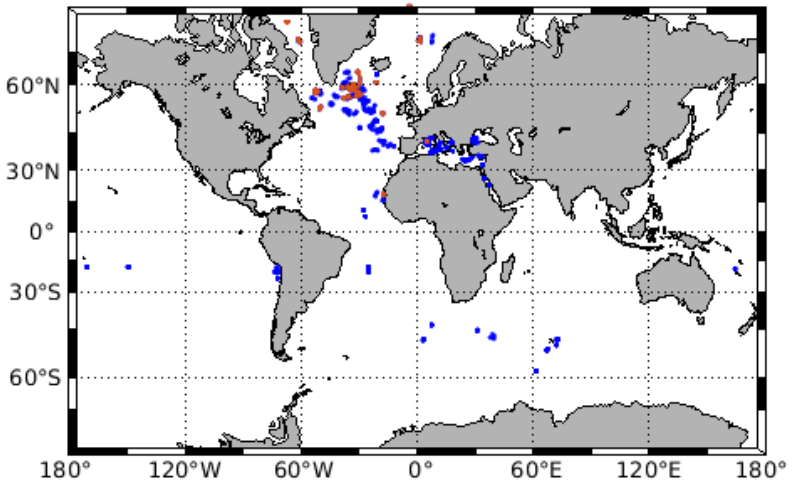
In Surface
○ No Go
Median(PPOX_GLODAP – PPOX_ADJUSTED_A) > 10

● Confirmed by results on gdac
Median(PPOX_ADJUSTED_D – PPOX_ADJUSTED_A) > 10

Real time adjustment procedure set up by DAC Coriolis

When do we choose not to apply? Which criteria used to apply

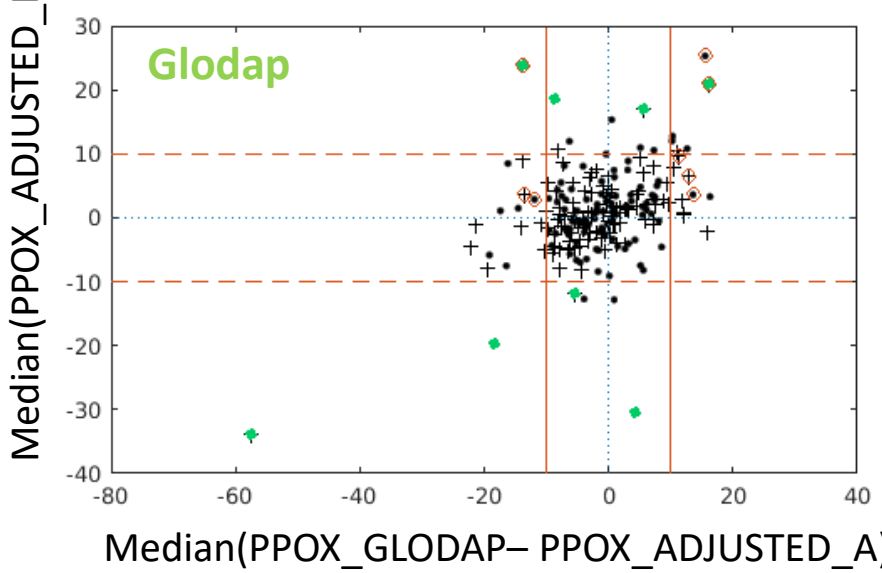


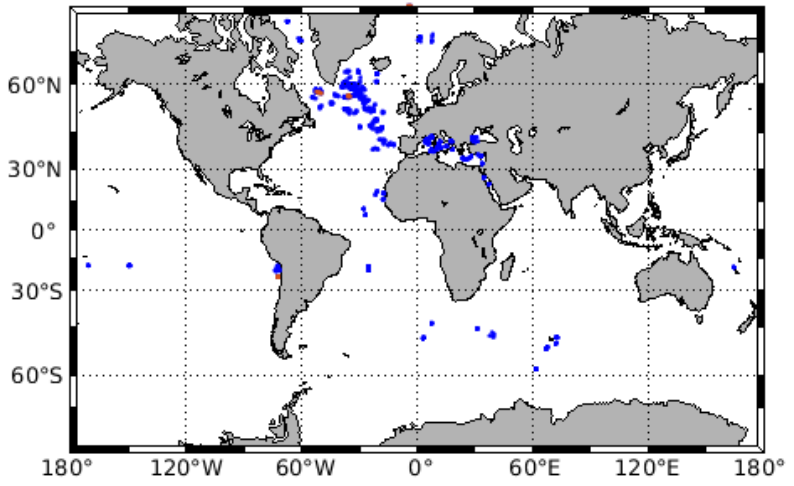


+ Surface
● 900 dbar

● position of floats tested
● No Go

At 900 dbar
○ No Go
Median(PPOX_GLODAP – PPOX_ADJUSTED_A) > 10





● Confirmed by results on gdac
Median(PPOX_ADJUSTED_D – PPOX_ADJUSTED_A) > 10

Real time adjustment procedure set up by DAC Coriolis

Method if no previous delayed-mode adjustment is available

(https://doi.org/10.13155/76709)

- **GO / No GO**

  Based on this study, we have devided to visualize all cycles for which :

  (1) Median Absolute Deviation > $MAD_{threshold}$(=10 /ppox_woa_monthly)
  (2) |median($PPOX\_clim_1$–PPOX_adjusted)| > 10 in surface
  (3) |median($PPOX\_clim_2$–PPOX_adjusted)| > 10 in surface (if no data from $clim_1$)
  (4) no data from $clim_1$ or $clim_2$ are available for comparison

Where $clim_1$= the mapped O_2 product GlodapV2.2016b
$clim_2$= the annual mapped O_2 product WOA18

- **To validate No Go**

Coriolis is going to build a 'in house' reference data base including GLODAPv2.2020 (adjusted data product), CARIMED (for the Mediterranean sea) for the moment. This data base should be completed with "trusted" adjusted profiles (we should also define some criteria to decide how we select good floats and good profiles), and other regional data set of reference.

➔ further information/discussion during the third part of the meeting

Real time adjustment procedure set up by DAC Coriolis

Method if no previous delayed-mode adjustment is available (https://doi.org/10.13155/76709)

- **How we fill SCIENTIFIC_CALIB_COMMENT and DOXY_ADJUSTED_ERROR**

Case 1_1: Adjustment by comparison of in water float data to WOA based on PSAT or PPOX, error in PPOX

SCIENTIFIC_CALIB_COMMENT = "DOXY_ADJUSTED is estimated from an adjustment of in water PSAT or PPOX float data at surface by comparison to WOA PSAT climatology or WOA PPOX in using $PSAT_{WOA}$ and TEMP and $PSAL_{float}$ at 1 atm, DOXY_ADJUSTED_ERROR is estimated from a PPOX_ERROR of [xx] mbar"

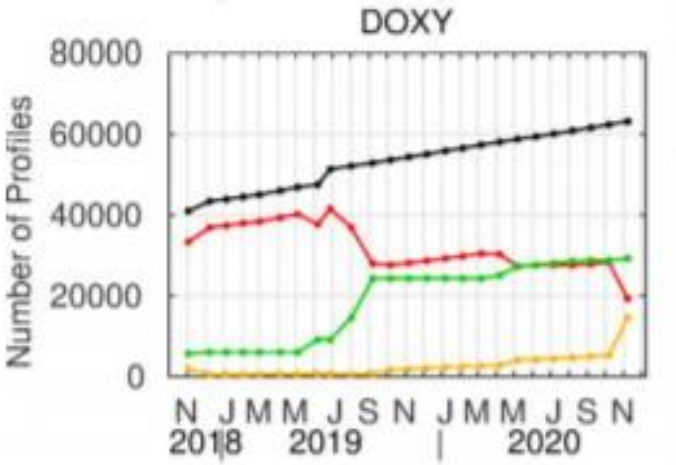
Propagation ERROR Method # = 1

propagation error of 10mbar by default or provided by PI in mbar

DOXY_ADJUSTED_ERROR = [X] µmol/kg is recomputed from CALIB_RT_ADJUSTED_ERROR

Real time adjustment procedure set up by DAC Coriolis

How many floats have been adjusted in RT



- 119 floats has been adjusted last week
  - many problems resolved now
  - a e-mail to inform PI must be sent very soon

Dear Birgit,
the float 6900666 (equipped with Optode S/N 4212) was deployed last month
We used the method : https://doi.org/10.13155/76709 to adjust the Doxy profiles, the DOXY_ADJUSTED profiles are available on the GDAC

Please let me know if you disagree with this adjustment and I will re-process the float
Regards,
Vincent

- 63 floats with No Go
  - need to build 'in house' reference database to validate or not

- Automatic implementation asap for new float

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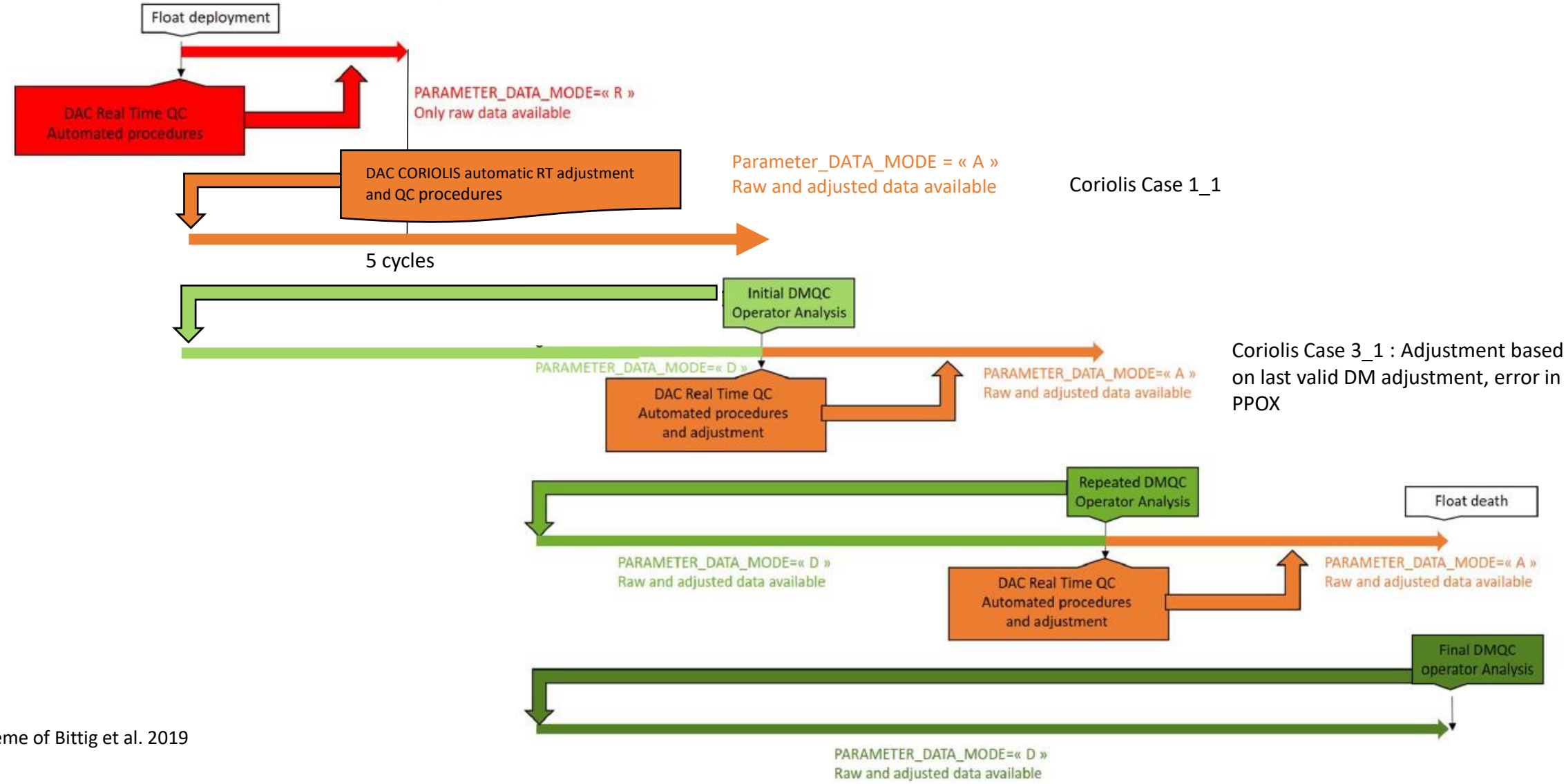
To improve DOXY quality in real time



Modified scheme of Bittig et al. 2019