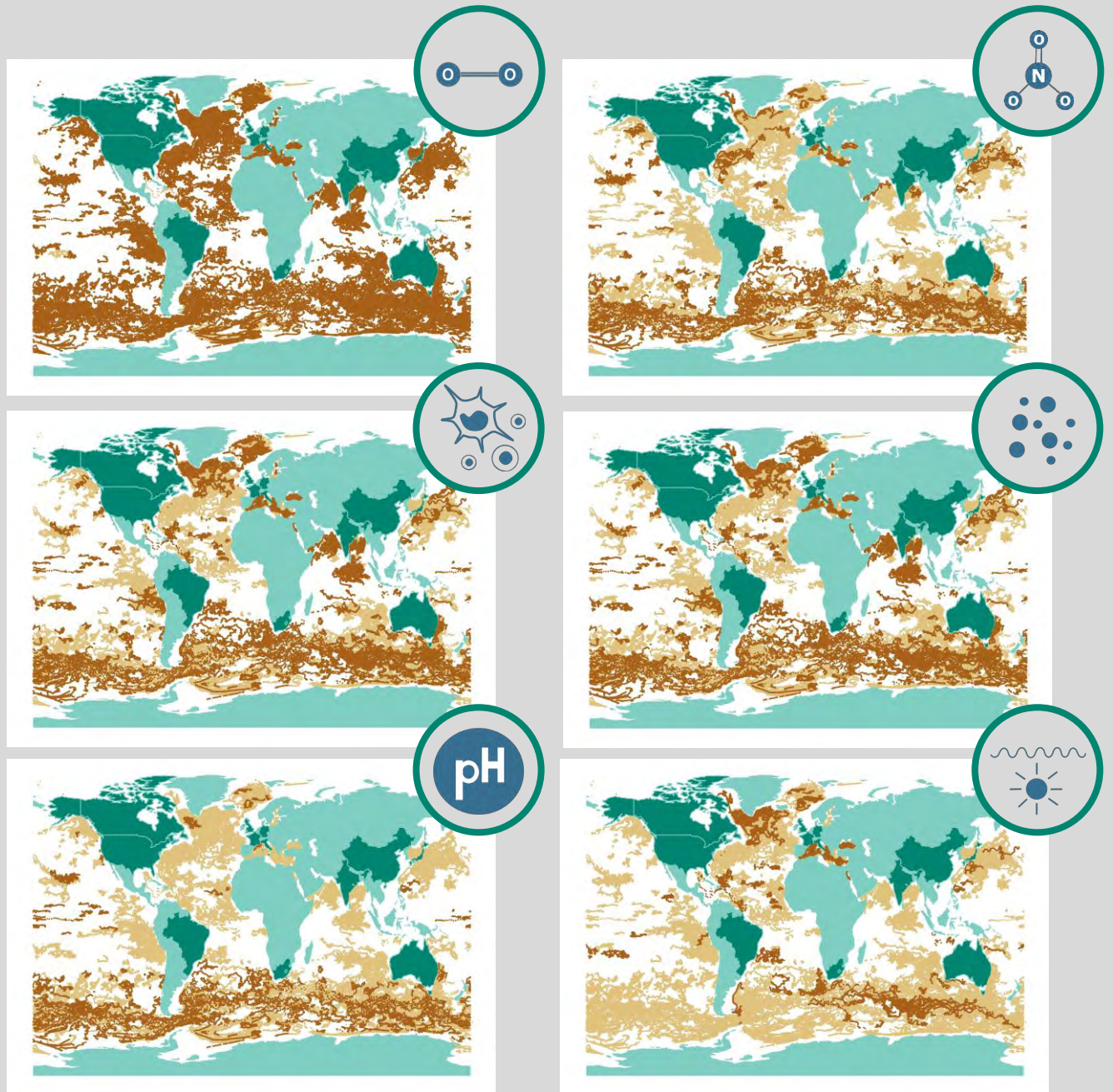


Cheat Sheet

Data distribution

Jan 2021



Cheat Sheet

Quality Control and GDAC

Jan 2021

- **Real-time quality control (RTQC)** is performed on data within 24 hours, which is followed by **delayed mode quality control (DMQC)** procedure.
- The **Argo Data Management Team (ADMT)** provides advice on these procedures argo-dm@jcommops.org
- Detailed information is outlined in the **BGC-Argo Guide**
Bittig et al. (2019) *Front. Mar. Sci.* 10.3389/fmars.2019.00502

DMQC dynamic climatologies

To improve data accuracy

CANYON-B

github.com/HCBScienceProducts/

LIARv2

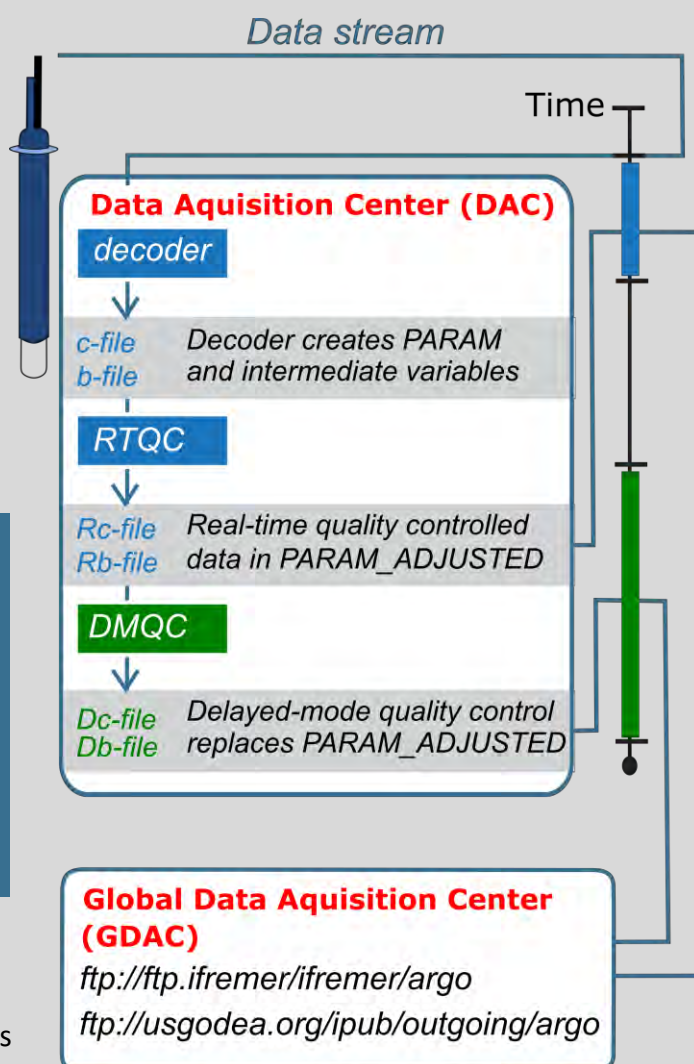
github.com/BRCScienceProducts/LIRs/
regional MLR

e.g. Williams et al. (2016) *Geo. Res. Lett*

User QC considerations

- DMQC is performed to the expertise of the data manager and ADMT recommendations
- The accuracy of raw data is not suitable for scientific application
- For specific applications, users should perform their own QC
- Contact the ADMT if you develop a procedure that improves data accuracy

Tip: Check the "SCIENTIFIC_CALIB_EQUATION", "SCIENTIFIC_CALIB_COEFFICIENT" and "SCIENTIFIC_CALIB_COMMENT" in b-files or contact data managers for further details on applied calibration and QC procedures



Cheat Sheet



Chlorophyll-a

Jan 2021

Expected Bias and RMSE*
Highly variable and < 6%



RTQC

- Dark offset
- NPQ correction (Xing 2012)
- Gain adjustment of factor 0.5
- Range test: $[-0.1, 50] \mu\text{mol kg}^{-1}$
- Negative spike test

DMQC

- In progress
- Recommend user adjusts gain regionally and performs visual checks

* If corrected to regional ship-based measurements, biases < 10 %. If not corrected, biases up to 300 %.

Resources

Schmechtig et al. (2014) Argo Data Management Team	10.13155/35385
Mignot et al. (2019) <i>Geophys. Res. Lett.</i>	10.1029/2018gl080541
Xing et al. (2012) <i>Limnol. Oceanogr.-Methods</i>	10.4319/lom.2012.10.483
Roesler et al. (2017) <i>Limnol. Oceanogr.-Methods</i>	10.1002/lom3.10185
Johnson et al. (2017) <i>J. Geophys. Res.-Oceans</i>	10.1002/2017jc012838
<i>To go further...</i>	
Thomalla et al. (2018) <i>Limnol. Oceanogr.-Methods</i>	10.1002/lom3.10234



Optical Backscatter

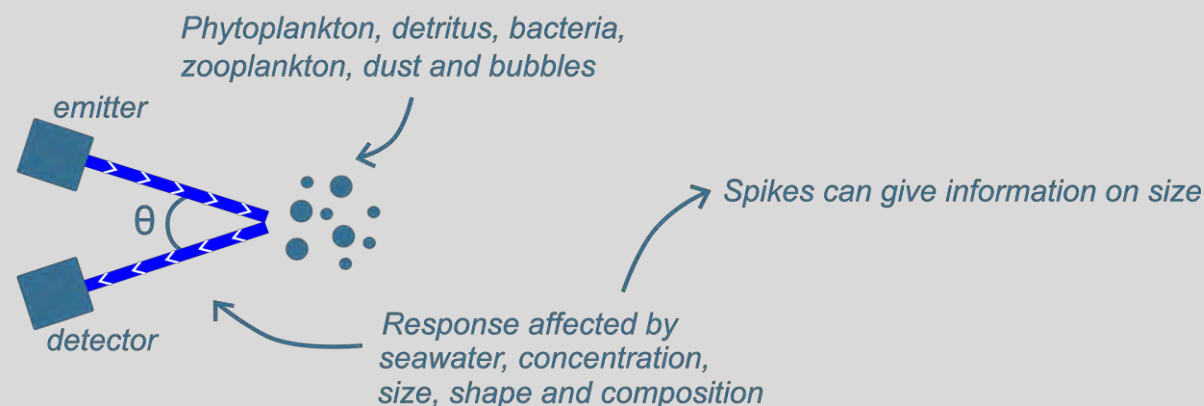
Jan 2021

Optical backscatter sensor

In oceanic conditions, it is a good regional proxy for POC

Expected Bias and RMSE*

N/A and 35 mg POC m⁻³



Note: Different sensors are deployed in BGC-Argo, with alternate θ and emitted light

RTQC

- Range test: [-0.01, 0.1] m⁻¹

DMQC

- Recommend user adjusts to POC regionally and performs visual checks based on application

* Error estimate based on DMQC data compared to regional ship-based measurements.

Resources

Schmechtig et al. (2015) Argo Data Management Team

10.13155/39459

Briggs et al. (2020) *Science*

10.1126/science.aay1790

Johnson et al. (2017) *J. Geophys. Res.-Oceans*

10.1002/2017jc012838

Briggs et al. (2011) *Deep Sea Res.-Pt. 1*

10.1016/j.dsr.2011.07.007

To go further...

Bellacicco et al. (2019) *Geophys. Res. Lett.*

10.1029/2019gl084078

Wojtasiewicz et al. (2018) *J. Atmos. Ocean. Tech.*

10.1175/JTECH-D-18-0027.1



pH

Jan 2021

Expected Bias and RMSE*
0.005 and 0.007



RTQC

- Range test: [7.3, 8.5]
- Spike test: 0.04

DMQC

- Offset adjustment with dynamic climatology
- Visual check

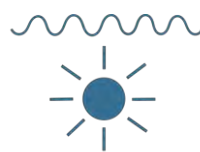
* Error estimate based on DMQC data compared to regional ship-based measurements.

Resources

Johnson et al. (2017) Argo Data Management Team	10.13155/57195
Williams et al. (2017) <i>Global Biogeochem. Cy.</i>	10.1002/2016gb005541
Williams et al. (2016) <i>Geophys. Res. Lett.</i>	10.1002/2016GL068539
Johnson et al. (2017) <i>J. Geophys. Res.-Oceans</i>	10.1002/2017jc012838



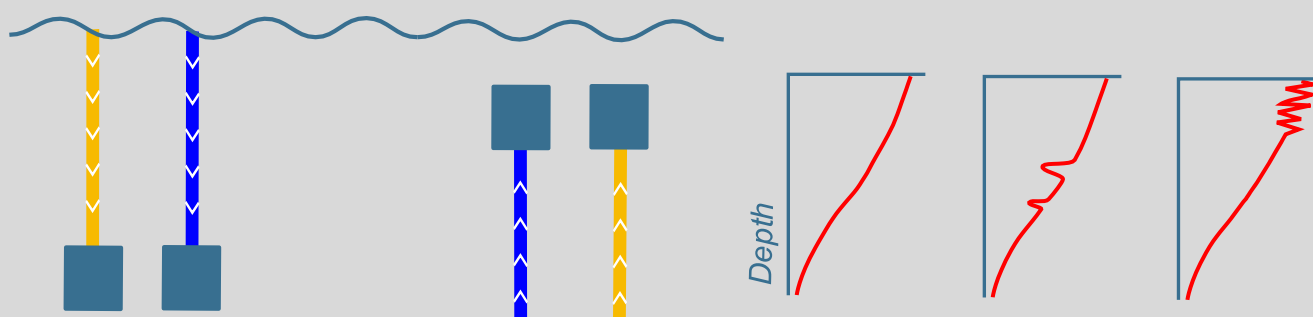
Cheat Sheet



Irradiance

Jan 2021

Expected Bias and RMSE*
<20 $\mu\text{W cm}^{-2} \text{ nm}^{-1}$ and 7-27%



RTQC

- Range test

DMQC

- In progress

* Dependent on wavelength and calculated by comparison to modelled data.

Resources

Poteau et al. (2019) Argo Data Management Team

10.13155/62466

Schmechtig et al. (2017) Argo Data Management Team

10.13155/51541

To go further...

Organelli et al. (2016) *J. Atmos. Oceanic Technol.*

10.1175/jtech-d-15-0193.1

Wojtasiewicz et al. (2018) *Remote Sens. Environ.*

10.1016/j.rse.2018.02.057



Cheat Sheet

Oxygen

Jan 2021

Expected Bias and RMSE*
3 and $0.1 \mu\text{mol kg}^{-1}$



Note: SBE43_IDO is not a fluorescence life-time based sensor. All others are.

RTQC

DMQC

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Range test: $[-5, 600] \mu\text{mol/kg}$• Spike test: $50 \mu\text{mol/kg}$• Gradient test: $50 \mu\text{mol/kg}$• Gain adjusted (WOA) | <ul style="list-style-type: none">• Gain and drift <i>in-situ</i> air calibration (NCEP)• Hook removal• Visual check |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|

* Error estimate based on DMQC data compared to regional ship-based measurements.

Resources

Thierry et al. (2018) Argo Data Management Team	10.13155/46542
Mignot et al. (2019) <i>Geophys. Res. Lett.</i>	10.1029/2018gl080541
Bittig et al. (2018) <i>Front. Mar. Sci.</i>	10.3389/fmars.2017.00429
Johnson et al. (2017) <i>J. Geophys. Res.-Oceans</i>	10.1002/2017jc012838
Bushinsky et al. (2016) <i>Limnol. Oceanogr.-Methods</i>	10.1002/lom3.10107
Bittig et al. (2014) <i>Limnol. Oceanogr.-Methods</i>	10.4319/lom.2014.12.617

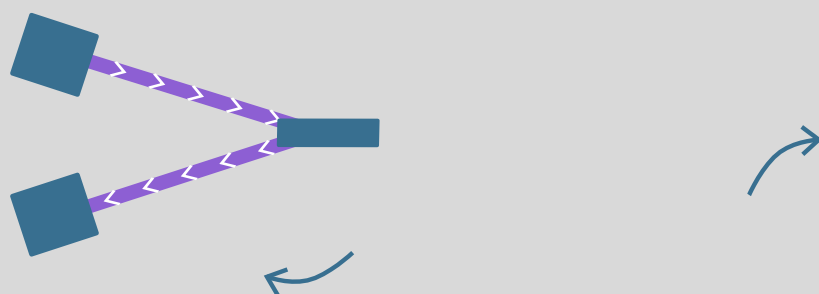
Cheat Sheet



Nitrate

Jan 2021

Expected Bias and RMSE*
0.5 and 0.5 $\mu\text{mol kg}^{-1}$



RTQC

- Not standardised by ADMT

DMQC

- Drift correction with dynamic climatology
- Visual check

* Error estimate based on DMQC data compared to regional ship-based measurements.

Resources

Johnson et al. (2018) Argo Data Management Team

10.13155/46121

Mignot et al. (2019) *Geophys. Res. Lett.*

10.1029/2018gl080541

Johnson et al. (2017) *J. Geophys. Res.-Oceans*

10.1002/2017jc012838

