

China BGC-Argo Report

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14 Oct. 2019

@ Villefranche-sur-Mer

Outlines

- ▶ 1. Float Status
- ▶ 2. Data Status



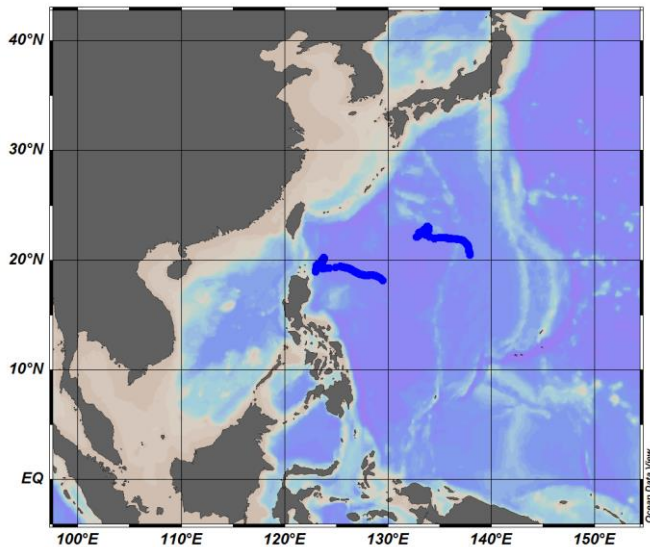
Outlines

- ▶ 1. Float Status
- ▶ 2. Data Status



I. Float Status

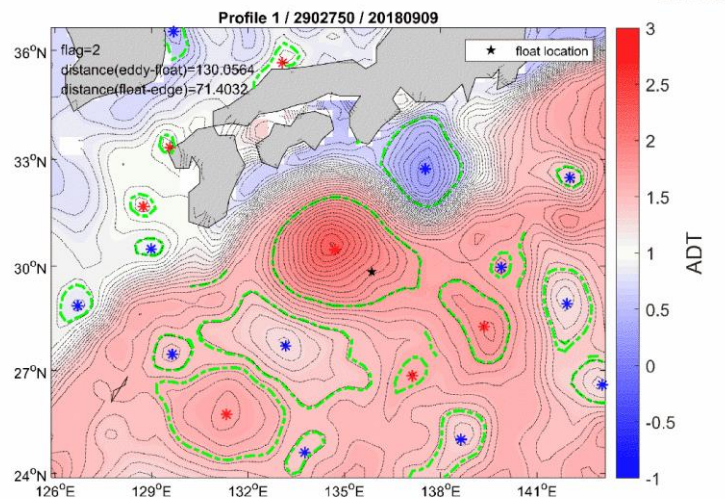
► I) Two 6-variable floats deployed



I. Float Status

► 2) One float recovered

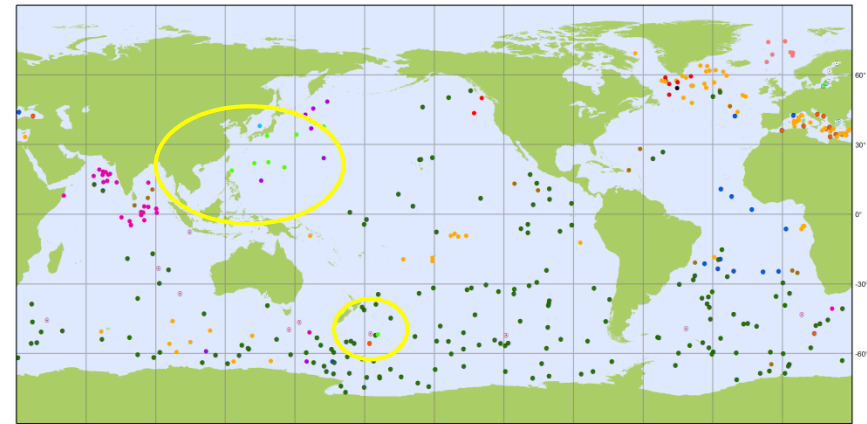
- Sep. 2018 - Jun. 2019
- 9 months, 228 profiles
- 191 daily profiles
- No bio-fouling
- Sent back NKE



I. Float Status

▶ 3) Alive CSIO floats (8)

- ▶ 7 in NW Pacific
- ▶ 1 in SO



Argo BioGeoChemical

National contributions - 366
Latest location of operational floats (data distributed within the last 30 days)

September 2019



Generated by www.jcommops.org, 07/10/2019

▶ 4) Deployment plan (6)

- ▶ 2 HM2000-O₂ (NW Pacific & SCS) To be deployed in Oct.
- ▶ 1 APEX-O₂ (NW Pacific) To be deployed in Oct.
- ▶ 1 Provor-ECO (NW Pacific)
- ▶ 2 Provor 5-Variable (NW Pacific) To be received in Oct./Nov.

I. Float Status

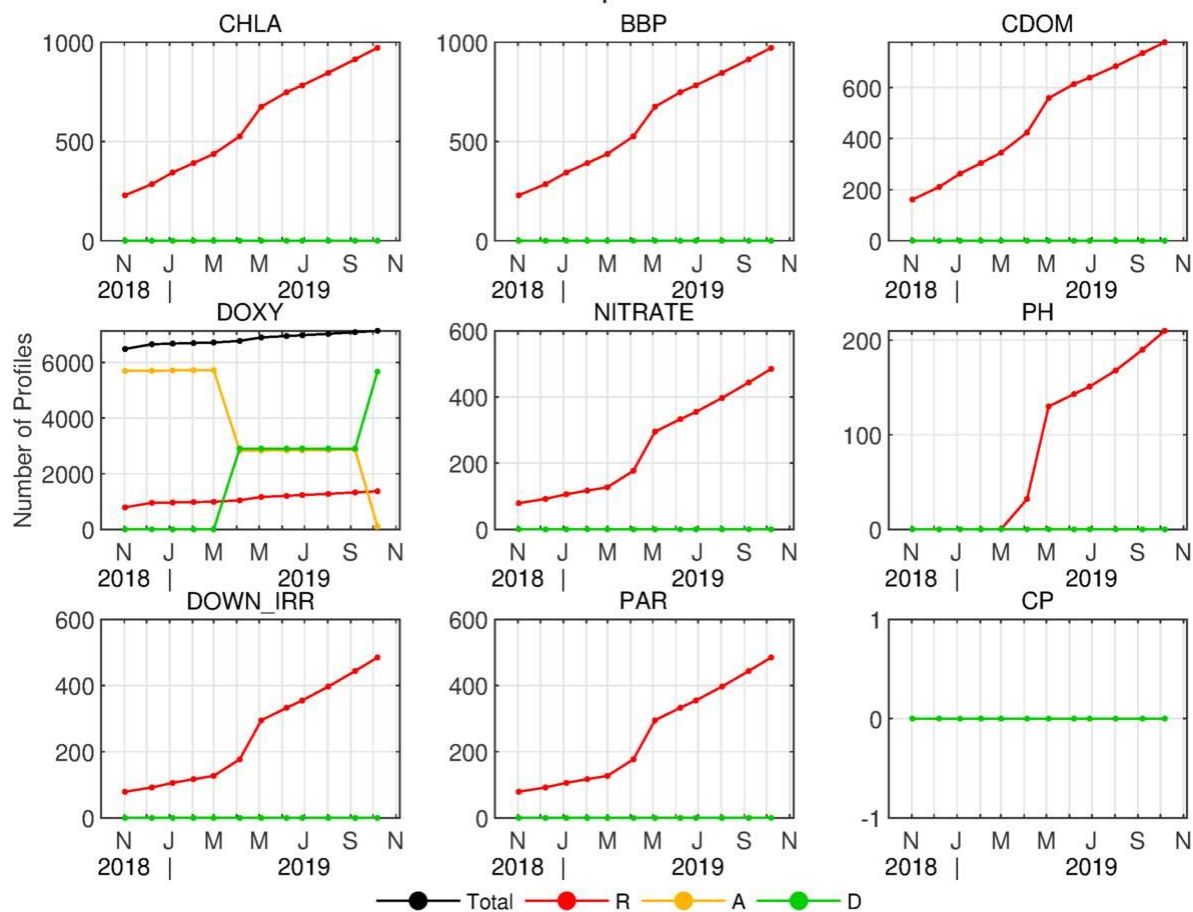
- ▶ 5) Other floats (Not sure if can be deployed in 2020)
 - ▶ 12 Provor-O₂ (SO) Waiting for the proper cruise
 - ▶ 4 Navis-SLI (NW Pacific) Expect to receive them in the next summer

Outlines

- ▶ 1. Float Status
- ▶ 2. Data Status

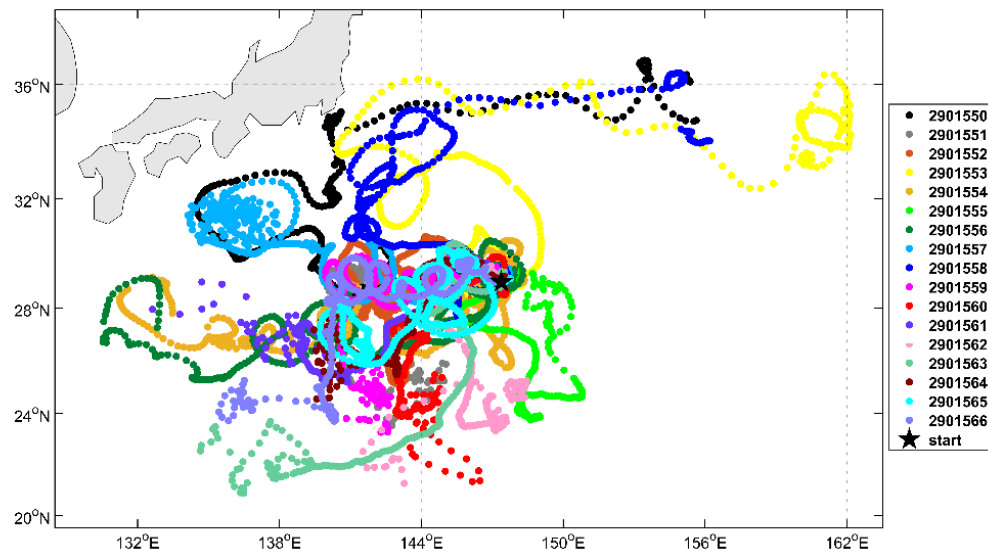
2. Data Status

Evolution of R/A/D-profiles for CSIO DAC



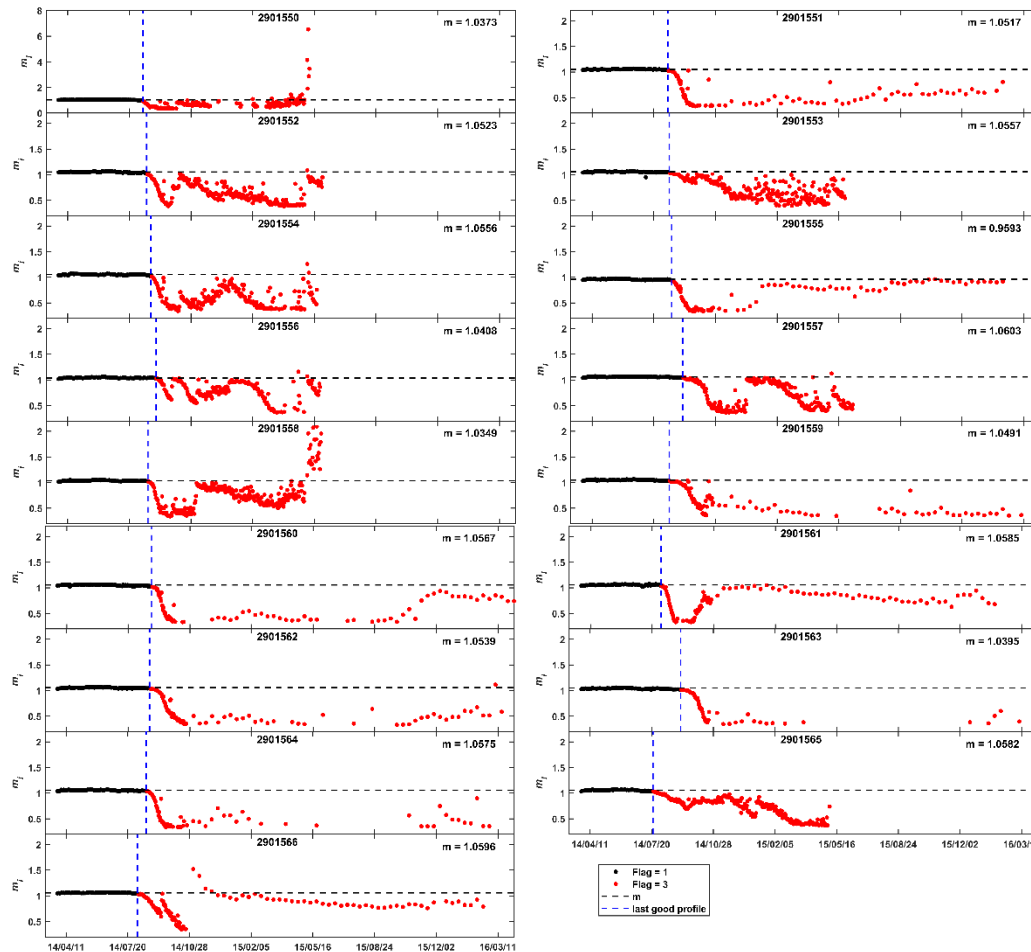
2. Data Status

► I) 17 Provor-O₂ data is re-processed



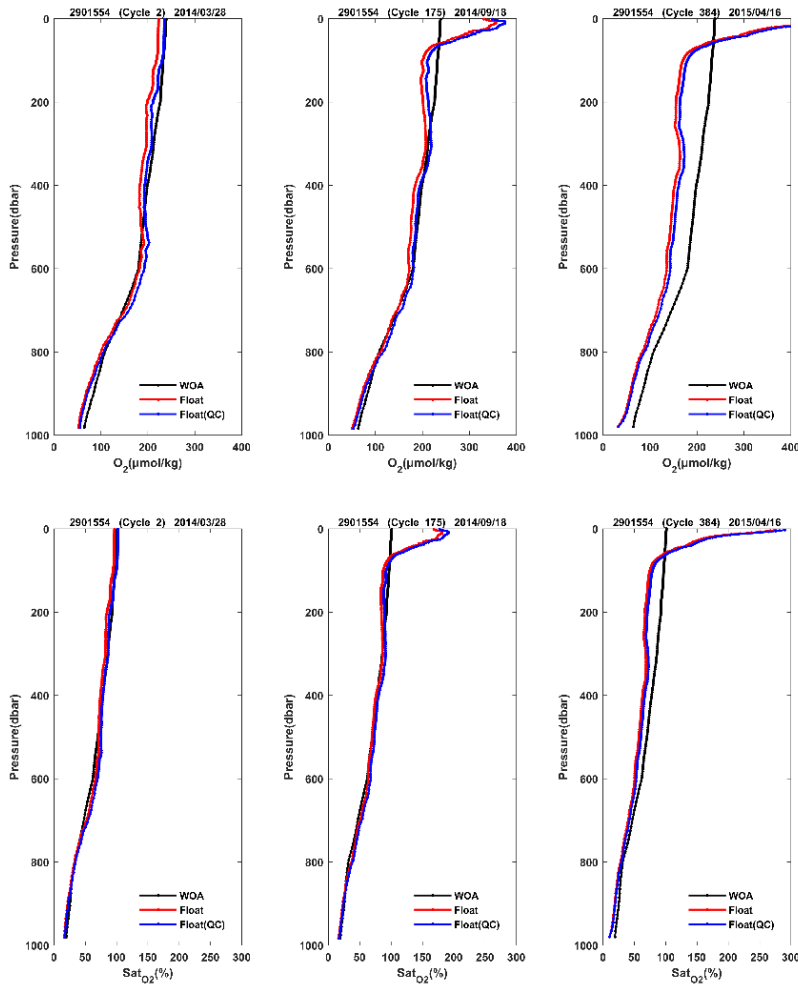
Deployed in the
end of March, 2014

2. Data Status



- m time-series based on WOA method
- The sensor problem appeared after 3 months due to everyday profiling
- Sensor-recorded O_2 increased abnormally at surface

2. Data Status



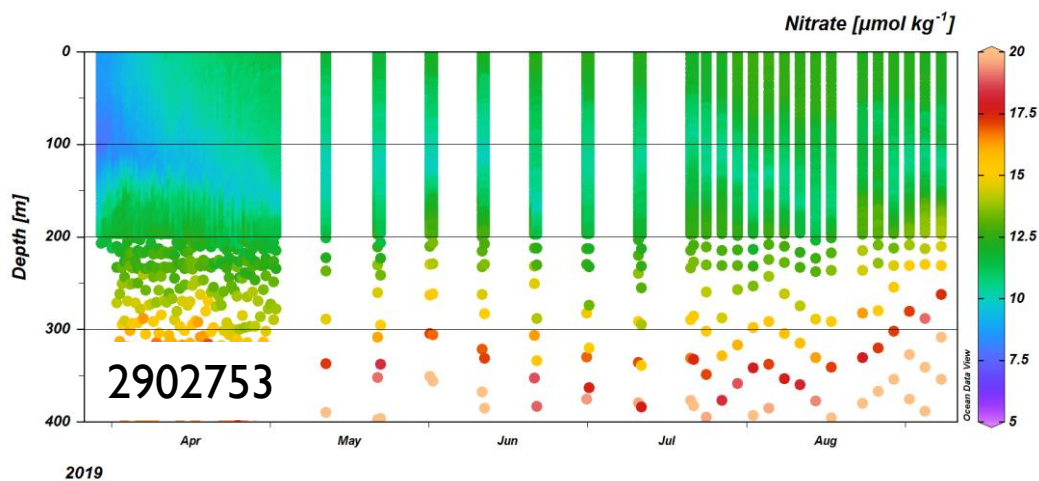
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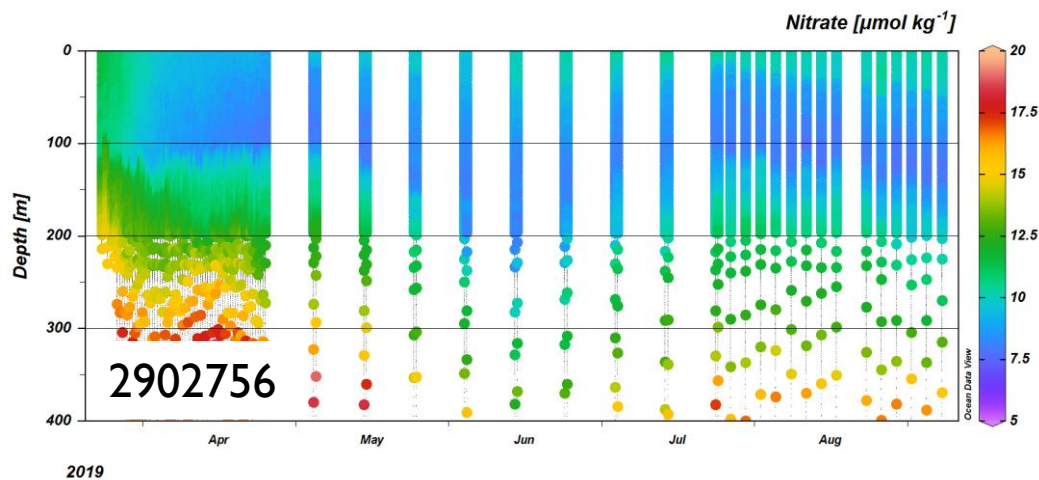
- ▶ 1) 17 Provor-O₂ data is re-processed
 - ▶ Identify the last good profile for each float
 - ▶ Obtain the median m value as the correction coefficient
 - ▶ Correct all the O₂ profiles before the “drift date”
 - ▶ Assign NA in the column of OXYGEN_ADJUSTED after the “drift date”



2. Data Status

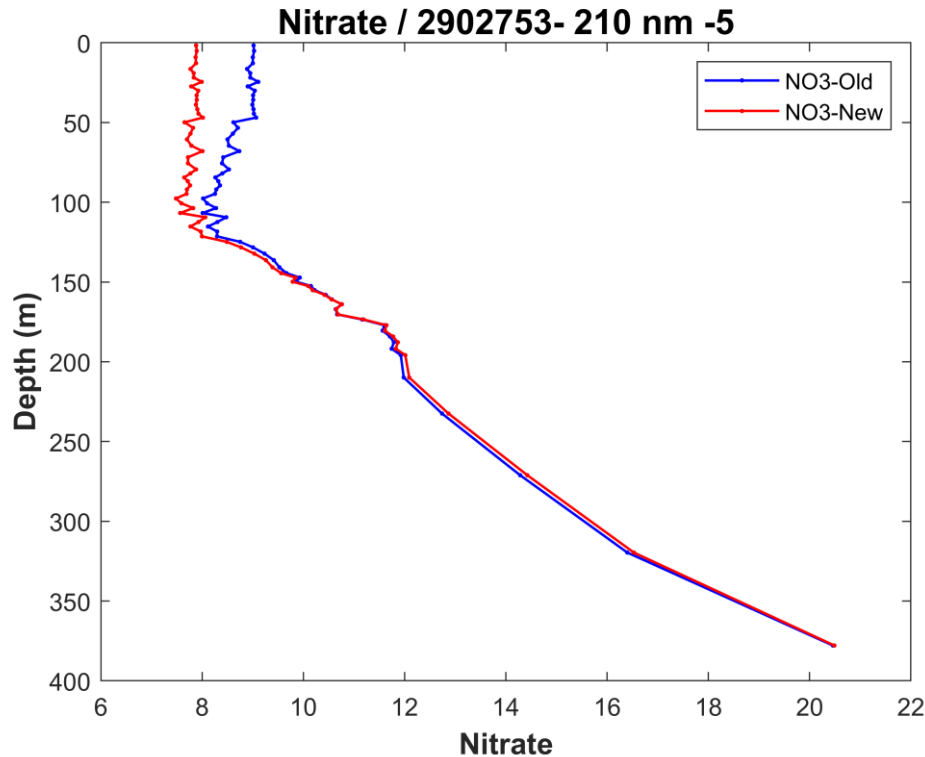


Abnormal
increase at sea
surface



2. Data Status

► 2) NO₃ issue observed by two 6-variable floats

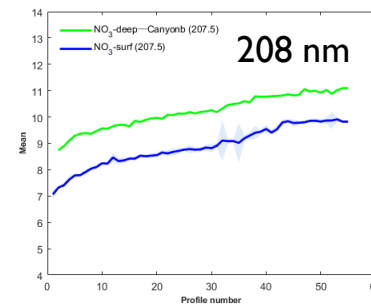
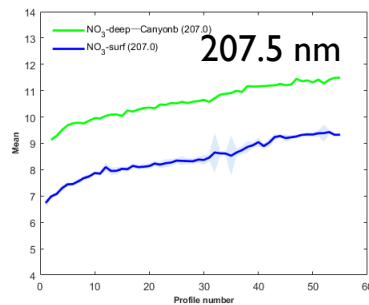
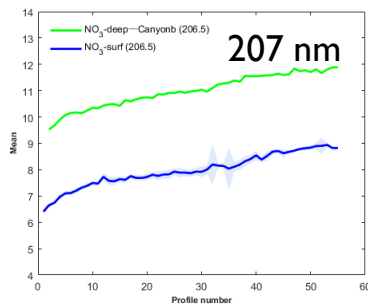


Abnormal
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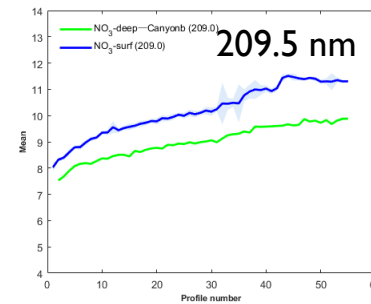
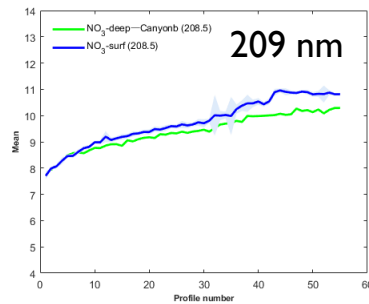
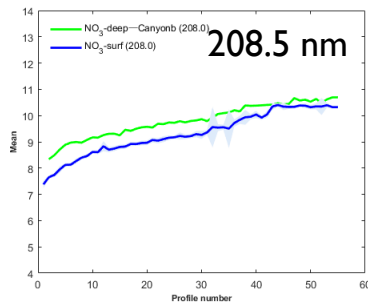
2. Data Status

► 2) NO_3 issue observed by two 6-variable floats

2902753



NO₃surface
NO₃deep – CanyonB

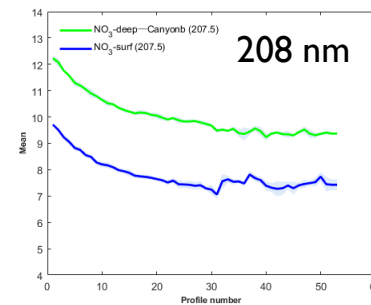
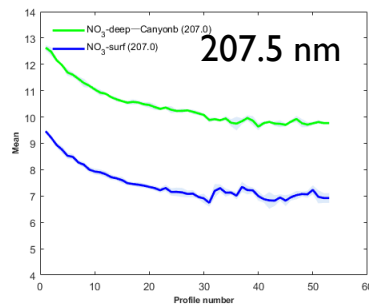
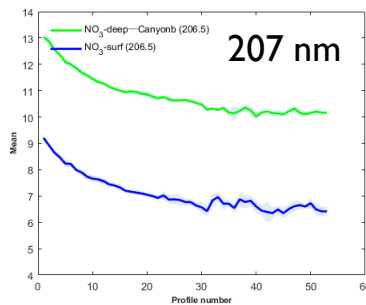


Tuning the reference wavelength at 207 to 207.5 nm could solve the issue, but cannot balance the surface and deep values

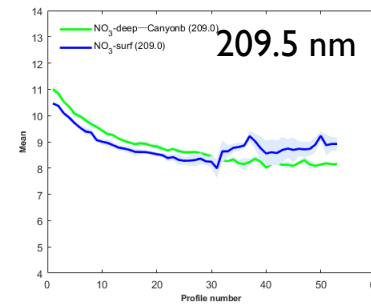
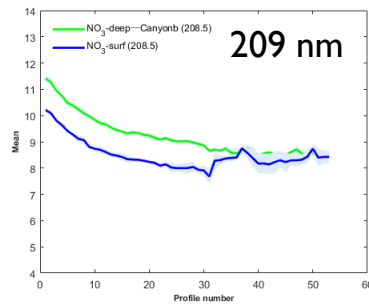
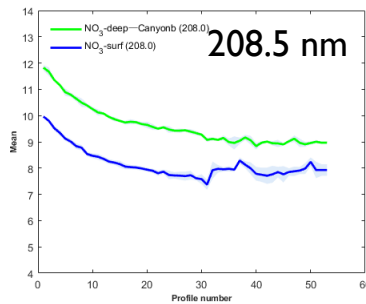
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2902756



$\text{NO}_{3\text{surface}}$
 $\text{NO}_{3\text{deep}} - \text{CanyonB}$



Tuning the
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2. Data Status

► 2) NO₃ issue observed by two 6-variable floats

$$WL = (\text{OPTICAL_WAVELENGTH_UV}(R) - \text{OPTICAL_WAVELENGTH_OFFSET})$$

OPTICAL_WAVELENGTH_OFFSET Can be tuned from 206 to 212 nm, with default of 210nm

Previous T-Correction Equation

$$F(R, T) = (A + B \cdot T) \cdot \exp[(C + D \cdot T) \cdot WL]$$

$$A = 1.1500276, B = 0.02840, C = -0.3101349, D = 0.001222$$

$$E_SWA_INSITU(R) = E_SWA_NITRATE(R) \cdot F(R, TEMP) / F(R, TEMP_CAL_NITRATE)$$

New T-Correction Equation

$$G(R) = (0.00000551649 \cdot WL^3 - 0.000343511 \cdot WL^2 + 0.00531286 \cdot WL + 0.0021161)$$

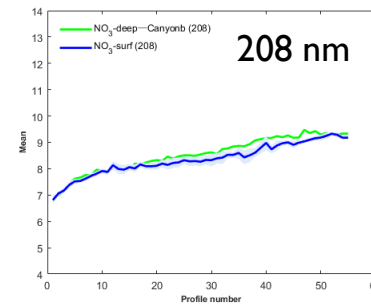
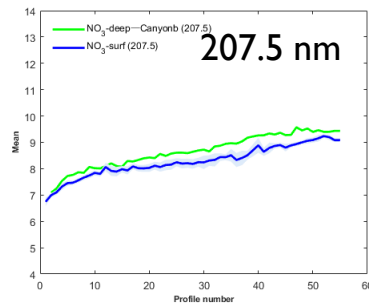
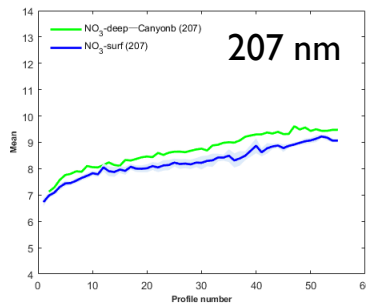
$$E_SWA_INSITU(R) = E_SWA_NITRATE(R) \cdot \exp[G(R) \cdot (TEMP - TEMP_CAL_NITRATE)]$$



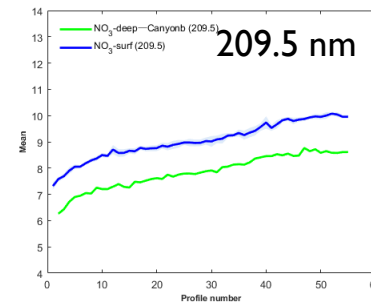
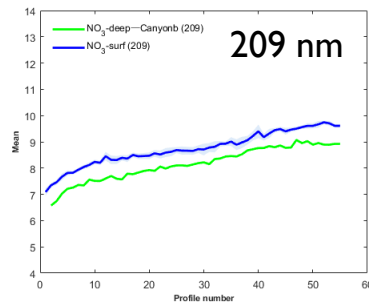
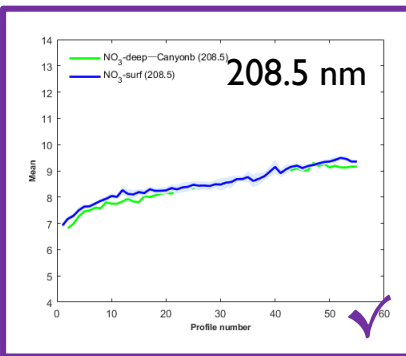
2. Data Status

► 2) NO_3 issue observed by two 6-variable floats

2902753



$\text{NO}_{3\text{surface}}$
 $\text{NO}_{3\text{deep}} - \text{CanyonB}$

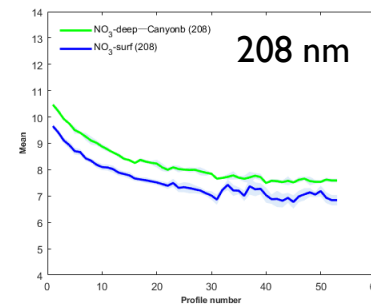
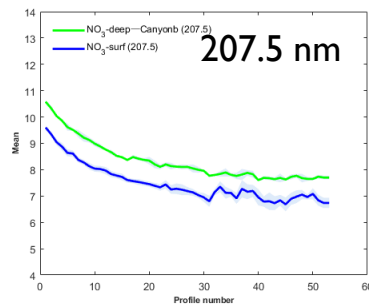
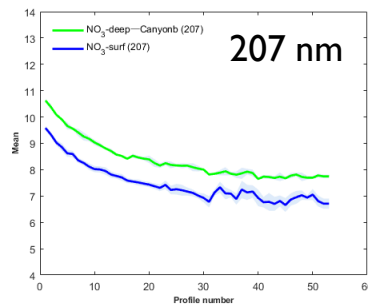


The Issue is
right now the
difference of
 $\text{NO}_{3\text{deep}}$ and
CanyonB is
neither constant
nor linear with
time/profile

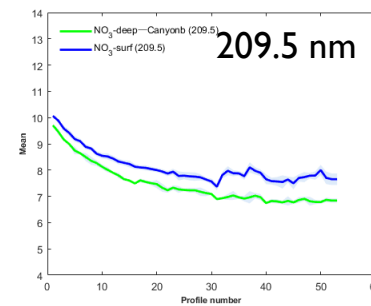
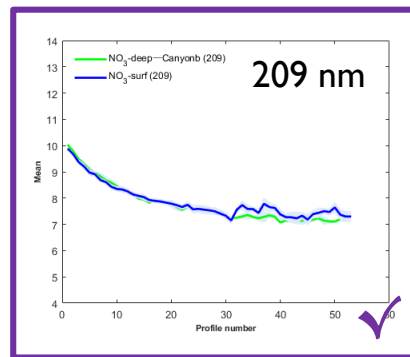
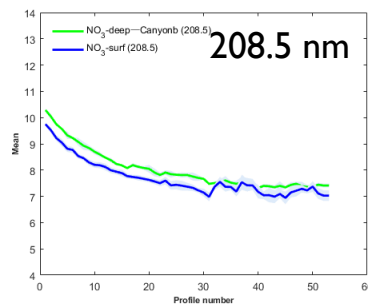
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► 2) NO_3 issue observed by two 6-variable floats

2902756



NO₃surface
NO₃deep – CanyonB

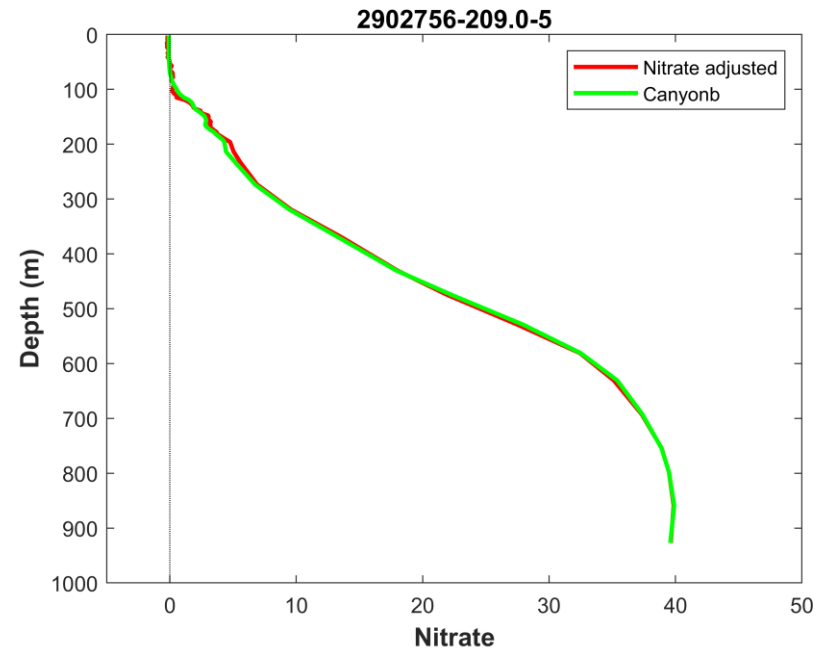
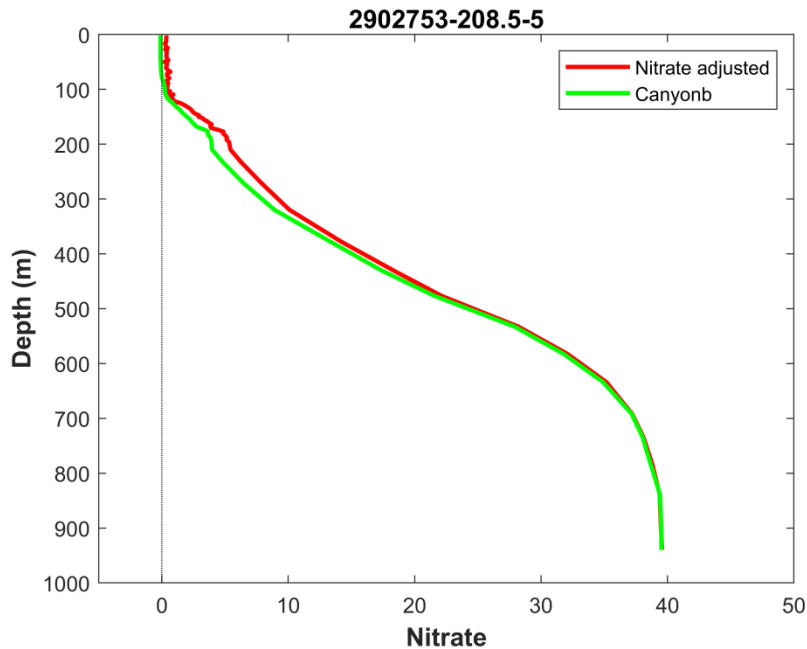


The Issue is
right now the
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2. Data Status

► 2) NO_3 issue observed by two 6-variable floats

Now, Offset is determined profile by profile



2. Data Status

- ▶ 2) NO₃ issue observed by two 6-variable floats
 - ▶ Previous T-Correction does not work well
 - ▶ New T-Correction works, but the reference wavelength still needs to be adjusted (from 206 to 212 nm)
 - ▶ The Offset is neither constant nor linear with time/profile, now we use CanyonB-based Offset profile by profile.
 - ▶ Next we will apply the BIC criteria to find the best fit with linear regression.

2. Data Status

- ▶ 3) In the next year:
 - ▶ Increasing the percentage of DMQC, especially on O_2 , NO_3 and pH

