Nitrate on PROVOR CTS4 Adjustment and RTQC

SCHMECHTIG C., PASQUERON DE FOMMERVAULT O., SERRA R., POTEAU A., CLAUSTRE H., D'ORTENZIO F.

Two Cases

NITRATE CONCENTRATION PROVIDED

1. RT_QC ON NITRATE:

Range Test, Spike Test

2. ADJUSTMENT ON WOA => NITRATE_ADJUSTED

3. RT_QC ON NITRATE_ADJUSTED

Range Test, Spike test

ABSORPTION SPECTRUM

1. Computation of NITRATE

2. RT_QC on NITRATE

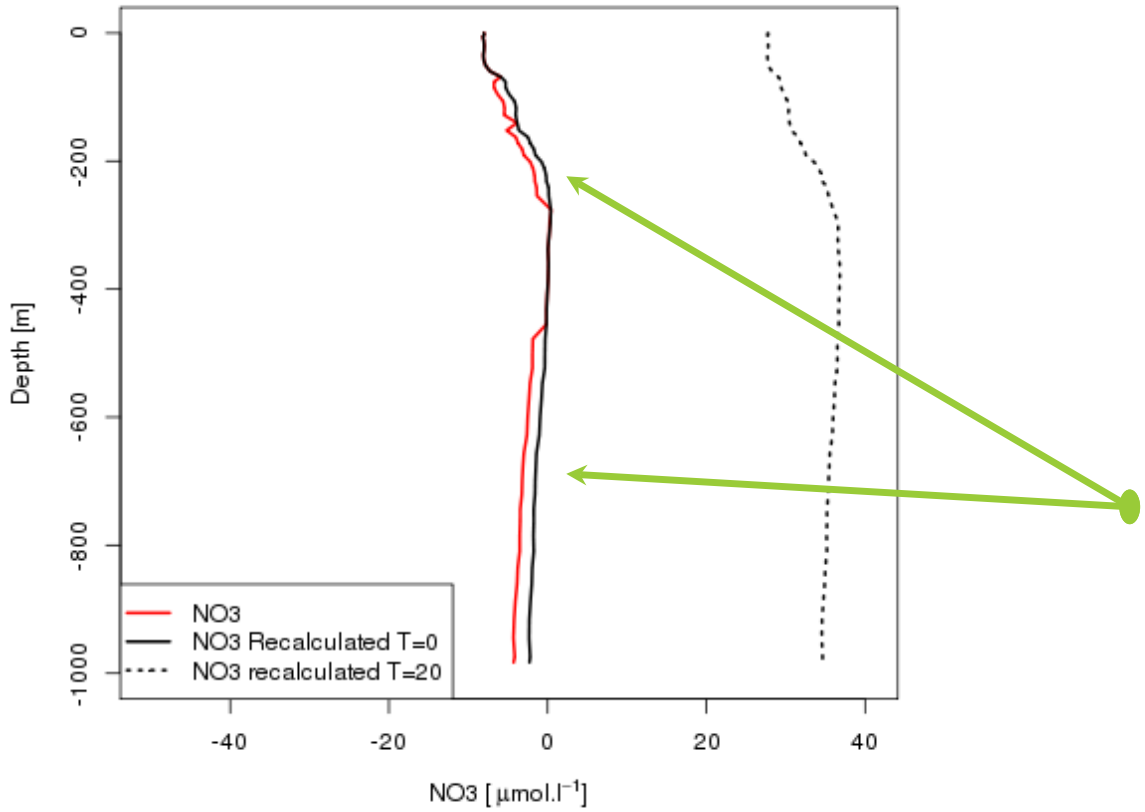
Range Test, Spike Test, Absorbance at 240nm, RMS

3. ADJUSTMENT ON vertical offset, pressure effect and on WOA

4. RT_QC ON NITRATE_ADJUSTED

Range Test, Spike Test, Absorbance at 240nm, RMS

Why it is worth to transmit the whole spectrum ?



Example FLOAT 6901600, lovbio073b
Profile 5

-Calibration file issue on board

The Suna is unable to find the TCAL value (Calibration temperature) => Tcal=0

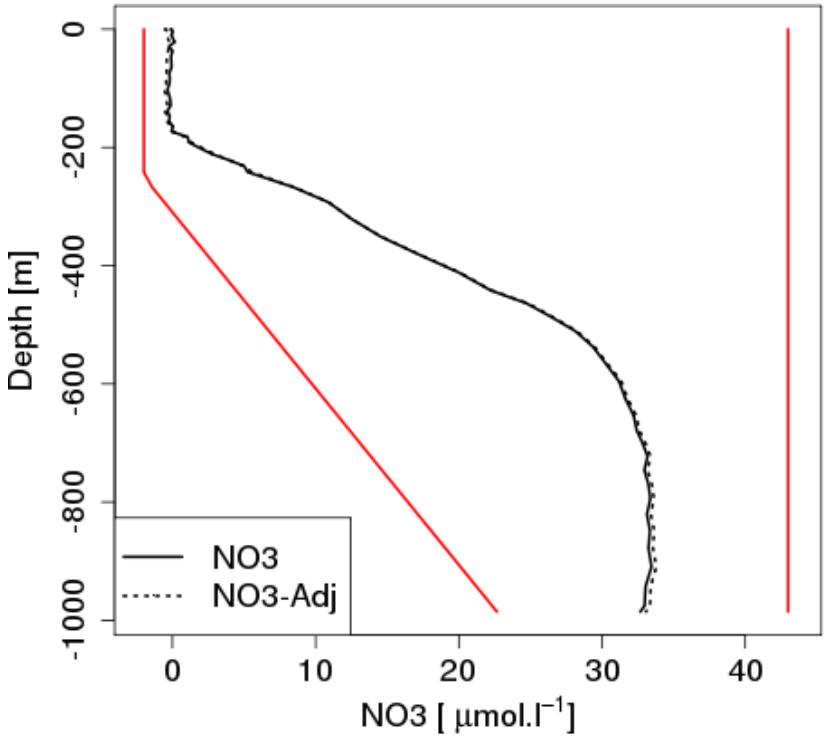
-Saturation

WOA NO3 Climatology

- ✓ Reference at 1000m
- ✓ Interpolation ? Krigging ? Closest neighbour ?

Range test

Float 6901032, in Atlantic Ocean



RangeMin=min(Clim.(1-std),max(-2,(Clim.(1-std)+2)/(1000-250).(P-250)-2))

RangeMax=Clim.(1+std)

- ✓ std=0.3
- ✓ Range min design to match profil shape

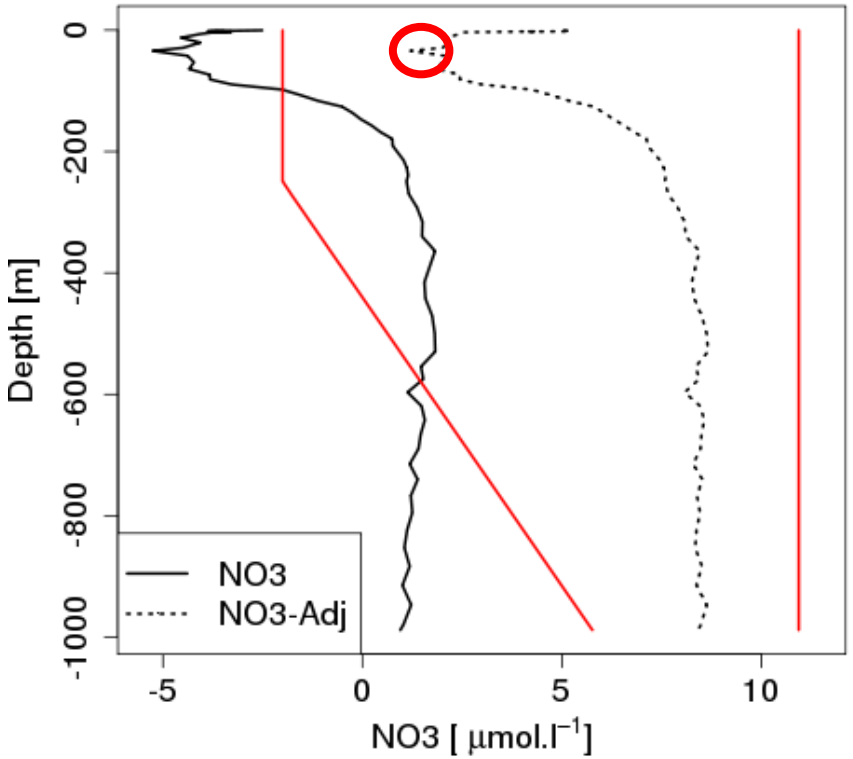
If NITRATE > RangeMax or NITRATE < RangeMin => NITRATE_QC=4

If NITRATE_ADJUSTED > RangeMax or NITRATE_ADJUSTED < RangeMin => NITRATE_ADJUSTED_QC=4

Spike test

Test value = | V2 − (V3 + V1)/2 | − | (V3 − V1) / 2 |

Float 6901490, in Tyrrhenian sea



At depth i,

V1=NITRATE[i-1], V2=NITRATE[i], V3=NITRATE[i+1]

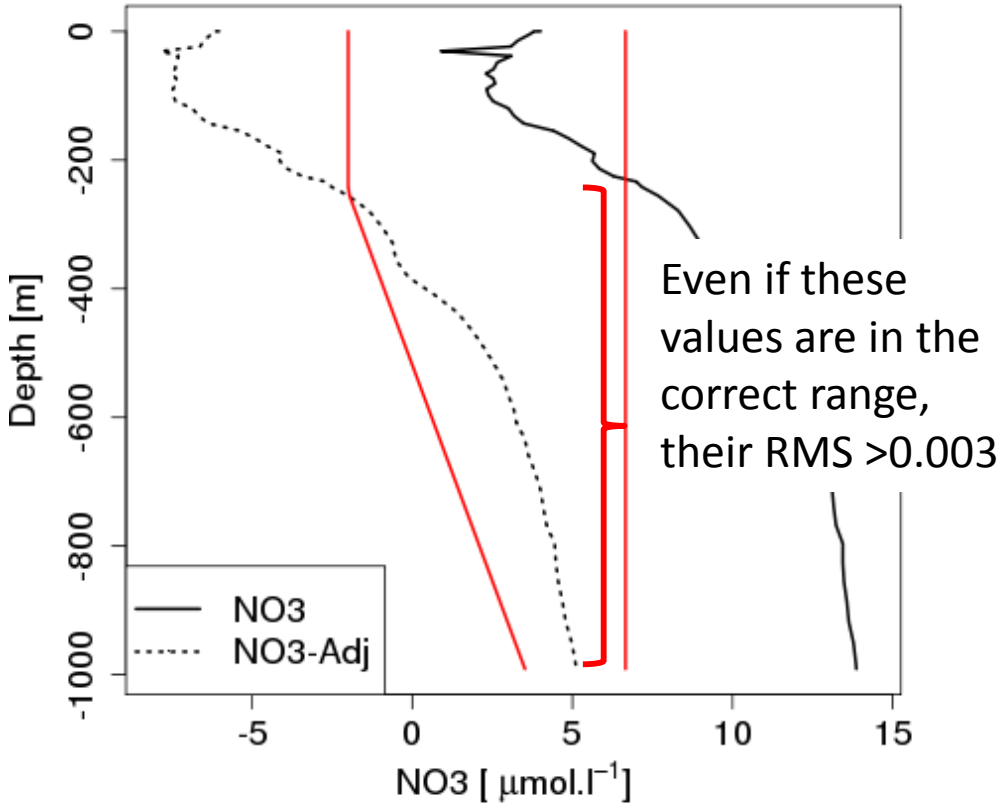
If Test Value > 0.5 => NITRATE_QC=4

At depth i,

V1=NITRATE_ADJUSTED[i-1], V2=NITRATE_ADJUSTED[i], V3=NITRATE_ADJUSTED[i+1]

If Test Value > 0.5 => NITRATE_QC=4

RMS Test



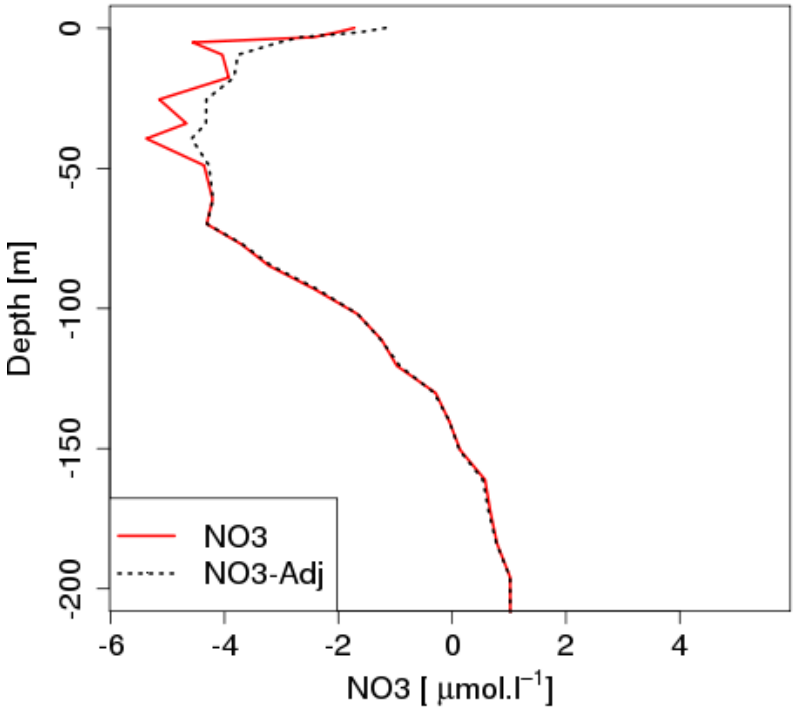
The root mean square error of the residuals of the predicted absorbance spectrum from the measured spectrum over the range 217-240nm is also used as QC.

If RMS(NITRATE) > 0.003 => NITRATE_QC=4

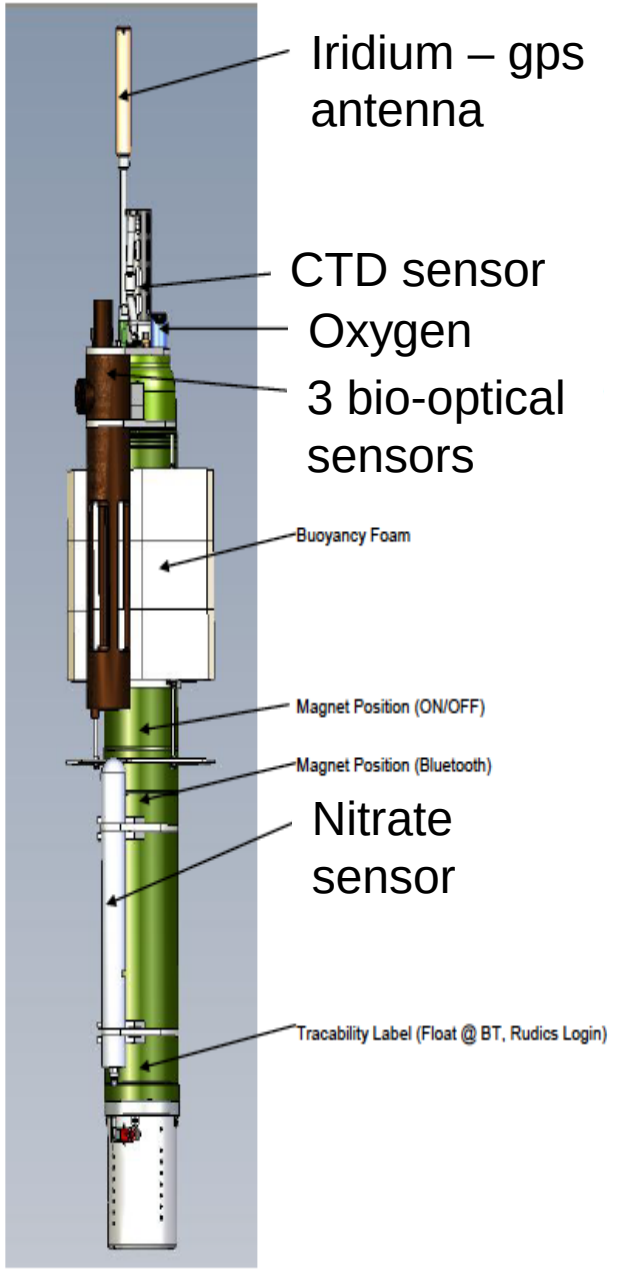
If RMS(NITRATE_ADJUSTED) > 0.003 => NITRATE_ADJUSTED_QC=4

Vertical pressure offset

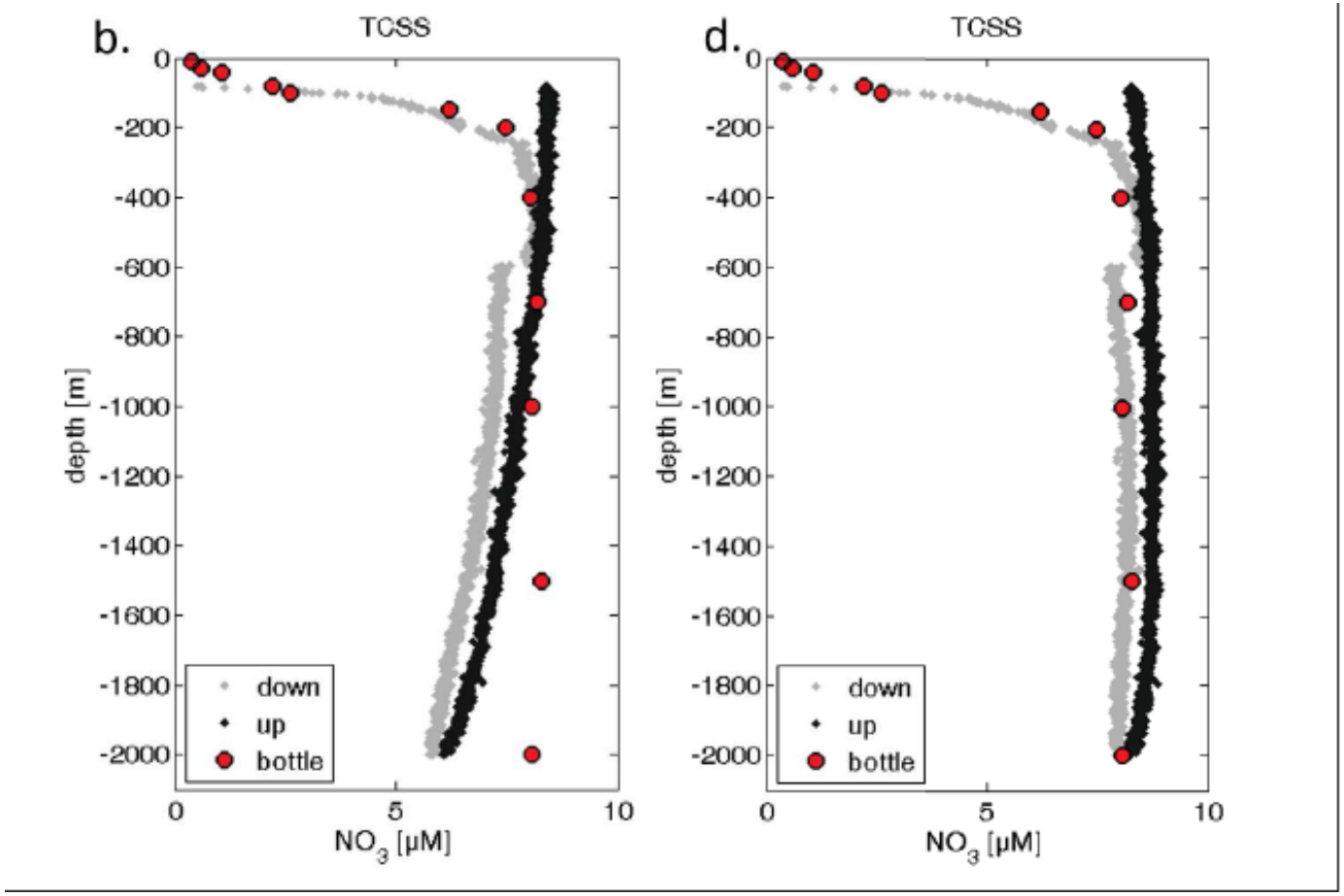
Float 6901490, in Tyrrhenian sea



1.5m



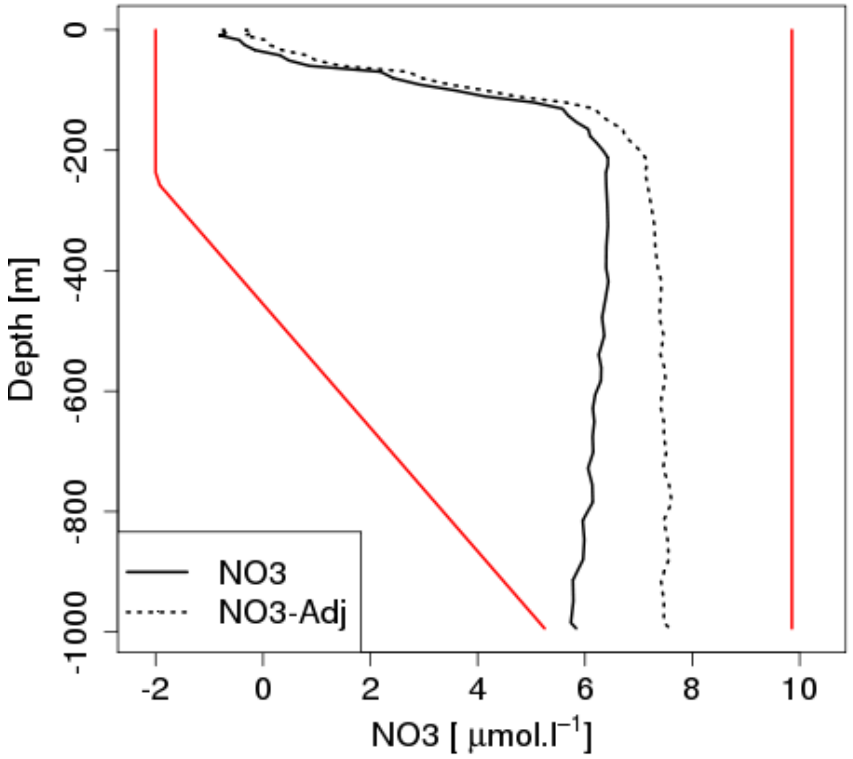
Pressure adjustment (1)



- ✓ During down cast, the bottle was open
- ✓ At 2000m-depth the bottle was closed
- ✓ During up cast, SUNA sample the same water mass
  - => Same temperature, salinity and nitrate concentrations
  - => The internal temperature was stabilized
  - => Pressure is the only variable parameter

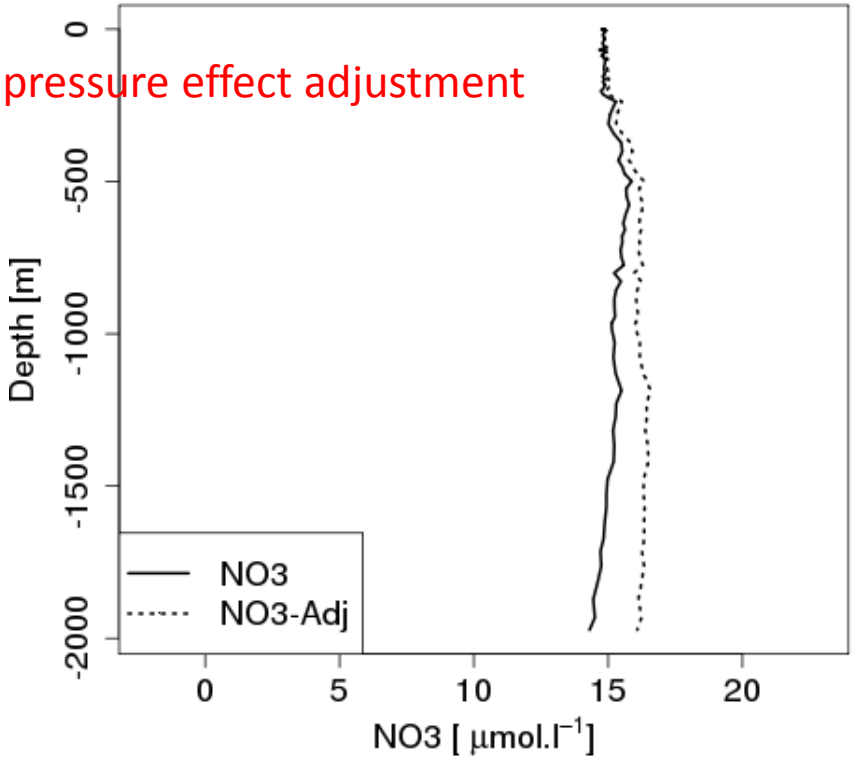
Pressure adjustment (2)

Float 6901032, in mediterranean sea



Float 6901485, in Atlantic ocean

Only pressure effect adjustment



Opened « operationnal » questions

- What should we do with NITRATE, NiTRATE adjusted, NITRATE recomputed, NITRATE recomputed and adjusted ?

- Do we consider that the pressure adjustment and the adjustment to account for the distance between CTD and SUNA are « adjustment » or « computation » ?

- How often do we compare with climatology at 1000m and how exactly? Closest neighbours, krigging, and if the profile don’t go to 1000m?

- How do we set up a test on saturation ?