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06/2014 – EMODnet Chemistry

Atlantic area

Quality checks of nutrients data

EMODnet Chemistry – Atlantic area

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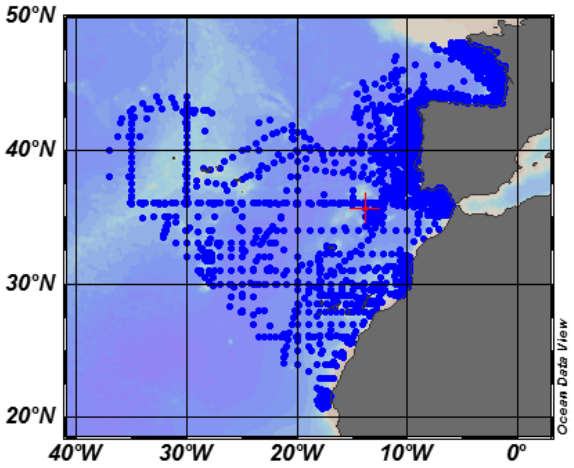
Content

1. Introduction

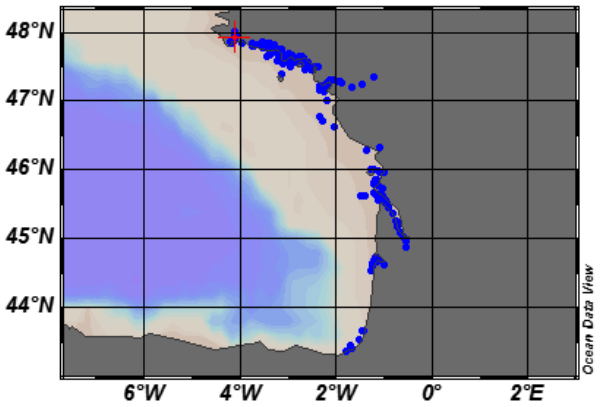
1.1 1st dataset: collected by MARIS Robot

The EMODnet dataset for the nutrients in the Atlantic regions contains

- 8489 CDIs of vertical profiles, with the following location:



- 268 CDIs of time series with the following location:



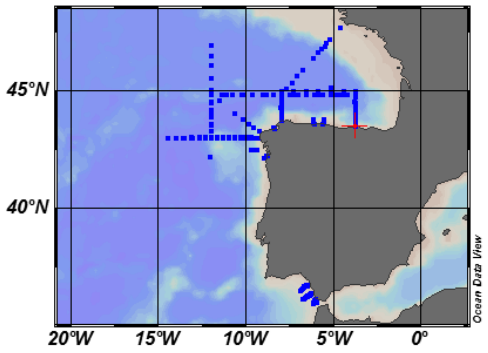
The CDIs are distributed by the following data centres:

EDMO Code	Name	Country	Nb of CDIs
353	IEO	Spain	2738
486	IFREMER	France	2358
590	IHPT	Portugal	1143
612	IMR	Norway	11
681	RIHMI	Russian Federation	2507

1.2 2nd dataset: Spanish dataset

At the time when the MARIS robot proceeds for the aggregation of EMODNet dataset, some Spanish data were not distributed at ODV format (the format was missing in the CDI description).
So we start the work with Spanish data missing, these data were sent later on as an additional Spanish dataset. The datasets have been quality checked separately and then merged, except for Nitrates and Nitrites (Spanish data delivered before we started the QCs).

This dataset contains 2780 stations (all with vertical profiles) located as follow:



2. QC of Ammonium data

2.1 1st Dataset

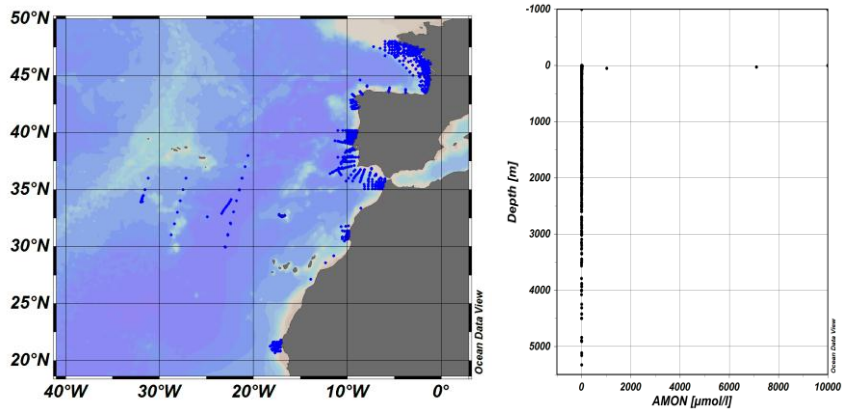
2.1.1 Description

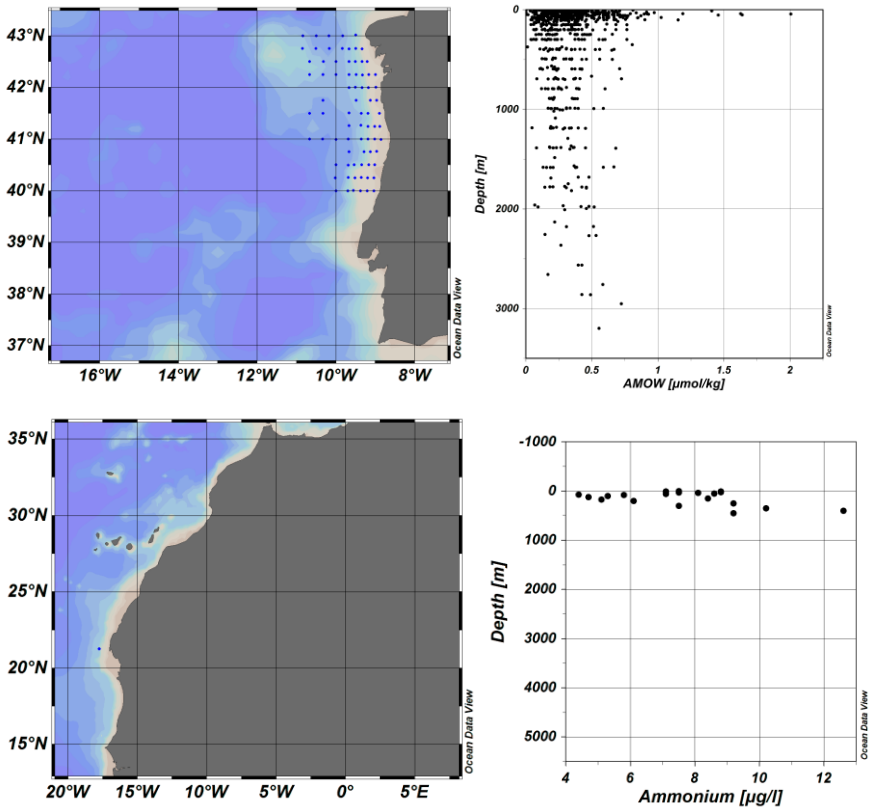
The dataset contains the following parameters related to ammonium:

Table 1- Ammonium parameters in the dataset

Parameter	Nb stations	Nb measurements
AMON [µmol/l]	4211	20783
AMOW [µmol/kg]	77	783
Ammonium [µg/l]	1	20
Total	**4289**	**21586**

Figure 1 – maps and plots (Ammonium/Depth) of all stations with ammonium parameters





2.1.2 Unit conversion and aggregation

For the product, only one unit is kept (µmol/l], the following conversions are applied:

Table 2: unit conversion for Ammonium parameters

AMON	µmol/l	AMONZZXX	NH4 unknown phase	none	NH4 in µmol/l
AMOW	µmol/kg	MDMAP004	NH4 unknown phase	Any […/kg]>>Any […/l]	NH4 in µmol/l
Ammonium	µg/l	AMONZZXX	NH4 unknown phase	*value/14.00670 (assuming it is µg N/l)*	NH4 in µmol/l

Conversion of ammonium in µg/l in ammonium in µmol/l:
View > Derived variables > Expressions, Derivatives, Integrals > Expression :
Label: Ammonium. Units: µmol/l
Expression in Postfix Notation: 0,0713944041066061 #1 *
NB: 1/14.00670= 0,0713944041066061

Export and Aggregation of AMON(µmol/l), AMOW (µmol/kg), Ammonium(µmol/l):
Export: Creation of a new collection:
Export > Station data > ODV Spreadsheet file, in .txt, select variables: AMON, AMOW, Ammonium[µmol/l].
Aggregation:
View > Derived variables > Special > Aggregated Variable
Select: AMON [µmol/l], AMOW[µmol/kg] and drvd: Ammonium[µmol/l]. For AMOW, make the conversion: Any […/kg]>>Any […/l].

2.1.3 Data quality

Put QF Seadatanet:
Collection > Properties > Data Variables > AMON-aggr > edit > QF scheme = SEADATANET
Total of stations: 4289.
21635 ammonium measurements (20832 of AMON [µmol/l], 783 of AMOW [µmol/kg]], 20 of Ammonium[µmol/l]).

Table 3: Flag value for ammonium parameters and number of corresponding measurements.

Flag value	AMON [µmol/l]	AMOW [µmol/kg]	Ammonium [µg/l]	Aggregated AMON [µmol/l]
0 (No QC)	2031	0	0	2031
1 (Good)	16024	783	20	16827
3 (Probably bad)	73	0	0	73
4 (Bad)	482	0	0	482
6 (Below detection)	2222	0	0	
Total	**20832**	**783**	**20**	**21635**

Some measurements are deleted from the dataset because their depth values were negative. (change QC flag: 1 --> 4) or values seem too high (change QC Flag: 1-->3).

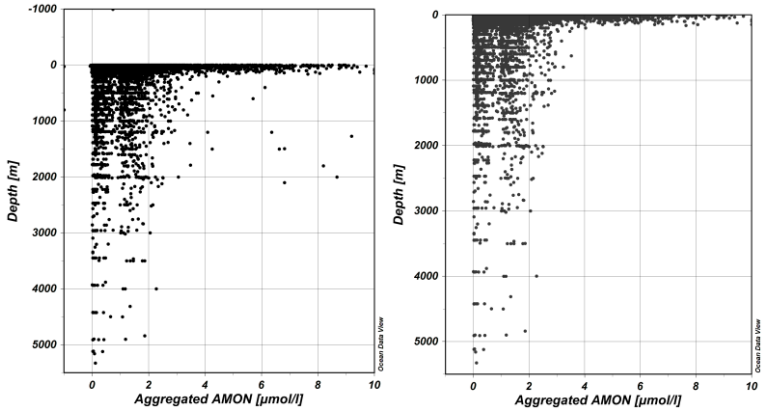


Figure 2: Aggregated ammonium parameters before QC (left) and after QC (right) for QF = 1 (SDN QF)

Table 4: Ammonium Flag changes during QC step

EDMO code	Cruise	LOCAL_CDI_ID	Depth [m]	Original flag for Ammonium	Changed to
353	BREOGAN 0684	SI2919840601600250_353_H09	2	0	1
	RADSAN 2005	SI2920050070507A80_353_H09	693.2	1	3
			890.1	1	3
	CANIGO 0997 - LEG2	SI2919970901101700_353_H09	467.1	1	3
486	ARCADINO	FI35200841004_00024_H09	1	1	4
			15.9	1	4
		FI35200941012_00062_H09	-999	1	4
		FI35200948015_00042_H09	1	1	4
		FI35200948015_00043_H09	1	1	4
		FI35200941004_00044_H09	17.9	1	4
			128.9	1	4
		FI35200941004_00052_H09	59.5	1	4
	CINECA 4 CH41	All stations (73000711)	all	0	1
	CINECA V	All stations (74001311)	all	0	1
	CINECA V CAP 7403	All stations (74002111)	all	0	1
	GIBRALTAR 75	All stations (75002211)	all	0	1
590	PTEUSTRAT11	PTEUSTRAT11_Nut_029.0_H09	2100	1	3
	IHTP2006-HERMES03	IHPT2006-HERMES03_Nut_020.0_H09	1400	1	3
		IHPT2006-HERMES03_Nut_022.0_H09	2000	1	3
			1800	1	3
			1500	1	3
		IHPT2006-HERMES03_Nut_023.0_H09	1500	1	3
		IHPT2006-HERMES03_Nut_024.0_H09	1270	1	3
			400	1	3
		IHPT2006-HERMES03_Nut_067.0_H09	100	0	4
			552	1	3
		IHPT2006-HERMES03_Nut_110.0_H09	600	0	4

	800	0	4
	1494	1	3
IHPT2006-HERMES03_Nut_116.0_H09	1200	1	3
	5	0	4
	300	0	4
	500	0	4
	1830	0	4
IHPT2006-HERMES03_Nut_124.0_H09	1200	1	3
	100	0	4
	200	0	4
	600	0	4
	1000	0	4
	2329	0	4
	2000	1	3
IHPT2006-HERMES03_Nut_139.0_H09	500	1	3
IHPT2006-HERMES03_Nut_140.0_H09	1787	1	3
	1787	3	1
	1787	1	3
IHPT2006-HERMES03_Nut_141.0_H09	600	1	4
	400	0	4
	500	0	4
	600	4	3

Table 5: Number of measurements of aggregated ammonium per QF, before and after QC

Flag value	Aggregated AMON before QC	Aggregated AMON after QC
0 (No QC)	2031	0
1 (Good)	16827	18824
3 (Probably bad)	73	96
4 (Bad)	482	507
6 (value bellow detection)	2222	2208
Total	**21635**	**21635**

2.2 Additional Spanish dataset

2.2.1 Description

The dataset contains one parameter related to ammonium:

Table 6- Ammonium parameter in the dataset

Parameter	Nb stations	Nb measurements
AMON [µmol/l]	1044	6728

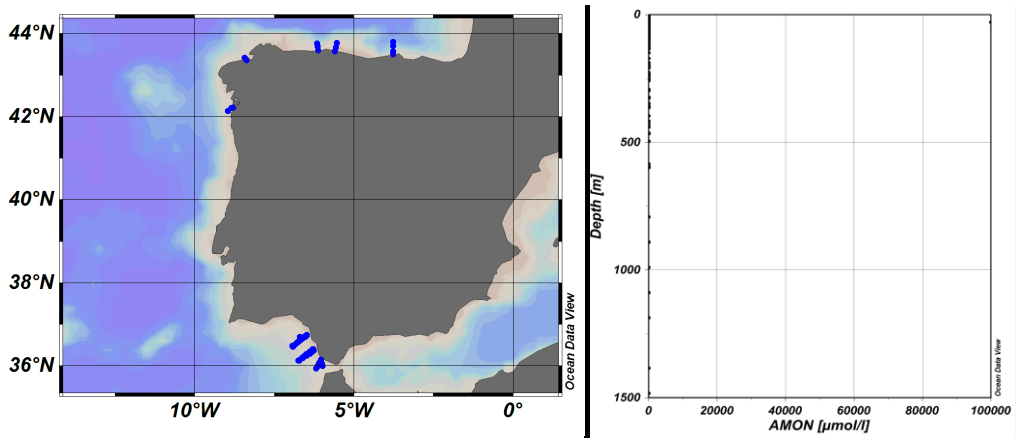


Figure 3 – map and plot (Ammonium/Depth) of all stations with ammonium

This dataset is homogeneous, and there is no need of conversion and aggregation.

2.2.2 Data quality

No change have been done on the Quality flags

Table 7: Number of measurements per QF before and after QC

Flag value	AMON: before and after QC [µmol/l]
1 (Good)	6724
3 (Probably bad)	2
4 (Bad)	2
Total	**6728**

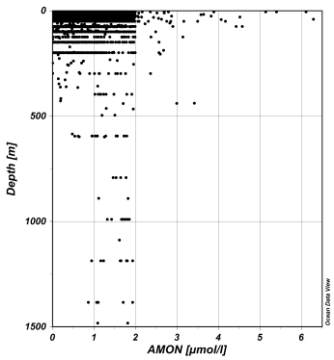


Figure 4: Ammonium of additional data for QF = 1 (SDN QF)

2.3 Total collection of Ammonium

Creation of a new collection with Depth, Aggregated AMON and AMON in µmol/l.
Import of the ODV spreadsheets created during previous steps into this new collection:
AGGREGATED_AMMONIUM_set1.txt
AMMONIUM_set2.txt

Last checks on data quality :
Deletions of some data lines for:

- Lines with no ammonium date (QC flags = 9), except for the first level line.
- Duplicates lines added when importing the Spanish dataset .

- All lines with negative depth.

QC flags=4 on depth were already existing in the file ; the corresponding ammonium data are also flagged to 4:

Table 8: Change on Ammonium QC flags linked to QC depth=4

EDMO code	Cruise	LOCAL_CDI_ID	Depth [m]	Original flag for Ammonium	Changed to
353	RADIAL GIJON 2001	SI2920010301200410_353_H09	148.7	1	4
			198.3	1	4
	RADIAL GIJON 2001	SI2920010301200430_353_H09	148.7	1	4
			198.3	1	4
	RADIAL GIJON 2001	SI2920010301200440_353_H09	148.7	1	4
			198.3	1	4
	RADIAL GIJON 2003	SI2920030311603A10_353_H0	173.5	1	4
	STOCA 0310	29CS20100304S00P20_353_H09 (station deleted: all lines with wrong depth)	5	1	4
	STOCA 1110	29CS20101106S0GD40_353_H09	124	1	4
		29CS20101106S0SP40_353_H09	124	1	4
		29CS20101106S0TF30_353_H09	111.2	1	4
486	ECOLOIRE	FI35199905009_0S020_H09	19.8	1	3
		FI35199905009_0S090_H09	15.9	1	3

New final collection: 4 994 stations with 25 946 Ammonium measurements

Final dataset is *data_from_AMON_final.txt* (corresponding to the collection *AMON_final.odv*)

Figure 5: Map and plot of final ammonium data (Flag 1)

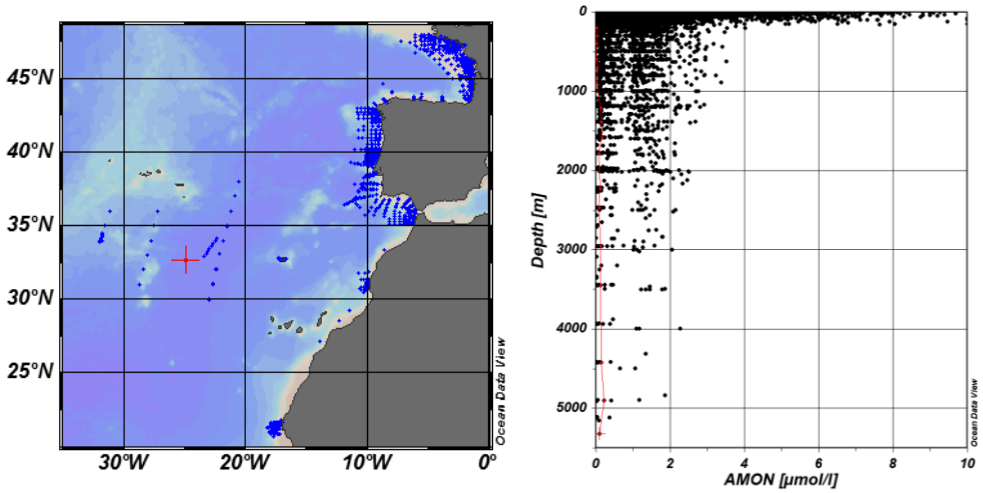
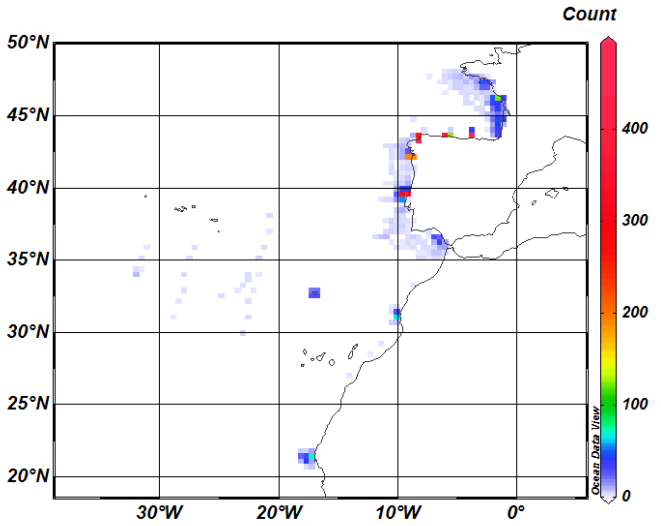


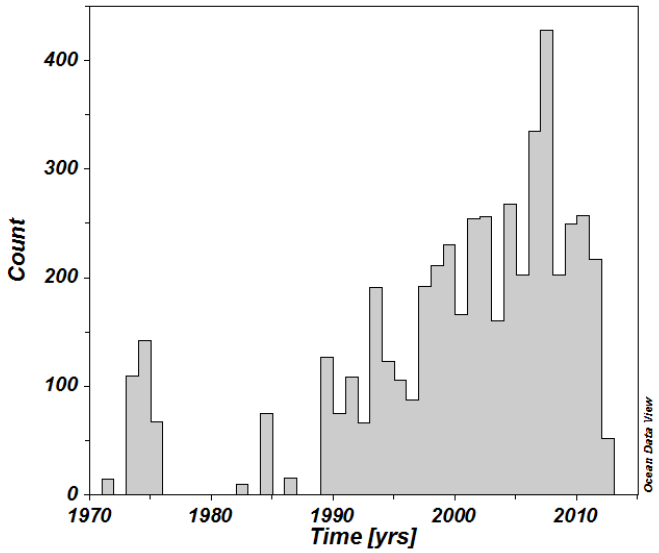
Table 9: Final QC flags of Ammonium dataset

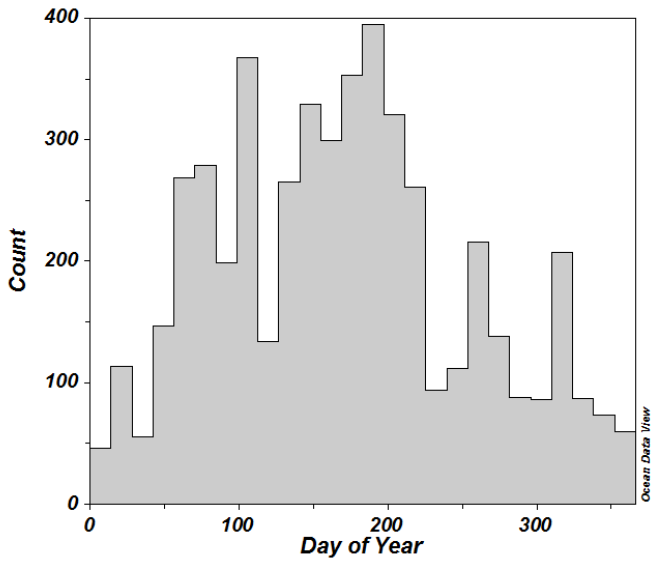
Flag value	Ammonium [µmol/l]
0 (No quality control)	0
1 (Good)	23 119
3 (Probably bad)	97
4 (Bad)	507
6 (value below detection)	2 223
Total	**25 946**

Statistics on the final Ammonium collection:

Figure 6 - Distribution of the Ammonium data (by location, by Time period and by Season)







3. QC of Silicate data

3.1 1st dataset

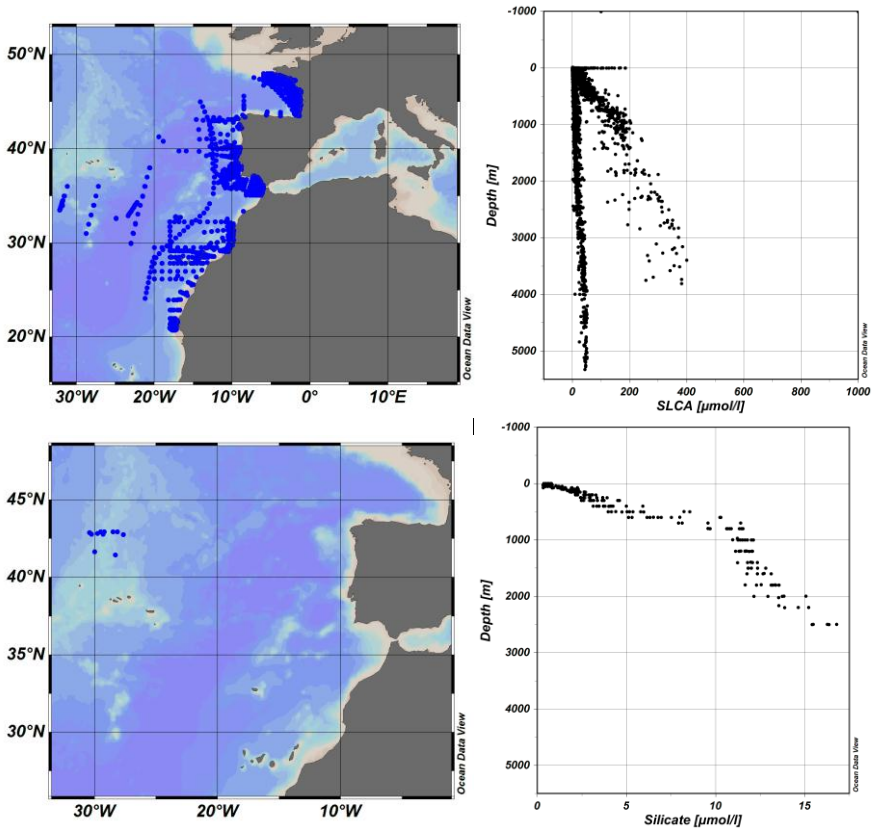
3.1.1 Description

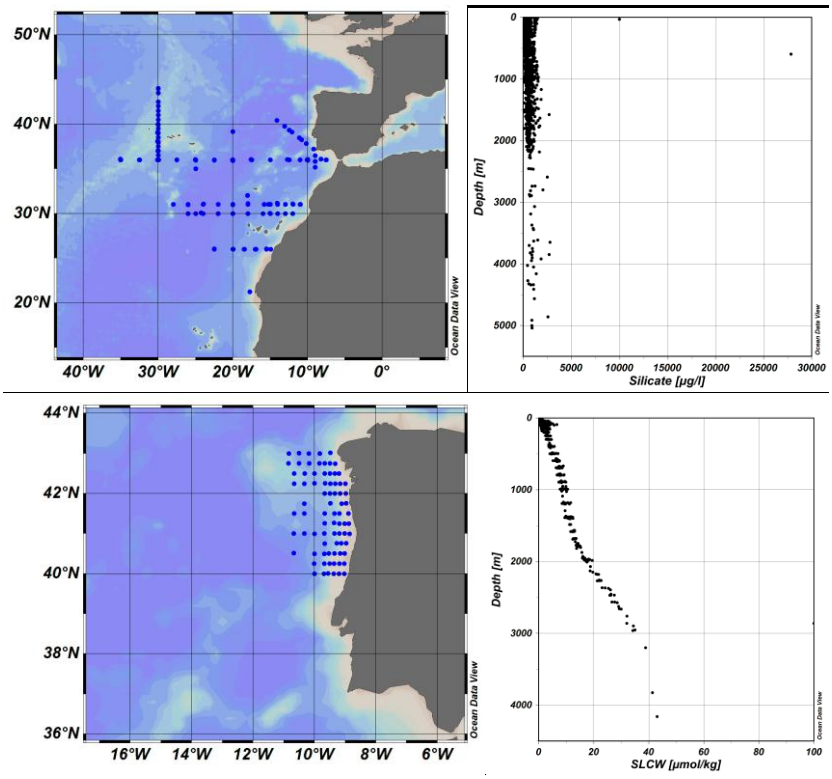
The dataset contains the following parameters related to silicate:

Table 10 -Silicate parameters in the dataset

Parameters	Nb stations	Nb measurements
SLCA [µmol/l]	4994	30665
Silicate [µmol/l]	11	249
Silicate [µg/l]	338	3932
SLCW [µmol/kg]	78	992
Total	**5 421**	**35 838**

Figure 7 – maps and plots (Silicate/Depth) of all stations with silicate parameters





3.1.2 Unit conversion and aggregation

For the product, only one unit is kept (µmol/l], the following conversions are applied:

Table 11: unit conversions for silicate parameters

SLCA	µmol/l	SLCAZZXX	SiO4 unknown phase	no	SiO4 in µmol/l
Silicate	µmol/l	SLCAZZXX	SiO4 unknown phase	no	SiO4 in µmol/l
Silicate	µg/l	SLCAZZXX	SiO4 unknown phase	*value/28.08550 (assuming it is µg Si/l)*	SiO4 in µmol/l
SLCW	µmol/kg	MDMAP012	SiO4 unknown phase	Any […/kg]>>Any […/l]	SiO4 in µmol/l

Conversion of silicate in µg/l in silicate in µmol/l:
View > Derived variables > Expressions, Derivatives, Integrals > Expression :
Label: Ammonium. Units: µmol/l
Expression in Postfix Notation: 0.0356055615887202 #1 *
NB: 1/28.08550= 0.0356055615887202

Export and Aggregation of SLCA (µmol/l), Silicate(µmol/l), Silicate(µmol/l), SLCW(µmol/kg):
Export: Creation of a new collection
Export > Station data > ODV Spreadsheet file, in .txt, select variables: SLCA, Silicate(µmol/l), drvd: Silicate(µmol/l), SLCW.
Aggregation:
View > Derived variables > Special > Aggregated Variable
Select: SLCA [µmol/l], Silicate [µmol/l], SLCW [µmol/kg], Silicate [µmol/l]. For SLCW [µmol/kg], select the conversion Any […/kg] >> Any […/l].
Export a new collection (AGGREGATED-SILICATE) with all silicates (non aggregated and aggregated).

3.1.3 Data quality

Put QF Seadatanet:
Collection > Properties > Data Variables > Aggregated SLCA> edit > QF scheme = SEADATANET

Total of 5421 stations and 35838 silicate measurements.

Table 12: Flag value for silicate parameters and number of measurements associated before QC

Flag value	SLCA [µmol/l]	Silicate [µmol/l]	SLCW [µmol/kg]	Silicate [µg/l]	Aggregated SLCA [µmol/l]
0 (No QC)	22	0	0	1	70
1 (Good)	29370	249	988	3931	34538
3 (Probably bad)	72	0	0	0	72
4 (Bad)	1154	0	4	0	1158
6 (Below detection)	46	0	0	0	0
Total	**30664**	**249**	**992**	**3932**	**35838**

Table 13: Silicate Flag changes during QC step

EDMO code	Cruise	Local_CDI_ID	Flag changed: Depth [m] = {depth1:original flag1 depth2:original flag2} -> new flag
353	RADCOR2001	SI292001004470002a_353_H09	Depth [m] = {69.4:0} -> 1
		SI29200100447003c9_353_H09	Depth [m] = {37.7:0} -> 1
		SI29200100447003c4_353_H09	Depth [m] = {14.9:0 19.8:0 29.8:0} -> 1
		SI292001004470004a_353_H09	Depth [m] = {0:0 6:0 11.9:0} -> 1
		SI2920010044700046_353_H09	Depth [m] = {17.9:0} -> 1
		SI2920010044700047_353_H09	Depth [m] = {11.9:0 17.9:0} -> 1
		SI2920010044700048_353_H09	Depth [m] = {17.9:0} -> 1
	RADVIGO97	SI291997004300015b_353_H09	Depth [m] = {5:0} -> 4
		SI291997004300015b_353_H09	Depth [m] = {5:4} -> 0
		SI291997004300015b_353_H09	Depth [m] = {5:0} -> 3
	RADVIGO96	SI291996004290003c_353_H09	Depth [m] = {29.8:0} -> 1
	MORENA 0593	SI2919930040900800_353_H09	Depth [m]={2861:1} -> 3
	RADPROF 0706	29CS200607120_00120_H09	Depth [m] = {0:1} -> 3
		29CS200607120_00170_H09	Depth [m] = {696.3:0 792.6:0} -> 4
		29CS200607120_00560_H09	Depth [m] = {3631.5:1} -> 3
		29CS200607120_01560_H09	Depth [m] = {2463.1:1} -> 3
		29CS200607120_01830_H09	Depth [m] = {4210.8:1} -> 3
	RADPROF 0208	29CS200802110_00070_H09	Depth [m] = {2:0} -> 4
		29CS200802110_00150_H09	Depth [m] = {1200.4:0 1201.4:0 1201.6:0} -> 4
		29CS200802110_00340_H09	Depth [m] = {2798.8:0 3299.5:0 3499.8:0 3601.2:0} -> 4
		29CS200802110_00350_H09	Depth [m] = {2299.3:0 2798.1:0 3298.2:0 3493.2:0 3688.9:0} -> 4
		29CS200802110_00360_H09	Depth [m] = {2299.7:0 2490.5:0 2997.8:0 3500.8:0 3701.2:0} -> 3
		29CS200802110_01070_H09	Depth [m] = {1196.3:0} -> 3
		29CS200802110_01100_H09	Depth [m] = {3498.7:0 3798.4:0 3997.5:0 4497.5:0 4996.9:0 5201.1:0} -> 4
		29CS200802110_01110_H09	Depth [m] = {3299.4:0 3497.8:0 3799.3:0 3997.7:0 4498.5:0 4997.6:0 5173.6:0} -> 4
		29CS200802110_01110_H09	Depth [m] = {3299.4:0 3497.8:0 3799.3:0 3997.7:0 4498.5:0 4997.6:0 5173.6:0} -> 4
		29CS200802110_01130_H09	Depth [m] = {1198.8:0 1299.2:0 2199.2:0 2798:0 3198.4:0 3696.7:0} -> 4
		29CS200802110_01200_H09	Depth [m] = {1200.9:0 1301.3:0 2798.5:0 3379.7:0} -> 4
		29CS200802110_01200_H09	Depth [m] = {2199.2:0} -> 4
	RADPROF0403	29CS200304090_00150_H09	Depth [m] = {1759.8:0} -> 4
		29CS200304090_00600_H09	Depth [m] = {1385:0} -> 4
		29CS200304090_00490_H09	Depth [m] = {1975.8:0} -> 4
		29CS200304090_00560_H09	Depth [m] = {2463.5:0 2954.7:0 3442.5:0 3847.9:0} -> 4
		29CS200304090_00110_H09	Depth [m] = {2464.6:0 2660.6:0 2862.2:0} -> 4
		29CS200304090_00480_H09	Depth [m] = {2465:0 2950.3:0 3928.7:0 4614.2:0} -> 4
		29CS200304090_00500_H09	Depth [m] = {2759.6:0 3343.3:0 3830.9:0 4565.2:0} -> 4
		29CS200304090_00330_H09	Depth [m] = {2951.8:0 3926.7:0} -> 4
		29CS200304090_00520_H09	Depth [m] = {2953.4:0 3927.4:0 4603:0} -> 4
		29CS200304090_00540_H09	Depth [m] = {2954.2:0 3929.9:0 4108.2:0} -> 4
		29CS200304090_00540_H09	Depth [m] = {2954.2:0 3929.9:0 4108.2:0} -> 4

		29CS200304090_00570_H09	Depth [m] = {2954.7:0 3143.8:0} -> 4
		29CS200304090_00340_H09	Depth [m] = {2955.4:0 3931.2:0 4418.3:0 4690.7:0} -> 4
		29CS200304090_00340_H09	Depth [m] = {2955.4:0 3931.2:0 4418.3:0 4690.7:0} -> 4
		29CS200304090_00360_H09	Depth [m] = {2955.5:0 3443.7:0 3897.1:0} -> 4
		29CS200304090_00220_H09	Depth [m] = {2955.5:0 3928.1:0 4417.2:0 4759.3:0} -> 4
		29CS200304090_00550_H09	Depth [m] = {2991.9:0 3489.7:0 3841.9:0} -> 4
		29CS200304090_00350_H09	Depth [m] = {3735.6:0 4369.6:0} -> 4
		29CS200304090_00230_H09	Depth [m] = {3929.6:0 4415.9:0 4719.5:0} -> 4
		29CS200304090_00200_H09	Depth [m] = {3933.4:0 4417.1:0 4855.1:0} -> 4
	RADPROF 0206	29CS200602050_00070_H09	Depth [m] = {1186.3:0 1597.3:0} -> 4
		29CS200602050_00350_H09	Depth [m] = {1705:0} -> 4
		29CS200602050_00280_H09	Depth [m] = {2953.4:0 3929.7:0 4294.5:0} -> 4
		29CS200602050_00560_H09	Depth [m] = {2953.9:0 4026.5:0} -> 4
		29CS200602050_00340_H09	Depth [m] = {2955.9:0 3344.4:0 4863.1:0} -> 4
		29CS200602050_01130_H09	Depth [m] = {3928.5:0 4587.1:0} -> 4
		29CS200602050_00210_H09	Depth [m] = {3929.8:0} -> 4
		29CS200602050_01110_H09	Depth [m] = {3930.1:0 4903.4:0} -> 4
		29CS200602050_01080_H09	Depth [m] = {3930.7:0} -> 4
	RADPROF 0105	29CS200501270_00600_H09	Depth [m] = {1483.5:0 1581.9:0 1778.5:0 1976.4:0} -> 4
		29CS200501270_00350_H09	Depth [m] = {1484:0 1583.1:0 2758.9:0 2951.6:0 3150.1:0 3443.3:0 3930.3:0 4318.6:0 4404.3:0} -> 4
		29CS200501270_00580_H09	Depth [m] = {1486:0 1582:0 2404.3:0} -> 4
		29CS200501270_00110_H09	Depth [m] = {1578.1:0 1972.5:0 2171.7:0 2756:0 2923.9:0} -> 4
		29CS200501270_00590_H09	Depth [m] = {1598.2:0 1799.1:0 2001.6:0 2198.4:0 2498.3:0 2758.9:0} -> 4
		29CS200501270_01040_H09	Depth [m] = {2179.5:0} -> 4
		29CS200501270_00570_H09	Depth [m] = {2463.6:0 2758:0 2953.8:0 3021.2:0} -> 4
		29CS200501270_00340_H09	Depth [m] = {2466.4:0 2759.2:0 2955.6:0 3150.8:0 3443.3:0 3933.3:0 4418.2:0 4869:0} -> 4
		29CS200501270_00340_H09	Depth [m] = {2466.4:0 2759.2:0 2955.6:0 3150.8:0 3443.3:0 3933.3:0 4418.2:0 4869:0} -> 4
		29CS200501270_00370_H09	Depth [m] = {2720.2:0 2726.3:0} -> 4
		29CS200501270_00560_H09	Depth [m] = {4056.3:0} -> 4
	RADPROF0811	29CS201108140_00120_H09	Depth [m] = {2953:1} -> 3
		29CS201108140_00340_H09	Depth [m] = {4416.8:1} -> 3
		29CS201108140_01100_H09	Depth [m] = {3931.2:1} -> 3
		29CS201108140_01140_H09	Depth [m] = {2955.2:1} -> 3
		29CS201108140_01140_H09	Depth [m] = {3442.8:1} -> 3
	POSEIDON 237-leg3	SI2919980400300380_353_H09	Depth [m] = {3997:1} -> 3
		SI2919970901101990_353_H09	Depth [m] = {4840.18:1} -> 3
486	CINECA-KAIKO MARU	FI35197100761_00790_H09	Depth [m] = {2720.2:1} -> 3
590	IHPT2006-HERMES03	IHPT2006-HERMES03_Nut_022.0_H09	Depth [m] = {1800:1 2000:1 2519:1} -> 3
681	16797	RNODC_Bottle_16797_49	Depth [m] = {0:1 10:1 20:1 30:1 47:1} -> 3
		RNODC_Bottle_16797_51	Depth [m] = {0:1 6:1 18:1 30:1 49:1 73:1} -> 3
		RNODC_Bottle_16797_53	Depth [m] = {0:1 11:1 22:1 32:1 48:1 86:1 101:1} -> 3
		RNODC_Bottle_16797_55	Depth [m] = {0:1 8:1 17:1 33:1 50:1 71:1 99:1 598:1} -> 3
		RNODC_Bottle_16797_57	Depth [m] = {0:1 10:1 19:1 30:1 50:1 75:1 97:1 150:1} -> 3
		RNODC_Bottle_16797_59	Depth [m] = {0:1 9:1 19:1 30:1 49:1 76:1} -> 3
		RNODC_Bottle_16797_238	Depth [m] = {0:1 10:1 19:1 31:1 48:1} -> 3
		RNODC_Bottle_16797_240	Depth [m] = {0:1 10:1 22:1 31:1 50:1} -> 3
		RNODC_Bottle_16797_242	Depth [m] = {0:1 10:1 24:1 32:1 48:1} -> 3
		RNODC_Bottle_16797_244	Depth [m] = {0:1 12:1 30:1} -> 3
		RNODC_Bottle_16797_246	Depth [m] = {0:1 10:1 21:1 31:1 50:1 73:1} -> 3
		RNODC_Bottle_16797_248	Depth [m] = {0:1 10:1 19:1 31:1 50:1 71:1} -> 3
		RNODC_Bottle_16797_250	Depth [m] = {0:1 13:1 23:1 31:1 50:1 75:1} -> 3
		RNODC_Bottle_16797_252	Depth [m] = {0:1 15:1 32:1 48:1 71:1} -> 3
		RNODC_Bottle_16797_253	Depth [m] = {0:1 10:1 19:1 32:1 49:1 75:1 97:1} -> 3
		RNODC_Bottle_16797_255	Depth [m] = {0:1 12:1 21:1 31:1 47:1 73:1 98:1} -> 3
		RNODC_Bottle_16797_256	Depth [m] = {0:1 10:1 21:1 33:1 51:1 73:1 97:1 147:1 203:1 248:1 308:1 408:1 507:1 591:1 811:1 1022:1 1219:1} -> 3
		RNODC_Bottle_16797_257	Depth [m] = {0:1 18:1 22:1 34:1 57:1 75:1 99:1 151:1} -> 3
		RNODC_Bottle_16797_259	Depth [m] = {0:1 11:1 20:1 30:1 50:1 76:1 97:1} -> 3
	11199	RNODC_Bottle_11199_347	Depth [m] = {31:0} -> 4
	16151	RNODC_Bottle_16151_2	Depth [m] = {20:1} -> 3
		RNODC_Bottle_16151_2	Depth [m] = {30:1 50:1 77:1 103:1} -> 3
		RNODC_Bottle_16151_2	Depth [m] = {0:1 12:1} -> 3
		RNODC_Bottle_16151_3	Depth [m] = {20:1 31:1 49:1 72:1 101:1} -> 3
		RNODC_Bottle_16151_3	Depth [m] = {0:1 11:1} -> 3

	RNODC_Bottle_16151_4	Depth [m] = {21:1 31:1 49:1 75:1 100:1} -> 3
	RNODC_Bottle_16151_4	Depth [m] = {0:1 10:1} -> 3
	RNODC_Bottle_16151_5	Depth [m] = {21:1 32:1 50:1 72:1 99:1} -> 3
	RNODC_Bottle_16151_5	Depth [m] = {0:1 11:1} -> 3
	RNODC_Bottle_16151_6	Depth [m] = {20:1 29:1 50:1 74:1} -> 3
	RNODC_Bottle_16151_6	Depth [m] = {0:1 11:1} -> 3
	RNODC_Bottle_16151_7	Depth [m] = {21:1 30:1 49:1 73:1 101:1 156:1} -> 3
	RNODC_Bottle_16151_7	Depth [m] = {0:1 12:1} -> 3
	RNODC_Bottle_16151_8	Depth [m] = {20:1 31:1 50:1 75:1 98:1} -> 3
	RNODC_Bottle_16151_8	Depth [m] = {0:1 10:1} -> 3
	RNODC_Bottle_16151_10	Depth [m] = {24:1 40:1 53:1 76:1 103:1} -> 3
	RNODC_Bottle_16151_10	Depth [m] = {0:1 13:1} -> 3
	RNODC_Bottle_16151_12	Depth [m] = {23:1 33:1 52:1} -> 3
	RNODC_Bottle_16151_12	Depth [m] = {0:1 15:1} -> 3
	RNODC_Bottle_16151_14	Depth [m] = {26:1 42:1 55:1 75:1 101:1} -> 3
	RNODC_Bottle_16151_14	Depth [m] = {0:1 13:1} -> 3
	RNODC_Bottle_16151_16	Depth [m] = {25:1 39:1 53:1} -> 3
	RNODC_Bottle_16151_16	Depth [m] = {0:1 13:1} -> 3
	RNODC_Bottle_16151_18	Depth [m] = {0:1 10:1 22:1 36:1 56:1} -> 3
	RNODC_Bottle_16151_20	Depth [m] = {11:1 24:1 42:1} -> 3
	RNODC_Bottle_16151_22	Depth [m] = {0:1 26:1 39:1} -> 3
	RNODC_Bottle_16151_24	Depth [m] = {0:1 11:1 21:1 33:1} -> 3
	RNODC_Bottle_16151_303	Depth [m] = {0:1 10:1 22:1 32:1 53:1 74:1 104:1} -> 3
	RNODC_Bottle_16151_304	Depth [m] = {0:1 13:1 21:1 35:1 55:1 75:1 100:1} -> 3
	RNODC_Bottle_16151_306	Depth [m] = {0:1 13:1 25:1 34:1 63:1 91:1 102:1} -> 3
	RNODC_Bottle_16151_307	Depth [m] = {0:1 10:1 26:1 32:1 52:1 74:1 100:1} -> 3
	RNODC_Bottle_16151_308	Depth [m] = {0:1 17:1 26:1 36:1 55:1 77:1 103:1} -> 3
	RNODC_Bottle_16151_309	Depth [m] = {0:1 10:1 21:1 32:1 51:1 76:1 99:1} -> 3
	RNODC_Bottle_16151_310	Depth [m] = {0:1 14:1 26:1 35:1 55:1 77:1 107:1} -> 3
	RNODC_Bottle_16151_311	Depth [m] = {0:1 10:1 21:1 30:1 50:1 76:1 100:1 153:1} -> 3
	RNODC_Bottle_16151_313	Depth [m] = {0:1 10:1 24:1 32:1 53:1 79:1 105:1 152:1} -> 3
	RNODC_Bottle_16151_316	Depth [m] = {0:1 13:1 24:1 33:1 51:1 75:1 100:1} -> 3
	RNODC_Bottle_16151_318	Depth [m] = {0:1 11:1 24:1 33:1 53:1 78:1 100:1} -> 3
16542	RNODC_Bottle_16542_62	Depth [m] = {10:1 19:1 28:1 45:1 74:1 95:1} -> 3
	RNODC_Bottle_16542_64	Depth [m] = {0:1 22:1 32:1 53:1 75:1 99:1 148:1} -> 3
	RNODC_Bottle_16542_65	Depth [m] = {0:1 10:1 19:1 30:1 48:1} -> 3
	RNODC_Bottle_16542_66	Depth [m] = {0:1 12:1 22:1 32:1 58:1 103:1} -> 3
	RNODC_Bottle_16542_67	Depth [m] = {0:1 10:1 20:1 32:1 54:1 72:1 98:1} -> 3
	RNODC_Bottle_16542_69	Depth [m] = {0:1 8:1 19:1 30:1 48:1} -> 3
	RNODC_Bottle_16542_70	Depth [m] = {0:1 7:1 19:1 33:1 47:1 74:1} -> 3
	RNODC_Bottle_16542_72	Depth [m] = {0:1 8:1 21:1 30:1 48:1} -> 3
	RNODC_Bottle_16542_73	Depth [m] = {0:1 8:1 18:1 28:1 48:1 75:1} -> 3
	RNODC_Bottle_16542_74	Depth [m] = {0:1 10:1 21:1 30:1 48:1 73:1} -> 3
	RNODC_Bottle_16542_75	Depth [m] = {0:1 10:1 22:1 32:1 48:1 74:1} -> 3
16948	RNODC_Bottle_16948_12	Depth [m] = {0:1 10:1 18:1 30:1 47:1 74:1 98:1 143:1 195:1} -> 3
	RNODC_Bottle_16948_14	Depth [m] = {0:1 13:1 23:1 32:1 51:1 73:1 102:1} -> 3
	RNODC_Bottle_16948_15	Depth [m] = {0:1 9:1 18:1 30:1 48:1 73:1 94:1 146:1} -> 3
	RNODC_Bottle_16948_16	Depth [m] = {0:1 12:1 23:1 32:1 49:1 73:1 99:1} -> 3
	RNODC_Bottle_16948_17	Depth [m] = {0:1 10:1 21:1 31:1 51:1 75:1 100:1} -> 3
	RNODC_Bottle_16948_18	Depth [m] = {0:1 16:1 21:1 32:1 50:1 74:1 98:1} -> 3
	RNODC_Bottle_16948_19	Depth [m] = {0:1 11:1 21:1 30:1 48:1 75:1 98:1} -> 3
	RNODC_Bottle_16948_20	Depth [m] = {0:1 10:1 21:1 29:1 48:1 70:1 96:1 147:1} -> 3
	RNODC_Bottle_16948_21	Depth [m] = {0:1 9:1 18:1 30:1 50:1 73:1 100:1 150:1} -> 3
	RNODC_Bottle_16948_22	Depth [m] = {0:1 12:1 19:1 31:1 52:1 73:1 104:1} -> 3
	RNODC_Bottle_16948_24	Depth [m] = {0:1 10:1 30:1 47:1 72:1} -> 3
	RNODC_Bottle_16948_26	Depth [m] = {0:1 9:1 20:1 31:1 50:1 72:1 99:1} -> 3
	RNODC_Bottle_16948_28	Depth [m] = {0:1 9:1 22:1 33:1 53:1 76:1} -> 3
	RNODC_Bottle_16948_30	Depth [m] = {0:1 10:1 24:1 36:1 49:1 76:1} -> 3
	RNODC_Bottle_16948_32	Depth [m] = {0:1 10:1 21:1 32:1 57:1} -> 3
	RNODC_Bottle_16948_34	Depth [m] = {0:1 10:1 21:1 31:1 49:1} -> 3
	RNODC_Bottle_16948_36	Depth [m] = {0:1 12:1 22:1 31:1 51:1 76:1} -> 3
	RNODC_Bottle_16948_306	Depth [m] = {0:1 9:1 19:1 34:1 53:1 80:1 100:1} -> 3
	RNODC_Bottle_16948_307	Depth [m] = {0:1 18:1 24:1 32:1 46:1 78:1 97:1} -> 3
	RNODC_Bottle_16948_309	Depth [m] = {0:1 11:1 19:1 28:1 49:1 74:1 104:1} -> 3
	RNODC_Bottle_16948_311	Depth [m] = {0:1 11:1 22:1 30:1 50:1 75:1 103:1} -> 3
	RNODC_Bottle_16948_313	Depth [m] = {0:1 10:1 21:1 34:1 53:1 75:1 200:1} -> 3
17208	RNODC_Bottle_17208_248	Depth [m] = {0:1 11:1 19:1 28:1 34:1 74:1 99:1 152:1 198:1} -> 3
8571	RNODC_Bottle_8571_230	Depth [m] = {1635:1} -> 3
4185	RNODC_Bottle_4185_16	Depth [m] = {3920:1} -> 4
4398	RNODC_Bottle_4398_31	Depth [m] = {4325:1} -> 3
	RNODC_Bottle_4398_393	Depth [m] = {4025:1} -> 3

	RNODC_Bottle_4398_397	Depth [m] = {4272:1} -> 3
4775	RNODC_Bottle_4775_14	Depth [m] = {1171:1} -> 3
	RNODC_Bottle_4775_14	Depth [m] = {2184:1} -> 3
	RNODC_Bottle_4775_16	Depth [m] = {3650:1} -> 4
	RNODC_Bottle_4775_17	Depth [m] = {1100:1 1780:1} -> 3
	RNODC_Bottle_4775_19	Depth [m] = {1333:1} -> 4
	RNODC_Bottle_4775_257	Depth [m] = {4860:1} -> 4
	RNODC_Bottle_4775_259	Depth [m] = {1673:1} -> 3
	RNODC_Bottle_4775_259	Depth [m] = {3847:1} -> 4
	RNODC_Bottle_4775_260	Depth [m] = {1040:1} -> 3
	RNODC_Bottle_4775_260	Depth [m] = {833:1} -> 3
	RNODC_Bottle_4775_260	Depth [m] = {1579:1} -> 4
	RNODC_Bottle_4775_262	Depth [m] = {2800:1} -> 4
	RNODC_Bottle_4775_262	Depth [m] = {1005:1} -> 3
	RNODC_Bottle_4775_262	Depth [m] = {800:1} -> 3
	RNODC_Bottle_4775_263	Depth [m] = {2591:1} -> 4
	RNODC_Bottle_4775_263	Depth [m] = {858:1} -> 3
	RNODC_Bottle_4775_265	Depth [m] = {795:1 972:1 1760:1} -> 3
6186	RNODC_Bottle_6186_184	Depth [m] = {2736:1 3613:1} -> 3
9873	RNODC_Bottle_9873_332	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
	RNODC_Bottle_9873_333	Depth [m] = {500:1} -> 4
	RNODC_Bottle_9873_334	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
9952	RNODC_Bottle_9952_10	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1} -> 4
	RNODC_Bottle_9952_11	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
	RNODC_Bottle_9952_12	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
	RNODC_Bottle_9952_13	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
	RNODC_Bottle_9952_14	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
	RNODC_Bottle_9952_15	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
	RNODC_Bottle_9952_16	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
	RNODC_Bottle_9952_17	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
	RNODC_Bottle_9952_20	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
	RNODC_Bottle_9952_21	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1} -> 4
	RNODC_Bottle_9952_21	Depth [m] = {0:4 10:4 20:4 30:4 50:4 75:4 100:4 150:4 200:4 250:4 300:4 400:4 500:4 600:4 800:4 1000:4 1200:4 1500:4} -> 4
	RNODC_Bottle_9952_22	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1} -> 4
	RNODC_Bottle_9952_23	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1} -> 4
	RNODC_Bottle_9952_24	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4
	RNODC_Bottle_9952_25	Depth [m] = {0:1 10:1 20:1 30:1 50:1 75:1 100:1 150:1 200:1 250:1 300:1 400:1 500:1 600:1 800:1 1000:1 1200:1 1500:1 2000:1} -> 4

3.2 Additional Spanish dataset

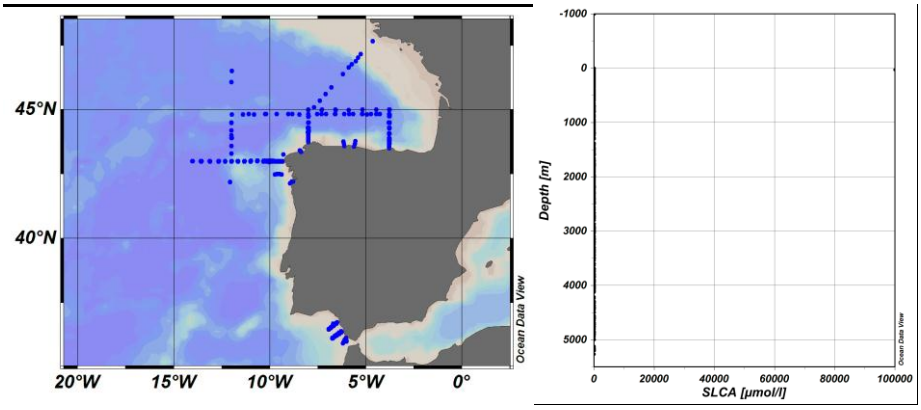
3.2.1 Description

The dataset contains one parameter related to silicate:

Table 14- Phosphate parameter in the dataset

Parameter	Nb stations	Nb measurements
SLCA [µmol/l]	2 190	19 036

Figure 8 – map and plot (Silicate/Depth) of all stations with silicate



3.2.2 Data quality

Table 15: Number of Silicate measurements per QF before and after QC

Flag value	SLCA Before QC	SLCA after QC
0 (No quality control)	298	0
1 (Good)	18730	18720
3 (Probably bad)	7	24
4 (Bad)	1	292
Total	**19036**	**19036**

3.3 Total collection of Silicates

Creation of a new collection with Depth, Aggregated SILICATE and SLCA in µmol/l.
Import of the ODV spreadsheets created during previous steps into this new collection:
AGGREGATED_SILICATE_set1.txt
SILICATE_set2.txt

Changed negative Portuguese values into absolute one with QF=6 in the .txt file.
There are 2 detection limits for the SLCA measurements : 0.1 and 0.3 µmol/l

Last checks on data quality:
Deletions of some data lines for:

- Lines with no Phosphate data (QC flags = 9)
- Duplicates lines added when importing the Spanish dataset .
- All lines with negative depth.

QC flags=3 or 4 on depth were already existing in the file ; the corresponding phosphate data are flagged accordingly to 3 or 4.

Table 16: Change on Silicate QC flags linked to QC depth=4

EDMO code	Cruise	Local_CDI_id	Depth [m]	Original flag for Phosphate	Changed to
353	POSEIDON 237-leg3	SI2919980400300180_353_H09	197.2	1	4
	STOCA 0310	29CS20100304S00P20_353_H09	5	1	4
			5	1	4
			4	1	4
	STOCA 1110	29CS20101106S0SP40_353_H09	124	1	4
			148.8	1	4
	STOCA 1110	29CS20101106S0GD40_353_H09	124	1	4
	STOCA 1110	29CS20101106S0TF30_353_H09	111.2	1	4

	RADIAL GIJON 2001	SI2920010301200340_353_H09	99.2	1	4
	RADIAL GIJON 2001	SI2920010301200410_353_H09	148.7	1	4
			198.3	1	4
	RADIAL GIJON 2001	SI2920010301200420_353_H09	148.7	1	4
			198.3	1	4
	RADIAL GIJON 2001	SI2920010301200450_353_H09	148.7	1	4
	RADIAL GIJON 2003	SI2920030311603A10_353_H09	173.5	1	4
486	BORD-EST 3	FI35198900951_00140_H09	735.2	1	3
	BORD-EST 3	FI35198900951_00190_H09	1968.8	1	3
	BORD-EST 3	FI35198900951_00490_H09	6.9	1	3
	BORD-EST 3	FI35198900951_00540_H09	1155.4	1	3
	ECOLOIRE	FI35199905009_0S090_H09	15.9	1	3
	ECOLOIRE	FI35199905009_0S020_H09	19.8	1	3
	MEDIPROD IV	FI35198100651_00030_H09	697.7	1	3

New final collection: 7 071 stations and 50 183 measurements.

Final data set is *data_from_SLCA_final.txt* (corresponding to the collection *SLCA_final.odv*)

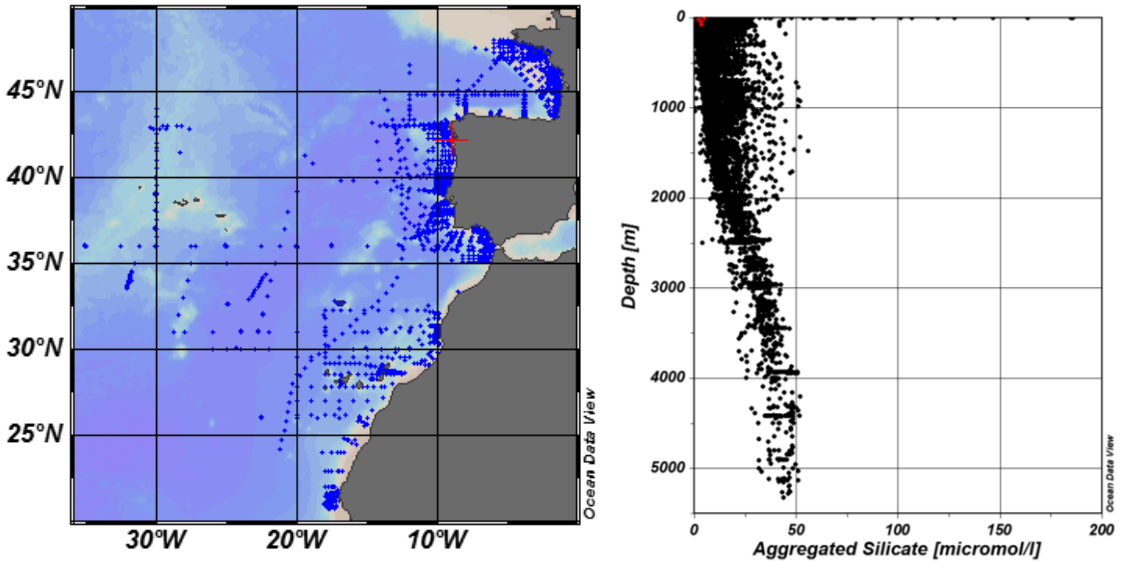


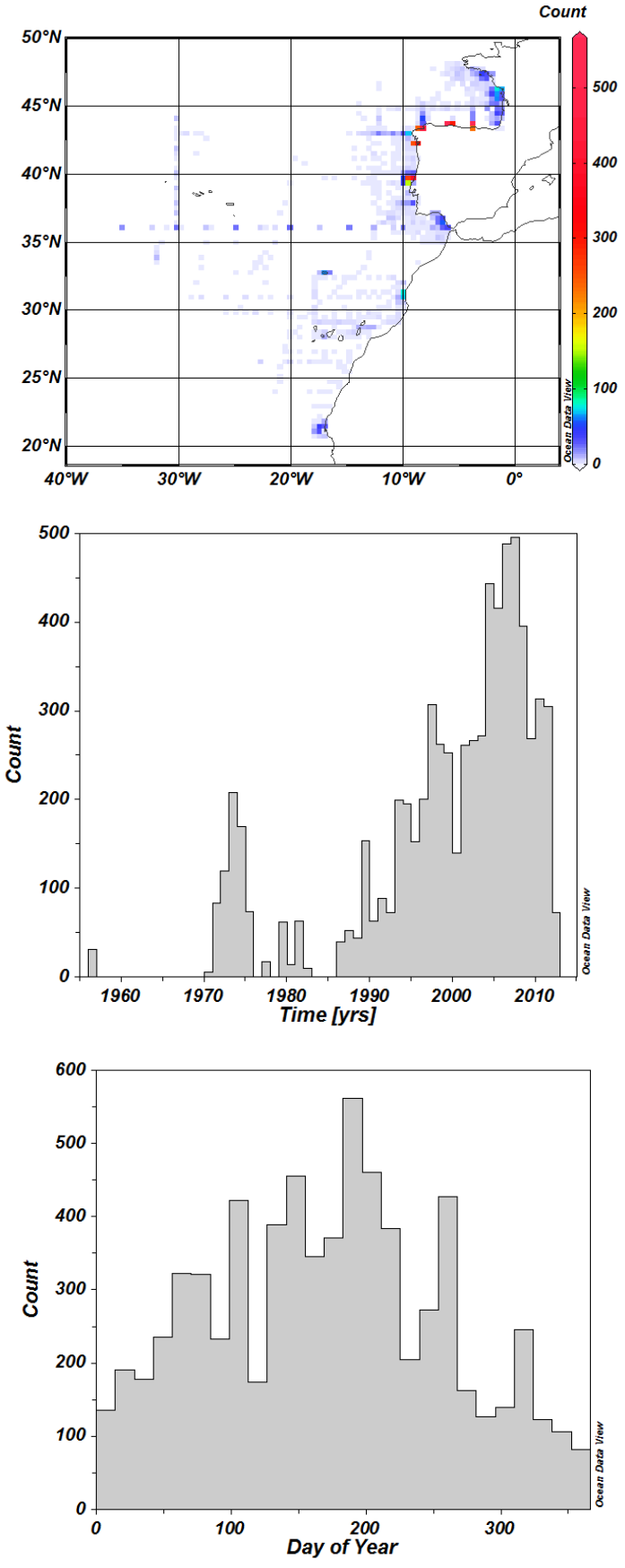
Figure 9: Map and plot of final Silicate data (Flag 1)

Table 17 : Final QC flags of Silicate dataset

Flag value	SILICATE: after QC
0 (No quality control)	0
1 (Good)	48 251
3 (Probably bad)	639
4 (Bad)	1 246
6 (below detection limit)	47
Total	**50 183**

Statistics on the final Silicate collection:

Figure 10 - Distribution of the Silicate data (by location, by Time period and by Season)



4. QC of Phosphate data

4.1 1st dataset

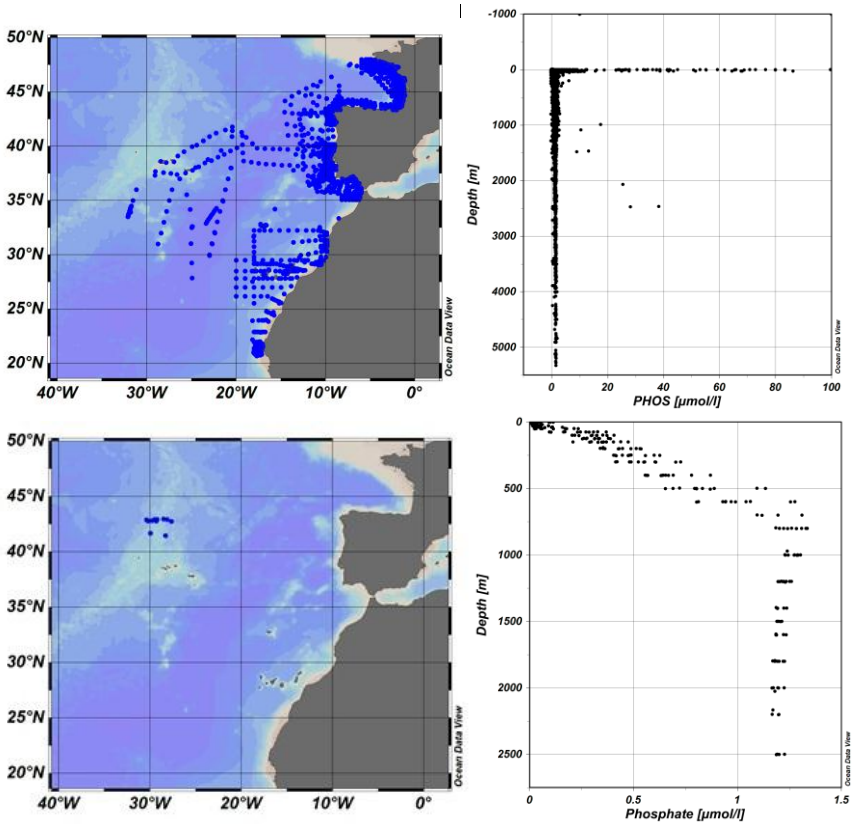
4.1.1 Description

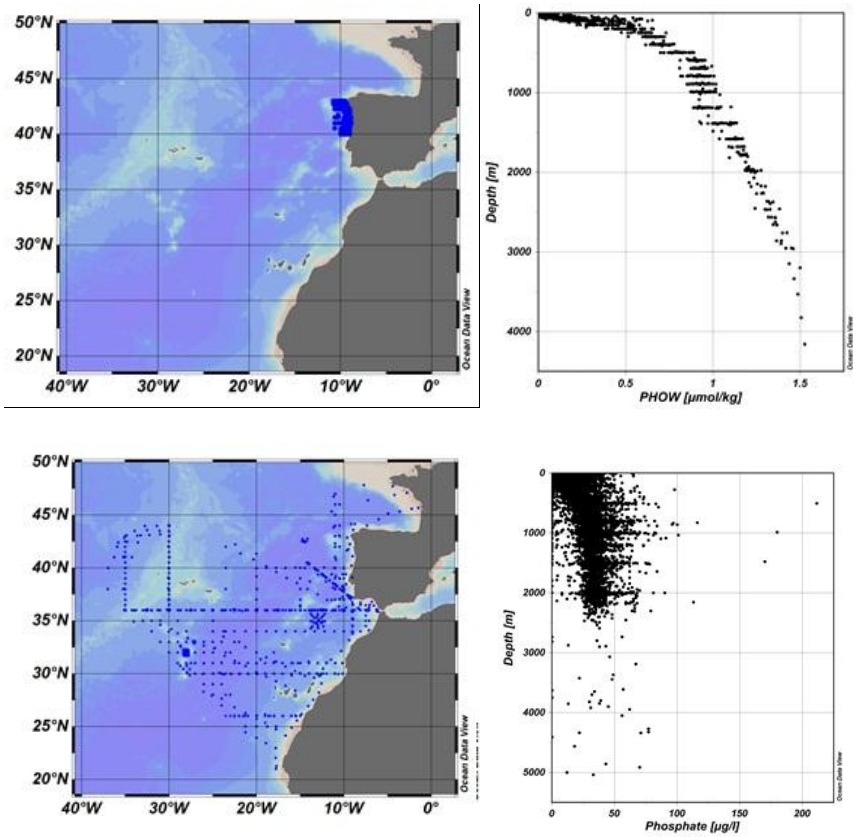
The dataset contains the following parameters related to phosphate:

Tableau 1: Phosphate parameters in the dataset

Parameters	Nb stations	Nb measurements
PHOS [µmol/l]	5539	32505
Phosphate [µmol/l]	11	249
PHOW [µmol/kg]	78	998
Phosphate [µg/l]	2501	38328
Total	**8129**	**72080**

Figure 11: maps and plots (Phosphate/Depth) of all stations with phosphate parameters





A problem was detected in phosphate [µg/l]: for cruise 14407, stations 281, 282, 283, 284, 286, 287: problem of units: values must be multiply by 10^{-1}.

4.1.2 Unit conversion and aggregation

For the product, only one unit is kept [µmol/l], the following conversions are applied:

Table 18: Conversion for phosphate parameters

PHOS	µmol/l	PHOSZZXX	PO4 unknown phase	none	PO4 in µmol/l
Phosphate	µmol/l	PHOSZZXX	PO4 unknown phase	none	PO4 in µmol/l
PHOW	µmol/kg	MDMAP906	PO4 unknown phase	Any […/kg]>>Any […/l]	PO4 in µmol/l
Phosphate	µg/l	PHOSZZXX	PO4 unknown phase	*Value/30.97376 (assuming it is µg P/l)*	PO4 in µmol/l

Conversion of phosphate in µg/l in phosphate in µmol/l:
View > Derived variables > Expressions, Derivatives, Integrals > Expression :
Label: Phosphate. Units: µmol/l
Expression in Postfix Notation: 0.0322853925387166 #1 *
NB: 1/ 30.97376=0.0322853925387166

Export and Aggregation of: PHOS [µmol/l], Phosphate [µmol/l], PHOW [µmol/kg], Phosphate [µmol/l], Phosphate [µg/l].
Export: Creation of a new collection:
Export > Station data > ODV Spreadsheet file, in .txt, select variables: Aggregation:
View > Derived variables > Special > Aggregated Variable

Select: PHOS [µmol/], Phosphate [µmol/l], PHOW [µmol/kg] conversion: Any […/kg] >> Any […/l], Phosphate [µmol/l].
Export a new collection (AGGREGATED-PHOSPHATE) with all phosphate parameters (non aggregated and aggregated).

4.1.3 Data quality

Total of stations: 8129 and 72080 measurements.

Table 19: Flag value for phosphate parameters and number of related measurements

Flag value	PHOS	Phosphate [µmol/l]	PHOW [µmol/kg]	Phosphate [µg/l]	Aggregated PHOS [µmol/l]
0 (No QC)	5	0	0	5	361
1 (Good)	31796	249	998	38311	71369
3 (Probably bad)	69	0	0	11	72
4 (Bad)	274	0	0	0	278
6 (Below detection)	361	0	0	1	0
Total	**32505**	**249**	**998**	**38328**	**72080**

A Problem with unit of some data of IEO was detected and corrected.

Figure 12: Map of all stations with aggregated phosphate

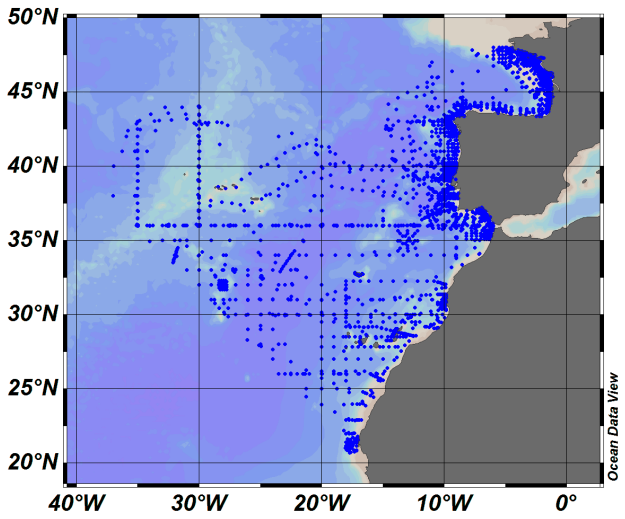


Table 20: Phosphate Flag changes during QC step

EDMO code	Cruise	LOCAL_CDI_ID	Depth [m]	Original flag for Phosphate	Changed to
353	STOCA 0812	29RM20120805S0GD50_353_H09	59.6	1	3
	HUELVAS 90	SI29199000130010D1_353_H09	0	1	3
681	16476	RNODC_Bottle_16476_5	506	1	3
	2966	RNODC_Bottle_2966_16	0	0	1
		RNODC_Bottle_2966_20	312	0	1
		RNODC_Bottle_2966_21	1479	1	3
	8751	NODC_Bottle_8751_29	2158	1	3
	17086	RNODC_Bottle_17086_118	285	0	1
	16752	RNODC_Bottle_16752_17	25	0	1
			1504	0	1

4.2 Additional Spanish data

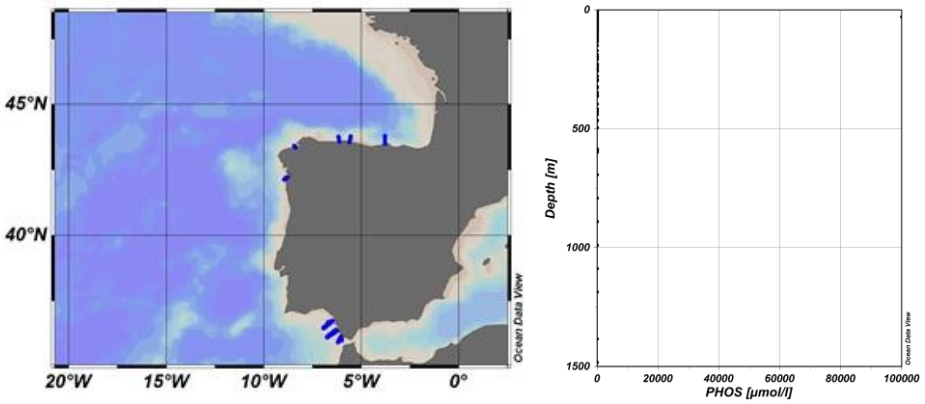
4.2.1 Description

The dataset contains one parameter related to phosphate:

Table 21- Phosphate parameter in the dataset

Parameter	Nb stations	Nb measurements
PHOS [µmol/l]	1044	7442

Figure 13 – map and plot (Phosphate/Depth) of all stations with phosphate measurements

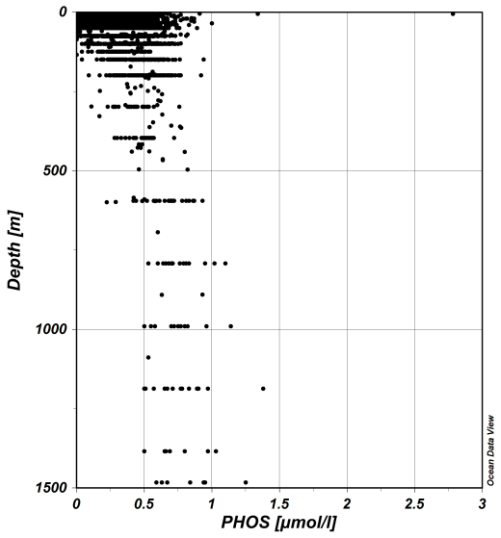


4.2.2 Data quality

Table 22: Flag value for phosphate parameters before and after QC

Flag value	PHOS before QC	PHOS after QC
1 (Good)	7436	7432
3 (Probably bad)	1	5
4 (Bad)	5	5
Total	7442	7442

Figure 14: Phosphate of additional data for QF = 1 (SDN QF)



4.3 Total collection of Phosphates

Creation of a new collection with Depth, Aggregated PHOSPHATE and PHOS in µmol/l.
Import of the ODV spreadsheets created during previous steps into this new collection:
AGGREGATED_PHOSPHATE_set1.txt
PHOSPHATE_set2.txt

Changed negative Portuguese values into absolute one with QF=6 in the .txt file.
There are 3 detection limits for the PHOS measurements : 0.03, 0.07 and 0.2 µmol/l

Last checks on data quality:
Deletions of some data lines for:

- Lines with no Phosphate data (QC flags = 9)
- Duplicates lines added when importing the Spanish dataset .
- All lines with negative depth.

QC flags=3 or 4 on depth were already existing in the file ; the corresponding phosphate data are flagged accordingly to 3 or 4.

Table 23: Change on Phosphate QC flags linked to QC depth=4

EDMO code	Cruise	Local_CDI_id	Depth [m]	Original flag for Phosphate	Changed to
353	STOCA 0310	29CS20100304S00P20_353_H09	5	1	4
			5	1	4
			4	1	4
	STOCA 1110	29CS20101106S0SP40_353_H09	124	1	4
			148.8	1	4
	STOCA 1110	29CS20101106S0GD40_353_H09	124	1	4
	STOCA 1110	29CS20101106S0TF30_353_H09	111.2	1	4
	ALBORAN-55	SI2919550001300030_353_H09	24.8	1	4
	RADIAL GIJON 2001	SI2920010301200340_353_H09	99.2	1	4
	RADIAL GIJON 2001	SI2920010301200410_353_H09	148.7	1	4
			198.3	1	4
	RADIAL GIJON 2001	SI2920010301200420_353_H09	148.7	1	4
			198.3	1	4
	RADIAL GIJON 2001	SI2920010301200430_353_H09	148.7	1	4
			198.3	1	4
	RADIAL GIJON 2001	SI2920010301200440_353_H09	148.7	1	4
			198.3	1	4
	RADIAL GIJON 2001	SI2920010301200450_353_H09	148.7	1	4
	RADIAL GIJON 2003	SI2920030311603A10_353_H09	173.5	1	4
	XAUEN-52	SI2919520001001030_353_H09	24.8	1	4
	XAUEN-53	SI2919530001101260_353_H09	9.9	1	4
	XAUEN-53	SI2919530001101290_353_H09	24.8	1	4
	XAUEN-53	SI2919530001101320_353_H09	49.6	1	4
	XAUEN-53	SI2919530001101350_353_H09	24.8	1	4
	XAUEN-53	SI2919530001101370_353_H09	9.9	1	4
	XAUEN-54	SI2919540001202230_353_H09	49.6	1	4
	CANIGO - MET37-leg2	SI2919970100700390_353_H09	3129.3071	1	4
486	BORD-EST 3	FI35198900951_00140_H09	735.2	1	3
	BORD-EST 3	FI35198900951_00190_H09	1968.8	1	3
	BORD-EST 3	FI35198900951_00490_H09	6.9	1	3
	BORD-EST 3	FI35198900951_00540_H09	1155.4	1	3
	ECOLOIRE	FI35199905009_0S090_H09	15.9	1	3
	ECOLOIRE	FI35199905009_0S020_H09	19.8	1	3
	MEDIPROD IV	FI35198100651_00030_H09	697.7	1	3

New final Phosphate collection: 76926 measurements and 8832 stations.

Final dataset is *data_from_PHOS_final.txt* (corresponding to the collection *PHOS_final.odv*)

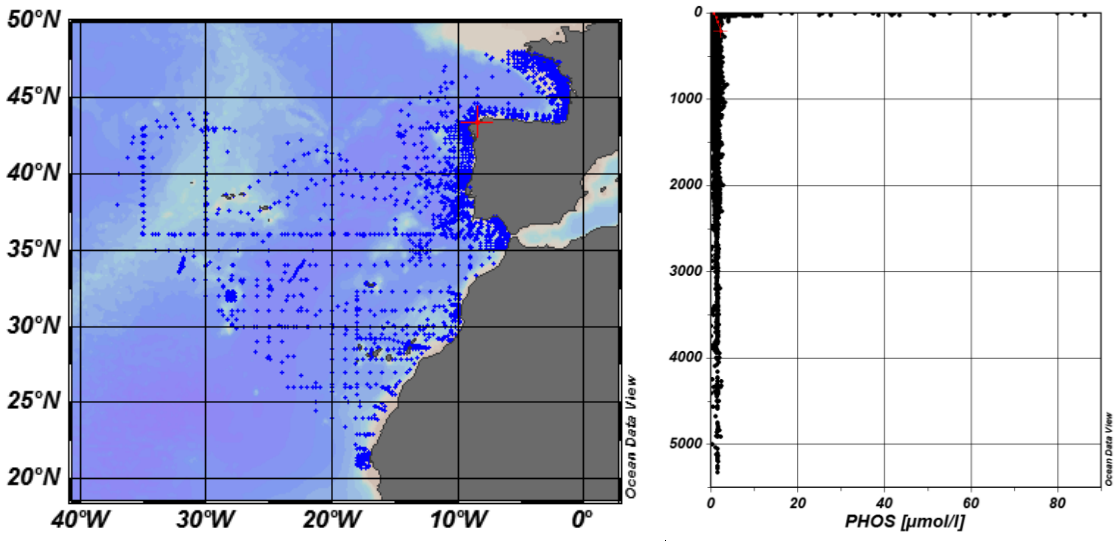


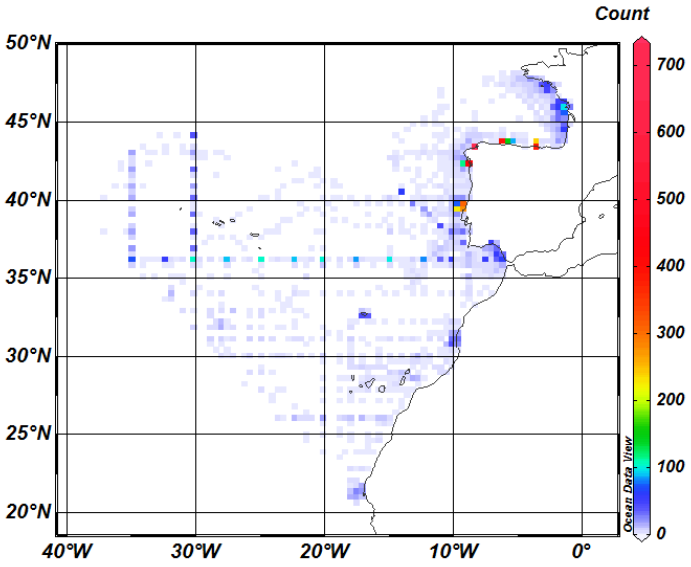
Figure 15: Map and plot of final Phosphate data (Flag 1)

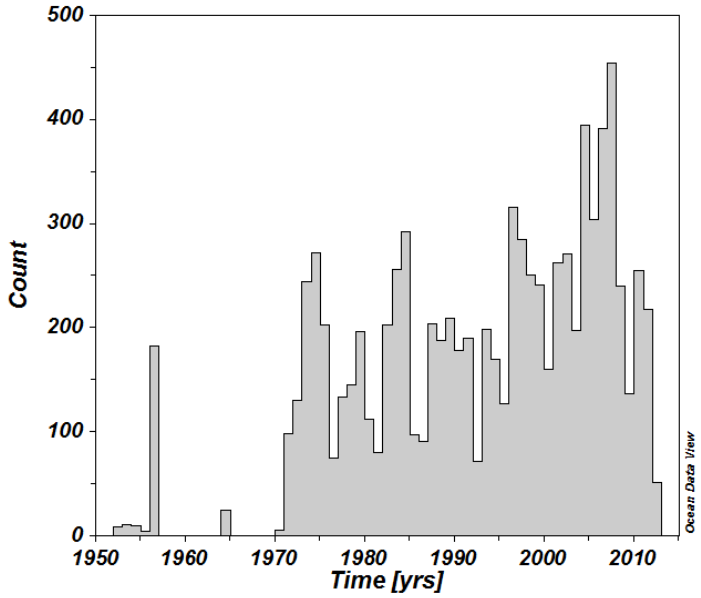
Table 24: Final QC flags of Phosphate dataset

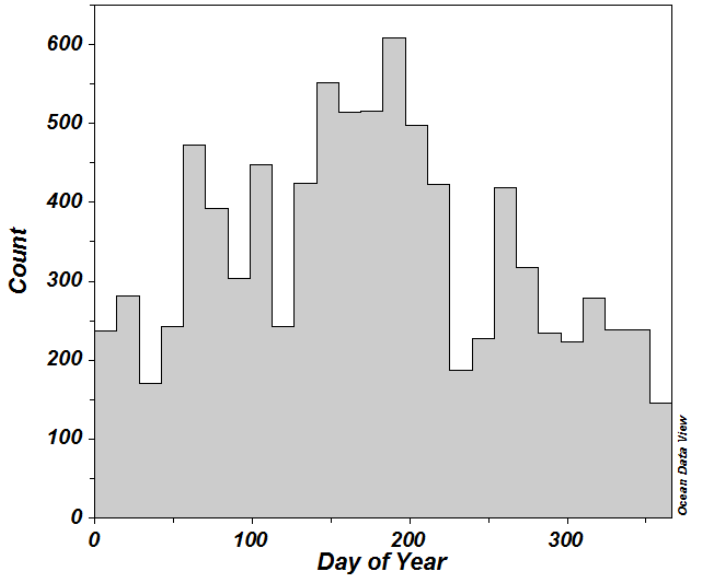
Flag value	PHOSPHATE after QC
0 (No quality control)	0
1 (Good)	76 170
3 (Probably bad)	88
4 (Bad)	307
6 (value below detection)	361
Total	**76 926**

Statistics on the final Phosphate collection:

Figure 16 - Distribution of the Phosphate data (by location, by Time period and by Season)







5. QC of Nitrate and Nitrite data

5.1 Description of the dataset

For Nitrate and Nitrite the 2nd additional Spanish dataset was received before we started the QC on these parameters, it was though possible to create a unique dataset for Nitrate and Nitrite by merging the 1st and 2nd datasets before performing the QC.

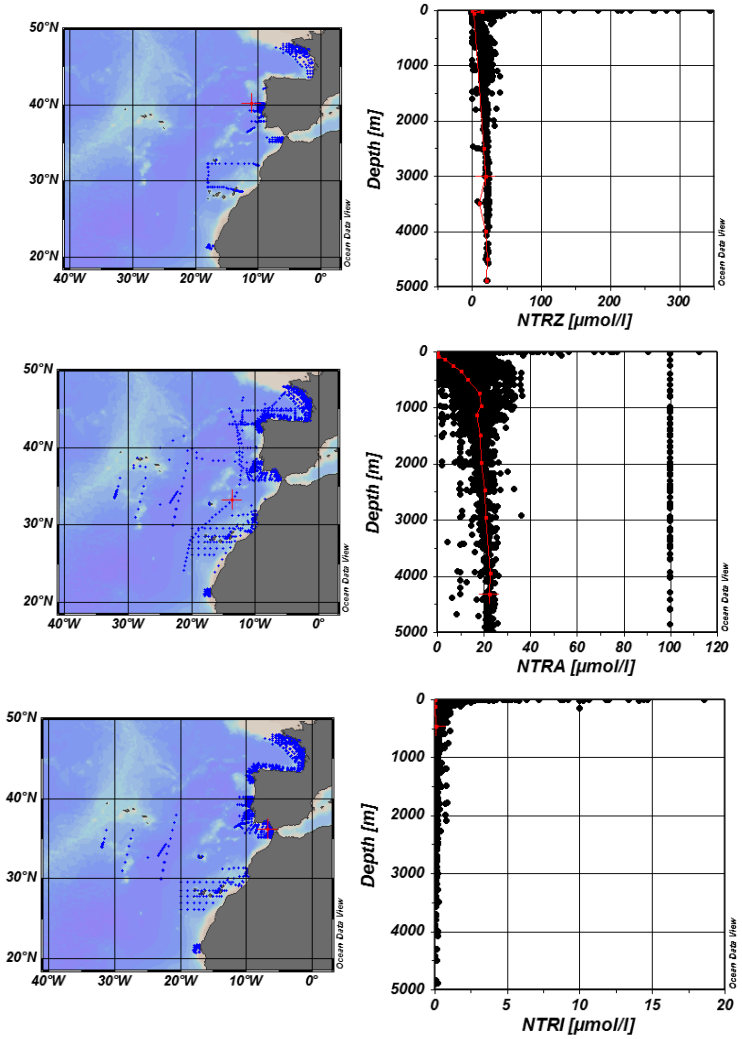
Creation of a new collection with 1st dataset and additional Spanish data:
Select all nitrate and nitrite parameters.
Import of the ODV spreadsheets created during previous steps into this new collection
NITRATE-NITRITE_set1.txt
NITRATES-NITRITES_set2.txt
Creation of a new collection: NITRATE_NITRITE_PARAMETER

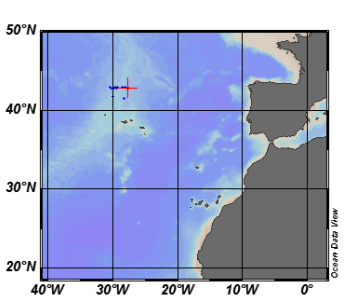
Table 2: Nitrate parameters in the dataset

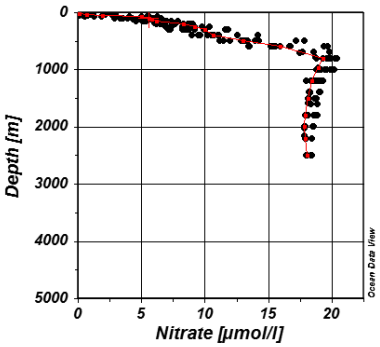
Parameters	Nb	Nb

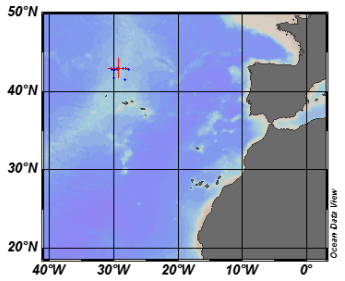
	stations	measurements
NTRZ (µmol/l)	1539	7973
NTRI (µmol/l)	5770	35499
NTRA (µmol/l)	5652	43282
Nitrite (µmol/l)	11	249
Nitrate (µmol/l)	11	249
NTAW (µmol/kg)	78	998
NTIW (µmol/kg)	78	826
Nitrite (µg/l)	146	1109
Nitrate (µg/l)	78	225
Total	**10268**	**90140**

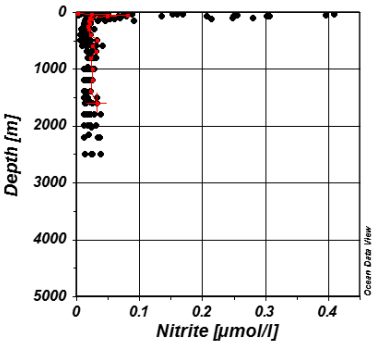
Figure 17 – maps and plots (/Depth) of all stations with Nitrate and Nitrite parameters

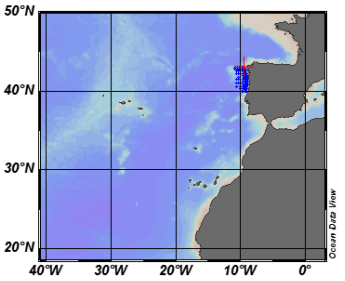


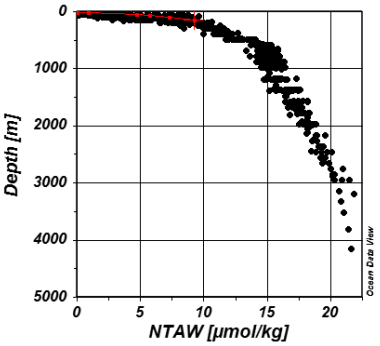

50°N
40°N
30°N
20°N
40°W
30°W
20°W
10°W
0°
Ocean Data View

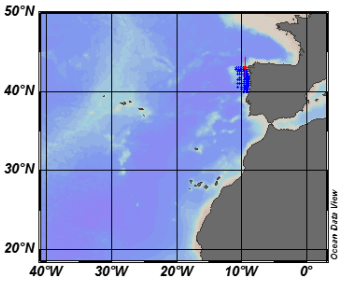

Depth [m]
0
1000
2000
3000
4000
5000
0
5
10
15
20
Nitrate [µmol/l]
Ocean Data View

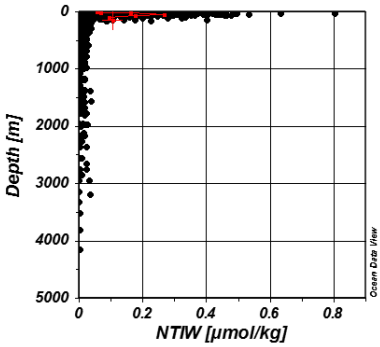

50°N
40°N
30°N
20°N
40°W
30°W
20°W
10°W
0°
Ocean Data View

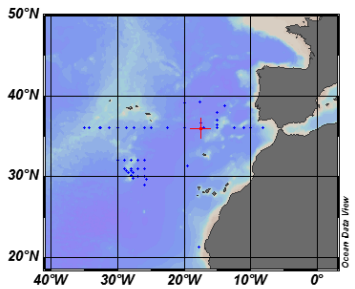

Depth [m]
0
1000
2000
3000
4000
5000
0
0.1
0.2
0.3
0.4
Nitrite [µmol/l]
Ocean Data View

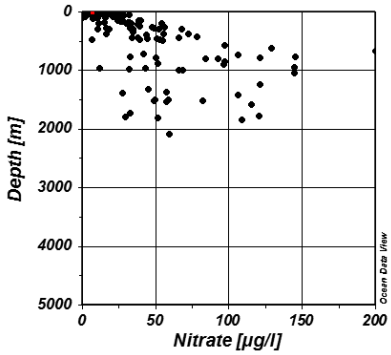

50°N
40°N
30°N
20°N
40°W
30°W
20°W
10°W
0°
Ocean Data View

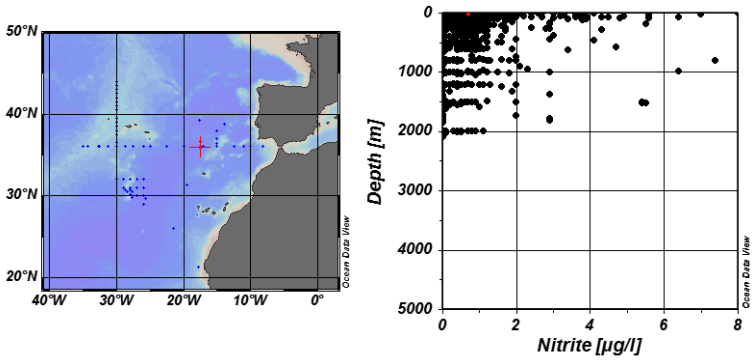

Depth [m]
0
1000
2000
3000
4000
5000
0
5
10
15
20
NTAW [µmol/kg]
Ocean Data View


50°N
40°N
30°N
20°N
40°W
30°W
20°W
10°W
0°
Ocean Data View


Depth [m]
0
1000
2000
3000
4000
5000
0
0.2
0.4
0.6
0.8
NTIW [µmol/kg]
Ocean Data View


50°N
40°N
30°N
20°N
40°W
30°W
20°W
10°W
0°
Ocean Data View


Depth [m]
0
1000
2000
3000
4000
5000
0
50
100
150
200
Nitrate [µg/l]
Ocean Data View



The quality flags per parameter code, in the initial dataset, are the following:

Table 25: QC flags of Nitrate and Nitrite parameters before the QC

Flag value	NTRZ [µmol/l]	NTRA [µmol/l]	NTRI [µmol/l]	Nitrate [µmol/l]	Nitrite [µmol/l]	NTAW [µmol/kg]	NTIW [µmol/kg]	Nitrate [µg/l]	Nitrite [µg/l]
0	2	486	2	0	0	0	0	1	1
1	7124	42145	34281	244	249	994	826	224	1108
3	38	119	52	0	0	0	0	0	0
4	5	413	141	0	0	4	0	0	0
5	0	0	0	5	0	0	0	0	0
6	804	119	1023	0	0	0	0	0	0
Total	**7973**	**43282**	**35499**	**249**	**249**	**998**	**826**	**225**	**1109**

5.2 Unit conversion and aggregation

For Nitrate and Nitrite special assumptions have been made. The final product will deal with Nitrate + Nitrite in µmol/l.
So all conversions have to be done to µmol/l.
Then considering Nitrate and Nitrite :

- when Nitrate+Nitrite is distributed, it will be taken into account for the final product,
- when only Nitrate and Nitrite are distributed they will be added as Nitrate+Nitrite to be used in the final product and
- when only Nitrate has been measured, it will be considered as Nitrate+Nitrite in the final product.

Table 26 gives the details of conversions and assumptions made.

Table 26: Conversion for Nitrate and Nitrite parameters

1	NTRZ	µmol/l	NTRZZZXX	NO2+NO3	None	NOx in µmol/l
2	NTRI	µmol/l	NTRIZZXX	NO2	NO2+NO3 calculated if Nitrite+Nitrate not available	NOx in µmol/l
3	NTRA	µmol/l	NTRAZZXX	NO3		
4				NO2 + NO3	If no NO2 measured	NOx in µmol/l
5	Nitrite	µmol/l	NTRIZZXX	NO2	NO2+NO3 calculated if Nitrite+Nitrate not available	NOx in µmol/l
6	Nitrate	µmol/l	NTRAZZXX	NO3		
7				NO2 + NO3	If no NO2 measured	NOx in µmol/l
8	NTIW	µmol/kg	MDMAP007	NO2	NO2+NO3 calculated if Nitrite+Nitrate not available then Any […/kg]>>Any […/l]	NOx in µmol/l
9	NTAW	µmol/kg	MDMAP005	NO3		
10				NO2+NO3	If no NO2 measured Any […/kg]>>Any […/l]	NOx in µmol/l
11	Nitrite	µg/l	NTRIZZXX	NO2	*NO2/14.00670+NO3/14.00670*	NOx in µmol/l

12	Nitrate	µg/l	NTRAZZXX	NO3	*(assuming it is µg N/l)* calculated if Nitrite+Nitrate not available	
13				NO2+NO3	*NO3/14.00670* If no NO2 measured	NOx in µmol/l

The following steps have been performed on the original data set:

Step 1:
Some conversions are made using Excel and the file is converted to text ODV file for uploading into ODV :

- all empty lines (all QC = 9 for all parameters) have been deleted. This results into the deletion of stations with no Nitrate and Nitrite measurements which were included in the dataset.
- calculation of NOx in [µmol/l] for all cases in Table 26 except 8, 9 and 10
    - For some stations, only Nitrites are measured, these stations will not be taken into account in the final NOx [µmol/l] dataset.
- calculation of NOx in [µmol/kg] for cases 8, 9 and 10 in Table 26.except 8, 9 and 10

Step2:

- Import the ODV file into ODV.
- Creation of variable Converted Nox [µmol/l] variable: Conversion of Nox in [µmol/kg] into Nox in [µmol/l]
- Creation of an aggregated Nox variable in [µmol/l]: aggregation of NOx [µmol/l] and Converted Nox [µmol/l].

The Aggregated NOx variable contains all Nitrate or Nitrate+Nitrite measurements of the dataset. The aggregated variable **has the ODV flag scale** → the original Flag6 values are lost for the aggregated variable, since the values are <0 they will be easy to find in ODV during next step.

Step3:

- Export the collection as NOx_beforeQC.txt ODV file containing **Depth with SeaDataNet flag scale** and **Aggregated Nox [µmol/l] with the ODV flag scale**.
- Import the file NOx_beforeQC.txt into ODV.
- Set the QC flag scale to SeaDataNet for the aggregated variable (this action was not possible before this step)
- Export the collection as NOx_beforeQC_flagsSDN.txt ODV file containing Depth and the Aggregated Nox [µmol/l] variables with SeaDataNet flag scale.
- Set back the flag to 6 for all negative values of NOx.
- Change all negative values in positive ones = detection limit (4 detection limits in the dataset : 0.24, 0.5, 0.51, 0.7).
- Delete all lines with no NOx measurements.

Step4:

- Import the updated file NOx_beforeQC_flagsSDN.txt into ODV

At the end, there are **7274** stations with Nitrate or (Nitrate and Nitrite) measurements.

5.3 Data quality

5.3.1 Description of the dataset before QC

The Nitrate and Nitrite data are delivered by the following data centres:

Table 27: Number of stations with Nitrate+Nitrite per data centre

EDMO Code	Name	Country	Nb stations
353	IEO	Spain	4329
486	IFREMER/SISMER	France	1714
590	IHPT	Portugal	1143
612	IMR	Norway	11
681	RIHMI-RNODC	Russian Federation	77
		Total	**7274**

Figure 18 - Location map of the 7274 Nitrate+Nitrite stations

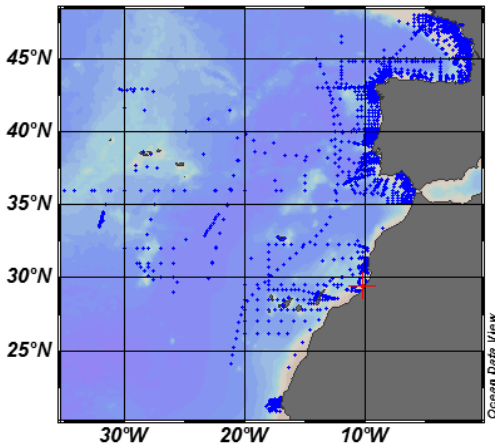
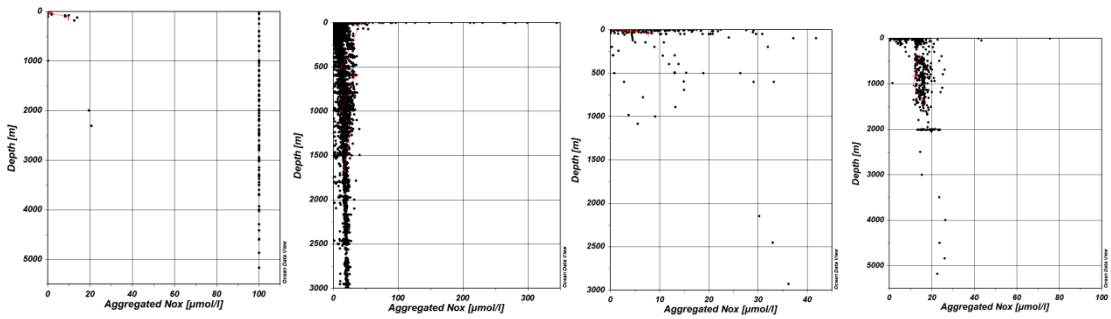


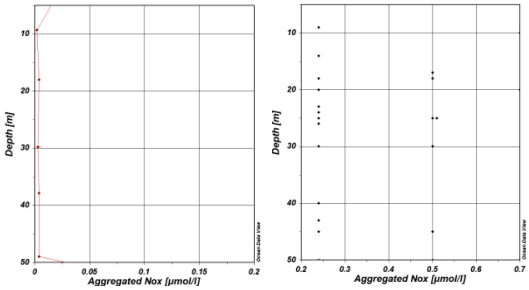
Table 28: QC flags of NOx before the QC

Flag value	NOx (Nitrate+Nitrite) [µmol/l]
0	489
1	50039
3	179
4	552
5	5
6	924
9	698
Total	**52886**

Figure 19 – QC flags of the NOx [µmol/l] before QC



Flag 0 Flag 1 Flag 3 Flag4

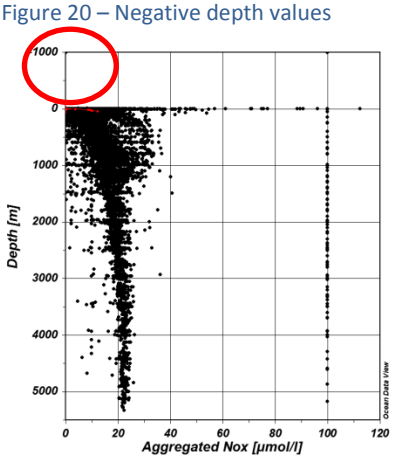


Flag 5 Flag 6

5.3.2 Description of the QCs

Problems with some depth data, negative values of Depth with QC =0 ➔ changed to QC= 4

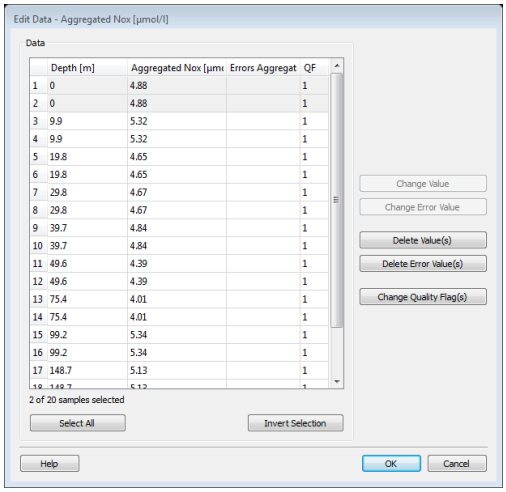
Figure 20 – Negative depth values



The merging of the 2 datasets (from MARIS Robot and then from Spain) have resulted into duplicates values for all lines of some stations as show in

Figure 21. These duplicates lines have been deleted using Excel.

Figure 21 – Duplicates lines in some stations



Some high values > 50 µmol/l near the surface are in river mouth or estuaries, these data are mostly distributed by France: GASPROD 1 and NUTRIGAS cruises in the Loire, METADOUR 1 cruise in the Adour river.
Flags 1 are kept.

Default values of NOx with QC=0 or with QC=1 ➔ changed to QC=9
Some doubtful NOx values with QC=1 ➔ changed to QC=3

All QC changes are described in Table 29: Nitrate+Nitrite Flag changes during QC stepTable 29.

Table 29: Nitrate+Nitrite Flag changes during QC step

EDMO code	Cruise	LOCAL_CDI_ID	Depth [m]	Original flag for Nitrate - Nitrite	Changed to
353	Azores I	SI2919980733003P10_353_H09	2467.7	1	3
		SI2919980733010P10_353_H09	5.2	0	1
			99.8	0	1
	CANARIAS I.CEDO-38	SI2919790046000170_353_H09	0	0	1
		SI2919790046000440_353_H09	0	0	1
	HUELVA-88	SI29198800128000A0_353_H09	0	0	1
	HUELVA-88	SI29198800128000F0_353_H09	0	0	1
	HUELVA-90	SI29199000130001C0_353_H09	26.8	1	3
		SI29199000130010C0_353_H09	26.8	1	3
		SI29199000130010C1_353_H09	26.8	1	3
	POSEIDON 237-leg3	SI2919980400300170_353_H09	592.5	1	9
			988	1	9
			1481.5	1	9
		SI2919980400300210_353_H09	2463.7	1	3
	RADCOR 2008	SI2920080045400260_353_H09	3	0	1
	RADCOR96	SI2919960044200026_353_H09	0	0	1
	RADCOR96	SI2919960044200024_353_H09	0	0	1
	RADCUD 1995	29JR199501170_09020_H09	2	0	1
		29JR199501170_10020_H09	2	0	1
		29JR199501170_10030_H09	2	0	1
	RADCUD 1998	29JR199801170_06030_H09	1	0	1
		29JR199801170_12030_H09	1	0	1
	RADCUD 1999	29JR199901210_07020_H09	2	0	1
	RADCUD 2000	29JR200001120_06010_H09	2	0	1
		29JR200001120_06020_H09	2	0	1
		29JR200001120_08020_H09	2	0	1

RADCUD 2001	29JR200101170_07030_H09	2	0	1
RADCUD 2003	29JR200301240_03030_H09	2	0	1
	29JR200301240_06010_H09	2	0	1
	29JR200301240_06020_H09	2	0	1
	29JR200301240_06030_H09	4	0	1
	29JR200301240_07010_H09	2	0	1
	29JR200301240_07020_H09	2	0	1
	29JR200301240_07030_H09	4	0	1
RADCUD 2004	29JR200402020_02030_H09	2	0	1
	29JR200402020_05020_H09	2	0	1
	29JR200402020_05030_H09	2	0	1
	29JR200402020_07020_H09	2	0	1
	29JR200402020_07030_H09	2	0	1
	29JR200402020_08020_H09	2	0	1
RADCUD 2005	29JR200501110_05020_H09	2	0	1
RADCUD 2007	29JR200701220_08030_H09	4	0	1
	29JR200802220_06030_H09	0	0	1
	29JR200802220_07010_H09	0	0	1
	29JR200802220_07020_H09	0	0	1
	29JR200802220_08010_H09	0	0	1
RADPROF 0105	29CS200501270_00080_H09	146.8	0	9
		590.7	0	9
	29CS200501270_00110_H09	1284.7	0	9
	29CS200501270_00340_H09	991.7	0	9
		1974.3	0	9
		2466.4	0	9
		2955.6	0	9
		4418.2	0	9
		4869.0	0	9
	29CS200501270_00350_H09	2951.6	0	9
	29CS200501270_00370_H09	2720.2	0	9
	29CS200501270_00380_H09	692.2	0	9
	29CS200501270_00560_H09	1.0	0	9
		9.9	0	9
		150.5	0	9
		249.5	0	9
		398.7	0	9
		497.6	0	9
		1190.7	0	9
		1975.8	0	9
		3152.3	0	9
	29CS200501270_00570_H09	1779.4	0	9
		3021.2	0	9
	29CS200501270_01040_H09	1385.5	0	9
	29CS200501270_06020_H09	1186.5	0	9
		1285.8	0	9
		1476.5	0	9
RADPROF 0204	29CS200402050_00070_H09	4.2	0	1
RADPROF 0206	29CS200602050_00070_H09	1186.3	0	9
	29CS200602050_00130_H09	2758.0	0	9
	29CS200602050_00140_H09	2757.3	0	9
		2942.0	0	9
	29CS200602050_00150_H09	1972.6	0	9
		2447.0	0	9

29CS200602050_00280_H09	246.5	0	9
	495.4	0	9
	792.2	0	9
	990.1	0	9
	1776.2	0	9
	2953.4	0	9
	3929.7	0	9
	4294.5	0	9
29CS200602050_00340_H09	1974.1	0	9
	2955.9	0	9
	3931.4	0	9
29CS200602050_00350_H09	245.9	0	9
	1973.9	0	9
	2462.4	0	9
	2952.1	0	9
29CS200602050_00360_H09	494.1	0	9
	791.1	0	9
	990.4	0	9
	1779.4	0	9
	1973.3	0	9
29CS200602050_00370_H09	1.1	0	9
	496.8	0	9
	792.8	0	9
	990.4	0	9
	1780.2	0	9
	1973.9	0	9
29CS200602050_00380_H09	594.4	0	9
	793.3	0	9
	991.1	0	9
	1037.6	0	9
29CS200602050_00560_H09	593.5	0	9
	791.8	0	9
	989.3	0	9
	1187.1	0	9
	1482.3	0	9
	1777.5	0	9
	1973.1	0	9
	2464.4	0	9
	2953.9	0	9
	4026.5	0	9
29CS200602050_00570_H09	790.3	0	9
	987.6	0	9
	1186.9	0	9
	1384.1	0	9
	1481.6	0	9
	1678.8	0	9
	1778.5	0	9
	1973.7	0	9
	2954.2	0	9
29CS200602050_00580_H09	149.9	0	9
	594.6	0	9
	793.0	0	9
	989.8	0	9
	1186.8	0	9

	1482.4	0	9
	1778.8	0	9
	1973.3	0	9
	2170.8	0	9
	2374.5	0	9
29CS200602050_00590_H09	595.1	0	9
	793.2	0	9
	990.5	0	9
	1187.5	0	9
	1483.7	0	9
	1776.2	0	9
	1976.0	0	9
	2169.9	0	9
29CS200602050_00600_H09	396.0	0	9
	591.4	0	9
	790.9	0	9
	988.7	0	9
	1187.4	0	9
	1482.8	0	9
	1778.9	0	9
	1973.7	0	9
	2171.0	0	9
	2403.1	0	9
29CS200602050_00610_H09	496.4	0	9
	593.6	0	9
	691.6	0	9
29CS200602050_00630_H09	2.4	0	9
29CS200602050_01080_H09	790.5	0	9
	989.0	0	9
	1974.3	0	9
	2954.3	0	9
	3930.7	0	9
	4605.3	0	9
29CS200602050_01130_H09	247.7	0	9
	495.2	0	9
	594.8	0	9
	791.9	0	9
	990.5	0	9
	1776.7	0	9
	1974.2	0	9
	2464.0	0	9
	2952.7	0	9
	3442.7	0	9
	3928.5	0	9
	4587.1	0	9
29CS200602050_01150_H09	246.5	0	9
	494.6	0	9
	791.8	0	9
	988.8	0	9
	1186.6	0	9
	1775.5	0	9
	1973.2	0	9
	2464.1	0	9
	2953.2	0	9

RADPROF 0208	29CS200802110_00070_H09	2.0	0	9
	29CS200802110_00080_H09	1500.7	0	9
		1802.6	0	9
		1901.5	0	9
		1998.7	0	9
		2104.5	0	9
		2200.5	0	9
	29CS200802110_00110_H09	1596.6	0	9
		1800.6	0	9
		1999.5	0	9
		2097.6	0	9
	29CS200802110_00130_H09	1801.4	0	9
		2497.8	0	9
		2600.7	0	9
		3304.1	0	9
	29CS200802110_00140_H09	1200.7	0	9
		1400.9	0	9
		1596.8	0	9
		1799.7	0	9
		1997.7	0	9
		2199.8	0	9
		2299.7	0	9
		2499.0	0	9
		2598.9	0	9
		2794.5	0	9
		2997.0	0	9
		3200.4	0	9
		3304.5	0	9
	29CS200802110_00150_H09	1200.4	0	9
		1201.4	0	9
		1201.6	0	9
	29CS200802110_00160_H09	2.4	0	9
		48.1	0	9
		1898.2	0	9
		2199.5	0	9
	29CS200802110_00170_H09	2047.2	0	9
	29CS200802110_00180_H09	698.3	0	9
		1499.3	0	9
		1598.5	0	9
		1701.5	0	9
	29CS200802110_00340_H09	2497.7	0	9
		2798.8	0	9
		3299.5	0	9
		3499.8	0	9
		3601.2	0	9
	29CS200802110_00350_H09	1999.8	0	9
		2299.3	0	9
		2499.8	0	9
		2798.1	0	9
		3000.0	0	9
		3298.2	0	9
		3493.2	0	9
		3688.9	0	9
	29CS200802110_00360_H09	2001.8	0	9

	2299.7	0	9
	2490.5	0	9
	2791.1	0	9
	2997.8	0	9
	3297.9	0	9
	3500.8	0	9
	3701.2	0	9
29CS200802110_00370_H09	2700.7	0	9
29CS200802110_00560_H09	799.8	0	9
	2996.9	0	9
	3322.5	0	9
29CS200802110_00580_H09	702.0	0	9
	798.1	0	9
	1003.7	0	9
	1200.8	0	9
	1301.0	0	9
	1399.8	0	9
	1799.2	0	9
29CS200802110_00610_H09	499.5	0	9
	499.6	0	9
	499.7	0	9
29CS200802110_01040_H09	1001.2	0	9
29CS200802110_01070_H09	1001.5	0	9
	1090.4	0	9
	1196.3	0	9
	1600.2	0	9
	1898.4	0	9
	2000.0	0	9
29CS200802110_01100_H09	1800.5	0	9
	3299.3	0	9
	3997.5	0	9
29CS200802110_01110_H09	2798.7	0	9
	3497.8	0	9
	3997.7	0	9
	5173.6	0	9
29CS200802110_01120_H09	2501.4	0	9
	2992.9	0	9
	3501.6	0	9
29CS200802110_01130_H09	1198.8	0	9
	1299.2	0	9
	1800.7	0	9
	2199.2	0	9
	2499.2	0	9
	2798.0	0	9
	2996.6	0	9
	3198.4	0	9
	3496.9	0	9
	3696.7	0	9
29CS200802110_01140_H09	1799.3	0	9
	1999.4	0	9
	2199.3	0	9
29CS200802110_01150_H09	1500.8	0	9
	3292.3	0	9
29CS200802110_01160_H09	2499.4	0	9

		29CS200802110_01170_H09	799.7	0	9
			1001.5	0	9
			1502.2	0	9
			1800.1	0	9
			2000.7	0	9
			3000.3	0	9
		29CS200802110_01200_H09	1200.9	0	9
			1301.3	0	9
			2199.2	0	9
			2798.5	0	9
			3298.9	0	9
			3379.7	0	9
	RADPROF 0403	29CS200304090_00540_H09	4108.2	1	3
	RADPROF 0706	29CS200607120_00350_H09	3931.5	1	9
			4322.3	1	9
		29CS200607120_00550_H09	790	1	9
			987.5	1	9
			1234.7	1	9
			1480.8	1	9
			1726.9	1	9
		29CS200607120_00560_H09	3441.4	1	9
			1480.6	1	9
			1973.1	1	9
		29CS200607120_00600_H09	1234.7	1	9
		29CS200607120_01070_H09	595	1	9
			691.4	1	9
			791.6	1	9
		29CS200607120_01810_H09	2952.6	1	9
			3441.5	1	9
			4082.1	1	9
		29CS200607120_01830_H09	3441.8	1	9
			4210.8	1	9
		29CS200607120_01840_H09	1726.1	1	9
			2462.8	1	9
			2549.7	1	9
	RADPROF 0805	SI29200508200_00330_H09	5.6	0	1
	RADPROF 0811	29CS201108140_01180_H09	989.9	0	9
	RADPROF 0903	29CS200309100_00160_H09	2.9	0	1
	RADPROF 0904	29CS200409070_00170_H09	all	1	9
		29CS200409070_00330_H09	52.9	0	1
	RADSAN 1994	SI2919940042102Aa0_353_H09	0	0	1
	RADSAN 1999	SI2919990069902A10_353_H09	0	0	1
	RADSAN 2000	SI2920000070004A90_353_H09	0	0	1
	RADSAN 2011	29JR201101100_05040_H09	0	0	1
		29JR201101100_07040_H09	0	0	1
	RADVIGO 2001	SI2920010043400151_353_H09	0	0	1
	RADVIGO 2007	29JN200701240_09030_H09	79.4	0	9
	RADVIGO 2009	29JN200901280_02030_H09	0	0	1
		29JN200901280_07010_H09	0	0	1
	STOCA 1110	29CS20101106S0GD10_353_H09	5.0	0	1
		29CS20101106S0GD60_353_H09	5.0	0	1
	STOCA 1111	29CS20111121S0SP60_353_H09	5.0	0	1
	STOCA 0311	29CS20110315S0GD40_353_H09	5	0	1
	STOCA 0312	29CS20120329S0TF30_353_H09	74.4	1	3

		29CS20120329S0GD30_353_H09	73.4	1	3
		29CS20120329S0GD10_353_H09	17.9	1	3
		29CS20120329S0SP60_353_H09	5.0	0	1
	STOCA 0812	29RM20120805S0TF20_353_H09	5	0	1
		29RM20120805S0SP60_353_H09	5	0	1
		29RM20120805S0SP30_353_H09	5	0	1
		29RM20120805S0SP20_353_H09	5	0	1
		29RM20120805S0SP10_353_H09	5	0	1
486	CINECA 4 CH41	FI35197300071_01100_H09	0	0	1
	CINECA III JEAN CHARCOT	FI35197200471_00020_H09	0	0	1
		FI35197200471_00330_H09	0	0	1
		FI35197200471_00420_H09	0	0	1
	CINECA V	FI35197400131_00540_H09	0	0	1
		FI35197400131_00550_H09	0	0	1
		FI35197400131_00720_H09	0	0	1
		FI35197400131_00860_H09	0	0	1
		FI35197400131_01070_H09	0	0	1
	CINECA V CAP 7403	FI35197400211_00300_H09	0	0	1
	DINOPHYSIS 88	FI35198800841_00410_H09	1	0	1
	HABIT 2006	FI35200604005_00003_H09	5	0	1
	METADOUR 1	FI35200148003_00010_H09	24.8	1	3
	PEGASE 97	FI35199704004_02670_H09	0	0	1
	PEGASE 98	FI35199804007_02940_H09	2	0	1
	S.H 135650	FI35197200891_00010_H09	1976.6	1	3
			2950.2	1	3
			3432.9	1	3
			3913.6	1	3
			4392.2	1	3
			4678.7	1	3
		FI35197200891_00070_H09	0.0	0	1
			2447.3	1	3
			2835.4	1	3
		FI35197200891_00080_H09	0.0	0	1
		FI35197200891_00100_H09	2921.5	1	3
			3400.6	1	3
		FI35197200891_00110_H09	3421.1	1	3
590	DISEPLA2002	DISEPLA2002_Nut_CTD_14.0_H09	5	0	1
	IHPT2006-HERMES03	HPT2006-HERMES03_Nut_018.0_H09	1000.0	1	3
		IHPT2006-HERMES03_Nut_022.0_H09	2000.0	1	3
		IHPT2006-HERMES03_Nut_023.0_H09	1100.0	1	3
		IHPT2006-HERMES03_Nut_051.0_H09	67.0	1	3
		IHPT2006-HERMES03_Nut_081.0_H09	68.0	1	3
		IHPT2006-HERMES03_Nut_101.1_H09	1200.0	1	3
		IHPT2006-HERMES03_Nut_110.0_H09	1494.0	1	3
		IHPT2006-HERMES03_Nut_126.0_H09	2100.0	1	3
		IHPT2006-HERMES03_Nut_140.0_H09	1787.0	1	3
	IHPT2010-HERMES02	IHPT2010-HERM02_Nut_258.0_H09	2000.0	0	1
			2305.0	0	1
	64PE252	64PE252_Nut_001.0_H09	3500.0	1	3
		64PE252_Nut_003.0_H09	3500.0	1	3
		64PE252_Nut_050.0_H09	2500.0	1	3
			3465.0	1	3
		64PE252_Nut_053.0_H09	2500.0	1	3
681	17086	RNODC_Bottle_17086_118	8.0	0	1

5.3.3 Description of the final dataset, after QC

Total number of stations after the QC: 7272.

Final dataset is *data_from_NOx_final.txt* (corresponding to the collection *NOx_final.odv*)

Figure 22 -Location map of the final NOx collection

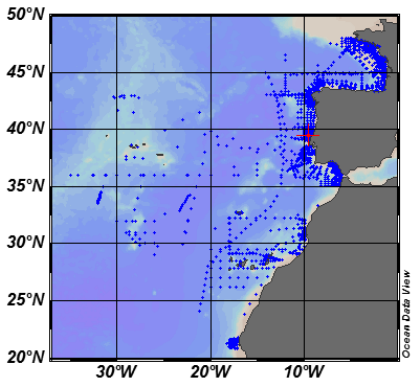


Table 30: QC flags of NOx after the QC

Flag value	NOx (Nitrate+Nitrite) [µmol/l]
0	0
1	46188
3	222
4	251
5	5
6	924
Total	**47590**

Figure 23 - final collection of NOx
Range fixed to 0-400 µmol/l

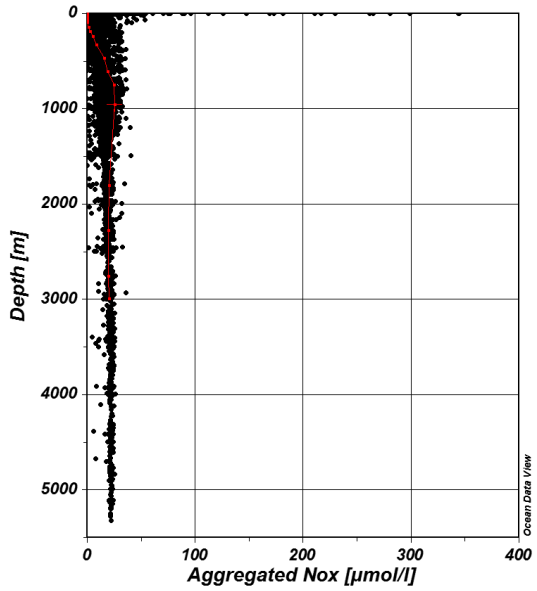
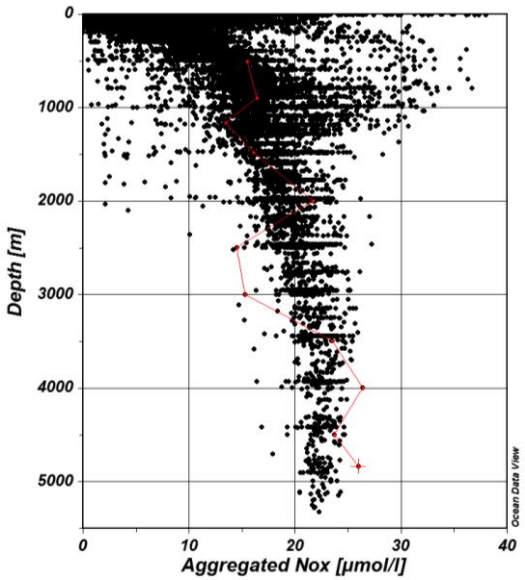


Figure 24 - Flag 1 for NOx in the final collection –
Range fixed to 0-40 µmol/l to avoid river mouth data



Statistics on the final Nox collection:

Figure 25 - Distribution of the Nitrate + Nitrite data (by location, by Time period and by Season)