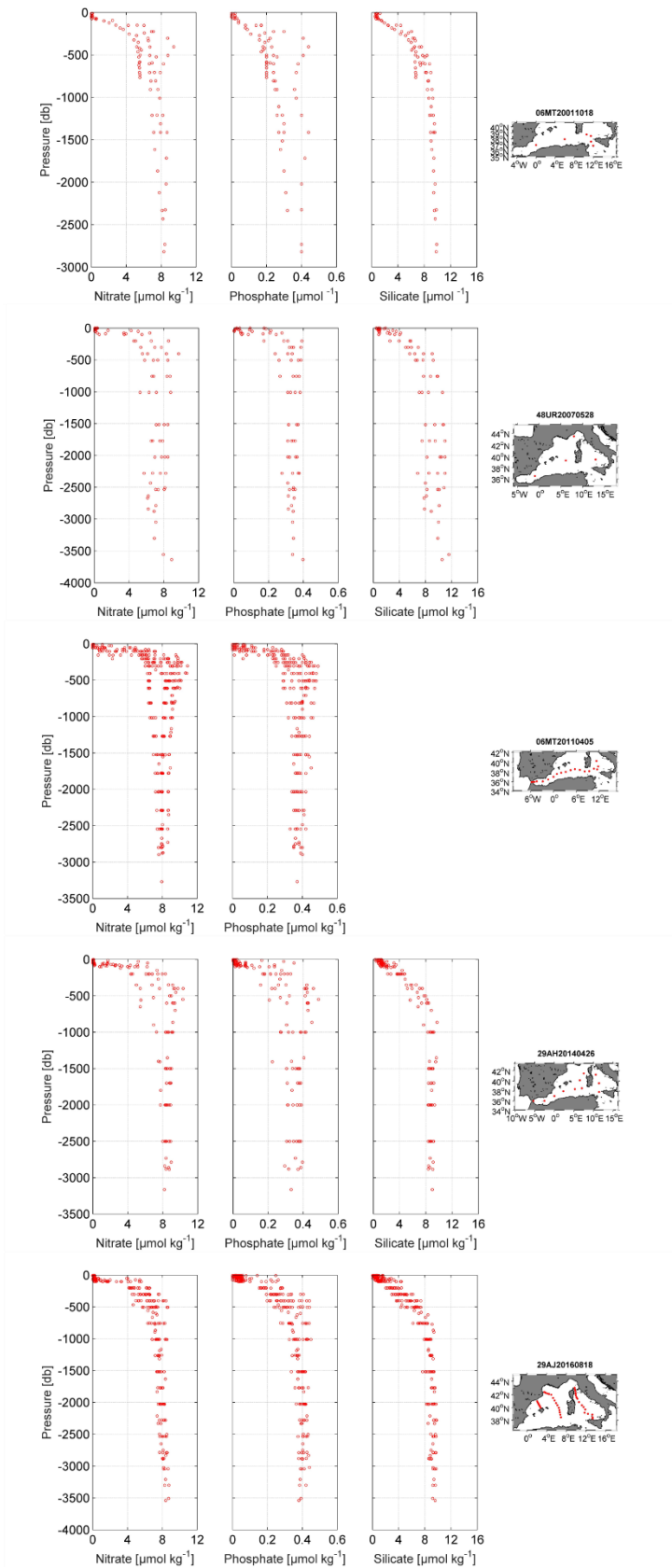
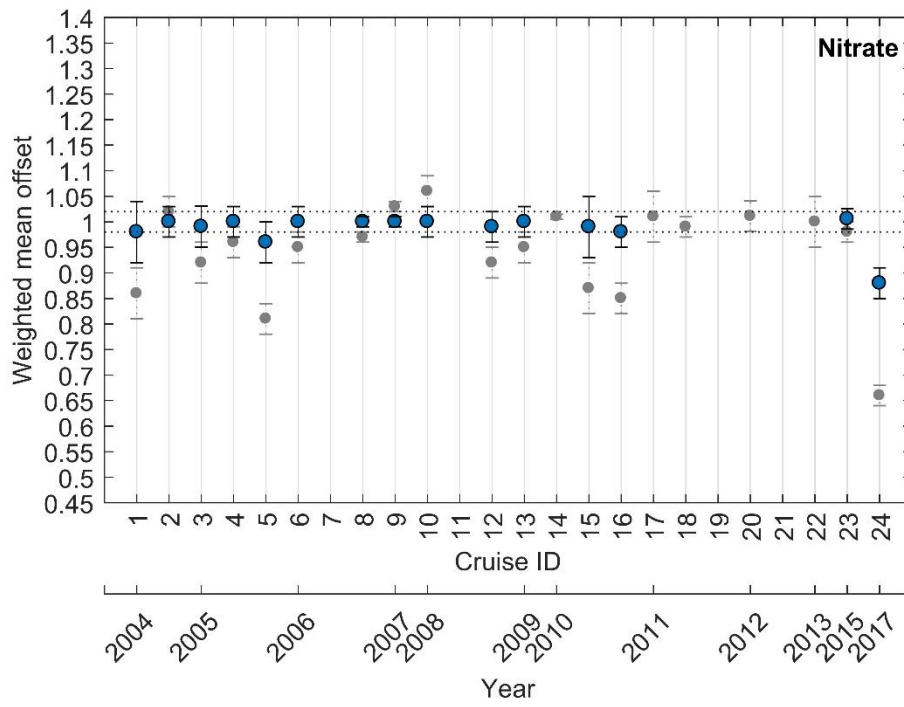
Supplementary material – Part 1

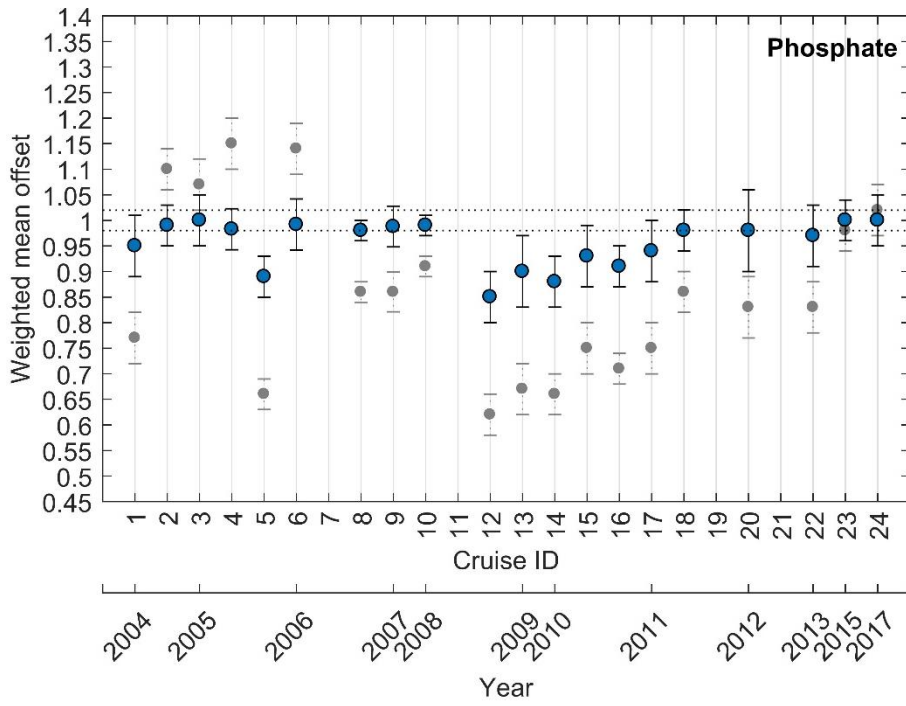
Figure 1S. Overview of vertical inorganic nutrient profiles and spatial coverage of reference cruises.

5   **Figure 2S**. Weighted mean offset for nitrate, before (grey) and after adjustment (blue). Error bars

6   indicate the standard deviation of the absolute weighted offset. The dashed lines indicate the accuracy

7   limit 2% for an adjustment to be recommended.

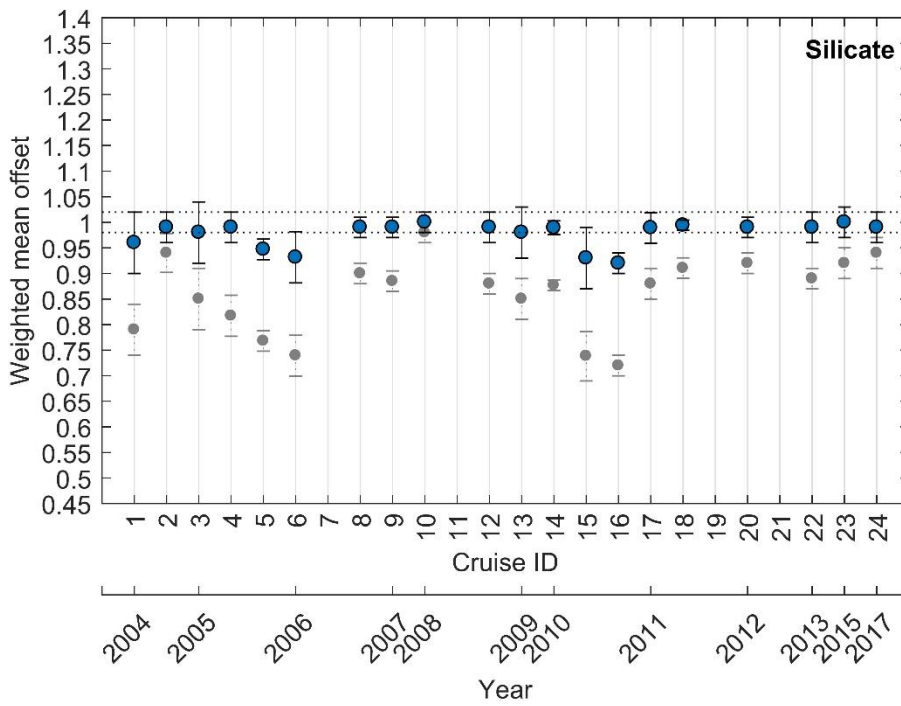
8

9

10   **Figure 3S**. Same as Fig. 2S but for phosphate.

11

12

13

14 **Figure 4S.** Same as Fig. 2S but for silicate.

15

16

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19   **Table 1S.** Reference cruises and coefficient of variation of nitrate, phosphate and silicate below

20   1000db.

Reference cruise ID/ Expocode		CV below 1000db		
		Nitrate	Phosphate	Silicate
6	06MT20011018	0.064762	0.17936	0.035814
22	48UR20070528	0.12141	0.074747	0.14479
27	29AJ20160818	0.05263	0.062751	0.054572
64	06MT20110405	0.073518	0.071952	-
17	29AH20140426	0.045697	0.11281	0.036588

21

22

Supplementary material – Part 2

A1. Database description

25   The database includes 870 stations sampled during 24 cruises between 2004 and 2017 in the Western

26   Mediterranean Sea (the reference cruise 29AJ20160818 was included in this dataset as cruise #24

27   because, it is part of the CNR-ISMAR data collection program), mainly on board of research vessels

28   owned by the Italian National Research Council. It includes bottle data combined with CTD data.

29   In all stations, measurements were carried out with a CTD-rosette system consisting of a CTD SBE

30   911 plus and a General Oceanics rosette with 24 12-l Niskin Bottles at the observed depth of the bottle

31   sample. Temperature measurements were performed with an SBE-3/F thermometer with a resolution

32   of $10{-}3$ °C and conductivity measurements were performed with an SBE-4 sensor with a resolution of

33    $3 \cdot 10{-}4$ S/m. The probes were calibrated before and after the cruise. Except for salinity, no certified

34   reference material (CRM) was used. CTD salinity was calibrated against measurements made with a

35   salinometer.

36   Samples of nitrate, phosphate and silicate were frozen to -20°C and stored before being analysed in

37   laboratories onshore.

38   Measurements were subjected to a rigorous quality control (primary and secondary quality control)

39   and the dataset presented is the product adjusted after the application of quality control approaches.

40

41 **A2. Database organization details**

42 Cruise identification: To guarantee the comparability between measurements, an alphanumeric
43 identification code (ID) together with an expedition code (Expocode) are defined a unique identifier.

Parameter	Unit/format	Variable in dataset	Method/ description	Comment	Original dataset	Adjusted dataset
Expedition code	12 digits	EXPOCODE	*Shipcode_yyyy_mm_dd* *yyyy_mm_dd: starting day*		✓	✓
Cruise ID		CRUISE	From 1 to 24		✓	✓
Event date	yyyy-mm-dd	DATE			✓	✓
Event time	hhmm	TIME			✓	✓
Day	dd	DAY			✓	✓
Month	mm	MONTH			✓	✓
Year	yyyy	YEAR			✓	✓
Longitude		LATITUDE			✓	✓
Latitude		LONGITUDE			✓	✓
Station number		STNNBR			✓	✓
Niskin bottle number		BTLNBR			✓	✓
Cast number		CASTNO			✓	✓
Pressure	dbar	CTDPRS	CTD pressure		✓	✓
Depth	Meters	DEPTH	Depth from pressure		✓	✓
Salinity		CTDSAL	CTD salinity	PSS-78	✓	✓
Salinity flag		CTDSAL_FLAG_W	WOCE flags		✓	✓
Temperature	°C	CTDTMP	CTD temperature	ITS-90	✓	✓
Potential temperature		THETA	Theta from CTDTMP CTDSAL		✓	✓
Nitrate	µmol kg^{-1}	NITRAT	standard colorimetric methods*		✓	✓
Nitrate flag		NITRAT_FLAG_W	WOCE flags After 1st quality control		✓	
Recommended nitrate flag		NITRAT_FLAG_re	WOCE flags recommended final flagging	Details in Section 5.4		✓
Phosphate	µmol kg^{-1}	PHSPHT	standard colorimetric methods*		✓	✓
Phosphate flag		PHSPHT_FLAG_W	WOCE flags After 1st quality control		✓	
Recommended phosphate flag		PHSPHT_FLAG_re	WOCE flags recommended final flagging	Details in Section 5.4		✓
Silicate	µmol kg^{-1}	SILCAT	standard colorimetric methods*		✓	✓
Silicate flag		SILCAT_FLAG_W	WOCE flags After 1st quality control		✓	
Recommended silicate flag		SILCAT_FLAG_re	WOCE flags recommended final flagging	Details in Section 5.4		✓

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45 * Standard colorimetric methods of seawater analysis (Grasshoff et al. (1999))

46 - **Data format**

47 *Original dataset: CNR_DIN_WMED_20042017_original.csv:* This is the original dataset with 24
48 fields including flag variables of 24 cruises for nitrate, phosphate, silicate and CTD salinity from the
49 primary quality control.

50

51 *Adjusted dataset: CNR_DIN_WMED_20042017_adjusted.csv*: This is the adjusted product with 24
52 fields, after removing outlier data (issued from primary quality control) and after applying adjustment

53 factors from the secondary quality control. Recommendations of section 5.4 are included in the flag
54 variables

55