Supplementary material to Aardema et al:

High resolution measurements of phytoplankton photosynthesis and abundance in the Dutch North Sea

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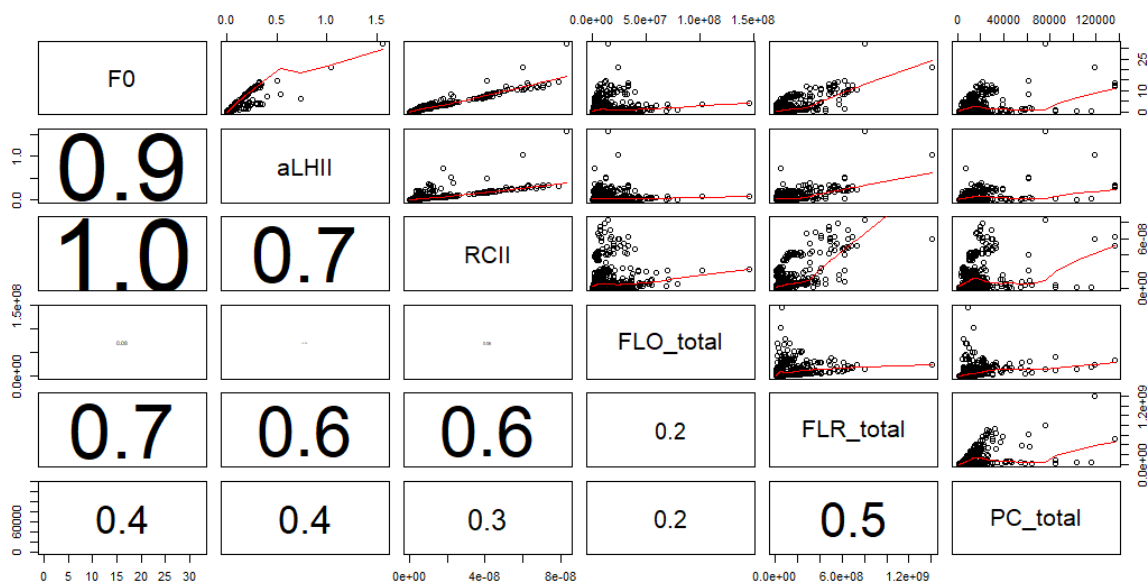
Figure S1: Pairplot of parameters informative on total phytoplankton abundance of the combined data of all cruises. F0, aLHII and RCII are derived from FRRf measurements. FLO_total, FLR_total and PC_total from FCM.
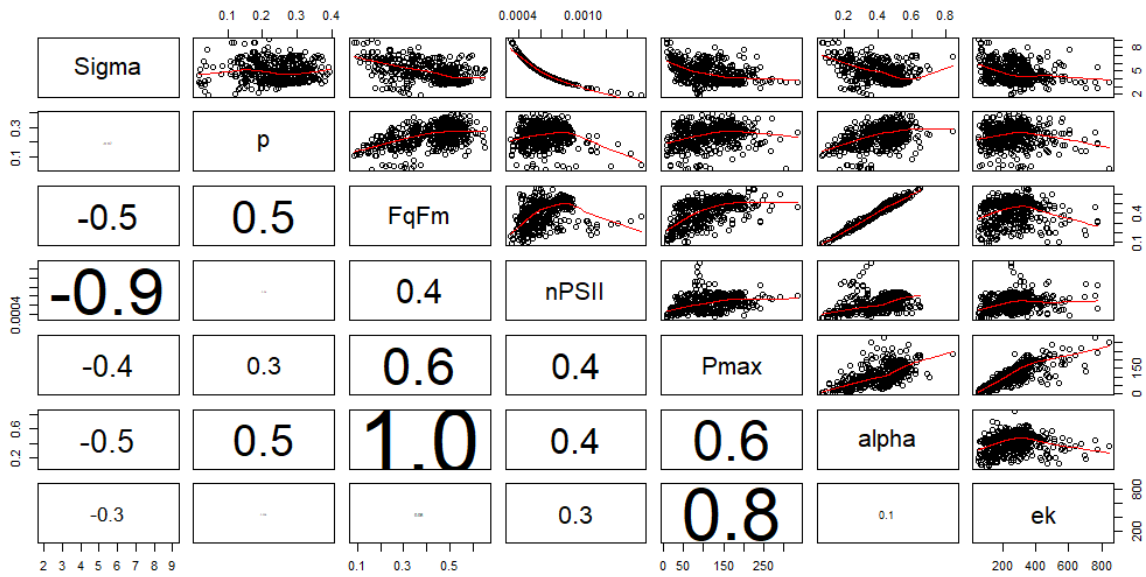
Figure S2: Pairplot of parameters informative on photophysiology of the phytoplankton as derived by FRR fluorometry.

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Table S1: nutrient concentrations (micromol/L) for the different stations for the Months April, May, June and August. The stations are named according to name of the transects (from South to North: off the coast from Walcheren (WALCRN), Noordwijk (NOORDWK) and Terschelling (TERSLG)) and the distance in kilometres from the coast. Potentially limiting nutrient concentrations are colored red, we used threshold concentration for DIN and Si as 2 µmol L^{-1} and PO$_4^{3-}$ as 0.2 µmol L^{-1} (Peperzak et al, 1991, Philippart et al., 2007), although Ly et al. (2014) showed that for Wadden Sea phytoplankton phosphate can become limiting when values become lower than 0.13-0.16 µmol L^{-1}.

Station	DIN (µM)				PO$_4$ (µM)				Si (µM)			
	April	May	June	August	April	May	June	August	April	May	June	August
WALCRN2	1.0	2.4	3.4	1.0	0.2	0.2	0.4	0.6	0.6	0.7	1.4	1.9
WALCRN20	1.2	3.1	1.1	0.3	0.1	0.1	0.3	0.3	0.2	2.7	0.5	2.0
WALCRN70	1.1	1.2	1.1	0.3	0.2	0.2	0.2	0.1	0.0	0.6	0.4	0.9
NOORDWK2	37.5	21.7	4.9	0.4	0.3	0.6	0.2	0.2	6.7	3.5	0.8	1.2
NOORDWK10	28.5	15.0	3.1	0.6	0.2	0.1	0.4	0.1	2.9	3.2	0.7	1.4
NOORDWK20	21.6	4.9	0.9	0.2	0.2	0.1	0.2	0.1	1.3	0.7	0.8	0.6
NOORDWK70	0.4	1.0	0.9	0.1	0.2	0.2	0.3	0.2	0.0	1.1	1.7	0.1
TERSLG10	10.1	1.9	0.9	0.6	0.3	0.2	0.2	0.2	3.0	2.4	0.5	0.7
TERSLG50	8.9	0.7	3.4	2.8	0.5	0.2	0.2	0.3	4.6	1.7	2.4	5.0
TERSLG100	12.6	0.7	1.9	0.3	0.5	0.2	0.3	0.2	3.9	0.5	1.1	1.7
TERSLG135	1.6	0.8	0.9	0.2	0.4	0.1	0.1	0.3	2.0	0.8	0.9	1.8
TERSLG175	0.9	NA	1.0	0.0	0.2	NA	0.2	0.2	0.6	NA	0.5	0.1
TERSLG235	1.0	NA	0.9	0.6	0.2	NA	0.3	0.3	0.0	NA	1.1	0.5

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Table S2: nutrient ratios for the Months April, May, June and August. The stations are named according to name of the transects (from South to North: off the coast from Walcheren (WALCRN), Noordwijk (NOORDWK) and Terschelling (TERSLG)) and the distance in kilometres from the coast. Colour shows the potential limiting nutrient based on "Redfield ratios" (N:P:Si=16:1:16), where red suggests potential P-limitation and blue potential N-limitation (left) or Si-limitation (right). Figures in bold are also assumed limiting based on nutrient concentration, where we used threshold concentration for DIN and Si as 2 μmol L^{-1} and PO$_4^{3-}$ as 0.2 μmol L^{-1} (Peperzak et al, 1991, Philippart et al., 2007), although Ly et al. (2014) showed that for Wadden Sea phytoplankton phosphate can become limiting when values become lower than 0.13-0.16 μmol L^{-1}.

N:P				
Station	April	May	June	August
WALCRN2	5.9	11.1	9.4	1.9
WALCRN20	9.0	27.2	4.0	1.2
WALCRN70	5.2	6.1	7.0	2.7
NOORDWK2	136.6	33.9	21.9	2.4
NOORDWK10	133.6	155.2	7.0	3.8
NOORDWK20	131.0	33.2	4.0	1.2
NOORDWK70	2.5	5.6	3.0	0.6
TERSLG10	30.4	9.2	4.2	2.8
TERSLG50	17.1	3.9	16.2	8.6
TERSLG100	23.7	3.8	6.1	1.4
TERSLG135	3.7	6.4	6.3	0.9
TERSLG175	3.4	NA	6.0	0.1
TERSLG235	4.3	NA	3.1	2.5

Si:P				
Station	April	May	June	August
WALCRN2	3.8	3.2	3.8	3.5
WALCRN20	1.5	23.8	2.0	6.6
WALCRN70	0.2	3.3	2.5	7.6
NOORDWK2	24.3	5.5	3.8	7.0
NOORDWK10	13.4	32.9	1.6	9.3
NOORDWK20	7.6	4.6	3.5	4.5
NOORDWK70	0.0	5.9	5.9	0.4
TERSLG10	9.1	11.6	2.3	3.2
TERSLG50	8.9	9.3	11.3	15.2
TERSLG100	7.3	2.9	3.6	7.8
TERSLG135	4.8	6.2	6.6	7.0
TERSLG175	2.5	NA	3.2	0.3
TERSLG235	0.0	NA	3.8	1.8