CRUISE REPORT 64PE366

CHARLET-3

15 – 25 March 2013

Ship	**: RV Pelagia**
Cruise Name	**: CHARLET** - Changes in resource limitation and energy transfer
Cruise Number	**: 64PE366**
Cruise Period	**: 15-25 March 2013**
Port of departure	**: Texel, NL**
Port of return	**: Texel, NL**
Responsible Institute	**: Royal Netherlands Institute for Sea Research (NIOZ)** **Landsdiep 4, 1797 SZ 't Horntje, Texel, The Netherlands**
Chief Scientist	**: Dr. C. P.D. Brussaard** **Dept. Biological Oceanography, NIOZ**

Acknowledgements

We like to express special thanks to Captain Pieter Kuijt and the crew of the R/V Pelagia. Furthermore, we thank Sander Asjes for onboard technical assistance, and Sharyn Ossebaar (NIOZ-Nutrient Lab) for nutrient analysis. We thank the NIOZ-Marine Research Facilities (MRF), NIOZ-Marine Technology (MT; Yvo Witte and Marcel Bakker) and NIOZ-Data Management (DMG) for on-shore support. The cruise was supported by the Research Council for Earth and Life Sciences (ALW) with financial aid from the Netherlands Organisation for Scientific Research (NWO).

CONTENT

Project abstract

- CHARLET -
Primary Production in the North Sea:
CHAnges in Resource Limitation and Energy Transfer

Primary production by phytoplankton provides the basis of marine food webs and is strongly determined by nutrient and light availability. Measures against eutrophication have mainly led to a reduction in phosphorus inputs into coastal seas like the North Sea, whereas nitrogen and silica loadings were much less reduced. This has resulted in major changes in the relative availability of different nutrients, and there is currently substantial disagreement whether phytoplankton growth in coastal waters is limited by nitrogen, phosphorus, or light. Furthermore, resource-mediated changes in the cellular composition of phytoplankton will have major implications for their nutritional quality for zooplankton, with effects that may cascade throughout the entire aquatic food web.

In this project, we will determine the limiting factors for phytoplankton growth in the North Sea, and how these limiting factors affect the food quality and species composition of the phytoplankton. We use novel approaches to assess in-situ resource limitation using stable isotope labeling, and implement the results of these studies in competition models describing phytoplankton growth in the North Sea. Furthermore, we investigate how the transfer of primary production to the classical zooplankton-based food web versus the viral loop is affected by shifts in the phytoplankton community and their food quality.

As part of the Dutch ZKO (Sea, Coast and Ocean) competitive funding program we will investigate how changes in resource limitation affect phytoplankton communities, and consequently energy transfer, in the North Sea. The project runs for 4 years (2011-2015).

The project combines mathematical models, laboratory studies and field work during cruises with the R/V Pelagia in two contrasting areas of the North Sea: the productive coastal area with relatively high nutrient inputs from rivers and the central North Sea with much reduced nutrient levels especially during summer. The project involves 4 cruise in the North Sea during spring and summer, of which the current one is the third cruise (the others took place in summer). The proposed work will offer key insights into the impact of changes in resource limitation on the carrying capacity of the North Sea.

Project Introduction and Objectives

Phytoplankton fix large amounts of CO_2 and account for almost half of the total primary production on Earth. These photosynthetic microorganisms make up the base of the marine food web and provide more than 99% of the organic matter used by marine food webs (Fig. 1). Phytoplankton production sets upper limits to both the overall activity of the pelagic food web and the quantity of organic carbon exported downwards. The nature and activity of the phytoplankton community are strongly influenced by physical and chemical factors that determine their light and nutrient availability. Phytoplankton losses by viral infection-induced death, grazing and sinking, however, restrain primary production and are thus equally important for ocean ecosystem productivity. These controlling processes influence the cycling of energy and biogeochemically relevant elements each very differently, directly affecting the production/respiration ratio of the ocean and the efficiency of the biological pump. As nicely formulated by Kirchman (1999), "how phytoplankton die largely determines how other marine organisms live". Phytoplankton biomass that sinks from the euphotic zone has a strong impact on carbon sequestration in the oceans, whereas grazed algae are channelled to higher trophic levels. Viral lysis directly affects the standing stock of dissolved organic carbon which forces the food web towards a more regenerative pathway.

The carrying capacity of ecosystems can be defined as the number of organisms or biomass at a given trophic level (e.g. primary producers, herbivores, carnivores) that can be sustained by the environment. Nitrogen availability is often thought to be the main limiting factor for primary production in the sea. However, management measures against eutrophication have mainly led to reduction in phosphorus (P) concentrations, whereas nitrogen (N) inputs were much less reduced or remained at similar levels (Turner et al 2003). This has induced major shifts in the N:P:Si ratios of coastal seas such as the North Sea and may have resulted in a shift from N limitation to P limitation. Surprisingly, long-term studies on phytoplankton biomass in the North Sea indicate an increase in phytoplankton biomass since the 1990s, especially in coastal areas, which appear to be related to an improved light climate. As phytoplankton play a central role in marine food webs, identification of the limiting resource for phytoplankton growth (N, P or light) is essential for our understanding of the North Sea ecosystem.

It is well-known that changes in nutrient and light availability affect both the biochemical composition and species composition of phytoplankton. Resource-mediated changes in phytoplankton stoichiometry have major implications for their nutritional quality for zooplankton, with effects on nutrient and energy transfer that may cascade throughout the entire aquatic food web. Moreover, a substantial fraction of phytoplankton production is not transferred to the classical food web, but regenerated within the microbial loop as viral infections are an important loss term for phytoplankton. Changes in resource limitation of the North Sea are thus likely to affect the phytoplankton species composition and their biochemical composition, which in turn may strongly determine whether primary production is either utilized by zooplankton and transferred to higher trophic levels or is lost in the viral loop.

In this project, we determine the limiting factors for phytoplankton growth in the North Sea and how changes in limiting resources affect the cellular composition, ecological stoichiometry and species composition of the plankton community. Based on recent developments in stable isotope labeling and analysis, it is now possible to study the biosynthesis of all major cellular compounds in organisms. We use these new methods to study in-situ nutrient and light limitation, and how this affects phytoplankton and zooplankton stoichiometry in the North Sea. In addition, we will develop competition models and perform

competition experiments to establish how changes in resource limitation of the North Sea affect phytoplankton community composition. Furthermore, we investigate to what extent changes in phytoplankton species composition and their nutritional quality (cellular composition) will affect trophic transfer efficiency of nutrients and energy to zooplankton grazing versus viral lysis. For instance, viruses are P-rich compared to zooplankton, such that reduced P contents in phytoplankton might result in shifts from virus attacks to more intense zooplankton grazing. We will study these processes in two contrasting areas of the North Sea: the coastal area with generally higher nutrient concentration due to direct inputs from rivers and the central North Sea with much reduced nutrient levels especially during summer.

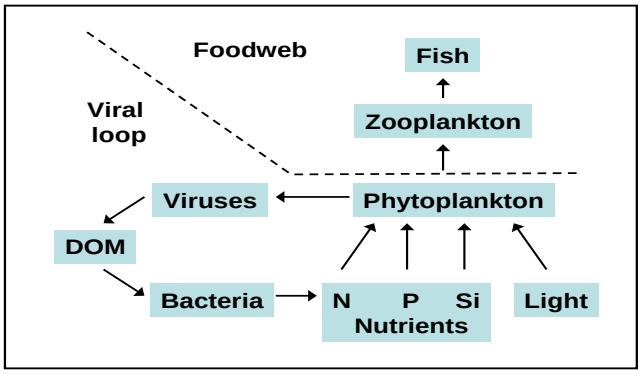


Fig 1. Integration of processes studied in this project. We will investigate how changes in resource availability affect the biochemical composition and species composition of the phytoplankton, and the subsequent transfer of phytoplankton production to the classic food web and the viral loop.

Within the CHARLET project the **following hypotheses are formulated**:

i. The first hypothesis that will be tested is that changes in nutrient and light (co-)limitation lead to predictable changes in the stoichiometry of North Sea phytoplankton species. We will exploit these relationships to study which resources limit phytoplankton growth, during different times of the year and at different locations in the North Sea.

ii. The second hypothesis is that changes in resource limitation have a major impact on the phytoplankton species composition of the North Sea. Some of these shifts in species composition will be straightforward to predict. For instance, it seems likely that poor competitors for phosphorus will disappear under severe phosphorus limitation. However, other changes in species composition will be more difficult to predict, because of the high dimensionality of the plankton community. In particular, we hypothesize that phytoplankton competition for three limiting resources (nitrogen, phosphorus, and light) may lead to multiple alternative stable states in community composition, through the formation of coalitions among the competing species.

iii. The third hypothesis implies that changes in phytoplankton stoichiometry have major consequences for the structure and functioning of the food web and therefore for the carrying capacity of the North Sea. Changes in phytoplankton stoichiometry will be traced into the cellular composition of zooplankton.

iv. The fourth main hypothesis predicts that changes in phytoplankton stoichiometry, due to alterations in resource limitation, will directly and indirectly affect grazing and viral mediated mortality rates, thereby impacting ecosystem functioning and carrying capacity. The requirements for viral production are P-controlled, and thus a change from N to P limitation of phytoplankton growth will promote the relative importance of zooplankton grazing as dominant loss factor.

v. The last hypothesis states that viral activity will modify the cellular composition of their phytoplankton host, which will subsequently affect the nutritional value of the host for grazers as well as the biogeochemical fluxes of C, N and P upon cell lysis.

The above mentioned hypotheses translate into the **following main objectives of the CHARLET** project:

1. To study the effect of resource limitation on the physiology and biochemical composition of representative phytoplankton and zooplankton species from the North Sea in laboratory cultures. We will implement a novel technique using stable isotopes to identify resource limitation in phytoplankton, first in the lab and then in the North Sea (NIOZ-YE).
2. To investigate how changes in nitrogen, phosphorus and light limitation affect phytoplankton competition and community structure (UvA).
3. To examine how changes in resource limitation and the biochemical composition of the phytoplankton affect the transfer of primary production to zooplankton grazing versus the viral loop (NIOZ-TX).
4. To determine phytoplankton abundance, physiology, composition, and primary production in the nutrient-limited central North Sea and the more eutrophic Dutch coastal waters. (NIOZ/UvA).

The main participants in the project are:

- Netherlands Institute of Sea Research – Yerseke (NIOZ-YE): Dr. Eric Boschker, PhD-student Julia Grosse.
- University of Amsterdam (UvA): Prof. Jef Huisman, PhD-student Amanda Burson.
- Netherlands Institute of Sea Research – Texel (NIOZ-TX): Dr. Corina Brussaard, PhD-student Paul O'Connor.

The CHARLET-3 cruise 2013

We studied during late spring the biology of plankton (with a major focus on phytoplankton) in the North Sea, along a transect from coastal waters to central North Sea water. This cruise was undertaken as part of larger integrated study with the main merit of assessing the production, composition and losses of phytoplankton in order to determine the limiting factors for phytoplankton growth in the North Sea and study how these limiting factors affect the food quality and species composition of the phytoplankton. This is the first of four cruises, during spring and summer. The cruise track is shown in Figure 2. Station details in Table 1 and the participant and crew list in Table 2.

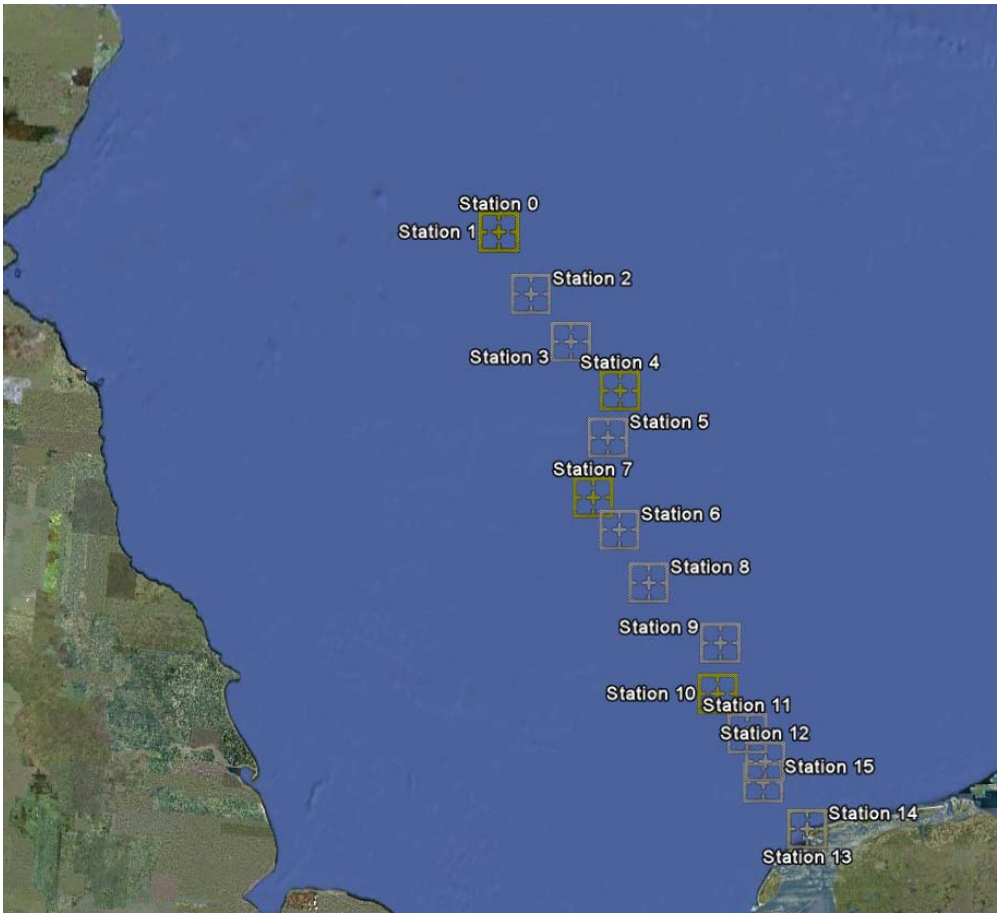


Fig. 2. Cruise track CHARLET-1, summer 2011. This cruise was longer in duration. During the present CHARLET-3 cruise, March 2013, we have sampled from south to north stations 13, 11, 10, 8, 7, 4, 2, and 1 (alike CHARLET-2).

Table 1. Station details CHARLET–3, 64PE366 cruise with R/V Pelagia.

Latitude (deg. min.milli)	Longitude (deg. min.milli)	Device name	Station-cast
N 53° 24' 9.018''	E 5° 8' 39.419''	CTD	13-1
N 53° 24' 9.184''	E 5° 8' 42.119''	CTD	13-2
N 53° 24' 7.79''	E 5° 8' 39.991''	CTD	13-3
N 53° 24' 8.204''	E 5° 8' 39.412''	Vertical Net 50	13-4
N 53° 24' 8.233''	E 5° 8' 46.601''	Vertical Net 50	13-5
N 53° 24' 11.704''	E 5° 8' 47.101''	Vertical Net 50	13-6
N 53° 24' 7.715''	E 5° 8' 40.139''	CTD	13-7
N 53° 24' 10.703''	E 5° 8' 36.46''	RAMSES underwater light sensors	13-8
N 53° 24' 7.258''	E 5° 8' 40.312''	CTD	13-9
N 53° 55' 12.194''	E 4° 36' 2.88''	CTD	11-1
N 53° 55' 17.245''	E 4° 35' 59.345''	Vertical Net 50	11-2
N 53° 55' 19.884''	E 4° 36' 7.11''	Vertical Net 50	11-3
N 53° 55' 19.816''	E 4° 36' 14.454''	Vertical Net 50	11-4
N 53° 55' 12.961''	E 4° 35' 55.932''	CTD	11-5
N 53° 55' 12.382''	E 4° 36' 0.608''	CTD	11-6
N 53° 55' 16.619''	E 4° 35' 59.471''	Vertical Net 50	11-7
N 53° 55' 18.836''	E 4° 36' 8.359''	Vertical Net 50	11-8
N 53° 55' 20.086''	E 4° 36' 17.024''	Vertical Net 50	11-9
N 53° 55' 21.59''	E 4° 36' 23.454''	Vertical Net 50	11-10
N 53° 55' 12.256''	E 4° 36' 2.156''	RAMSES underwater light sensors	11-11
N 53° 55' 11.525''	E 4° 35' 59.075''	CTD	11-12
N 54° 7' 49.48''	E 4° 19' 45.314''	CTD	10-1
N 54° 7' 48.702''	E 4° 19' 41.3''	Vertical Net 50	10-2
N 54° 7' 49.375''	E 4° 19' 39.677''	Vertical Net 50	10-3
N 54° 7' 51.532''	E 4° 19' 42.528''	Vertical Net 50	10-4
N 54° 7' 48.565''	E 4° 19' 48.785''	CTD	10-5
N 54° 7' 49.998''	E 4° 19' 48.518''	CTD	10-6
N 54° 7' 50.898''	E 4° 19' 47.528''	CTD	10-7
N 54° 7' 49.544''	E 4° 19' 49.508''	CTD	10-8
N 54° 7' 50.174''	E 4° 19' 50.689''	CTD	10-9
N 54° 7' 48.439''	E 4° 19' 56.698''	Vertical Net 50	10-10
N 54° 7' 50.675''	E 4° 20' 3.116''	Vertical Net 50	10-11
N 54° 7' 53.652''	E 4° 20' 8.351''	Vertical Net 50	10-12
N 54° 7' 59.106''	E 4° 20' 18.74''	Vertical Net 50	10-13
N 54° 7' 48.14''	E 4° 19' 48.05''	RAMSES underwater light sensors	10-14
N 54° 7' 48.263''	E 4° 19' 50.174''	CTD	10-15
N 54° 43' 12.515''	E 3° 40' 43.032''	CTD	8-1
N 54° 43' 12''	E 3° 40' 39.378''	Vertical Net 50	8-2
N 54° 43' 13.886''	E 3° 40' 41.092''	Vertical Net 50	8-3
N 54° 43' 16.5''	E 3° 40' 42.064''	Vertical Net 50	8-4
N 54° 43' 13.069''	E 3° 40' 49.71''	CTD	8-5
N 54° 43' 11.01''	E 3° 40' 46.114''	CTD	8-6
N 54° 43' 13.116''	E 3° 40' 45.055''	Vertical Net 50	8-7
N 54° 43' 13.991''	E 3° 40' 48.086''	Vertical Net 50	8-8
N 54° 43' 15.733''	E 3° 40' 48.882''	Vertical Net 50	8-9
N 54° 43' 17.332''	E 3° 40' 50.12''	Vertical Net 50	8-10
N 54° 43' 13.361''	E 3° 40' 47.485''	RAMSES underwater light sensors	8-11

N 54° 43' 12.284''	E 3° 40' 48.23''	CTD	8-12
N 55° 10' 12.814''	E 3° 9' 1.03''	CTD	7-1
N 55° 10' 10.952''	E 3° 9' 1.163''	Vertical Net 50	7-2
N 55° 10' 11.687''	E 3° 8' 56.015''	Vertical Net 50	7-3
N 55° 10' 12.842''	E 3° 8' 52.645''	Vertical Net 50	7-4
N 55° 10' 11.676''	E 3° 8' 58.902''	CTD	7-5
N 55° 10' 12.065''	E 3° 9' 0.119''	CTD	7-6
N 55° 10' 11.708''	E 3° 8' 59.006''	CTD	7-7
N 55° 10' 12.353''	E 3° 8' 56.238''	CTD	7-8
N 55° 10' 10.456''	E 3° 8' 59.514''	CTD	7-9
N 55° 10' 9.84''	E 3° 8' 56.299''	Vertical Net 50	7-10
N 55° 10' 10.2''	E 3° 8' 54.456''	Vertical Net 50	7-11
N 55° 10' 11.23''	E 3° 8' 56.306''	Vertical Net 50	7-12
N 55° 10' 12.774''	E 3° 8' 56.782''	Vertical Net 50	7-13
N 55° 10' 11.348''	E 3° 8' 59.302''	RAMSES underwater light sensors	7-14
N 55° 10' 11.064''	E 3° 9' 1.429''	CTD	7-15
N 55° 44' 24.504''	E 3° 22' 46.078''	CTD	4-1
N 55° 44' 24.634''	E 3° 22' 46.625''	Vertical Net 50	4-2
N 55° 44' 25.966''	E 3° 22' 38.082''	Vertical Net 50	4-3
N 55° 44' 29.062''	E 3° 22' 34.464''	Vertical Net 50	4-4
N 55° 44' 23.86''	E 3° 22' 49.901''	CTD	4-5
N 55° 44' 22.618''	E 3° 22' 48.446''	CTD	4-6
N 55° 44' 22.124''	E 3° 22' 46.074''	Vertical Net 50	4-7
N 55° 44' 23.078''	E 3° 22' 45.743''	Vertical Net 50	4-8
N 55° 44' 24.738''	E 3° 22' 44.936''	Vertical Net 50	4-9
N 55° 44' 27.265''	E 3° 22' 47.518''	Vertical Net 50	4-10
N 55° 44' 23.881''	E 3° 22' 46.286''	RAMSES underwater light sensors	4-11
N 55° 44' 23.14''	E 3° 22' 47.233''	CTD	4-12
N 56° 34' 47.374''	E 2° 10' 14.549''	CTD	1-1
N 56° 34' 47.41''	E 2° 10' 11.528''	Vertical Net 50	1-2
N 56° 34' 48.655''	E 2° 10' 15.085''	Vertical Net 50	1-3
N 56° 34' 49.278''	E 2° 10' 21.59''	Vertical Net 50	1-4
N 56° 34' 48.821''	E 2° 10' 13.508''	CTD	1-5
N 56° 34' 47.352''	E 2° 10' 10.448''	CTD	1-6
N 56° 34' 47.053''	E 2° 10' 11.762''	CTD	1-7
N 56° 34' 45.66''	E 2° 10' 8.666''	CTD	1-8
N 56° 34' 49.753''	E 2° 10' 2.039''	Vertical Net 50	1-9
N 56° 34' 49.318''	E 2° 9' 59.141''	Vertical Net 50	1-10
N 56° 34' 49.087''	E 2° 9' 59.882''	Vertical Net 50	1-11
N 56° 34' 48.666''	E 2° 9' 46.537''	Vertical Net 50	1-12
N 56° 34' 48.425''	E 2° 10' 8.821''	RAMSES underwater light sensors	1-13
N 56° 34' 48.889''	E 2° 10' 14.207''	CTD	1-14
N 56° 14' 59.071''	E 2° 29' 54.258''	CTD	2-1
N 56° 15' 1.001''	E 2° 29' 49.232''	Vertical Net 50	2-2
N 56° 15' 1.786''	E 2° 29' 50.258''	Vertical Net 50	2-3
N 56° 15' 2.794''	E 2° 29' 52.71''	Vertical Net 50	2-4
N 56° 15' 6.88''	E 2° 29' 45.056''	CTD	2-5

Table 2. R/V Pelagia Cruise CHARLET-3 Participants and Crew listing.

PARTICIPANTS LIST	In alphabetic order
Name	**Institute/University**
Corina Brussaard	NIOZ-TX, Chief Scientist
Larissa Akil	UvA
Sander Asjes	NIOZ-TX
Elodie Burrillon	NIOZ-YE
Amanda Burson	UvA
Richard Doggen	NIOZ-TX
Emma Greenwell	UvA
Julia Grosse	NIOZ-YE
Maud van den Haspel	NIOZ-TX
Anna Noordeloos	NIOZ-TX
Paul O'Connor	NIOZ-TX
Swier Oosterhuis	NIOZ-TX
Sharyn Ossebaar	NIOZ-TX

CREW LIST	
Pieter Kuijt	Master
Joep van Haaren	Ch. Officer
Martijn Heesemans	Ch. Engineer
Lennert Bliemer	2nd Officer
Leon van Houten	2nd Engineer
Rik van Katwijk	Cook
Ger Vermeulen	Bosun
Sjaak Maas	Ship's Techn.
Jose Vitoria	Ship's Techn.
Freddy Hiemstra	A/B
Lukas Riesthuis	Steward-O/S

Water samples were taken using the Sea-Bird SBE 32 sampler carousel, NIOZ hexagon frame, equipped with 24 Niskin type water samplers of 12 liters each, internal springs, and the Sea-Bird SBE11+ deckunit with NMEA navigational input. PC running Seasave 7.21d. The following underwater sensors were used: Sea-Bird SBE911+ pumped underwater unit with single temperature sensor, single conductivity sensor, SBE43 dissolved oxygen sensor, Chelsea Technology Aquatracka III fluorometer, Wetlabs C-star 25 cm transmissometer and bottom sensing altimeter.
The underwater light spectrum was studied using a RAMSES instrument (see for more detail furtheron in cruise report). Furthermore, a vertical net was used to collect the larger sized mesozooplankton (>200 µm mesh size).
Besides direct sampling of the upper water column and short-termed (max 24 h) on-board incubation, on-deck incubations using 5 L bottles were conducted for up to 5 days. Additionally, optical measurements were obtained and the ship's continuous Aquaflow system from a depth of 3 m (detecting temperature, salinity, optical back scatter, and fluorescence) was and will be used for validation, adaptation and testing new satellite products for Chlorophyll and primary production retrieval.

The North Sea showed, according to expectation, no seasonal stratification yet. The weather conditions were more winter-like with low air temperatures and prolonged easterly winds. The concentration of nutrients was still relatively high, promoting larger sized algae such as diatoms but the poor light conditions prevented the spring diatom bloom thus far. Specific larger phytoplankton diatoms such as *Corethron, Rhizosolenia, Chaetoceros, Coscinodiscus* were observed, with *Corethron* only at station 4 (water temperature as low as around 3°C and nitrogen and phosphorus concentrations relatively low). Phytoplankton photosynthetic capacity was good except for station 11, all depths.

In total 8 locations were sampled (stations), during which 40 CTD casts, 7 Ramses profiles and 48 vertical net hawls have been performed. Only some of measurements could be analysed on board (e.g. macronutrients, direct counts of phytoplankton, physical and optical variables). Numerous samples were stored for later analysis at the home laboratories.

Detailed description of the different scientific activities can be found in the following section.

Scientific activities (per variable):

Nutrient measurements

- Sharyn Ossebaar –

Summary
Nutrients were analysed in a thermo-stated lab container equipped with a QuAAtro Continuous Flow Analyser, measuring approximately 385 samples during the cruise. Measurements were made simultaneously on four channels for Phosphate, Ammonium, Nitrite, and Nitrate with Nitrite together. All measurements were calibrated with standards diluted in low nutrient seawater (LNSW) in the salinity range of the North Sea stations.

Equipment and methods
Sampling and Measuring. Sample seawater was obtained from the CTD rosette sampler from all depths required and from incubation experiments. All CTD samples were collected in 125ml polypropylene bottles. The bottles were rinsed three times with the seawater before being fully filled. In the lab container the nutrient samples were filtered over a 0.2µm Acrodisc filter into 5ml polyethylene vials, (also known as 'ponyvials') rinsing three times, and stored in the dark at 4°C until analysis. Prior to analysis, all samples were brought to lab temperature of 21.5°C in about one to two hours and then covered with parafilm to avoid gas exchange and evaporation before being placed in the auto-sampler. All analyses were done within 18 hours on the auto-analyzer, a SEAL QuAAtro autoanalyzer using a sample rate of 60 samples per hour. The QuAAtro uses an LED instead of a lamp as a light source to avoid the noise effect of the movements of the ship on the light source and therefore on the baseline. Calibration standards were diluted from stock solutions of the different nutrients in 0.2µm filtered low nutrient seawater (LNSW) and were freshly prepared every day. The LNSW is surface seawater depleted of most nutrients; it is also used as baseline water for the analysis between the samples. Each run of the system had a correlation coefficient of at least 0.9999 for 10 calibration points, but typical 1.0000 for linear chemistry. The samples were measured from the lowest to the highest concentration in order to keep carry-over effects as small as possible, i.e. from surface to deep waters. Concentrations were recorded in 'µmol per liter' (µM/L) at the container temperature of 21.5°C. During every run a daily freshly diluted mixed nutrient standard, containing silicate, phosphate and nitrate (a so-called nutrient cocktail), was measured in triplicate. The cocktail was used as a guide to monitor the performance of the analyzer.

Analytical Methods. The colorimetric methods used are as follows:
Ortho-Phosphate (PO_4) reacts with ammonium molybdate at pH 1.0, and potassium antimonyltartrate is used as an inhibitor. The yellow phosphate-molybdenum complex is reduced by ascorbic acid and measured at 880 nm (Riley & Murphy, 1962).
Ammonium (NH_4) reacts with phenol and sodiumhypochlorite at pH 10.5 to form an indo-phenolblue complex. Citrate is used as a buffer and complexant for calcium and magnesium at this pH. The color is measured at 630 nm. Koroleff, 1969 and optimized by W. Helder and R. de Vries, 1979.
Nitrate plus nitrite (NO_3+NO_2) is mixed with an imidazol buffer at pH 7.5 and reduced by a copperized cadmium column to nitrite. The nitrite is diazotated with sulphanylamide and naphtylethylene-diamine to a pink colored complex and measured at 550 nm. Nitrate is calculated

by subtracting the nitrite value of the nitrite channel from the 'NO3+NO2' value. (Grasshoff et al, 1983)
Nitrite (NO_2) is diazotated with sulphanylamide and naphtylethylene-diamine to a pink colored complex and measured at 550 nm. (Grasshoff et al, 1983)
Silicate reacts with ammonium molybdate to a yellow complex, after reduction with ascorbic acid; the obtained blue silica-molybdenum complex is measured at 800 nm. Oxalic acid is added to prevent formation of the blue phosphate-molybdenum (Strickland & Parsons, 1968). Silicate will be performed in the nutrient laboratory of the NIOZ after the cruise.

Calibration and Standards. Nutrient primary stock standards were prepared at the NIOZ.
Phosphate: by weighing Potassium dihydrogen phosphate into a calibrated volumetric PP flask to 1mM PO_4.
Nitrate: weighing Potassium nitrate into a calibrated volumetric PP flask set to 10mM NO_3.
Nitrite: weighing Sodium nitrite into a calibrated volumetric PP flask set to 0.5mM NO_2.
Silicate: by weighing Na_2SiF_6 into a calibrated volumetric PP flask to 19.99mM mM Si.
All standards were stored at room temperature in a 100% humidified box. The calibration standards were prepared daily by diluting the separate stock standards, using three electronic pipettes, into four 100ml PP volumetric flasks (calibrated at the NIOZ) filled with low nutrient sea water LNSW. The blank values of the LNSW were measured onboard and added to the calibration values to get the absolute nutrient values. Our standards are regularly monitored by participating in inter-calibration exercises from ICES and Quasimeme and even more recently from the RMNS exercise organised by Michio Aoyama MRI/Japan.

Statistics of the analysis during this cruise:
The standard deviation of 10 3rd level calibrant samples measured in one run:

	Stdev	Average Value(µM/L)
PO4:	0.004 µM/L	0.722
NH4:	0.012 µM/L	3.54
NO3 + NO2:	0.085 µM/L	30.61
NO2:	0.004 µM/L	0.765

The standard deviation of the NIOZ Cocktail(1008)X250 measured between different runs:

	Stdev	Average Value(µM/L)	N
PO4:	0.007 µM/L	0.911	34 at 250 times diluted
NO3 +NO2:	0.085 µM/L	13.75	34 at 250 times diluted

The standard deviation of the deepest sample duplicate measured between two different runs:

	Stdev
PO4:	0.012 µM/L
NH4:	0.032 µM/L
NO3 +NO2:	0.084 µM/L
NO2:	0.004 µM/L

Method Detection Limits. The method detection limits was calculated during the cruise using the standard deviation of ten samples containing 2% of the highest standard used for the calibration curve and multiplied with the student's value for n=10, thus being 2.81. (M.D.L = Std Dev of 10 samples x 2.81)

	M.D.L.(µM/L)	Used measuring range µM/L:
PO4	0.012	1.01
NH4	0.041	5.05
NO3+NO2	0.010	41.01
NO2	0.004	1.01

Data Quality & Remarks. By using the NIOZ in-house Lab Cocktail reference (Cocktail1008) it is possible to monitor the performance of the QuAAtro and its analysis. It is suggested that through diluting the in-house cocktail by means of an electronic pipette and a calibrated flask, a small error of maximum 0.15% is introduced.

References

- Grasshoff, K. et al. (1983). Methods of seawater analysis. Verlag Chemie GmbH, Weinheim. 419 pp
- Strickland, J.D.H. and Parsons, T.R., 1968. A pracitcal handbook of seawater analysis. first edition, Fisheries Research Board of Canada, Bulletin. No 167, 1968. p.65.
- Murphy, J. & Riley, J.P., 1962. A modified single solution method for the determination of phosphate in natural waters. Analytica chim. Acta 27, 31-36
- Koroleff, 1969 and optimized by W. Helder and R. de Vries, 1979. An automatic phenol-hypochlorite method for the determination of ammonia in sea- and brackish waters. Neth. J. Sea Research 13(1): 154-160.

Flow cytometric abundances of phytoplankton, bacteria and viruses

- Anna Noordeloos, Maud vd Haspel, Paul O'Connor -

For all stations and each depth, samples were taken for phytoplankton, bacteria and viruses.
Samples for bacterial and viral abundances were fixed with glutaraldehyde solution (25% EM-grade; final concentration of 0.5%) for 15-30 min at 4ºC, after which the samples were flash frozen and stored at -80ºC. Fixed samples will be analyzed in the home laboratory (NIOZ-Texel) upon completion of the cruise.

Phytoplankton samples were measured fresh using flow cytometry. The basic instrument applied for single-cell analysis of the phytoplankton community was a bench top flow cytometer, Becton Dickinson FACSCalibur. The instrument is equipped with a 15mW Argon laser (488 nm excitation), which has an emission in the green, orange, and red. In addition, forward and side (90º) light scatter are collected. The fresh phytoplankton populations were discriminated using red chlorophyll auto fluorescence and scatter. Species/group composition was characterized based on the cellular bio-optical properties, including forward- and side scatter and chlorophyll fluorescence, of the algal cells. Figure 4 shows two examples of different populations dominating the pico- and nano phytoplankton community. The natural community was size-fractionated using 12, 10, 8, 5, 3, 2, 1, 0.8 and 0.4 µm pore-size PC-filters of small (<10 mL) sample volumes. Numerically dominant were the phytoplankton <3 µm diameter.

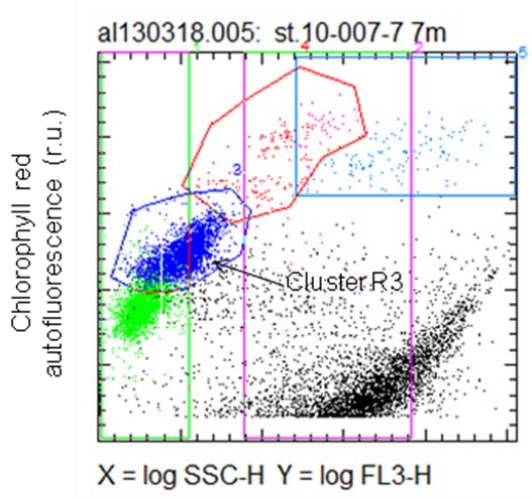


Figure shows flow cytometric dotplot of the various different algal populations found at station 10. The arrow indicates the population of 1-2 µm diameter picoeukaryotic phytoplankton.

Table: Phytoplankton abundances per mL obtained by flow cytometry for all stations, 7 m depth.

Station	Cyano (0,8-2 µm)	Crypto (2 - 5 µm)	Pico (0,4 - 2 µm)	Nano 1 (2 - 5 µm)	Nano 2 (>5 µm)
1	1369	63	4217	915	285
2	2102	112	4703	893	203
4	537	26	183	569	41
7	13192	302	14311	408	622
8	11172	253	8851	451	371
10	7031	99	8772	358	329

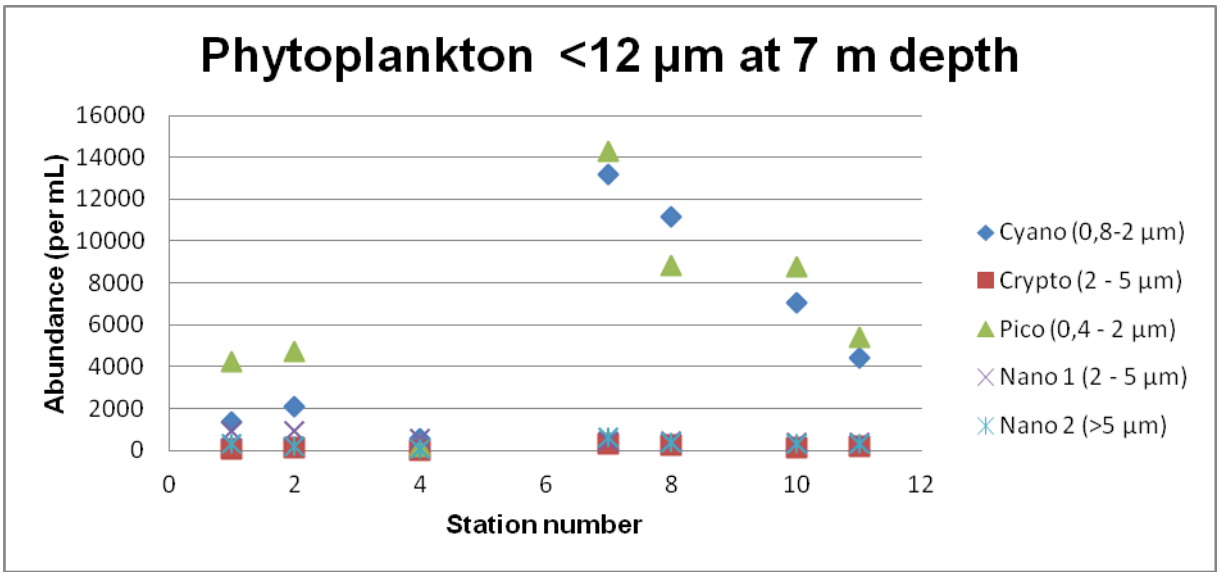
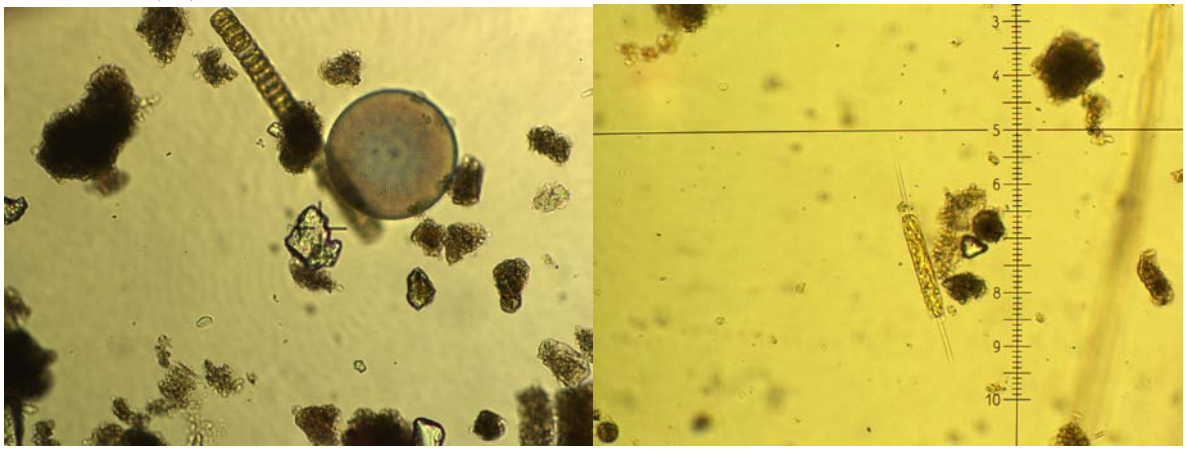


Figure shows flow cytometric data of algal abundancance of different clusters for all stations at 7 m depti (CTD at 8 AM CTD with exception of station 2, CTD at 8 PM.

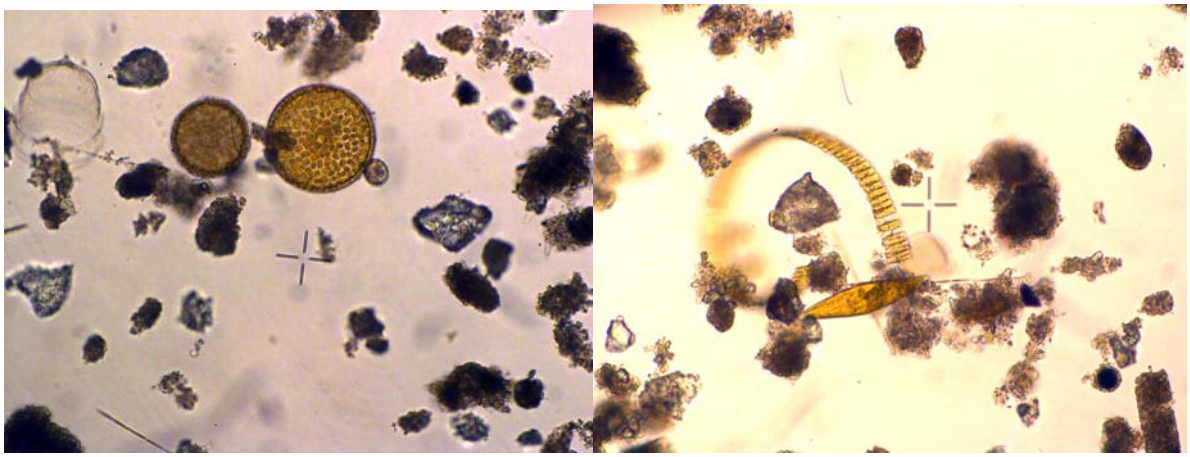
Phytoplankton light microscopy on-board

- Corina Brussaard, Sander Asjes –

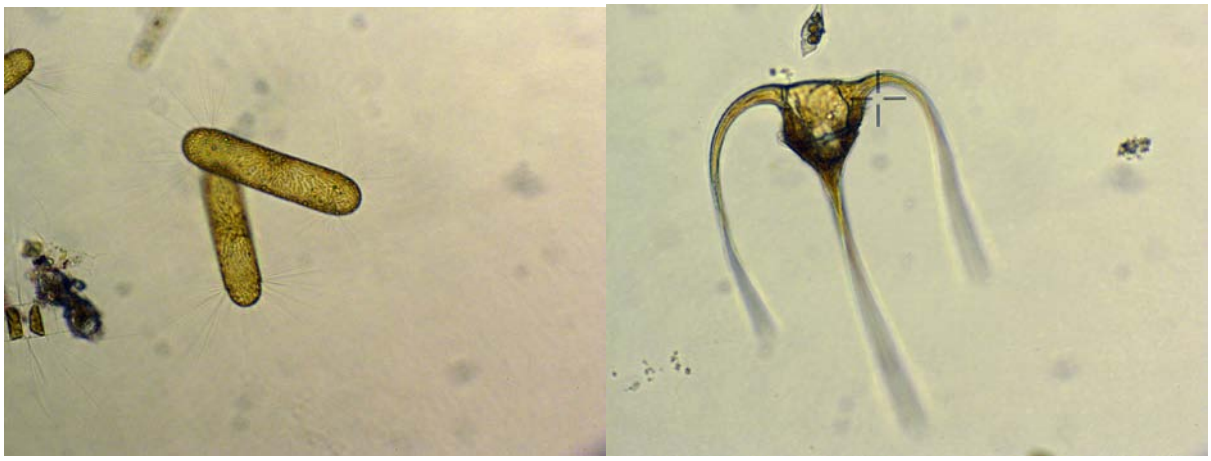
At most stations a concentrate of the 7 m sample was prepared of >15 µm phytoplankton for qualitative light microscopy analysis. Below a compilation of photos of main phytoplankton species at stations 8, 7, 2 and 1.



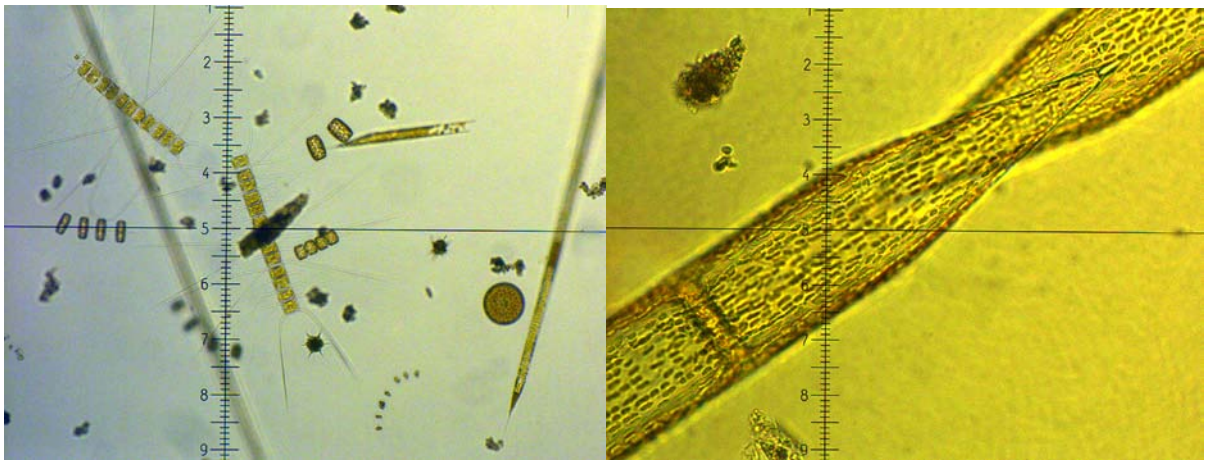
Station 8



Station 7



Station 4



Station 1

Bioassays, High resolution sampling, 77K, light spectrum

- Amanda Burson, Emma Greenwell, Larissa Akil –

Bioassays:
Nutrient addition bioassay experiment for 84 hours in ambient surface water flow through incubation chambers. T=0 and source water from station 13, 10, 7, and 1 at 7 m depth. Investigations are to determine if, via significant stimulation of growth, phytoplankton communities are nutrient or light limited in the North Sea. Treatments as follows:

Treatment	Bottle #	NO3	PO4	Si	Light
Control (Whole)	1-4	None	None	None	=10 % ambient
Control (<20 um)	5-8	None	None	None	=10 % ambient
+N (Whole)	9-12	80 uM	None	None	=10 % ambient
+N (<20 um)	13-16	80 uM	None	None	=10 % ambient
+P (Whole)	17-20	None	5 uM	None	=10 % ambient
+P (<20 um)	21-24	None	5 uM	None	=10 % ambient
+N+P (Whole)	25-28	80 uM	5 uM	None	=10 % ambient
+N+P (<20 um)	29-32	80 uM	5 uM	None	=10 % ambient
+N+P+Si (Whole)	33-36	80 uM	5 uM	80 uM	=10 % ambient
+N+P+Si (<20 um)	27-40	80 uM	5 uM	80 uM	=10 % ambient
High light (Whole)	41-44	None	None	None	=15 % ambient
High light (<20 um)	45-48	None	None	None	=15 % ambient
+Si (Whole)	49-52	None	None	80 uM	=10 % ambient
+Si (<20 um)	53-56	None	None	80 uM	=10 % ambient

T=0 Parameters measured/collected for are as follows:

Parameter	Volume	Replicates	Storage
Chlorophyll *a*	250 mL filtered	2 each size fraction	-20 C
Particulate organic	500 mL filtered	2 each size	-20 C

carbon and nitrogen		fraction	
Particulate organic phosphorus	500 mL filtered	2 each size fraction	-20 C
Lugol's iodine preservation	50 mL	1 each size fraction	Room temp dark
Flow cytometry phytoplankton	5 mL	4 each size fraction	-80 C
Flow cytometry virus	1.2 mL	1 each size fraction	-80 C
Fluoresence of chla filters using PAM	NA	2 each size fraction	NA

T=48 Parameters measured/collected for are as follows:

Parameter	**Volume**	**Replicates**	**Storage**
Chlorophyll *a*	100 mL filtered	1 per bottle	-20 C
Fluoresence of chla filters using PAM	NA	1 per bottle	NA

T=F Parameters measured/collected for are as follows:

Parameter	**Volume**	**Replicates**	**Storage**
Chlorophyll *a*	250 mL filtered	1 per bottle	-20 C
Dissolved inorganic nutrients (0.22 membrane filtered)	20 mL	1 per bottle	-20 C
Particulate organic carbon and nitrogen	500 mL filtered	1 per bottle	-20 C
Particulate organic phosphorus	500 mL filtered	1 per bottle	-20 C
Lugol's iodine preservation	15 mL	1 per bottle	Room temp dark
Flow cytometry phytoplankton	5 mL	2 per bottle	-80 C
Flow cytometry virus	1.2 mL	1 per treatment	-80 C
Fluoresence of chla filters using PAM	NA	1 per bottle	NA

High Resolution Sampling:
Water (10 L) was collected from all stations (13, 11, 10, 8, 7, 4, 2, 1) at 2 pm. Water was collected from 2m, 7m, 10m then every 5 m. Water was split into two size fractions, whole and less than 20 then processed as follows:

Parameter	**Volume**	**Replicates**	**Storage**
Chlorophyll *a*	500 mL filtered	1 per depth per size	-20 C

		fraction	
Particulate organic carbon and nitrogen	500 mL filtered	1 per depth per size fraction	-20 C
Particulate organic phosphorus	500 mL filtered	1 per depth per size fraction	-20 C
Lugol's iodine preservation	15 mL	1 per depth per size fraction	Room temp dark
Flow cytometry phytoplankton	5 mL	2 per depth per size fraction	-80 C
Fluoresence of chla filters using PAM	NA	1 per depth per size fraction	NA

77K nutrient fluorescence test trial

Nutrient induced fluorescence trials of PSI-low temp fluoresence were performed from stations 13, 11, 10, 8, 7, 4, and 2 from 7 m depth. One hundred milliliters of sample were incubated with the following treatments:

Bottle	Treatment
1-3	Control
4-6	Phosphate (5 uM)
7-9	Nitrate (80 uM)
10-12	Silicate (80 uM

One milliliter of sample water is mixed with one milliliter 60% glycerol into macro spectrophotometer cuvettes at t=0, 12, 24 and 48 hours. Solution is carefully frozen in liquid nirtogen and stored at -80°C. Frozen samples will then be measured using the spectrofluorometer located at the UvA.

RAMSES Light Spectra

TRIOS RAMSES probes were used to measure underwater light spectra at all stations (13, 11, 10, 8, 7, 4, 2, 1). Two probes were deployed overboard, one measuring light up the other down along with pressure and inclinitation.

Inoculum collection

At all stations water was collected (20 L) for inoculums for future experiments at UvA. Water was bubbled for 30 min using CO2 then placed in cold containers during transect.

Allocation of recently fixed carbon into different biochemical components

- Julia Grosse and Elodie Burrilion –

In order to characterize the carbon allocation in the different phytoplankton communities at 4stations (13,10,7,1) under in-situ conditions, surface waters (7m) was labeled with 13C-bicarbonate and incubated in flow through incubators. Initial samples were taken for suspended particulate matter, fatty acids, amino acids, carbohydrates, DNA/RNA, DIC and pigment composition. Subsamples (total of 5 time points) were taken over a period of 24 hours to describe diurnal changes in the carbon flow between pools of different biochemical molecules. Samples will be taken to the NIOZ-Yerseke for analysis of 13C incorporation into total biomass and biochemical compounds.
Additional incubations were performed by adding nitrate (+N), phosphate (+P) and nitrate, phosphate and silicate (+N+P+Si) to the incubations. This experiment aims to investigate short-term changes in biochemical compound composition in phytoplankton. At stations 13,10,7,1 one time point was sampled after 24h. Stations 13 and 7 had an additional time point sampled after 72h.

Incorporation of phytoplankton amino acids and fatty acids into zooplankton

- Julia Grosse –

This set of samples aimed to characterize the transfer of essential fatty acids and amino acids between trophic levels. We took zooplankton samples from net-tows at stations 13, 10, 8,7,4,2 and 1 and will compare results of fatty acid and amino acid composition between phytoplankton and zooplankton. Analysis will take place at NIOZ-Yerseke.

C-uptake and ETR of North Sea phytoplankton in relation to light intensities.

- Julia Grosse and Elodie Burrilion –

Additional 13C- bicarbonate incubations were performed at stations 13,10,7,1 to quantify the effect of light intensity on carbon uptake. The following light intensities were tested: 100%, 50%, 25%, 15% and 3-6%. Simultaneously, measurements of the maximum photosynthetic quantum yields were taken with a FRRF (fast repetition rate fluorometer). This provides a measure of the maximum photosynthetic quantum yields.

Phytoplankton community structure

- Swier Oosterhuis –

Phytoplankton species composition was determined by obtaining samples for pigment composition from different depths at every station. After analysis by HPLC, Chlorophyll a will be used as an indicator for algal biomass (to be correlated to the fluorescence data from the CTD). Furthermore, specific marker pigments can reveal the presence of certain species. Using the CHEMTAX program, the contribution of these species to the total population can be estimated. In addition, pigment composition gives information on the photoacclimation status of algae (i.e if they are acclimated to high or low light). At all stations 2-3 depths were sampled (typically 7, 25 and 40 m). Analysis will be performed in the home laboratory (NIOZ-Texel).

Phytoplankton viral lysis and microzooplankton grazing rates

- Paul O'Connor –

Using the adapted dilution method by Baudoux et al. (2005), microzooplankton grazing and virally induced mortality can be estimated simultanously. The principle is that the removal of predators (grazers and viruses) by dilution allows the algal cells to increase in standing stock over the measured 24 h period. The difference in algal concentration over the period; therefore, provides an estimate of algal growth rate. Plotting the growth rate against the dilution, the slope of the linear regression represents the loss rat. Depending on the type of diluent (either grazer-free or grazer and virus-free) the microzooplankton grazing rate and the viral lysis rate can be obtained. From the difference between the two dilutions series the actual virally mediated algal mortality rate can be calculated (see Figure below).

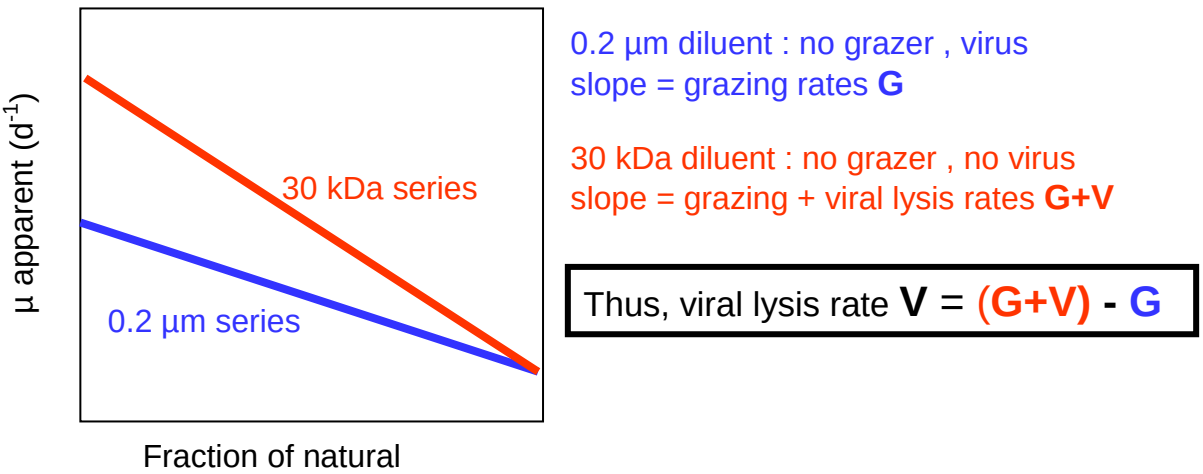


Figure: Dilution method principle.

All stations were carefully sampled at 7 m in the morning (because of the synchronicity of phytoplankton cell division and potential diel effects on viral infection processes) with the sample bottles protected against the light. Samples were gravity filtered through a 0.45 µm filter (Sartopore-2, 300) to create the grazer-free fraction and passed through a 30 kDa

tangential flow filtration system (Sartorious Vivaflow 200) to create the virus-free diluent (Fig. 7). A series of dilutions were prepared to measure 24 h loss rates of the phytoplankton. Using 1 L polycarbonate incubation bottles, natural water (reverse sieved through 200 µm mesh-size) was very gently (siphoned) added to the 0.45 µm and 30 kDa filtrate to create parallel dilution series of 100, 70, 40 and 20% of the total volume (all dilutions in triplicate). Subsamples for algal abundance were taken at T=0 and T=24h and the phytoplankton measured fresh using a bench top flow cytometer (Becton Dickinson FACSCalibur) equipped with a 15mW Argon laser (488nm excitation). Bottles were placed randomly on a slow turning wheel in an on-deck incubator at *in situ* temperature and irradiance (using variable numbers of screens). Specific phytoplankton groups were discriminated by differences in side scatter and red/orange fluorescence. Flow rates of the flow cytometer were calibrated daily to maintain quality control.

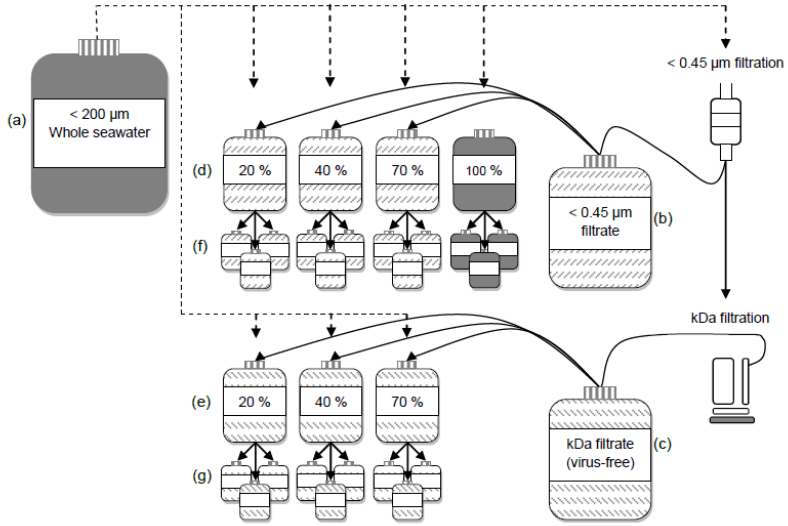


Figure. Experimental design of the modified dilution approach.

Phytoplankton sinking rates

- Maud van den Haspel and Paul O'Connor -

The sinking rates of phytoplankton were determined at several main stations over the course of the cruise. Sinking rates were permitted by the use of specially designed ship-board SETCOL devices, wherein a settling column is held in a 2-dimensional gimbal apparatus which eliminates the turbulence induced by the ship's roll. The column is gently filled with a homogeneous seawater sample and allowed to settle undisturbed for a set period of time under *in-situ* light and temperature conditions. A control consisting of a 1 L clear plastic Nalgene bottle was also filled and incubated under in-situ conditions for the duration of settlement. After settling, the upper portion of the column was carefully sampled by opening a valve located on the side of the column. The middle fraction was drained via a lower valve located on the side of the column, and the bottom fraction fraction via a valve located on the bottom of the column. Subsamples of both top, middle and bottom fraction and the control were taken for flow cytometric analysis of phytoplankton. The remaining volume was filtered onto a GF/F filter, flash frozen and stored at -80°C for HPLC analysis back in the NIOZ-Texel home lab.

Grazing experiments using fluorescently labelled prey

- Richard Doggen –

A different approach of determining the grazing rates of bacteria, cyanobacteria and algae (10 µm cell diameter) by heterotrophic nanoflagellates (HNF) and microzooplankton was investigated using green fluorescently labeled prey (method Sherr & Sherr using the green fluorescent stain DTAF). The dye did not fade incubated for 24 h under in situ conditions and the prey did not decay.
Fluorescently labeled prey was gently combined with whole water in 1 L incubations at <5 % of the natural concentration. Grazing was determined by monitoring the concentration of labeled prey at the start of the experiment and after a incubation at in situ temperature and light. The analysis was completed by preparation of filters at the start of the experiment and after 24 h, to be counted using epifluorescence microscopy (organisms will be distinguished based on their green fluorescence). The experiments were conducted at 1 depth (7m) for the fluorescently labelled bacteria (FLB), cyanobacteria (FLC) and algae (FLA). Filters are stored at -20ºC until further analysis at the home laboratory.
Additionally, samples for the abundance of HNF and microzooplankton community structure and abundance were taken and fixed. Glutaraldhyde fixed HNF (1% final using 10% working fixative stock) were filtered through 0.2 µm filter and stored for at -20ºC. Samples for microzooplankton (using brown glass bottles) were fixed with Lugol and stored in the dark at 4ºC until further analysis.

Mesozooplankton secondary production and biomass

- Swier Oosterhuis -

At each station samples were taken to measure the grazing rate of the mesozooplankton by means of the gut clearance rate (Baars & Oosterhuis, NJSR 1985). Plankton samples were collected using a WP-2 net equipped with 200 µm mesh size plankton net. Net hauls were usually done in the morning at daylight and in the evening at dusk. The catch was divided in 5 equal portions and each portion was added to approximately 1 L GF/F-filtered seawater (0.7 µm nominal pore size). The bottles were incubated at *in situ* seawater temperature and zooplankton from the bottles was collected at discrete time intervals (0, 10, 20, 30 and 60 minutes respectively), filtered using 200 µm mesh filter and frozen at -80ºC for later chlorophyll a (phaeophytine) gut contents and biomass analysis at the lab. From the rate of gut contents loss with time and the initial gut content, the grazing (ingestion) rate can be calculated.
At the same times, zooplankton samples for total biomass and taxonomy were taken with the same WP 2 net as described above. The samples were preserved in 4% formaldehyde.
Preceding the net catch, water samples were taken for pigment analysis at discrete depths and filtered using a GF/F filter. The filters were preserved in a -80 C freezer.

Determination of lytic / lysogenic viral infection of prokaryotes

- Tim Piel and Paul O'Connor -

In order to estimate the production of both lytic and lysogenic viruses, seawater samples were taken along a transect of the North sea at 7 m from all but one stations (except station 2 due to weather conditions). Rates of lytic viral infection were determined according to the method of Winget et al. (2005). Briefly, the sample was washed with virus-free sample generated by tangential flow ultrafiltration (30 kDa Vivaflow-200 cartridge) and incubated in triplicate in 50 mL Greiner tubesat *in situ* temperature in the dark for up to 24 hours. This way further infection of the bacteria was prevented and the production of newly released viruses monitored at regular time intervals (every 3 hours) for flow cytometric analysis (Brussaard 2004). Rates of lysogenic infection were determined by addition of Mitomycin C (1 µg/mL final concentration) to initiate the lytic phase of any lysogenic viruses currently infecting the bacterial population. A 0.2 µm filtered treatment was prepared to monitor for viral loss due to the experimental set-up. Results from this experiment will be available following flow cytometric analysis of the samples back at NIOZ-Texel.

APPENDIXES

Appendix I. Logbook ship's scientific activities CHARLET-3 cruise 2013

Appendix II. Instruments configuration file CHARLET-3 cruise 2013

Appendix III. Onboard database CHARLET-3 cruise 2013

Appendix IV. Masterfile CHARLET-3 cruise 2013

station activity listing

Date	Time (UTC)	Latitude	Longitude	Device name	Station-cast
	(+1h)	(deg. min.milli)	(deg. min.milli)		
16/03/2013	5:04:38	N 53° 24' 9.018''	E 5° 8' 39.419''	CTD	13-1
16/03/2013	6:02:43	N 53° 24' 9.184''	E 5° 8' 42.119''	CTD	13-2
16/03/2013	7:07:40	N 53° 24' 7.79''	E 5° 8' 39.991''	CTD	13-3
16/03/2013	8:09:40	N 53° 24' 8.204''	E 5° 8' 39.412''	Vertical Net 50	13-4
16/03/2013	8:12:51	N 53° 24' 8.233''	E 5° 8' 46.601''	Vertical Net 50	13-5
16/03/2013	8:15:36	N 53° 24' 11.704''	E 5° 8' 47.101''	Vertical Net 50	13-6
16/03/2013	8:41:07	N 53° 24' 7.715''	E 5° 8' 40.139''	CTD	13-7
16/03/2013	12:10:25	N 53° 24' 10.703''	E 5° 8' 36.46''	RAMSES underwater light sensors	13-8
16/03/2013	13:04:12	N 53° 24' 7.258''	E 5° 8' 40.312''	CTD	13-9
16/03/2013	20:04:29	N 53° 55' 12.194''	E 4° 36' 2.88''	CTD	11-1
16/03/2013	20:24:52	N 53° 55' 17.245''	E 4° 35' 59.345''	Vertical Net 50	11-2
16/03/2013	20:32:23	N 53° 55' 19.884''	E 4° 36' 7.11''	Vertical Net 50	11-3
16/03/2013	20:38:53	N 53° 55' 19.816''	E 4° 36' 14.454''	Vertical Net 50	11-4
17/03/2013	5:36:50	N 53° 55' 12.961''	E 4° 35' 55.932''	CTD	11-5
17/03/2013	6:59:50	N 53° 55' 12.382''	E 4° 36' 0.608''	CTD	11-6
17/03/2013	9:05:42	N 53° 55' 16.619''	E 4° 35' 59.471''	Vertical Net 50	11-7
17/03/2013	9:13:42	N 53° 55' 18.836''	E 4° 36' 8.359''	Vertical Net 50	11-8
17/03/2013	9:20:27	N 53° 55' 20.086''	E 4° 36' 17.024''	Vertical Net 50	11-9
17/03/2013	9:25:59	N 53° 55' 21.59''	E 4° 36' 23.454''	Vertical Net 50	11-10
17/03/2013	12:15:32	N 53° 55' 12.256''	E 4° 36' 2.156''	RAMSES underwater light sensors	11-11
17/03/2013	13:00:39	N 53° 55' 11.525''	E 4° 35' 59.075''	CTD	11-12
17/03/2013	19:01:52	N 54° 7' 49.48''	E 4° 19' 45.314''	CTD	10-1
17/03/2013	19:18:22	N 54° 7' 48.702''	E 4° 19' 41.3''	Vertical Net 50	10-2
17/03/2013	19:27:45	N 54° 7' 49.375''	E 4° 19' 39.677''	Vertical Net 50	10-3
17/03/2013	19:37:14	N 54° 7' 51.532''	E 4° 19' 42.528''	Vertical Net 50	10-4
18/03/2013	5:03:46	N 54° 7' 48.565''	E 4° 19' 48.785''	CTD	10-5
18/03/2013	5:43:14	N 54° 7' 49.998''	E 4° 19' 48.518''	CTD	10-6
18/03/2013	7:03:42	N 54° 7' 50.898''	E 4° 19' 47.528''	CTD	10-7
18/03/2013	8:07:32	N 54° 7' 49.544''	E 4° 19' 49.508''	CTD	10-8
18/03/2013	8:28:34	N 54° 7' 50.174''	E 4° 19' 50.689''	CTD	10-9
18/03/2013	9:06:28	N 54° 7' 48.439''	E 4° 19' 56.698''	Vertical Net 50	10-10
18/03/2013	9:13:36	N 54° 7' 50.675''	E 4° 20' 3.116''	Vertical Net 50	10-11
18/03/2013	9:20:27	N 54° 7' 53.652''	E 4° 20' 8.351''	Vertical Net 50	10-12
18/03/2013	9:29:08	N 54° 7' 59.106''	E 4° 20' 18.74''	Vertical Net 50	10-13
18/03/2013	12:12:07	N 54° 7' 48.14''	E 4° 19' 48.05''	RAMSES underwater light sensors	10-14
18/03/2013	13:05:12	N 54° 7' 48.263''	E 4° 19' 50.174''	CTD	10-15
18/03/2013	19:02:33	N 54° 43' 12.515''	E 3° 40' 43.032''	CTD	8-1
18/03/2013	19:15:56	N 54° 43' 12''	E 3° 40' 39.378''	Vertical Net 50	8-2
18/03/2013	19:22:02	N 54° 43' 13.886''	E 3° 40' 41.092''	Vertical Net 50	8-3
18/03/2013	19:29:48	N 54° 43' 16.5''	E 3° 40' 42.064''	Vertical Net 50	8-4
19/03/2013	5:35:46	N 54° 43' 13.069''	E 3° 40' 49.71''	CTD	8-5
19/03/2013	7:05:03	N 54° 43' 11.01''	E 3° 40' 46.114''	CTD	8-6
19/03/2013	9:06:30	N 54° 43' 13.116''	E 3° 40' 45.055''	Vertical Net 50	8-7
19/03/2013	9:13:01	N 54° 43' 13.991''	E 3° 40' 48.086''	Vertical Net 50	8-8
19/03/2013	9:18:37	N 54° 43' 15.733''	E 3° 40' 48.882''	Vertical Net 50	8-9
19/03/2013	9:24:50	N 54° 43' 17.332''	E 3° 40' 50.12''	Vertical Net 50	8-10
19/03/2013	12:14:58	N 54° 43' 13.361''	E 3° 40' 47.485''	RAMSES underwater light sensors	8-11
19/03/2013	13:01:54	N 54° 43' 12.284''	E 3° 40' 48.23''	CTD	8-12
19/03/2013	19:01:14	N 55° 10' 12.814''	E 3° 9' 1.03''	CTD	7-1
19/03/2013	19:12:15	N 55° 10' 10.952''	E 3° 9' 1.163''	Vertical Net 50	7-2
19/03/2013	19:16:28	N 55° 10' 11.687''	E 3° 8' 56.015''	Vertical Net 50	7-3
19/03/2013	19:23:35	N 55° 10' 12.842''	E 3° 8' 52.645''	Vertical Net 50	7-4
20/03/2013	5:02:41	N 55° 10' 11.676''	E 3° 8' 58.902''	CTD	7-5
20/03/2013	5:40:04	N 55° 10' 12.065''	E 3° 9' 0.119''	CTD	7-6
20/03/2013	7:02:59	N 55° 10' 11.708''	E 3° 8' 59.006''	CTD	7-7
20/03/2013	7:33:42	N 55° 10' 12.353''	E 3° 8' 56.238''	CTD	7-8
20/03/2013	8:05:23	N 55° 10' 10.456''	E 3° 8' 59.514''	CTD	7-9
20/03/2013	9:05:39	N 55° 10' 9.84''	E 3° 8' 56.299''	Vertical Net 50	7-10
20/03/2013	9:09:12	N 55° 10' 10.2''	E 3° 8' 54.456''	Vertical Net 50	7-11
20/03/2013	9:13:33	N 55° 10' 11.23''	E 3° 8' 56.306''	Vertical Net 50	7-12
20/03/2013	9:18:35	N 55° 10' 12.774''	E 3° 8' 56.782''	Vertical Net 50	7-13

20/03/2013	12:12:41	N 55° 10' 11.348''	E 3° 8' 59.302''	RAMSES underwater light sensors	7-14
20/03/2013	12:59:42	N 55° 10' 11.064''	E 3° 9' 1.429''	CTD	7-15
20/03/2013	18:59:10	N 55° 44' 24.504''	E 3° 22' 46.078''	CTD	4-1
20/03/2013	19:15:29	N 55° 44' 24.634''	E 3° 22' 46.625''	Vertical Net 50	4-2
20/03/2013	19:23:53	N 55° 44' 25.966''	E 3° 22' 38.082''	Vertical Net 50	4-3
20/03/2013	19:32:44	N 55° 44' 29.062''	E 3° 22' 34.464''	Vertical Net 50	4-4
21/03/2013	5:28:50	N 55° 44' 23.86''	E 3° 22' 49.901''	CTD	4-5
21/03/2013	7:00:06	N 55° 44' 22.618''	E 3° 22' 48.446''	CTD	4-6
21/03/2013	9:08:19	N 55° 44' 22.124''	E 3° 22' 46.074''	Vertical Net 50	4-7
21/03/2013	9:16:28	N 55° 44' 23.078''	E 3° 22' 45.743''	Vertical Net 50	4-8
21/03/2013	9:21:58	N 55° 44' 24.738''	E 3° 22' 44.936''	Vertical Net 50	4-9
21/03/2013	9:30:41	N 55° 44' 27.265''	E 3° 22' 47.518''	Vertical Net 50	4-10
21/03/2013	12:08:12	N 55° 44' 23.881''	E 3° 22' 46.286''	RAMSES underwater light sensors	4-11
21/03/2013	12:46:16	N 55° 44' 23.14''	E 3° 22' 47.233''	CTD	4-12
21/03/2013	19:10:31	N 56° 34' 47.374''	E 2° 10' 14.549''	CTD	1-1
21/03/2013	19:26:25	N 56° 34' 47.41''	E 2° 10' 11.528''	Vertical Net 50	1-2
21/03/2013	19:35:43	N 56° 34' 48.655''	E 2° 10' 15.085''	Vertical Net 50	1-3
21/03/2013	19:45:36	N 56° 34' 49.278''	E 2° 10' 21.59''	Vertical Net 50	1-4
22/03/2013	4:58:24	N 56° 34' 48.821''	E 2° 10' 13.508''	CTD	1-5
22/03/2013	5:39:36	N 56° 34' 47.352''	E 2° 10' 10.448''	CTD	1-6
22/03/2013	6:58:51	N 56° 34' 47.053''	E 2° 10' 11.762''	CTD	1-7
22/03/2013	7:59:28	N 56° 34' 45.66''	E 2° 10' 8.666''	CTD	1-8
22/03/2013	9:07:46	N 56° 34' 49.753''	E 2° 10' 2.039''	Vertical Net 50	1-9
22/03/2013	9:23:42	N 56° 34' 49.318''	E 2° 9' 59.141''	Vertical Net 50	1-10
22/03/2013	9:30:25	N 56° 34' 49.087''	E 2° 9' 59.882''	Vertical Net 50	1-11
22/03/2013	9:41:24	N 56° 34' 48.666''	E 2° 9' 46.537''	Vertical Net 50	1-12
22/03/2013	12:08:47	N 56° 34' 48.425''	E 2° 10' 8.821''	RAMSES underwater light sensors	1-13
22/03/2013	13:02:25	N 56° 34' 48.889''	E 2° 10' 14.207''	CTD	1-14
22/03/2013	18:58:26	N 56° 14' 59.071''	E 2° 29' 54.258''	CTD	2-1
22/03/2013	19:25:05	N 56° 15' 1.001''	E 2° 29' 49.232''	Vertical Net 50	2-2
22/03/2013	19:36:49	N 56° 15' 1.786''	E 2° 29' 50.258''	Vertical Net 50	2-3
22/03/2013	19:42:32	N 56° 15' 2.794''	E 2° 29' 52.71''	Vertical Net 50	2-4
22/03/2013	20:02:05	N 56° 15' 6.88''	E 2° 29' 45.056''	CTD	2-5

Date	Time (UTC)	Latitude	Longitude	Device name	Station-cast
	(+1h)	(deg. min.milli)	(deg. min.milli)		
16/03/2013	5:04:38	N 53° 24' 9.018''	E 5° 8' 39.419''	CTD	13-1
16/03/2013	6:02:43	N 53° 24' 9.184''	E 5° 8' 42.119''	CTD	13-2
16/03/2013	7:07:40	N 53° 24' 7.79''	E 5° 8' 39.991''	CTD	13-3
16/03/2013	8:41:07	N 53° 24' 7.715''	E 5° 8' 40.139''	CTD	13-7
16/03/2013	13:04:12	N 53° 24' 7.258''	E 5° 8' 40.312''	CTD	13-9
16/03/2013	20:04:29	N 53° 55' 12.194''	E 4° 36' 2.88''	CTD	11-1
17/03/2013	5:36:50	N 53° 55' 12.961''	E 4° 35' 55.932''	CTD	11-5
17/03/2013	6:59:50	N 53° 55' 12.382''	E 4° 36' 0.608''	CTD	11-6
17/03/2013	13:00:39	N 53° 55' 11.525''	E 4° 35' 59.075''	CTD	11-12
17/03/2013	19:01:52	N 54° 7' 49.48''	E 4° 19' 45.314''	CTD	10-1
18/03/2013	5:03:46	N 54° 7' 48.565''	E 4° 19' 48.785''	CTD	10-5
18/03/2013	5:43:14	N 54° 7' 49.998''	E 4° 19' 48.518''	CTD	10-6
18/03/2013	7:03:42	N 54° 7' 50.898''	E 4° 19' 47.528''	CTD	10-7
18/03/2013	8:07:32	N 54° 7' 49.544''	E 4° 19' 49.508''	CTD	10-8
18/03/2013	8:28:34	N 54° 7' 50.174''	E 4° 19' 50.689''	CTD	10-9
18/03/2013	13:05:12	N 54° 7' 48.263''	E 4° 19' 50.174''	CTD	10-15
18/03/2013	19:02:33	N 54° 43' 12.515''	E 3° 40' 43.032''	CTD	8-1
19/03/2013	5:35:46	N 54° 43' 13.069''	E 3° 40' 49.71''	CTD	8-5
19/03/2013	7:05:03	N 54° 43' 11.01''	E 3° 40' 46.114''	CTD	8-6
19/03/2013	7:05:03	N 54° 43' 11.01''	E 3° 40' 46.114''	CTD	8-6
19/03/2013	13:01:54	N 54° 43' 12.284''	E 3° 40' 48.23''	CTD	8-12
19/03/2013	19:01:14	N 55° 10' 12.814''	E 3° 9' 1.03''	CTD	7-1
20/03/2013	5:02:41	N 55° 10' 11.676''	E 3° 8' 58.902''	CTD	7-5
20/03/2013	5:40:04	N 55° 10' 12.065''	E 3° 9' 0.119''	CTD	7-6
20/03/2013	7:02:59	N 55° 10' 11.708''	E 3° 8' 59.006''	CTD	7-7
20/03/2013	7:33:42	N 55° 10' 12.353''	E 3° 8' 56.238''	CTD	7-8
20/03/2013	8:05:23	N 55° 10' 10.456''	E 3° 8' 59.514''	CTD	7-9
20/03/2013	12:59:42	N 55° 10' 11.064''	E 3° 9' 1.429''	CTD	7-15
20/03/2013	18:59:10	N 55° 44' 24.504''	E 3° 22' 46.078''	CTD	4-1
21/03/2013	5:28:50	N 55° 44' 23.86''	E 3° 22' 49.901''	CTD	4-5
21/03/2013	7:00:06	N 55° 44' 22.618''	E 3° 22' 48.446''	CTD	4-6
21/03/2013	12:46:16	N 55° 44' 23.14''	E 3° 22' 47.233''	CTD	4-12
21/03/2013	19:10:31	N 56° 34' 47.374''	E 2° 10' 14.549''	CTD	1-1
22/03/2013	4:58:24	N 56° 34' 48.821''	E 2° 10' 13.508''	CTD	1-5
22/03/2013	5:39:36	N 56° 34' 47.352''	E 2° 10' 10.448''	CTD	1-6
22/03/2013	6:58:51	N 56° 34' 47.053''	E 2° 10' 11.762''	CTD	1-7
22/03/2013	7:59:28	N 56° 34' 45.66''	E 2° 10' 8.666''	CTD	1-8
22/03/2013	13:02:25	N 56° 34' 48.889''	E 2° 10' 14.207''	CTD	1-14
22/03/2013	18:58:26	N 56° 14' 59.071''	E 2° 29' 54.258''	CTD	2-1
22/03/2013	20:02:05	N 56° 15' 6.88''	E 2° 29' 45.056''	CTD	2-5

Date	Time (UTC)	Latitude	Longitude	Device name	Station-cast
	(+1h)	(deg. min.milli)	(deg. min.milli)		
16/03/2013	8:09:40	N 53° 24' 8.204''	E 5° 8' 39.412''	Vertical Net 50	13-4
16/03/2013	8:12:51	N 53° 24' 8.233''	E 5° 8' 46.601''	Vertical Net 50	13-5
16/03/2013	8:15:36	N 53° 24' 11.704''	E 5° 8' 47.101''	Vertical Net 50	13-6
16/03/2013	20:24:52	N 53° 55' 17.245''	E 4° 35' 59.345''	Vertical Net 50	11-2
16/03/2013	20:32:23	N 53° 55' 19.884''	E 4° 36' 7.11''	Vertical Net 50	11-3
16/03/2013	20:38:53	N 53° 55' 19.816''	E 4° 36' 14.454''	Vertical Net 50	11-4
17/03/2013	9:05:42	N 53° 55' 16.619''	E 4° 35' 59.471''	Vertical Net 50	11-7
17/03/2013	9:13:42	N 53° 55' 18.836''	E 4° 36' 8.359''	Vertical Net 50	11-8
17/03/2013	9:20:27	N 53° 55' 20.086''	E 4° 36' 17.024''	Vertical Net 50	11-9
17/03/2013	9:25:59	N 53° 55' 21.59''	E 4° 36' 23.454''	Vertical Net 50	11-10
17/03/2013	19:18:22	N 54° 7' 48.702''	E 4° 19' 41.3''	Vertical Net 50	10-2
17/03/2013	19:27:45	N 54° 7' 49.375''	E 4° 19' 39.677''	Vertical Net 50	10-3
17/03/2013	19:37:14	N 54° 7' 51.532''	E 4° 19' 42.528''	Vertical Net 50	10-4
18/03/2013	9:06:28	N 54° 7' 48.439''	E 4° 19' 56.698''	Vertical Net 50	10-10
18/03/2013	9:13:36	N 54° 7' 50.675''	E 4° 20' 3.116''	Vertical Net 50	10-11
18/03/2013	9:20:27	N 54° 7' 53.652''	E 4° 20' 8.351''	Vertical Net 50	10-12
18/03/2013	9:29:08	N 54° 7' 59.106''	E 4° 20' 18.74''	Vertical Net 50	10-13
18/03/2013	19:15:56	N 54° 43' 12''	E 3° 40' 39.378''	Vertical Net 50	8-2
18/03/2013	19:22:02	N 54° 43' 13.886''	E 3° 40' 41.092''	Vertical Net 50	8-3
18/03/2013	19:29:48	N 54° 43' 16.5''	E 3° 40' 42.064''	Vertical Net 50	8-4
19/03/2013	9:06:30	N 54° 43' 13.116''	E 3° 40' 45.055''	Vertical Net 50	8-7
19/03/2013	9:13:01	N 54° 43' 13.991''	E 3° 40' 48.086''	Vertical Net 50	8-8
19/03/2013	9:18:37	N 54° 43' 15.733''	E 3° 40' 48.882''	Vertical Net 50	8-9
19/03/2013	9:24:50	N 54° 43' 17.332''	E 3° 40' 50.12''	Vertical Net 50	8-10
19/03/2013	19:12:15	N 55° 10' 10.952''	E 3° 9' 1.163''	Vertical Net 50	7-2
19/03/2013	19:16:28	N 55° 10' 11.687''	E 3° 8' 56.015''	Vertical Net 50	7-3
19/03/2013	19:23:35	N 55° 10' 12.842''	E 3° 8' 52.645''	Vertical Net 50	7-4
20/03/2013	9:05:39	N 55° 10' 9.84''	E 3° 8' 56.299''	Vertical Net 50	7-10
20/03/2013	9:09:12	N 55° 10' 10.2''	E 3° 8' 54.456''	Vertical Net 50	7-11
20/03/2013	9:13:33	N 55° 10' 11.23''	E 3° 8' 56.306''	Vertical Net 50	7-12
20/03/2013	9:18:35	N 55° 10' 12.774''	E 3° 8' 56.782''	Vertical Net 50	7-13
20/03/2013	19:15:29	N 55° 44' 24.634''	E 3° 22' 46.625''	Vertical Net 50	4-2
20/03/2013	19:23:53	N 55° 44' 25.966''	E 3° 22' 38.082''	Vertical Net 50	4-3
20/03/2013	19:32:44	N 55° 44' 29.062''	E 3° 22' 34.464''	Vertical Net 50	4-4
21/03/2013	9:08:19	N 55° 44' 22.124''	E 3° 22' 46.074''	Vertical Net 50	4-7
21/03/2013	9:16:28	N 55° 44' 23.078''	E 3° 22' 45.743''	Vertical Net 50	4-8
21/03/2013	9:21:58	N 55° 44' 24.738''	E 3° 22' 44.936''	Vertical Net 50	4-9
21/03/2013	9:30:41	N 55° 44' 27.265''	E 3° 22' 47.518''	Vertical Net 50	4-10
21/03/2013	19:26:25	N 56° 34' 47.41''	E 2° 10' 11.528''	Vertical Net 50	1-2
21/03/2013	19:35:43	N 56° 34' 48.655''	E 2° 10' 15.085''	Vertical Net 50	1-3
21/03/2013	19:45:36	N 56° 34' 49.278''	E 2° 10' 21.59''	Vertical Net 50	1-4
22/03/2013	9:07:46	N 56° 34' 49.753''	E 2° 10' 2.039''	Vertical Net 50	1-9
22/03/2013	9:23:42	N 56° 34' 49.318''	E 2° 9' 59.141''	Vertical Net 50	1-10
22/03/2013	9:30:25	N 56° 34' 49.087''	E 2° 9' 59.882''	Vertical Net 50	1-11
22/03/2013	9:41:24	N 56° 34' 48.666''	E 2° 9' 46.537''	Vertical Net 50	1-12
22/03/2013	19:25:05	N 56° 15' 1.001''	E 2° 29' 49.232''	Vertical Net 50	2-2
22/03/2013	19:36:49	N 56° 15' 1.786''	E 2° 29' 50.258''	Vertical Net 50	2-3
22/03/2013	19:42:32	N 56° 15' 2.794''	E 2° 29' 52.71''	Vertical Net 50	2-4

Date	Time (UTC)	Latitude	Longitude	Device name	Station-cast
	(+1h)	(deg. min.milli)	(deg. min.milli)		
16/03/2013	12:10:25	N 53° 24' 10.703''	E 5° 8' 36.46''	RAMSES underwater light sensors	13-8
17/03/2013	12:15:32	N 53° 55' 12.256''	E 4° 36' 2.156''	RAMSES underwater light sensors	11-11
18/03/2013	12:12:07	N 54° 7' 48.14''	E 4° 19' 48.05''	RAMSES underwater light sensors	10-14
19/03/2013	12:14:58	N 54° 43' 13.361''	E 3° 40' 47.485''	RAMSES underwater light sensors	8-11
20/03/2013	12:12:41	N 55° 10' 11.348''	E 3° 8' 59.302''	RAMSES underwater light sensors	7-14
21/03/2013	12:08:12	N 55° 44' 23.881''	E 3° 22' 46.286''	RAMSES underwater light sensors	4-11
22/03/2013	12:08:47	N 56° 34' 48.425''	E 2° 10' 8.821''	RAMSES underwater light sensors	1-13

PSA file: C:\Data\CTD\64PE360\64PE360mainframe.psa

Date: 03/22/2013

Instrument configuration file: C:\Data\CTD\64PE366\64PE366#1.CON

Configuration report for SBE 911plus/917plus CTD

Frequency channels suppressed : 0
Voltage words suppressed : 0
Computer interface : RS-232C
Deck unit : SBE11plus Firmware Version >= 5.0
Scans to average : 1
NMEA position data added : Yes
NMEA depth data added : No
NMEA time added : No
NMEA device connected to : PC
Surface PAR voltage added : Yes
Scan time added : Yes

1) Frequency 0, Temperature

Serial number : 032118
Calibrated on : 9 jan 2013
G : 4.12887603e-003
H : 6.28752139e-004
I : 2.13755745e-005
J : 2.26164422e-006
F0 : 1000.000
Slope : 1.00000000
Offset : 0.0000

2) Frequency 1, Conductivity

Serial number : 043035
Calibrated on : 09 jan 2013
G : -9.56572715e+000
H : 1.35672629e+000
I : 7.41743640e-004
J : 1.91397961e-005
CTcor : 3.2500e-006
CPcor : -9.57000000e-008
Slope : 1.00000000
Offset : 0.00000

3) Frequency 2, Pressure, Digiquartz with TC

Serial number : 53978
Calibrated on : 5 januari 2009
C1 : -4.560326e+004
C2 : 6.384354e-001
C3 : 1.351670e-002
D1 : 3.987300e-002
D2 : 0.000000e+000
T1 : 3.036575e+001
T2 : -1.373321e-004
T3 : 4.342220e-006

T4 : 1.893830e-009
T5 : 0.000000e+000
Slope : 0.99994000
Offset : -2.49120
AD590M : 1.143000e-002
AD590B : -8.526850e+000

4) Frequency 3, Free

5) Frequency 4, Free

6) A/D voltage 0, Fluorometer, Chelsea Aqua 3

Serial number : 088-008
Calibrated on : 28 feb 2013
VB : 0.505600
V1 : 2.120700
Vacetone : 0.820400
Scale factor : 1.000000
Slope : 1.000000
Offset : 0.000000

7) A/D voltage 1, Oxygen, SBE 43

Serial number : 431141
Calibrated on : 02-feb-2013
Equation : Sea-Bird
Soc : 4.95200e-001
Offset : -5.09600e-001
A : -2.81170e-003
B : 9.96990e-005
C : -1.95470e-006
E : 3.60000e-002
Tau20 : 2.50000e+000
D1 : 1.92630e-004
D2 : -4.64800e-002
H1 : -3.30000e-002
H2 : 5.00000e+003
H3 : 1.45000e+003

8) A/D voltage 2, Turbidity Meter, Seapoint

Serial number : 11541
Calibrated on : jan 2011
Gain setting : 20 x
Scale factor : 1.000

9) A/D voltage 3, Transmissometer, Chelsea/Seatech

Serial number : CST-1112DR
Calibrated on : 27-3-2012
M : 21.0837
B : -1.2650
Path length : 0.250

10) A/D voltage 4, PAR/Irradiance, Biospherical/Licor

Serial number : 092

```
    Calibrated on        : 15 - 2 - 2012
    M                    : 0.88510000
    B                    : 1.27800000
    Calibration constant : 10000000000.00000000
    Multiplier           : 1.35890000
    Offset               : 0.00000000

11) A/D voltage 5, Free

12) A/D voltage 6, Altimeter

    Serial number : 47597
    Calibrated on : Jan. 2011
    Scale factor  : 15.000
    Offset        : 0.000

13) A/D voltage 7, Free

14) SPAR voltage, Unavailable

15) SPAR voltage, SPAR/Surface Irradiance

    Serial number     : 095
    Calibrated on     : 15 - 2 - 2012
    Conversion factor : 1053.00000000
    Ratio multiplier  : 0.00000000

Scan length                   : 44
-----------------------------------------------
Pump Control
   This setting is only applicable to a custom build of the SBE 9plus.
   Enable pump on / pump off commands: NO
-----------------------------------------------
Data Acquisition:
   Archive data:                    YES
   Delay archiving:                 NO
   Data archive:
C:\Data\CTD\64PE366\64PE366_S01C14.hex
   Timeout (seconds) at startup:    60
   Timeout (seconds) between scans: 10
-----------------------------------------------
Instrument port configuration:
   Port      = COM1
   Baud rate = 19200
   Parity    = N
   Data bits = 8
   Stop bits = 1
-----------------------------------------------
Water Sampler Data:
   Water Sampler Type:   SBE Carousel
   Number of bottles:    24
   Port:                 COM11
   Enable remote firing: NO
   Firing sequence:      Sequential
   Tone for bottle fire confirmation uses PC internal speakers.
-----------------------------------------------
Header information:
   Header Choice = Prompt for Header Information
```

```
      prompt 0 = Ship: Pelagia
      prompt 1 = Station:
      prompt 2 = Operator:
-----------------------------------------
TCP/IP - port numbers:
   Data acquisition:
      Data port:            49163
      Status port:          49165
      Command port:         49164
   Remote bottle firing:
      Command port:         49167
      Status port:          49168
   Remote data publishing:
      Converted data port:  49161
      Raw data port:        49160
-----------------------------------------
Miscellaneous data for calculations
   Depth and Average Sound Velocity
      Latitude when NMEA is not available: 0.00000000
   Average Sound Velocity
      Minimum pressure [db]:               20.00000000
      Minimum salinity [psu]:              20.00000000
      Pressure window size [db]:           20.00000000
      Time window size [s]:                60.00000000
   Descent and Acceleration
      Window size [s]:                     2.00000000
   Plume Anomaly
      Theta-B:                             0.00000000
      Salinity-B                           0.00000000
      Theta-Z / Salinity-Z                 0.00000000
      Reference pressure [db]              0.00000000
   Oxygen
      Window size [s]:                     2.00000000
      Apply hysteresis correction:         1
      Apply Tau correction:                1
   Potential Temperature Anomaly
      A0:                                  0.00000000
      A1:                                  0.00000000
      A1 Multiplier:                       Salinity
-----------------------------------------
Serial Data Output:
   Output data to serial port: YES
   Seconds between updates:    0.00000000
   Port      = COM3
   Baud rate = 9600
   Parity    = N
   Data bits = 8
   Stop bits = 1
   Variables:
   Digits   Variable Name [units]
   ------   --------------------
   0        Scan Count
   7        Conductivity [S/m]
   5        Temperature [ITS-90, deg C]
   4        Depth [salt water, m]
   5        Salinity, Practical [PSU]
-----------------------------------------
Mark Variables:
```

```
   Variables:
   Digits   Variable Name [units]
   ------   --------------------
   0        Scan Count
   4        Depth [salt water, m]
   7        Conductivity [S/m]
   5        Salinity, Practical [PSU]
-----------------------------------------------
Shared File Output:
   Output data to shared file: NO
-----------------------------------------------
TCP/IP Output:
   Raw data:
      Output raw data to socket:              NO
      XML wrapper and settings:               NO
      Seconds between raw data updates:       0.00000000
   Converted data:
      Output converted data to socket:        NO
      XML format:                             NO
-----------------------------------------------
SBE 11plus Deck Unit Alarms
   Enable minimum pressure alarm:    NO
   Enable maximum pressure alarm:    NO
   Enable altimeter alarm:           NO
-----------------------------------------------
SBE 14 Remote Display
   Enable SBE 14 Remote Display:     NO
-----------------------------------------------
PC Alarms
   Enable minimum pressure alarm:    NO
   Enable maximum pressure alarm:    NO
   Enable altimeter alarm:           NO
   Enable bottom contact alarm:      YES
   Alarm uses PC sound card.
-----------------------------------------------
Options:
   Prompt to save program setup changes: YES
   Automatically save program setup changes on exit: NO
   Confirm instrument configuration change: YES
   Confirm display setup changes: YES
   Confirm output file overwrite: YES
   Check scan length: NO
   Compare serial numbers: NO
   Maximized plot may cover Seasave: NO
```

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	***NOTE: Dutch style = comma instead of decimal***							***responsible PI***	Brussaard	*Brussaard*	*Brussaard*	*Brussaard*	*Brussaard*	*Brussaard*	*Brussaard*	*Brussaard*
2																
3	**Station**	**Cast**	**date**	**Time (+1h)**	**Lat**	**Lon**	**Depth bottom (m)**	**Notes**	**bottle #**	**Depth**	**Temperature**	**Salinity**	**Density**	**Transmission**	**luorescenc**	**Oxygen**
4										DepSM	T090C	Sal00	Sigma-é00	Xmiss	FICS-ug/L	eox0 mm/k
5	**13**	**1**	16/03/2013	5:04:38	N 53° 24' 9.018"	E 5° 8' 39.419"	7									
6									23	3,7	2,3	30,8	24,60	0,10	1,98	268,11
7									22	3,7	2,3	30,8	24,60	0,10	1,98	265,99
8									21	3,8	2,3	30,8	24,61	0,10	1,98	274,24
9									20	3,7	2,3	30,8	24,61	0,10	1,99	287,06
10									19	3,5	2,3	30,8	24,61	0,12	2,00	295,96
11									18	3,6	2,3	30,8	24,60	0,11	2,00	278,19
12									17	4,0	2,3	30,8	24,61	0,12	1,98	276,57
13									16	3,7	2,3	30,8	24,61	0,13	1,96	276,03
14									15	3,5	2,3	30,8	24,61	0,13	1,94	272,23
15									14	3,6	2,3	30,8	24,61	0,14	1,93	281,32
16									13	3,7	2,3	30,8	24,61	0,14	1,96	276,60
17									12	3,7	2,3	30,8	24,60	0,14	1,96	274,36
18									11	3,7	2,3	30,8	24,61	0,13	1,96	289,55
19									10	3,5	2,3	30,8	24,61	0,13	1,98	286,13
20									9	3,6	2,3	30,8	24,60	0,13	2,00	276,44
21									8	3,8	2,3	30,8	24,60	0,12	2,00	270,24
22									7	3,7	2,3	30,8	24,60	0,10	2,01	273,27
23									6	3,5	2,3	30,8	24,60	0,10	2,01	274,15
24									5	3,5	2,3	30,8	24,60	0,10	2,01	271,41
25									4	3,7	2,3	30,8	24,60	0,10	2,01	278,87
26									3	3,7	2,3	30,8	24,60	0,10	2,01	277,42
27									2	3,7	2,3	30,8	24,60	0,10	1,96	273,07
28									1	3,7	2,3	30,8	24,59	0,10	2,00	266,35
29	**13**	**2**	16/03/2013	6:02:43	N 53° 24' 9.184"	E 5° 8' 42.119"										
30									24	3,2	2,3	30,9	24,63	-0,06	3,11	278,49
31									23	3,4	2,3	30,9	24,63	-0,06	3,12	286,18
32									22	3,4	2,3	30,9	24,63	-0,06	3,09	290,50
33									21	3,5	2,3	30,9	24,63	-0,06	3,10	280,17
34									20	3,2	2,3	30,9	24,63	-0,06	3,12	283,23
35									19	3,4	2,3	30,9	24,63	-0,06	3,13	290,24
36									18	3,4	2,3	30,8	24,63	-0,06	3,14	261,42
37									17	3,5	2,3	30,9	24,63	-0,06	3,10	294,16
38									16	3,4	2,3	30,9	24,63	-0,06	3,14	271,29
39									15	3,4	2,3	30,9	24,63	-0,06	3,10	254,64
40									14	3,5	2,3	30,9	24,63	-0,06	3,07	252,72
41									13	3,3	2,3	30,8	24,63	-0,06	3,03	257,79
42									12	3,3	2,3	30,9	24,63	-0,06	3,07	261,98
43									11	3,4	2,3	30,9	24,63	-0,06	3,12	261,89
44									10	3,4	2,3	30,9	24,63	-0,06	3,12	262,11
45									9	3,5	2,3	30,9	24,63	-0,06	3,09	271,79
46									8	3,4	2,3	30,9	24,63	-0,06	3,08	280,62
47									7	3,4	2,3	30,9	24,63	-0,06	3,09	278,75
48									6	3,5	2,3	30,9	24,63	-0,06	3,09	266,01
49									5	3,5	2,3	30,9	24,64	-0,06	3,09	255,02
50									4	3,6	2,3	30,9	24,63	-0,06	3,09	258,37
51									3	3,5	2,3	30,9	24,63	-0,06	3,09	265,54
52									2	3,4	2,3	30,9	24,63	-0,06	3,17	284,31
53									1	3,4	2,3	30,9	24,63	-0,06	3,09	292,03
54	**13**	**3**	16/03/2013	7:07:40	N 53° 24' 7.79"	E 5° 8' 39.991"										
55									24	3,4	2,7	31,4	25,02	-0,06	2,76	257,31
56									23	3,4	2,7	31,4	25,02	-0,06	2,73	257,06
57									22	3,5	2,7	31,4	25,02	-0,06	2,74	261,00
58									21	3,5	2,7	31,4	25,02	-0,06	2,75	262,92
59									20	3,5	2,7	31,4	25,02	-0,06	2,75	273,60

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
60									19	3,4	2,7	31,4	25,02	-0,06	2,74	285,98
61									18	3,4	2,7	31,4	25,02	-0,06	2,76	273,98
62									17	3,5	2,7	31,4	25,02	-0,06	2,78	271,82
63									16	3,5	2,7	31,4	25,02	-0,06	2,79	284,06
64									15	3,2	2,7	31,4	25,02	-0,06	2,76	276,36
65									14	3,6	2,7	31,4	25,02	-0,06	2,81	267,30
66									13	3,5	2,7	31,4	25,02	-0,06	2,77	288,73
67									12	3,3	2,7	31,4	25,02	-0,06	2,76	288,14
68									11	3,5	2,7	31,4	25,02	-0,06	2,76	262,30
69									10	3,3	2,7	31,4	25,02	-0,06	2,69	286,75
70									9	3,6	2,7	31,4	25,02	-0,06	2,70	272,55
71									8	3,4	2,7	31,4	25,02	-0,06	2,70	280,62
72									7	3,0	2,7	31,4	25,02	-0,06	2,68	294,00
73									6	3,5	2,7	31,4	25,02	-0,06	2,61	264,41
74									5	3,1	2,7	31,4	25,02	-0,06	2,62	279,67
75									4	3,2	2,7	31,4	25,02	-0,06	2,69	282,66
76									3	3,3	2,7	31,4	25,02	-0,06	2,73	287,57
77									2	3,2	2,7	31,4	25,02	-0,06	2,70	281,49
78									1	3,5	2,7	31,4	25,02	-0,06	2,72	265,53
79	**13**	**7**	16/03/2013	8:41:07	N 53° 24' 7.715"	E 5° 8' 40.139"										
80									24	3,9	2,7	31,4	25,06	-0,03	2,63	269,29
81									23	4,0	2,7	31,4	25,06	-0,02	2,56	275,79
82									22	4,0	2,7	31,4	25,06	0,00	2,53	280,79
83									21	4,0	2,7	31,4	25,06	0,02	2,50	270,04
84									20	4,2	2,7	31,4	25,06	0,03	2,49	278,30
85									19	3,9	2,7	31,4	25,06	0,04	2,47	284,37
86									18	3,8	2,7	31,4	25,06	0,05	2,55	278,30
87									17	4,1	2,7	31,4	25,06	0,07	2,67	275,69
88									16	4,0	2,7	31,4	25,06	0,05	2,70	287,23
89									15	3,8	2,7	31,4	25,06	0,04	2,74	264,68
90									14	4,2	2,7	31,4	25,06	0,00	2,82	262,45
91									13	3,9	2,7	31,4	25,06	-0,01	2,81	283,67
92									12	4,0	2,7	31,4	25,06	-0,03	2,82	275,31
93									11	4,1	2,7	31,4	25,06	-0,03	2,78	285,92
94									10	4,2	2,7	31,4	25,06	-0,03	2,82	276,68
95									9	4,1	2,7	31,4	25,06	-0,03	2,80	277,66
96									8	4,0	2,7	31,4	25,06	-0,03	2,75	282,15
97									7	4,0	2,7	31,4	25,06	-0,03	2,74	265,05
98									6	4,2	2,7	31,4	25,06	-0,03	2,75	267,39
99									5	4,1	2,7	31,4	25,06	-0,03	2,73	273,51
100									4	3,8	2,7	31,4	25,06	-0,03	2,71	267,93
101									3	4,0	2,7	31,4	25,06	-0,03	2,74	260,26
102									2	4,1	2,7	31,4	25,06	-0,03	2,76	261,20
103									1	4,0	2,7	31,4	25,06	-0,04	2,78	268,56
104	**13**	**9**	16/03/2013	13:04:12	N 53° 24' 7.258"	E 5° 8' 40.312"										
105									23	4,4	2,9	31,5	25,09	0,09	2,24	275,82
106									22	4,1	2,9	31,5	25,09	0,07	2,25	287,39
107									21	3,8	2,9	31,5	25,09	0,06	2,22	283,98
108									20	3,6	2,9	31,5	25,09	0,06	2,21	272,19
109									19	3,9	2,9	31,5	25,09	0,07	2,22	270,67
110									18	4,1	2,9	31,5	25,09	0,06	2,25	277,28
111									17	4,1	2,9	31,5	25,09	0,06	2,24	280,31
112									16	3,8	2,9	31,5	25,09	0,06	2,24	282,54
113									15	4,1	2,9	31,5	25,10	0,06	2,23	277,12
114									14	4,3	2,9	31,5	25,09	0,06	2,24	273,83
115									13	4,0	2,9	31,5	25,10	0,06	2,22	261,33
116									12	4,1	2,9	31,5	25,10	0,06	2,25	270,71
117									11	3,8	2,9	31,5	25,09	0,06	2,25	285,54
118									10	4,5	2,9	31,5	25,10	0,06	2,24	255,13
119									9	3,9	2,9	31,5	25,09	0,08	2,20	259,05

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
120									8	3,6	2,9	31,5	25,09	0,09	2,20	259,57
121									7	3,8	2,9	31,5	25,10	0,09	2,20	260,65
122									6	4,0	2,9	31,5	25,10	0,09	2,21	263,37
123									5	4,1	2,9	31,5	25,10	0,08	2,20	260,08
124									4	4,1	2,9	31,5	25,10	0,09	2,22	257,92
125									3	3,9	2,9	31,5	25,10	0,09	2,21	264,77
126									2	3,9	2,9	31,5	25,10	0,08	2,20	258,03
127									1	3,9	2,9	31,5	25,10	0,08	2,20	262,80
128	**11**	**1**	16/03/2013	20:04:29	N 53° 55' 12.194"	E 4° 36' 2.88"	43,5									
129									10	3,0	4,1	34,6	27,46	67,95	0,11	258,55
130									9	3,1	4,1	34,6	27,46	68,02	0,11	260,72
131									8	6,3	4,1	34,6	27,46	67,46	0,11	247,62
132									7	6,7	4,1	34,6	27,47	68,04	0,11	242,38
133									6	25,2	4,1	34,6	27,47	67,96	0,12	266,36
134									5	25,8	4,1	34,6	27,47	67,42	0,12	241,19
135									4	35,2	4,1	34,6	27,47	64,76	0,14	274,50
136									3	35,4	4,1	34,6	27,47	64,57	0,13	255,06
137									2	40,4	4,1	34,6	27,47	64,51	0,13	256,03
138									1	40,9	4,1	34,6	27,47	65,08	0,14	248,31
139	**11**	**5**	17/03/2013	5:36:50	N 53° 55' 12.961"	E 4° 35' 55.932"										
140									18	6,9	4,1	34,6	27,46	67,95	0,10	260,99
141									17	7,0	4,1	34,6	27,46	67,96	0,10	260,09
142									16	7,0	4,1	34,6	27,46	67,78	0,11	256,93
143									15	7,1	4,1	34,6	27,46	67,73	0,10	264,94
144									14	6,5	4,1	34,6	27,46	67,60	0,10	272,85
145									13	7,4	4,1	34,6	27,46	68,07	0,11	258,86
146									12	6,6	4,1	34,6	27,46	68,43	0,11	268,04
147									11	6,7	4,1	34,6	27,46	68,57	0,10	258,21
148									10	7,1	4,1	34,6	27,46	68,27	0,10	264,25
149									9	6,9	4,1	34,6	27,46	68,04	0,10	251,88
150									8	7,0	4,1	34,6	27,46	68,01	0,10	257,85
151									7	6,8	4,1	34,6	27,46	67,70	0,10	264,62
152									6	6,7	4,1	34,6	27,46	67,57	0,10	258,43
153									5	7,1	4,1	34,6	27,46	67,79	0,11	263,54
154									4	7,3	4,1	34,6	27,46	67,61	0,10	262,64
155									3	6,4	4,1	34,6	27,46	67,55	0,10	261,34
156									2	6,6	4,1	34,6	27,46	68,46	0,10	257,36
157									1	6,5	4,1	34,6	27,46	68,51	0,10	269,00
158	**11**	**6**	17/03/2013	6:59:50	N 53° 55' 12.382"	E 4° 36' 0.608"										
159									24	2,9	4,1	34,6	27,45	71,98	0,09	269,60
160									23	3,3	4,1	34,6	27,45	71,40	0,09	252,93
161									22	7,3	4,1	34,6	27,46	72,08	0,10	250,11
162									21	7,4	4,1	34,6	27,46	71,83	0,10	266,45
163									20	7,0	4,1	34,6	27,46	72,20	0,09	255,49
164									19	7,3	4,1	34,6	27,46	71,88	0,09	250,17
165									18	7,1	4,1	34,6	27,46	71,79	0,09	263,80
166									17	7,1	4,1	34,6	27,46	71,81	0,09	248,23
167									16	7,3	4,1	34,6	27,46	71,72	0,09	259,12
168									15	7,0	4,1	34,6	27,46	71,76	0,09	261,44
169									14	7,7	4,1	34,6	27,45	71,37	0,09	251,28
170									13	7,3	4,1	34,6	27,45	72,01	0,10	254,19
171									12	14,9	4,1	34,6	27,46	72,39	0,09	242,12
172									11	14,4	4,1	34,6	27,46	72,15	0,09	261,37
173									10	23,8	4,1	34,6	27,46	72,16	0,09	258,17
174									9	24,0	4,1	34,6	27,46	71,75	0,09	255,79
175									8	24,0	4,1	34,6	27,46	71,71	0,10	266,31
176									7	23,6	4,1	34,6	27,46	71,78	0,09	263,32
177									6	23,9	4,1	34,6	27,46	71,44	0,09	259,03
178									5	23,2	4,1	34,6	27,46	72,10	0,09	268,67
179									4	23,6	4,1	34,6	27,46	71,83	0,09	264,79

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
180									3	23,9	4,1	34,6	27,46	72,19	0,09	262,82
181									2	34,1	4,1	34,6	27,46	70,45	0,10	245,14
182									1	34,4	4,1	34,6	27,46	70,32	0,10	250,06
183	**11**	**12**	17/03/2013	13:00:39	N 53° 55' 11.525"	E 4° 35' 59.075"										
184									24	3,0	4,1	34,6	27,42	72,05	0,10	264,65
185									23	2,2	4,1	34,6	27,42	72,18	0,11	261,10
186									22	7,1	4,1	34,6	27,42	72,62	0,11	256,94
187									21	7,2	4,1	34,6	27,42	72,53	0,11	263,02
188									20	7,1	4,1	34,6	27,42	72,62	0,10	243,35
189									19	7,4	4,1	34,6	27,42	72,31	0,10	246,97
190									18	7,1	4,1	34,6	27,42	72,34	0,10	236,42
191									17	7,3	4,1	34,6	27,42	72,28	0,10	232,42
192									16	7,2	4,1	34,6	27,42	72,36	0,11	237,67
193									15	7,1	4,1	34,6	27,42	72,48	0,11	232,02
194									14	10,2	4,1	34,6	27,43	71,16	0,10	270,45
195									13	10,0	4,1	34,6	27,43	71,34	0,10	256,37
196									12	15,1	4,1	34,6	27,43	69,73	0,11	249,88
197									11	15,2	4,1	34,6	27,43	69,78	0,11	265,00
198									10	20,0	4,1	34,6	27,43	70,55	0,11	266,82
199									9	20,6	4,1	34,6	27,43	70,90	0,10	246,55
200									8	25,2	4,1	34,6	27,43	71,45	0,10	244,17
201									7	24,9	4,1	34,6	27,43	71,73	0,10	244,91
202									6	30,5	4,1	34,6	27,43	71,00	0,10	251,23
203									5	30,5	4,1	34,6	27,43	70,96	0,10	262,83
204									4	35,2	4,1	34,6	27,43	69,86	0,12	247,61
205									3	35,3	4,1	34,6	27,43	69,87	0,12	260,51
206									2	39,5	4,1	34,6	27,43	70,30	0,11	268,59
207									1	39,4	4,1	34,6	27,43	70,30	0,11	249,60
208	**10**	**1**	17/03/2013	19:01:52	N 54° 7' 49.48"	E 4° 19' 45.314"	49									
209									9	2,5	4,2	34,8	27,59	76,39	0,08	249,93
210									8	2,7	4,2	34,8	27,59	76,22	0,09	263,50
211									7	7,2	4,2	34,8	27,59	76,99	0,08	260,69
212									6	7,9	4,2	34,8	27,59	76,99	0,08	240,14
213									5	24,6	4,2	34,8	27,59	77,43	0,09	221,33
214									4	24,7	4,2	34,8	27,59	77,23	0,10	237,08
215									3	40,9	4,2	34,8	27,59	76,61	0,09	249,93
216									2	40,9	4,2	34,8	27,59	76,59	0,13	268,29
217									1	46,4	4,2	34,8	27,59	53,26	0,20	253,47
218	**10**	**5**	18/03/2013	5:03:46	N 54° 7' 48.565"	E 4° 19' 48.785"										
219									24	7,0	4,2	34,8	27,58	78,93	0,07	263,93
220									23	7,1	4,2	34,8	27,58	78,97	0,08	264,08
221									22	7,1	4,2	34,8	27,58	78,94	0,08	246,14
222									21	7,0	4,2	34,8	27,58	78,93	0,07	229,55
223									20	7,1	4,2	34,8	27,58	78,93	0,08	234,38
224									19	6,9	4,2	34,8	27,58	78,91	0,08	244,59
225									18	7,0	4,2	34,8	27,58	78,87	0,08	256,29
226									17	7,0	4,2	34,8	27,58	78,94	0,08	264,56
227									16	7,0	4,2	34,8	27,58	78,89	0,08	252,73
228									15	7,1	4,2	34,8	27,58	78,93	0,08	266,29
229									14	6,9	4,2	34,8	27,58	78,97	0,08	266,89
230									13	7,2	4,2	34,8	27,58	78,88	0,08	242,31
231									12	6,9	4,2	34,8	27,58	79,01	0,08	249,61
232									11	6,8	4,2	34,8	27,58	79,10	0,08	247,08
233									10	7,0	4,2	34,8	27,58	79,00	0,08	240,78
234									9	7,2	4,2	34,8	27,58	78,95	0,08	245,76
235									8	7,1	4,2	34,8	27,58	79,01	0,08	255,23
236									7	6,9	4,2	34,8	27,58	79,01	0,08	253,97
237									6	6,9	4,2	34,8	27,58	78,92	0,08	242,01
238									5	7,1	4,2	34,8	27,58	78,93	0,08	243,74
239									4	7,2	4,2	34,8	27,58	78,94	0,08	257,15

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
240									3	7,0	4,2	34,8	27,58	78,99	0,08	271,16
241									2	6,9	4,2	34,8	27,58	79,00	0,07	257,33
242									1	7,3	4,2	34,8	27,58	79,11	0,08	241,88
243	**10**	**6**	18/03/2013	5:43:14	N 54° 7' 49.998"	E 4° 19' 48.518"										
244									24	6,9	4,2	34,8	27,59	79,11	0,08	264,51
245									23	7,0	4,2	34,8	27,59	78,89	0,08	254,76
246									22	7,2	4,2	34,8	27,58	78,95	0,08	250,27
247									21	7,2	4,2	34,8	27,58	78,93	0,08	261,71
248									20	6,9	4,2	34,8	27,59	78,90	0,08	269,65
249									19	6,6	4,2	34,8	27,58	78,96	0,08	260,54
250									18	6,8	4,2	34,8	27,58	78,92	0,08	247,29
251									17	7,0	4,2	34,8	27,58	78,87	0,08	245,41
252									16	6,9	4,2	34,8	27,58	78,84	0,08	249,84
253									15	6,8	4,2	34,8	27,58	78,96	0,08	256,27
254									14	6,8	4,2	34,8	27,58	78,89	0,08	263,61
255									13	6,9	4,2	34,8	27,58	78,81	0,08	261,22
256									12	6,9	4,2	34,8	27,58	78,79	0,08	245,40
257									11	7,1	4,2	34,8	27,59	78,80	0,08	239,49
258									10	7,1	4,2	34,8	27,59	78,88	0,08	244,01
259									9	6,8	4,2	34,8	27,59	78,81	0,08	247,71
260									8	6,5	4,2	34,8	27,59	78,81	0,08	251,29
261									7	6,4	4,2	34,8	27,59	78,84	0,08	259,37
262									6	6,6	4,2	34,8	27,59	78,93	0,08	262,31
263									5	6,8	4,2	34,8	27,59	78,95	0,08	252,81
264									4	6,9	4,2	34,8	27,59	78,81	0,08	248,44
265									3	7,0	4,2	34,8	27,59	78,83	0,08	257,39
266									2	6,9	4,2	34,8	27,59	78,84	0,08	262,55
267									1	6,7	4,2	34,8	27,59	78,90	0,08	251,53
268	**10**	**7**	18/03/2013	7:03:42	N 54° 7' 50.898"	E 4° 19' 47.528"										
269									24	2,2	4,2	34,8	27,58	78,24	0,08	254,18
270									23	1,7	4,2	34,8	27,58	78,29	0,08	268,49
271									22	6,9	4,2	34,8	27,59	78,85	0,08	244,41
272									21	7,1	4,2	34,8	27,58	78,96	0,08	240,27
273									20	7,0	4,2	34,8	27,58	78,61	0,08	263,55
274									19	7,1	4,2	34,8	27,58	78,52	0,08	240,52
275									18	7,4	4,2	34,8	27,58	78,43	0,08	247,43
276									17	6,9	4,2	34,8	27,58	78,42	0,08	269,13
277									16	7,2	4,2	34,8	27,58	78,43	0,08	247,32
278									15	7,6	4,2	34,8	27,58	78,58	0,08	241,90
279									14	6,9	4,2	34,8	27,58	78,50	0,08	252,13
280									13	7,4	4,2	34,8	27,58	78,50	0,09	243,97
281									12	7,3	4,2	34,8	27,58	78,25	0,08	244,26
282									11	7,2	4,2	34,8	27,58	78,36	0,08	259,79
283									10	7,0	4,2	34,8	27,58	78,34	0,09	259,51
284									9	7,3	4,2	34,8	27,58	78,48	0,08	242,66
285									8	7,3	4,2	34,8	27,58	78,53	0,09	240,25
286									7	7,0	4,2	34,8	27,58	78,41	0,08	253,34
287									6	25,5	4,2	34,8	27,59	78,15	0,08	245,52
288									5	25,1	4,2	34,8	27,58	78,21	0,08	245,31
289									4	25,1	4,2	34,8	27,58	78,24	0,08	239,98
290									3	25,4	4,2	34,8	27,58	78,13	0,08	242,61
291									2	40,1	4,2	34,8	27,58	76,34	0,09	258,89
292									1	39,6	4,2	34,8	27,58	76,31	0,09	265,38
293	**10**	**8**	18/03/2013	8:07:32	N 54° 7' 49.544"	E 4° 19' 49.508"		**failed**								
294																
295	**10**	**9**	18/03/2013	8:28:34	N 54° 7' 50.174"	E 4° 19' 50.689"										
296									24	2,0	4,2	34,8	27,58	78,69	0,08	254,05
297									23	1,5	4,2	34,8	27,58	78,73	0,08	263,47
298									22	6,8	4,2	34,8	27,58	78,72	0,08	269,42
299									21	7,9	4,2	34,8	27,58	78,49	0,09	235,91

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
300									20	7,2	4,2	34,8	27,58	78,51	0,10	241,93
301									19	6,9	4,2	34,8	27,58	78,43	0,09	253,50
302									18	7,0	4,2	34,8	27,58	78,48	0,08	264,29
303									17	7,4	4,2	34,8	27,58	78,55	0,08	232,30
304									16	7,6	4,2	34,8	27,58	78,74	0,08	233,07
305									15	7,4	4,2	34,8	27,58	78,64	0,08	241,58
306									14	10,0	4,2	34,8	27,58	78,45	0,09	248,17
307									13	10,1	4,2	34,8	27,58	78,26	0,08	253,51
308									12	15,8	4,2	34,8	27,58	78,44	0,08	260,32
309									11	16,8	4,2	34,8	27,58	78,80	0,08	236,04
310									10	20,9	4,2	34,8	27,58	78,43	0,08	244,42
311									9	20,6	4,2	34,8	27,58	78,34	0,08	243,76
312									8	23,3	4,2	34,8	27,58	77,93	0,08	264,37
313									7	24,1	4,2	34,8	27,58	77,95	0,08	239,60
314									6	30,6	4,2	34,8	27,58	78,22	0,08	256,97
315									5	30,9	4,2	34,8	27,58	78,28	0,08	251,58
316									4	35,1	4,2	34,8	27,58	78,12	0,08	253,54
317									3	35,2	4,2	34,8	27,58	78,09	0,08	263,17
318									2	40,8	4,2	34,8	27,58	78,03	0,09	243,58
319									1	40,8	4,2	34,8	27,58	78,21	0,09	244,93
320	**10**	**15**	18/03/2013	13:05:12	N 54° 7' 48.263"	E 4° 19' 50.174"										
321									24	2,1	4,3	34,7	27,49	81,85	0,06	267,40
322									23	1,9	4,3	34,7	27,49	81,77	0,07	252,20
323									22	6,4	4,2	34,7	27,50	81,50	0,08	262,64
324									21	7,0	4,2	34,7	27,50	81,51	0,08	252,06
325									20	6,6	4,2	34,7	27,50	81,55	0,08	259,24
326									19	6,9	4,2	34,7	27,50	81,49	0,08	241,20
327									18	6,8	4,2	34,7	27,50	81,74	0,08	242,97
328									17	6,9	4,2	34,7	27,50	81,57	0,08	239,24
329									16	6,9	4,2	34,7	27,50	81,56	0,08	242,64
330									15	6,7	4,2	34,7	27,50	81,58	0,11	256,96
331									14	10,1	4,2	34,7	27,50	81,53	0,08	257,08
332									13	10,0	4,2	34,7	27,50	81,53	0,08	254,42
333									12	15,3	4,2	34,7	27,50	81,46	0,07	236,83
334									11	15,1	4,2	34,7	27,50	81,68	0,07	243,77
335									10	20,0	4,2	34,7	27,51	81,17	0,08	240,18
336									9	19,8	4,2	34,7	27,51	81,17	0,07	255,80
337									8	25,6	4,2	34,7	27,52	79,43	0,07	244,58
338									7	24,5	4,2	34,7	27,52	79,68	0,07	256,82
339									6	30,9	4,2	34,7	27,53	77,34	0,08	252,07
340									5	31,6	4,2	34,7	27,53	77,71	0,08	247,89
341									4	34,8	4,2	34,7	27,53	76,35	0,08	252,44
342									3	35,6	4,2	34,7	27,53	76,38	0,08	253,15
343									2	40,1	4,2	34,7	27,53	76,04	0,08	249,16
344									1	40,3	4,2	34,7	27,53	75,94	0,08	236,74
345	**8**	**1**	18/03/2013	19:02:33	N 54° 43' 12.515"	E 3° 40' 43.032"	46									
346									8	2,9	4,1	34,5	27,35	81,56	0,10	239,27
347									7	2,0	4,1	34,5	27,35	81,82	0,10	251,03
348									6	6,6	4,1	34,5	27,35	81,50	0,11	263,55
349									5	7,0	4,1	34,5	27,35	81,34	0,11	264,61
350									4	25,7	4,1	34,5	27,36	79,95	0,12	252,70
351									3	25,4	4,1	34,5	27,36	79,77	0,12	246,40
352									2	34,7	4,1	34,5	27,36	75,59	0,13	246,98
353									1	34,8	4,1	34,5	27,36	76,01	0,13	262,17
354	**8**	**5**	19/03/2013	5:35:46	N 54° 43' 13.069"	E 3° 40' 49.71"										
355									24	7,0	4,1	34,4	27,32	78,65	0,10	247,91
356									23	6,9	4,1	34,4	27,32	78,57	0,10	248,16
357									22	6,8	4,1	34,4	27,32	78,51	0,10	259,68
358									21	6,7	4,1	34,4	27,32	78,47	0,10	258,67
359									20	6,8	4,1	34,4	27,32	78,43	0,10	247,41

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
360									19	6,9	4,1	34,4	27,32	78,45	0,10	252,89
361									18	6,6	4,1	34,4	27,32	78,38	0,10	260,63
362									17	6,3	4,1	34,4	27,32	78,48	0,10	274,79
363									16	6,9	4,1	34,4	27,32	78,22	0,10	256,62
364									15	6,9	4,1	34,4	27,32	78,52	0,10	260,48
365									14	6,6	4,1	34,4	27,32	78,55	0,10	257,25
366									13	6,7	4,1	34,4	27,32	78,53	0,11	266,58
367									12	6,3	4,1	34,4	27,32	78,38	0,11	271,77
368									11	6,8	4,1	34,4	27,32	78,56	0,10	265,51
369									10	7,1	4,1	34,4	27,32	78,64	0,10	273,74
370									9	6,8	4,1	34,4	27,32	78,54	0,10	247,56
371									8	7,0	4,1	34,4	27,32	78,55	0,10	239,94
372									7	6,7	4,1	34,4	27,32	78,54	0,10	239,34
373									6	6,4	4,1	34,4	27,32	78,60	0,10	246,35
374									5	6,6	4,1	34,4	27,32	78,68	0,10	266,39
375									4	26,0	4,1	34,4	27,32	77,95	0,12	256,48
376									3	25,2	4,1	34,4	27,32	77,94	0,12	267,32
377									2	25,1	4,1	34,4	27,32	77,83	0,12	258,58
378									1	40,7	4,1	34,4	27,32	69,46	0,15	256,61
379	**8**	**6**	19/03/2013	7:05:03	N 54° 43' 11.01"	E 3° 40' 46.114"										
380									24	1,4	4,1	34,4	27,32	73,82	0,12	278,99
381									23	7,1	4,1	34,4	27,32	75,49	0,11	256,23
382									22	7,9	4,1	34,4	27,32	75,64	0,11	245,11
383									21	7,7	4,1	34,4	27,32	75,41	0,11	245,45
384									20	7,2	4,1	34,4	27,32	74,94	0,11	248,59
385									19	7,0	4,1	34,4	27,32	74,92	0,11	258,46
386									18	6,9	4,1	34,4	27,32	75,18	0,11	261,68
387									17	7,2	4,1	34,4	27,32	74,97	0,11	250,59
388									16	7,7	4,1	34,4	27,32	75,24	0,11	250,08
389									15	7,7	4,1	34,4	27,32	75,28	0,11	260,71
390									14	7,4	4,1	34,4	27,32	74,66	0,11	272,35
391									13	6,2	4,1	34,4	27,32	74,94	0,12	263,68
392									12	10,7	4,1	34,4	27,32	73,79	0,12	241,12
393									11	14,8	4,1	34,4	27,32	73,72	0,12	255,02
394									10	14,8	4,1	34,4	27,32	73,82	0,11	252,51
395									9	20,8	4,1	34,4	27,32	73,08	0,11	254,45
396									8	19,7	4,1	34,4	27,32	73,62	0,12	263,43
397									7	25,6	4,1	34,4	27,32	76,11	0,11	269,98
398									6	25,2	4,1	34,4	27,32	76,90	0,10	245,18
399									5	30,5	4,1	34,4	27,32	72,65	0,13	256,24
400									4	30,1	4,1	34,4	27,32	73,30	0,13	260,97
401									3	35,5	4,1	34,4	27,32	72,45	0,13	273,54
402									2	34,4	4,1	34,4	27,32	73,68	0,13	264,73
403									1	40,9	4,1	34,4	27,32	72,11	0,14	263,28
404	**8**	**12**	19/03/2013	13:01:54	N 54° 43' 12.284"	E 3° 40' 48.23"										
405									24	3,3	4,1	34,4	27,31	71,35	0,12	249,83
406									23	2,8	4,1	34,4	27,31	71,30	0,12	263,61
407									22	6,7	4,1	34,4	27,31	71,37	0,14	264,37
408									21	7,7	4,1	34,4	27,31	71,62	0,12	246,71
409									20	7,7	4,1	34,4	27,31	71,86	0,12	267,35
410									19	7,2	4,1	34,4	27,31	71,60	0,12	252,91
411									18	7,6	4,1	34,4	27,31	72,29	0,12	248,15
412									17	7,5	4,1	34,4	27,31	72,34	0,12	231,54
413									16	7,9	4,1	34,4	27,31	72,41	0,11	238,12
414									15	8,2	4,1	34,4	27,31	72,17	0,12	255,53
415									14	8,2	4,1	34,4	27,31	72,68	0,12	254,94
416									13	10,1	4,1	34,4	27,31	72,69	0,12	248,05
417									12	13,8	4,1	34,4	27,31	72,65	0,12	279,48
418									11	15,5	4,1	34,3	27,20	73,28	0,11	228,98
419									10	19,4	4,1	34,4	27,31	72,37	0,12	272,55

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
420									9	20,4	4,1	34,4	27,31	72,29	0,11	248,67
421									8	24,7	4,1	34,4	27,31	71,33	0,12	257,83
422									7	25,3	4,1	34,4	27,31	71,61	0,12	259,17
423									6	31,3	4,1	34,4	27,31	73,28	0,12	248,82
424									5	31,1	4,1	34,4	27,31	72,78	0,12	254,54
425									4	34,6	4,1	34,4	27,31	67,77	0,15	269,93
426									3	36,0	4,1	34,4	27,31	68,88	0,14	247,19
427									2	40,8	4,1	34,4	27,31	62,75	0,16	255,31
428									1	40,6	4,1	34,4	27,31	62,57	0,17	268,78
429	**7**	**1**	19/03/2013	19:01:14	N 55° 10' 12.814"	E 3° 9' 1.03"	31									
430									6	1,7	3,9	34,6	27,51	74,29	0,21	265,41
431									5	2,8	3,9	34,6	27,51	73,80	0,20	258,61
432									4	6,3	3,9	34,6	27,51	73,94	0,20	268,50
433									3	6,9	3,9	34,6	27,51	74,03	0,21	255,47
434									2	25,8	3,9	34,6	27,51	74,36	0,24	247,83
435									1	25,3	3,9	34,6	27,51	74,63	0,23	262,91
436	**7**	**5**	20/03/2013	5:02:41	N 55° 10' 11.676"	E 3° 8' 58.902"										
437									24	6,7	3,8	34,6	27,51	77,40	0,19	264,62
438									23	6,5	3,8	34,6	27,51	77,50	0,19	251,36
439									22	6,9	3,8	34,6	27,51	76,97	0,19	239,38
440									21	7,2	3,8	34,6	27,51	77,37	0,20	241,58
441									20	7,2	3,8	34,6	27,51	77,06	0,19	251,34
442									19	6,9	3,8	34,6	27,51	76,74	0,19	264,07
443									18	6,7	3,8	34,6	27,51	77,21	0,19	269,27
444									17	6,8	3,8	34,6	27,51	76,89	0,20	252,59
445									16	7,2	3,8	34,6	27,51	76,31	0,22	242,60
446									15	7,4	3,8	34,6	27,51	76,52	0,23	243,55
447									14	7,3	3,8	34,6	27,51	76,46	0,21	250,62
448									13	7,0	3,8	34,6	27,51	76,26	0,20	260,41
449									12	6,8	3,8	34,6	27,51	76,48	0,20	266,47
450									11	7,0	3,8	34,6	27,51	76,29	0,19	245,80
451									10	7,4	3,8	34,6	27,51	76,39	0,20	235,79
452									9	7,5	3,8	34,6	27,51	76,51	0,20	241,10
453									8	7,0	3,8	34,6	27,51	76,70	0,18	255,98
454									7	6,7	3,8	34,6	27,51	77,09	0,18	267,54
455									6	6,7	3,8	34,6	27,51	77,40	0,19	267,67
456									5	6,9	3,8	34,6	27,51	76,77	0,20	253,92
457									4	7,4	3,8	34,6	27,51	76,55	0,21	247,50
458									3	7,5	3,8	34,6	27,51	76,61	0,23	256,32
459									2	7,2	3,8	34,6	27,51	76,64	0,19	272,22
460									1	7,2	3,8	34,6	27,51	76,64	0,19	258,25
461	**7**	**6**	20/03/2013	5:40:04	N 55° 10' 12.065"	E 3° 9' 0.119"										
462									24	7,5	3,8	34,6	27,51	77,18	0,19	247,94
463									23	7,5	3,8	34,6	27,51	77,16	0,19	254,88
464									22	7,5	3,8	34,6	27,51	76,87	0,18	270,13
465									21	7,6	3,8	34,6	27,51	76,75	0,19	257,77
466									20	8,2	3,8	34,6	27,51	76,67	0,19	259,23
467									19	7,7	3,8	34,6	27,51	76,81	0,19	262,22
468									18	7,1	3,8	34,6	27,51	77,22	0,19	267,30
469									17	7,3	3,8	34,6	27,51	77,23	0,19	249,97
470									16	7,8	3,8	34,6	27,51	77,43	0,19	261,14
471									15	7,6	3,8	34,6	27,51	77,25	0,20	271,55
472									14	7,6	3,8	34,6	27,51	77,38	0,20	250,16
473									13	7,9	3,8	34,6	27,51	77,43	0,19	241,23
474									12	7,6	3,8	34,6	27,51	77,52	0,18	249,68
475									11	7,2	3,8	34,6	27,51	77,52	0,18	268,26
476									10	7,3	3,8	34,6	27,51	77,35	0,18	264,25
477									9	7,7	3,8	34,6	27,51	77,60	0,18	234,49
478									8	7,9	3,8	34,6	27,51	77,48	0,18	230,81
479									7	7,6	3,8	34,6	27,51	77,34	0,19	235,24

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
480									6	7,3	3,8	34,6	27,51	77,24	0,19	243,34
481									5	7,1	3,8	34,6	27,51	77,33	0,19	253,87
482									4	7,2	3,8	34,6	27,51	77,37	0,18	261,73
483									3	7,6	3,8	34,6	27,51	77,37	0,18	252,53
484									2	25,0	3,8	34,6	27,51	77,03	0,21	255,66
485									1	25,1	3,8	34,6	27,51	77,36	0,21	252,93
486	**7**	**7**	20/03/2013	7:02:59	N 55° 10' 11.708"	E 3° 8' 59.006"										
487									12	2,0	3,8	34,6	27,51	76,45	0,19	260,68
488									11	1,7	3,8	34,6	27,51	76,46	0,19	264,47
489									10	7,4	3,8	34,6	27,51	77,09	0,19	237,48
490									9	6,6	3,8	34,6	27,51	76,93	0,20	254,97
491									8	9,9	3,8	34,6	27,51	77,45	0,19	264,72
492									7	10,1	3,8	34,6	27,51	77,34	0,19	254,51
493									6	15,0	3,8	34,6	27,51	78,28	0,19	239,34
494									5	14,7	3,8	34,6	27,51	78,29	0,18	266,80
495									4	21,0	3,8	34,6	27,51	77,89	0,20	258,09
496									3	21,1	3,8	34,6	27,51	77,76	0,18	251,87
497									2	25,0	3,8	34,6	27,51	76,81	0,18	257,31
498									1	25,7	3,8	34,6	27,51	77,38	0,20	249,29
499	**7**	**8**	20/03/2013	7:33:42	N 55° 10' 12.353"	E 3° 8' 56.238"										
500									24	6,7	3,8	34,6	27,51	78,42	0,19	265,79
501									23	6,9	3,8	34,6	27,51	78,77	0,19	271,20
502									22	7,1	3,8	34,6	27,51	78,74	0,19	260,70
503									21	7,2	3,8	34,6	27,51	78,38	0,18	244,74
504									20	7,4	3,8	34,6	27,51	78,33	0,18	243,20
505									19	7,2	3,8	34,6	27,51	78,18	0,18	246,51
506									18	6,8	3,8	34,6	27,51	78,48	0,18	251,05
507									17	6,7	3,8	34,6	27,51	78,74	0,19	262,72
508									16	6,8	3,8	34,6	27,51	78,69	0,19	270,51
509									15	6,8	3,8	34,6	27,51	78,20	0,19	261,16
510									14	7,1	3,8	34,6	27,51	77,87	0,19	253,99
511									13	7,4	3,8	34,6	27,51	78,04	0,19	256,62
512									12	7,2	3,8	34,6	27,51	77,87	0,19	260,59
513									11	6,7	3,8	34,6	27,51	77,85	0,20	267,86
514									10	6,5	3,8	34,6	27,51	78,00	0,20	262,02
515									9	6,8	3,8	34,6	27,51	78,09	0,20	247,60
516									8	7,1	3,8	34,6	27,51	78,41	0,20	247,20
517									7	7,1	3,8	34,6	27,51	78,45	0,20	253,44
518									6	6,9	3,8	34,6	27,51	78,16	0,19	255,71
519									5	6,8	3,8	34,6	27,51	78,09	0,19	252,29
520									4	6,9	3,8	34,6	27,51	77,79	0,19	257,72
521									3	6,9	3,8	34,6	27,51	77,62	0,20	268,05
522									2	6,8	3,8	34,6	27,51	77,56	0,20	268,33
523									1	6,9	3,8	34,6	27,51	77,80	0,19	262,51
524	**7**	**9**	20/03/2013	8:05:23	N 55° 10' 10.456"	E 3° 8' 59.514"										
525									13	7,6	3,8	34,6	27,51	77,11	0,18	248,46
526									12	7,5	3,8	34,6	27,51	76,96	0,19	271,45
527									11	7,7	3,8	34,6	27,51	76,82	0,18	249,03
528									10	8,0	3,8	34,6	27,51	76,96	0,18	244,88
529									9	7,8	3,8	34,6	27,51	77,23	0,19	249,84
530									8	7,4	3,8	34,6	27,51	77,27	0,19	258,70
531									7	7,2	3,8	34,6	27,51	77,30	0,20	268,21
532									6	7,4	3,8	34,6	27,51	77,07	0,19	273,85
533									5	7,7	3,8	34,6	27,51	77,08	0,18	256,80
534									4	7,6	3,8	34,6	27,51	77,10	0,19	257,25
535									3	7,5	3,8	34,6	27,51	77,19	0,19	269,78
536									2	7,4	3,8	34,6	27,51	77,21	0,19	252,08
537									1	7,9	3,8	34,6	27,51	77,58	0,19	246,27
538	**7**	**15**	20/03/2013	12:59:42	N 55° 10' 11.064"	E 3° 9' 1.429"										
539									20	1,4	3,8	34,6	27,51	76,72	0,18	256,61

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
540									19	1,9	3,8	34,6	27,51	76,71	0,17	258,70
541									18	6,4	3,8	34,6	27,51	77,69	0,20	264,70
542									17	6,7	3,8	34,6	27,51	77,54	0,20	275,05
543									16	6,8	3,8	34,6	27,51	77,80	0,19	249,79
544									15	6,7	3,8	34,6	27,51	77,71	0,19	267,72
545									14	6,6	3,8	34,6	27,51	77,72	0,20	253,43
546									13	6,4	3,8	34,6	27,51	77,59	0,20	259,49
547									12	6,9	3,8	34,6	27,51	77,75	0,21	248,45
548									11	6,1	3,8	34,6	27,51	78,27	0,20	256,30
549									10	6,8	3,8	34,6	27,51	77,66	0,21	246,25
550									9	6,4	3,8	34,6	27,51	77,93	0,21	266,10
551									8	10,8	3,8	34,6	27,51	77,15	0,20	255,48
552									7	10,7	3,8	34,6	27,51	77,14	0,20	272,04
553									6	15,6	3,8	34,6	27,51	77,06	0,20	238,04
554									5	15,5	3,8	34,6	27,51	76,74	0,20	239,91
555									4	20,4	3,8	34,6	27,51	77,70	0,19	268,66
556									3	20,5	3,8	34,6	27,51	77,93	0,20	260,60
557									2	23,9	3,8	34,6	27,51	77,60	0,20	268,52
558									1	24,3	3,8	34,6	27,51	77,73	0,19	247,75
559	**4**	**1**	20/03/2013	18:59:10	N 55° 44' 24.504"	E 3° 22' 46.078"	53									
560									8	2,0	3,4	34,5	27,47	93,31	0,26	262,55
561									7	1,6	3,4	34,5	27,47	93,07	0,15	271,59
562									6	7,9	3,4	34,5	27,47	93,02	0,36	272,82
563									5	7,2	3,4	34,5	27,47	92,84	0,98	284,97
564									4	25,7	3,4	34,5	27,49	93,32	0,15	264,09
565									3	25,6	3,4	34,5	27,48	93,10	0,17	252,80
566									2	44,6	3,4	34,6	27,50	91,14	0,26	274,46
567									1	44,8	3,4	34,6	27,50	91,56	0,24	258,02
568	**4**	**5**	21/03/2013	5:28:50	N 55° 44' 23.86"	E 3° 22' 49.901"										
569									24	2,2	3,3	34,5	27,47	93,25	0,14	267,16
570									23	6,8	3,3	34,5	27,47	93,53	0,13	246,63
571									22	6,6	3,3	34,5	27,47	93,07	0,16	247,39
572									21	6,5	3,3	34,5	27,47	92,98	0,12	262,79
573									20	6,9	3,3	34,5	27,47	92,95	0,14	246,35
574									19	7,0	3,3	34,5	27,47	93,11	0,16	247,82
575									18	6,7	3,3	34,5	27,47	92,88	0,15	257,63
576									17	6,3	3,3	34,5	27,47	93,12	0,18	268,77
577									16	6,5	3,3	34,5	27,47	93,20	0,22	260,59
578									15	6,4	3,3	34,5	27,47	92,69	0,17	249,80
579									14	6,6	3,3	34,5	27,47	92,95	0,24	237,73
580									13	6,4	3,3	34,5	27,47	93,21	0,15	246,91
581									12	6,4	3,3	34,5	27,47	93,47	0,22	253,36
582									11	6,7	3,3	34,5	27,47	93,25	0,21	256,28
583									10	6,5	3,3	34,5	27,47	93,31	0,17	277,44
584									9	6,4	3,3	34,5	27,47	92,93	0,36	260,59
585									8	6,9	3,3	34,5	27,47	93,11	0,30	263,64
586									7	6,4	3,3	34,5	27,47	93,07	0,34	264,34
587									6	6,5	3,3	34,5	27,47	93,27	0,13	259,02
588									5	14,5	3,3	34,5	27,47	93,14	0,11	279,74
589									4	24,3	3,3	34,5	27,47	93,60	0,14	255,30
590									3	24,5	3,3	34,5	27,47	93,53	0,16	249,39
591									2	34,9	3,3	34,5	27,48	93,29	0,13	269,25
592									1	45,2	3,4	34,5	27,48	92,52	0,24	261,83
593	**4**	**6**	21/03/2013	7:00:06	N 55° 44' 22.618"	E 3° 22' 48.446"										
594									24	1,7	3,3	34,5	27,48	93,42	0,12	269,21
595									23	1,8	3,3	34,5	27,48	93,51	0,12	263,23
596									22	7,3	3,3	34,5	27,48	93,36	0,12	264,99
597									21	7,2	3,3	34,5	27,48	93,11	0,11	272,96
598									20	7,0	3,3	34,5	27,48	93,25	0,11	270,34
599									19	7,0	3,3	34,5	27,48	93,24	0,11	267,76

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
600									18	7,2	3,3	34,5	27,48	93,15	0,12	267,61
601									17	7,1	3,3	34,5	27,48	93,33	0,15	267,99
602									16	7,1	3,3	34,5	27,48	92,54	0,22	272,81
603									15	7,2	3,3	34,5	27,48	92,37	0,16	274,18
604									14	7,1	3,3	34,5	27,48	93,08	0,14	263,74
605									13	7,1	3,3	34,5	27,48	93,34	0,13	256,03
606									12	7,2	3,3	34,5	27,48	93,35	0,13	261,99
607									11	7,1	3,3	34,5	27,48	92,81	0,15	271,39
608									10	6,8	3,3	34,5	27,48	92,73	0,17	272,22
609									9	6,9	3,3	34,5	27,48	92,98	0,27	263,37
610									8	7,3	3,3	34,5	27,48	92,95	0,19	270,40
611									7	7,1	3,3	34,5	27,48	93,16	0,14	267,26
612									6	7,4	3,3	34,5	27,48	93,04	0,30	258,99
613									5	15,0	3,3	34,5	27,48	93,44	0,25	259,62
614									4	25,3	3,3	34,5	27,48	93,02	0,14	252,72
615									3	29,6	3,4	34,5	27,48	93,23	0,19	259,97
616									2	39,6	3,4	34,5	27,48	92,17	0,14	278,17
617									1	50,7	3,4	34,5	27,46	73,86	1,04	245,36
618	**4**	**12**	21/03/2013	12:46:16	N 55° 44' 23.14"	E 3° 22' 47.233"										
619									24	2,1	3,3	34,5	27,48	93,41	0,09	265,88
620									23	2,0	3,3	34,5	27,48	93,31	0,10	273,80
621									22	5,9	3,3	34,5	27,48	93,43	0,12	280,91
622									21	6,0	3,3	34,5	27,48	93,36	0,10	275,29
623									20	6,5	3,3	34,5	27,48	93,28	0,10	269,04
624									19	7,2	3,3	34,5	27,48	93,33	0,10	271,18
625									18	7,0	3,3	34,5	27,48	92,88	0,12	273,56
626									17	10,1	3,3	34,5	27,48	93,27	0,12	252,57
627									16	9,2	3,3	34,5	27,48	93,41	0,12	270,36
628									15	14,2	3,3	34,5	27,48	93,12	0,13	267,73
629									14	14,4	3,3	34,5	27,48	92,84	0,11	269,43
630									13	19,1	3,3	34,5	27,48	93,23	0,16	268,43
631									12	19,6	3,3	34,5	27,48	93,32	0,26	259,37
632									11	25,0	3,3	34,5	27,48	93,25	0,17	262,15
633									10	24,8	3,3	34,5	27,48	93,37	0,14	271,89
634									9	29,8	3,3	34,5	27,48	93,37	0,12	262,51
635									8	29,5	3,3	34,5	27,48	92,84	0,17	277,53
636									7	35,6	3,3	34,5	27,48	93,20	0,17	268,89
637									6	34,6	3,3	34,5	27,48	92,97	0,35	286,03
638									5	40,2	3,4	34,5	27,49	92,26	0,18	271,19
639									4	40,0	3,4	34,5	27,49	92,81	0,12	264,85
640									3	45,4	3,4	34,6	27,49	91,25	0,15	271,27
641									2	44,9	3,4	34,6	27,49	91,71	0,16	265,83
642									1	50,7	3,4	34,5	27,48	84,81	0,53	270,11
643	**2**	**1**	22/03/2013	18:58:26	N 56° 14' 59.071"	E 2° 29' 54.258"	75									
644									24	1,5	5,2	35,2	27,78	92,93	0,10	292,71
645									23	2,0	5,2	35,2	27,78	92,75	0,08	293,84
646									22	6,9	5,2	35,2	27,78	93,35	0,08	292,95
647									21	7,0	5,2	35,2	27,78	93,13	0,10	293,23
648									20	7,6	5,2	35,2	27,78	93,33	0,09	293,02
649									19	7,4	5,2	35,2	27,78	93,31	0,09	293,26
650									18	7,1	5,2	35,2	27,78	93,36	0,09	293,58
651									17	7,9	5,2	35,2	27,78	93,37	0,10	293,21
652									16	7,4	5,2	35,2	27,78	93,33	0,10	293,49
653									15	7,0	5,2	35,2	27,78	93,25	0,09	293,00
654									14	10,8	5,2	35,2	27,78	93,45	0,13	293,79
655									13	11,2	5,2	35,2	27,78	93,37	0,29	293,00
656									12	14,8	5,2	35,2	27,78	93,39	0,17	292,94
657									11	14,9	5,2	35,2	27,78	93,45	0,18	292,85
658									10	19,9	5,2	35,2	27,78	93,33	0,14	293,55
659									9	20,4	5,2	35,2	27,78	93,28	0,23	293,13

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
660									8	26,0	5,2	35,2	27,78	93,20	0,08	292,99
661									7	25,6	5,2	35,2	27,78	93,22	0,10	292,67
662									6	50,0	5,2	35,2	27,78	93,11	0,16	292,84
663									5	51,7	5,2	35,2	27,78	93,07	0,11	292,61
664									4	54,1	5,2	35,2	27,78	93,20	0,09	292,87
665									3	54,8	5,2	35,2	27,78	93,24	0,11	293,68
666									2	70,4	5,2	35,2	27,78	93,21	0,10	293,50
667									1	70,6	5,2	35,2	27,78	93,09	0,09	294,15
668	**2**	**5**	22/03/2013	20:02:05	N 56° 15' 6.88"	E 2° 29' 45.056"										
669									24	6,2	5,2	35,2	27,78	93,14	0,12	293,45
670									23	6,2	5,2	35,2	27,78	93,10	0,13	293,48
671									22	6,5	5,2	35,2	27,78	92,82	0,09	293,17
672									21	6,2	5,2	35,2	27,78	92,38	0,09	293,02
673									20	6,7	5,2	35,2	27,78	92,71	0,09	292,90
674									19	6,6	5,2	35,2	27,78	92,75	0,09	292,98
675									18	5,9	5,2	35,2	27,78	92,41	0,13	292,91
676									17	6,1	5,2	35,2	27,78	92,59	0,12	292,78
677									16	6,5	5,2	35,2	27,78	92,90	0,10	292,54
678									15	6,4	5,2	35,2	27,78	93,27	0,07	292,88
679									14	6,1	5,2	35,2	27,78	93,30	0,09	292,67
680									13	5,8	5,2	35,2	27,78	93,33	0,09	293,16
681									12	24,9	5,2	35,2	27,78	93,44	0,07	292,88
682									11	25,0	5,2	35,2	27,78	93,31	0,07	293,04
683									10	31,3	5,2	35,2	27,78	93,31	0,10	292,99
684									9	30,3	5,2	35,2	27,78	93,29	0,10	292,79
685									8	34,4	5,2	35,2	27,78	93,34	0,09	292,92
686									7	35,1	5,2	35,2	27,78	93,20	0,09	292,91
687									6	41,2	5,2	35,2	27,78	93,28	0,09	292,94
688									5	40,7	5,2	35,2	27,78	93,32	0,08	292,89
689									4	44,6	5,2	35,2	27,78	93,44	0,10	293,22
690									3	44,9	5,2	35,2	27,78	93,41	0,11	293,98
691									2	60,3	5,2	35,2	27,78	93,32	0,14	292,20
692									1	60,1	5,2	35,2	27,78	93,34	0,09	293,41
693	**1**	**1**	21/03/2013	19:10:31	N 56° 34' 47.374"	E 2° 10' 14.549"	84									
694									10	2,3	5,1	35,1	27,75	93,51	0,08	261,71
695									9	2,4	5,1	35,1	27,75	93,44	0,11	251,47
696									8	6,8	5,1	35,1	27,75	93,60	0,16	240,62
697									7	7,2	5,1	35,1	27,75	93,57	0,12	230,11
698									6	25,2	5,2	35,1	27,75	93,57	0,13	230,93
699									5	24,7	5,2	35,1	27,75	93,52	0,09	238,79
700									4	50,1	5,2	35,1	27,76	93,67	0,10	231,66
701									3	50,0	5,2	35,1	27,76	93,58	0,11	239,66
702									2	81,1	5,2	35,1	27,75	93,47	0,11	245,09
703									1	80,6	5,2	35,1	27,76	93,62	0,14	263,70
704	**1**	**5**	22/03/2013	4:58:24	N 56° 34' 48.821"	E 2° 10' 13.508"										
705									24	6,9	5,1	35,1	27,76	93,74	0,11	248,61
706									23	7,7	5,1	35,1	27,76	93,76	0,12	240,97
707									22	7,6	5,1	35,1	27,76	93,82	0,12	244,15
708									21	7,0	5,1	35,1	27,76	93,86	0,10	257,18
709									20	6,8	5,1	35,1	27,76	93,80	0,09	254,41
710									19	7,3	5,1	35,1	27,76	93,87	0,10	236,40
711									18	7,2	5,1	35,1	27,76	93,78	0,11	260,63
712									17	7,1	5,1	35,1	27,76	93,78	0,10	246,76
713									16	7,4	5,1	35,1	27,76	93,73	0,10	233,41
714									15	7,1	5,1	35,1	27,76	93,62	0,11	243,83
715									14	7,0	5,1	35,1	27,76	93,72	0,13	259,28
716									13	7,2	5,1	35,1	27,76	93,75	0,16	245,79
717									12	7,6	5,1	35,1	27,76	93,74	0,15	246,81
718									11	7,3	5,1	35,1	27,76	93,85	0,13	260,52
719									10	7,0	5,1	35,1	27,76	93,90	0,09	248,96

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
720									9	7,1	5,1	35,1	27,76	93,80	0,12	256,69
721									8	7,0	5,1	35,1	27,76	93,52	0,14	242,65
722									7	7,2	5,1	35,1	27,76	93,84	0,11	246,71
723									6	7,2	5,1	35,1	27,76	93,80	0,10	258,15
724									5	6,9	5,1	35,1	27,76	93,86	0,10	254,19
725									4	7,2	5,1	35,1	27,76	93,82	0,10	251,28
726									3	7,2	5,1	35,1	27,76	93,86	0,11	259,52
727									2	6,9	5,1	35,1	27,76	93,89	0,11	245,44
728									1	7,2	5,1	35,1	27,76	93,90	0,11	250,47
729	**1**	**6**	22/03/2013	5:39:36	N 56° 34' 47.352"	E 2° 10' 10.448"										
730									24	7,3	5,1	35,1	27,76	93,86	0,12	250,69
731									23	7,4	5,1	35,1	27,76	93,62	0,13	246,79
732									22	7,4	5,1	35,1	27,76	93,84	0,10	264,30
733									21	7,6	5,1	35,1	27,76	93,79	0,10	244,64
734									20	7,8	5,1	35,1	27,76	93,75	0,09	242,71
735									18	7,4	5,1	34,9	27,60	93,80	0,10	251,82
736									17	7,1	5,1	35,1	27,76	93,76	0,10	261,39
737									16	7,0	5,1	35,1	27,76	93,71	0,09	263,16
738									15	7,7	5,1	35,1	27,76	93,72	0,08	237,45
739									14	7,9	5,1	35,1	27,76	93,76	0,11	234,12
740									13	7,7	5,1	35,1	27,76	93,80	0,13	236,59
741									12	7,4	5,1	35,1	27,76	93,77	0,15	244,92
742									11	7,3	5,1	35,1	27,76	93,72	0,13	255,33
743									10	7,2	5,1	35,1	27,76	93,79	0,10	258,85
744									9	7,2	5,1	35,1	27,76	93,77	0,10	249,43
745									8	7,5	5,1	35,1	27,76	93,75	0,12	251,49
746									7	7,5	5,1	35,1	27,76	93,79	0,11	265,92
747									6	7,3	5,1	35,1	27,76	93,72	0,10	251,68
748									5	7,7	5,1	35,1	27,76	93,84	0,11	251,18
749									4	25,6	5,1	35,1	27,76	93,88	0,09	225,41
750									3	25,7	5,1	35,1	27,76	93,78	0,14	232,17
751									2	50,8	5,2	35,1	27,77	93,91	0,19	247,11
752									1	69,6	5,2	35,1	27,76	93,88	0,12	239,58
753	**1**	**7**	22/03/2013	6:58:51	N 56° 34' 47.053"	E 2° 10' 11.762"										
754									24	1,6	5,1	35,1	27,76	93,73	0,12	247,94
755									23	2,2	5,1	35,1	27,76	93,77	0,11	250,69
756									22	7,0	5,1	35,1	27,76	93,91	0,13	243,34
757									21	7,1	5,1	35,1	27,76	93,89	0,12	230,64
758									20	7,3	5,1	35,1	27,75	93,85	0,12	232,12
759									19	7,0	5,1	35,1	27,73	93,78	0,13	240,07
760									18	6,5	5,1	35,1	27,76	93,81	0,12	253,99
761									17	6,6	5,1	35,1	27,76	93,86	0,10	259,16
762									16	7,1	5,1	35,1	27,71	93,76	0,13	249,51
763									15	7,7	5,1	35,0	27,67	93,72	0,13	250,23
764									14	7,5	5,1	35,1	27,76	93,71	0,09	251,71
765									13	6,6	5,1	35,1	27,76	93,78	0,10	256,12
766									12	6,7	5,1	35,1	27,76	93,75	0,10	251,48
767									11	7,4	5,1	35,1	27,76	93,85	0,09	257,85
768									10	6,2	5,1	35,1	27,76	93,75	0,09	256,00
769									9	14,8	5,1	35,1	27,76	93,84	0,11	254,99
770									8	24,7	5,1	35,1	27,76	93,86	0,13	243,07
771									7	24,3	5,1	35,0	27,62	93,83	0,11	260,22
772									6	24,5	5,1	34,4	27,21	93,79	0,10	245,39
773									5	40,5	5,1	35,1	27,76	93,85	0,13	248,43
774									4	49,4	5,2	35,1	27,77	93,73	0,10	263,73
775									3	49,7	5,2	35,1	27,76	93,91	0,11	248,32
776									2	60,2	5,2	35,1	27,76	93,81	0,12	243,60
777									1	81,3	5,2	35,1	27,76	93,74	0,11	251,72
778	**1**	**8**	22/03/2013	7:59:28	N 56° 34' 45.66"	E 2° 10' 8.666"										
779									24	7,4	5,1	35,1	27,76	93,93	0,23	245,70

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
780									23	6,5	5,1	35,1	27,76	93,87	0,14	257,07
781									22	6,2	5,1	35,1	27,76	93,86	0,11	265,52
782									21	6,7	5,1	35,1	27,76	93,71	0,12	250,01
783									20	7,5	5,1	35,1	27,76	93,90	0,11	237,29
784									19	7,3	5,1	35,1	27,76	93,87	0,10	254,64
785									18	7,0	5,1	35,1	27,76	93,88	0,10	249,84
786									17	7,0	5,1	35,1	27,76	93,77	0,13	264,64
787									16	7,2	5,1	35,1	27,76	93,86	0,22	242,30
788									15	6,8	5,1	35,1	27,76	93,86	0,25	263,71
789									14	7,0	5,1	35,1	27,76	93,86	0,13	261,08
790									13	7,5	5,1	35,1	27,76	93,89	0,12	258,80
791									12	7,5	5,1	35,1	27,76	93,85	0,11	256,28
792									11	7,1	5,1	35,1	27,76	93,84	0,10	248,80
793									10	6,9	5,1	35,1	27,76	93,90	0,11	252,80
794									9	6,7	5,1	35,1	27,76	93,94	0,11	250,51
795									8	6,6	5,1	35,1	27,76	93,92	0,12	235,76
796									7	6,8	5,1	35,1	27,76	93,98	0,12	232,90
797									6	7,1	5,1	35,1	27,76	93,99	0,11	237,27
798									5	7,1	5,1	35,1	27,76	93,93	0,10	242,41
799									4	7,1	5,1	35,1	27,76	93,92	0,10	254,81
800									3	6,9	5,1	35,1	27,76	93,78	0,10	267,62
801									2	6,8	5,1	35,1	27,76	93,85	0,09	255,28
802									1	7,2	5,1	35,1	27,76	93,86	0,11	240,64
803	**1**	**14**	22/03/2013	13:02:25	N 56° 34' 48.889"	E 2° 10' 14.207"										
804									24	1,6	5,1	35,1	27,76	93,73	0,10	293,96
805									23	2,4	5,1	35,1	27,76	93,23	0,11	294,08
806									22	7,1	5,1	35,1	27,76	93,69	0,11	293,41
807									21	7,3	5,1	35,1	27,76	93,82	0,12	293,99
808									20	7,6	5,1	35,1	27,76	93,87	0,13	294,19
809									19	7,3	5,1	35,1	27,76	93,87	0,16	293,96
810									18	6,6	5,1	35,1	27,76	93,88	0,16	294,06
811									17	7,3	5,1	35,1	27,76	93,83	0,11	294,33
812									16	10,6	5,1	35,1	27,76	93,81	0,09	293,96
813									15	11,7	5,1	35,1	27,76	93,74	0,12	294,24
814									14	15,4	5,1	35,1	27,76	93,89	0,09	293,60
815									13	15,4	5,1	35,1	27,76	93,89	0,14	293,92
816									12	18,9	5,1	35,1	27,76	93,86	0,11	293,33
817									11	19,8	5,1	35,1	27,76	93,83	0,10	293,90
818									10	25,2	5,1	35,1	27,76	93,58	0,14	293,83
819									9	25,8	5,1	35,1	27,76	93,83	0,10	294,12
820									8	30,3	5,1	35,1	27,76	93,79	0,10	294,28
821									7	35,2	5,1	35,1	27,76	93,76	0,10	293,64
822									6	40,0	5,1	35,1	27,76	93,80	0,20	294,50
823									5	39,2	5,1	35,1	27,76	93,80	0,11	294,19
824									4	46,1	5,1	35,1	27,76	93,90	0,11	294,10
825									3	49,8	5,1	35,1	27,76	93,78	0,15	294,38
826									2	49,6	5,1	35,1	27,76	93,84	0,19	293,98
827									1	53,4	5,1	35,1	27,76	93,74	0,15	294,63
828																

	Q	R	S	T	U	V	W	X
1	*Brussaard*	*Brussaard*	*Brussaard*	*Brussaard*	*Brussaard*	*Brussaard*	*Brussaard*	*Brussaard*
2								
3	**Par**	**Spar**	**PO4**	**NH4**	**NOx**	**NO2**	**NO3**	**Fv/Fm**
4	ol quanta/m	ol quanta/m	µmol/L	µmol/L	µmol/L	µmol/L	µmol/L	
5								
6	0,05	20,73						
7	0,05	20,57						
8	0,05	27,37						
9	0,05	25,40						
10	0,05	24,17						
11	0,05	20,60						
12	0,05	20,60						
13	0,05	20,60						
14	0,05	20,57						
15	0,05	27,24						
16	0,05	20,57						
17	0,05	27,21						
18	0,05	23,33						
19	0,05	33,80						
20	0,05	20,99						
21	0,05	20,60						
22	0,05	20,57						
23	0,05	20,57						
24	0,05	20,57						
25	0,05	20,57						
26	0,05	20,60						
27	0,05	25,77	0,70	5,35	32,96	0,95	32,01	
28	0,05	27,26	0,70	5,40	33,20	0,96	32,24	
29								
30	0,05	27,66						
31	0,05	27,39						
32	0,05	27,32						
33	0,05	30,81						
34	0,05	33,72						
35	0,05	43,71						
36	0,05	30,52						
37	0,05	27,00						
38	0,05	40,33						
39	0,05	32,22						
40	0,05	27,00						
41	0,05	33,88						
42	0,05	28,89						
43	0,05	27,00	0,73	5,49	33,04	0,96	32,08	
44	0,05	27,00	0,71	5,46	32,80	0,95	31,85	
45	0,05	27,00						
46	0,05	29,91						
47	0,05	48,52						
48	0,05	34,09						
49	0,05	33,59						
50	0,05	27,00						
51	0,05	32,12						
52	0,05	27,00	0,71	5,67	33,09	0,95	32,13	
53	0,05	33,67	0,72	5,48	33,03	0,96	32,07	
54								
55	0,05	195,74						
56	0,05	195,25						
57	0,05	195,32						
58	0,05	195,30						
59	0,05	195,19						

	Q	R	S	T	U	V	W	X
60	0,05	195,32						
61	0,05	195,01	0,65	3,81	29,59	0,79	28,80	
62	0,05	194,83	0,65	3,90	29,75	0,79	28,95	
63	0,05	194,17	0,65	3,86	29,86	0,79	29,06	
64	0,05	194,11	0,65	3,79	29,74	0,79	28,95	
65	0,05	194,04	0,65	4,23	29,80	0,79	29,01	
66	0,05	193,90	0,64	3,81	29,79	0,79	28,99	
67	0,05	193,17	0,65	3,90	29,82	0,80	29,02	
68	0,05	192,86	0,64	3,79	29,51	0,79	28,72	
69	0,05	192,57	0,65	3,92	29,82	0,80	29,03	
70	0,05	191,89	0,65	3,92	29,81	0,79	29,02	
71	0,05	191,70	0,65	3,82	29,79	0,79	29,00	
72	0,05	191,41	0,64	3,85	29,77	0,80	28,97	
73	0,05	191,36	0,65	3,93	29,81	0,80	29,01	
74	0,05	191,44	0,65	3,86	29,75	0,79	28,96	
75	0,05	190,84	0,64	3,82	29,71	0,79	28,93	
76	0,05	190,29	0,64	3,82	29,75	0,79	28,96	
77	0,05	190,18	0,64	3,85	29,81	0,79	29,02	
78	0,05	190,05	0,64	3,81	29,69	0,79	28,90	0,59
79								
80	0,05	361,29						
81	0,05	361,29						
82	0,05	361,29						
83	0,05	360,66						
84	0,05	369,16						
85	0,05	368,61						
86	0,05	369,03						
87	0,05	368,42						
88	0,05	360,03						
89	0,05	360,26						
90	0,05	384,24						
91	0,05	375,77						
92	0,05	369,71						
93	0,05	393,38						
94	0,05	392,46						
95	0,05	392,14						
96	0,05	392,09						
97	0,05	391,54						
98	0,05	390,96						
99	0,05	391,70						
100	0,05	391,93						
101	0,05	391,09						
102	0,05	390,73	0,61	3,56	28,70	0,76	27,94	
103	0,05	391,25	0,61	3,55	28,92	0,76	28,17	0,62
104								
105	0,05	573,87						
106	0,05	547,85						
107	0,05	553,75						
108	0,05	564,37						
109	0,05	551,62						
110	0,05	571,85	0,60	3,12	28,10	0,72	27,39	
111	0,05	575,58	0,60	3,13	28,07	0,71	27,35	
112	0,05	565,74	0,59	3,22	28,36	0,72	27,64	
113	0,05	577,76						
114	0,05	578,07						
115	0,05	577,50						
116	0,05	578,18						
117	0,05	577,50						
118	0,05	580,83						
119	0,05	579,12						

	Q	R	S	T	U	V	W	X
120	0,05	578,97						
121	0,05	579,70						
122	0,05	579,83						
123	0,05	580,59						
124	0,05	581,25						
125	0,05	581,25						
126	0,05	583,06						
127	0,05	583,32	0,60	3,17	28,27	0,72	27,55	0,54
128								
129	1,12	28,89						
130	1,08	36,24	0,53	0,35	11,19	0,19	11,01	
131	0,18	31,30						
132	0,16	20,57	0,54	0,34	11,24	0,19	11,05	
133	0,05	37,84						
134	0,05	39,15	0,54	0,31	11,22	0,18	11,03	
135	0,05	41,75						
136	0,05	40,93	0,54	0,33	11,15	0,18	10,97	
137	0,05	29,28						
138	0,05	37,81	0,54	0,30	11,20	0,18	11,02	
139								
140	0,17	53,92						
141	0,16	46,73						
142	0,15	26,03						
143	0,18	24,56						
144	0,20	36,84						
145	0,14	31,78						
146	0,18	35,53						
147	0,21	43,61						
148	0,14	37,26						
149	0,17	28,76						
150	0,18	23,09						
151	0,17	45,00						
152	0,19	40,41						
153	0,15	21,86						
154	0,15	30,91	0,50	0,35	11,30	0,22	11,08	
155	0,21	28,42	0,51	0,38	11,30	0,22	11,08	
156	0,22	36,45	0,51	0,35	11,37	0,22	11,15	
157	0,15	31,36	0,51	0,34	11,24	0,22	11,03	
158								
159	29,74	276,32						
160	26,09	283,67	0,51	0,29	11,17	0,22	10,95	0,45
161	4,54	245,91	0,52	0,28	11,20	0,22	10,98	
162	4,28	247,96	0,51	0,25	11,14	0,22	10,93	
163	4,96	245,76	0,51	0,26	11,17	0,22	10,95	
164	4,30	243,37	0,50	0,26	11,24	0,22	11,03	
165	4,42	272,83	0,51	0,27	11,22	0,22	11,01	
166	5,06	272,44	0,52	0,27	11,20	0,22	10,99	
167	4,41	288,68	0,52	0,26	11,13	0,22	10,92	
168	4,42	284,17	0,51	0,27	11,15	0,22	10,94	
169	4,06	266,46	0,52	0,29	11,21	0,22	10,99	
170	4,25	272,83	0,51	0,27	11,14	0,22	10,92	0,25
171	0,32	279,58						
172	0,45	286,40	0,51	0,24	11,15	0,21	10,94	0,36
173	0,05	210,59						
174	0,05	193,99						
175	0,05	202,25						
176	0,05	195,32						
177	0,05	196,27						
178	0,05	207,45						
179	0,05	187,50						

	Q	R	S	T	U	V	W	X
180	0,05	196,24	0,52	0,27	11,16	0,21	10,95	0,26
181	0,05	233,68						
182	0,05	248,56	0,49	0,28	11,14	0,21	10,93	0,35
183								
184	67,11	388,24						
185	104,42	387,00	0,53	0,22	11,22	0,18	11,04	
186	11,89	369,92						
187	11,11	367,79						
188	12,94	364,90						
189	9,74	363,47						
190	12,47	360,90						
191	10,48	359,84						
192	11,99	358,71						
193	11,71	357,69	0,53	0,19	11,31	0,18	11,13	0,35
194	3,25	370,32						
195	4,38	369,95	0,53	0,21	11,34	0,19	11,16	
196	0,57	393,43						
197	0,62	393,59	0,53	0,21	11,24	0,18	11,06	
198	0,12	396,00						
199	0,09	396,00	0,53	0,21	11,20	0,18	11,02	
200	0,05	417,86						
201	0,05	417,86	0,53	0,23	11,29	0,19	11,10	
202	0,05	396,58						
203	0,05	396,00	0,52	0,22	11,30	0,19	11,11	
204	0,05	394,45						
205	0,05	393,43	0,53	0,22	11,33	0,19	11,15	
206	0,05	400,23						
207	0,05	401,11	0,53	0,21	11,34	0,19	11,16	
208								
209	1,87	63,00						
210	1,35	63,00	0,54	0,20	9,81	0,12	9,69	
211	0,21	63,00						
212	0,14	63,00	0,54	0,16	9,79	0,12	9,67	
213	0,05	63,00						
214	0,05	63,00	0,54	0,16	9,83	0,12	9,71	
215	0,05	63,00						
216	0,05	63,00						
217	0,05	63,00	0,54	0,13	9,82	0,12	9,70	
218								
219	0,23	56,78						
220	0,22	56,60						
221	0,24	56,68						
222	0,24	56,60						
223	0,22	56,57						
224	0,26	56,62						
225	0,21	56,57						
226	0,26	56,57						
227	0,25	56,65						
228	0,21	56,60						
229	0,24	56,57						
230	0,23	56,57						
231	0,27	56,57						
232	0,23	56,62						
233	0,24	56,57						
234	0,25	56,57						
235	0,22	56,70						
236	0,23	55,73						
237	0,24	55,76						
238	0,23	56,57						
239	0,23	56,57						

	Q	R	S	T	U	V	W	X
240	0,21	56,57						
241	0,23	56,57						
242	0,20	56,57	0,54	0,18	9,90	0,11	9,79	
243								
244	0,31	55,60						
245	0,32	51,04						
246	0,27	54,29						
247	0,22	57,86						
248	0,25	57,86						
249	0,33	57,86						
250	0,32	57,86						
251	0,25	57,86						
252	0,25	57,86						
253	0,29	57,86						
254	0,27	57,86						
255	0,25	57,86						
256	0,29	57,86						
257	0,27	57,86						
258	0,26	57,86						
259	0,25	57,86						
260	0,28	57,86						
261	0,32	57,86						
262	0,29	57,86						
263	0,27	57,86	0,54	0,14	9,65	0,11	9,54	
264	0,29	57,86	0,54	0,14	9,66	0,11	9,55	
265	0,26	58,22						
266	0,23	58,17						
267	0,26	57,88						
268								
269	14,22	95,14						
270	17,28	99,55	0,55	0,11	9,53	0,11	9,42	0,69
271	3,78	114,87						
272	3,97	113,30						
273	3,46	111,10						
274	4,09	110,13						
275	3,60	110,96						
276	3,67	109,37	0,55	0,08	9,54	0,11	9,43	
277	3,98	109,29	0,55	0,08	9,53	0,11	9,43	
278	3,23	109,29	0,55	0,08	9,55	0,11	9,44	
279	3,49	107,32	0,56	0,13	9,51	0,11	9,39	
280	3,56	104,25	0,55	0,09	9,67	0,11	9,56	
281	2,89	106,21	0,56	0,09	9,59	0,11	9,48	
282	2,91	105,82	0,55	0,11	9,51	0,11	9,40	
283	3,83	105,43	0,55	0,10	9,43	0,11	9,32	
284	3,35	105,43	0,55	0,11	9,66	0,12	9,54	
285	2,70	104,32	0,55	0,09	9,51	0,11	9,40	
286	3,60	104,14	0,55	0,09	9,59	0,11	9,48	0,68
287	0,05	64,29						
288	0,05	64,13						
289	0,05	63,55						
290	0,05	63,32	0,55	0,09	9,59	0,11	9,48	0,63
291	0,05	98,16	0,55	0,13	9,53	0,11	9,42	0,55
292	0,05	92,13						
293								
294								
295								
296	42,38	177,43	0,55	0,13	9,58	0,10	9,48	
297	50,39	177,43						
298	7,21	181,29						
299	5,43	180,00	0,55	0,07	9,49	0,10	9,39	

	Q	R	S	T	U	V	W	X
300	6,13	180,00						
301	7,57	180,55						
302	8,36	180,79						
303	7,13	180,05						
304	6,36	180,00						
305	6,88	180,00						
306	2,87	187,71						
307	2,85	187,71	0,55	0,07	9,53	0,10	9,42	
308	0,49	192,60						
309	0,40	191,57	0,56	0,07	9,56	0,10	9,46	
310	0,14	183,86						
311	0,13	183,25	0,55	0,07	9,52	0,10	9,41	
312	0,05	171,00						
313	0,05	170,92	0,55	0,09	9,55	0,11	9,44	
314	0,05	177,48						
315	0,05	177,56	0,55	0,08	9,50	0,10	9,40	
316	0,05	190,29						
317	0,05	190,32	0,55	0,05	9,52	0,10	9,42	
318	0,05	191,05						
319	0,05	190,29	0,55	0,09	9,55	0,10	9,44	0,71
320								
321	174,30	554,11	0,55	0,06	9,52	0,10	9,42	
322	195,01	554,72						
323	51,65	557,47						
324	42,55	556,71	0,55	0,15	5,79	0,12	5,66	
325	48,27	554,67						
326	45,10	553,62	0,55	0,12	5,77	0,12	5,65	
327	45,73	552,60						
328	44,35	552,12	0,55	0,11	5,77	0,12	5,65	0,50
329	40,10	551,18						
330	43,16	551,57	0,56	0,10	5,74	0,12	5,62	0,61
331	15,57	511,29						
332	17,46	509,22						0,60
333	3,50	444,12						
334	3,73	445,80						0,55
335	1,29	449,10						
336	1,03	453,57						0,63
337	0,36	485,82						
338	0,51	481,67						0,58
339	0,08	441,95						
340	0,07	441,00						0,61
341	0,05	385,79						
342	0,05	384,90						0,57
343	0,05	362,41						
344	0,05	362,57						0,55
345								
346	1,48	55,29						
347	1,82	55,29	0,55	0,15	5,79	0,12	5,66	
348	0,30	55,29						
349	0,28	55,29	0,55	0,12	5,77	0,12	5,65	
350	0,05	55,29						
351	0,05	55,29	0,55	0,11	5,77	0,12	5,65	
352	0,05	55,29						
353	0,05	55,29	0,56	0,10	5,74	0,12	5,62	
354								
355	0,23	54,87						
356	0,21	54,45						
357	0,29	54,53						
358	0,28	55,16						
359	0,24	54,79						

	Q	R	S	T	U	V	W	X
360	0,30	54,63						
361	0,26	54,81						
362	0,26	54,00						
363	0,25	54,21						
364	0,24	54,66						
365	0,26	54,03						
366	0,27	54,18						
367	0,29	54,66						
368	0,27	54,97						
369	0,25	54,92						
370	0,24	54,45						
371	0,25	54,76						
372	0,28	55,05						
373	0,28	54,81						
374	0,29	54,66	0,55	0,13	6,14	0,12	6,03	
375	0,05	54,00	0,56	0,19	6,14	0,12	6,03	
376	0,05	54,16	0,57	0,17	6,12	0,12	6,00	
377	0,05	54,00	0,56	0,13	6,18	0,12	6,06	
378	0,05	54,00	0,56	0,08	6,15	0,11	6,03	
379								
380	21,59	69,43	0,56	0,09	6,10	0,12	5,99	0,60
381	2,18	100,29	0,56	0,09	6,16	0,12	6,04	
382	1,39	100,29	0,56	0,08	6,14	0,12	6,02	
383	1,60	100,29	0,56	0,08	6,16	0,12	6,04	
384	2,23	101,02	0,56	0,07	6,13	0,12	6,01	
385	2,15	101,57	0,56	0,13	6,05	0,12	5,93	
386	2,22	101,57	0,56	0,13	6,05	0,12	5,93	
387	2,32	102,23	0,56	0,12	6,05	0,12	5,93	
388	1,67	102,86	0,56	0,13	6,07	0,12	5,94	
389	1,54	102,86	0,57	0,11	6,04	0,12	5,92	
390	2,03	102,86	0,56	0,11	6,08	0,12	5,95	
391	2,81	103,49	0,56	0,10	6,06	0,12	5,94	0,66
392	0,37	91,29	0,56	0,14	6,09	0,12	5,97	0,61
393	0,09	93,86						
394	0,10	95,14	0,56	0,15	6,07	0,12	5,95	0,61
395	0,05	92,57						
396	0,05	92,57	0,56	0,13	6,09	0,12	5,96	0,61
397	0,05	91,10						
398	0,05	87,48	0,57	0,12	6,16	0,12	6,03	0,59
399	0,05	87,43						
400	0,05	87,43	0,57	0,10	6,13	0,12	6,01	0,65
401	0,05	82,29						
402	0,05	82,29	0,57	0,07	6,10	0,12	5,98	0,58
403	0,05	86,27	0,56	0,11	6,11	0,12	5,98	0,54
404								
405	24,82	186,64						
406	28,58	194,98	0,56	0,12	6,40	0,12	6,29	
407	5,94	206,97						
408	3,40	208,00	0,57	0,13	6,40	0,12	6,29	
409	3,77	207,08	0,57	0,09	6,44	0,12	6,32	
410	4,51	210,31	0,56	0,09	6,44	0,12	6,33	
411	4,44	210,86	0,57	0,11	6,39	0,12	6,27	
412	3,95	210,86	0,57	0,08	6,44	0,11	6,33	
413	3,79	212,14	0,57	0,06	6,38	0,12	6,26	
414	2,88	218,57	0,57	0,07	6,43	0,12	6,31	
415	3,05	218,57						
416	1,55	232,45	0,56	0,07	6,43	0,12	6,32	
417	0,36	212,14						
418	0,18	211,12	0,56	0,08	6,38	0,12	6,27	
419	0,05	208,68						

	Q	R	S	T	U	V	W	X
420	0,05	208,29	0,57	0,08	6,41	0,12	6,29	
421	0,05	216,00						
422	0,05	216,00	0,56	0,07	6,39	0,12	6,27	
423	0,05	229,80						
424	0,05	230,14	0,56	0,08	6,38	0,12	6,26	
425	0,05	226,29						
426	0,05	225,63	0,57	0,06	6,39	0,12	6,28	
427	0,05	213,43						
428	0,05	213,43	0,58	0,08	6,38	0,12	6,26	
429								
430	2,42	53,95						
431	1,57	54,00	0,54	0,13	5,26	0,08	5,18	
432	0,24	54,00						
433	0,16	54,00	0,55	0,15	5,26	0,08	5,18	
434	0,05	54,00						
435	0,05	54,00	0,54	0,12	5,27	0,08	5,19	
436								
437	0,22	54,00						
438	0,26	54,00						
439	0,21	53,87						
440	0,18	53,87						
441	0,20	54,00						
442	0,20	54,00						
443	0,20	54,00						
444	0,22	54,00						
445	0,19	54,00						
446	0,18	54,00						
447	0,18	54,00						
448	0,18	54,00						
449	0,20	53,87						
450	0,21	53,87						
451	0,18	54,00						
452	0,14	54,00						
453	0,19	54,00						
454	0,22	54,00						
455	0,20	54,00						
456	0,21	54,00						
457	0,18	54,00						
458	0,16	54,00						
459	0,18	54,00						
460	0,16	54,00	0,54	0,13	5,21	0,08	5,13	
461								
462	0,23	55,29						
463	0,20	55,29						
464	0,20	55,29						
465	0,22	55,29						
466	0,17	55,29						
467	0,17	55,29	0,53	0,17	5,22	0,08	5,14	
468	0,24	55,29	0,54	0,15	5,24	0,08	5,16	
469	0,23	55,29	0,54	0,14	5,21	0,08	5,13	
470	0,18	55,29						
471	0,20	55,29						
472	0,19	55,29						
473	0,18	55,29						
474	0,20	55,29						
475	0,22	55,29						
476	0,23	55,29						
477	0,19	55,29						
478	0,17	55,29						
479	0,19	55,29						

	Q	R	S	T	U	V	W	X
480	0,20	55,29						
481	0,22	55,29						
482	0,23	55,29						
483	0,20	55,29	0,54	0,12	5,22	0,08	5,15	
484	0,05	55,29	0,53	0,14	5,23	0,08	5,15	
485	0,05	55,29						
486								
487	26,57	135,00	0,52	0,16	5,22	0,08	5,15	
488	33,73	135,00	0,52	0,10	5,22	0,07	5,15	0,66
489	3,07	146,52	0,54	0,15	5,22	0,08	5,14	
490	4,26	146,57	0,53	0,10	5,19	0,08	5,11	0,69
491	1,65	149,77						
492	1,63	142,19	0,52	0,10	5,21	0,08	5,13	0,66
493	0,28	134,37						
494	0,28	136,29	0,52	0,09	5,22	0,08	5,14	0,72
495	0,05	140,01						
496	0,05	138,86	0,53	0,11	5,20	0,07	5,12	0,67
497	0,05	126,95						
498	0,05	126,00	0,53	0,10	5,22	0,08	5,15	0,71
499								
500	5,79	154,34						
501	5,04	154,29						
502	4,89	154,29						
503	4,79	153,87						
504	4,23	153,13						
505	4,29	153,39						
506	5,22	153,87						
507	5,36	153,21						
508	4,83	152,00						
509	5,04	153,81						
510	5,05	155,57						
511	4,34	155,57	0,53	0,13	5,15	0,08	5,07	
512	3,73	155,20						
513	4,19	155,02	0,53	0,09	5,19	0,08	5,11	
514	5,74	154,60	0,53	0,09	5,18	0,08	5,10	
515	5,81	154,29	0,53	0,10	5,20	0,08	5,13	
516	4,64	154,32	0,53	0,10	5,17	0,08	5,09	
517	4,29	154,29	0,53	0,09	5,20	0,08	5,12	
518	4,61	154,29	0,53	0,11	5,18	0,08	5,11	
519	5,09	154,29	0,54	0,11	5,19	0,08	5,11	
520	5,06	154,29	0,54	0,11	5,24	0,08	5,16	
521	4,63	154,29	0,53	0,11	5,22	0,08	5,14	
522	4,74	153,66	0,53	0,11	5,22	0,08	5,14	
523	4,62	153,00	0,53	0,11	5,17	0,08	5,09	
524								
525	9,08	313,32						
526	10,15	311,17						
527	9,85	312,43						
528	7,84	311,67						
529	8,00	310,17						
530	10,24	310,33						
531	11,12	310,51						
532	10,18	307,34						
533	9,72	306,18						
534	8,03	304,03						
535	10,03	304,84						
536	11,12	306,37						
537	7,28	306,39	0,53	0,10	5,16	0,08	5,09	0,65
538								
539	181,61	453,65						

	Q	R	S	T	U	V	W	X
540	156,32	461,52	0,52	0,15	5,19	0,07	5,11	
541	48,85	775,10						
542	40,29	774,02						
543	42,82	788,43						
544	40,64	783,94	0,52	0,15	5,15	0,08	5,08	
545	47,27	786,62	0,52	0,12	5,19	0,07	5,11	
546	47,05	781,82	0,53	0,12	5,16	0,08	5,09	
547	41,29	772,63	0,52	0,12	5,17	0,07	5,09	
548	52,16	781,22	0,52	0,12	5,17	0,08	5,09	
549	39,70	765,45	0,52	0,10	5,16	0,08	5,08	
550	43,00	730,89	0,53	0,10	5,15	0,08	5,08	
551	8,28	735,46						
552	8,33	721,86	0,52	0,19	5,21	0,08	5,12	
553	1,52	713,57						
554	1,42	722,13	0,52	0,12	5,18	0,07	5,10	
555	0,34	744,40						
556	0,33	764,40	0,53	0,11	5,16	0,08	5,09	
557	0,12	825,40						
558	0,11	816,53	0,52	0,10	5,16	0,08	5,09	
559								
560	3,34	52,71						
561	2,74	52,71	0,16	0,25	0,41	0,03	0,38	
562	0,51	52,71						
563	0,54	52,69	0,16	0,26	0,41	0,03	0,38	
564	0,05	52,71						
565	0,05	52,71	0,16	0,25	0,42	0,03	0,39	
566	0,05	52,71						
567	0,05	52,71	0,18	0,32	0,51	0,03	0,48	
568								
569	4,33	56,57	0,16	0,35	0,44	0,03	0,41	
570	1,10	56,57						
571	1,09	56,57						
572	1,10	56,57						
573	1,05	56,57						
574	0,98	56,57						
575	1,09	56,57						
576	1,14	56,57						
577	1,13	56,57						
578	1,15	56,57						
579	1,14	56,44						
580	1,13	56,57						
581	1,09	56,57						
582	1,09	56,55						
583	1,03	56,57						
584	1,09	56,57	0,16	0,30	0,44	0,03	0,41	
585	0,91	56,57	0,16	0,30	0,43	0,03	0,40	
586	0,99	55,92	0,16	0,31	0,43	0,03	0,40	
587	0,99	56,20	0,16	0,28	0,42	0,03	0,39	
588	0,18	55,31	0,17	0,29	0,42	0,03	0,39	
589	0,05	55,29	0,16	0,27	0,42	0,03	0,39	
590	0,05	55,29	0,16	0,26	0,42	0,03	0,39	
591	0,05	55,29	0,17	0,30	0,44	0,03	0,41	
592	0,05	55,26						
593								
594	58,76	180,71						
595	54,60	183,49	0,16	0,28	0,42	0,03	0,39	0,65
596	17,79	184,41						
597	18,08	185,51						
598	19,17	186,11						
599	18,97	185,12						

	Q	R	S	T	U	V	W	X
600	18,90	184,54						
601	19,35	186,22	0,16	0,29	0,42	0,03	0,39	
602	18,75	187,19	0,17	0,27	0,41	0,03	0,38	
603	18,75	184,80	0,16	0,27	0,42	0,03	0,38	
604	19,20	183,52	0,17	0,29	0,42	0,03	0,38	
605	19,00	185,41	0,16	0,27	0,42	0,03	0,38	
606	18,83	187,71	0,16	0,29	0,41	0,03	0,38	
607	18,67	187,14	0,15	0,28	0,41	0,03	0,38	
608	19,54	185,22	0,16	0,27	0,41	0,03	0,38	
609	20,00	184,88	0,16	0,29	0,41	0,03	0,38	
610	18,22	186,64	0,16	0,29	0,42	0,03	0,38	
611	18,47	186,61	0,16	0,27	0,42	0,03	0,39	0,62
612	18,42	185,72	0,16	0,28	0,42	0,03	0,39	0,63
613	5,18	189,87						
614	1,37	189,89	0,16	0,28	0,42	0,03	0,38	0,66
615	0,89	200,28	0,16	0,27	0,42	0,03	0,39	0,63
616	0,22	191,44	0,17		0,44	0,04	0,40	0,66
617	0,05	189,34	0,16	0,28	0,44	0,03	0,41	0,65
618								
619	256,44	526,15						
620	230,24	531,76	0,17	0,26	0,43	0,03	0,40	
621	91,42	549,84	0,17	0,27	0,43	0,03	0,39	
622	89,41	546,61	0,17	0,25	0,42	0,03	0,39	
623	85,59	545,46	0,17	0,25	0,42	0,03	0,39	
624	77,80	550,39	0,18	0,27	0,42	0,03	0,39	
625	73,16	560,76	0,17	0,25	0,42	0,03	0,39	
626	57,29	533,23						
627	62,40	532,58	0,17	0,29	0,42	0,03	0,39	
628	31,80	565,24						
629	29,69	560,28	0,18	0,29	0,42	0,03	0,39	
630	28,12	1045,10						
631	25,70	1089,90	0,17	0,26	0,42	0,03	0,39	
632	13,56	1174,60						
633	14,28	1193,90	0,17	0,26	0,42	0,03	0,39	
634	4,10	647,05						
635	4,35	644,09	0,17	0,30	0,43	0,03	0,39	
636	2,06	663,11						
637	2,17	638,42	0,17	0,27	0,42	0,03	0,39	
638	0,93	531,00						
639	0,95	531,05	0,17	0,29	0,43	0,03	0,39	
640	0,43	498,78						
641	0,46	489,99	0,18	0,30	0,45	0,03	0,42	
642	0,09	504,47	0,18	0,30	0,46	0,03	0,43	
643								
644	3,13	53,79						
645	2,67	53,58	0,53	0,13	6,47	0,18	6,30	
646	0,50	53,34						
647	0,50	53,76						
648	0,42	53,58	0,53	0,13	6,45	0,18	6,27	
649	0,42	53,37	0,53	0,11	6,46	0,18	6,28	
650	0,41	53,63	0,53	0,14	6,46	0,18	6,28	
651	0,36	53,00	0,53	0,09	6,46	0,18	6,28	
652	0,40	53,21	0,53	0,10	6,46	0,18	6,27	
653	0,41	53,19	0,53	0,09	6,44	0,18	6,26	
654	0,20	53,87						
655	0,22	53,74	0,53	0,06	6,46	0,18	6,28	
656	0,07	52,82						
657	0,07	52,87	0,53	0,08	6,44	0,18	6,26	
658	0,05	53,13						
659	0,05	53,13	0,52	0,09	6,45	0,18	6,27	

	Q	R	S	T	U	V	W	X
660	0,05	52,74						
661	0,05	52,71	0,53	0,07	6,42	0,18	6,24	
662	0,05	52,71						
663	0,05	52,98	0,53	0,09	6,42	0,18	6,24	
664	0,05	52,74						
665	0,05	52,71	0,53	0,08	6,44	0,18	6,26	
666	0,05	52,71						
667	0,05	52,77	0,54	0,13	6,46	0,19	6,27	
668								
669	0,69	53,92						
670	0,71	53,74						
671	0,65	53,74						
672	0,63	53,66						
673	0,54	53,42						
674	0,54	53,76	0,52	0,10	6,41	0,17	6,24	
675	0,64	53,79	0,52	0,09	6,38	0,18	6,20	
676	0,63	53,74	0,53	0,12	6,41	0,18	6,22	
677	0,57	53,79	0,53	0,09	6,39	0,18	6,22	
678	0,70	53,97	0,53	0,08	6,40	0,18	6,22	
679	0,68	53,92	0,53	0,07	6,40	0,18	6,22	
680	0,72	53,95	0,53	0,07	6,41	0,18	6,23	
681	0,05	53,11						
682	0,05	53,06	0,53	0,09	6,41	0,18	6,23	
683	0,05	53,00						
684	0,05	52,98	0,53	0,09	6,40	0,18	6,22	
685	0,05	53,53						
686	0,05	53,16	0,53	0,09	6,40	0,18	6,22	
687	0,05	52,85						
688	0,05	52,71	0,53	0,09	6,40	0,18	6,22	
689	0,05	52,77						
690	0,05	52,71	0,53	0,09	6,41	0,18	6,23	
691	0,05	52,71						
692	0,05	52,74	0,53	0,09	6,40	0,18	6,22	
693								
694	2,49	54,00						
695	2,60	54,00	0,53	0,15	6,36	0,16	6,20	
696	0,58	53,97						
697	0,61	53,74	0,55	0,14	6,42	0,16	6,25	
698	0,05	20,57						
699	0,05	20,57	0,54	0,14	6,41	0,16	6,25	
700	0,05	53,48						
701	0,05	53,50	0,53	0,12	6,41	0,17	6,24	
702	0,05	52,71						
703	0,05	52,71	0,53	0,12	6,52	0,17	6,35	
704								
705	0,59	54,00						
706	0,56	53,82						
707	0,52	53,90						
708	0,56	53,53						
709	0,60	53,34						
710	0,52	53,45						
711	0,48	53,55						
712	0,55	53,58						
713	0,57	53,87						
714	0,57	53,97						
715	0,54	54,00						
716	0,61	53,95						
717	0,59	53,82						
718	0,57	54,00						
719	0,63	53,66						

	Q	R	S	T	U	V	W	X
720	0,59	53,92						
721	0,64	53,97						
722	0,58	53,76						
723	0,51	53,00						
724	0,61	53,37						
725	0,55	53,97						
726	0,49	53,79						
727	0,55	53,95						
728	0,45	53,90	0,53	0,12	6,40	0,17	6,23	
729								
730	0,85	56,57						
731	0,90	56,57						
732	0,88	56,57						
733	0,90	56,57						
734	0,84	56,57						
735	0,91	56,57						
736	0,93	56,57						
737	0,94	56,57						
738	0,89	56,57						
739	0,87	56,57						
740	0,87	56,57						
741	0,89	56,57						
742	0,86	56,57						
743	0,89	56,57						
744	0,94	56,57						
745	0,90	56,57	0,54	0,15	6,42	0,17	6,26	
746	0,87	56,57	0,53	0,12	6,41	0,17	6,24	
747	0,88	56,57	0,53	0,10	6,40	0,17	6,23	
748	0,82	56,57	0,54	0,10	6,42	0,17	6,25	
749	0,06	55,78	0,54	0,12	6,43	0,17	6,26	
750	0,06	55,37	0,53	0,12	6,45	0,17	6,28	
751	0,05	55,31	0,55	0,09	6,46	0,17	6,29	
752	0,05	55,29						
753								
754	24,51	69,43						
755	20,05	69,30	0,52	0,09	6,39	0,17	6,22	0,73
756	6,70	84,86						
757	6,80	84,86						
758	6,76	84,86	0,53	0,09	6,43	0,17	6,26	
759	6,93	84,86	0,53	0,11	6,42	0,17	6,25	
760	6,97	84,86	0,53	0,11	6,44	0,17	6,27	
761	6,94	84,86	0,53	0,10	6,43	0,17	6,26	
762	7,07	84,86	0,53	0,09	6,42	0,17	6,25	
763	6,43	84,33	0,53	0,09	6,50	0,17	6,33	
764	5,84	83,60	0,54	0,08	6,46	0,17	6,29	
765	6,64	83,57	0,53	0,10	6,43	0,17	6,26	
766	7,45	84,18	0,53	0,08	6,43	0,17	6,26	
767	6,56	83,57	0,53	0,09	6,43	0,17	6,26	
768	6,49	83,57	0,54	0,08	6,48	0,17	6,31	0,61
769	2,88	84,83	0,54	0,11	6,48	0,17	6,31	0,60
770	1,30	89,71						
771	1,27	89,48						
772	1,33	90,47	0,53	0,08	6,40	0,17	6,23	0,66
773	0,32	79,64	0,54	0,09	6,45	0,17	6,27	0,63
774	0,11	77,33						
775	0,11	77,22	0,54	0,10	6,46	0,17	6,28	0,67
776	0,05	79,71	0,54	0,08	6,44	0,17	6,27	0,61
777	0,05	82,29	0,54	0,09	6,49	0,17	6,32	0,80
778								
779	22,79	183,83						

	Q	R	S	T	U	V	W	X
780	24,82	184,30						
781	27,40	185,46						
782	25,98	185,48						
783	22,85	184,88						
784	22,40	184,20						
785	24,76	185,17						
786	23,91	186,43						
787	23,60	185,61						
788	22,69	185,90						
789	26,34	186,43						
790	23,18	186,43						
791	23,22	186,43						
792	25,35	186,43						
793	25,69	186,51						
794	25,34	187,42						
795	26,81	187,71						
796	27,15	187,71						
797	26,41	187,71						
798	25,61	187,68						
799	24,65	187,55						
800	24,19	187,68						
801	25,41	187,71						
802	25,52	188,42	0,53	0,12	6,42	0,17	6,25	
803								
804	87,15	255,75						
805	64,89	254,23	0,53	0,09	6,33	0,17	6,17	
806	39,43	258,43						
807	40,41	258,43	0,53	0,08	6,33	0,17	6,16	
808	35,75	258,43	0,53	0,12	6,33	0,17	6,17	
809	31,47	258,43	0,53	0,10	6,34	0,17	6,18	
810	41,66	258,90	0,53	0,08	6,34	0,16	6,18	
811	44,06	259,45	0,53	0,08	6,38	0,16	6,22	
812	24,46	243,00						
813	25,16	241,74	0,53	0,10	6,39	0,16	6,23	
814	12,88	207,03						
815	12,53	206,47	0,53	0,11	6,40	0,16	6,24	
816	6,21	175,02						
817	5,55	174,86	0,54	0,10	6,40	0,17	6,24	
818	3,08	176,14						
819	4,33	225,74	0,54	0,08	6,39	0,16	6,23	
820	3,02	252,24	0,54	0,09	6,39	0,17	6,22	
821	2,03	231,48	0,53	0,08	6,38	0,16	6,21	
822	1,28	257,14						
823	1,38	257,14	0,53	0,11	6,38	0,17	6,19	
824	0,73	242,97	0,53	0,09	6,39	0,17	6,22	
825	0,73	306,79						
826	0,74	312,95	0,53	0,09	6,39	0,17	6,22	
827	0,60	381,86	0,54	0,09	6,40	0,17	6,23	
828								

Charlet-3 cruise, 2013; 64PE366							
Station	**Cast**	**Who**	**Responsible scientist**	**What are you sampling for?**	**Sampling device**	**time of day**	**Bottle #**
13	1	S. Ossebaar	C Brussaard	Nutrients (PO4, NH4, NO3, NO2)	CTD	6:00 AM	1,2
13	2	S. Ossebaar	C Brussaard	Nutrients	CTD	6:30AM	1,2,10,11
13	3	S. Ossebaar	C Brussaard	Nutrients	CTD	8AM	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15, 16,17,18
13	7	S. Ossebaar	C Brussaard	Nutrients	CTD	9AM	1,2
13	9	S. Ossebaar	C Brussaard	Nutrients	CTD	2PM	1,16,17,18,
11	1	S. Ossebaar	C Brussaard	Nutrients	CTD	8PM	1,3,5,7,9
11	5	S. Ossebaar	C Brussaard	Nutrients	CTD	6:30AM	1,2,3,4
11	6	S. Ossebaar	C Brussaard	Nutrients	CTD	8AM	1,3,11,13,14,15,16,17,18,19,20,21,22,23
11	12	S. Ossebaar	C Brussaard	Nutrients	CTD	2PM	1,3,5,7,9,11,13,15,23
10	1	S. Ossebaar	C Brussaard	Nutrients	CTD	8PM	1,4,6,8
10	5	S. Ossebaar	C Brussaard	Nutrients	CTD	6AM	1
10	6	S. Ossebaar	C Brussaard	Nutrients	CTD	6:30AM	4,5
10	7	S. Ossebaar	C Brussaard	Nutrients	CTD	8AM	2,3,7,8,9,10,11,12,13,14,15,16,17,23
10	9	S. Ossebaar	C Brussaard	Nutrients	CTD	9AM	1
10	15	S. Ossebaar	C Brussaard	Nutrients	CTD	2PM	1,3,5,7,9,11,13,15,23
8	1	S. Ossebaar	C Brussaard	Nutrients	CTD	8PM	1,3,5,7,9
8	5	S. Ossebaar	C Brussaard	Nutrients	CTD	6:30AM	1,2,3,4,5
8	6	S. Ossebaar	C Brussaard	Nutrients	CTD	8AM	1,2,4,6,8,10,12,13,14,15,16,17,18,19,20,21,22,23,24
8	12	S. Ossebaar	C Brussaard	Nutrients	CTD	2PM	1,3,5,7,9,11,13,15,16,17,18,19,20,21,23
7	1	S. Ossebaar	C Brussaard	Nutrients	CTD	8PM	1,3,5
7	5	S. Ossebaar	C Brussaard	Nutrients	CTD	6AM	1
7	6	S. Ossebaar	C Brussaard	Nutrients	CTD	6:30AM	2,3,17,18,19
7	7	S. Ossebaar	C Brussaard	Nutrients	CTD	8AM	1,3,5,7,9,10,11,12
7	8	S. Ossebaar	C Brussaard	Nutrients	CTD	8:30AM	1,2,3,4,5,6,7,8,9,10,11,13
7	15	S. Ossebaar	C Brussaard	Nutrients	CTD	2PM	1,3,5,7,9,10,11,12,13,14,15,19
4	1	S. Ossebaar	C Brussaard	Nutrients	CTD	8PM	1,3,5,7

4	5	S. Ossebaar	C Brussaard	Nutrients	CTD	6:30AM	1,2,3,4,5,6,7,8,9,24
4	6	S. Ossebaar	C Brussaard	Nutrients	CTD	8AM	1,2,3,4,6,7,8,9,10,11,12,13,14,15,16,17,23
4	12	S. Ossebaar	C Brussaard	Nutrients	CTD	2PM	1,2,4,6,8,10,12,14,16,18,19,20,21,22,23
1	1	S. Ossebaar	C Brussaard	Nutrients	CTD	8PM	1,3,5,7,9
1	5	S. Ossebaar	C Brussaard	Nutrients	CTD	6AM	1
1	6	S. Ossebaar	C Brussaard	Nutrients	CTD	6:30AM	2,3,4,5,6,7,8
1	7	S. Ossebaar	C Brussaard	Nutrients	CTD	8AM	1,2,3,5,6,9,10,11,12,13,14,15,16,17,18,19,20,23
1	8	S. Ossebaar	C Brussaard	Nutrients	CTD	9AM	1
1	14	S. Ossebaar	C Brussaard	Nutrients	CTD	2PM	1,2,4,5,7,8,9,11,13,15,17,18,19,20,21,23
2	1	S. Ossebaar	C Brussaard	Nutrients	CTD	8PM	1,3,5,7,9,11,13,15,16,17,18,19,20,23
2	5	S. Ossebaar	C Brussaard	Nutrients	CTD	9PM	1,3,5,7,9,11,13,14,15,16,17,18,19

Charlet-3 cruise, 2013; 64PE366								
Station	**Cast**	**Who**	**Responsible scientist**	**What are you sampling for?**	**Sampling device**	**time of day**	**Depths**	**Bottle #**
13	3	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 AM	3,5, 3.5	1, 2
13	4,5,6	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	9:15 AM	7 m	1
11	1	Oosterhuis	Oosterhuis	HPLC	CTD	9:30 PM	35, 25, 7, 2 m	3,5,7,9
11	7	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	35, 25, 7, 2 m	1,3,13,23
11	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	9:30 PM	35	2
11	7.8.9.10	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	35	3
10	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	40, 25, 7,2 m	3,5,7,9
10	7	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	40, 25, 7,2 m	2,4,8,23
10	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 PM	45	4
10	10.11.12.13	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	45	5
8	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	35,25,7,2	2,4,6,8
8	6	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	35,25,7,3	2,6,13,24
8	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 PM	35	
8	7.8.9.10	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	35	
7	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	25,7,2	1,3,5
7	8	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	25,7,3	1,9,11
7	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 PM	25	
7	10.11.12.13	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	25	
4	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	45,25,7,2	1,3,5,7
4	6	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	50,40,25,7,2	1,2,4,7,23
4	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 PM	45	
4	7.8.9.10	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	45	
1	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	1,3,5,7,9	80,50,25,7,2
1	7	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	1,3,6,10,23	80,50,25,7,3
1	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 PM	75	
1	9,10,11,12	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	75	
2	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	1,5,7,15,23	70,50,25,7,2
2	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 AM	65	

Charlet-3 cruise, 2013; 64PE366

Station	Cast	Who	What are you sampling for?	Sampling device	time of day	Depths	Bottle #
13	13-1	Grosse	13C uptake, with and without nutrient additions	CTD	6:00AM	7m	1-24
13	13-2	Grosse	13C uptake with nutrient additions and different light	CTD	6:30AM	7m	10-24
13	13-3	Grosse	FRRF measurments	CTD	8:00 AM	7m	11-8
13	13-6	Grosse	Zooplankton biomolecule analysis	vertical net 50	10:00 AM	whole water column	
11	11-5	Grosse	biomolecules analysis algae	CTD	6:30AM	7m	5-18
11	11-6	Grosse	FRRF measurments	CTD	8:00Am	7m	13
11	11-9	Grosse	Zooplankton biomolecule analysis	vertical net 50	10:00 AM	whole water column	
10	10-5	Grosse	13C uptake, with and without nutrient additions	CTD	6:00 AM	7m	1-24
10	10-6	Grosse	13C uptake with nutrient additions and different light	CTD	6:30AM	7m	5-24
10	10-7	Grosse	FRRF measurments	CTD	8:00 AM	7m	7
10	10-8	Grosse	Zooplankton biomolecule analysis	vertical net 50	10:00 AM	whole water column	
8	8-5	Grosse	biomolecules analysis algae	CTD	6:30 AM	7m	5-19
8	8-6	Grosse	FRRF measurments	CTD	8:00Am	7m	13
8	8-7	Grosse	Zooplankton biomolecule analysis	vertical net 50	10:00 AM	whole water column	
7	7-5	Grosse	13C uptake, with and without nutrient additions	CTD	6:00AM	7m	1-24
7	7-6	Grosse	13C uptake with nutrient additions and different light	CTD	6:30 AM	7m	3-16
7	7-8	Grosse	FRRF measurments	CTD	8:00 AM	7m	1
7	7-10	Grosse	Zooplankton biomolecule analysis	vertical net 50	10:00 AM	whole water column	
4	4-6	Grosse	biomolecules analysis algae	CTD	8:00 AM	7m	17
4	4-7	Grosse	Zooplankton biomolecule analysis	vertical net 50	10:00 AM	whole water column	
1	1-5	Grosse	13C uptake, with and without nutrient additions	CTD	6:00AM	7m	1-24
1	1-6	Grosse	13C uptake with nutrient additions and different light	CTD	6:30 AM	7m	8-18,20
1	1-7	Grosse	FRRF measurments	CTD	8:00 AM	7m	10
1	1-8	Grosse	Zooplankton biomolecule analysis	vertical net 50	10:00 AM	whole water column	
2	2-1	Grosse	biomolecules analysis algae	CTD	8:00PM	7m	19,20

Charlet-3 cruise, 2013; 64PE366								
Station	Cast	Who	Responsible scientist	What are you sampling for?	Sampling device	time of day	Depths	Bottle #
13	3	Burson	Burson/Huisman	Lugol algae	CTD	8:00 AM	3.5 m	1
13	7	Burson	Burson/Huisman	Bioassay	CTD	9:30 AM	3.5 m	1 to 24
13	8	Burson	Burson/Huisman	Light Spectra	RAMSES	1:00 PM		
13	9	Burson	Burson/Huisman	Cellular characteristics	CTD	2:00 PM	3,5	1 to 12
11	6	Burson	Burson/Huisman	Lugol algae	CTD	8:00 AM	7	13
11	11	Burson	Burson/Huisman	Light Spectra	RAMSES	1:00 PM		
11	12	Burson	Burson/Huisman	Cellular characteristics	CTD	2:00 PM	40, 35, 30, 25, 20, 15, 10, 7, 3	1 to 16, 23, 24
10	7	Burson	Burson/Huisman	Lugol algae	CTD	8:00 AM	7	7
10	9	Burson	Burson/Huisman	Bioassay	CTD	9:30 AM	7	1 to 24
10	14	Burson	Burson/Huisman	Light Spectra	RAMSES	1:00 PM		
10	15	Burson	Burson/Huisman	Cellular characteristics	CTD	2:00 PM	40, 35, 30, 25, 20, 15, 10, 7, 2	1, 3, 5, 7, 9, 11, 13, 15
8	6	Burson	Burson/Huisman	Lugol algae	CTD	8:00 AM	7	13
8	11	Burson	Burson/Huisman	Light Spectra	RAMSES	1:00 PM		
8	12	Burson	Burson/Huisman	Cellular characteristics	CTD	2:00 PM	40, 35, 30, 25, 20, 15, 10, 7, 2	1, 3, 5, 7, 9, 11, 13, 15
7	7	Burson	Burson/Huisman	Lugol algae	CTD	8:00 AM	7	9
7	8	Burson	Burson/Huisman	Bioassay	CTD	8:00 AM	7	13 to 24
7	9	Burson	Burson/Huisman	Bioassay	CTD	9:00 AM	7	1 to 12
7	14	Burson	Burson/Huisman	Light Spectra	RAMSES	1:00 PM		
7	15	Burson	Burson/Huisman	Cellular characteristics	CTD	2:00 PM	25, 20, 15, 10 ,7,2	1,3,5,7,9,19,
4	6	Burson	Burson/Huisman	Lugol algae	CTD	8:00 AM	7	7
4	11	Burson	Burson/Huisman	Light Spectra	RAMSES	1:00 PM		
4	12	Burson	Burson/Huisman	Cellular characteristics	CTD	1:30 PM	50,45,40,35,30,25,20,15,10,7,2	1,2,4,6,8,10,12,14,16,18,23
1	7	Burson	Burson/Huisman	Lugol algae	CTD	8:00 AM	7	10
1	8	Burson	Burson/Huisman	Bioassay	CTD	9:00 AM	7	1 to 23
1	13	Burson	Burson/Huisman	Light Spectra	RAMSES	1:00 PM		
1	14	Burson	Burson/Huisman	Cellular characteristics	CTD	2:00 PM	55,50,45,40,35,30,25,20,15,10,7,2	1,2,4,5,7,8,9,11,13,15,17, 23
2	1	Burson	Burson/Huisman	Cellular characteristics	CTD	8:00 PM	55, 50, 25, 20, 15, 10 7, 2	4,6,8,10,12,14,16,24
2	5	Burson	Burson/Huisman	Cellular characteristics	CTD	9:00 PM	45,40,35,30,25	4,6,8,10

Charlet-3 cruise, 2013; 64PE366								
Station	Cast	Who	Responsible scientist	What are you sampling for?	Sampling device	time of day	Depths	Bottle #
13	2	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	6:30 AM	3.5m	1,2
11	5	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	6:30 AM	7m	2,3,4
11	6	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	8:00 AM	7m	14,15
11	12	O'Connor	O'Connor/Brussaard	viral infection algae TEM	CTD	2:00 PM	7m	17,18
10	6	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	6:30 AM	7m	1,2,3
10	7	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	8:00 AM	7m	8,9
8	5	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	6:30 AM	7m	2,3,4
8	6	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	8:00 AM	7m	14,15
8	12	O'Connor	O'Connor/Brussaard	viral infection algae TEM	CTD	2:00 PM	7m	16,17
8	12	O'Connor	O'Connor/Brussaard	algal sinking rate	CTD	2:00 PM	7m	19,2
7	6	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	6:30 AM	7m	17,18,19
7	7	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	8:00 AM	7m	2,3
7	15	O'Connor	O'Connor/Brussaard	viral infection algae TEM	CTD	2:00 PM	7m	10,11
7	15	O'Connor	O'Connor/Brussaard	algal sinking rate	CTD	2:00 PM	7m	13,14
4	5	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	6:30 AM	7m	7,8
4	6	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	8:00 AM	7m	8,9
4	12	O'Connor	O'Connor/Brussaard	viral infection algae TEM	CTD	2:00 PM	7m	19,20
4	12	O'Connor	O'Connor/Brussaard	algal sinking rate	CTD	2:00 PM	7m	21,22
1	6	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	6:30 AM	7m	6,7
1	7	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	8:00 AM	7m	11,12
1	14	O'Connor	O'Connor/Brussaard	viral infection algae TEM	CTD	2:00 PM	7m	18,19
1	14	O'Connor	O'Connor/Brussaard	algal sinking rate	CTD	2:00 PM	7m	20,21
2	1	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	8:00 PM	7m	16,17,18
2	2	O'Connor	O'Connor/Brussaard	viral lysis and grazing algae LH	CTD	9:00 PM	7m	14,15

Charlet-3 cruise, 2013; 64PE366								
Station	Cast	Who	Responsible scientist	What are you sampling for?	Sampling device	time of day	Depths	Bottle #
13	3	Haspel	O'Connor/Brussaard	algal sinking rate	CTD	8:00 AM	7 m	6,7,8
11	6	Haspel	O'Connor/Brussaard	algal sinking rate	CTD	8:00 AM	7 m	19, 20
11	12	Haspel	O'Connor/Brussaard	algal sinking rate	CTD	2:00 PM	7 m	16, 17
10	7	Haspel	O'Connor/Brussaard	algal sinking rate	CTD	8:00 AM	7 m	13, 14, 15
10	15	Haspel	O'Connor/Brussaard	algal sinking rate	CTD	2:00 PM	7 m	16, 17, 18, 19, 20, 21, 22
8	6	Haspel	O'Connor/Brussaard	algal sinking rate	CTD	8:00 AM	7 m	19, 20, 21
7	8	Haspel	O'Connor/Brussaard	algal sinking rate	CTD	8:00 AM	7 m	7, 8, 9
4	6	Haspel	O'Connor/Brussaard	algal sinking rate	CTD	8:00 AM	7 m	13, 14

Charlet-3 cruise, 2013; 64PE366								
Station	Cast	Who	Responsible scientist	What are you sampling for?	Sampling device	time of day	Depths	Bottle #
13	3	DOGGEN	O'Connor/Brussaard	microzooplankton + HNF	CTD	8.00 AM	3.5 m	5
13	3	DOGGEN	O'Connor/Brussaard	grazing by fluorescent labeled prey	CTD	8.00 AM	3.5 m	5
11	6	DOGGEN	O'Connor/Brussaard	microzooplankton + HNF	CTD	8.00 AM	7 m	17
11	6	DOGGEN	O'Connor/Brussaard	grazing by fluorescent labeled prey	CTD	8.00 AM	7 m	17, 18
10	7	DOGGEN	O'Connor/Brussaard	microzooplankton + HNF	CTD	8.00 AM	7 m	11
10	7	DOGGEN	O'Connor/Brussaard	grazing by fluorescent labeled prey	CTD	8.00 AM	7 m	11, 12
8	6	DOGGEN	O'Connor/Brussaard	microzooplankton + HNF	CTD	8.00 AM	7m	17
8	6	DOGGEN	O'Connor/Brussaard	grazing by fluorescent labeled prey	CTD	8.00 AM	7m	17, 18
7	7	DOGGEN	O'Connor/Brussaard	microzooplankton + HNF	CTD	8.00 AM	7m	7
7	7	DOGGEN	O'Connor/Brussaard	grazing by fluorescent labeled prey	CTD	8.00 AM	7m	7
7	8	DOGGEN	O'Connor/Brussaard	grazing by fluorescent labeled prey	CTD	8.00 AM	7m	5
4	6	DOGGEN	O'Connor/Brussaard	microzooplankton + HNF	CTD	8.00 AM	7m	11
4	6	DOGGEN	O'Connor/Brussaard	grazing by fluorescent labeled prey	CTD	8.00 AM	7m	11, 12
1	7	DOGGEN	O'Connor/Brussaard	microzooplankton + HNF	CTD	8.00 AM	7m	14, 15
1	7	DOGGEN	O'Connor/Brussaard	grazing by fluorescent labeled prey	CTD	8.00 AM	7m	14, 15
2	1	DOGGEN	O'Connor/Brussaard	microzooplankton + HNF	CTD	8.00 AM	7m	16, 17

Charlet-3 cruise, 2013; 64PE366									
Station	Cast	Who	Responsible scientist	What are you sampling for?	Sampling device	time of day	Depths	Bottle #	Other comments
13	3	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 AM	3,5, 3.5	1, 2	Lots of debris
13	4,5,6	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	9:15 AM	7 m	1	Lots of debris
11	1	Oosterhuis	Oosterhuis	HPLC	CTD	9:30 PM	35, 25, 7, 2 m	3,5,7,9	
11	7	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	35, 25, 7, 2 m	1,3,13,23	
11	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	9:30 PM	35	2	
11	7.8.9.10	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	35	3	
10	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	40, 25, 7,2 m	3,5,7,9	
10	7	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	40, 25, 7,2 m	2,4,8,23	
10	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 PM	45	4	
10	10.11.12.13	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	45	5	
8	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	35,25,7,2	2,4,6,8	
8	6	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	35,25,7,3	2,6,13,24	
8	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 PM	35		
8	7.8.9.10	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	35		
7	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	25,7,2	1,3,5	
7	8	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	25,7,3	1,9,11	
7	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 PM	25		
7	10.11.12.13	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	25		
4	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	45,25,7,2	1,3,5,7	
4	6	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	50,40,25,7,2	1,2,4,7,23	
4	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 PM	45		
4	7.8.9.10	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	45		
1	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	1,3,5,7,9	80,50,25,7,2	
1	7	Oosterhuis	Oosterhuis	HPLC	CTD	10:00 AM	1,3,6,10,23	80,50,25,7,3	
1	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 PM	75		
1	9,10,11,12	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	10:00 AM	75		
2	1	Oosterhuis	Oosterhuis	HPLC	CTD	8:00 PM	1,5,7,15,23	70,50,25,7,2	
2	2,3,4	Oosterhuis	Oosterhuis	Meso zoopl. Grazing	Vert. Net 200 um	8:30 AM	65		

Charlet-3 cruise, 2013; 64PE366								
Station	**Cast**	**Who**	**Responsible scientist**	**What are you sampling for?**	**Sampling device**	**time of day**	**Depths**	**Bottle #**
13	3	Tim	O'Connor/Brussaard	viral production	CTD	8:00 AM	7 m	10
11	6	Tim	O'Connor/Brussaard	viral production	CTD	8:00 AM	7 m	21
10	7	Tim	O'Connor/Brussaard	viral production	CTD	8:00 AM	7 m	16
8	6	Tim	O'Connor/Brussaard	viral production	CTD	8:00 AM	7 m	22
7	8	Tim	O'Connor/Brussaard	viral production	CTD	8:00 AM	7 m	10
4	6	Tim	O'Connor/Brussaard	viral production	CTD	8:00 AM	7 m	16
1	7	Tim	O'Connor/Brussaard	viral production	CTD	8:00 AM	7 m	19