The BOUSSOLE project technical reports; report #7-5, issue 1.

BOUSSOLE buoy deployment & maintenance log. July 23, 2004 – June 2, 2005

Guislain BECU, David ANTOINE, Francis LOUIS, Alec SCOTT

Laboratoire d'Océanographie de Villefranche (LOV), 06238 Villefranche sur mer cedex, FRANCE

BOUSSOLE project

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Foreword

This report is part of the technical report series that is being established by the BOUSSOLE project.

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European Space Agency

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Centre National de la Recherche Scientifique, France

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1. SCOPE OF DOCUMENT

The BOUSSOLE buoy deployment and maintenance log is a record of all events that occur from the deployment to the recovery of one of the two upper sections of the buoy.

The aim is to keep track of all maintenance operations, such as instruments cleaning or rotations, instruments malfunctions, incidents with the buoy structure, if any, biofouling development and so on.

This information is crucial to a subsequent correct interpretation of the data.

Keeping track of these events also allows their analysis in view of the permanent improvement of protocols.

The present report concerns “buoy deployment 2”, from July 22 of 2004 to June 2 of 2005.

2. DESCRIPTION OF OPERATIONS

2.1 Upper Section preparation

This is the session during which all instruments are physically mounted onto the buoy structure and the full system is tested to check whether it is correctly functioning.

Contrary to what was done before, the Buoy II was set up within the "CCI premises" in Villefranche-Sur-Mer (i.e., a large facility that is rented to the port authorities in Villefranche), and not within the hangar of the "Foselev" company in Toulon. This solution provided an appreciated gain of time. Below are some pictures of the preparation, as taken on July 9, 2004.





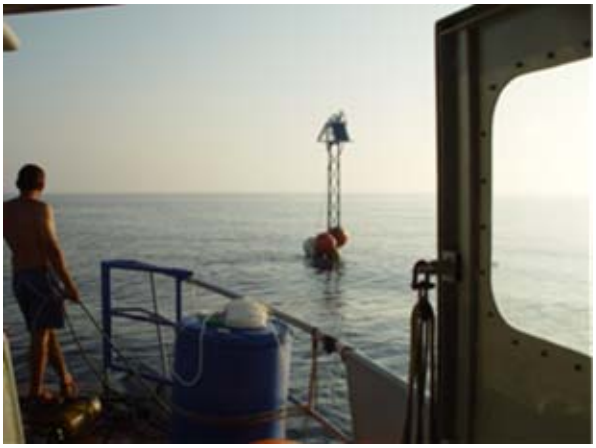





2.2 UPPER SECTION EXCHANGE/ HELICOPTER LIFT

2.2.1 Thursday 22nd July, 2004

Departed Villefranche on the SAMAR dive boat GGIX with Alec Scott, 3 divers, a crew member and Stephan Bourreau, a cameraman. After arrival at the buoy site with conditions very calm, recovery of the top section of the buoy went very smoothly. The buoy section was floated then the base was lifted onto the stern of the boat using the small crane. The 9m buoy arms with radiometers were detached as they came into reach of the men on deck. With the buoy partly on deck, the crane was reconnected further towards the head so that it could be lifted further into the boat to secure a stable position for the night.




2.2.2 Friday 23rd July, 2004

Work started at 07h00 with the preparations of the buoy to be lifted out of the water. Straps were attached in an identical manner to the buoy section back in Villefranche-Sur-Mer. By 09h00, the buoy was ready and the satellite phone call was made to David Antoine in Villefranche-Sur-Mer that we were ready for the helicopter.

15 minutes later, the helicopter arrived although it was instantly visible that the 9m arm with the radiometers was broken and hanging off the buoy by the straps and cables. The helicopter deposited the new buoy section and lifted the old section without problem.

The newly delivered section was mounted onto the back of the boat as had been performed the previous evening with the other section. It instantly became apparent that the arm had broken at the delrin collar between the arm and the arm socket on the buoy. In addition to this, the pvc disk meant to separate the upper and lower buoy sections had smashed to pieces.

Using a collar from the previous buoy, the new arm was reattached although the bolt holes were not in the same position so the arm was not able to be bolted into position. Instead, the straps used for transportation were attached in place to keep the arms in position.

For the insulating disk, there was nothing left of it so a foam mattress was cut up and duct-taped to the base surface. These reparations and operations took some extra time to complete so by the time the buoy was placed back in place, it was nearing 3 pm.

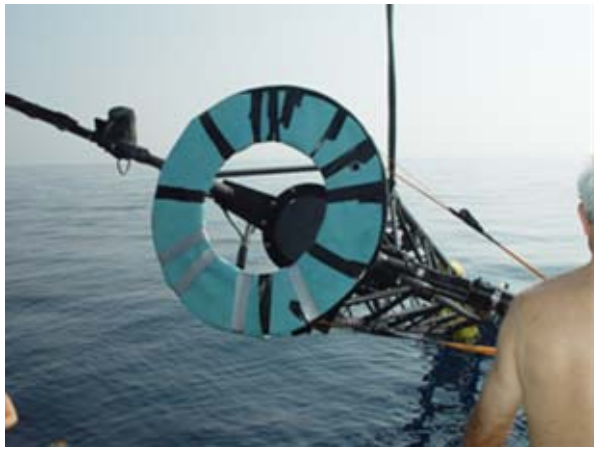
Communication with the buoy was not able to be established after one attempt and there was not enough time to wait an hour for another try.

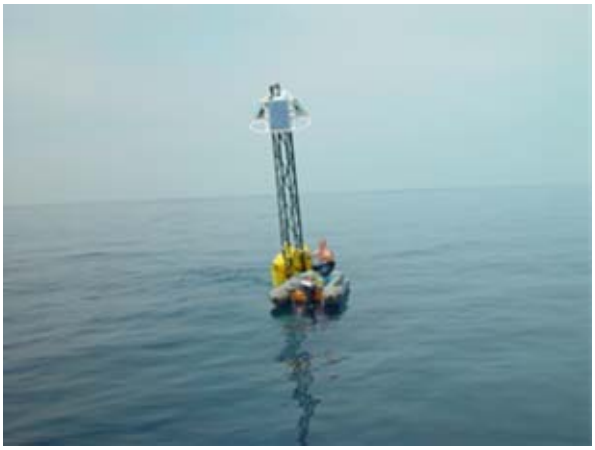
At this date, buoy is equipped with

- **Boussole rads, MVDS062, OCP038 and OCP039**
- **HydroScat2 #2031247**
- **strain100 #001**
- **Wetrlabs Transmissionmeters C-Star #746PR and #747PR**
- **Chelsea fluorometers #175265 and #175266**







2.3 AOPEX - REPARATIONS

2.3.1 Saturday 31st July, 2004

At the start of the AOPEX cruise on Le Suroit, the dive boat GGIX, pulled up alongside the ship at 18h00 with Leo Gimenez and his dive buddy Philippe. Alec Scott joined them on their boat, along with some tools and materials to go to the buoy site and repair some damage that occurred the previous week during the helicopter delivery of the upper buoy section.

The divers replaced the DACNet computer **(put the DACNet #2 instead of DACNet #1)**, OCP 9m Data-100 **(put the OCP037 instead of OCP039) and the cables for the fluorometer, transmissometer and OCP power/telemetry**. The system was tested after this reinstallation. All instruments appeared to be working except those connected to the 4m Data-100. A replacement unit was on the ship so was recuperated and was intended to be installed by the divers in the last few minutes of daylight. Unfortunately, it later became apparent that there had been a mis-communication when briefing the divers and they had, in actual fact, replaced the 9m Data-100 a second time **(put_the OCP036 instead of newly installed OCP037)**. They had not touched the data-100 at 4m but had put the replacement 4m sensor at 9m and removed the one that had just been installed. **Final result OCP036 (instead of OCP039) was installed at 9m and OCP038 remained at 4m**.

With the operation believed to have been successful at the time, the divers also fixed in the 4 shaft anodes that needed replacing above the sphere.

Due to the late hour, there was no time to test the buoy directly after the dive. A link was later established on the ship which indicated the 9m OCPs working. Before the connection was broken because of distance from the buoy, using the communication indicator lights in the DACNet Base Client software, it was apparent that the OC9 was now communicating although it was not possible to view the data on Satview, suggesting a configuration problem. This, indeed, turned out to be because a different Data-100 than expected was in place. The 4m OCP, however, was not showing any signs of working.

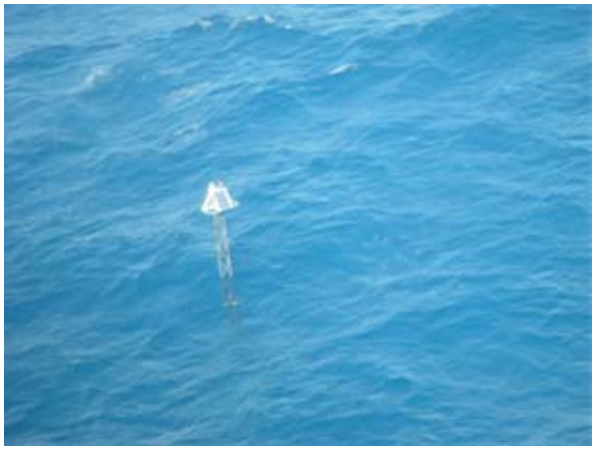
2.3.2 Wednesday 4th August, 2004

During the AOPEX cruise, by free-diving, the OCP 4m Data-100 was replaced **(put OCP037 instead of OCP038)**. The two Data 100s on the buoy are, therefore, the original from September 2003 except that their depths are now opposite to their previous positions. This inversion is due to the mistake made with the SAMAR divers during the repair operation on 31st of July. **In addition, the cables for the OCP4 power/telemetry, fluorometer and transmissometer have been replaced** with the previous set because we cannot be sure exactly what has caused the previous problems where we lost all OCP communication. **The DACNet port AC** for the OCP 4m telemetry/power was suspected to have blown a fuse so the replacement cable **was connected to the DACNet port AI** and the configuration adjusted appropriately to use this port.

2.4 ROUTINE AND EXTRA CRUISES AND INSTRUMENT EXCHANGE

2.4.1 Wednesday 25th August, 2004

No ARGOS messages were delivered for few days. An urgent mission with helicopter was engaged. The buoy was present and apparently not in danger. Communication via the CISCO module failed because the battery embarked aboard the helicopter had, contrary to expectation, insufficient charge.



2.4.2 Friday 3rd September, 2004

This cruise was organized aboard the Nika III dive boat ("Michel Bo" dive company in Beaulieu/mer). Departure was at 06h30 and upon arrival the divers went straight to work to clean all of the sensors. The conditions were slightly choppy with around 12 knots of wind but with this bath tub of a boat, it was rather uncomfortable. **The divers exchanged the radiometers at 4m and 9m, the Hydroscat and the Strain 100 (put Stan's rads, HS2#2021045 and Strain100#002).**

Reasons for the changes - The new Hydroscat had not sent any useful data since the buoy launch at the end of July 2004 – only housekeeping data was logged suggesting a configuration problem. The Strain 100 was the original (001) for the buoy which was faulty since the flooding of the amplifier unit in 2003. Despite relaying internal voltage and temperature data, the signal from the amplifier was not registering. This had been difficult to assess in the lab before relaunching.

2.4.3 Monday 20th September, 2004

Sophie Bonnet, a Phd student from LOV, retrieved the buoy data from the R/V Tethys-2 during a DYFAMED cruise.

2.4.4 Saturday 23rd October, 2004

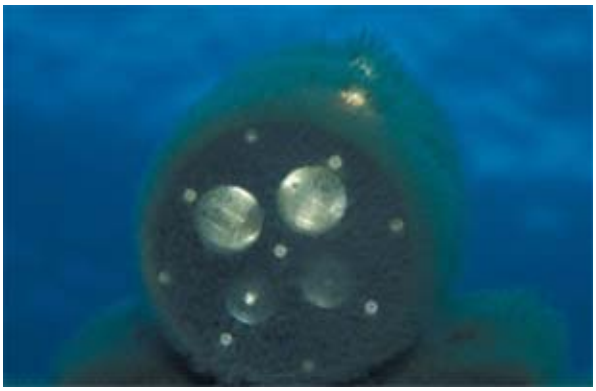
As the weather didn't allow the divers to work on the buoy during the 15–19 October period (BOUSSOLE cruise #36), the 23rd of October was borrowed to DYNAPROC cruise, as DYNAPROC didn't use Thetys-2 and the sea conditions were rather calm for this day. David Luquet (from CNRS) and 2 divers (from the SAMAR company) took some underwater pictures before and after sensors cleaning. They also tried to remove algal contamination on the metallic structure of the buoy to avoid too fast re-contamination of sensors, but the anti-fouling paint is not hard enough and flakes with a simple sponge cleaning. After cleaning and one hours measurements, radiometers were exchanged, Guislain Bécu changed the MVD **(put the Boussole rads and MVD set)**, and the buoy data were a last time retrieved.

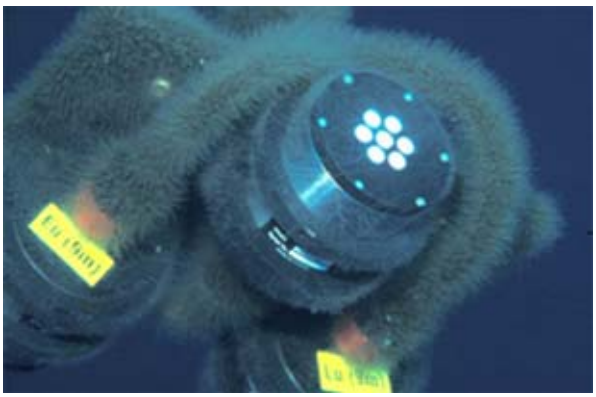
2.4.5 Monday 22sd November, 2004

This day was part of the BOUSSOLE cruise #37, but Stan's rads were still in Satlantic premises in Halifax for calibration. **The Boussole rads were only cleaned.**

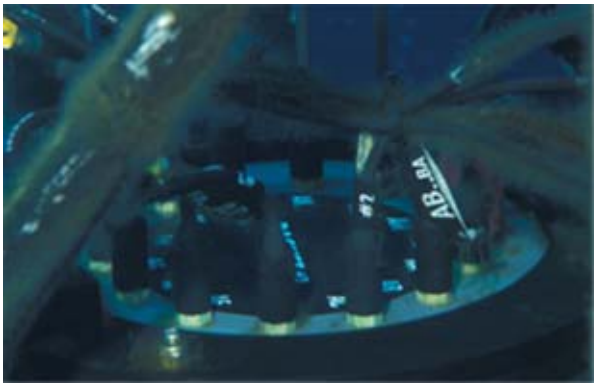
2.4.6 Thursday 16th December, 2004

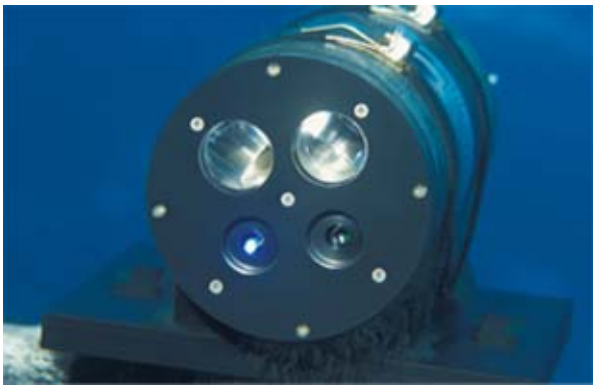
As the buoy strain sensor was indicating a weird value for few weeks, it was decided to try to measure it mechanically. This operation was tried on the 16th of December, as this was also a crucial date to exchange the buoy radiometers. The only mechanical weighing hook that was available was far too big to be safely manipulated, especially with the quite large swell of that day. This operation was cancelled, but the radiometers were nevertheless exchanged, and the data retrieved **(put the Stan's rads and MVD set)**.





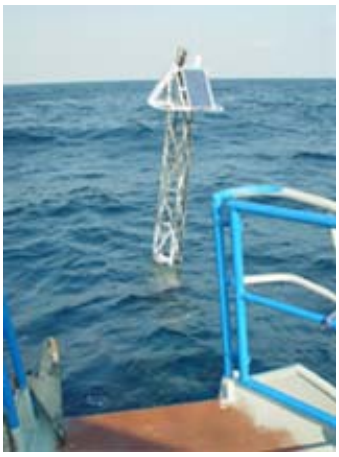




2.4.7 Friday 18th February, 2005

A cruise with the SAMAR company was engaged to exchange the DACNet **(put the DACNet #1)**, rads **(put Boussole rads and MVD and MVDS#0009)** and OCPs **(put OCP038 at 4 m depth and OCP039 at 9 m depth)**, as the system stopped on 2nd January, 2005 (weather prevented earlier intervention). Buoy data were also retrieved.



2.4.8 Thursday 24th February, 2005

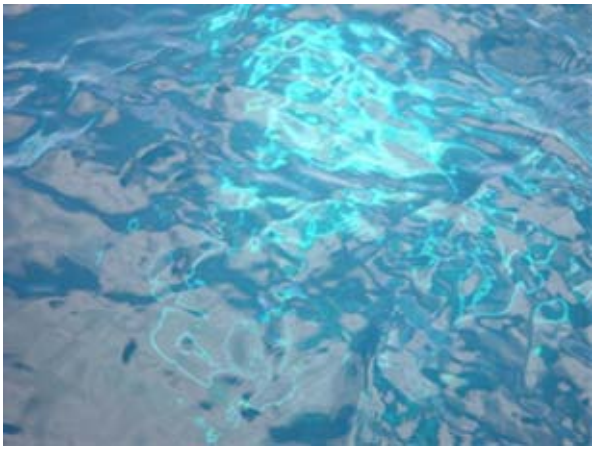
This day was part of the BOUSSOLE cruise #39. Communication via the CISCO module failed for a few times. A direct connection from the buoy head was attempted. Unfortunately, **the "DACNet to CISCO" cable**

was found to be out of order, preventing any communication with the buoy, direct or via CISCO unit.



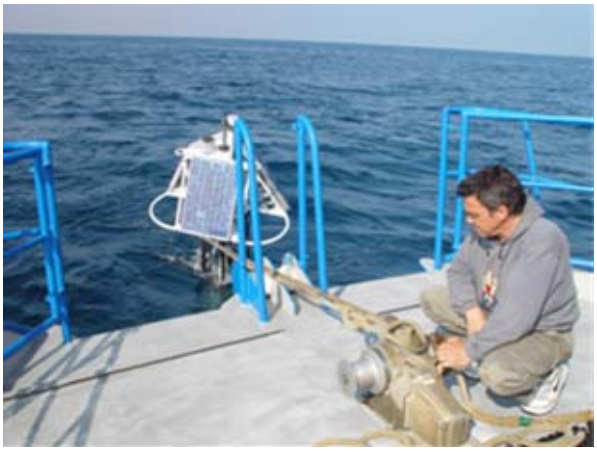

2.4.9 Friday 11th March, 2005

This cruise was planned with the SAMAR company onboard the dive boat GG-IX in order to exchange the “DACNet to CISCO” cable. Unfortunately, even with optimistic weather forecast, subsurface currents were so strong that the top of the buoy head was at a depth of 6 meters, and any diving operation was impossible. The buoy position was 43°21.903 North and 7°53.972 East, which is about 200 m from the usual position.

2.4.10 Saturday 19th March, 2005

As the weather forecast was still favourable, another cruise onboard dive boat GG-IX was engaged to exchange the “DACNet to CISCO cable”. Subsurface currents were still strong, but less than the previous week, so that the buoy head was above the surface (nevertheless by less than 1 meter!). The buoy head was attached to the boat, in order to pull the buoy structure and lift it up. The faulty cable was exchanged, and the diver had to connect the cable to the CISCO unit from the sea.



2.4.11 Friday 25th March, 2005

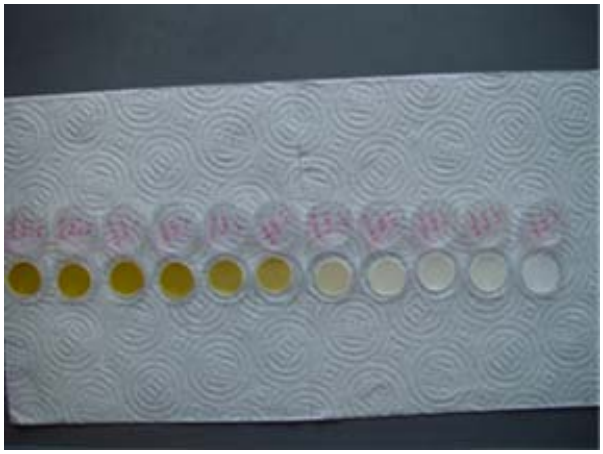
This day was part of the BOUSSOLE cruise #40. A cameraman took some video sequences of the cruise, and t**he Boussole rads were only cleaned.** The spring bloom had begun ; divers said they had only 3 to 4 meters of visibility in these green waters.




2.4.12 Monday 15th April, 2005

This day was part of the BOUSSOLE cruise #41, and **the Boussole rads were only cleaned.** Again, divers say they had a few meters visibility, but the waters were more yellow rather than green, which appeared on the water sampling filters.

A “king of herrings” fish was found on site.

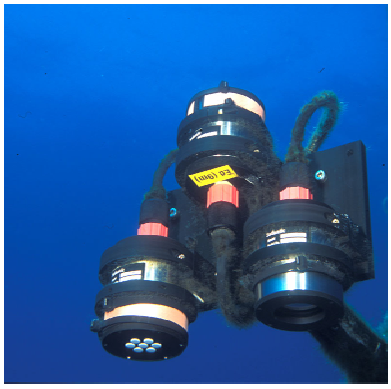
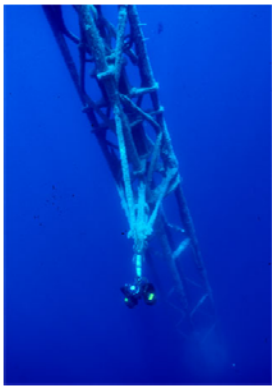
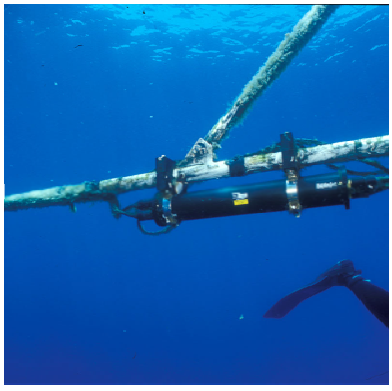
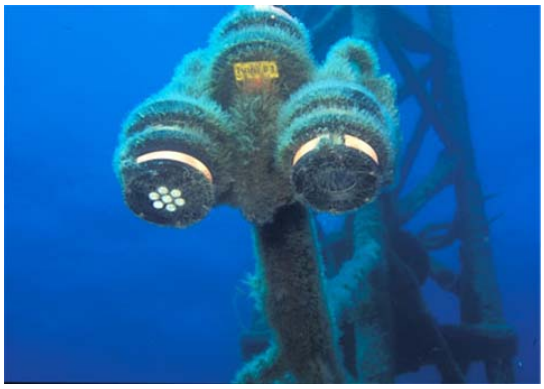
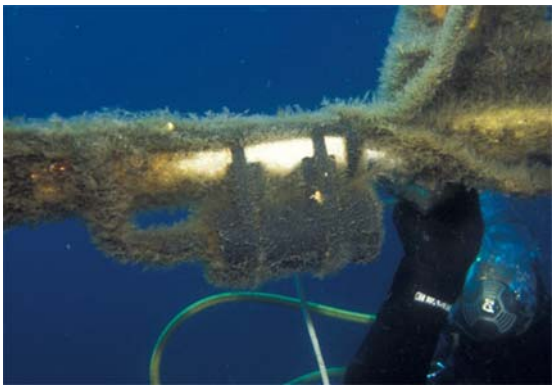
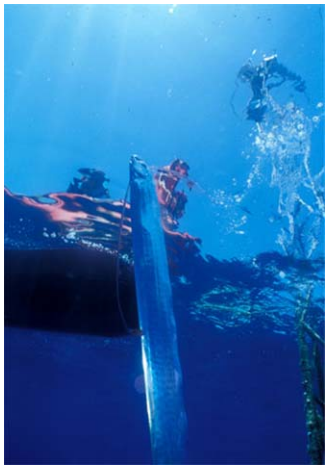



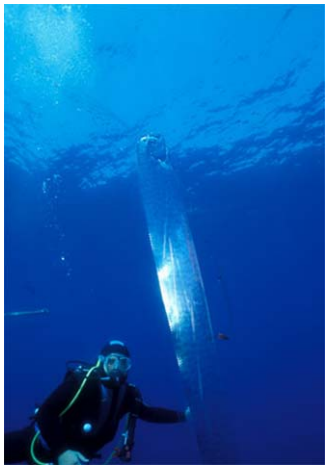
2.4.13 Thursday 26th May, 2005

This day was part of the BOUSSOLE cruise #42, and **the Boussole rads were only cleaned.** Sea Water was bluer and clearer than the 2 previous months, but still a little bit turbid (visibility of about 20 m).

The anti fouling paint of the buoy structure was scrapped a lot at this date. To avoid a too strong algal contamination, some copper rings were fixed around the radiometer heads.

3 "kings of herrings" fish were found on site.



2.5 BUOY MOORING REMOVAL

2.5.1 Thursday 2nd June, 2005

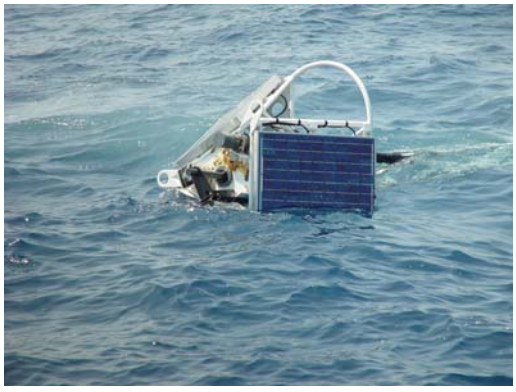
The cruise began with the loading of the buoy upper part on the CASTOR-02 (FOSELEV MARINE company) on Thursday 2nd June early in the morning (05:30 am – see the buoy III deployment journal), in the Villefranche bay (detailed in the next maintenance report).

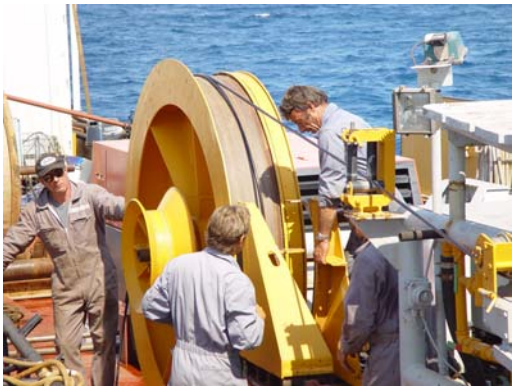
Transit to the BOUSSOLE site with the CASTOR-02 took about 5 hours, so the removal of the buoy upper section began at 11:00 am. The weather conditions were not perfect (the sea was a bit rough, with a wind blowing at about 15 knots). Nevertheless the recovery of the upper section was achieved in due time. It was unscrewed from the lower section, then floated and lifted on the boat with the CASTOR-02 side crane, and installed at such a place so that it was not perturbing the next steps of operations.

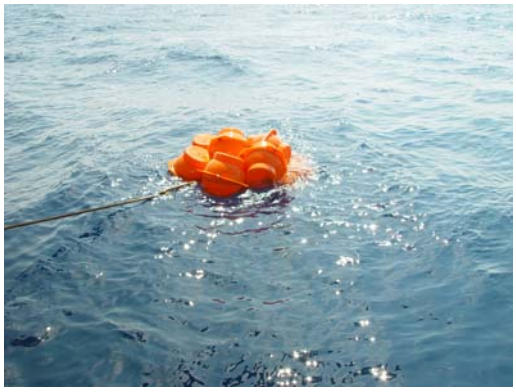
Then, acoustics releases were triggered in order to recover the buoy lower part with all the mooring (Kevlar cable, deep sea floating sphere, chain and acoustic releases). The cable was then rolled up, and the buoy lower section was fixed outside of the CASTOR-02, on the port side of the ship. This part of the work did not raised any major difficulty, and was finished at about 17:00 pm.

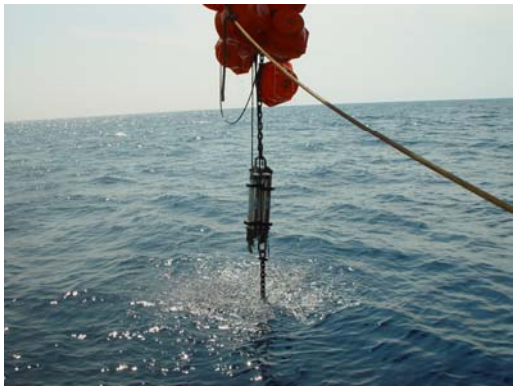
The buoy metallic structure was found to be ok, except the anti fouling paint. The kevlar cable terminations as well as the chains and manilas were also in a good state (after 20 months of deployment). The protective anodes of the acoustic releases were completely disintegrated and were replaced.

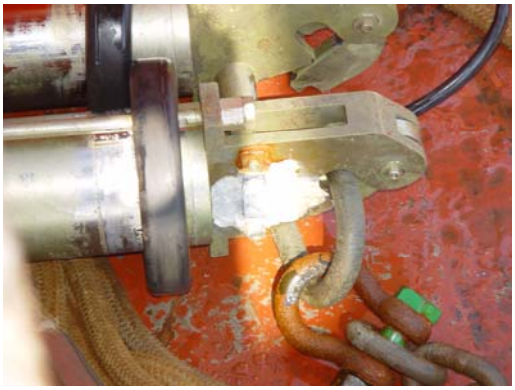


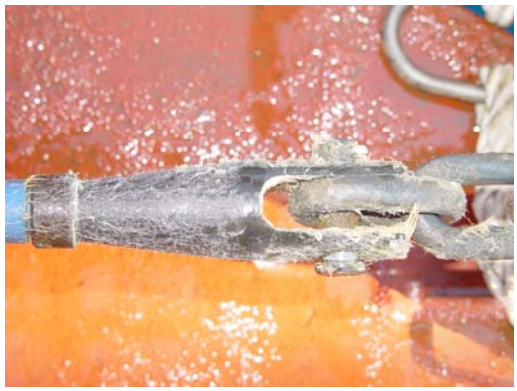













3. QUANTITATIVE SUMMARY

The deployment lasted 314 days, among which 75 days were without data acquisition. The sole reason for these interruptions of the data stream was the recurrent failure of the DacNET central computer. The cause of these problems have been identified and corrected, so that one should expect a more regular functioning for the next deployments.

To be completed in the next version of the report.

4. INSTRUMENT SCHEDULE

To be completed in the next version of the report.

5. ANY PROBLEMS ENCOUNTERED ?

To be completed in the next version of the report.

6. LESSONS LEARNED

The use of a helicopter to perform the exchange of the upper section of the buoy, although attractive because it is minimizing the time needed for the operation and eliminates delicate and long transport by road, revealed to be perilous. The failure of the operation was however essentially due to the excessive speed of the helicopter, in spite of what was decided during the preparation of the operation. It is therefore not totally clear for us whether this solution has to be definitely abandoned or simply adapted to prevent any damage of the buoy and of the instrumentation.

The deployment lasted 10 months, which is too much, not in term of the buoy structure, which did not show any sign of weakness, but because of biofouling. The anti-fouling paint that was used on that buoy was not hard enough (mechanically speaking), so that it was more or less totally removed after, say, 6 months in the water. Then, bio-fouling of the buoy structure started to growth and had adverse effects on the monthly cleaning of the instrumentation (i.e., rapid re-colonisation of the instruments). Therefore, for he future buoy deployments, it was decided not to have the buoy for more than about 6 months in the water (this was actually the initial decision, which was not respected for logistic reasons), and to replace the anti-fouling paint by a new paint, which is mechanically stronger. Anti-fouling devices have been also added to the instruments, under the form of copper rings and plaques.

We had nearly 50 days without data collection, between January 2, 2005 and February 18, 2005. The reason was, as explained in section 3 above, the failure of the DacNET. The data collection was not able to restart more rapidly because the second DacNET was in Satlantic premises at the beginning of the year for a maintenance session. We had to wait the return of the DacNET, and then to find a time slot with good weather conditions, and with a boat and divers available. This situation ended up with the 50 days without data. This example illustrate the necessity to purchase a third DacNET, in order to have permanently : one DacNET at sea, collecting the data, one DacNET in our lab, ready to be deployed in case the one at sea experiences a failure, and one DacNET in Stalantic premises, being checked. By this way, we would minimize the risk of long periods without data.

The buoy rarely went to be totally submerged. This situation happened X times because of a strong mistral wind, and two times because of a very strong current. The latter occurred in March of 2004 (the day just after the buoy deployment), and in February of 2005, when the water column is deeply mixed (formation of dense waters in the northwestern Med. Sea), and the buoy sphere reached a depth of about 53 meters..

To be completed in the next version of the report.

7. ACKNOWLEDGEMENTS

The BOUSSOLE project has been set up thanks to the work of numerous people, and thanks to the support and funding of several Agencies and Institutions. The latter are listed in the foreword of this report. Specifically, the following contracts are acknowledged : the French Space Agency CNES provided funds through the TAOB and TOSCA scientific committees, ESA through ESTEC contract N°14393/00/NL/DC, including CCNs #1, #2 and #3, ESRIN through contract N° 17286/03/I-OL, and NASA through a "Letter of Agreement". Funding has been also obtained from the French CSOA committee and the "Observatoire Océanologique de Villefranche".

The crews and Captains of the following ships are also warmly thanked for their help at sea : the Castor-02 vessel from the Fosevel Marine company (buoy/mooring operations), the INSU R/V Téthys-II and Georges Petit (regular monthly cruises), the GG-IX from the Samar company and the Nika-III (on-demand short operations on site). Pilots and crew members of the Valair and Commerçair helicopter companies are also thanked for their willingness in accomplishing for us unusual survey missions above the BOUSSOLE site. Emmanuel Bosc, Maria Vlachou, Guillaume Lecomte, who have occasionally provided some help in collecting data, are also thanked for their help.

The French institute IFREMER and the Norvegian Marintek company are also thanked for their help and fairness in the engineering

studies that were ordered to them after the major failure of the buoy in spring of 2002.

The data that are collected for several years near the BOUSSOLE site by the French weather forecast Agency, "Meteo France", and which are provided in real time on the internet, have been of great help in the day-to-day management of the monthly cruises.

Two companies have largely contributed to the BOUSSOLE project, namely the ACRI-in/Genimar company, Sophia Antipolis, France (buoy conception) and Satlantic Inc., Halifax, NS Canada (buoy centralized acquisition system and radiometers); their help is specifically acknowledged here.

8. DAILY DATA COLLECTION SHEETS

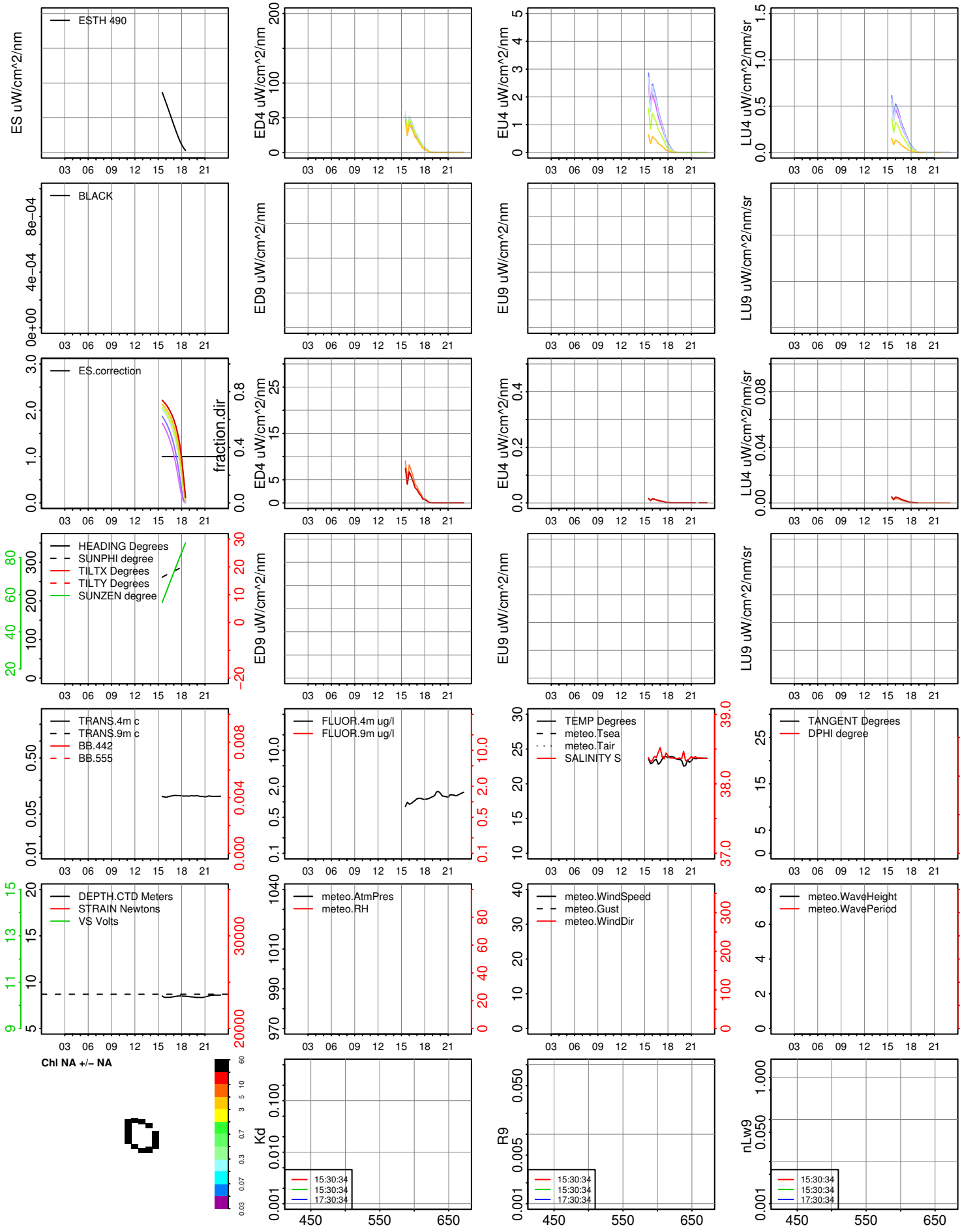
The following pages are meant to summarize the data collected each day by the buoy.

2004-08-04

In air
In water
412 442 490 510 560 665 683

solar noon : 11:34:38 GMT
sun zenith angle at solar noon : 26.18
HPLC Chlorophyll concentration : 0.13

2005-06-23

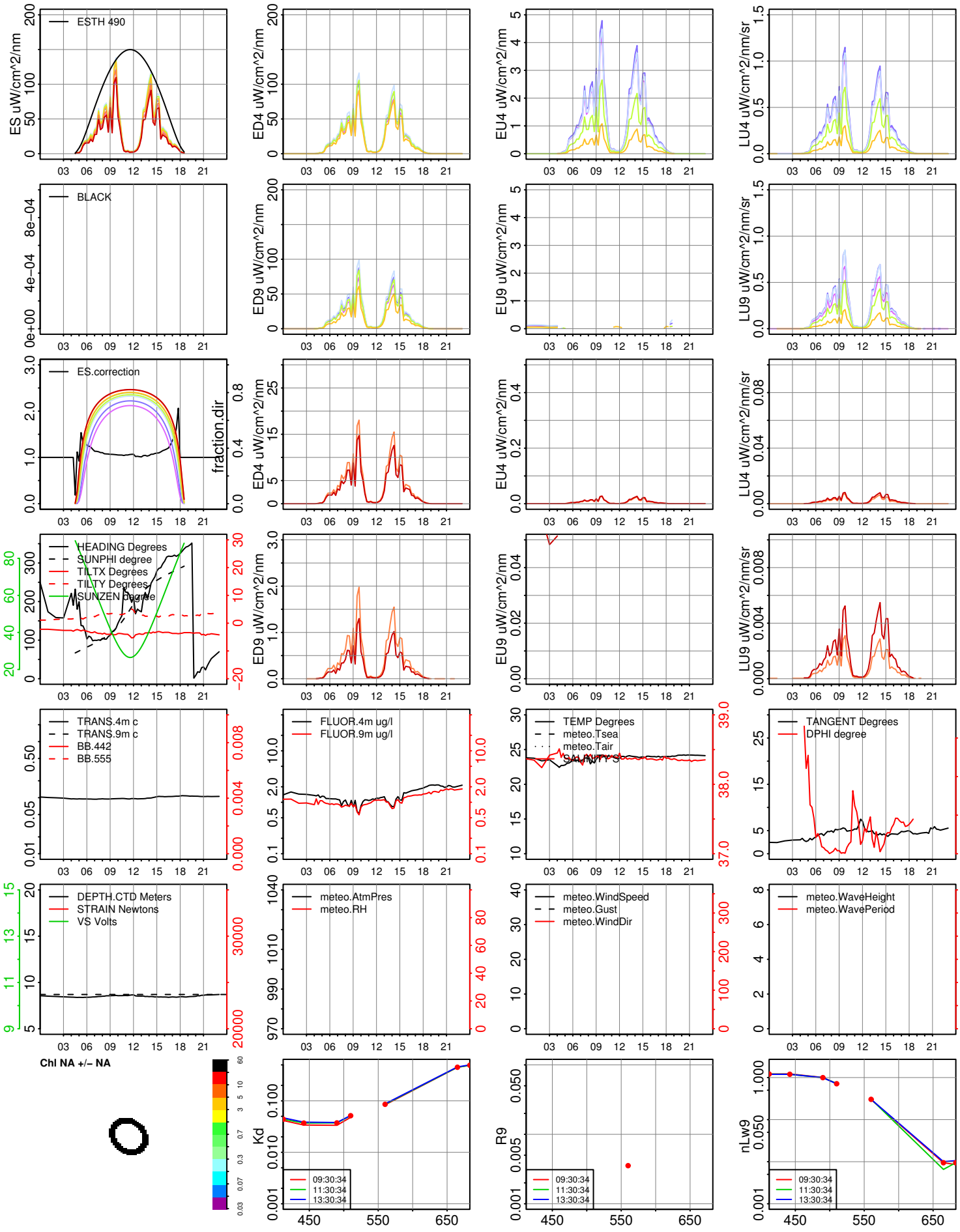


2004-08-05

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:34:34 GMT
sun zenith angle at solar noon : 26.44
HPLC Chlorophyll concentration : NA

2005-06-23

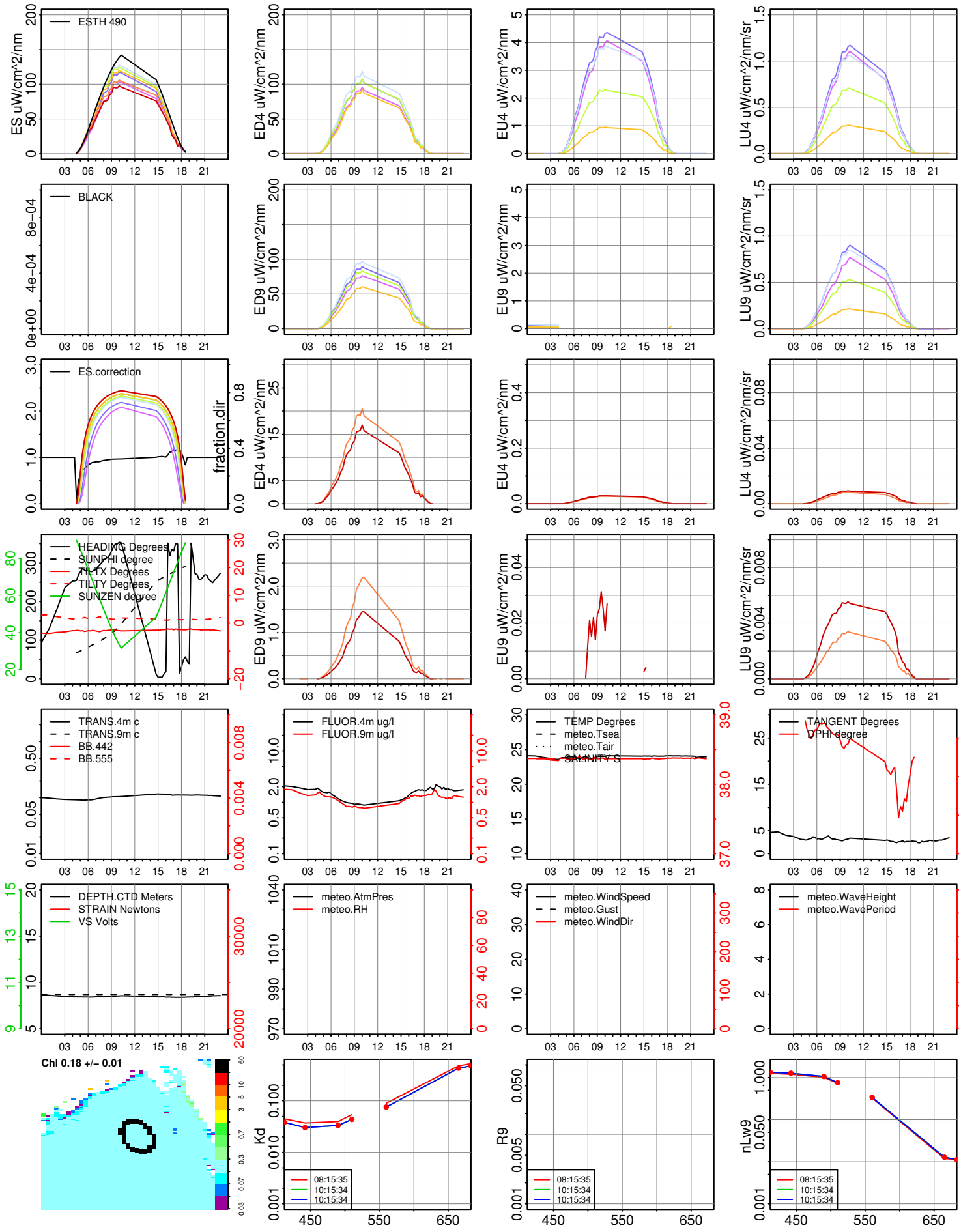


2004-08-06

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:34:28 GMT
sun zenith angle at solar noon : 26.72
HPLC Chlorophyll concentration : NA

2005-06-23

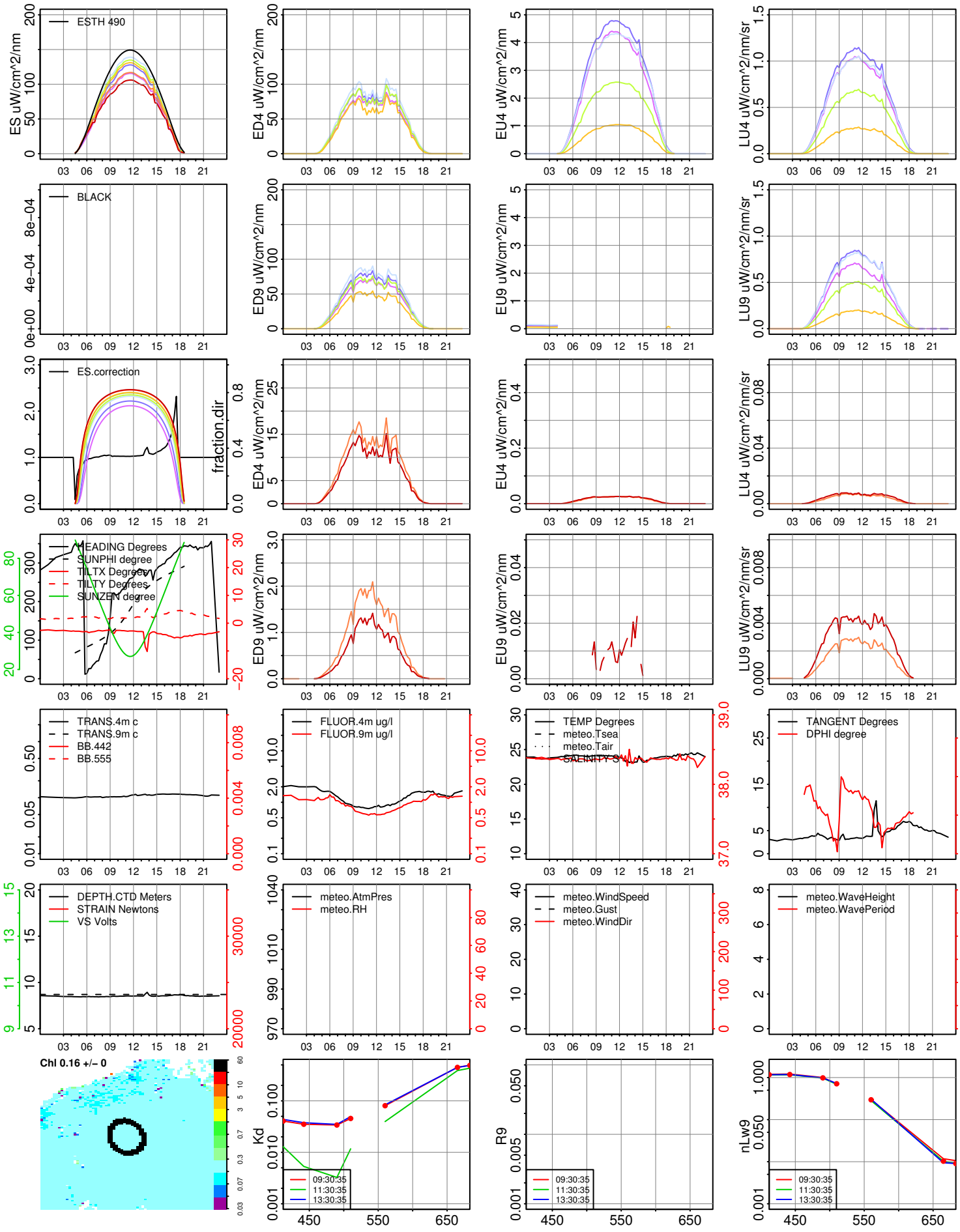


2004–08–07

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:34:20 GMT
sun zenith angle at solar noon : 27
HPLC Chlorophyll concentration : NA

2005–06–23

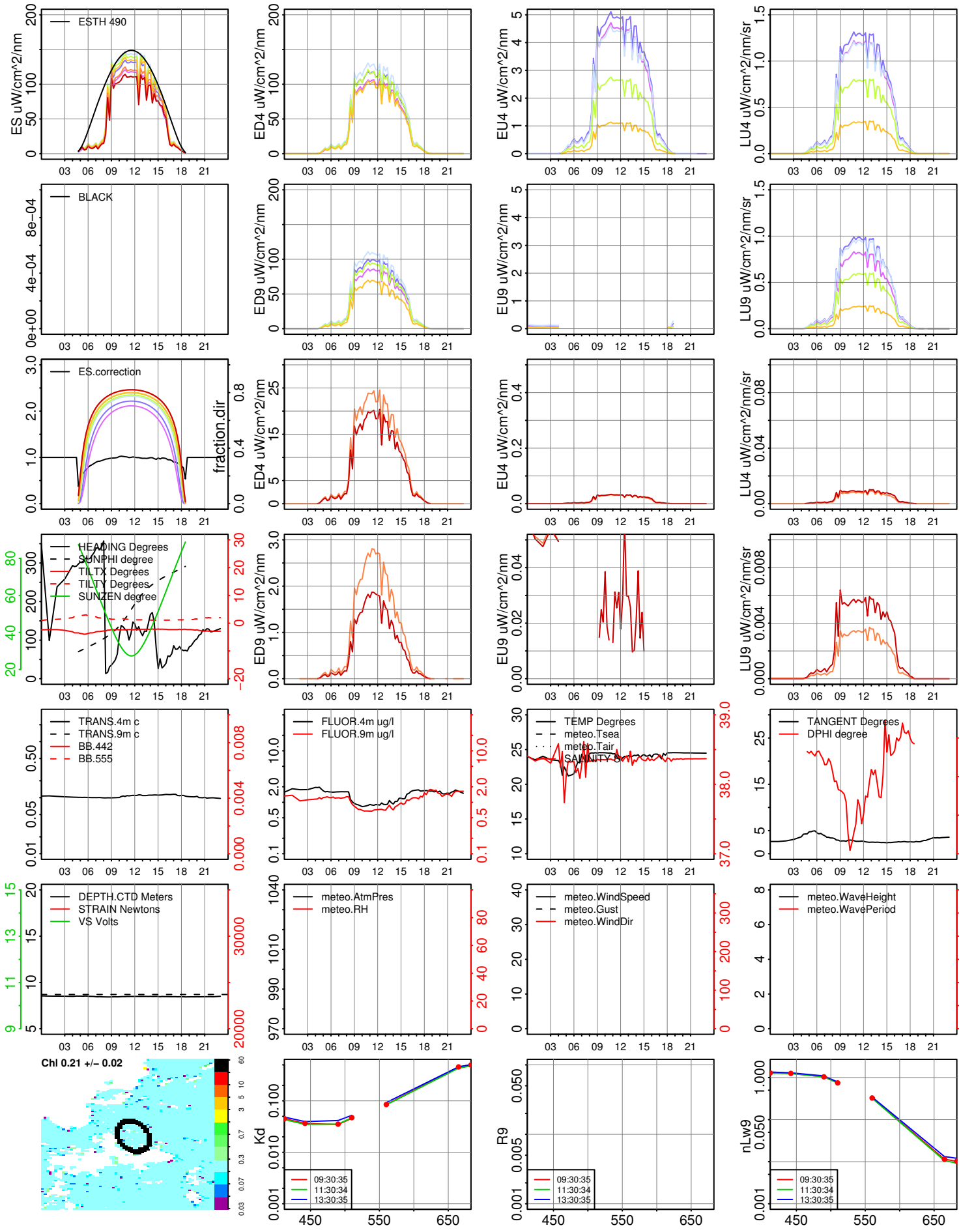


2004–08–08

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:34:14 GMT
sun zenith angle at solar noon : 27.28
HPLC Chlorophyll concentration : NA

2005–06–23

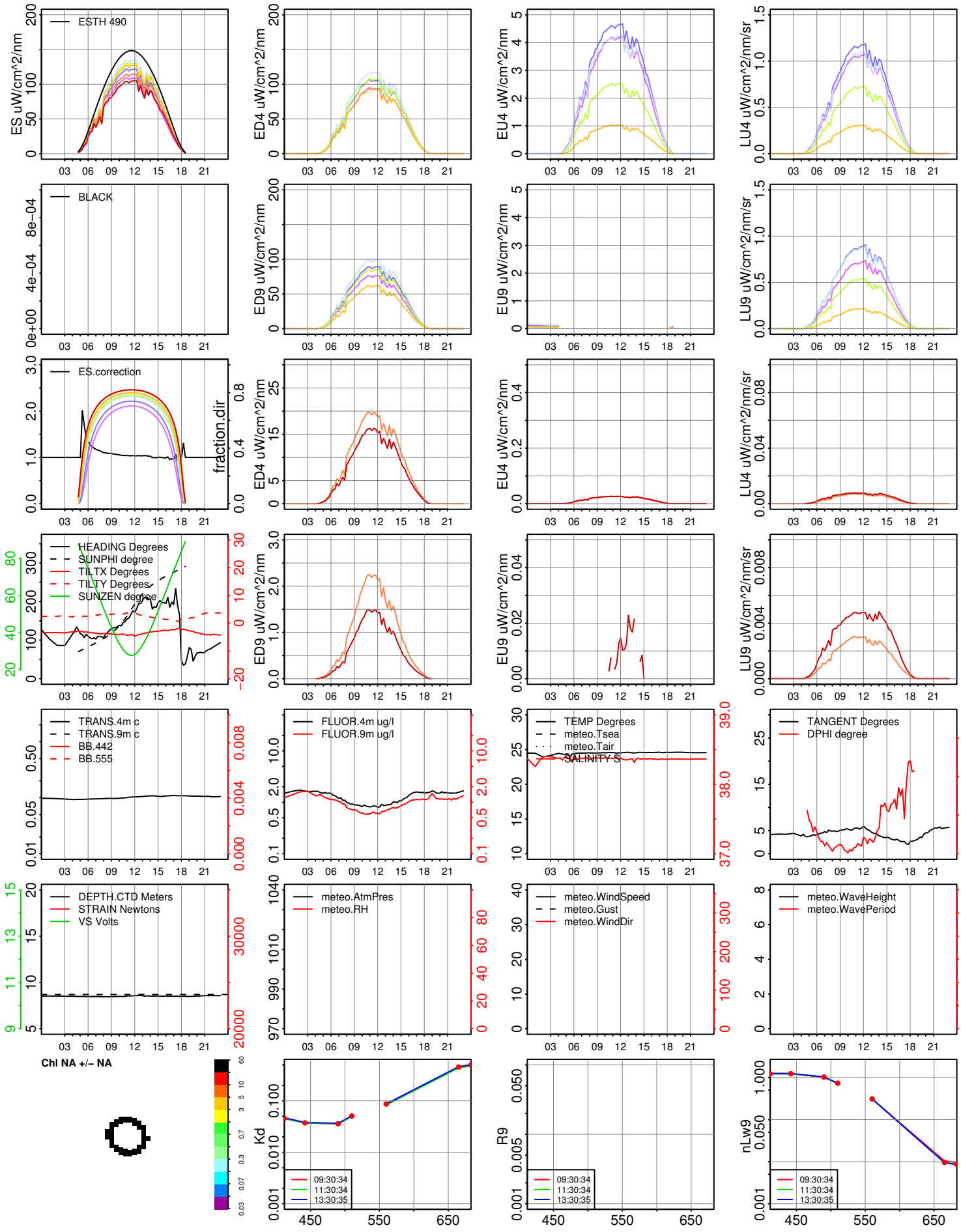


2004–08–09

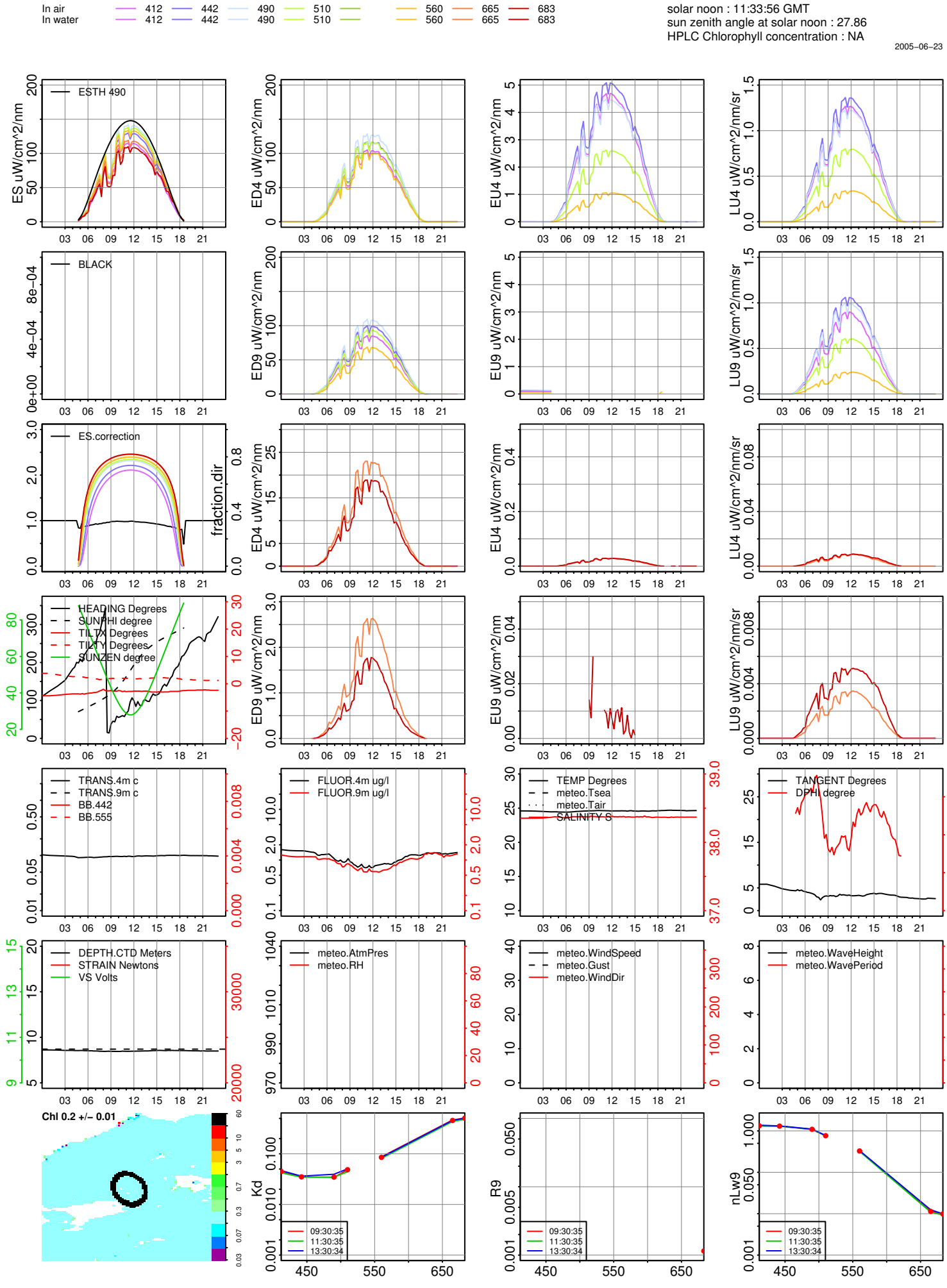
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:34:6 GMT
sun zenith angle at solar noon : 27.57
HPLC Chlorophyll concentration : NA

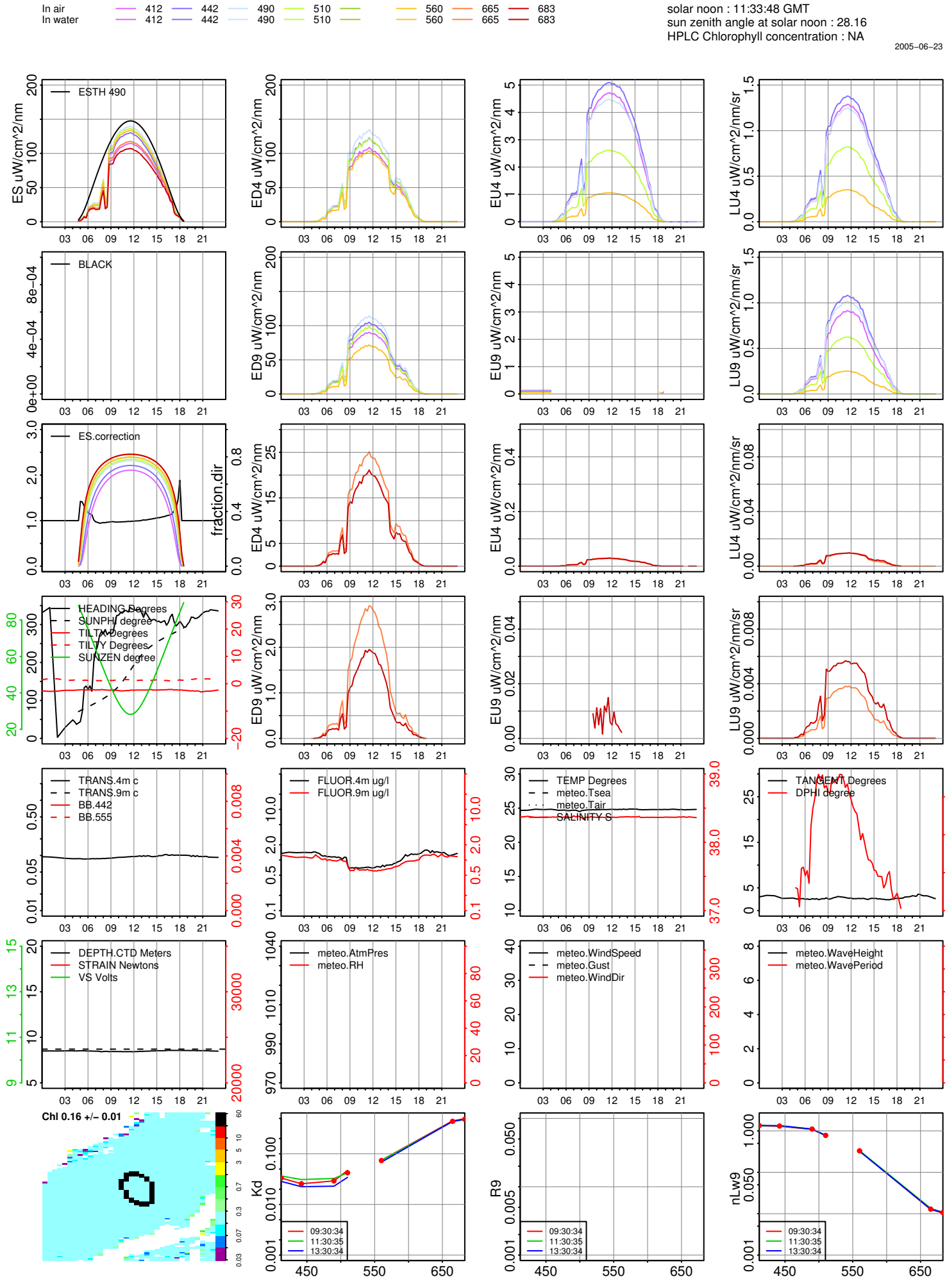
2005–06–23



2004–08–10


In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683
solar noon : 11:33:56 GMT
sun zenith angle at solar noon : 27.86
HPLC Chlorophyll concentration : NA
2005–06–23
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.2 +/– 0.01
Kd
R9
nLw9
09:30:35
11:30:35
13:30:34

2004–08–11

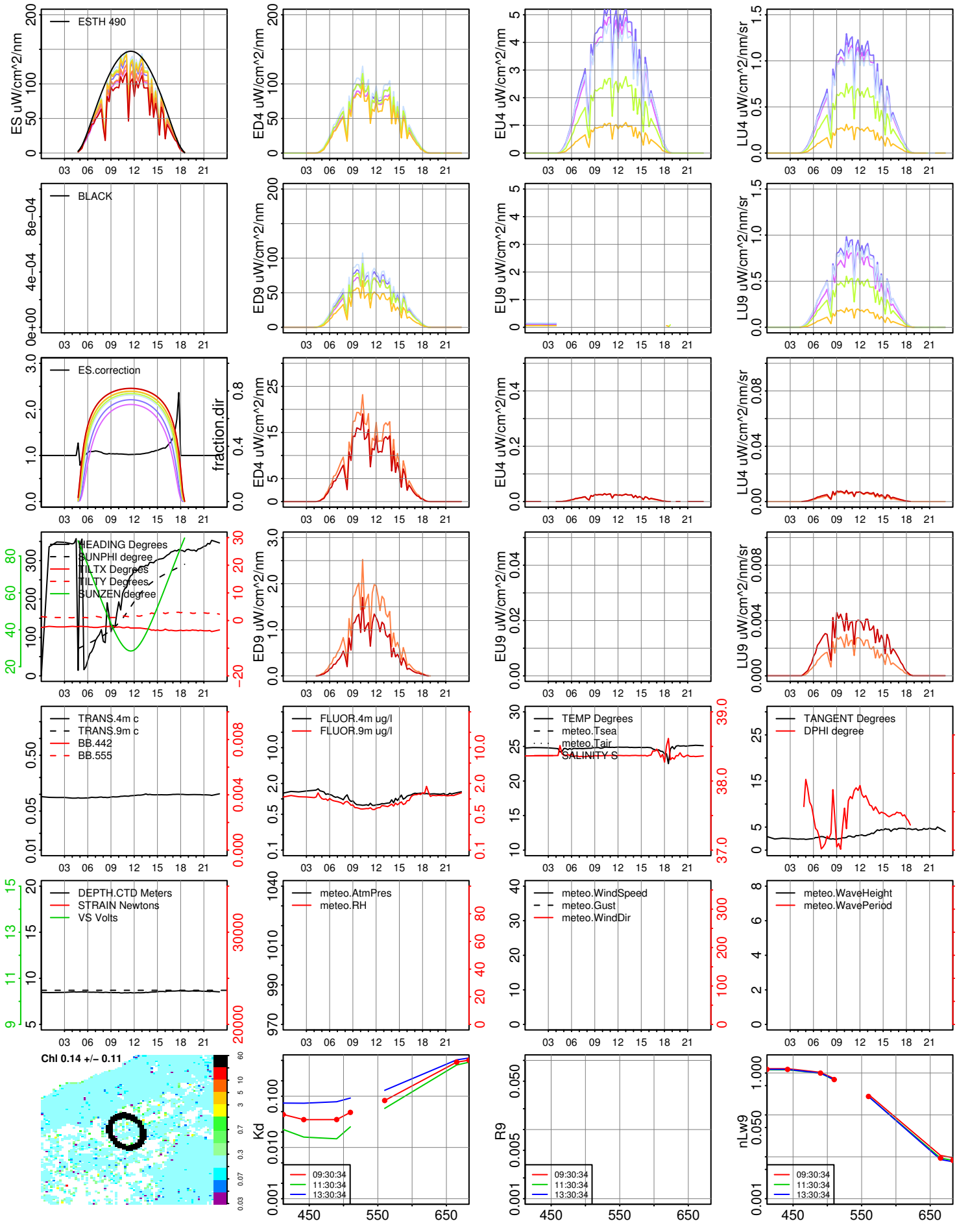

In air
In water
412
442
490
510
560
665
683
solar noon : 11:33:48 GMT
sun zenith angle at solar noon : 28.16
HPLC Chlorophyll concentration : NA
2005–06–23
ESTH 490
BLACK
ES.correction
HEADING.Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT.Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.16 +/– 0.01
09:30:34
11:30:35
13:30:34

2004–08–12

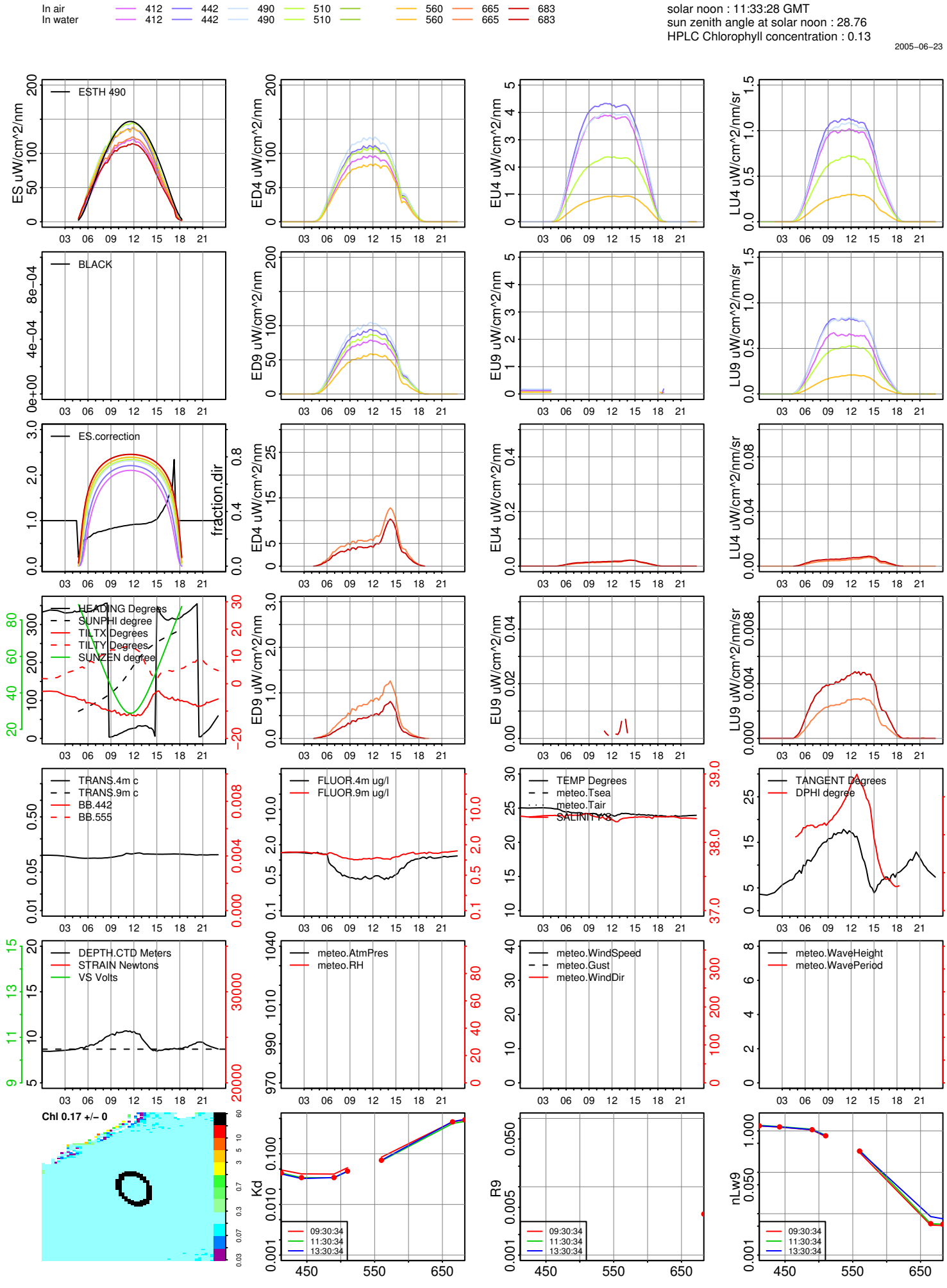
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:33:38 GMT
sun zenith angle at solar noon : 28.46
HPLC Chlorophyll concentration : 0.09

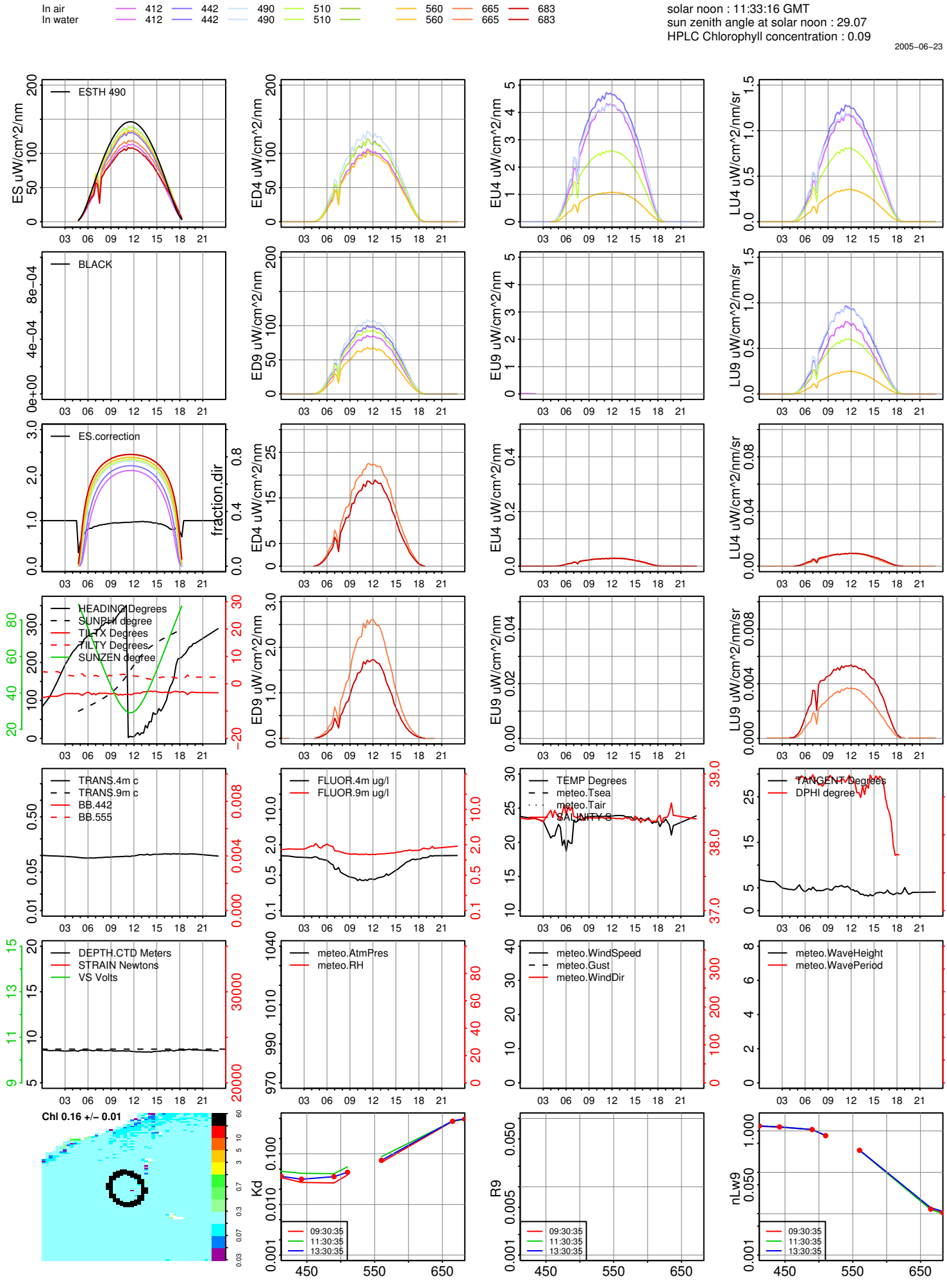
2005–06–23



2004–08–13


In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:33:28 GMT
sun zenith angle at solar noon : 28.76
HPLC Chlorophyll concentration : 0.13
2005–06–23
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.17 +/– 0
Kd
R9
nLw9
09:30:34
11:30:34
13:30:34

2004–08–14

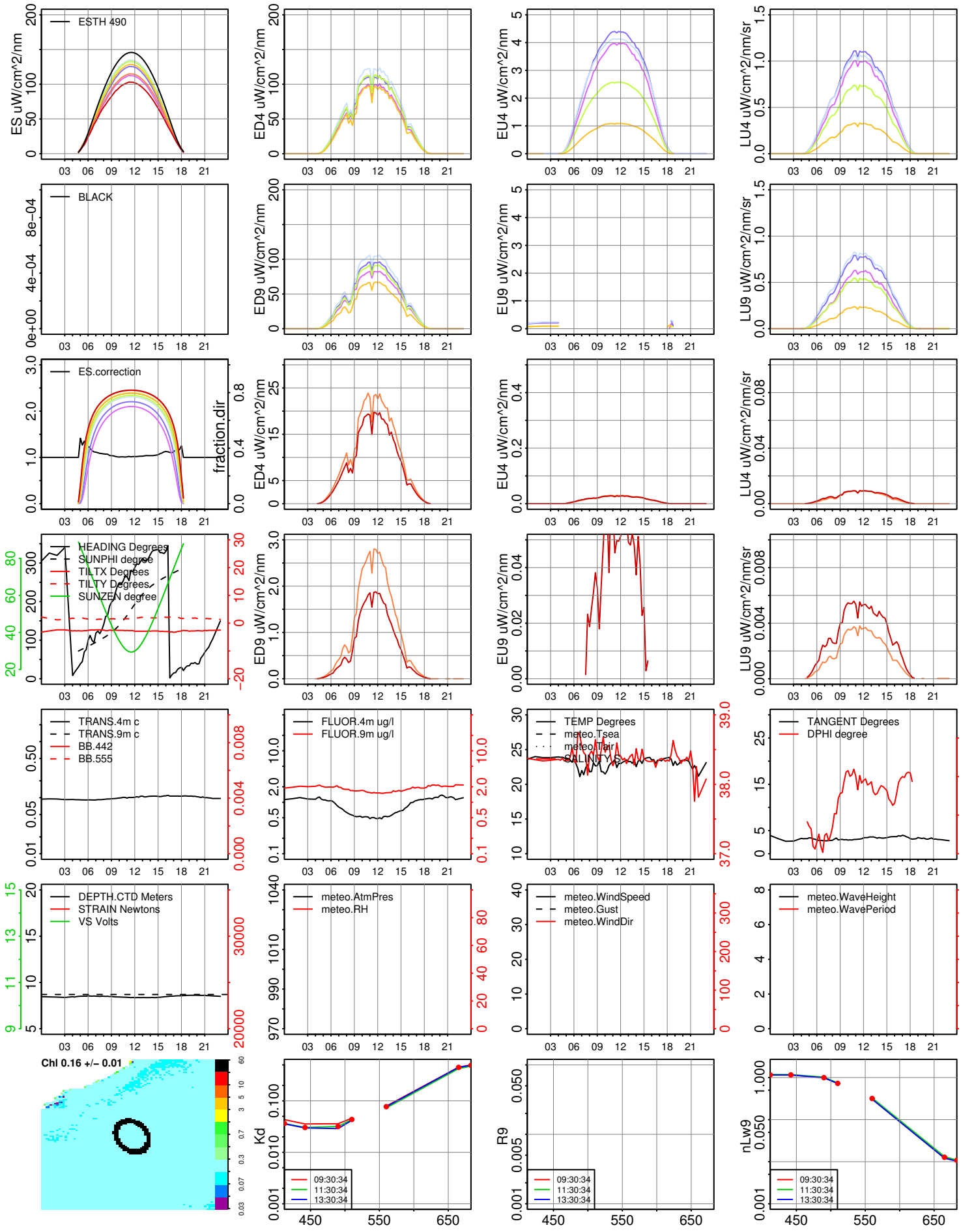

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:33:16 GMT
sun zenith angle at solar noon : 29.07
HPLC Chlorophyll concentration : 0.09
2005–06–23
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.16 +/– 0.01
Kd
R9
nLw9
09:30:35
11:30:35
13:30:35

2004–08–15

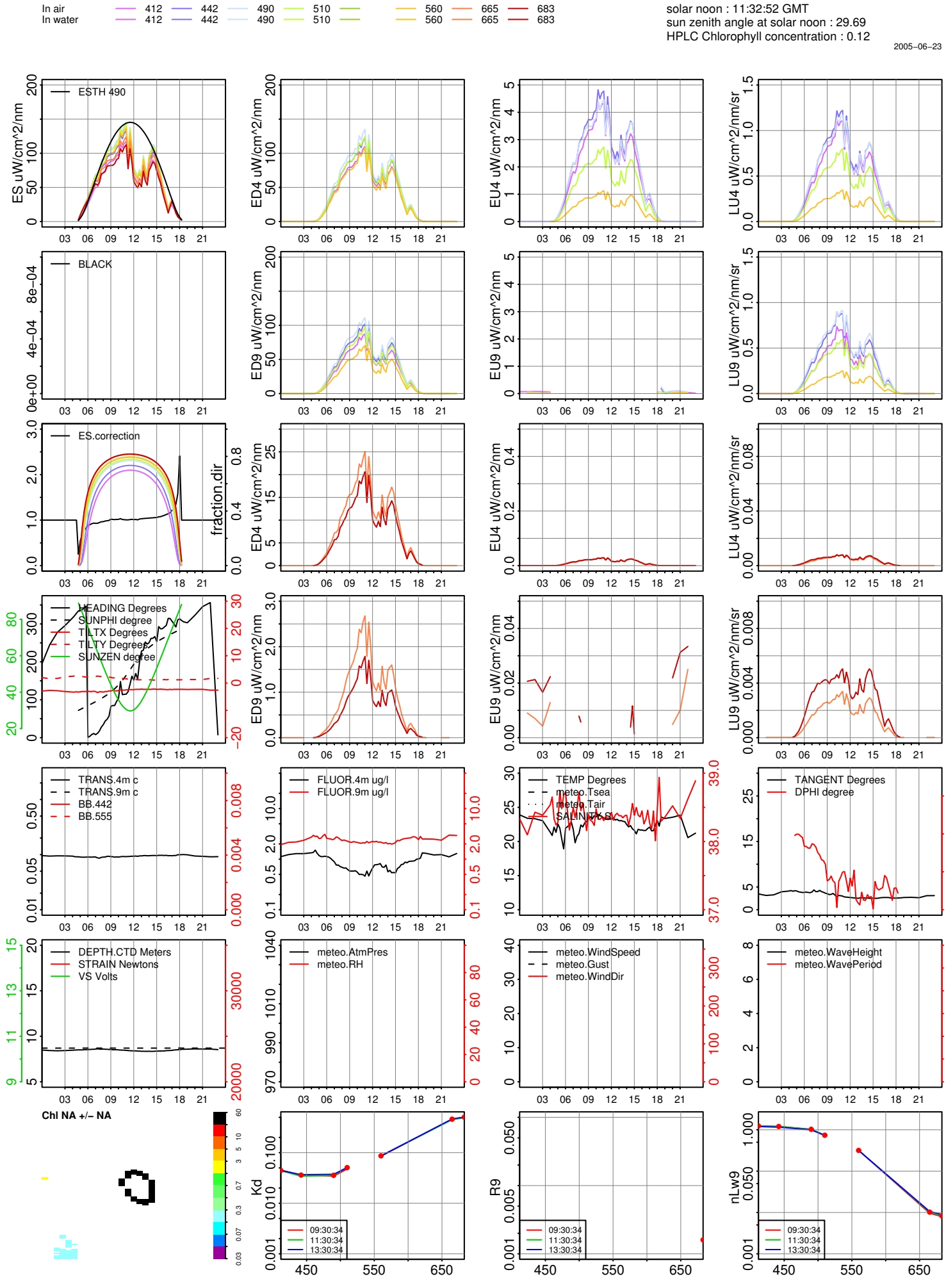
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:33:4 GMT
sun zenith angle at solar noon : 29.38
HPLC Chlorophyll concentration : 0.1

2005–06–23



2004–08–16

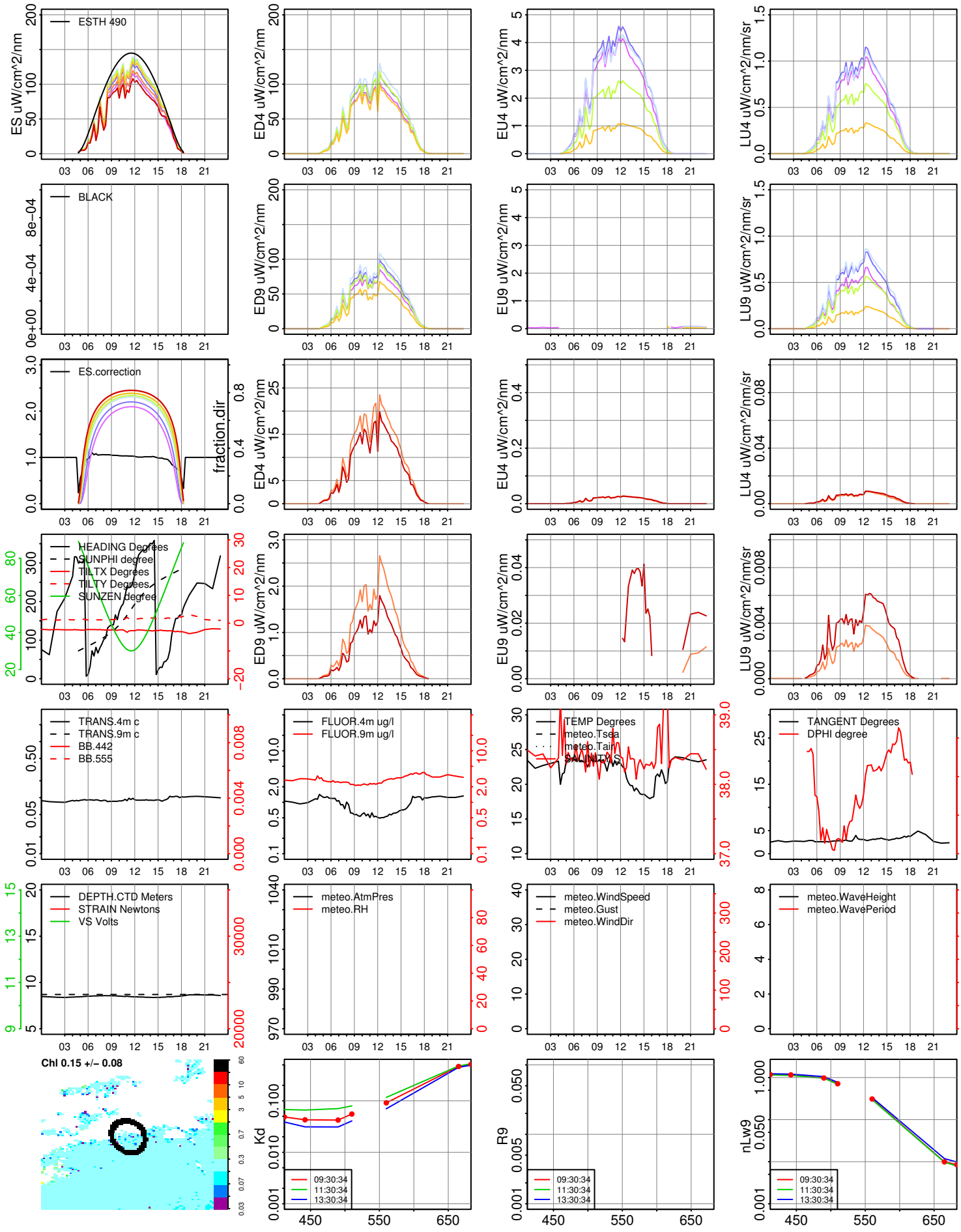

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:32:52 GMT
sun zenith angle at solar noon : 29.69
HPLC Chlorophyll concentration : 0.12
2005–06–23
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY.S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:30:34
11:30:34
13:30:34

2004–08–17

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:32:40 GMT
sun zenith angle at solar noon : 30.01
HPLC Chlorophyll concentration : NA

2005–06–23

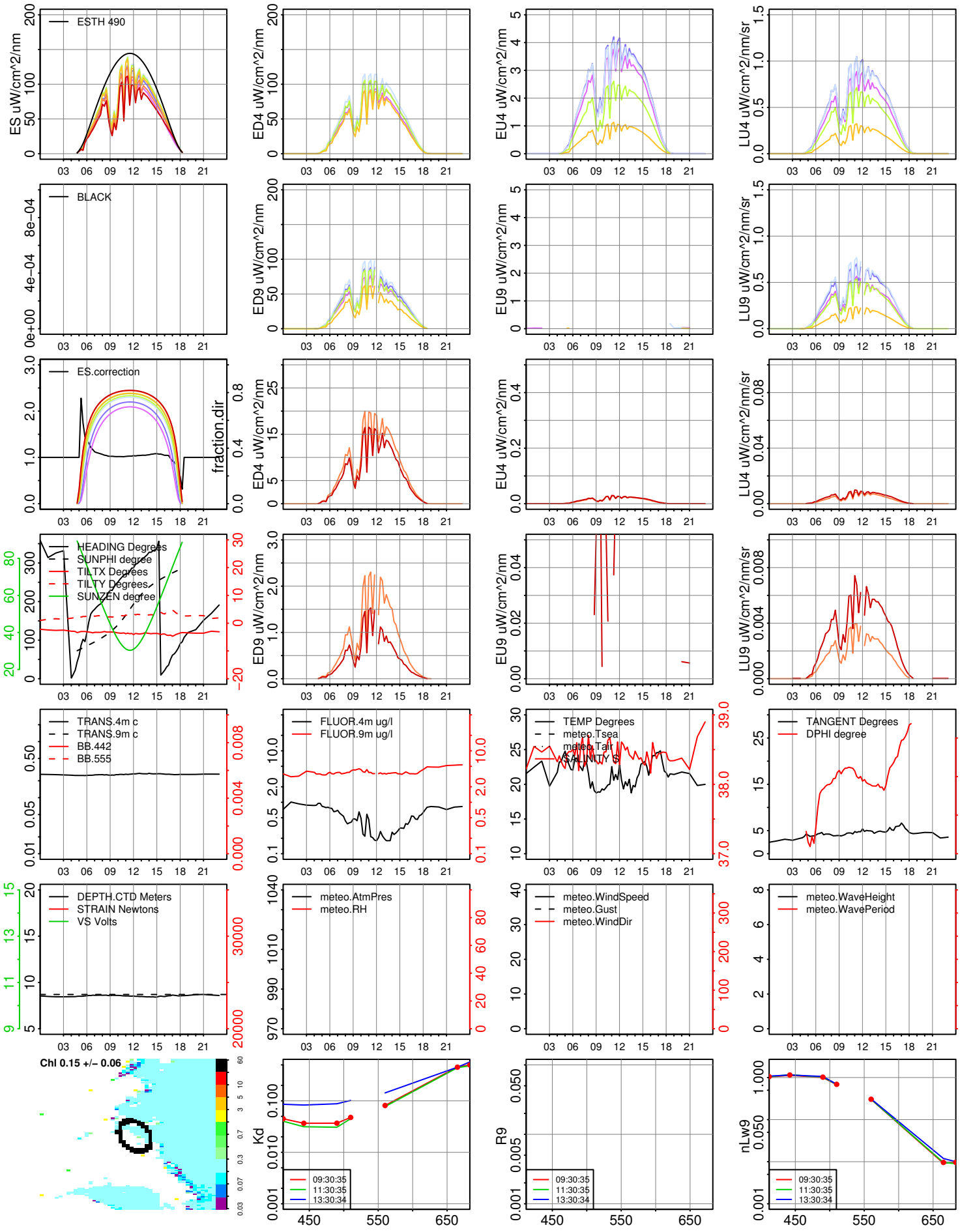


2004–08–18

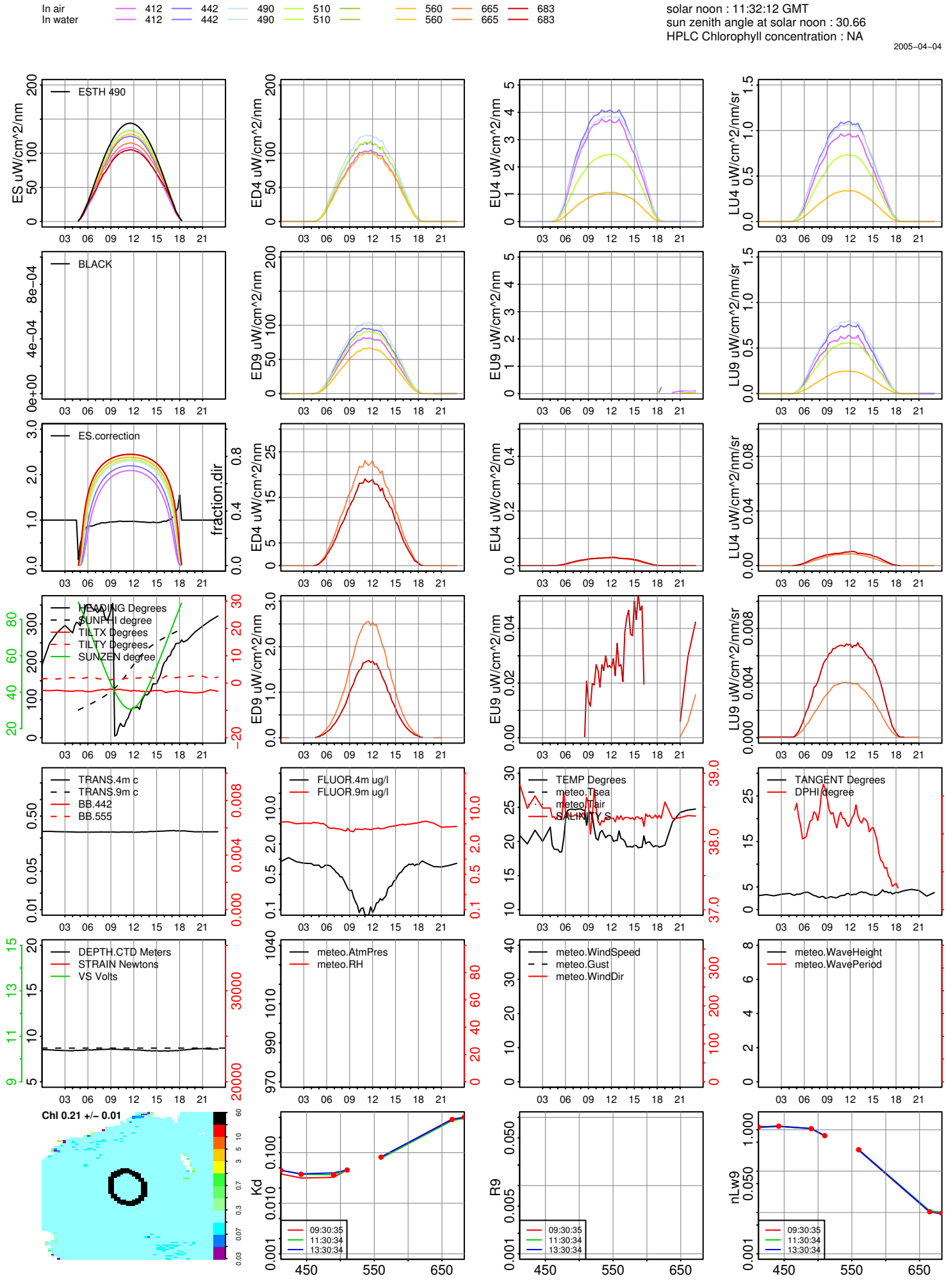
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:32:26 GMT
sun zenith angle at solar noon : 30.33
HPLC Chlorophyll concentration : NA

2005–04–04



2004–08–19

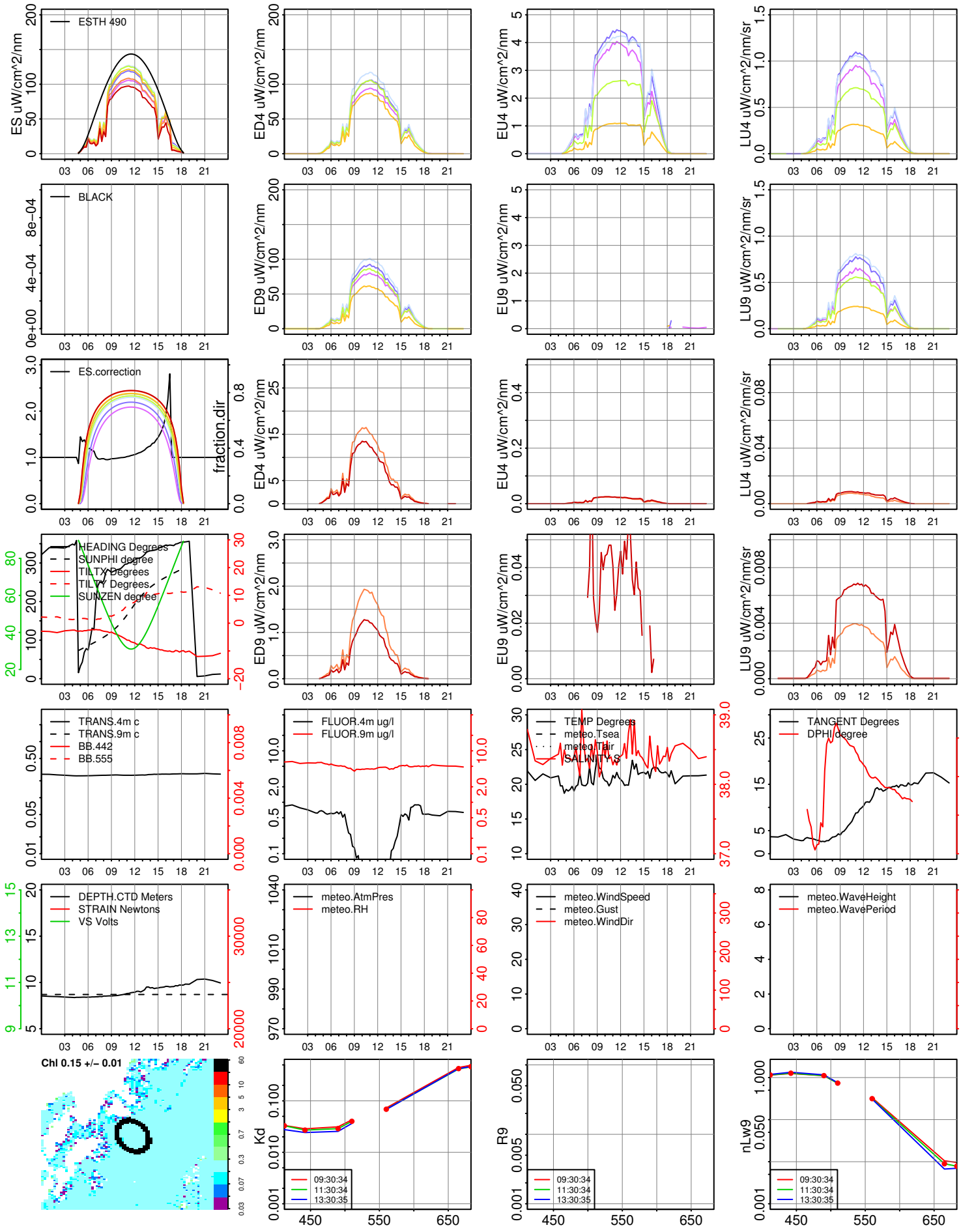

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:32:12 GMT
sun zenith angle at solar noon : 30.66
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.21 +/– 0.01
Kd
R9
nLw9
09:30:35
11:30:34
13:30:34

2004–08–20

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:31:58 GMT
sun zenith angle at solar noon : 30.99
HPLC Chlorophyll concentration : NA

2005–04–04

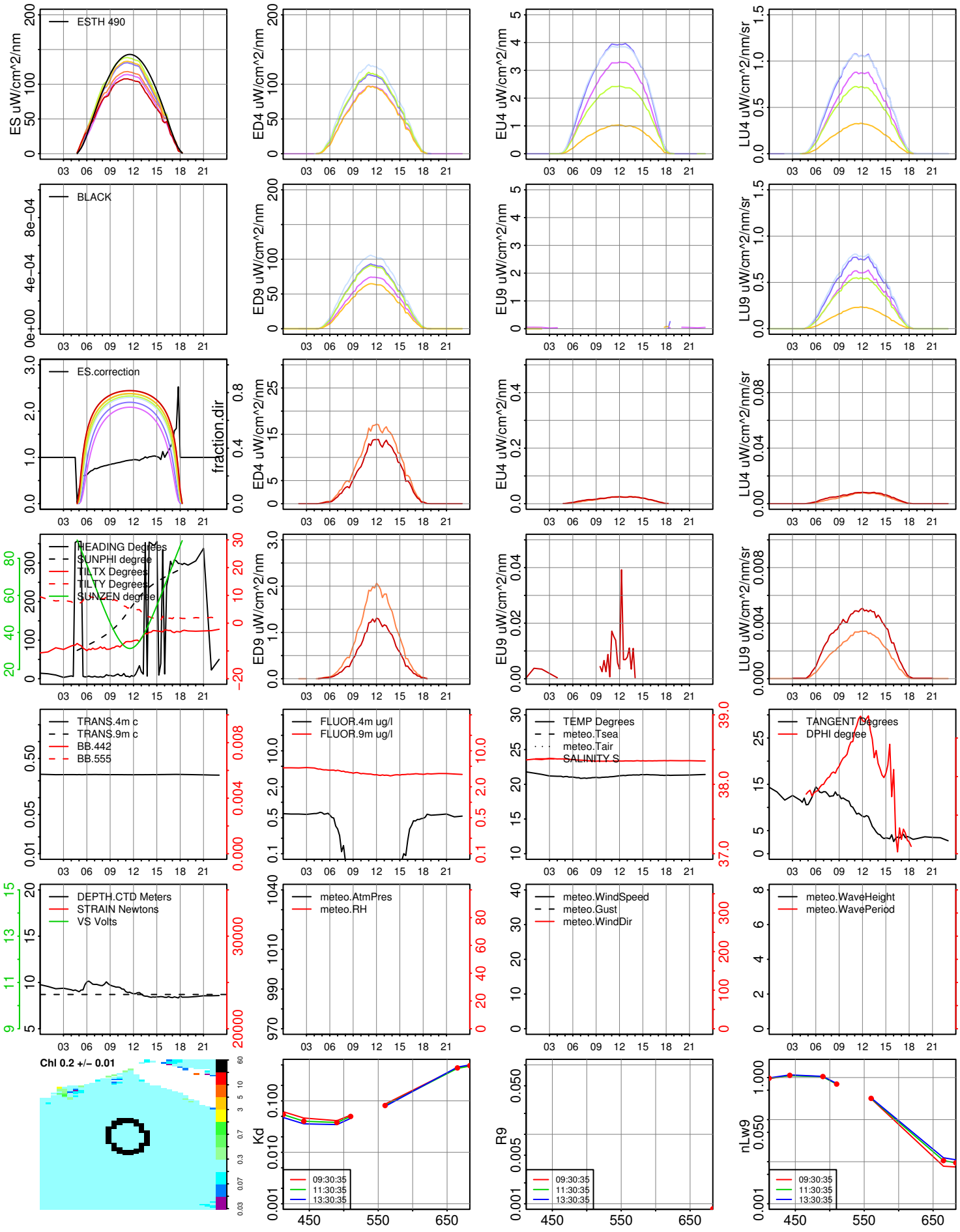


2004–08–21

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:31:42 GMT
sun zenith angle at solar noon : 31.32
HPLC Chlorophyll concentration : NA

2005–04–04

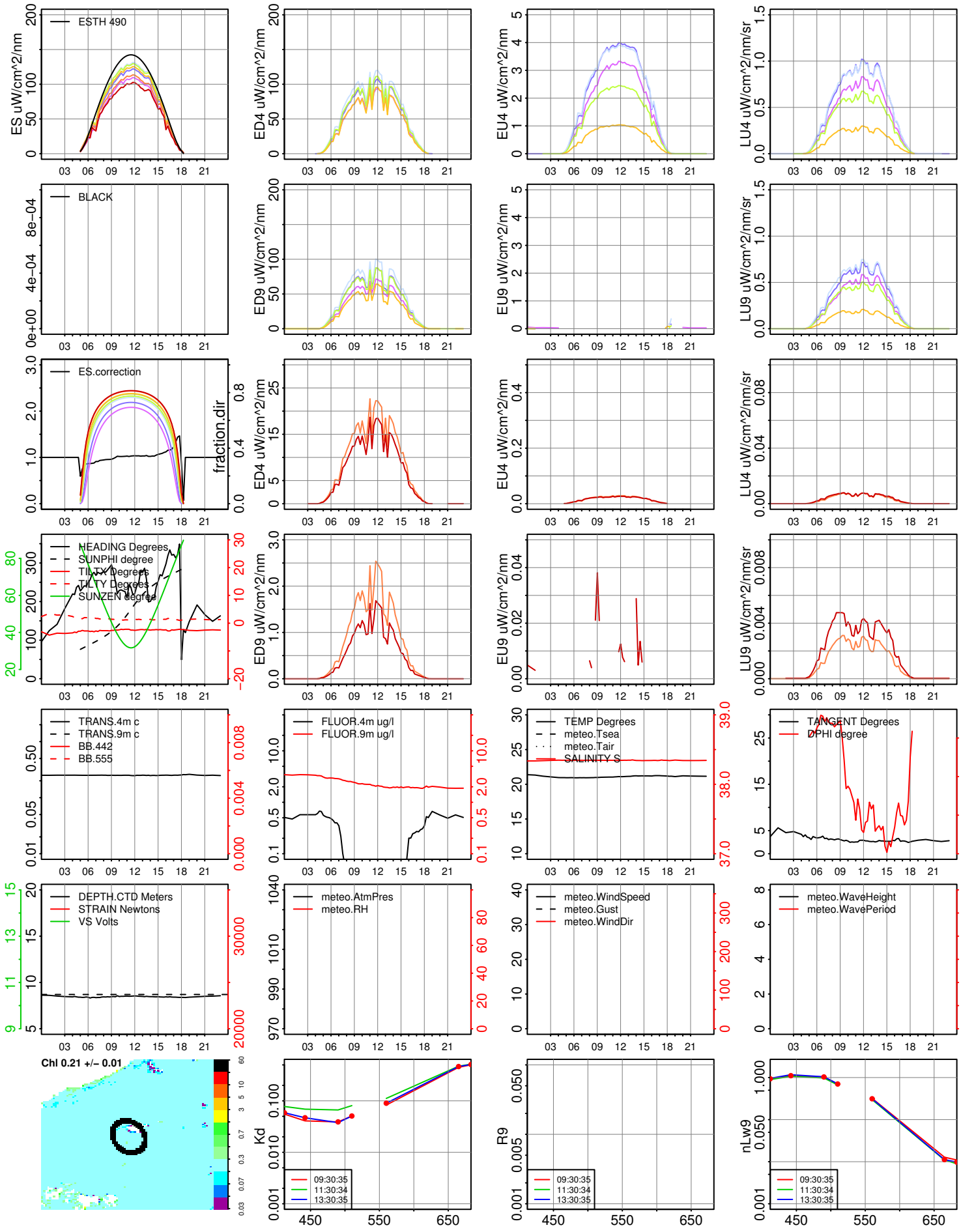


2004–08–22

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:31:28 GMT
sun zenith angle at solar noon : 31.65
HPLC Chlorophyll concentration : NA

2005–04–04

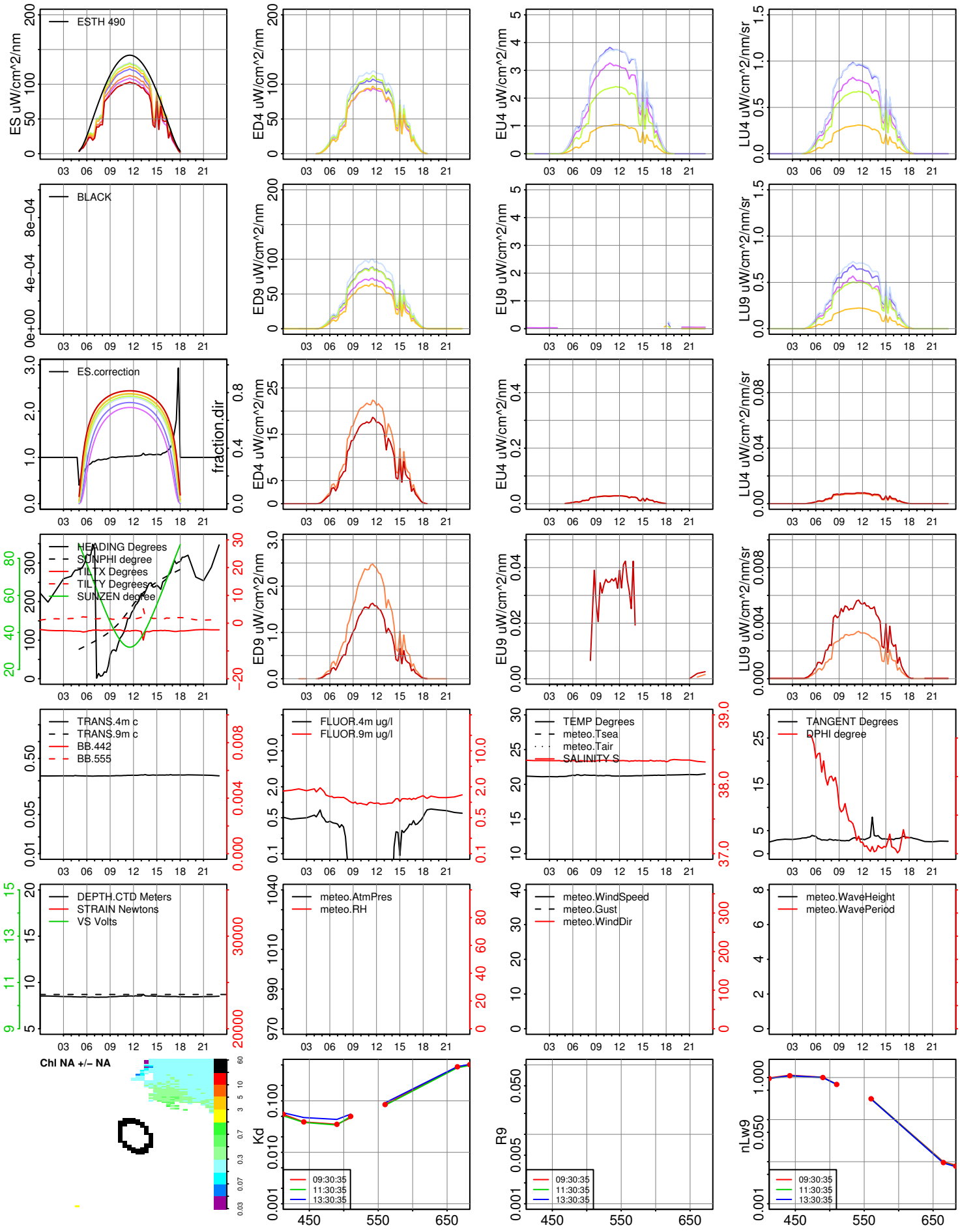


2004–08–23

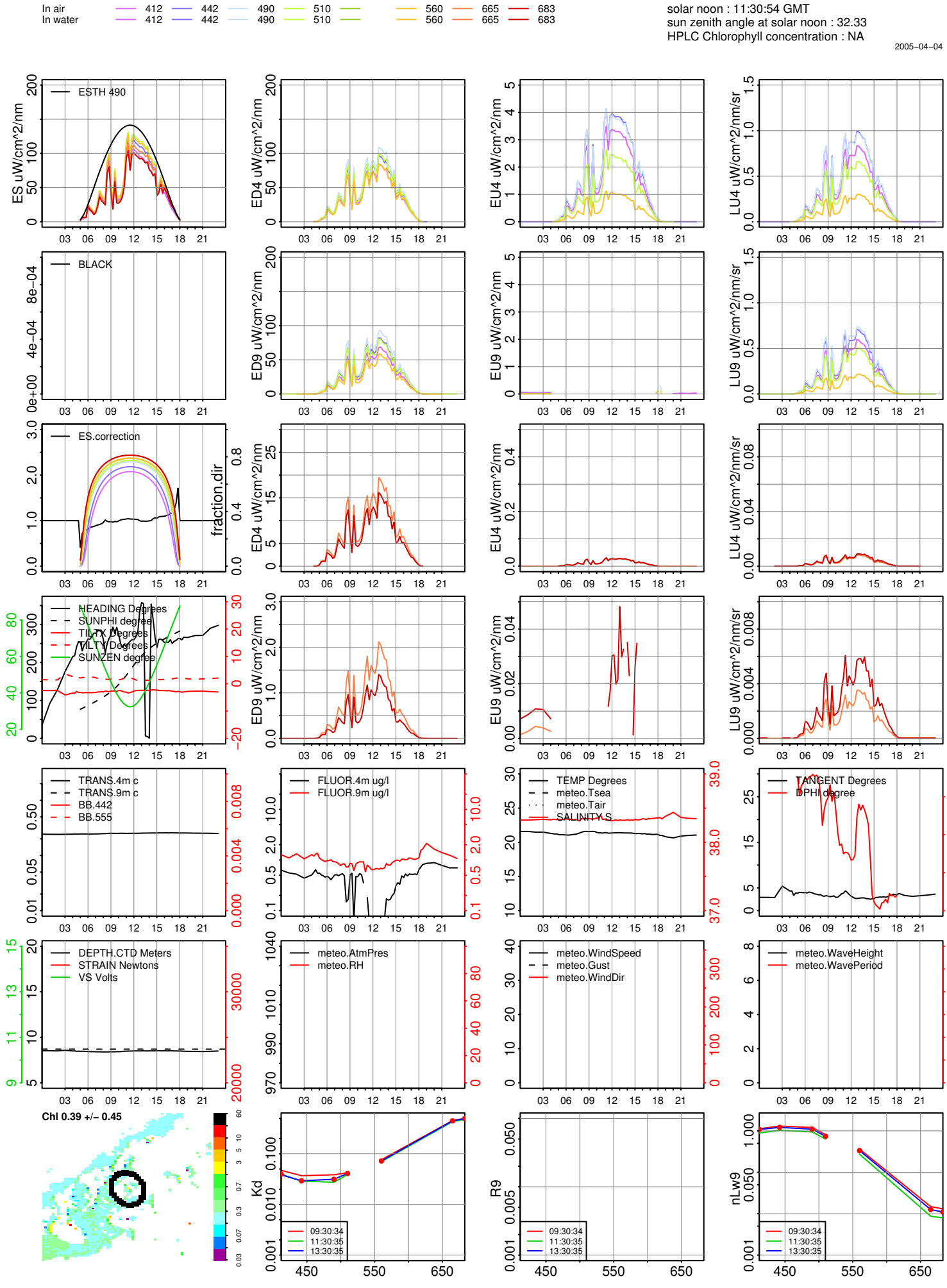
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:31:12 GMT
sun zenith angle at solar noon : 31.99
HPLC Chlorophyll concentration : NA

2005–04–04



2004–08–24

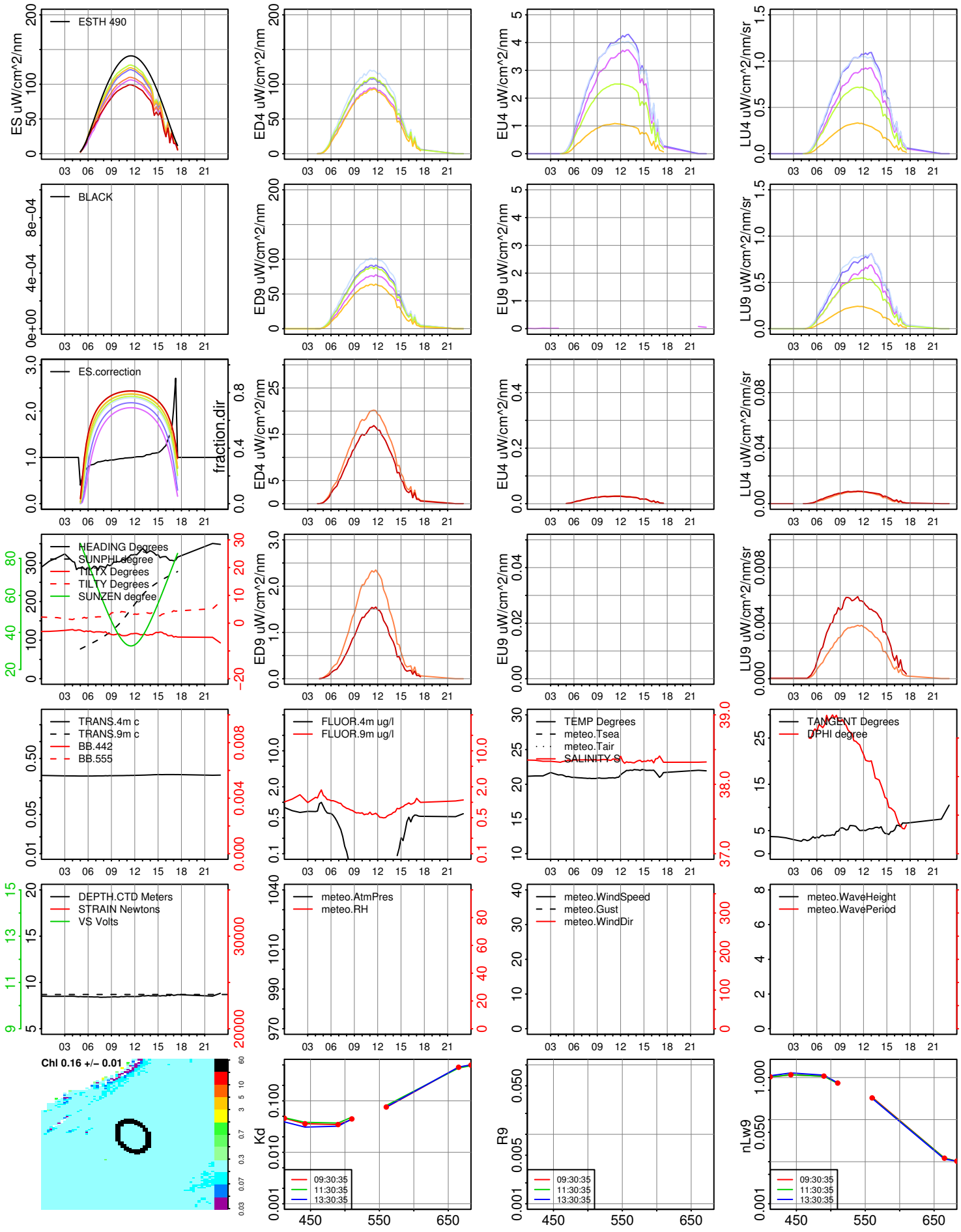

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:30:54 GMT
sun zenith angle at solar noon : 32.33
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY.S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.39 +/– 0.45
Kd
R9
nLw9
09:30:34
11:30:35
13:30:35

2004–08–25

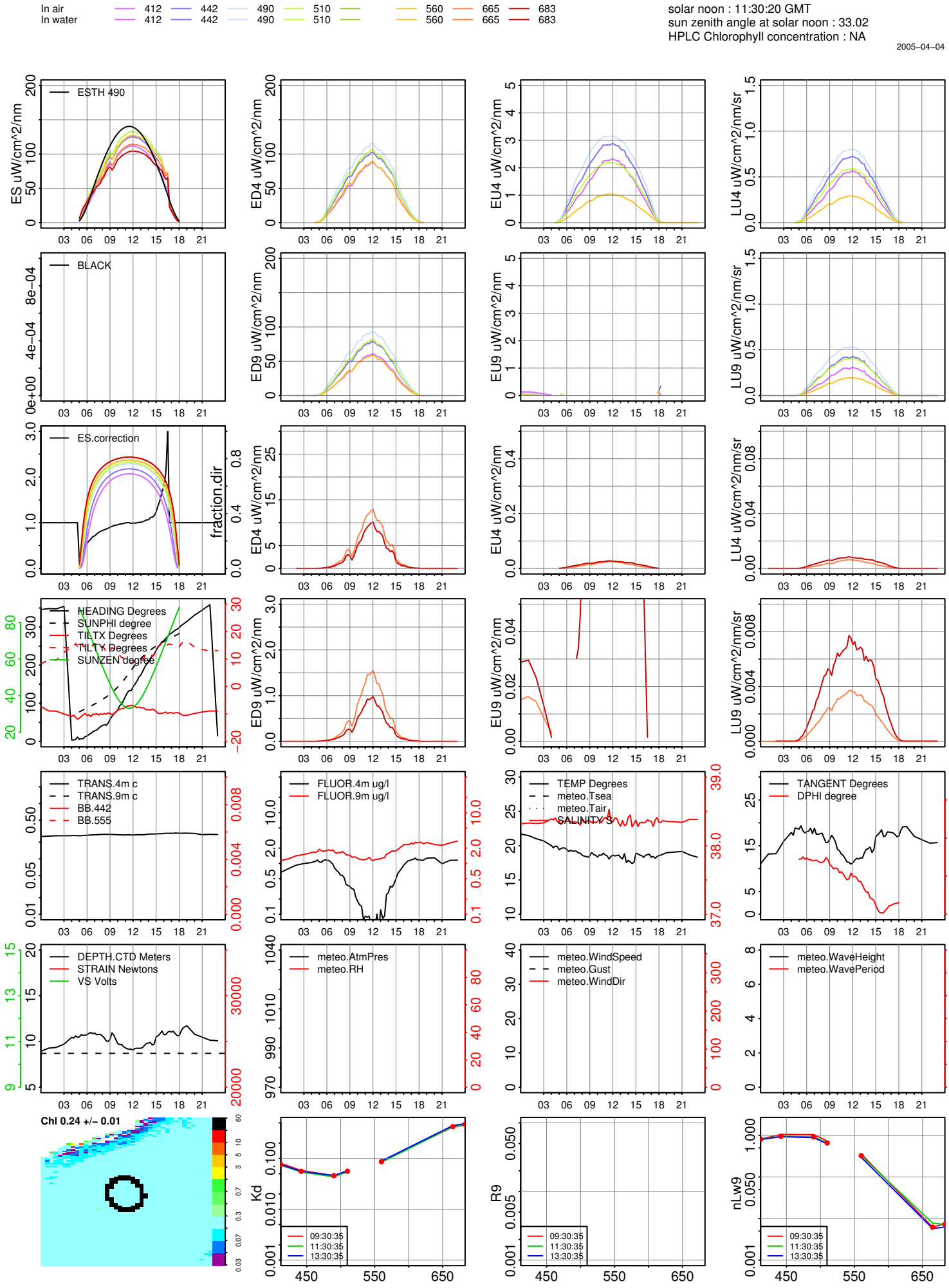
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:30:38 GMT
sun zenith angle at solar noon : 32.68
HPLC Chlorophyll concentration : NA

2005–04–04



2004–08–26

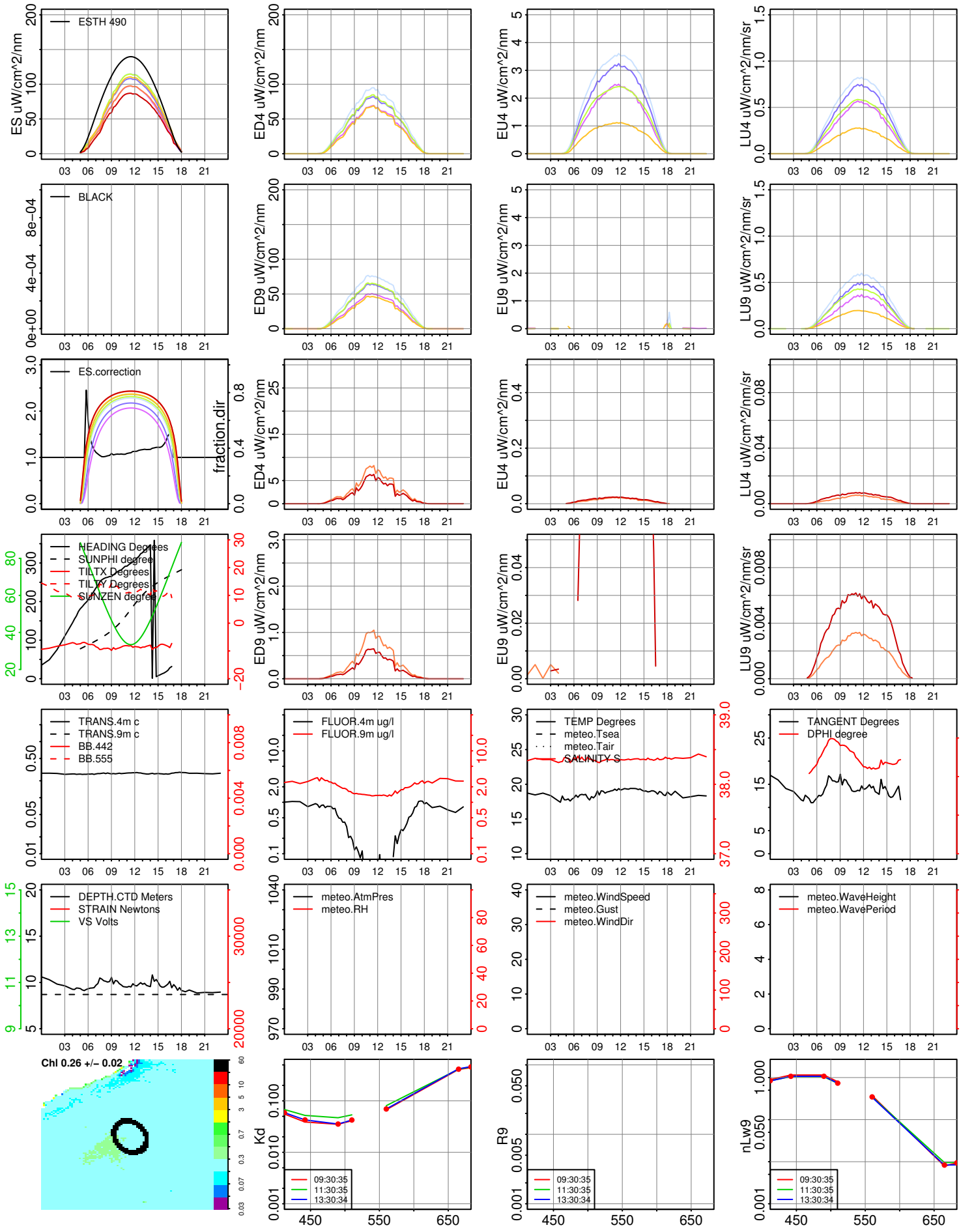

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:30:20 GMT
sun zenith angle at solar noon : 33.02
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.24 +/– 0.01
Kd
R9
nLw9
09:30:35
11:30:35
13:30:35

2004–08–27

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:30:2 GMT
sun zenith angle at solar noon : 33.37
HPLC Chlorophyll concentration : NA

2005–04–04

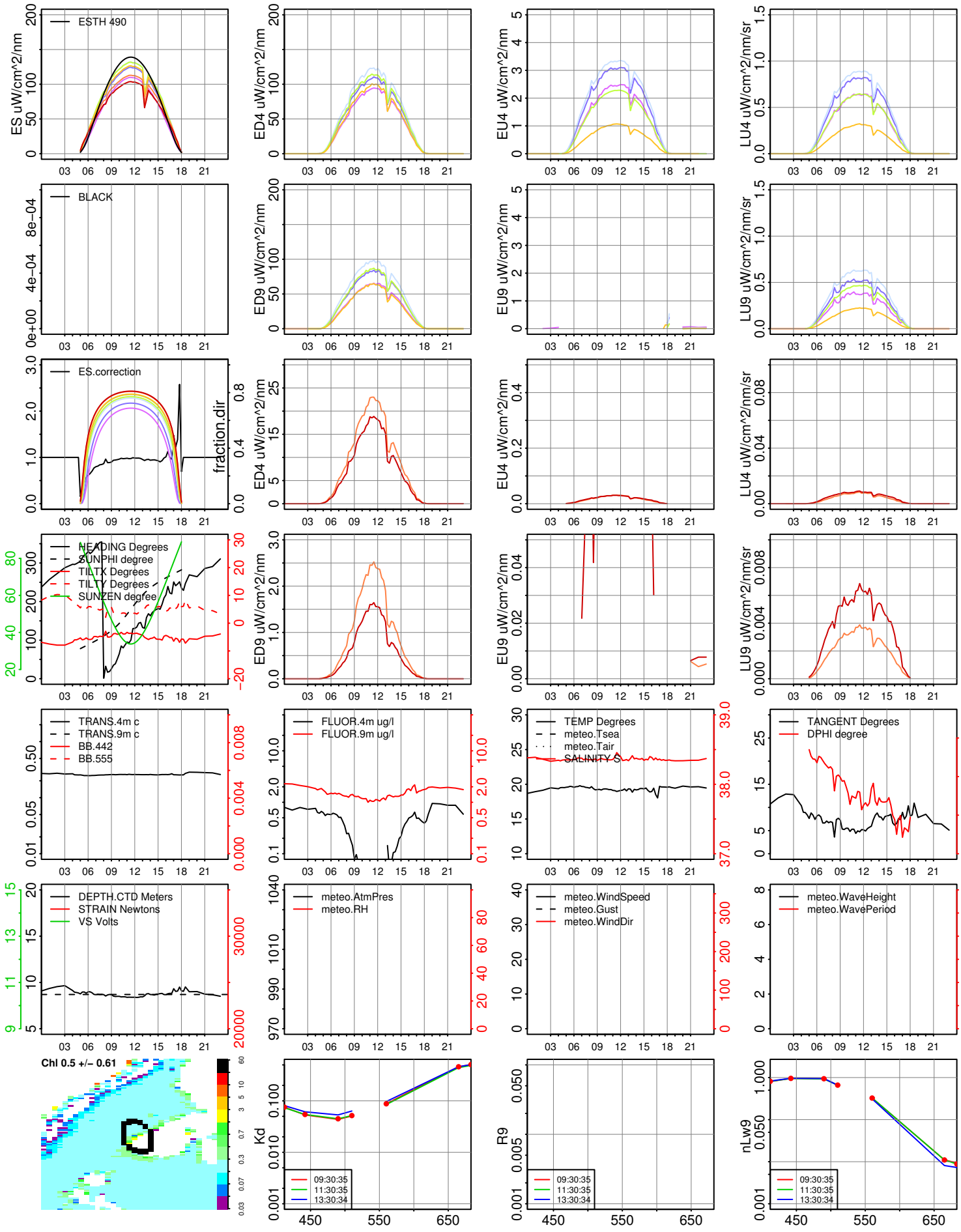


2004–08–28

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:29:44 GMT
sun zenith angle at solar noon : 33.72
HPLC Chlorophyll concentration : NA

2005–04–04

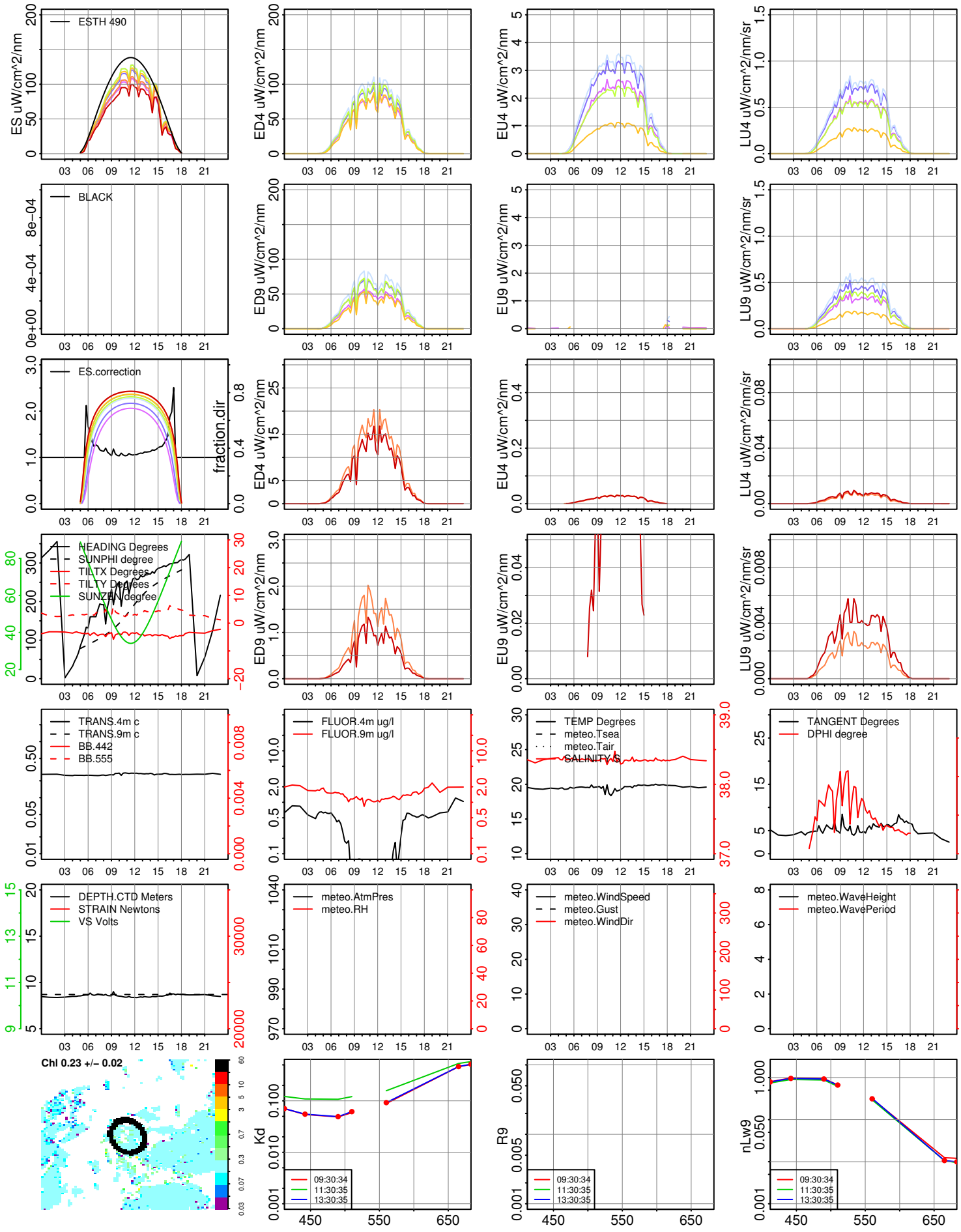


2004–08–29

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:29:26 GMT
sun zenith angle at solar noon : 34.08
HPLC Chlorophyll concentration : NA

2005–04–04

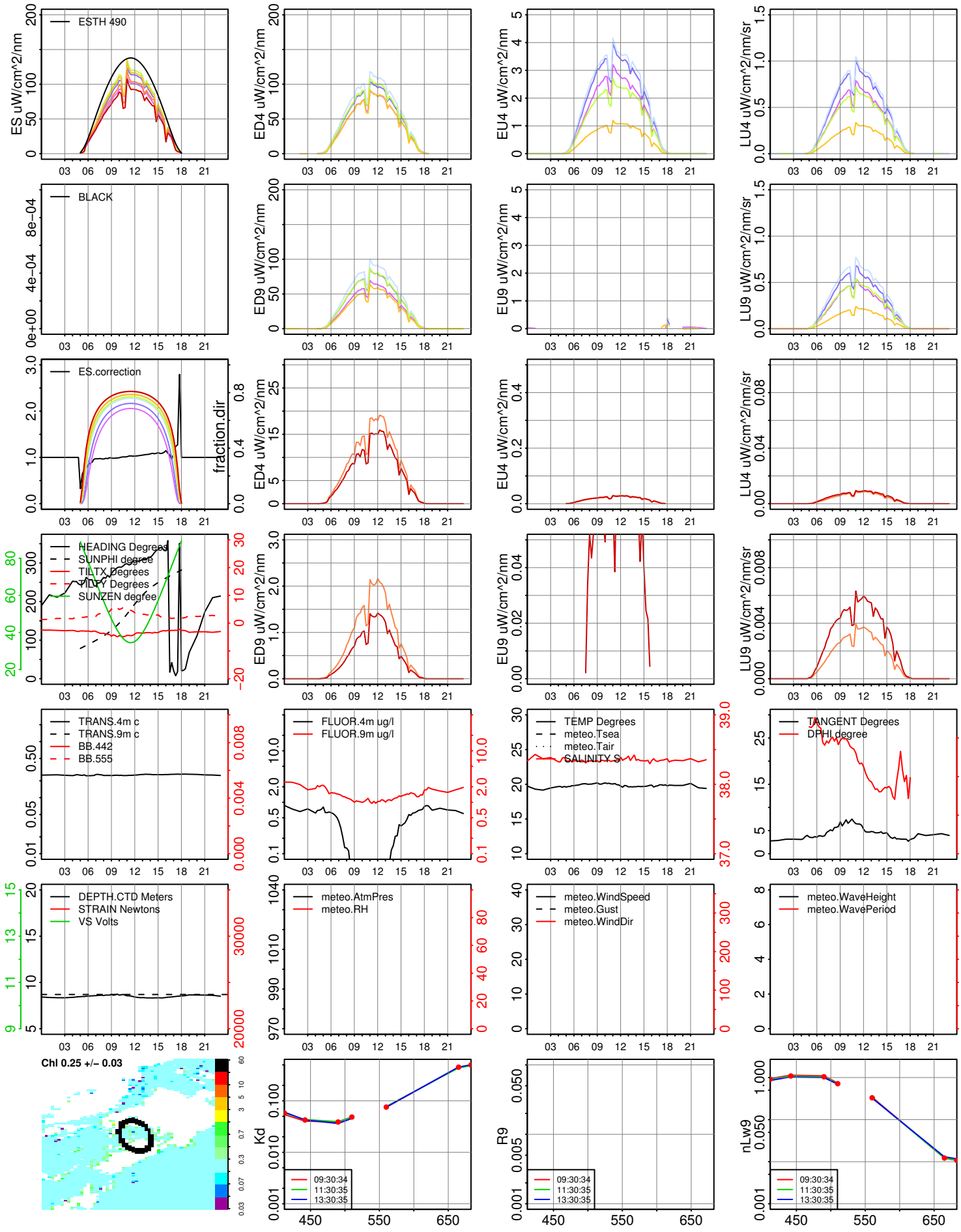


2004–08–30

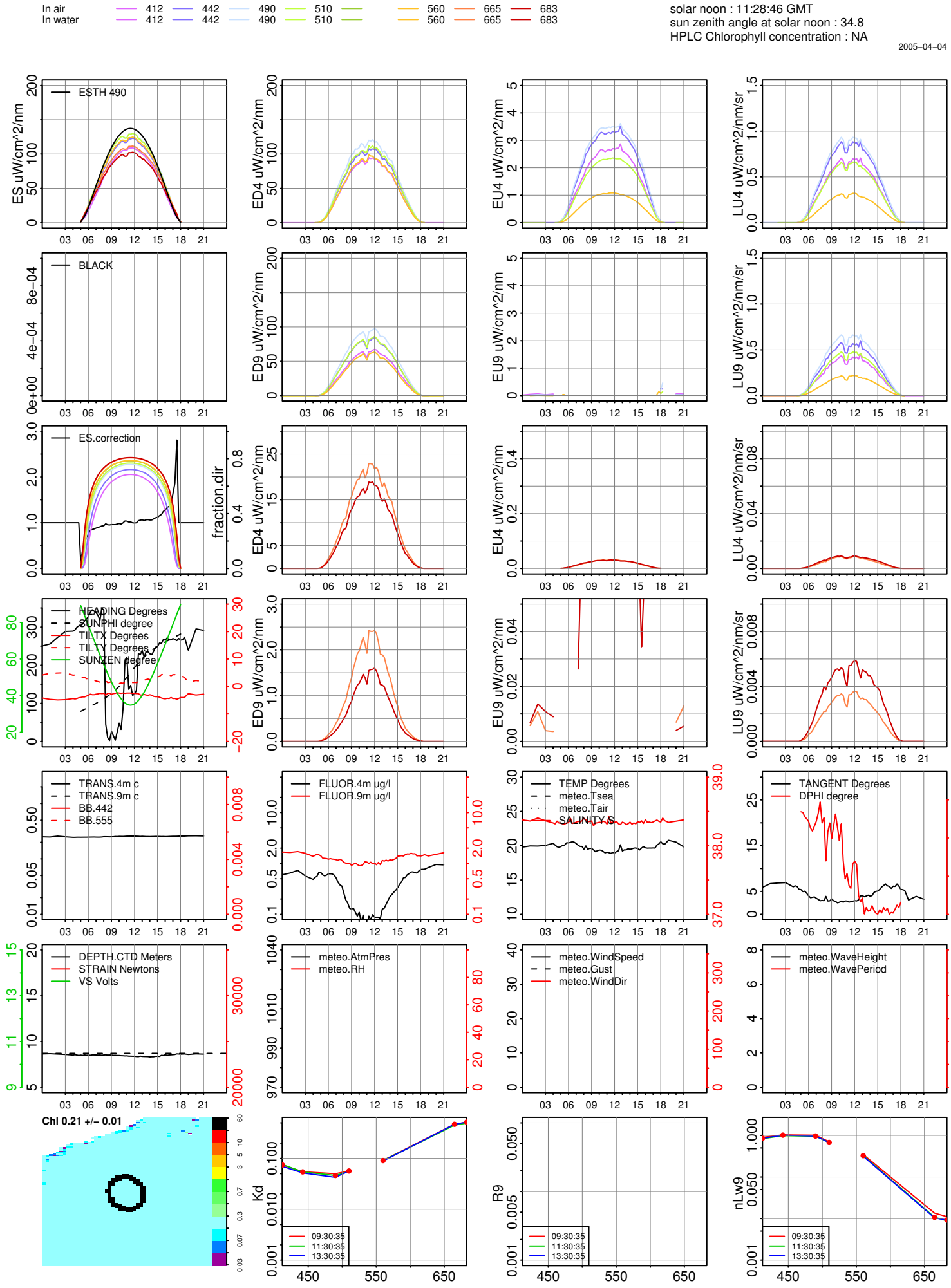
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:29:6 GMT
sun zenith angle at solar noon : 34.44
HPLC Chlorophyll concentration : NA

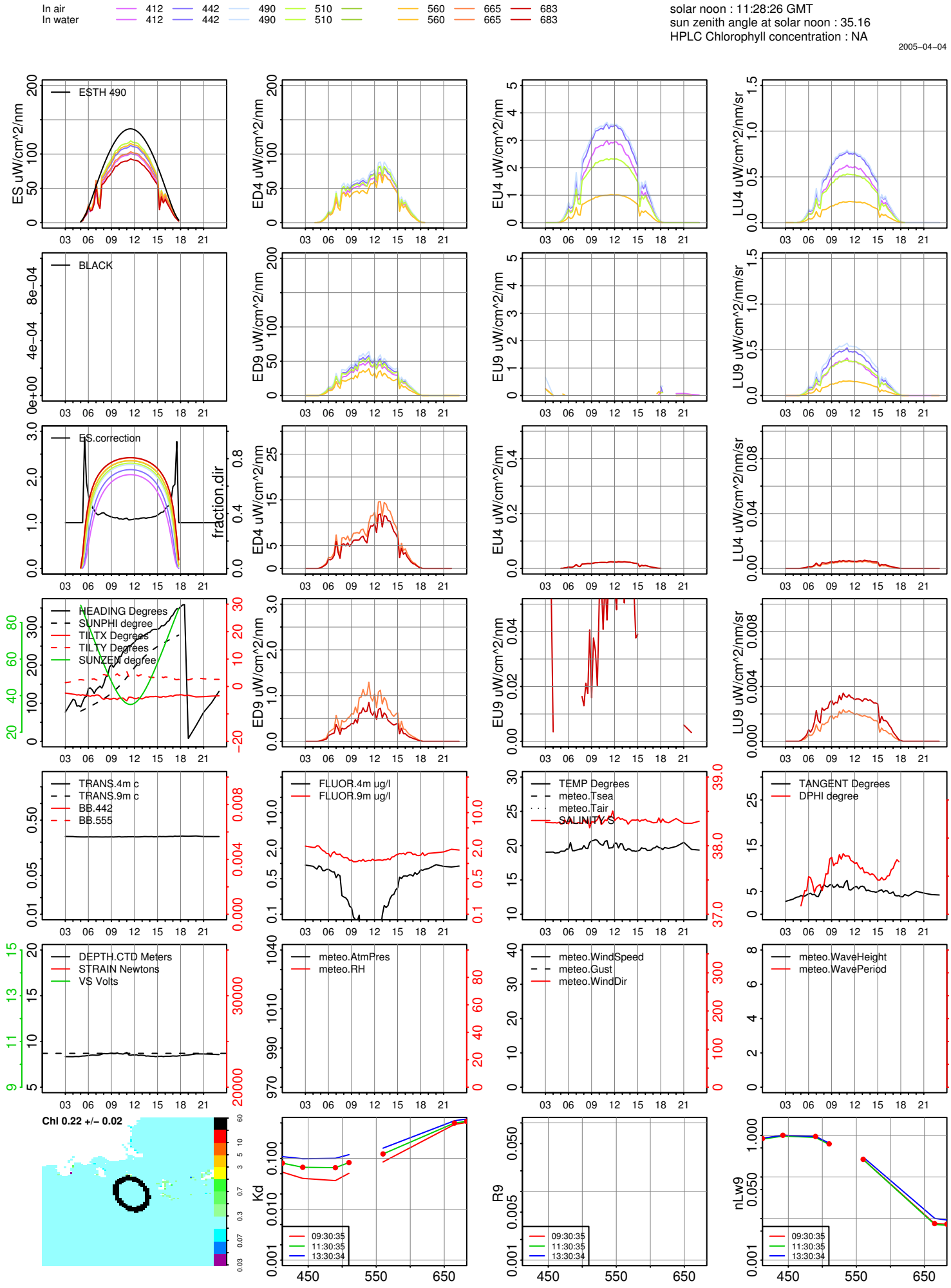
2005–04–04



2004–08–31


In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:28:46 GMT
sun zenith angle at solar noon : 34.8
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.21 +/– 0.01
Kd
R9
nLw9
09:30:35
11:30:35
13:30:35

2004-09-01

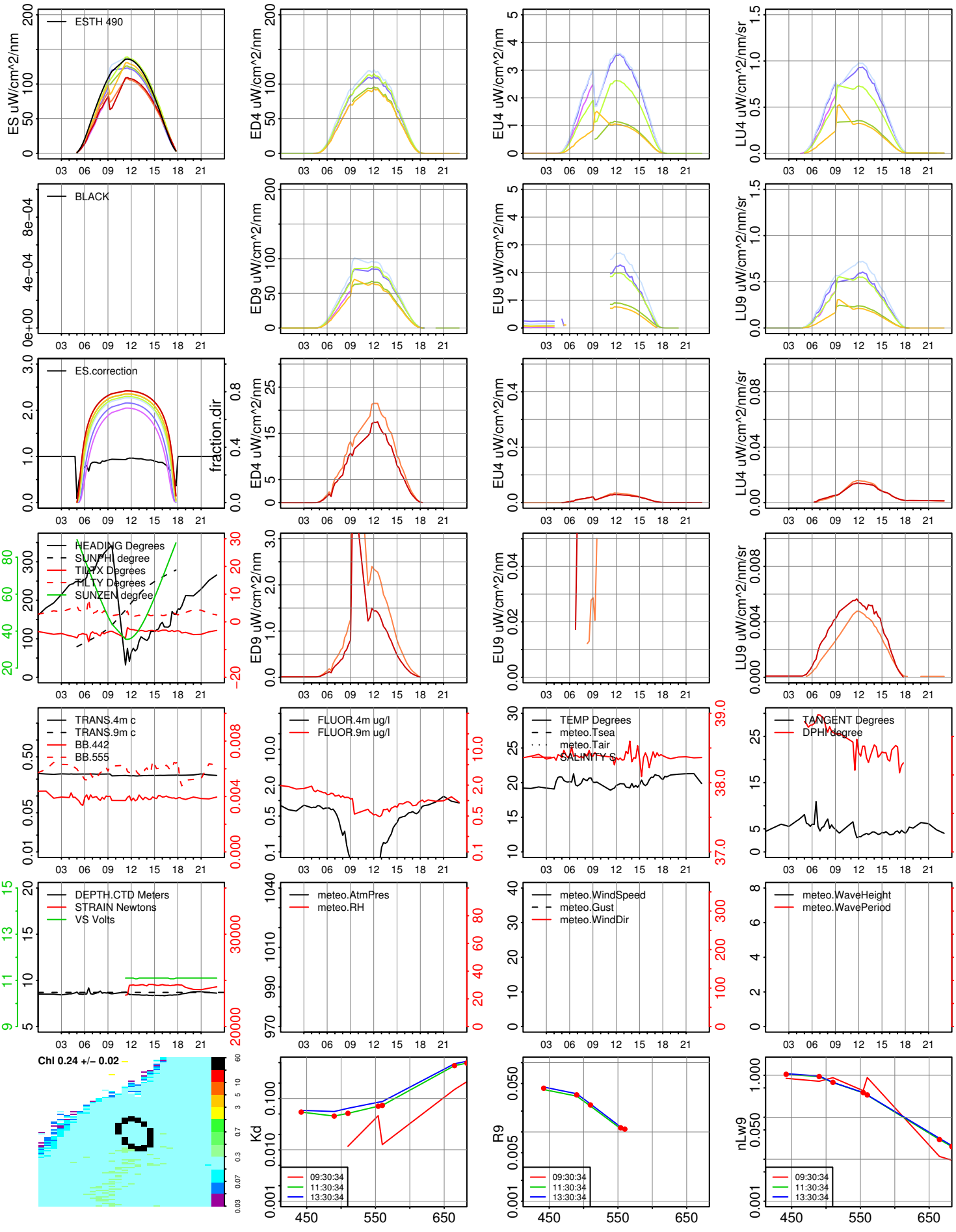

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:28:26 GMT
sun zenith angle at solar noon : 35.16
HPLC Chlorophyll concentration : NA
2005-04-04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.22 +/- 0.02
Kd
R9
nLw9
09:30:35
11:30:35
13:30:34

2004–09–02

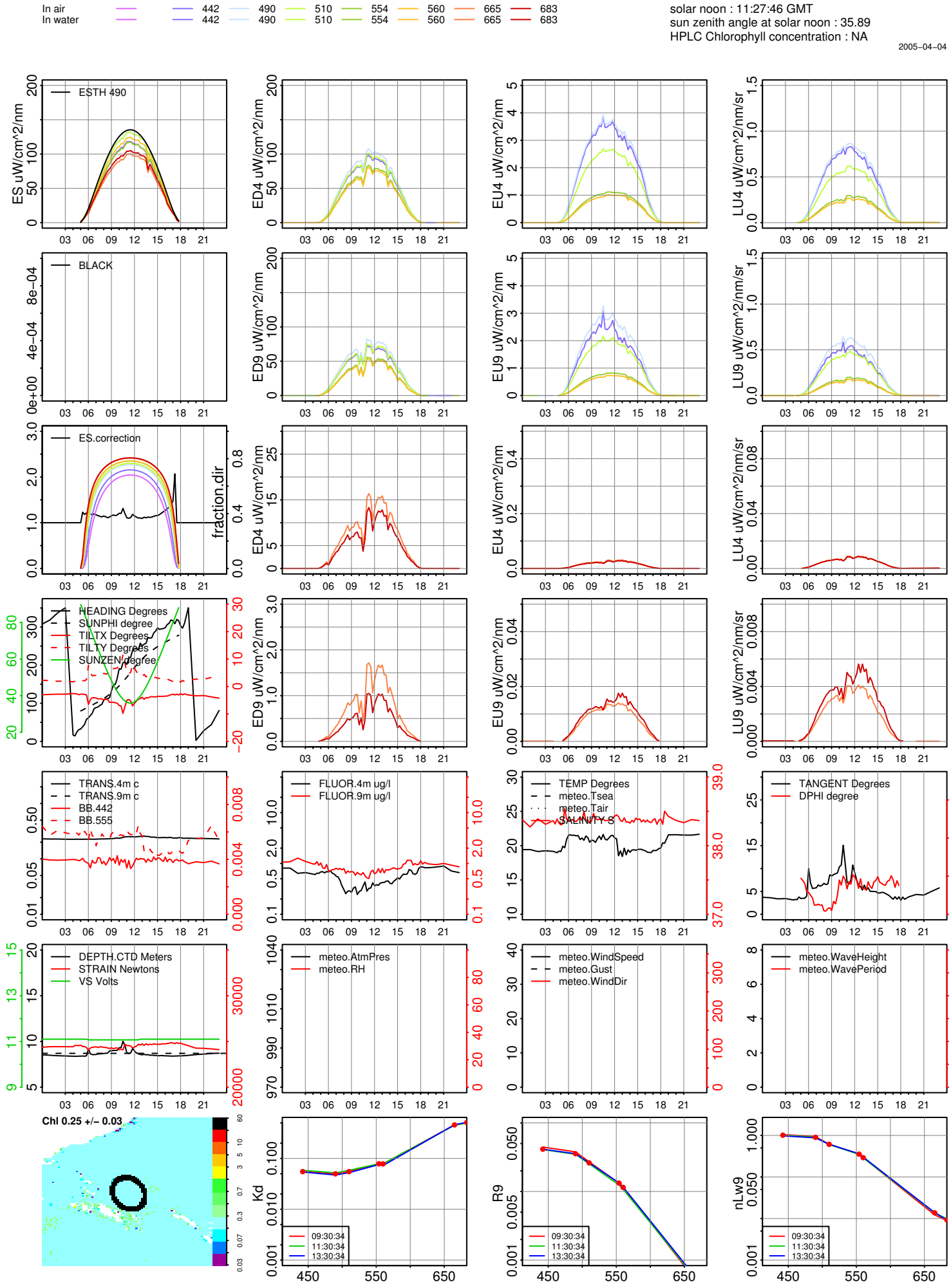
In air 412 442 490 510 554 560 665 683
In water 412 442 490 510 554 560 665 683

solar noon : 11:28:6 GMT
sun zenith angle at solar noon : 35.52
HPLC Chlorophyll concentration : NA

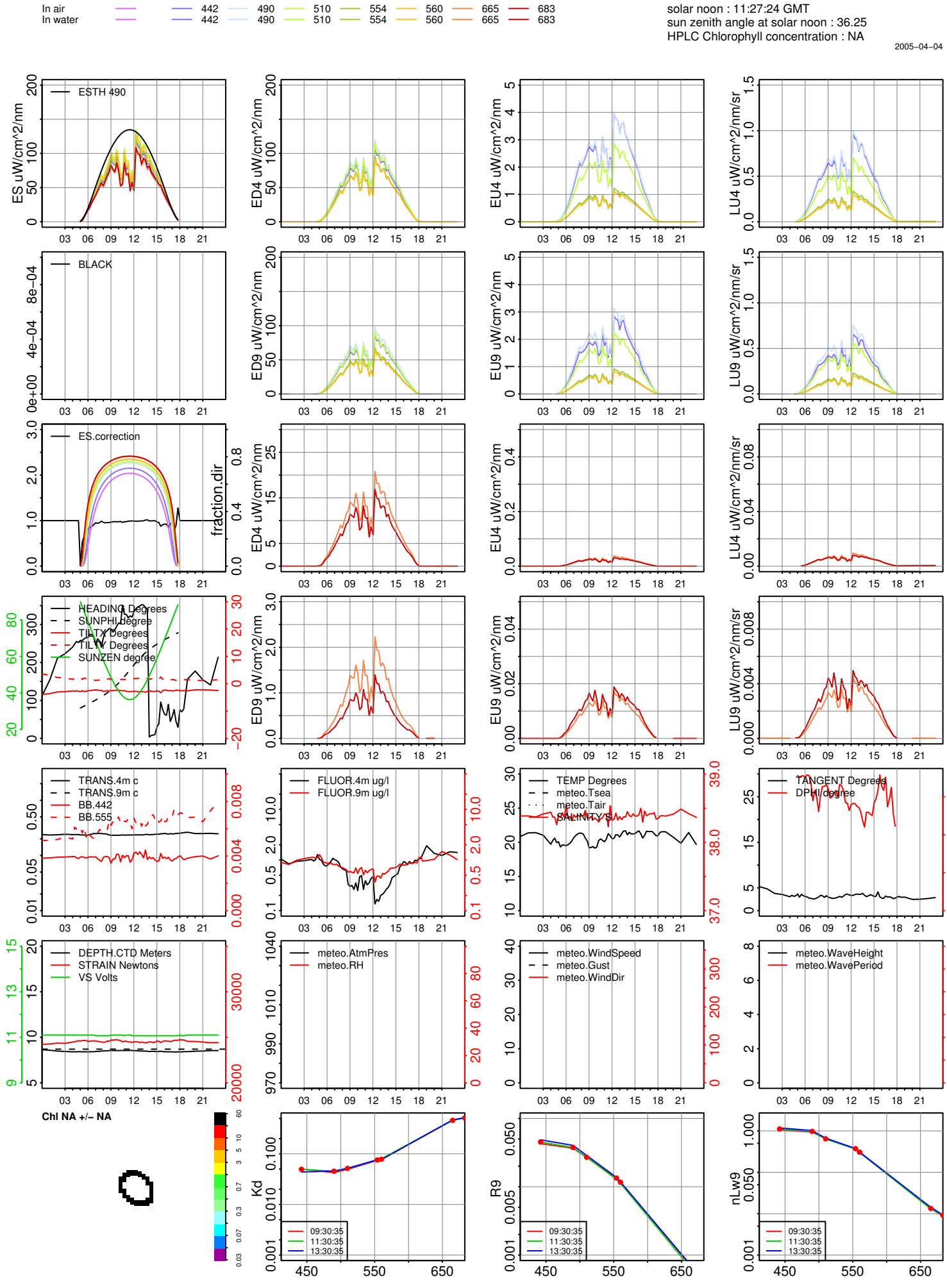
2005–04–04



2004–09–03


In air
In water
442
490
510
554
560
665
683
solar noon : 11:27:46 GMT
sun zenith angle at solar noon : 35.89
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.25 +/– 0.03
Kd
R9
nLw9
09:30:34
11:30:34
13:30:34

2004–09–04

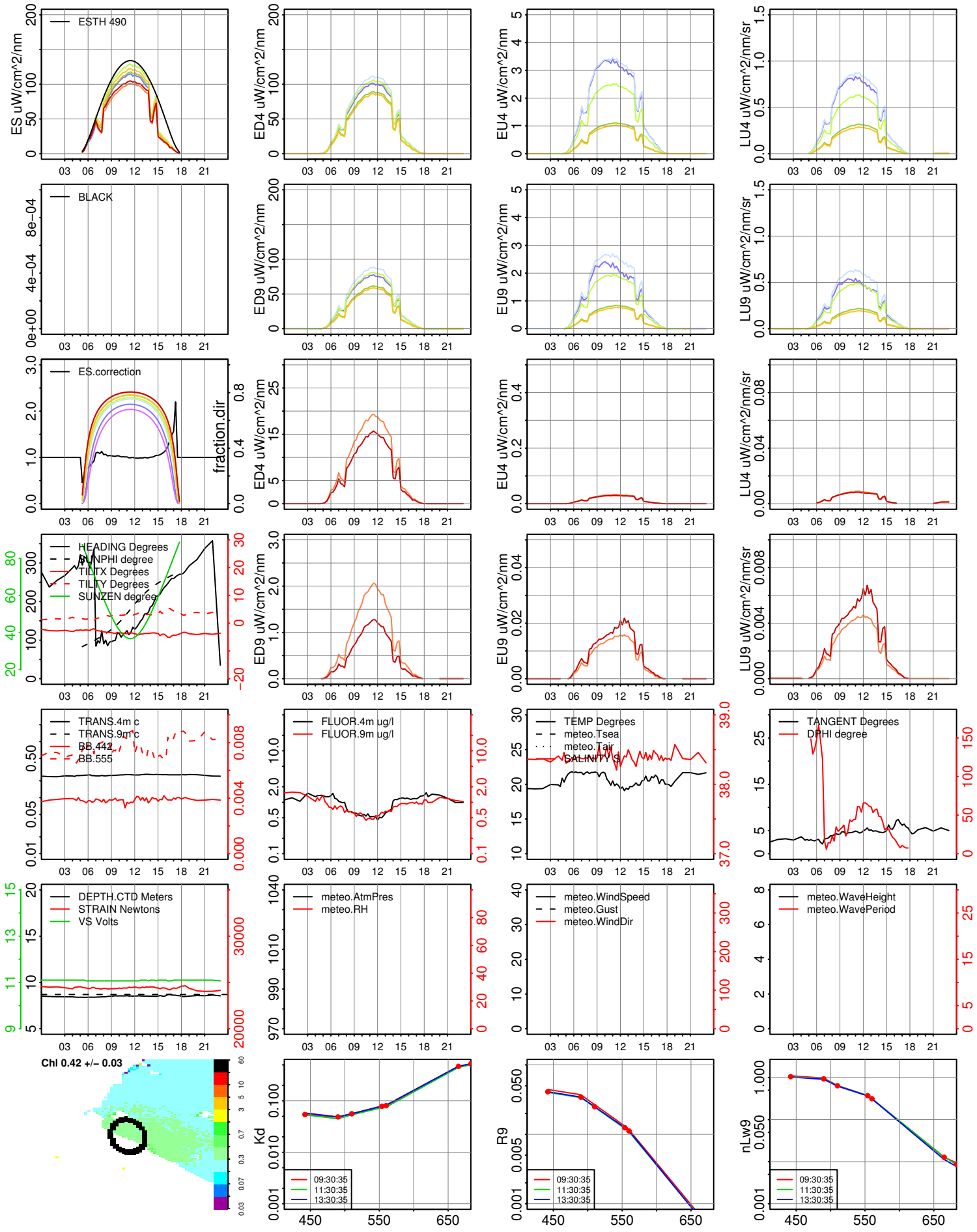

In air
In water
442
490
510
554
560
665
683
solar noon : 11:27:24 GMT
sun zenith angle at solar noon : 36.25
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:30:35
11:30:35
13:30:35

2004–09–05

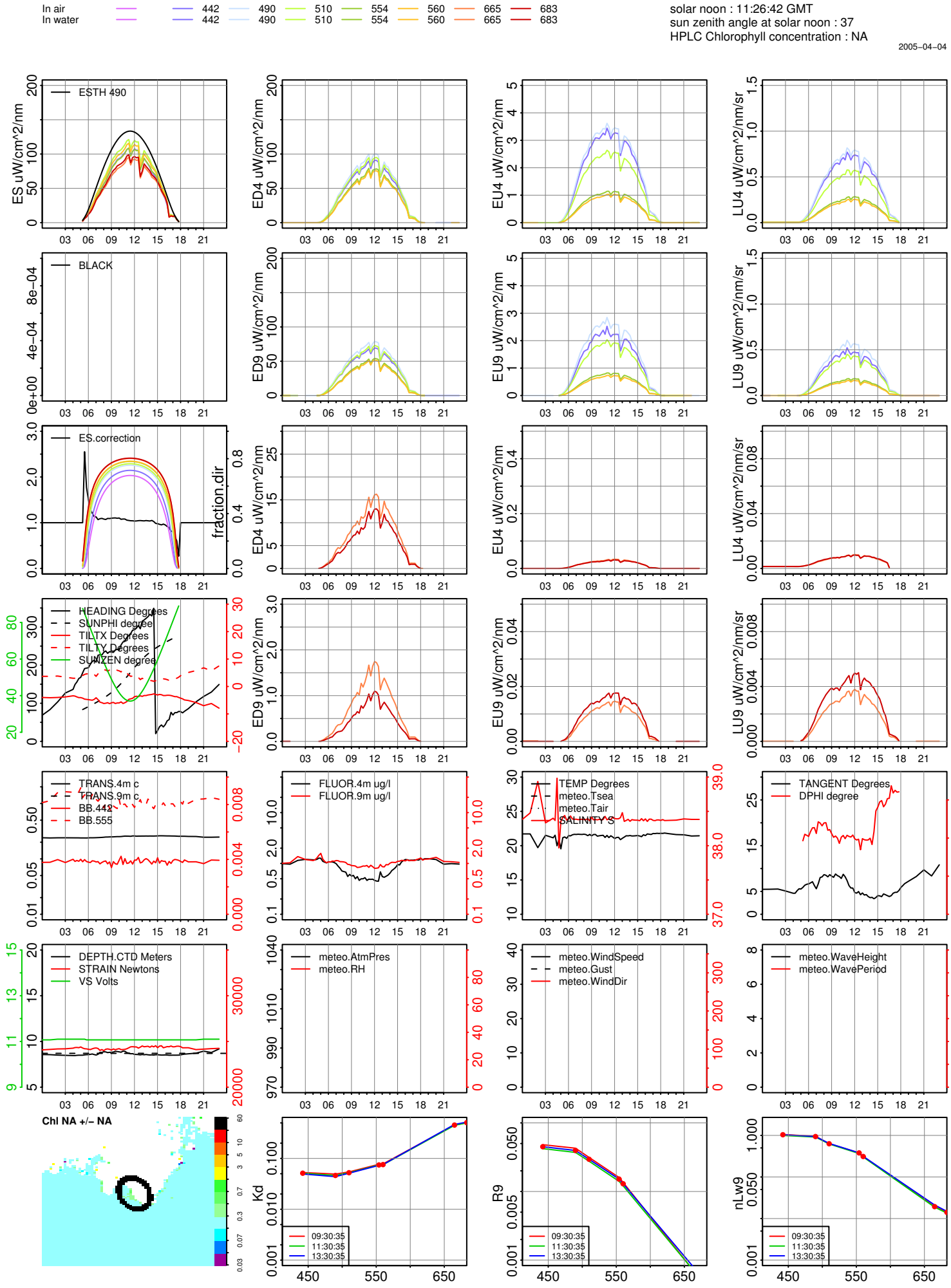
In air / In water: 442 442 | 490 490 | 510 510 | 554 554 | 560 560 | 665 665 | 683 683

solar noon : 11:27:4 GMT
sun zenith angle at solar noon : 36.62
HPLC Chlorophyll concentration : NA

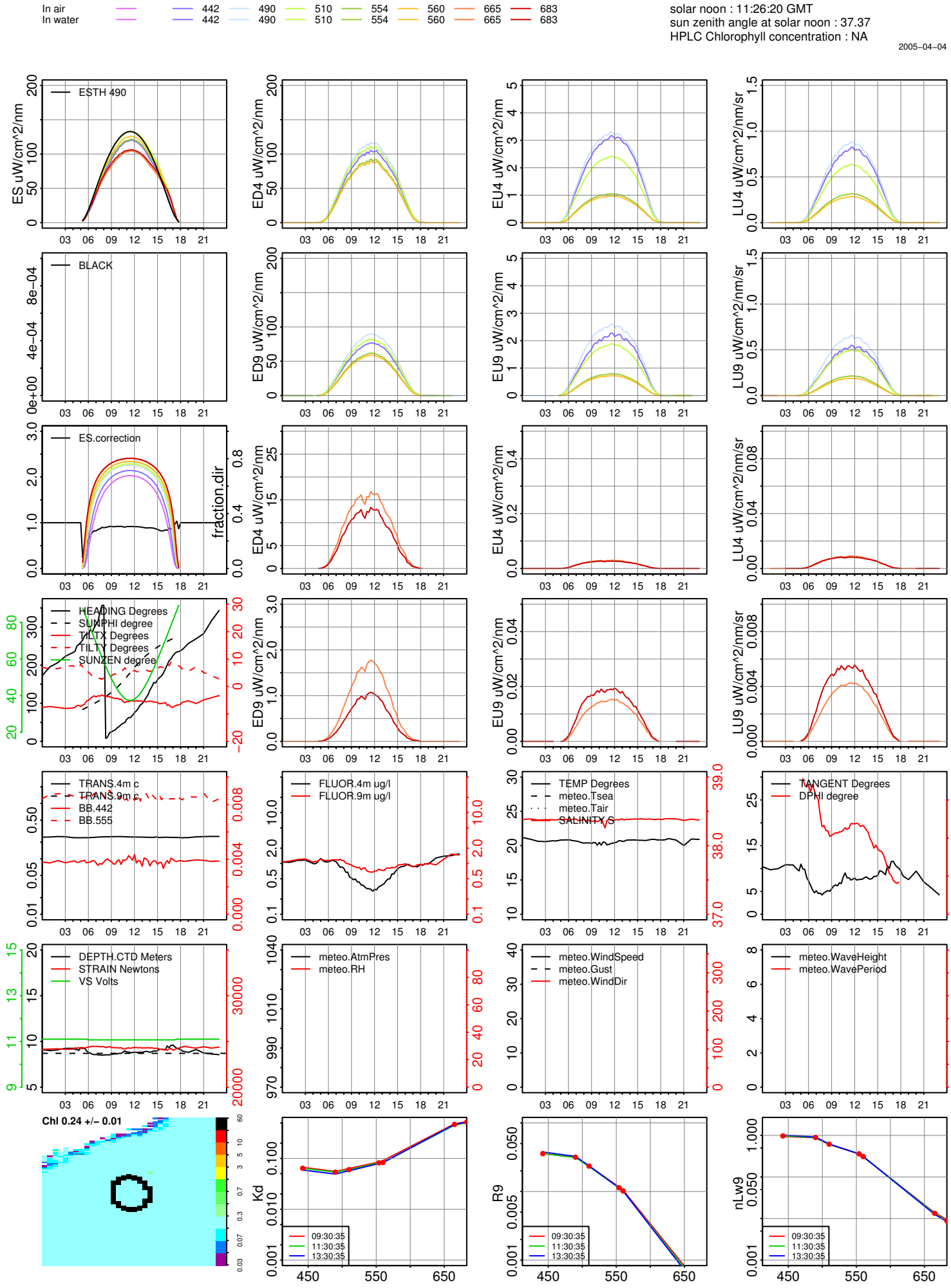
2005–04–04



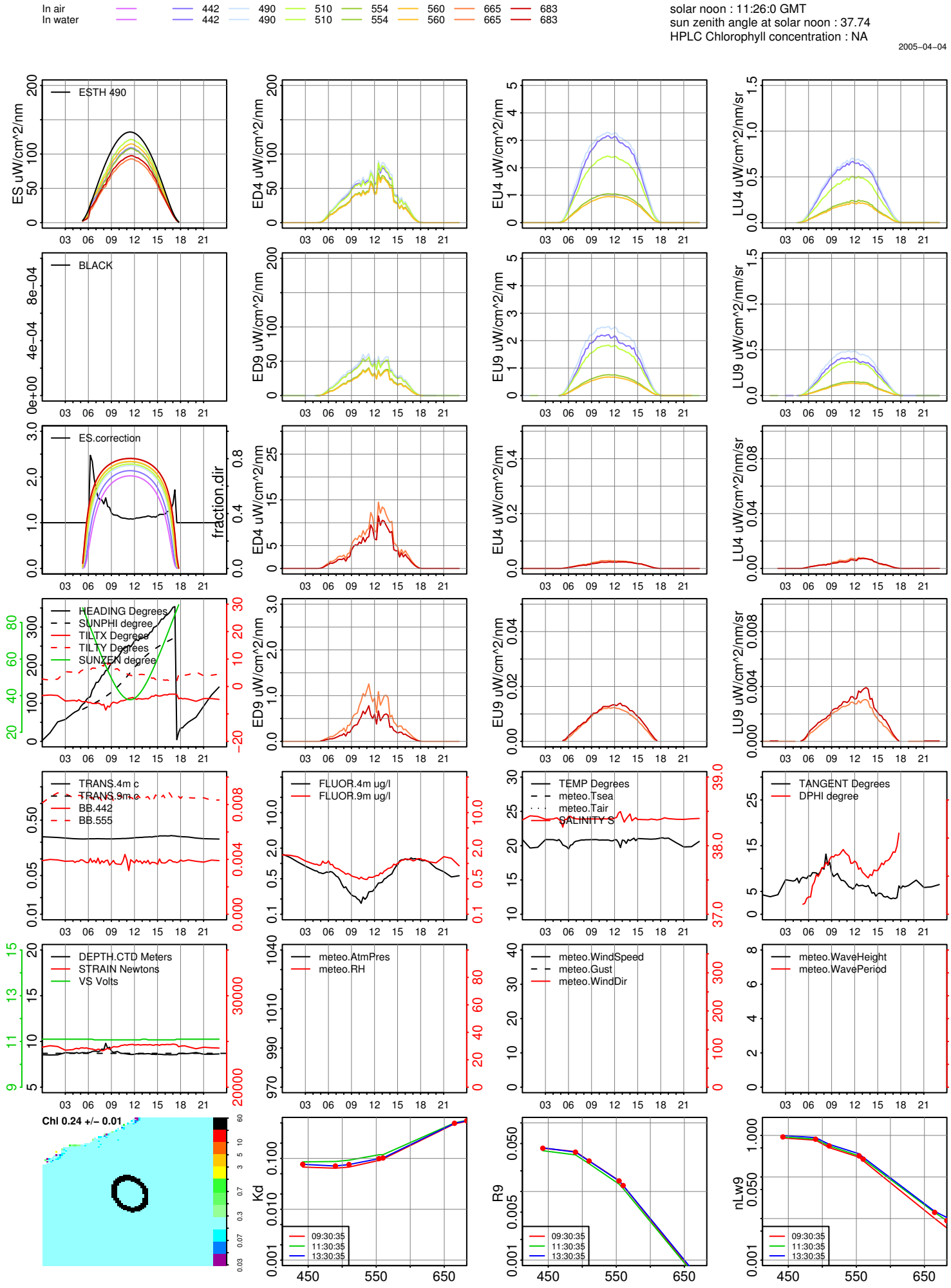
2004–09–06


In air
In water
442
490
510
554
560
665
683
solar noon : 11:26:42 GMT
sun zenith angle at solar noon : 37
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:30:35
11:30:35
13:30:35

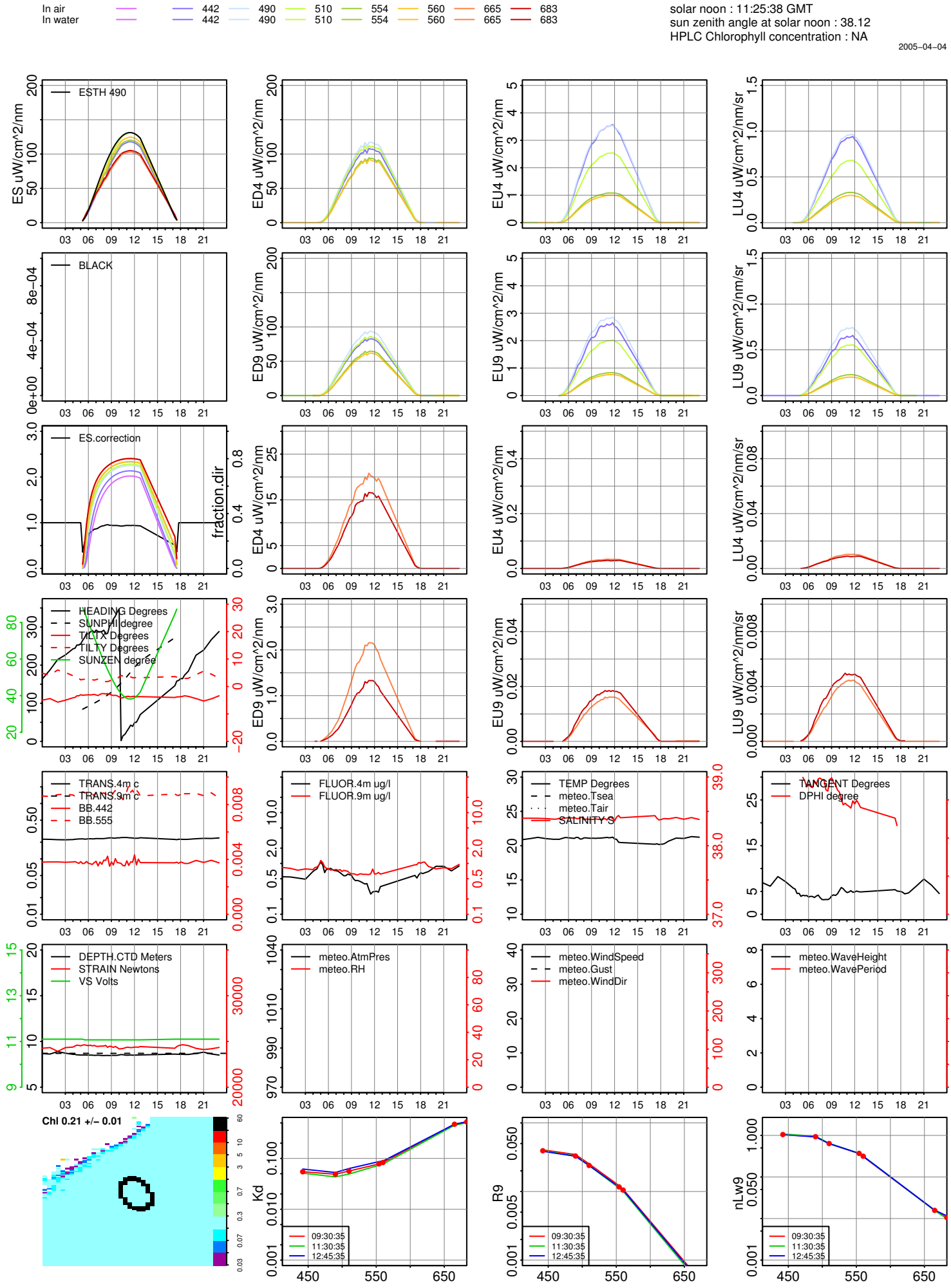
2004–09–07


In air
In water
442
490
510
554
560
665
683
solar noon : 11:26:20 GMT
sun zenith angle at solar noon : 37.37
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.24 +/– 0.01
Kd
R9
nLw9
09:30:35
11:30:35
13:30:35

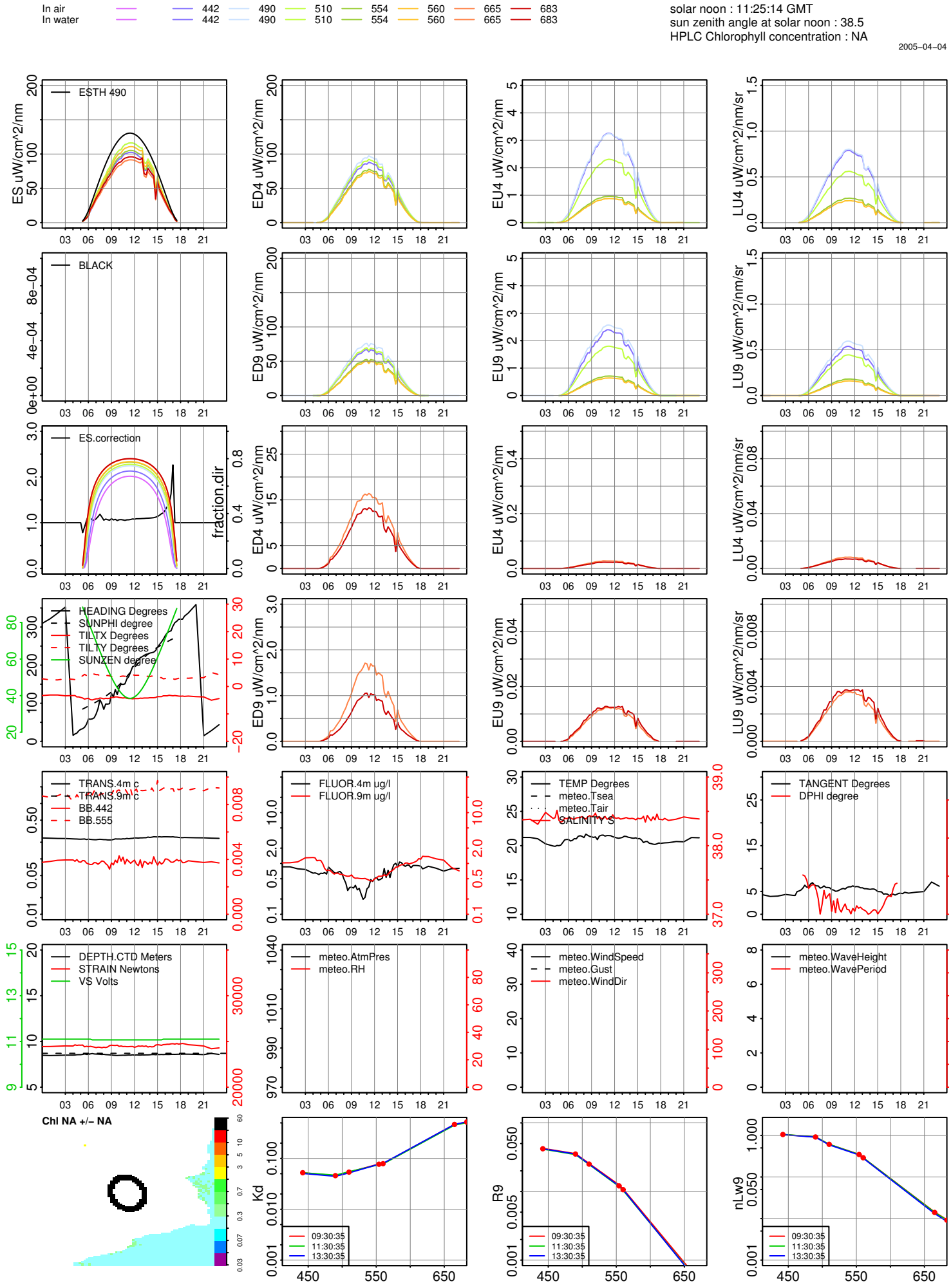
2004–09–08


In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:26:0 GMT
sun zenith angle at solar noon : 37.74
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.24 +/– 0.01
Kd
R9
nLw9
09:30:35
11:30:35
13:30:35

2004–09–09


In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:25:38 GMT
sun zenith angle at solar noon : 38.12
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.21 +/– 0.01
Kd
R9
nLw9
09:30:35
11:30:35
12:45:35

2004–09–10

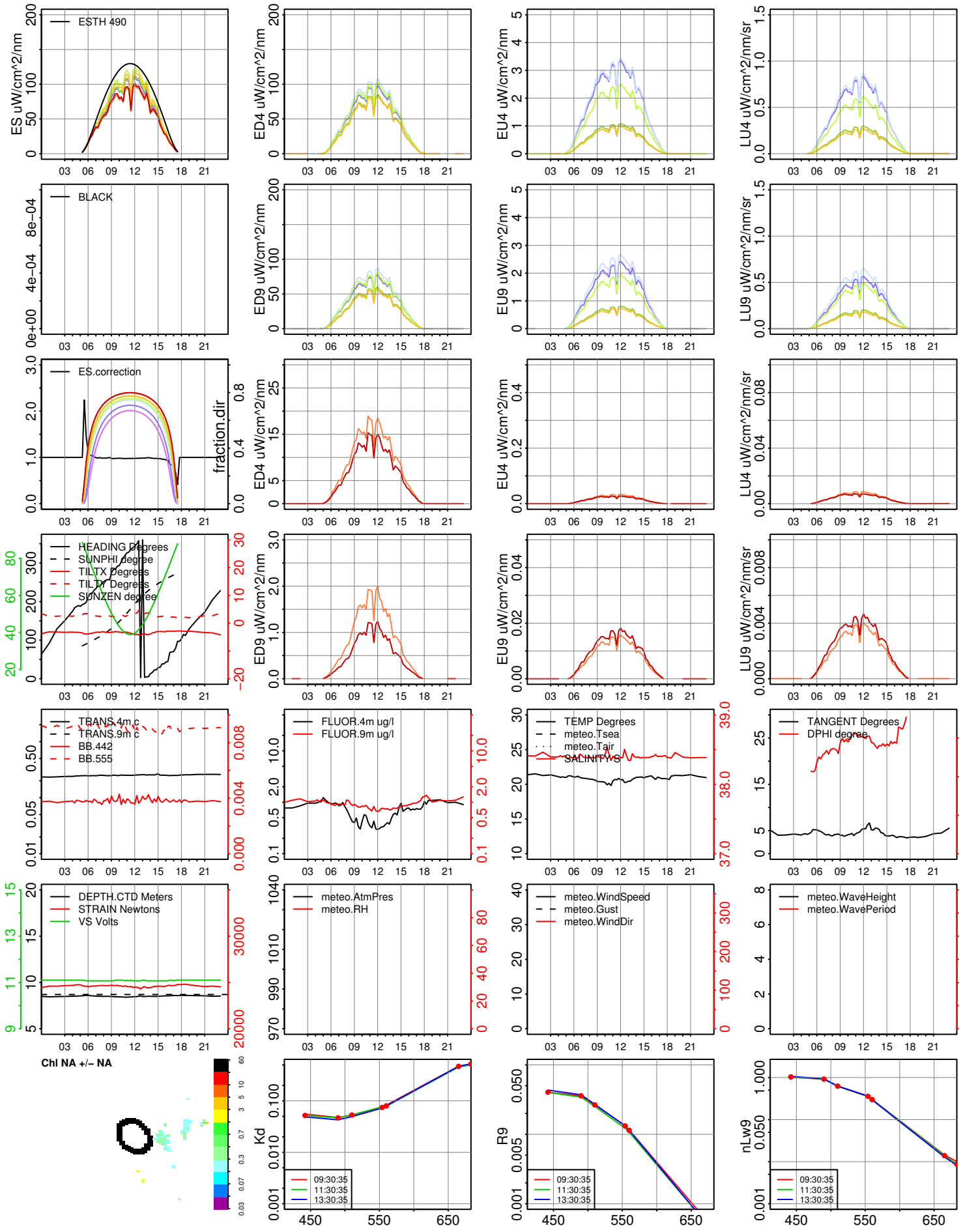

In air
In water
442
490
510
554
560
665
683
solar noon : 11:25:14 GMT
sun zenith angle at solar noon : 38.5
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:30:35
11:30:35
13:30:35

2004–09–11

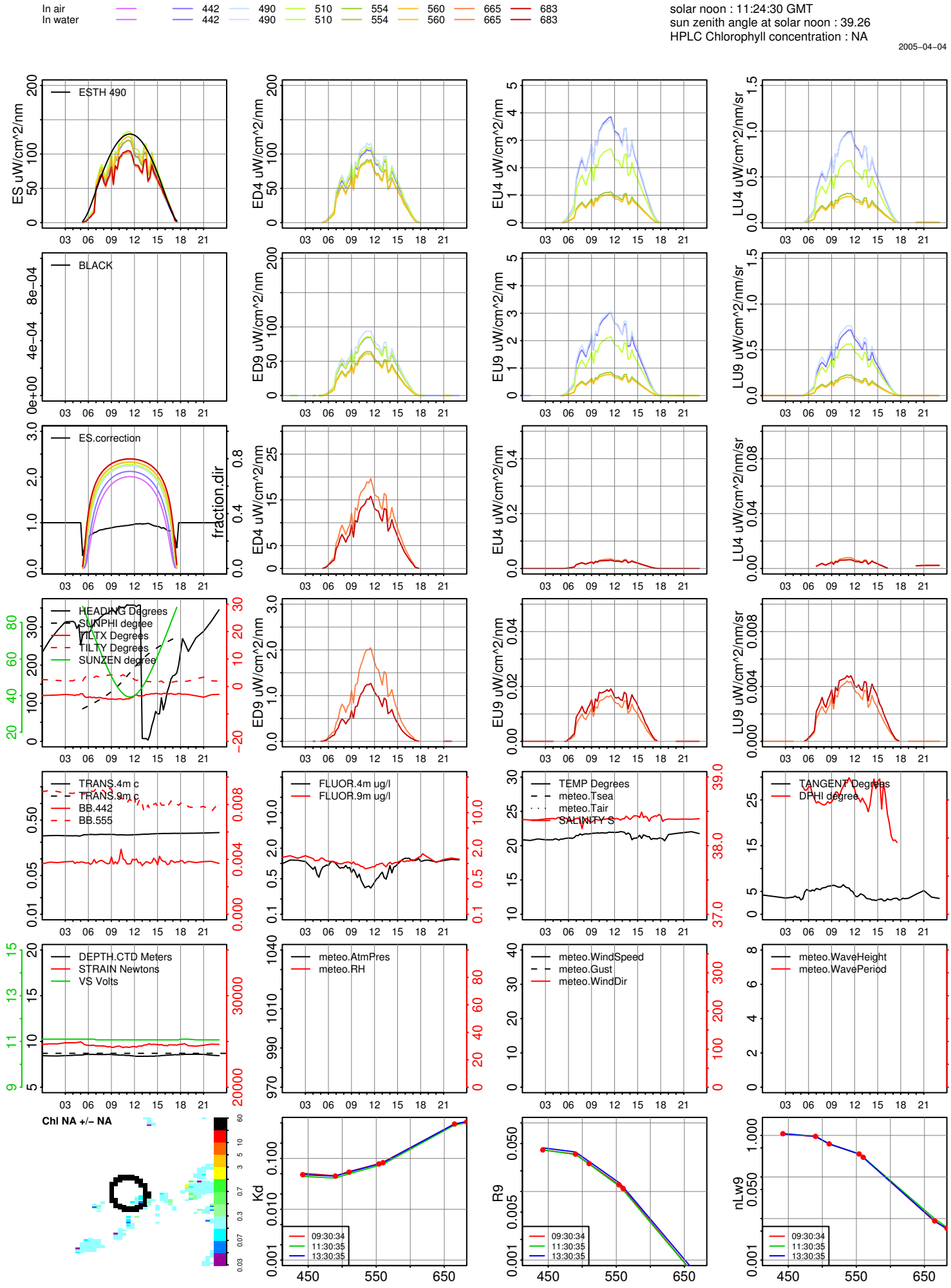
In air 442 490 510 554 560 665 683
In water 442 490 510 554 560 665 683

solar noon : 11:24:52 GMT
sun zenith angle at solar noon : 38.88
HPLC Chlorophyll concentration : NA

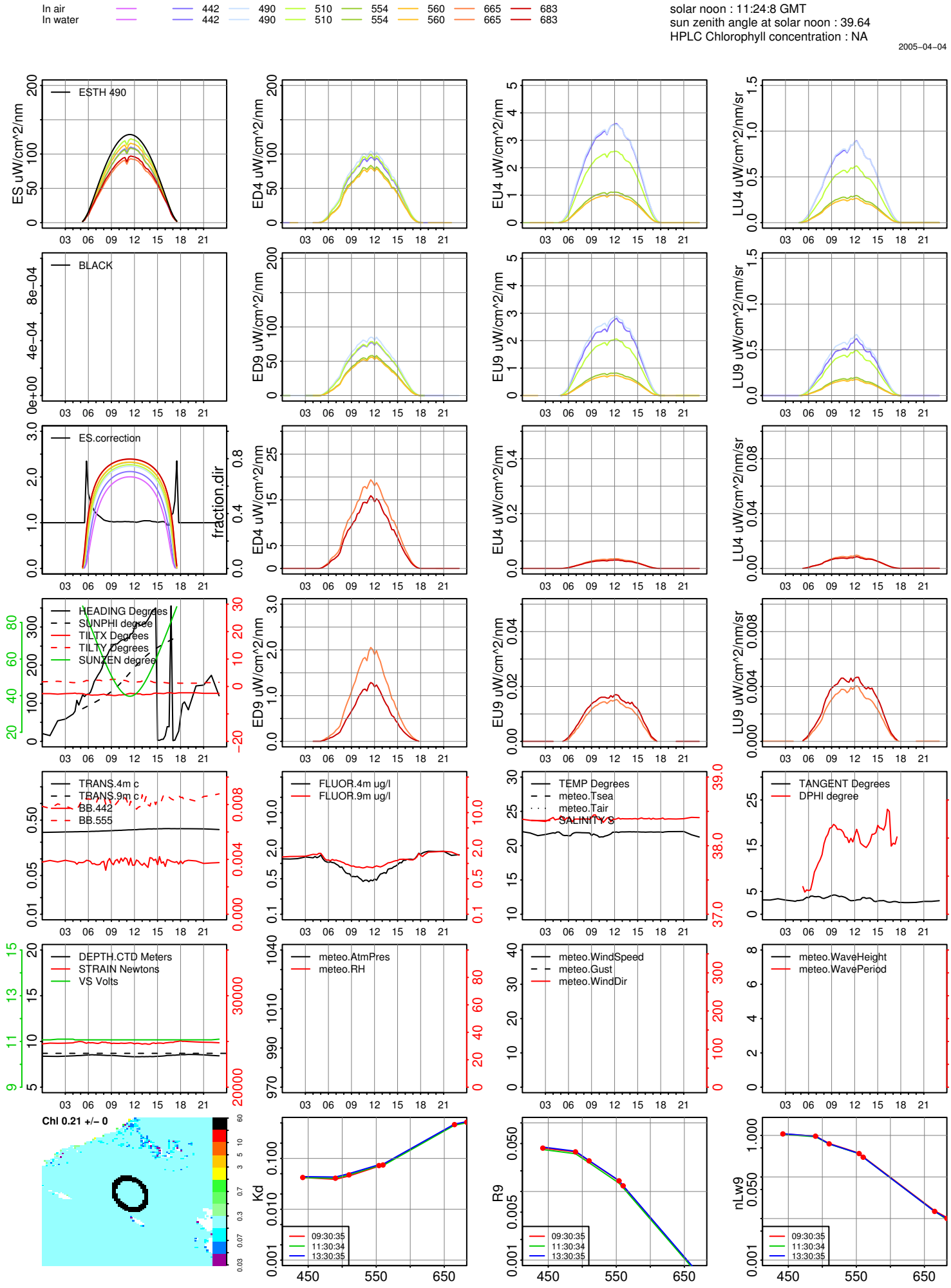
2005–04–04



2004–09–12


In air
In water
442
490
510
554
560
665
683
solar noon : 11:24:30 GMT
sun zenith angle at solar noon : 39.26
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:30:34
11:30:35
13:30:35

2004–09–13

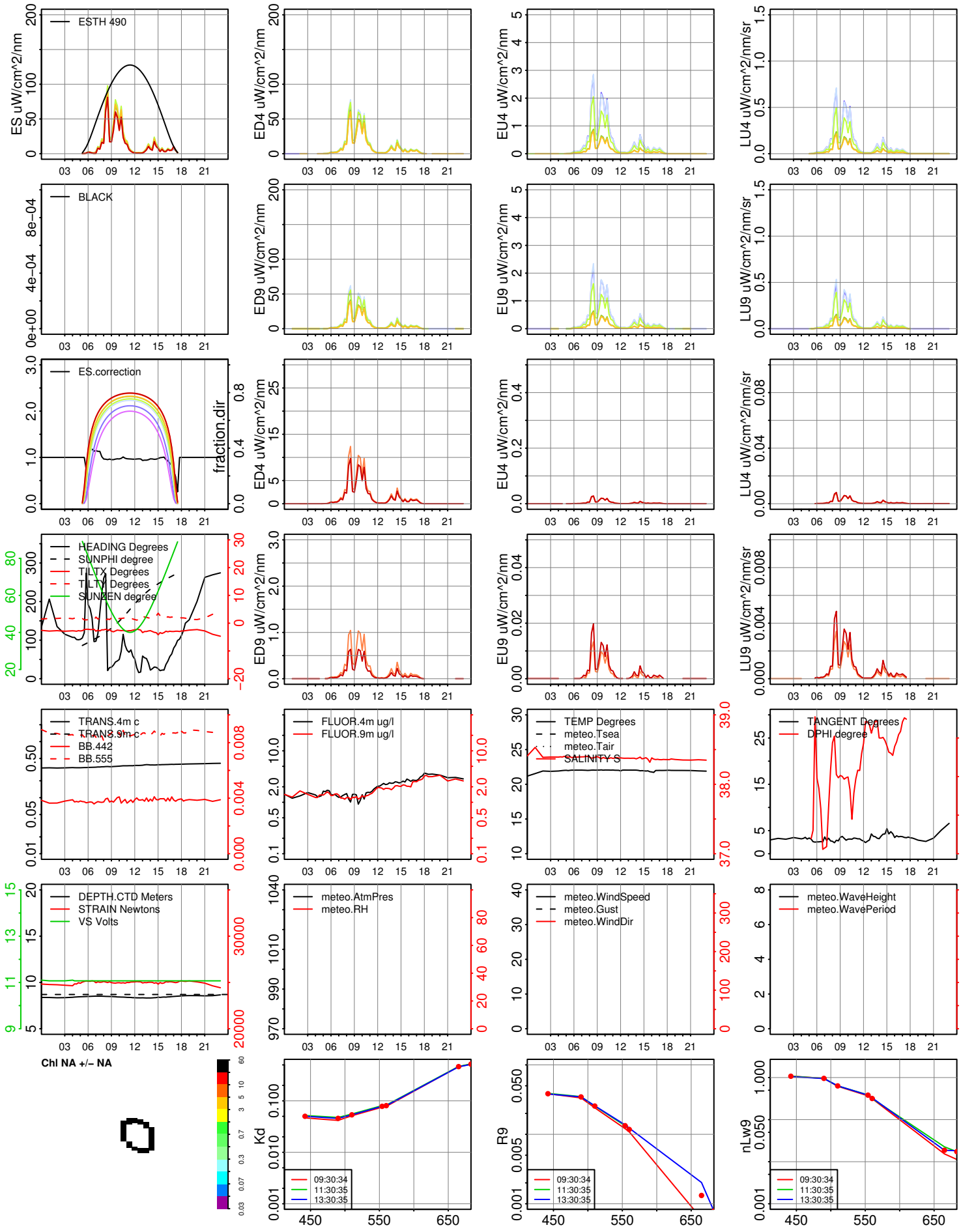

In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:24:8 GMT
sun zenith angle at solar noon : 39.64
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.21 +/– 0
Kd
R9
nLw9
09:30:35
11:30:34
13:30:35

2004–09–14

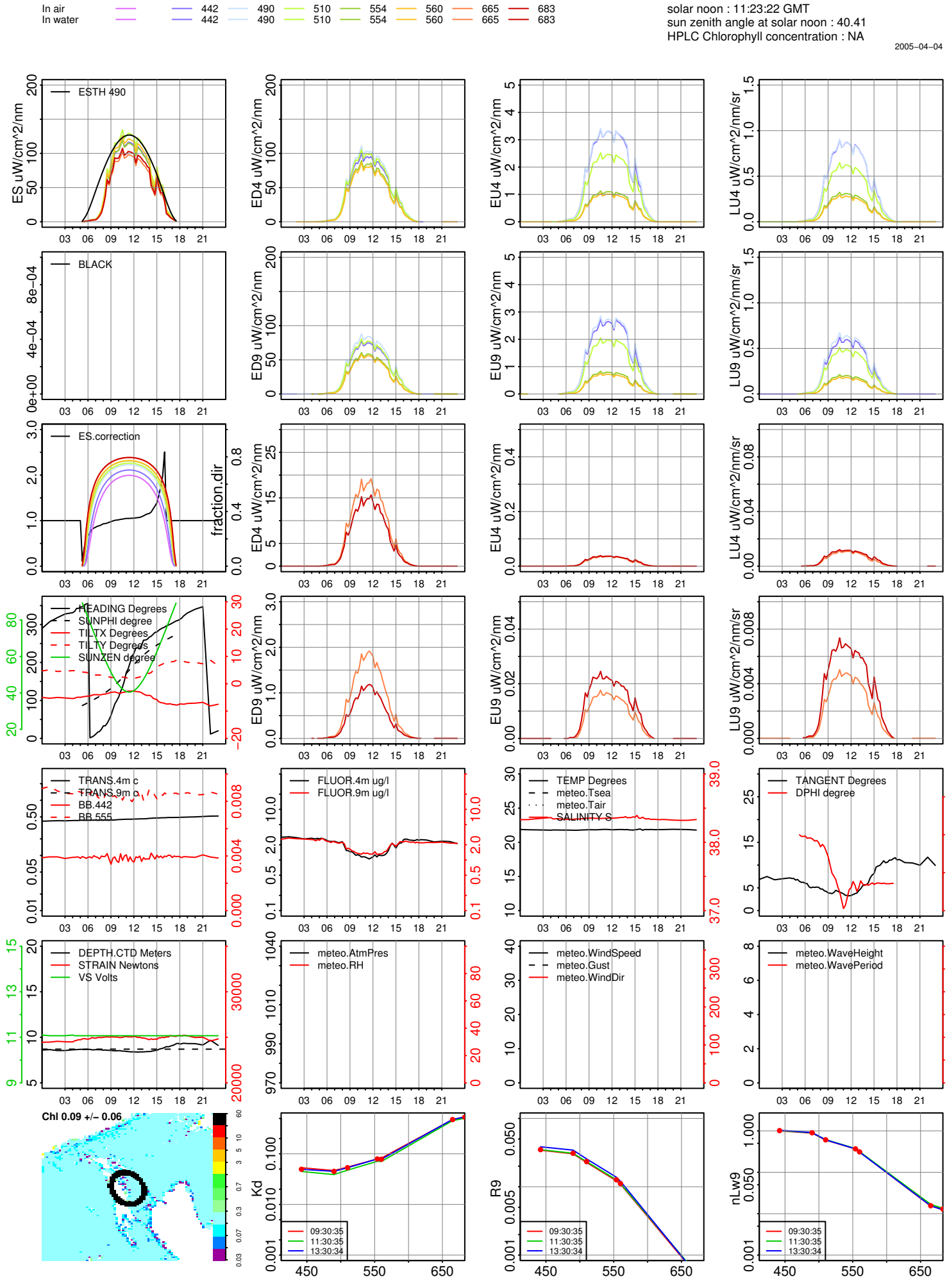
In air 442 490 510 554 560 665 683
In water 442 490 510 554 560 665 683

solar noon : 11:23:46 GMT
sun zenith angle at solar noon : 40.02
HPLC Chlorophyll concentration : NA

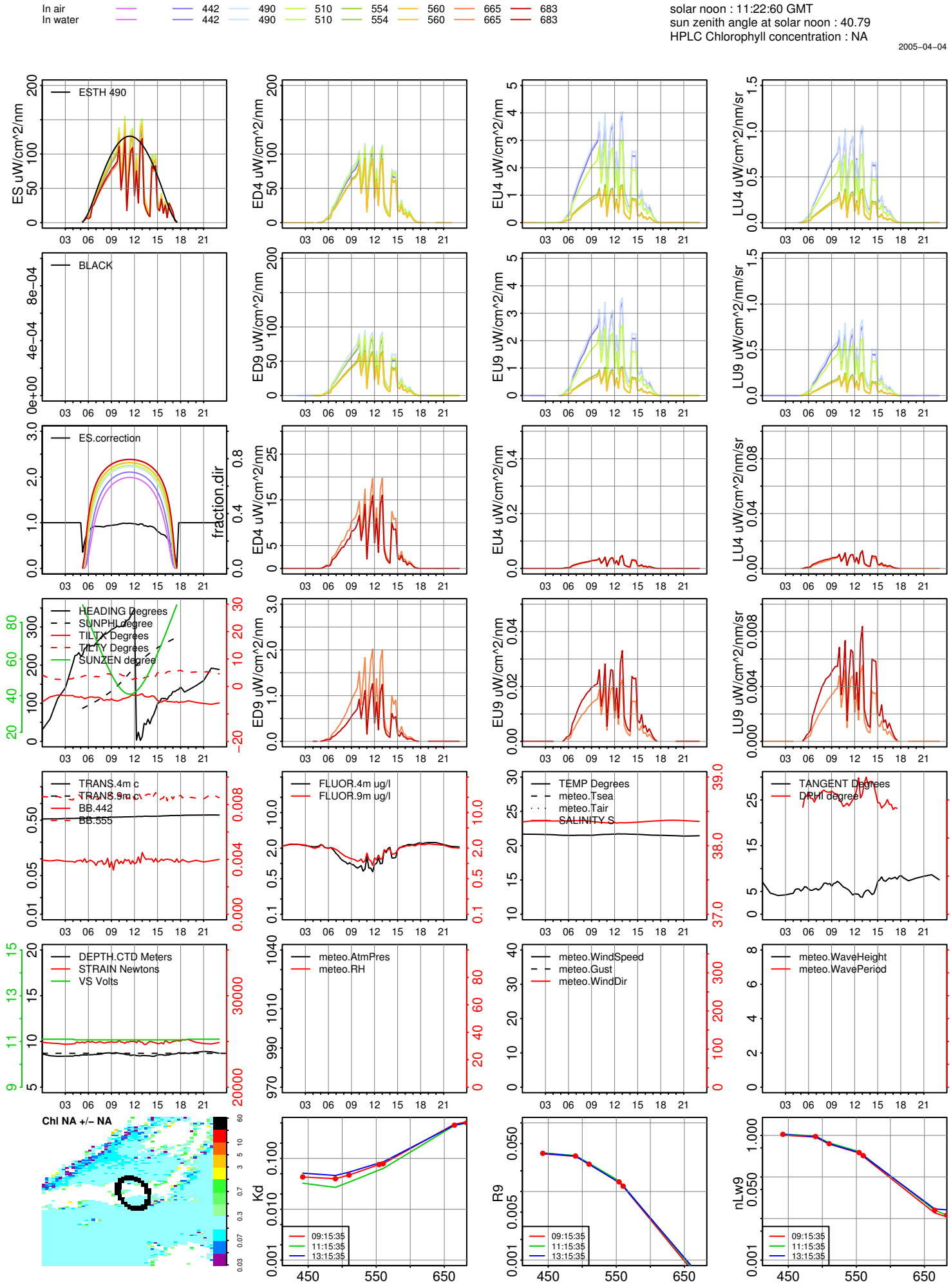
2005–04–04



2004–09–15


In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:23:22 GMT
sun zenith angle at solar noon : 40.41
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.09 +/– 0.06
Kd
R9
nLw9
09:30:35
11:30:35
13:30:34

2004–09–16

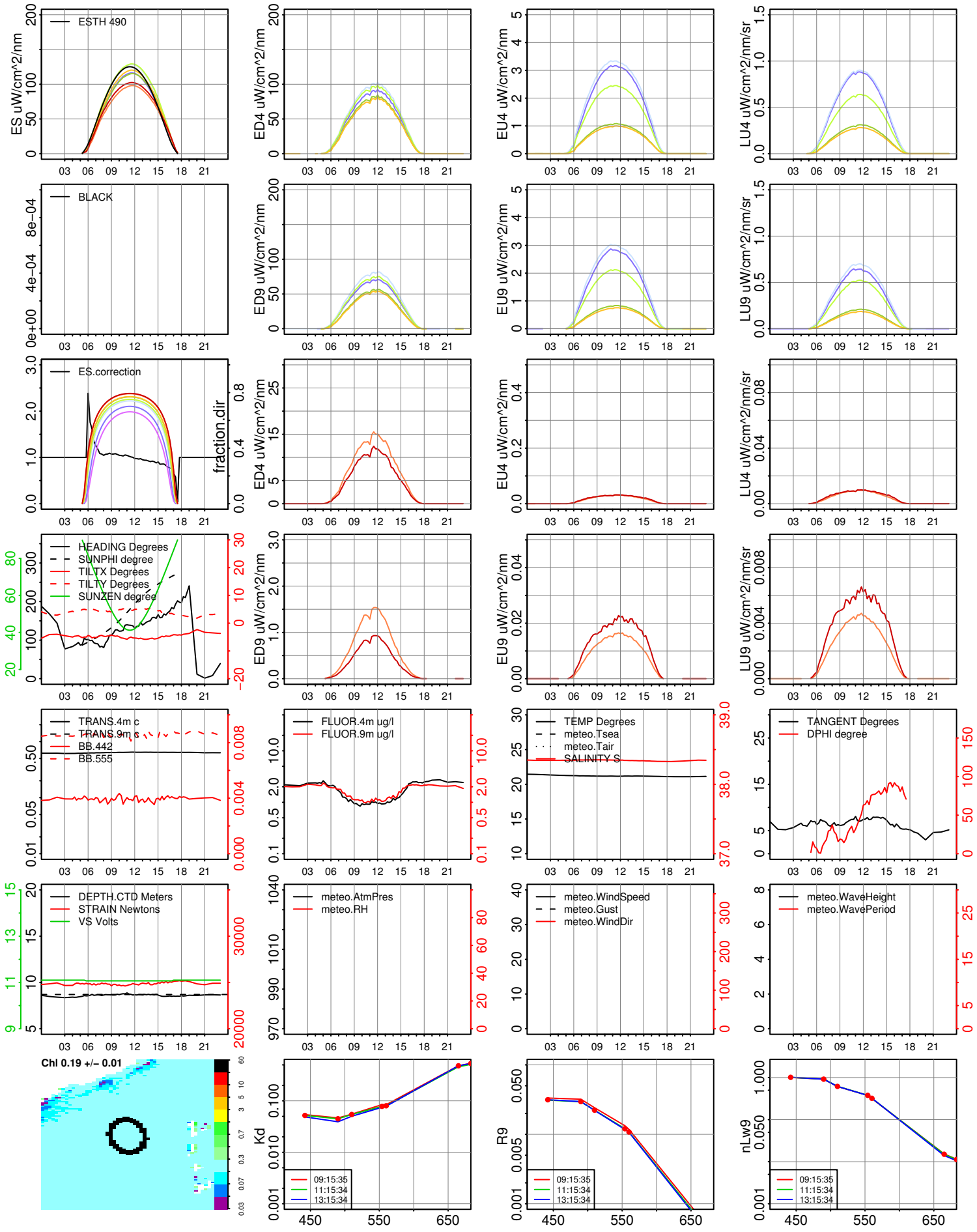

In air
In water
442
490
510
554
560
665
683
solar noon : 11:22:60 GMT
sun zenith angle at solar noon : 40.79
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DRHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:35
13:15:35

2004–09–17

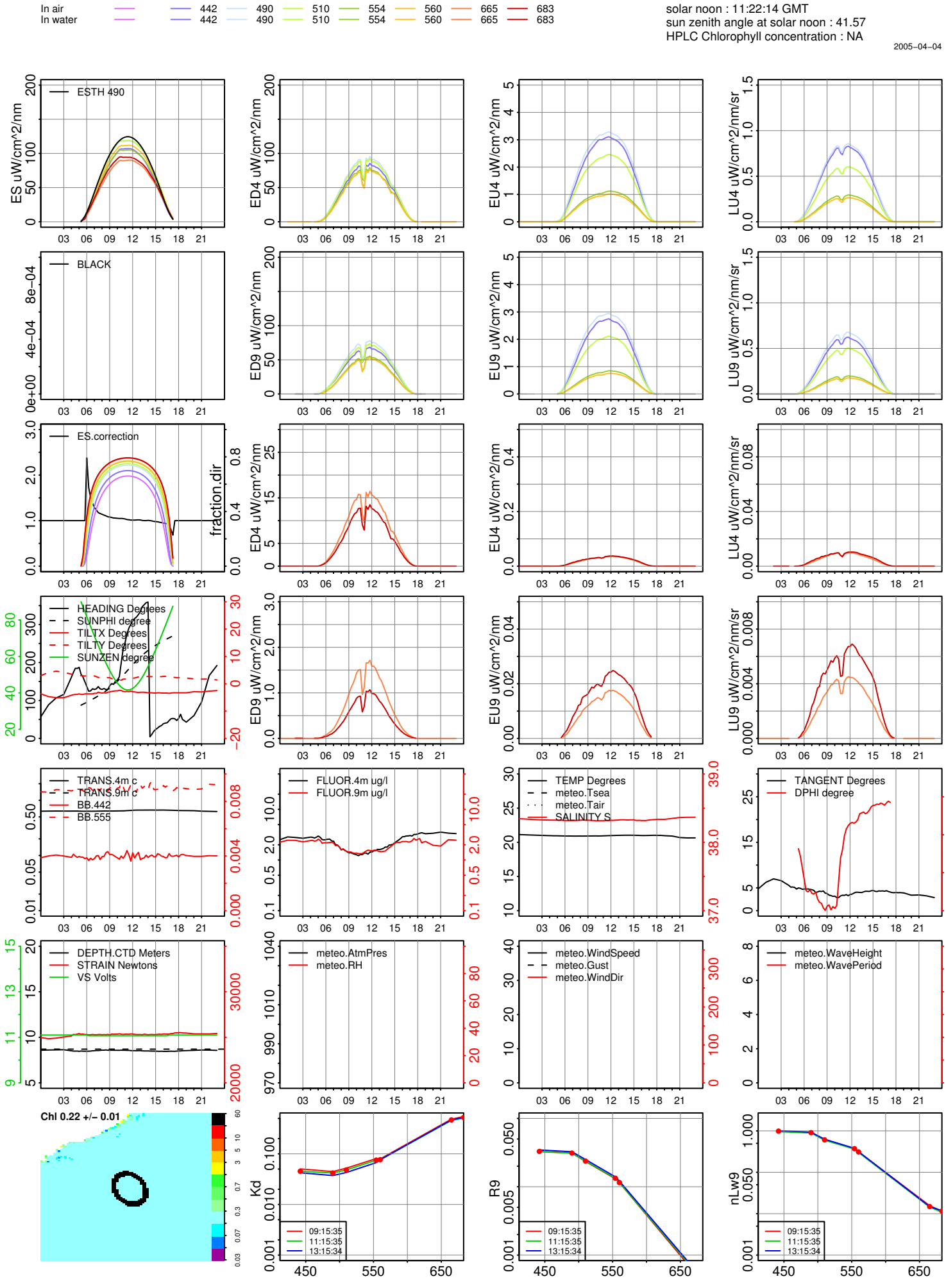
In air / In water: 442 / 442, 490 / 490, 510 / 510, 554 / 554, 560 / 560, 665 / 665, 683 / 683

solar noon : 11:22:38 GMT
sun zenith angle at solar noon : 41.18
HPLC Chlorophyll concentration : NA

2005–04–04



2004–09–18

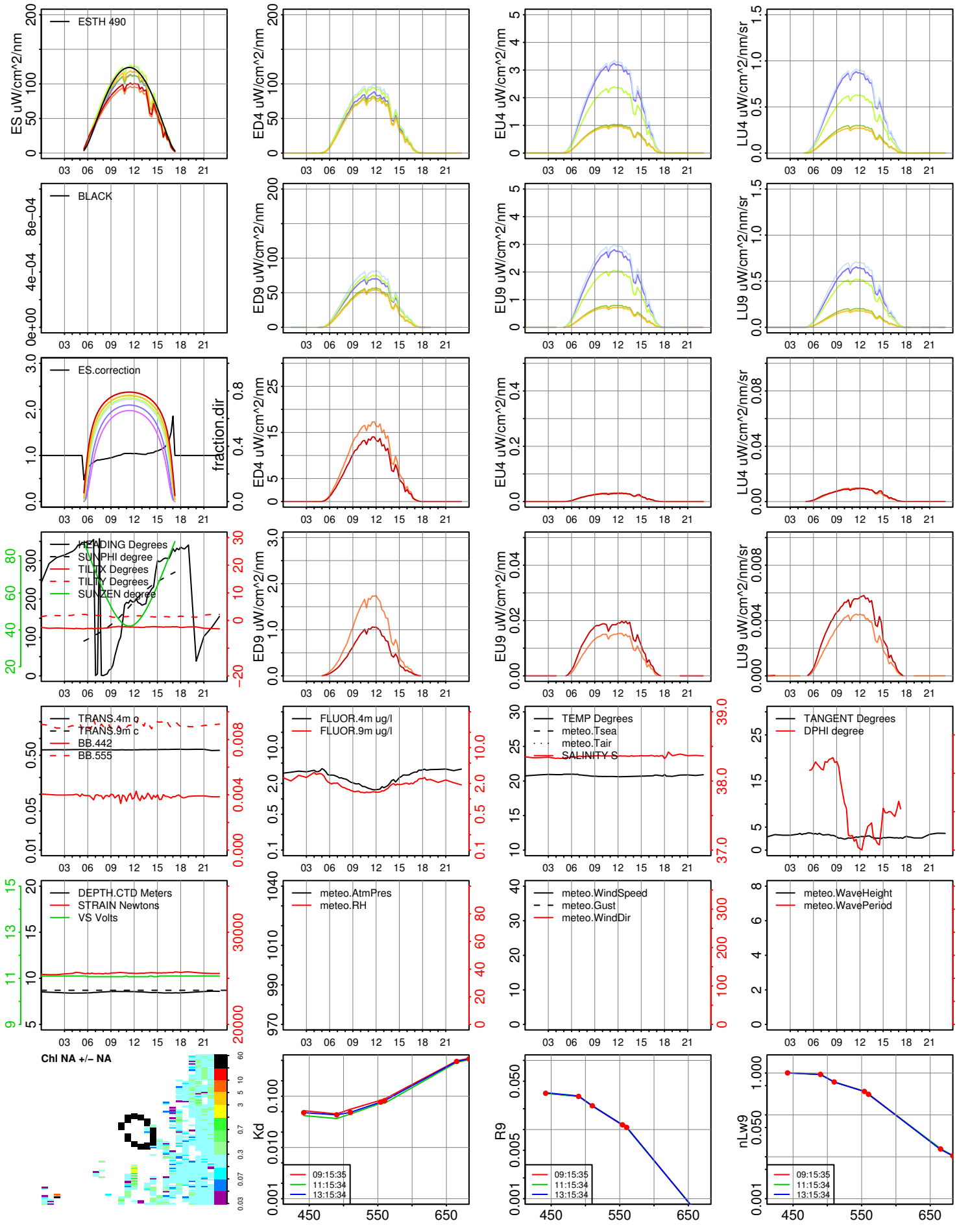

In air
In water
442
490
510
554
560
665
683
solar noon : 11:22:14 GMT
sun zenith angle at solar noon : 41.57
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.22 +/– 0.01
Kd
R9
nLw9
09:15:35
11:15:35
13:15:34

2004–09–19

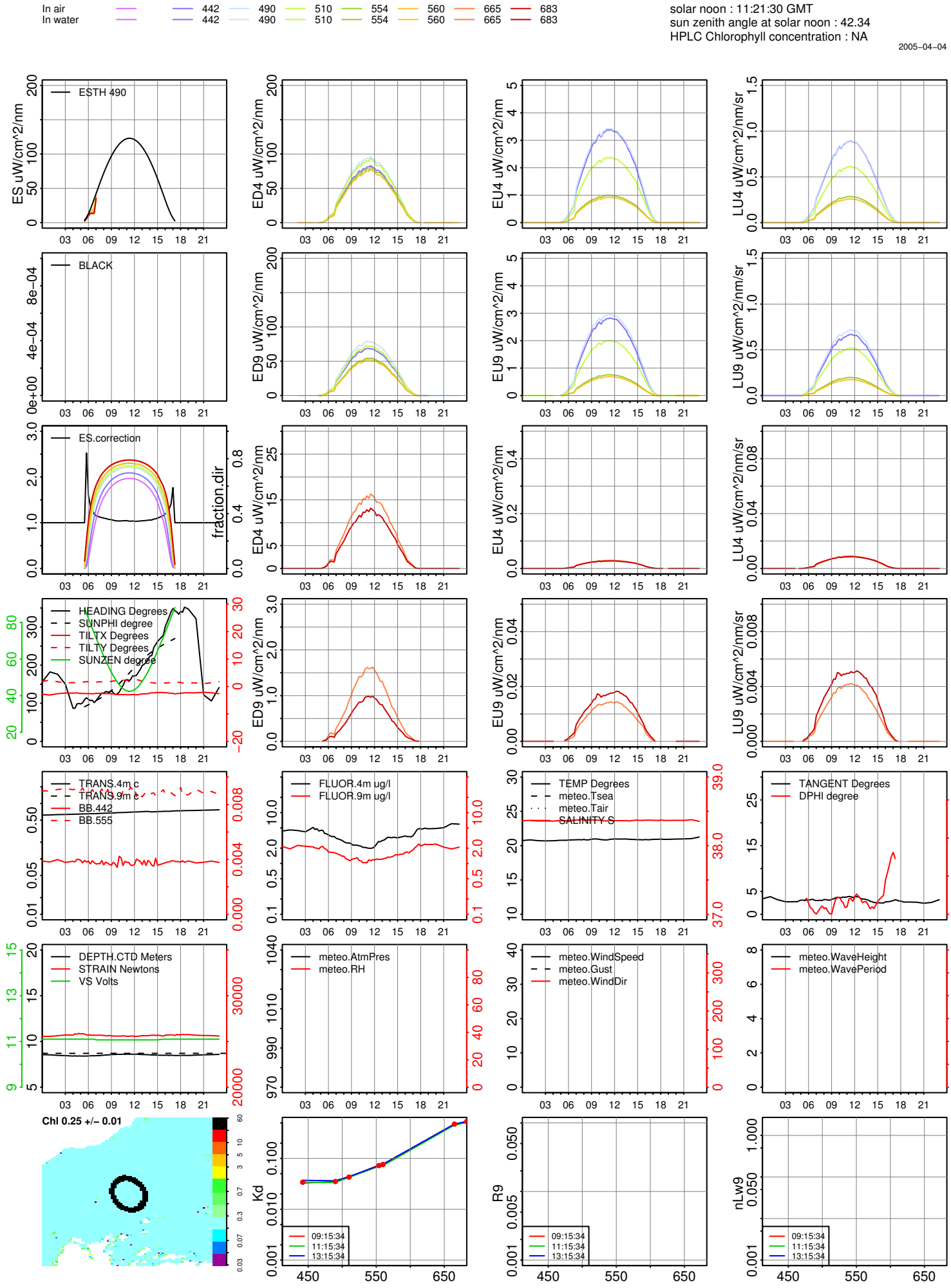
In air 442 490 510 554 560 665 683
In water 442 490 510 554 560 665 683

solar noon : 11:21:52 GMT
sun zenith angle at solar noon : 41.95
HPLC Chlorophyll concentration : NA

2005–04–04



2004–09–20

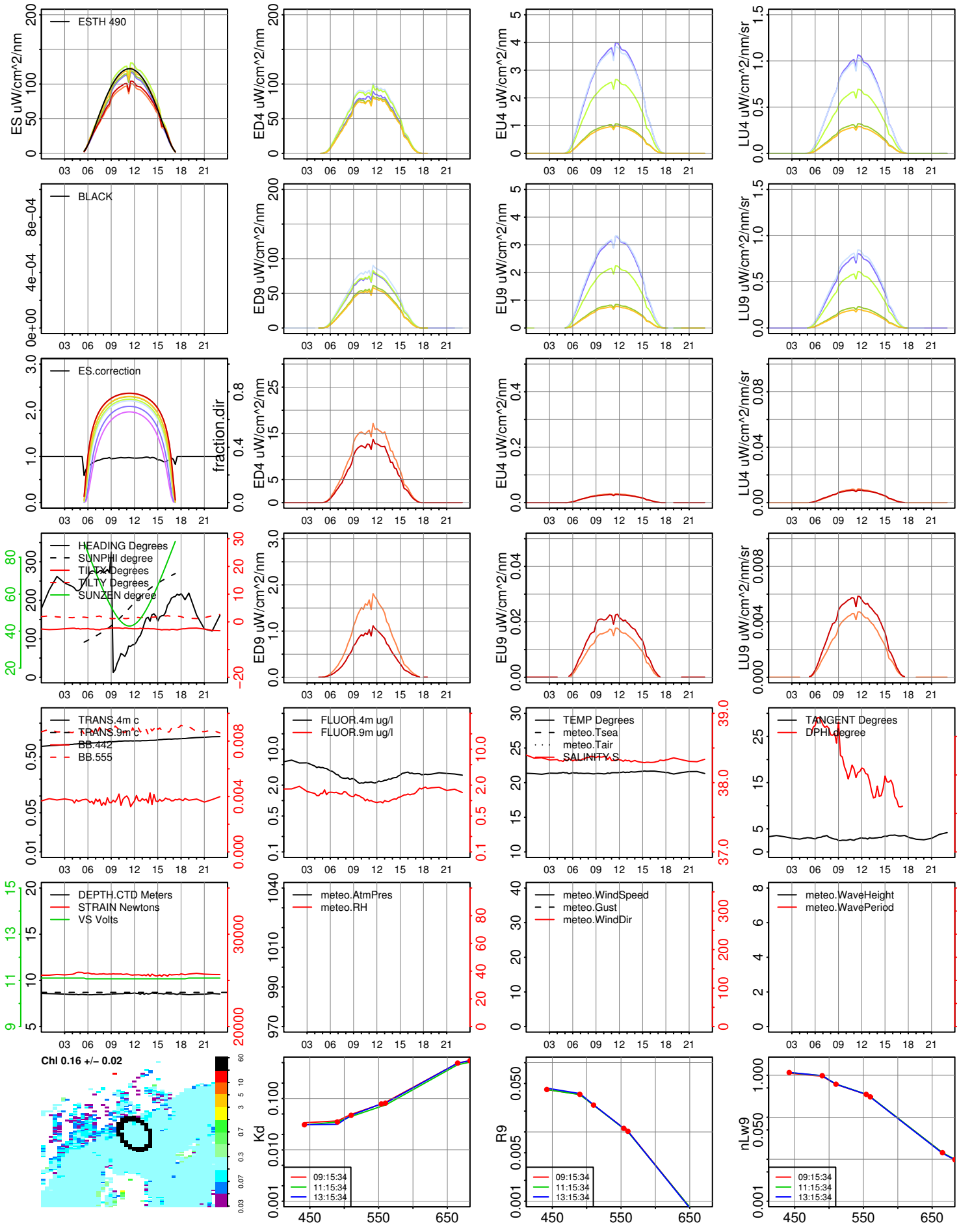

In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:21:30 GMT
sun zenith angle at solar noon : 42.34
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.25 +/– 0.01
Kd
R9
nLw9
09:15:34
11:15:34
13:15:34

2004–09–21

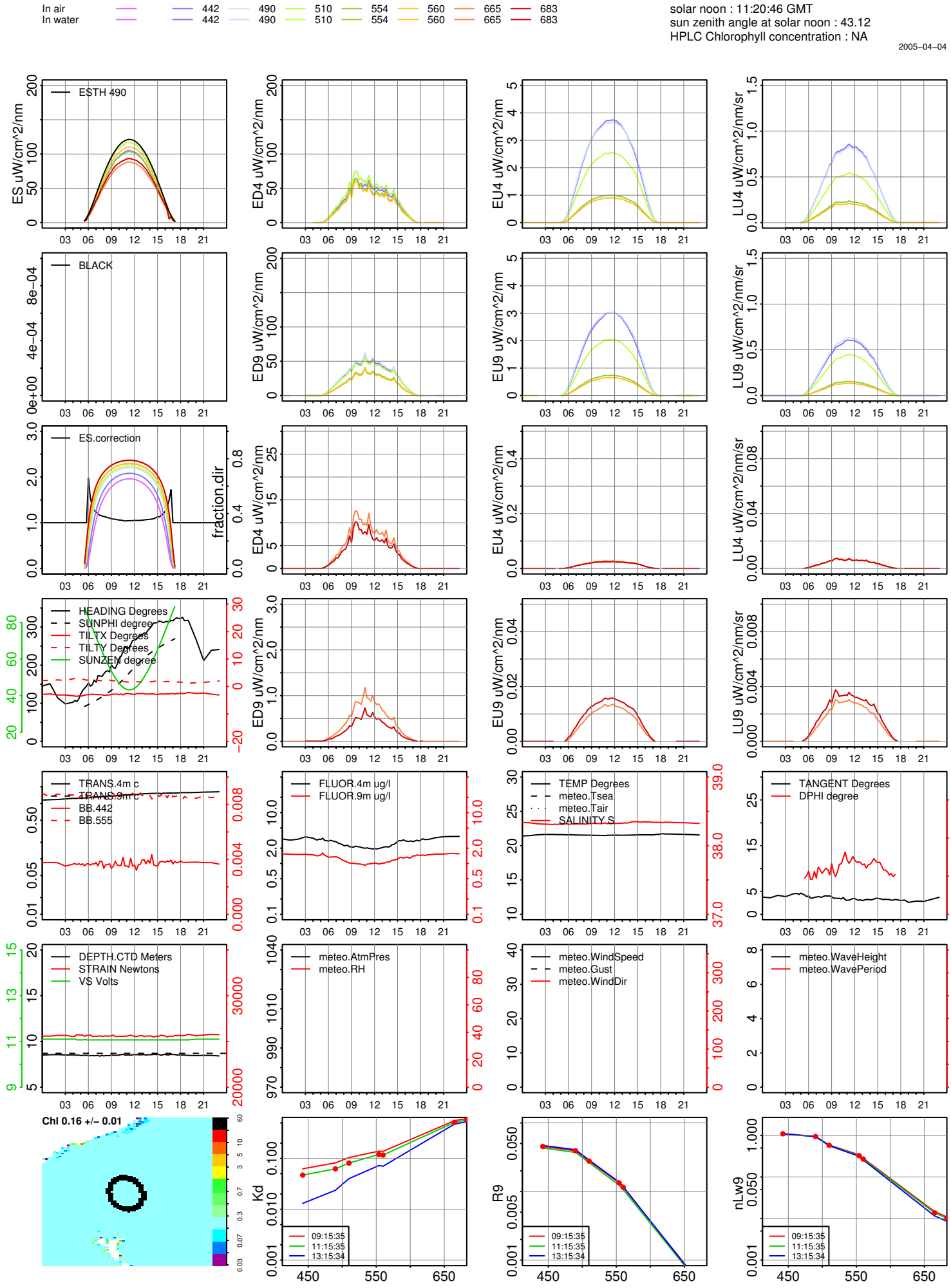
In air 442 490 510 554 560 665 683
In water 442 490 510 554 560 665 683

solar noon : 11:21:8 GMT
sun zenith angle at solar noon : 42.73
HPLC Chlorophyll concentration : NA

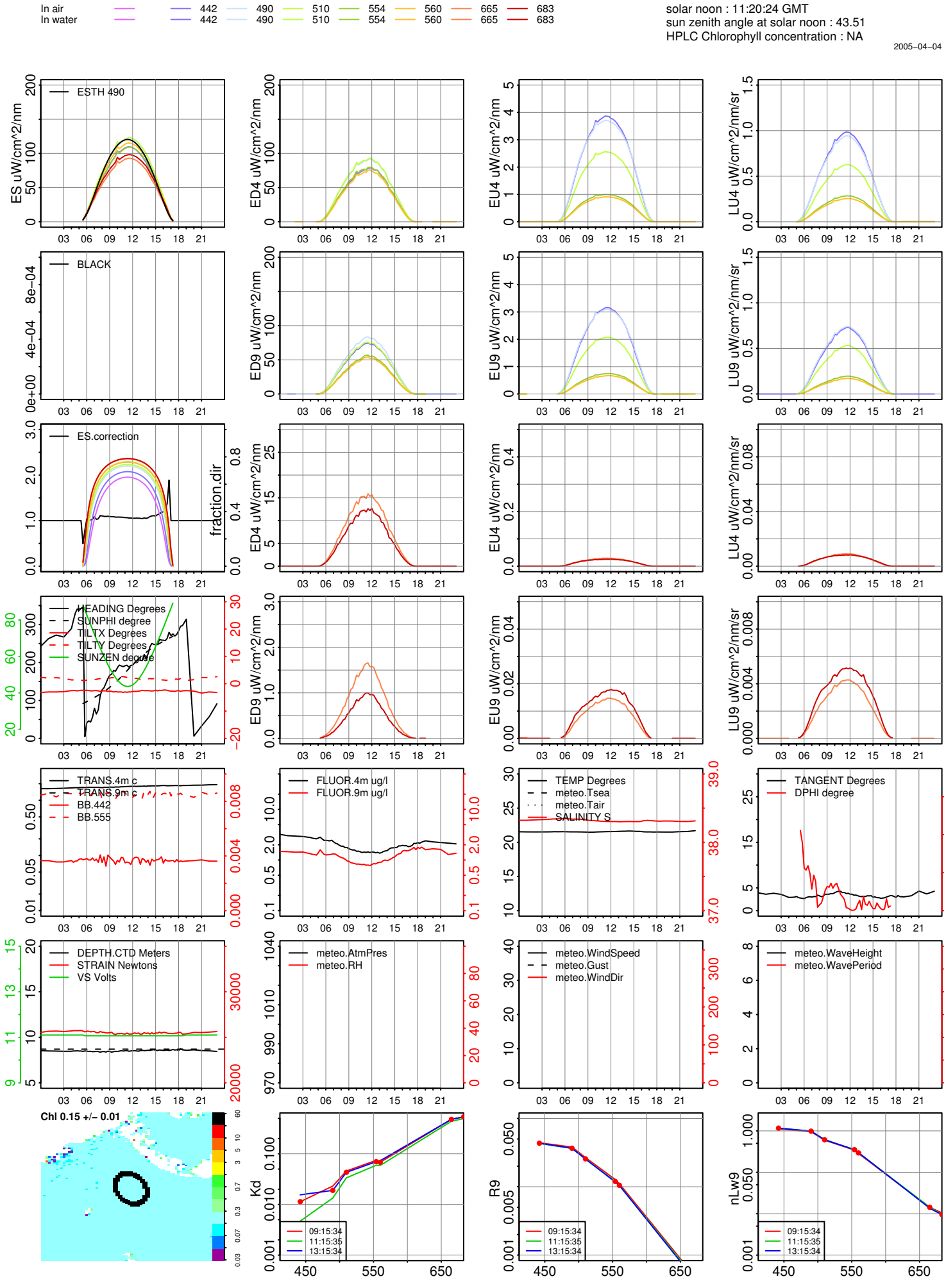
2005–04–04



2004–09–22


In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:20:46 GMT
sun zenith angle at solar noon : 43.12
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.16 +/– 0.01
Kd
R9
nLw9
09:15:35
11:15:35
13:15:34

2004–09–23

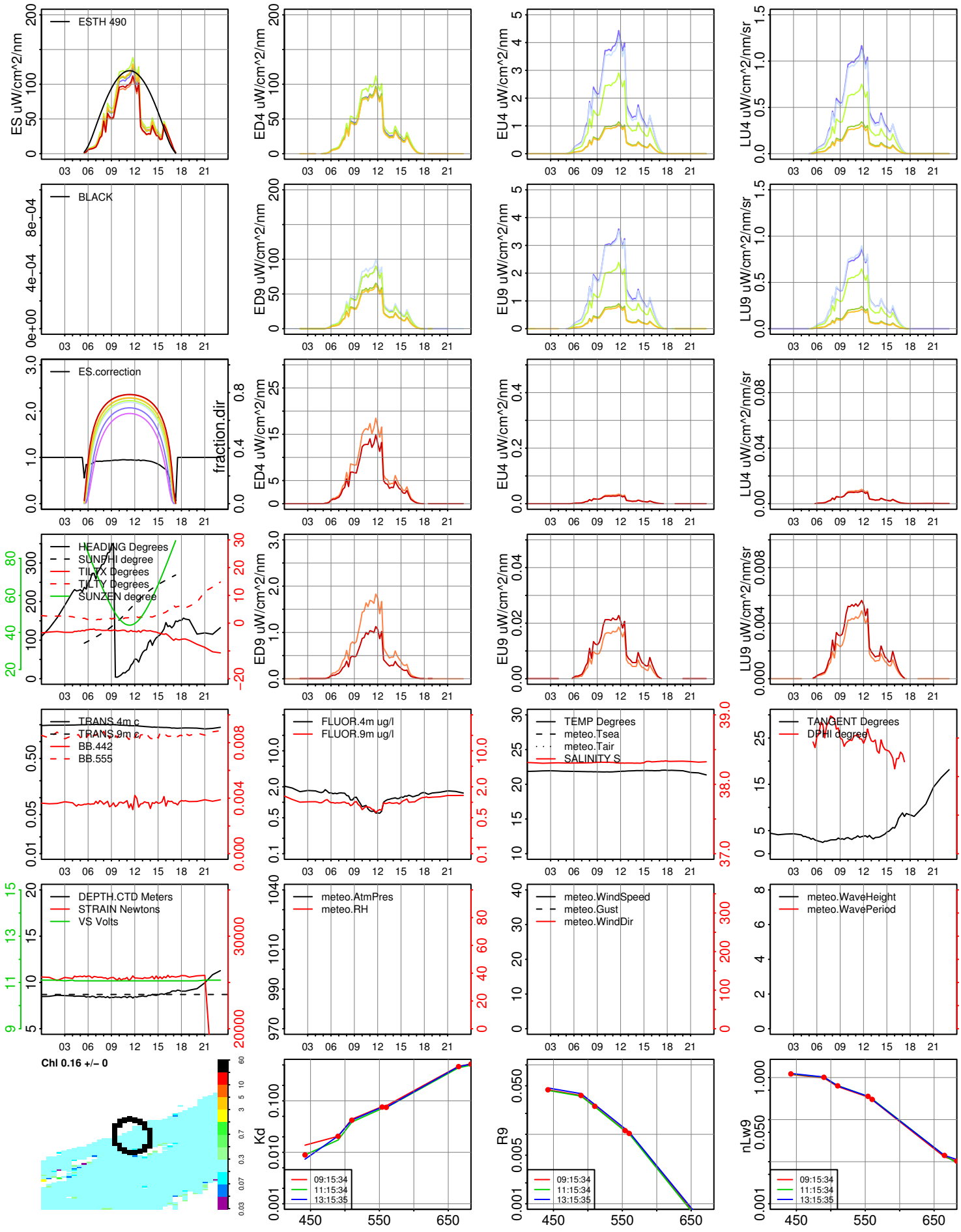

In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:20:24 GMT
sun zenith angle at solar noon : 43.51
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.15 +/– 0.01
Kd
R9
nLw9
09:15:34
11:15:35
13:15:34
03 06 09 12 15 18 21
450 550 650

2004–09–24

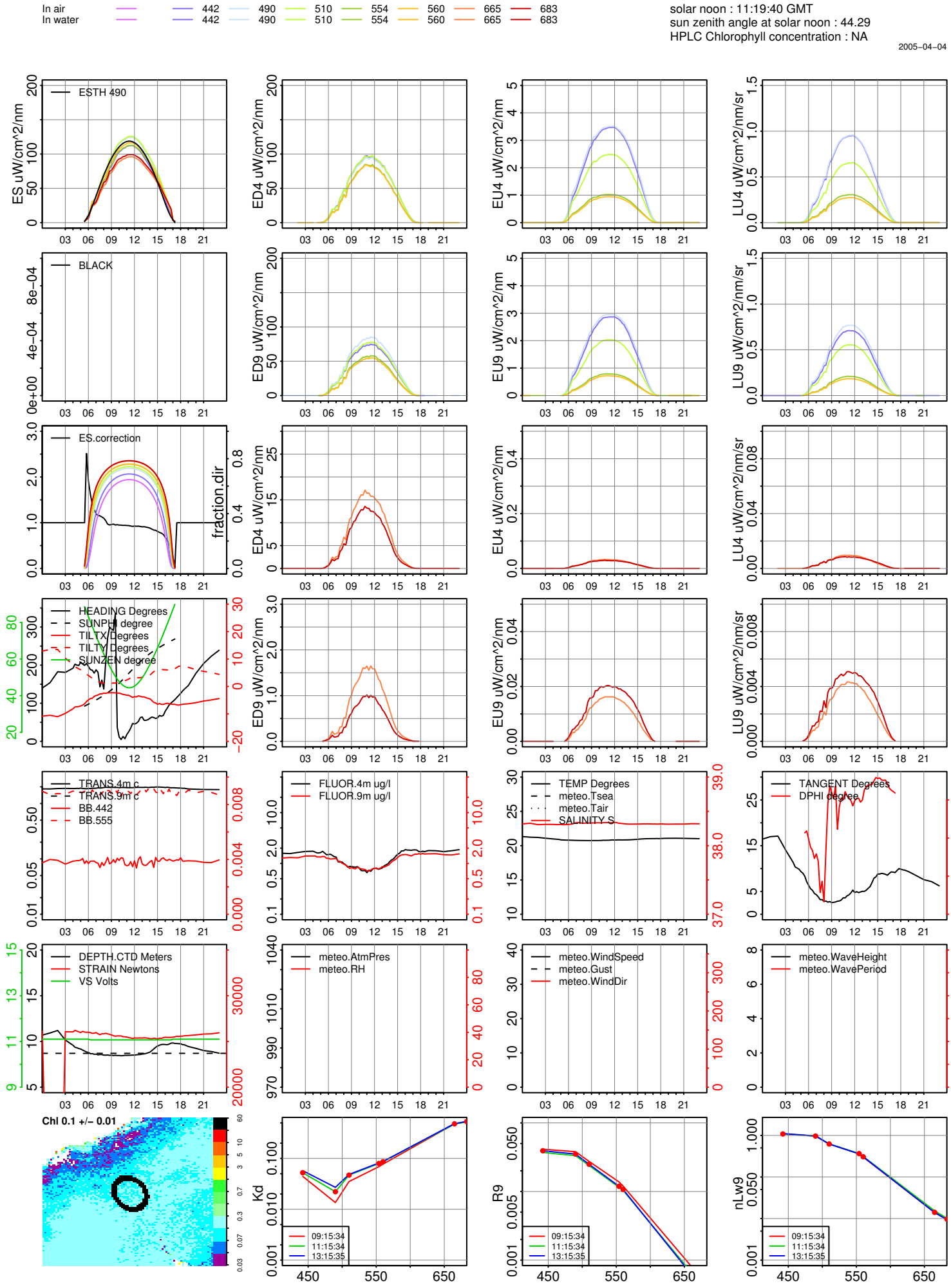
In air 442 490 510 554 560 665 683
In water 442 490 510 554 560 665 683

solar noon : 11:20:2 GMT
sun zenith angle at solar noon : 43.9
HPLC Chlorophyll concentration : NA

2005–04–04



2004–09–25

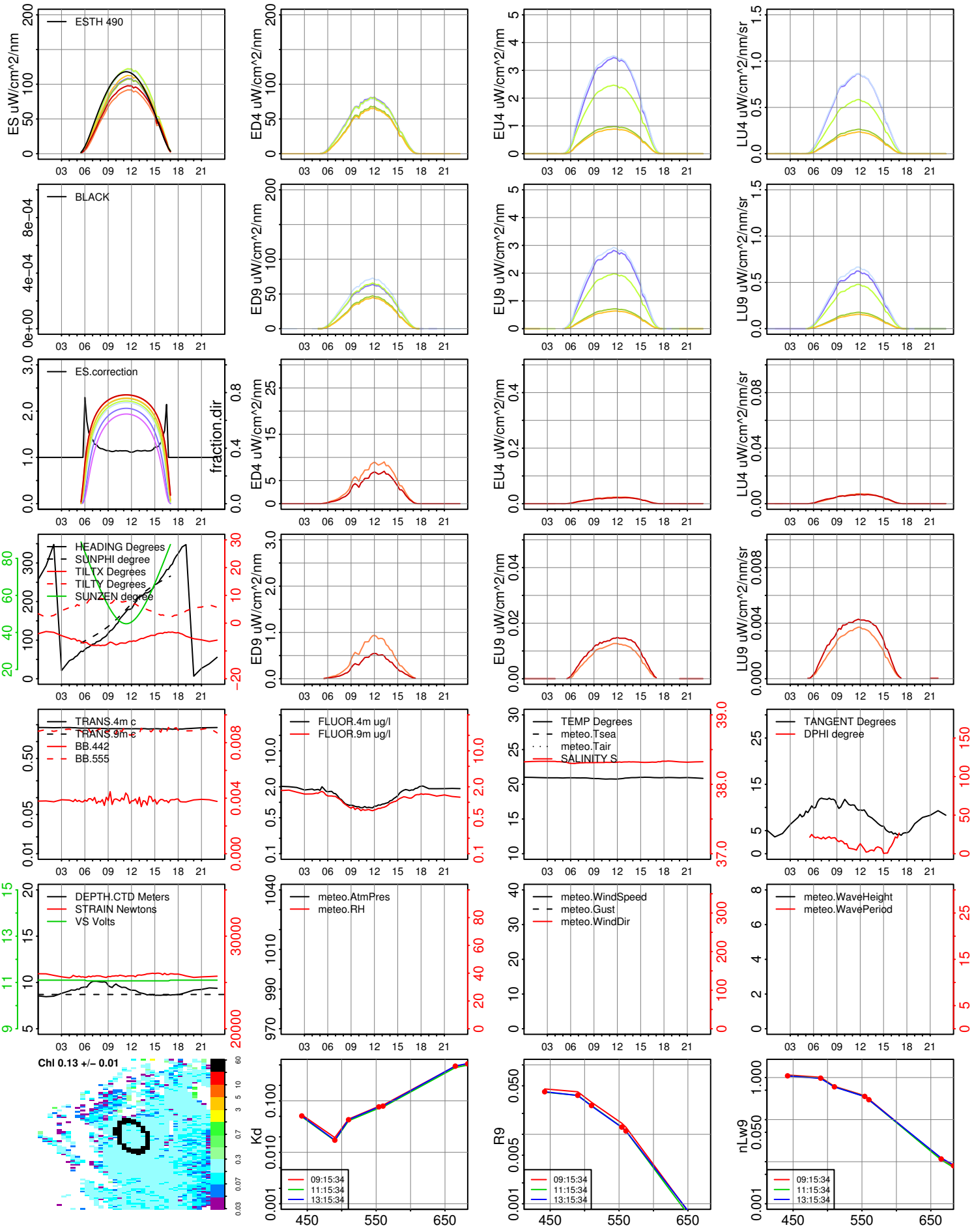

In air
In water
442
490
510
554
560
665
683
solar noon : 11:19:40 GMT
sun zenith angle at solar noon : 44.29
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPLN degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.1 +/– 0.01
Kd
R9
nLw9
09:15:34
11:15:34
13:15:35

2004–09–26

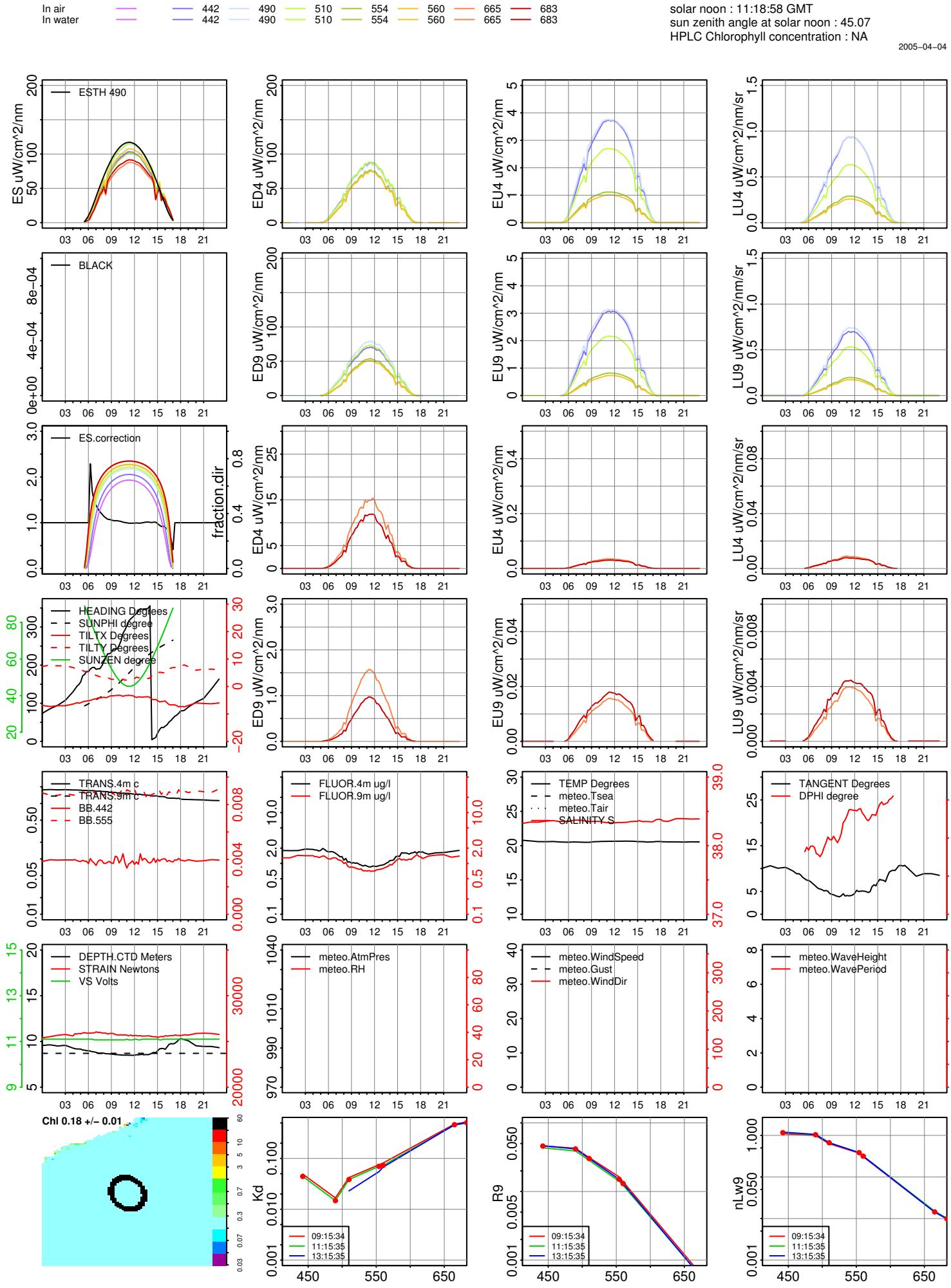
In air / In water: 442 / 442, 490 / 490, 510 / 510, 554 / 554, 560 / 560, 665 / 665, 683 / 683

solar noon : 11:19:18 GMT
sun zenith angle at solar noon : 44.68
HPLC Chlorophyll concentration : NA

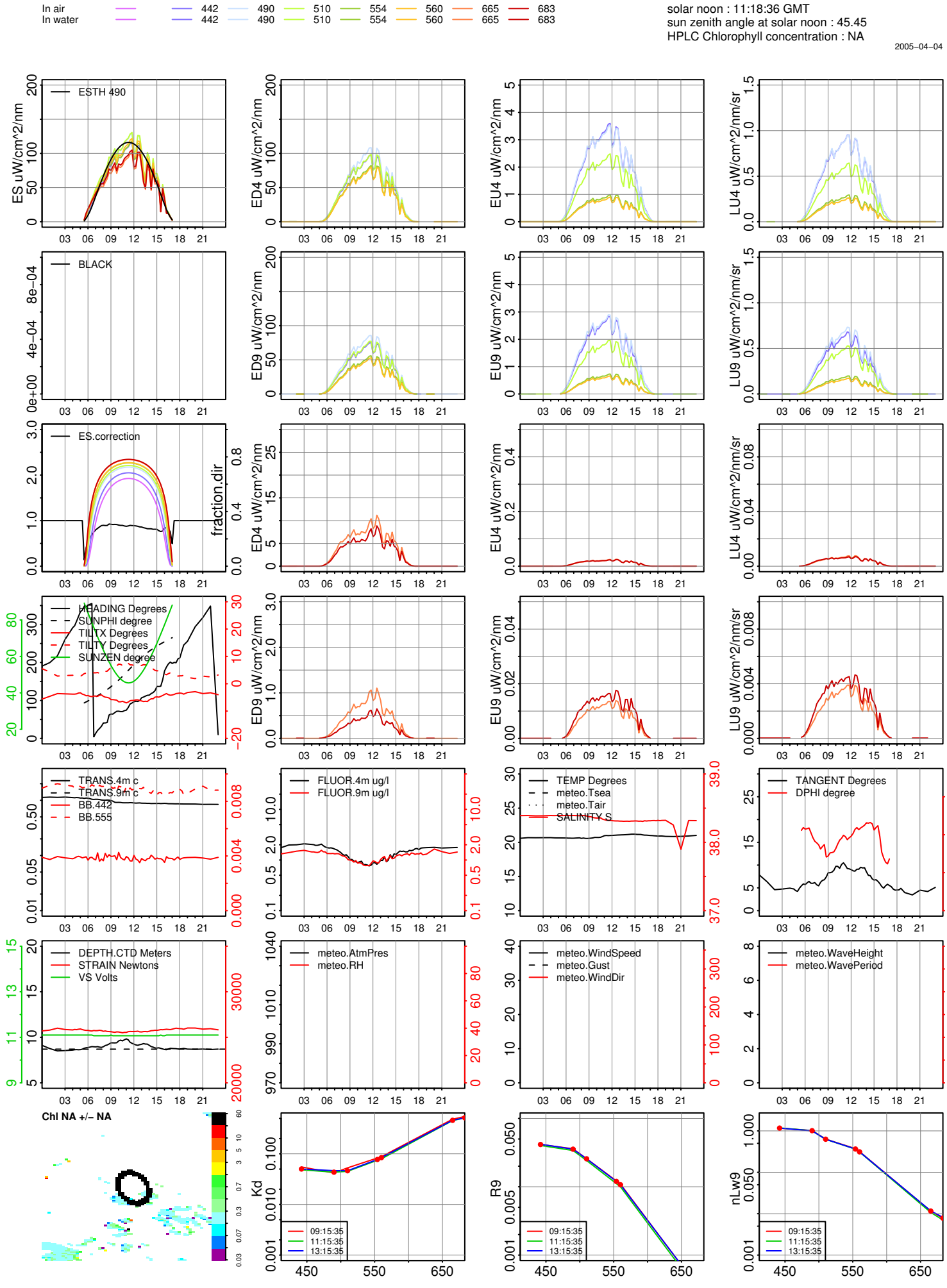
2005–04–04



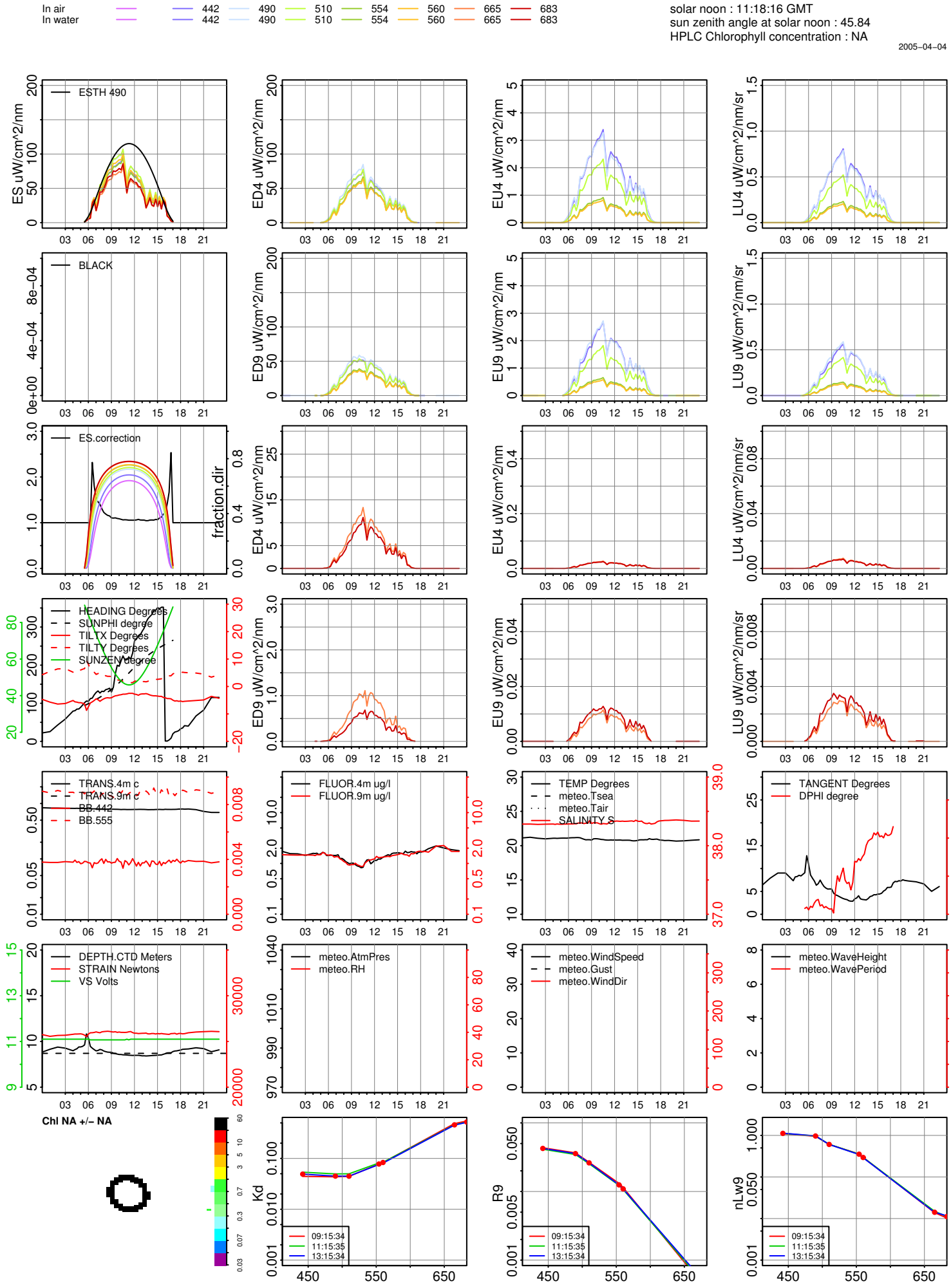
2004–09–27


In air
In water
442
490
510
554
560
665
683
solar noon : 11:18:58 GMT
sun zenith angle at solar noon : 45.07
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.18 +/– 0.01
Kd
R9
nLw9
09:15:34
11:15:35
13:15:35

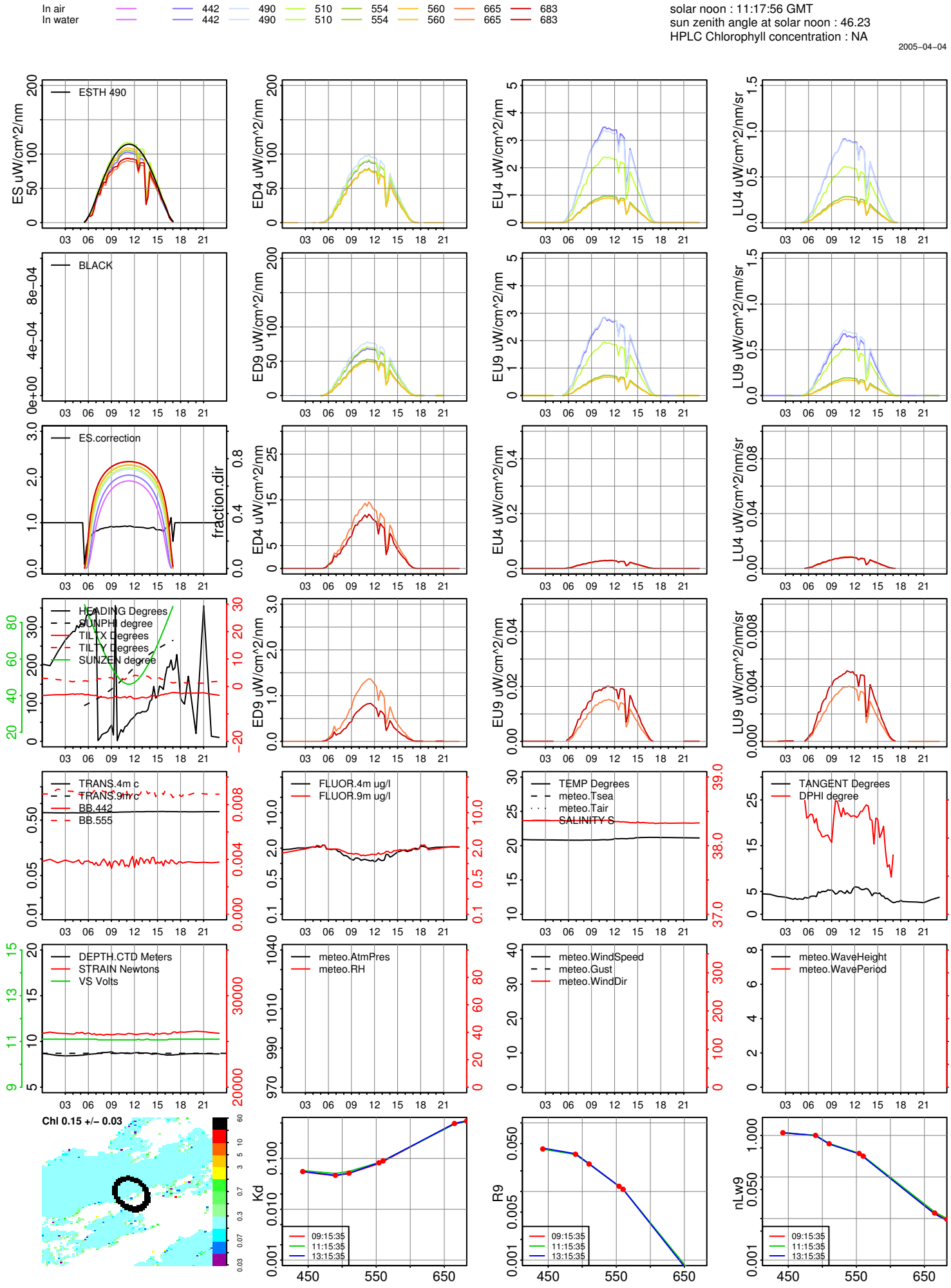
2004–09–28


In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:18:36 GMT
sun zenith angle at solar noon : 45.45
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:35
13:15:35

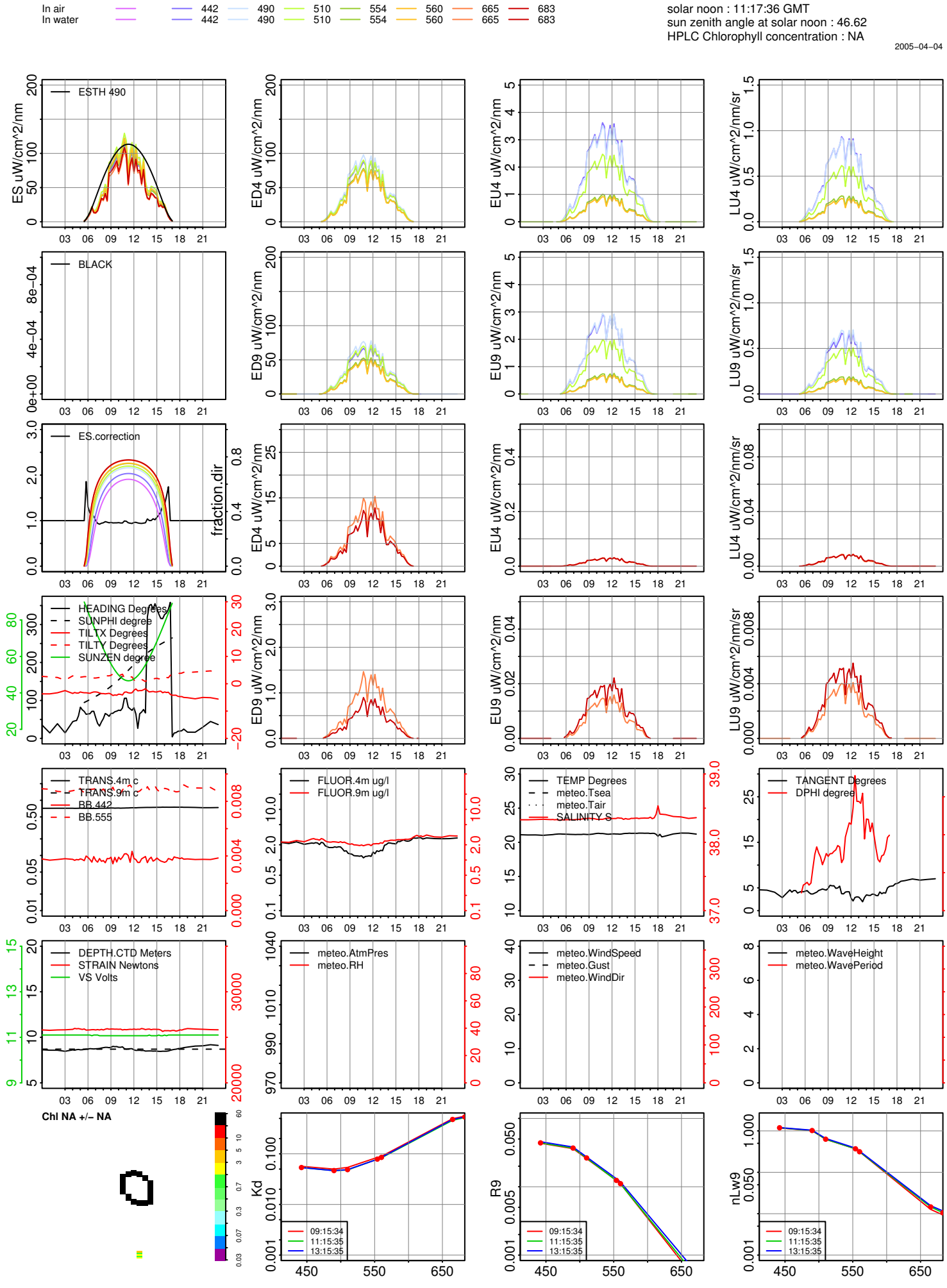
2004–09–29


In air
In water
442
490
510
554
560
665
683
solar noon : 11:18:16 GMT
sun zenith angle at solar noon : 45.84
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:34
11:15:35
13:15:34

2004–09–30


In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:17:56 GMT
sun zenith angle at solar noon : 46.23
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.15 +/– 0.03
Kd
R9
nLw9
09:15:35
11:15:35
13:15:35

2004–10–01

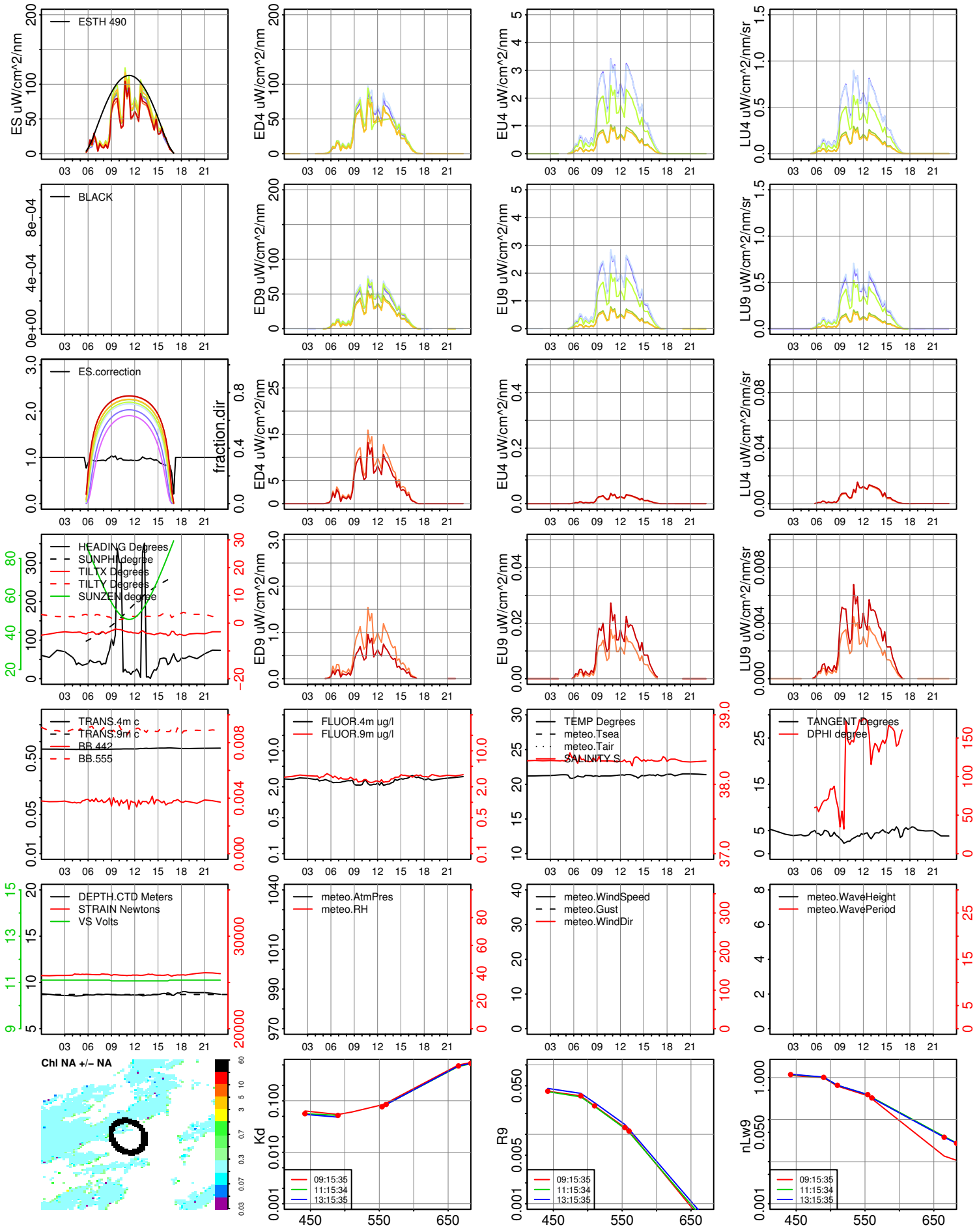

In air
In water
442
490
510
554
560
665
683
solar noon : 11:17:36 GMT
sun zenith angle at solar noon : 46.62
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:34
11:15:35
13:15:35

2004–10–02

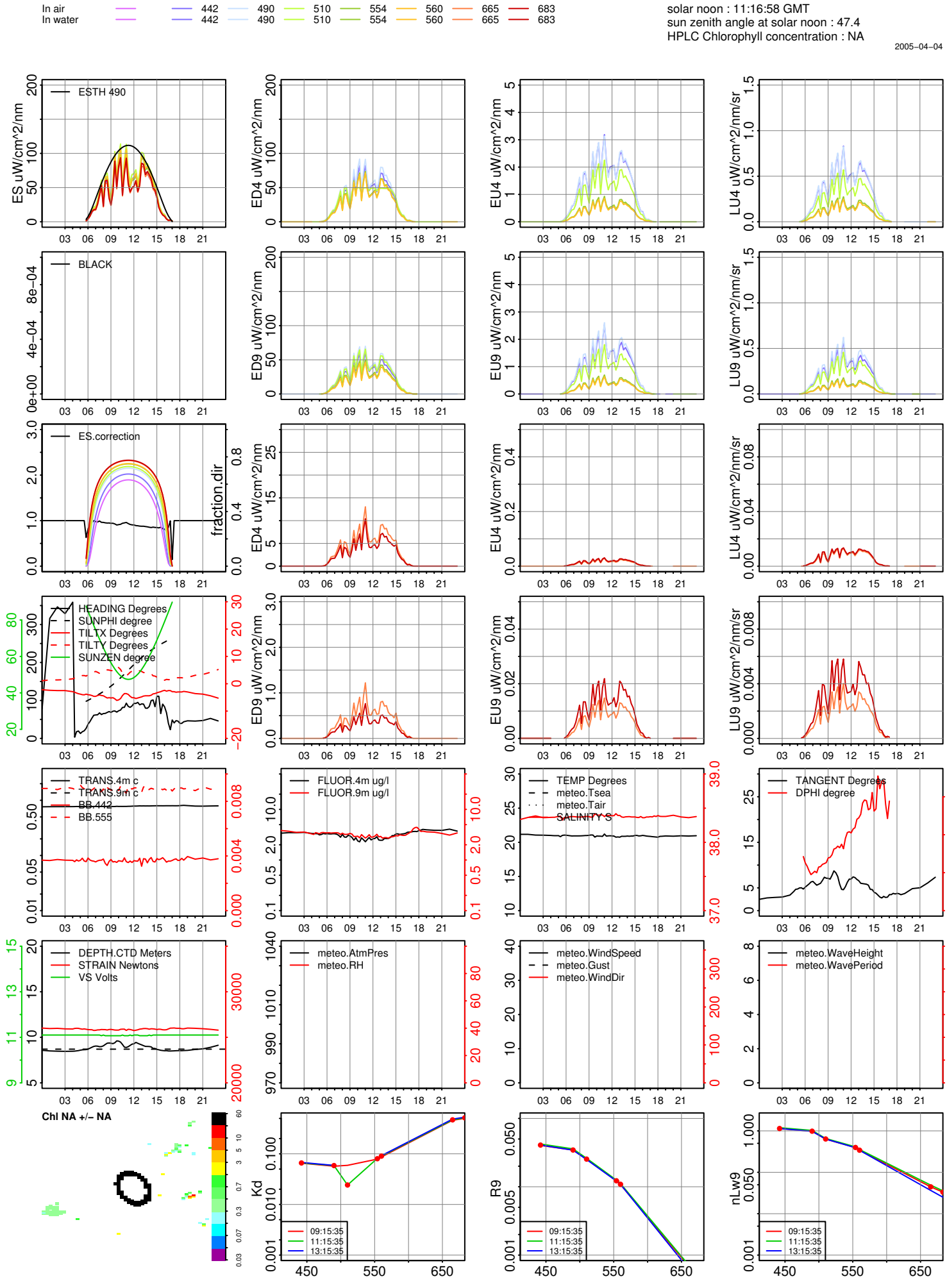
In air / In water: 442 / 442, 490 / 490, 510 / 510, 554 / 554, 560 / 560, 665 / 665, 683 / 683

solar noon : 11:17:16 GMT
sun zenith angle at solar noon : 47.01
HPLC Chlorophyll concentration : NA

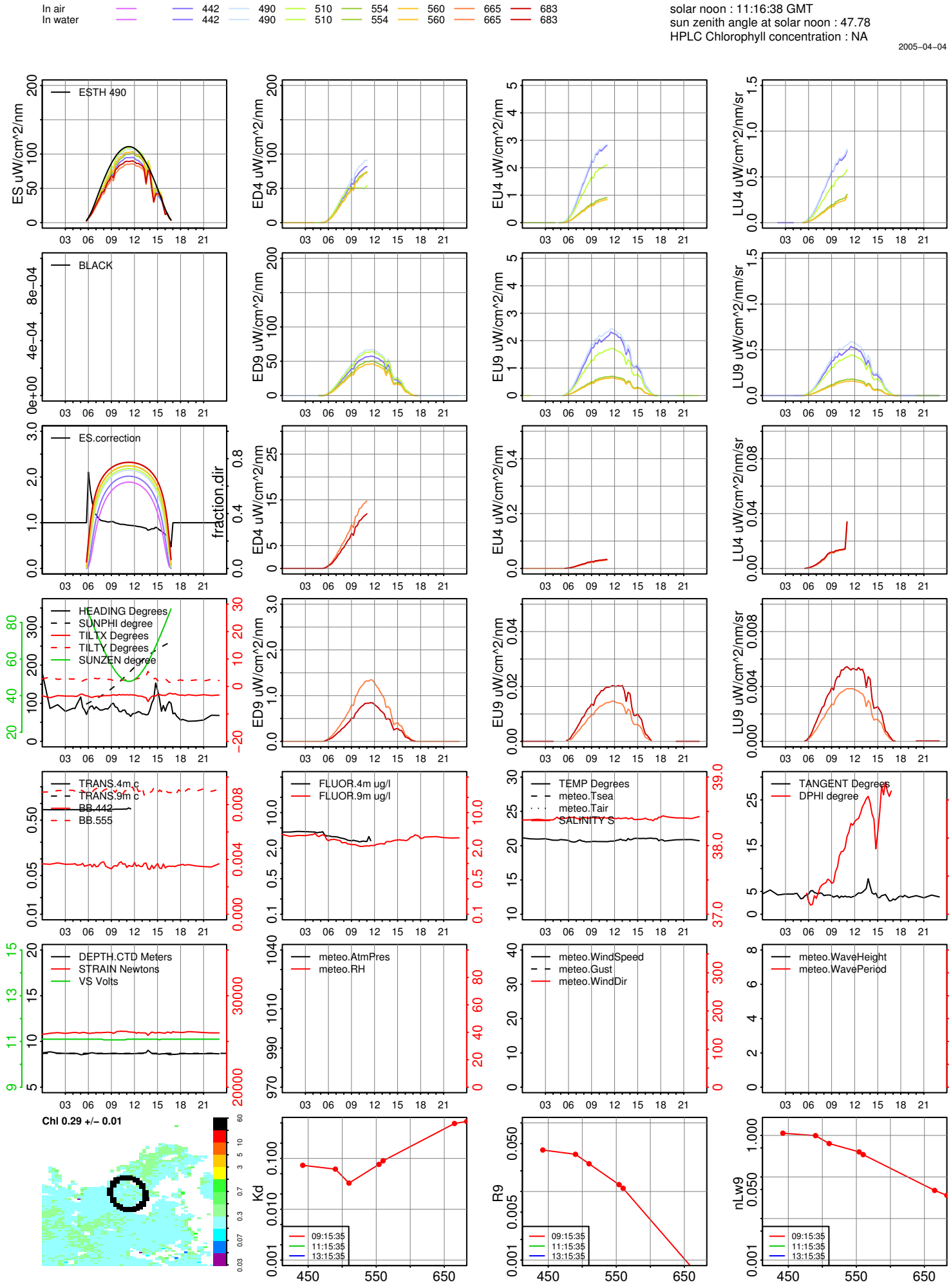
2005–04–04



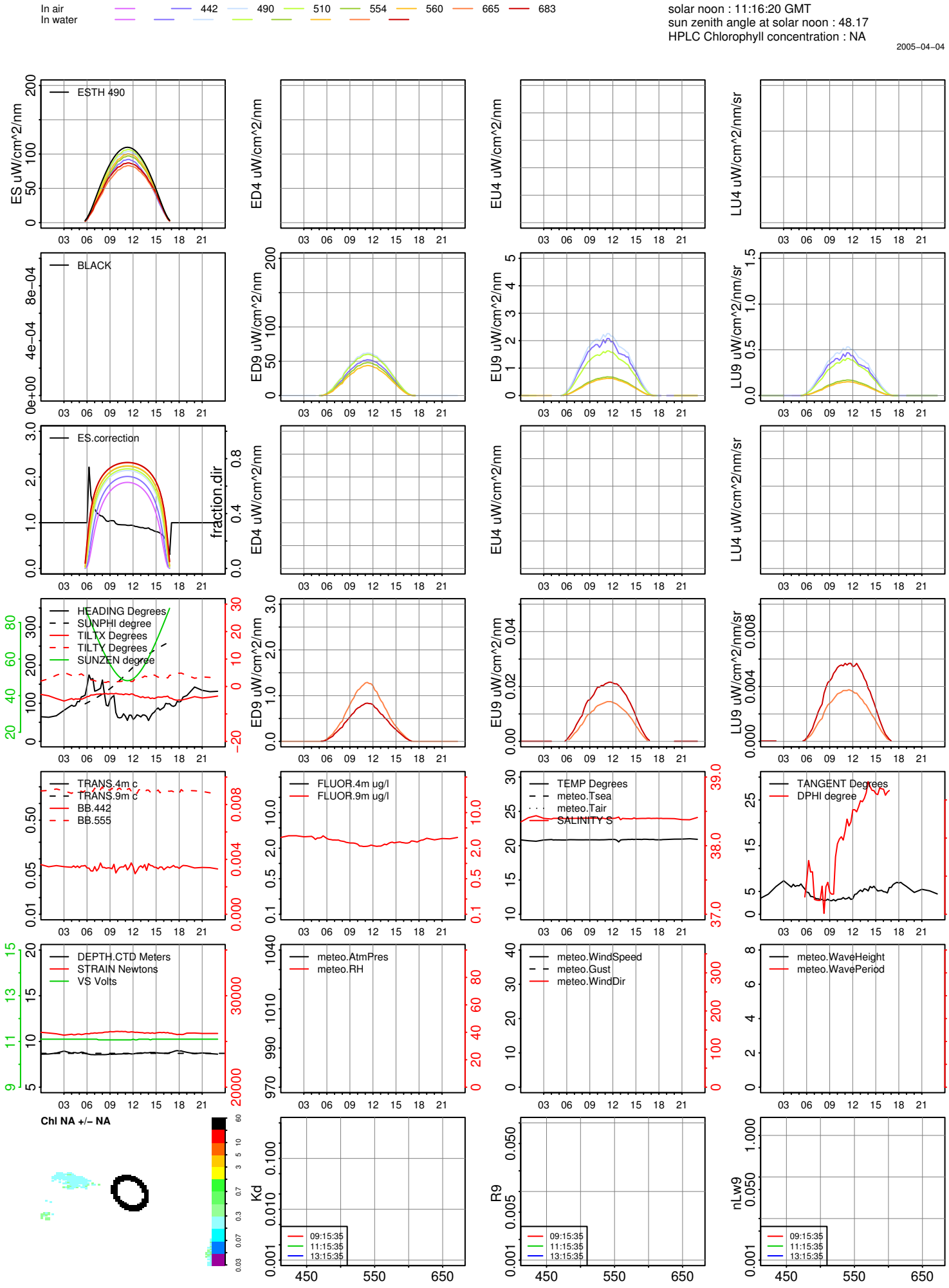
2004–10–03


In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:16:58 GMT
sun zenith angle at solar noon : 47.4
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:35
13:15:35

2004–10–04


In air
In water
442
442
490
490
510
510
554
554
560
560
665
665
683
683
solar noon : 11:16:38 GMT
sun zenith angle at solar noon : 47.78
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.29 +/– 0.01
Kd
R9
nLw9
09:15:35
11:15:35
13:15:35

2004–10–05

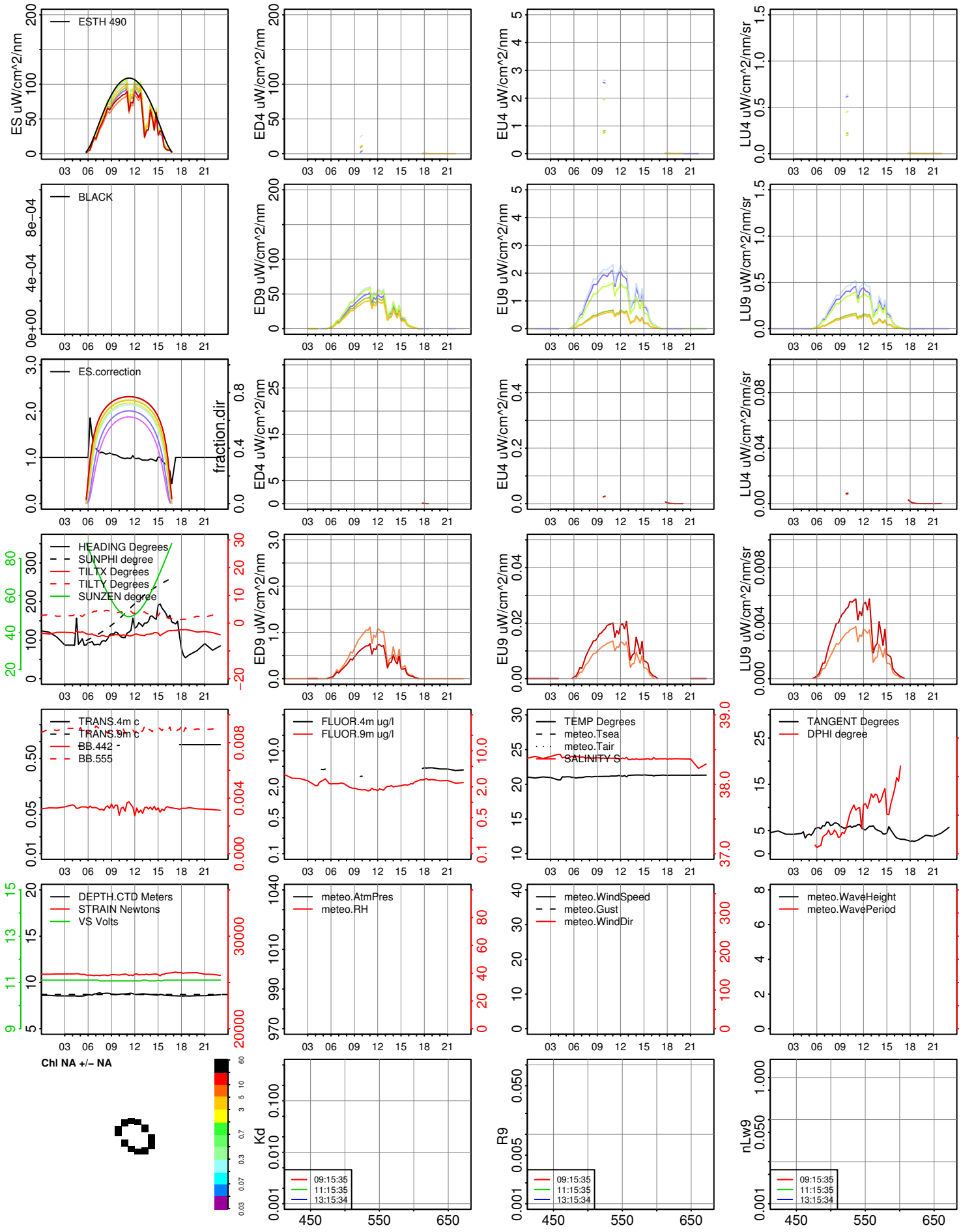

In air
In water
442
490
510
554
560
665
683
solar noon : 11:16:20 GMT
sun zenith angle at solar noon : 48.17
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:35
13:15:35

2004–10–06

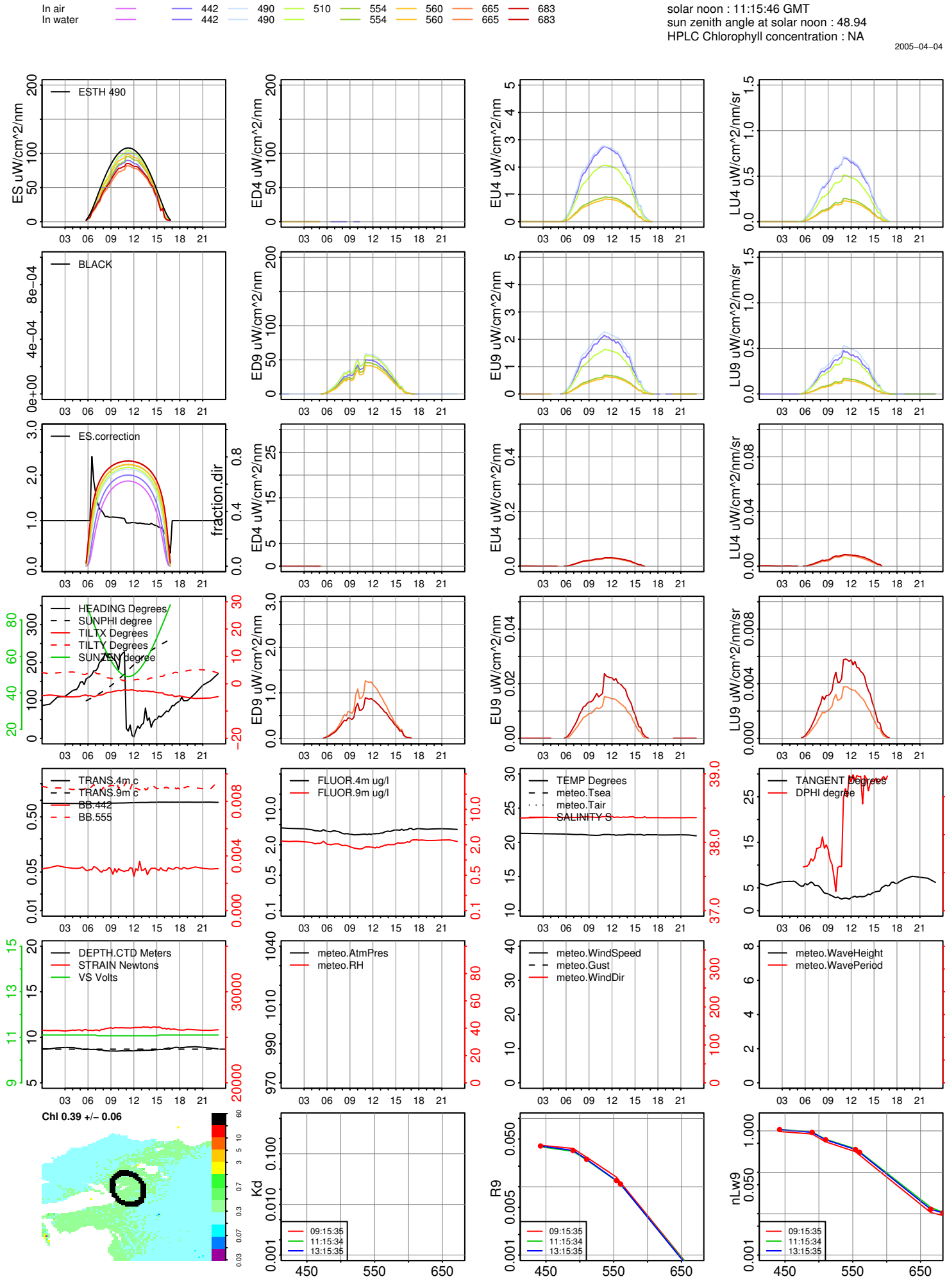
In air 442 490 510 554 560 665 683
In water 442 490 554 560 665 683

solar noon : 11:16:2 GMT
sun zenith angle at solar noon : 48.55
HPLC Chlorophyll concentration : NA

2005–04–04



2004–10–07

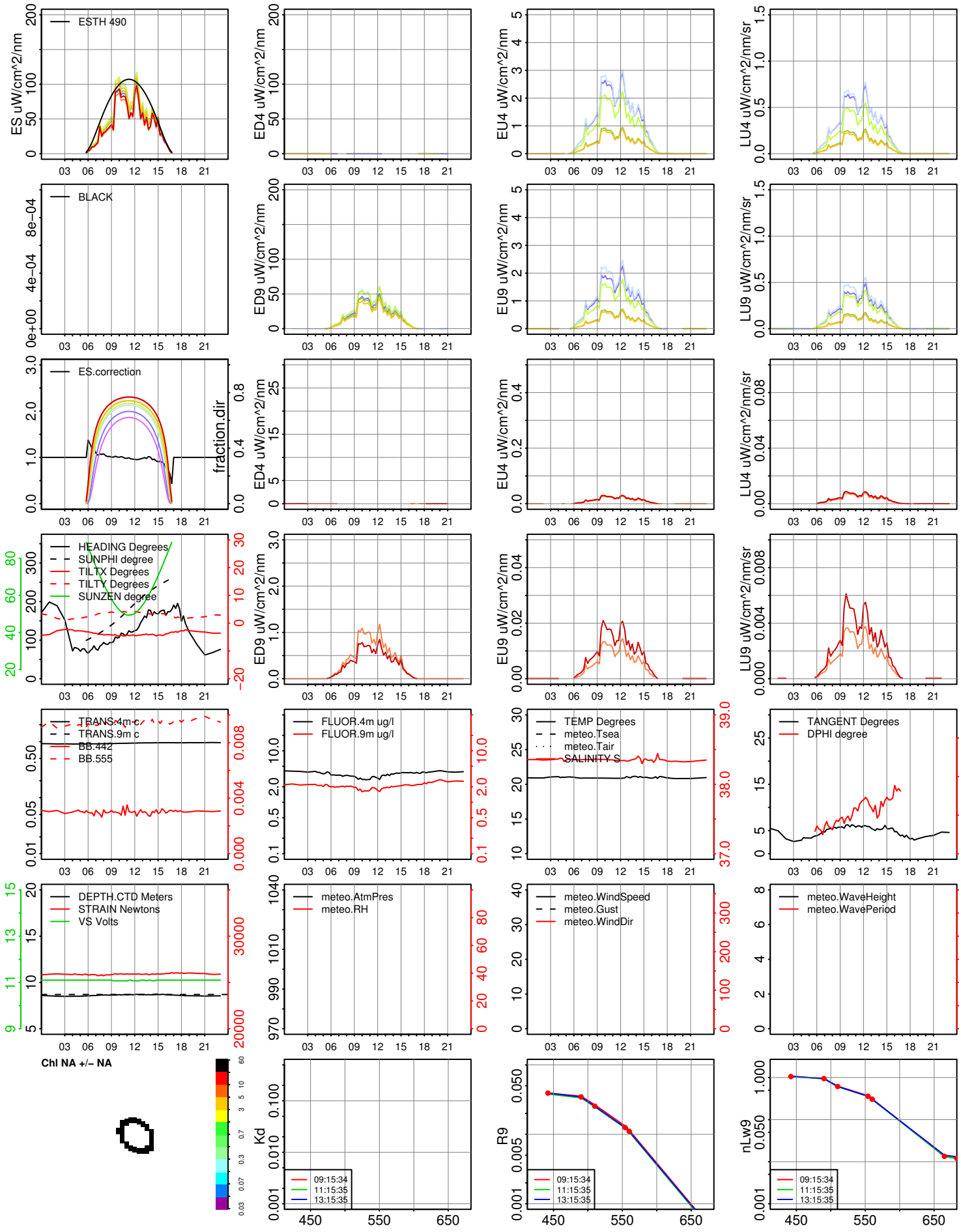

In air
In water
442
442
490
490
510
554
554
560
560
665
665
683
683
solar noon : 11:15:46 GMT
sun zenith angle at solar noon : 48.94
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.39 +/– 0.06
Kd
R9
nLw9
09:15:35
11:15:34
13:15:35

2004–10–08

In air 442 490 510 554 560 665 683
In water 442 490 554 560 665 683

solar noon : 11:15:28 GMT
sun zenith angle at solar noon : 49.32
HPLC Chlorophyll concentration : NA

2005–04–04

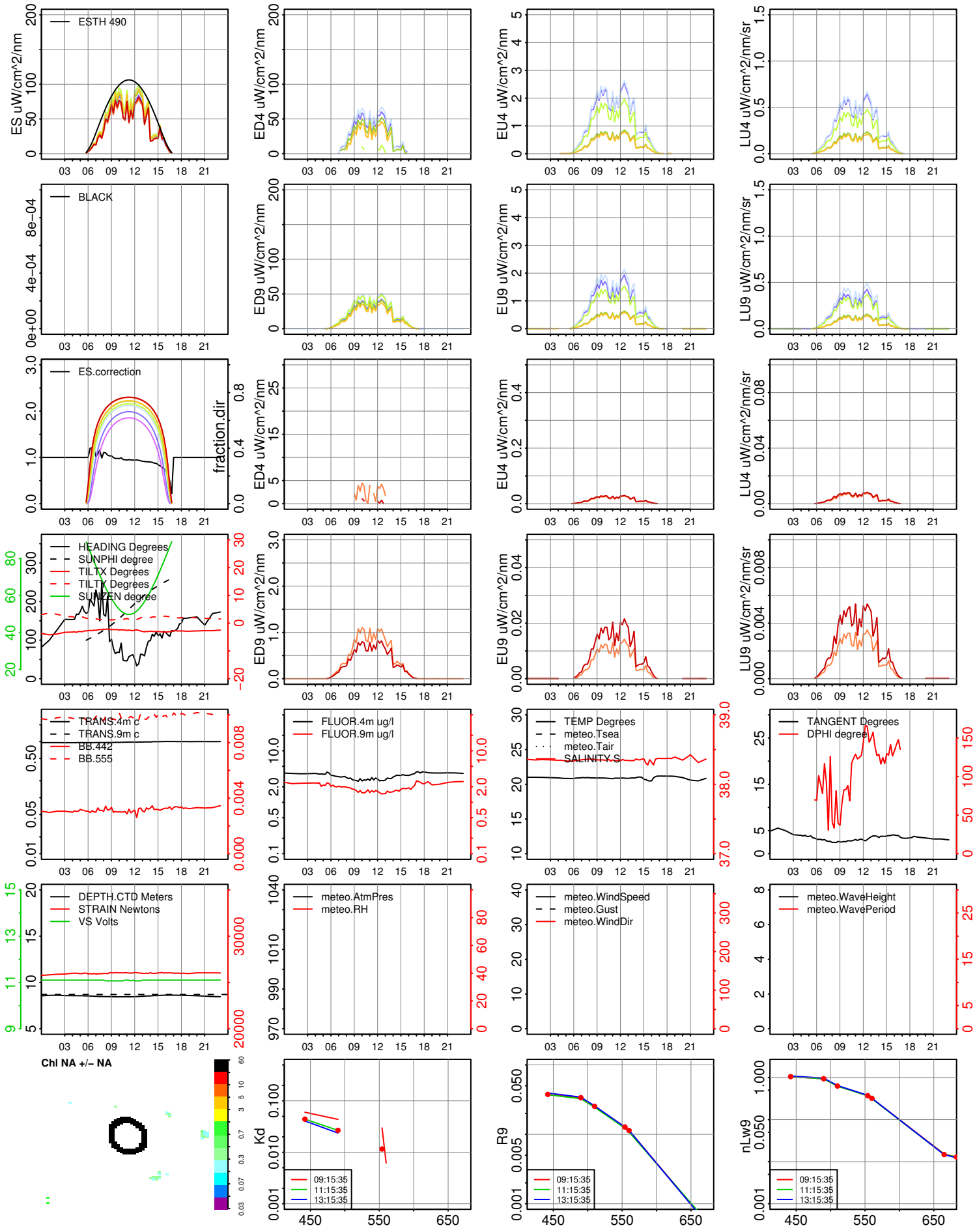


2004–10–09

In air 442 490 510 554 560 665 683
In water 442 490 510 554 560 665 683

solar noon : 11:15:12 GMT
sun zenith angle at solar noon : 49.7
HPLC Chlorophyll concentration : NA

2005–04–04



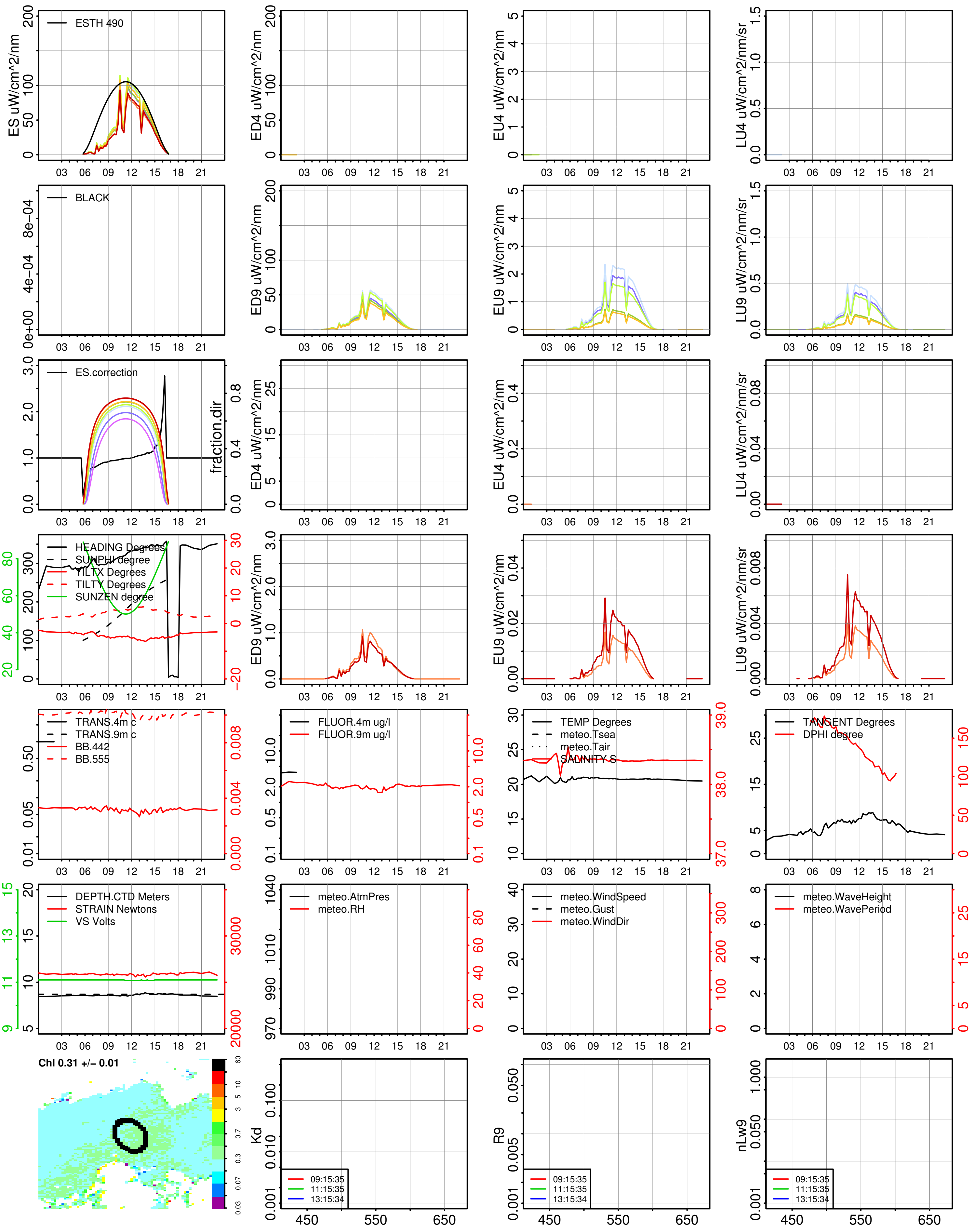
buoy daily data collection sheet

2004−10−10

In air		442	490	510	554	560	665	683
In water		442	490	510	554	560	665	683

solar noon : 11:14:56 GMT
sun zenith angle at solar noon : 50.08
HPLC Chlorophyll concentration : NA

2005−04−04

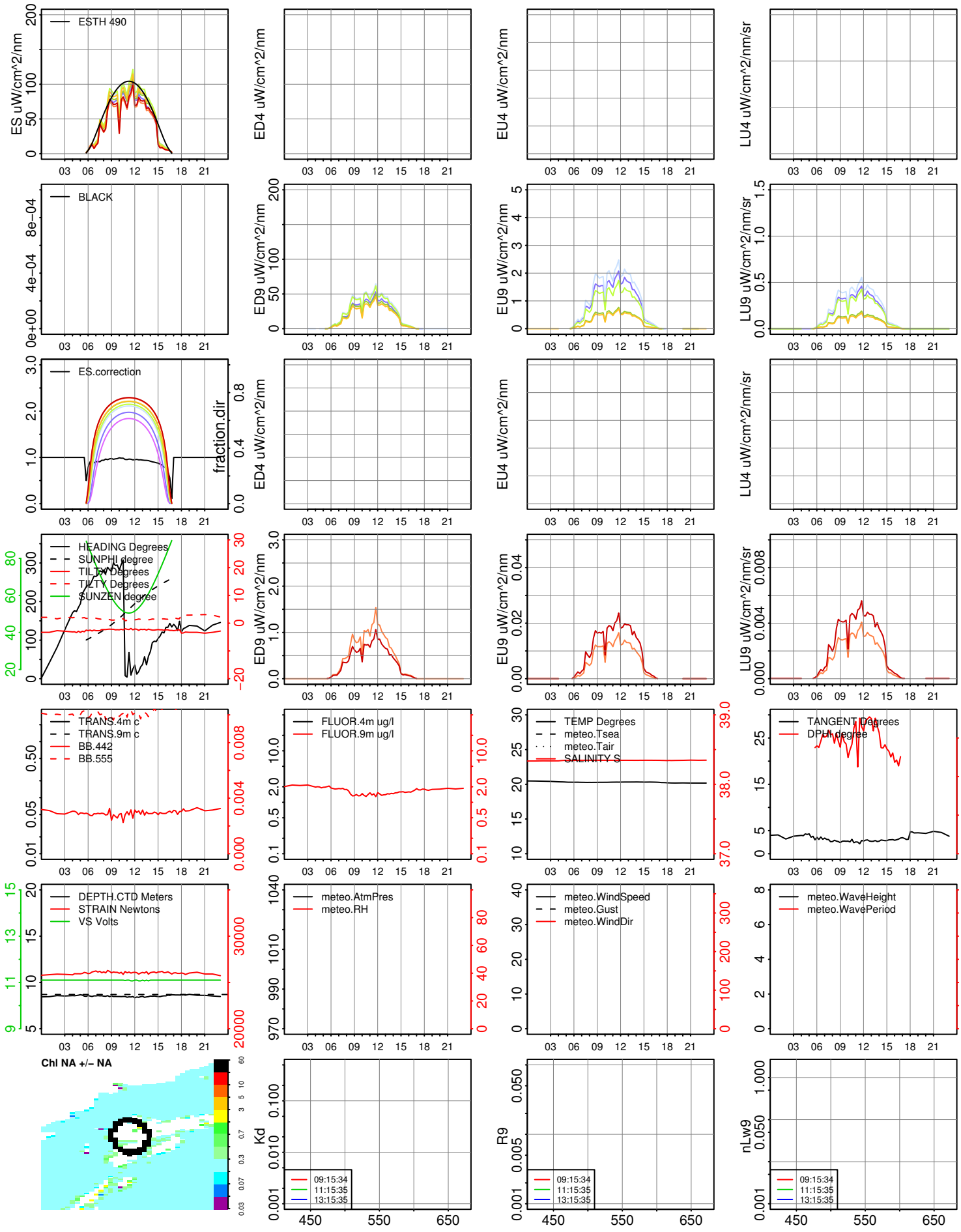


2004–10–11

In air
In water
442 490 510 554 560 665 683

solar noon : 11:14:42 GMT
sun zenith angle at solar noon : 50.46
HPLC Chlorophyll concentration : NA

2005–04–04

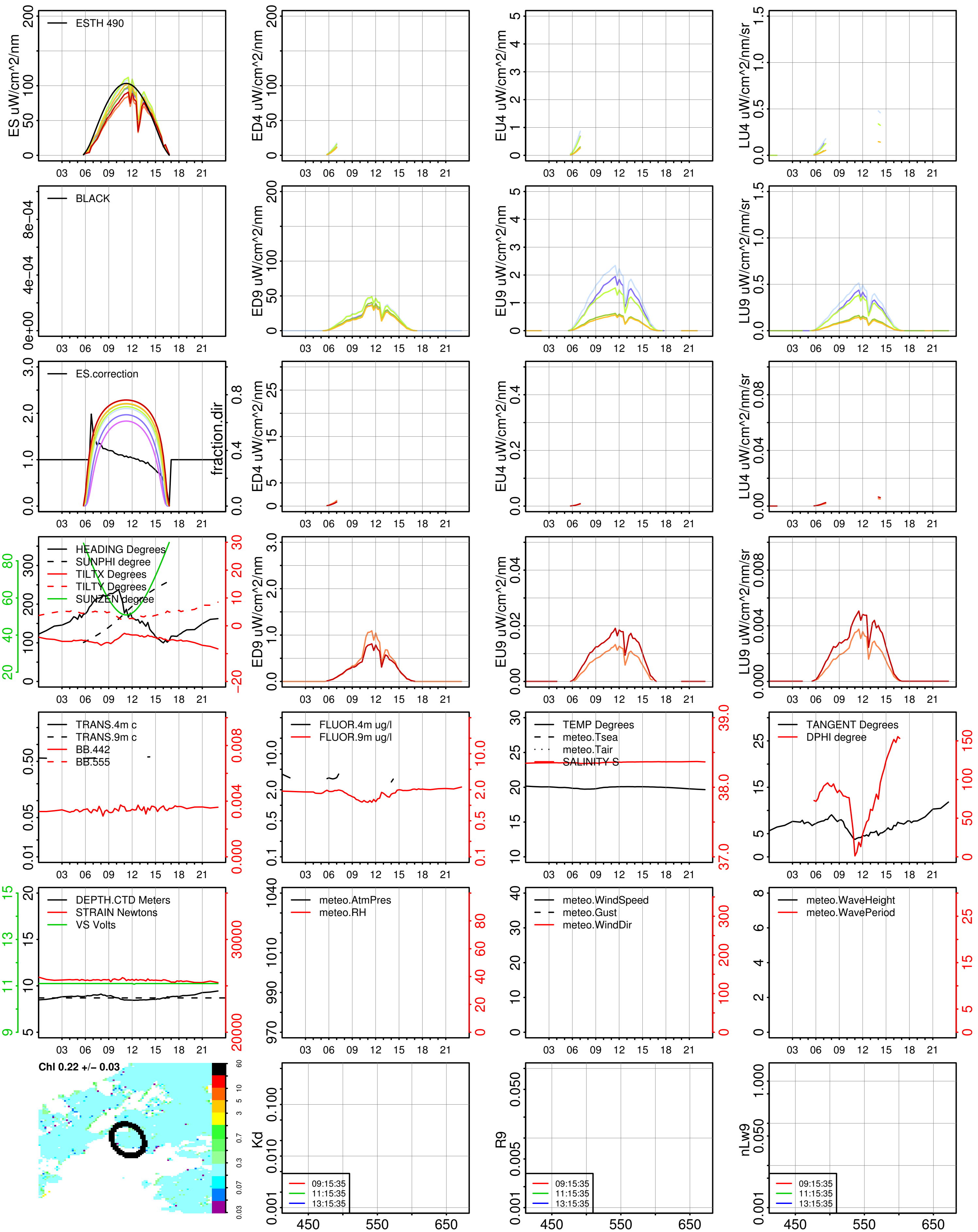


BOUSSOLE buoy daily data collection sheet
2004−10−12

In air — 442 490 510 554 560 665 683
In water — 442 490 510 554 560 665 683

solar noon : 11:14:26 GMT
sun zenith angle at solar noon : 50.84
HPLC Chlorophyll concentration : NA

2005−04−04

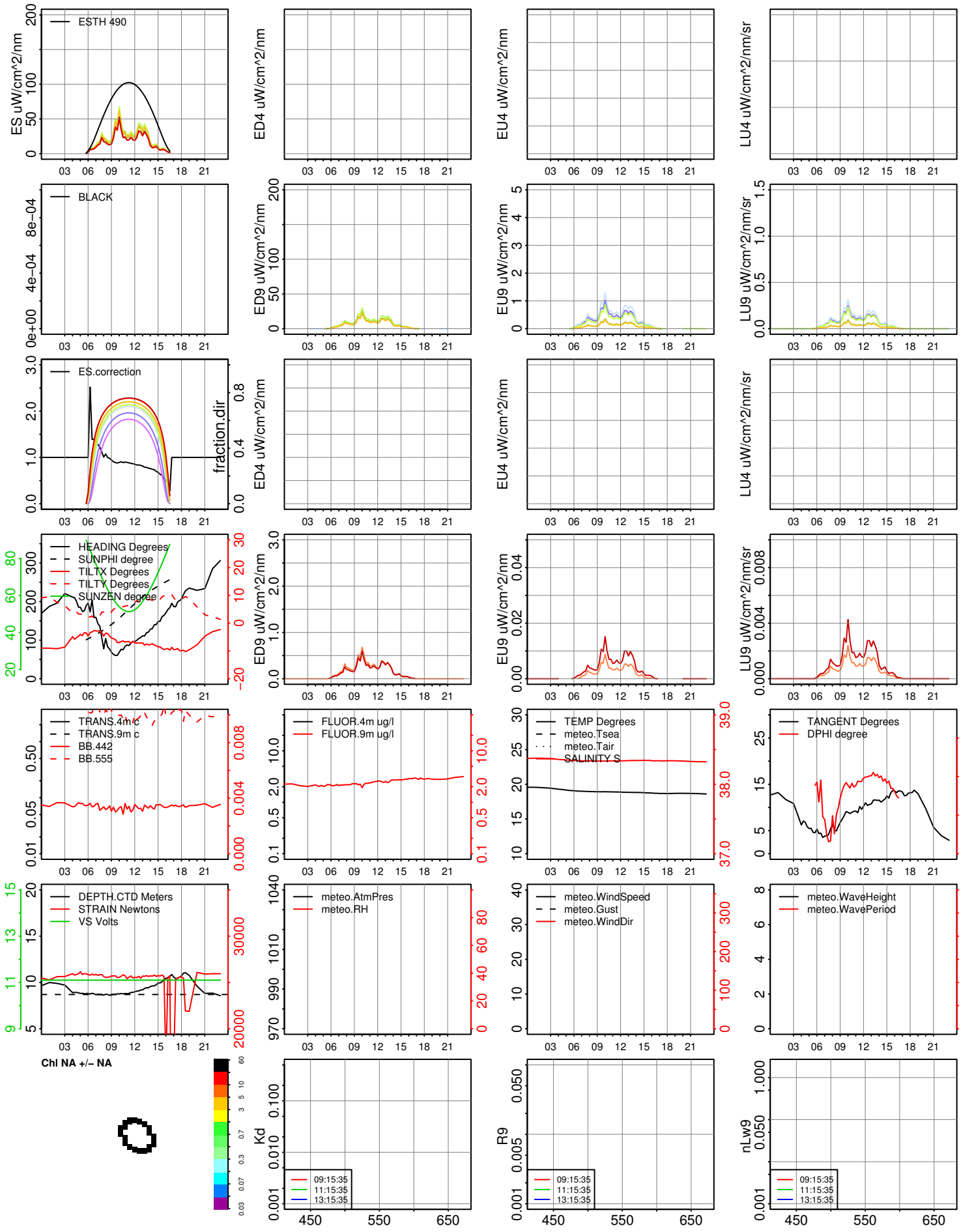


2004–10–13

In air
In water
442 490 510 554 560 665 683

solar noon : 11:14:12 GMT
sun zenith angle at solar noon : 51.21
HPLC Chlorophyll concentration : NA

2005–04–04

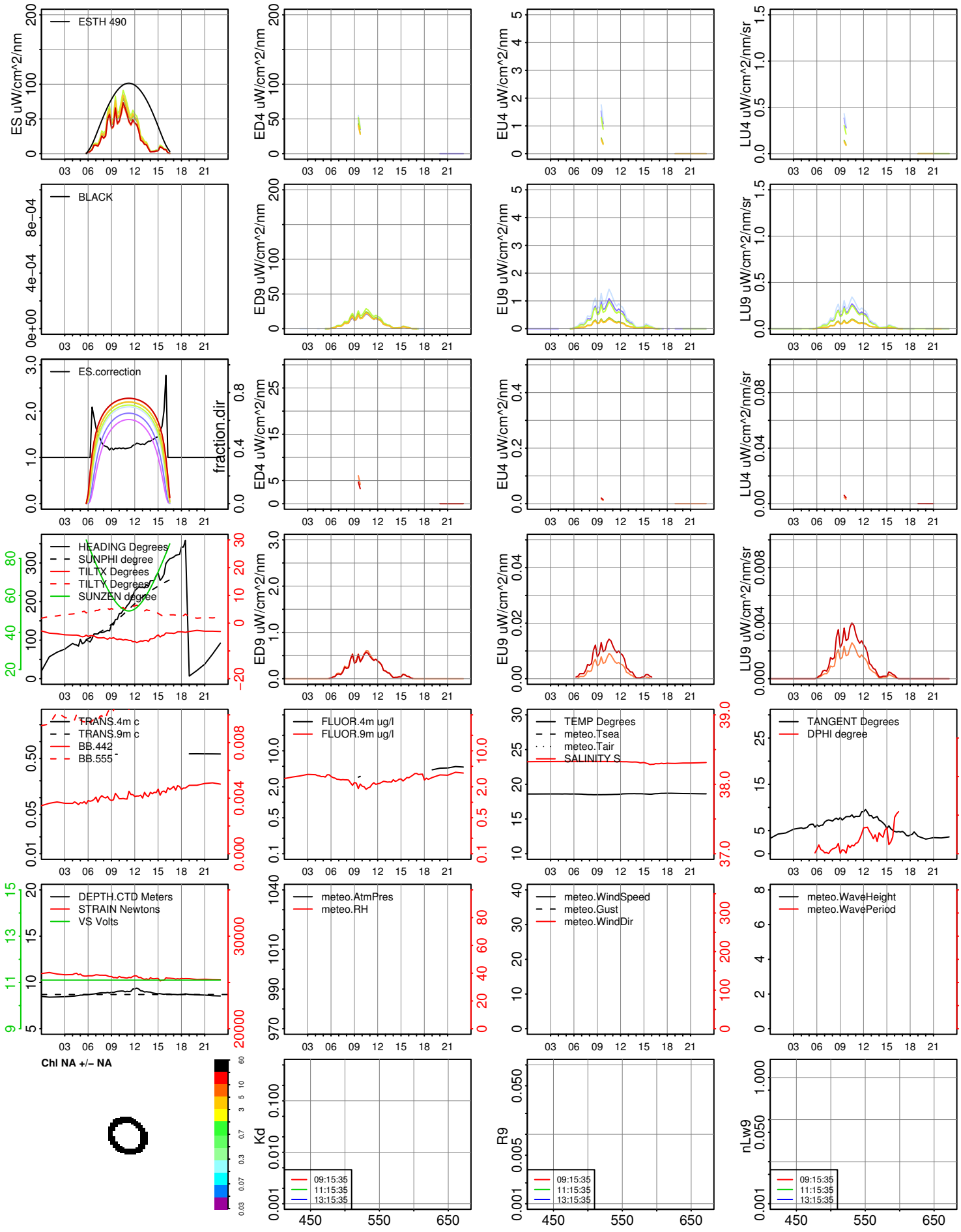


2004–10–14

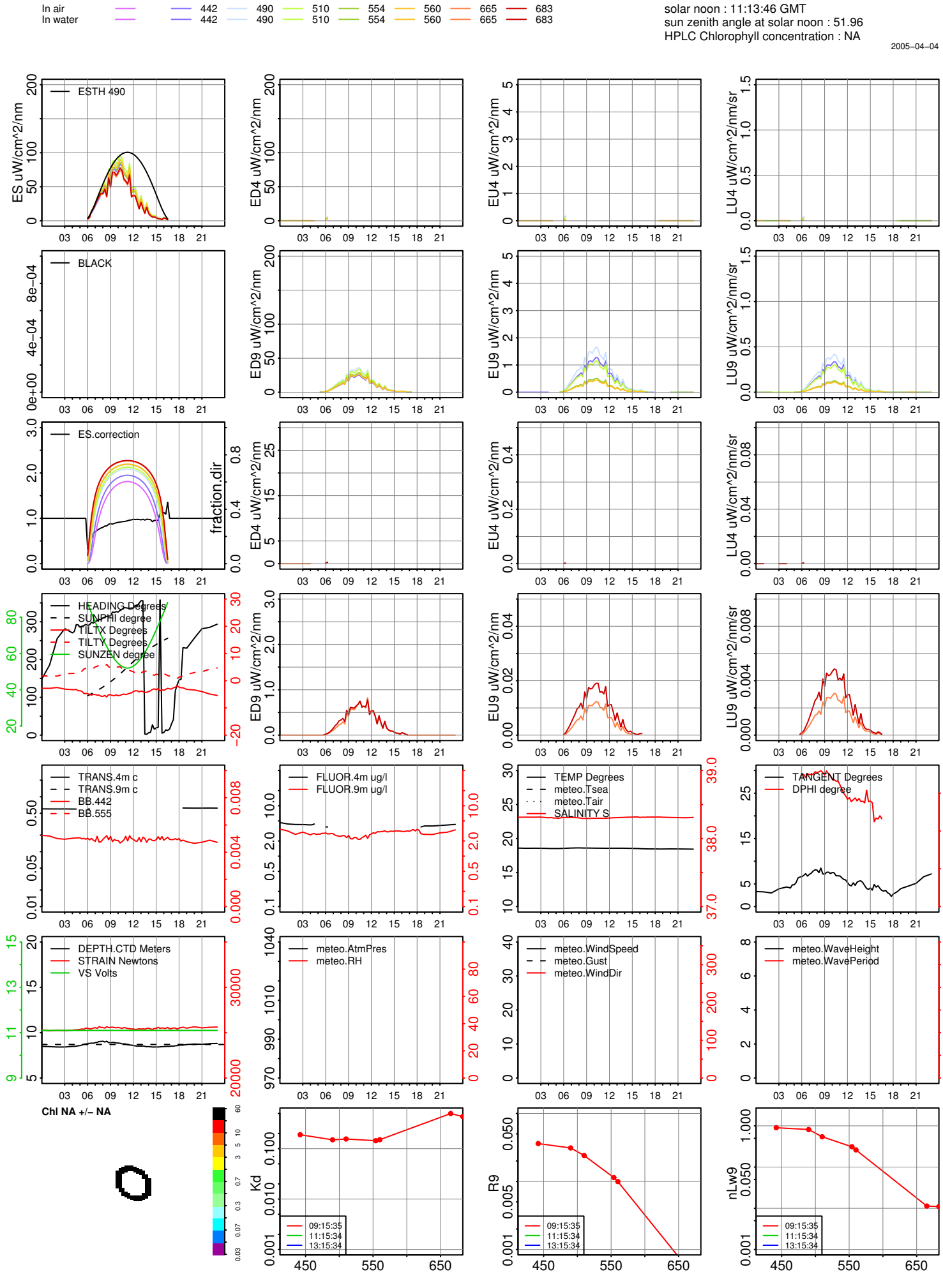
In air 442 490 510 554 560 665 683
In water 442 490 510 554 560 665 683

solar noon : 11:13:60 GMT
sun zenith angle at solar noon : 51.58
HPLC Chlorophyll concentration : NA

2005–04–04



2004–10–15

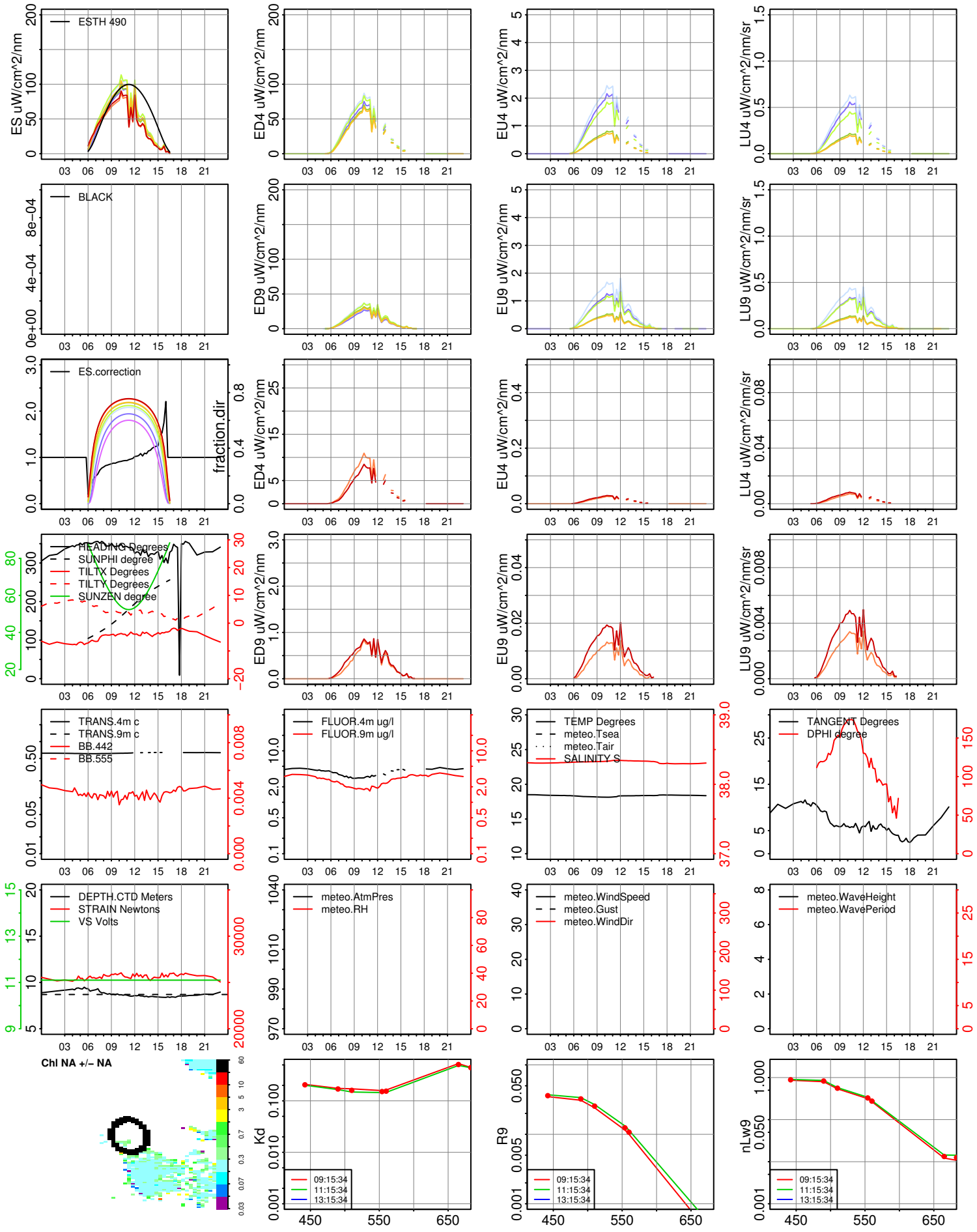

In air
In water
442
490
510
554
560
665
683
solar noon : 11:13:46 GMT
sun zenith angle at solar noon : 51.96
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:34
13:15:34

2004–10–16

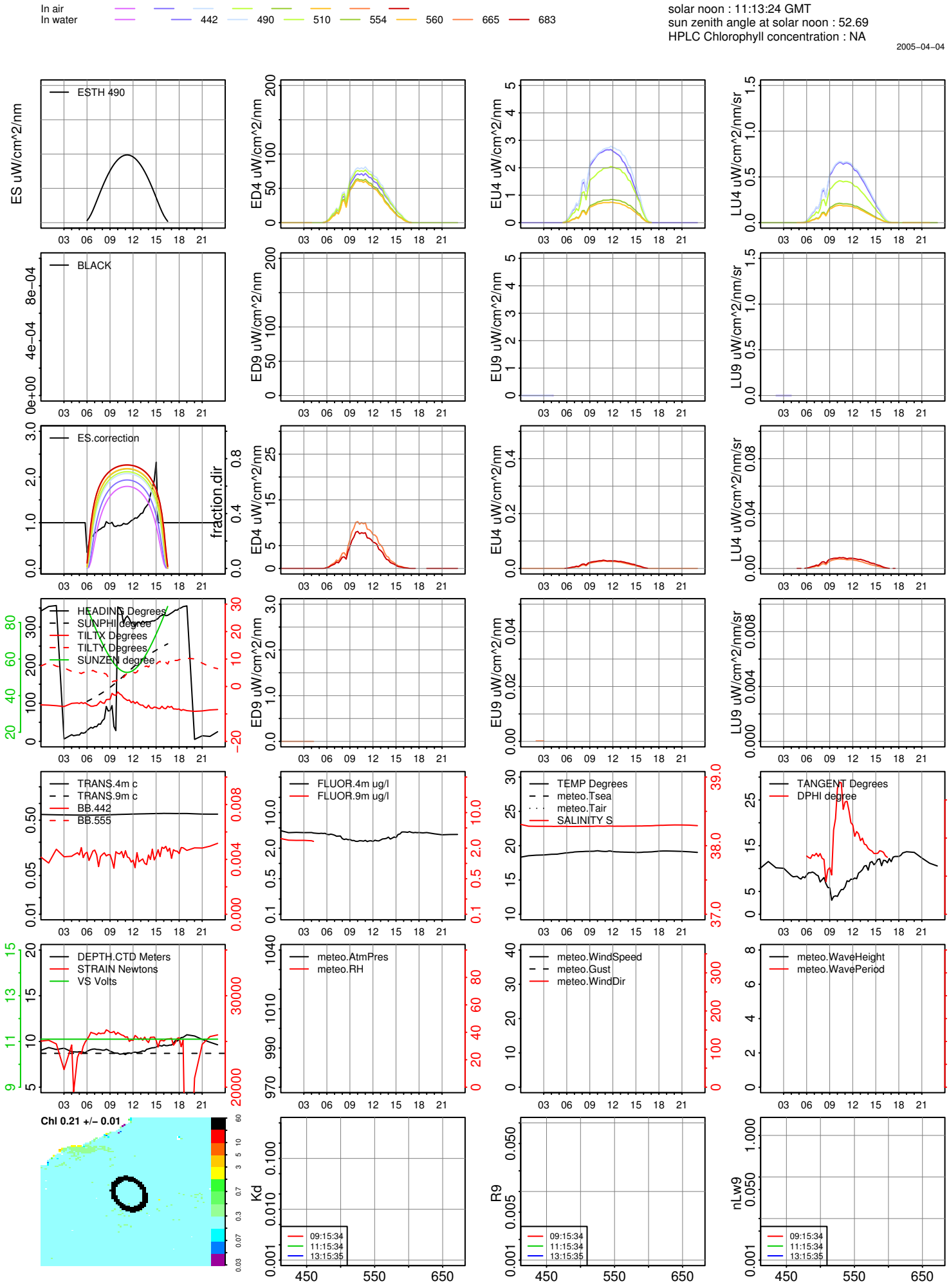
In air / In water: 442 / 442, 490 / 490, 510 / 510, 554 / 554, 560 / 560, 665 / 665, 683 / 683

solar noon : 11:13:34 GMT
sun zenith angle at solar noon : 52.33
HPLC Chlorophyll concentration : NA

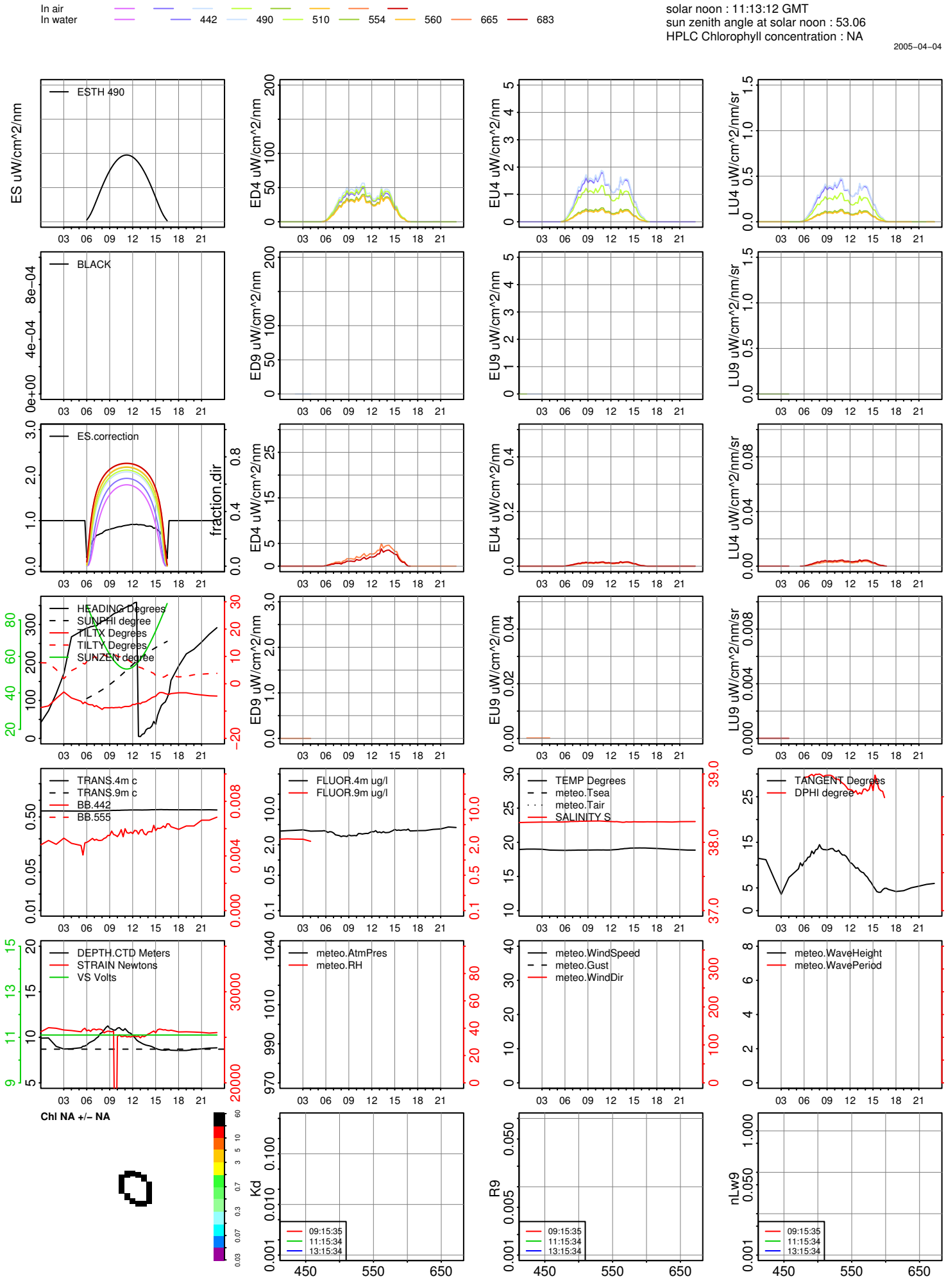
2005–04–04



2004–10–17


In air
In water
442
490
510
554
560
665
683
solar noon : 11:13:24 GMT
sun zenith angle at solar noon : 52.69
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.21 +/– 0.01
Kd
R9
nLw9
09:15:34
11:15:34
13:15:35

2004–10–18

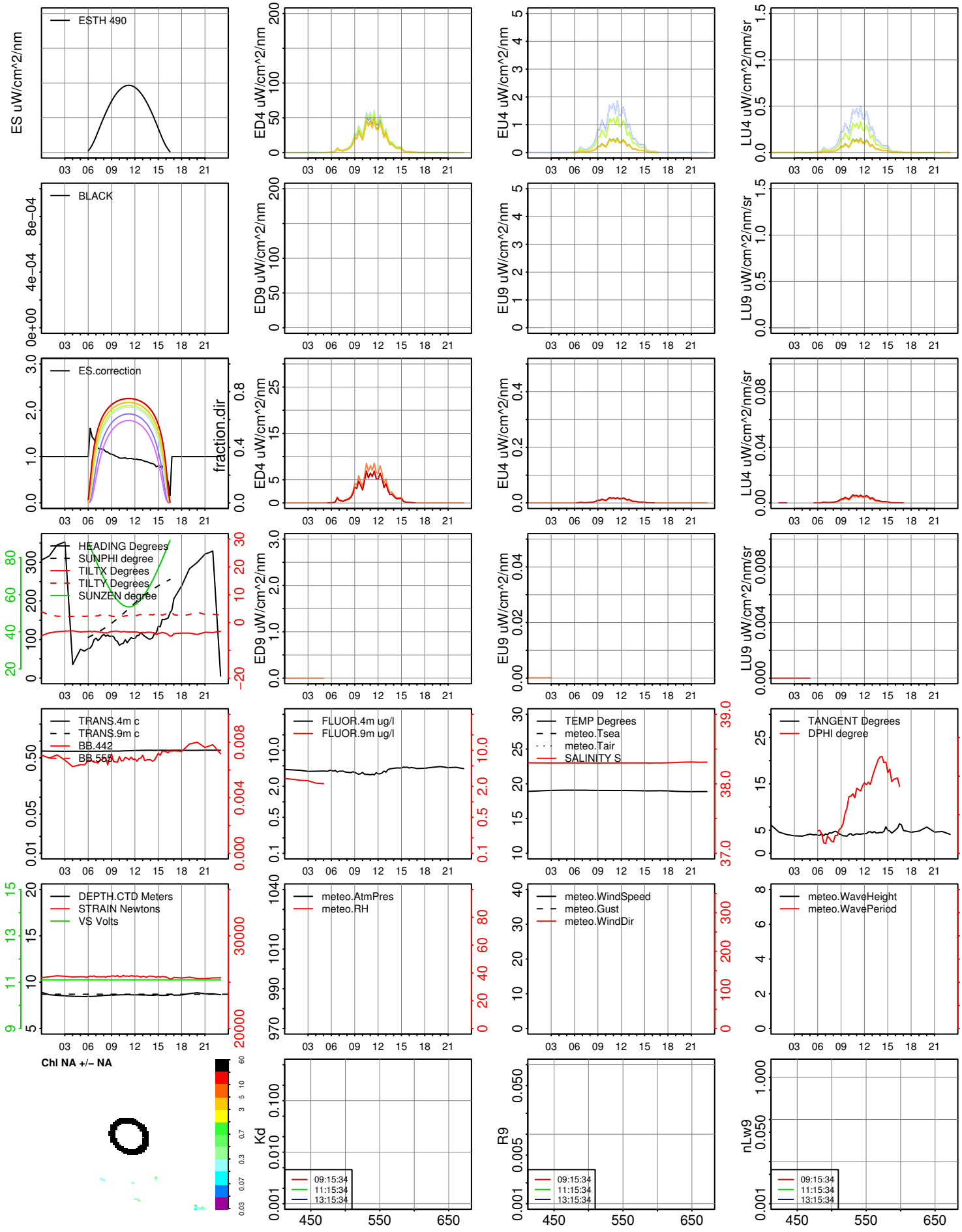

In air
In water
442
490
510
554
560
665
683
solar noon : 11:13:12 GMT
sun zenith angle at solar noon : 53.06
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:34
13:15:34

2004–10–19

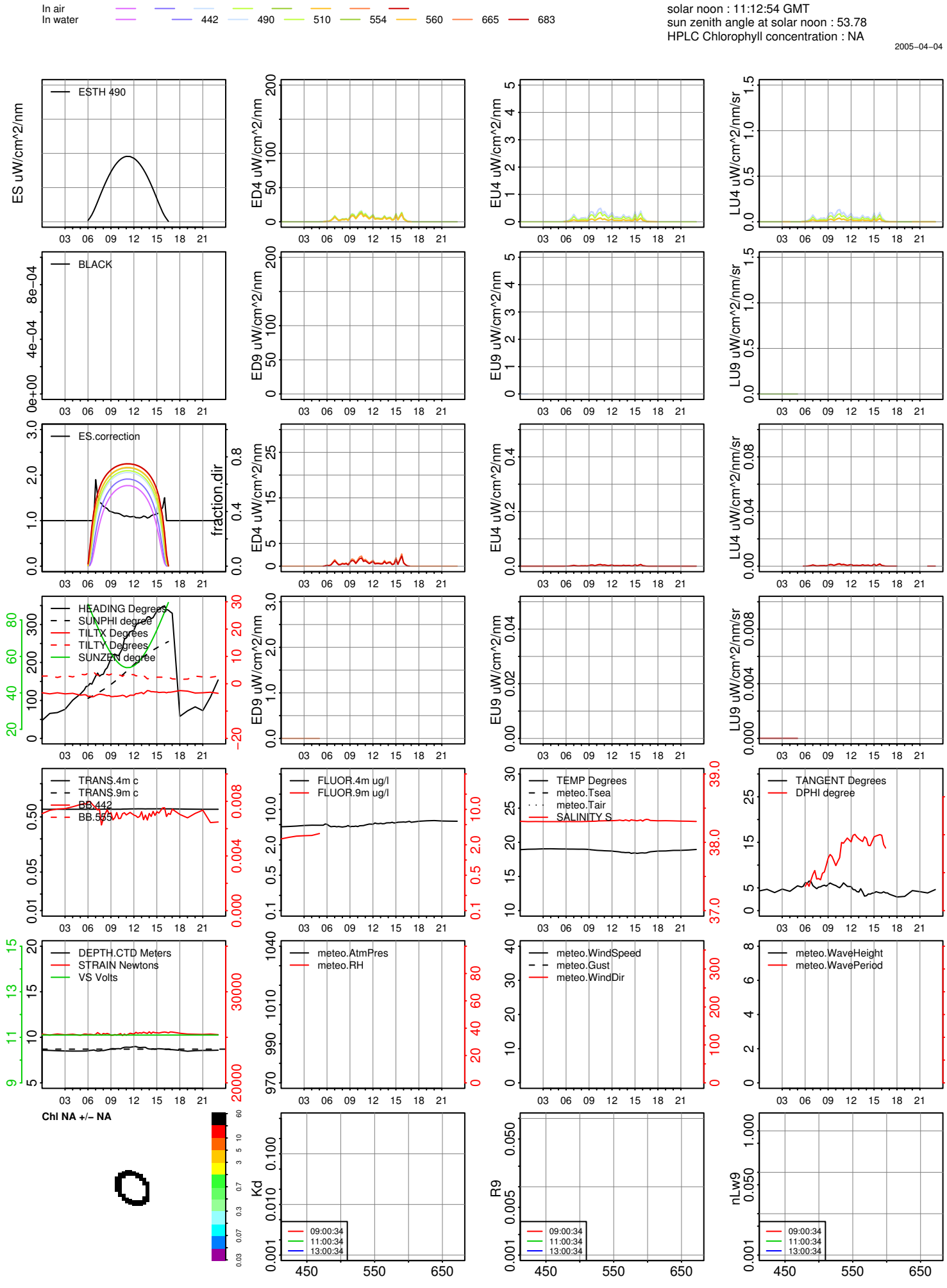
In air
In water
442 490 510 554 560 665 683

solar noon : 11:13:2 GMT
sun zenith angle at solar noon : 53.42
HPLC Chlorophyll concentration : NA

2005–04–04



2004–10–20

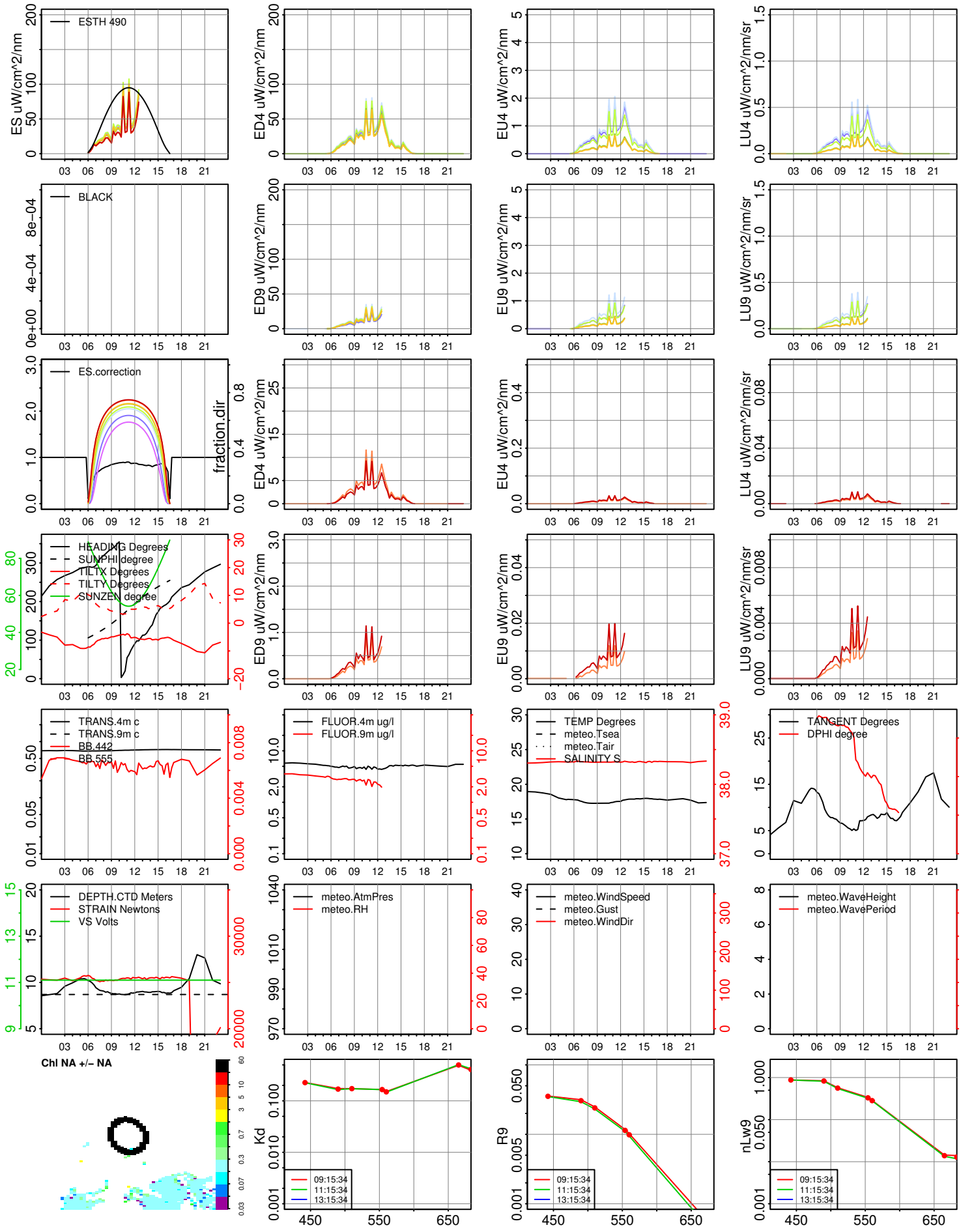

In air
In water
442
490
510
554
560
665
683
solar noon : 11:12:54 GMT
sun zenith angle at solar noon : 53.78
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:00:34
11:00:34
13:00:34

2004–10–21

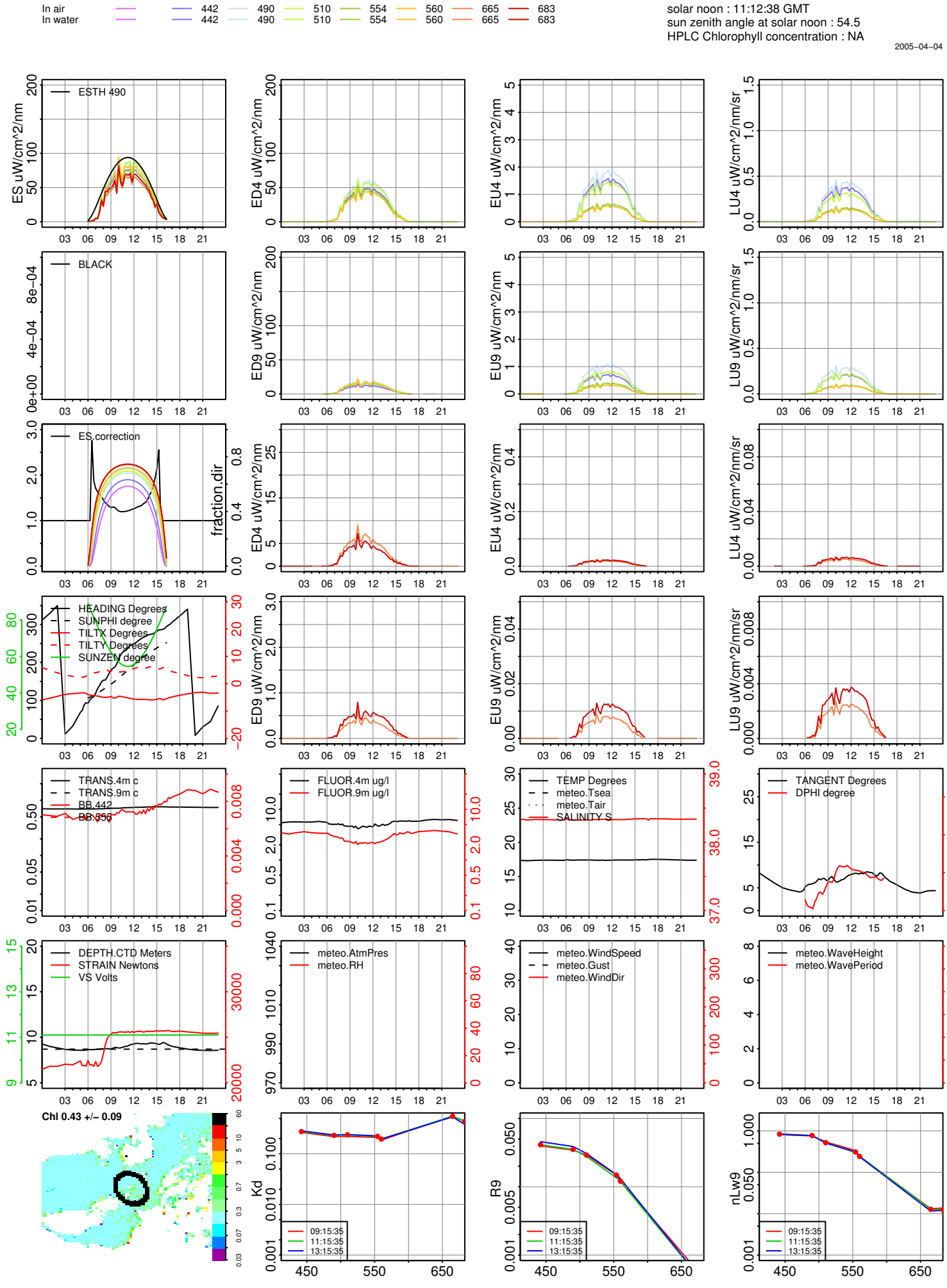
In air 442 490 510 554 560 665 683
In water 442 490 510 554 560 665 683

solar noon : 11:12:44 GMT
sun zenith angle at solar noon : 54.14
HPLC Chlorophyll concentration : NA

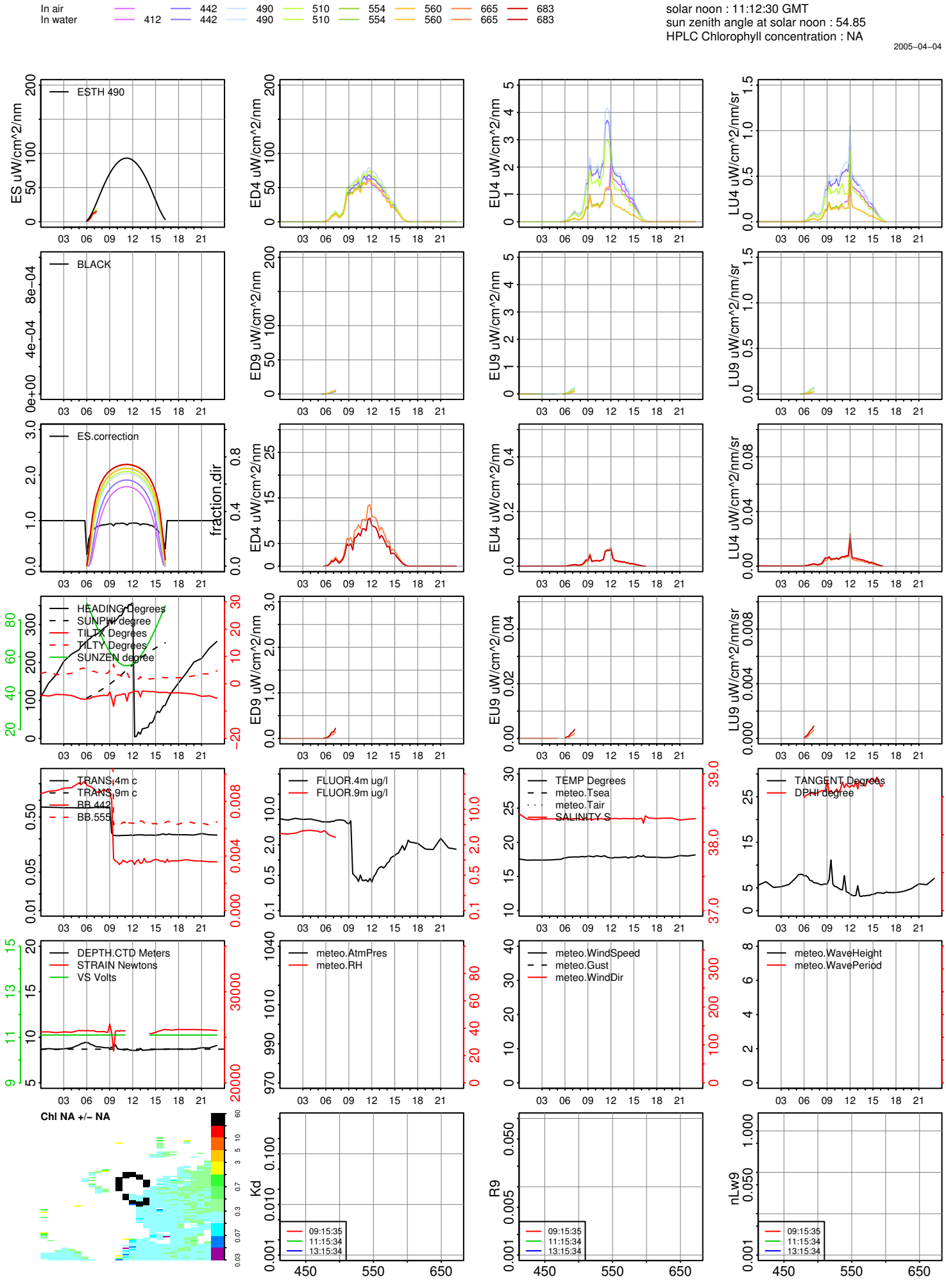
2005–04–04



2004–10–22


In air
In water
442
490
510
554
560
665
683
solar noon : 11:12:38 GMT
sun zenith angle at solar noon : 54.5
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.550
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.43 +/– 0.09
Kd
R9
nLw9
09:15:35
11:15:35
13:15:35

2004–10–23

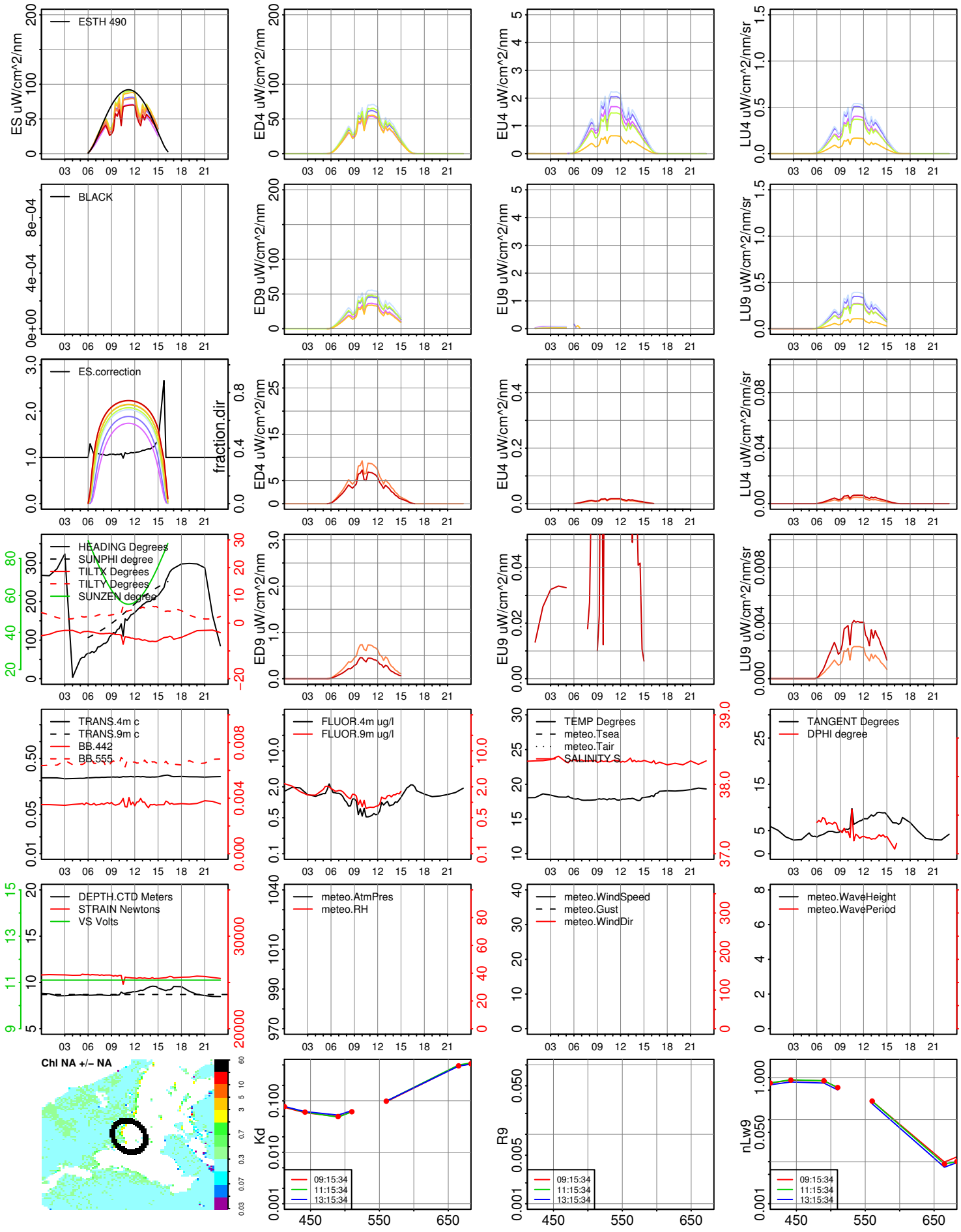

In air
In water
412
442
490
510
554
560
665
683
solar noon : 11:12:30 GMT
sun zenith angle at solar noon : 54.85
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPIW degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:34
13:15:34

2004–10–24

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:12:24 GMT
sun zenith angle at solar noon : 55.2
HPLC Chlorophyll concentration : NA

2005–04–04

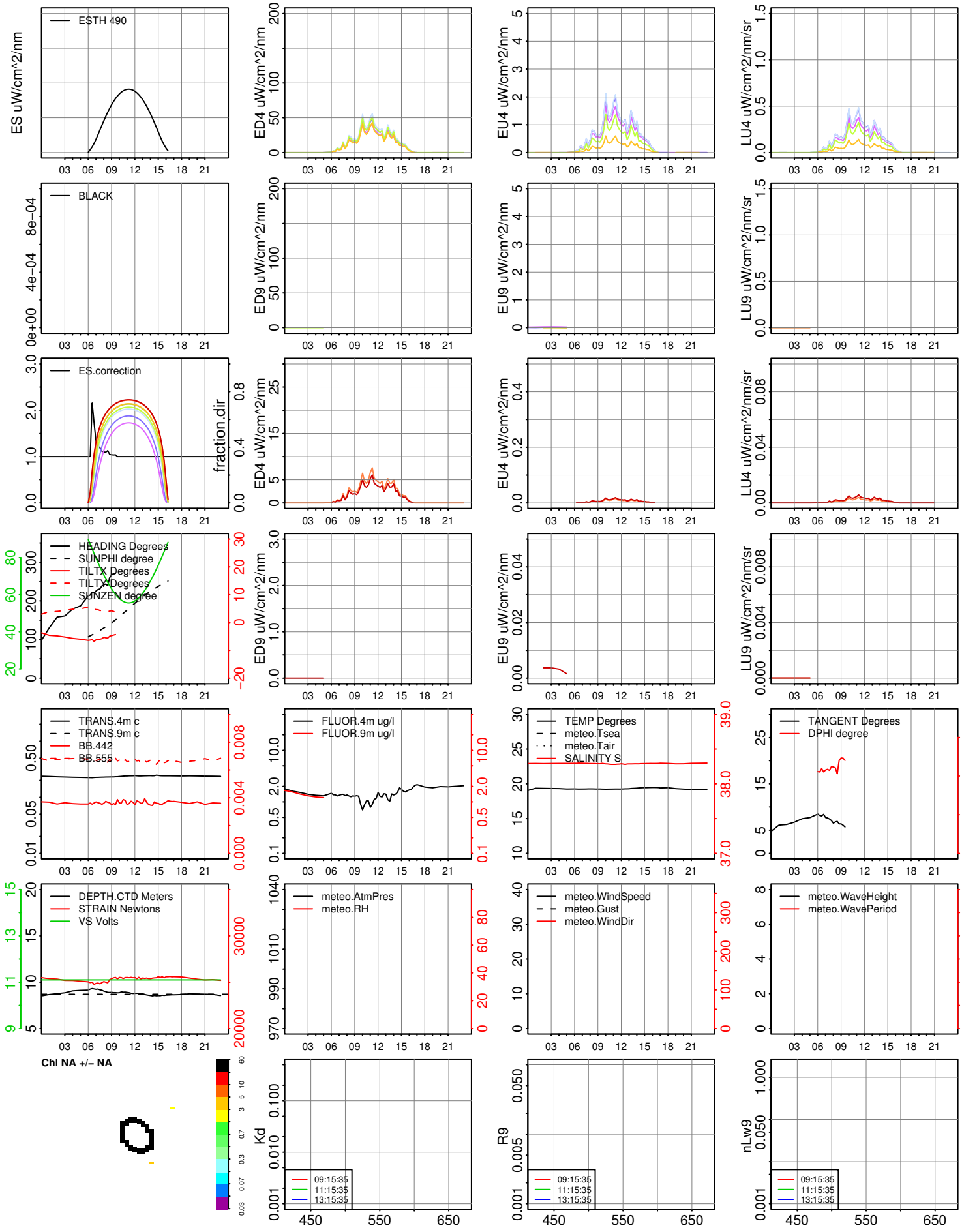


2004–10–25

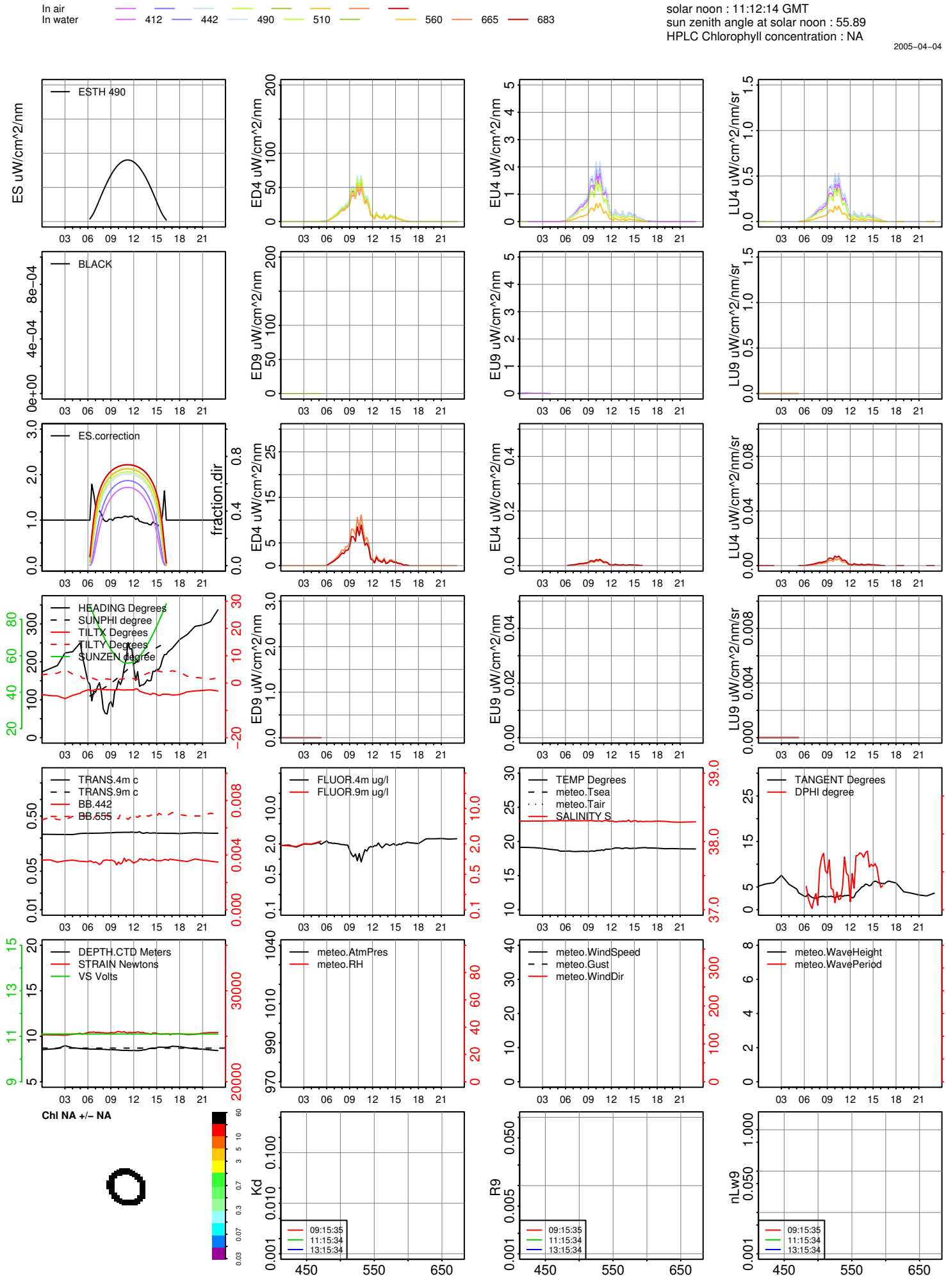
In air
In water
412 442 490 510 560 665 683

solar noon : 11:12:18 GMT
sun zenith angle at solar noon : 55.54
HPLC Chlorophyll concentration : NA

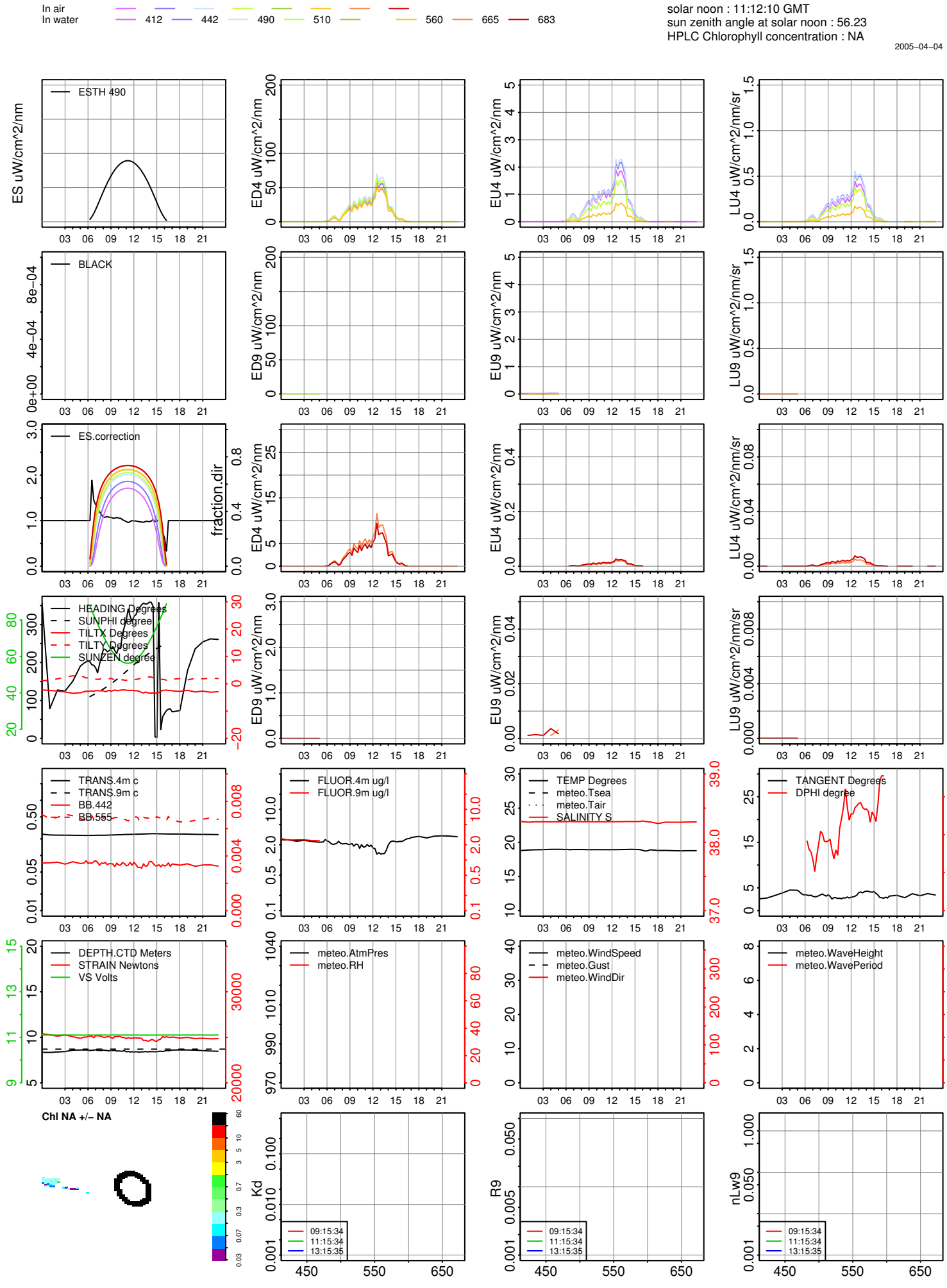
2005–04–04



2004–10–26


In air
In water
412
442
490
510
560
665
683
solar noon : 11:12:14 GMT
sun zenith angle at solar noon : 55.89
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:34
13:15:34
03 06 09 12 15 18 21
450 550 650

2004–10–27

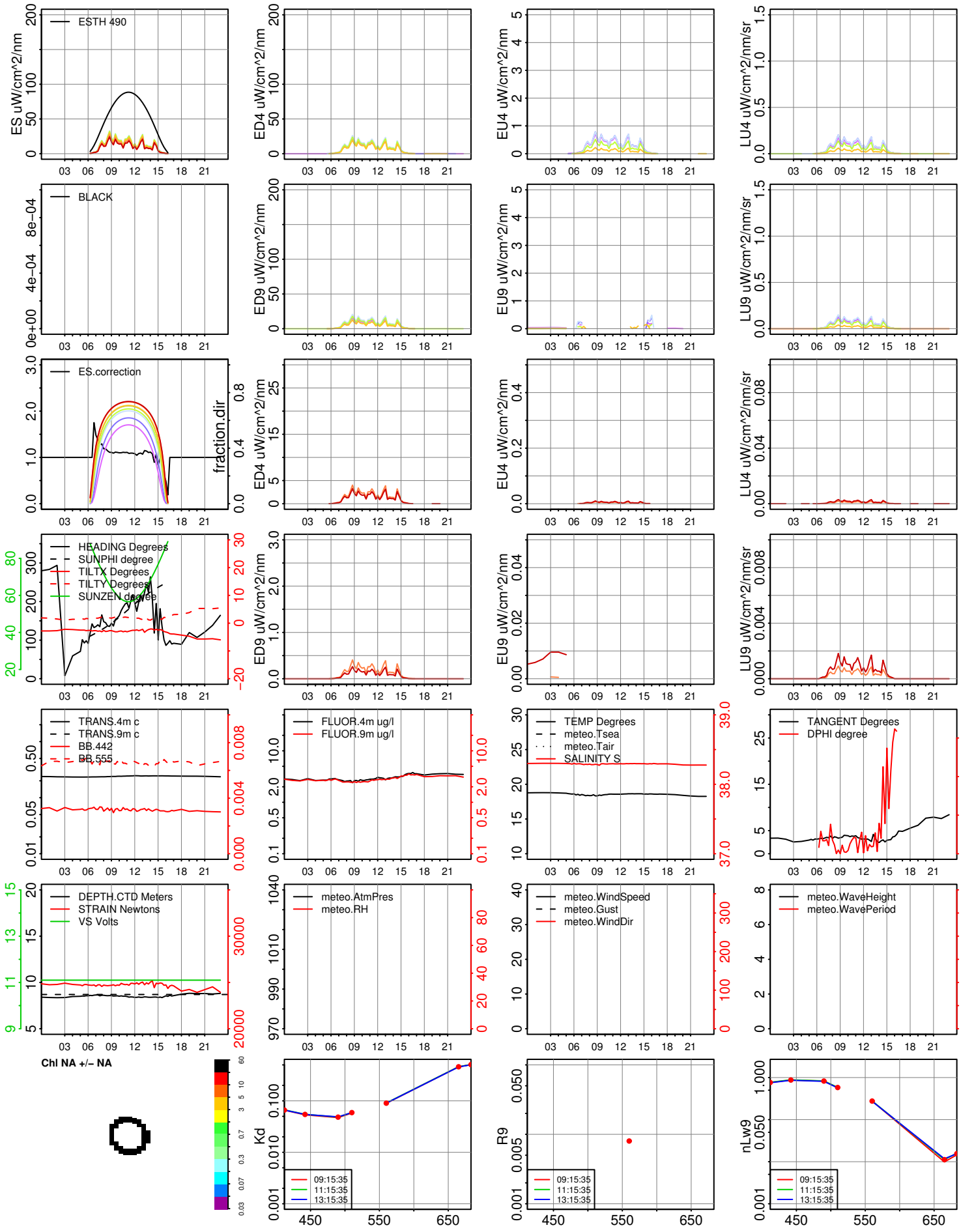

In air
In water
412
442
490
510
560
665
683
solar noon : 11:12:10 GMT
sun zenith angle at solar noon : 56.23
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:34
11:15:34
13:15:35
03 06 09 12 15 18 21
450 550 650

2004–10–28

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:12:6 GMT
sun zenith angle at solar noon : 56.57
HPLC Chlorophyll concentration : NA

2005–04–04

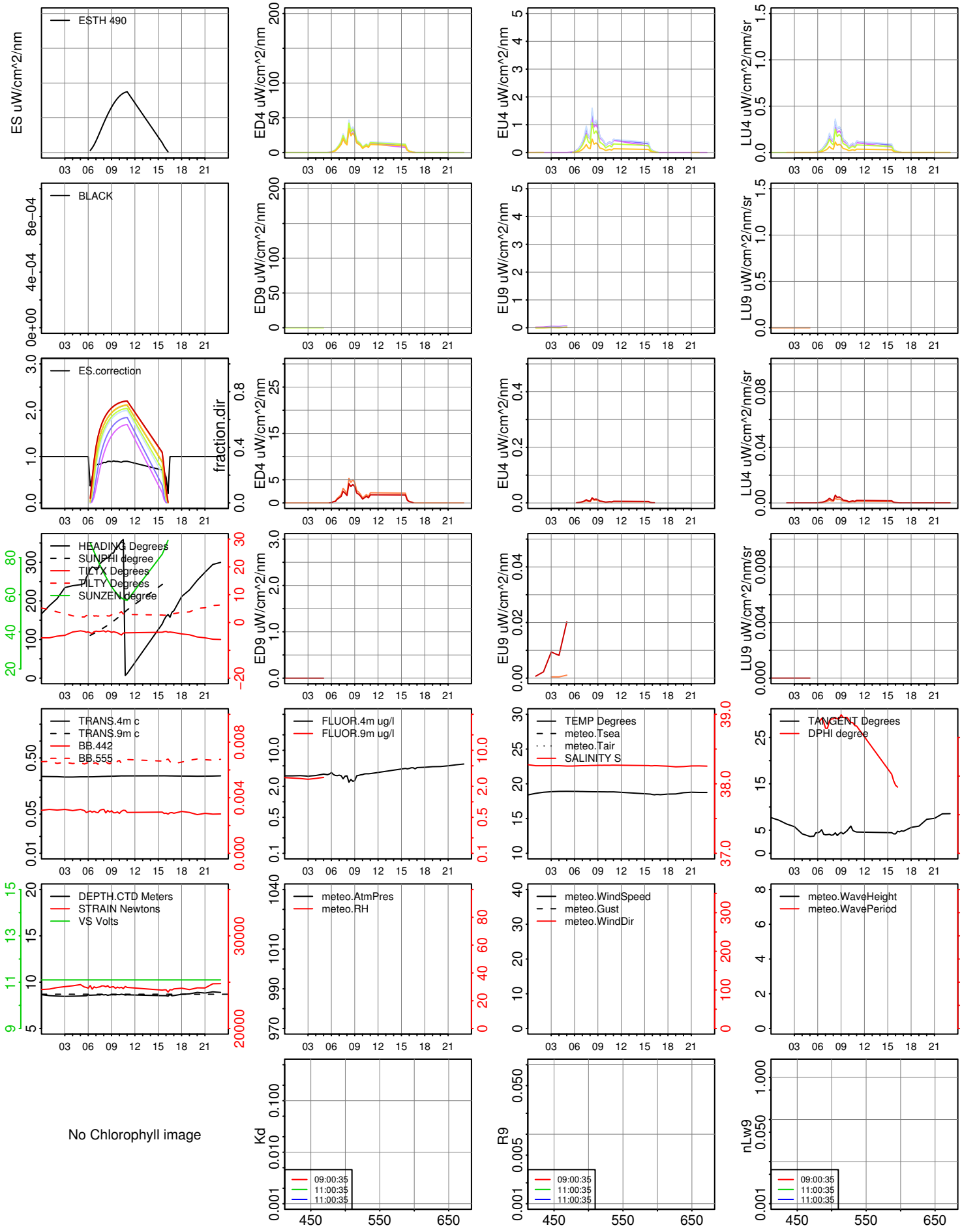


2004–10–29

In air
In water
412 442 490 510 560 665 683

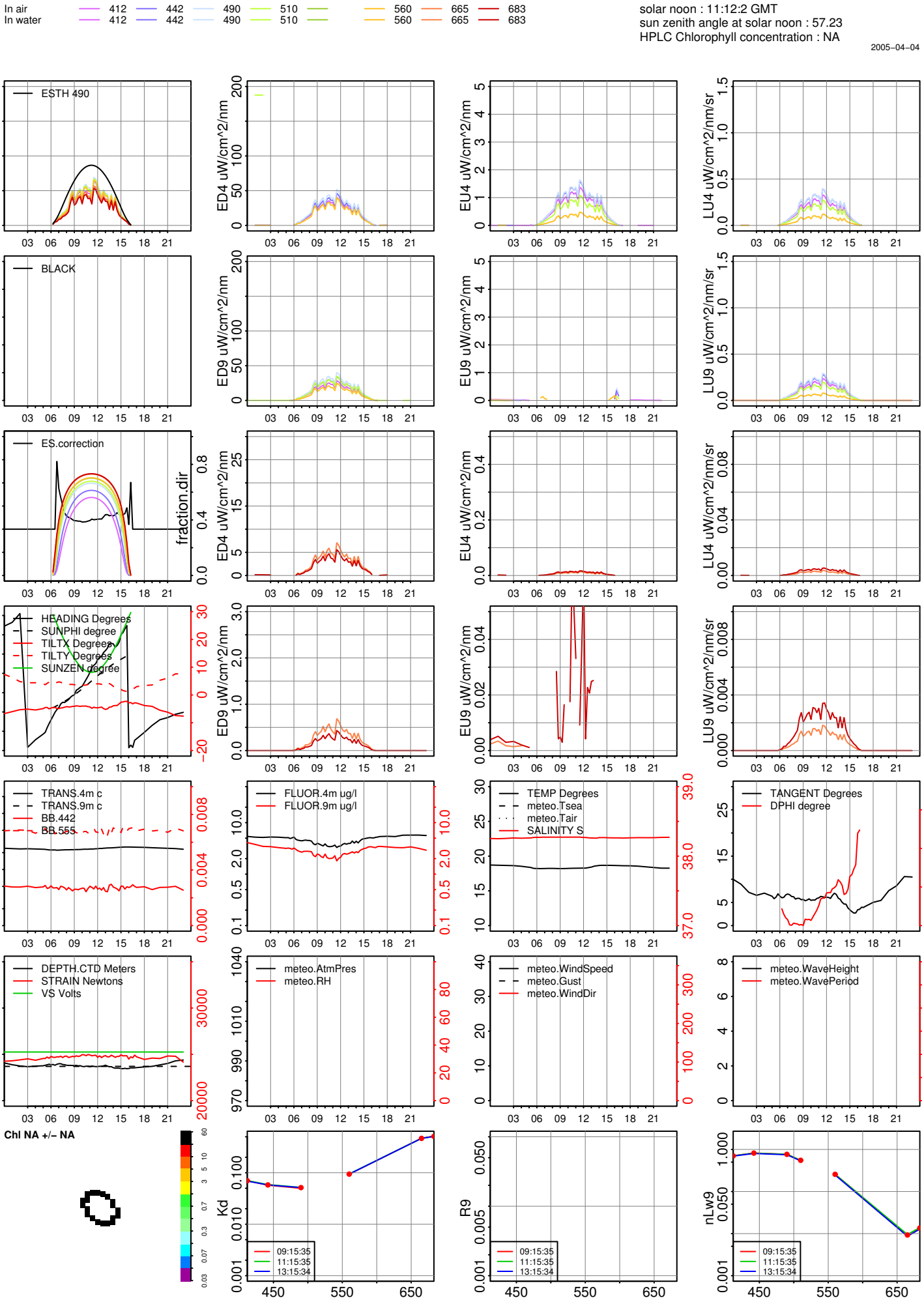
solar noon : 11:12:4 GMT
sun zenith angle at solar noon : 56.9
HPLC Chlorophyll concentration : NA

2005–04–04

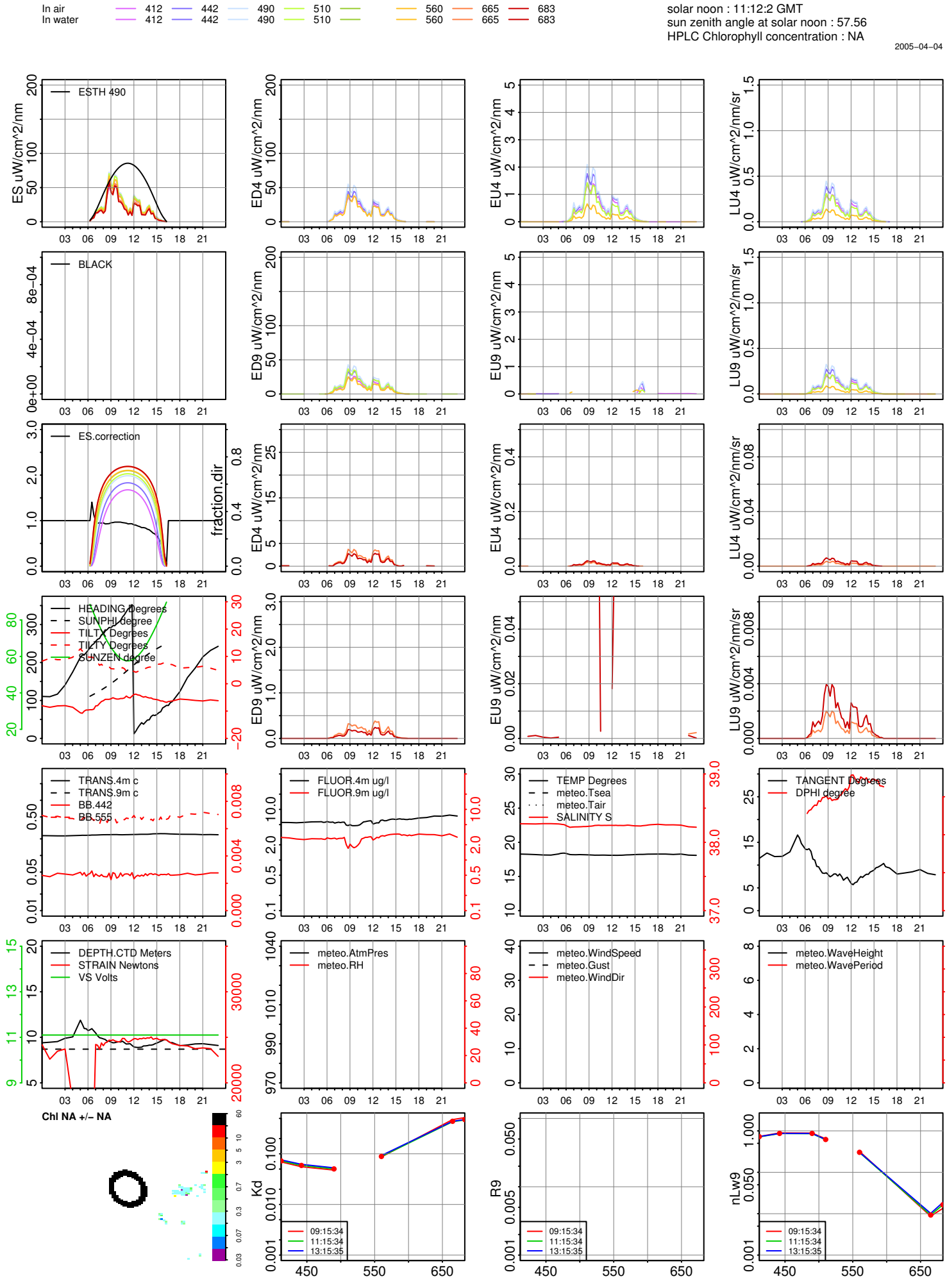


No Chlorophyll image

2004–10–30


In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:12:2 GMT
sun zenith angle at solar noon : 57.23
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:35
13:15:34

2004–10–31

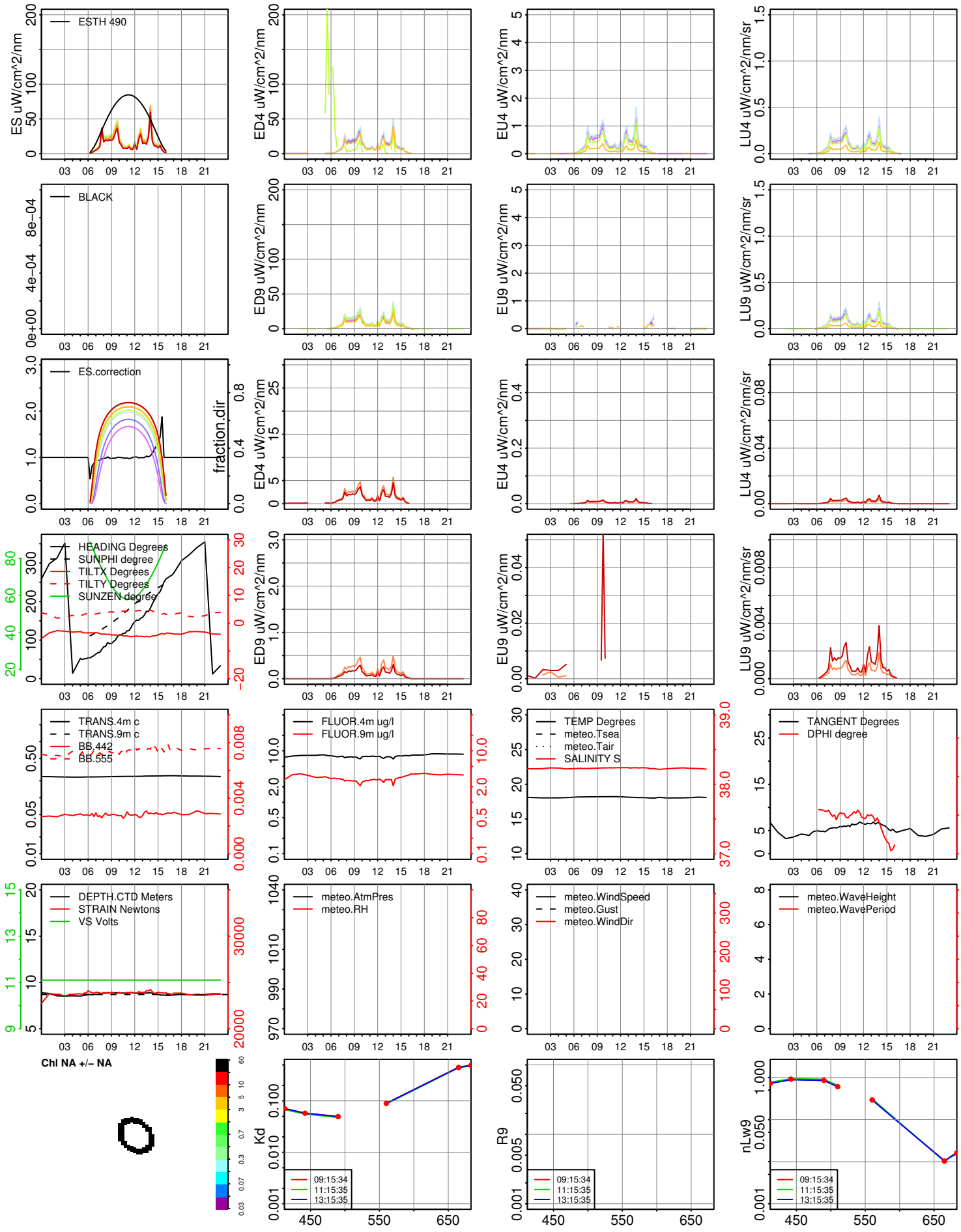

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:12:2 GMT
sun zenith angle at solar noon : 57.56
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:34
11:15:34
13:15:35

2004–11–01

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:12:2 GMT
sun zenith angle at solar noon : 57.88
HPLC Chlorophyll concentration : NA

2005–04–04

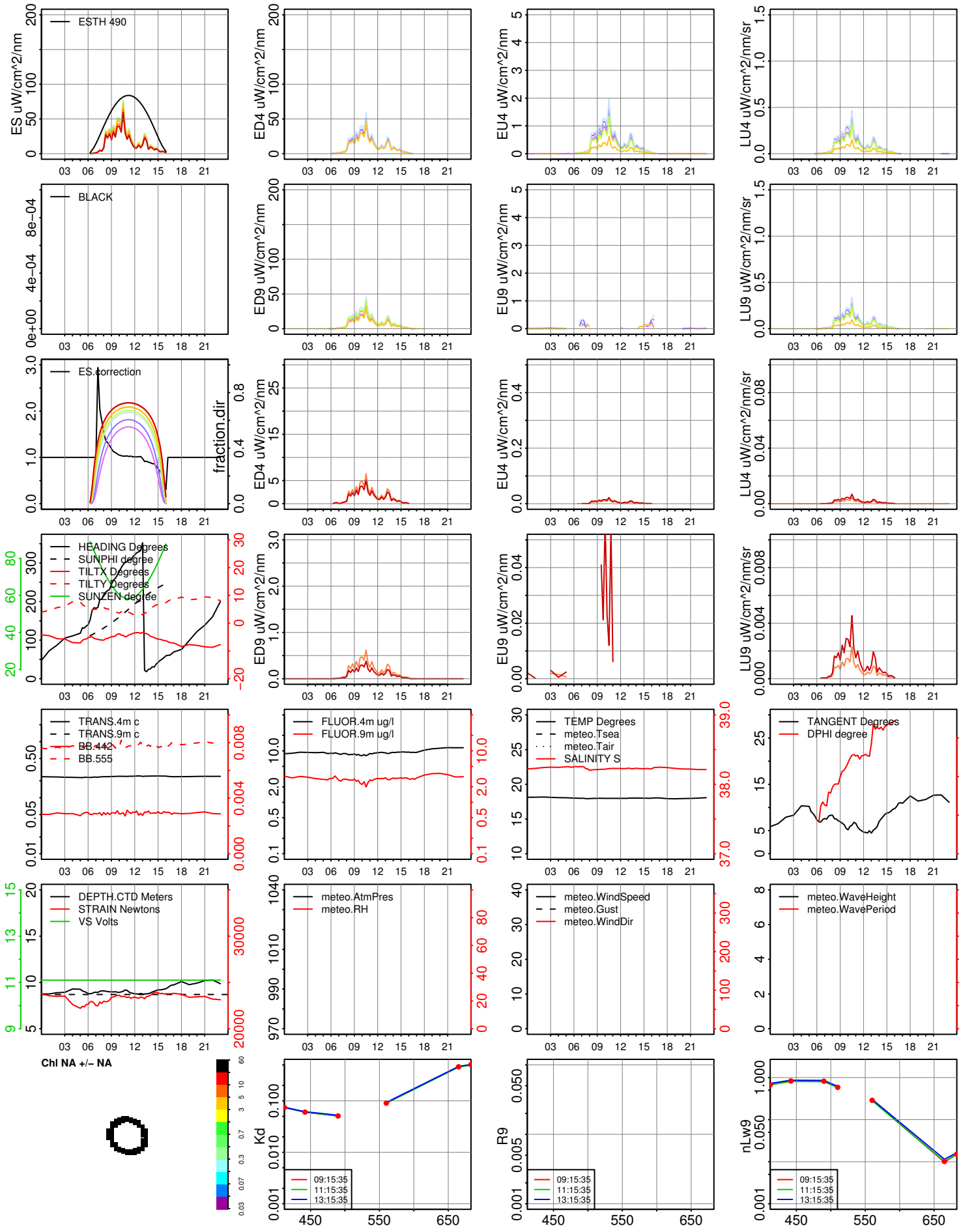


2004-11-02

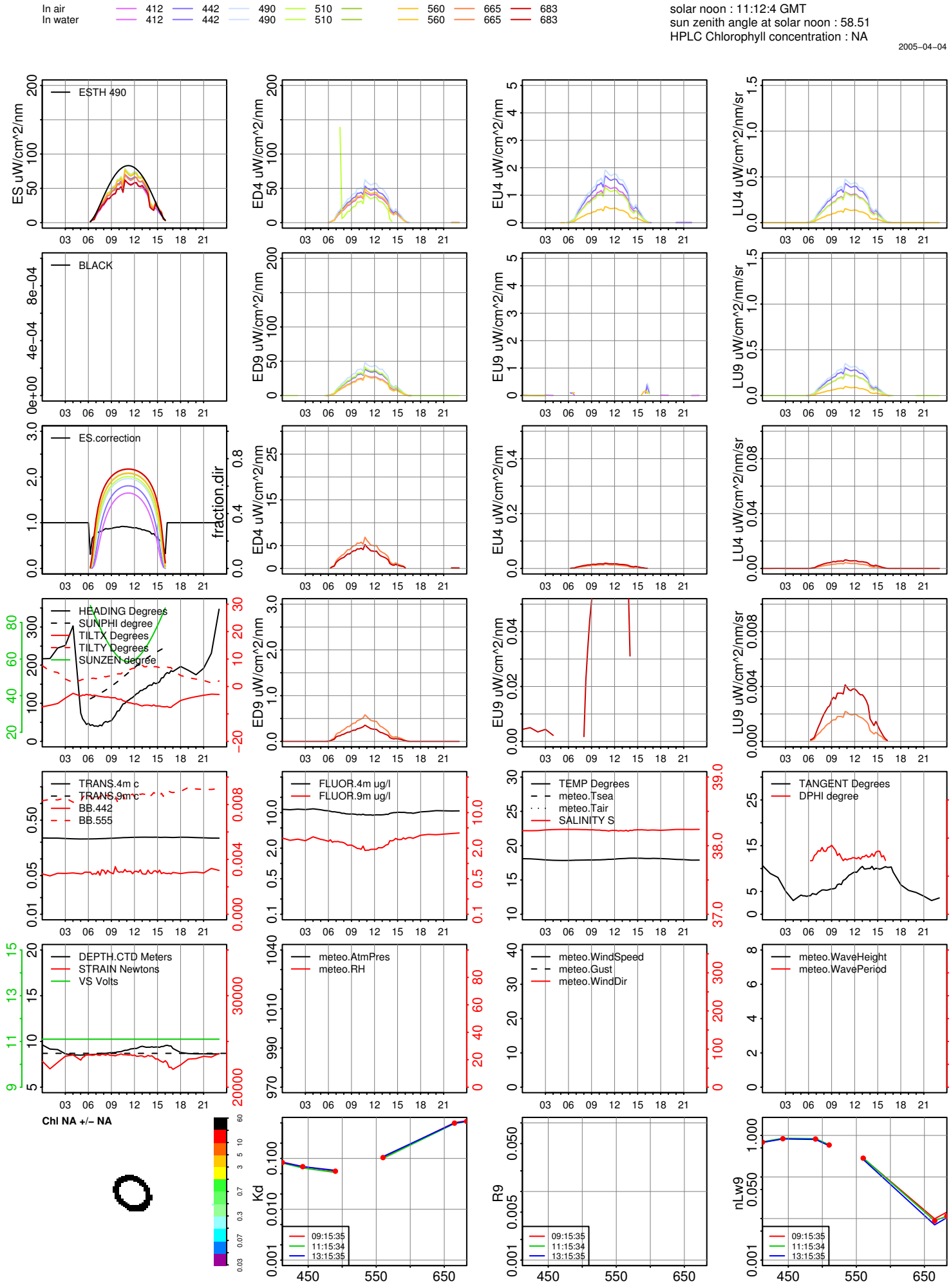
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:12:2 GMT
sun zenith angle at solar noon : 58.2
HPLC Chlorophyll concentration : NA

2005-04-04



2004–11–03

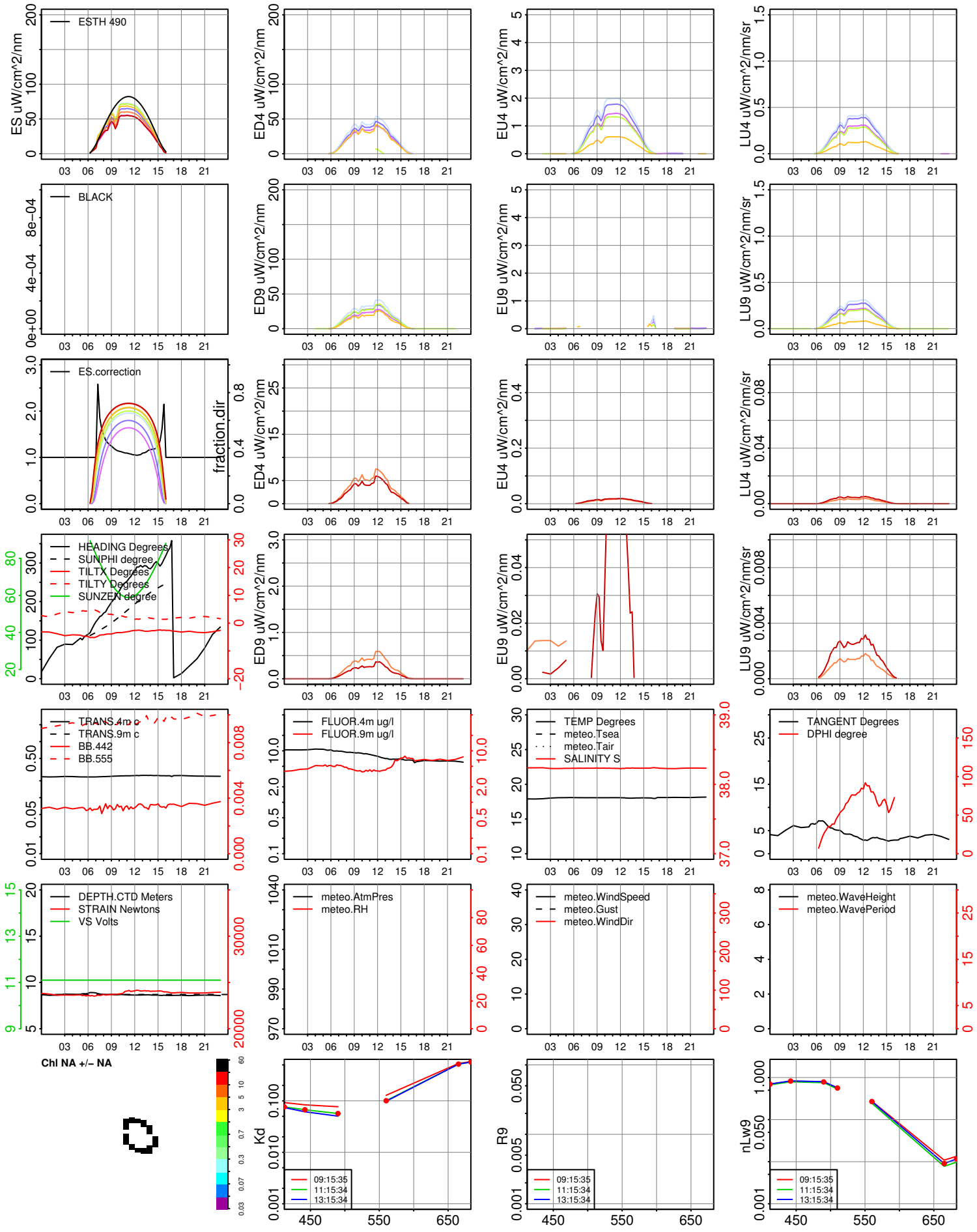

In air
In water
412
442
490
510
560
665
683
solar noon : 11:12:4 GMT
sun zenith angle at solar noon : 58.51
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:34
13:15:35

2004–11–04

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:12:6 GMT
sun zenith angle at solar noon : 58.82
HPLC Chlorophyll concentration : NA

2005–04–04

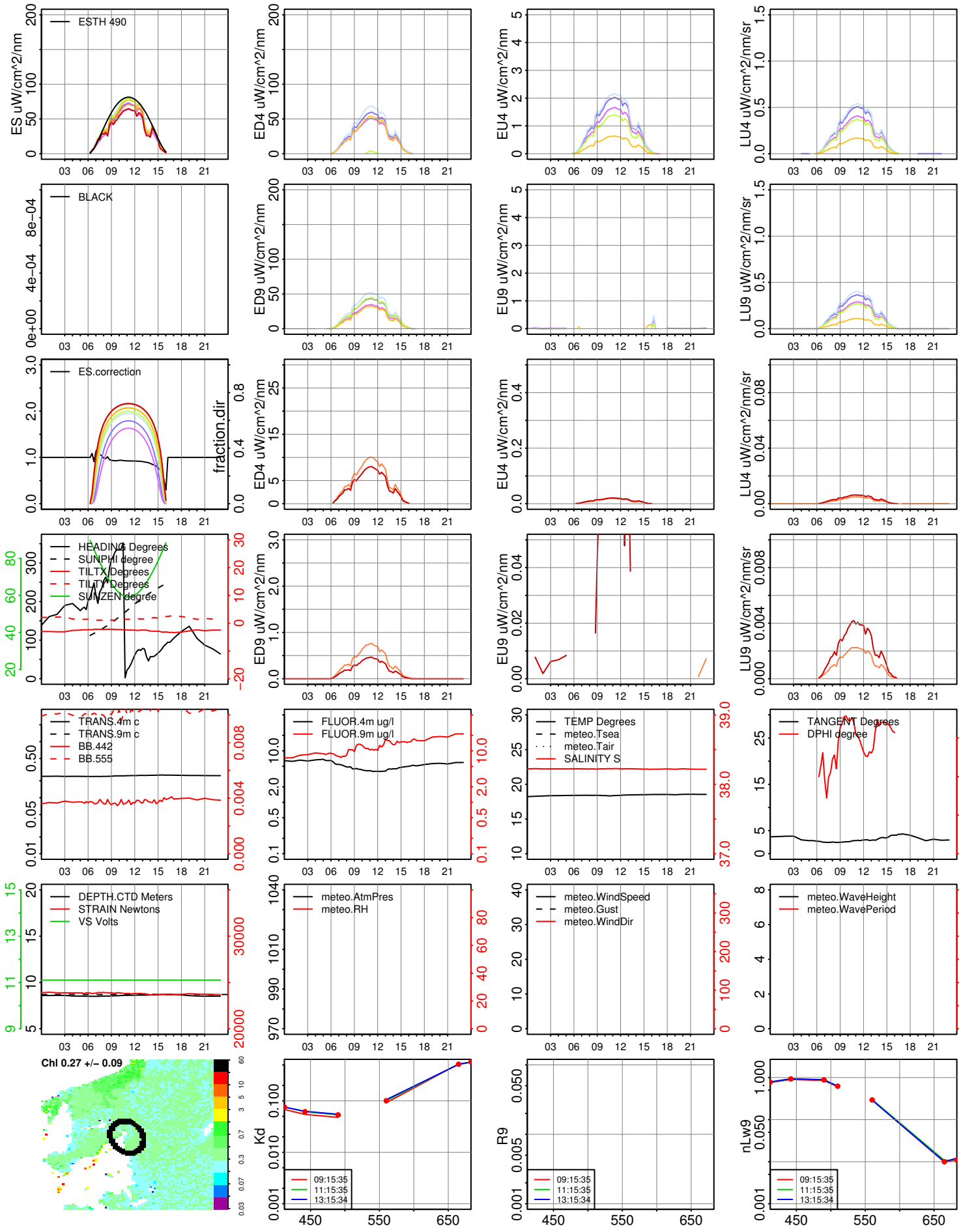


2004–11–05

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:12:10 GMT
sun zenith angle at solar noon : 59.13
HPLC Chlorophyll concentration : NA

2005–04–04

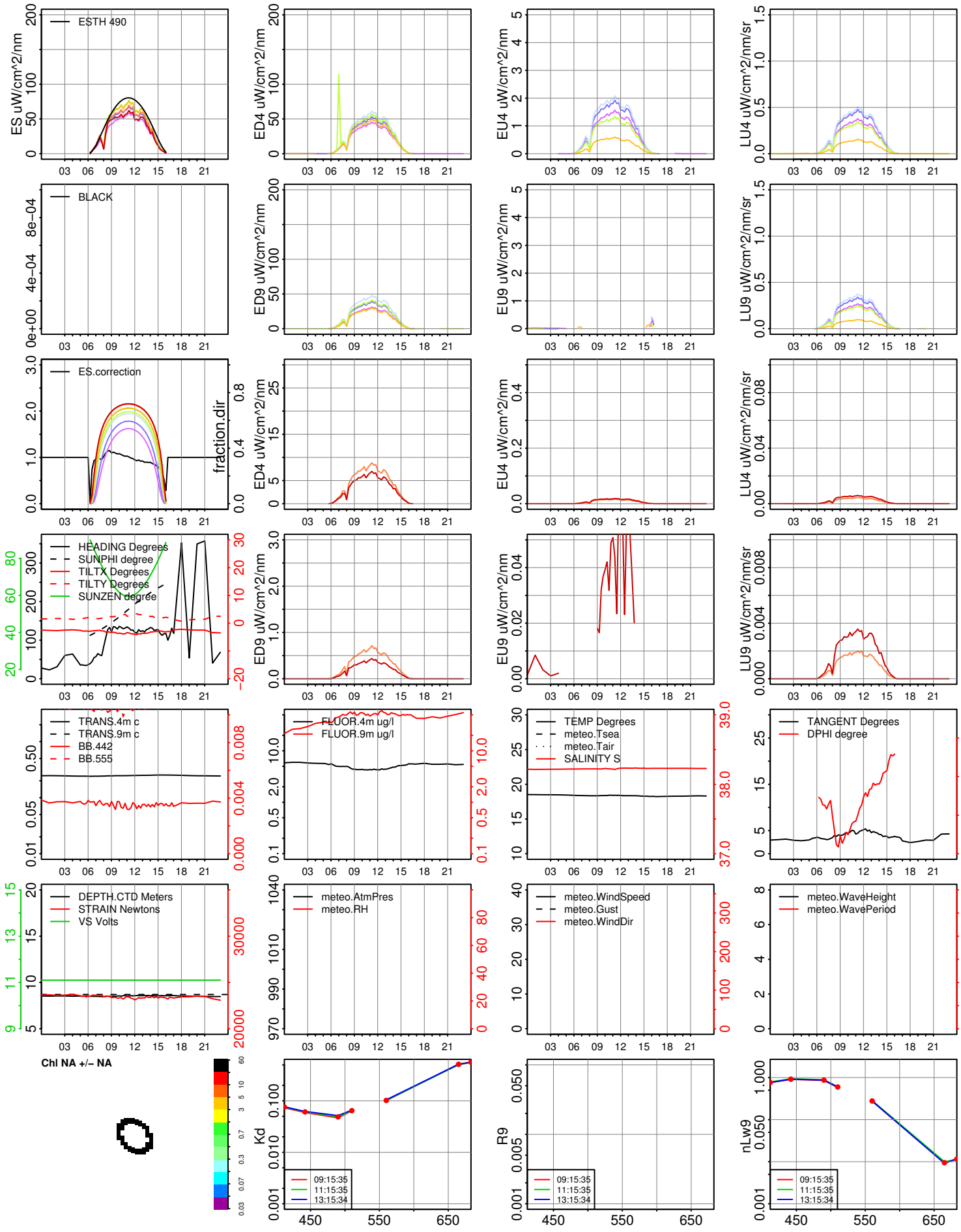


2004–11–06

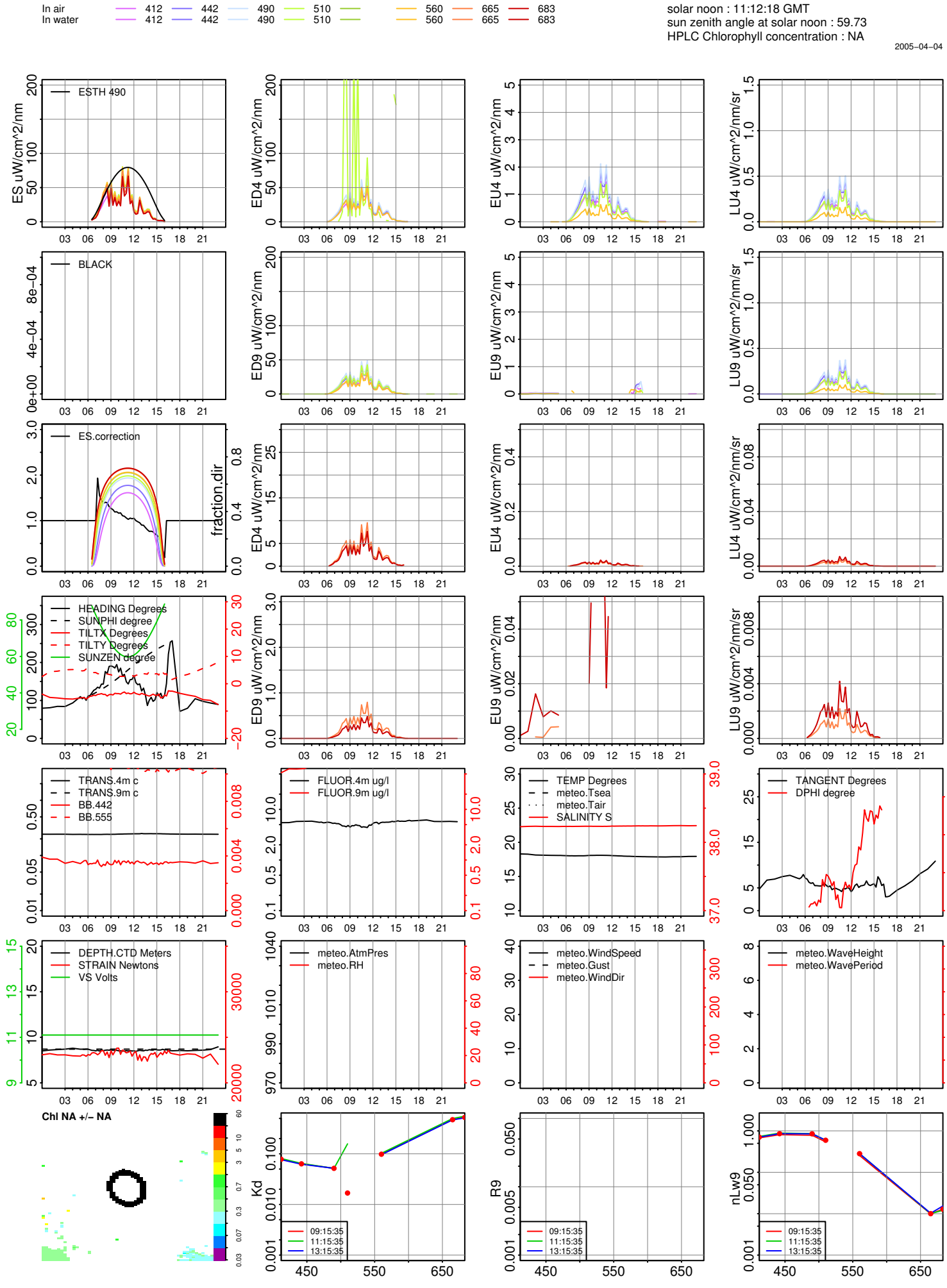
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:12:14 GMT
sun zenith angle at solar noon : 59.43
HPLC Chlorophyll concentration : NA

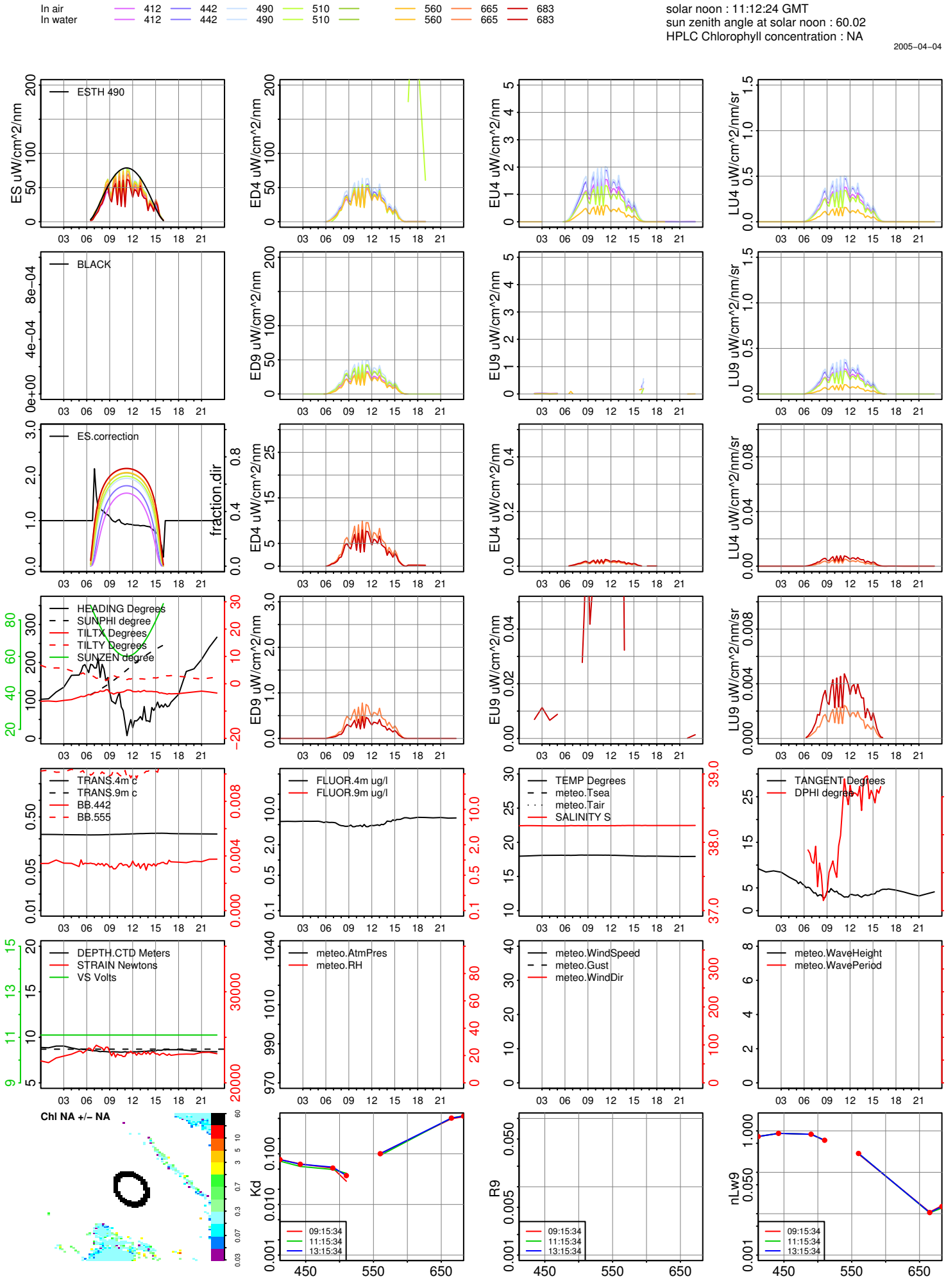
2005–04–04



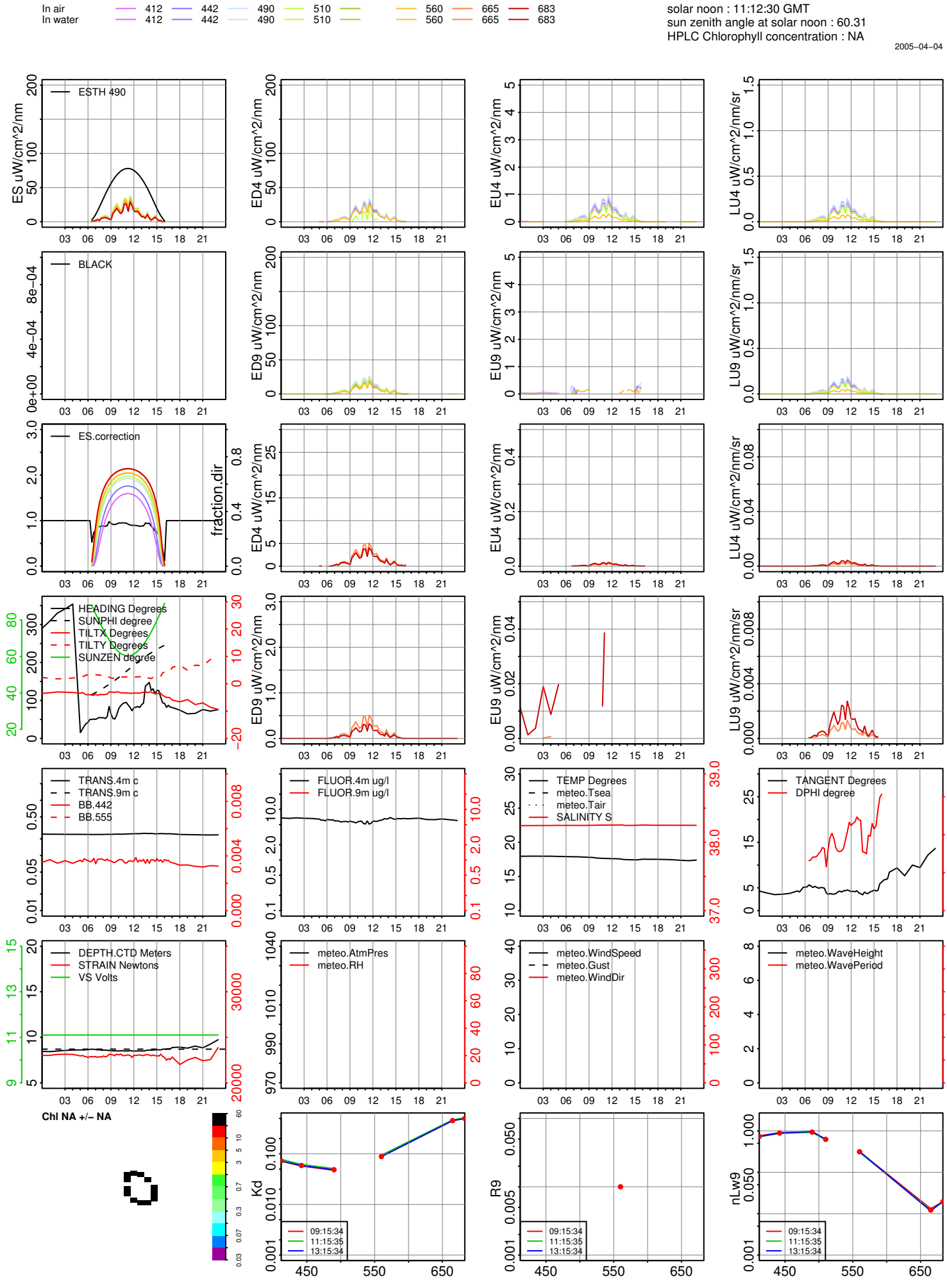
2004–11–07


In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:12:18 GMT
sun zenith angle at solar noon : 59.73
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:35
13:15:35

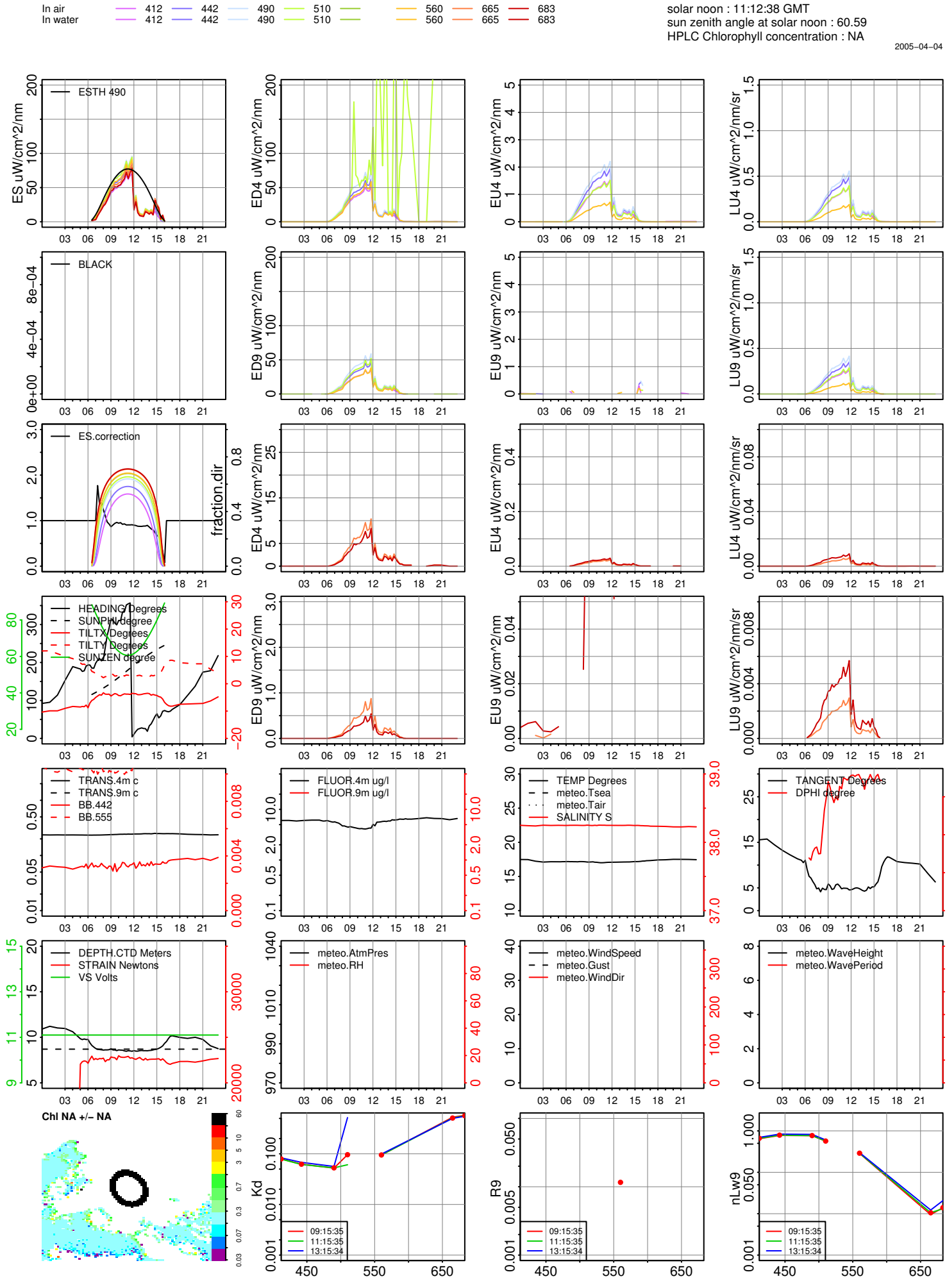
2004–11–08


In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:12:24 GMT
sun zenith angle at solar noon : 60.02
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:34
11:15:34
13:15:34

2004-11-09


In air
In water
412
442
490
510
560
665
683
solar noon : 11:12:30 GMT
sun zenith angle at solar noon : 60.31
HPLC Chlorophyll concentration : NA
2005-04-04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/- NA
Kd
R9
nLw9
09:15:34
11:15:35
13:15:34

2004–11–10

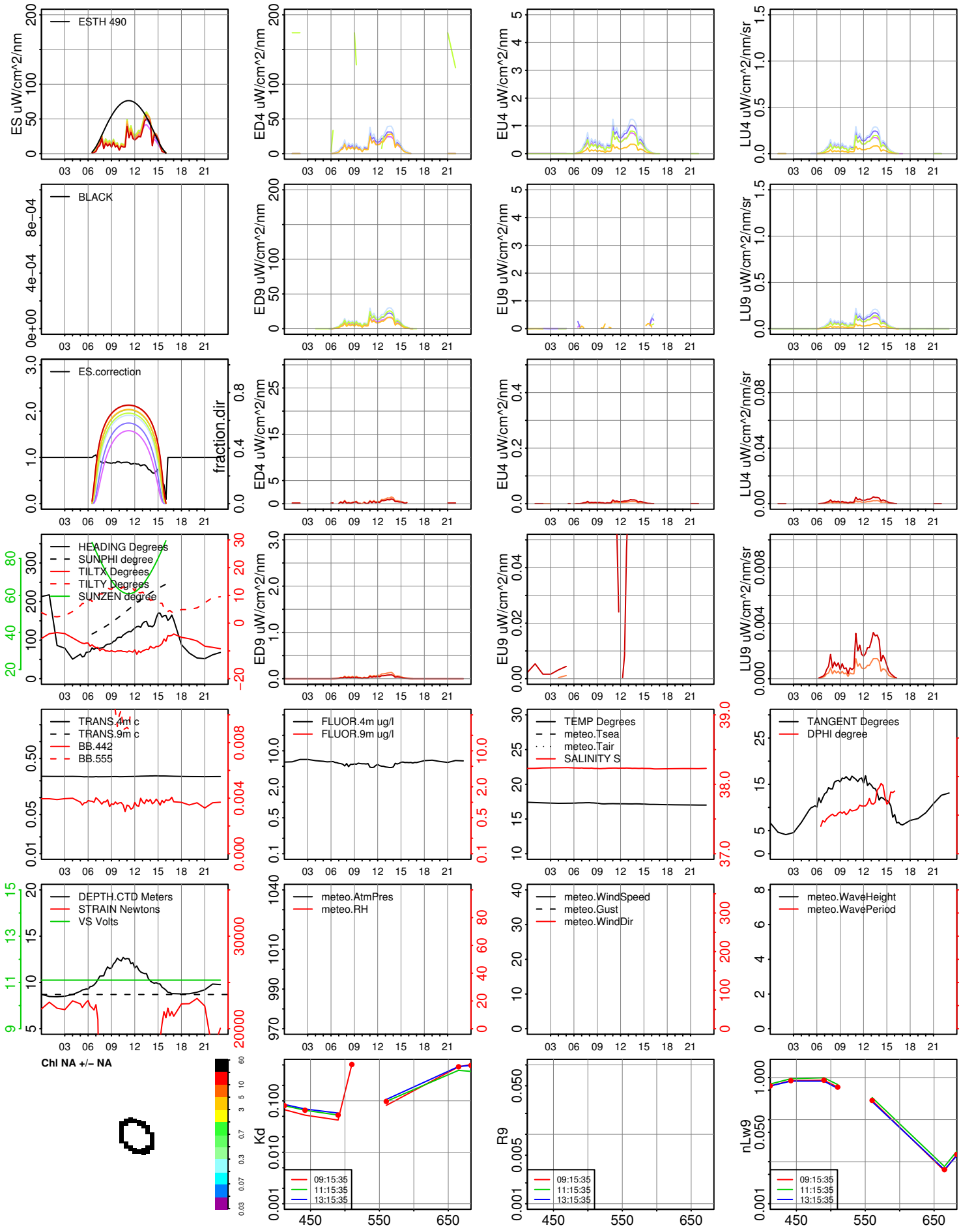

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:12:38 GMT
sun zenith angle at solar noon : 60.59
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPIN degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:35
11:15:35
13:15:34

2004–11–11

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:12:46 GMT
sun zenith angle at solar noon : 60.87
HPLC Chlorophyll concentration : NA

2005–04–04

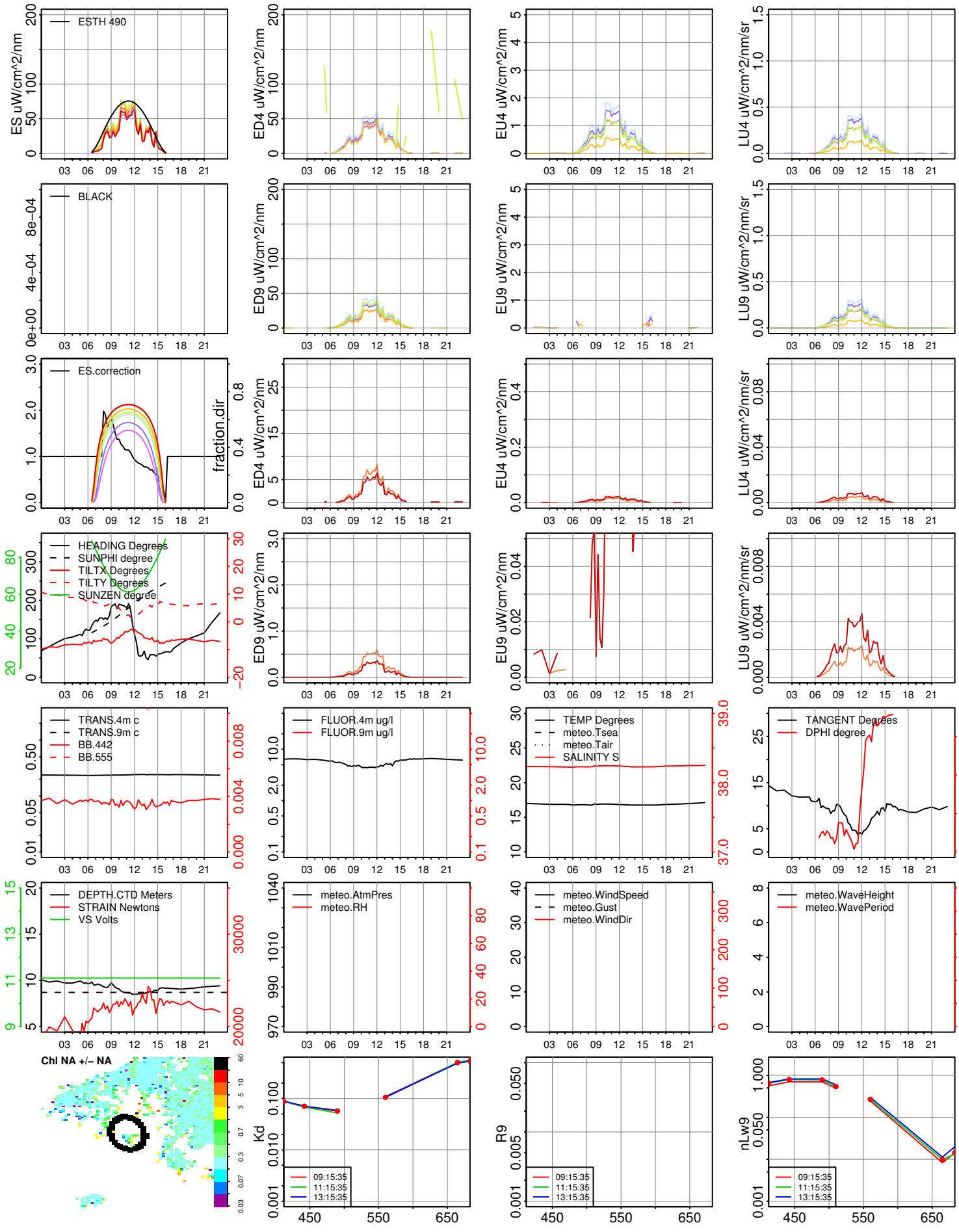


2004–11–12

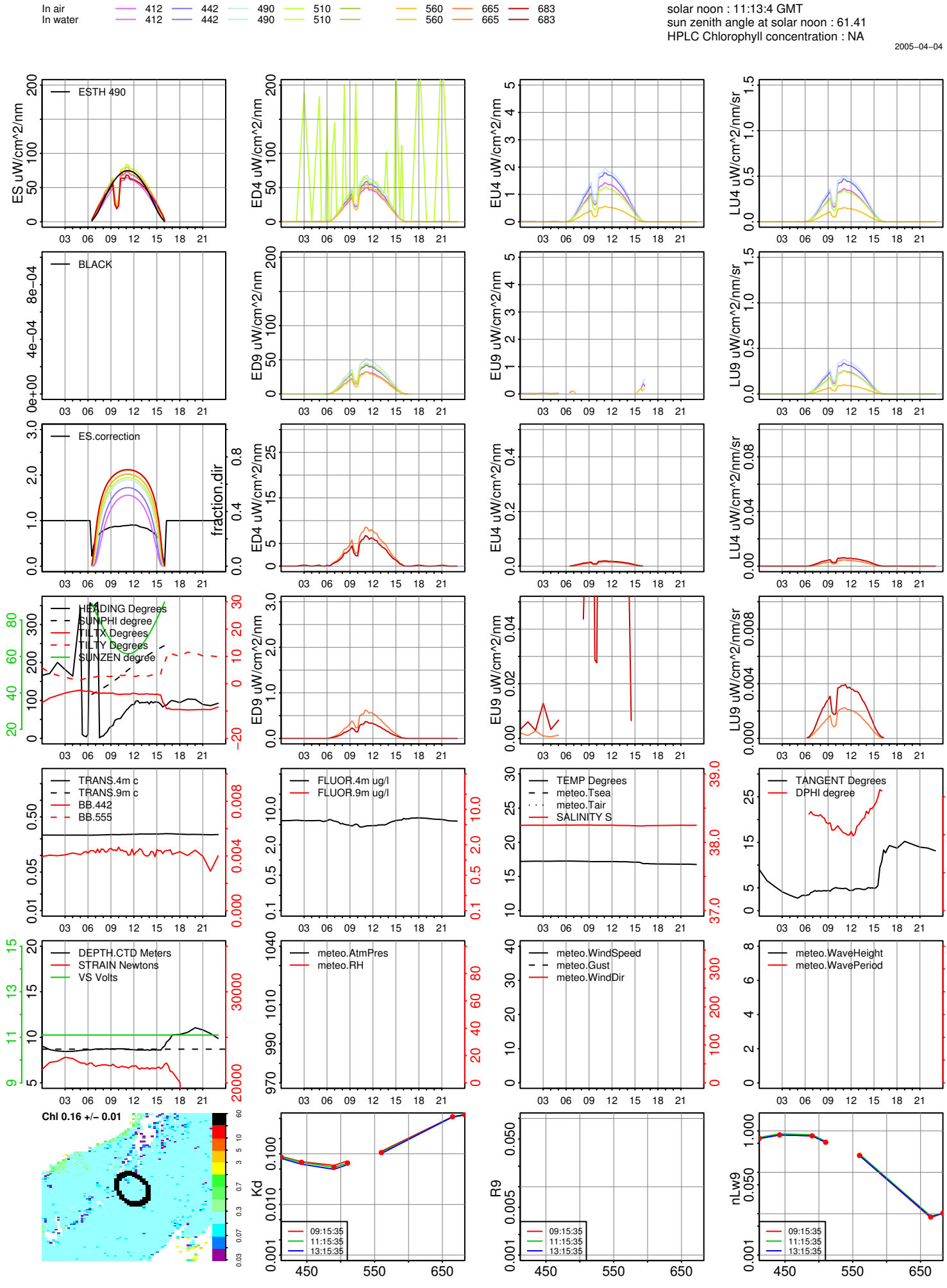
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:12:56 GMT
sun zenith angle at solar noon : 61.14
HPLC Chlorophyll concentration : NA

2005–04–04



2004–11–13

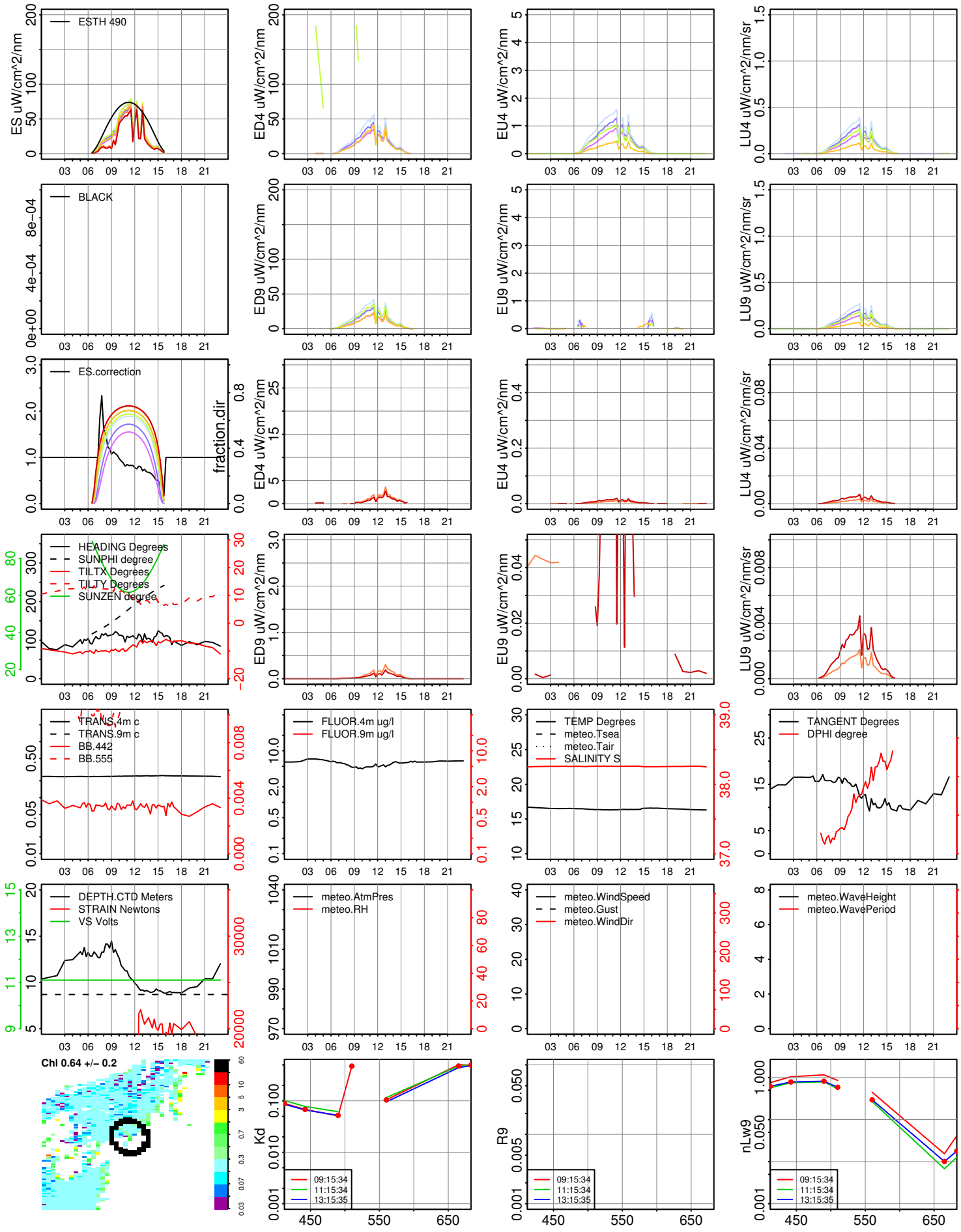

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:13:4 GMT
sun zenith angle at solar noon : 61.41
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.16 +/– 0.01
Kd
R9
nLw9
09:15:35
11:15:35
13:15:35

2004–11–14

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:13:16 GMT
sun zenith angle at solar noon : 61.67
HPLC Chlorophyll concentration : NA

2005–04–04

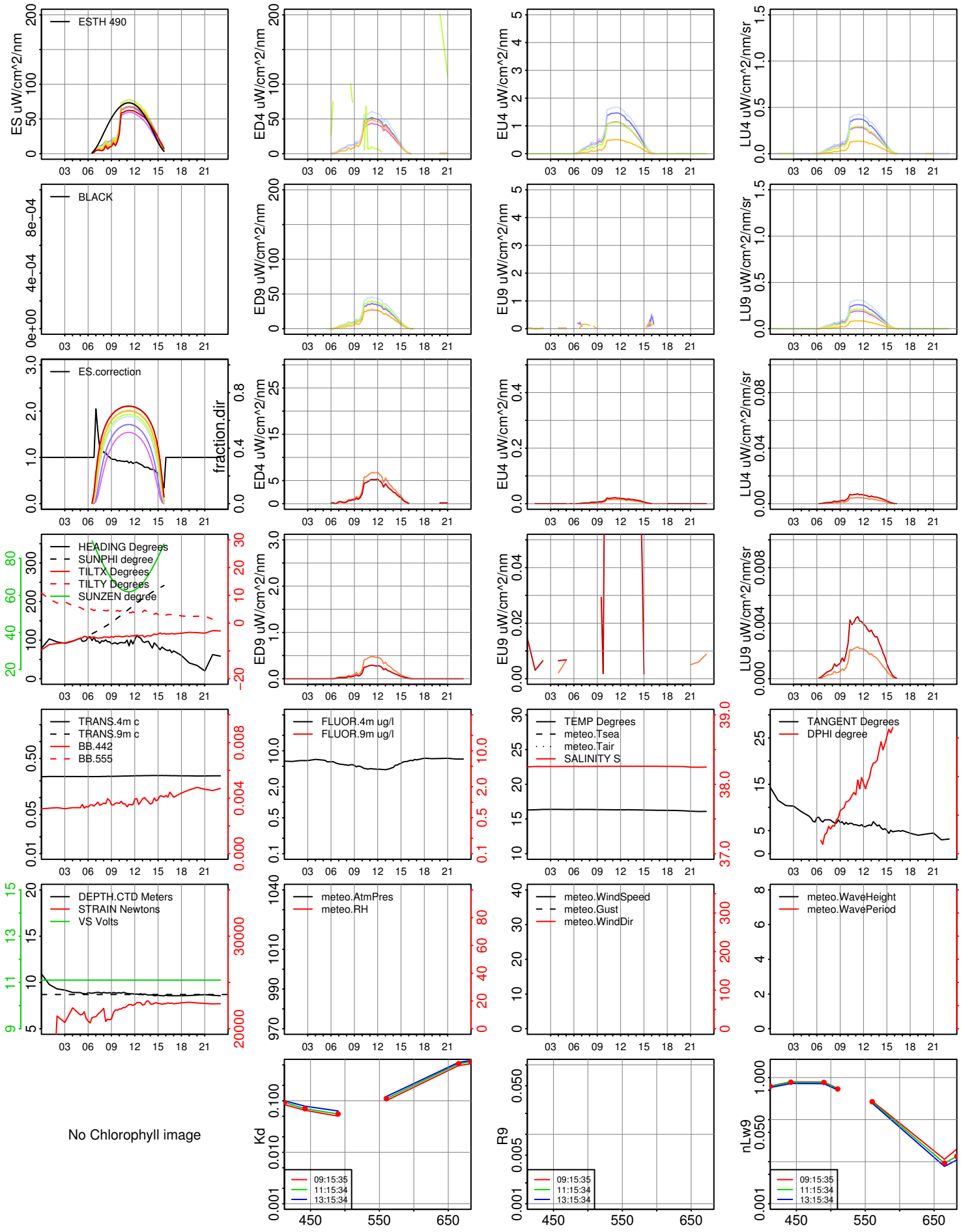


2004–11–15

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

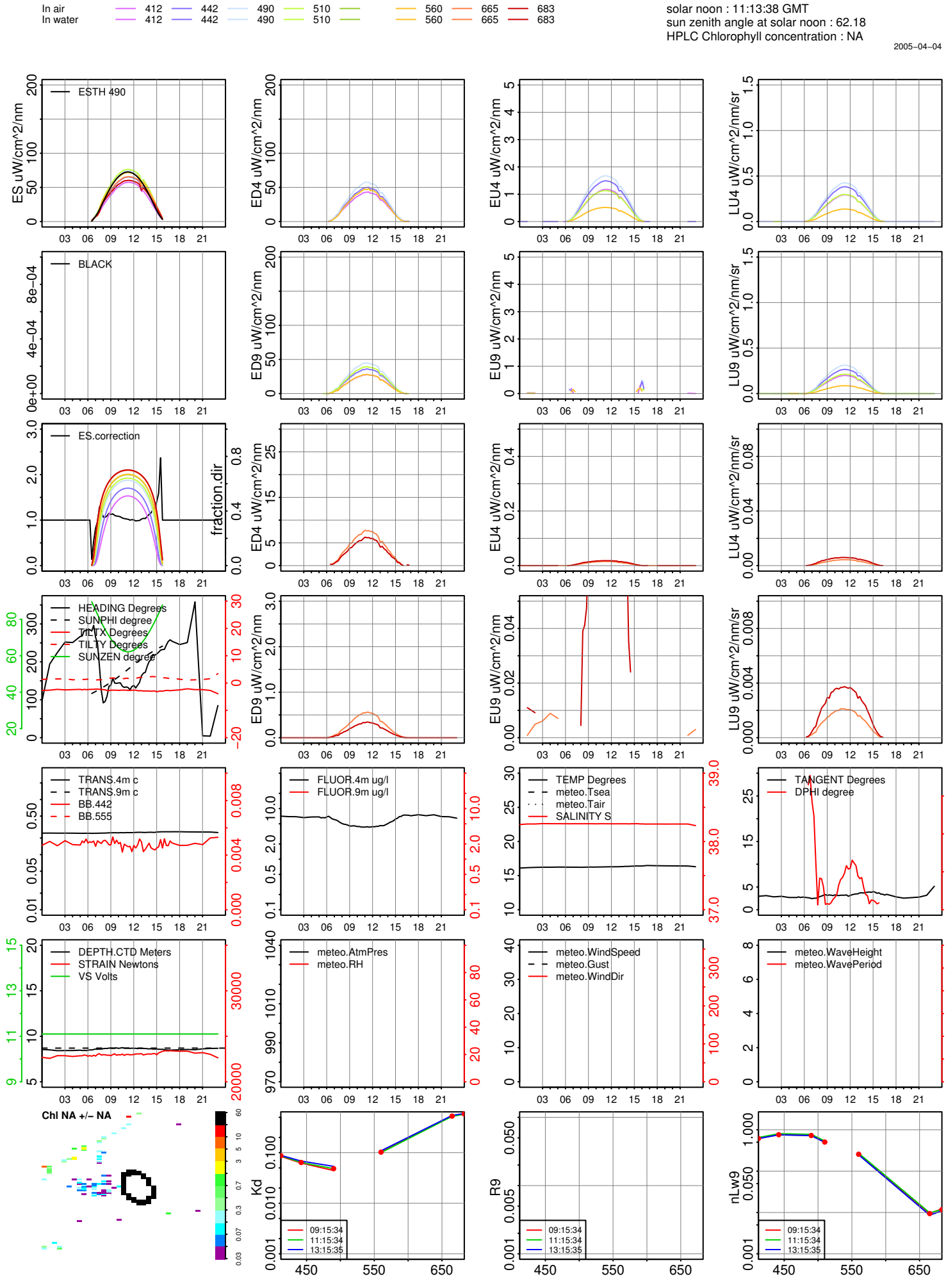
solar noon : 11:13:26 GMT
sun zenith angle at solar noon : 61.93
HPLC Chlorophyll concentration : NA

2005–04–04



No Chlorophyll image

2004–11–16

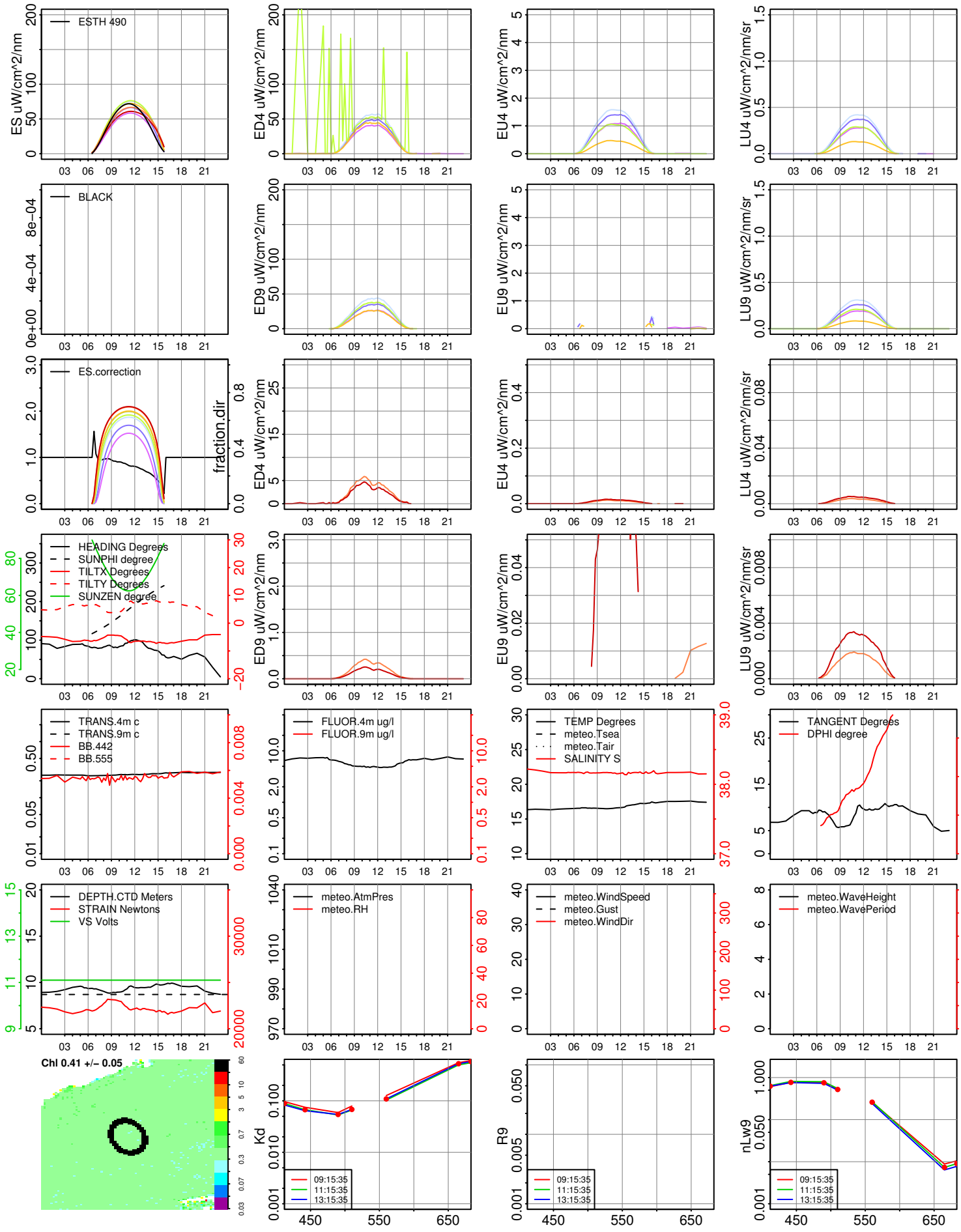

In air
In water
412
442
490
510
560
665
683
solar noon : 11:13:38 GMT
sun zenith angle at solar noon : 62.18
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:34
11:15:34
13:15:35

2004–11–17

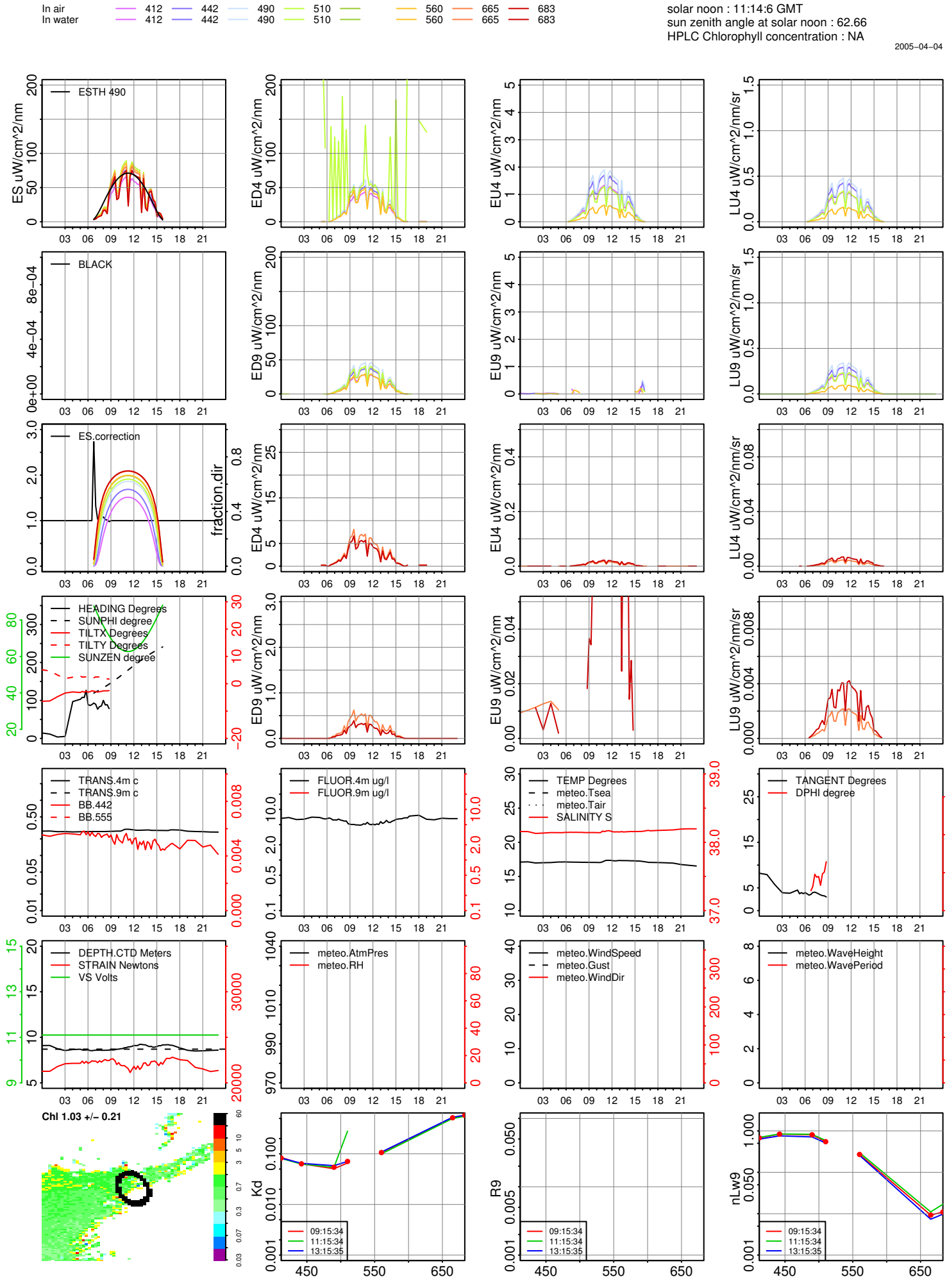
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:13:52 GMT
sun zenith angle at solar noon : 62.42
HPLC Chlorophyll concentration : NA

2005–04–04



2004–11–18

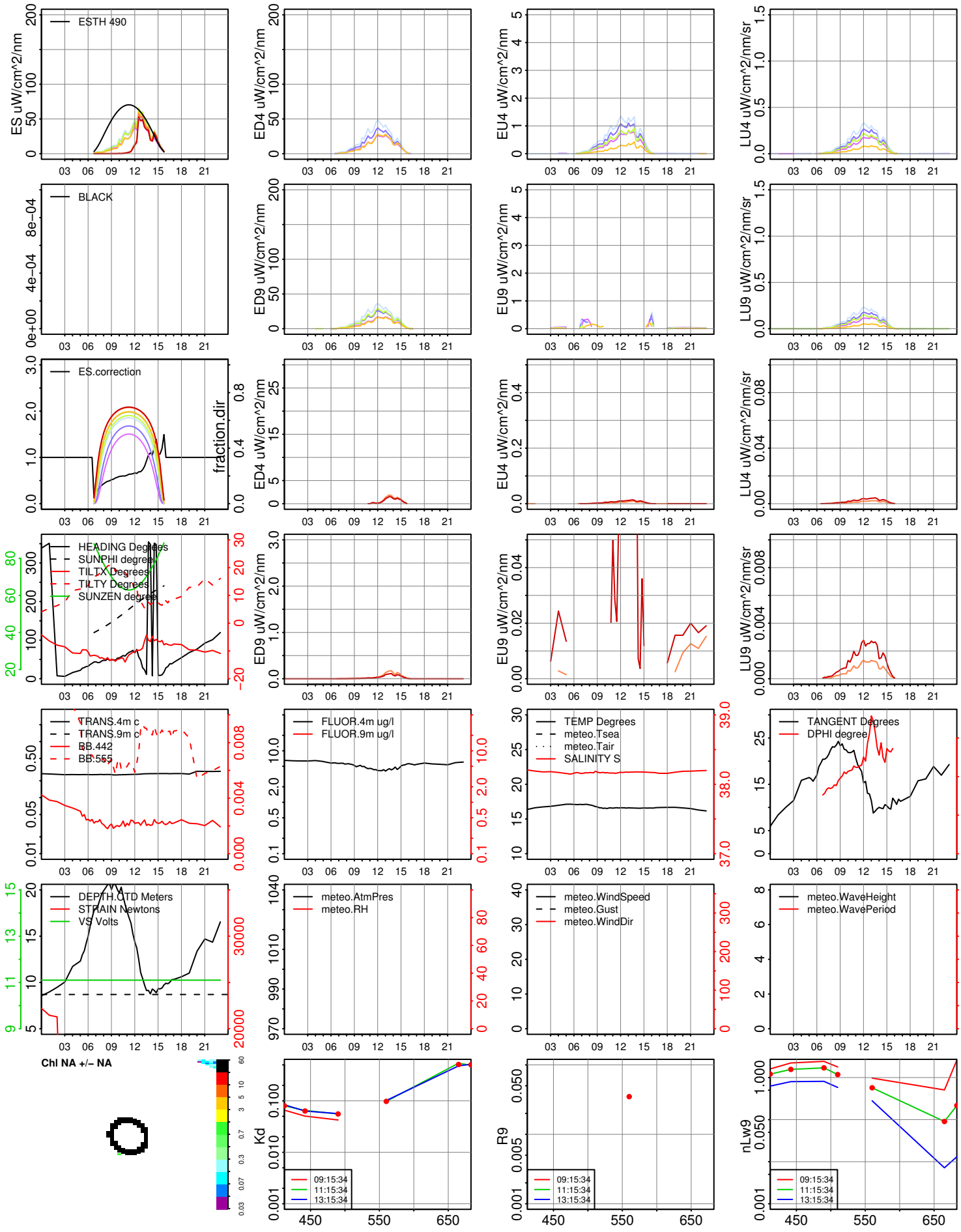

In air
In water
412
442
490
510
560
665
683
solar noon : 11:14:6 GMT
sun zenith angle at solar noon : 62.66
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 1.03 +/– 0.21
Kd
R9
nLw9
09:15:34
11:15:34
13:15:35

2004–11–19

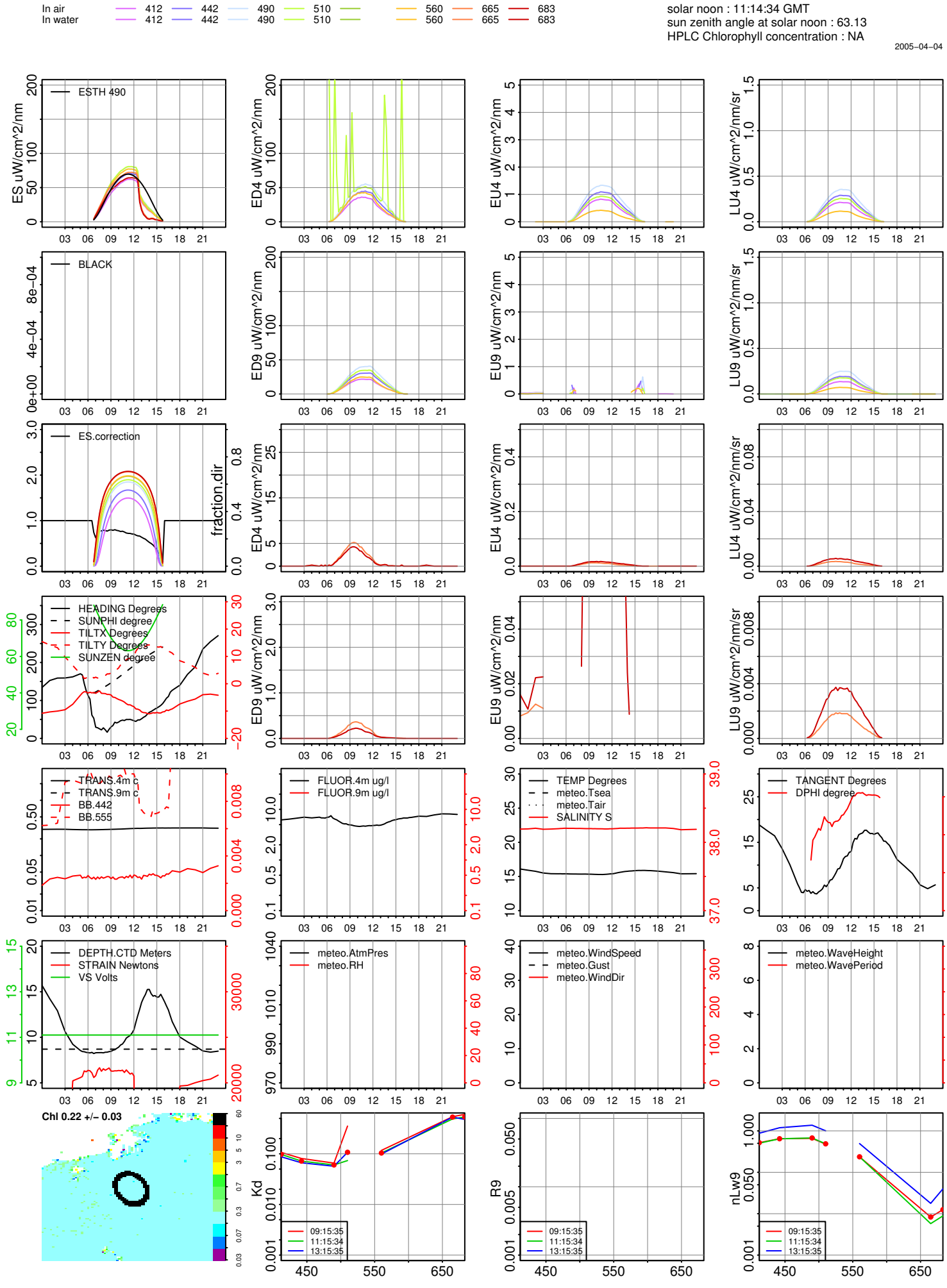
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:14:20 GMT
sun zenith angle at solar noon : 62.9
HPLC Chlorophyll concentration : NA

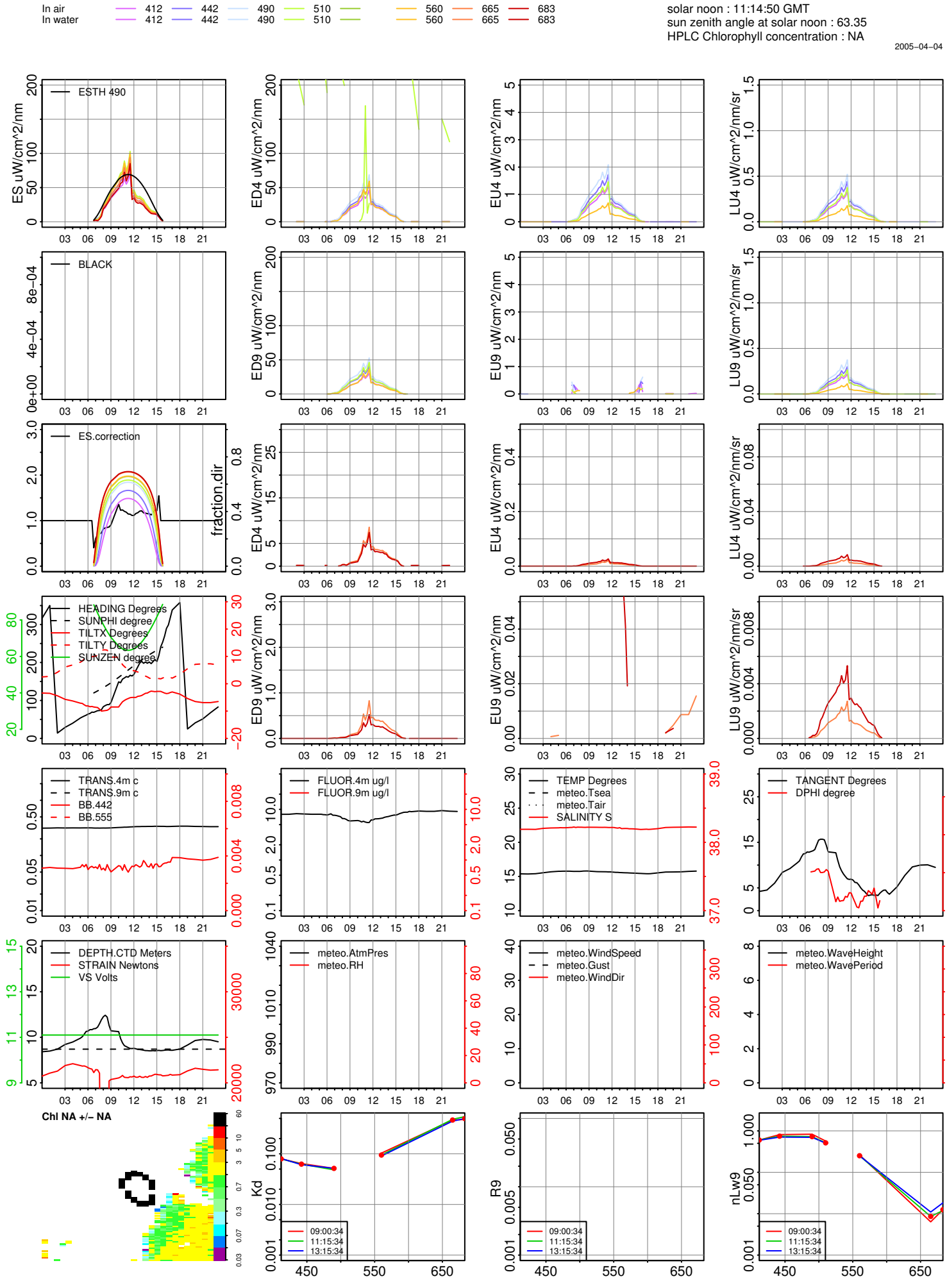
2005–04–04



2004–11–20


In air
In water
412
442
490
510
560
665
683
solar noon : 11:14:34 GMT
sun zenith angle at solar noon : 63.13
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.22 +/– 0.03
Kd
R9
nLw9
09:15:35
11:15:34
13:15:35

2004–11–21

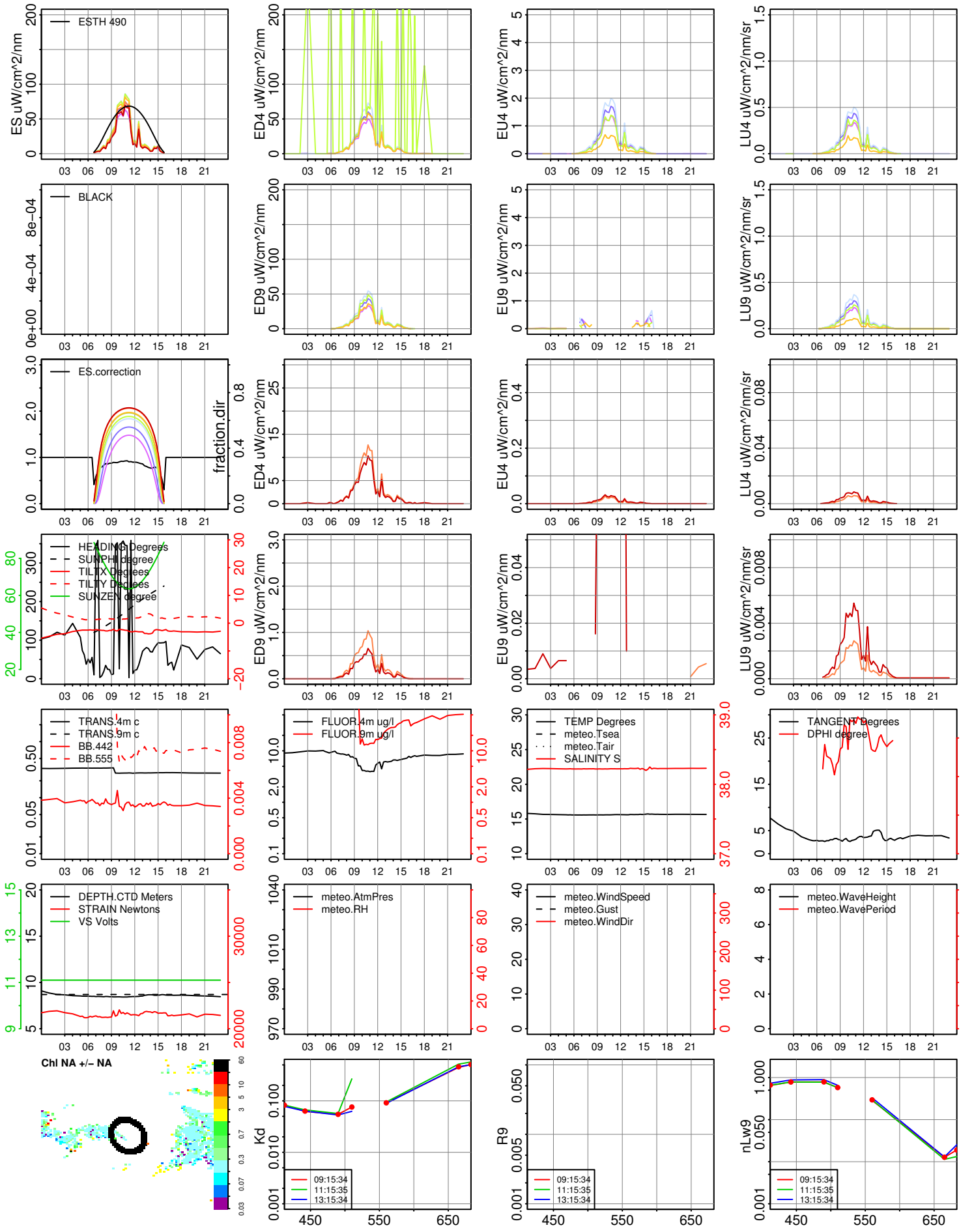

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:14:50 GMT
sun zenith angle at solar noon : 63.35
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degrees
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:00:34
11:15:34
13:15:34

2004–11–22

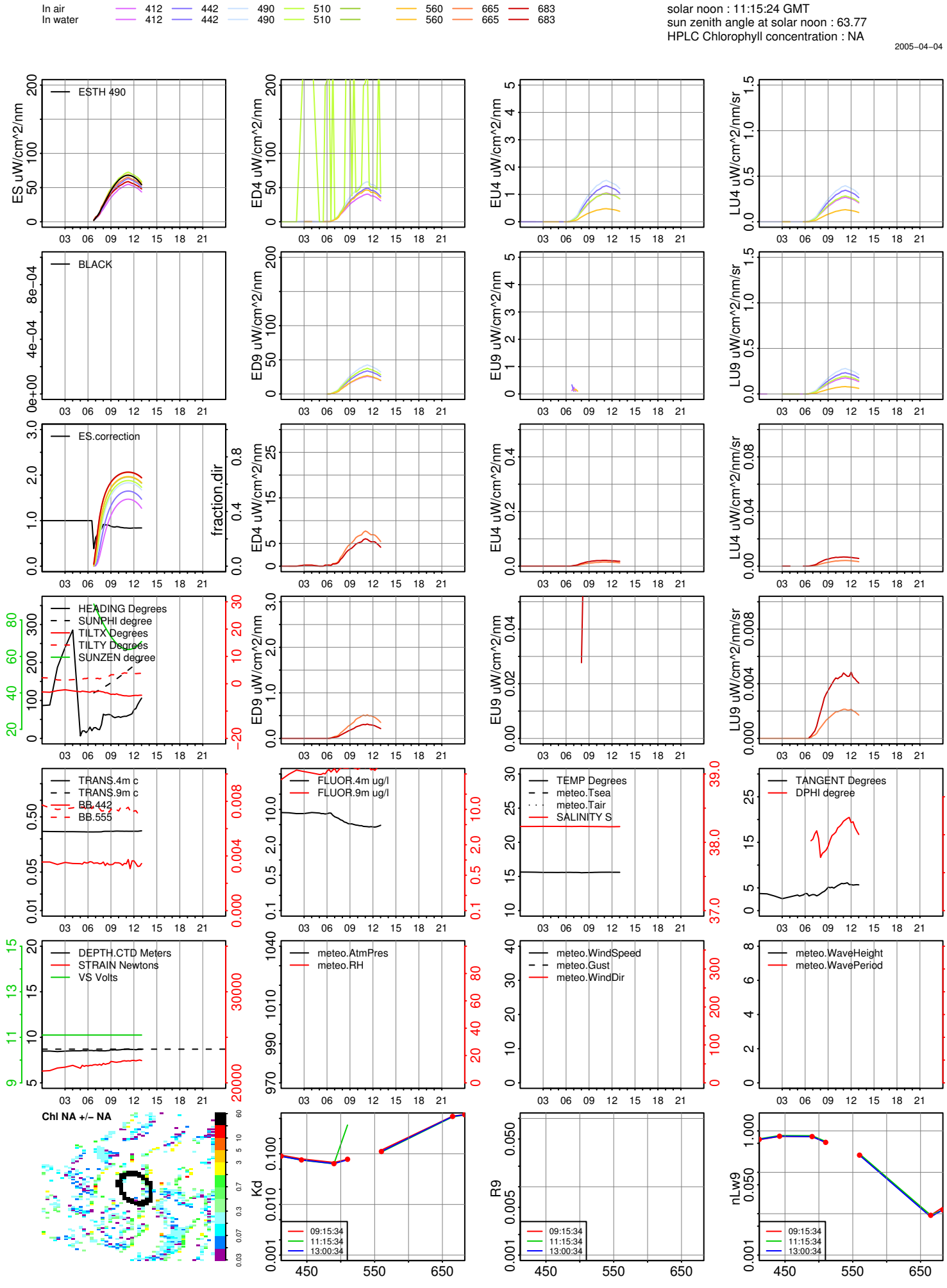
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:15:6 GMT
sun zenith angle at solar noon : 63.56
HPLC Chlorophyll concentration : NA

2005–04–04



2004–11–23

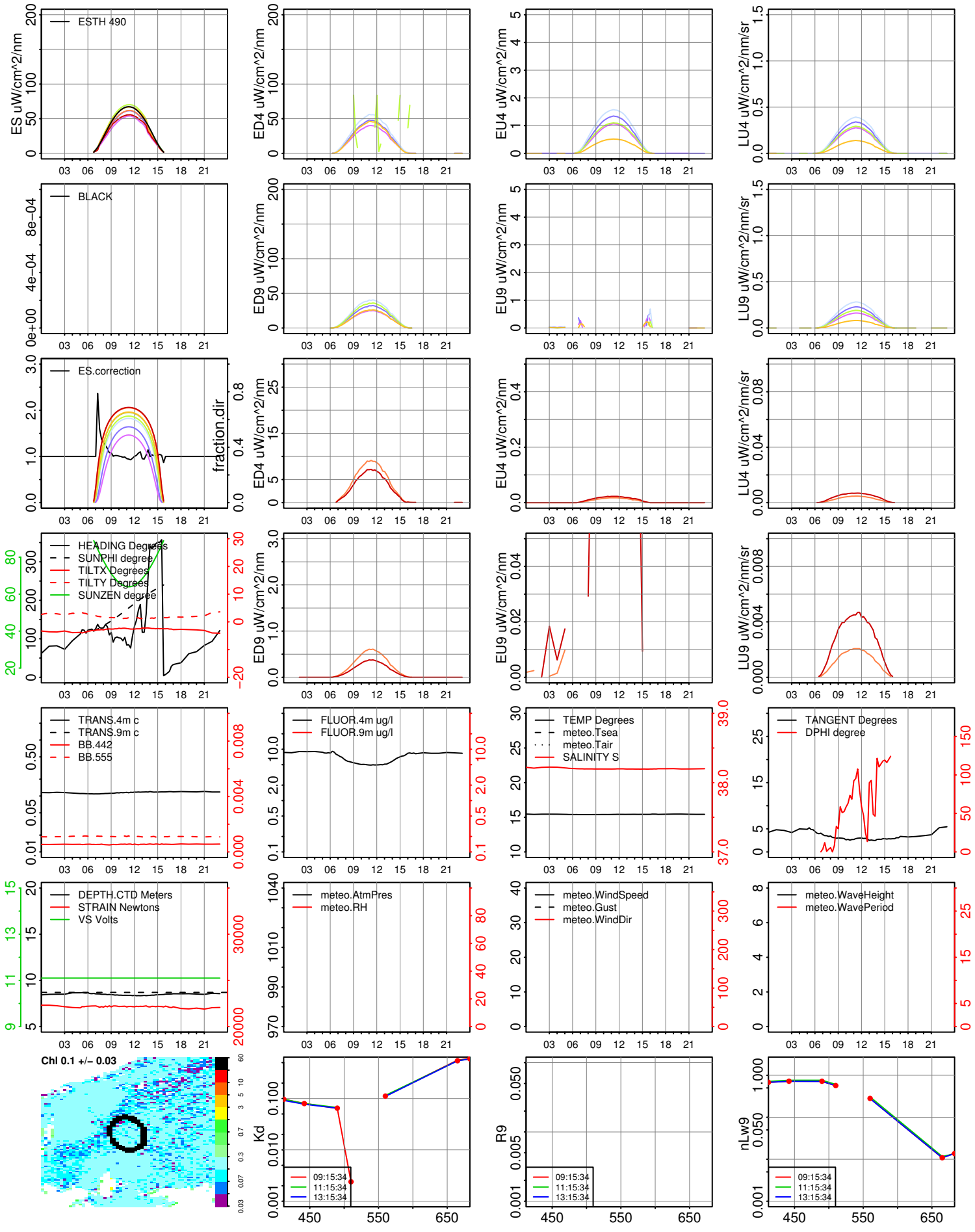

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:15:24 GMT
sun zenith angle at solar noon : 63.77
HPLC Chlorophyll concentration : NA
2005–04–04
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl NA +/– NA
Kd
R9
nLw9
09:15:34
11:15:34
13:00:34

2004–11–24

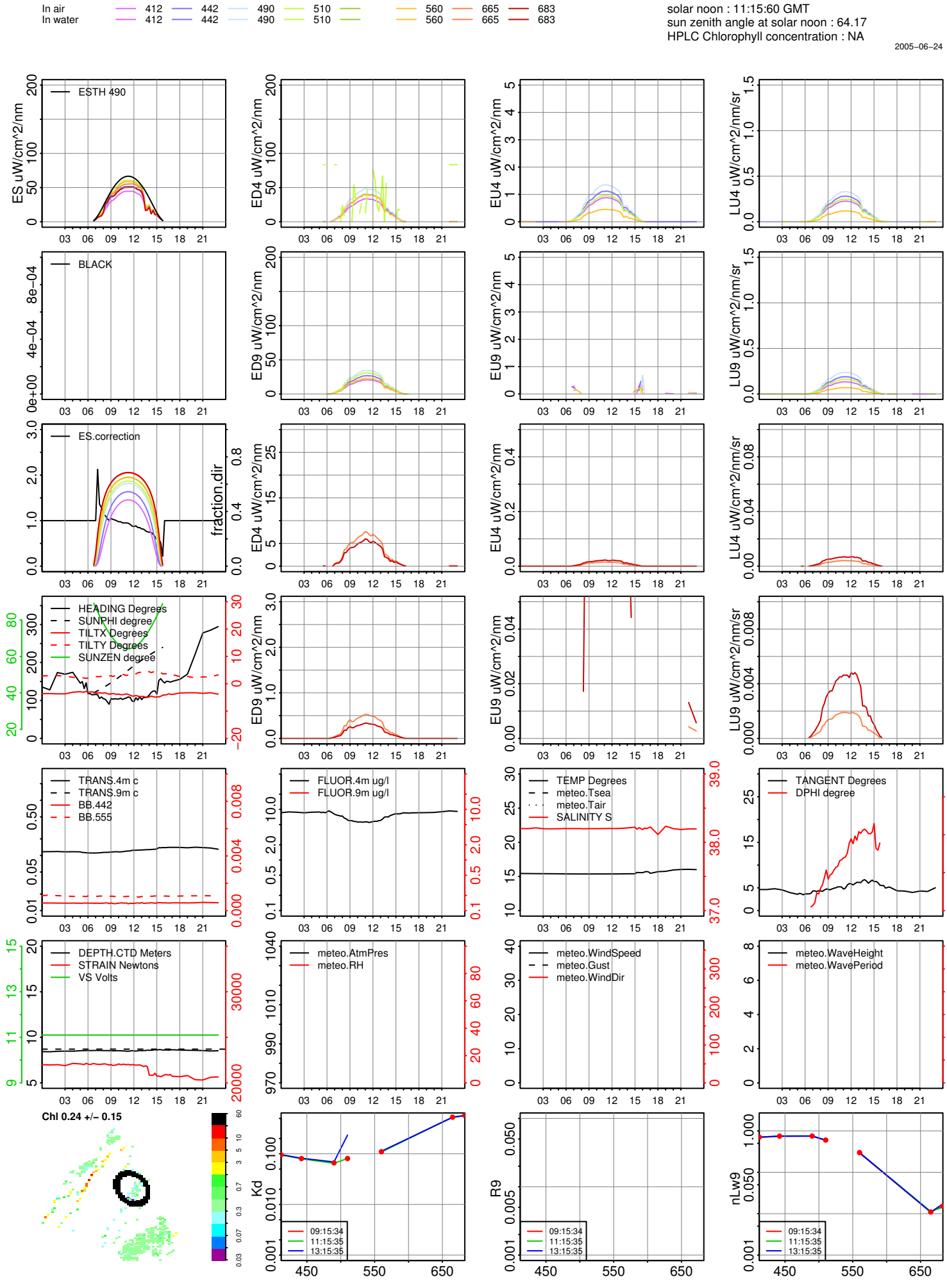
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:15:42 GMT
sun zenith angle at solar noon : 63.98
HPLC Chlorophyll concentration : NA

2005–06–24



2004–11–25

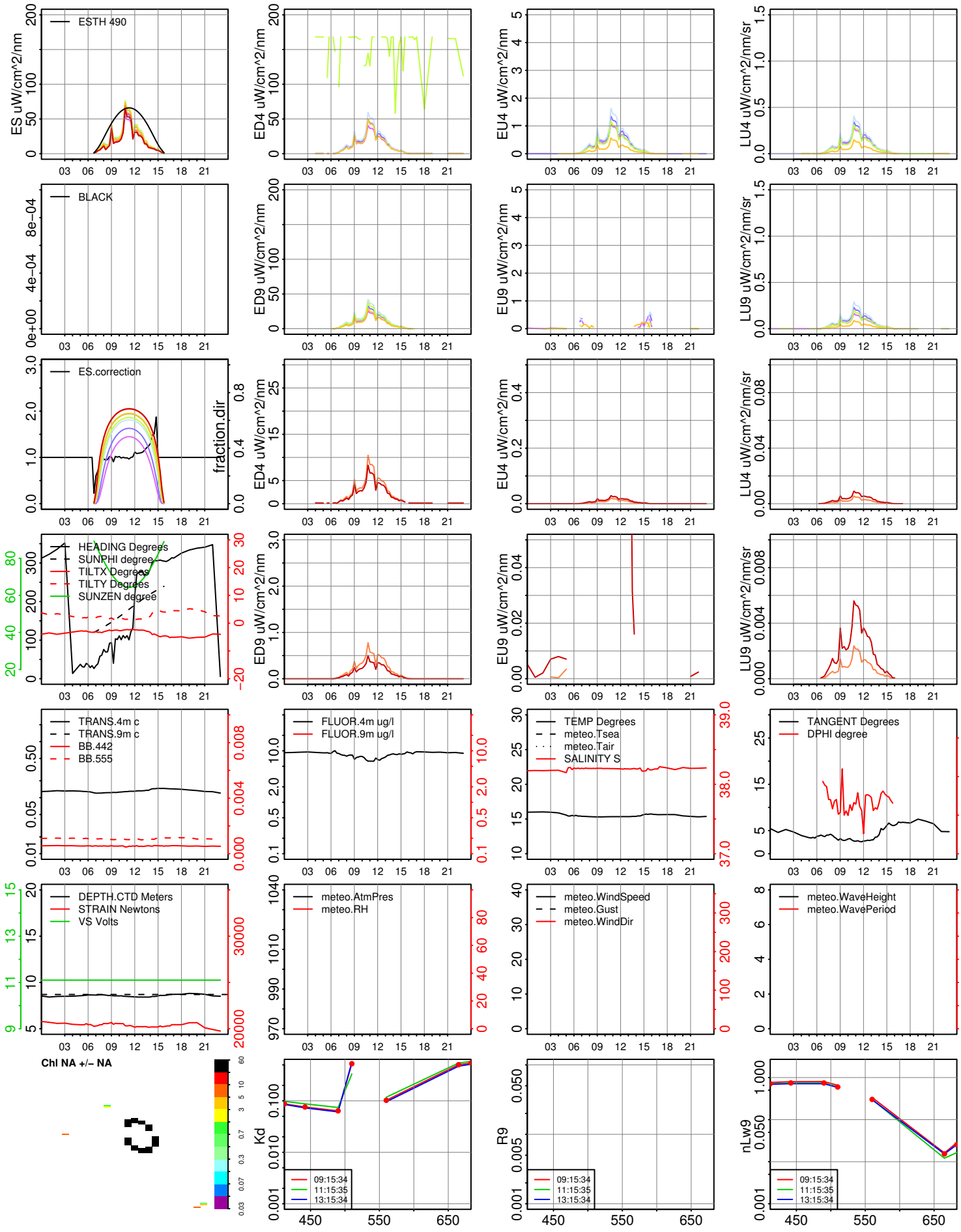

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:15:60 GMT
sun zenith angle at solar noon : 64.17
HPLC Chlorophyll concentration : NA
2005–06–24
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.24 +/– 0.15
Kd
R9
nLw9
09:15:34
11:15:35
13:15:35

2004–11–26

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:16:20 GMT
sun zenith angle at solar noon : 64.36
HPLC Chlorophyll concentration : NA

2005–06–24

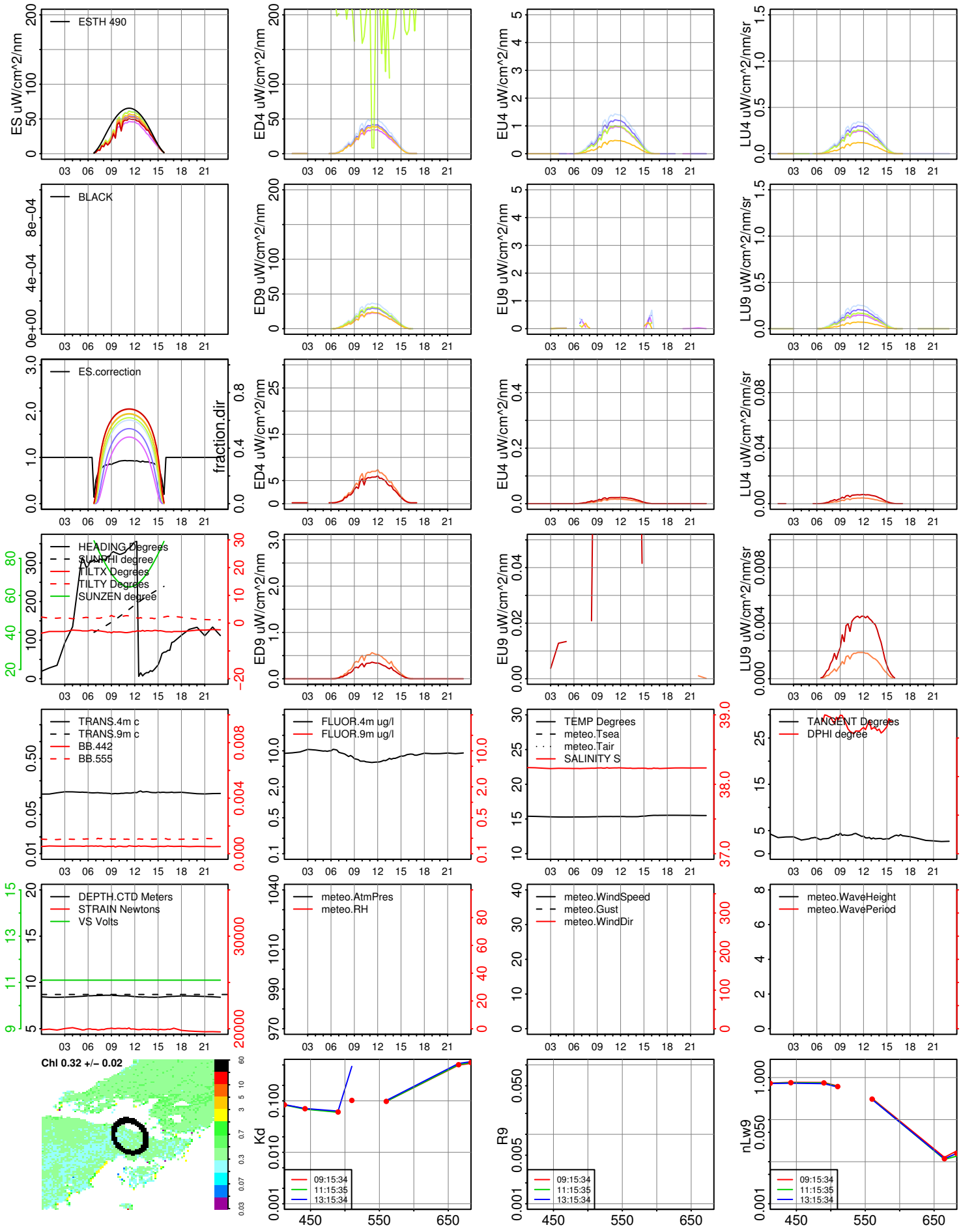


2004-11-27

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:16:38 GMT
sun zenith angle at solar noon : 64.55
HPLC Chlorophyll concentration : NA

2005-06-24

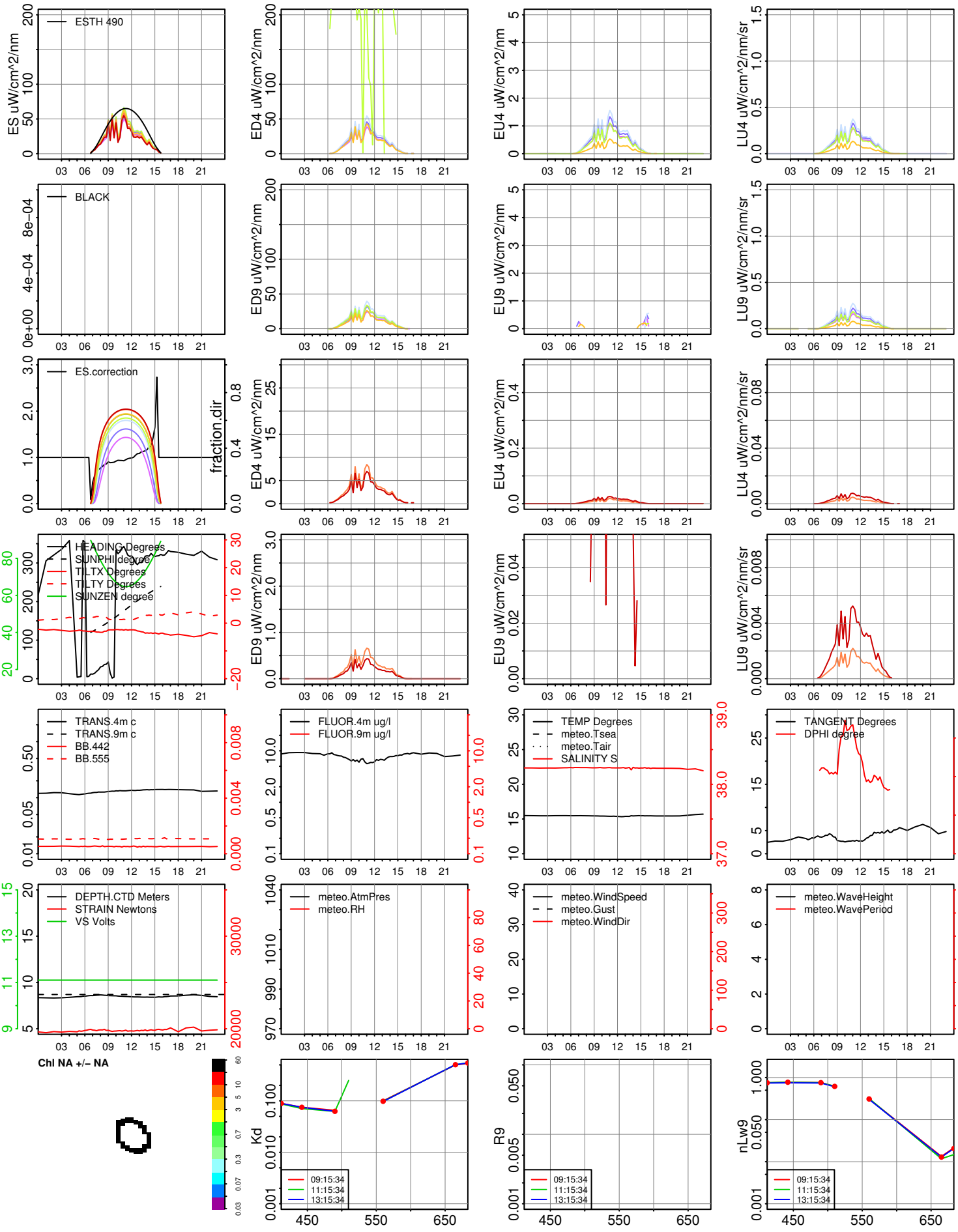


2004–11–28

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:16:60 GMT
sun zenith angle at solar noon : 64.72
HPLC Chlorophyll concentration : NA

2005–06–24

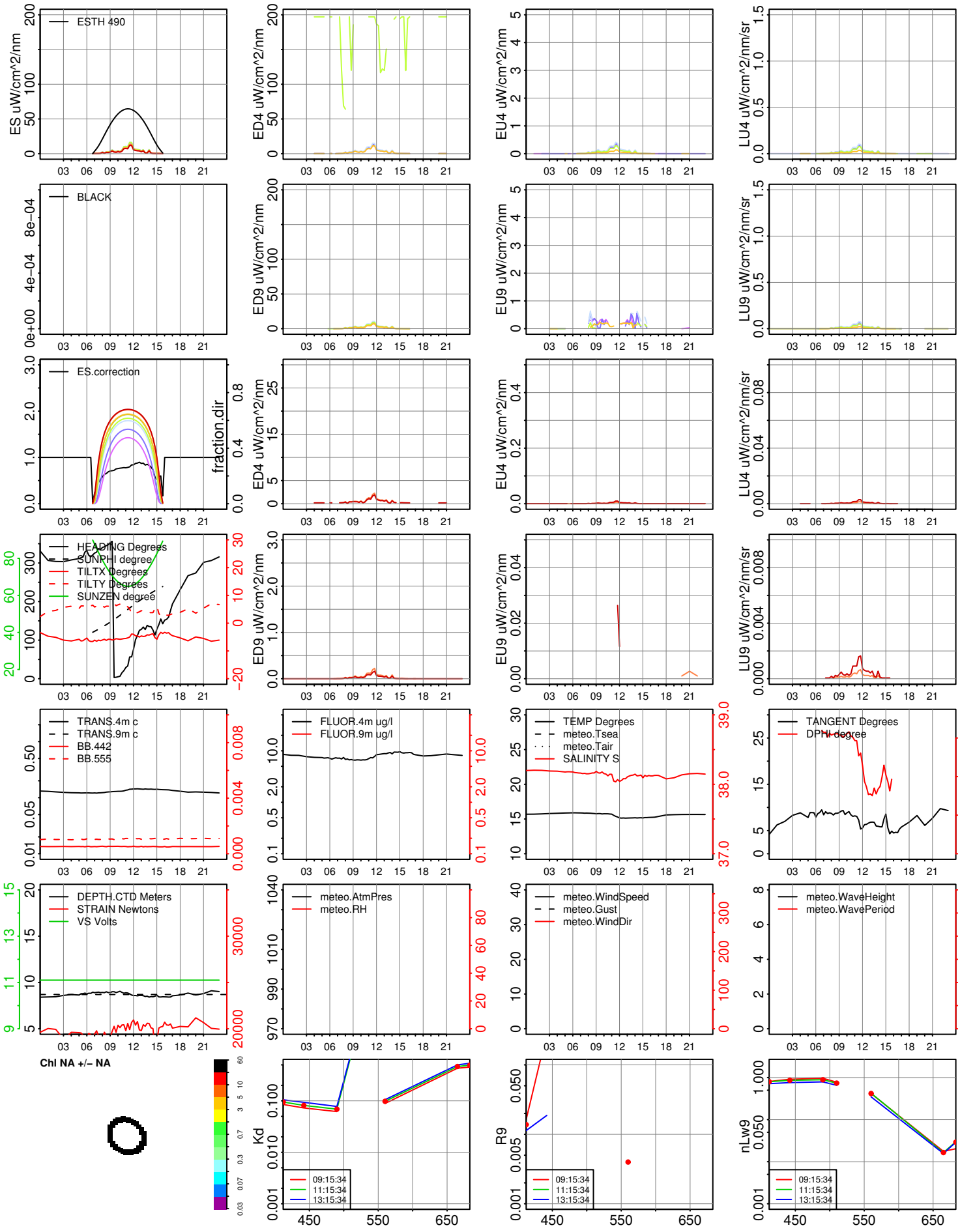


2004-11-29

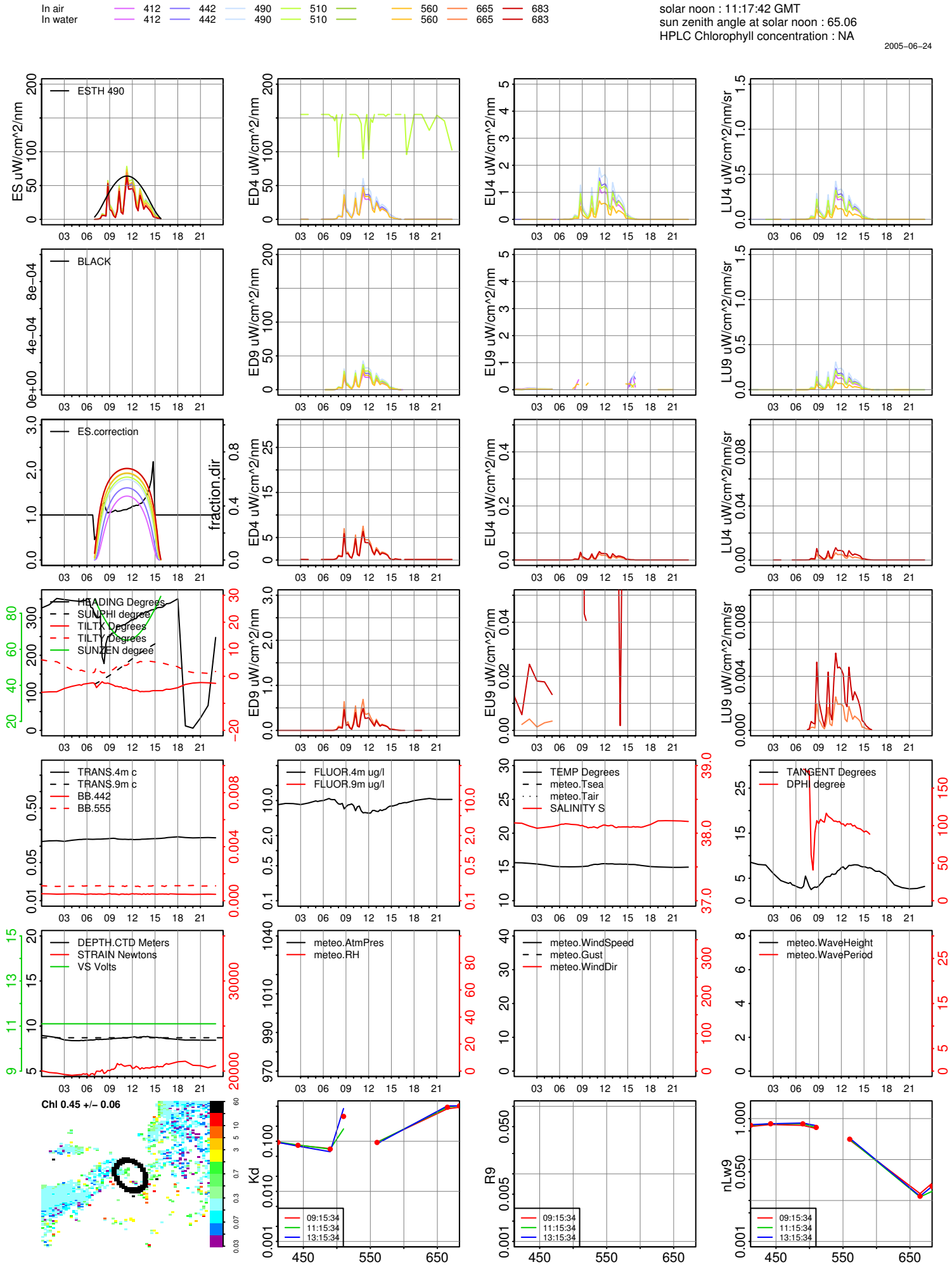
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:17:20 GMT
sun zenith angle at solar noon : 64.89
HPLC Chlorophyll concentration : NA

2005-06-24



2004−11−30

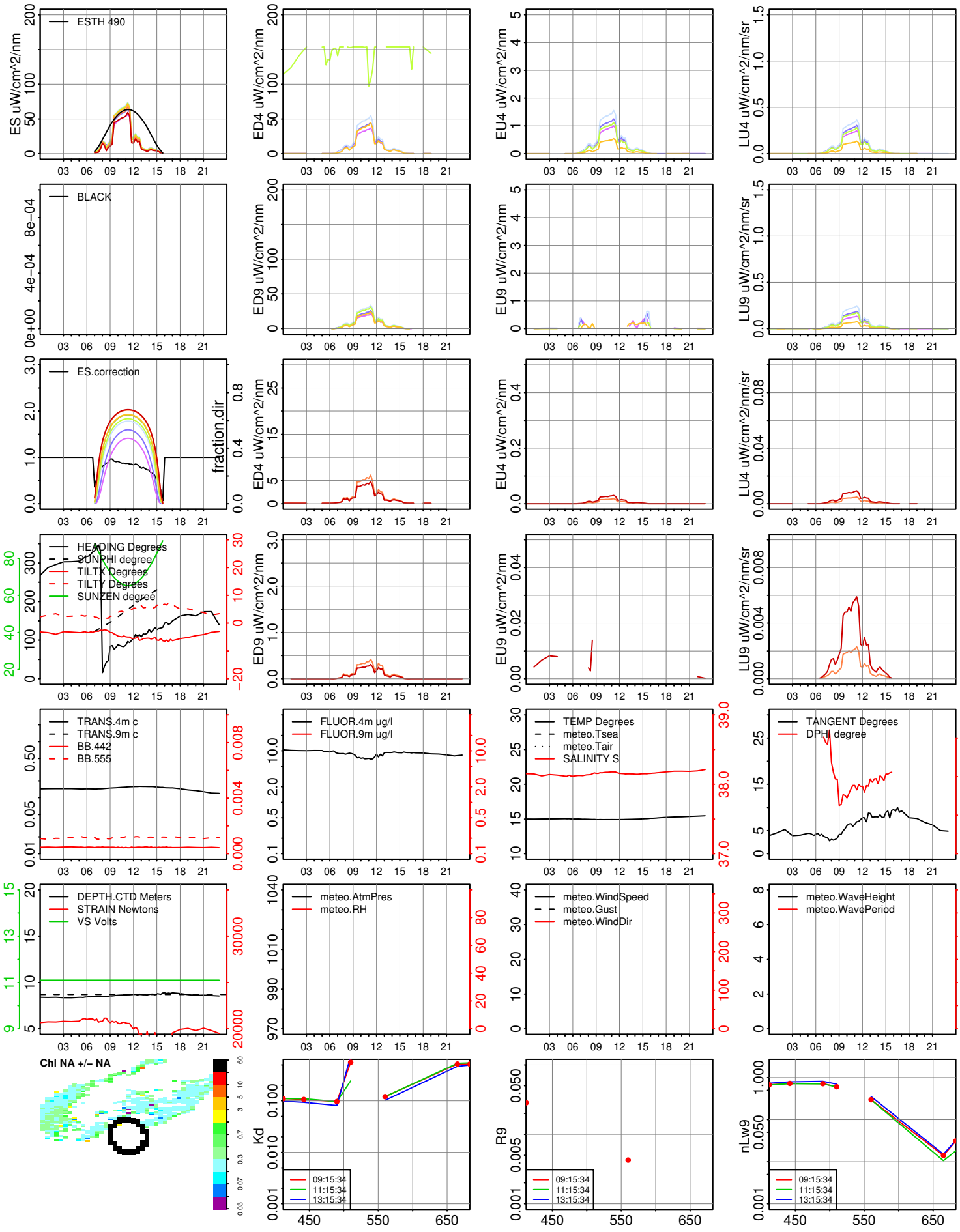

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:17:42 GMT
sun zenith angle at solar noon : 65.06
HPLC Chlorophyll concentration : NA
2005−06−24
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.45 +/− 0.06
Kd
R9
nLw9
09:15:34
11:15:34
13:15:34

2004–12–01

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:18:4 GMT
sun zenith angle at solar noon : 65.21
HPLC Chlorophyll concentration : NA

2005–06–24

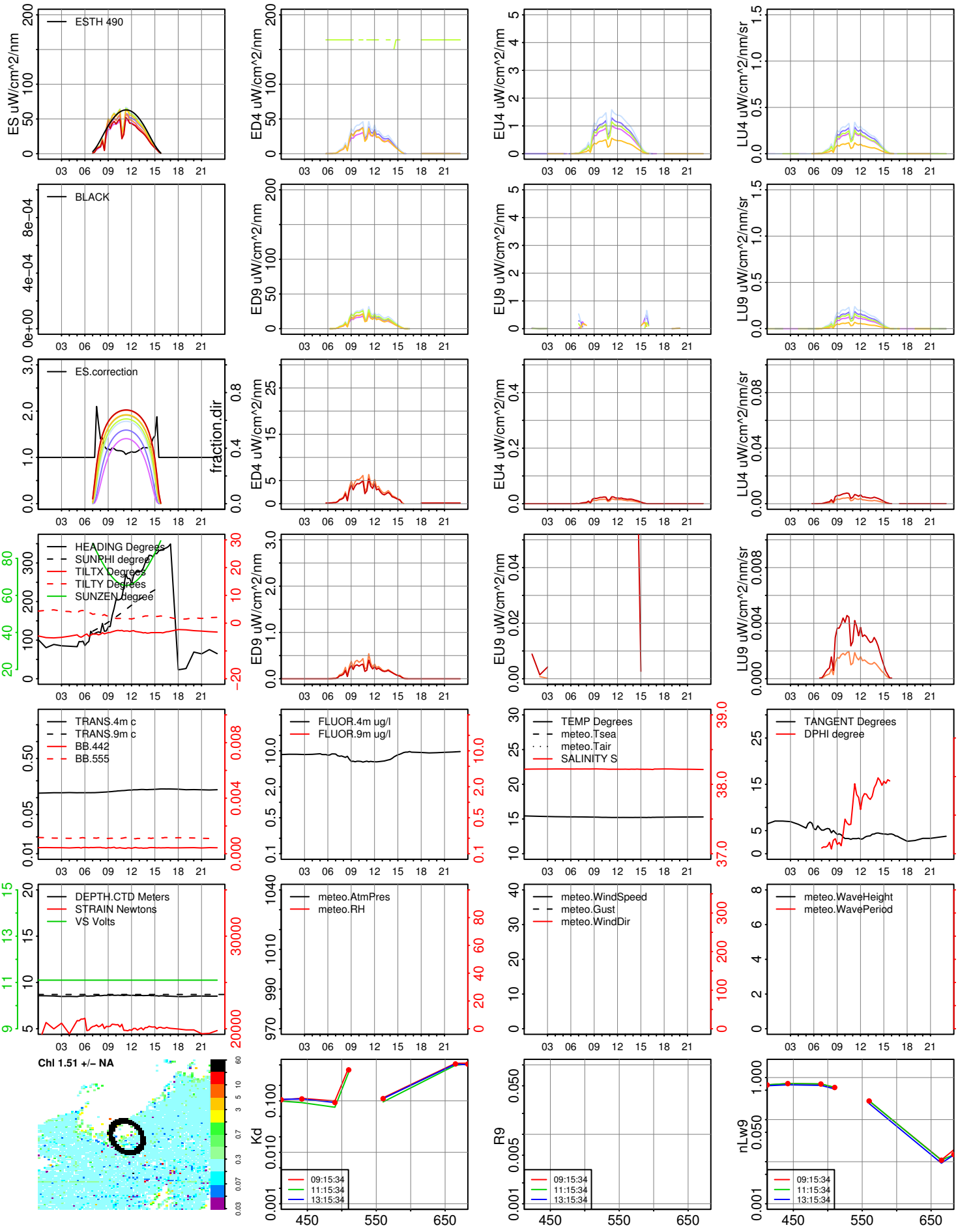


2004–12–02

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:18:26 GMT
sun zenith angle at solar noon : 65.36
HPLC Chlorophyll concentration : NA

2005–06–24

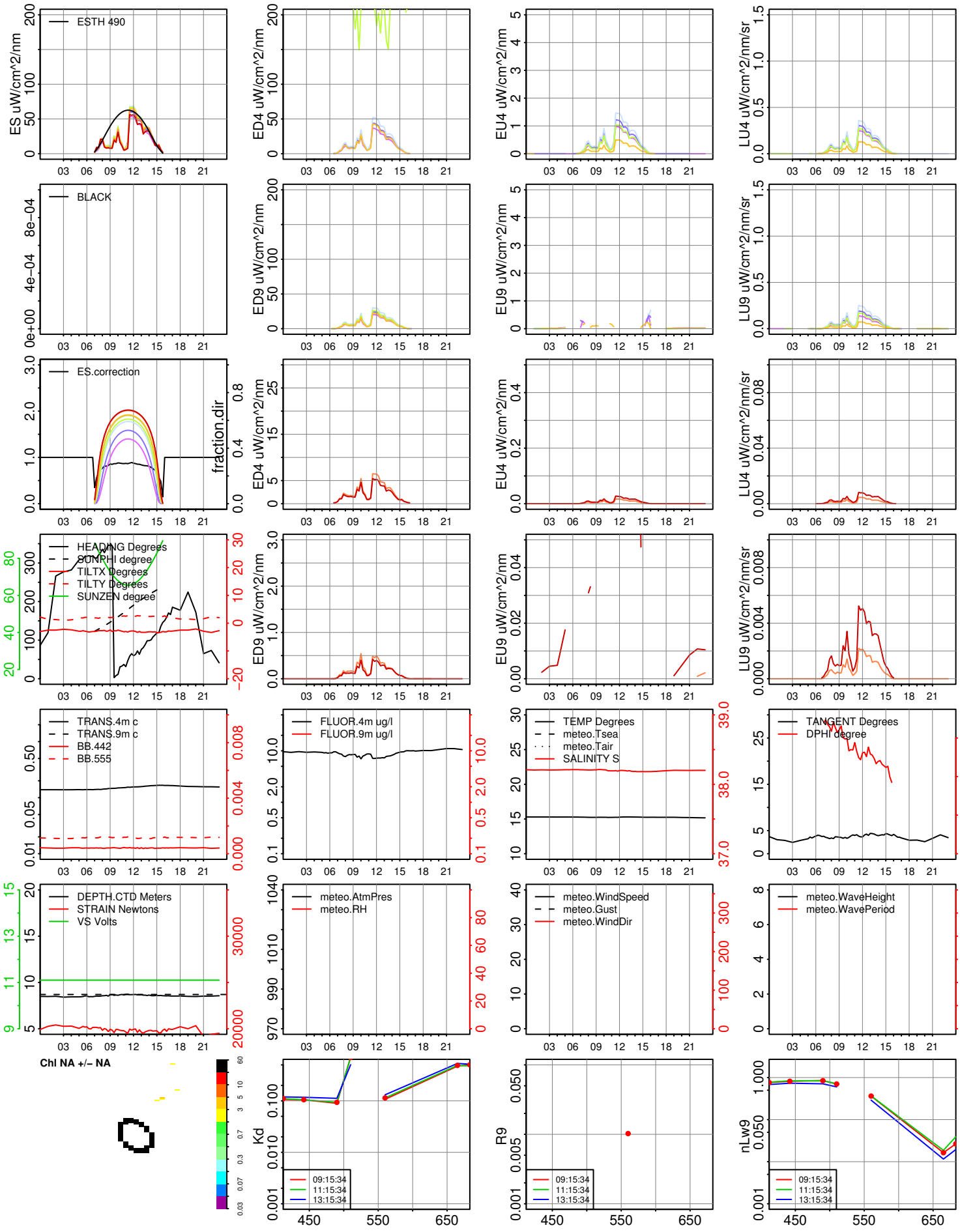


2004–12–03

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:18:48 GMT
sun zenith angle at solar noon : 65.51
HPLC Chlorophyll concentration : NA

2005–06–24

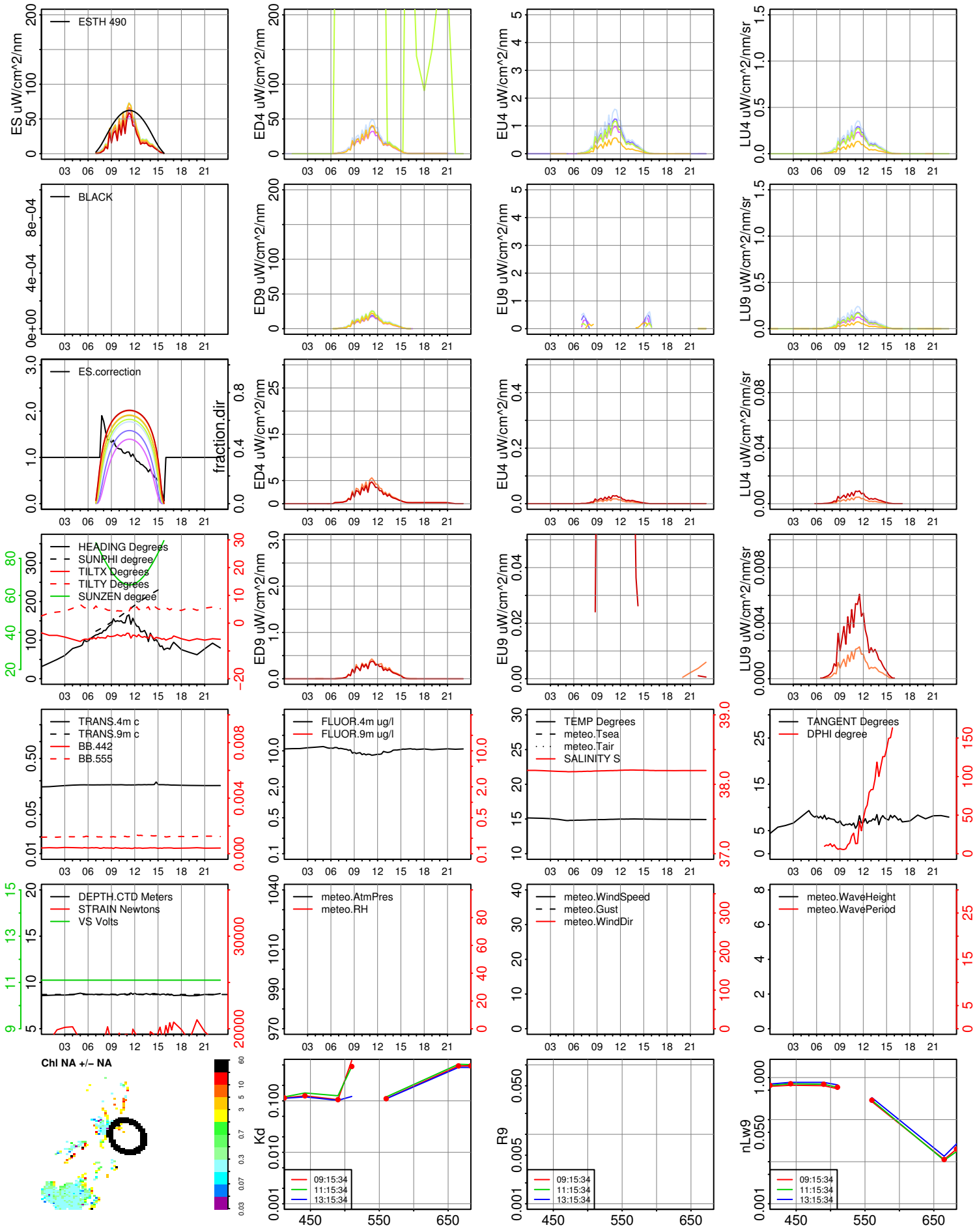


2004–12–04

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:19:12 GMT
sun zenith angle at solar noon : 65.64
HPLC Chlorophyll concentration : NA

2005–06–24

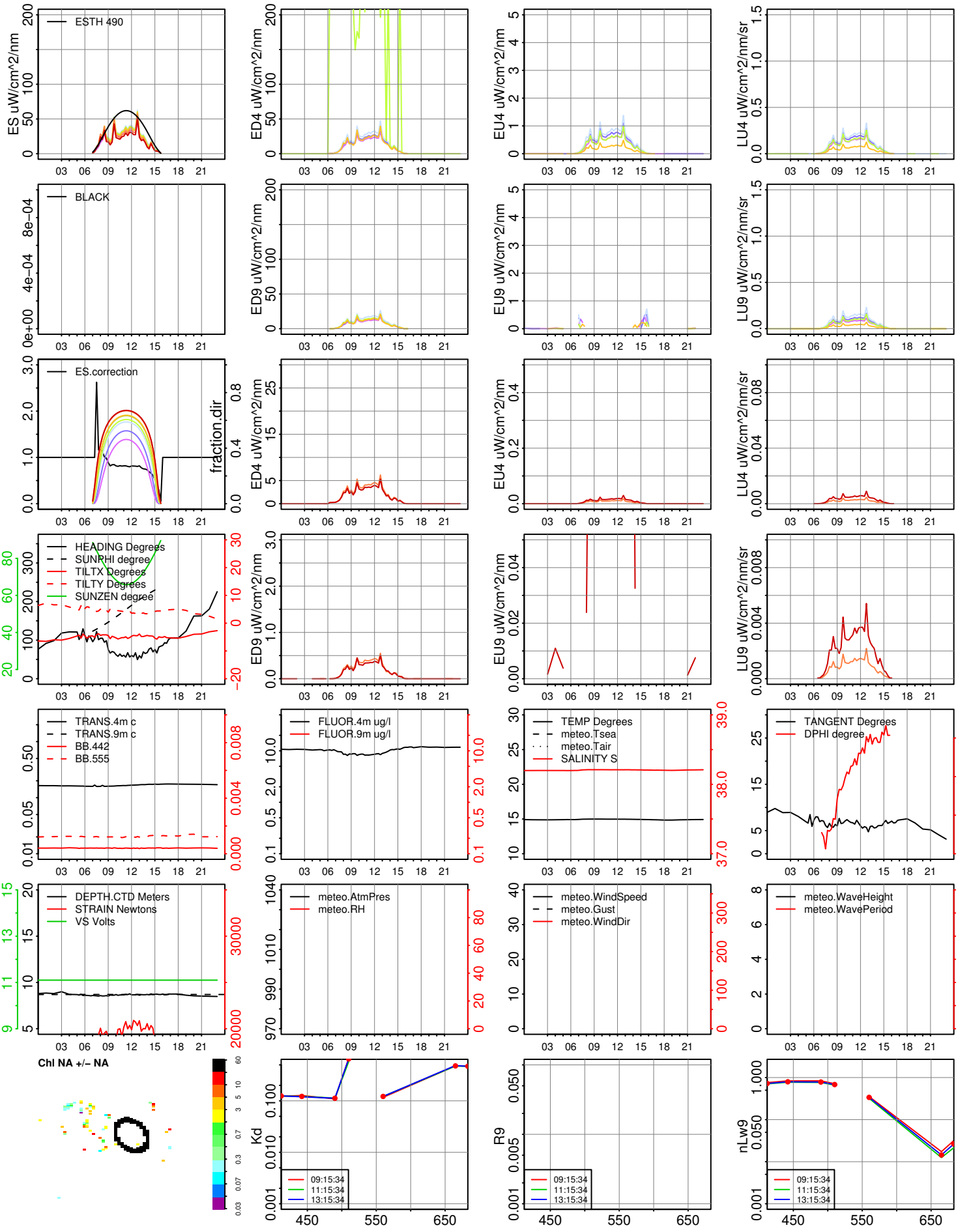


2004–12–05

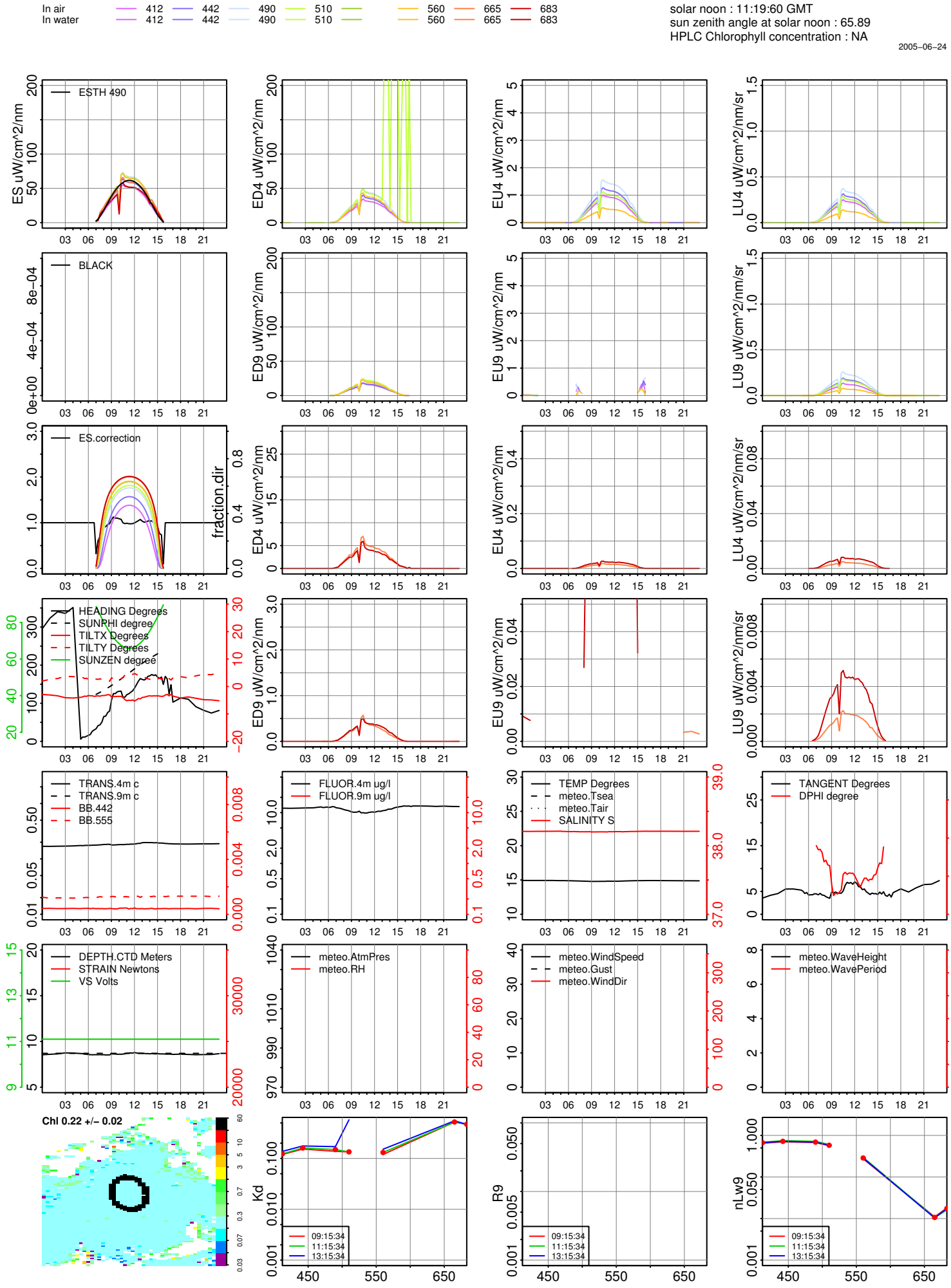
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:19:36 GMT
sun zenith angle at solar noon : 65.77
HPLC Chlorophyll concentration : NA

2005–06–24



2004–12–06

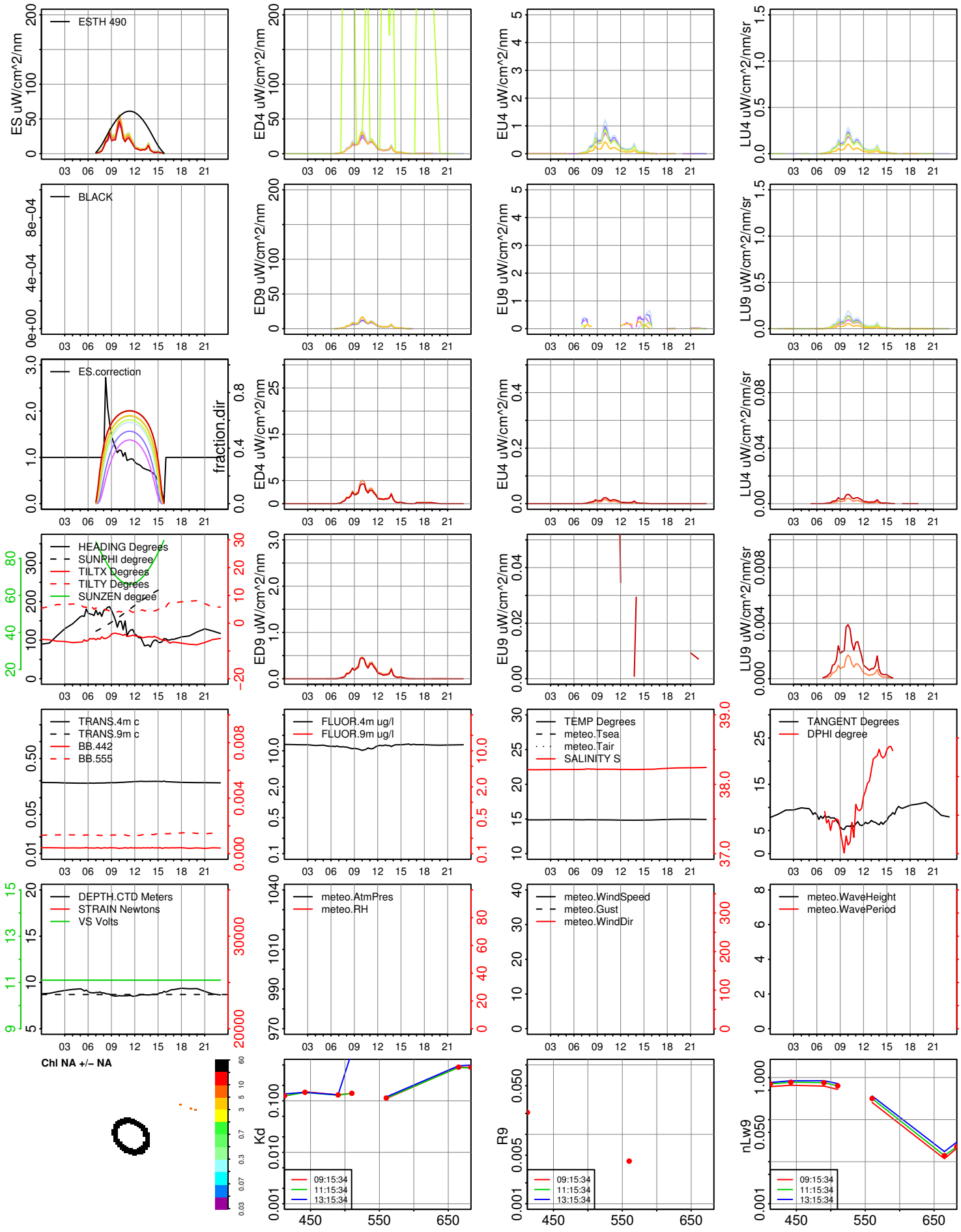

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:19:60 GMT
sun zenith angle at solar noon : 65.89
HPLC Chlorophyll concentration : NA
2005–06–24
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.22 +/– 0.02
Kd
R9
nLw9
09:15:34
11:15:34
13:15:34

2004–12–07

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:20:26 GMT
sun zenith angle at solar noon : 66
HPLC Chlorophyll concentration : NA

2005–06–24

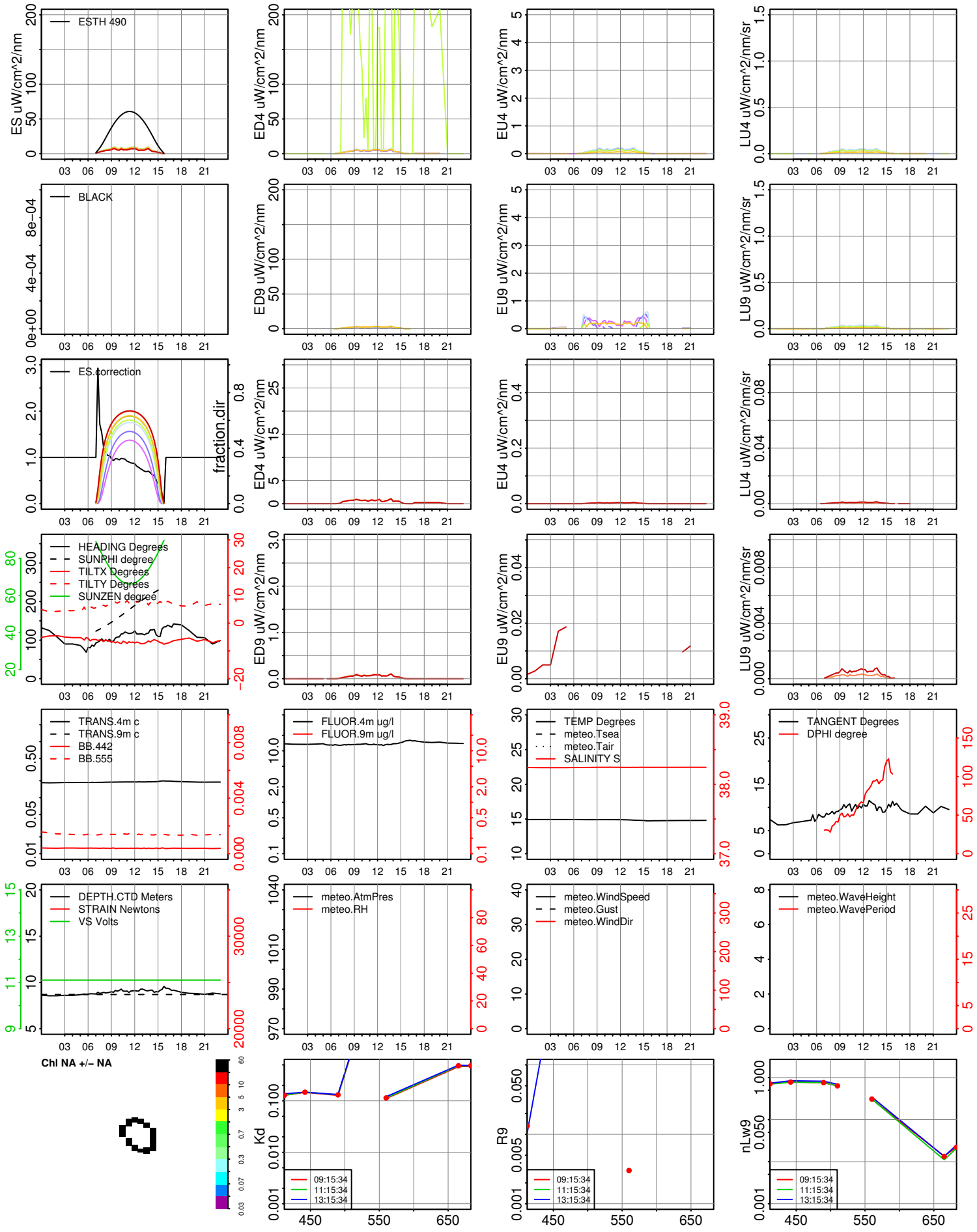


2004–12–08

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:20:50 GMT
sun zenith angle at solar noon : 66.11
HPLC Chlorophyll concentration : NA

2005–06–24

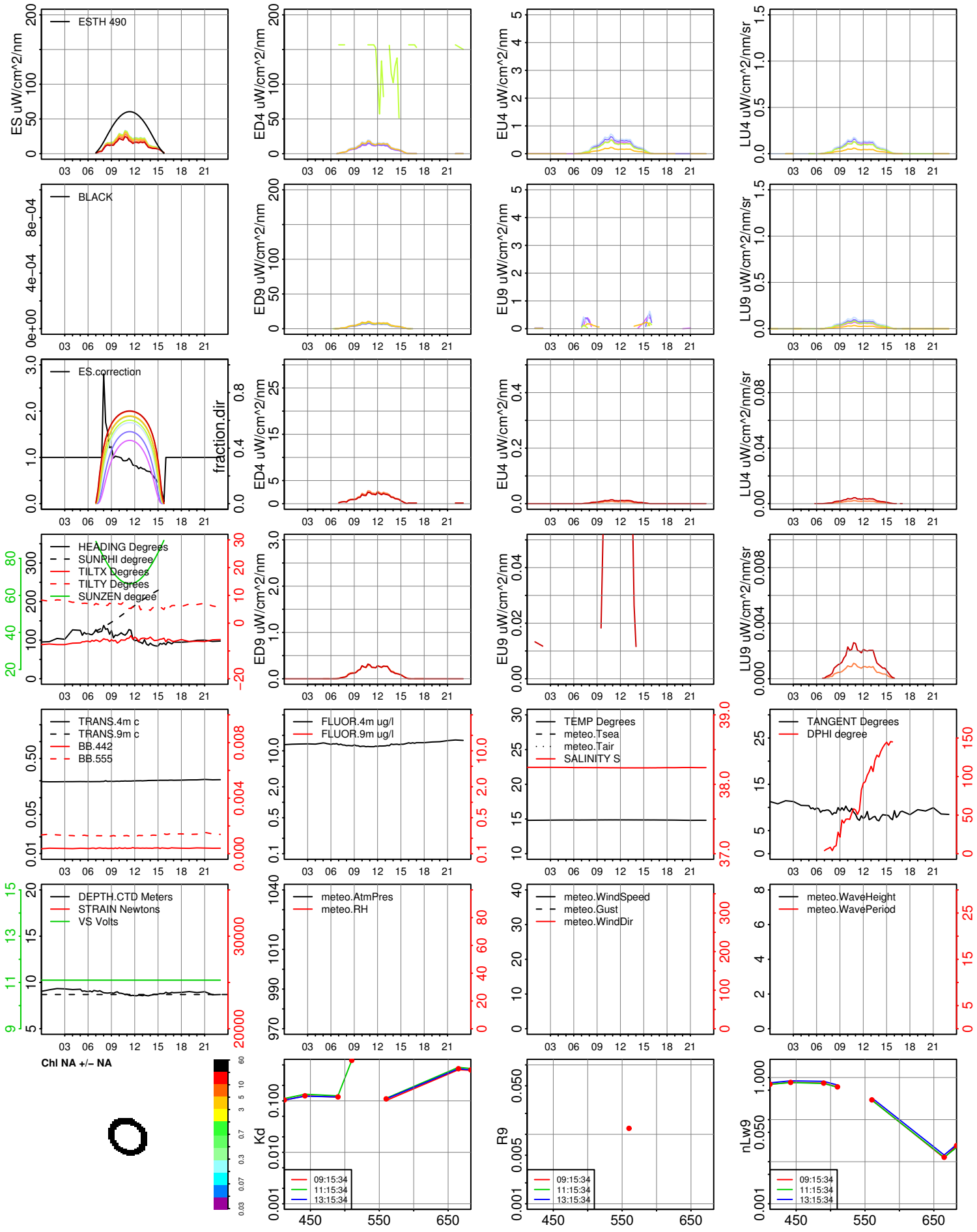


2004–12–09

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:21:16 GMT
sun zenith angle at solar noon : 66.21
HPLC Chlorophyll concentration : NA

2005–06–24

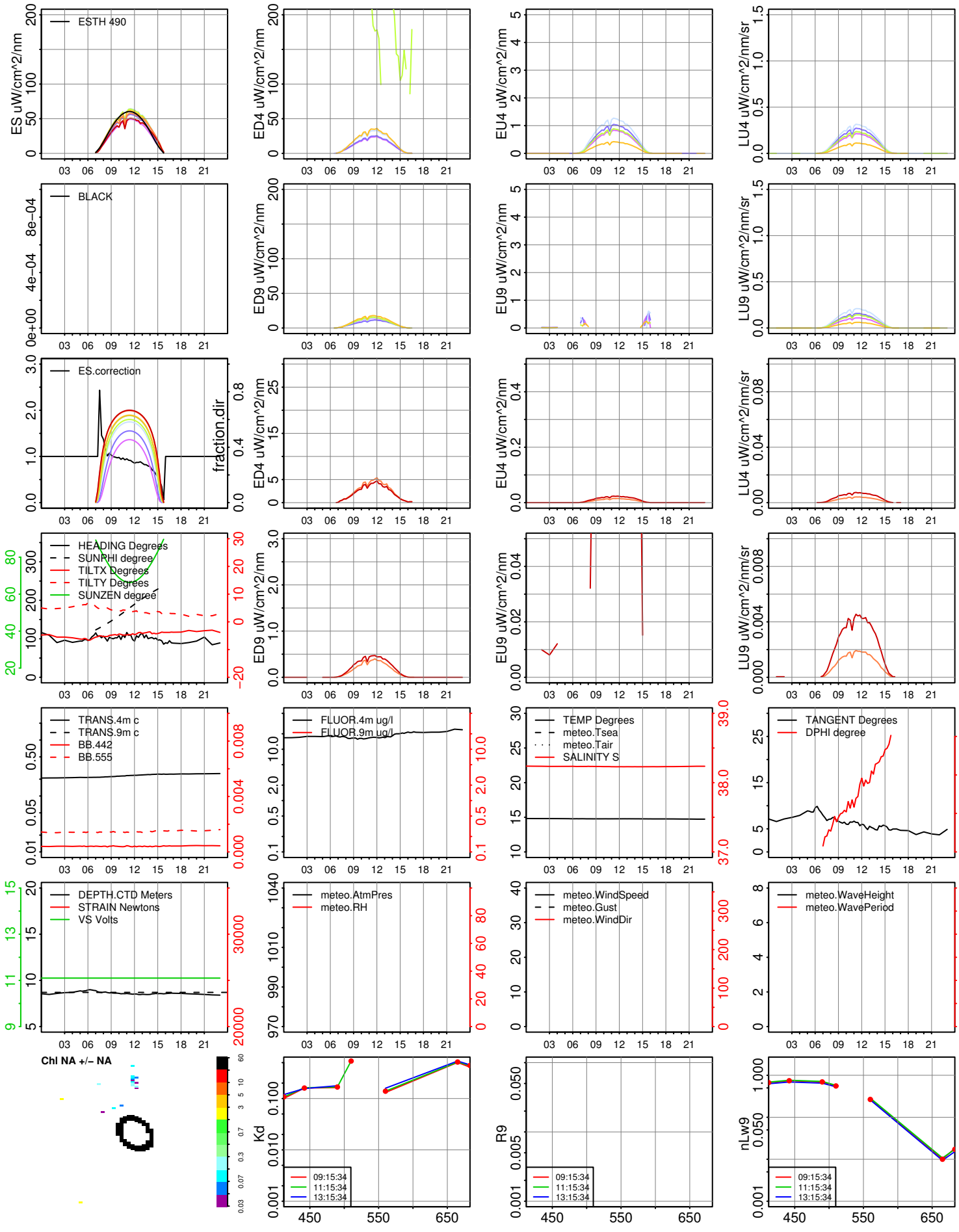


2004–12–10

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:21:42 GMT
sun zenith angle at solar noon : 66.3
HPLC Chlorophyll concentration : NA

2005–06–24

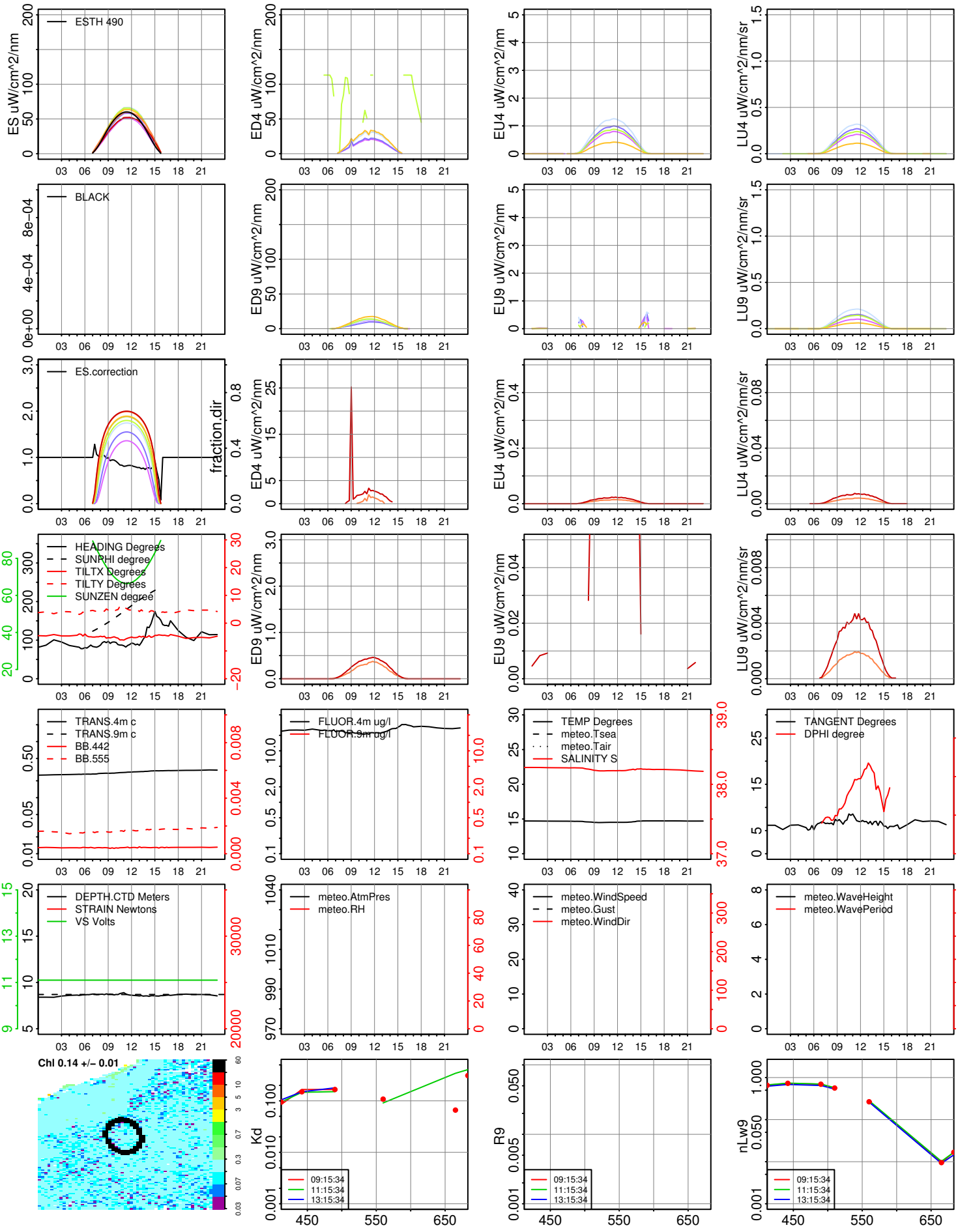


2004–12–11

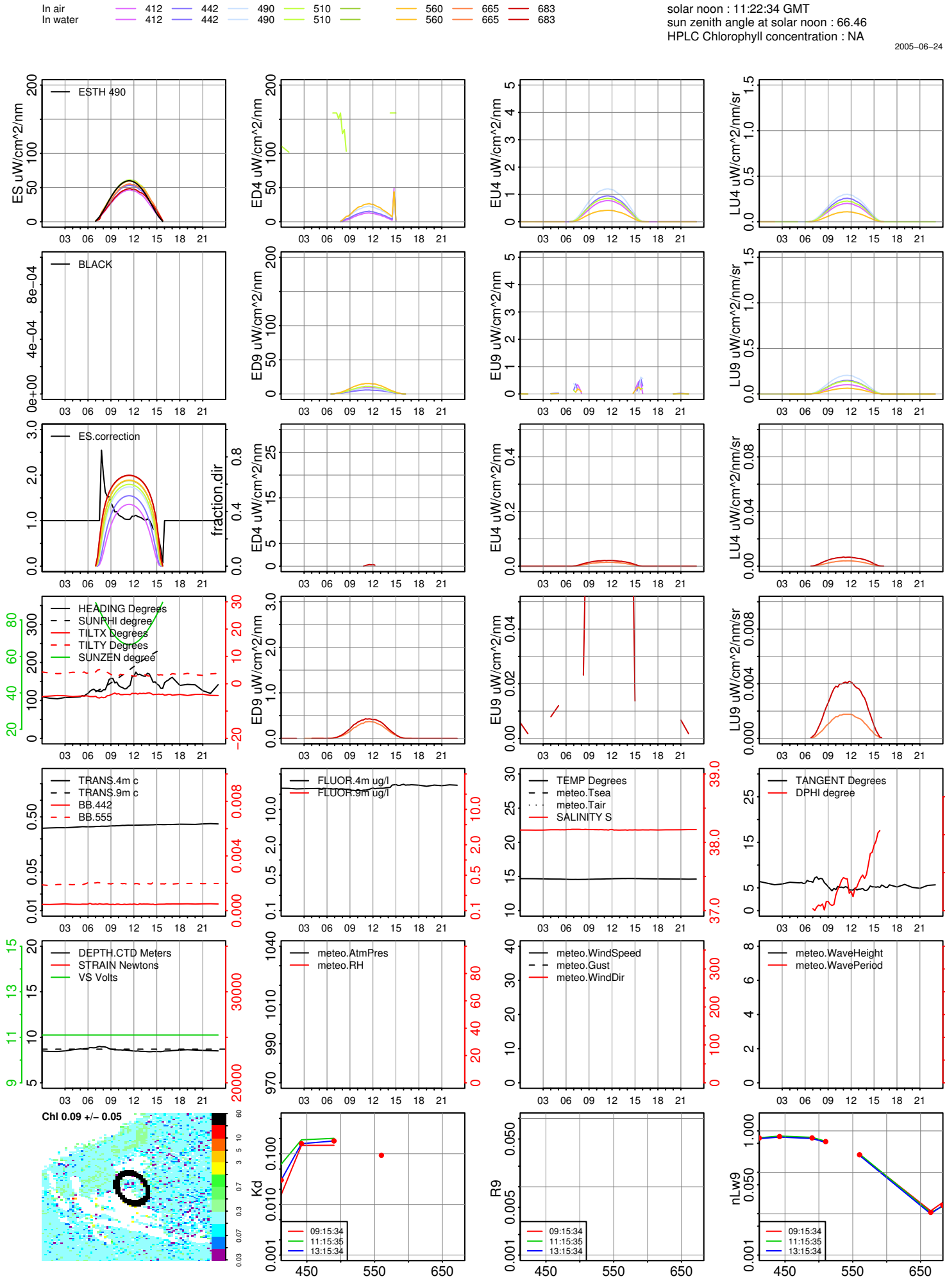
In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:22:8 GMT
sun zenith angle at solar noon : 66.38
HPLC Chlorophyll concentration : NA

2005–06–24



2004–12–12

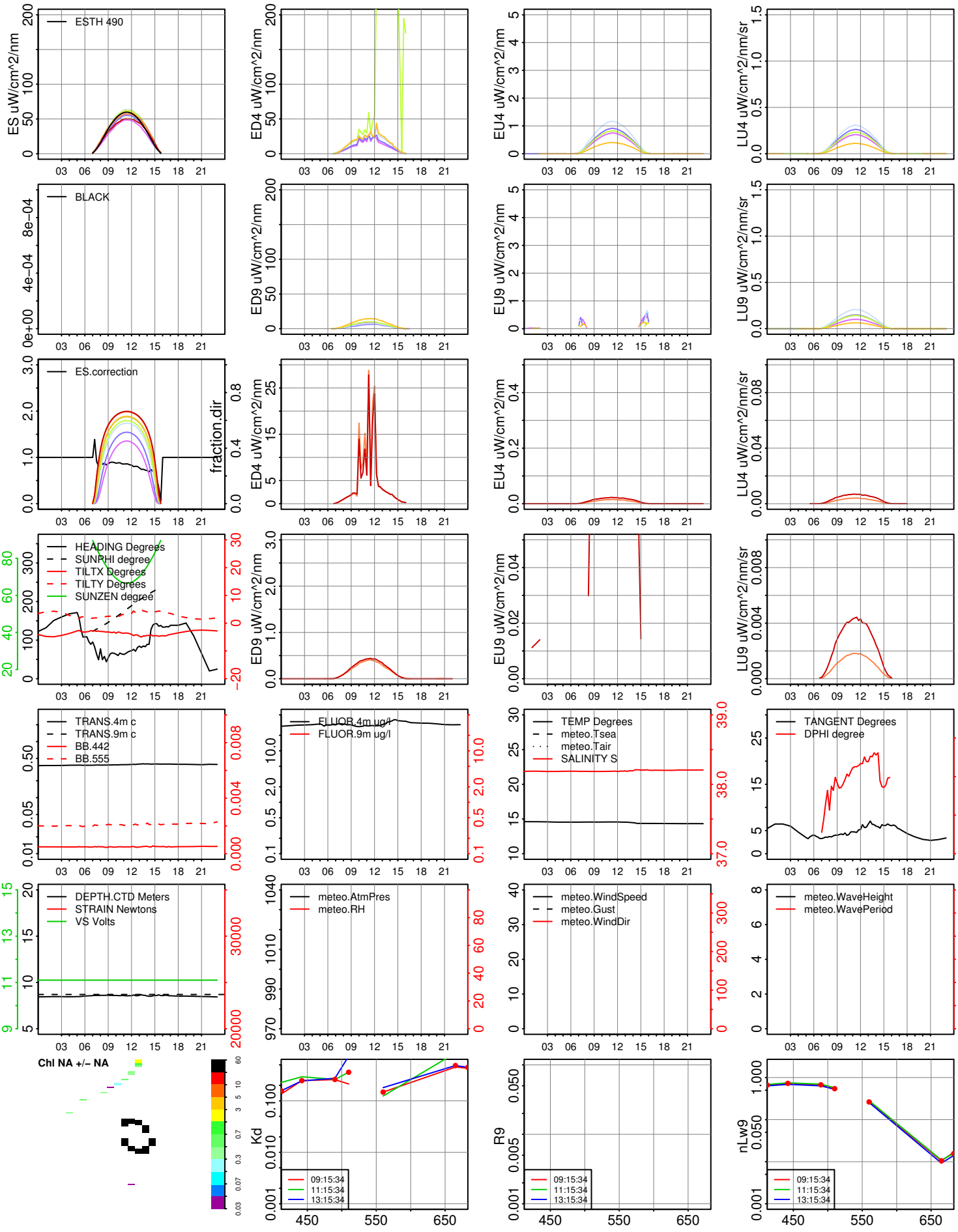

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:22:34 GMT
sun zenith angle at solar noon : 66.46
HPLC Chlorophyll concentration : NA
2005–06–24
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Chl 0.09 +/– 0.05
Kd
R9
nLw9
09:15:34
11:15:35
13:15:34

2004–12–13

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:23:2 GMT
sun zenith angle at solar noon : 66.53
HPLC Chlorophyll concentration : NA

2005–06–24

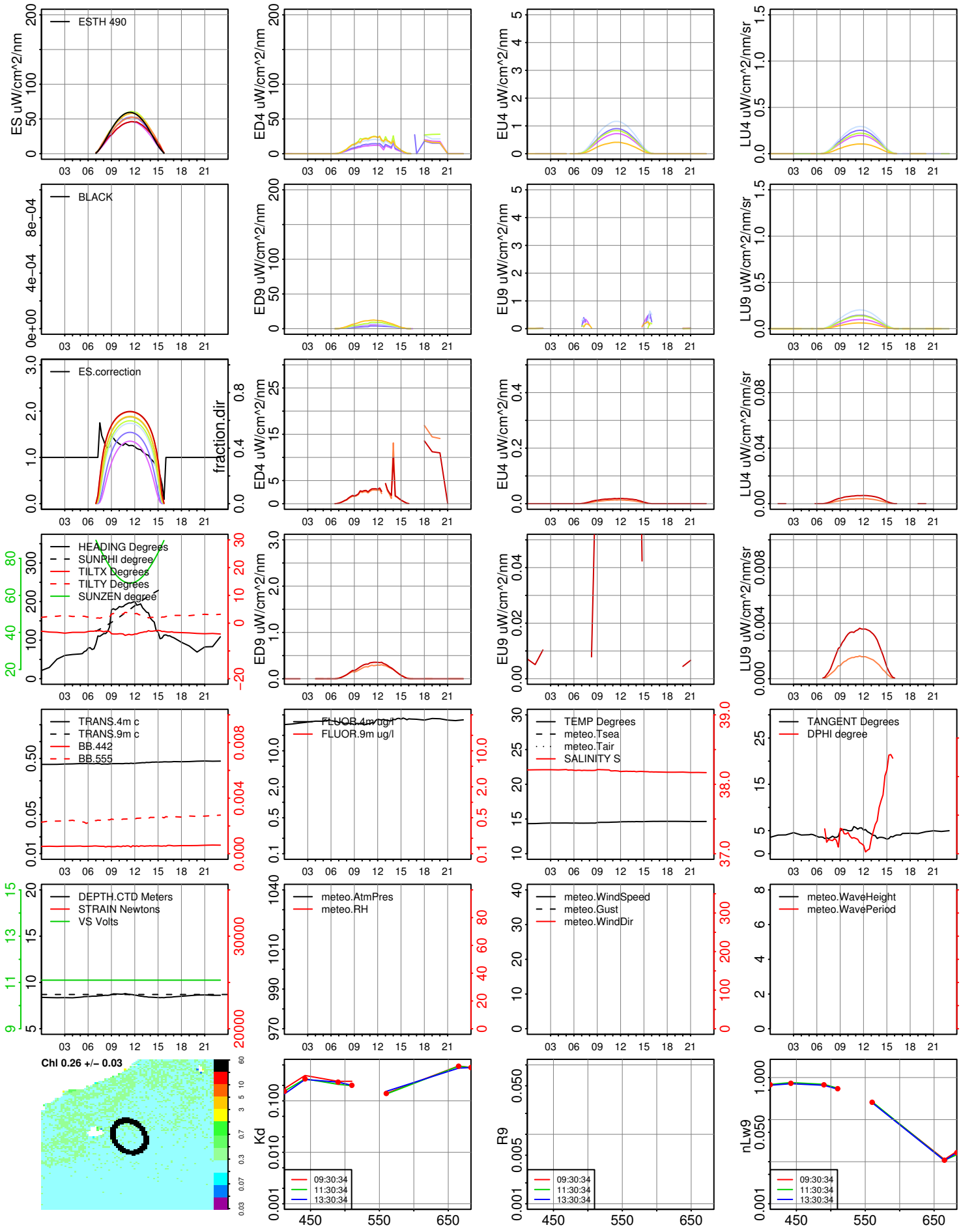


2004–12–14

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:23:28 GMT
sun zenith angle at solar noon : 66.59
HPLC Chlorophyll concentration : NA

2005–06–24

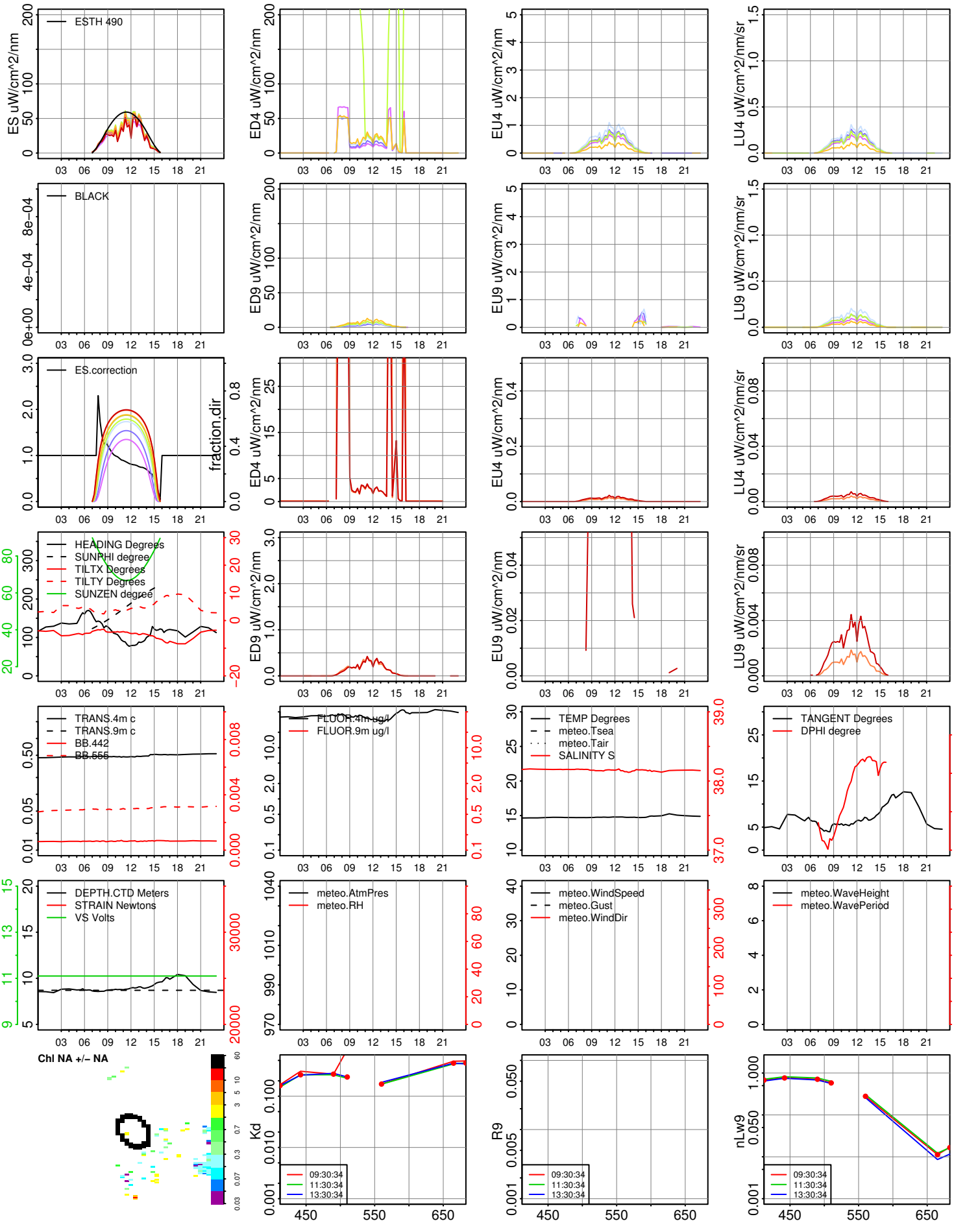


2004–12–15

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:23:56 GMT
sun zenith angle at solar noon : 66.64
HPLC Chlorophyll concentration : NA

2005–06–24

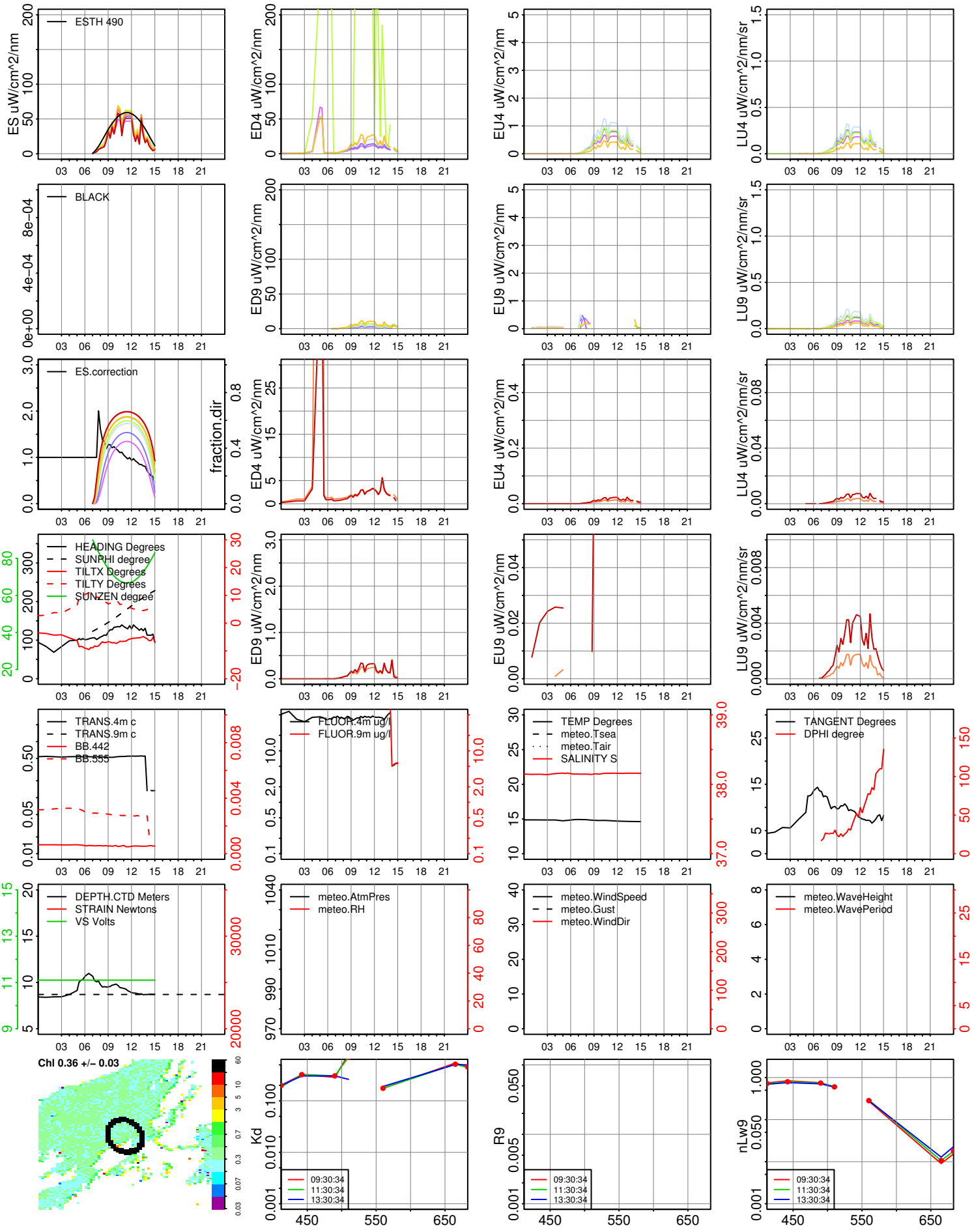


2004–12–16

In air / In water: 412 412 | 442 442 | 490 490 | 510 510 | 554 554 | 560 560 | 665 665 | 683 683

solar noon : 11:24:22 GMT
sun zenith angle at solar noon : 66.68
HPLC Chlorophyll concentration : NA

2005–06–24

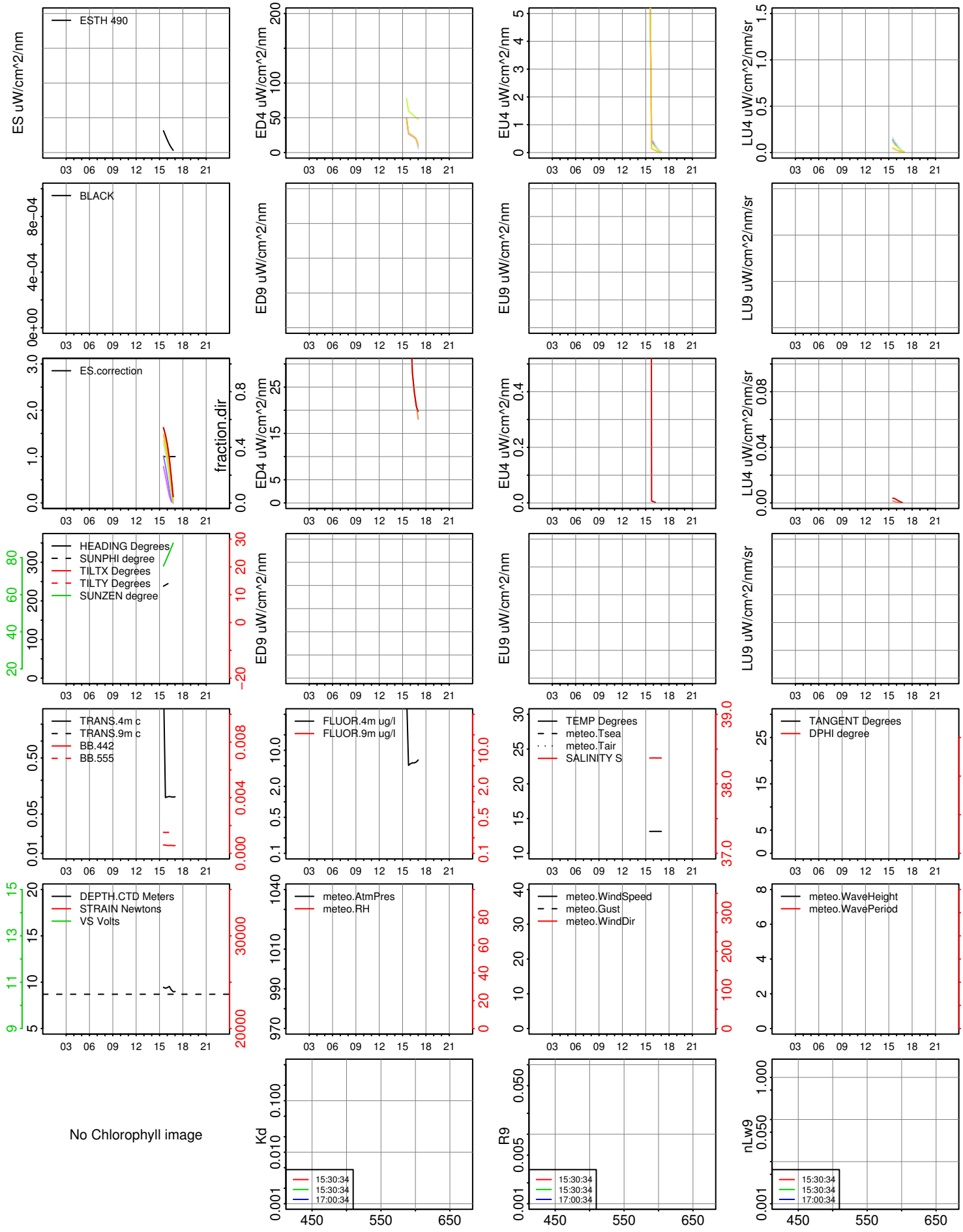


2005–02–18

In air
In water
412 442 490 510 560 665 683

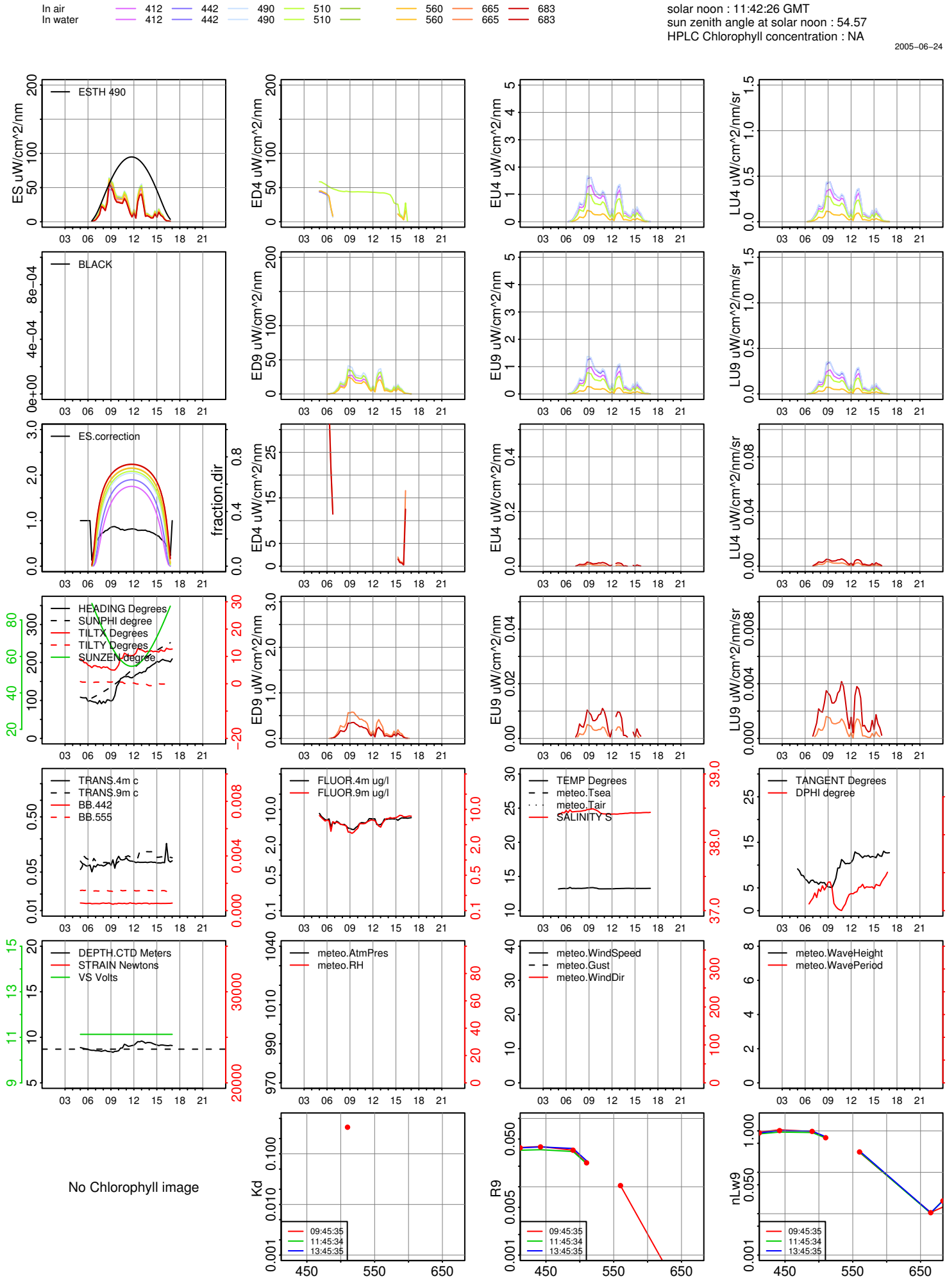
solar noon : 11:42:30 GMT
sun zenith angle at solar noon : 54.93
HPLC Chlorophyll concentration : NA

2005–06–24



No Chlorophyll image

2005–02–19

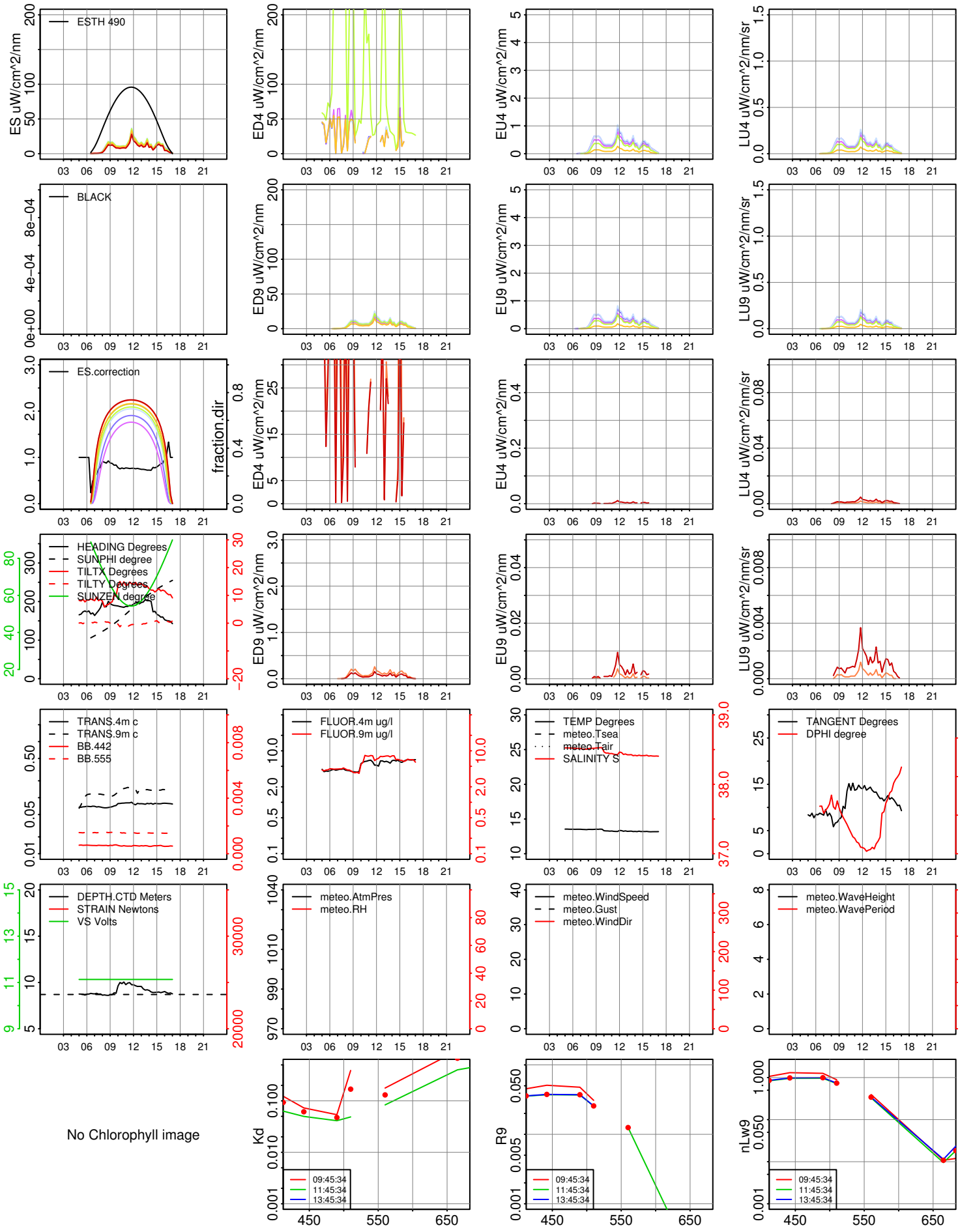

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:42:26 GMT
sun zenith angle at solar noon : 54.57
HPLC Chlorophyll concentration : NA
2005–06–24
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Kd
R9
nLw9
09:45:35
11:45:34
13:45:35
No Chlorophyll image

2005–02–20

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:42:22 GMT
sun zenith angle at solar noon : 54.21
HPLC Chlorophyll concentration : NA

2005–06–24



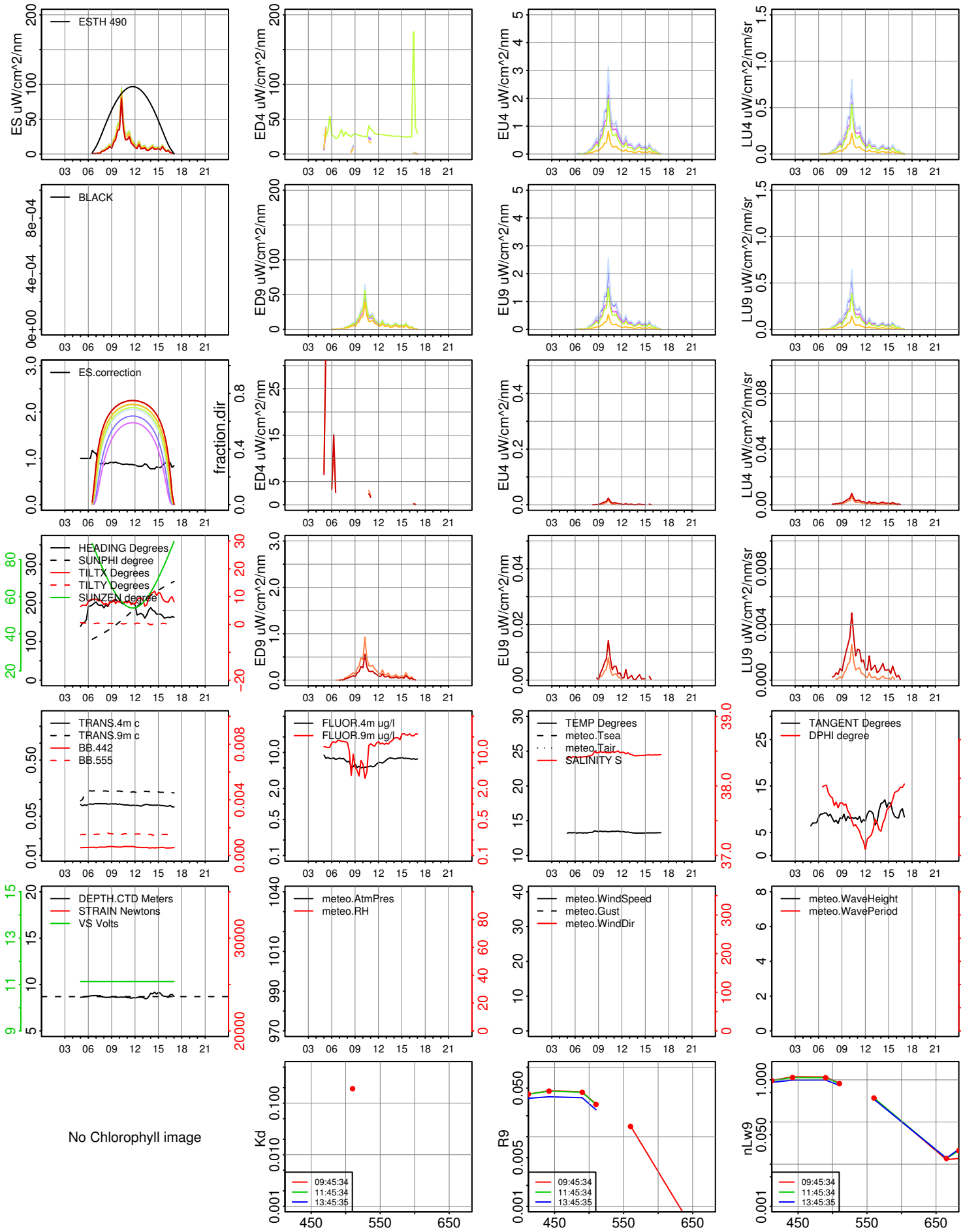
No Chlorophyll image

2005–02–21

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:42:16 GMT
sun zenith angle at solar noon : 53.85
HPLC Chlorophyll concentration : NA

2005–06–24



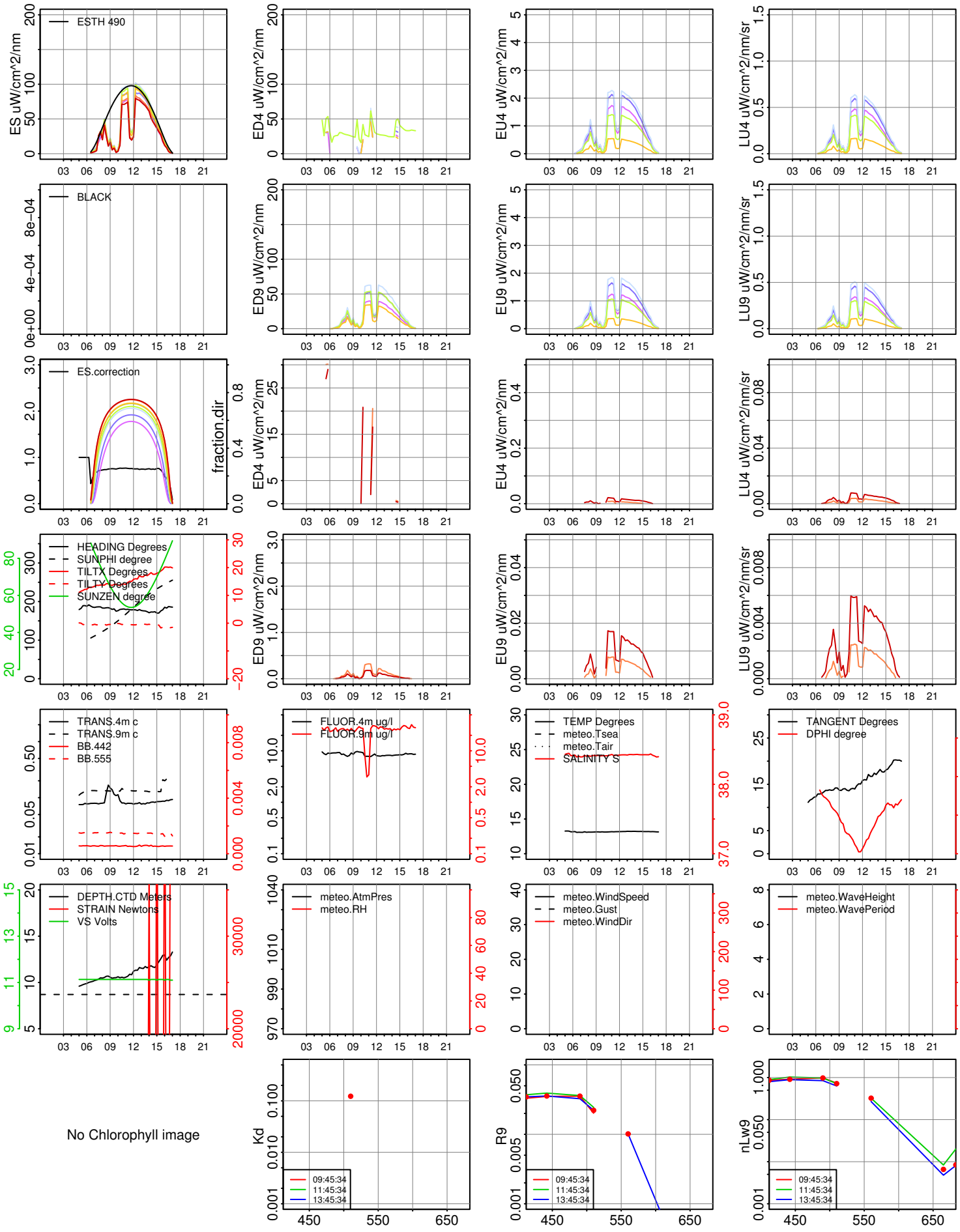
No Chlorophyll image

2005–02–22

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:42:10 GMT
sun zenith angle at solar noon : 53.48
HPLC Chlorophyll concentration : NA

2005–06–24



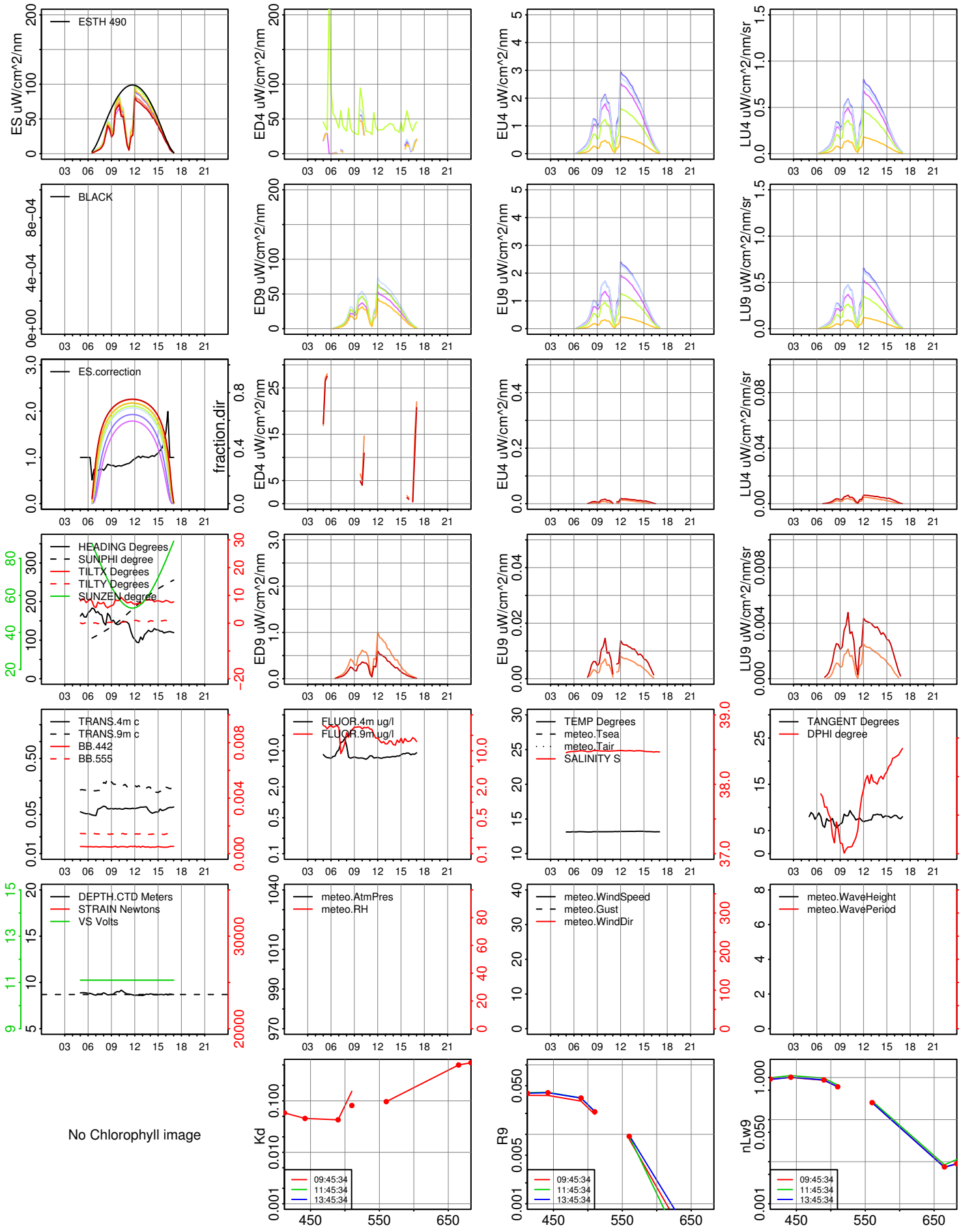
No Chlorophyll image

2005–02–23

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:42:2 GMT
sun zenith angle at solar noon : 53.12
HPLC Chlorophyll concentration : NA

2005–06–24



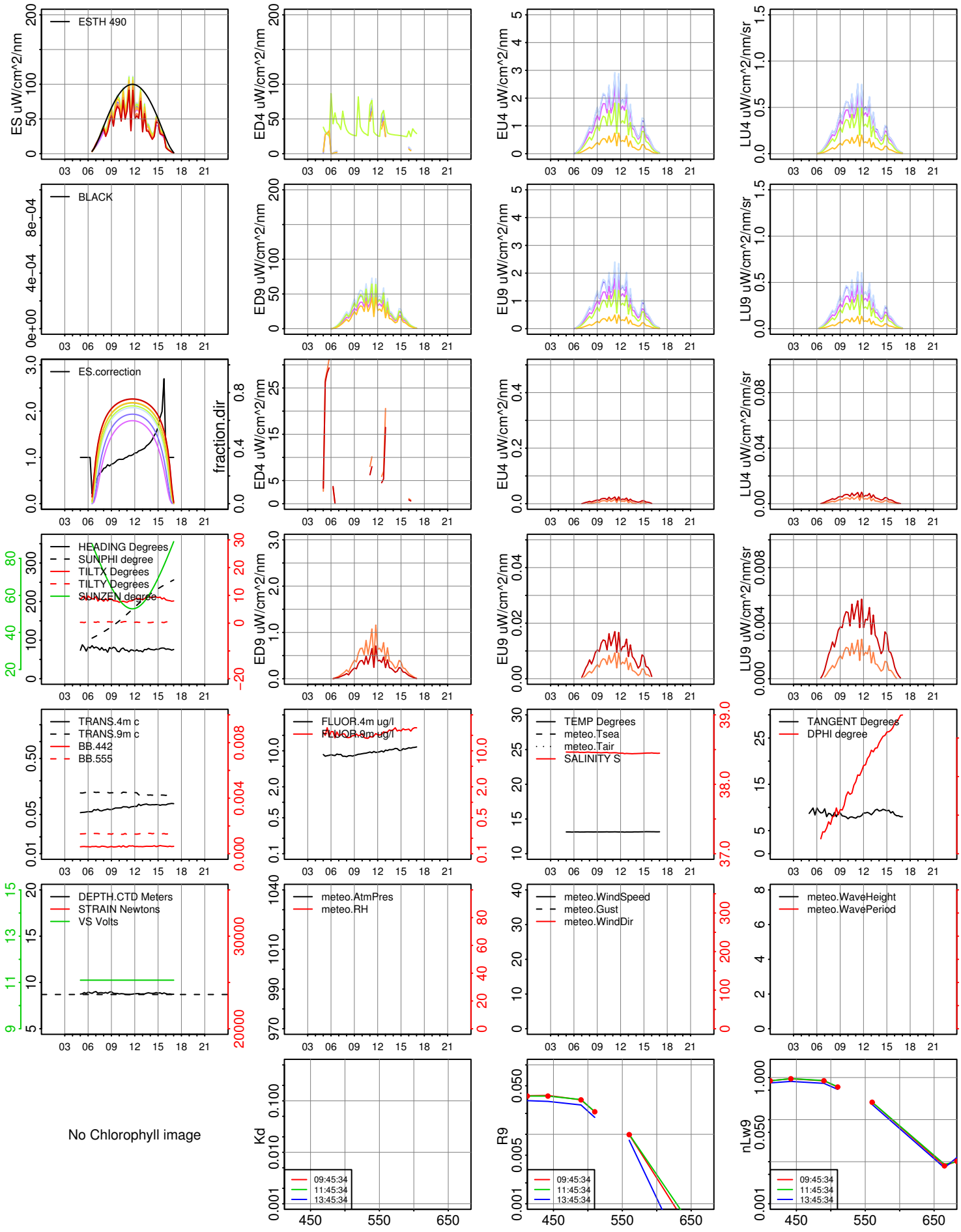
No Chlorophyll image

2005–02–24

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

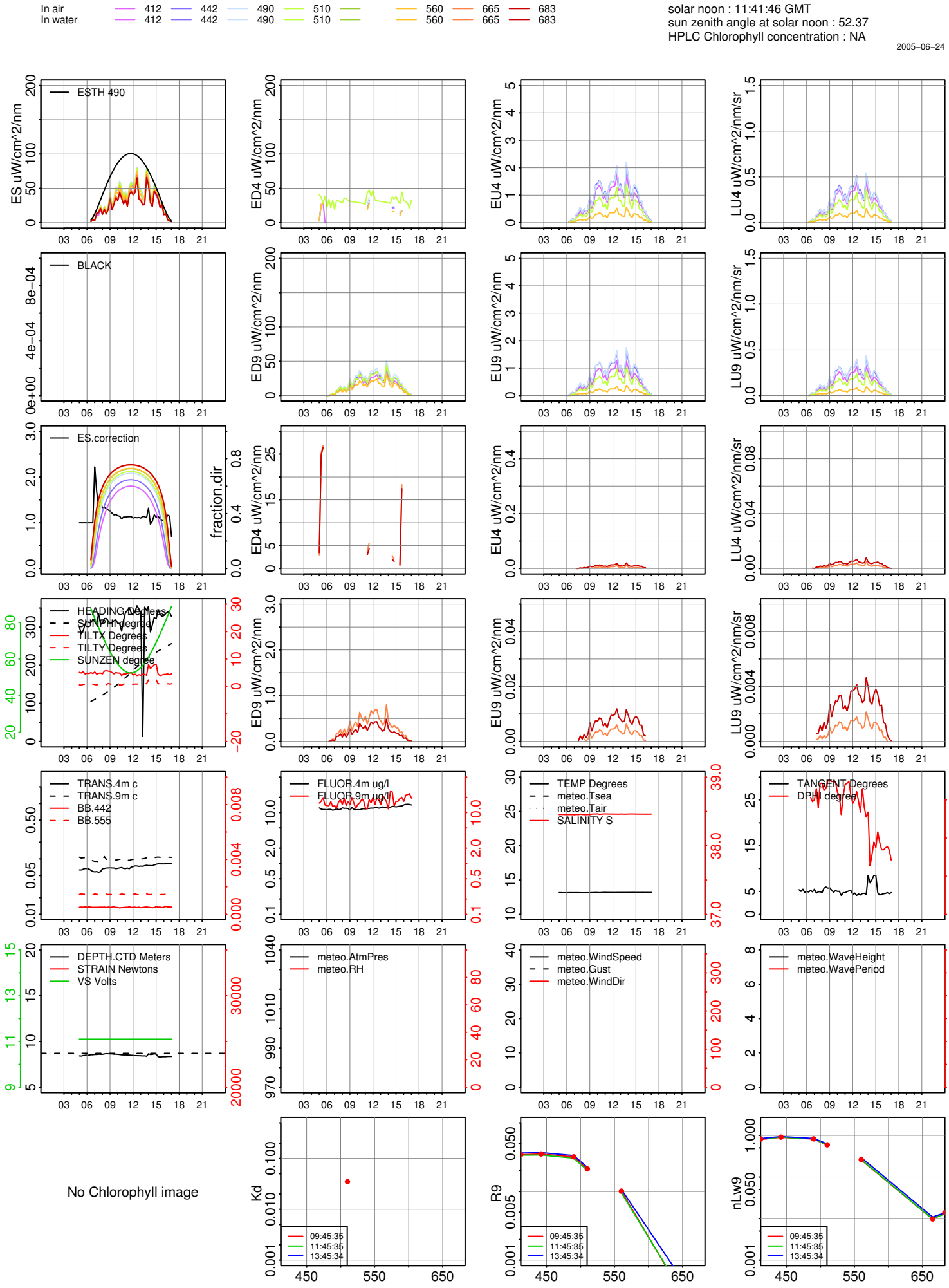
solar noon : 11:41:54 GMT
sun zenith angle at solar noon : 52.75
HPLC Chlorophyll concentration : NA

2005–06–24



No Chlorophyll image

2005–02–25

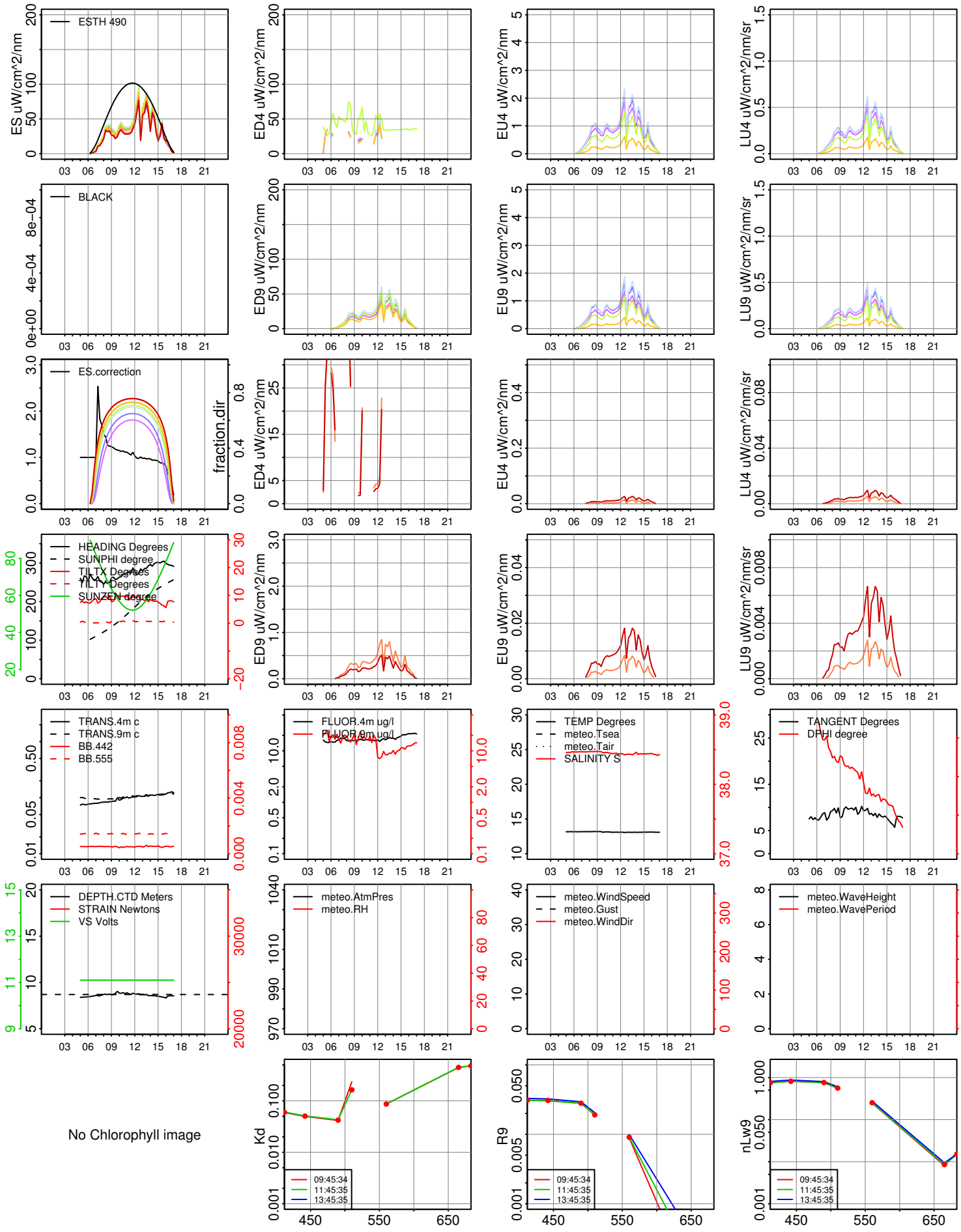

In air
In water
412
442
490
510
560
665
683
solar noon : 11:41:46 GMT
sun zenith angle at solar noon : 52.37
HPLC Chlorophyll concentration : NA
2005–06–24
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SONPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
No Chlorophyll image
Kd
R9
nLw9
09:45:35
11:45:35
13:45:34

2005–02–26

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:41:38 GMT
sun zenith angle at solar noon : 52
HPLC Chlorophyll concentration : NA

2005–06–24



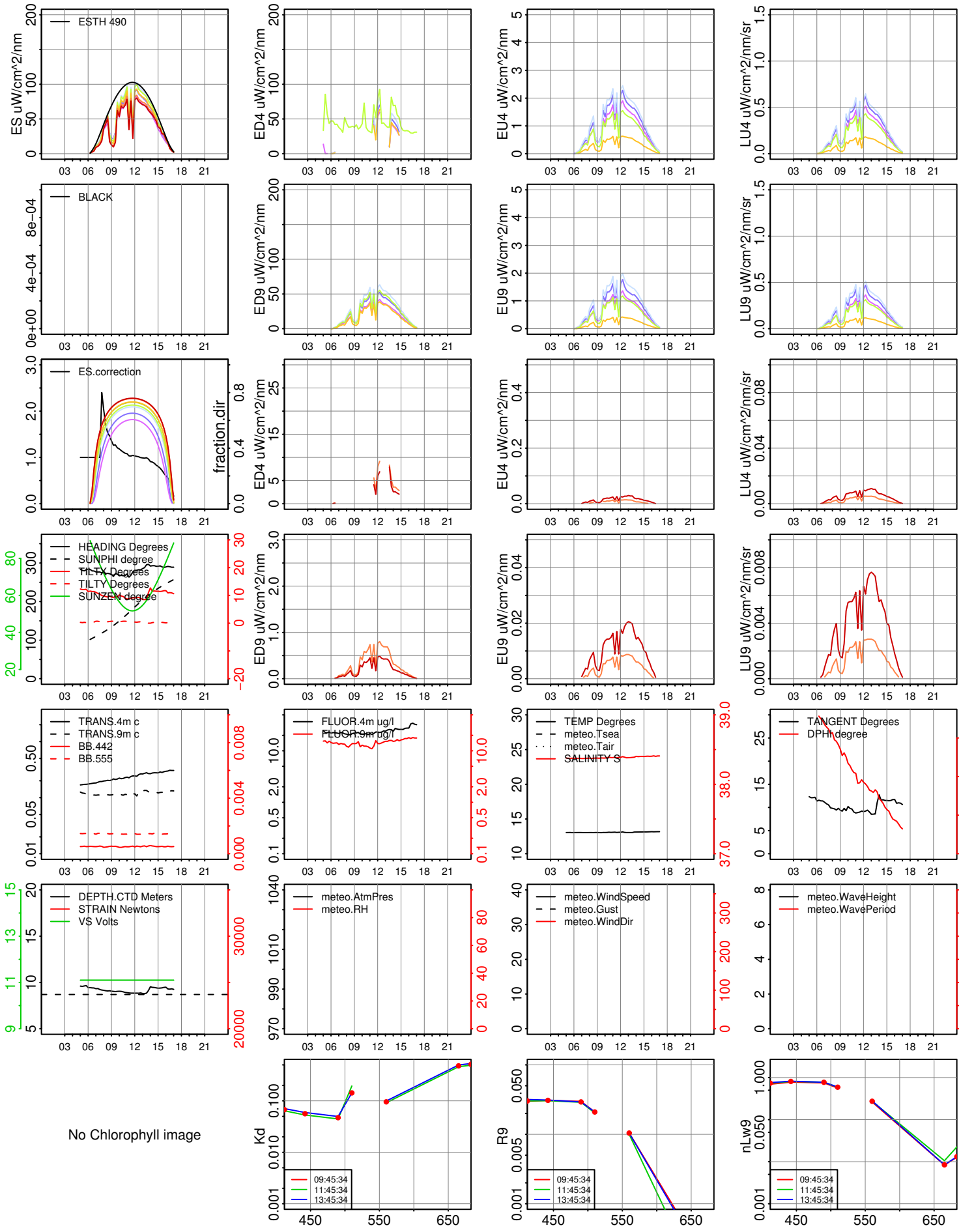
No Chlorophyll image

2005–02–27

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:41:28 GMT
sun zenith angle at solar noon : 51.62
HPLC Chlorophyll concentration : NA

2005–06–24



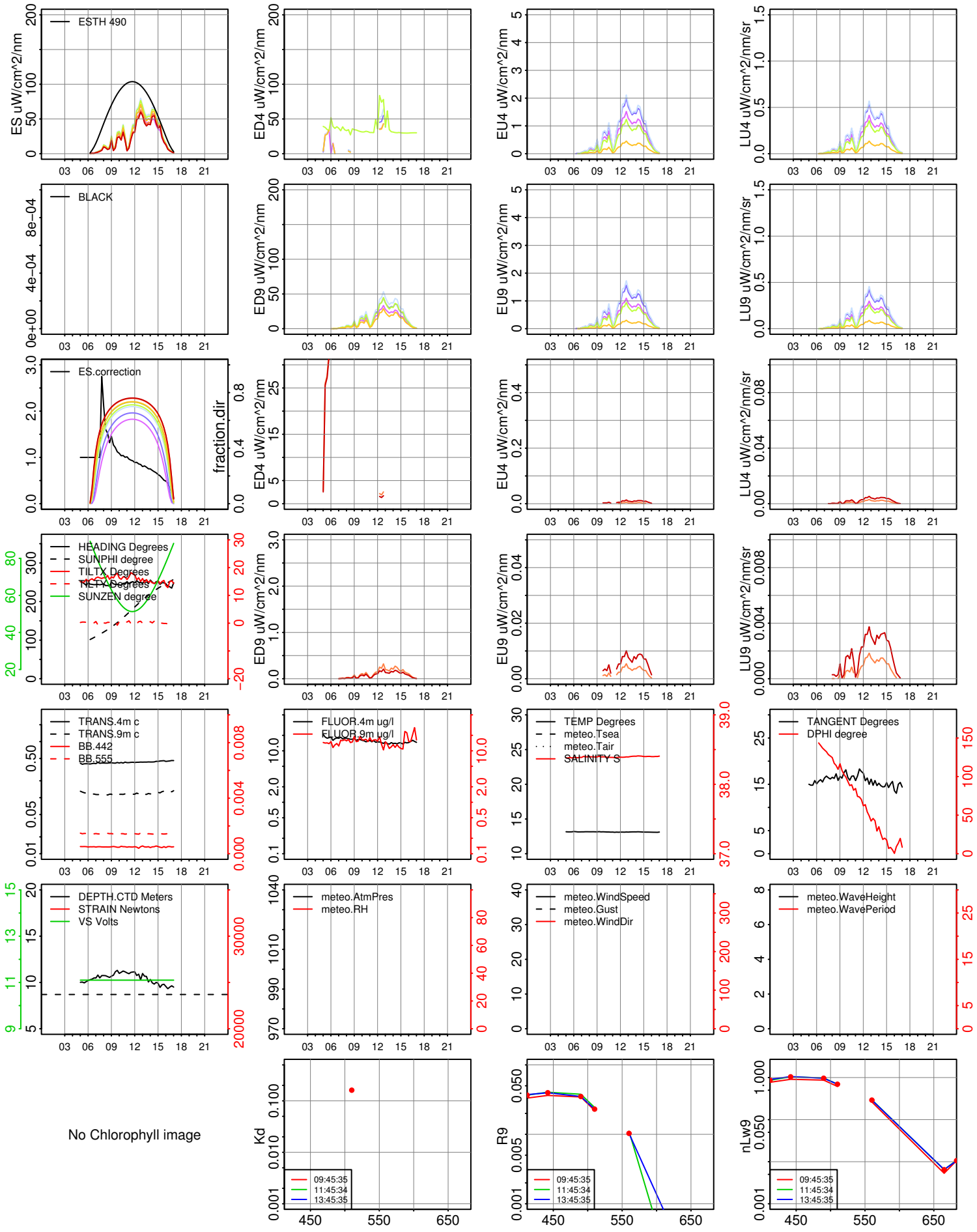
No Chlorophyll image

2005–02–28

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:41:18 GMT
sun zenith angle at solar noon : 51.25
HPLC Chlorophyll concentration : NA

2005–06–24



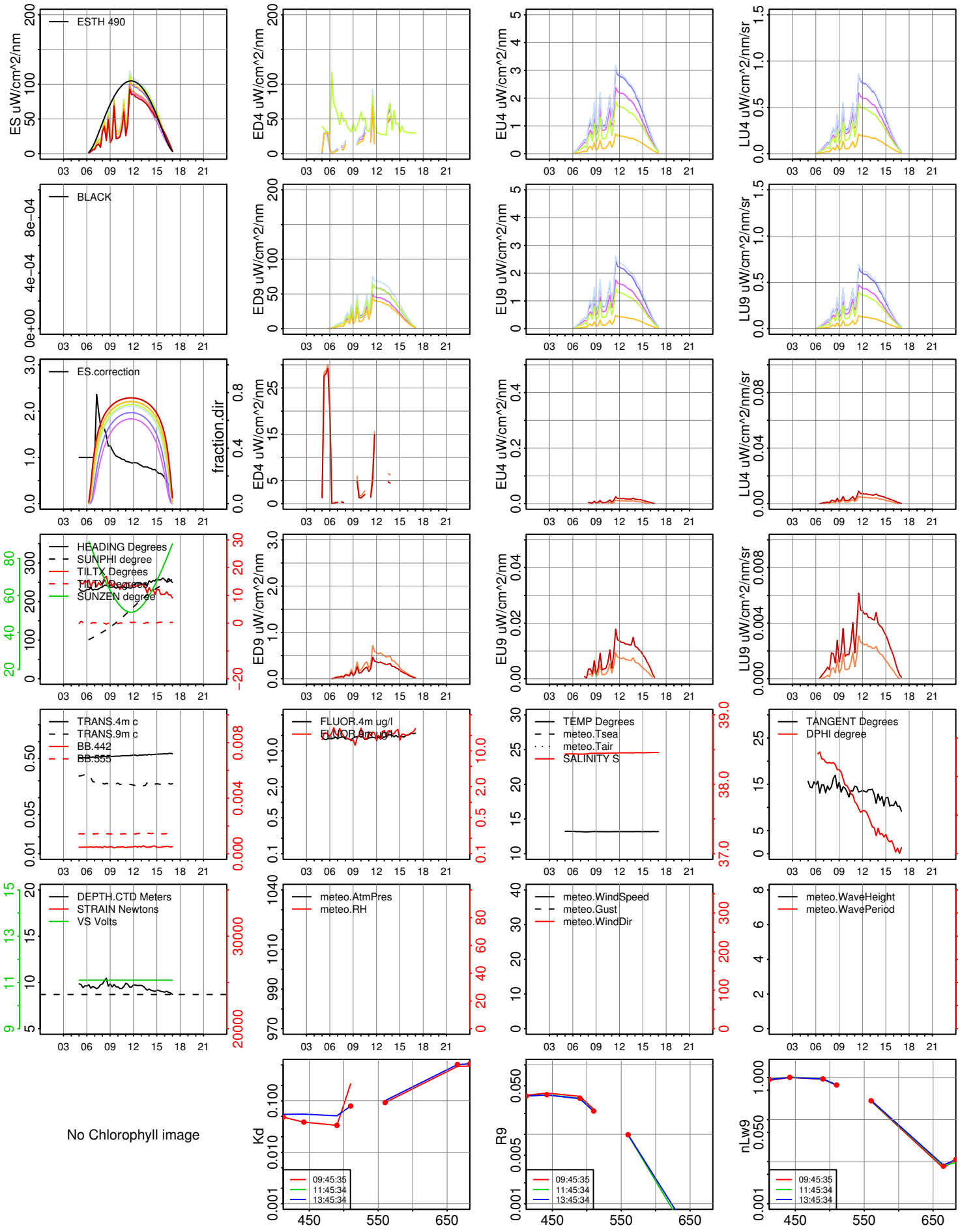
No Chlorophyll image

2005–03–01

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:41:8 GMT
sun zenith angle at solar noon : 50.87
HPLC Chlorophyll concentration : NA

2005–06–24



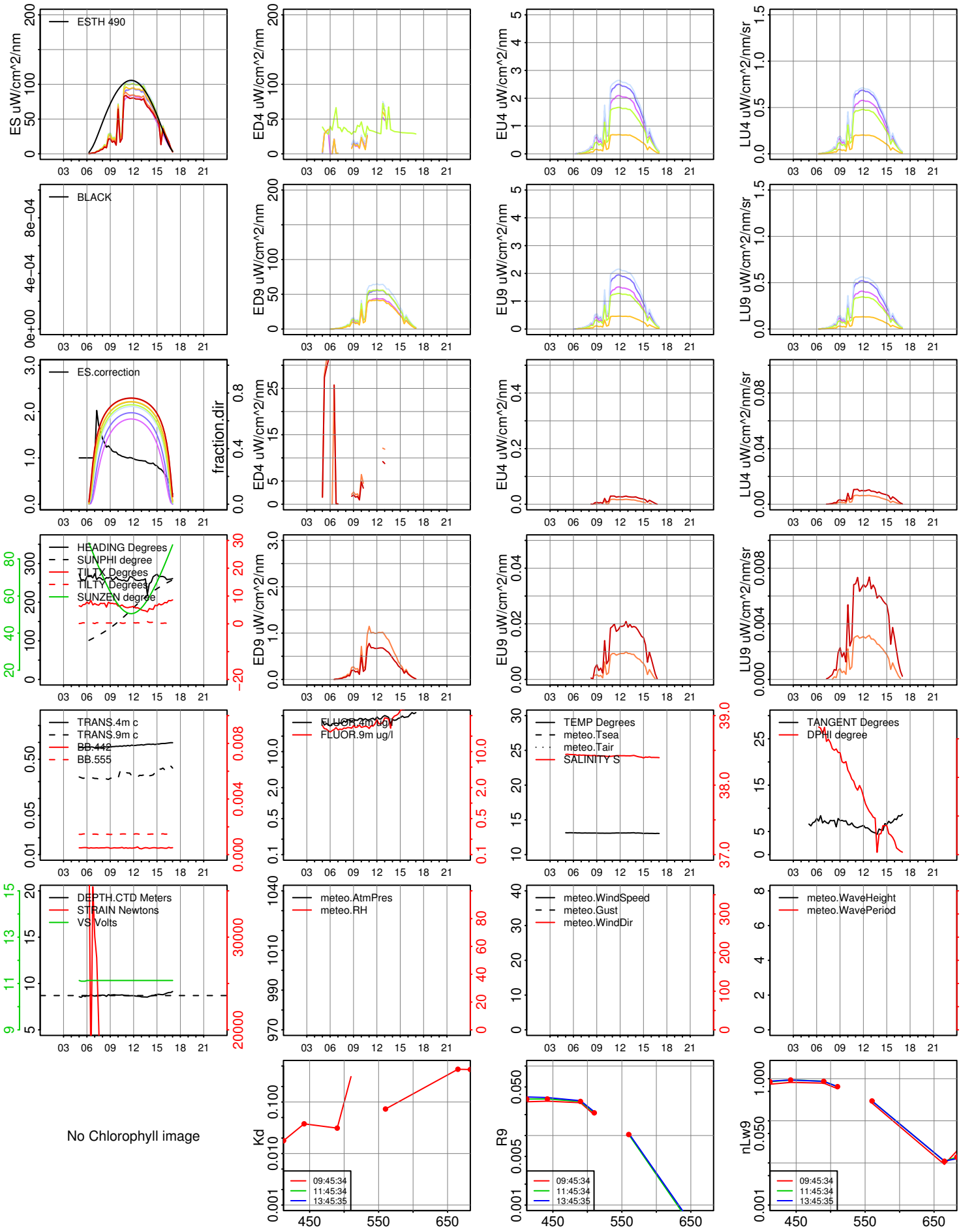
No Chlorophyll image

2005–03–02

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:40:56 GMT
sun zenith angle at solar noon : 50.48
HPLC Chlorophyll concentration : NA

2005–06–24



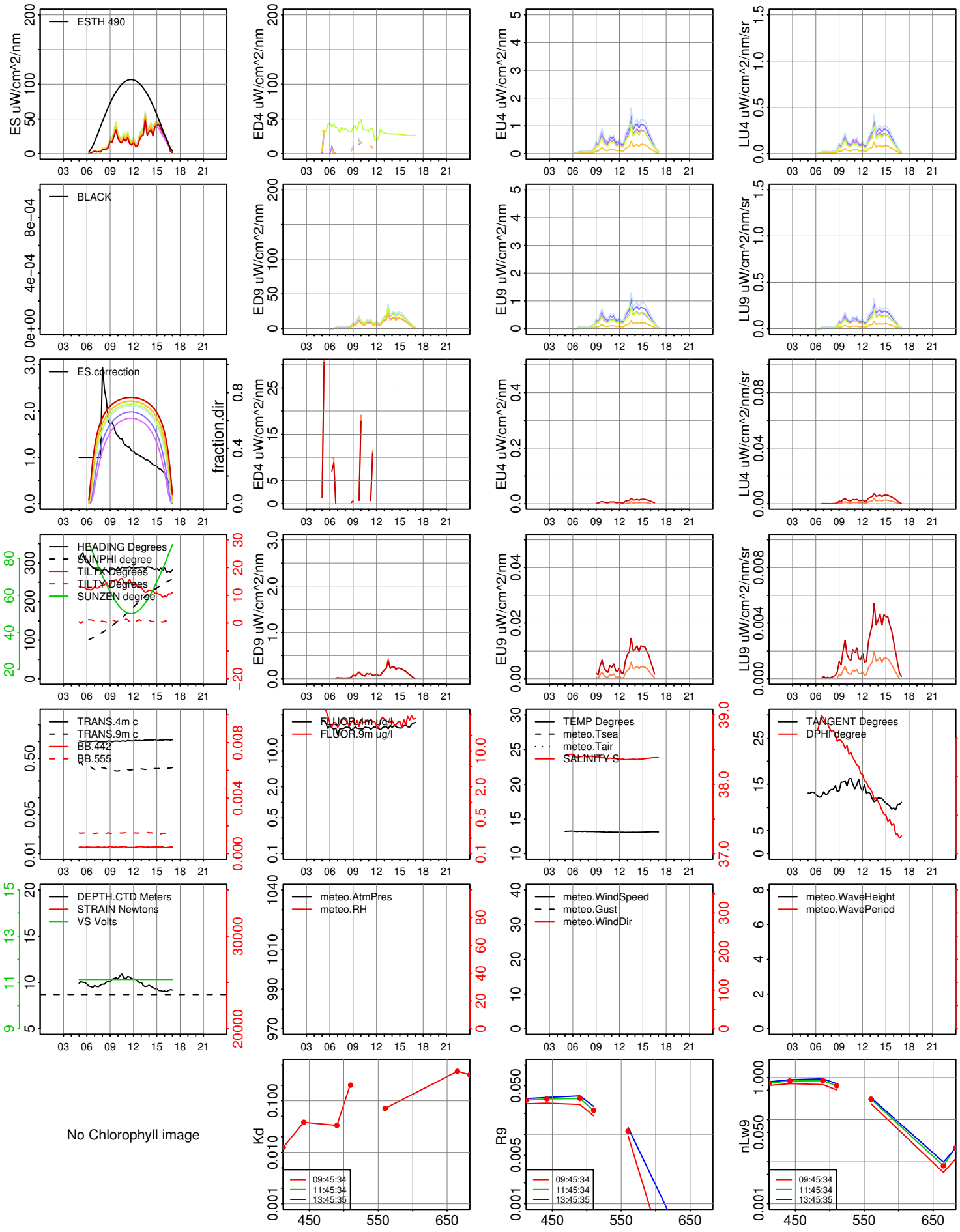
No Chlorophyll image

2005–03–03

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:40:44 GMT
sun zenith angle at solar noon : 50.1
HPLC Chlorophyll concentration : NA

2005–06–24



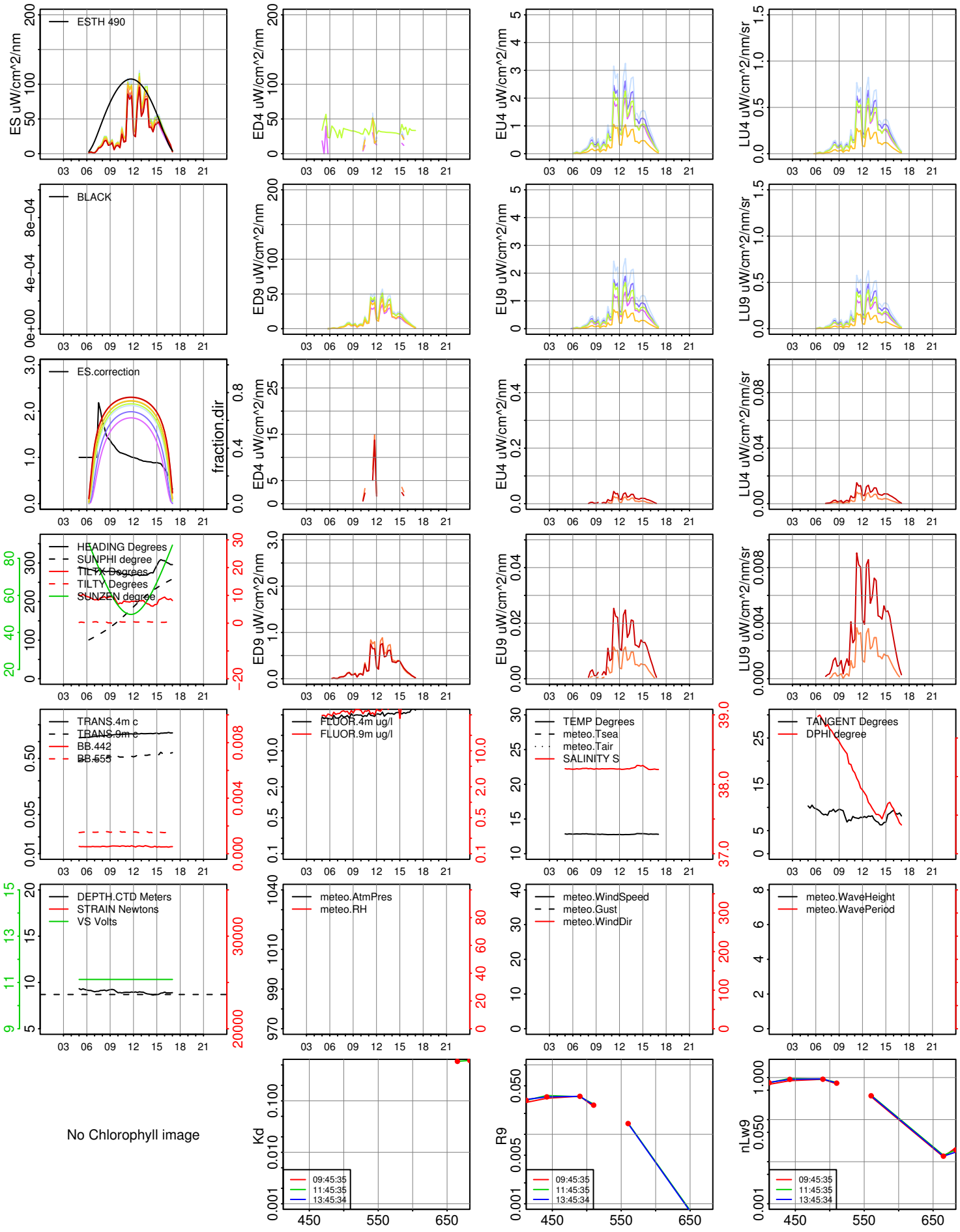
No Chlorophyll image

2005–03–04

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

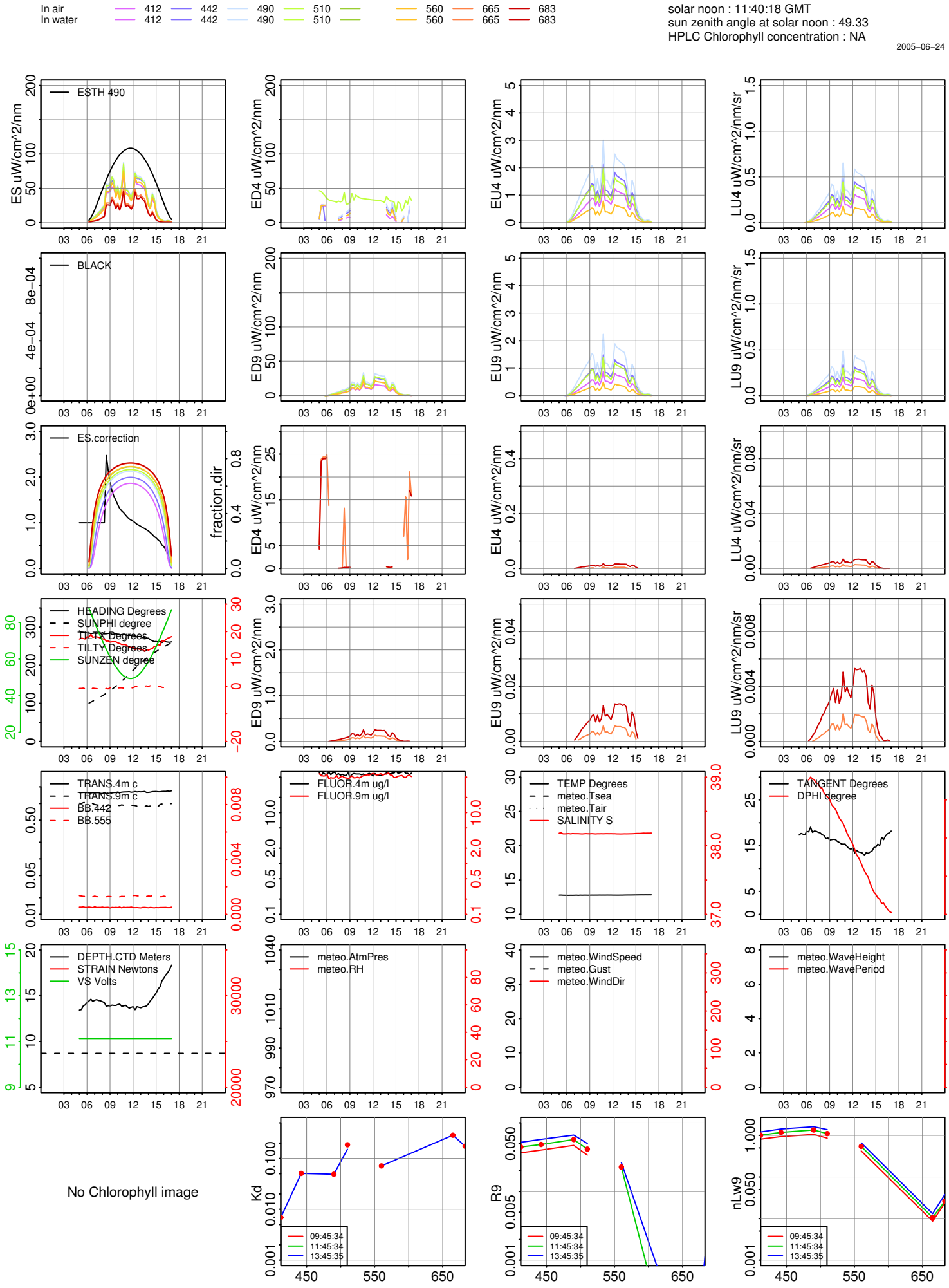
solar noon : 11:40:32 GMT
sun zenith angle at solar noon : 49.72
HPLC Chlorophyll concentration : NA

2005–06–24



No Chlorophyll image

2005–03–05



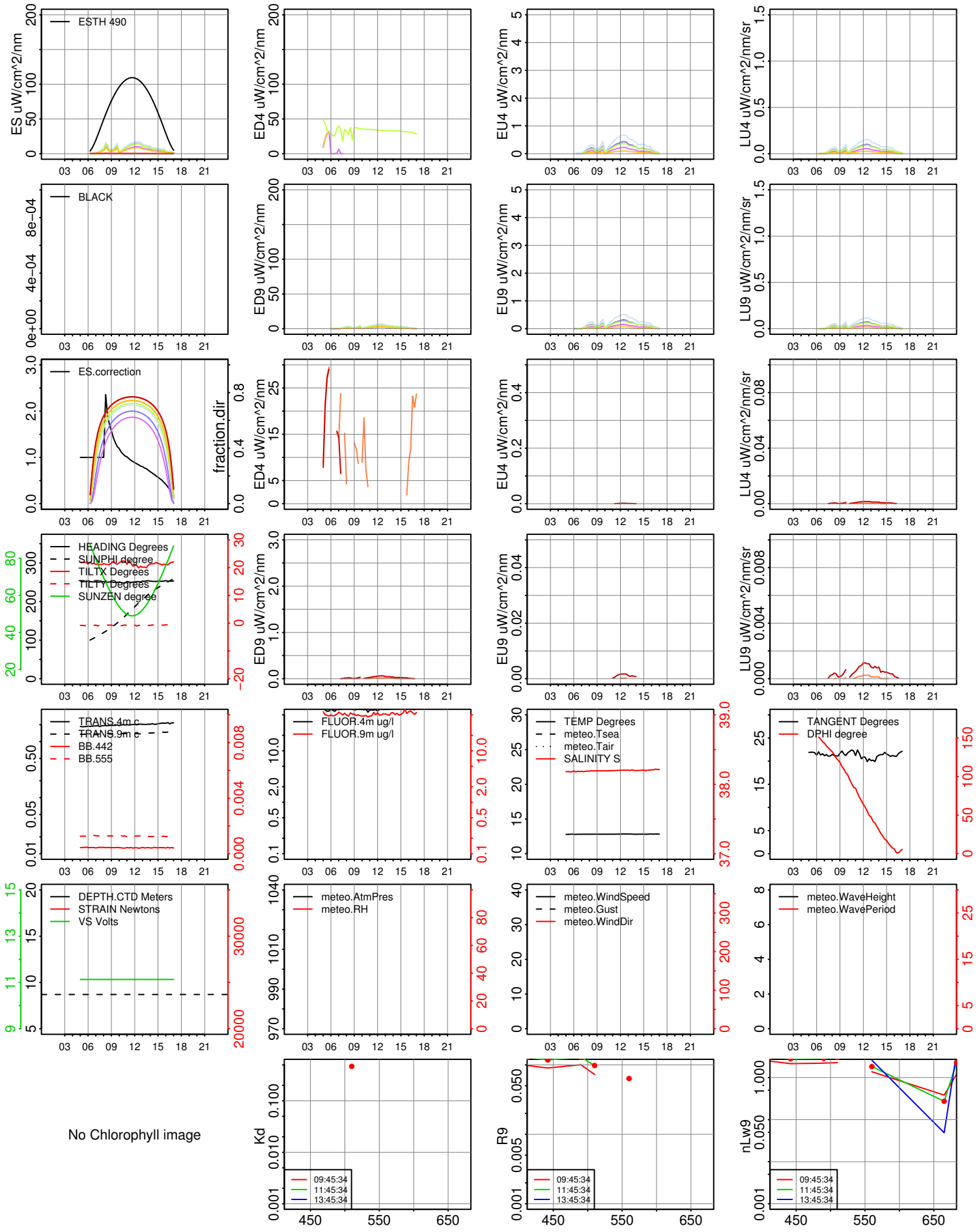
No Chlorophyll image

2005–03–06

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:40:6 GMT
sun zenith angle at solar noon : 48.94
HPLC Chlorophyll concentration : NA

2005–06–24



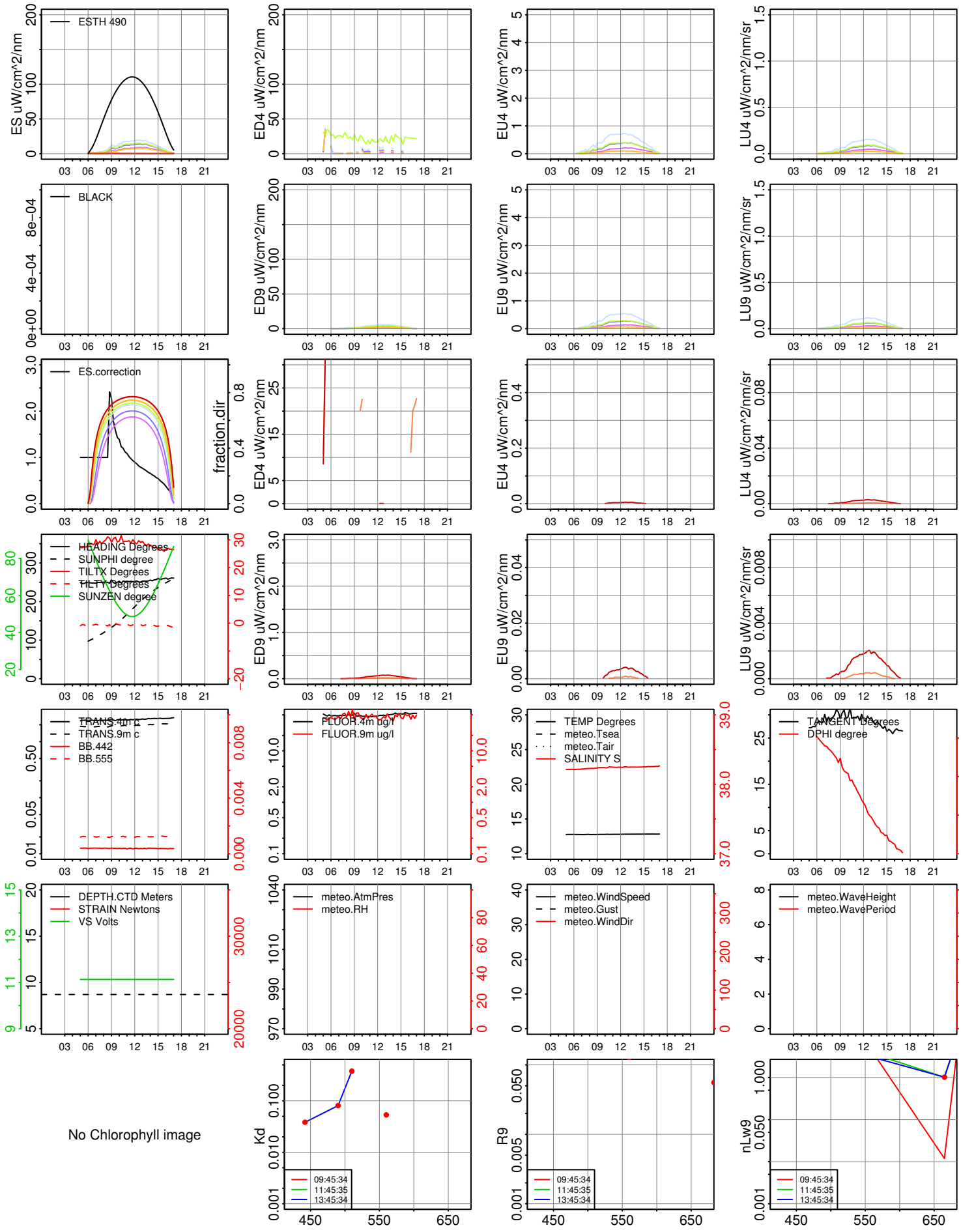
No Chlorophyll image

2005–03–07

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

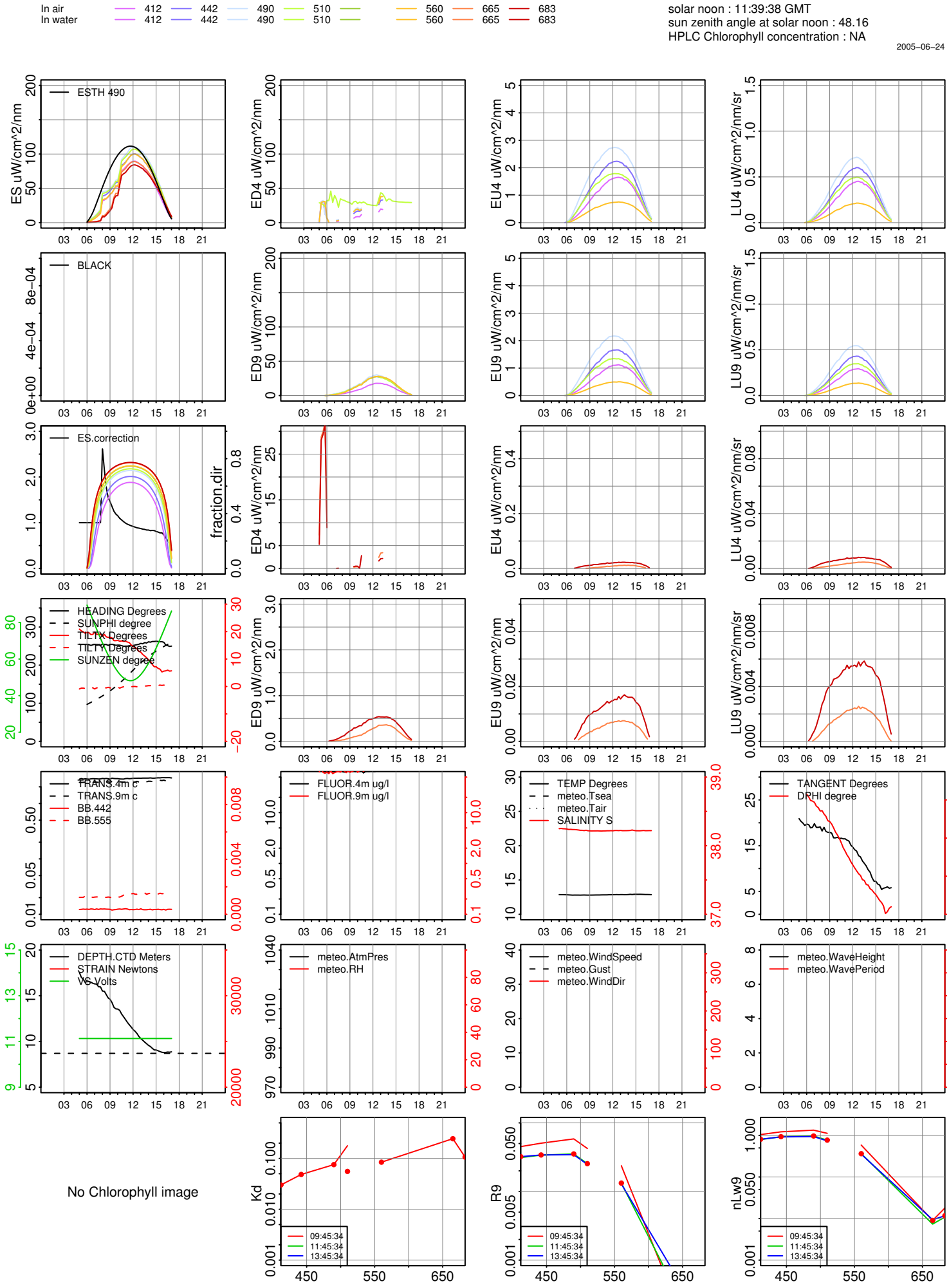
solar noon : 11:39:52 GMT
sun zenith angle at solar noon : 48.55
HPLC Chlorophyll concentration : NA

2005–06–24



No Chlorophyll image

2005–03–08

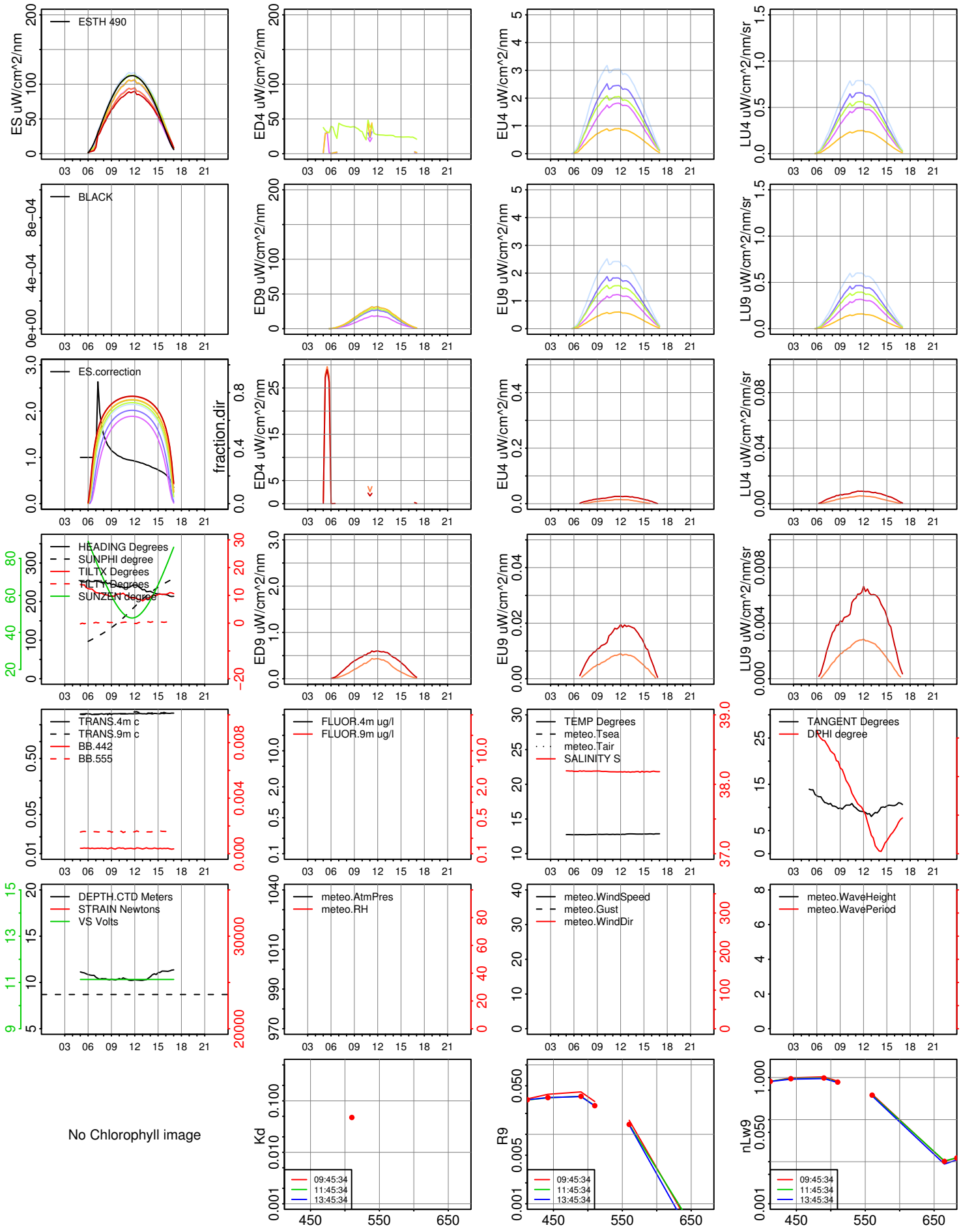

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:39:38 GMT
sun zenith angle at solar noon : 48.16
HPLC Chlorophyll concentration : NA
2005–06–24
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DRHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
No Chlorophyll image
Kd
R9
nLw9
09:45:34
11:45:34
13:45:34

2005–03–09

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:39:22 GMT
sun zenith angle at solar noon : 47.77
HPLC Chlorophyll concentration : NA

2005–06–24



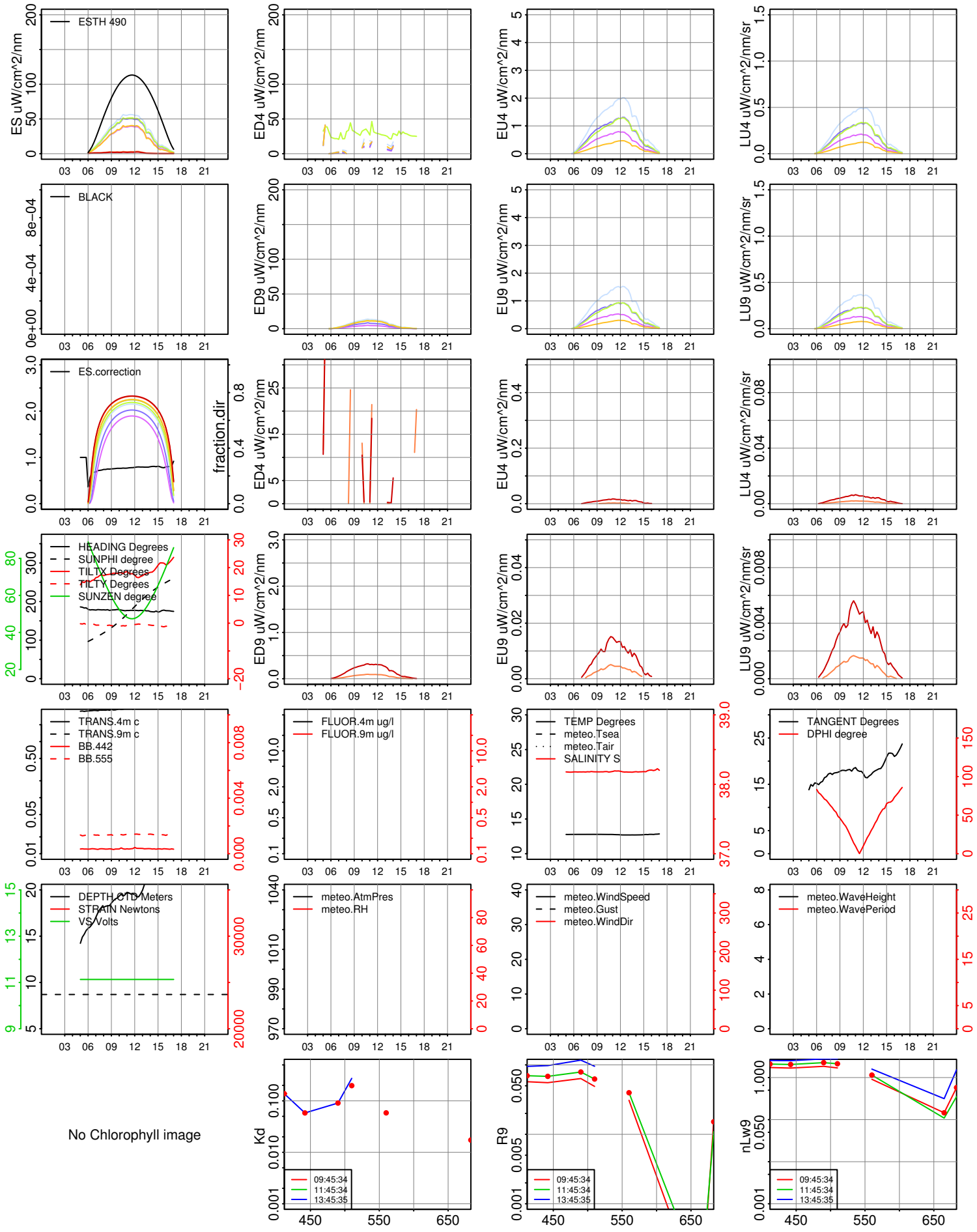
No Chlorophyll image

2005–03–10

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:39:8 GMT
sun zenith angle at solar noon : 47.38
HPLC Chlorophyll concentration : NA

2005–06–24



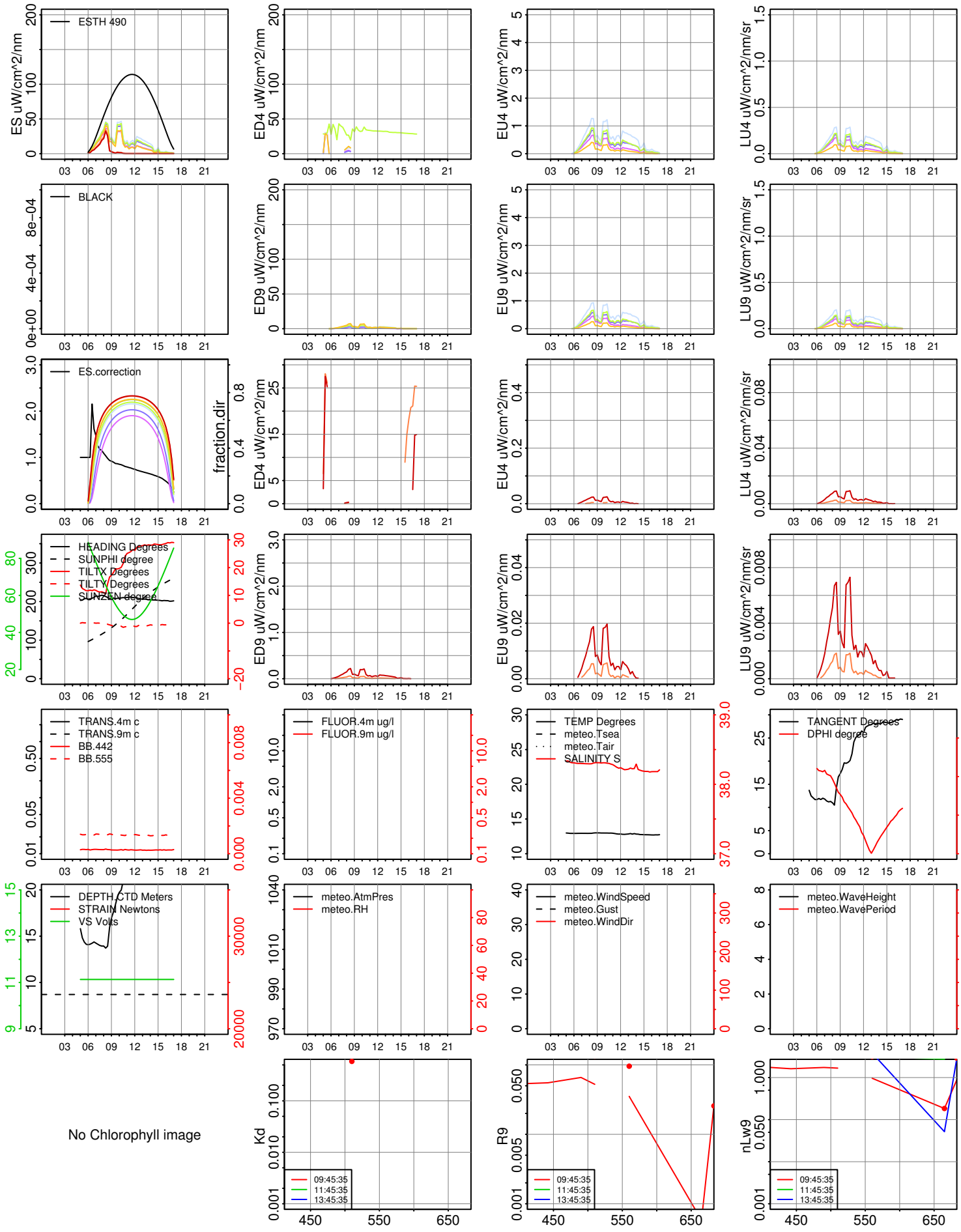
No Chlorophyll image

2005–03–11

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:38:52 GMT
sun zenith angle at solar noon : 46.99
HPLC Chlorophyll concentration : NA

2005–06–24



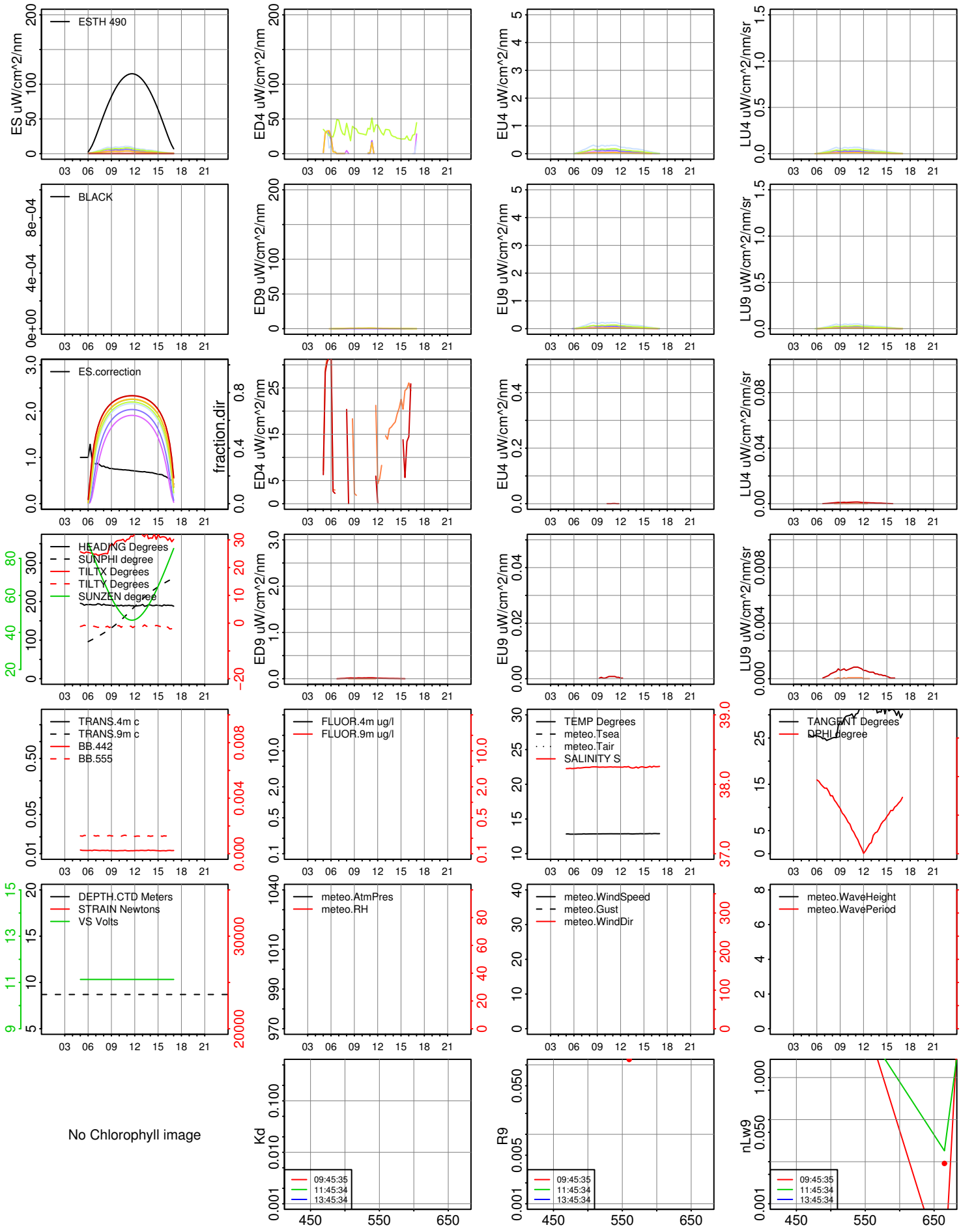
No Chlorophyll image

2005–03–12

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:38:36 GMT
sun zenith angle at solar noon : 46.59
HPLC Chlorophyll concentration : NA

2005–06–24



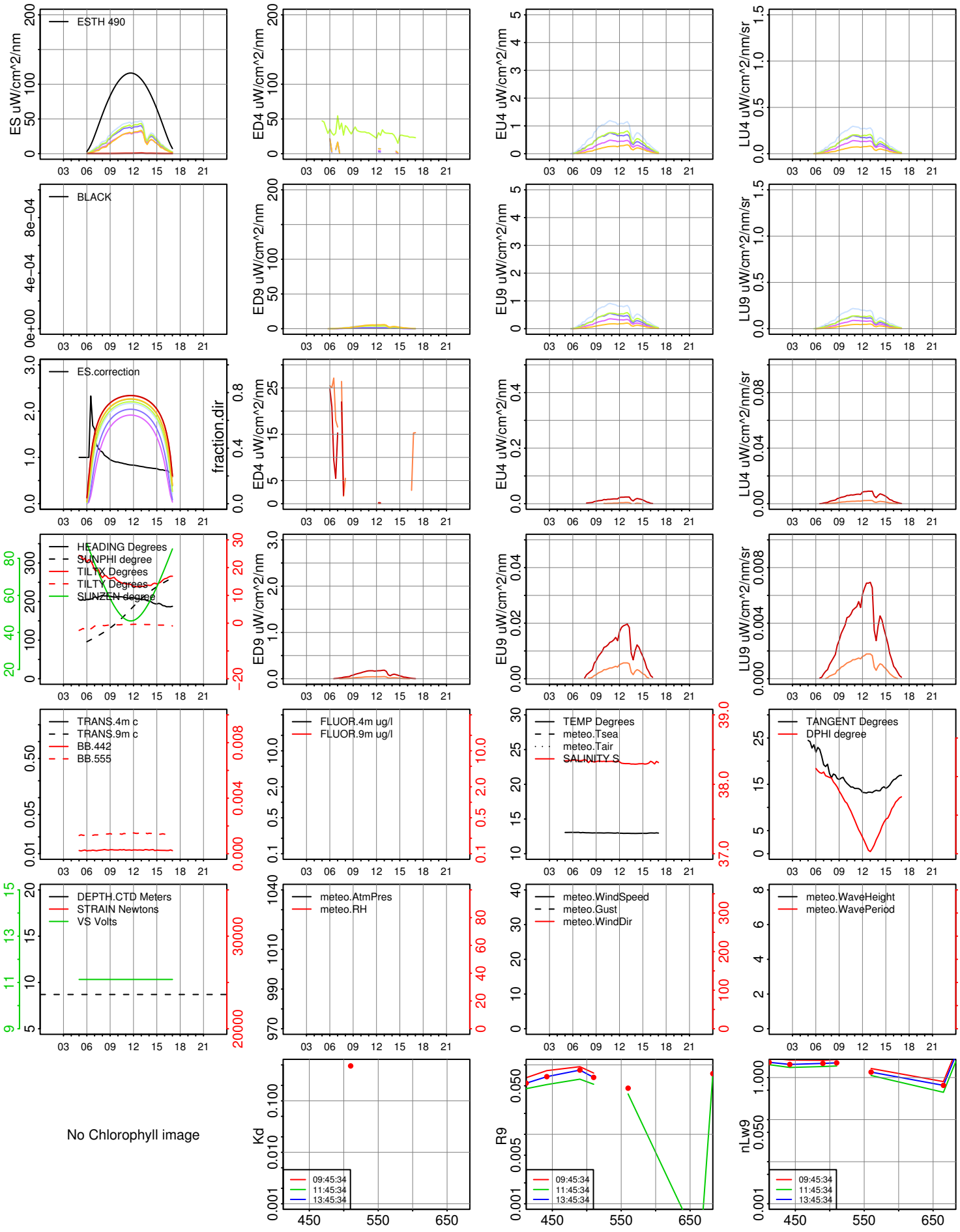
No Chlorophyll image

2005–03–13

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:38:18 GMT
sun zenith angle at solar noon : 46.2
HPLC Chlorophyll concentration : NA

2005–06–24



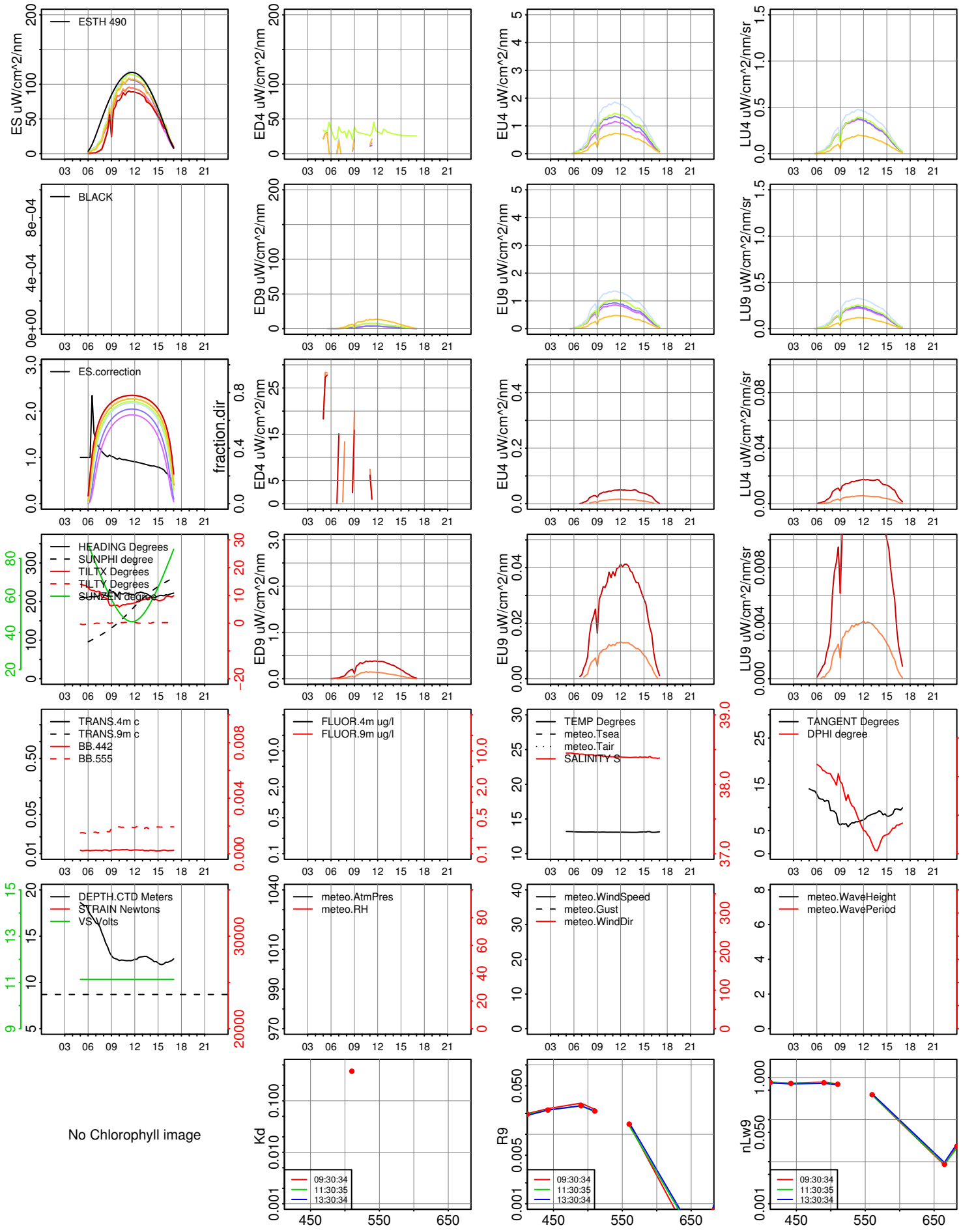
No Chlorophyll image

2005–03–14

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:38:2 GMT
sun zenith angle at solar noon : 45.8
HPLC Chlorophyll concentration : NA

2005–06–24



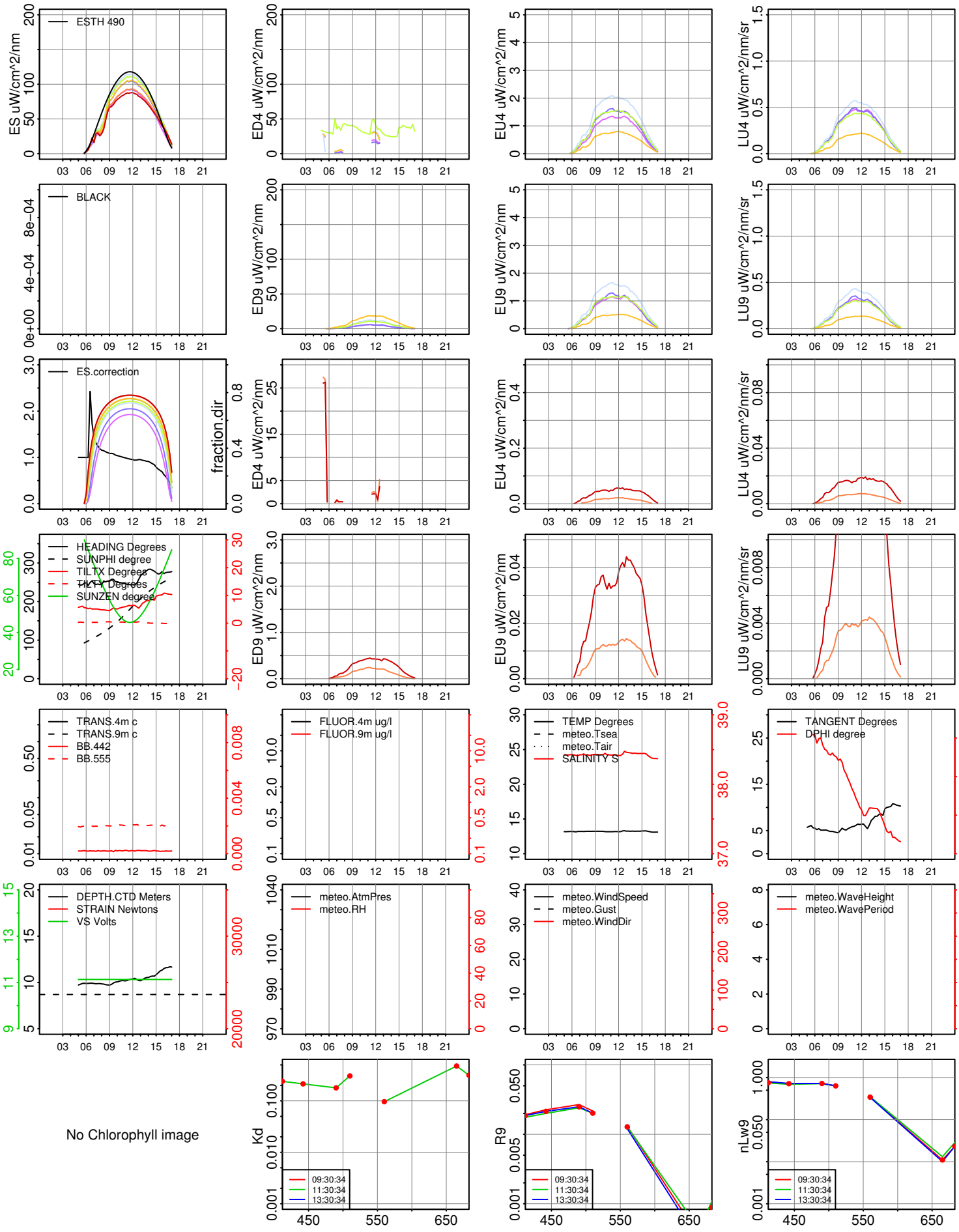
No Chlorophyll image

2005–03–15

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:37:46 GMT
sun zenith angle at solar noon : 45.41
HPLC Chlorophyll concentration : NA

2005–06–24



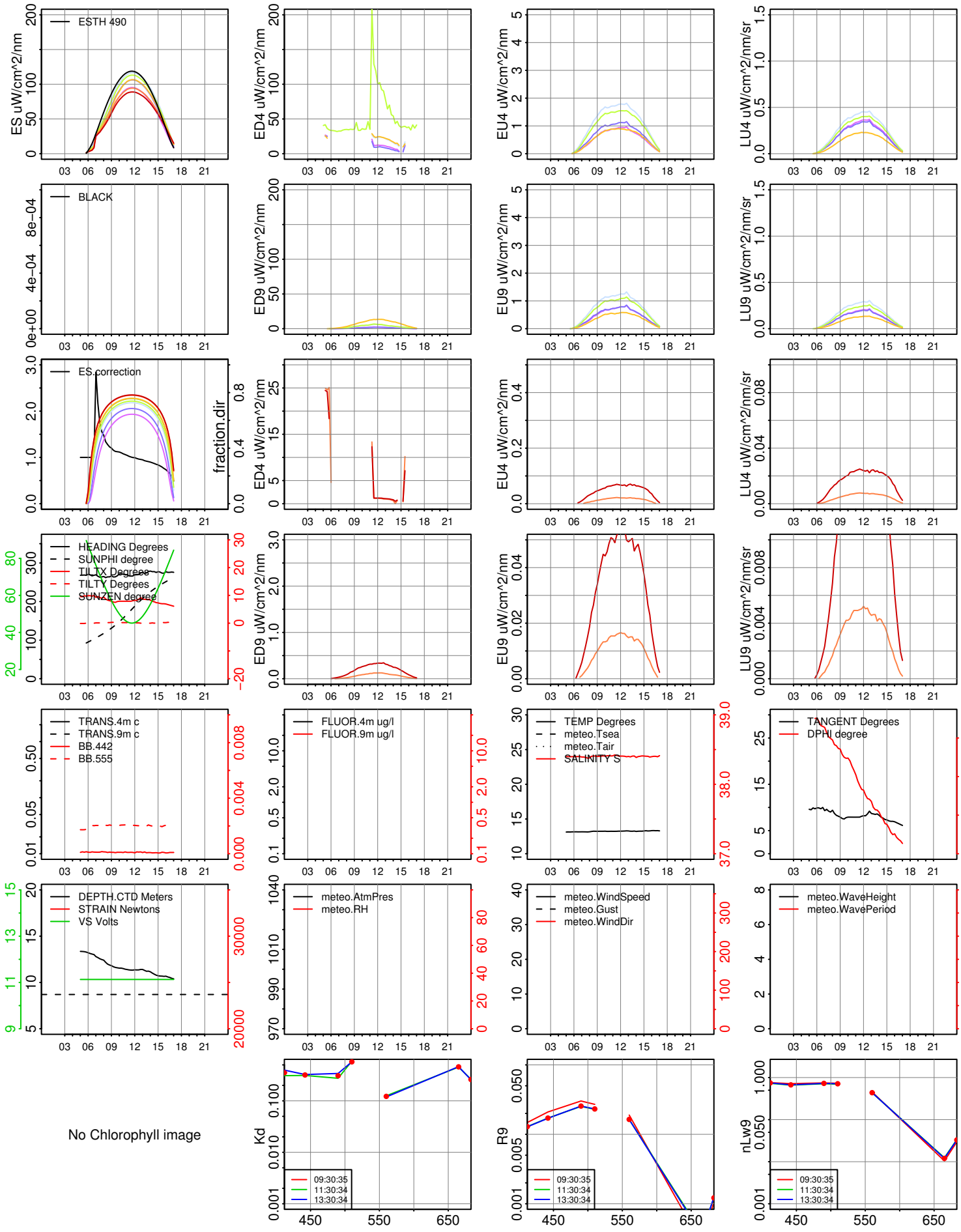
No Chlorophyll image

2005–03–16

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:37:28 GMT
sun zenith angle at solar noon : 45.01
HPLC Chlorophyll concentration : NA

2005–06–24



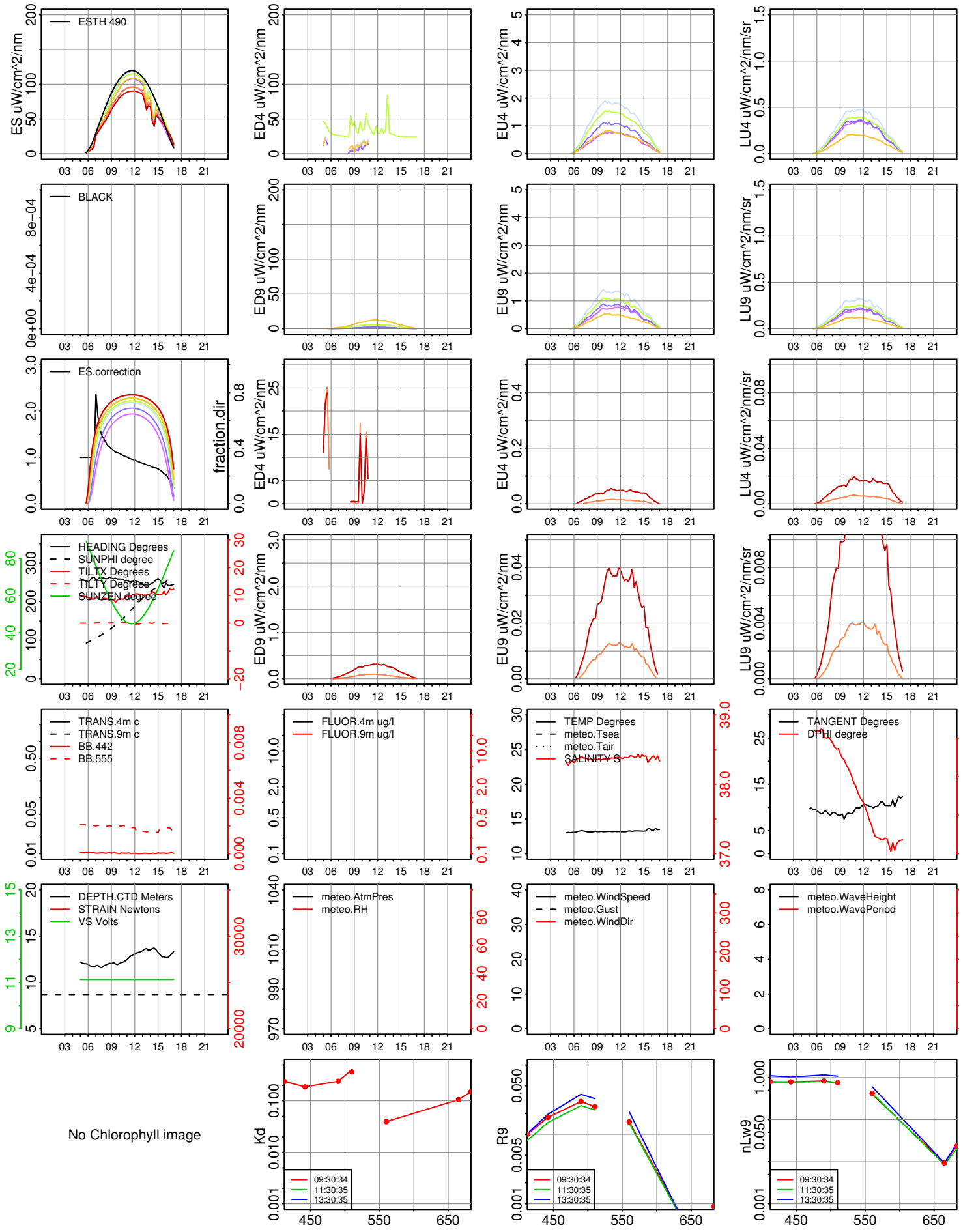
No Chlorophyll image

2005–03–17

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:37:10 GMT
sun zenith angle at solar noon : 44.62
HPLC Chlorophyll concentration : NA

2005–06–24



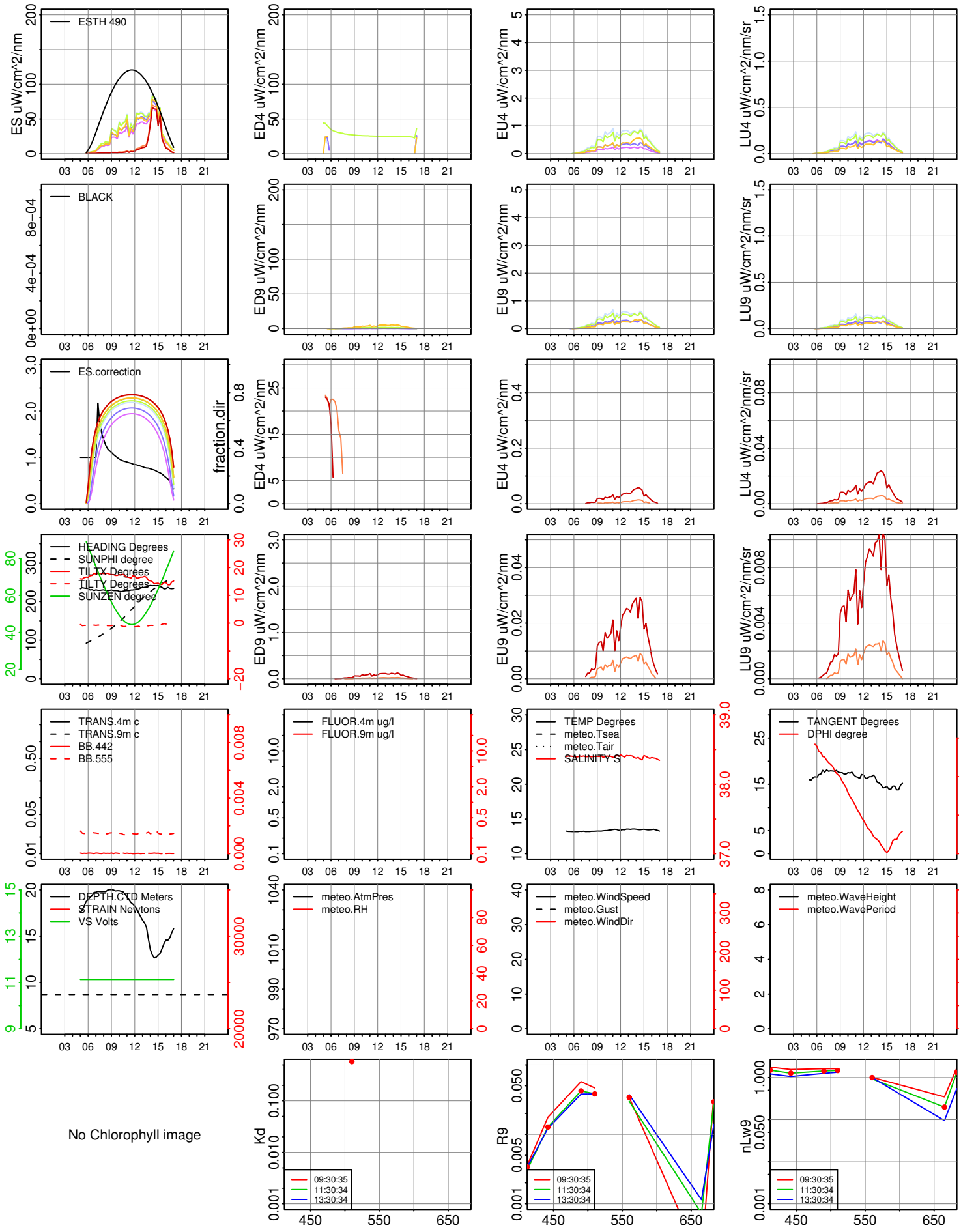
No Chlorophyll image

2005–03–18

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:36:52 GMT
sun zenith angle at solar noon : 44.22
HPLC Chlorophyll concentration : NA

2005–06–24



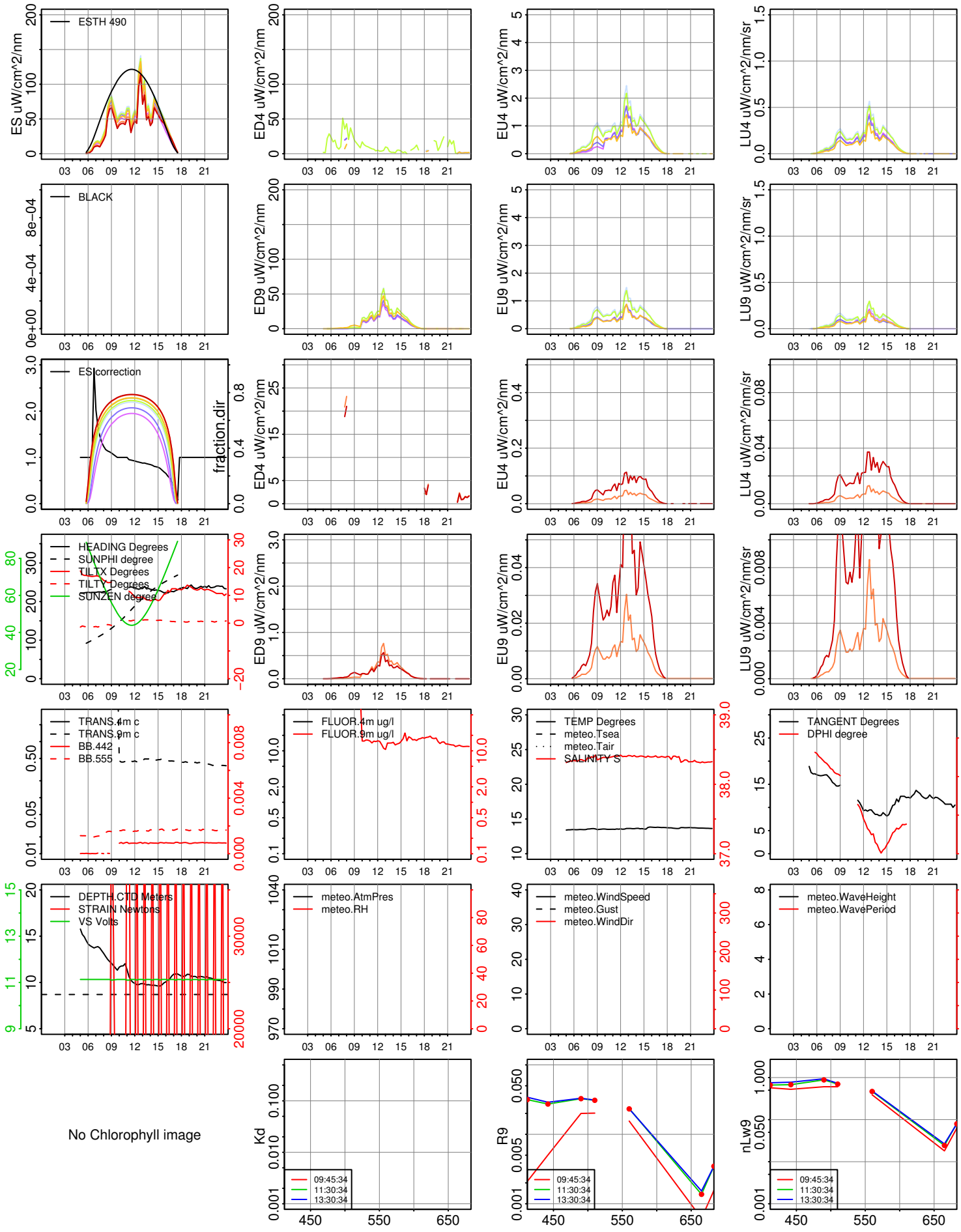
No Chlorophyll image

2005–03–19

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:36:34 GMT
sun zenith angle at solar noon : 43.83
HPLC Chlorophyll concentration : NA

2005–06–24



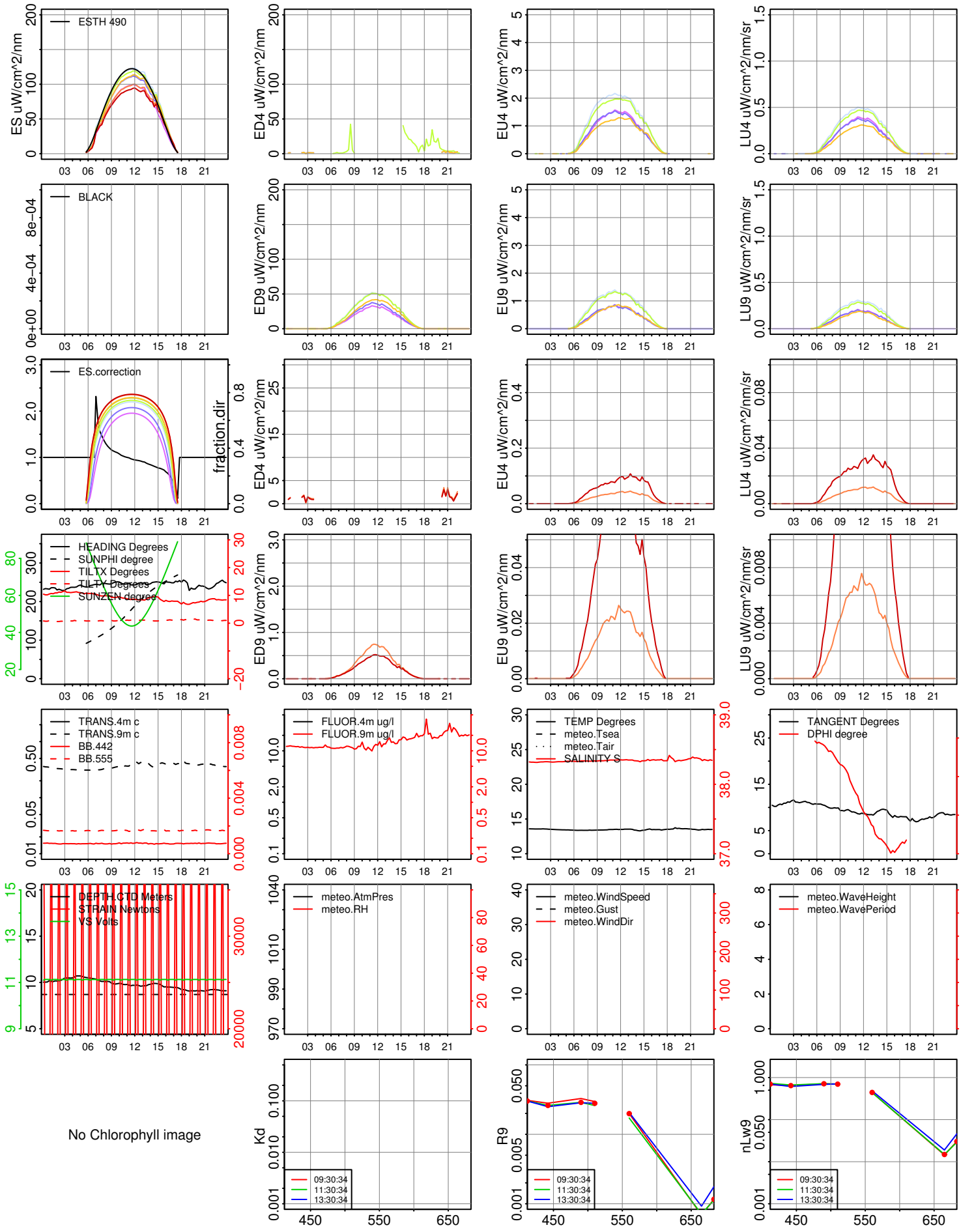
No Chlorophyll image

2005–03–20

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:36:16 GMT
sun zenith angle at solar noon : 43.43
HPLC Chlorophyll concentration : NA

2005–06–24



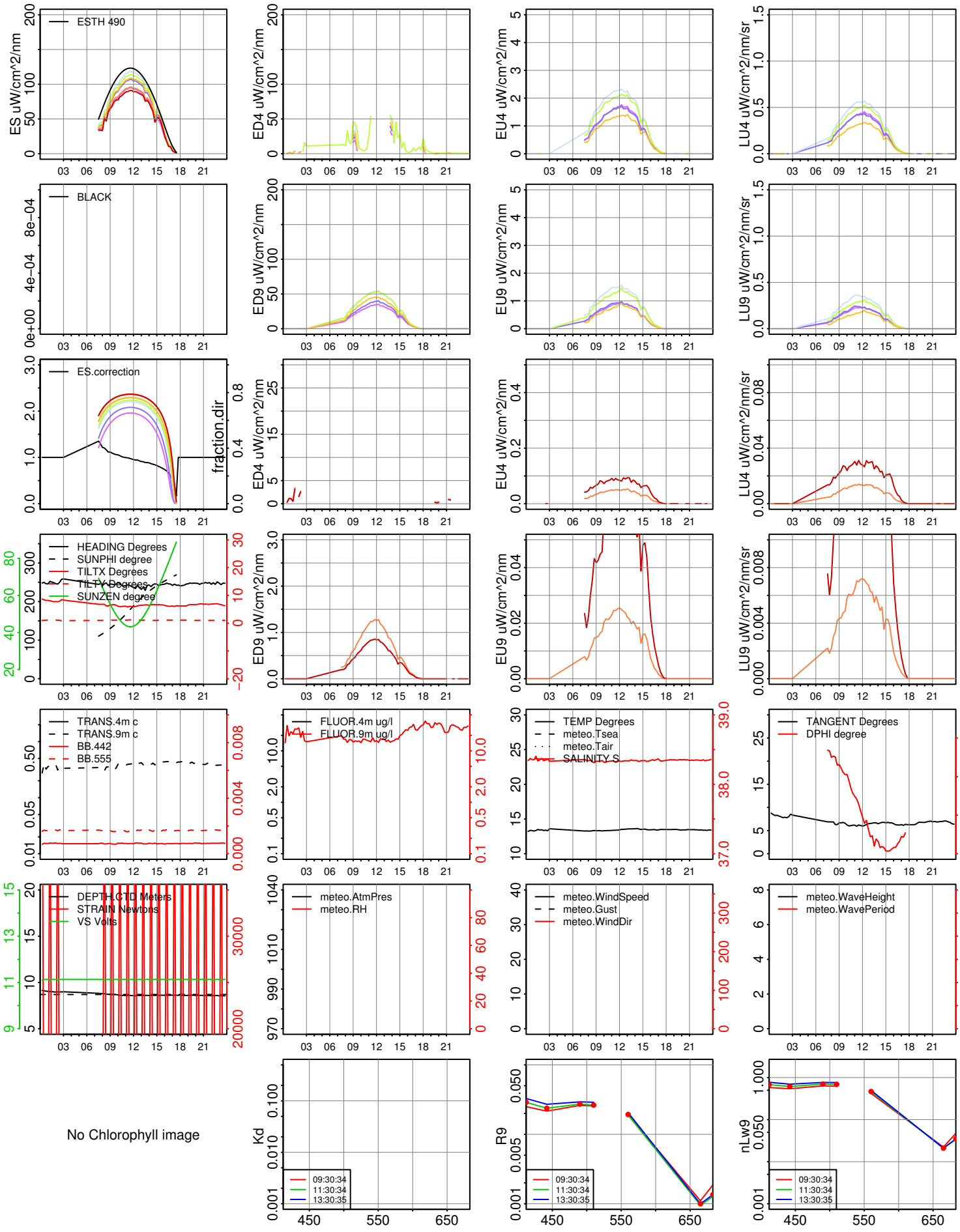
No Chlorophyll image

2005–03–21

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:35:56 GMT
sun zenith angle at solar noon : 43.04
HPLC Chlorophyll concentration : NA

2005–06–24



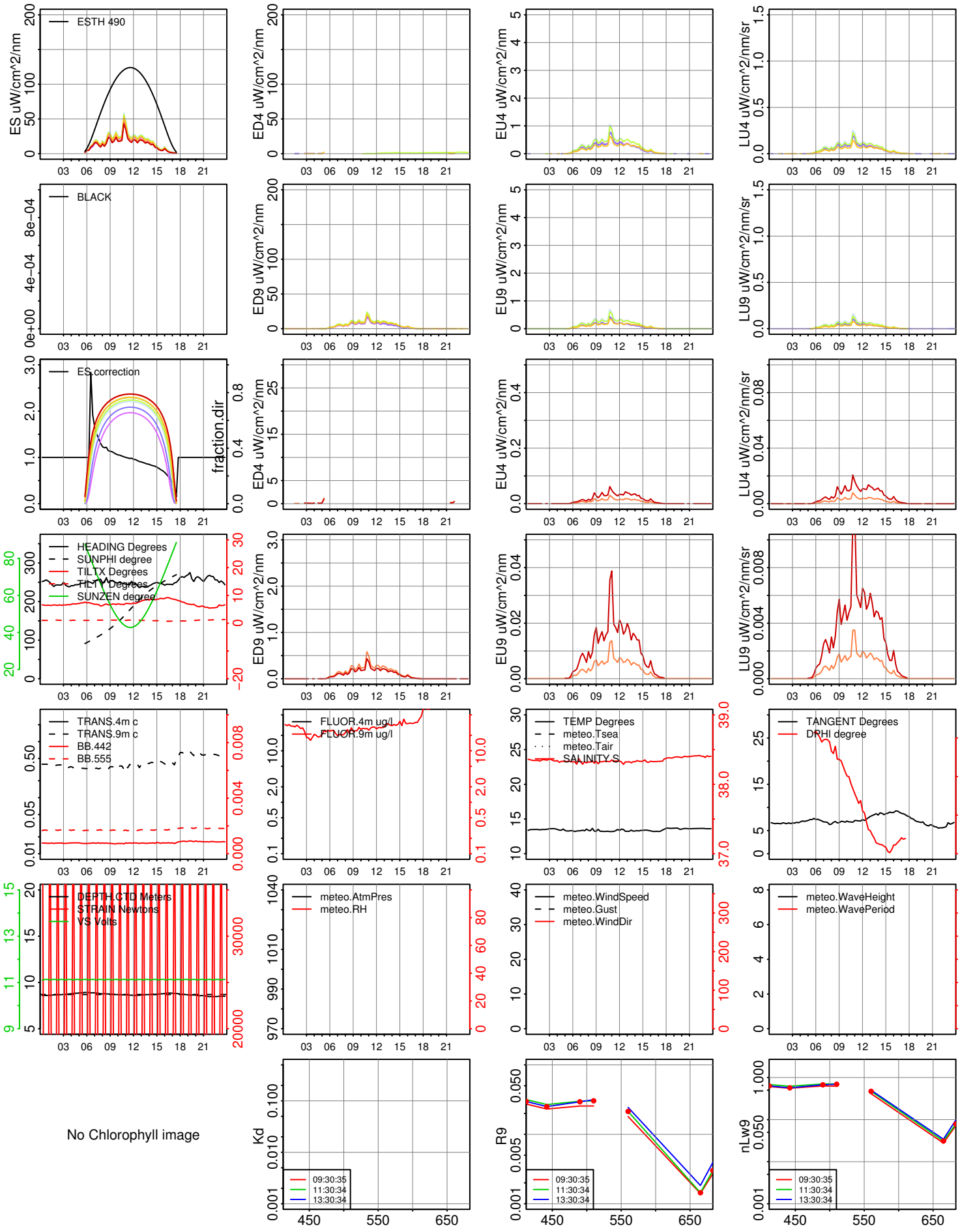
No Chlorophyll image

2005–03–22

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:35:38 GMT
sun zenith angle at solar noon : 42.64
HPLC Chlorophyll concentration : NA

2005–06–24



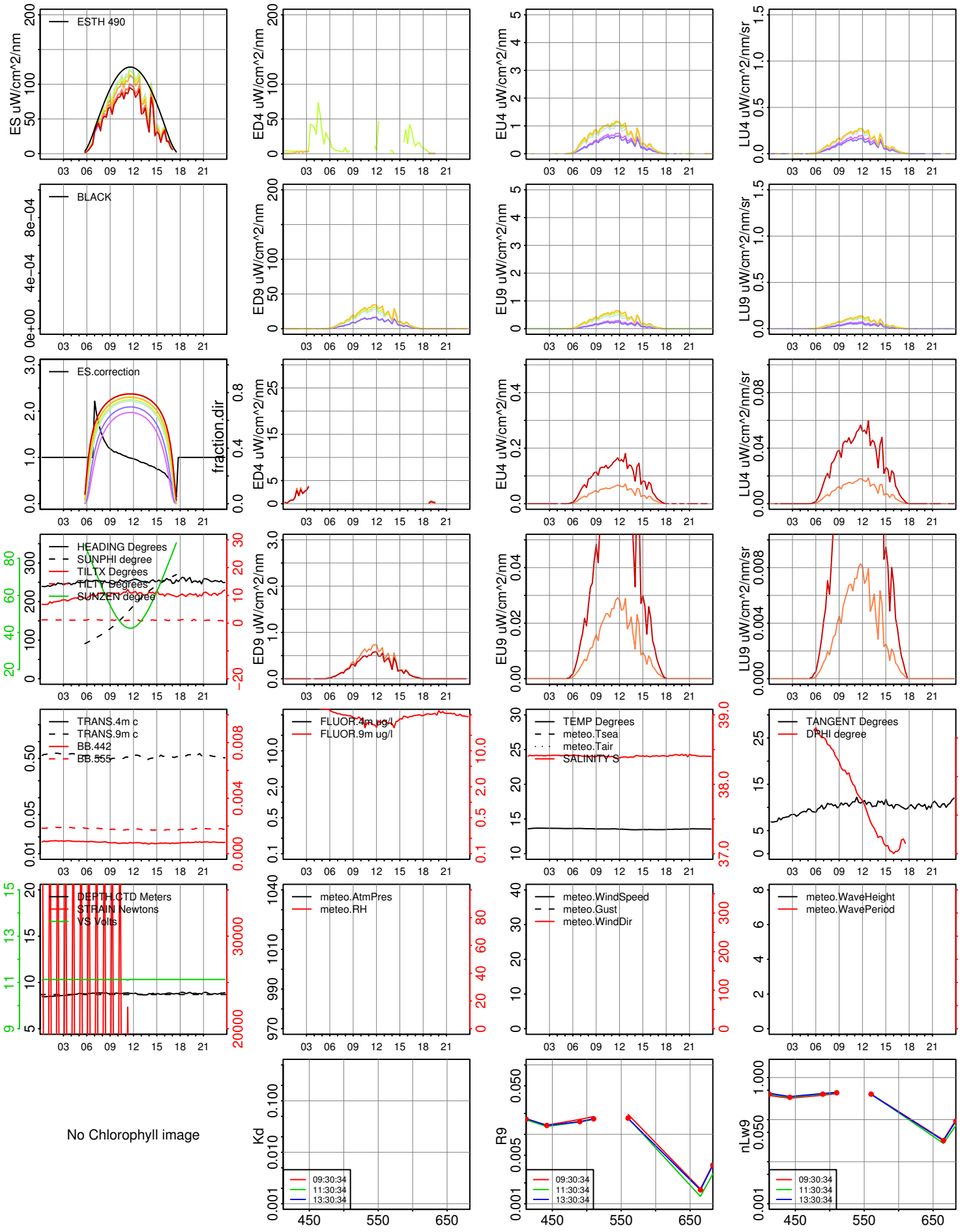
No Chlorophyll image

2005–03–23

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:35:20 GMT
sun zenith angle at solar noon : 42.25
HPLC Chlorophyll concentration : NA

2005–06–24



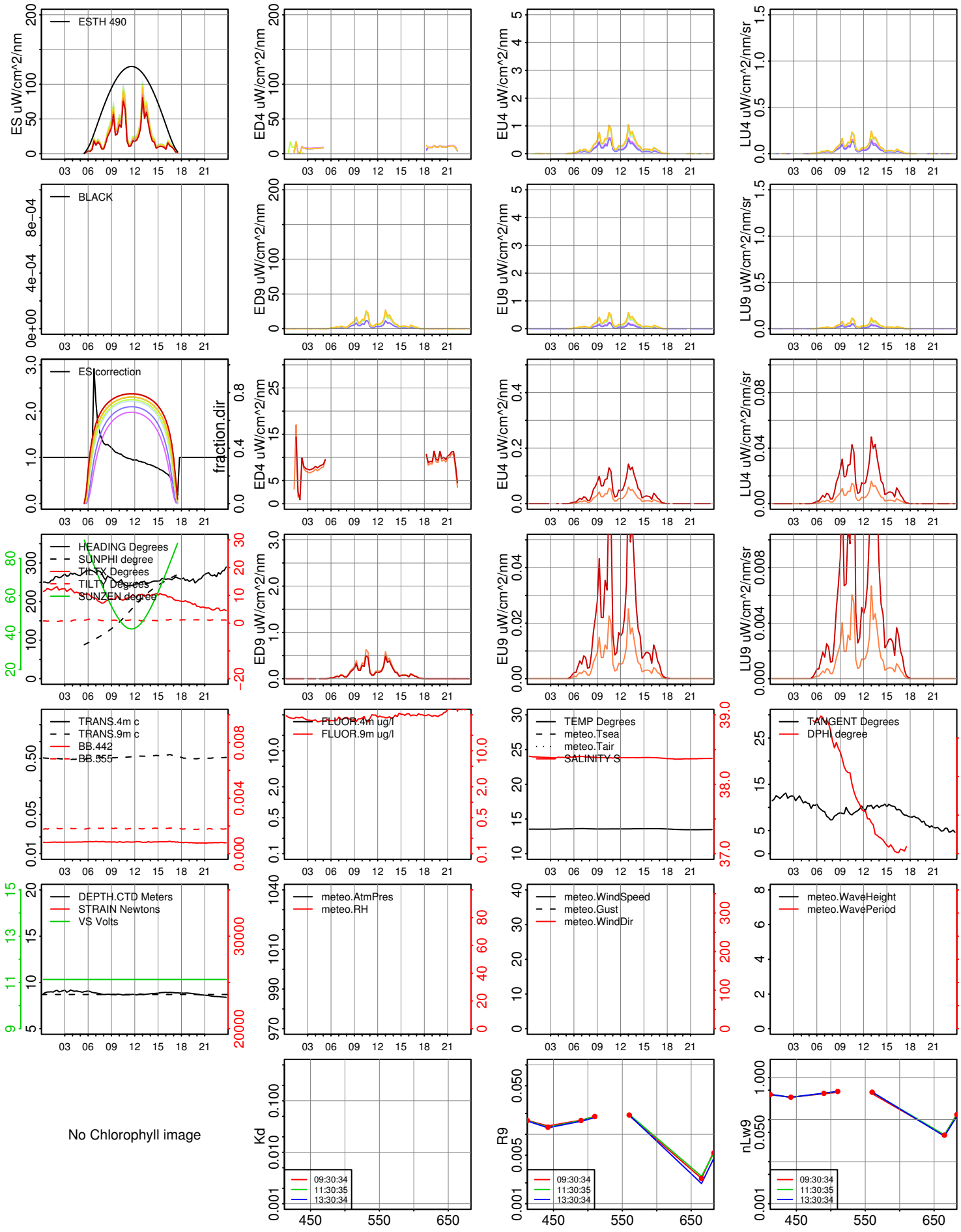
No Chlorophyll image

2005–03–24

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:34:60 GMT
sun zenith angle at solar noon : 41.86
HPLC Chlorophyll concentration : NA

2005–06–24



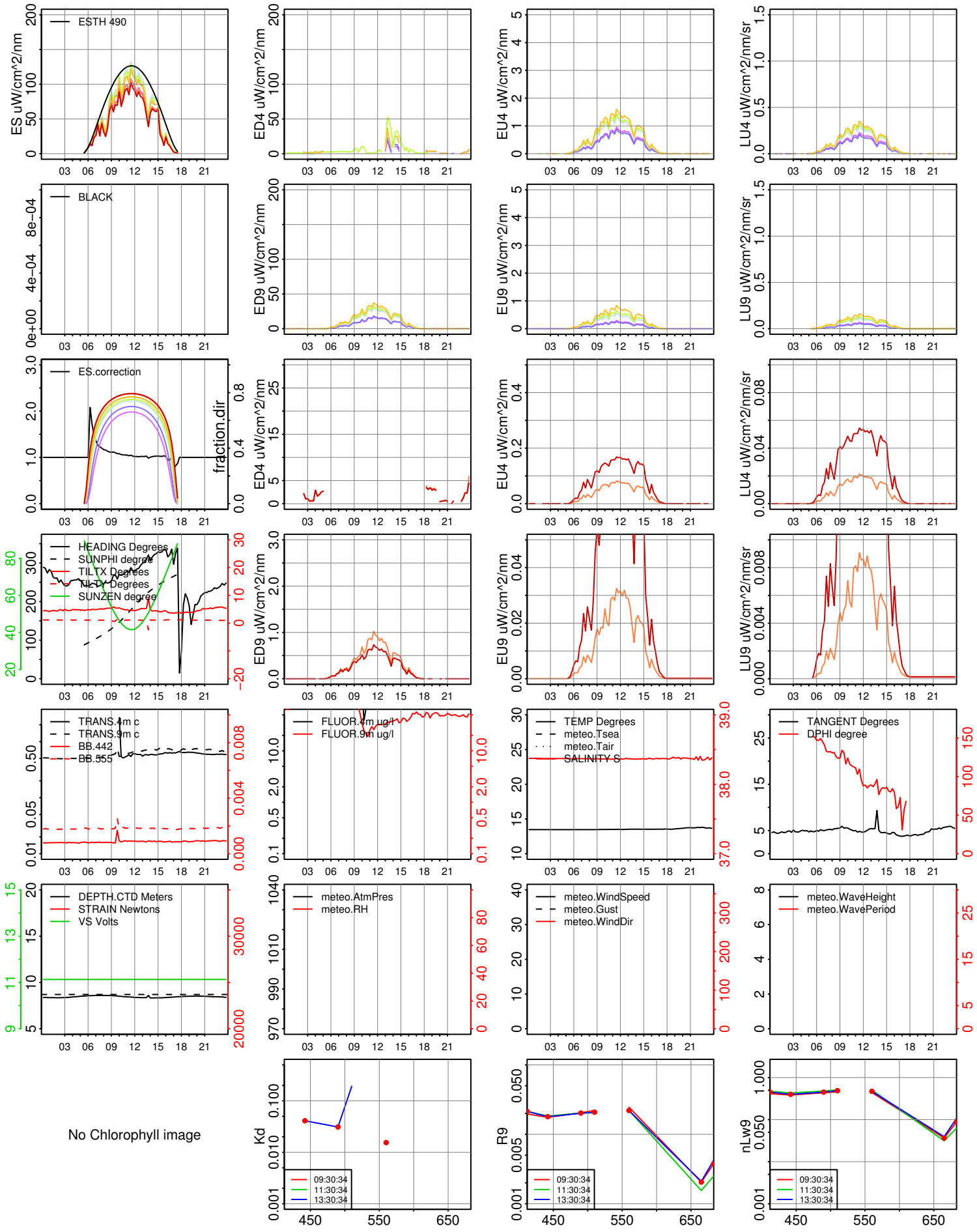
No Chlorophyll image

2005–03–25

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:34:42 GMT
sun zenith angle at solar noon : 41.46
HPLC Chlorophyll concentration : NA

2005–06–24



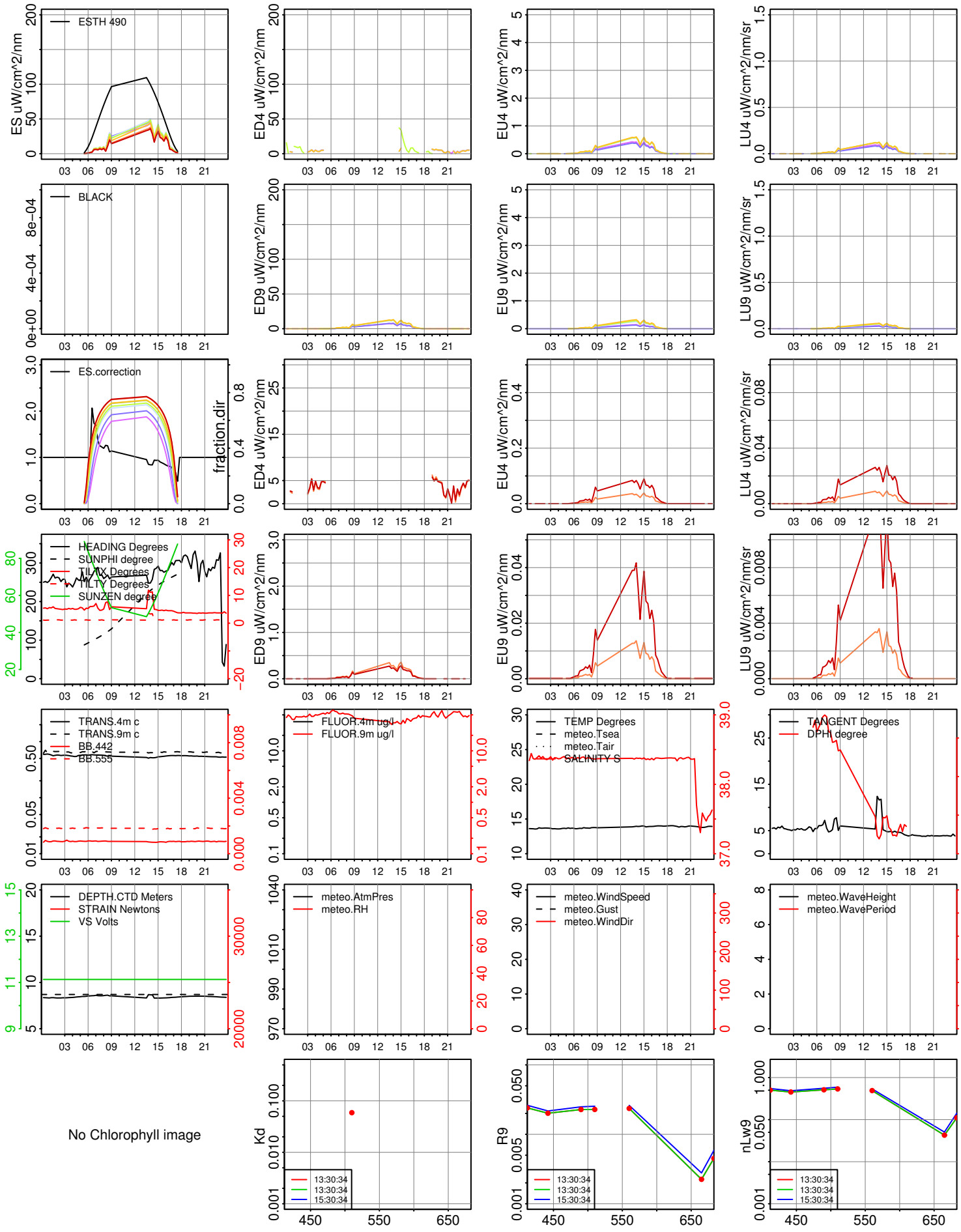
No Chlorophyll image

2005–03–26

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:34:22 GMT
sun zenith angle at solar noon : 41.07
HPLC Chlorophyll concentration : NA

2005–06–24



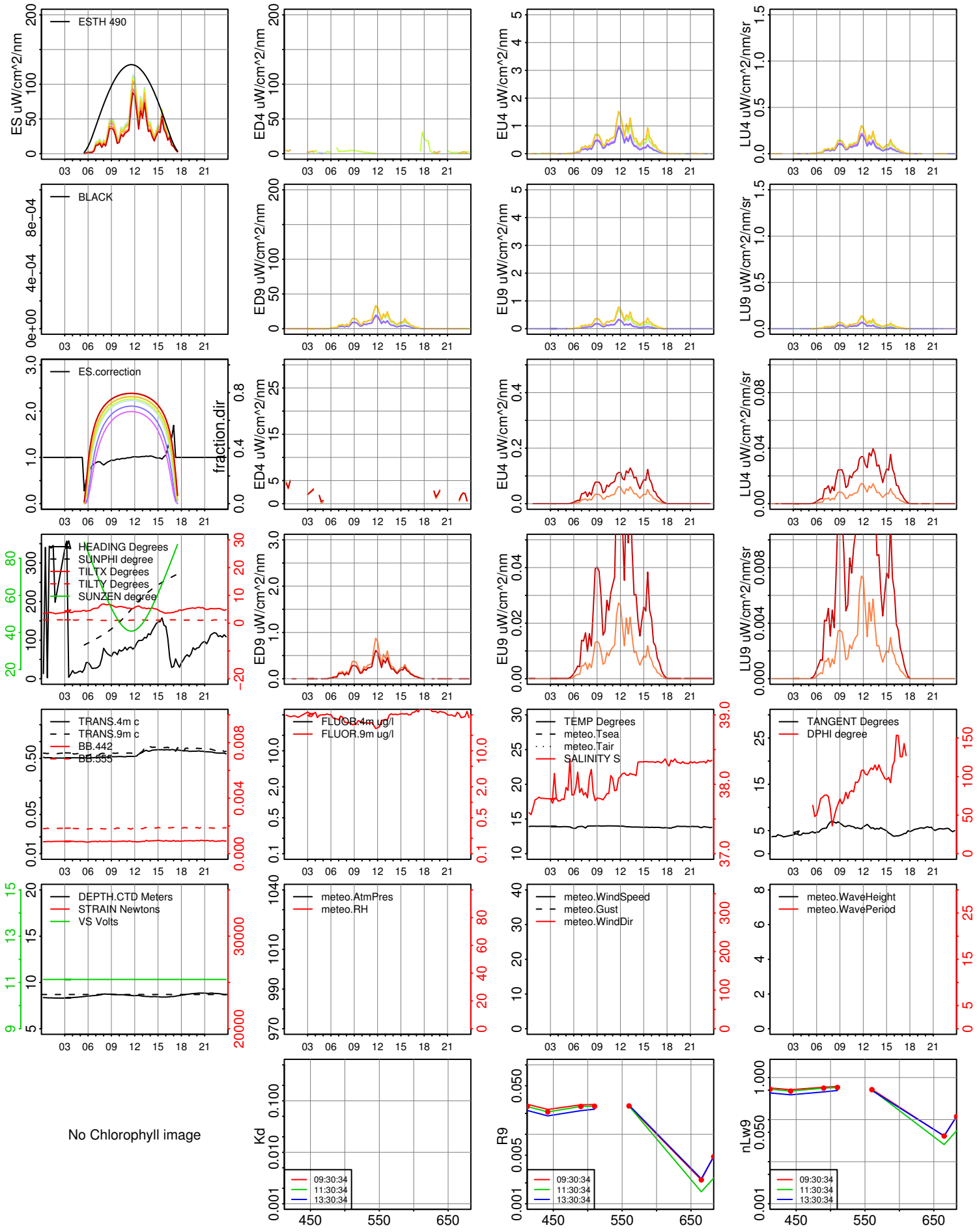
No Chlorophyll image

2005–03–27

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:34:4 GMT
sun zenith angle at solar noon : 40.68
HPLC Chlorophyll concentration : NA

2005–06–24



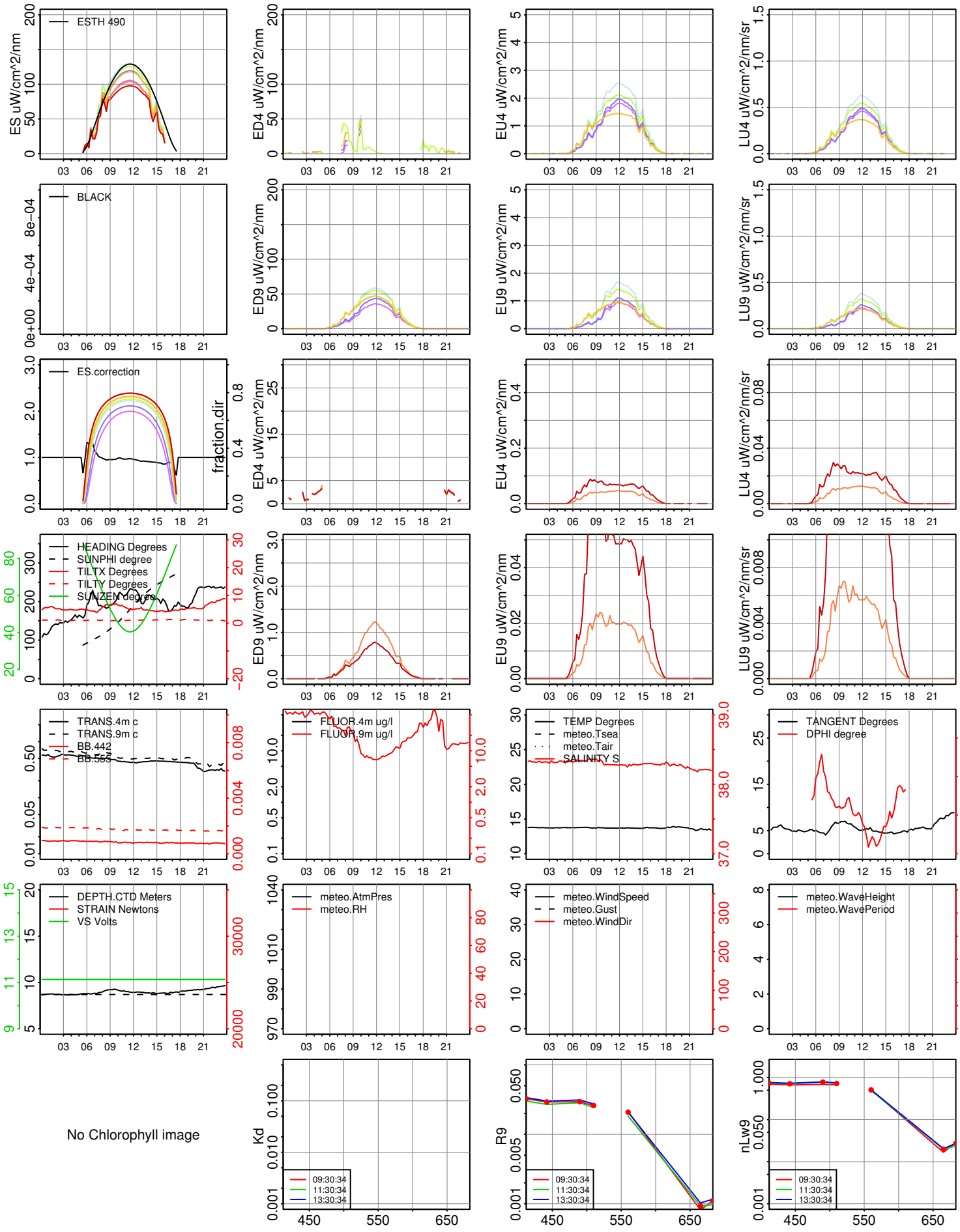
No Chlorophyll image

2005–03–28

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:33:44 GMT
sun zenith angle at solar noon : 40.29
HPLC Chlorophyll concentration : NA

2005–06–24



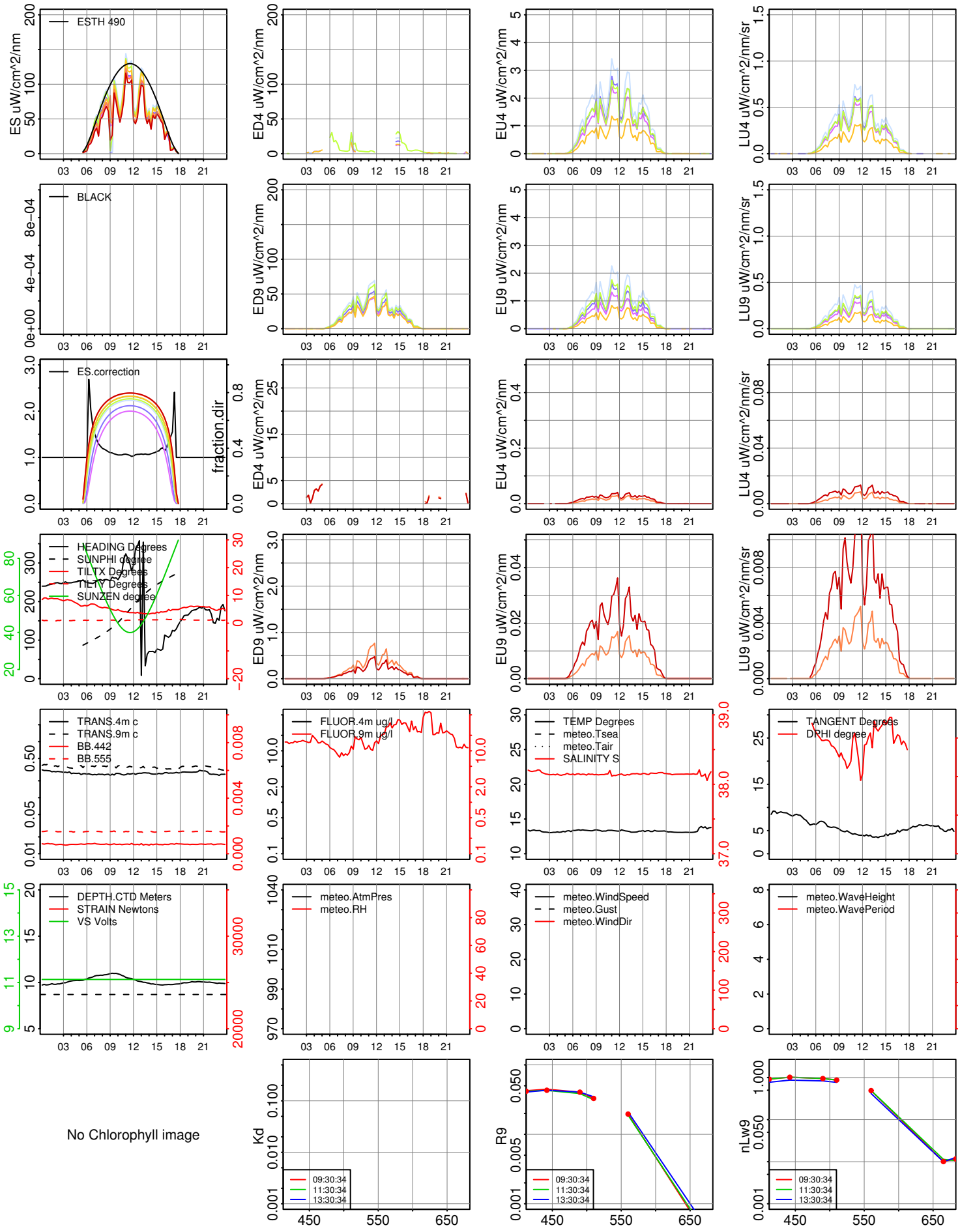
No Chlorophyll image

2005–03–29

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:33:24 GMT
sun zenith angle at solar noon : 39.9
HPLC Chlorophyll concentration : NA

2005–06–24



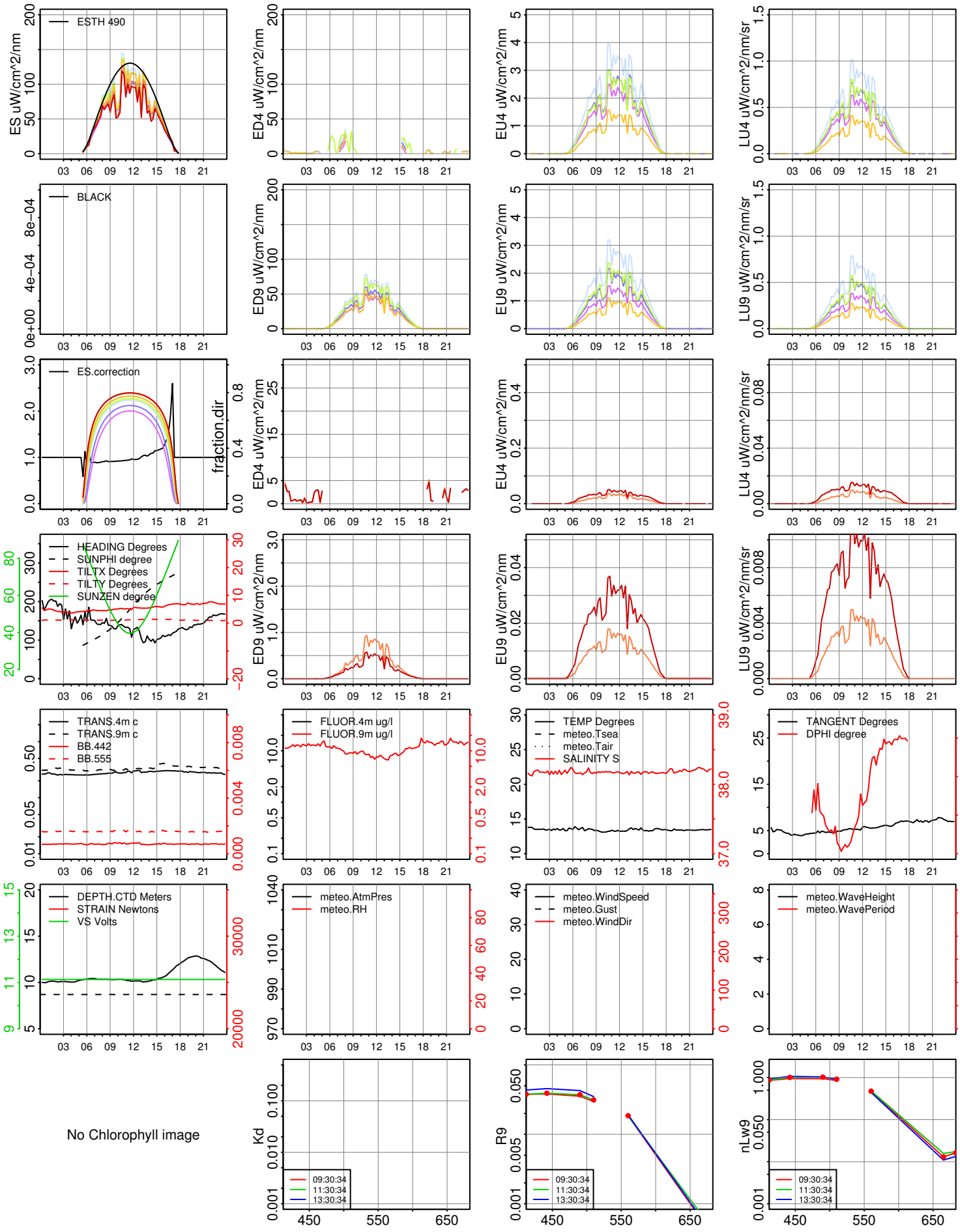
No Chlorophyll image

2005–03–30

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:33:6 GMT
sun zenith angle at solar noon : 39.51
HPLC Chlorophyll concentration : NA

2005–06–24



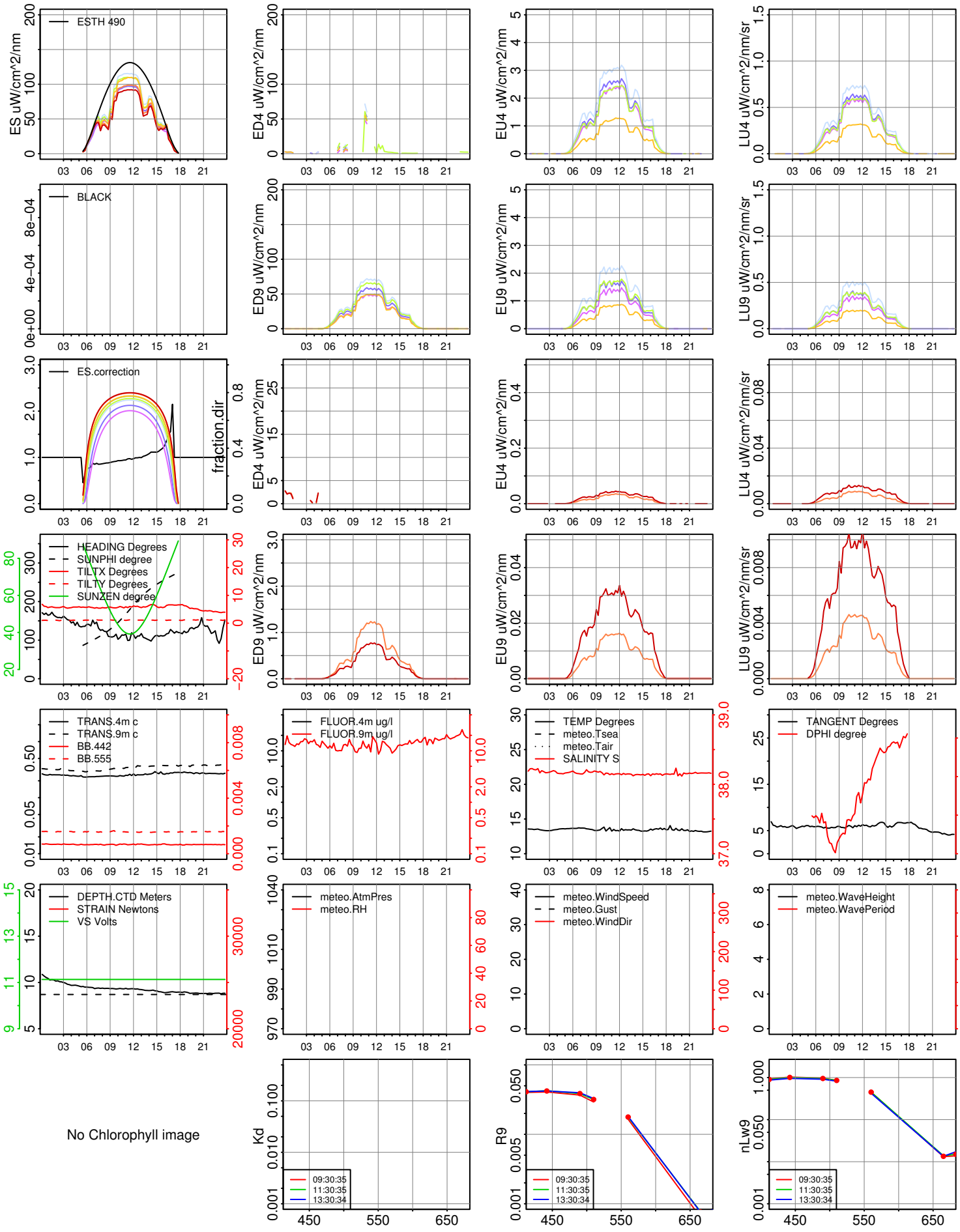
No Chlorophyll image

2005–03–31

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:32:46 GMT
sun zenith angle at solar noon : 39.12
HPLC Chlorophyll concentration : NA

2005–06–24



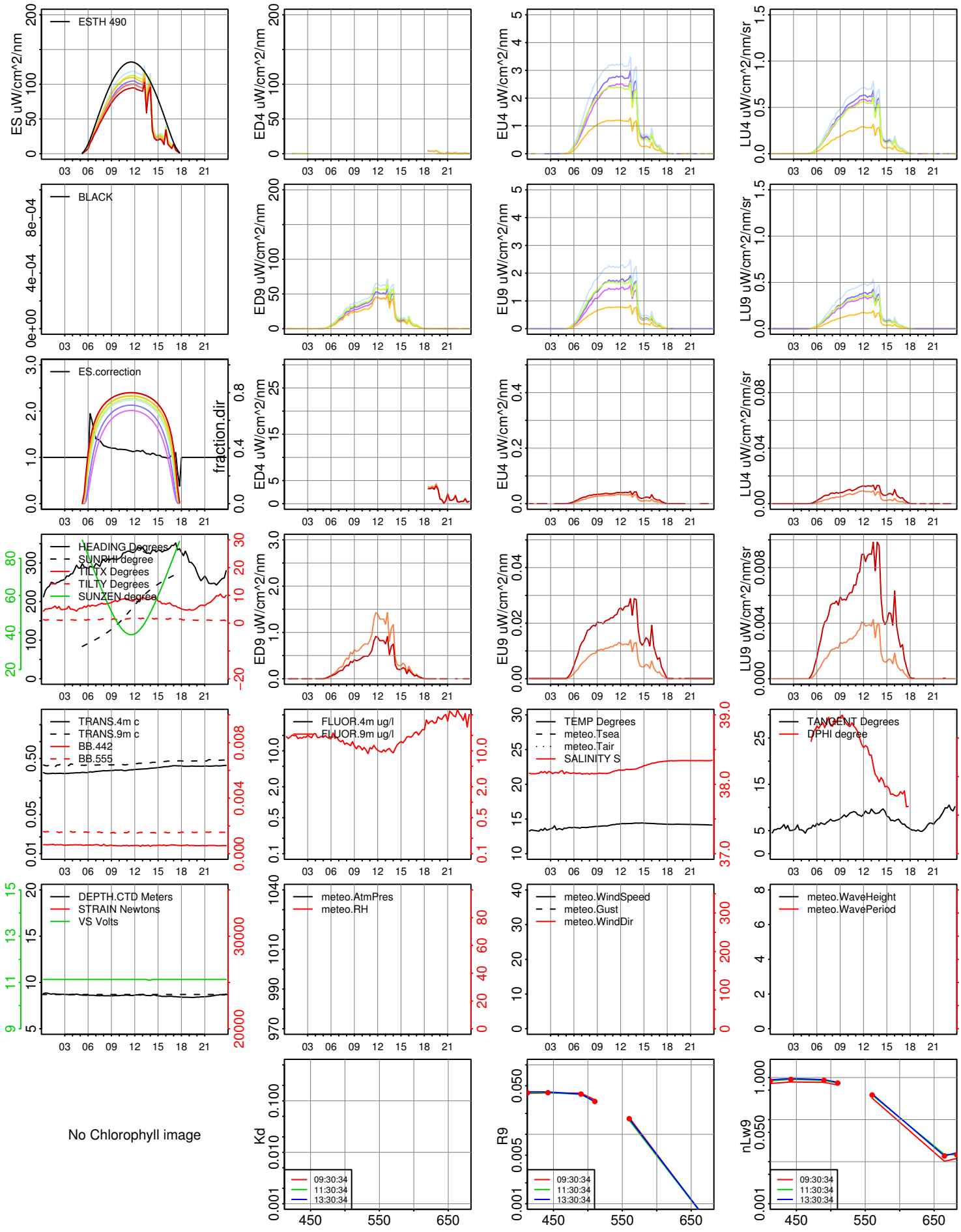
No Chlorophyll image

2005–04–01

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:32:28 GMT
sun zenith angle at solar noon : 38.74
HPLC Chlorophyll concentration : NA

2005–06–24



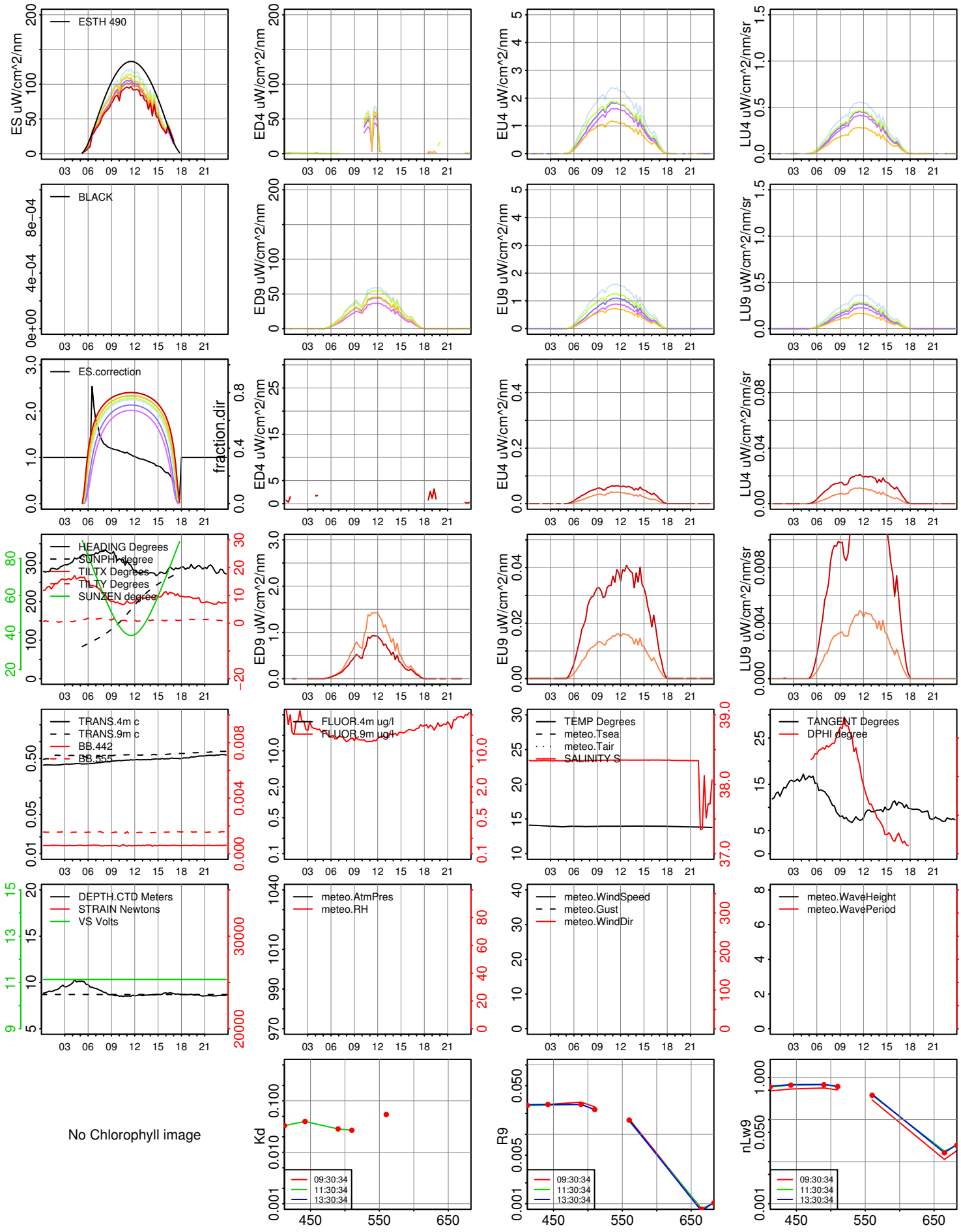
No Chlorophyll image

2005–04–02

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:32:8 GMT
sun zenith angle at solar noon : 38.35
HPLC Chlorophyll concentration : NA

2005–06–24



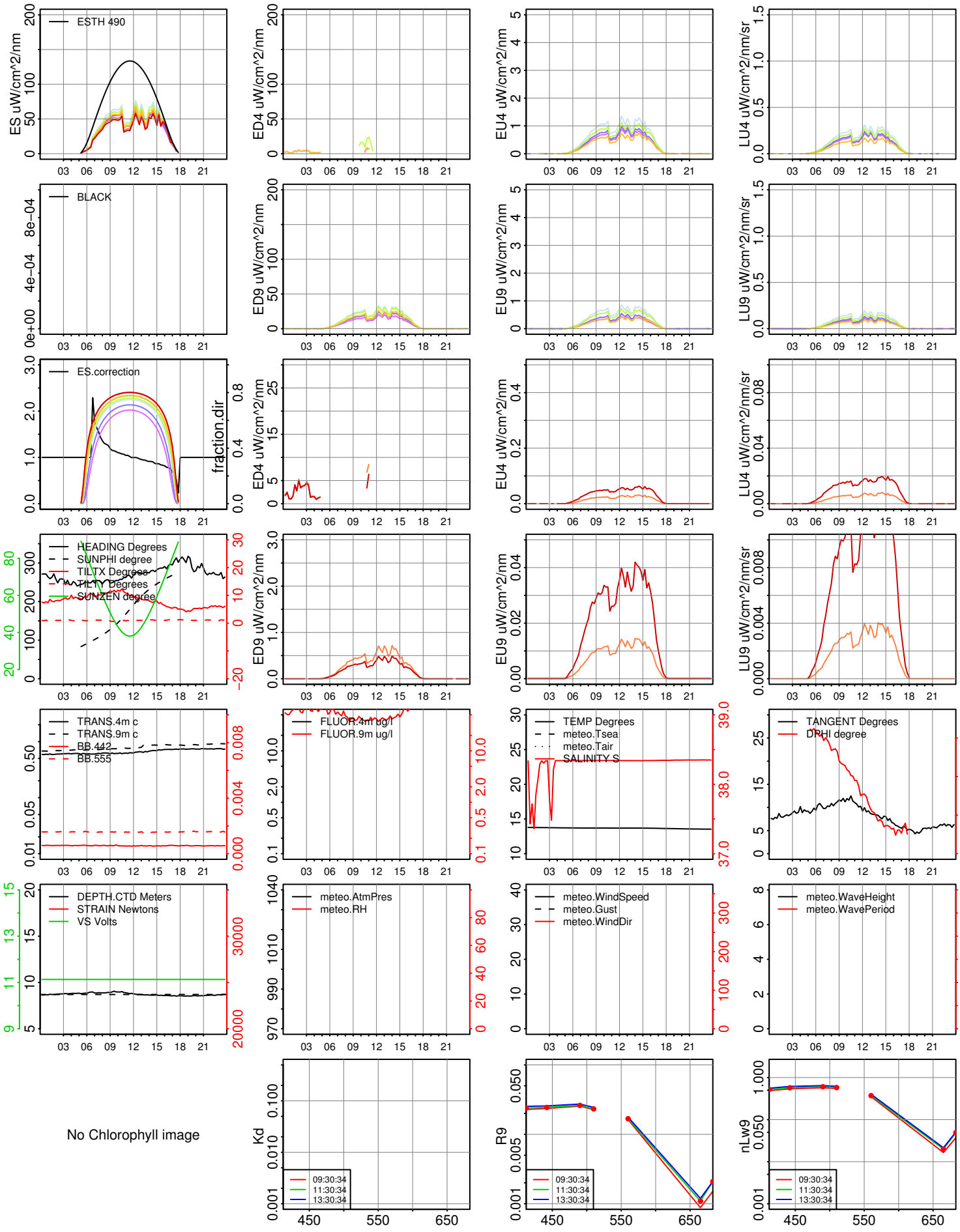
No Chlorophyll image

2005–04–03

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:31:50 GMT
sun zenith angle at solar noon : 37.97
HPLC Chlorophyll concentration : NA

2005–06–24



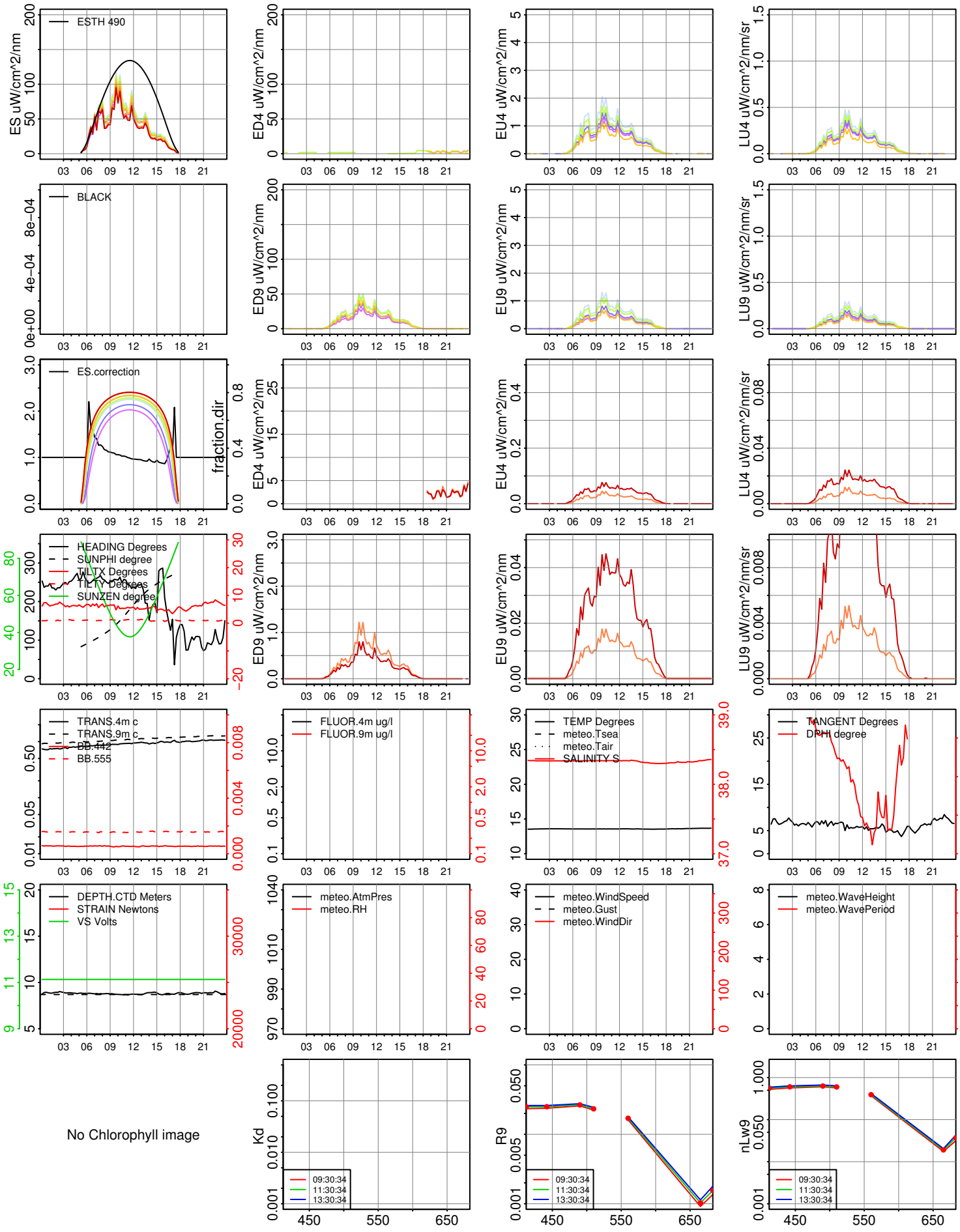
No Chlorophyll image

2005–04–04

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:31:32 GMT
sun zenith angle at solar noon : 37.59
HPLC Chlorophyll concentration : NA

2005–06–24



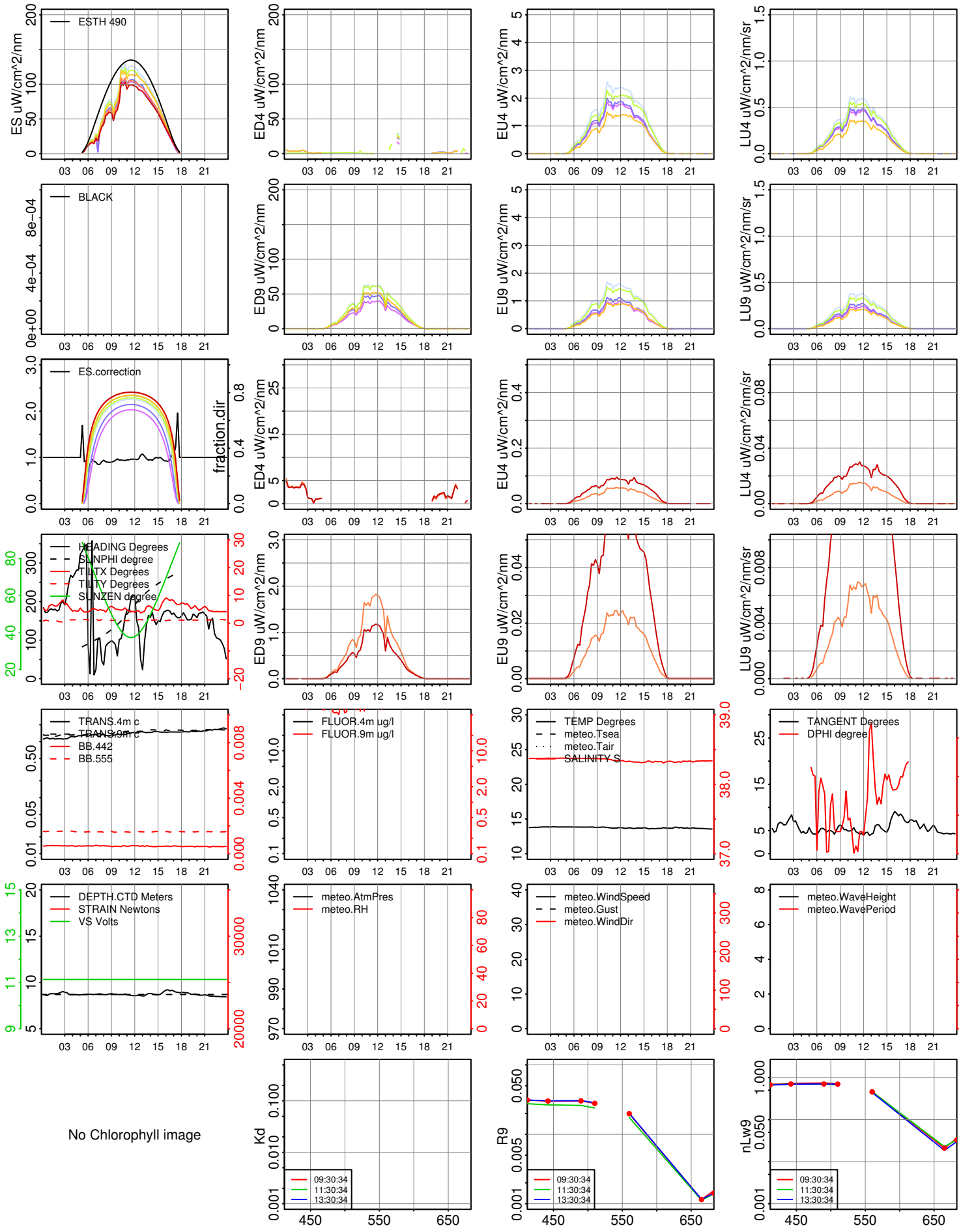
No Chlorophyll image

2005–04–05

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:31:14 GMT
sun zenith angle at solar noon : 37.21
HPLC Chlorophyll concentration : NA

2005–06–24



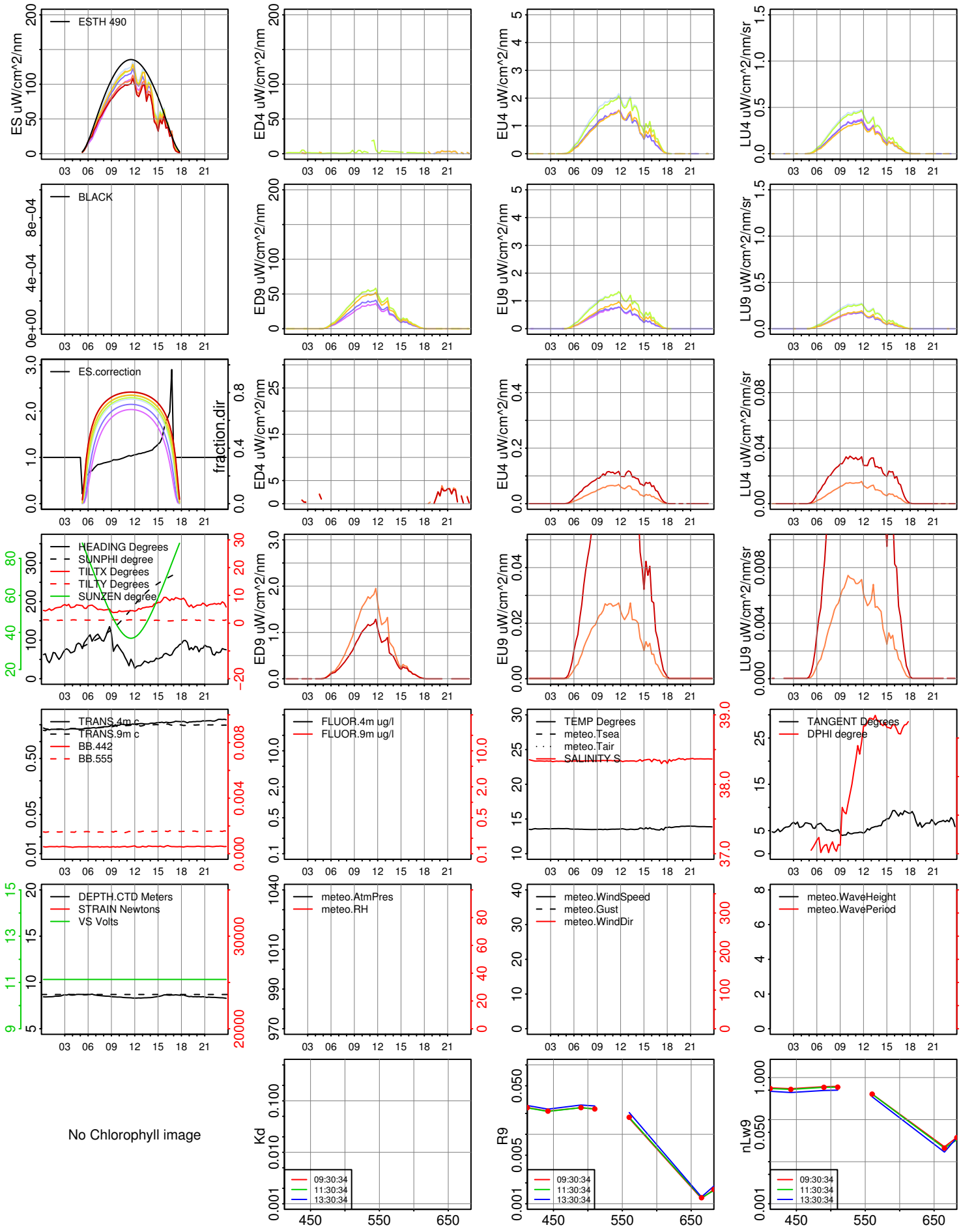
No Chlorophyll image

2005–04–06

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:30:54 GMT
sun zenith angle at solar noon : 36.83
HPLC Chlorophyll concentration : NA

2005–06–24



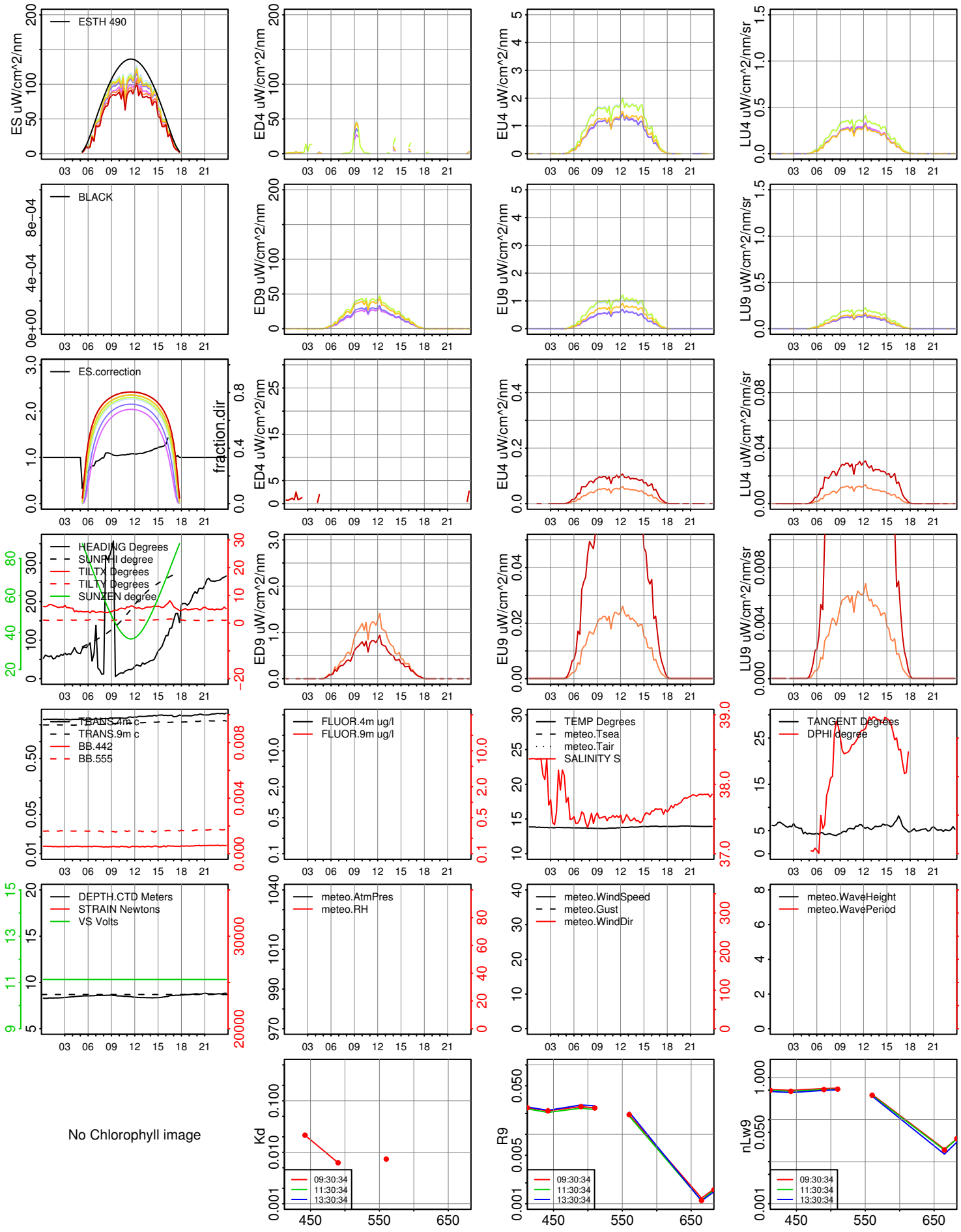
No Chlorophyll image

2005–04–07

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:30:36 GMT
sun zenith angle at solar noon : 36.46
HPLC Chlorophyll concentration : NA

2005–06–24



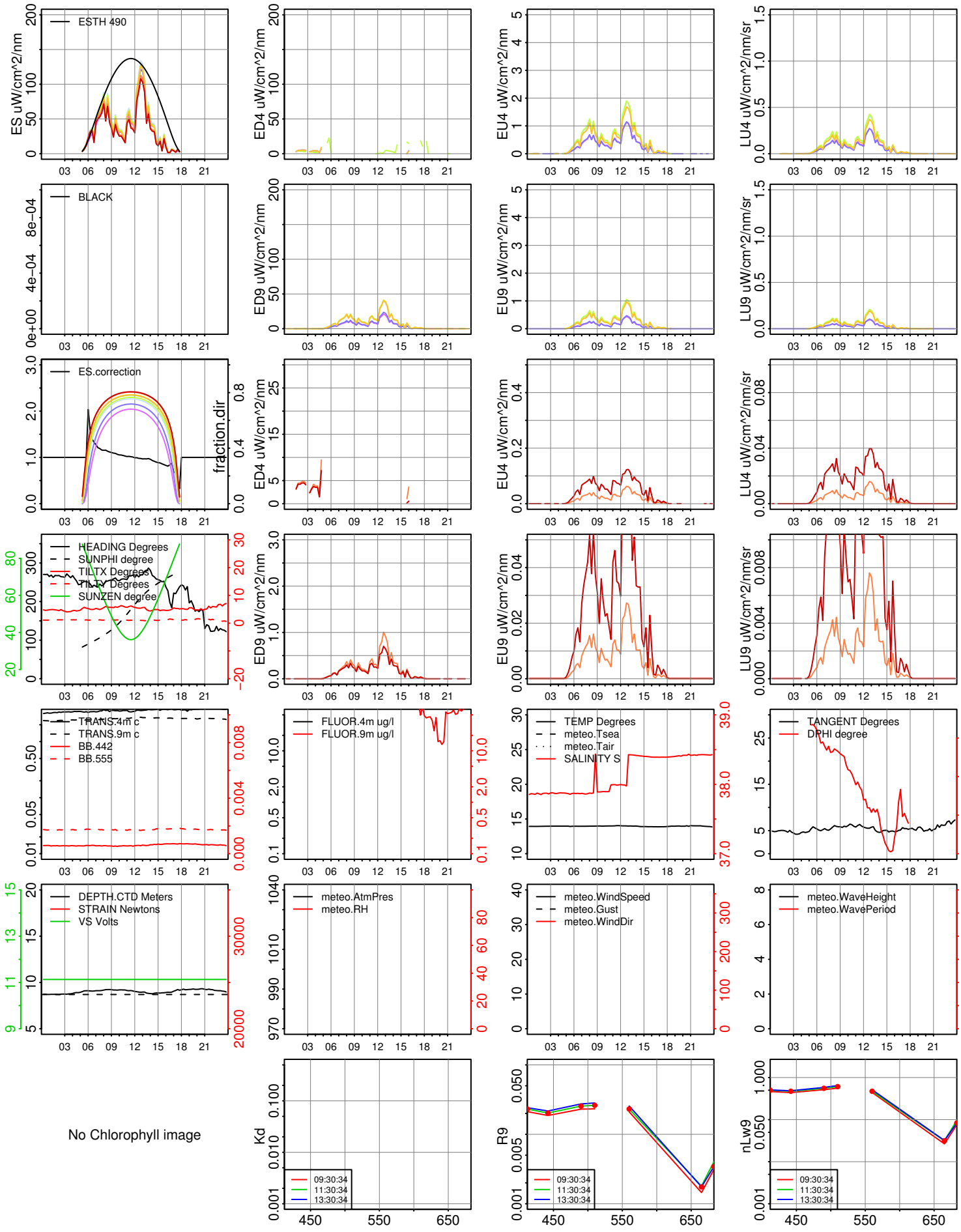
No Chlorophyll image

2005–04–08

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:30:20 GMT
sun zenith angle at solar noon : 36.08
HPLC Chlorophyll concentration : NA

2005–06–24



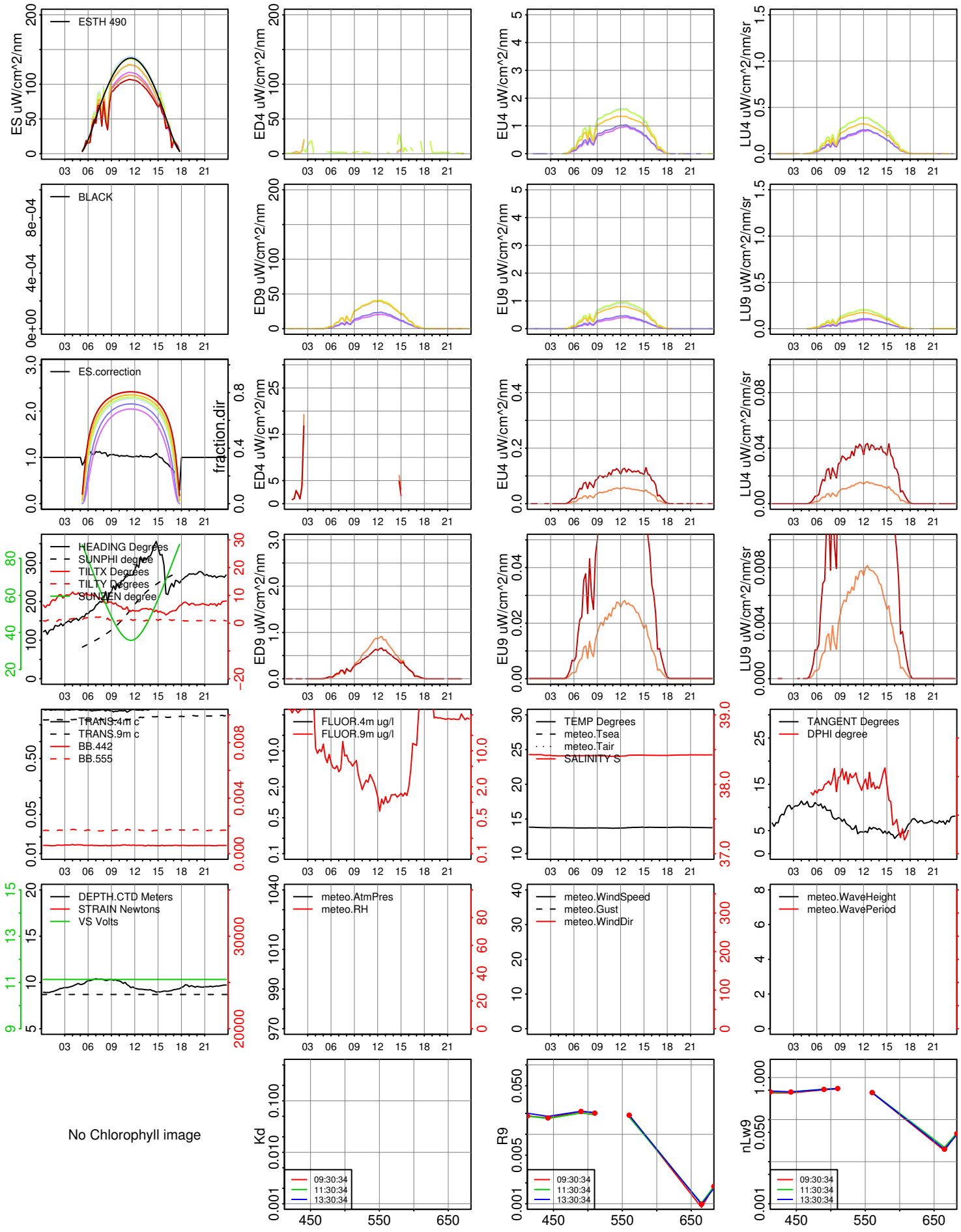
No Chlorophyll image

2005–04–09

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:30:2 GMT
sun zenith angle at solar noon : 35.71
HPLC Chlorophyll concentration : NA

2005–06–24



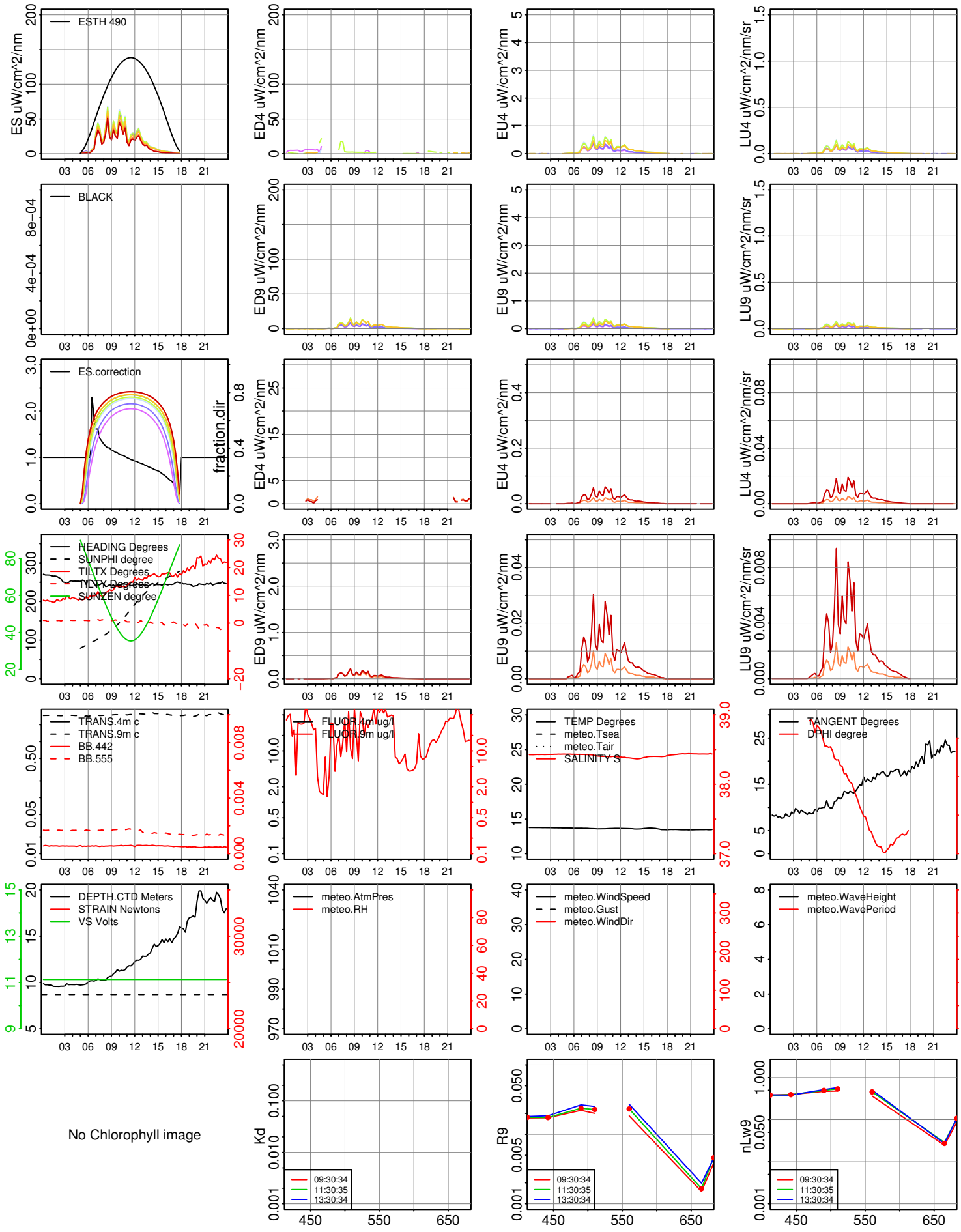
No Chlorophyll image

2005–04–10

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:29:44 GMT
sun zenith angle at solar noon : 35.34
HPLC Chlorophyll concentration : NA

2005–06–24



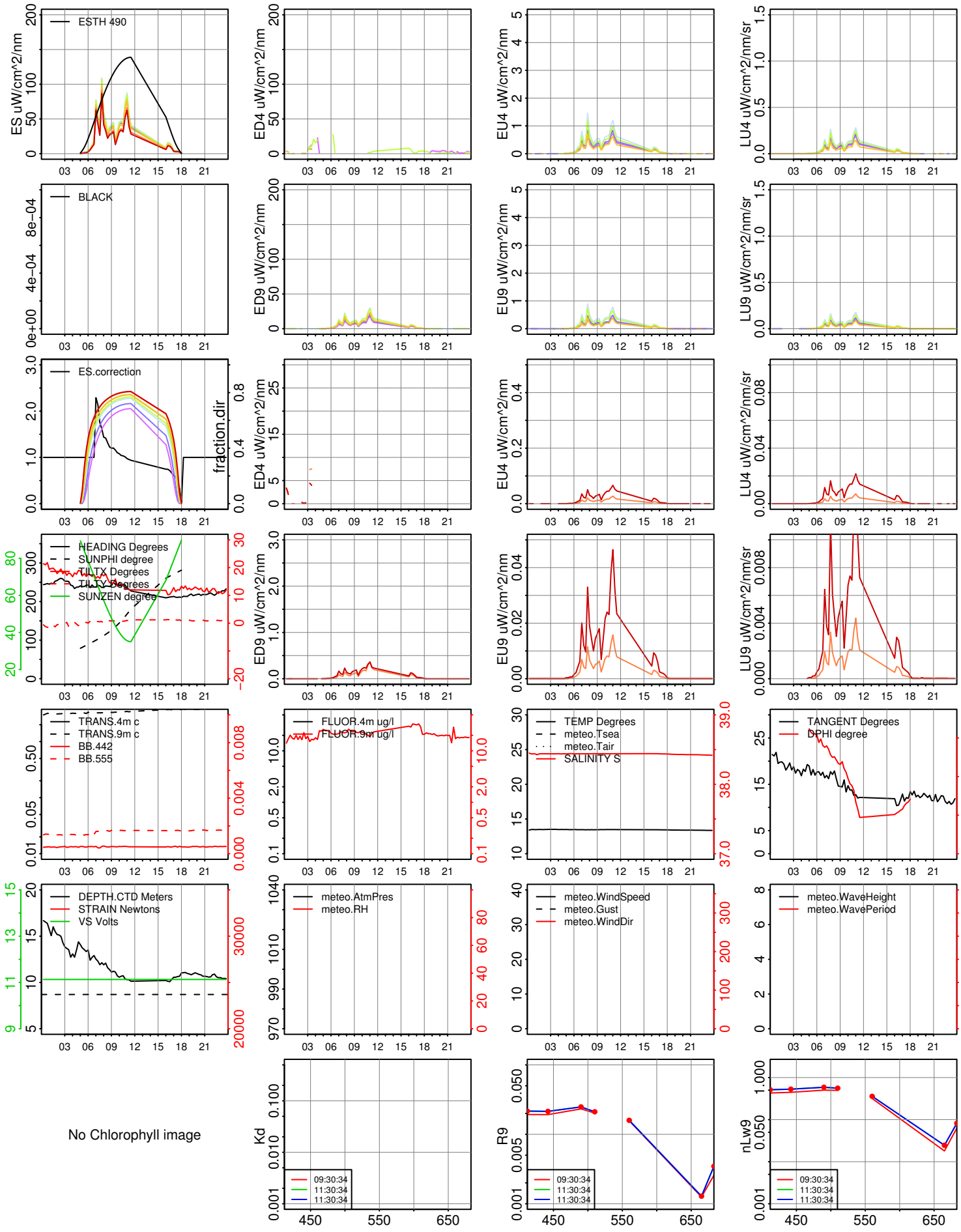
No Chlorophyll image

2005–04–11

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:29:28 GMT
sun zenith angle at solar noon : 34.97
HPLC Chlorophyll concentration : NA

2005–06–24



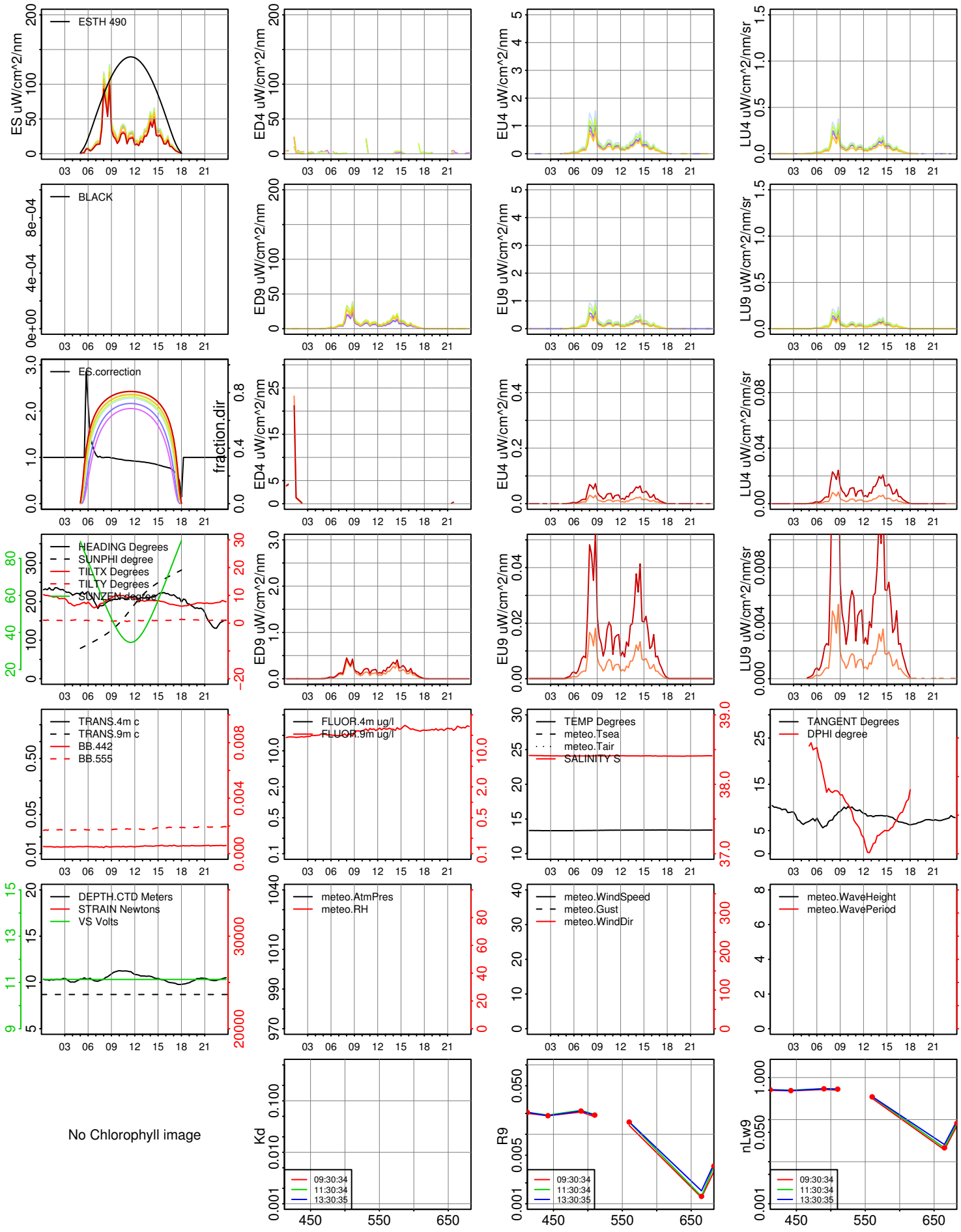
No Chlorophyll image

2005–04–12

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:29:10 GMT
sun zenith angle at solar noon : 34.61
HPLC Chlorophyll concentration : NA

2005–06–24



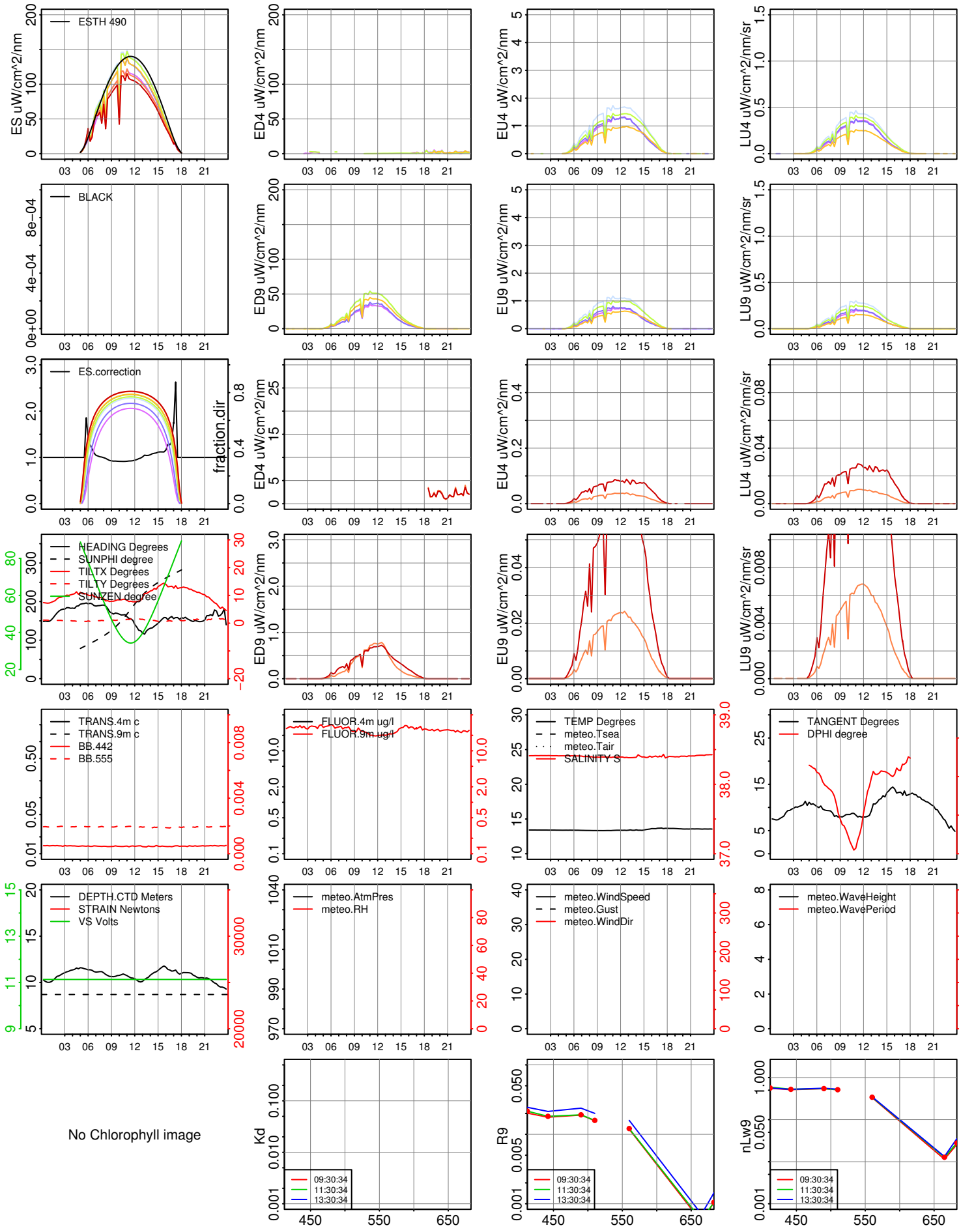
No Chlorophyll image

2005–04–13

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:28:54 GMT
sun zenith angle at solar noon : 34.25
HPLC Chlorophyll concentration : NA

2005–06–24



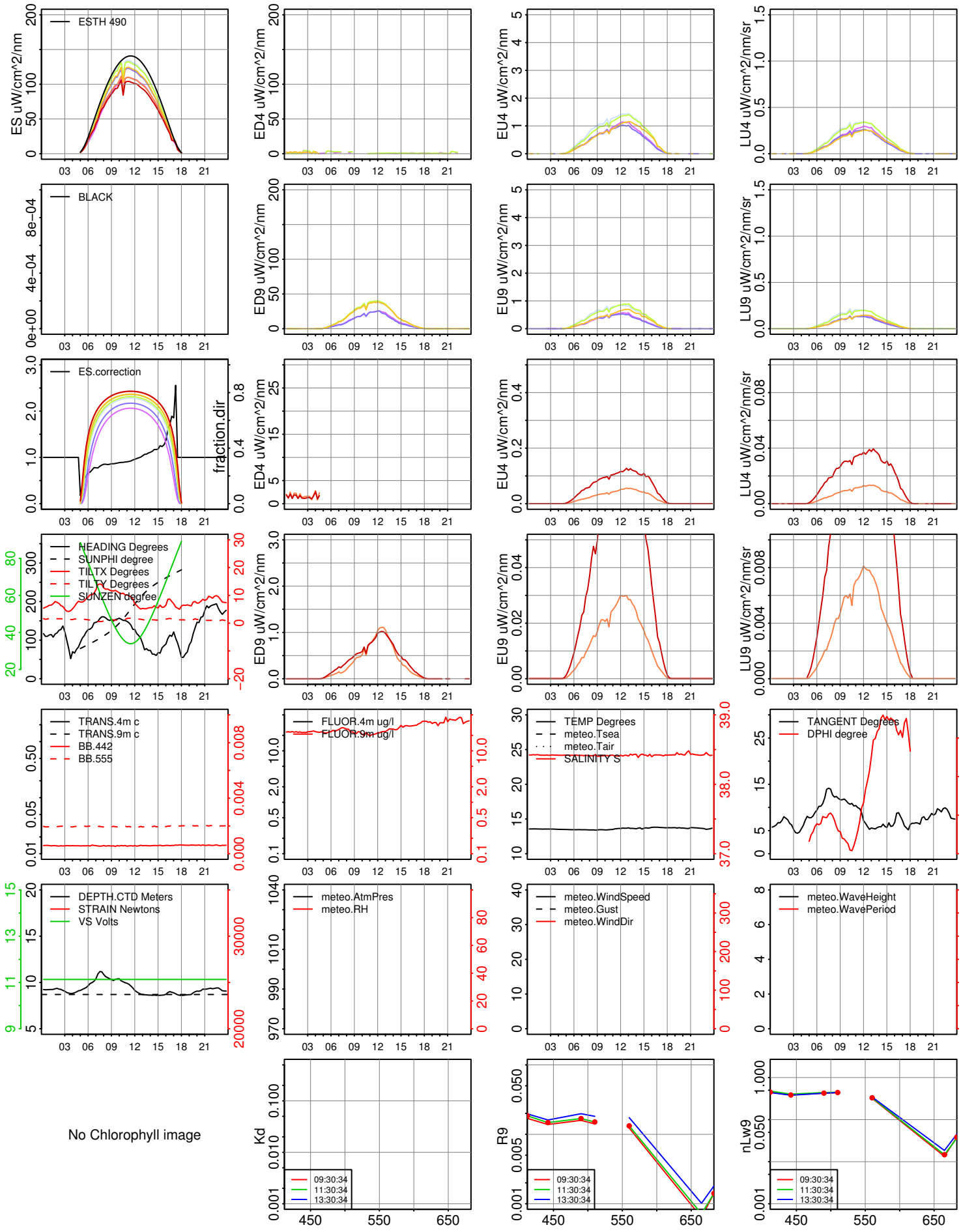
No Chlorophyll image

2005–04–14

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:28:38 GMT
sun zenith angle at solar noon : 33.89
HPLC Chlorophyll concentration : NA

2005–06–24



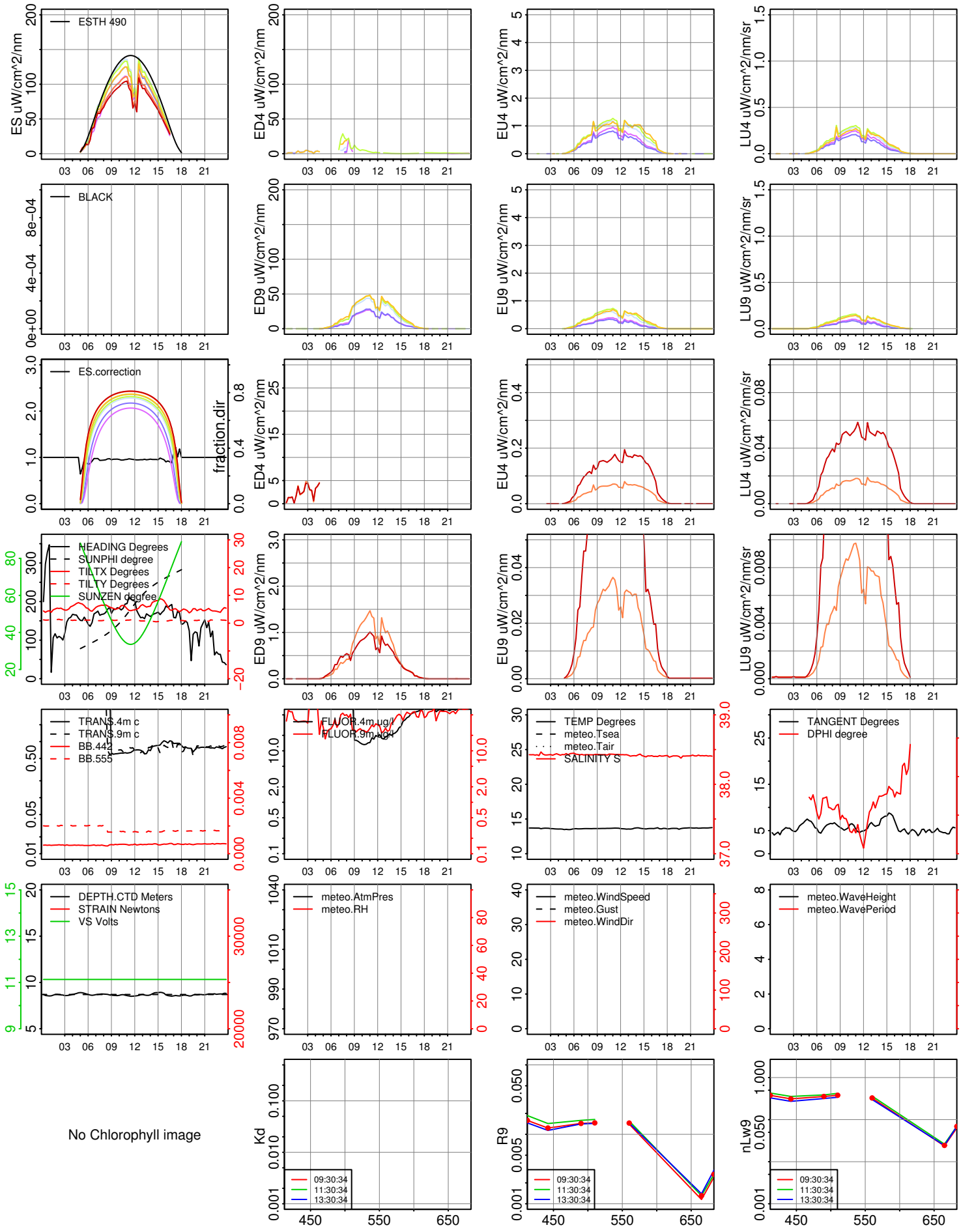
No Chlorophyll image

2005–04–15

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:28:22 GMT
sun zenith angle at solar noon : 33.53
HPLC Chlorophyll concentration : NA

2005–06–24



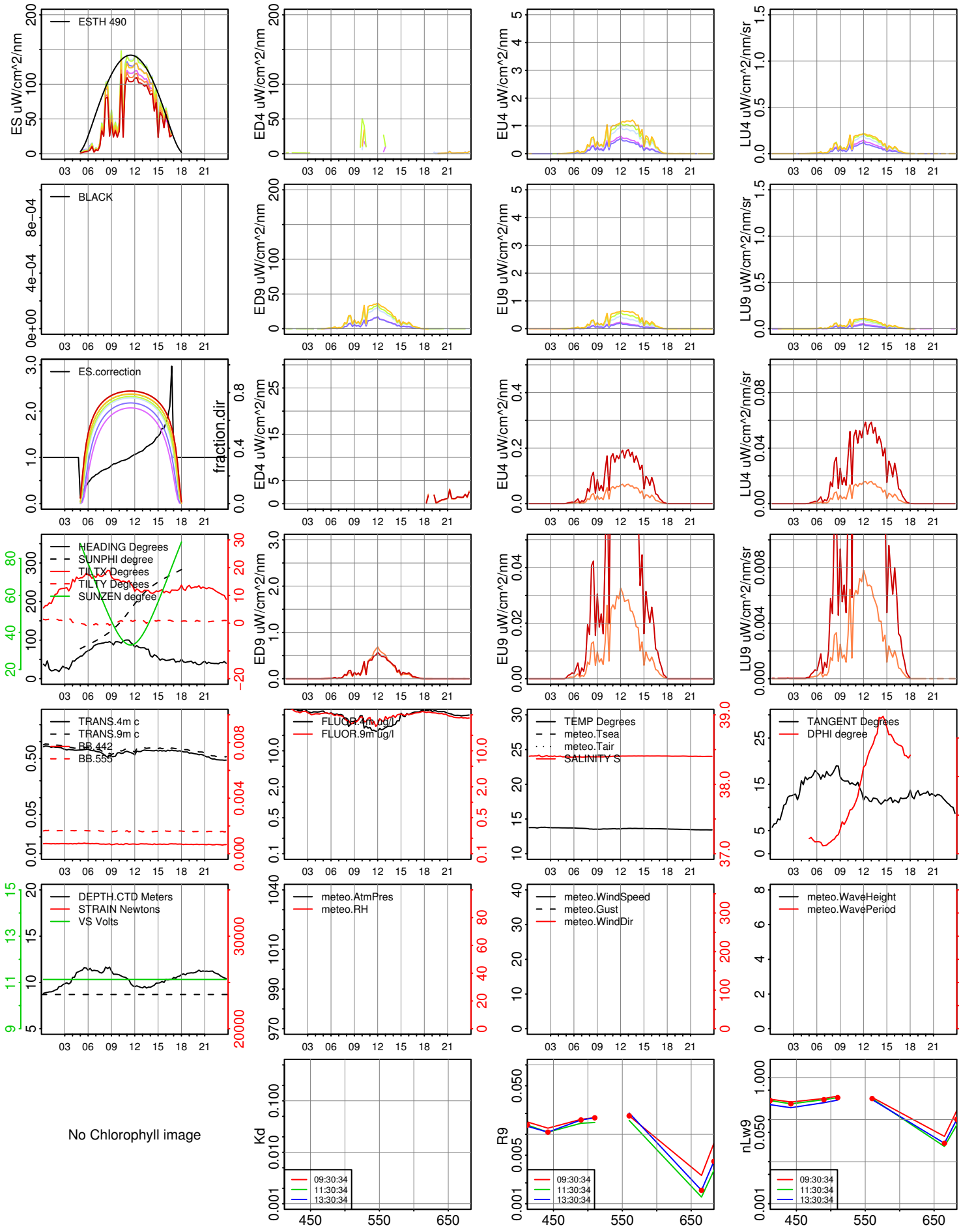
No Chlorophyll image

2005–04–16

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:28:8 GMT
sun zenith angle at solar noon : 33.17
HPLC Chlorophyll concentration : NA

2005–06–24



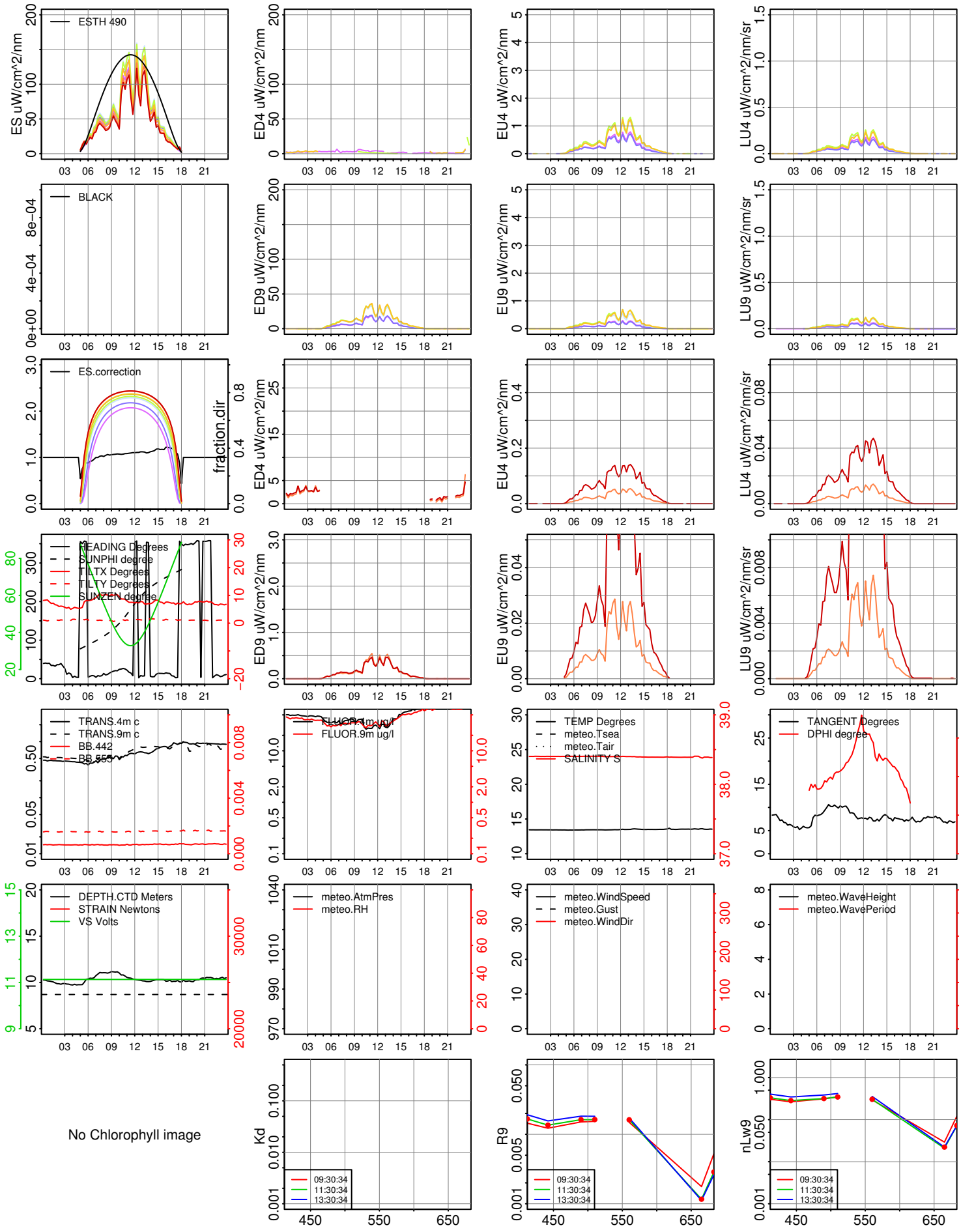
No Chlorophyll image

2005–04–17

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:27:52 GMT
sun zenith angle at solar noon : 32.82
HPLC Chlorophyll concentration : NA

2005–06–24



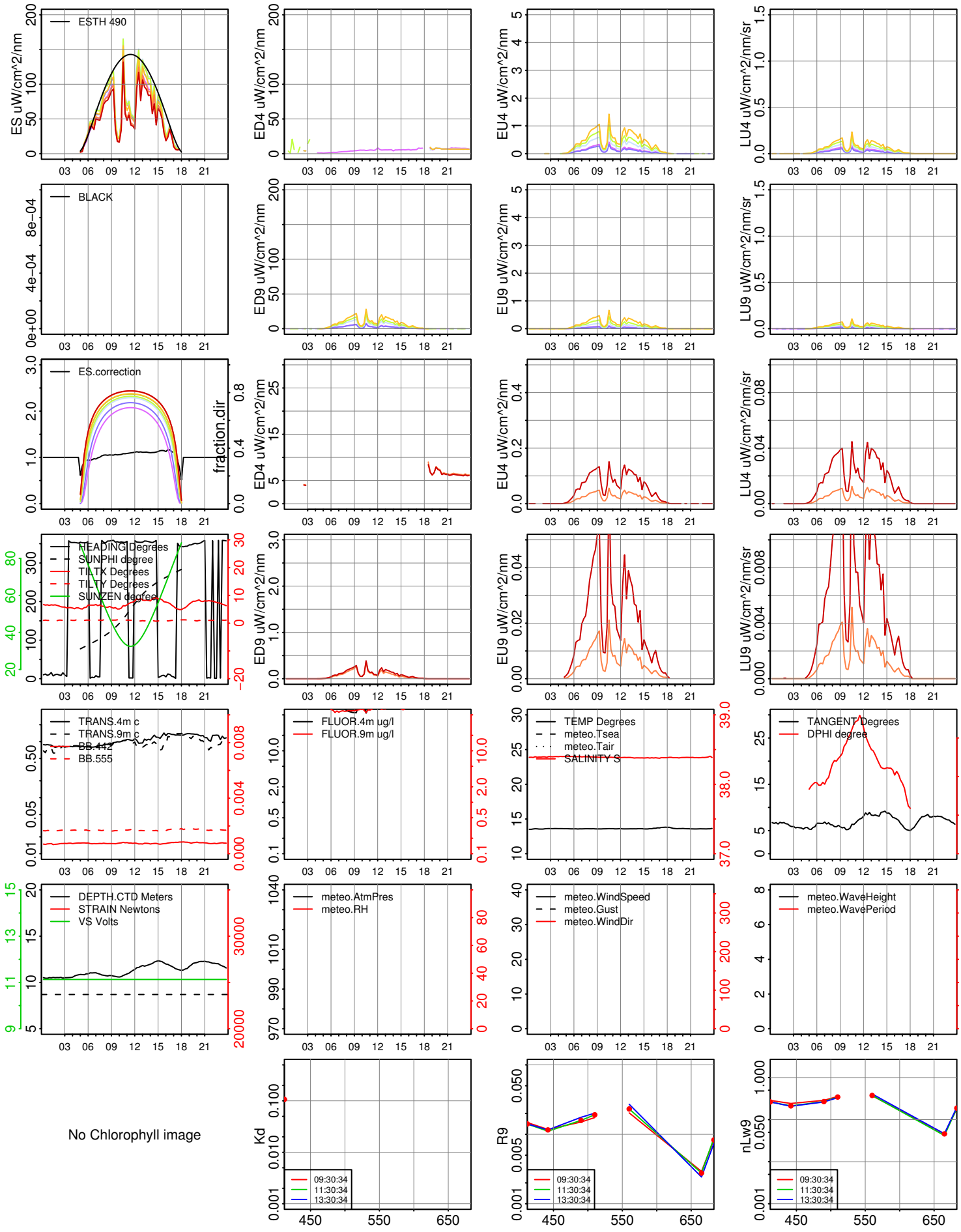
No Chlorophyll image

2005–04–18

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:27:38 GMT
sun zenith angle at solar noon : 32.47
HPLC Chlorophyll concentration : NA

2005–06–24



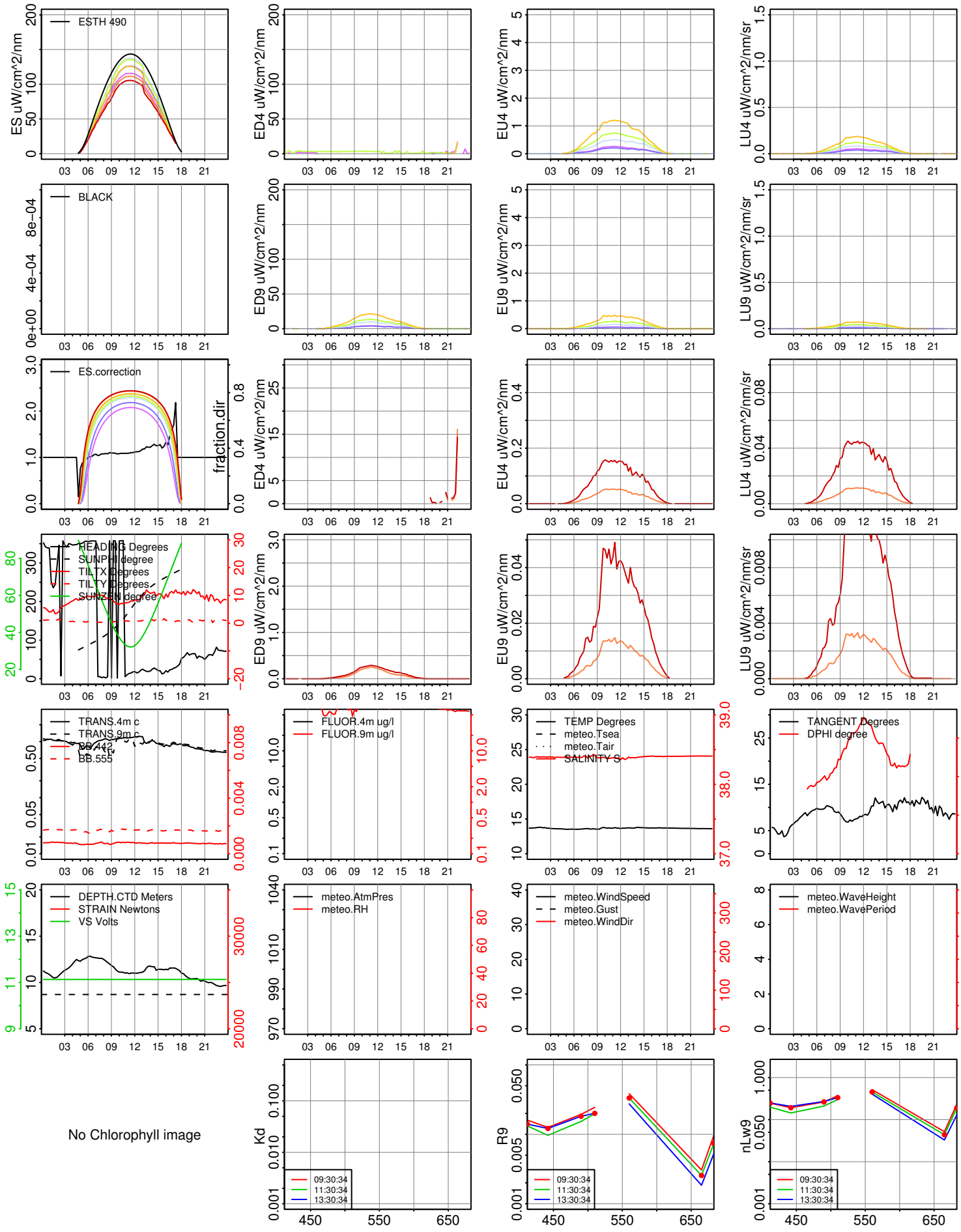
No Chlorophyll image

2005–04–19

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:27:24 GMT
sun zenith angle at solar noon : 32.13
HPLC Chlorophyll concentration : NA

2005–06–24



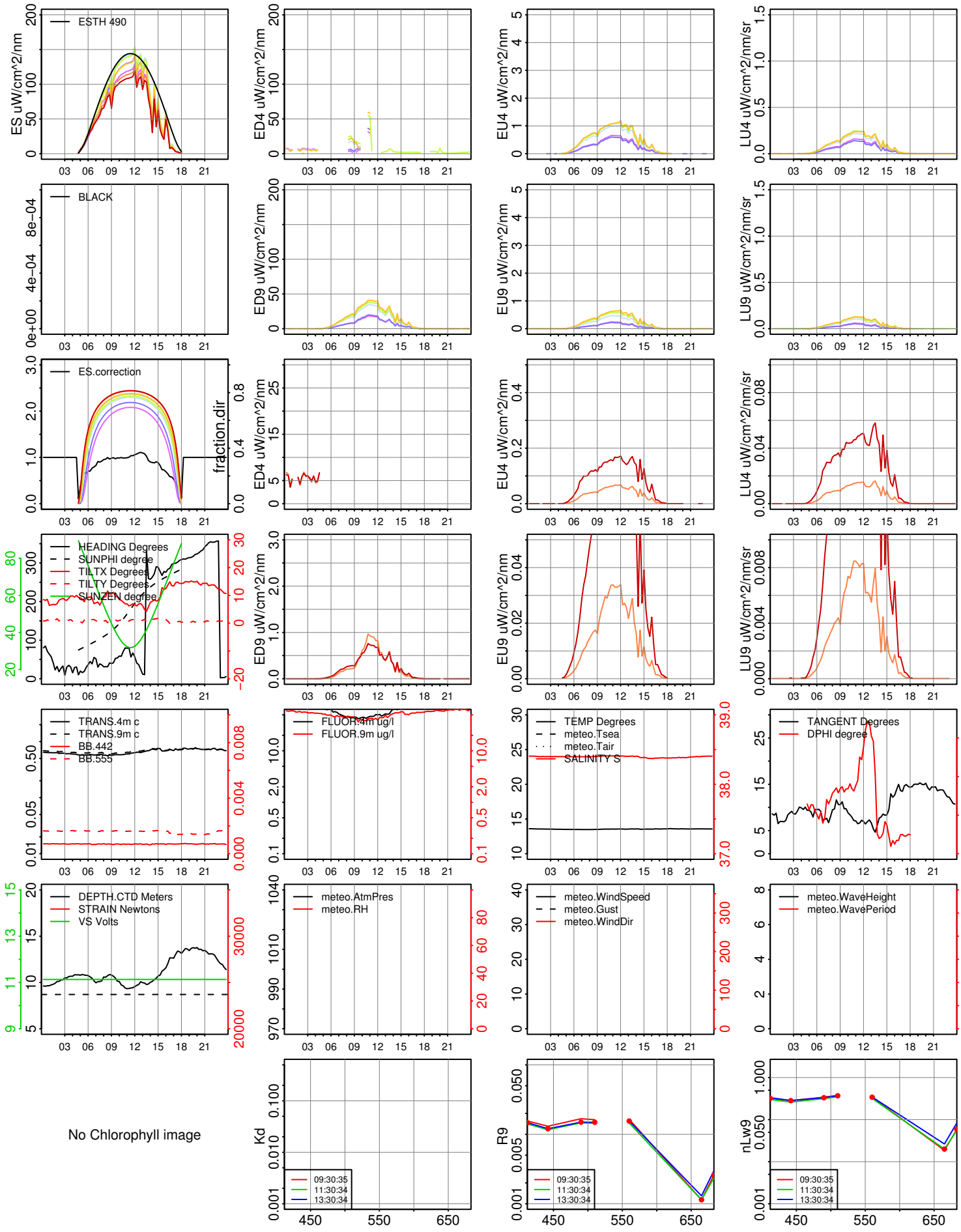
No Chlorophyll image

2005–04–20

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:27:10 GMT
sun zenith angle at solar noon : 31.78
HPLC Chlorophyll concentration : NA

2005–06–24



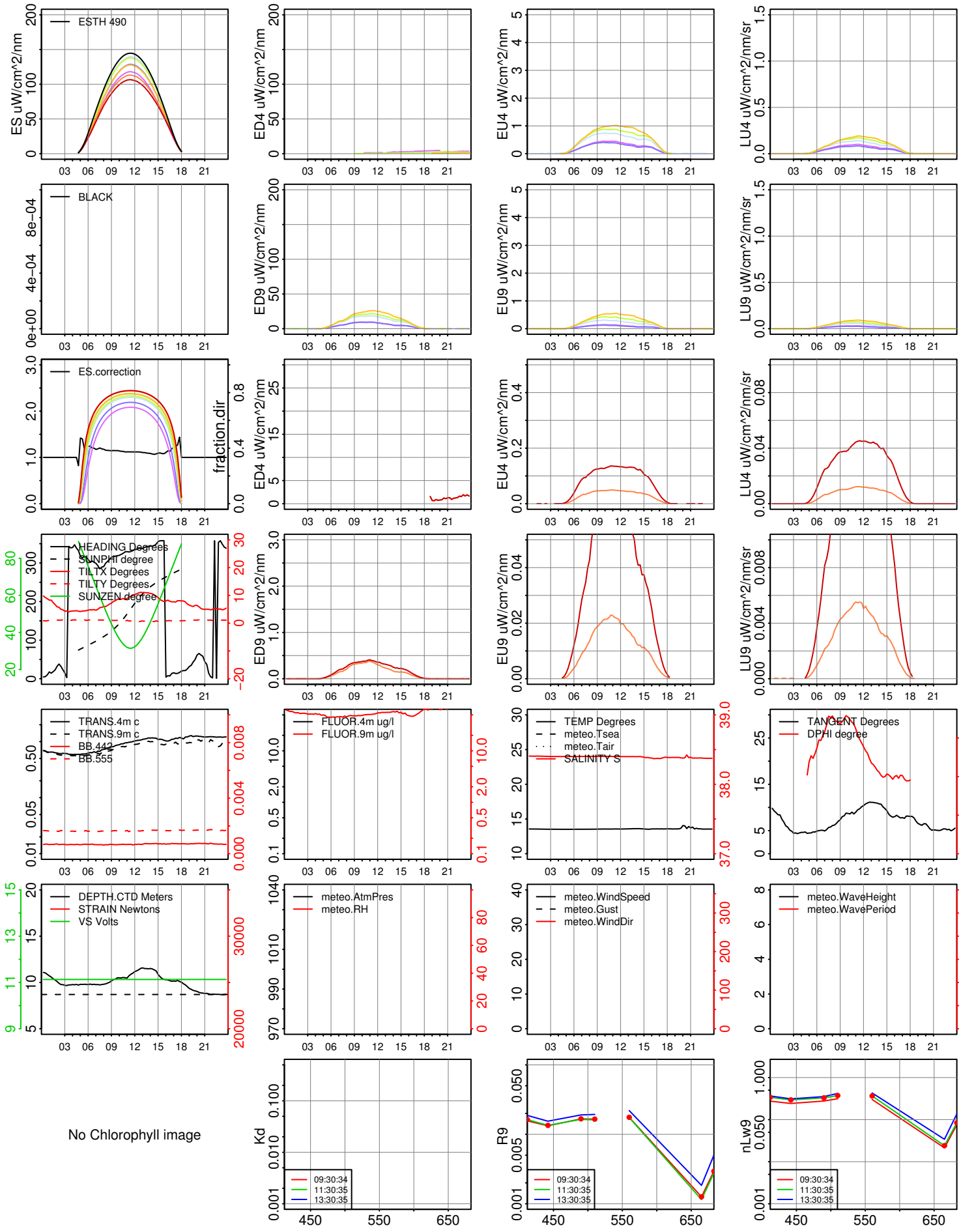
No Chlorophyll image

2005–04–21

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:26:58 GMT
sun zenith angle at solar noon : 31.44
HPLC Chlorophyll concentration : NA

2005–06–24



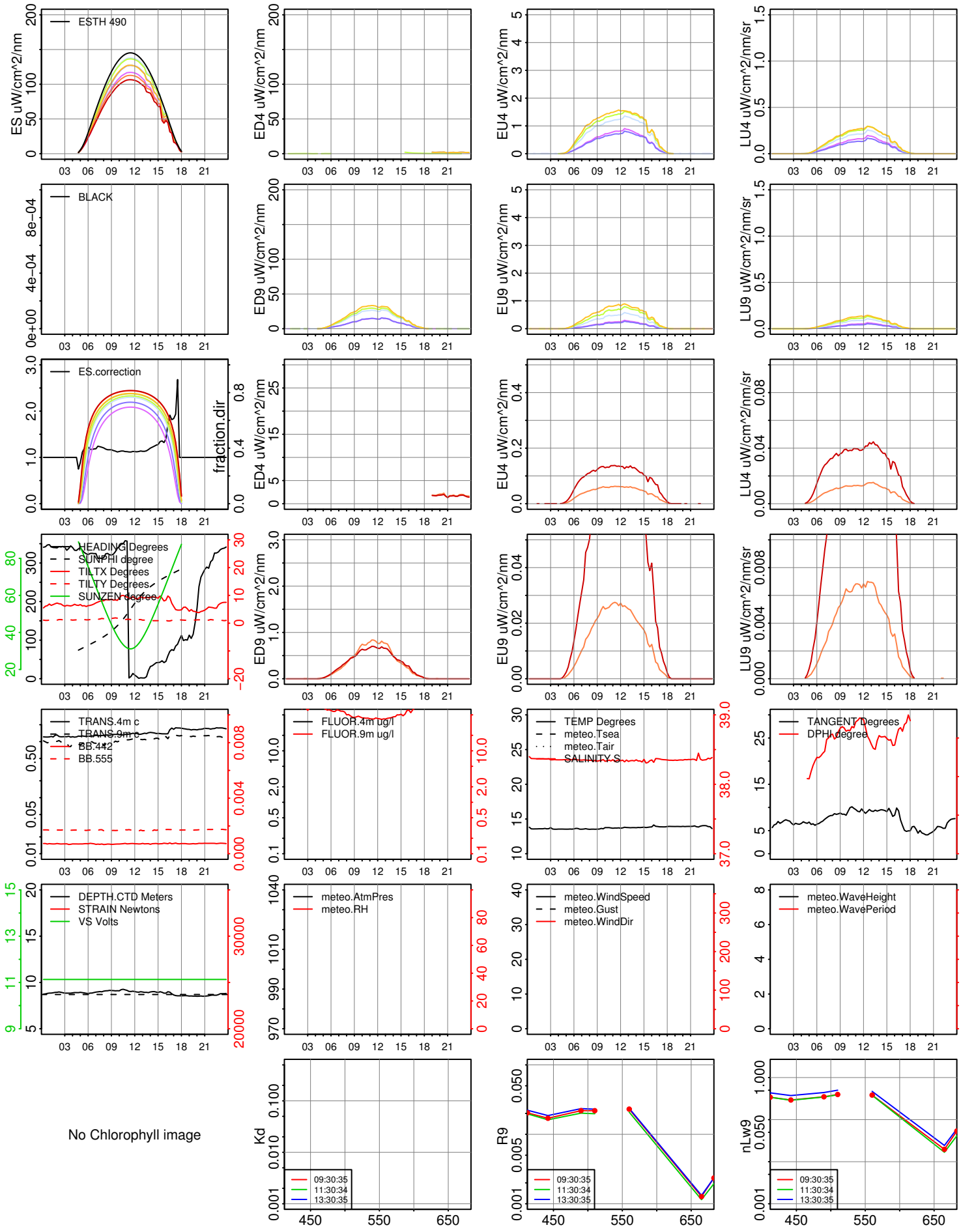
No Chlorophyll image

2005–04–22

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

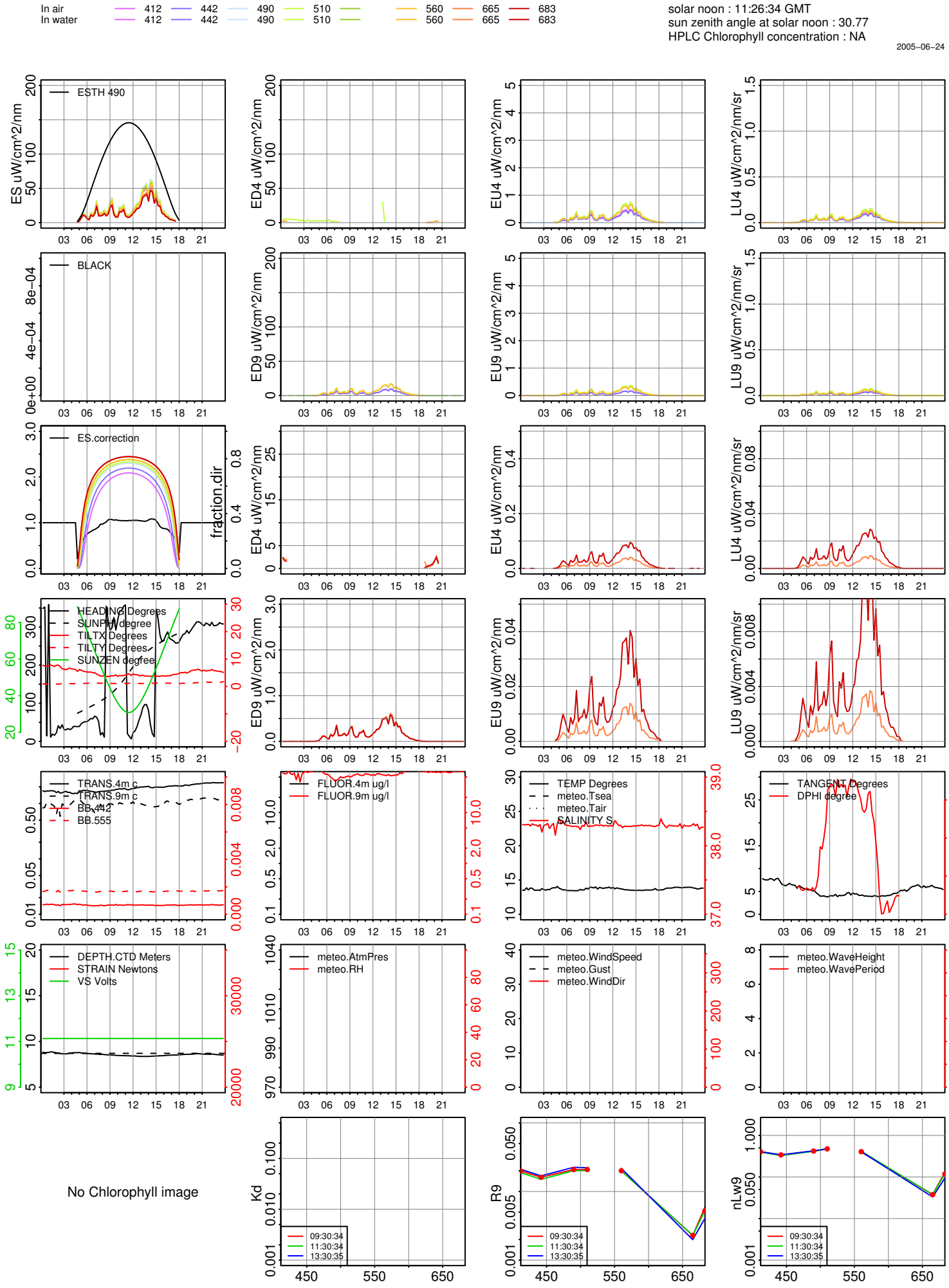
solar noon : 11:26:46 GMT
sun zenith angle at solar noon : 31.11
HPLC Chlorophyll concentration : NA

2005–06–24



No Chlorophyll image

2005–04–23

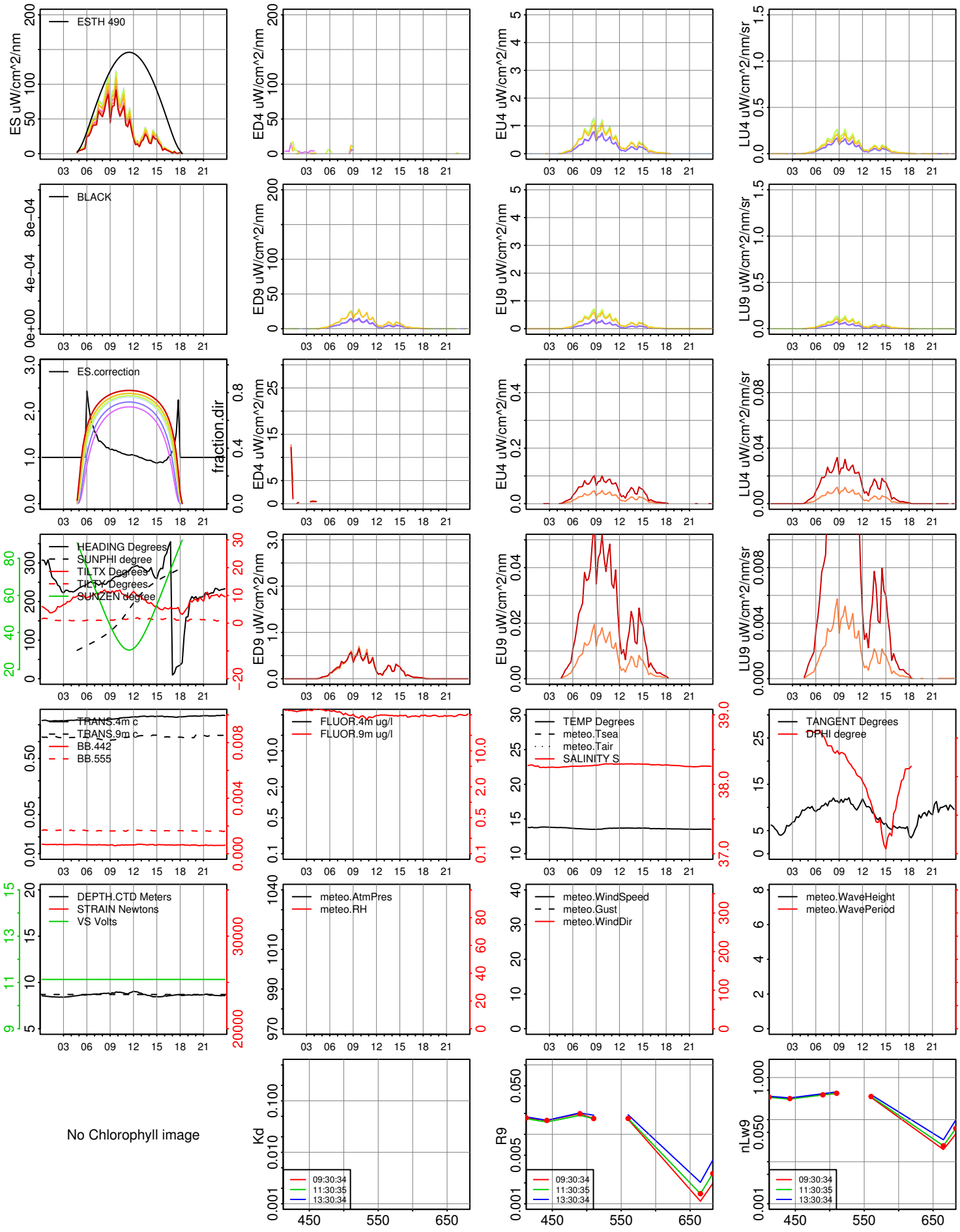

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:26:34 GMT
sun zenith angle at solar noon : 30.77
HPLC Chlorophyll concentration : NA
2005–06–24
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPW degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.412
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
Kd
R9
nLw9
09:30:34
11:30:34
13:30:35
No Chlorophyll image

2005–04–24

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:26:22 GMT
sun zenith angle at solar noon : 30.44
HPLC Chlorophyll concentration : NA

2005–06–24



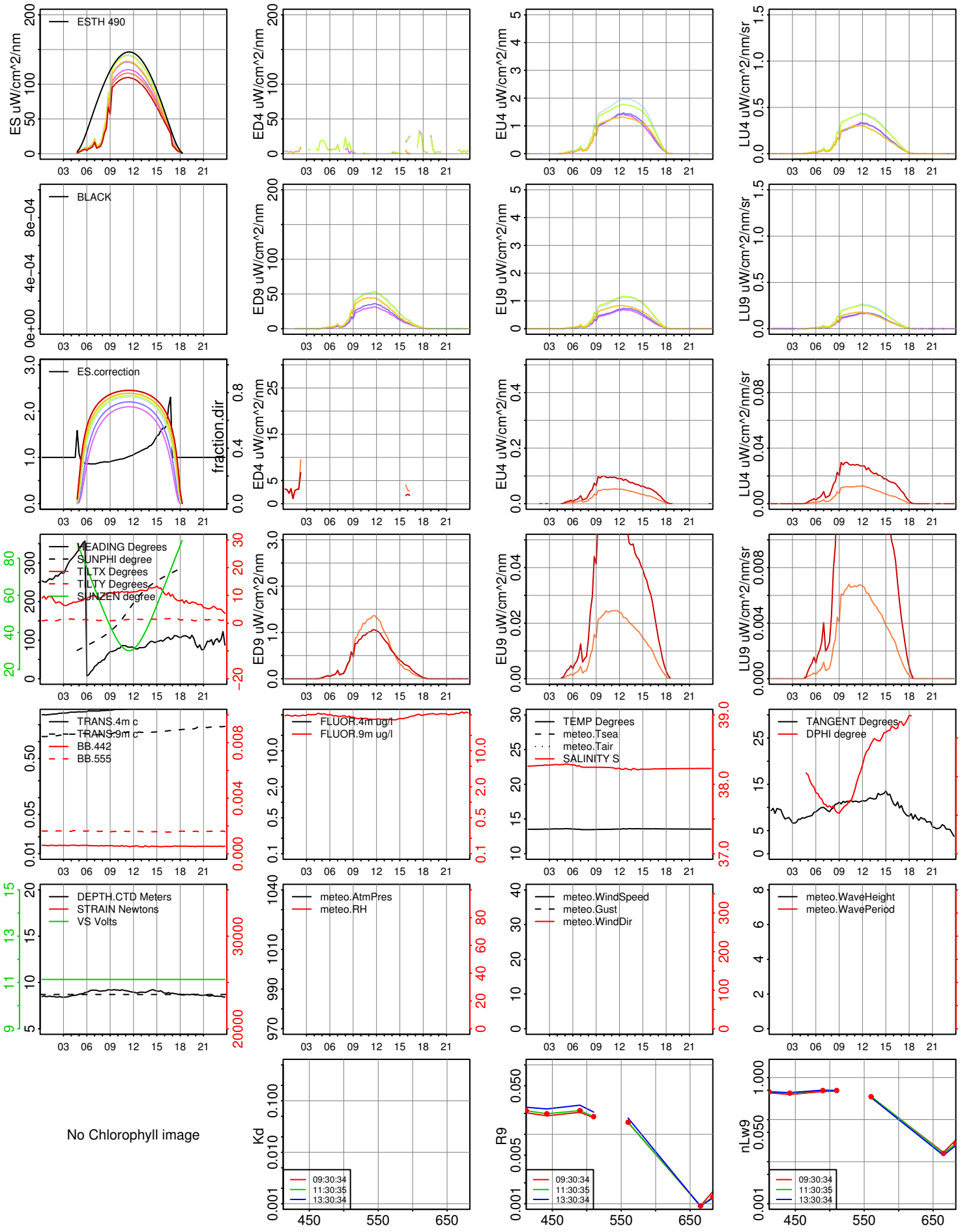
No Chlorophyll image

2005–04–25

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

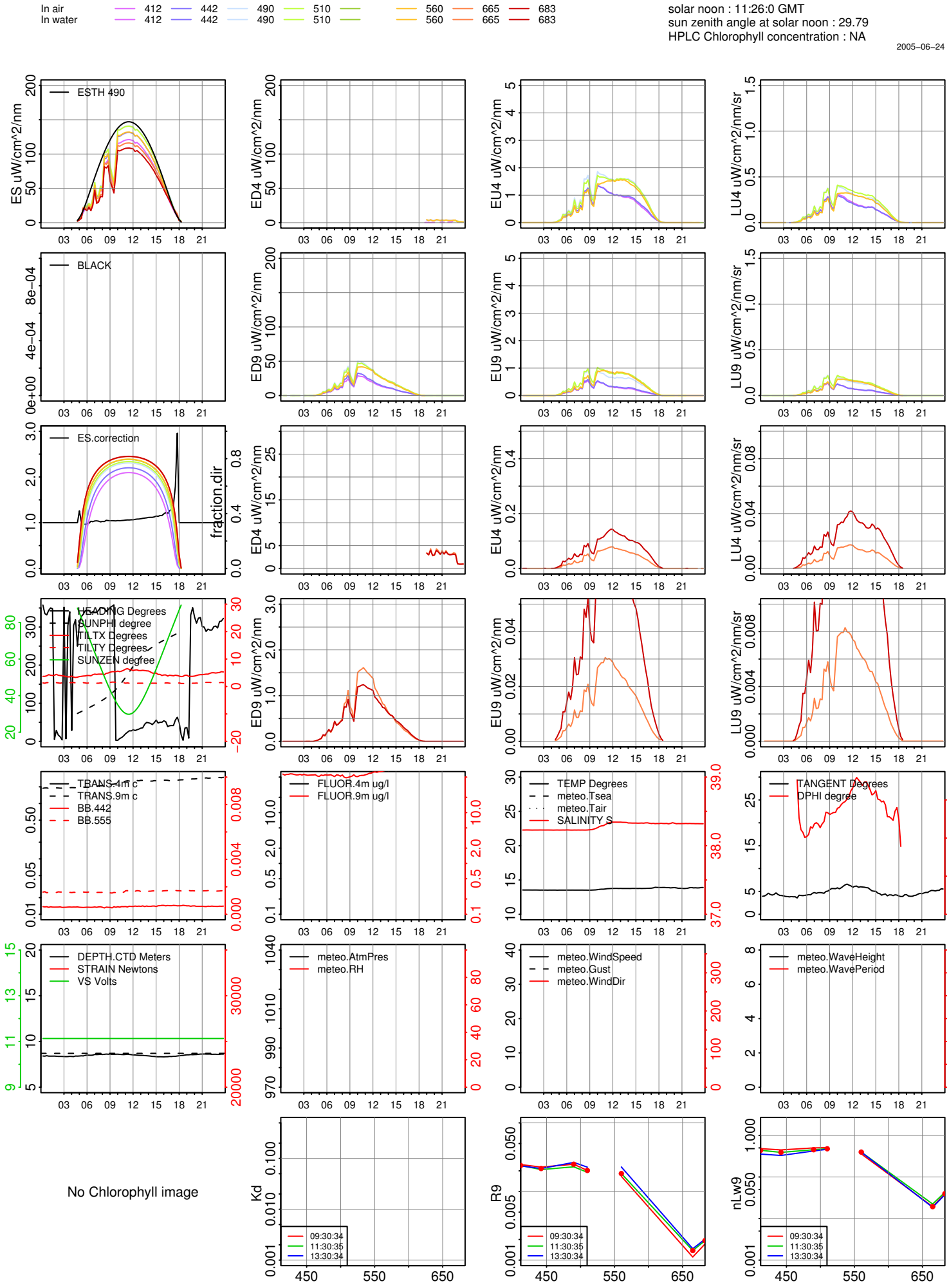
solar noon : 11:26:10 GMT
sun zenith angle at solar noon : 30.11
HPLC Chlorophyll concentration : NA

2005–06–24



No Chlorophyll image

2005–04–26



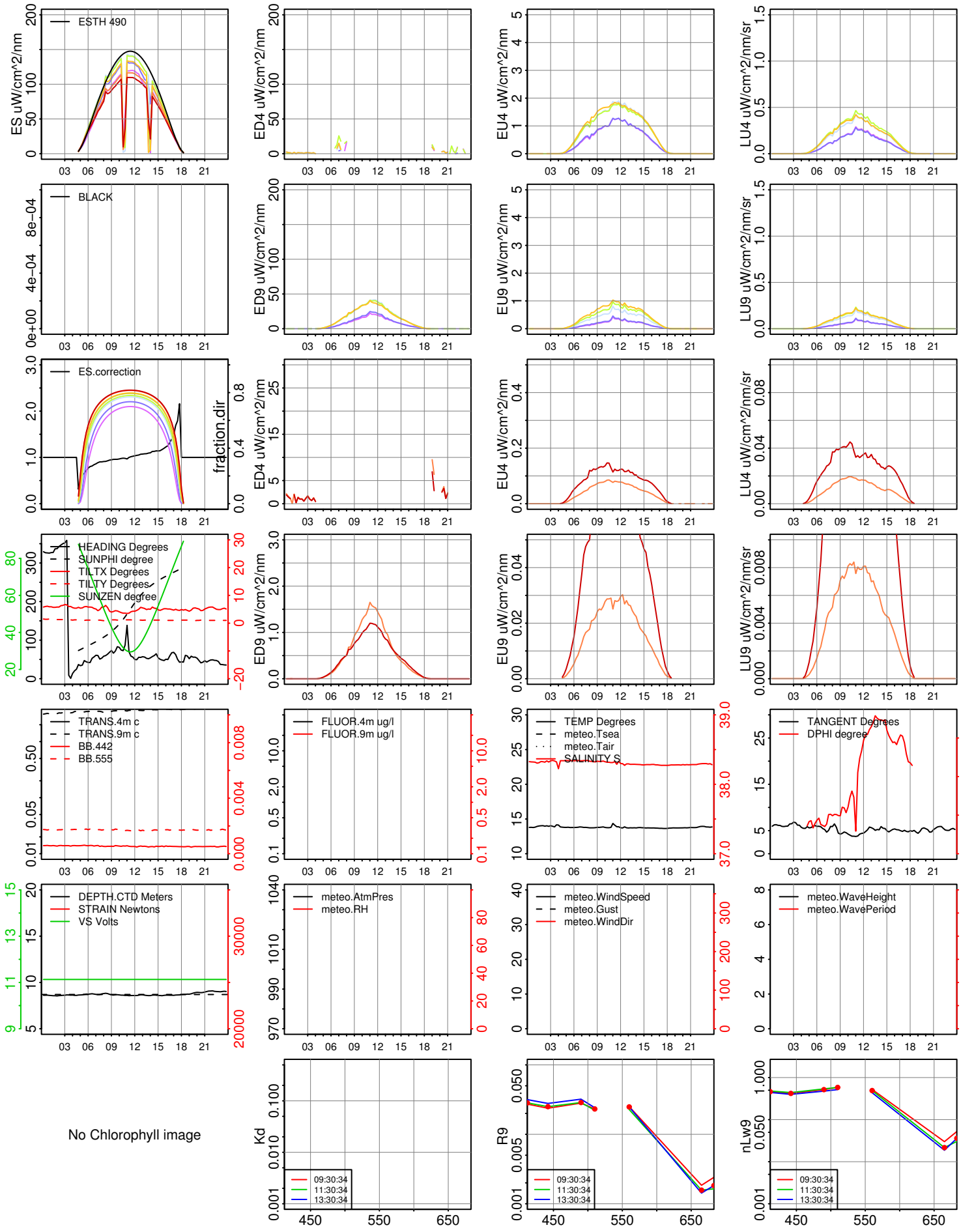
No Chlorophyll image

2005–04–27

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:50 GMT
sun zenith angle at solar noon : 29.47
HPLC Chlorophyll concentration : NA

2005–06–24



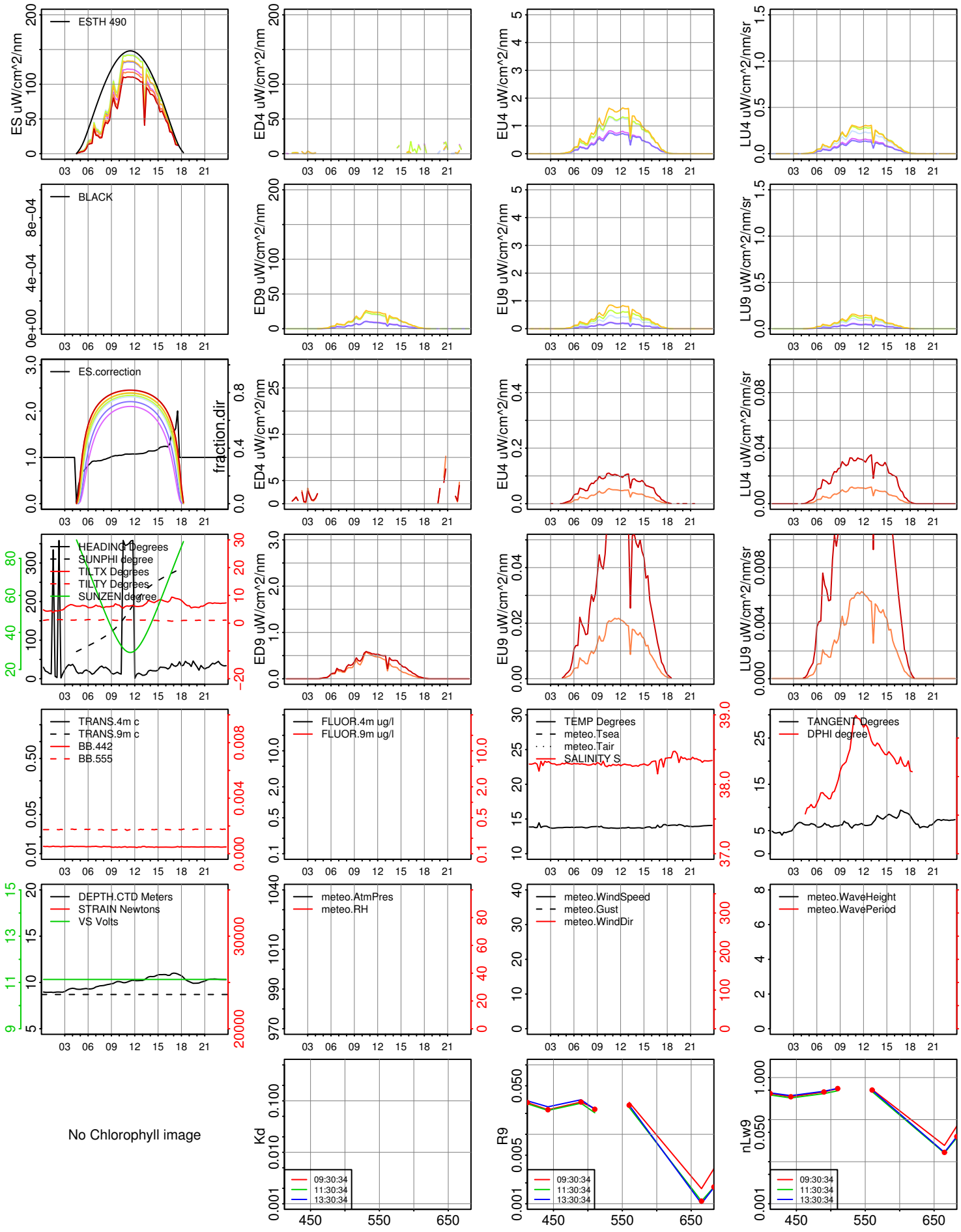
No Chlorophyll image

2005–04–28

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:40 GMT
sun zenith angle at solar noon : 29.16
HPLC Chlorophyll concentration : NA

2005–06–24



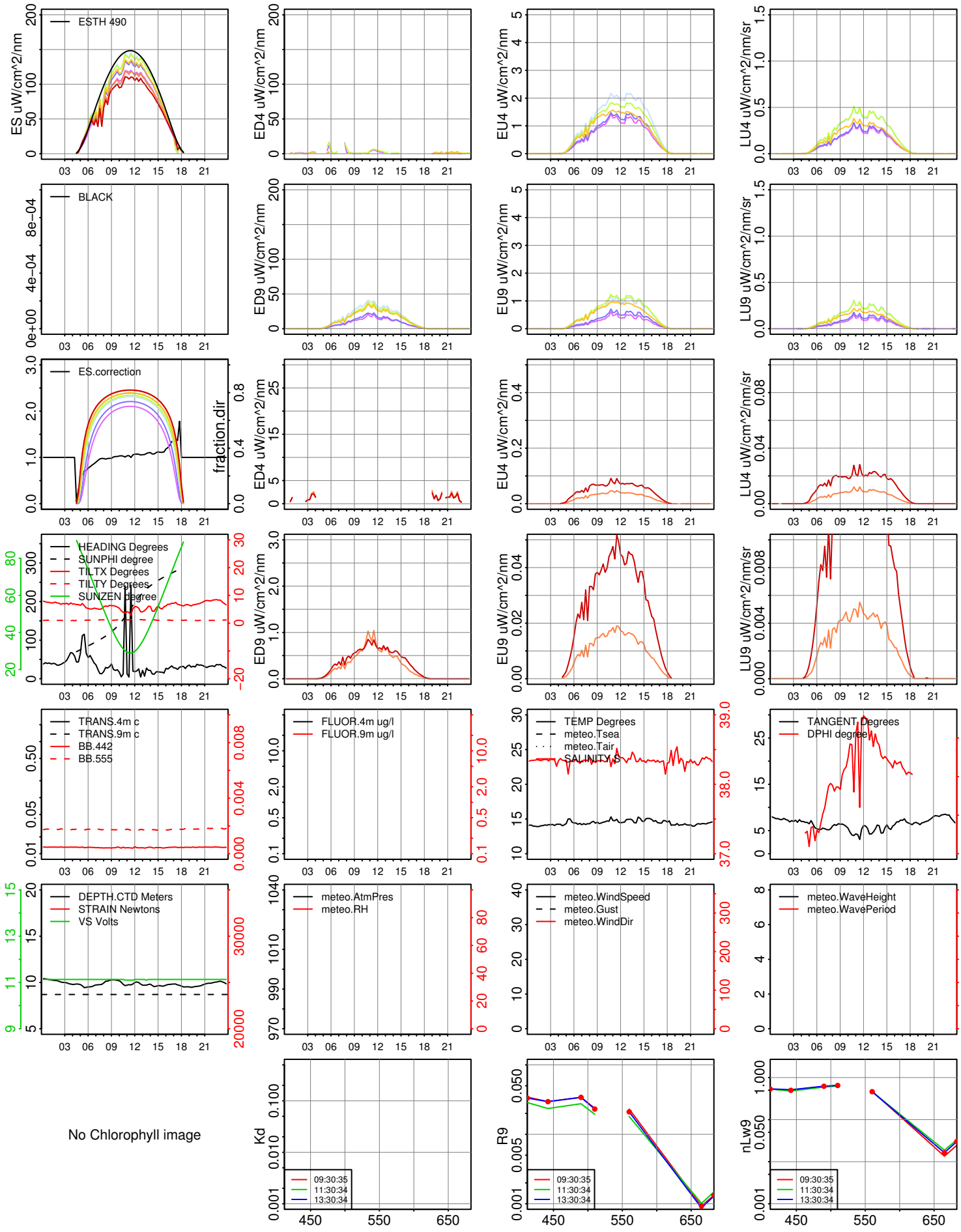
No Chlorophyll image

2005–04–29

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:32 GMT
sun zenith angle at solar noon : 28.85
HPLC Chlorophyll concentration : NA

2005–06–24



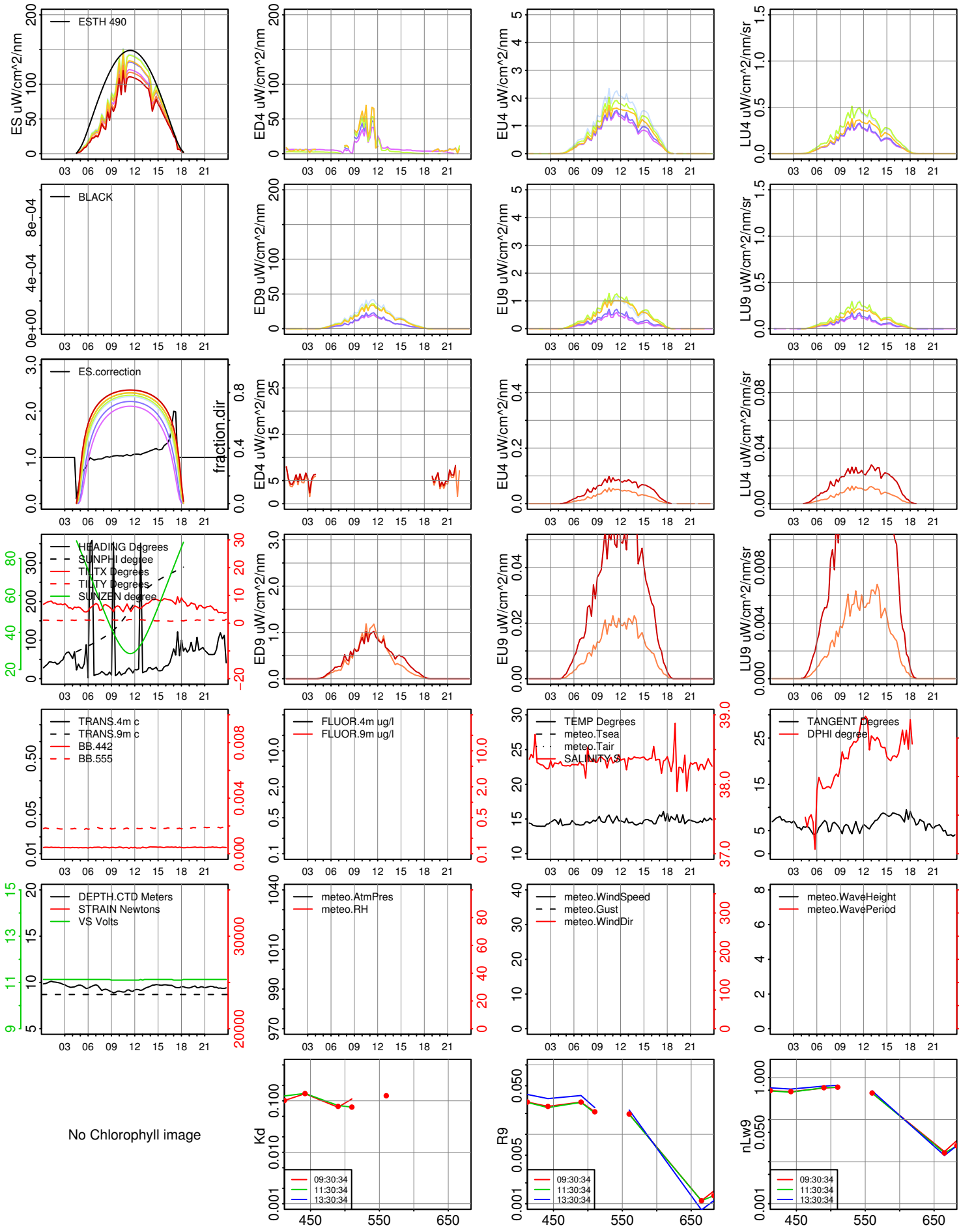
No Chlorophyll image

2005–04–30

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:24 GMT
sun zenith angle at solar noon : 28.54
HPLC Chlorophyll concentration : NA

2005–06–24



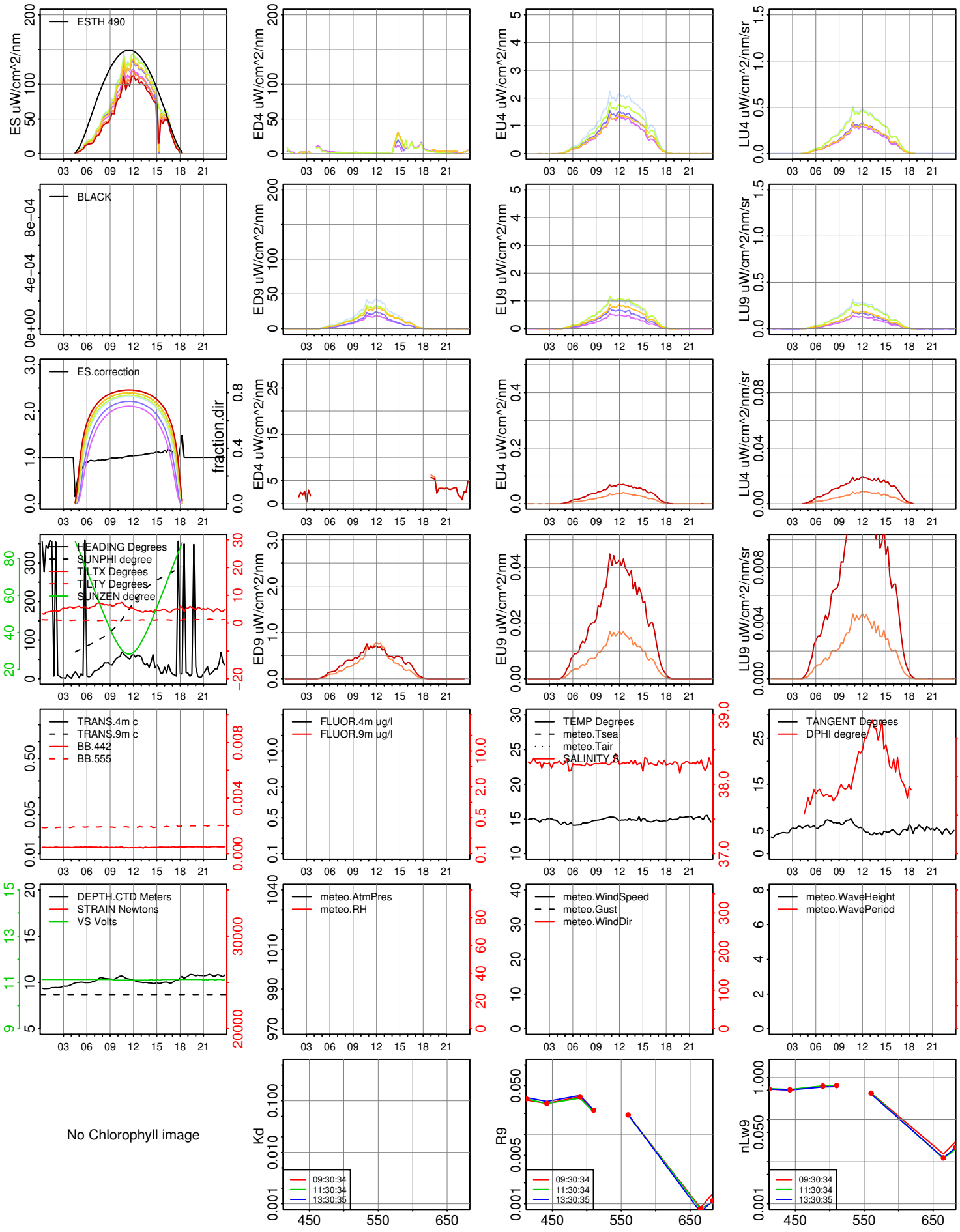
No Chlorophyll image

2005-05-01

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:16 GMT
sun zenith angle at solar noon : 28.23
HPLC Chlorophyll concentration : NA

2005-06-24



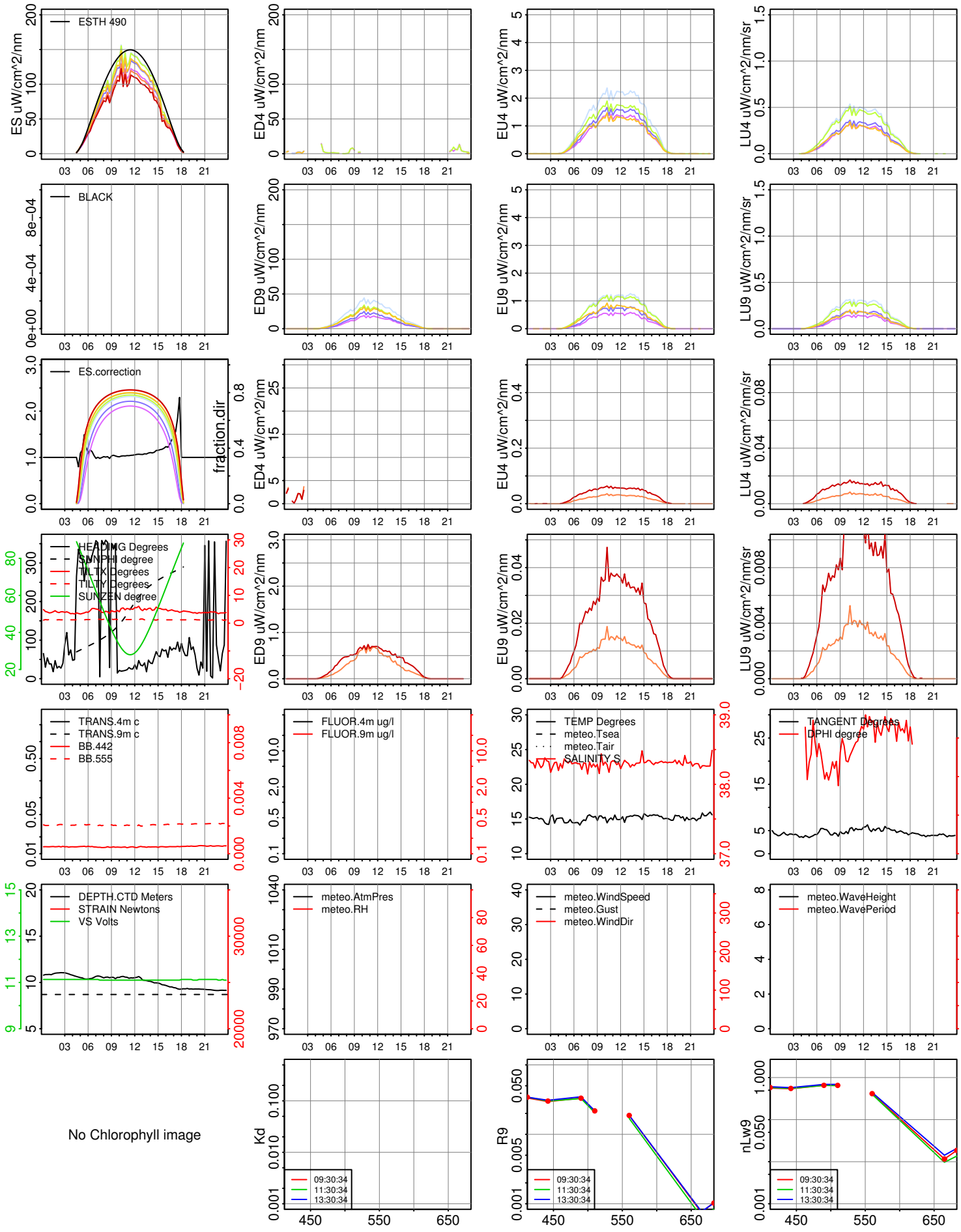
No Chlorophyll image

2005–05–02

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:8 GMT
sun zenith angle at solar noon : 27.93
HPLC Chlorophyll concentration : NA

2005–06–24



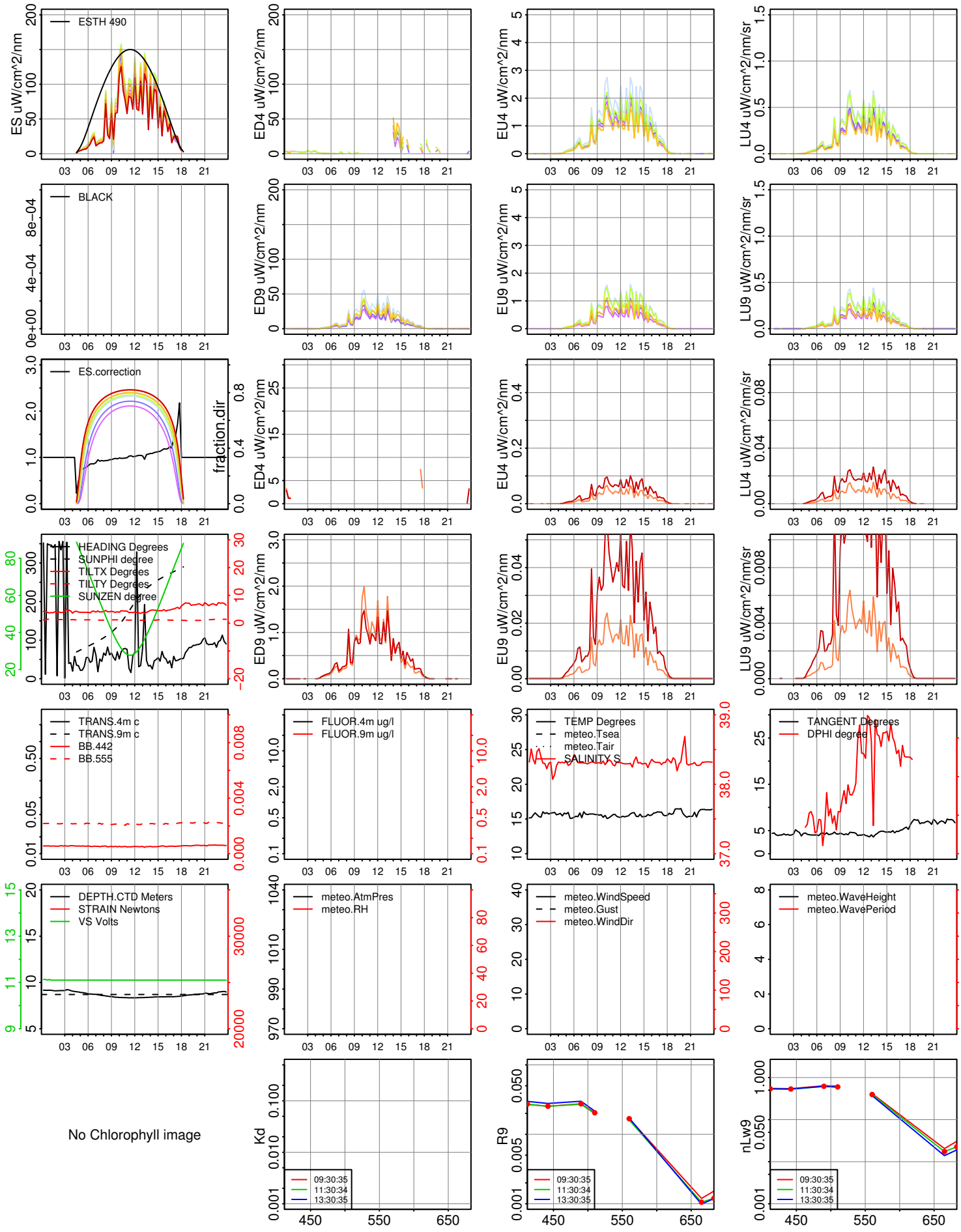
No Chlorophyll image

2005–05–03

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:2 GMT
sun zenith angle at solar noon : 27.64
HPLC Chlorophyll concentration : NA

2005–06–24



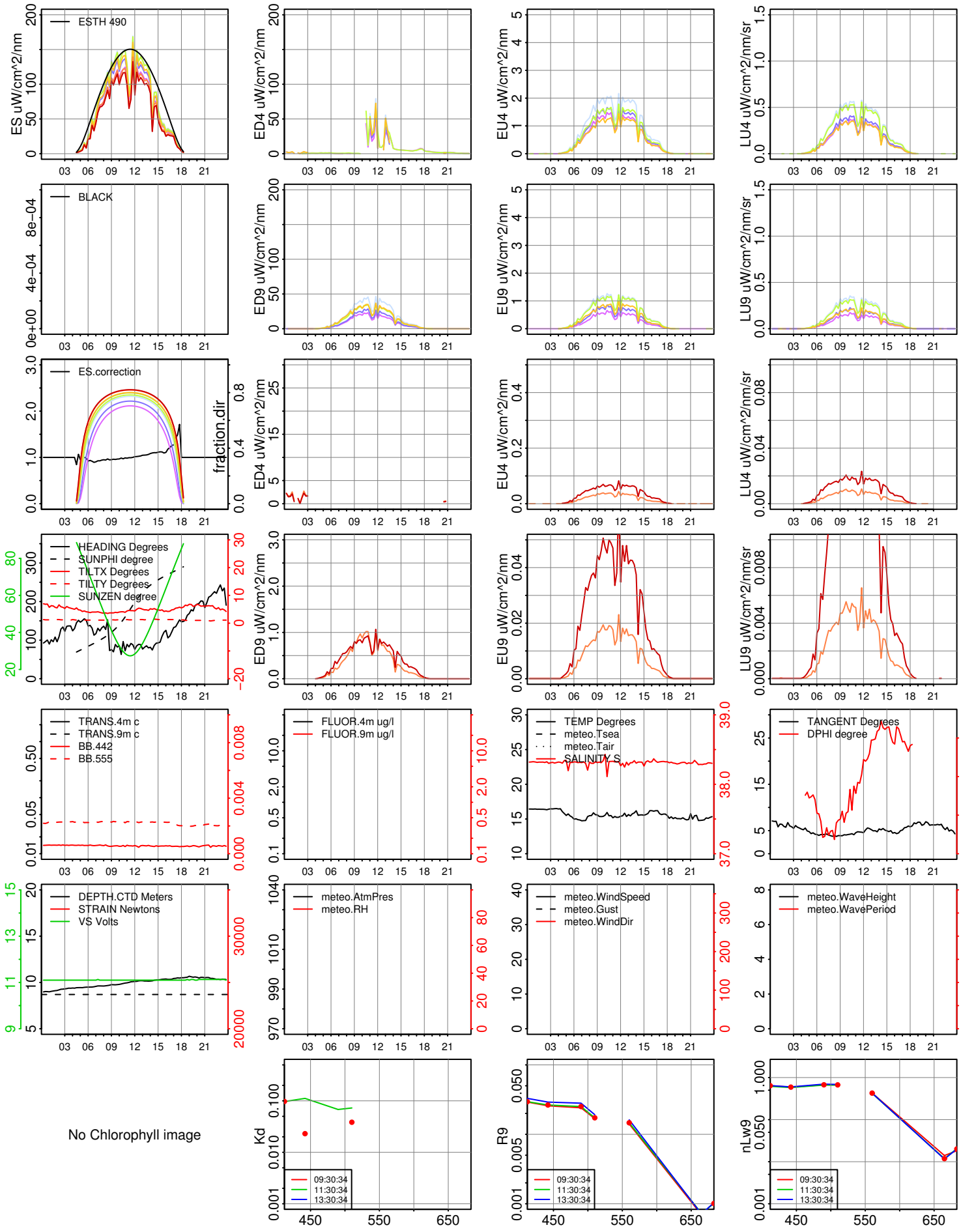
No Chlorophyll image

2005–05–04

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:56 GMT
sun zenith angle at solar noon : 27.35
HPLC Chlorophyll concentration : NA

2005–06–24



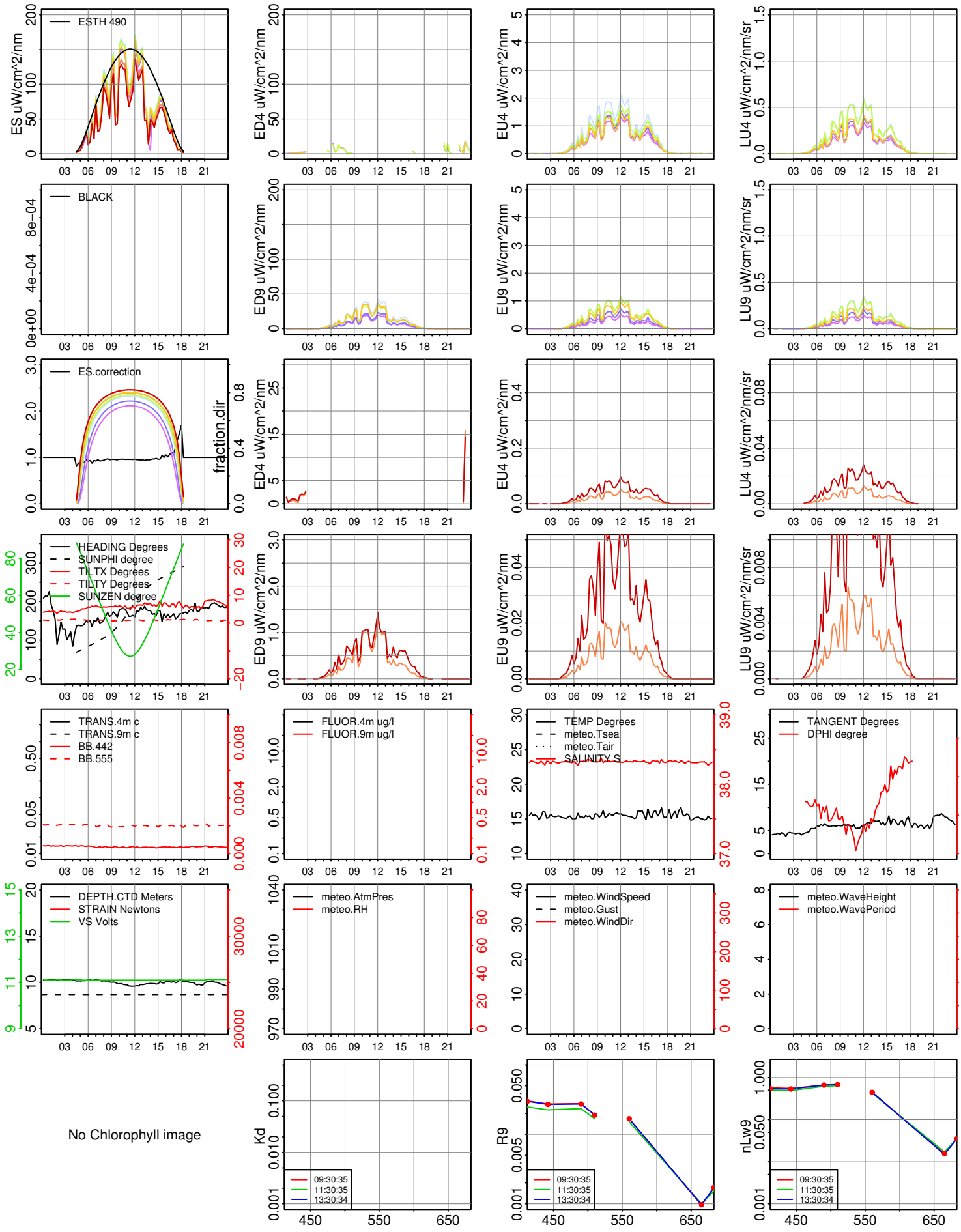
No Chlorophyll image

2005–05–05

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:50 GMT
sun zenith angle at solar noon : 27.06
HPLC Chlorophyll concentration : NA

2005–06–24



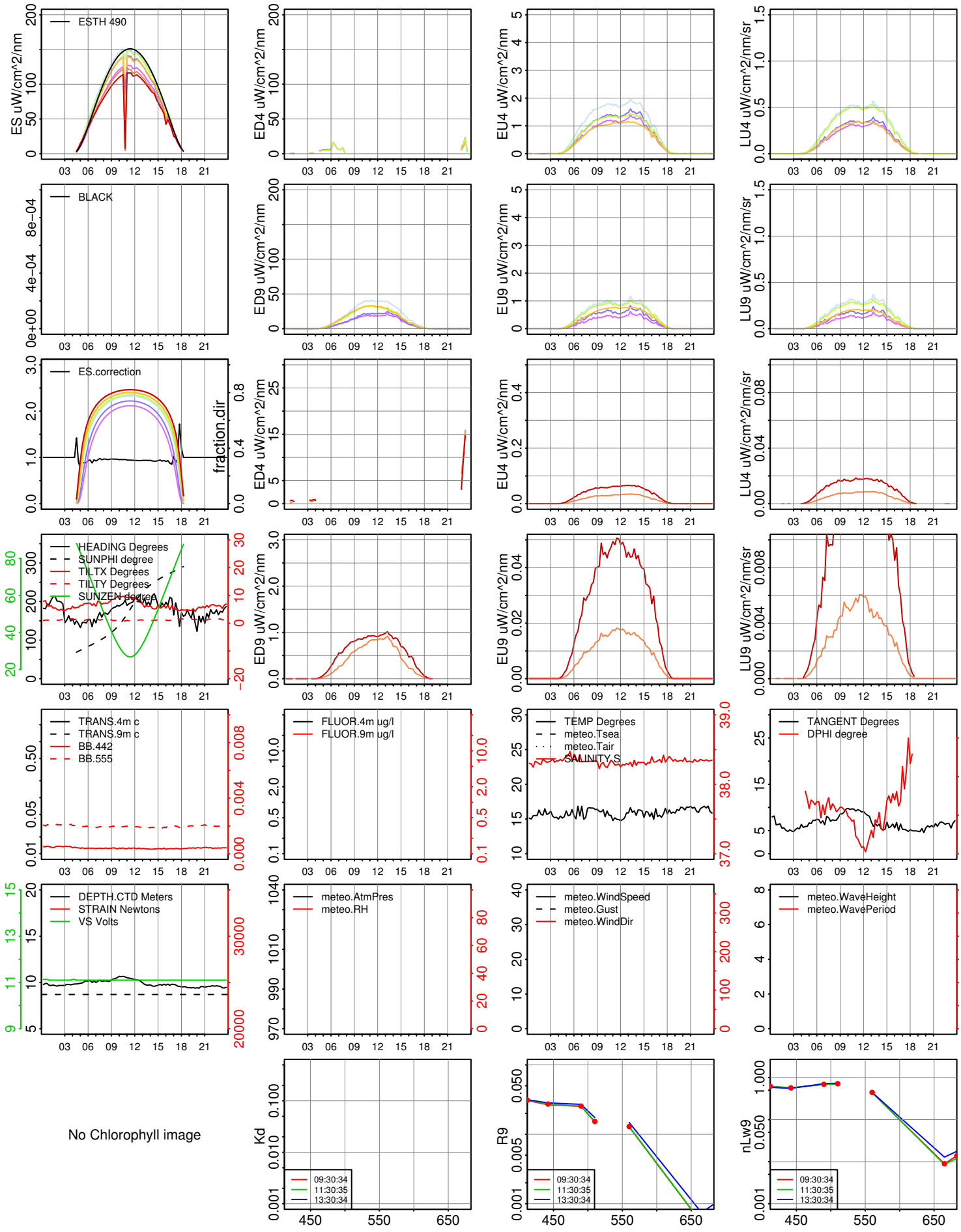
No Chlorophyll image

2005–05–06

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:46 GMT
sun zenith angle at solar noon : 26.78
HPLC Chlorophyll concentration : NA

2005–06–24



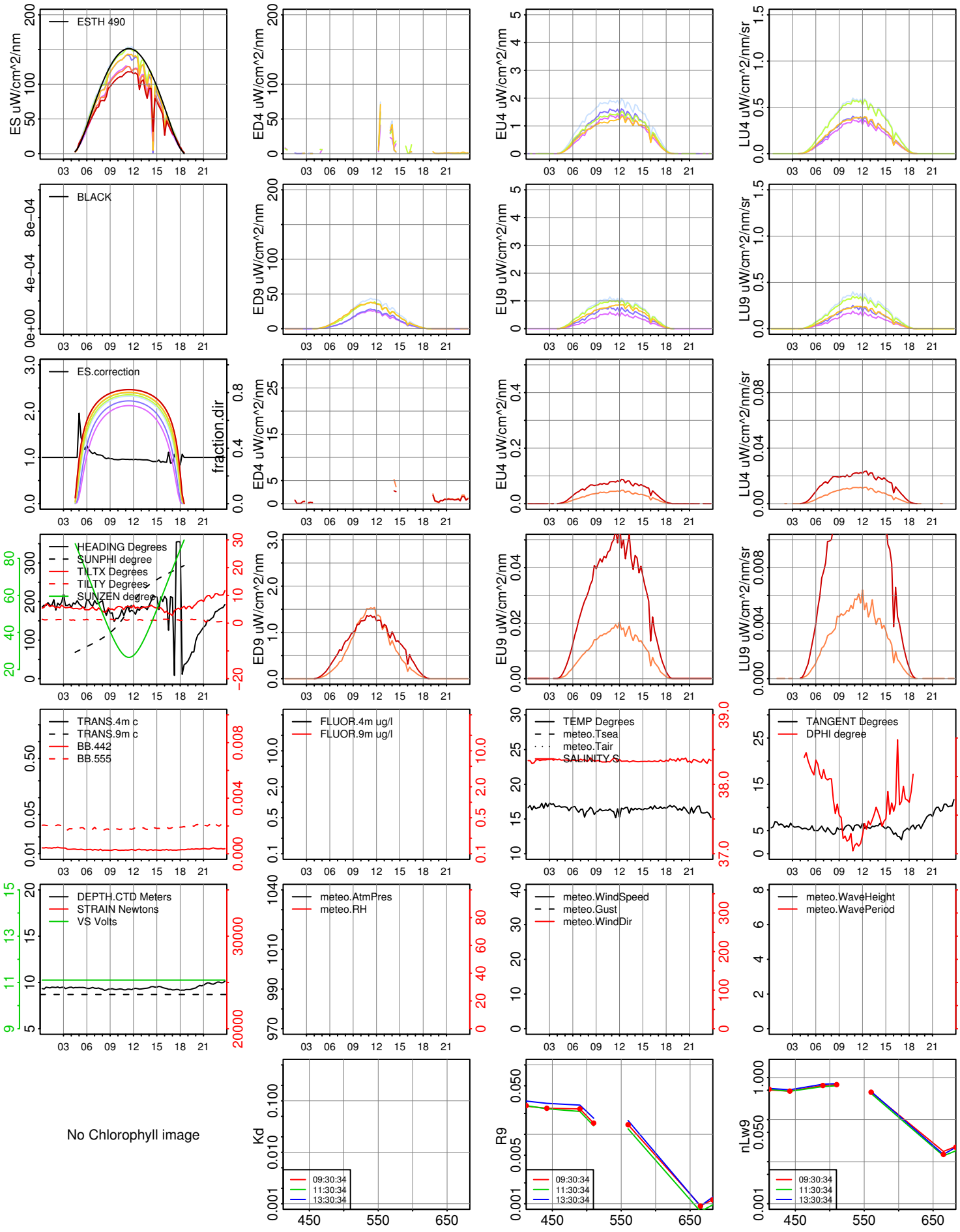
No Chlorophyll image

2005–05–07

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:42 GMT
sun zenith angle at solar noon : 26.5
HPLC Chlorophyll concentration : NA

2005–06–24



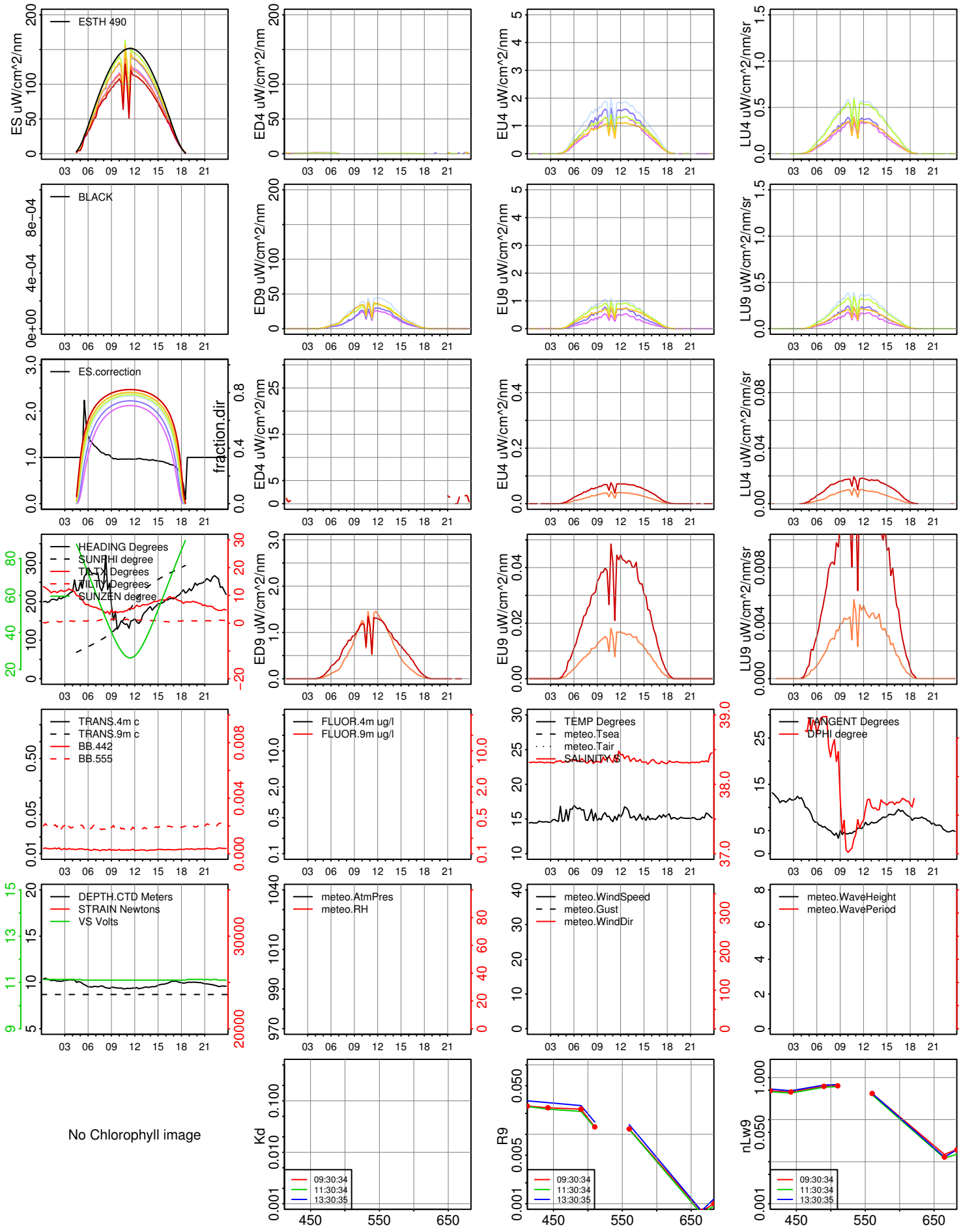
No Chlorophyll image

2005–05–08

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:38 GMT
sun zenith angle at solar noon : 26.23
HPLC Chlorophyll concentration : NA

2005–06–24



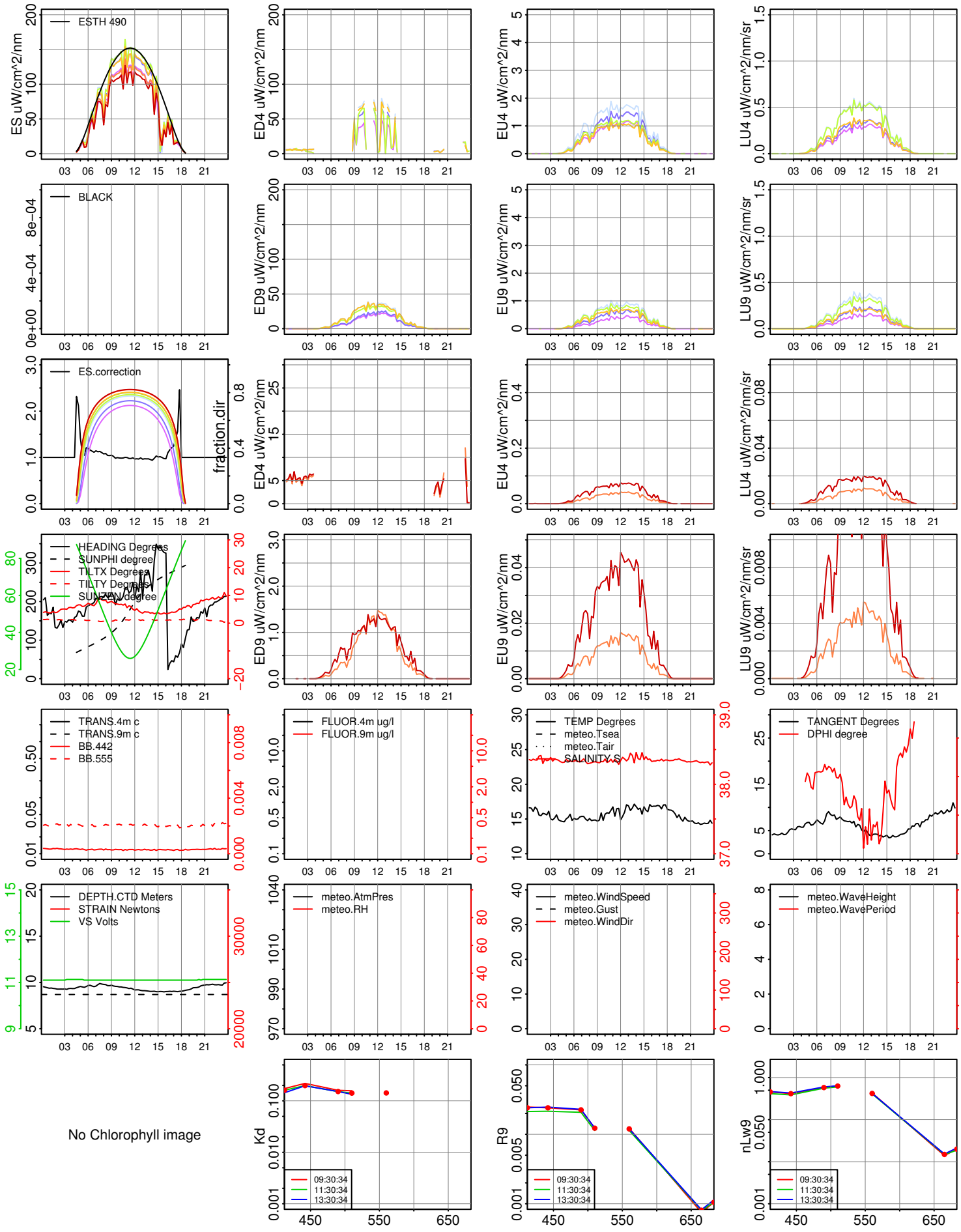
No Chlorophyll image

2005–05–09

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:34 GMT
sun zenith angle at solar noon : 25.96
HPLC Chlorophyll concentration : NA

2005–06–24



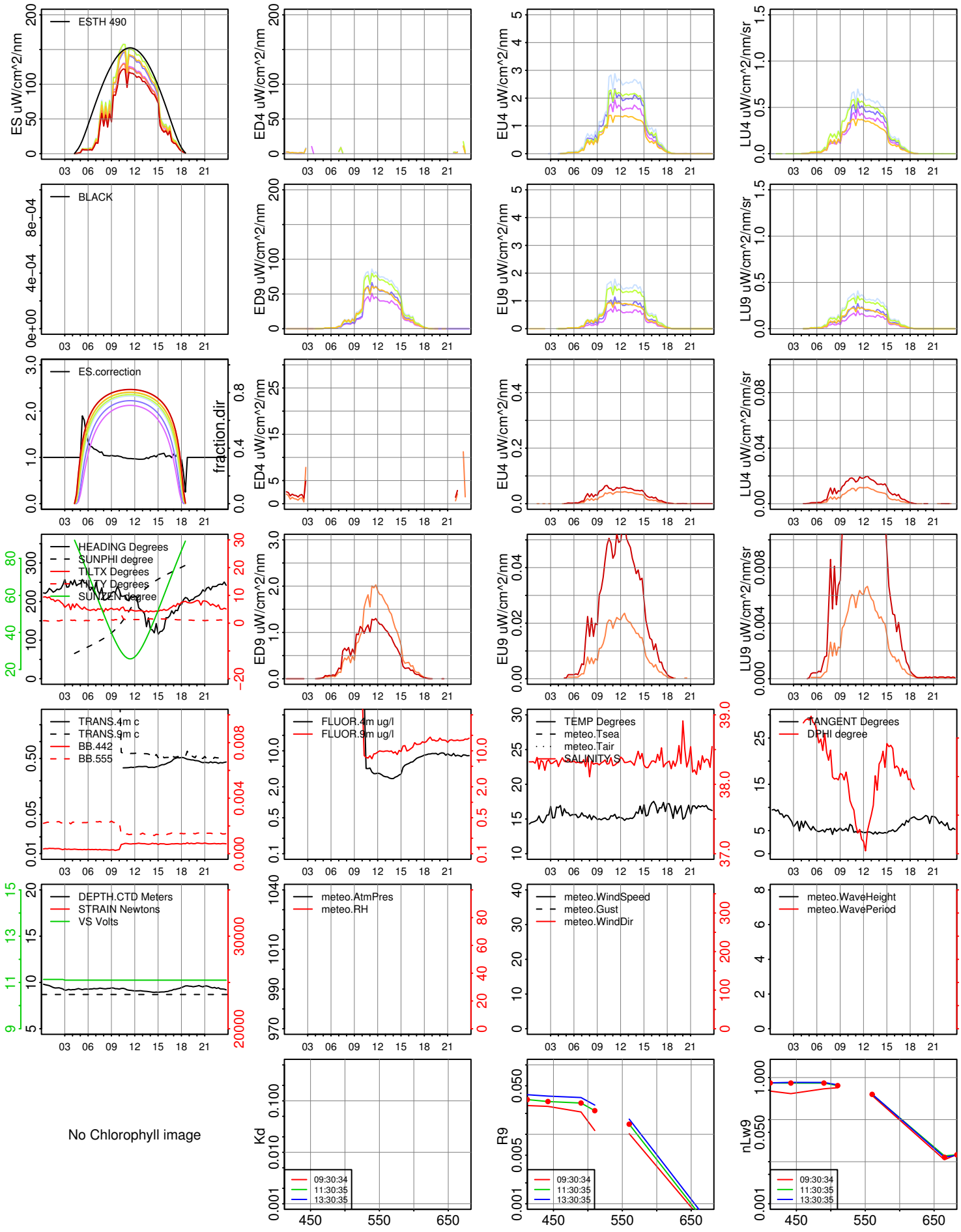
No Chlorophyll image

2005–05–10

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:32 GMT
sun zenith angle at solar noon : 25.7
HPLC Chlorophyll concentration : NA

2005–06–24



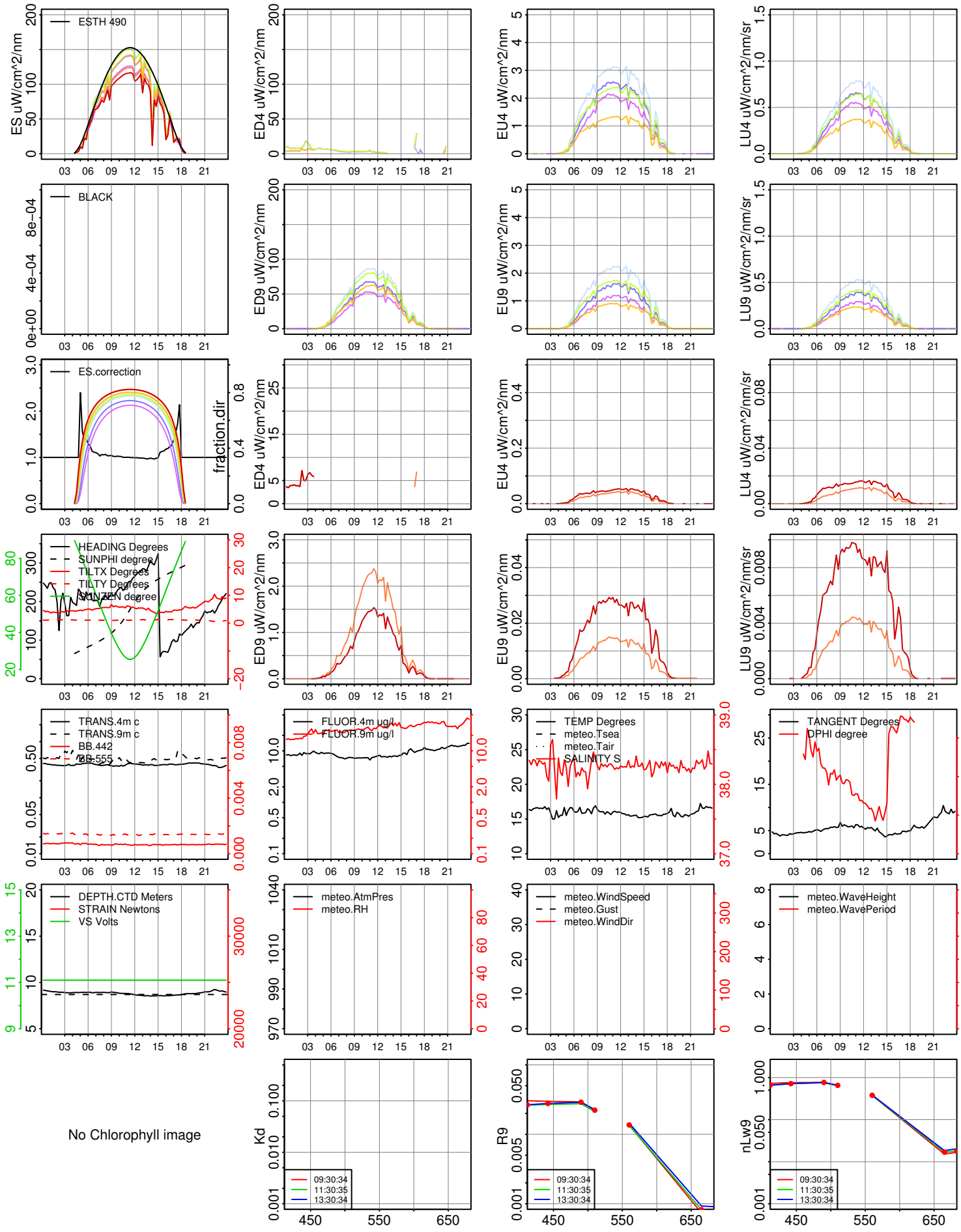
No Chlorophyll image

2005–05–11

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:30 GMT
sun zenith angle at solar noon : 25.44
HPLC Chlorophyll concentration : NA

2005–06–24



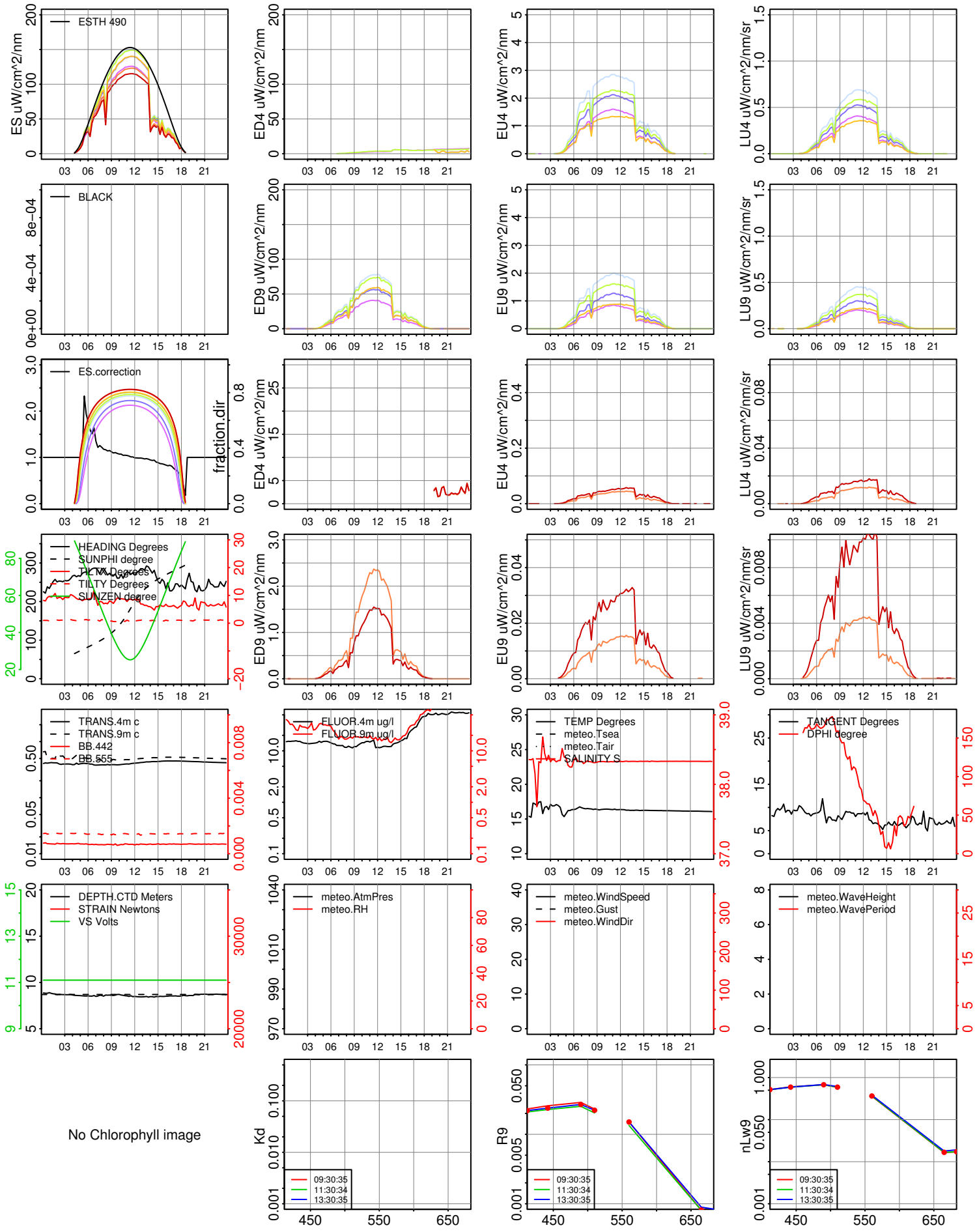
No Chlorophyll image

2005–05–12

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:30 GMT
sun zenith angle at solar noon : 25.18
HPLC Chlorophyll concentration : NA

2005–06–24



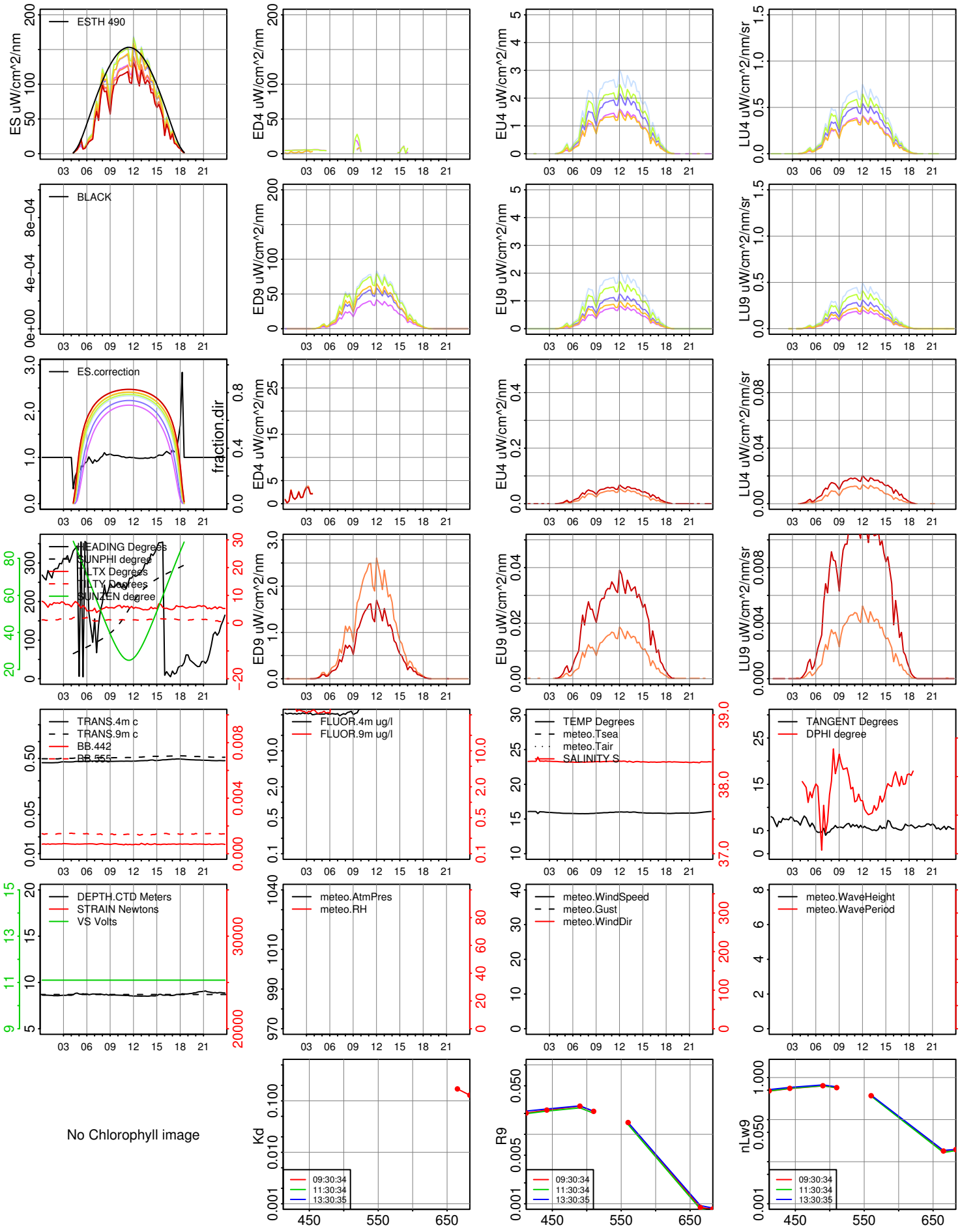
No Chlorophyll image

2005–05–13

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:28 GMT
sun zenith angle at solar noon : 24.94
HPLC Chlorophyll concentration : NA

2005–06–24



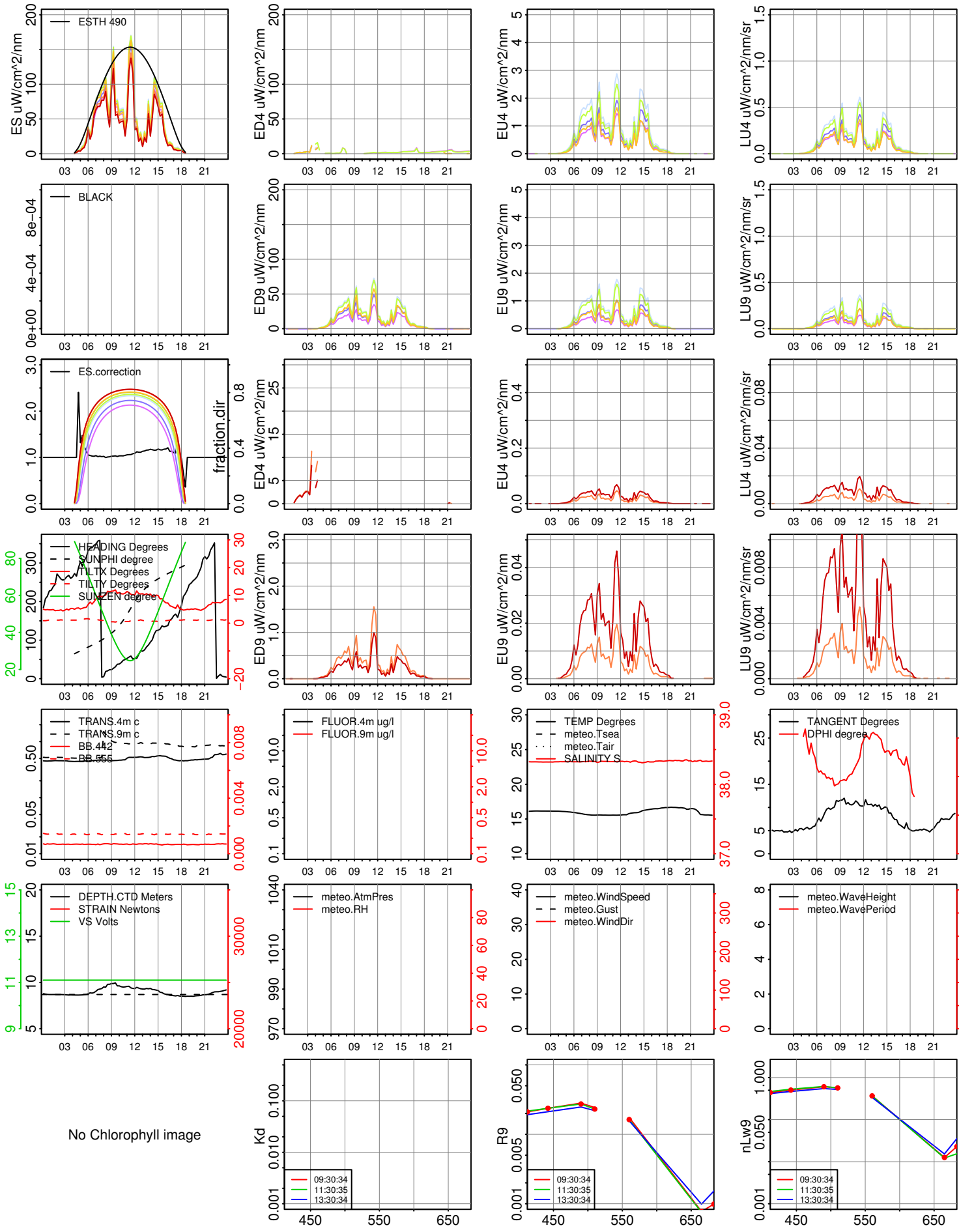
No Chlorophyll image

2005–05–14

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:28 GMT
sun zenith angle at solar noon : 24.69
HPLC Chlorophyll concentration : NA

2005–06–24



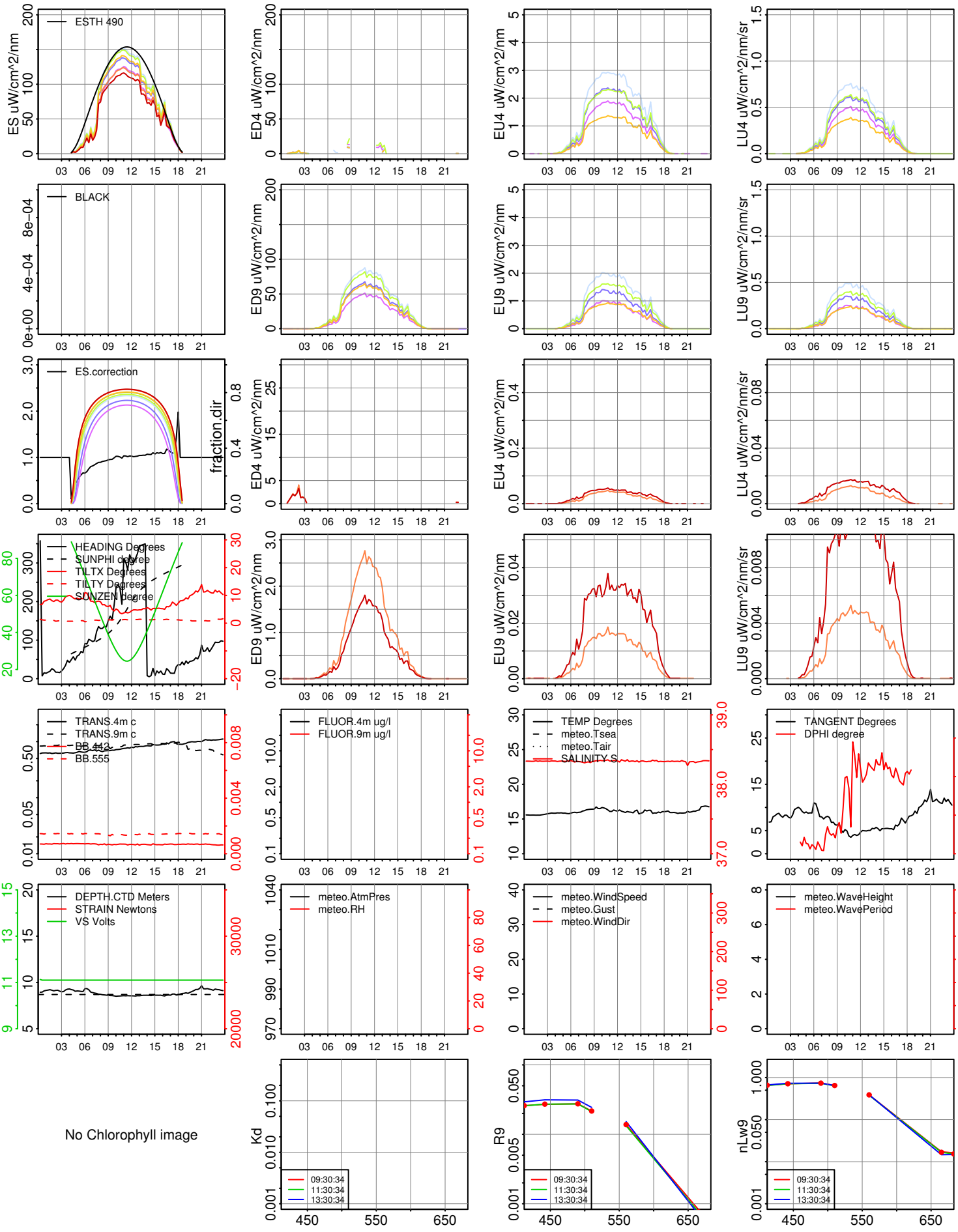
No Chlorophyll image

2005–05–15

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:28 GMT
sun zenith angle at solar noon : 24.46
HPLC Chlorophyll concentration : NA

2005–06–24



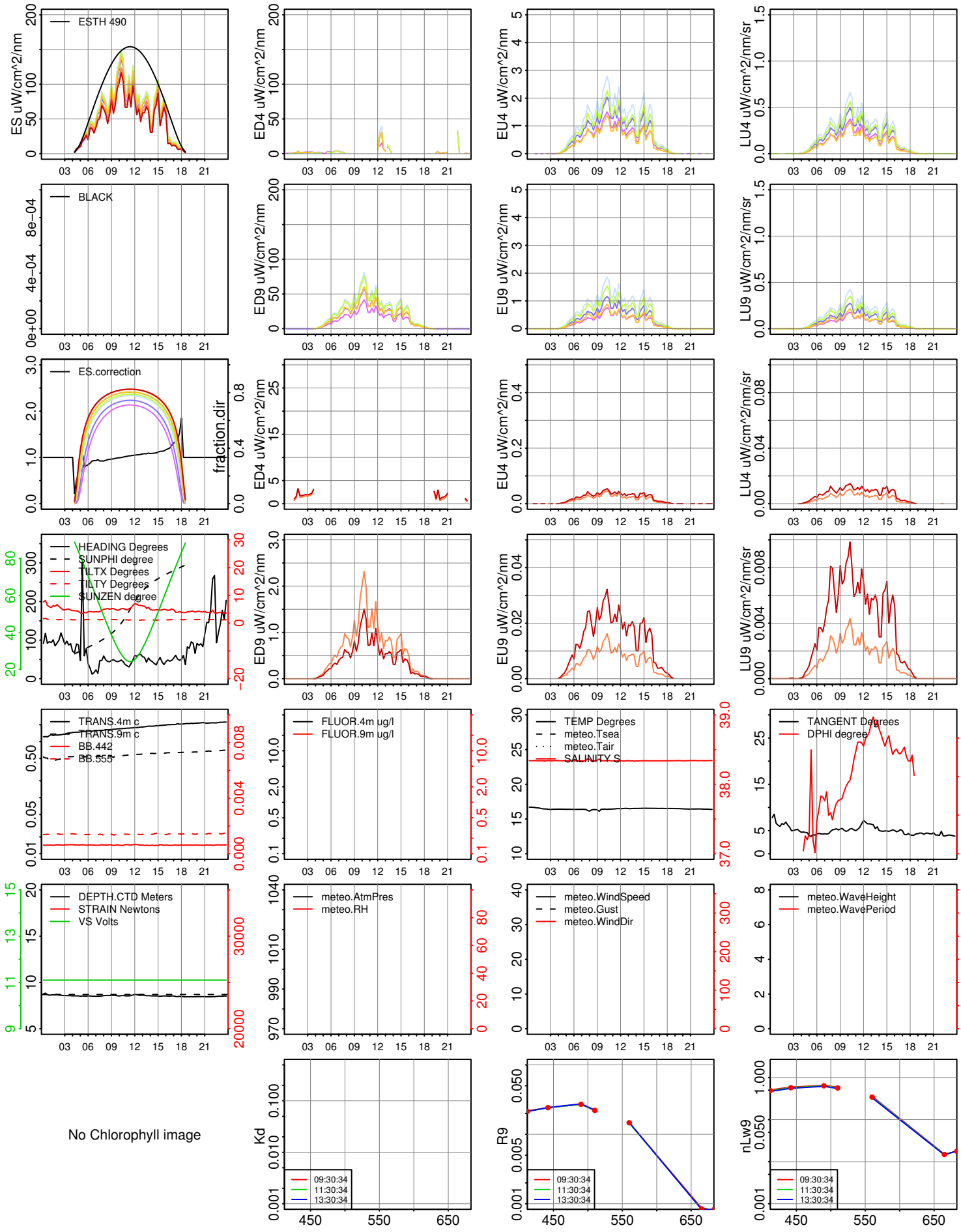
No Chlorophyll image

2005–05–16

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:30 GMT
sun zenith angle at solar noon : 24.22
HPLC Chlorophyll concentration : NA

2005–06–24



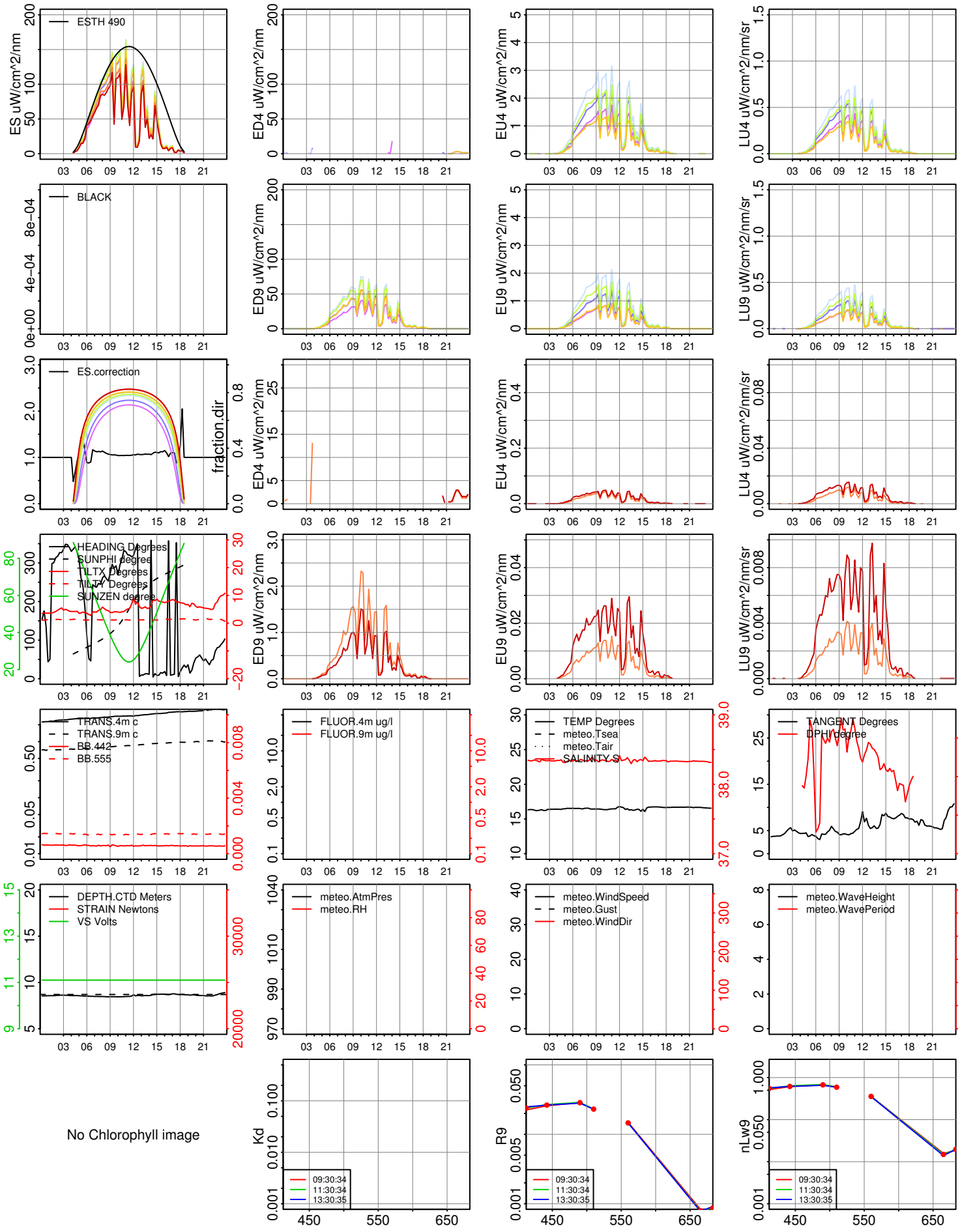
No Chlorophyll image

2005–05–17

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:32 GMT
sun zenith angle at solar noon : 23.99
HPLC Chlorophyll concentration : NA

2005–06–24



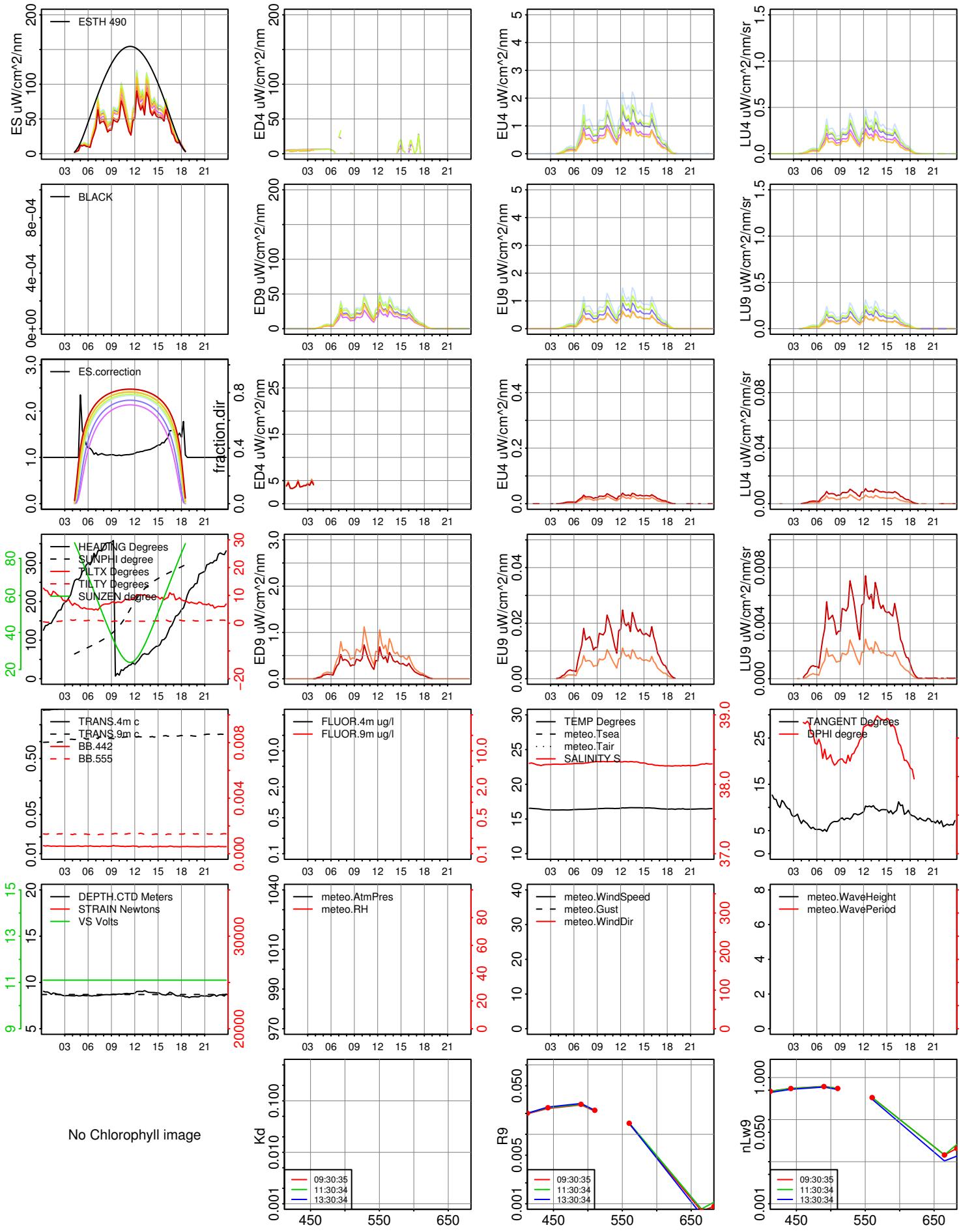
No Chlorophyll image

2005–05–18

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:34 GMT
sun zenith angle at solar noon : 23.77
HPLC Chlorophyll concentration : NA

2005–06–24



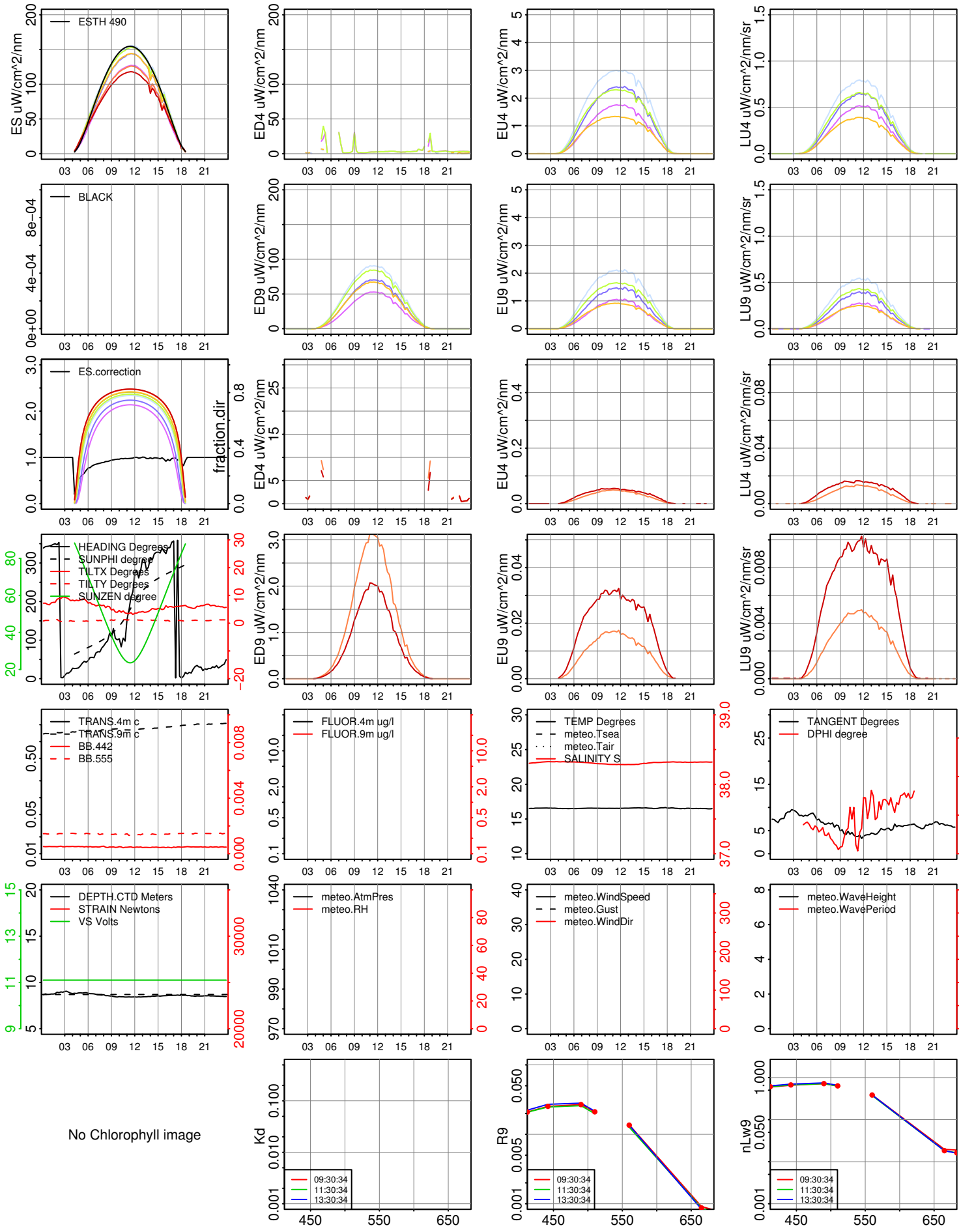
No Chlorophyll image

2005–05–19

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:36 GMT
sun zenith angle at solar noon : 23.56
HPLC Chlorophyll concentration : NA

2005–06–24



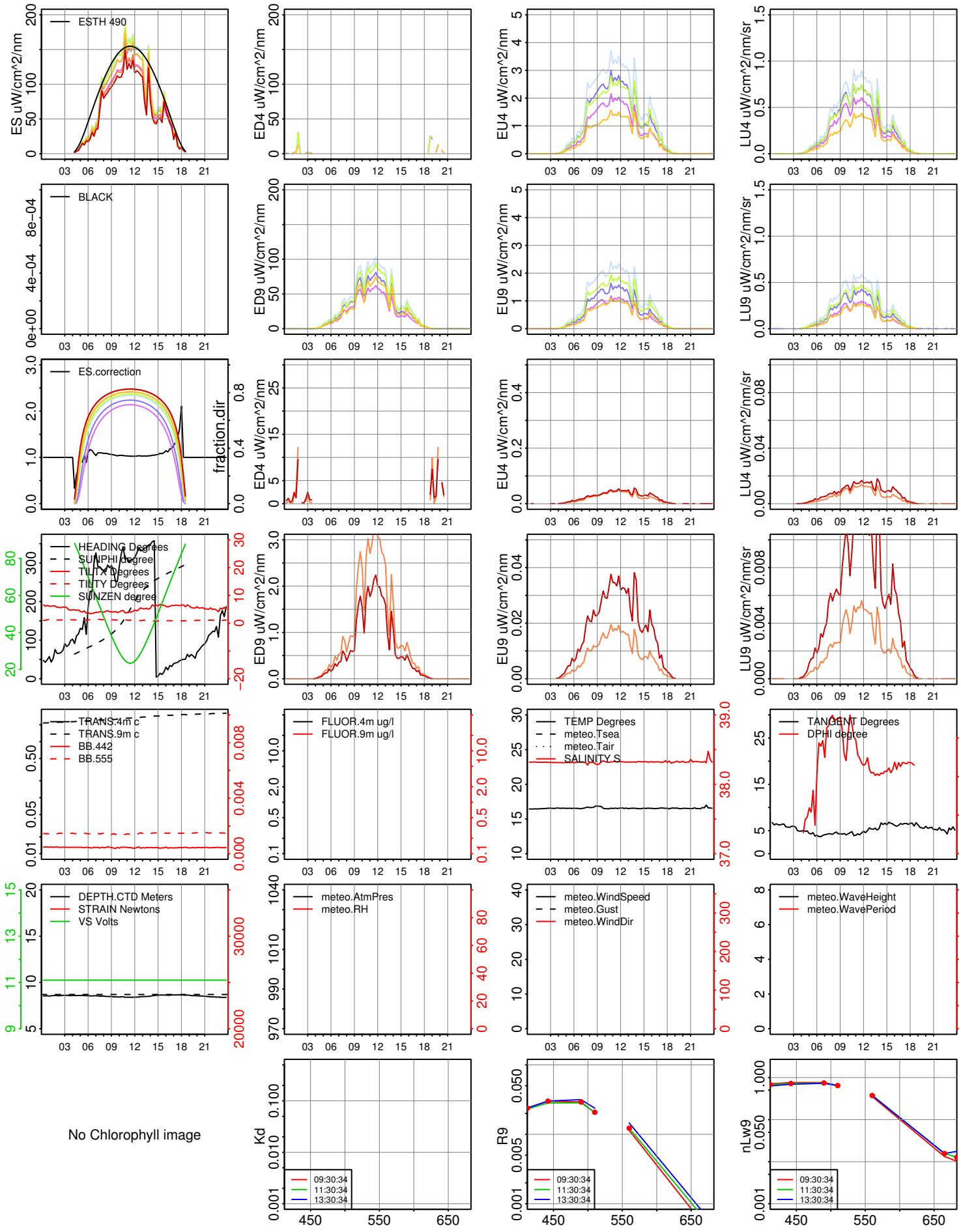
No Chlorophyll image

2005–05–20

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:40 GMT
sun zenith angle at solar noon : 23.35
HPLC Chlorophyll concentration : NA

2005–06–24



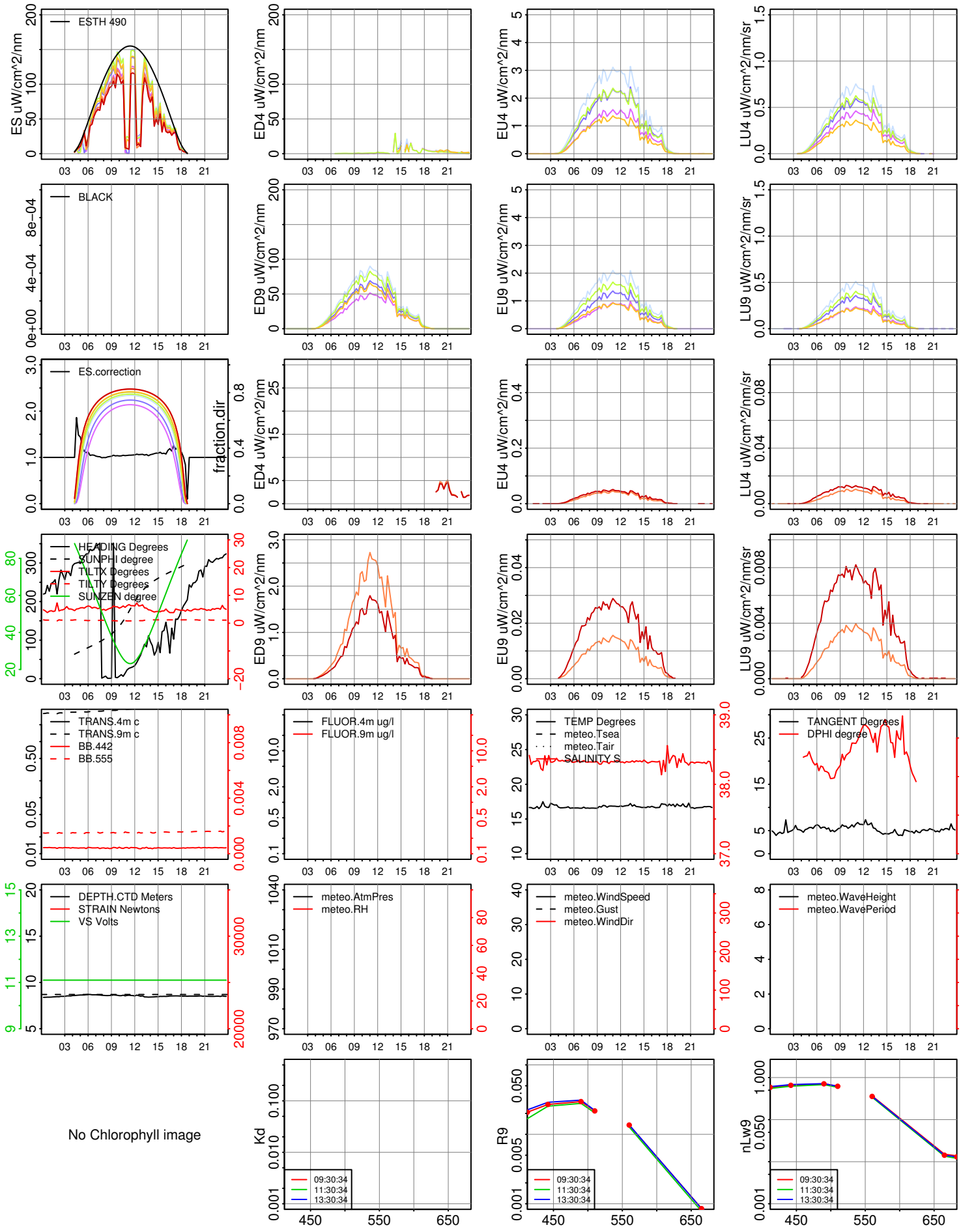
No Chlorophyll image

2005–05–21

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:44 GMT
sun zenith angle at solar noon : 23.14
HPLC Chlorophyll concentration : NA

2005–06–24



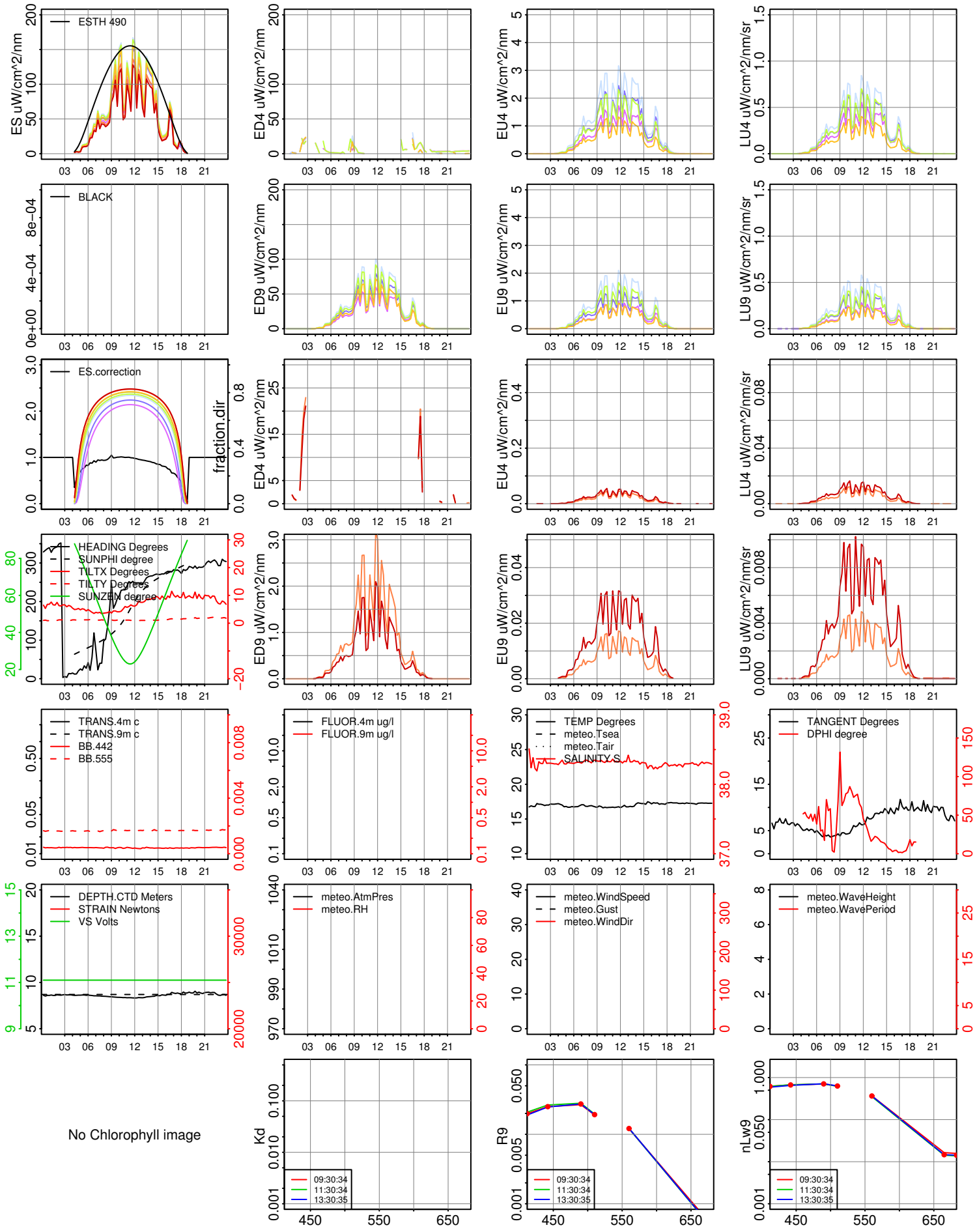
No Chlorophyll image

2005–05–22

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:48 GMT
sun zenith angle at solar noon : 22.94
HPLC Chlorophyll concentration : NA

2005–06–24



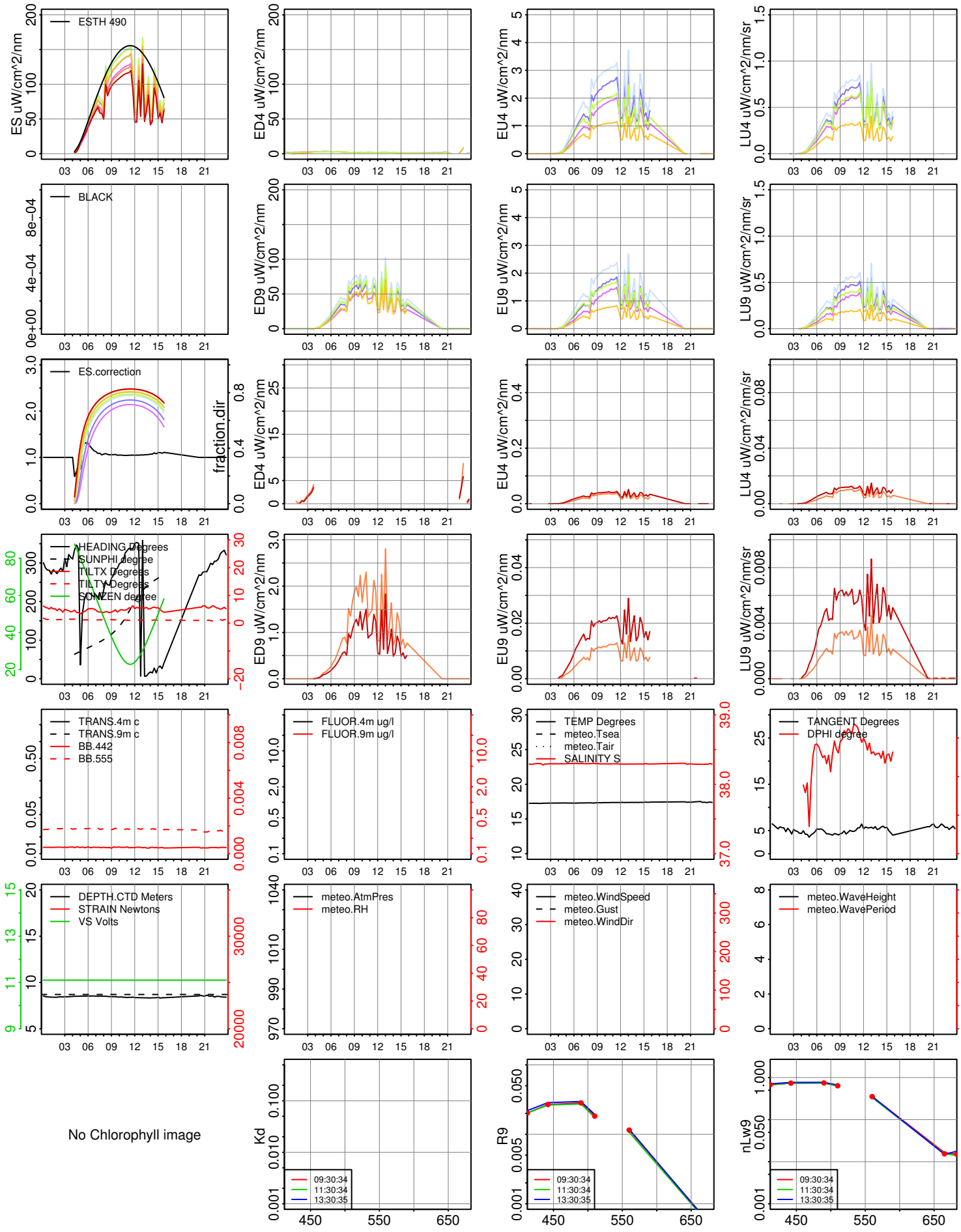
No Chlorophyll image

2005–05–23

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:54 GMT
sun zenith angle at solar noon : 22.75
HPLC Chlorophyll concentration : NA

2005–06–24



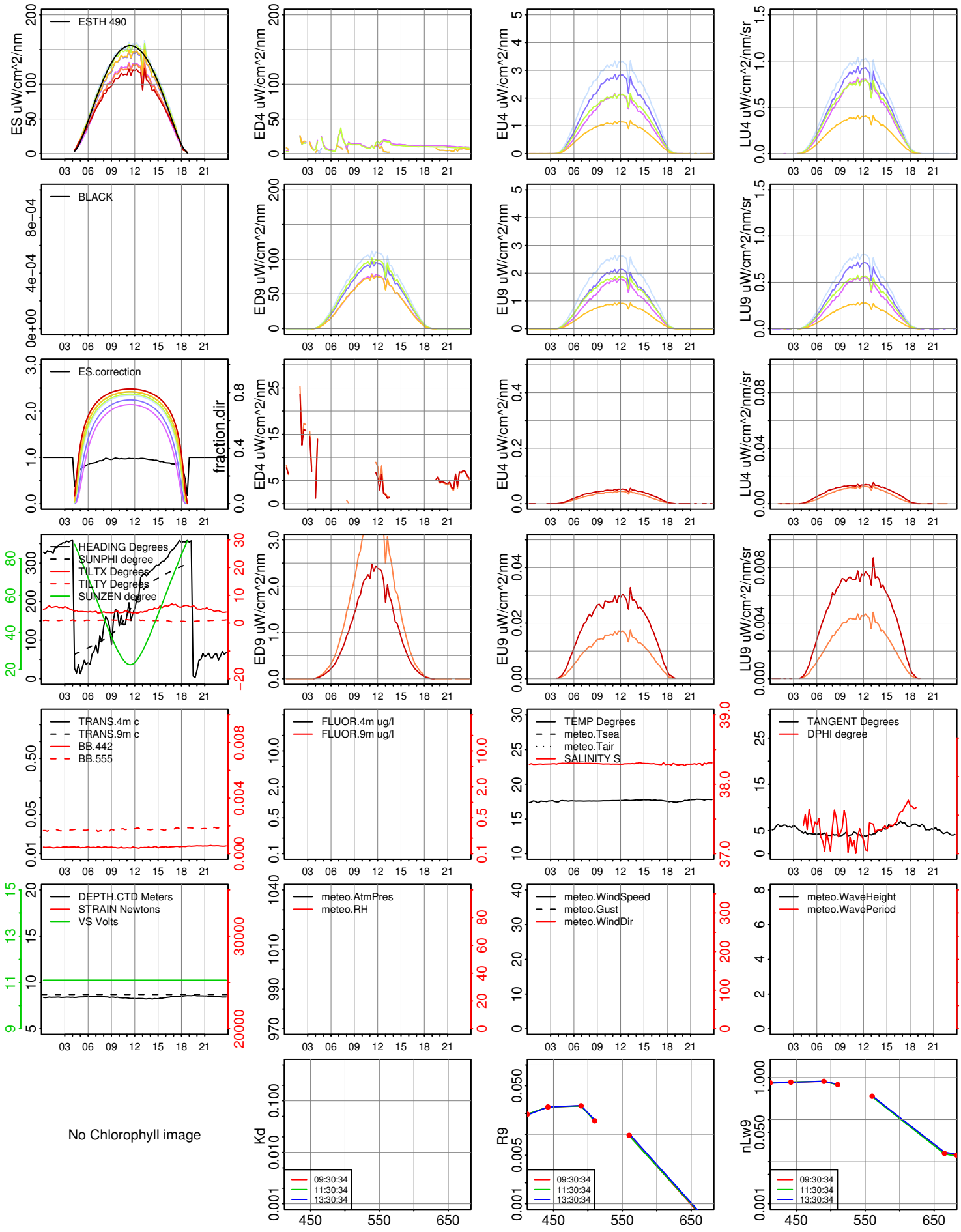
No Chlorophyll image

2005–05–24

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:24:58 GMT
sun zenith angle at solar noon : 22.56
HPLC Chlorophyll concentration : NA

2005–06–24



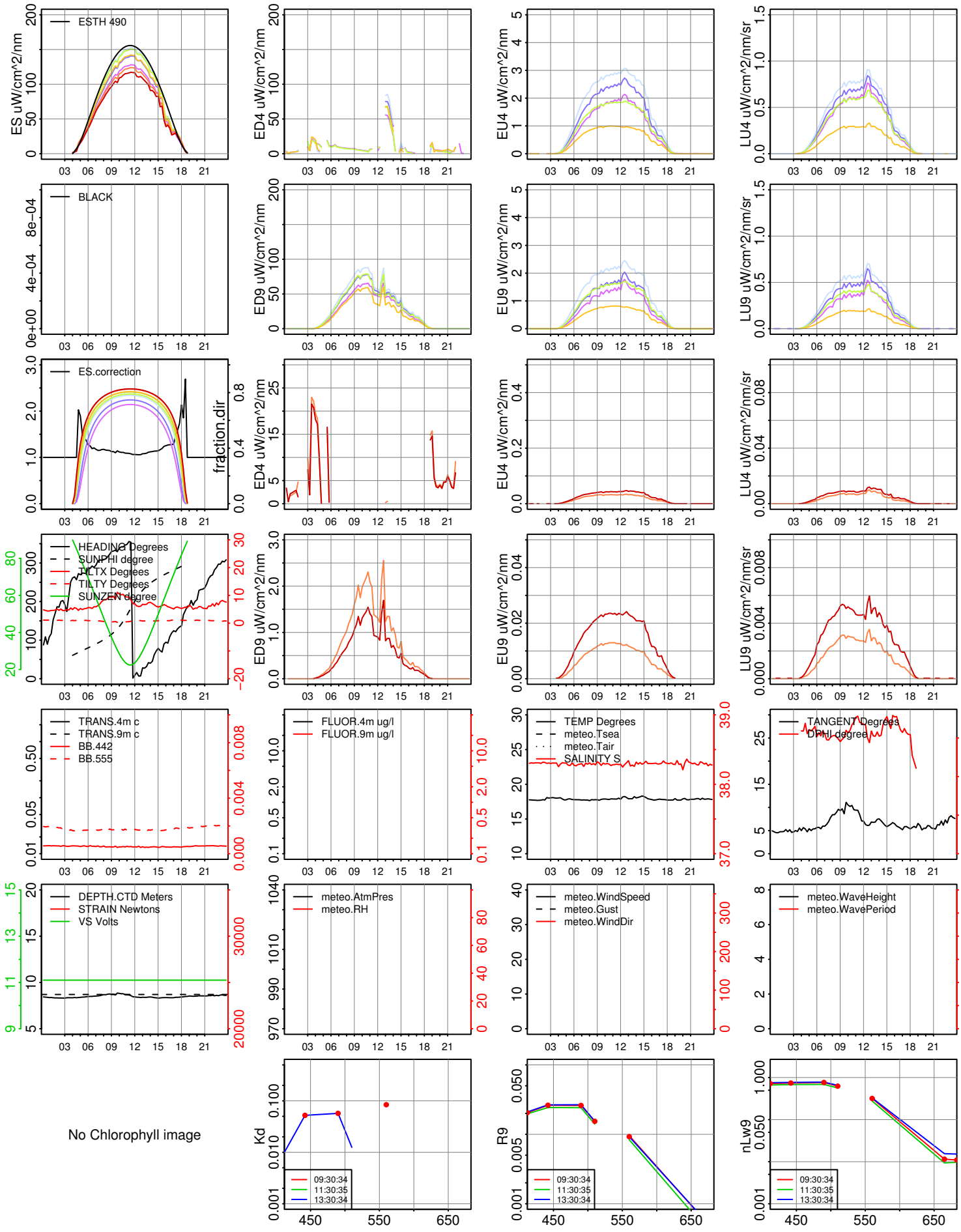
No Chlorophyll image

2005–05–25

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:4 GMT
sun zenith angle at solar noon : 22.38
HPLC Chlorophyll concentration : NA

2005–06–24



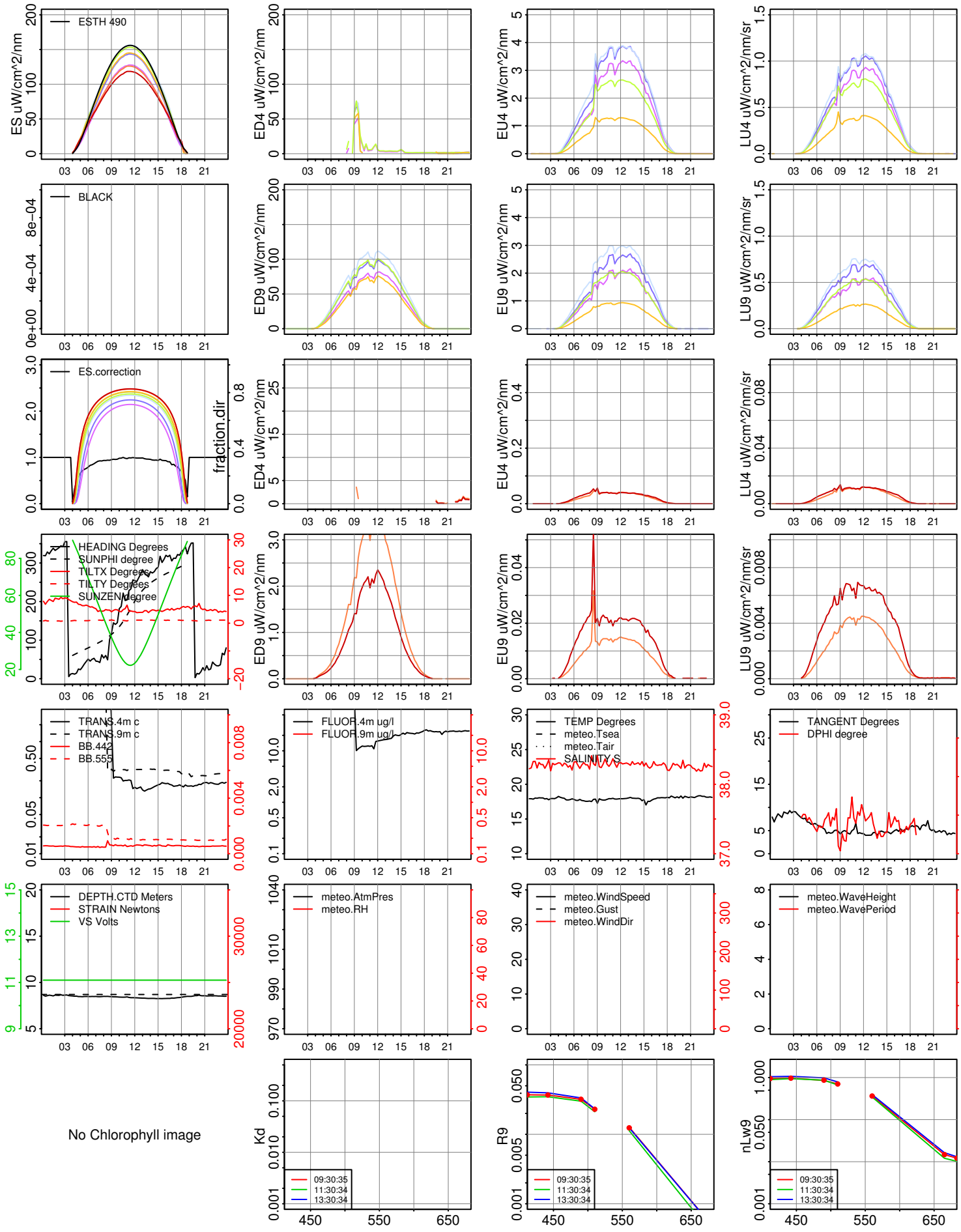
No Chlorophyll image

2005–05–26

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

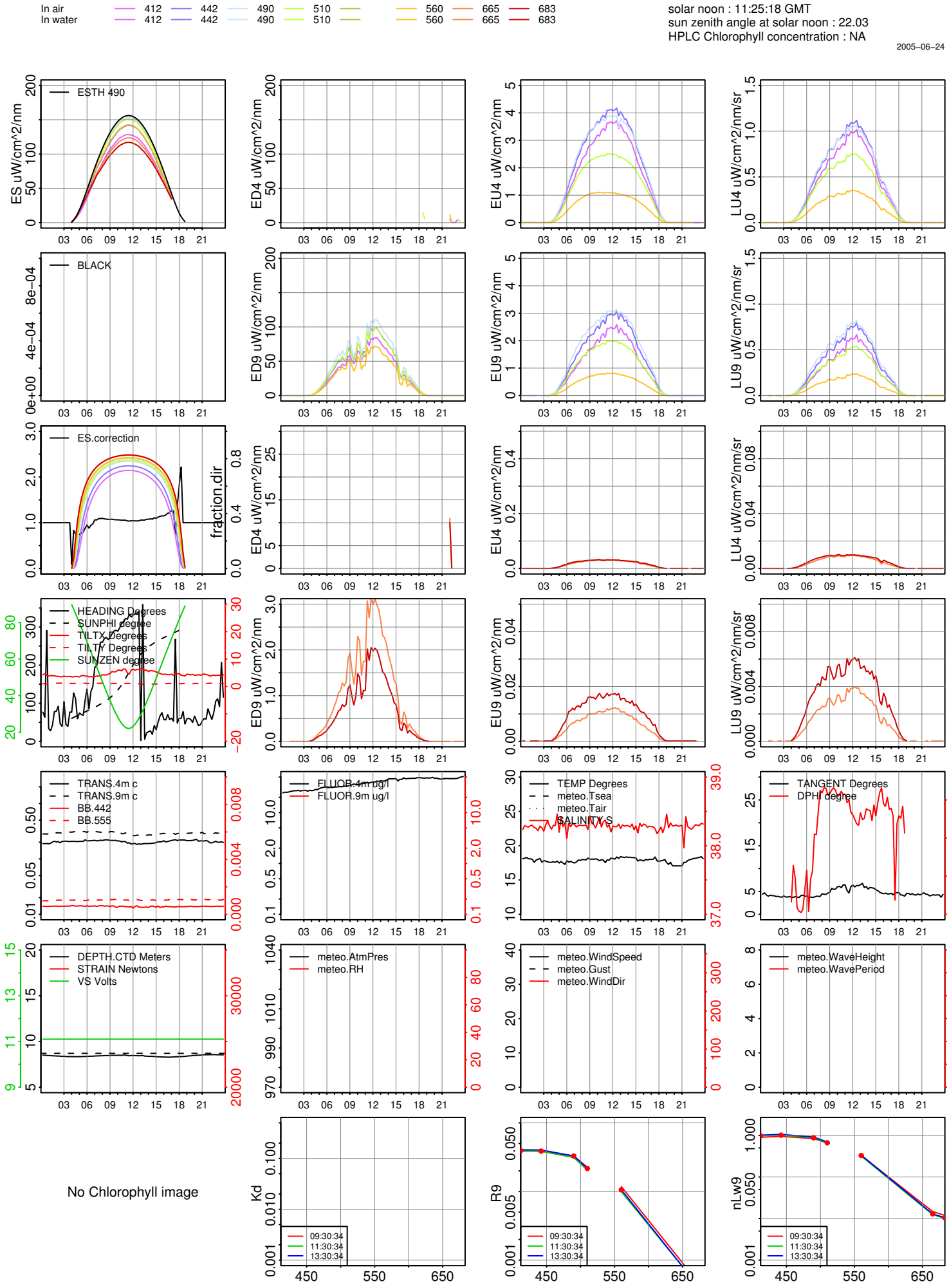
solar noon : 11:25:10 GMT
sun zenith angle at solar noon : 22.2
HPLC Chlorophyll concentration : NA

2005–06–24



No Chlorophyll image

2005–05–27

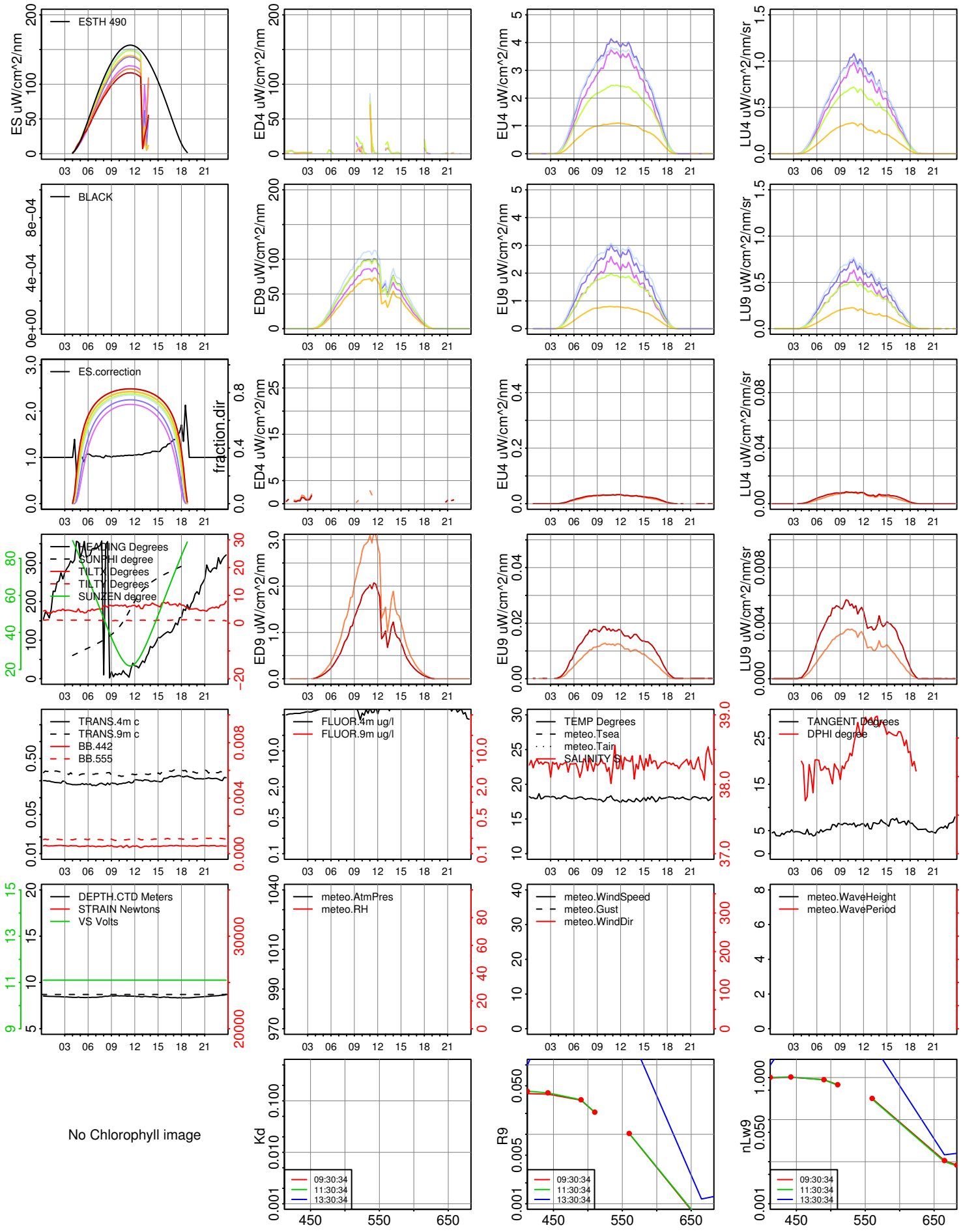

In air
In water
412
412
442
442
490
490
510
510
560
560
665
665
683
683
solar noon : 11:25:18 GMT
sun zenith angle at solar noon : 22.03
HPLC Chlorophyll concentration : NA
2005–06–24
ESTH 490
ES uW/cm^2/nm
ED4 uW/cm^2/nm
EU4 uW/cm^2/nm
LU4 uW/cm^2/nm/sr
BLACK
ED9 uW/cm^2/nm
EU9 uW/cm^2/nm
LU9 uW/cm^2/nm/sr
ES.correction
fraction.dir
HEADING Degrees
SUNPHI degree
TILTX Degrees
TILTY Degrees
SUNZEN degree
TRANS.4m c
TRANS.9m c
BB.442
BB.555
FLUOR.4m ug/l
FLUOR.9m ug/l
TEMP Degrees
meteo.Tsea
meteo.Tair
SALINITY.S
TANGENT Degrees
DPHI degree
DEPTH.CTD Meters
STRAIN Newtons
VS Volts
meteo.AtmPres
meteo.RH
meteo.WindSpeed
meteo.Gust
meteo.WindDir
meteo.WaveHeight
meteo.WavePeriod
No Chlorophyll image
Kd
R9
nLw9
09:30:34
11:30:34
13:30:34

2005–05–28

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:26 GMT
sun zenith angle at solar noon : 21.87
HPLC Chlorophyll concentration : NA

2005–06–24



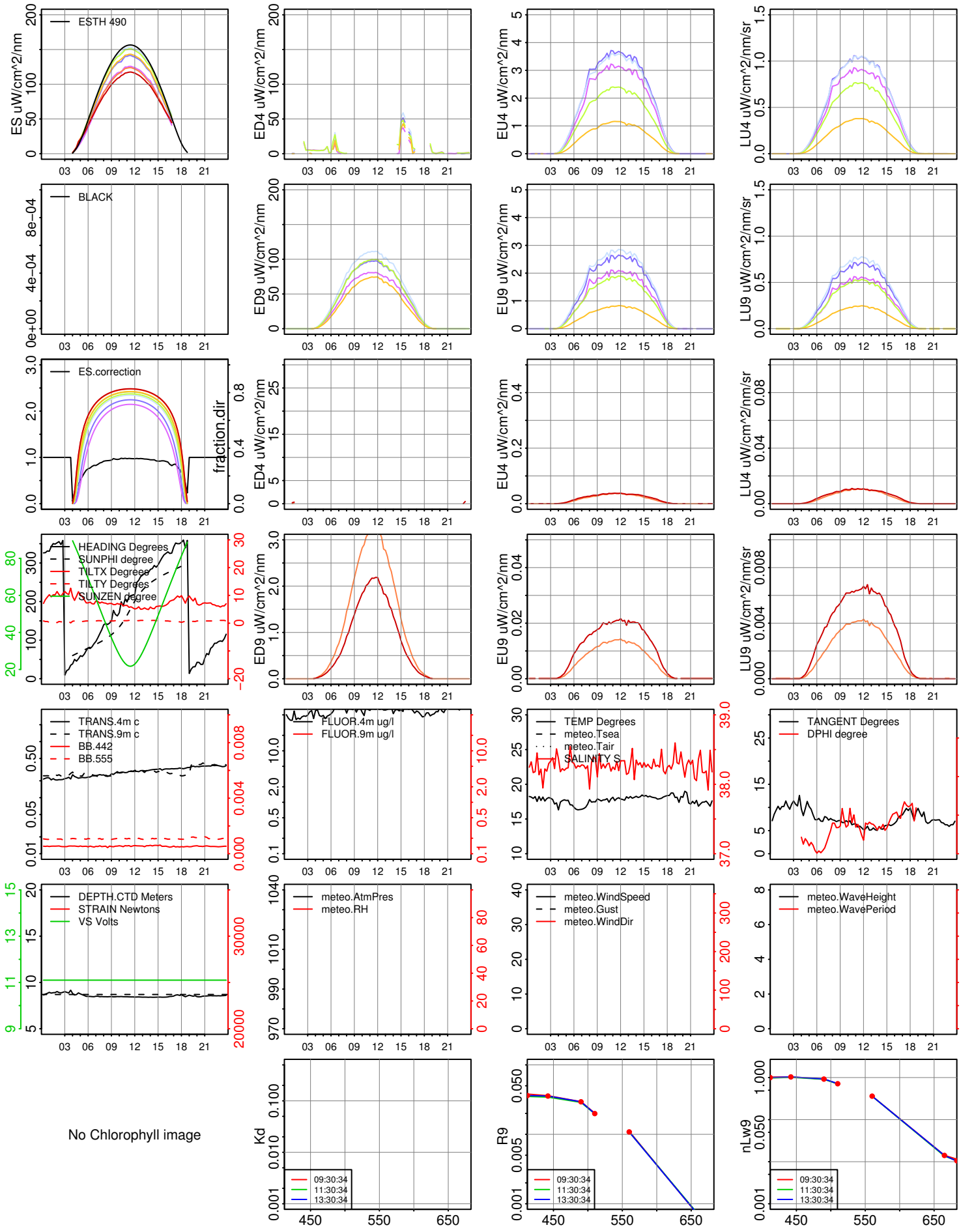
No Chlorophyll image

2005–05–29

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:34 GMT
sun zenith angle at solar noon : 21.71
HPLC Chlorophyll concentration : NA

2005–06–24



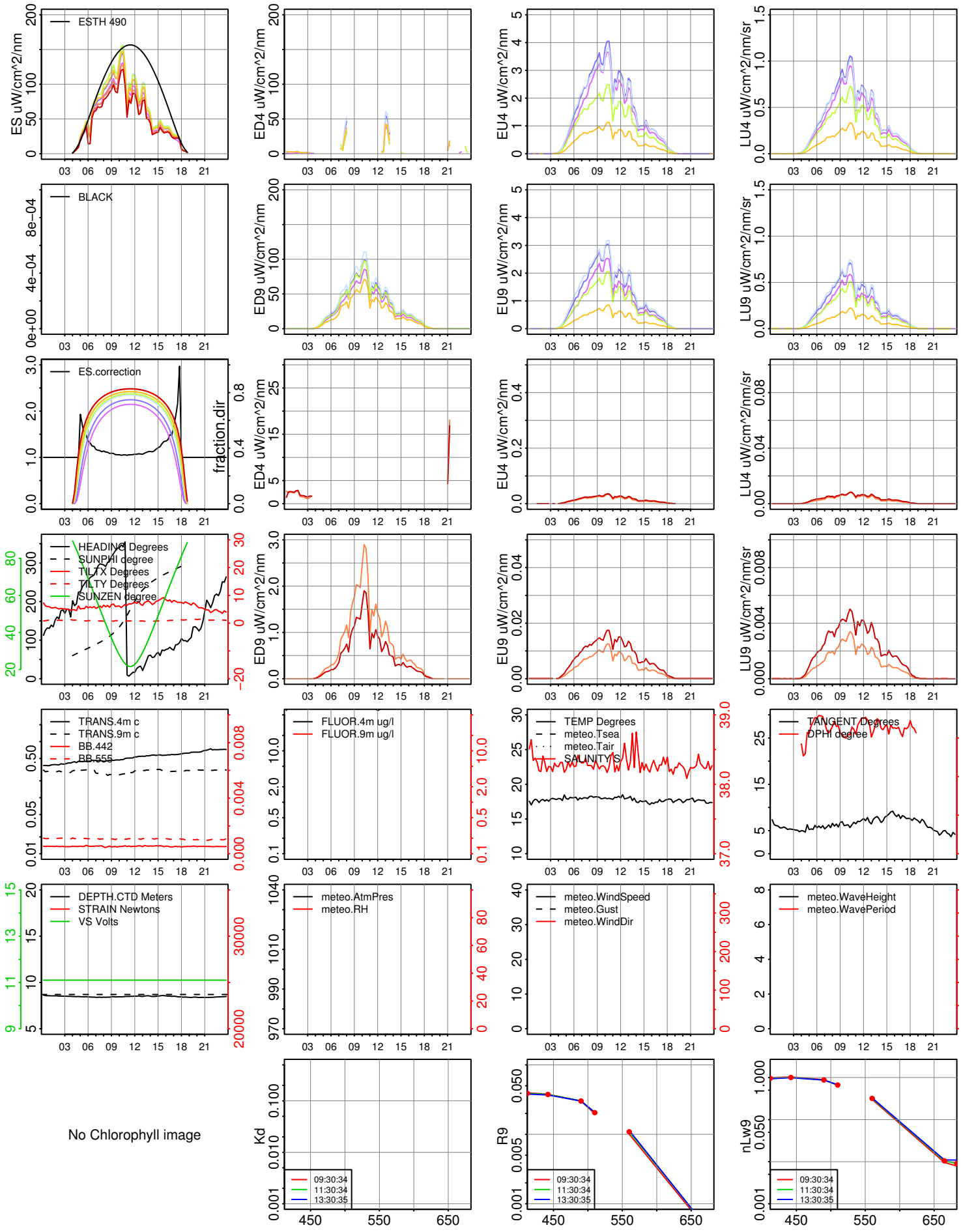
No Chlorophyll image

2005–05–30

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:42 GMT
sun zenith angle at solar noon : 21.56
HPLC Chlorophyll concentration : NA

2005–06–24



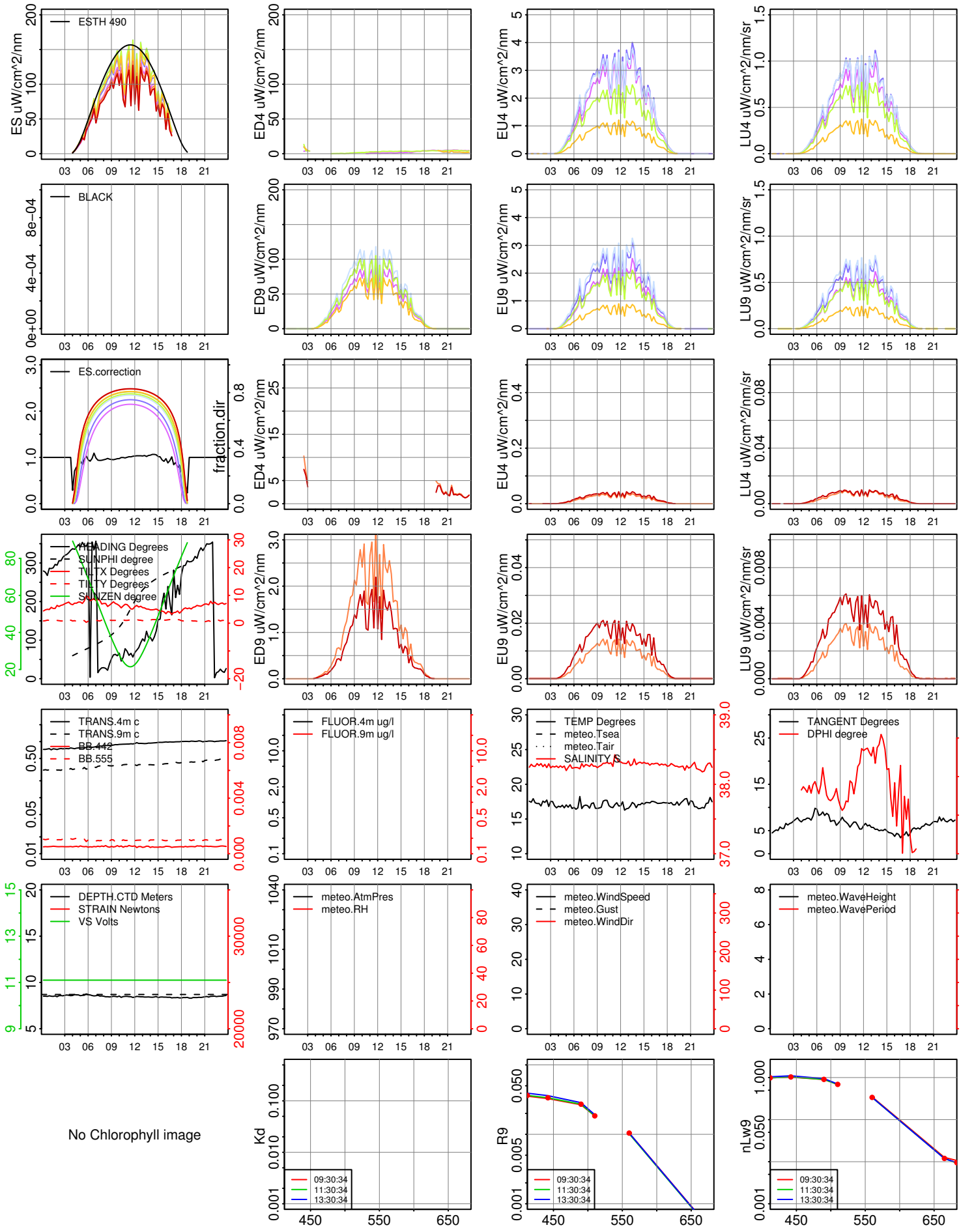
No Chlorophyll image

2005–05–31

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:25:50 GMT
sun zenith angle at solar noon : 21.42
HPLC Chlorophyll concentration : NA

2005–06–24



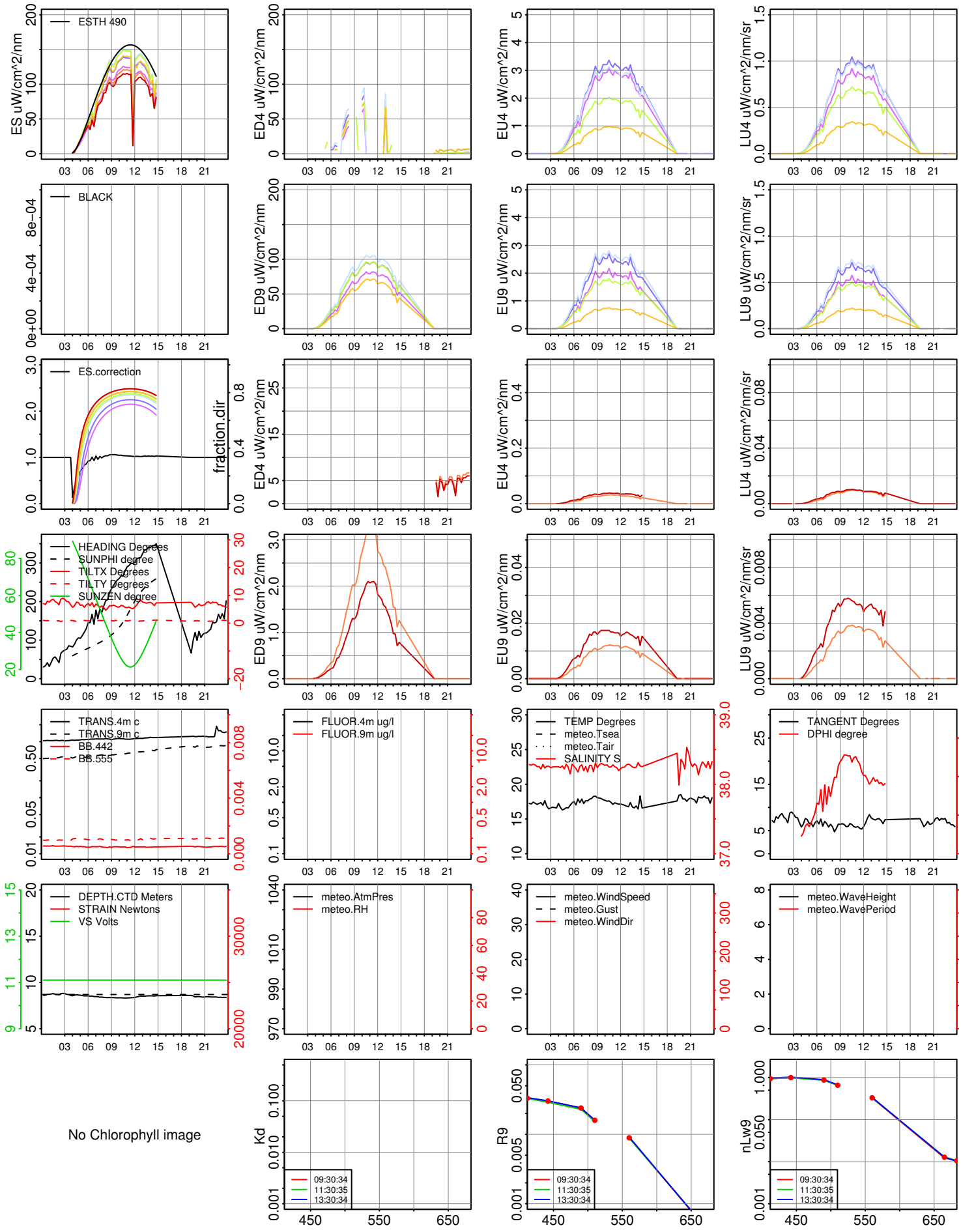
No Chlorophyll image

2005–06–01

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:26:0 GMT
sun zenith angle at solar noon : 21.28
HPLC Chlorophyll concentration : NA

2005–06–24



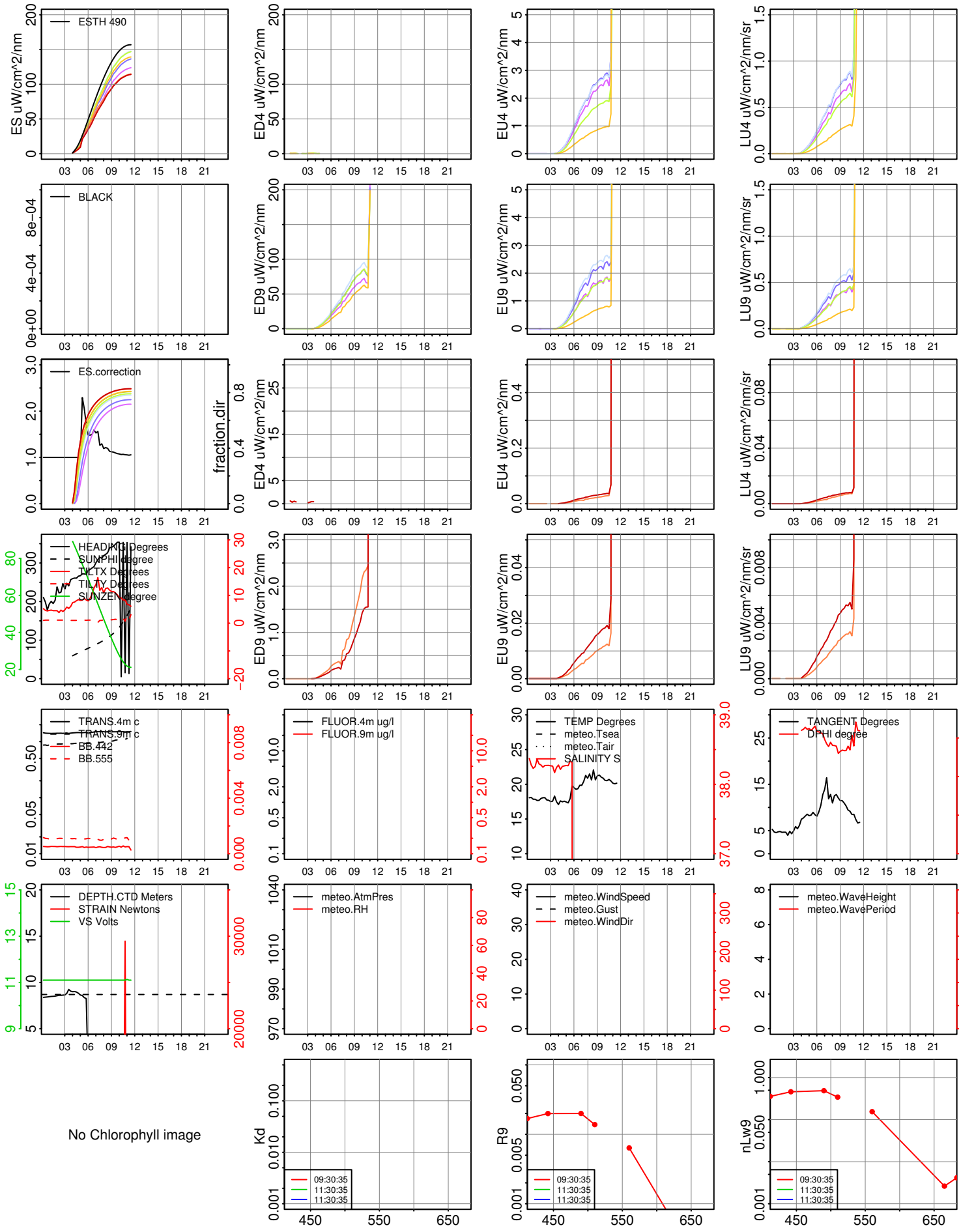
No Chlorophyll image

2005–06–02

In air 412 442 490 510 560 665 683
In water 412 442 490 510 560 665 683

solar noon : 11:26:8 GMT
sun zenith angle at solar noon : 21.15
HPLC Chlorophyll concentration : NA

2005–06–24



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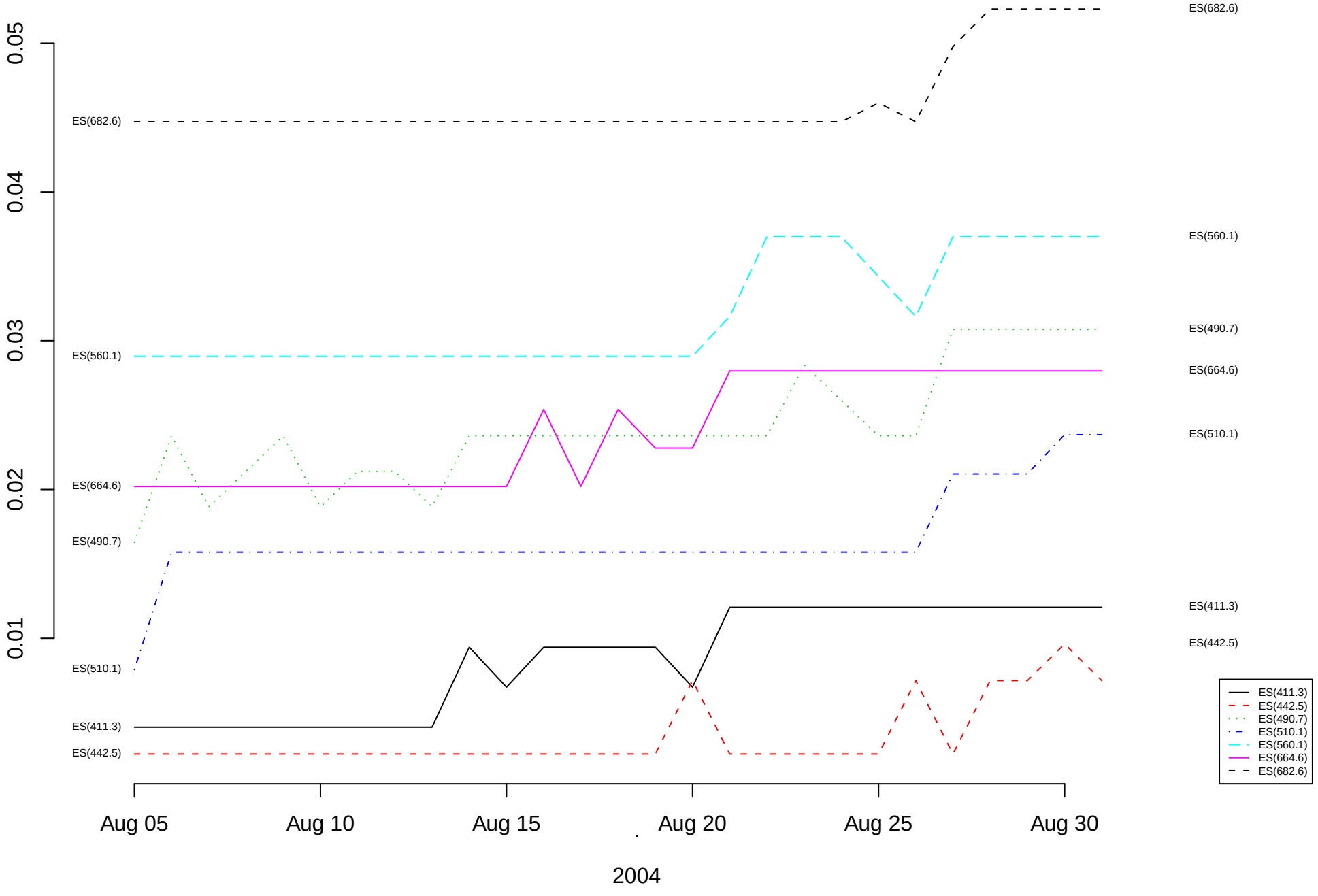
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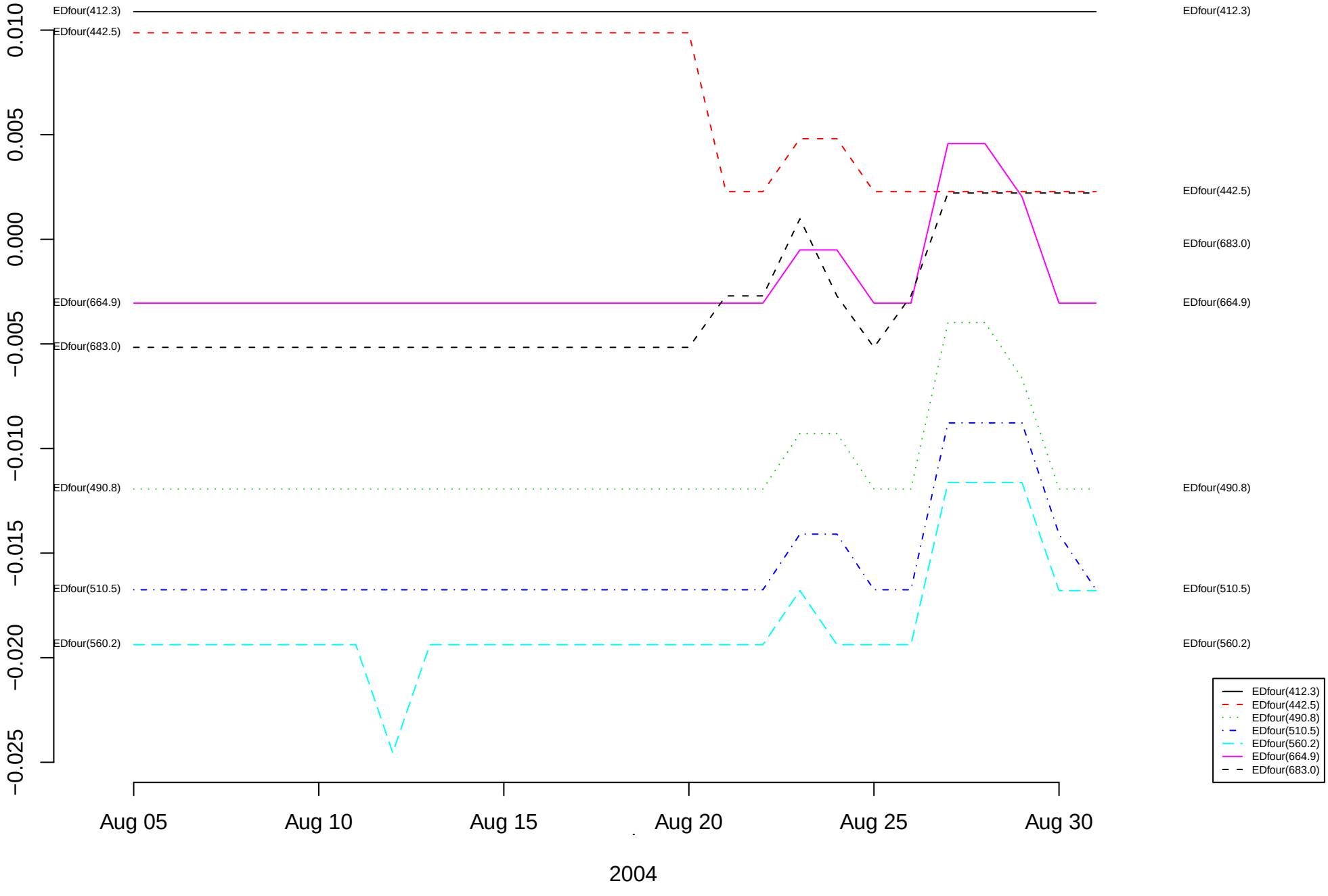
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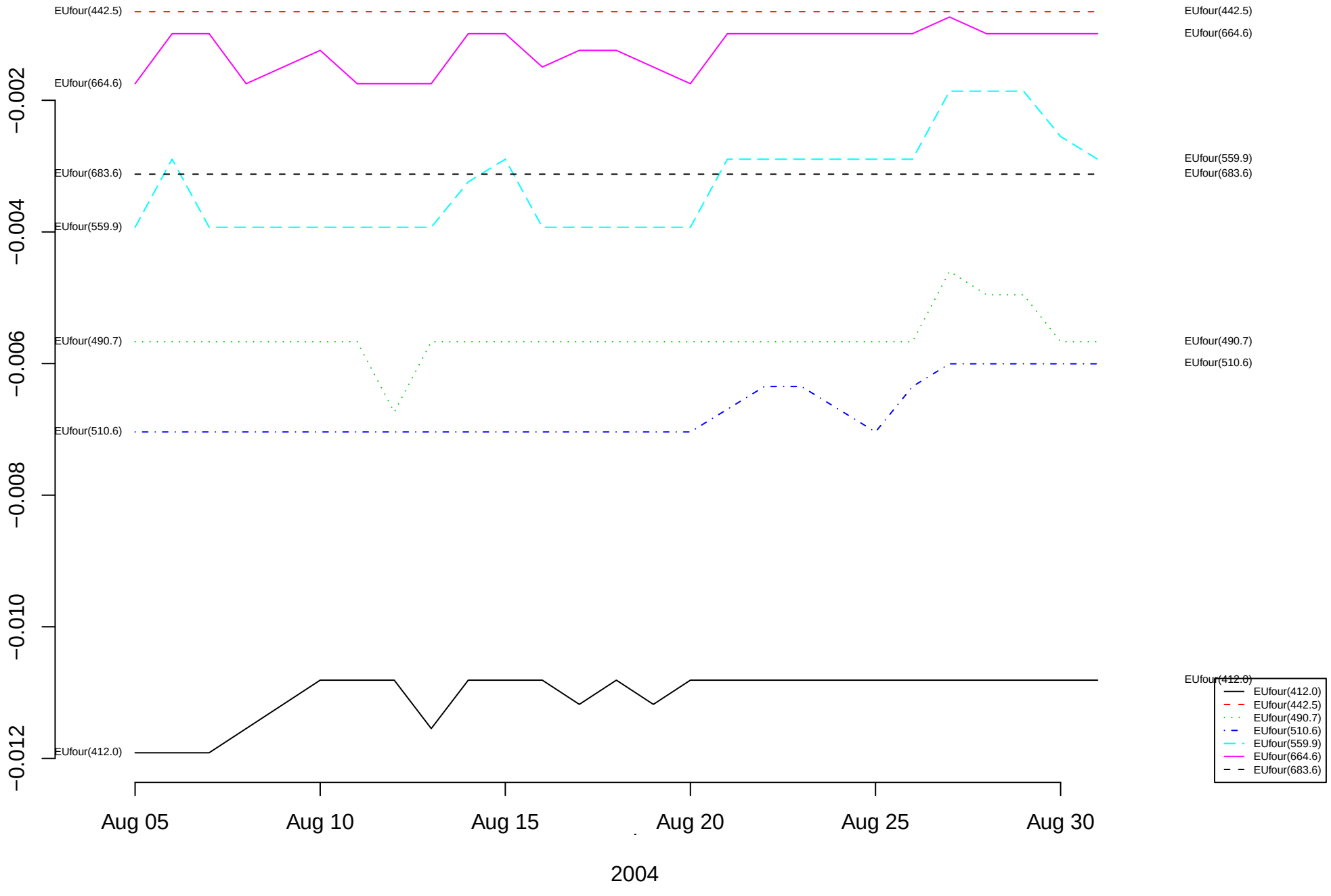
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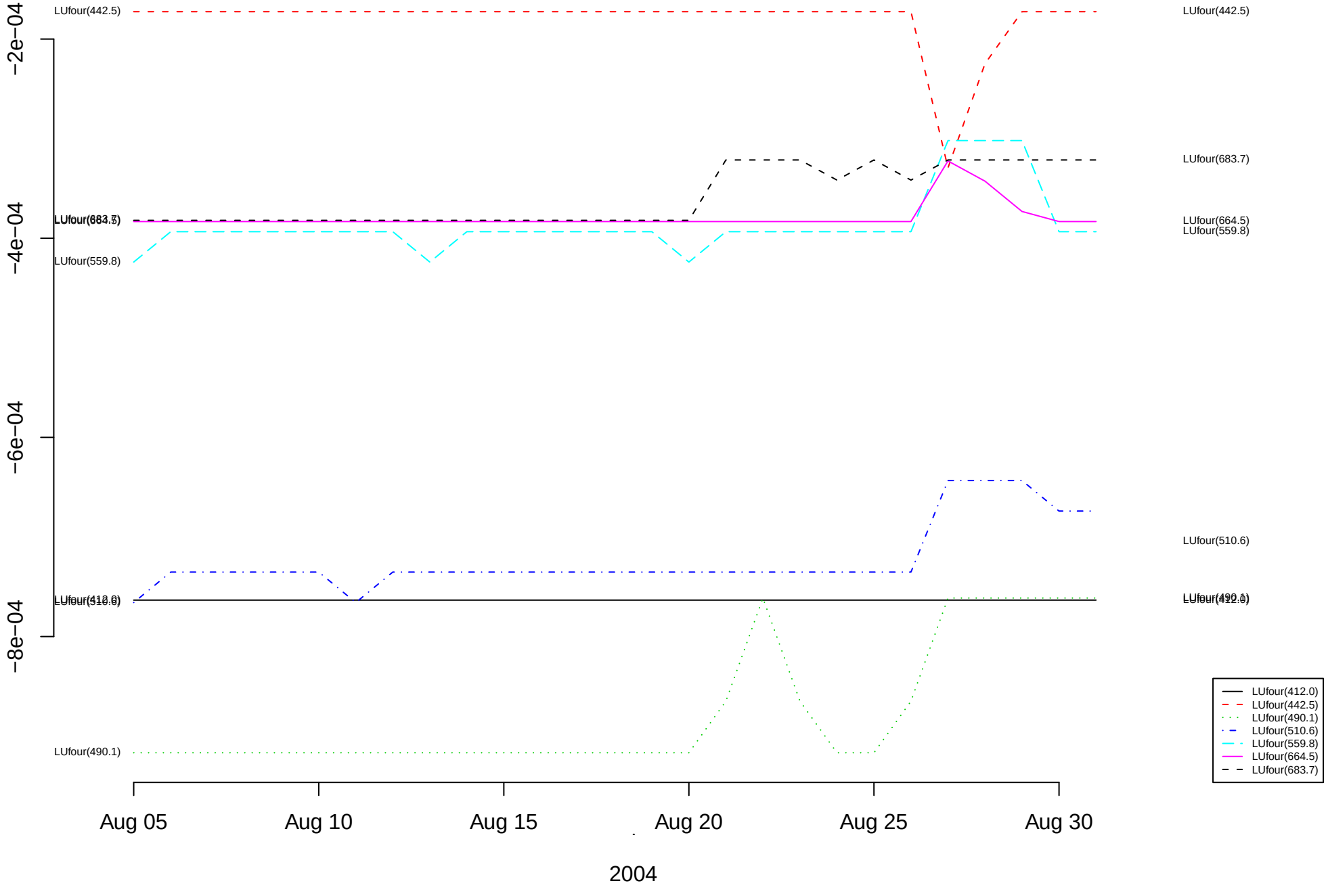
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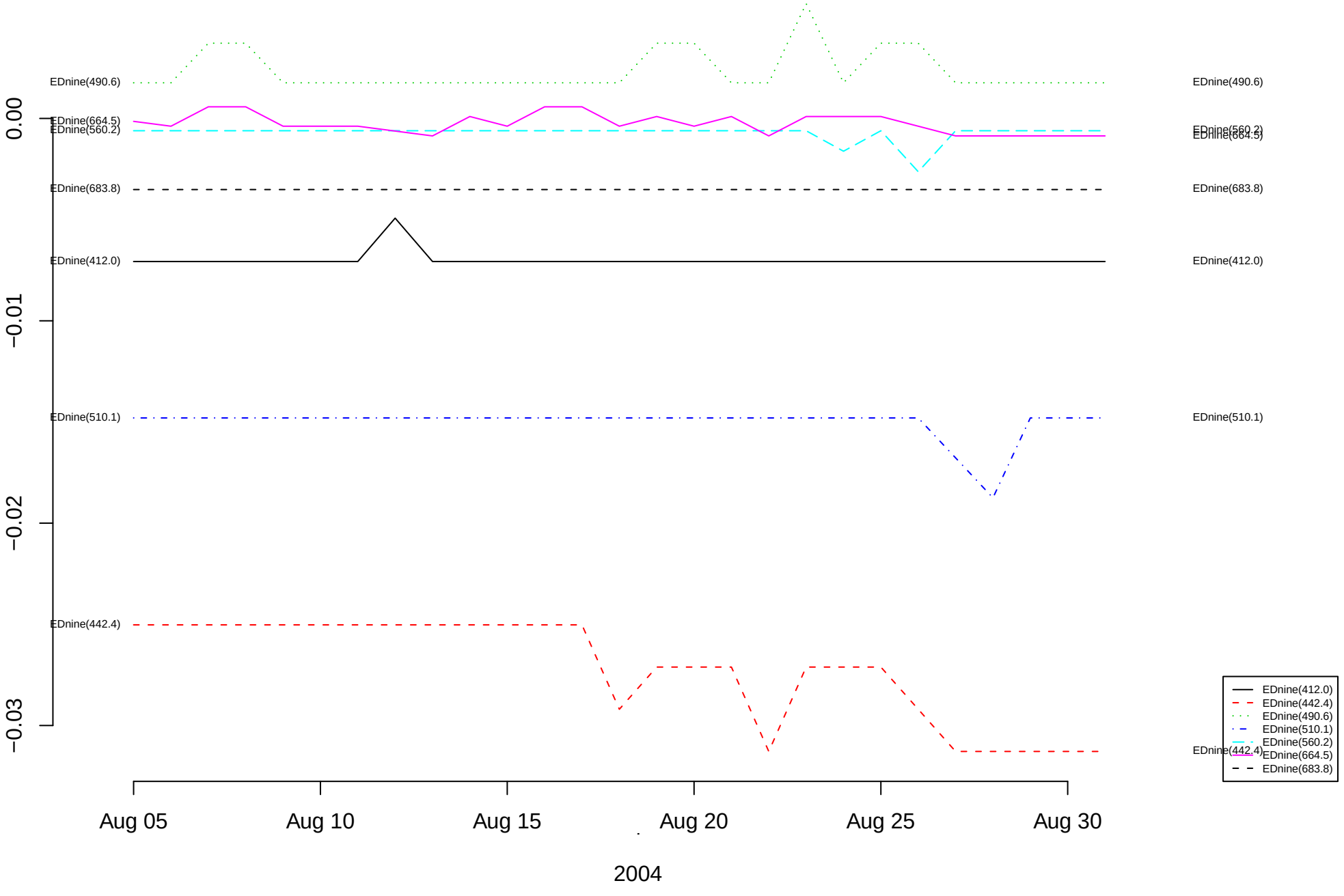
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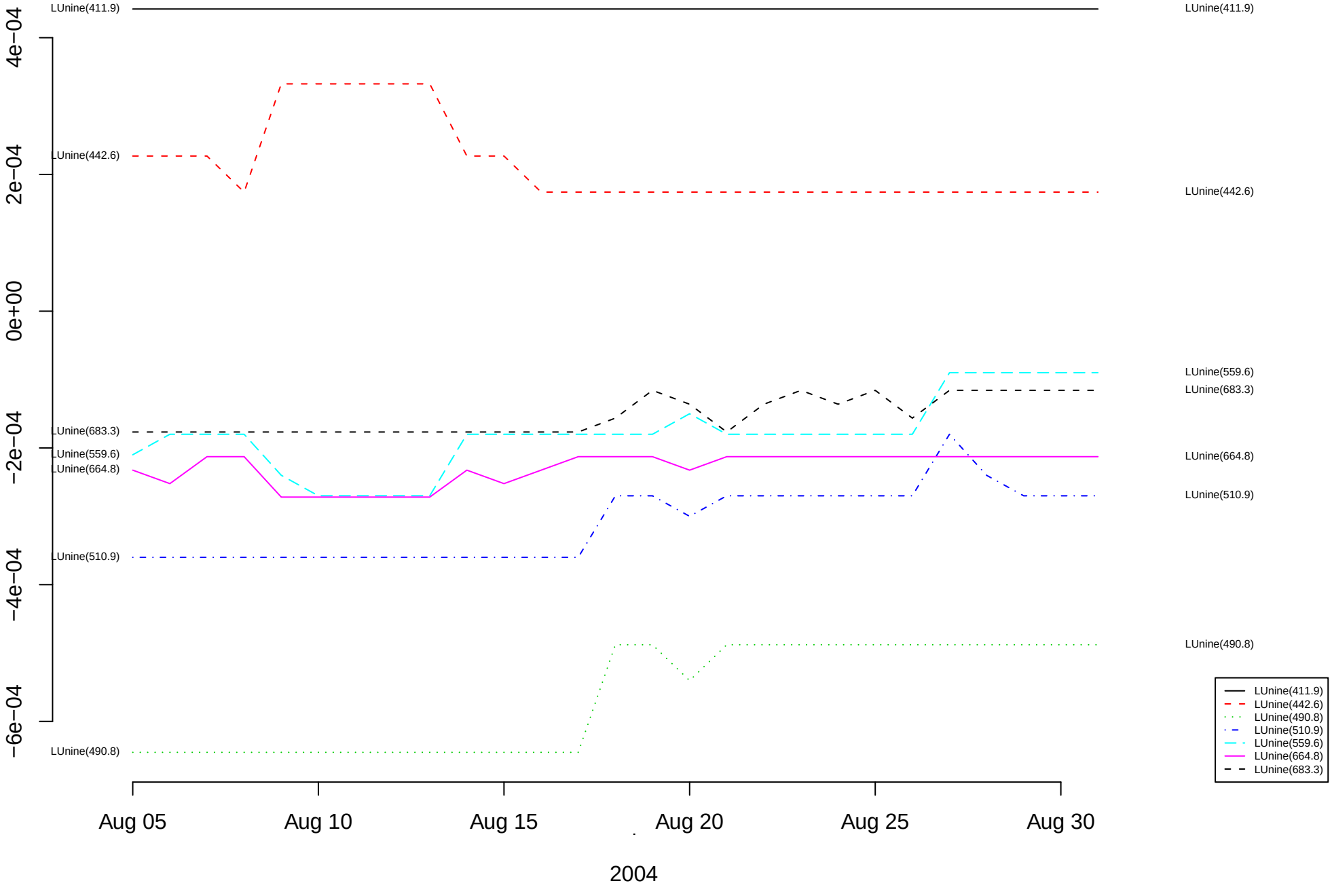
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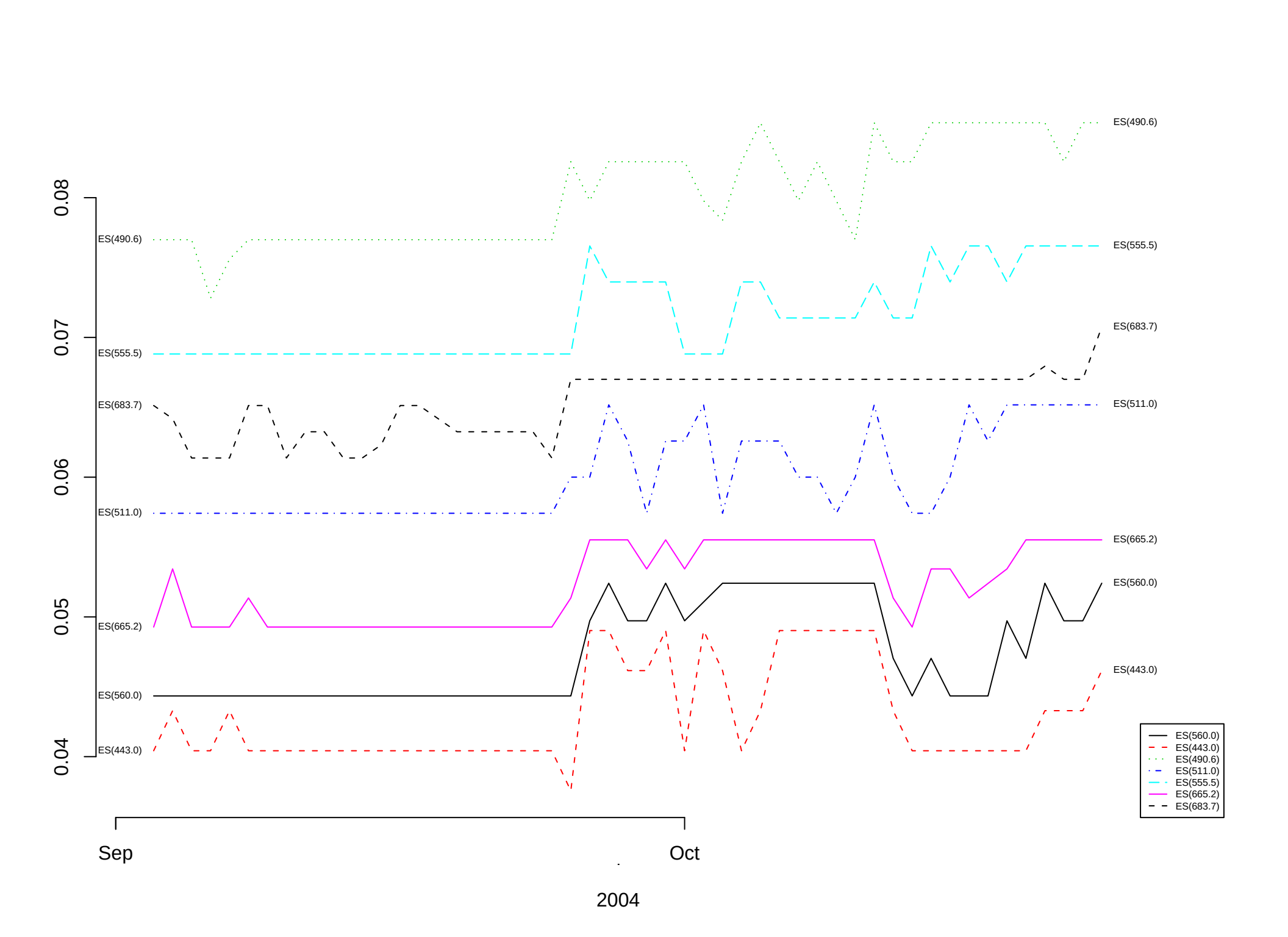
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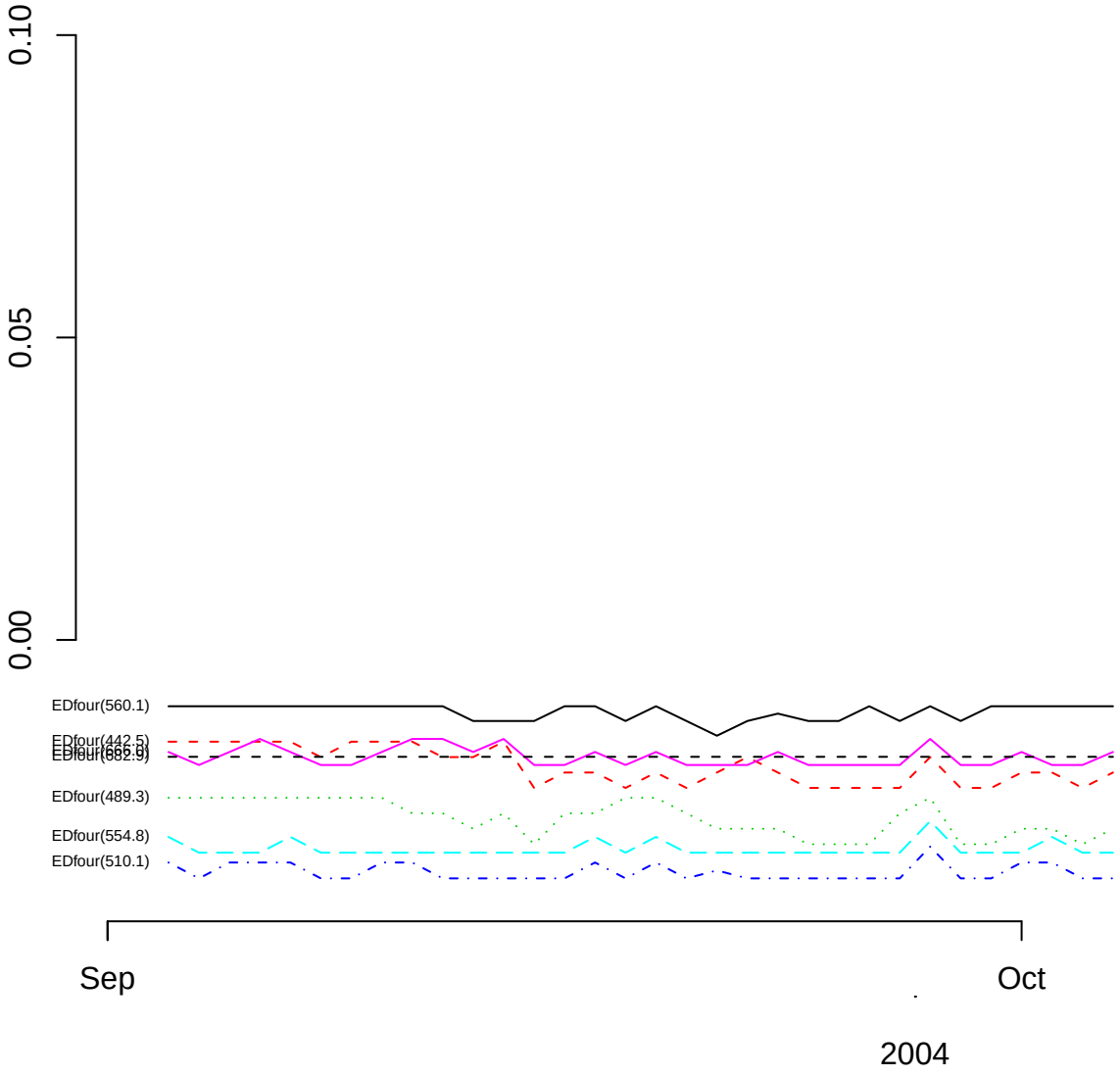
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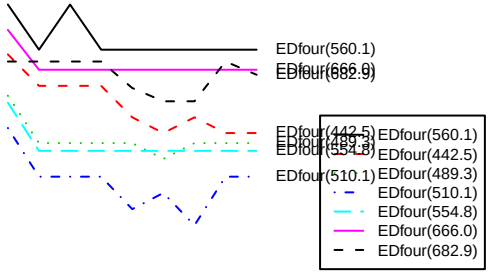
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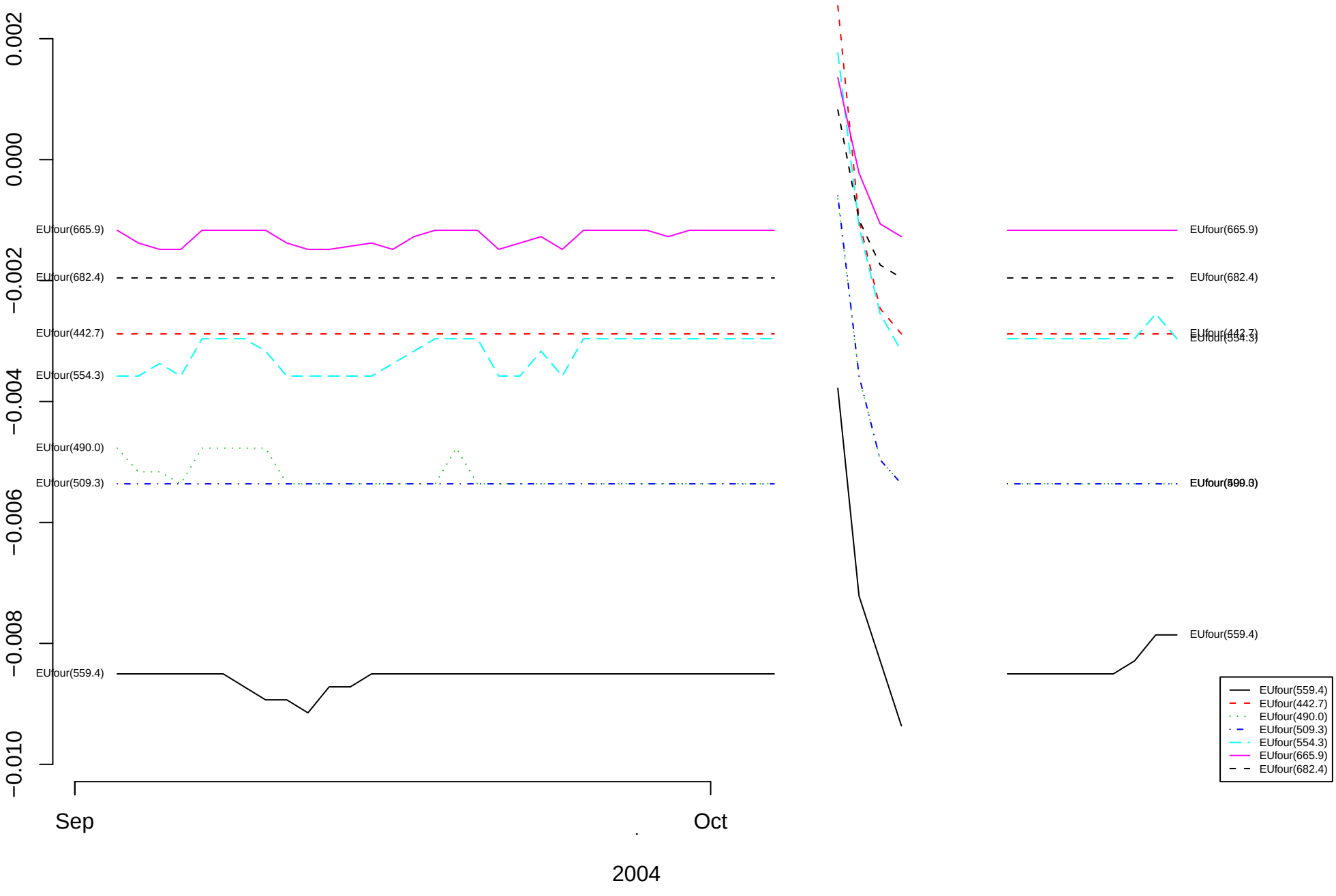
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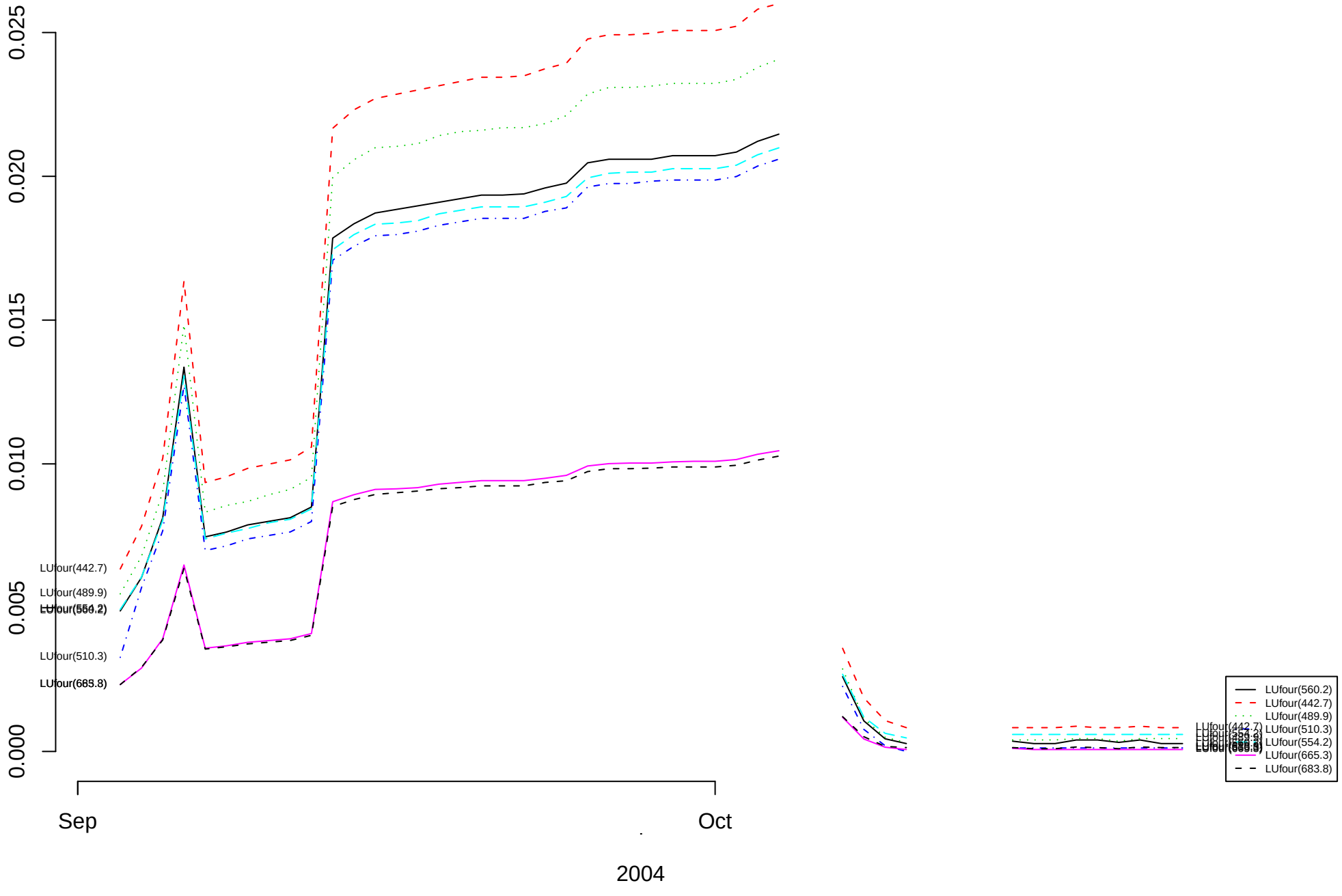
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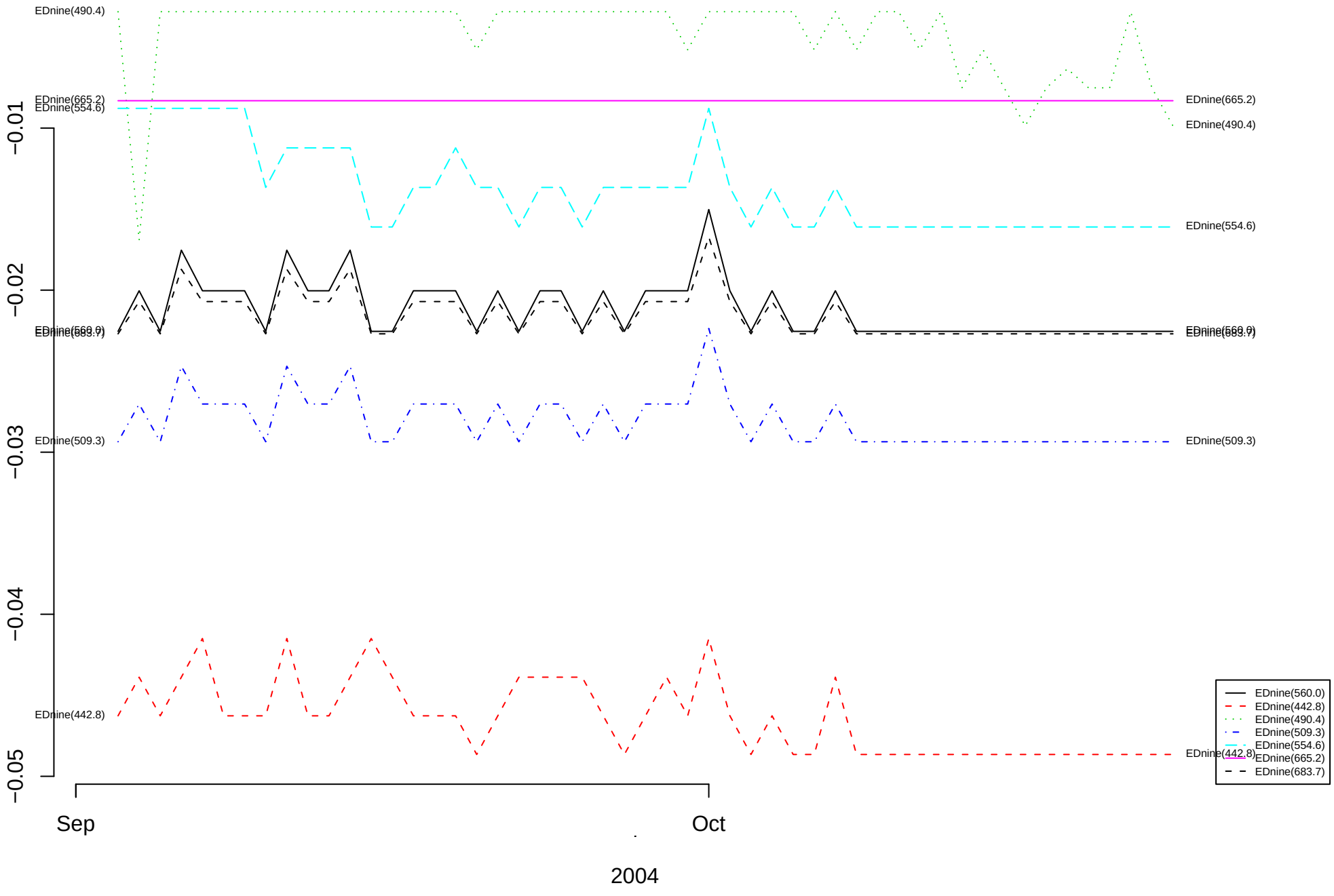
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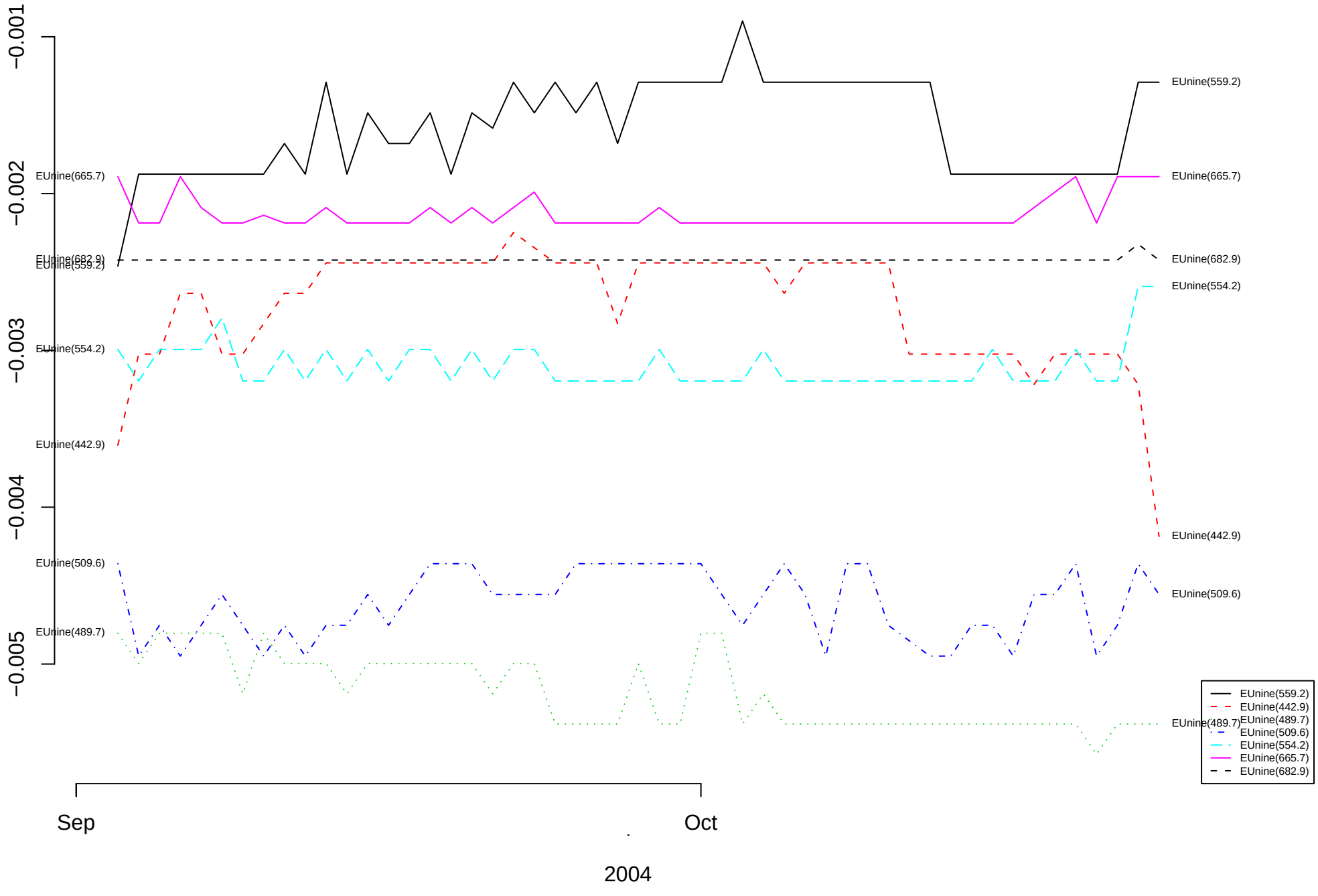
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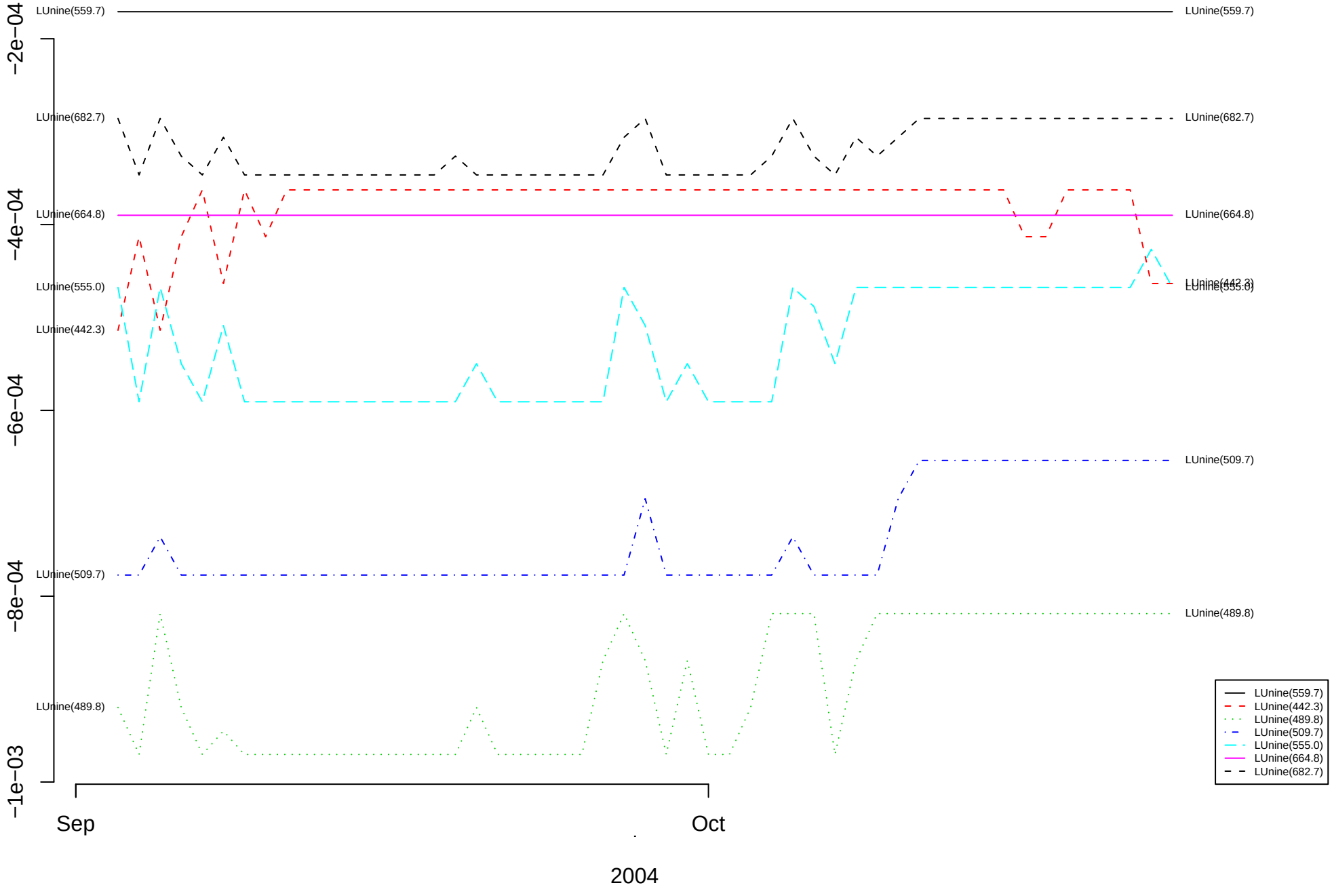
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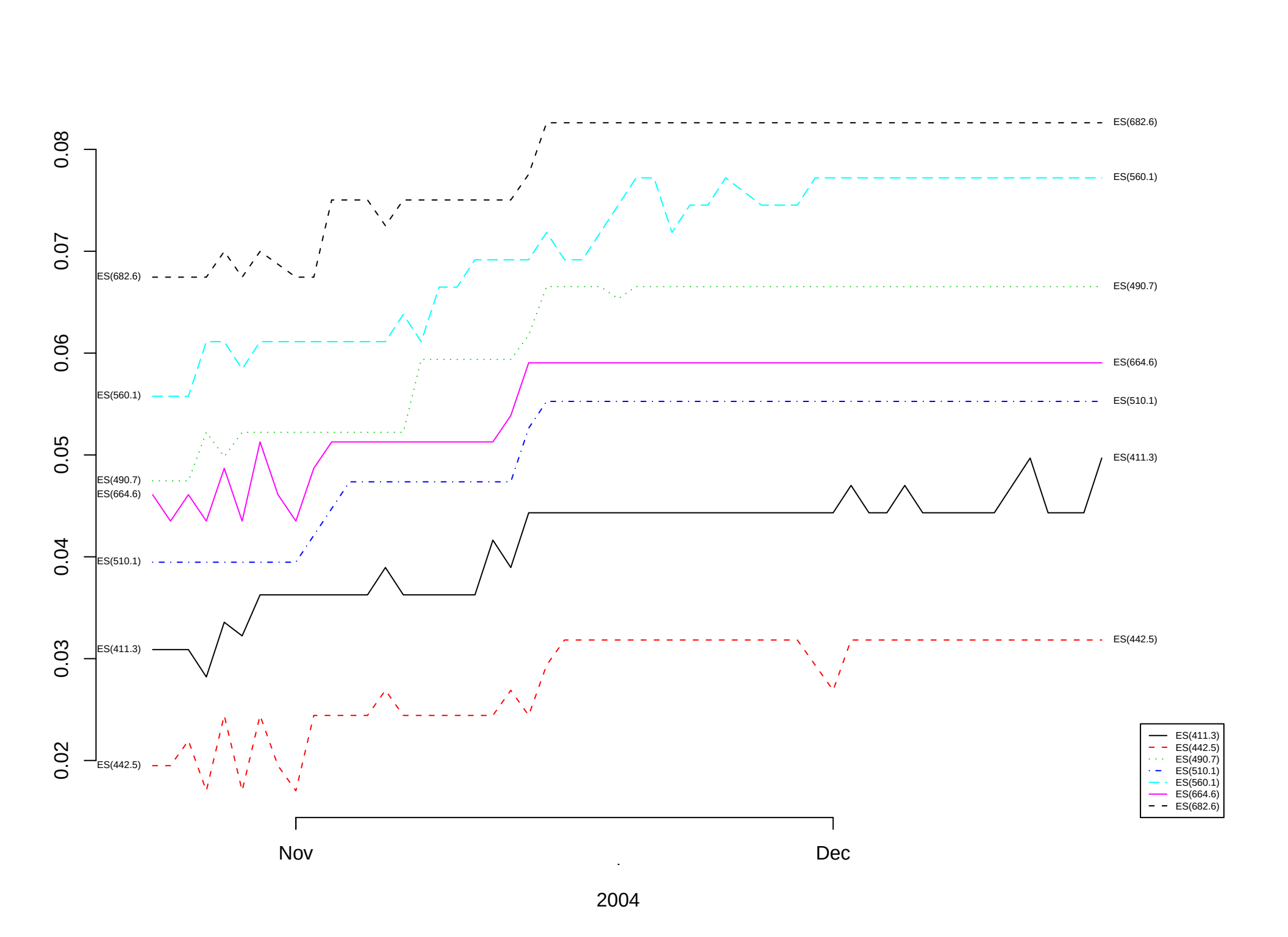
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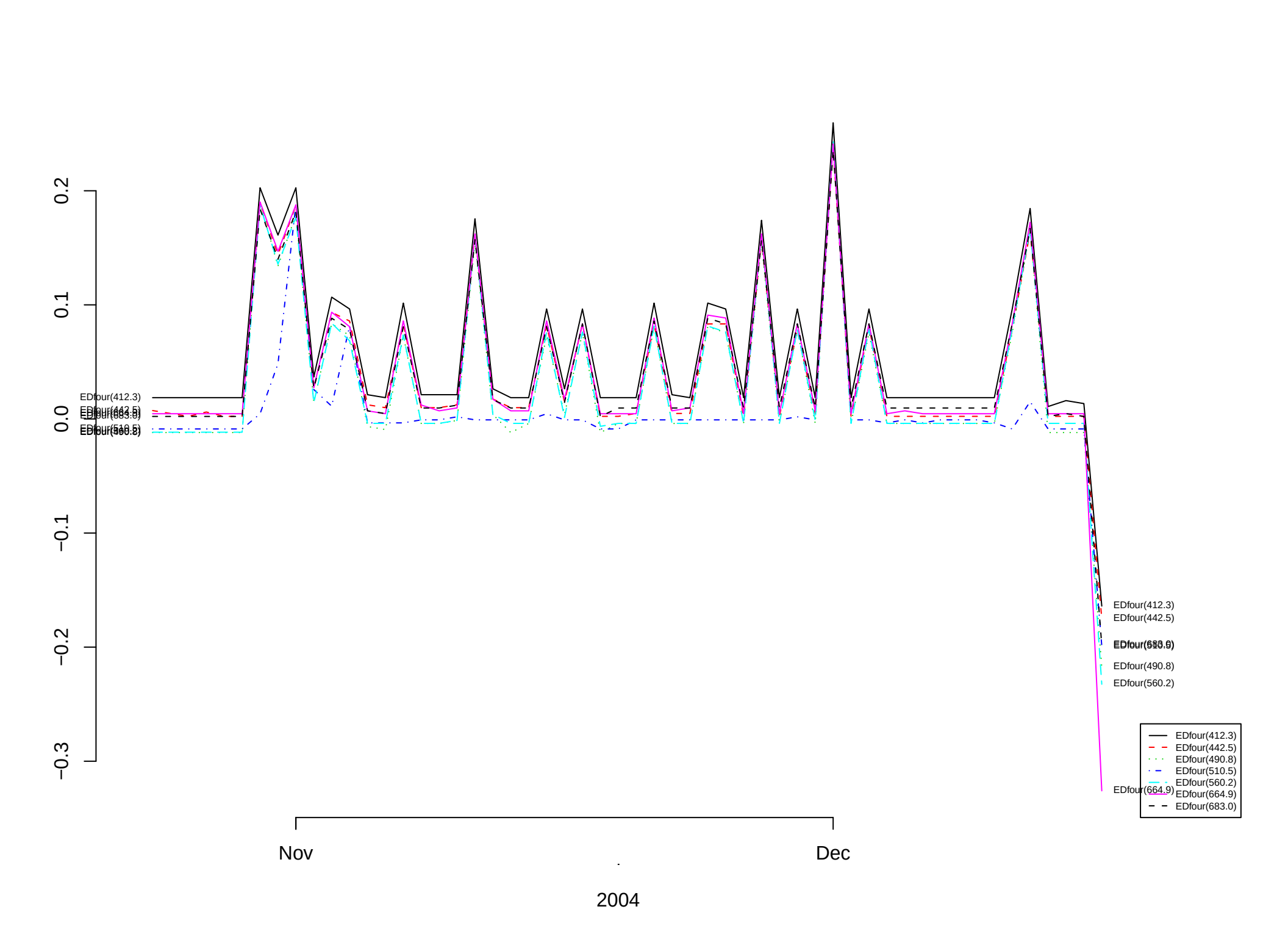
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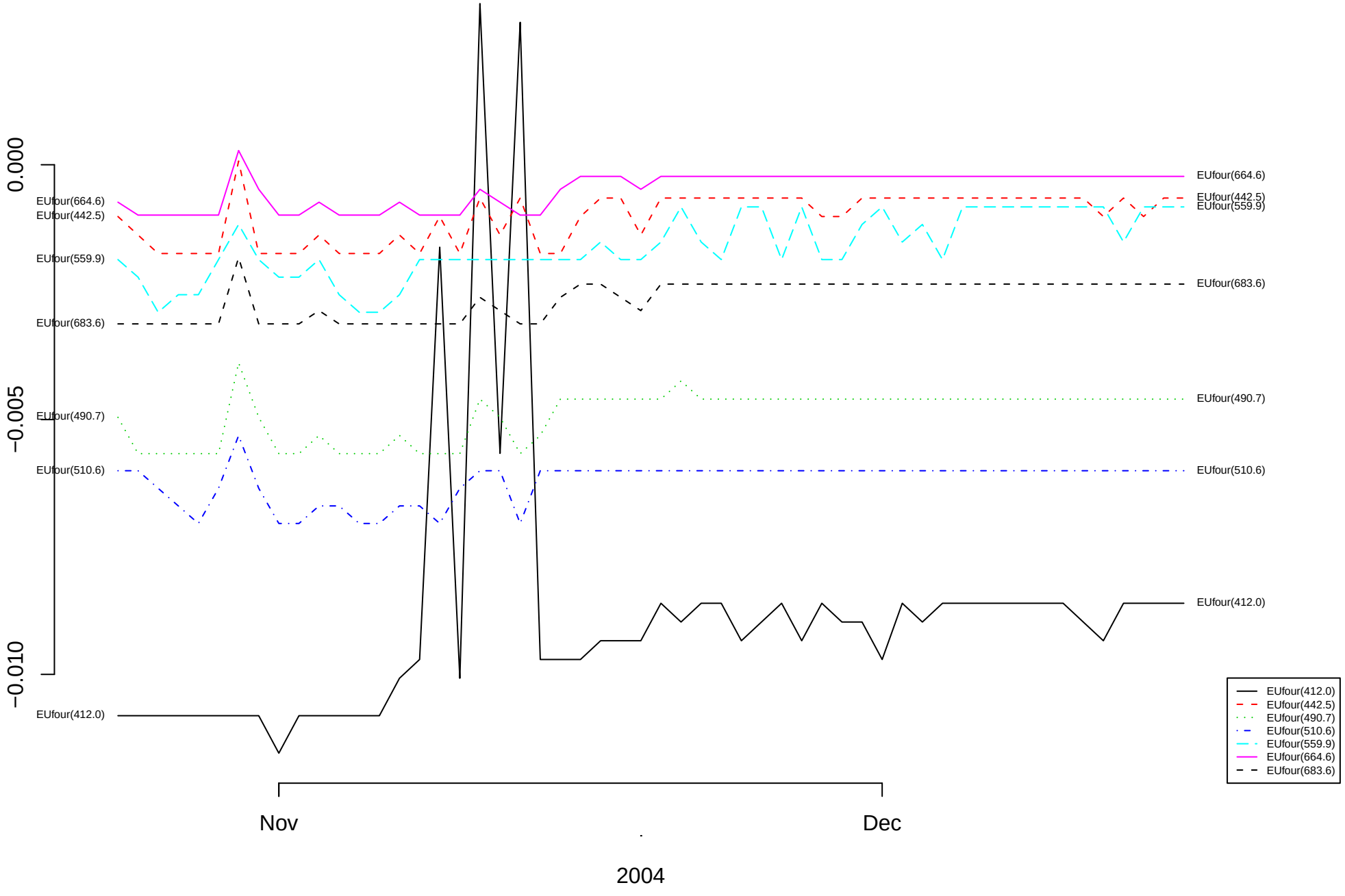
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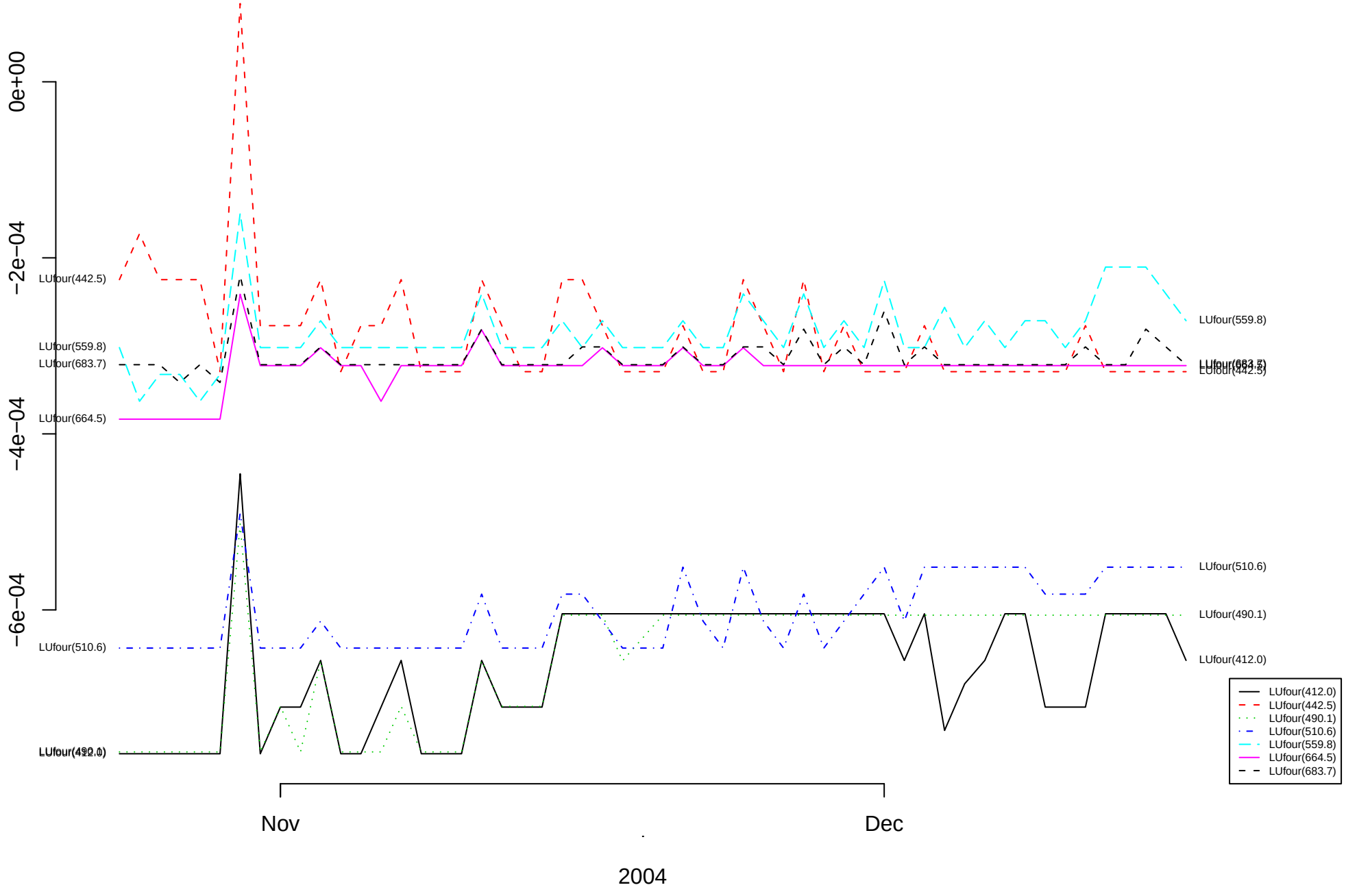
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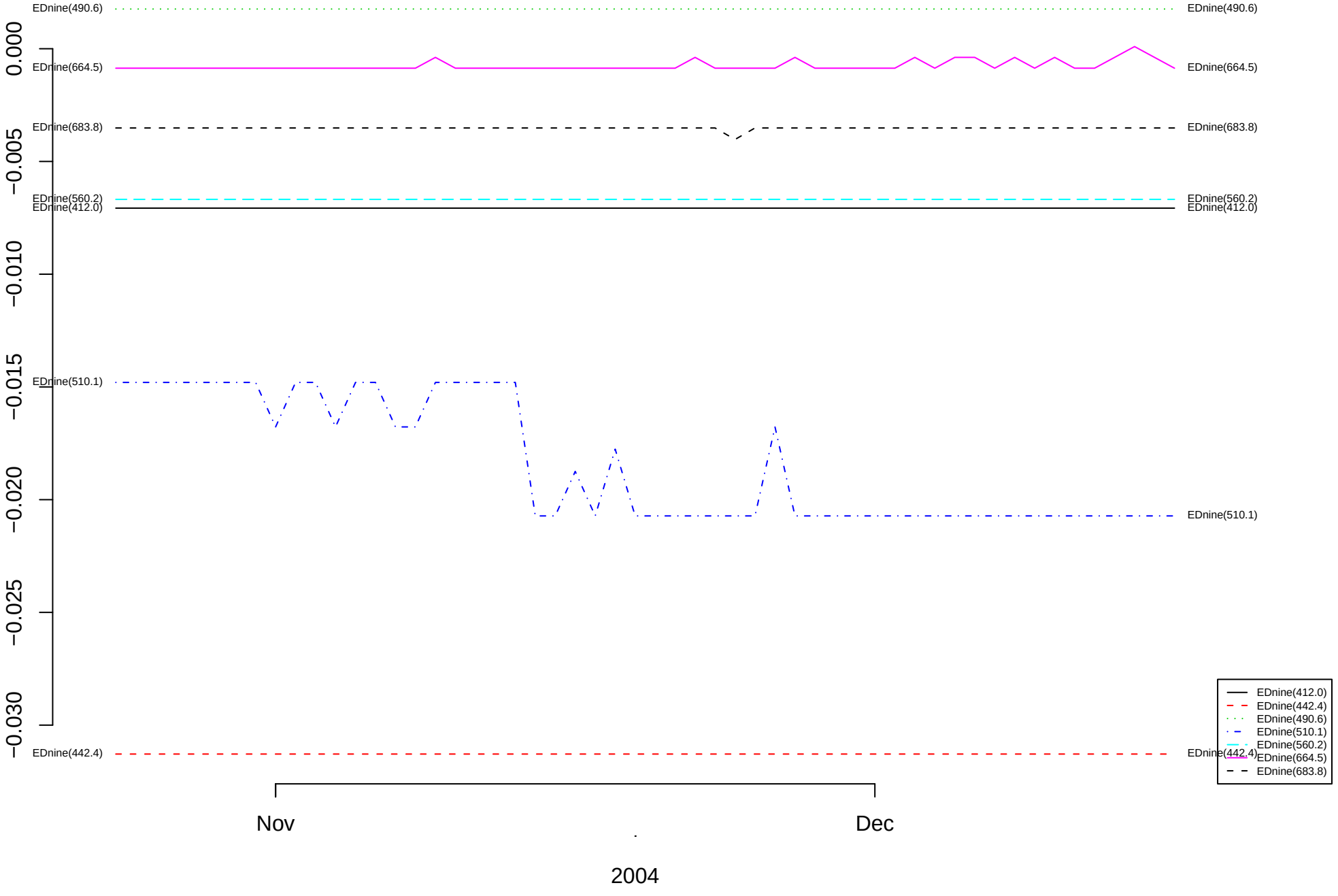
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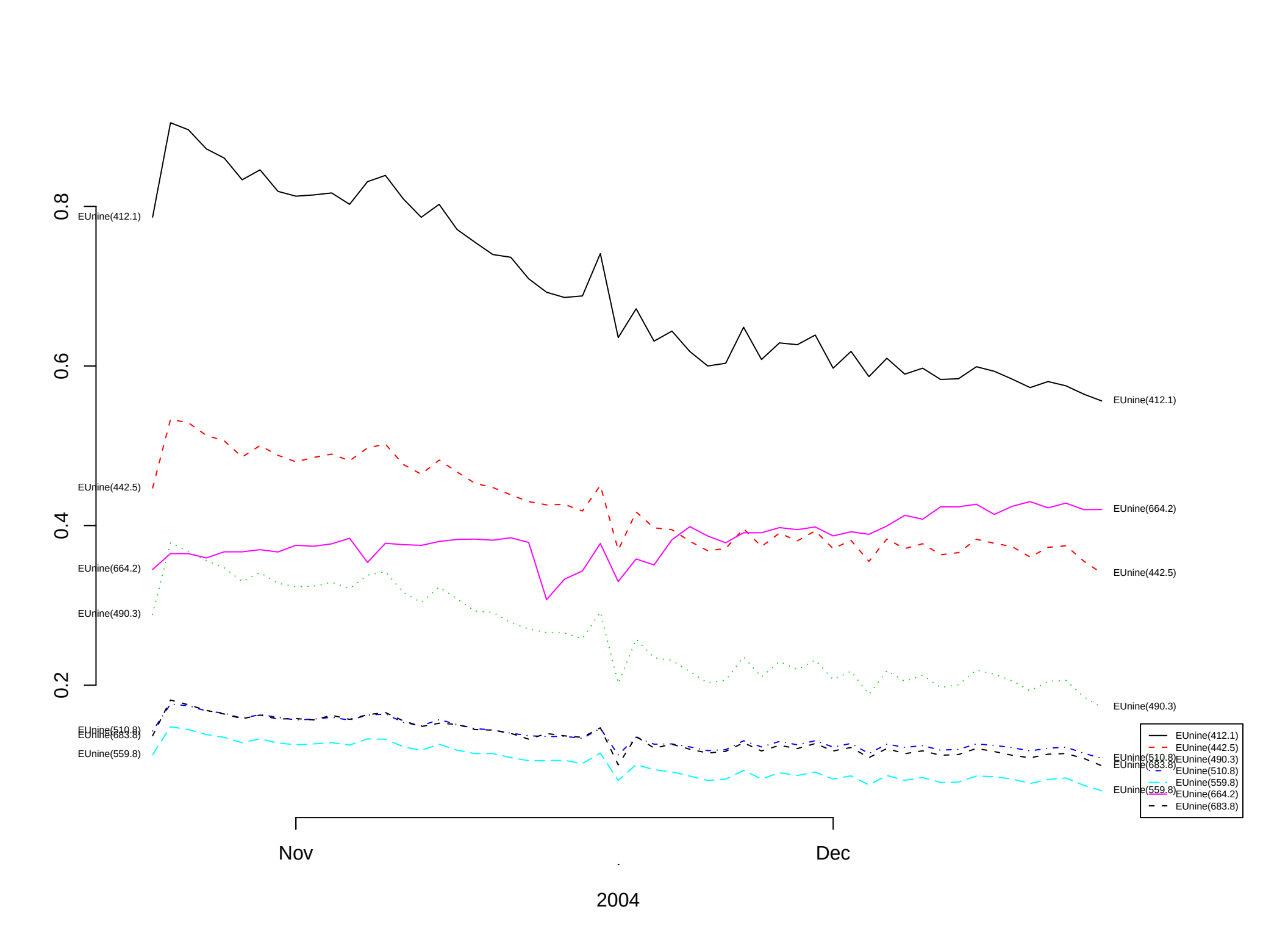
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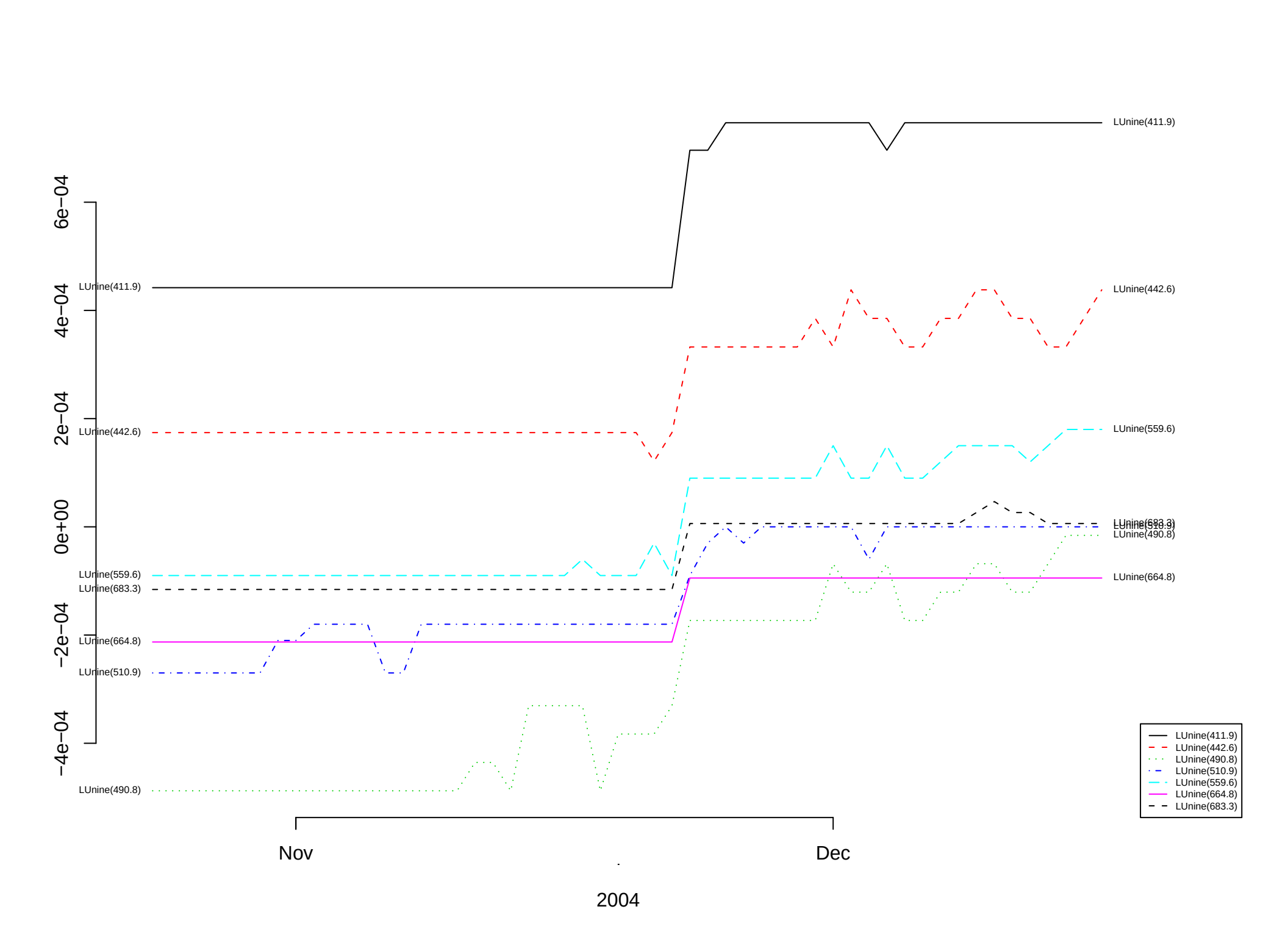
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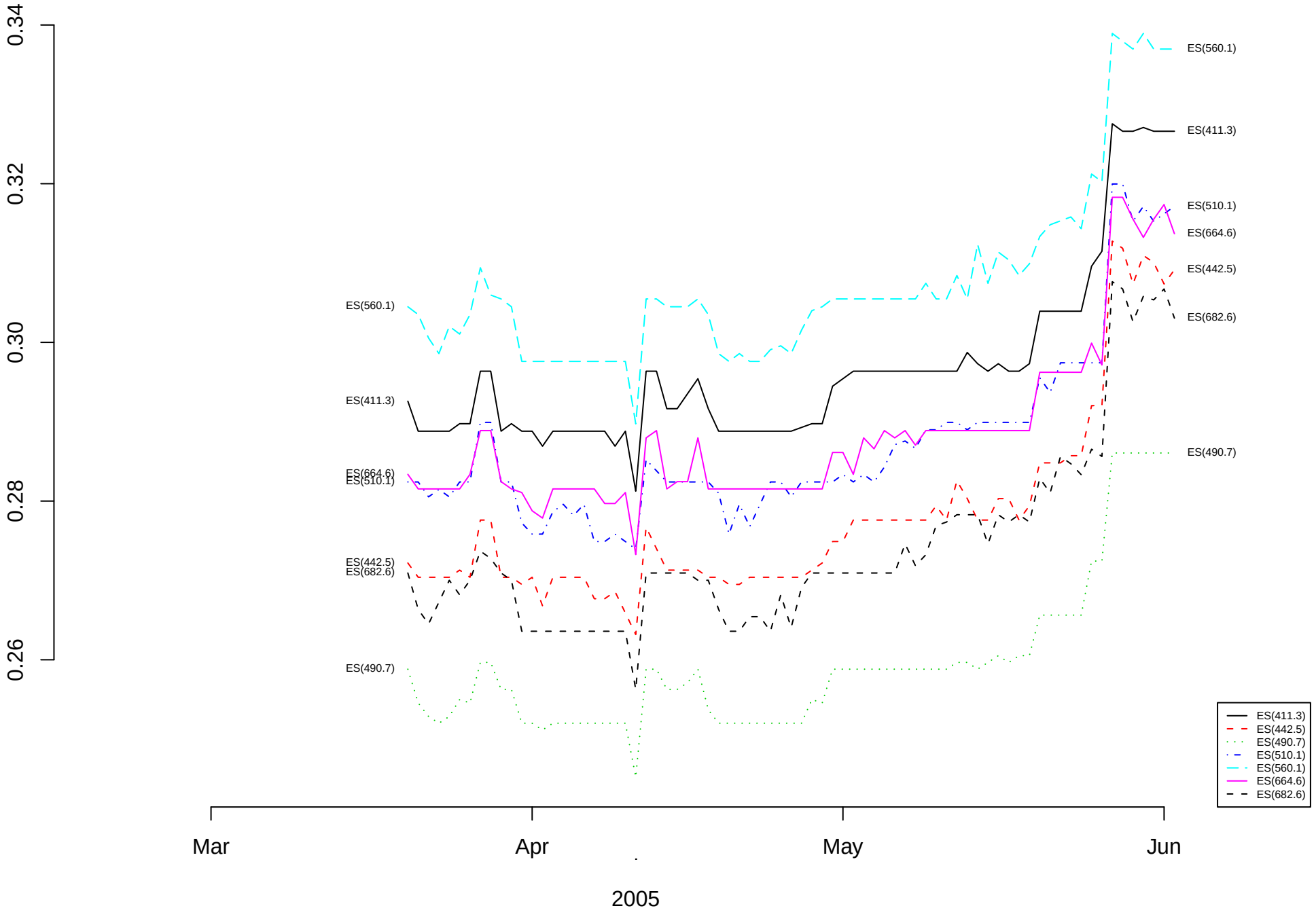
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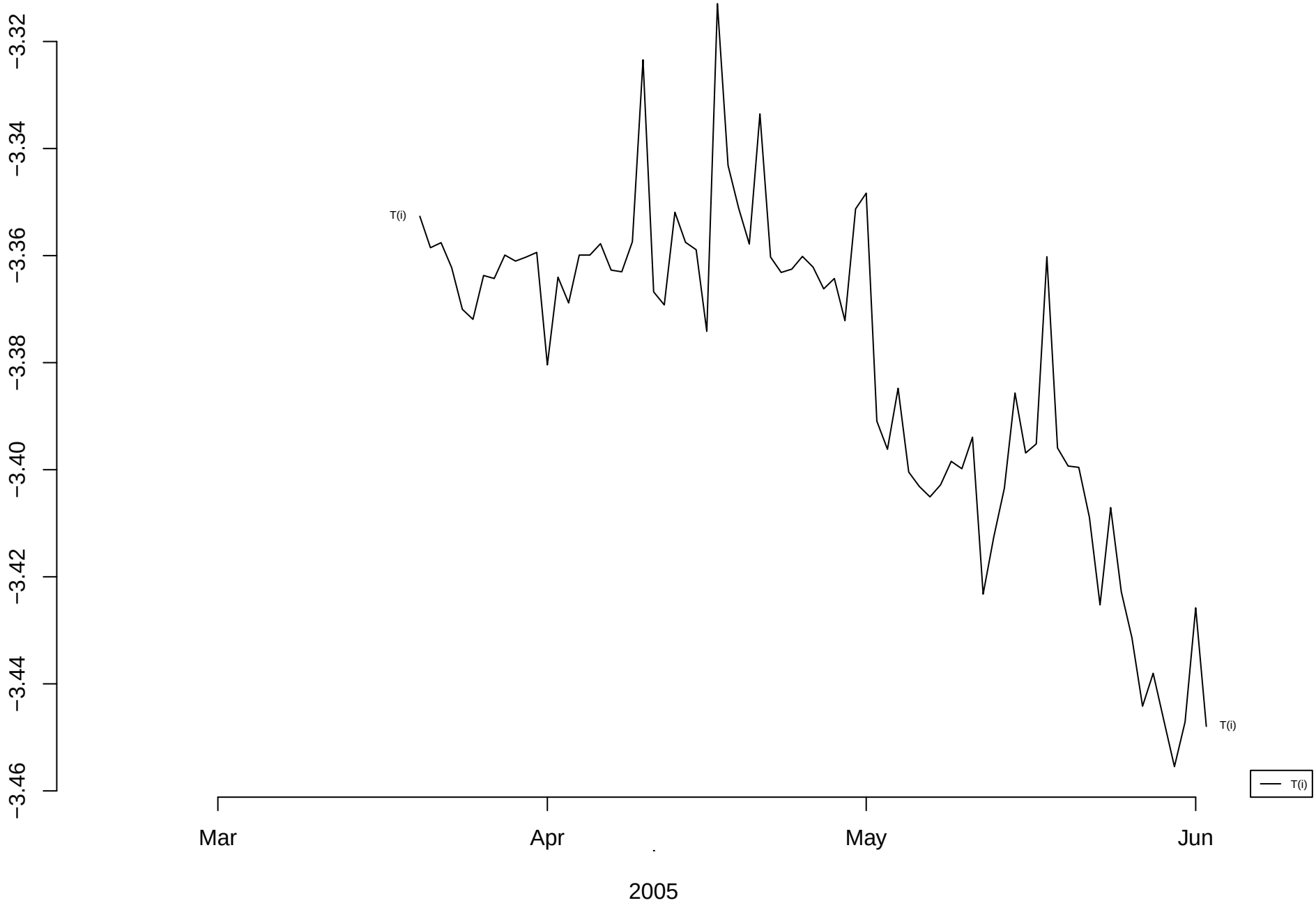
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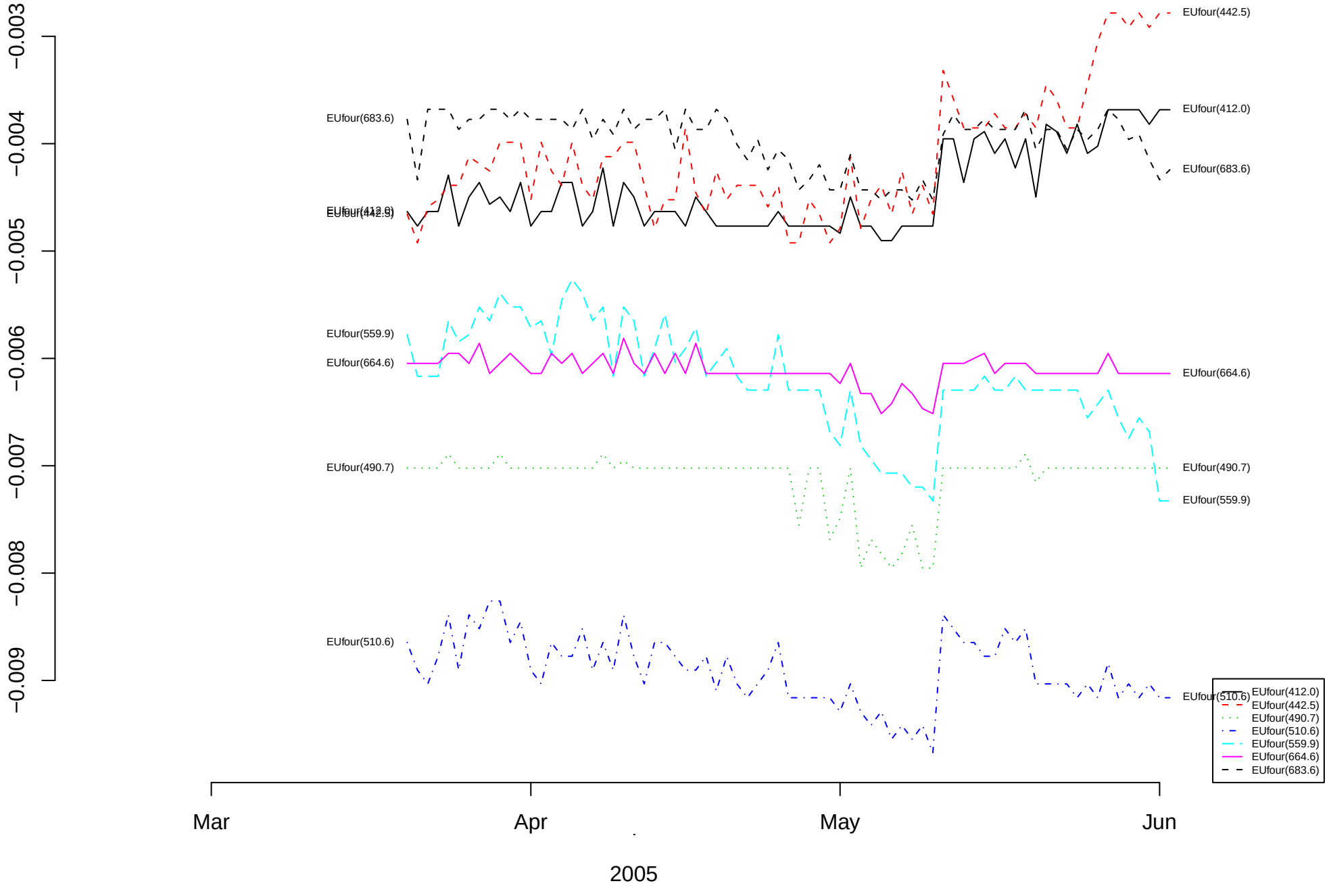
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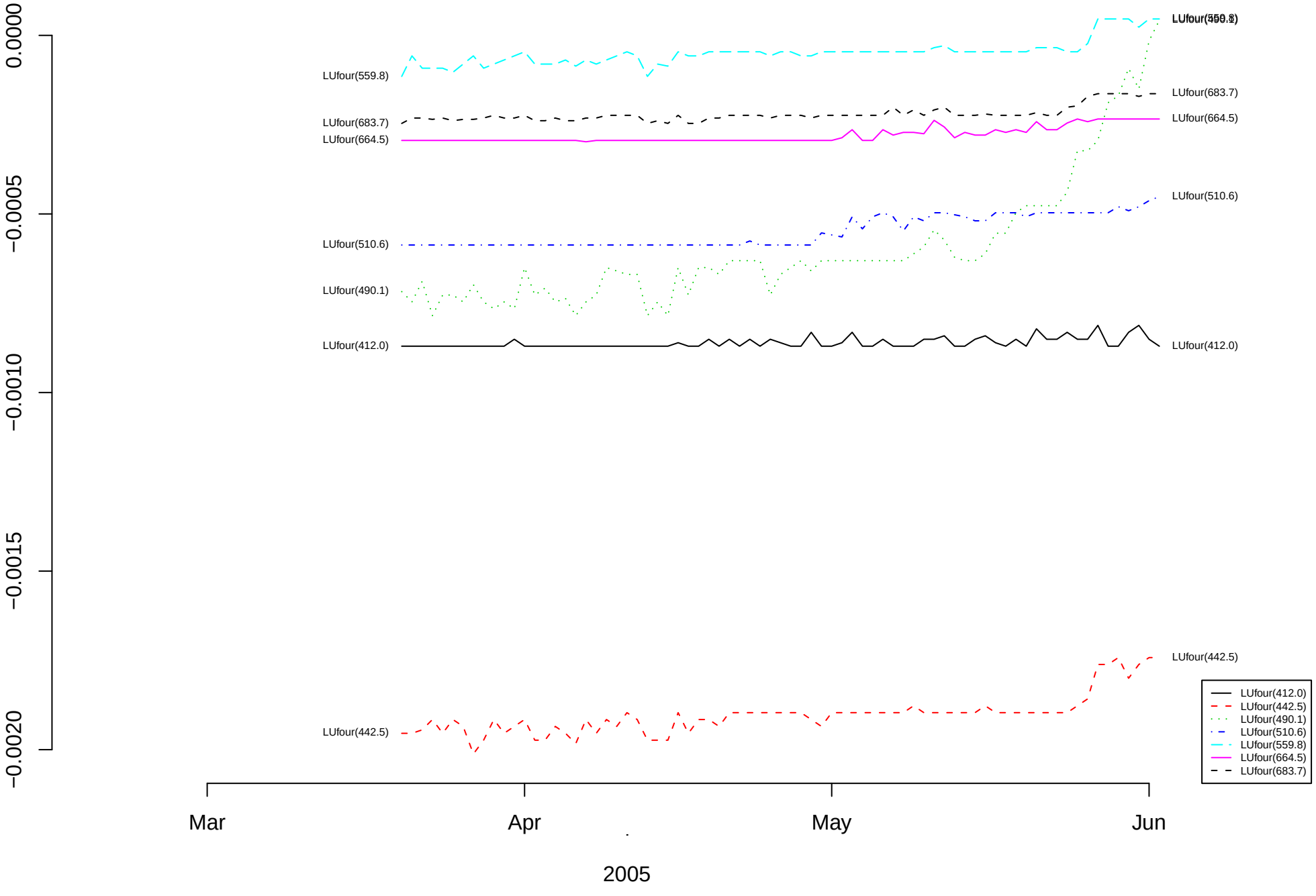
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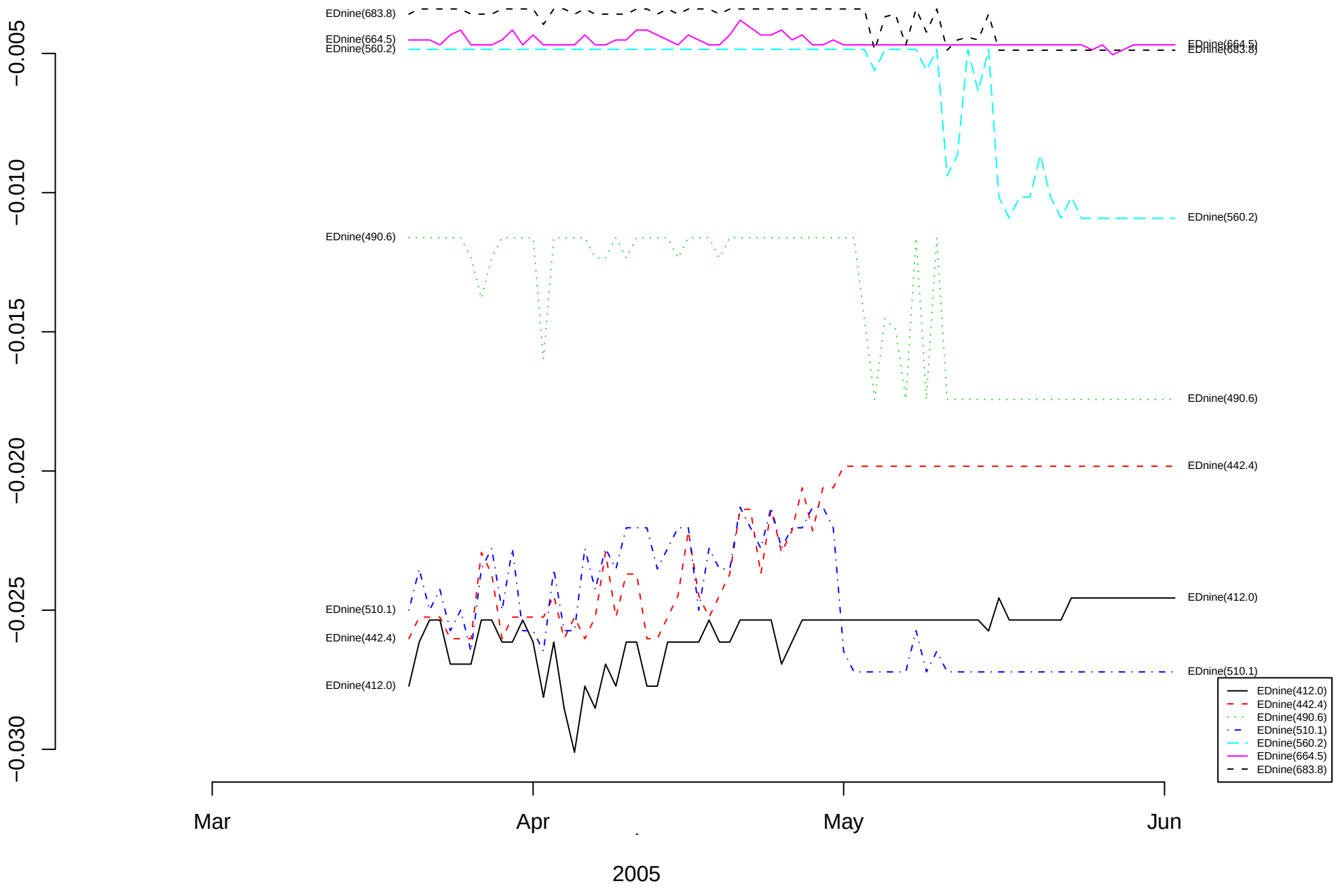
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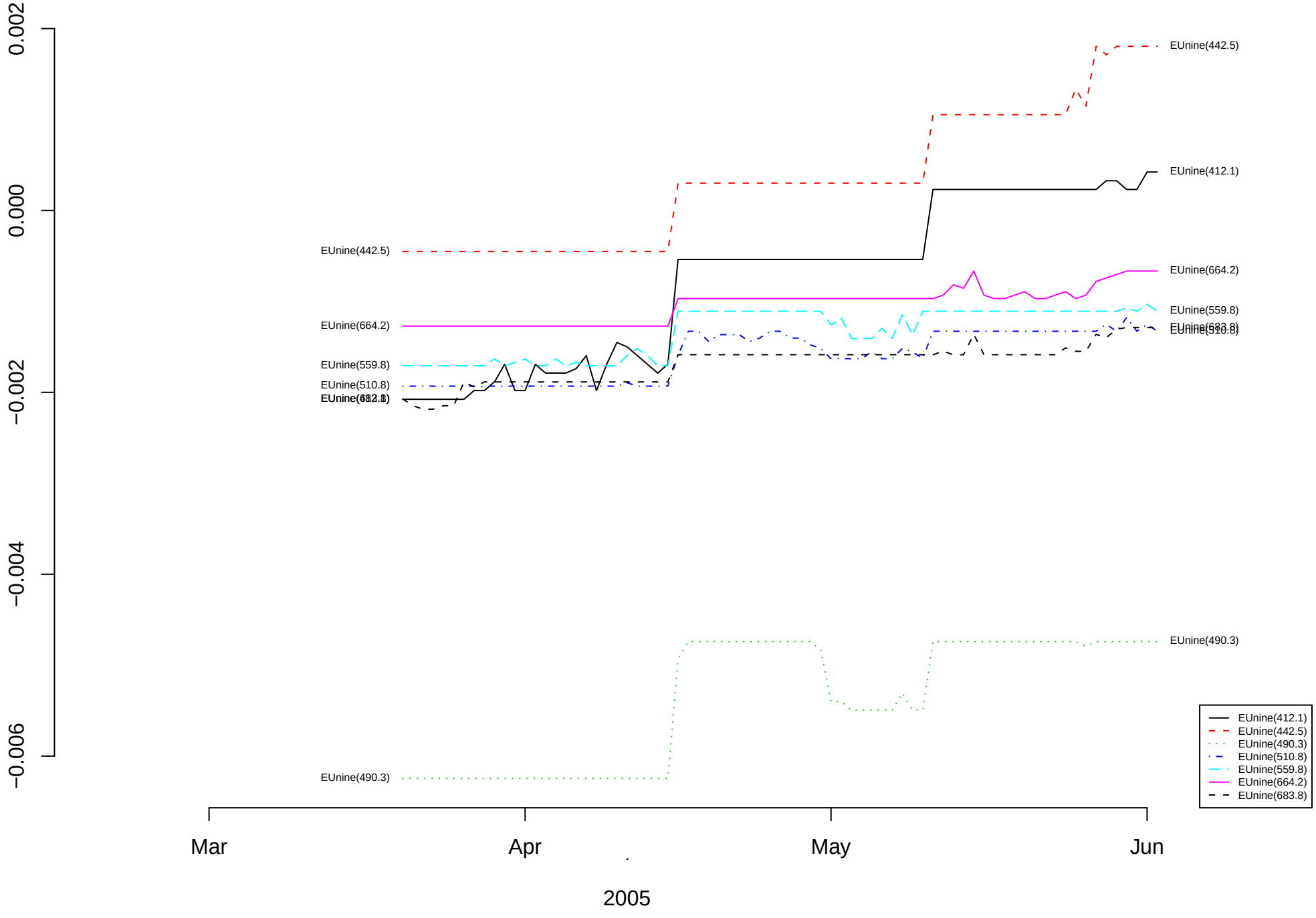
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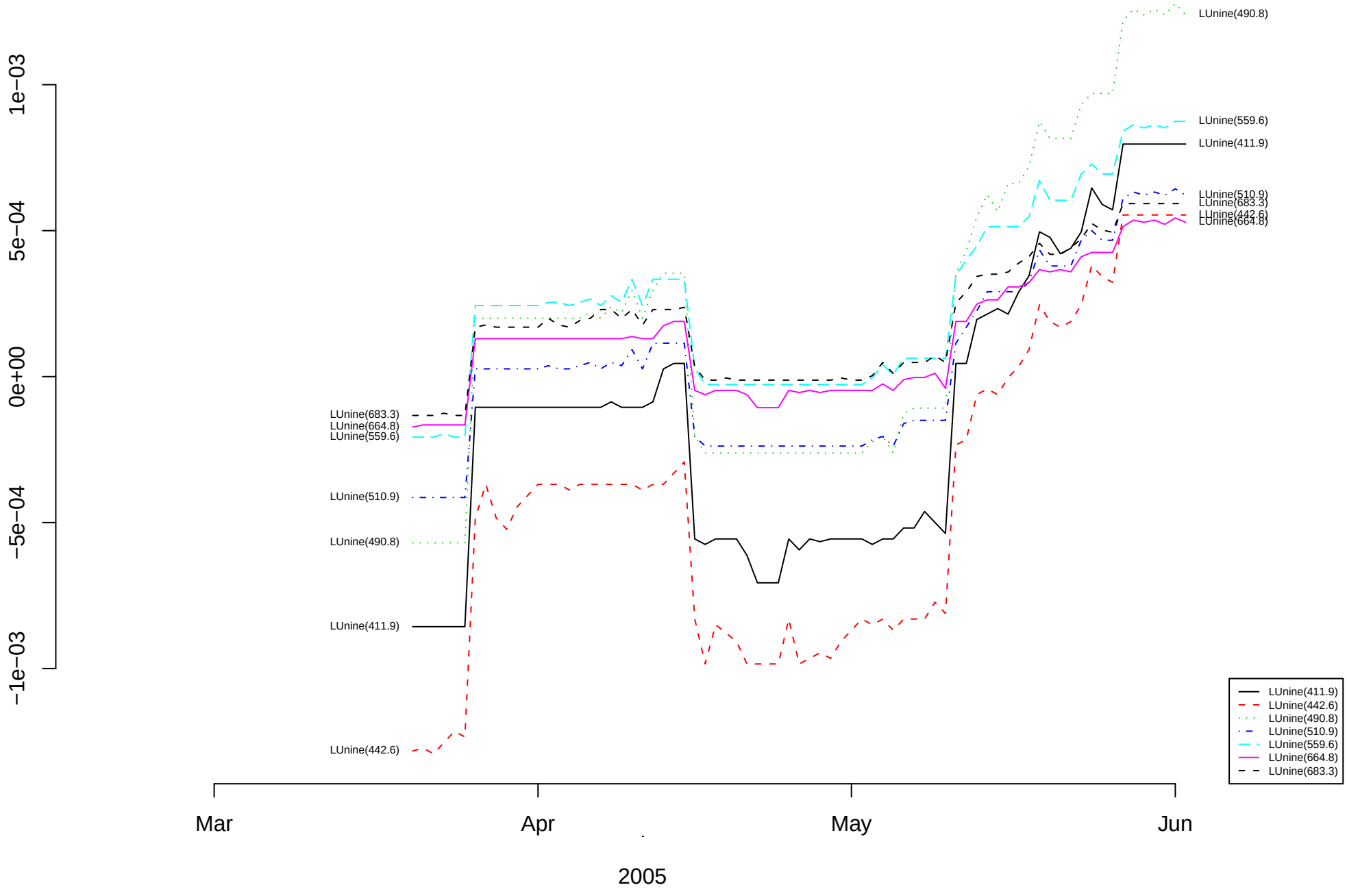
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