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**OPTICAL DATA FROM THE DUTCH COASTAL WATERS,  
WITH REFERENCE TO REMOTE SENSING APPLICATIONS<sup>st</sup>  
a data report**

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## ABSTRACT

This report contains the data of the research project REMONO (REMOte sensing NOrth sea), which has been carried out by the Netherlands Institute for Sea Research (NIOZ) in 1989. During several research cruises an extensive data set on the optical properties (upwelling and downwelling spectral irradiance, beam attenuation coefficient (at 670 nm), and the Secchi-disk depth) of the Dutch coastal waters has been compiled.

Besides optical data also biochemical data (chlorophyll-a concentration, total suspended matter concentration, yellow substance concentration) and hydrographical data (surface temperature, salinity, water depth) have been obtained at the  $\pm$  130 ship stations.

From the upwelling and downwelling spectral irradiances the spectral reflectance and the spectral irradiance attenuation coefficients have been computed.

The optical data is presented mainly graphically in this report as a function of wavelength, the remainder of the data is presented in tabular form.

The final objective of the work is to investigate and refine the relationships between the spectral reflectance of the seawater and the seawater composition. These relationships will be used for the interpretation of Remote Sensing images.

The investigations have been performed within the framework of the BCRS (National Remote Sensing Board) project A.O. - 3.3 "Interpretation of optical remote sensing measurements over coastal waters" and project T.O. - 1.24 "Investigations on the applicability of CAESAR for water quality monitoring". During one specific cruise in June, a national airborne remote sensing experiment has been performed in cooperation with the National Aerospace Laboratory and Rijkswaterstaat.

The final results on above mentioned research projects will be published soon (G. Marees and M.R. Wernand, 1990).

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# 1. INTRODUCTION

The REMONO (REMOte sensing NOrth sea) project has been carried out by the Netherlands Institute for Sea Research during four different periods of 1989 (april, may/june, august and november).

By the use of the underwater multi-spectral irradiance meter ASIR (see Spitzer and Wernand, 1986) an extensive data set on the optical properties of the Dutch coastal waters has been compiled.

The objective of the project is to develop practical remote sensing algorithms (relationships) from the spectral irradiance data and in-situ data on water quality. The main interest is in algorithms for the Dutch coastal waters, suited for multispectral remote sensing devices.

Similar studies performed in relatively clear ocean waters (the so-called Case I waters) have been reviewed by Gordon and Morel (1983).

The advantage of the use of the multispectral irradiance meter in this research is that virtually all spectral bands of (present and future) optical remote sensing scanners can be simulated. The spectral irradiance data from long lasting (ship-borne) research cruises covering large sea areas can so be correlated with corresponding in-situ data. Large data sets for the algorithm development have been compiled this way. Without the underwater irradiance meter just a few well-timed data points obtained at the time of satellite/(aircraft) pass can be available for the interpretation of a specific remote sensing image. In-situ data sampled a few hours (or days!) before or after a satellite pass are not representative for the water quality at the time of the satellite pass, leading to misinterpretation of the remote sensing image. This is especially the case for the variable coastal waters.

With respect to the optical data it is mentioned that not only the upwelling and downwelling spectral irradiances have been obtained. Also the beam attenuation coefficient (at 670 nm) and the Secchi-disk depth have been measured at each station. From the spectral irradiances the spectral reflectance and the diffuse (upwelling and downwelling) spectral attenuation coefficient have been calculated.

Besides optical data the following non-optical (surface) quantities have been determined for each station:

Chlorophyll-a concentration, Total Suspended Matter concentration (organic and an-organic fraction), Yellow Substance concentration, Temperature, Salinity and bottom-depth.

Research cruises have been performed in four different seasons in order to investigate the temporal variations of the algorithms. The optical data collected during research cruises of 1988 have not been presented in this report, but will be used in later analyses.

## 2. CRUISE AREA AND STATIONS

The research cruises with the R.V. Aurelia have been performed in the Dutch coastal waters (see fig. 1, the area enclosed by the rectangle).

During 4 different seasons of 1989 -april, may/june, august and november- data at 130 ship stations has been sampled. The locations of the various stations are shown in figs. 2 - 5 for the 4 periods. The precise geographical coordinates of the stations have been given in section 5 and in the appendices.

The ship stations are located in an area with large horizontal turbidity gradients; turbid waters are found near the coast and relatively clear waters at about 30 km from the coast (M. Visser et al., D. Eisma et al.).

The water depth at all stations was larger than 10 m. It can be calculated that for the turbid coastal waters, with the above mentioned water depths, the contribution of the bottom reflectance to the observed total reflectance is negligible (i.e. less than the noise equivalent  $\Delta\rho$  of the irradiance meter) (G. Marees and D. Spitzer, 1989).

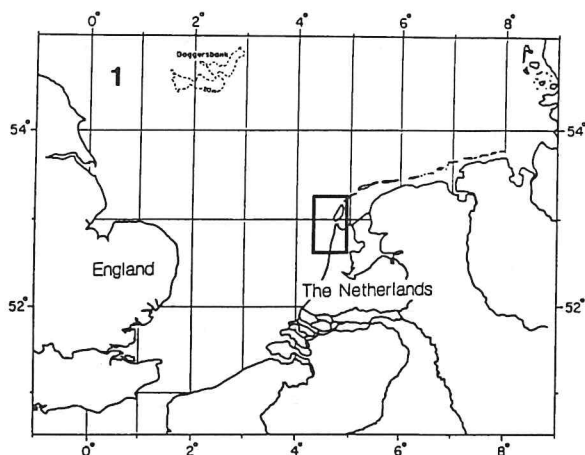


Fig. 1. Southern part of the North Sea.  
The cruise area is enclosed by the rectangle.

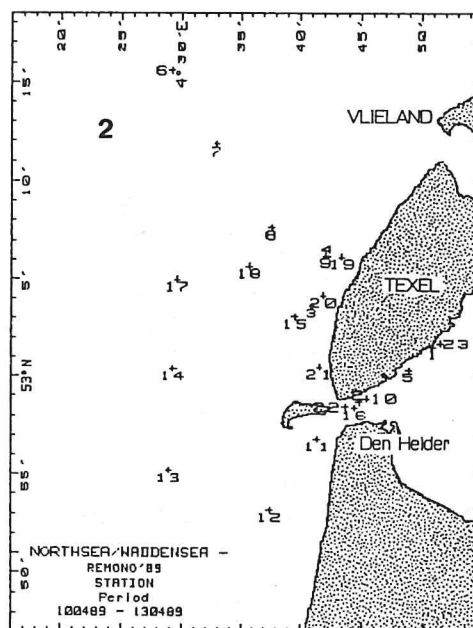


Fig. 2. Station positions april cruise



### 3. THE EXPERIMENT

#### 3.1 OPTICAL MEASUREMENTS

Most of the optical seatruth data have been obtained by means of an underwater spectral irradiance meter.

The at the NIOZ developed "Advanced Spectral Irradiance Meter" (fig.6 ASIR, see also front plate) can scan 22 spectral channels between 400 and 720 nm within several seconds. The spectral bandwidth of each channel is within 12 nm. The irradiance is collected by two cosine diffusers, one at each side of the instrument. The upwelling and downwelling irradiance is simultaneously detected and recorded on board by means of an HP data acquisition and storage system which is controlled by a microcomputer. Variations of the incident solar radiation are recorded by a separate instrument mounted at the top of the measuring platform. Irradiance depth profiles, characteristic for the structure of the water column, can also be recorded at a single chosen channel.

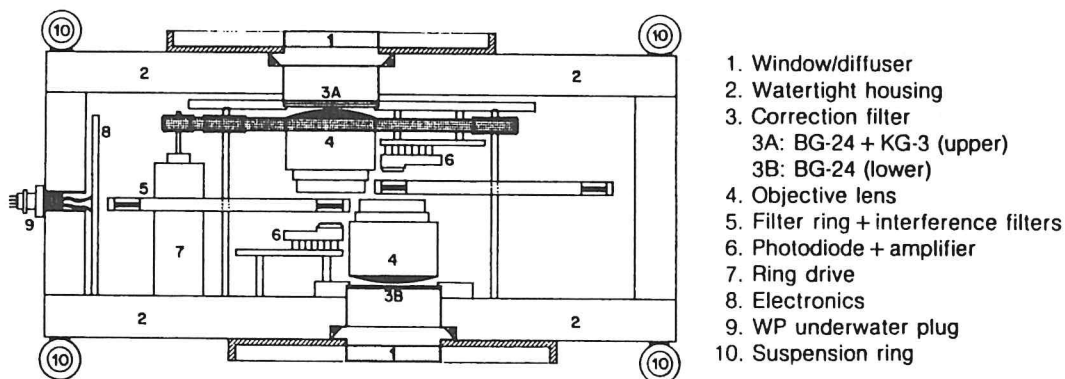


Fig. 6. Schematic drawing of the apparatus

At each station irradiance spectra have been measured at several depths (3 - 8) within the euphotic zone. In general, the maximum measuring depth corresponds roughly to the 1 % irradiance level, depending, of course, on the specific spectral band.

During the measurement of an irradiance spectrum, the variation of the incident solar radiation and of the measuring depth (due to wave action) have been frequently checked. When the variations of the downwelling solar irradiance were over 10% during an irradiance scan, the data acquisition program automatically stopped and started over

again. When the registered depth variations were found to be too large the whole scan was repeated. The irradiance meter has been calibrated before and after each cruise. At all stations also the Secchi-disk depth (disk  $\phi=30$  cm) has been determined.

The irradiance spectra as well as the Secchi-disk depth are so-called apparent quantities and depend, a.o., on the solar altitude. For this reason the measurements have been performed between 10.30h and 16.00h, at relatively high solar altitude.

Besides the earlier mentioned apparent optical quantities also the inherent transmission of a parallel beam of monochromatic light (at 670 nm) has been measured at all stations using a "SEATECH" transmissometer with a path length in the water of 25 cm. The transmission has been measured at several depths. From the beam transmission the beam attenuation coefficient  $C(670\text{nm})$  has been calculated on-line. It can easily be shown that the beam attenuation coefficient is proportional to the concentration of suspended materials in the water. We found that the attenuation coefficient was almost constant over the watercolumn, except for a sharp increase (up to a factor of 3) near the bottom due to resuspension of bottom materials. The transmissometer has been calibrated before each cruise by updating the so-called air-calibration coefficient.

During the cruises in april, june and august Schumacher (NIOZ) has made photographic images of suspended materials in the water column using a suspension camera. From the surface water samples of the April cruise a flow cytometric analysis has been made by Veldhuis (NIOZ). Hardly any correlation has been found between our optical data and the flow-cytometric data. Results on the last two issues have not been presented in this report.



### 3.2 NON-OPTICAL MEASUREMENTS

The objective of our remote sensing research is to investigate and refine the relationships between the spectral reflectance of seawater and the seawater composition.

There is a consensus in the international remote sensing world that the spectral reflectance of the sea water (the color of the sea) is determined by 3 quantities : the Total Suspended Matter concentration, the Chlorophyll concentration and the Yellow Substance concentration (dissolved organic materials ) (see for instance: Sathyendranath et al).

These 3 quantities have been determined from surface seawater samples using standard techniques and procedures (see Strickland and Parsons).

Summarizing:

The Total Suspended Matter concentration (TSM) is determined from the difference in weight of a 0.4  $\mu\text{m}$  polycarbonate filter before and after filtration of the seawater sample (details concerning the heating of the filter before weighing it are not discussed here).

The Chlorophyll concentration (Chl) is determined from a 1.2  $\mu\text{m}$  Whatman GF/C filter. After filtration of the seawater sample (1 à 2 liter) the filter is packed in aluminum foil and is immediately frozen at  $-20^{\circ}\text{C}$ . In the laboratory the Chlorophyll concentration is calculated from a fluoremetric method using a "Turner" fluorescence meter.

The Yellow Substance concentration (YS) is determined by measuring the transmission of the filtrate of the TSM filtration at wavelengths of 310 nm and of 500 nm by means of a double beam photospectrometer (Perkin Elmer model 200, path length = 5 cm). The transmission at 500 nm serves as a small correction for suspended particles still present in the filtrate. From the transmission at 310 nm and 500 nm, the Yellow Substance absorption at 380 nm is calculated assuming an exponential decrease of the absorption with increasing wavelength (Bricaud et al, 1981).

The sea surface temperature (read from bucket thermometers) and the surface salinity (determined in the laboratory using an Autosal salinometer) have also been given in section 5 and in the appendices. These quantities characterize the water mass and the hydrographical structure of the coastal area.

To check the accuracy of determination of all mentioned quantities, several duplicates and blanks have been processed.

#### 4. PRESENTATION OF THE DATA

The data have been presented in section 5 and in the appendices A, B, C and D of this report.

In section 5 tables with specific information on the various ship stations and corresponding seawater quality (surface values) have been presented for the 4 cruise periods.

Table headers:

|                                |                                                                                                 |
|--------------------------------|-------------------------------------------------------------------------------------------------|
| STATION:                       | station number                                                                                  |
| DATE:                          | date; [d/m/y](d=day, m=month, y=year)                                                           |
| LOC.TIME                       | local time; [hh.mm] (hh=hours, mm=minutes)                                                      |
| LATITUDE:                      | geographical latitude (N); DD,mmdd<br>(DD=degrees, mm=minutes, dd=decimal minutes)              |
| LONGITUD:                      | geographical longitude (E); DD,mmdd (idem)                                                      |
| Kd( $\lambda$ ) (1/m):         | attenuation coefficient for downwelling diffuse irradiance of wavelength $\lambda$ .            |
| TSM (g/m <sup>3</sup> ):       | Total Suspended Matter concentration                                                            |
| Co(670) (1/m):                 | Beam attenuation coefficient (at 670 nm)                                                        |
| SECCHI-D (m):                  | Secchi-disk depth                                                                               |
| CHLOROPH (mg/m <sup>3</sup> ): | Chlorophyll-a concentration                                                                     |
| T.P. (mg/m <sup>3</sup> ):     | Total Pigment concentration<br>(=Chlorophyll-a + Phaeophytine-a concent.)                       |
| Y.S. (1/m):                    | Yellow Substance concentration expressed by means of its light absorption coefficient at 380 nm |
| OrgSM (g/m <sup>3</sup> ):     | Organic part of Total Suspended Matter concentration                                            |
| SALINITY (o/oo):               | Salinity (in o/oo)                                                                              |
| TEMP. (°C):                    | sea surface temperature                                                                         |
| DEPTH (m):                     | water depth                                                                                     |

The meteorological conditions (wind speed, wind direction, cloudiness) and the wave height, current speed and current direction have been measured, but are not presented in this report.

A -1 in the table indicates that the specific quantity has not been measured.

In section 5 are besides the above mentioned tables, 4 graphs included; 1 graph for each cruise period. In the graphs the averaged near-surface reflectance  $R(\lambda)$  (average value found between 0 and 2.1 m depth) is plotted versus the wavelength. Each curve represents the reflectance at a specific station. The diversity of reflectance curves is illustrative for the diversity of the water quality in the coastal areas.

The individual reflectance curves are shown in the appendices. In table II, for the june period, the station numbers 3201 up to 3215 correspond to an anchor station at which at each hour data has been collected.

In APPENDICES A-D spectral data obtained with the underwater irradiance meter ASIR are presented. Appendix A shows the data of the april cruise, appendix B the data of the june cruise etc. Each page of the appendices corresponds to another ship station.

In the upper left graph the downwelling spectral irradiance  $E_d$  (units  $W/m^2/nm$ ) is plotted versus the wavelength (in nm). Note that the graphs are semi-logarithmic. The specific measuring depth (in m) is plotted at the right-hand side of each curve. Negative depths in the april and june period have been caused by wave action: the zero depth level has been chosen just below the sea surface. In the later cruises the depth sensor has been "nulled" above the surface.

In the middle left graph the upwelling spectral irradiance  $E_u$  is plotted in a similar way. Not all the measured irradiance spectra are presented for reasons of clarity. A representative selection of the spectra has been made, with the emphasis on the near surface spectra. The up- and downwelling irradiance spectra are not corrected for variations of the downwelling solar irradiance.

The spectral reflectance  $R$  (%) has been calculated on-line using the  $E_u$  and  $E_d$  spectra. The results are shown in the lower left (non-logarithmic) graphs. The used symbols for the different depths in the reflectance graphs correspond to the similar symbols in the irradiance graphs.

The upper graph at the right-hand side in the appendices shows the attenuation of downwelling diffuse irradiance  $K_d(\lambda) = -(\ln(E_{d1}/E_{d2}))/\Delta z$  on a linear scale versus the wavelength. The different line-types in the graphs correspond to different depth intervals  $\Delta z$  ( $=z_1-z_2$ ) over which the attenuation has been calculated. The mentioned depth intervals are shown together with the corresponding line types just below the horizontal axes. Before calculation of the  $K$  spectra the irradiance spectra have been corrected for the difference in downwelling solar irradiance. Just a few of the calculated spectra are shown in the graphs for clarity.

The graphs in the middle at the right-hand side show the attenuation of upwelling diffuse irradiance  $K_u(\lambda)$  in a similar way as described before for  $K_d(\lambda)$ .

Sometimes a spectral curve in one of the 5 described graphs is interrupted at a certain wavelength interval. This indicates that either the magnitude of the upwelling or the magnitude of the downwelling irradiance is close to its so-called dark current value. When in the attenuation graphs the usual symbols (+) have been replaced by circles (o) the relative error of the calculated attenuation becomes large for the same reasons as mentioned above. One is mentioned that the downwelling irradiance spectra have been manually smoothed in some cases before the calculation of  $K_d$ .

The table in the lower right-hand side shows relevant station information (earlier shown in section 5). The spectra of station 19 of the april period are not shown because of technical problems. The relevant spectral data of station 19 have been used in later analyses. Due to the low solar altitude spectral data at stations 3209 upto 3215 has not been measured.

It is noted that the reliability of the optical data has been badly influenced in some cases by the presence of surface waves in two ways:

1. the actual underwater path length of the irradiance changes during the scan of a single spectrum.
2. the waves act as "burning glasses" and can randomly focus the irradiance on a diffuser during a scan.

Both phenomena sometimes result in totally unusable spectra. In this report spectra for all stations are presented. It should be clear, however, that for some stations not the complete measured spectrum can be used in further analyses.

The spectral data of, for instance, stations:  
4,5,10,12 of the april period  
and of stations:

1,2,3,4 of the november period are totally unusable.

In general, the spectra of the april and of the november cruise are less smooth than these of the june and the august cruise.

## 5. SEATRUTH DATA DUTCH COASTAL WATERS

### DATA APRIL PERIOD

| STATION | DATE    | LOC.TIME | LATITUDE | LONGITUDE | Kd(S12) | TSM    | Co(660) | SECCHI-D | CHLOROPH | T.P.    | Y.S.  | SALINITY | Kd(670) | TEMP. | DEPTH |
|---------|---------|----------|----------|-----------|---------|--------|---------|----------|----------|---------|-------|----------|---------|-------|-------|
|         | [d/m/y] | [h.m]    | [N]      | [E]       | (m-1)   | (g/m3) | (m-1)   | (m)      | (mg/m3)  | (mg/m3) | (m-1) | (o/oo)   | (m-1)   | (°C)  | (m)   |
| 1       | 100489  | 10.25    | 53.0147  | 4.5087    | 1.55    | 22.3   | 6       | 1        | 11.4     | 15      | 2.2   | 28.879   | 1.65    | 7.5   | 26    |
| 2       | 100489  | 12       | 52.5866  | 4.4477    | .85     | 9.4    | 3.4     | 1.9      | 12.8     | 13.9    | 2.3   | 30.447   | 1.1     | 7.6   | 33.5  |
| 3       | 100489  | 13.05    | 53.0362  | 4.4099    | .67     | 4.9    | 2.2     | 3        | 13.2     | 14.7    | 1     | 31.751   | .95     | 7.7   | 13.5  |
| 4       | 100489  | 13.5     | 53.0614  | 4.4228    | .55     | 14.2   | 2.1     | 3        | 11.1     | 11.1    | 1.3   | 31.893   | .9      | 8     | 13.5  |
| 5       | 100489  | 15.45    | 53.0029  | 4.4888    | 1.3     | 14.6   | 4.9     | 1.4      | 12.4     | 12.4    | 1.4   | 28.819   | 1.3     | 7.6   | 20    |
| 6       | 110489  | 11.3     | 53.1556  | 4.2924    | .5      | 3.7    | 2.1     | 3.3      | 16.1     | 17.3    | .95   | 33.316   | .75     | 7.6   | 30.5  |
| 7       | 110489  | 12.35    | 53.118   | 4.3298    | .65     | 3.7    | 2.5     | 2.9      | 21.9     | 21.9    | .98   | 30.056   | .85     | 7.6   | 30    |
| 8       | 110489  | 13.5     | 53.076   | 4.3765    | .6      | 5.5    | 2.1     | 2.5      | 15.9     | 18.2    | .83   | 32.2     | .7      | 7.6   | 24.5  |
| 9       | 110489  | 14.4     | 53.0617  | 4.4213    | .65     | 10.3   | 2.9     | 2.5      | 18.8     | 21.7    | .97   | 31.739   | .95     | 7.6   | 12.5  |
| 10      | 110489  | 15.5     | 52.5884  | 4.4539    | 1.6     | 21.5   | 5.5     | 1        | 16.8     | 17.4    | 1.4   | 30.525   | 1.5     | 7.7   | 29    |
| 11      | 120489  | 9.55     | 52.5678  | 4.4138    | 1.5     | 18.7   | 4.5     | 1.4      | 21.6     | 23.3    | .85   | 30.928   | 1.25    | 7.7   | 28.5  |
| 12      | 120489  | 11.1     | 52.5315  | 4.3747    | 1.05    | 22.3   | 2.9     | 1.9      | 15.2     | 15.2    | 1.4   | 31.371   | 1.1     | 7.7   | 13    |
| 13      | 120489  | 12.3     | 52.5517  | 4.2896    | .5      | 3.6    | 1.9     | 3.5      | 16.4     | 16.5    | .64   | 32.483   | .9      | 7.8   | 27.5  |
| 14      | 120489  | 13.3     | 53.0035  | 4.2929    | .6      | 2.9    | 2       | 3.8      | 17.9     | 19.4    | .66   | 32.872   | .8      | 8.1   | 28.5  |
| 15      | 120489  | 14.3     | 53.0304  | 4.3958    | .5      | 3.4    | 1.9     | 3.5      | 8.4      | 8.8     | .54   | 31.859   | .8      | 8     | 14.5  |
| 16      | 120489  | 15.3     | 52.5838  | 4.444     | .62     | 5.5    | 2.6     | 2.2      | 13.1     | 14.3    | .76   | 30.652   | .9      | 8     | 36.5  |
| 17      | 130489  | 10.15    | 53.0494  | 4.2966    | .35     | 3.3    | 1.4     | 4.5      | 12       | 12      | .87   | 32.504   | .52     | 7.7   | 26.5  |
| 18      | 130489  | 11.15    | 53.0562  | 4.3574    | .48     | 2.3    | 1.7     | 3.5      | 10       | 10      | 1.1   | 31.502   | .8      | 8     | 24.5  |
| 19      | 130489  | 12       | 53.0611  | 4.4342    | 1.24    | 8      | 3.8     | 2        | 30       | 33.9    | 1.2   | 31.526   | 1.39    | 7.9   | 13.5  |
| 20      | 130489  | 12.45    | 53.0414  | 4.4191    | .7      | 3.5    | 2.6     | 3.2      | 23.1     | 28.4    | .95   | 31.8     | 1.05    | 7.95  | 14.5  |
| 21      | 130489  | 13.3     | 53.0044  | 4.416     | .75     | 5.9    | 2.7     | 2.7      | 16.1     | 18.5    | 1.1   | 31.259   | 1.05    | 8     | 11    |
| 22      | 130489  | 14.1     | 52.5842  | 4.4366    | .85     | 8.9    | 2.9     | 2.25     | 25.7     | 30.8    | 1.2   | 30.852   | 1.15    | 8.1   | 33.5  |
| 222     | 130489  | 14.3     | 52.5842  | 4.4366    | .71     | 4.2    | 2.3     | 2.5      | 21.4     | 24.3    | 1.1   | 30.863   | 1.05    | 8.3   | 33.5  |
| 23      | 130489  | 15.3     | 53.0166  | 4.5149    | .59     | 5      | 2.1     | 2.7      | 11.6     | 12.3    | 1.3   | 29.038   | .85     | 8.2   | 26.5  |

### DATA MAY/JUNE PERIOD

| STATION | DATE    | LOC. TIME | LATITUDE | LONGITUDE | Kd(520) | TSM    | Co(670) | SECHCHI-D | CHLOROPH | OrgSM  | V.S.  | SALINITY | Kd(670) | TEMP. | DEPTH |
|---------|---------|-----------|----------|-----------|---------|--------|---------|-----------|----------|--------|-------|----------|---------|-------|-------|
|         | [d/m/y] | [h.m]     | [N]      | [E]       | (m-1)   | (g/n3) | [m-1]   | (m)       | (mg/n3)  | (g/n3) | (m-1) | (o/oo)   | (m-1)   | (°C)  | (m)   |
| 1       | 290589  | 12.05     | 53.1713  | 4.2739    | .2      | 4.18   | .67     | 10        | 3.51     | 2.5    | 1.5   | 33.011   | .5      | 13.4  | 28.1  |
| 2       | 290589  | 13.3      | 53.12    | 4.3294    | .22     | 2.33   | .77     | 7         | 6.25     | 1.2    | 1.5   | 31.171   | .53     | 12.8  | 28.9  |
| 3       | 290589  | 14.3      | 53.0773  | 4.3777    | .35     | 1.93   | .9      | 7.5       | 9.11     | 1.07   | 1.6   | 32.218   | .55     | 14.2  | 23.5  |
| 4       | 290589  | 15.15     | 53.0626  | 4.417     | .44     | 2.82   | .95     | 6         | 6.59     | 1.78   | 1.5   | 32.408   | .6      | 13.6  | 14.2  |
| 5       | 300589  | 10.1      | 53.0559  | 4.3538    | .4      | 4.38   | .83     | 6.5       | 4.52     | 2.2    | 1.67  | 32.874   | .8      | 13    | 23.2  |
| 6       | 300589  | 11.35     | 52.5865  | 4.4498    | .7      | 4.27   | 1.2     | 4         | 10.47    | 1.68   | 2.1   | 28.298   | .75     | 15.7  | 30.5  |
| 7       | 300589  | 13.1      | 53.0066  | 4.491     | .95     | 11.71  | 1.85    | 2         | 12.11    | 3.81   | 2.1   | 29.538   | 1.05    | 15    | 18.2  |
| 8       | 300589  | 13.5      | 53.0155  | 4.5143    | .8      | 6.5    | 1.55    | 3         | 11.58    | 3.14   | 2.1   | 29.882   | .95     | 14.8  | 30    |
| 9       | 310589  | 9.5       | 52.5676  | 4.1116    | .82     | 9.25   | 1.65    | 3         | 9.29     | 5.35   | 1.9   | 29.406   | 1.15    | 14.6  | 16.2  |
| 10      | 310589  | 10.4      | 52.5334  | 4.3776    | .72     | 4.53   | 1.41    | 3.5       | 9        | 1.91   | 1.8   | 30.498   | .95     | 14    | 11.5  |
| 11      | 310589  | 11.45     | 52.5669  | 4.4113    | .7      | 3.1    | 1.61    | 3.5       | 13.29    | .54    | 2.1   | 28.878   | .95     | 14.8  | 15.5  |
| 12      | 310589  | 13.05     | 52.5727  | 4.417     | .75     | 9.23   | 1.56    | 3.5       | 13.53    | 4.86   | 2.4   | 27.825   | .75     | 15.3  | 22.9  |
| 13      | 310589  | 13.4      | 52.5862  | 4.4498    | .62     | 4.2    | 1.5     | 3.5       | 10.59    | 2.08   | 2.5   | 27.765   | .85     | 15.6  | 28.9  |
| 14      | 310589  | 14.15     | 52.598   | 4.4799    | .8      | 9.25   | 2.57    | 2.5       | 15.11    | 3.95   | 2.1   | 28.486   | .8      | 15.6  | 19.9  |
| 15      | 310589  | 14.55     | 53.0214  | 4.521     | 1.4     | 10     | 2.6     | 1.75      | 13.35    | 3.24   | 2.2   | 28.286   | 1.35    | 16    | 24.5  |
| 16      | 10689   | 9.4       | 53.0426  | 4.4161    | .6      | 5.83   | 1.66    | 3.5       | 10       | 3.56   | 2.3   | 30.648   | .85     | 13.8  | 11.2  |
| 17      | 10689   | 10.2      | 53.0603  | 4.4163    | .55     | 8.03   | 1.48    | 4         | 6.49     | 2.56   | 2.2   | 31.976   | .75     | 13.2  | 12.5  |
| 18      | 10689   | 11        | 53.083   | 4.4153    | .35     | 2.04   | .82     | 7         | 3.55     | .99    | 2     | 32.427   | .65     | 13    | 17.5  |
| 19      | 10689   | 11.5      | 53.1051  | 4.4111    | .35     | 7.3    | .81     | 6.5       | 1.56     | 3.28   | 1.7   | 32.785   | .67     | 12.9  | 20    |
| 20      | 10689   | 13.05     | 53.1173  | 4.3284    | .2      | 6.4    | .68     | 8.5       | 1.52     | 3.72   | 1     | 33.335   | .53     | 12.4  | 29.3  |
| 21      | 10689   | 15.05     | 52.5866  | 4.4422    | .85     | 8.36   | 1.75    | 3.5       | 9.17     | 5.63   | 2.9   | 28.887   | 1       | 15.3  | 20    |
| 22      | 20689   | 9.4       | 53.0281  | 4.3891    | .35     | 2.36   | 1.14    | 5         | 5.27     | 1.42   | 2.1   | 31.428   | .7      | 13.6  | 14.2  |
| 23      | 20689   | 10.45     | 53.0485  | 4.2994    | .2      | 3.9    | .73     | 10.5      | 2.13     | 2.25   | 1.4   | 33.402   | .52     | 12.7  | 25    |
| 24      | 20689   | 11.35     | 53.0017  | 4.2889    | .2      | 2.97   | .74     | 9.5       | 2.68     | 1      | .9    | 33.365   | .5      | 12.7  | 25.4  |
| 25      | 20689   | 12.45     | 52.598   | 4.2837    | .22     | 2.5    | .77     | 10.5      | 2.32     | 1.76   | 1     | 33.287   | .52     | 13.2  | 26.5  |
| 26      | 20689   | 13.5      | 52.5304  | 4.3699    | .55     | 2.83   | 1.47    | 4         | 8.7      | 1.23   | 2.5   | 30.79    | .85     | 14.1  | 13    |
| 27      | 50689   | 10.1      | 52.53    | 4.3755    | .27     | 3.16   | 1.28    | 5         | 1.92     | 1.32   | 1.2   | 32.88    | .55     | 12.6  | 13.5  |
| 28      | 50689   | 11.1      | 52.475   | 4.3552    | .45     | 4      | 1.67    | 4         | 1.91     | 1.7    | 2.9   | 32.226   | .7      | 12.8  | 15.6  |
| 29      | 50689   | 12        | 52.4249  | 4.3348    | .4      | 5.83   | 1.5     | 5         | 1.91     | 2.67   | 1.1   | 31.936   | .7      | 12.9  | 20.5  |
| 30      | 50689   | 12.55     | 52.3717  | 4.3142    | .75     | 5.31   | 1.82    | 3.5       | 1.63     | 2.47   | 1.4   | 31.445   | .85     | 13    | 12.4  |
| 31      | 50689   | 15.1      | 52.5251  | 4.379     | .9      | 8.13   | 3       | 2         | 11.76    | 2.24   | 1.6   | 31.544   | 1.05    | 13.3  | 11.5  |
| 3201    | 60689   | 11.1      | 53.0769  | 4.3805    | .55     | 3.77   | 1.45    | 4.5       | 5.12     | 2.19   | 1.1   | 32.619   | 1.05    | 13.1  | 23.5  |
| 3202    | 60689   | 12.05     | 53.0769  | 4.3805    | .3      | 4.77   | 1.37    | 4.5       | 4.11     | 2.21   | 1.2   | 32.588   | .65     | 13.2  | 21.5  |
| 3203    | 60689   | 13.05     | 53.0769  | 4.3805    | .38     | 1.7    | 1.36    | 5         | 4.46     | .92    | 1.9   | 32.486   | .65     | 13.2  | 20.5  |
| 3204    | 60689   | 14.05     | 53.0769  | 4.3805    | .37     | 5.4    | 1.37    | 4.5       | 4.44     | 2.74   | 2     | 32.445   | .65     | 13.2  | 20.5  |
| 3205    | 60689   | 15        | 53.0769  | 4.3805    | .35     | 4.43   | 1.42    | 4.75      | 4.23     | 1.94   | 2.1   | 32.416   | .7      | 13.2  | 20    |
| 3206    | 60689   | 16.05     | 53.0769  | 4.3805    | .4      | 6      | 1.48    | 4.5       | 5.06     | 3.15   | 2.4   | 32.367   | .7      | 13.4  | 19.5  |
| 3207    | 60689   | 17.05     | 53.0769  | 4.3805    | .4      | 5.9    | 1.48    | 4.5       | .89      | 2.77   | 1.5   | 32.175   | .7      | 13.6  | 19.7  |
| 3208    | 60689   | 18        | 53.0769  | 4.3805    | .4      | 5.6    | 1.47    | 4.5       | 4.26     | 2.96   | 2.1   | 32.259   | .7      | 13.4  | 22.3  |
| 33      | 70689   | 9.35      | 53.1634  | 4.3394    | .25     | 4.02   | 1       | 7         | 1.48     | 2.41   | 1.1   | 33.327   | .62     | 12.7  | 30    |
| 34      | 70689   | 12.45     | 53.0338  | 4.3838    | .33     | 3.88   | 1.27    | 5.5       | 3.63     | 2.24   | 1.2   | 32.872   | .67     | 13    | 18.5  |
| 35      | 80689   | 9.55      | 53.0429  | 4.4177    | .65     | 5.23   | 2.6     | 3         | 9.29     | 2.94   | 1.6   | 32.307   | .85     | 13.2  | 13.5  |
| 36      | 80689   | 11.1      | 53.1147  | 4.3735    | .35     | 2.52   | 1.29    | 6         | 3.42     | 1.51   | 2.1   | 32.8     | .7      | 13.3  | 23.3  |
| 37      | 80689   | 12.35     | 53.1831  | 4.3221    | .17     | 3.09   | .87     | 8.5       | .88      | 1.86   | .8    | 33.566   | .47     | 12.8  | 28.5  |
| 38      | 80689   | 13.3      | 53.1698  | 4.2773    | .17     | 4.2    | .93     | 8.5       | .78      | 1.88   | .8    | 33.796   | .5      | 13    | 28.5  |
| 39      | 80689   | 14.5      | 53.0974  | 4.3571    | .28     | 2.88   | 1.16    | 6.5       | 2.44     | 1.66   | 1     | 33.226   | .57     | 13.1  | 23.5  |
| 40      | 120689  | 11        | 53.0963  | 4.4194    | .45     | 3.93   | 1.68    | 4         | 4.97     | 1.64   | 2.1   | 32.014   | .7      | 14.7  | 10.2  |
| 41      | 120689  | 12        | 53.037   | 4.417     | .35     | 6.68   | 1.6     | 4         | 3.81     | 3.77   | 1.45  | 32.033   | .7      | 14.7  | 11.7  |
| 42      | 120689  | 12.4      | 53.0609  | 4.4187    | .3      | 5.48   | 1.48    | 4.5       | 3.27     | 3.01   | 1.5   | 32.172   | .6      | 14.4  | 12.8  |
| 43      | 120689  | 12.55     | 53.0832  | 4.4161    | .32     | 6.33   | 1.41    | 5         | 2.2      | 3.91   | 1.4   | 32.245   | .65     | 14.6  | 18.5  |
| 44      | 120689  | 13.25     | 53.1049  | 4.4136    | .3      | 5.16   | 1.42    | 5         | 3.13     | 3.18   | 1.3   | 32.426   | .65     | 14.6  | 20.9  |
| 3209    | 60689   | 19        | 53.0769  | 4.3805    | -1      | 2.97   | 1.78    | -1        | 4.26     | 1.29   | -1    | -1       | -1      | 13.4  | 23    |
| 3210    | 60689   | 20        | 53.0769  | 4.3805    | -1      | 3.67   | 1.48    | -1        | 3.39     | 1.32   | -1    | -1       | -1      | 13.4  | 23    |
| 3211    | 60689   | 21        | 53.0769  | 4.3805    | -1      | 3.57   | 1.5     | -1        | 4.58     | 1.93   | -1    | -1       | -1      | 13.2  | 23.3  |
| 3212    | 60689   | 22        | 53.0769  | 4.3805    | -1      | 4.17   | 1.43    | -1        | 6.07     | 2.66   | -1    | -1       | -1      | 13.1  | 23.35 |
| 3213    | 60689   | 23        | 53.0769  | 4.3805    | -1      | 5.03   | 1.42    | -1        | 3.96     | 3.31   | -1    | -1       | -1      | 13    | 21.5  |
| 3214    | 60689   | 24        | 53.0769  | 4.3805    | -1      | 3.1    | 1.43    | -1        | 6.04     | 1.9    | -1    | -1       | -1      | 13.1  | 21    |
| 3215    | 60689   | 1         | 53.0769  | 4.3805    | -1      | 3.63   | 1.42    | -1        | 5.6      | 1.69   | -1    | -1       | -1      | 13    | 20.5  |

## DATA AUGUST PERIOD

| STATION | DATE    | LOC. TIME | LATITUDE | LONGITUDE | Kd(520) | TSM    | Co(670) | SECHCHI-D | CHLOROPH | OrgSM  | Y.S.  | SALINITY | Kd(670) | TEMP. | DEPTH |
|---------|---------|-----------|----------|-----------|---------|--------|---------|-----------|----------|--------|-------|----------|---------|-------|-------|
|         | [d/m/y] | [h.m]     | [N]      | [E]       | (n-1)   | (q/n3) | [n-1]   | (n)       | (ng/n3)  | (q/n3) | (n-1) | (o/oo)   | (n-1)   | (°C)  | (n)   |
| 1       | 210889  | 9.55      | 53.0436  | 4.4208    | .6      | 3.1    | 3.5     | 3.5       | 14.6     | 1.1    | 1.38  | 31.307   | .88     | 19.2  | 14.3  |
| 2       | 210889  | 10.3      | 53.0623  | 4.4197    | .4      | 2.5    | 1.4     | 4.5       | 12.9     | 1      | 1.23  | 31.521   | .75     | 19.2  | 13.4  |
| 3       | 210889  | 11        | 53.0838  | 4.4155    | .45     | 3.2    | 1.2     | 5         | 12.9     | 1.1    | 1.09  | 31.695   | .8      | 19.2  | 19.9  |
| 4       | 210889  | 11.3      | 53.1063  | 4.4161    | .32     | 2.5    | 1.2     | 5.5       | 14       | 1.1    | 1.01  | 31.886   | .48     | 19.2  | 21.3  |
| 5       | 210889  | 12.5      | 53.1843  | 4.3225    | .17     | 1.4    | .86     | 7.5       | 4.5      | .67    | .87   | 34.218   | .58     | 18.5  | 28.3  |
| 6       | 210889  | 13.25     | 53.1803  | 4.3066    | .22     | 1.8    | .82     | 8         | 3.2      | .6     | .5    | 34.589   | .6      | 18.4  | 27.8  |
| 7       | 210889  | 14        | 53.1508  | 4.296     | .22     | 2.1    | .85     | 9.5       | 3.6      | 1      | .62   | 34.421   | .58     | 18.4  | 29.9  |
| 8       | 220889  | 9.45      | 53.0434  | 4.4177    | .62     | 4.1    | 2.4     | 2.5       | 18.2     | 1.6    | 1.19  | 31.113   | 1       | 19.4  | 12.1  |
| 9       | 220889  | 10.3      | 53.0783  | 4.3769    | .38     | 2.4    | 1.3     | 5         | 11       | .9     | .88   | 31.578   | .78     | 19.4  | 23    |
| 10      | 220889  | 11.4      | 53.05    | 4.3086    | .4      | 2.7    | 1.6     | 4         | 12       | 1.7    | 1.09  | 31.559   | .8      | 19.2  | 27.1  |
| 11      | 220889  | 12.4      | 53.0032  | 4.293     | .22     | 1.7    | 1       | 7         | 5.4      | 1      | .86   | 33.779   | .58     | 18.7  | 27.8  |
| 12      | 220889  | 13.3      | 52.5509  | 4.2985    | .18     | 1.4    | 1       | 7         | 3.6      | .63    | .49   | 34.434   | .52     | 18.7  | 26    |
| 13      | 220889  | 14.2      | 52.5321  | 4.3726    | .32     | 2.8    | 1.3     | 5         | 6.7      | 1.3    | 1.54  | 31.743   | .84     | 19.2  | 12.7  |
| 14      | 220889  | 15.15     | 52.569   | 4.4122    | .72     | 7.5    | 3.2     | 2.5       | 21       | 2.9    | 1.24  | 30.86    | .93     | 19.4  | 17.6  |
| 15      | 230889  | 9.45      | 52.529   | 4.3736    | .48     | 3.3    | 1.6     | 4         | 8.4      | .7     | .87   | 32.082   | .81     | 18.7  | 13.6  |
| 16      | 230889  | 11        | 52.4743  | 4.3479    | .31     | 2      | 1.4     | 4.5       | 4.8      | .6     | 1     | 31.562   | .68     | 19    | 18.7  |
| 17      | 230889  | 12        | 52.4255  | 4.3238    | .34     | 2.4    | 1.3     | 5         | 3.9      | .8     | 1.18  | 31.724   | .63     | 19    | 21.6  |
| 18      | 230889  | 13        | 52.3735  | 4.3084    | .36     | 3.1    | 1.4     | 4.5       | 3.8      | .6     | .93   | 31.228   | .6      | 19.2  | 18.5  |
| 19      | 240889  | 9.4       | 53.0461  | 4.4186    | .68     | 6.4    | 3       | 2.5       | 21.5     | 2      | 1.19  | 31.009   | 1       | 19    | 12    |
| 20      | 240889  | 10.45     | 52.5844  | 4.4404    | 1.05    | 6.7    | 3.74    | 2.5       | 26       | 1.7    | 1.73  | 29.484   | 1.22    | 19.5  | 33.7  |
| 21      | 240889  | 11.15     | 52.5985  | 4.481     | 1.15    | 6.4    | 3.5     | 2         | 28.2     | 2.2    | 1.67  | 29.262   | 1.22    | 19.7  | 20.6  |
| 22      | 240889  | 11.3      | 53.0034  | 4.4932    | 1.15    | 5.6    | 4.2     | 2         | 25       | 1.8    | 1.65  | -1       | 1.27    | 19.6  | 21.4  |
| 23      | 240889  | 12.45     | 53.0191  | 4.5225    | 1.35    | 5.4    | 3.6     | 2         | 28.6     | 1.7    | 1.74  | 29.195   | 1.62    | 19.6  | 31.4  |
| 24      | 240889  | 13.55     | 52.5878  | 4.4486    | .82     | 7.7    | 3.9     | 1.75      | 21       | 1.7    | 1.07  | 31.556   | 1.12    | 19    | 21.7  |
| 25      | 240889  | 14.2      | 52.598   | 4.4805    | .82     | 8.1    | 3.1     | 2         | 23       | 2.4    | 1.48  | 30.833   | 1.15    | 19.2  | 22.2  |
| 26      | 240889  | 14.55     | 53.0185  | 4.5148    | .9      | 6      | 3.3     | 2         | 23.3     | 2.1    | 1.5   | 29.904   | 1.15    | 19.4  | 23.7  |
| 27      | 250889  | 8.5       | 52.5861  | 4.4439    | .85     | 4.8    | 3.2     | 2.5       | 24.1     | 1.4    | 1.8   | 29.205   | 1.2     | 19.1  | 27.7  |
| 28      | 250889  | 9.35      | 52.5999  | 4.4841    | 1       | 7.6    | 2.9     | 2         | 16.2     | 2      | 1.91  | 28.757   | 1.28    | 19.4  | 18.5  |
| 29      | 250889  | 10.2      | 53.0202  | 4.5195    | .78     | 4.1    | 2.7     | 2.5       | 15       | 1.4    | 1.87  | 28.717   | .98     | 19.2  | 24.6  |
| 292     | 250889  | 10.22     | 53.0202  | 4.5195    | .78     | 2.7    | 2.7     | 2.5       | 15.7     | 1      | 1.86  | 28.717   | .98     | 19.2  | 24.6  |



## DATA NOVEMBER PERIOD

| STATION | DATE    | LOC.TIME | LATITUDE | LONGITUDE | Kd(520) | TSM    | Co(670) | SECHHI-D | CHLOROPH | OrgSM  | Y.S.  | SALINITY | Kd(670) | TEMP. | DEPTH |
|---------|---------|----------|----------|-----------|---------|--------|---------|----------|----------|--------|-------|----------|---------|-------|-------|
|         | [d/m/y] | [h.m]    | [N]      | [E]       | (m-1)   | (g/m3) | [m-1]   | (m)      | (mg/m3)  | (g/m3) | (m-1) | (o/oo)   | (m-1)   | (°C)  | (m)   |
| 1       | 271189  | 10.15    | 53.0426  | 4.417     | 1.5     | 28.9   | 9.85    | 1.25     | 9.7      | 3.8    | 1.45  | 31.244   | 1.3     | 7.4   | 12.4  |
| 2       | 271189  | 11.2     | 52.5631  | 4.4045    | 1.45    | 22     | 6.45    | 1.25     | 7.5      | 5      | 1.11  | 29.304   | 1.45    | 6.7   | 14.7  |
| 3       | 271189  | 11.5     | 52.542   | 4.3858    | 1.5     | 16.7   | 5.4     | 1.25     | 5        | 3.9    | .92   | 29.817   | 1.7     | 7     | 11.9  |
| 4       | 271189  | 13       | 52.5861  | 4.4473    | .85     | 25.6   | 5.55    | 1        | 7.5      | 6.2    | 1.31  | 28.224   | .6      | 5.9   | 34    |
| 5       | 271189  | 14       | 53.0188  | 4.5183    | 1.05    | 10     | 3.7     | 1.75     | 3.7      | 2.1    | 1.11  | 28.239   | 1.22    | 5     | 29    |
| 6       | 271189  | 14.3     | 53.0049  | 4.4897    | .9      | 12.5   | 3.5     | 1.75     | 3.7      | 2.9    | 1.17  | 28.393   | 1.15    | 5     | 17.8  |
| 7       | 281189  | 9.3      | 53.0922  | 4.4171    | -1      | 11.1   | 4.35    | 1.5      | 5.5      | 2.1    | 1.47  | 30.817   | -1      | 7.2   | 10.5  |
| 8       | 281189  | 11.1     | 53.1409  | 4.3515    | .3      | 2.4    | .75     | 7        | 2.6      | .82    | .63   | 33.467   | .65     | 9.5   | 29    |
| 9       | 281189  | 11.55    | 53.1138  | 4.357     | .3      | 1.9    | .88     | 6        | 2.9      | .65    | .78   | 33.164   | .7      | 9.4   | 25.5  |
| 10      | 281189  | 12.5     | 53.0978  | 4.3768    | .32     | 3.2    | 1.15    | 5        | 4.9      | .63    | .82   | 32.843   | .76     | 9     | 22    |
| 11      | 281189  | 13.25    | 53.0775  | 4.3881    | .48     | 4.5    | 1.6     | 2.75     | 4.9      | .94    | .87   | 32.532   | 1       | 8.6   | 20    |
| 12      | 281189  | 14.05    | 53.0624  | 4.4028    | 1.2     | 13     | 5.1     | 1        | 7.7      | 2.4    | .99   | 31.706   | 1.35    | 7.4   | 17    |
| 13      | 281189  | 14.5     | 53.0449  | 4.4181    | 1.7     | 14     | 8.1     | 1        | 6.3      | 2.6    | 1.32  | 30.906   | 2.2     | 7.2   | 10.7  |
| 14      | 291189  | 11       | 52.3687  | 4.3056    | .85     | 6      | 1.9     | 3        | 4.3      | 1.5    | 1.59  | 31.888   | 1.15    | 7.6   | 18.2  |
| 15      | 291189  | 12.05    | 52.4231  | 4.3306    | .8      | 10.3   | 2.5     | 2        | 4        | 2.1    | 1.01  | 32.299   | 1.05    | 8.1   | 21.4  |
| 16      | 291189  | 13.15    | 52.4873  | 4.3544    | .77     | 7.9    | 2.5     | 2        | 3.7      | 1.6    | 1.06  | 32.568   | 1.02    | 8.4   | 15.3  |
| 17      | 291189  | 14.05    | 52.5285  | 4.3697    | 1.2     | 12.3   | 4.15    | 1.25     | 4.3      | 2.6    | 1.15  | 30.557   | 1.35    | 7.2   | 13.1  |
| 18      | 291189  | 15       | 52.5632  | 4.4025    | 1.35    | 13.6   | 3.8     | 1.25     | 5.5      | 2.8    | 1.38  | 28.087   | 1.65    | 5.4   | 15.2  |
| 19      | 301189  | 10       | 53.0618  | 4.3956    | .42     | 4.3    | 1.55    | 3.5      | 5.7      | 1      | .71   | 31.95    | .82     | 7.6   | 20.9  |
| 20      | 301189  | 10.35    | 53.0766  | 4.3759    | .35     | 2.8    | 1.29    | 4        | 4.6      | .68    | .73   | 32.338   | .88     | 8.2   | 22    |
| 21      | 301189  | 11.05    | 53.0569  | 4.3532    | .35     | 2.6    | 1.27    | 4        | 2.3      | .6     | .85   | 32.605   | .85     | 8.4   | 24.6  |
| 22      | 301189  | 11.5     | 53.0514  | 4.2991    | .25     | 1.2    | .81     | 7        | 2.8      | .29    | .49   | 33.67    | .7      | 9.2   | 26.2  |
| 23      | 301189  | 12.5     | 52.5987  | 4.2883    | .32     | 2.7    | .85     | 6        | 2.6      | .45    | .76   | 33.408   | .68     | 8.8   | 27.1  |
| 24      | 301189  | 13.45    | 52.5504  | 4.29      | .26     | 1.9    | 1.02    | 5.5      | 4.6      | .2     | .73   | 33.023   | .78     | 8.5   | 24.6  |
| 25      | 301189  | 14.35    | 52.5408  | 4.3386    | .73     | 7.4    | 2.87    | 1.75     | 5.5      | 1.3    | .92   | 31.675   | 1.02    | 7.6   | 20.6  |
| 26      | 301189  | 15.15    | 52.5347  | 4.3809    | 1.01    | 13.4   | 4.15    | 1.25     | 6.6      | 3      | .99   | 30.513   | 1.22    | 6.7   | 13.1  |

N.B. An error in the calibration procedure for the Turner fluorescence meter has caused that all the calculated Chlorophyll concentrations for the November period are a factor of two too high.



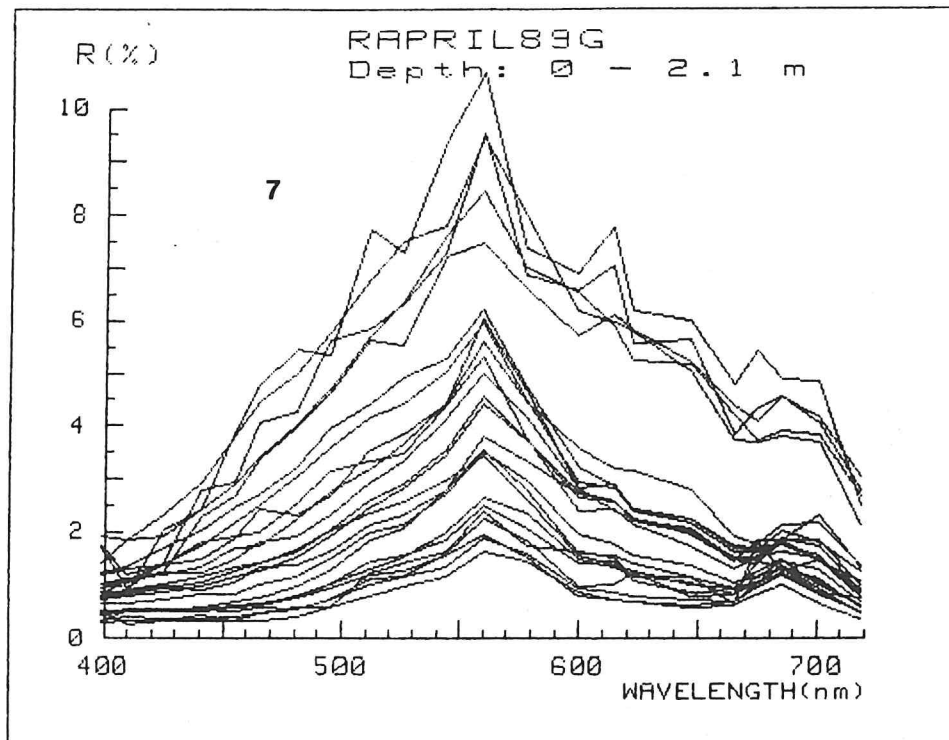
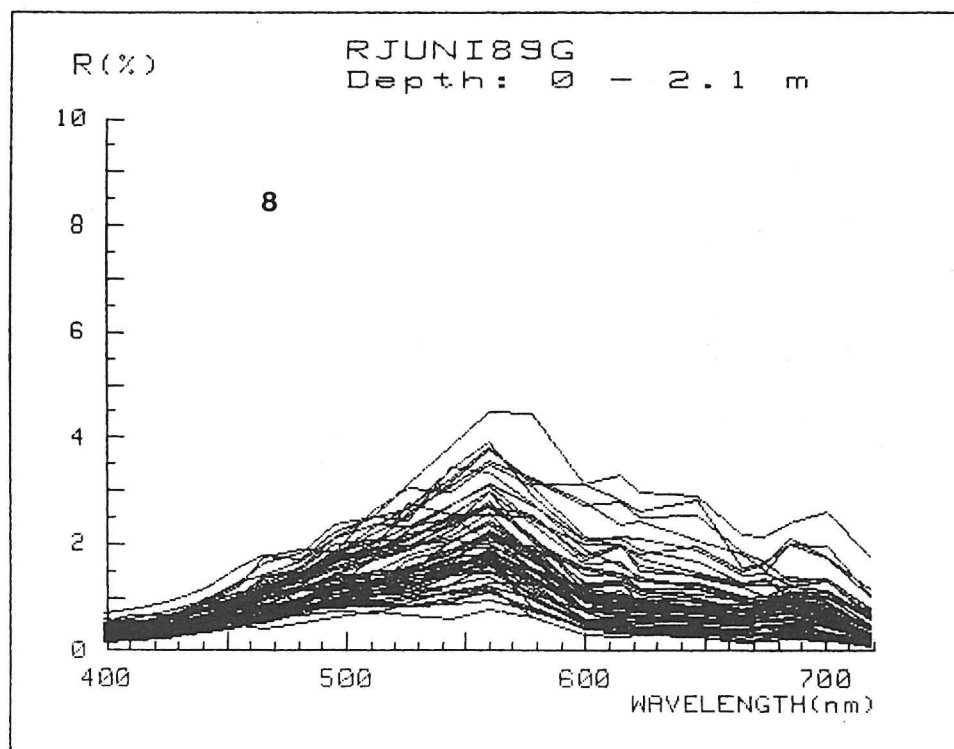


Fig. 7 and 8. Compilation of surface reflectance spectra april and may/june period



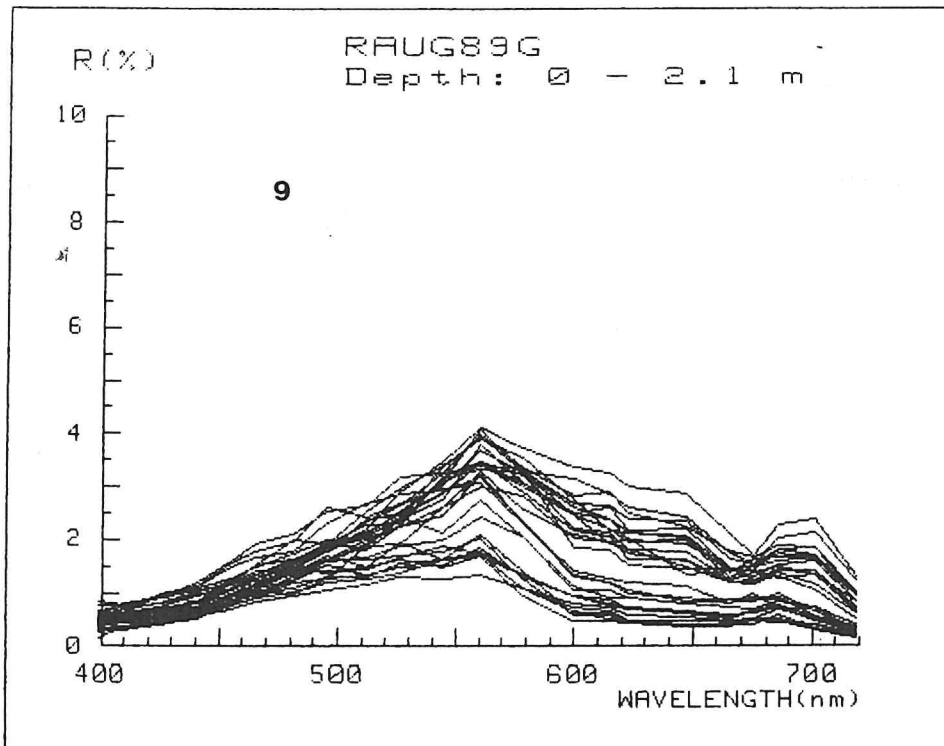
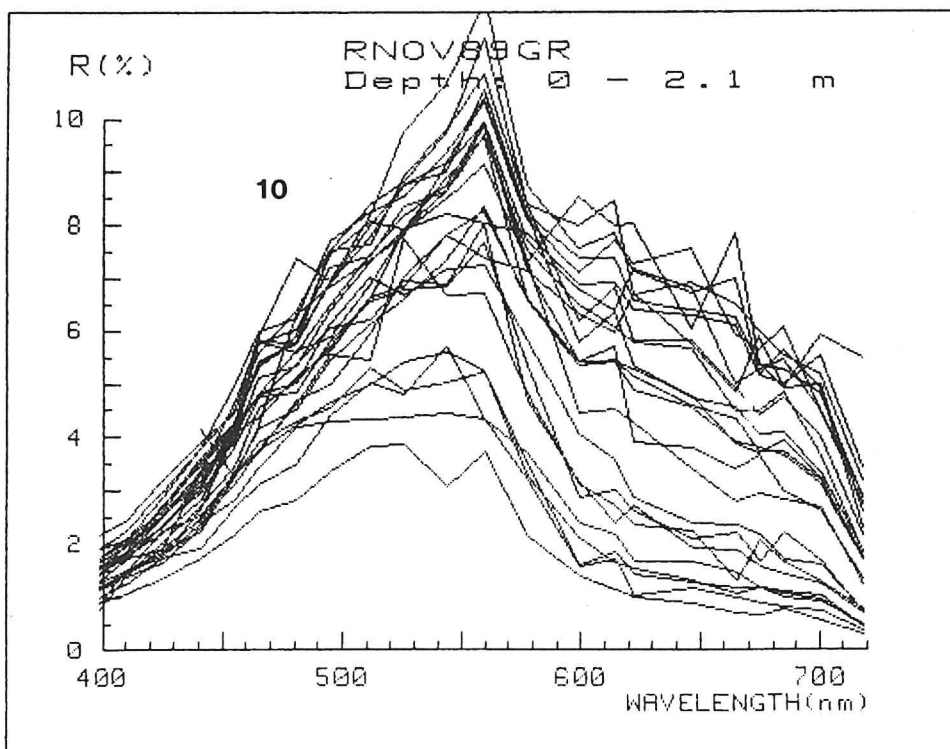


Fig. 9. and 10. Compilation of surface reflectance spectra august and november period



## 6. ACKNOWLEDGEMENTS

We would like to thank the crew of the R.V. 'Aurelia' for the pleasant cooperation during the cruises. We greatly acknowledge the accurate biochemical analyses performed on board by W. Frankema and R. Manuels and the financial support of the Netherlands Remote Sensing Board (BCRS).

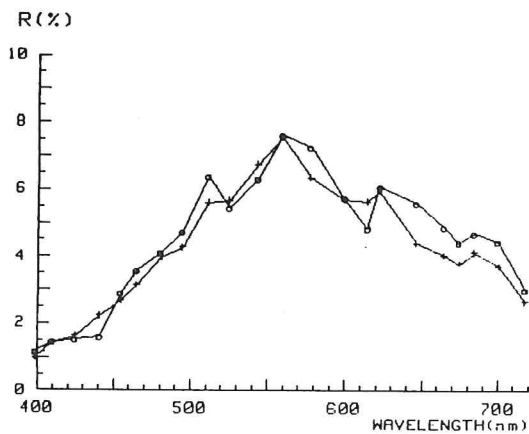
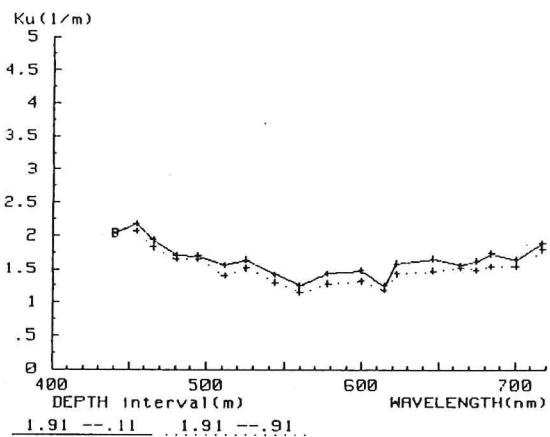
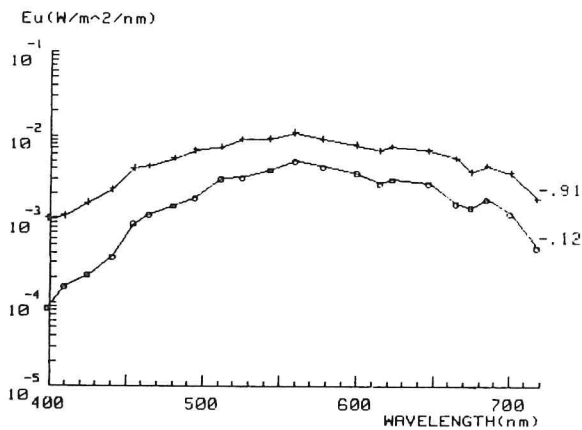
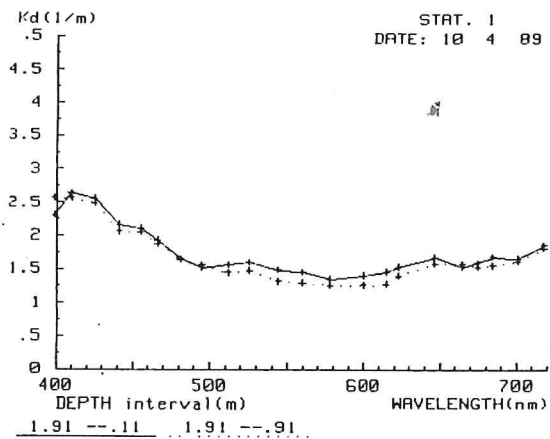
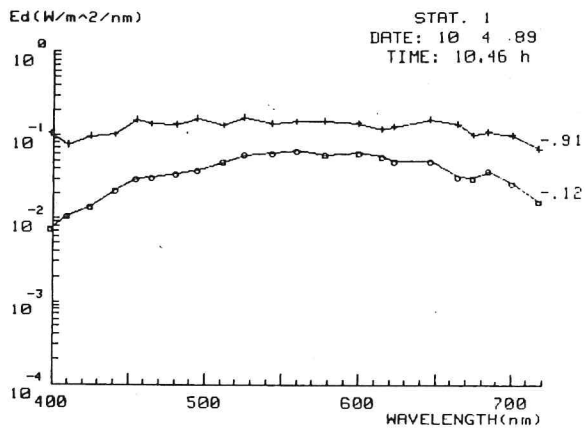
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**8      APPENDICES  
OPTICAL DATA:**

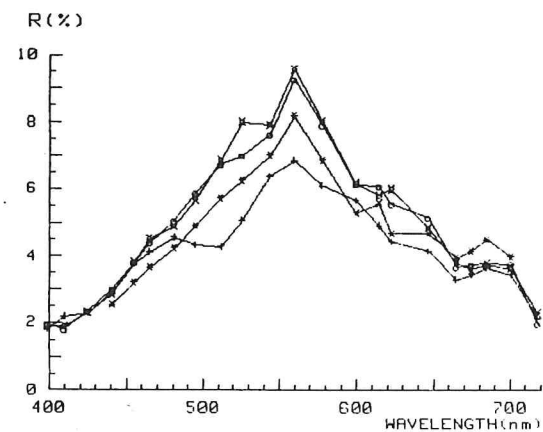
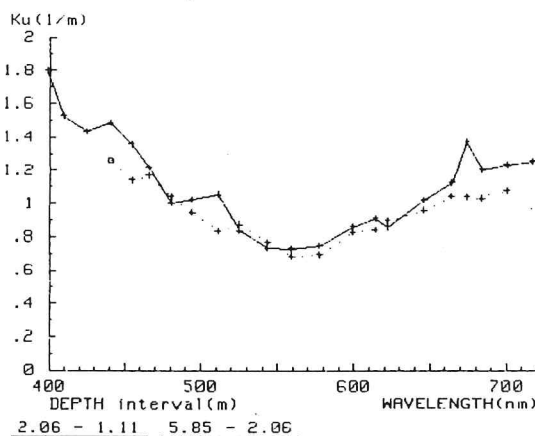
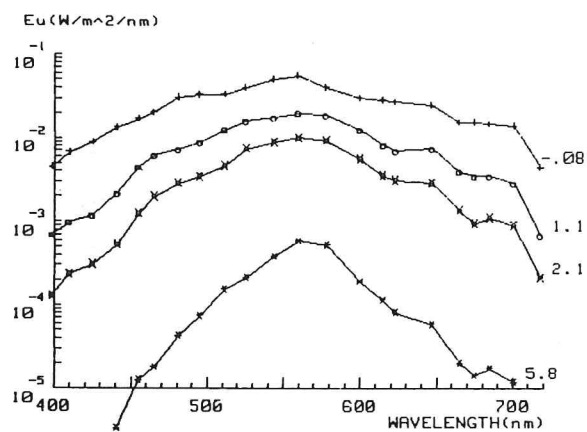
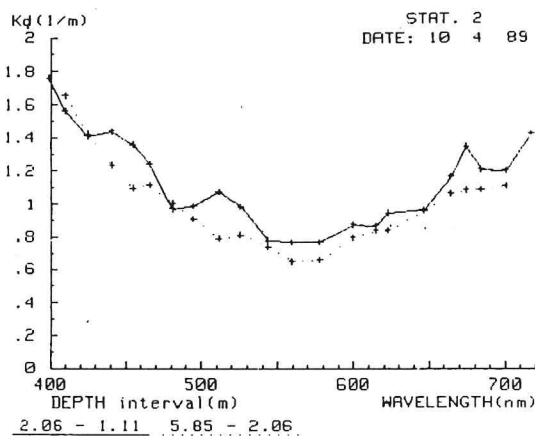
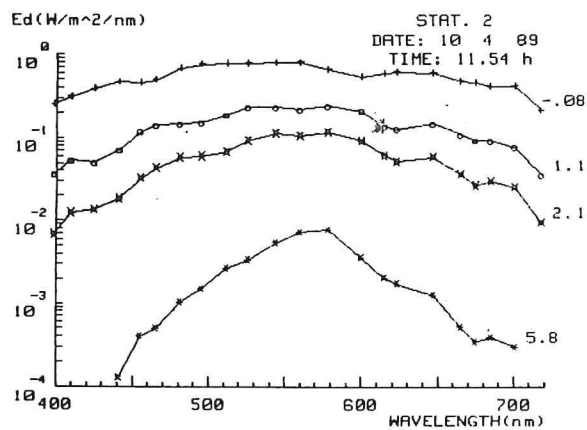
|                        |           |
|------------------------|-----------|
| <b>APRIL CRUISE</b>    | <b>A1</b> |
| <b>MAY/JUNE CRUISE</b> | <b>B1</b> |
| <b>AUGUST CRUISE</b>   | <b>C1</b> |
| <b>NOVEMBER CRUISE</b> | <b>D1</b> |

A1



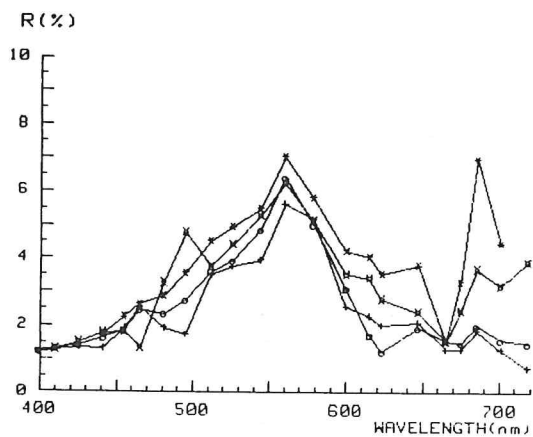
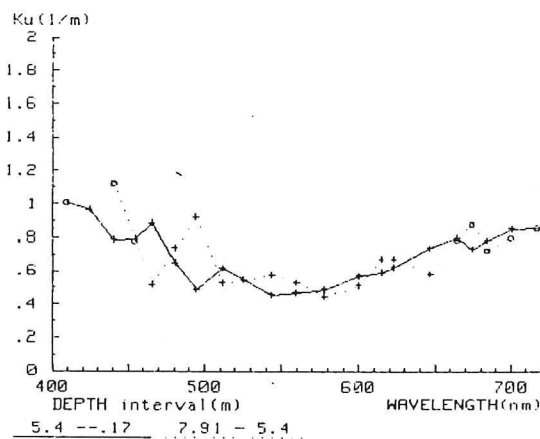
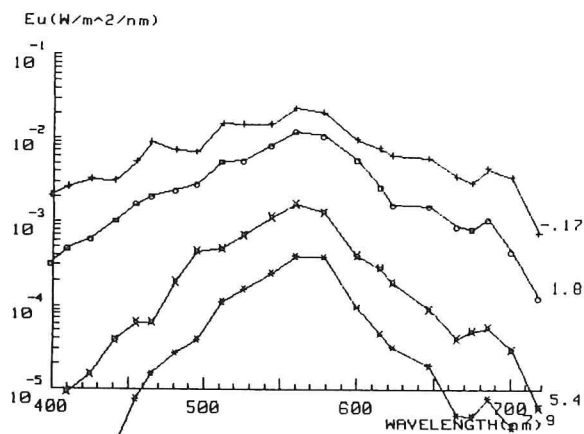
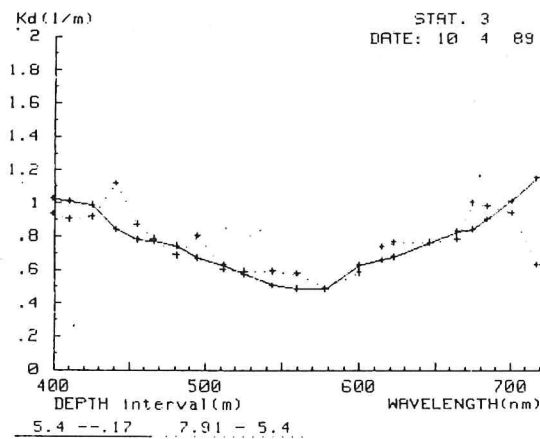
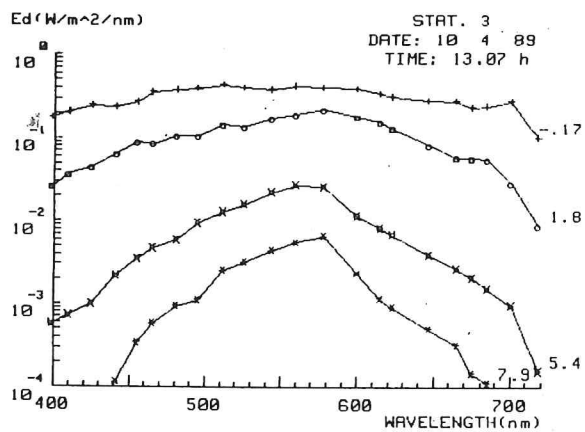
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| Latit.: [N]                       | 53 : 1.47 |
| Longit.: [E]                      | 4 : 50.87 |
| Salinity (o/oo):                  | 28.879    |
| Temp. (°C):                       | 7.5       |
| Co [670nm] (1/m):                 | 6.00      |
| Secchi depth (m):                 | 1.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 22.3      |
| Chloroph. (mg/m <sup>3</sup> ):   | 11.4      |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.2       |

A2

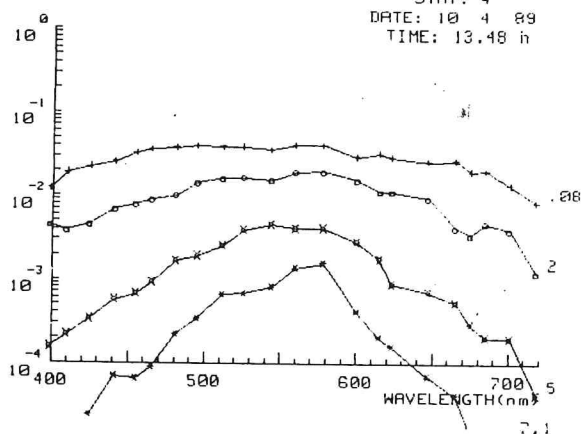


|                                   |             |
|-----------------------------------|-------------|
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| Latit.: [N]                       | 52 : 58.66  |
| Longit.: [E]                      | 4 : 44.77   |
| Salinity (o/oo):                  | 30.447      |
| Temp. (°C):                       | 7.6         |
| Co [670nm] (1/m):                 | 3.40        |
| Secchi depth (m):                 | 1.9         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 9.4         |
| Chloroph. (mg/m <sup>3</sup> ):   | 12.8        |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.3         |

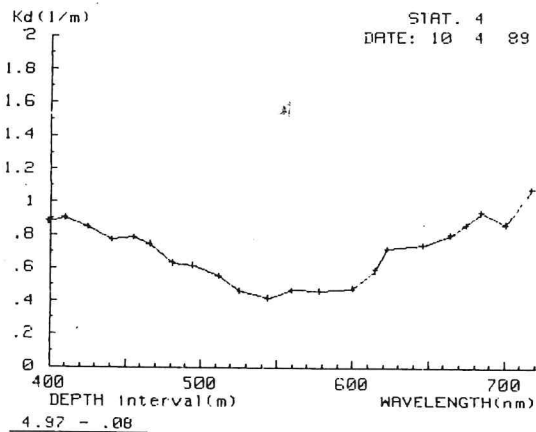
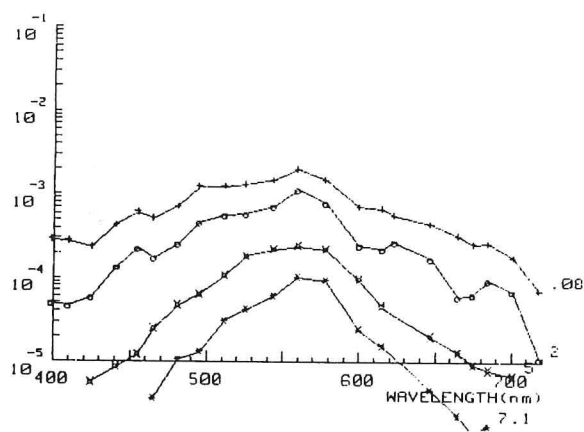
A3



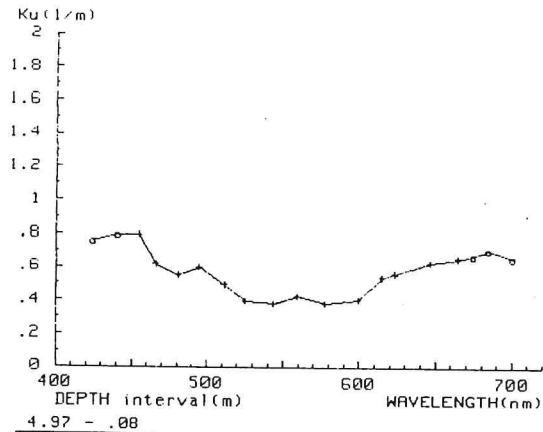
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| Longit.: [E]                      | 4 : 40.99 |
| Salinity (o/oo):                  | 31.751    |
| Temp. (°C):                       | 7.7       |
| Co [670nm] (1/m):                 | 2.20      |
| Secchi depth (m):                 | 3.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.9       |
| Chloroph. (mg/m <sup>3</sup> ):   | 13.2      |
| Yell. Sub. (m-1):                 | 1.0       |

Ed(W/m<sup>2</sup>/nm)

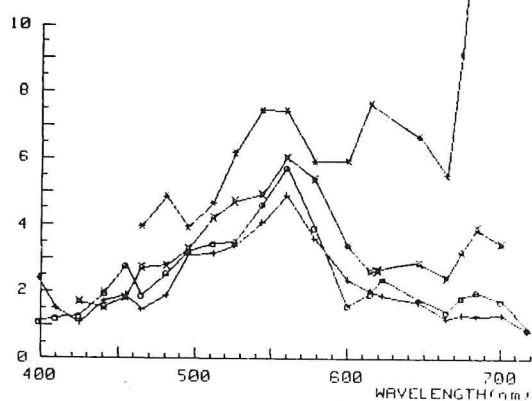
Kd (1/m)

Eu(W/m<sup>2</sup>/nm)

Ku (1/m)



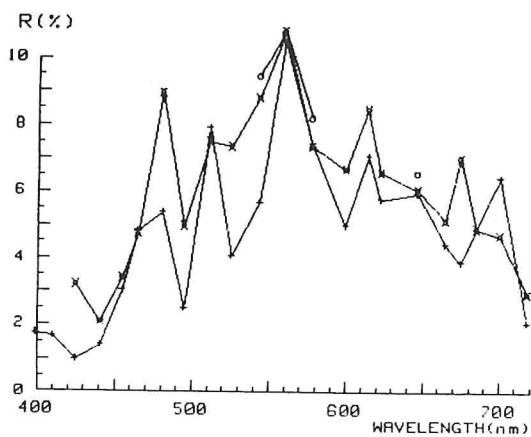
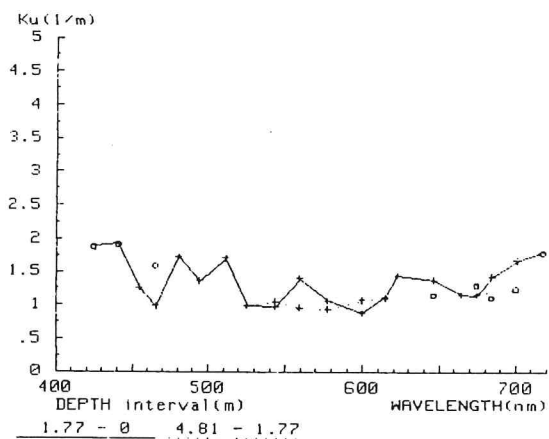
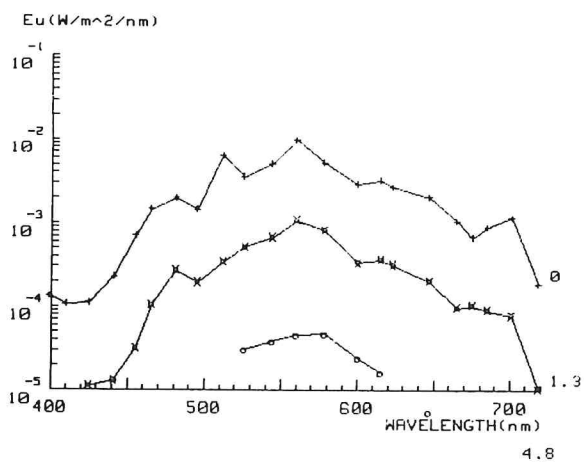
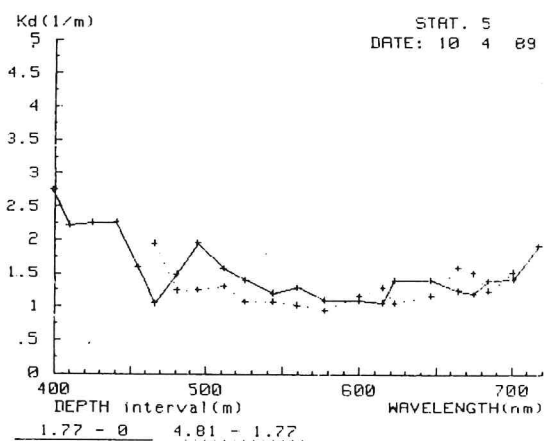
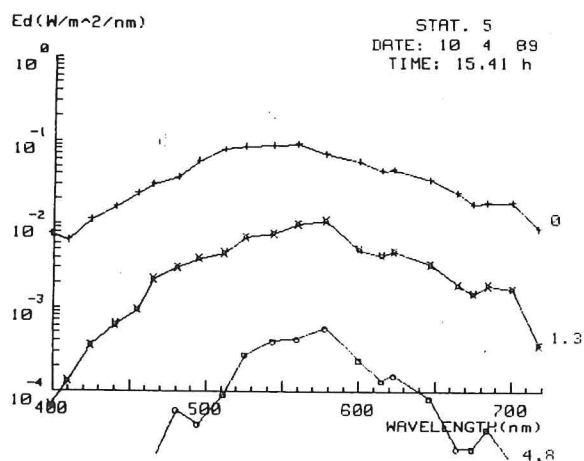
R(%)



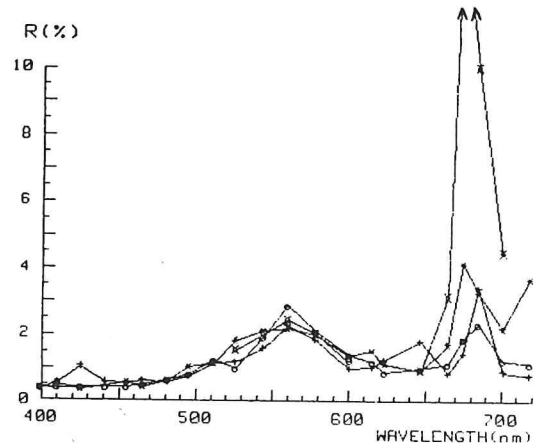
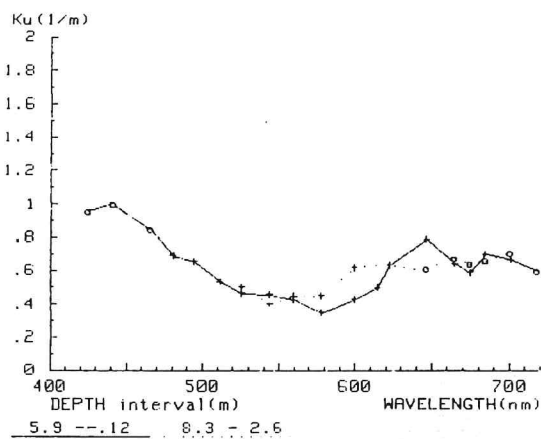
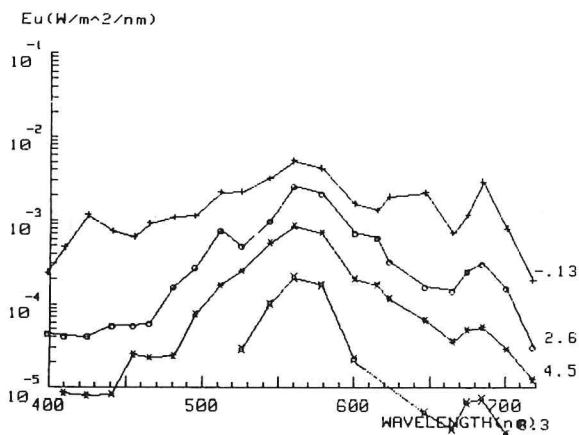
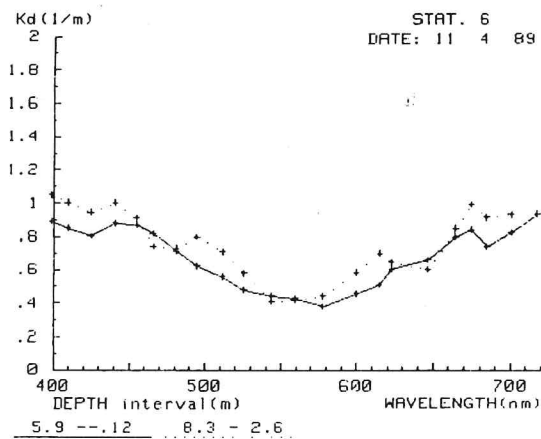
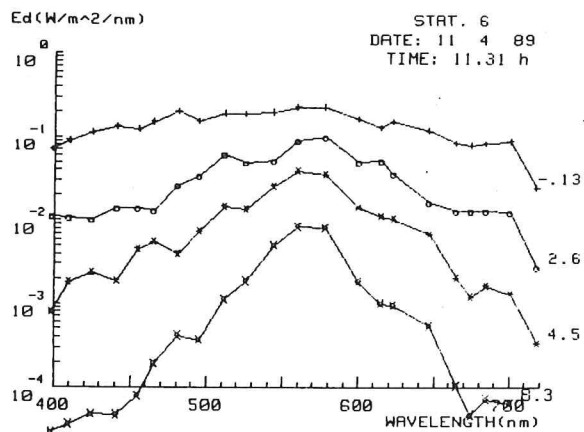
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| Longit.: [E]                      | 4 : 42.28 |
| Salinity (o/oo):                  | 31.893    |
| Temp. (°C):                       | 8.0       |
| Co [670nm] (1/m):                 | 2.10      |
| Secchi depth (m):                 | 3.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 14.2      |
| Chloroph. (mg/m <sup>3</sup> ):   | 11.1      |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.3       |



A5

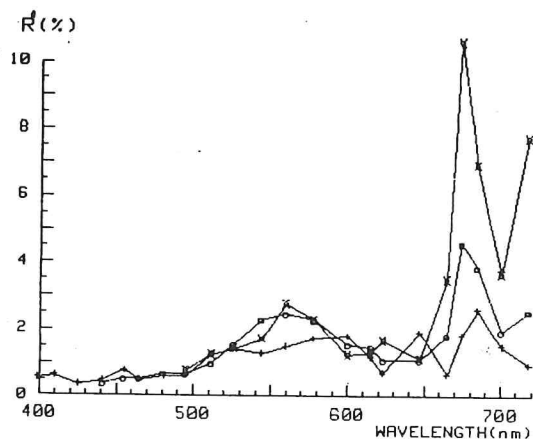
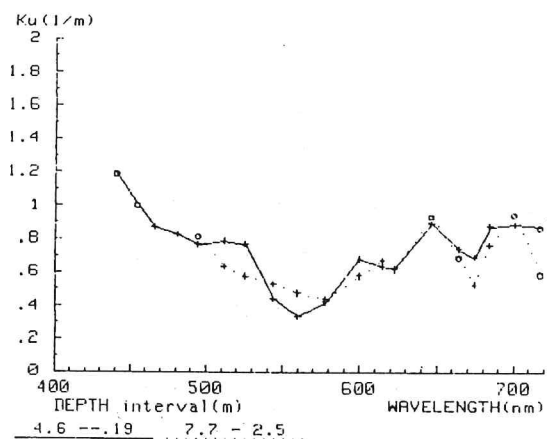
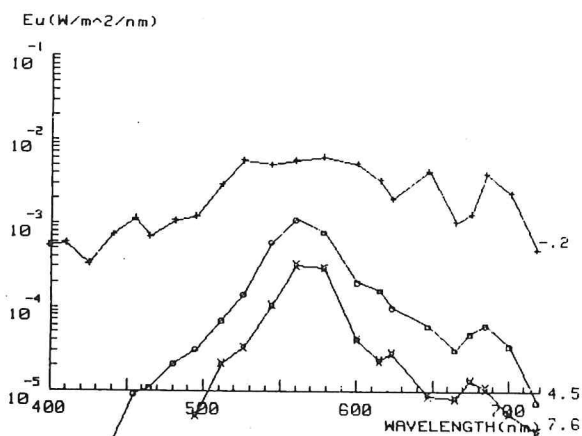
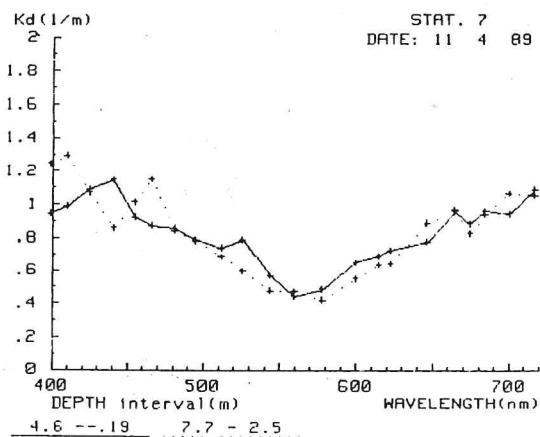
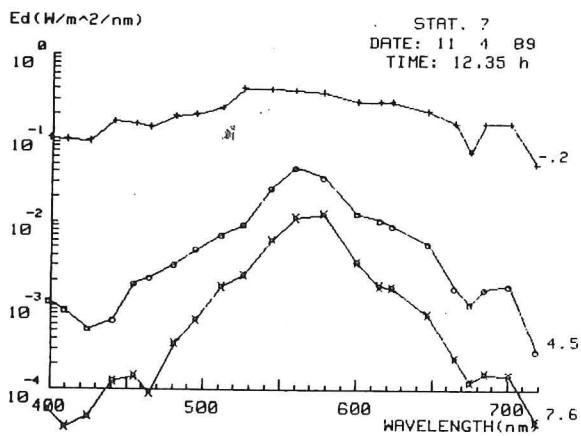


|                                   |             |
|-----------------------------------|-------------|
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| Longit.: [E]                      | 4 : 48.88   |
| Salinity (o/oo):                  | 28.819      |
| Temp. (°C):                       | 7.6         |
| Co [670nm] (1/m):                 | 4.90        |
| Secchi depth (m):                 | 1.4         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 14.6        |
| Chloroph. (mg/m <sup>3</sup> ):   | 12.4        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.4         |

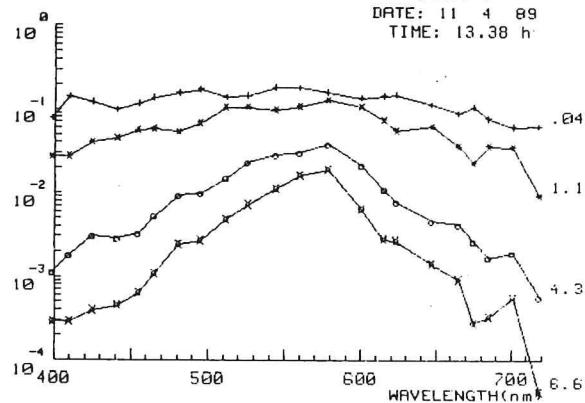


|                                   |            |
|-----------------------------------|------------|
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| Time:                             | 11.30      |
| Latit.: [N]                       | 53 : 15.56 |
| Longit.: [E]                      | 4 : 29.24  |
| Salinity (o/oo):                  | 33.316     |
| Temp. (°C):                       | 7.6        |
| Co [670nm] (1/m):                 | 2.10       |
| Secchi depth (m):                 | 3.3        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.7        |
| Chloroph. (mg/m <sup>3</sup> ):   | 16.1       |
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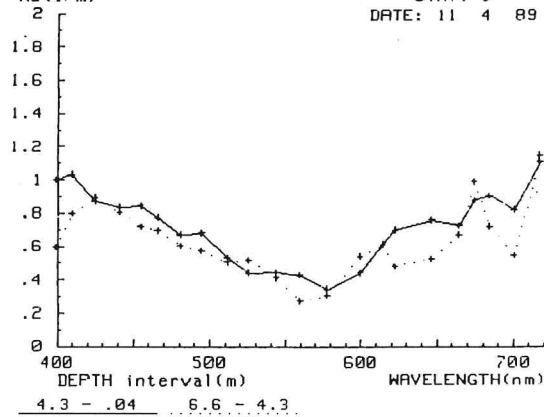
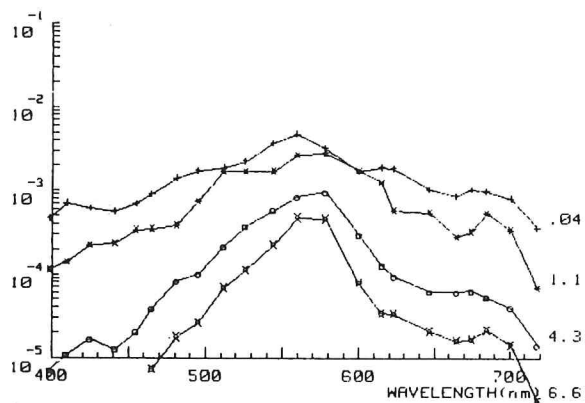
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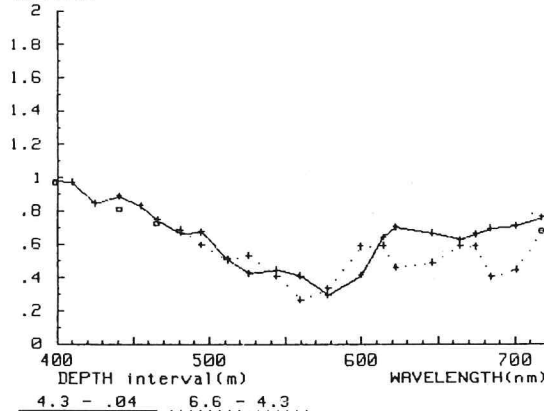
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| Longit.: [E]                      | 4 : 32.98   |
| Salinity (o/oo):                  | 30.056      |
| Temp. (°C):                       | 7.6         |
| Co [670nm] (1/m):                 | 2.50        |
| Secchi depth (m):                 | 2.9         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.7         |
| Chloroph. (mg/m <sup>3</sup> ):   | 21.9        |
| Yell. Sub. (m <sup>-1</sup> ):    | .98         |

Ed(W/m<sup>2</sup>/nm)
 STAT. 8  
 DATE: 11 4 89  
 TIME: 13.38 h


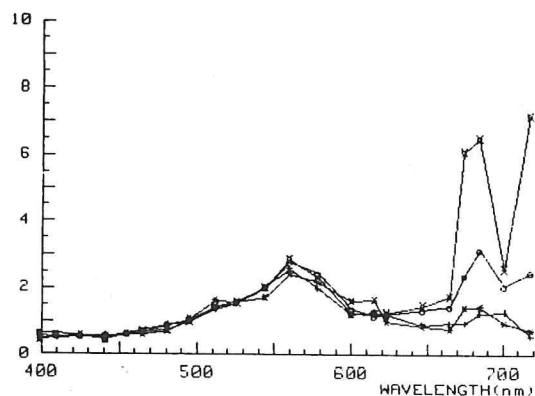
Kd(1/m)

 STAT. 8  
 DATE: 11 4 89
Eu(W/m<sup>2</sup>/nm)

Ku(1/m)



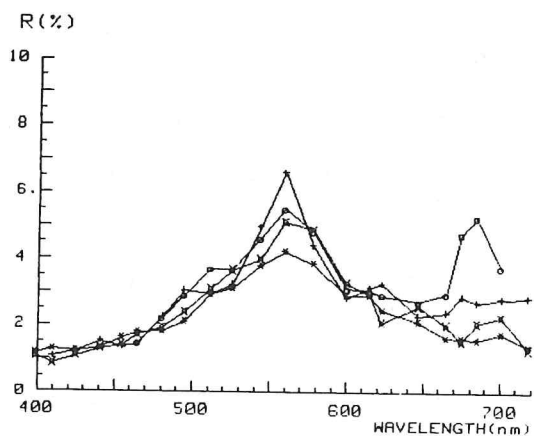
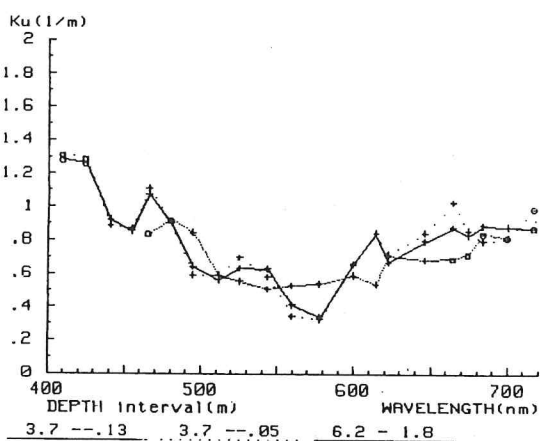
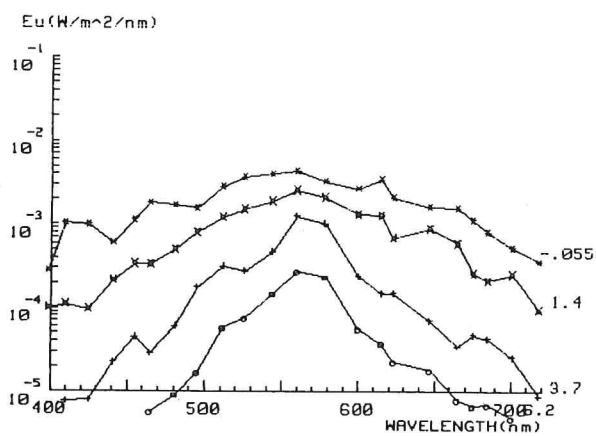
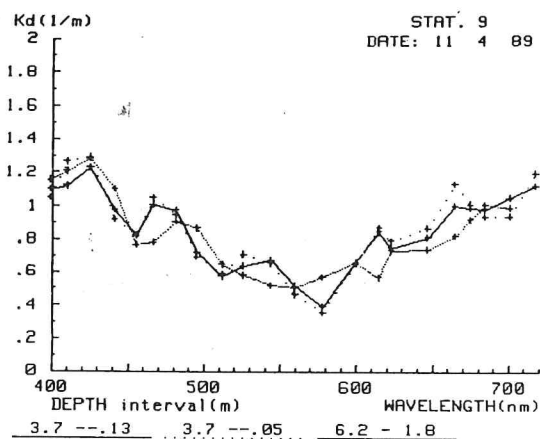
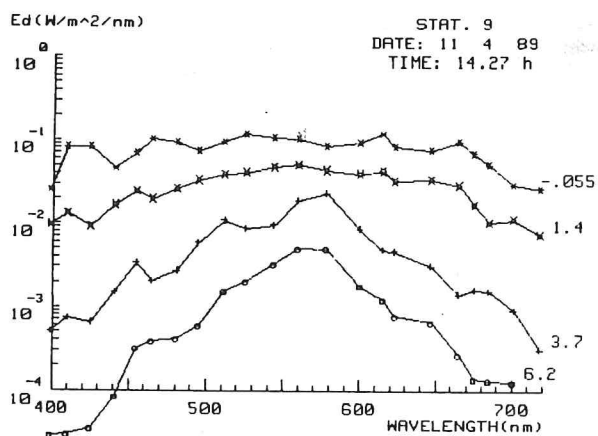
R(%)



|                                   |             |
|-----------------------------------|-------------|
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| Time:                             | 13.50       |
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| Longit.: [E]                      | 4 : 37.65   |
| Salinity (o/oo):                  | 32.200      |
| Temp. (°C):                       | 7.6         |
| Co [670nm] (1/m):                 | 2.10        |
| Secchi depth (m):                 | 2.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.5         |
| Chloroph. (mg/m <sup>3</sup> ):   | 15.9        |
| Yell. Sub. (m <sup>-1</sup> ):    | .83         |

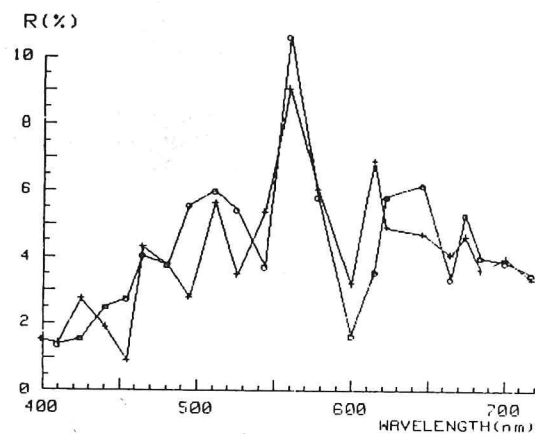
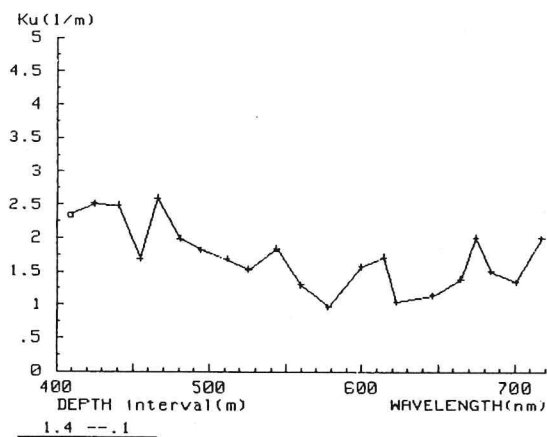
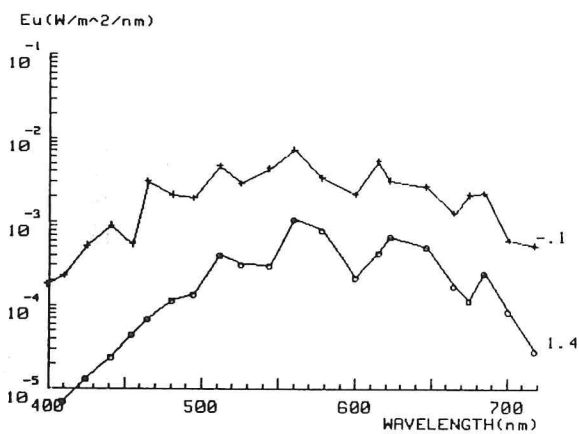
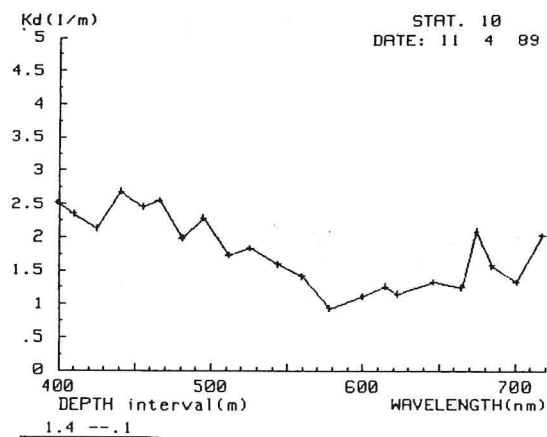
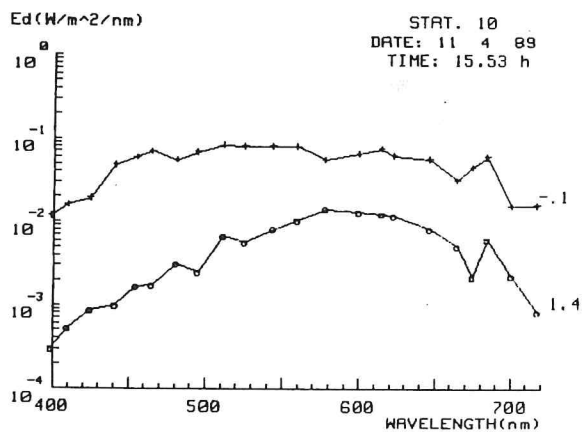
A9

16



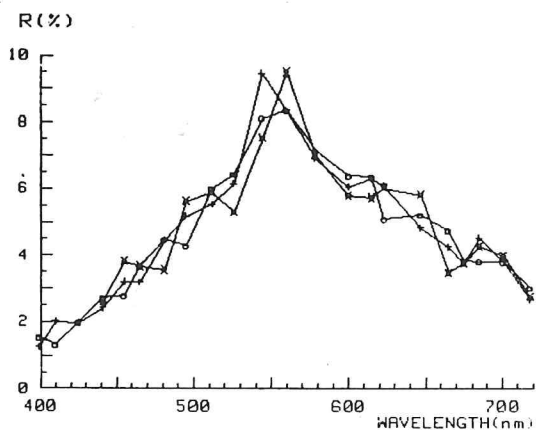
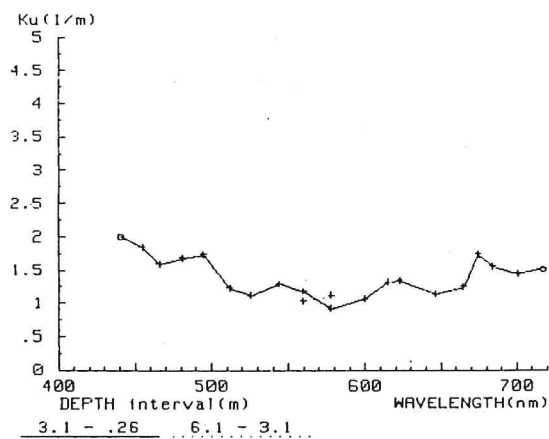
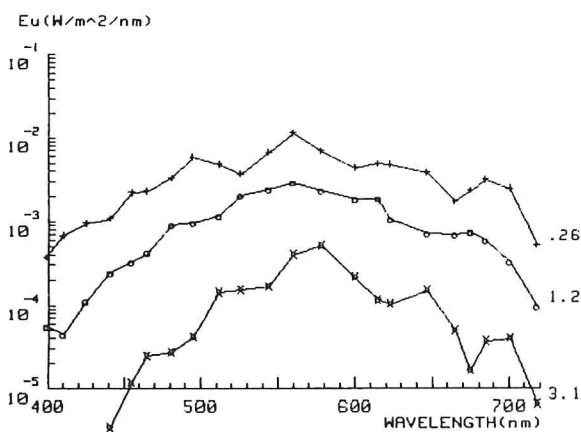
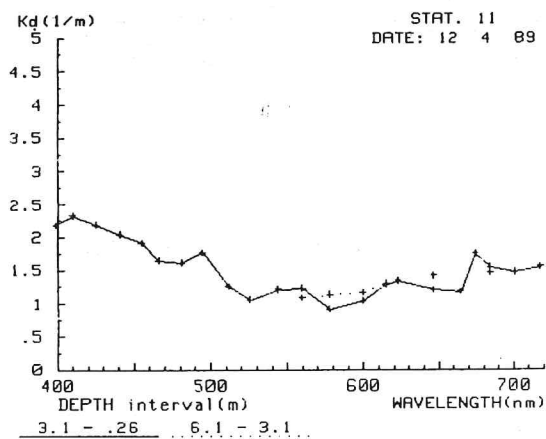
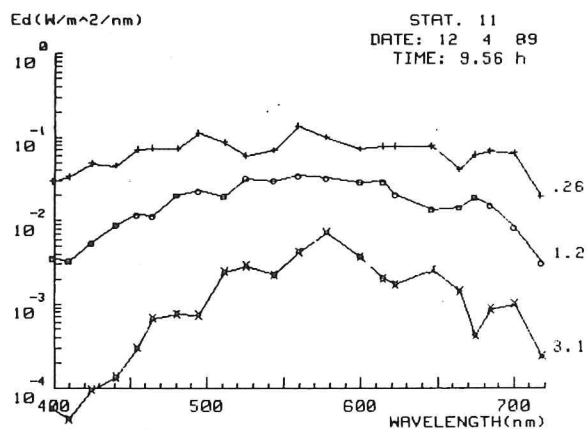
|                                   |           |
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| Date:                             | 11-4-89   |
| Time:                             | 14.40     |
| Latit.: [N]                       | 53 : 6.17 |
| Longit.: [E]                      | 4 : 42.13 |
| Salinity (o/oo):                  | 31.739    |
| Temp. (°C):                       | 7.6       |
| Co [670nm] (1/m):                 | 2.90      |
| Secchi depth (m):                 | 2.5       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 10.3      |
| Chloroph. (mg/m <sup>3</sup> ):   | 18.8      |
| Yell. Sub. (m-l):                 | .97       |

A10

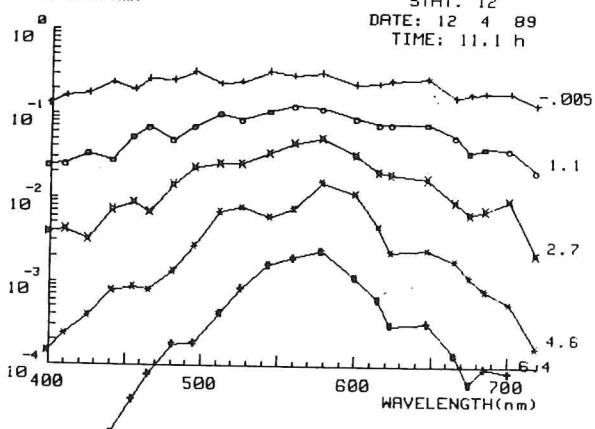


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 10          |
| Date:                             | 11 - 4 - 89 |
| Time:                             | 15.50       |
| Latit.: [N]                       | 52 : 58.84  |
| Longit.: [E]                      | 4 : 45.39   |
| Salinity (o/oo):                  | 30.525      |
| Temp. (°C):                       | 7.7         |
| Co [670nm] (1/m):                 | 5.50        |
| Secchi depth (m):                 | 1.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 21.5        |
| Chloroph. (mg/m <sup>3</sup> ):   | 16.8        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.4         |

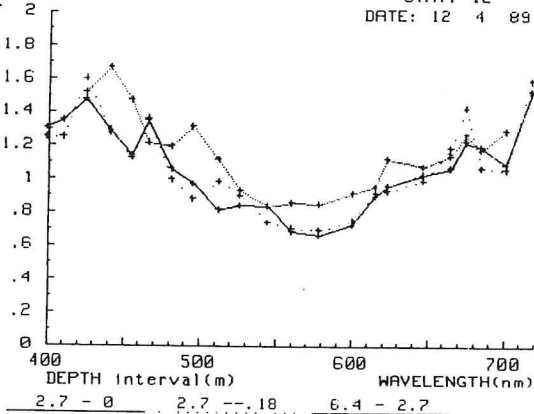
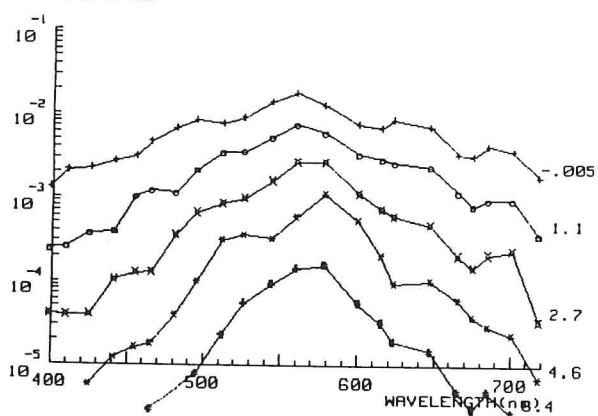
A11



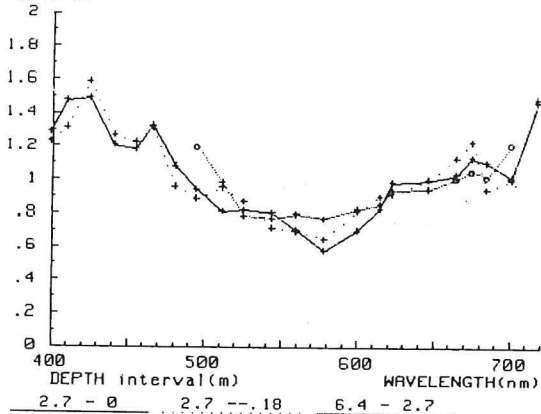
|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 11          |
| Date:                             | 12 - 4 - 89 |
| Time:                             | 9.55        |
| Latit.: [N]                       | 52 : 56.78  |
| Longit.: [E]                      | 4 : 41.38   |
| Salinity (o/oo):                  | 30.928      |
| Temp. (°C):                       | 7.7         |
| Co [670nm] (1/m):                 | 4.50        |
| Secchi depth (m):                 | 1.4         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 18.7        |
| Chloroph. (mg/m <sup>3</sup> ):   | 21.6        |
| Yell. Sub. (m <sup>-1</sup> ):    | .85         |

Ed(W/m<sup>2</sup>/nm)

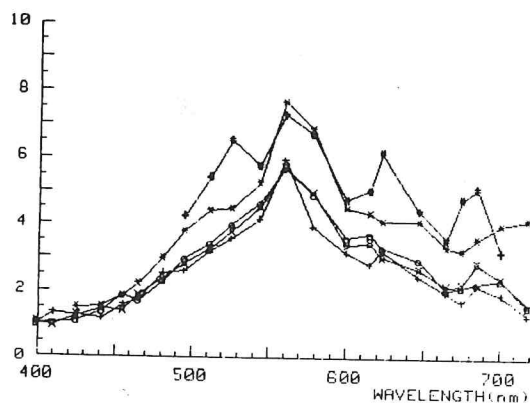
Kd(1/m)

Eu(W/m<sup>2</sup>/nm)

Ku(1/m)



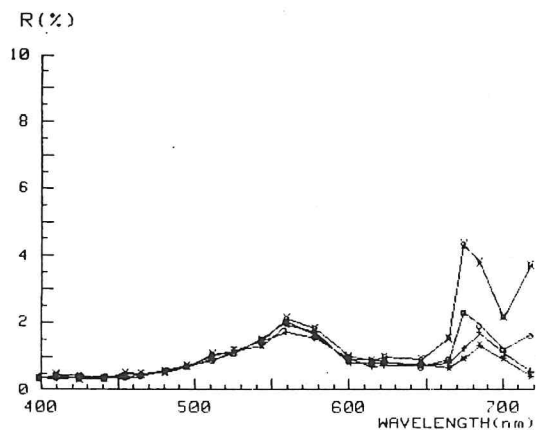
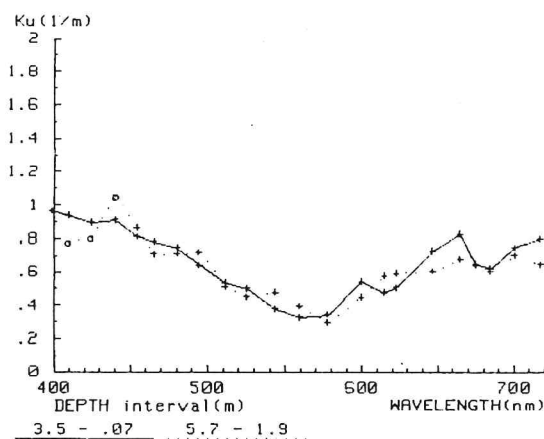
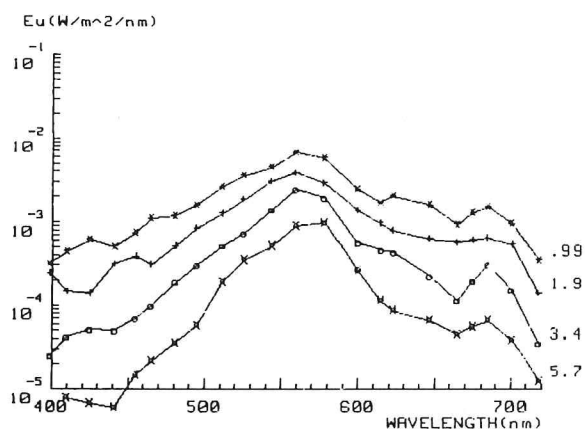
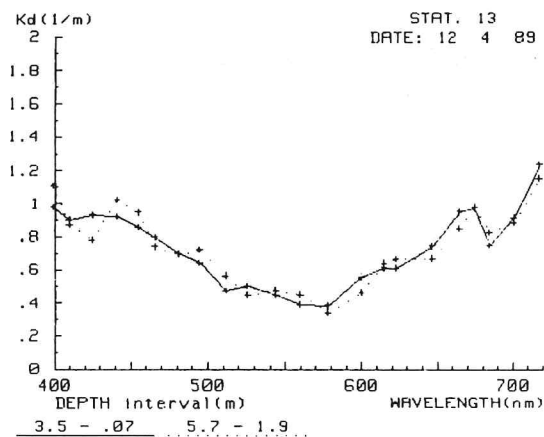
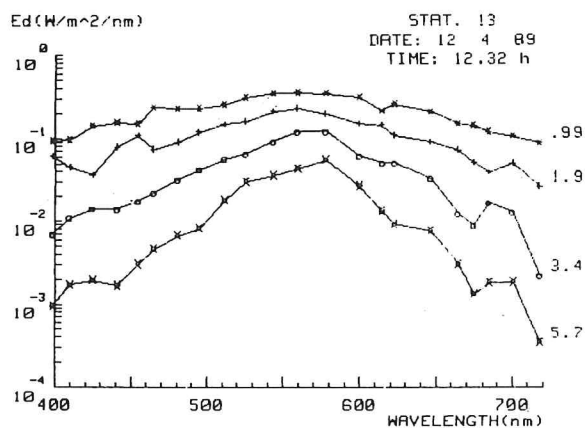
R(%)



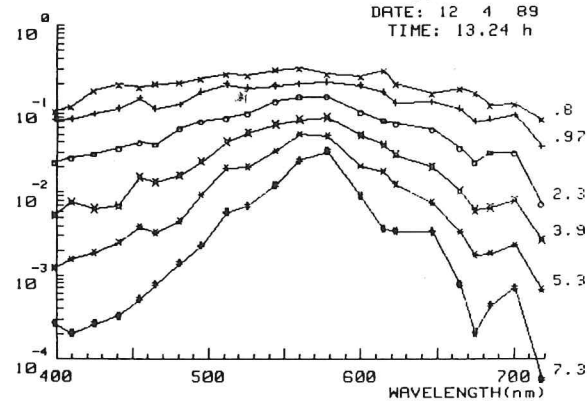
|                   |          |
|-------------------|----------|
| Station:          | 12       |
| Date:             | 12-4-89  |
| Time:             | 11.10    |
| Latit.: [N]       | 52:53.15 |
| Longit.: [E]      | 4:37.47  |
| Salinity(o/oo):   | 31.371   |
| Temp.(°C):        | 7.7      |
| Co[670nm](1/m):   | 2.90     |
| Secchi depth(m):  | 1.9      |
| Tot.Sus.M.(g/m³): | 22.3     |
| Chloroph.(mg/m³): | 15.2     |
| Yell.Sub.(m-l):   | 1.4      |



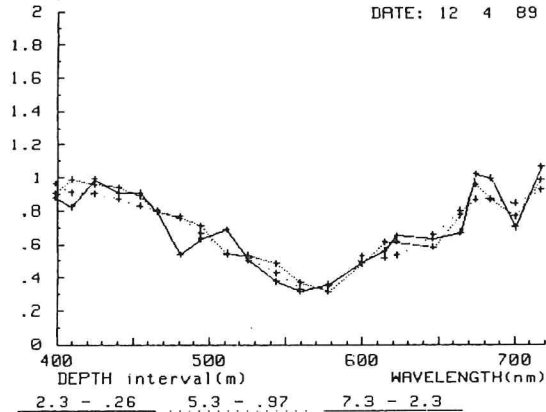
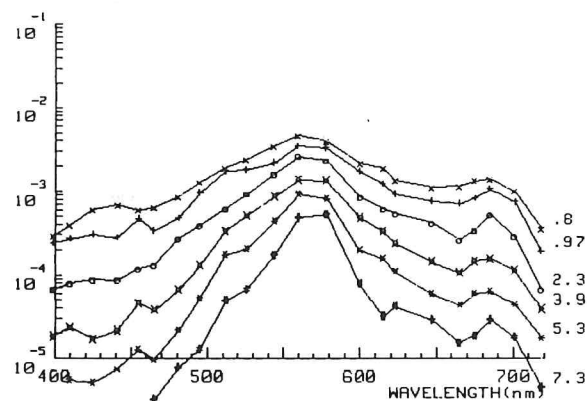
A13



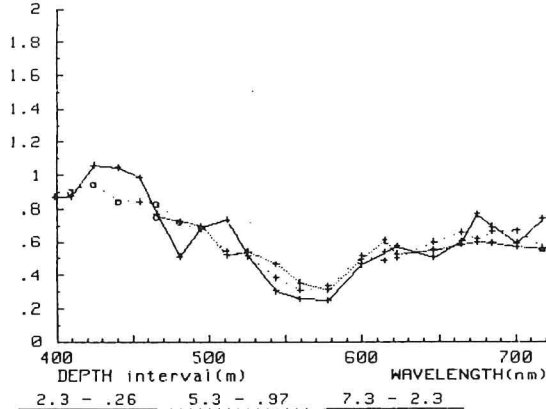
|                                |             |
|--------------------------------|-------------|
| Station:                       | 13          |
| Date:                          | 12 - 4 - 89 |
| Time:                          | 12.30       |
| Latit.: [N]                    | 52 : 55.17  |
| Longit.: [E]                   | 4 : 28.96   |
| Salinity(o/oo):                | 32.483      |
| Temp. (°C):                    | 7.8         |
| Co[670nm](1/m):                | 1.90        |
| Secchi depth(m):               | 3.5         |
| Tot.Sus.M.(g/m <sup>3</sup> ): | 3.6         |
| Chloroph.(mg/m <sup>3</sup> ): | 16.4        |
| Yell.Sub.(m-1):                | .64         |

Ed(W/m<sup>2</sup>/nm)
 STAT. 14  
 DATE: 12 4 89  
 TIME: 13.24 h


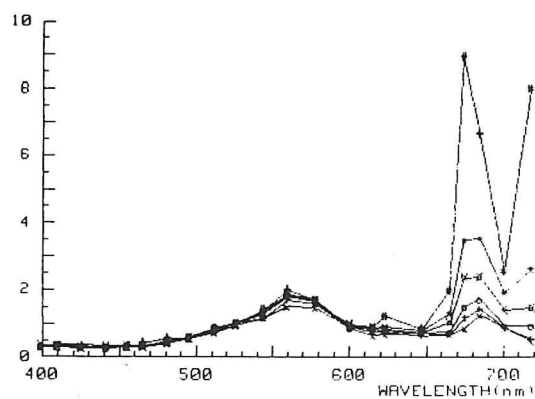
Kd(1/m)

 STAT. 14  
 DATE: 12 4 89
Eu(W/m<sup>2</sup>/nm)

Ku(1/m)

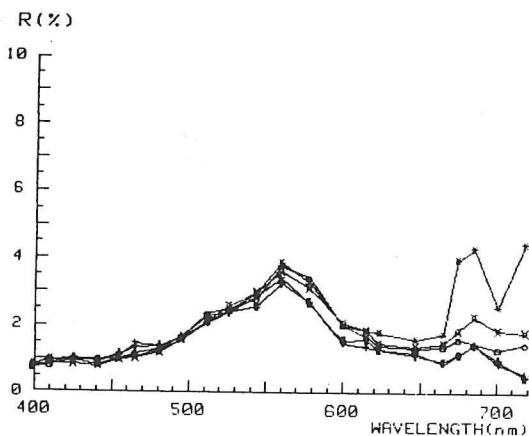
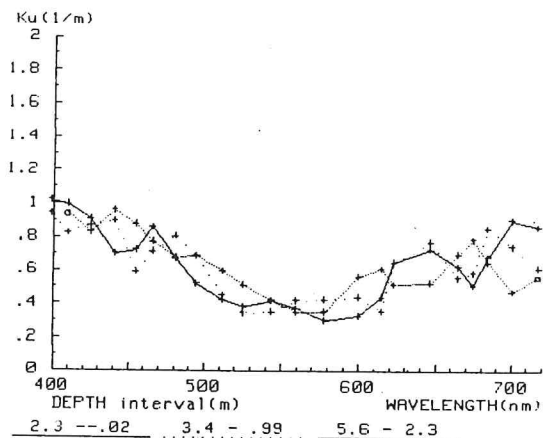
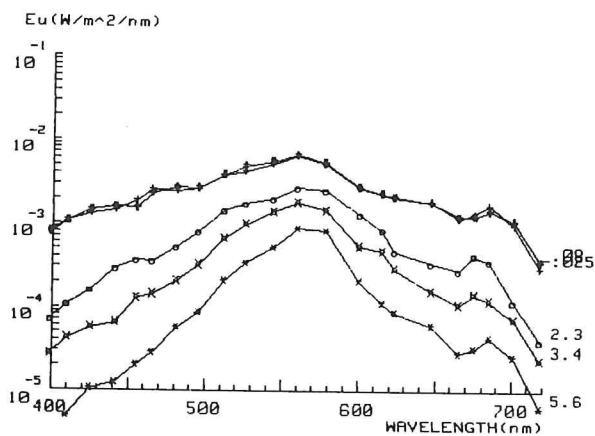
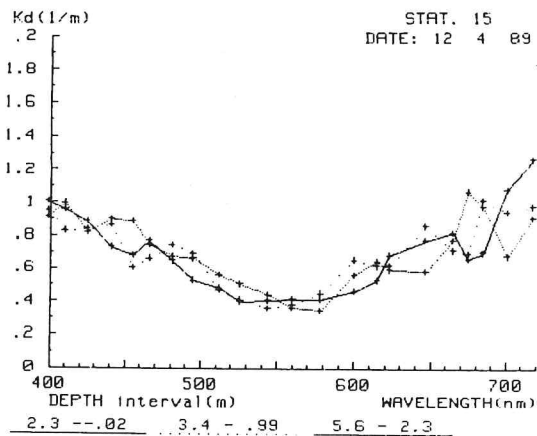
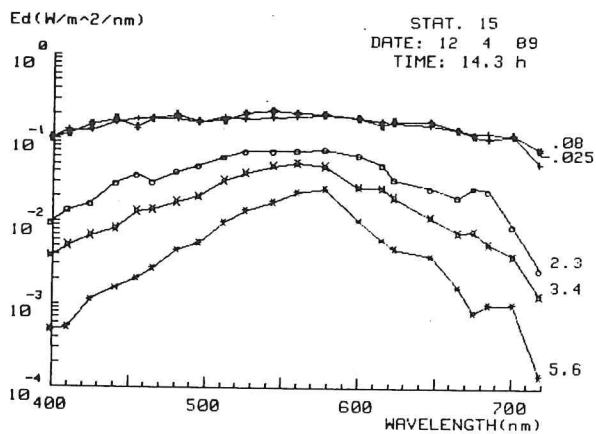


R(%)



|                      |             |
|----------------------|-------------|
| Station:             | 14          |
| Date:                | 12 - 4 - 89 |
| Time:                | 13.30       |
| Latit.: [N]          | 53 : .35    |
| Longit.: [E]         | 4 : 29.29   |
| Salinity(o/oo):      | 32.872      |
| Temp. (°C):          | 8.1         |
| Co [670nm] (1/m):    | 2.00        |
| Secchi depth(m):     | 3.8         |
| Tot. Sus. M. (g/m³): | 2.9         |
| Chloroph. (mg/m³):   | 17.9        |
| Yell. Sub. (m⁻¹):    | .66         |

A15

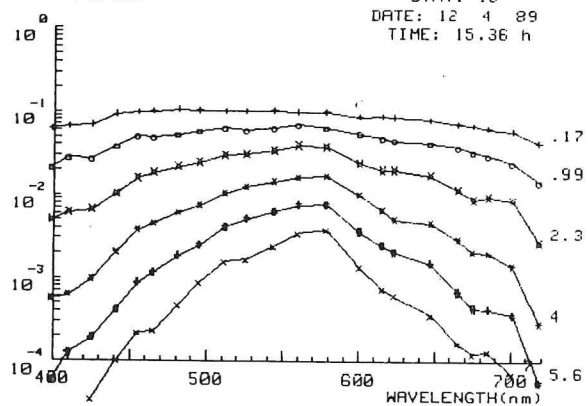


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 15          |
| Date:                             | 12 - 4 - 89 |
| Time:                             | 14.30       |
| Latit.: [N]                       | 53 : 3.04   |
| Longit.: [E]                      | 4 : 39.58   |
| Salinity (o/oo):                  | 31.859      |
| Temp. (°C):                       | 8.0         |
| Co [670nm] (1/m):                 | 1.90        |
| Secchi depth (m):                 | 3.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.4         |
| Chloroph. (mg/m <sup>3</sup> ):   | 8.4         |
| Yell. Sub. (m <sup>-1</sup> ):    | .54         |

A16

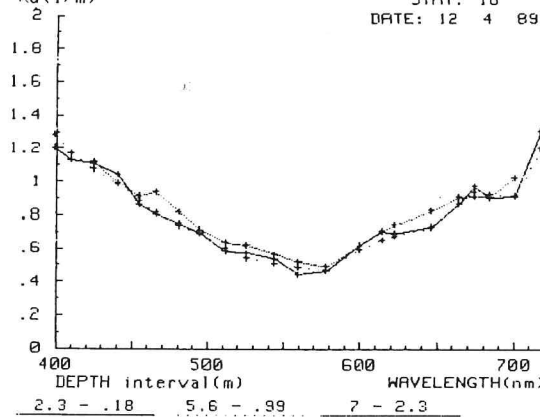
Ed(W/m<sup>2</sup>/nm)

STAT. 16  
DATE: 12 4 89  
TIME: 15.36 h

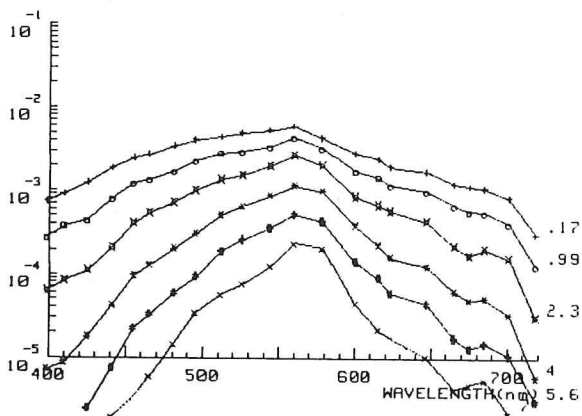


Kd(1/m)

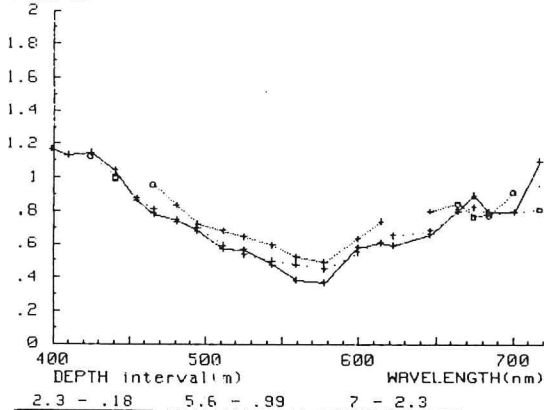
STAT. 16  
DATE: 12 4 89



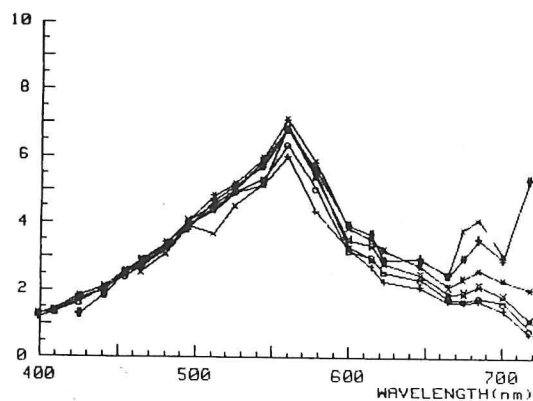
Eu(W/m<sup>2</sup>/nm)



Ku(1/m)



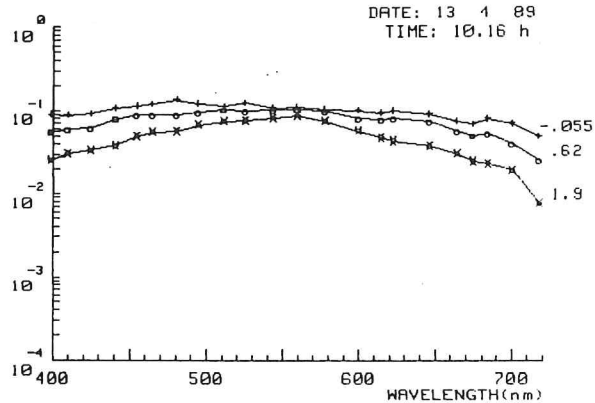
R(%)



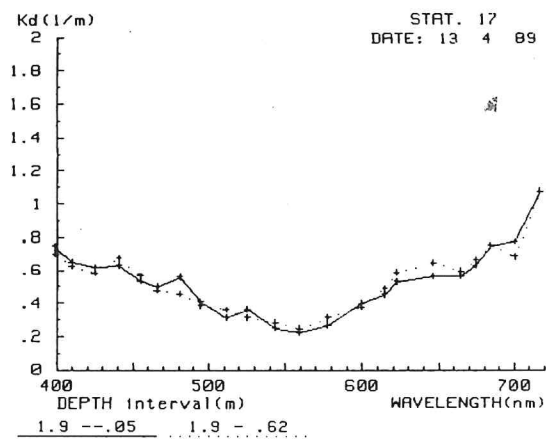
|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 16          |
| Date:                             | 12 - 4 - 89 |
| Time:                             | 15.30       |
| Latit.: [N]                       | 52 : 58.38  |
| Longit.: [E]                      | 4 : 44.40   |
| Salinity (o/oo):                  | 30.652      |
| Temp. (°C):                       | 8.0         |
| Co [670nm] (1/m):                 | 2.60        |
| Secchi depth (m):                 | 2.2         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.5         |
| Chloroph. (mg/m <sup>3</sup> ):   | 13.1        |
| Yell. Sub. (m <sup>-1</sup> ):    | .76         |

A17

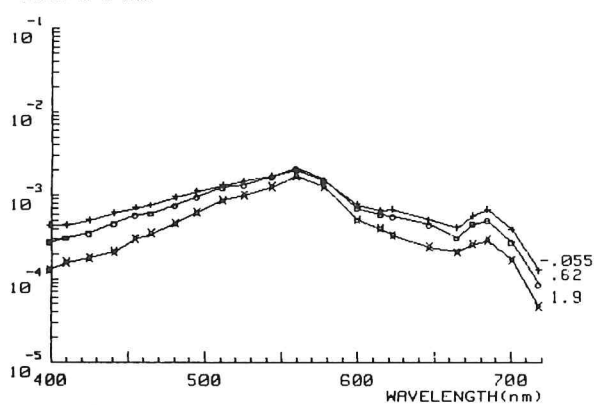
Ed (W/m<sup>2</sup>/nm)



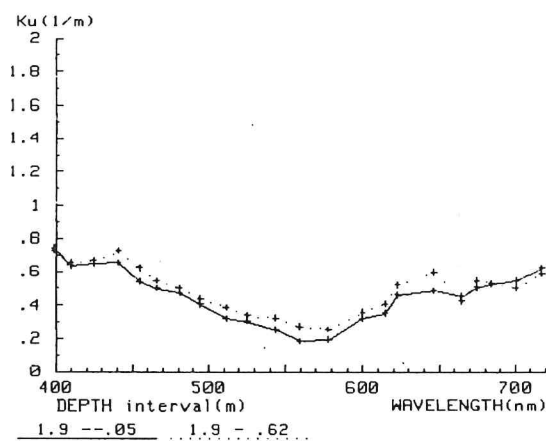
Kd (1/m)



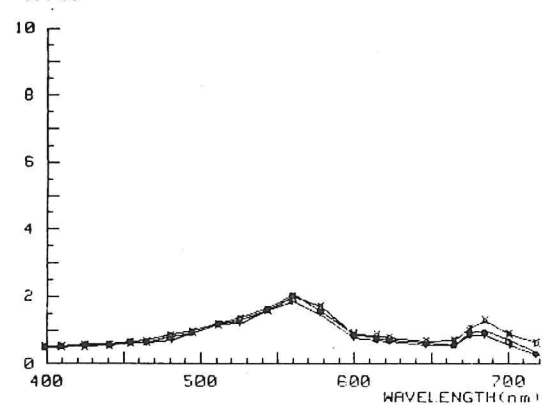
Eu (W/m<sup>2</sup>/nm)



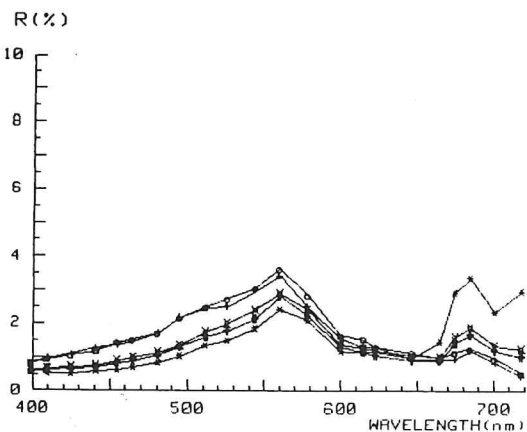
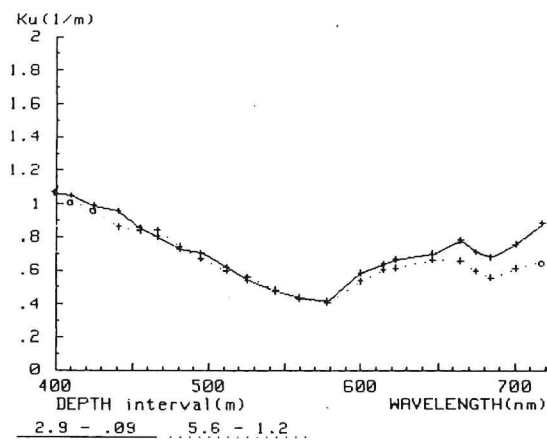
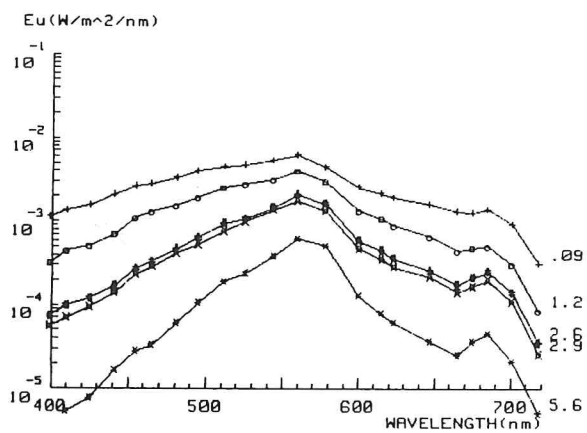
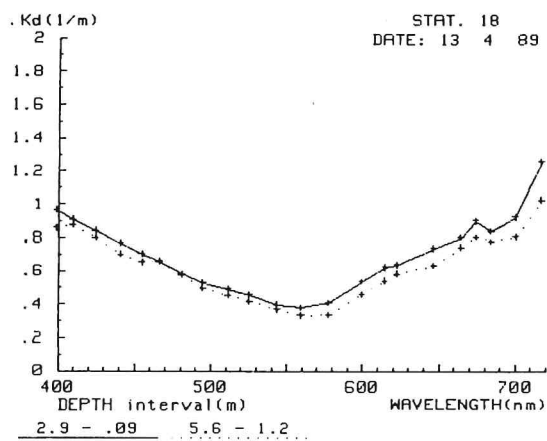
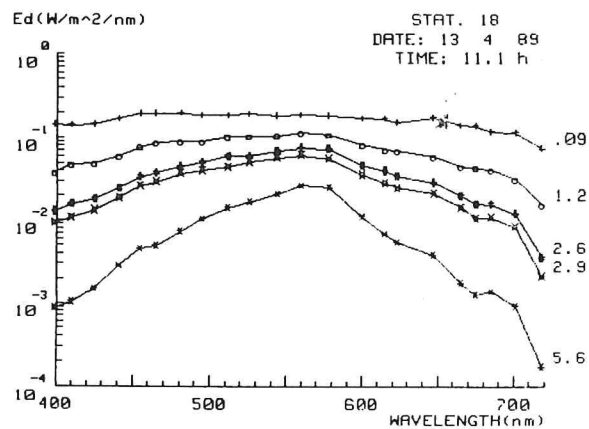
Ku (1/m)



R (%)



|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 17        |
| Date:                             | 13 -4 -89 |
| Time:                             | 10.15     |
| Latit.: [N]                       | 53 : 4.94 |
| Longit.: [E]                      | 4 : 29.66 |
| Salinity (o/oo):                  | 32.504    |
| Temp. (°C):                       | 7.7       |
| Co [670nm] (1/m):                 | 1.40      |
| Secchi depth (m):                 | 4.5       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.3       |
| Chloroph. (mg/m <sup>3</sup> ):   | 12.0      |
| Yell. Sub. (m <sup>-1</sup> ):    | .87       |

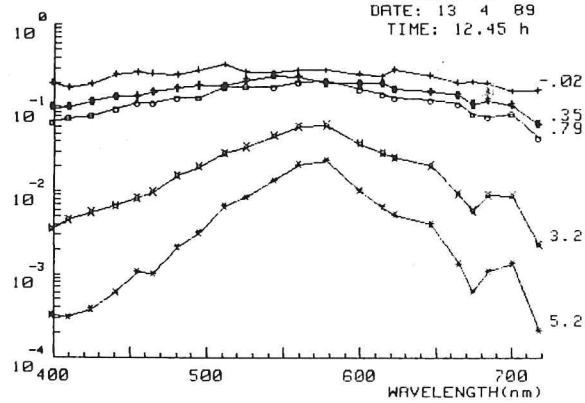


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 18          |
| Date:                             | 13 - 4 - 89 |
| Time:                             | 11.15       |
| Latit.: [N]                       | 53 : 5.62   |
| Longit.: [E]                      | 4 : 35.74   |
| Salinity (o/oo):                  | 31.502      |
| Temp. (°C):                       | 8.0         |
| Co [670nm] (1/m):                 | 1.70        |
| Secchi depth (m):                 | 3.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.3         |
| Chloroph. (mg/m <sup>3</sup> ):   | 10.0        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.1         |

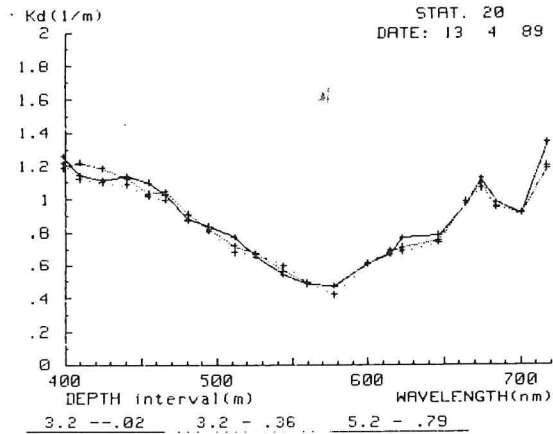
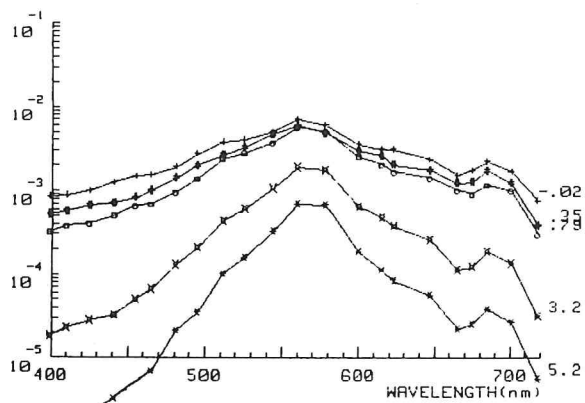
A19

Due to technical problems no spectral data are presented.

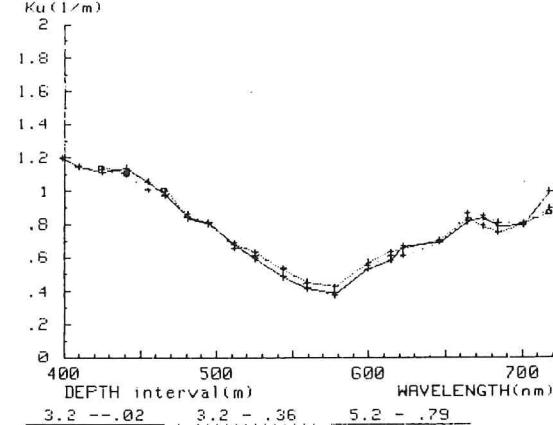
|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 19          |
| Date:                             | 13 - 4 - 89 |
| Time:                             | 12.00       |
| Latit.: [N]                       | 53 : 6.11   |
| Longit.: [E]                      | 4 : 43.42   |
| Salinity (o/oo):                  | 31.526      |
| Temp. (°C):                       | 7.9         |
| Co [670nm] (1/m):                 | 3.80        |
| Secchi depth (m):                 | 2.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 8.0         |
| Chloroph. (mg/m <sup>3</sup> ):   | 30.0        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.2         |

Ed (W/m<sup>2</sup>/nm)

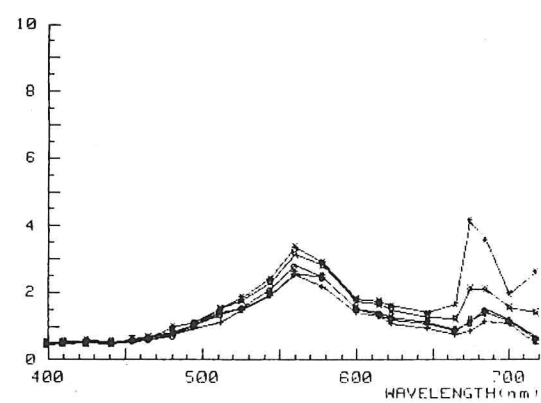
Kd (1/m)

Eu (W/m<sup>2</sup>/nm)

Ku (1/m)



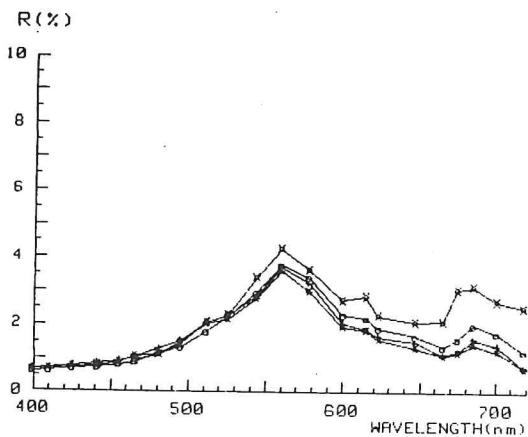
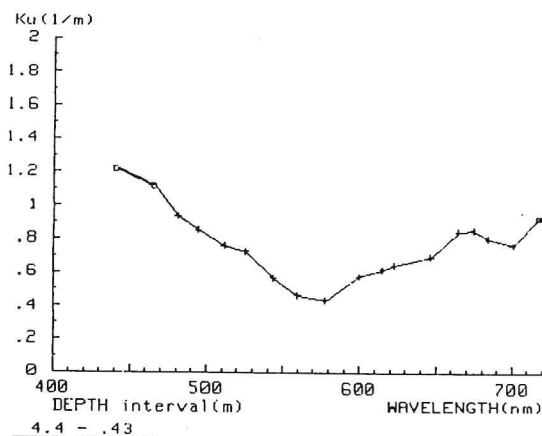
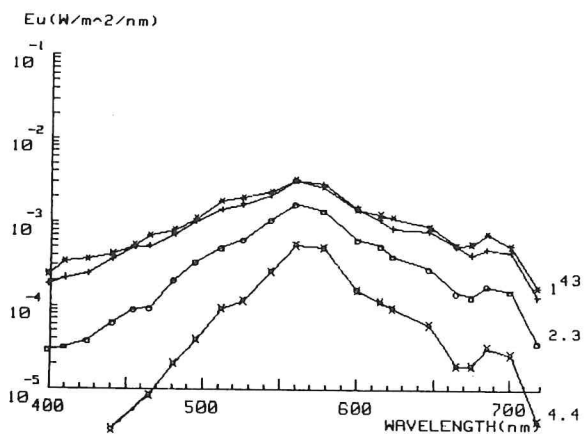
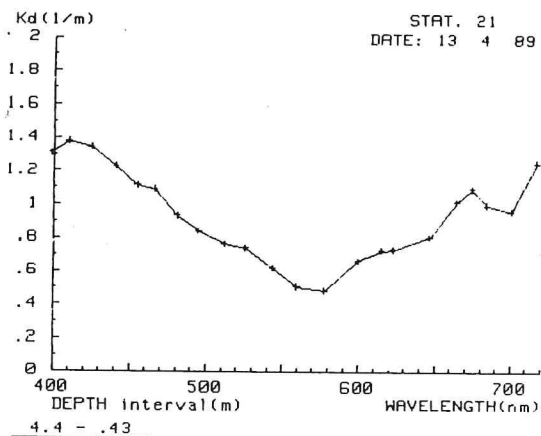
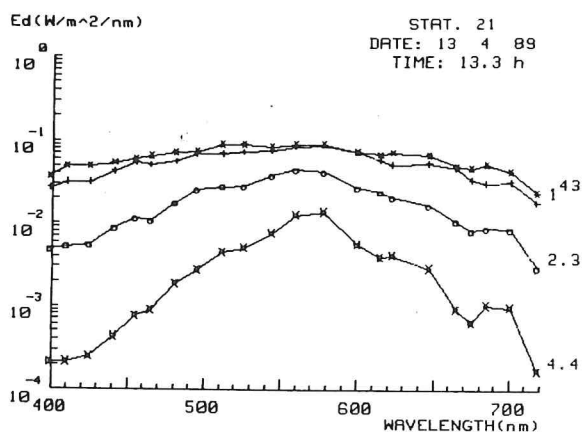
R (%)



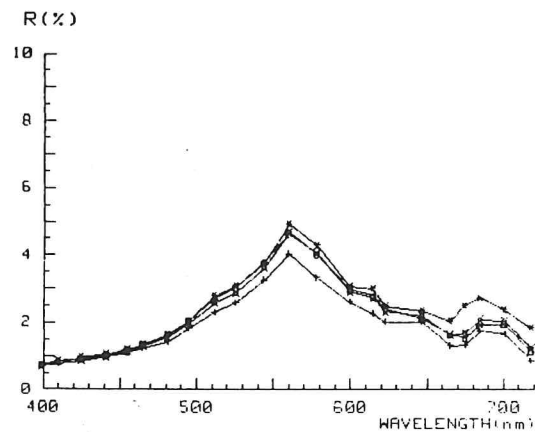
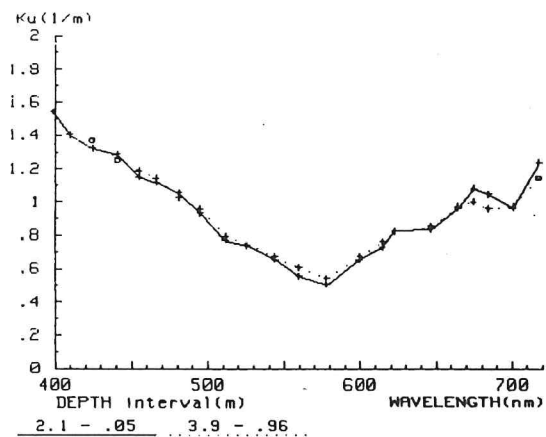
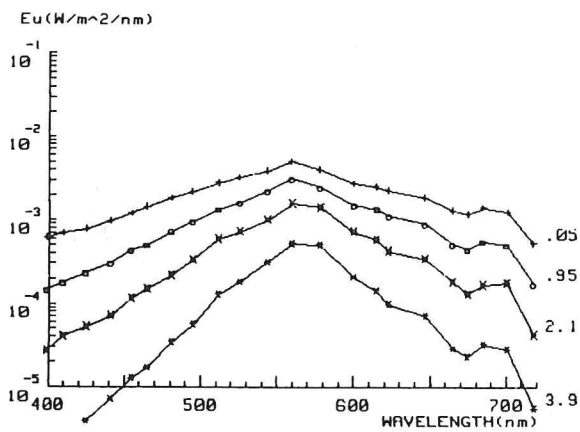
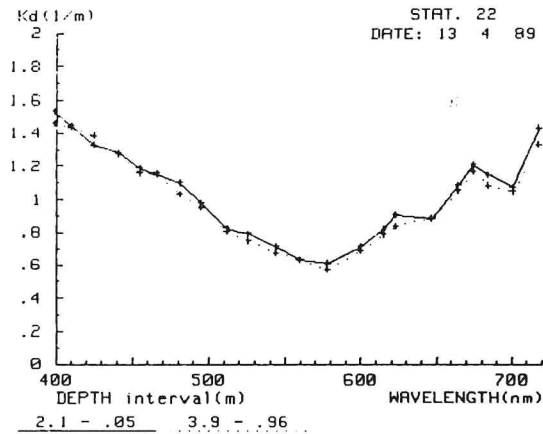
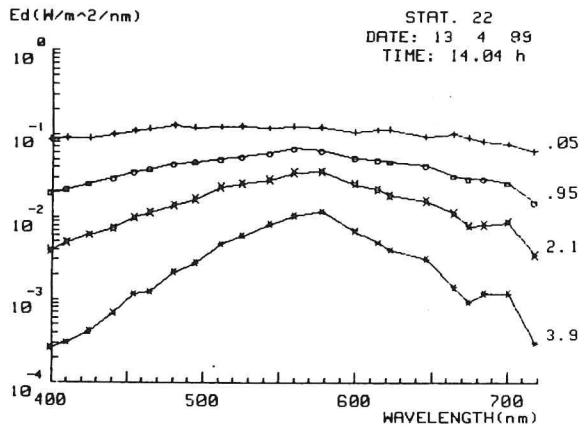
|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 20        |
| Date:                             | 13-4-89   |
| Time:                             | 12.45     |
| Latit.: [N]                       | 53 : 4.14 |
| Longit.: [E]                      | 4 : 41.91 |
| Salinity (o/oo):                  | 31.800    |
| Temp. (°C):                       | 8.0       |
| Co [670nm] (1/m):                 | 2.60      |
| Secchi depth (m):                 | 3.2       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.5       |
| Chloroph. (mg/m <sup>3</sup> ):   | 23.1      |
| Yell. Sub. (m <sup>-1</sup> ):    | .95       |



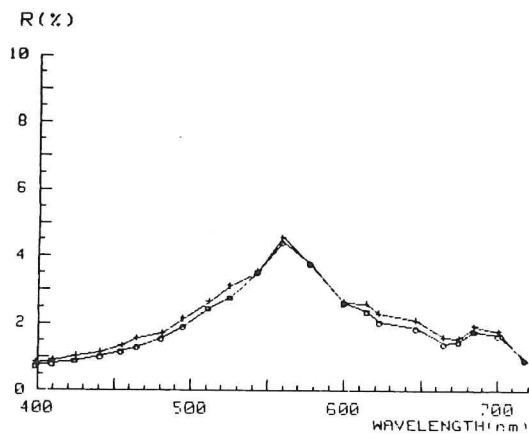
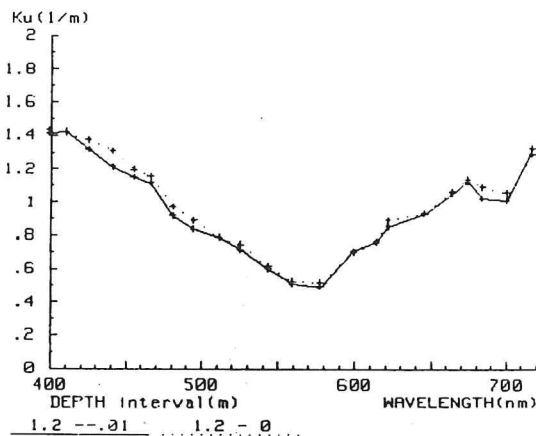
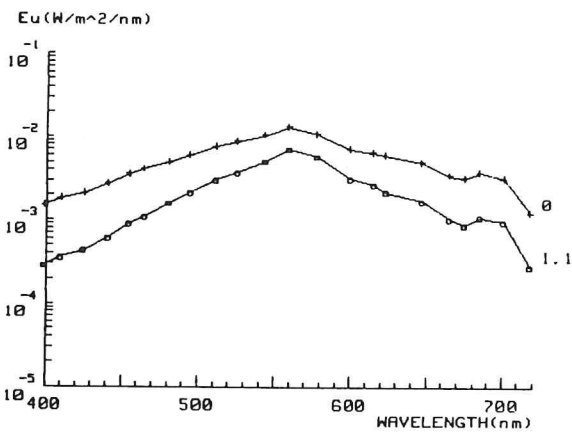
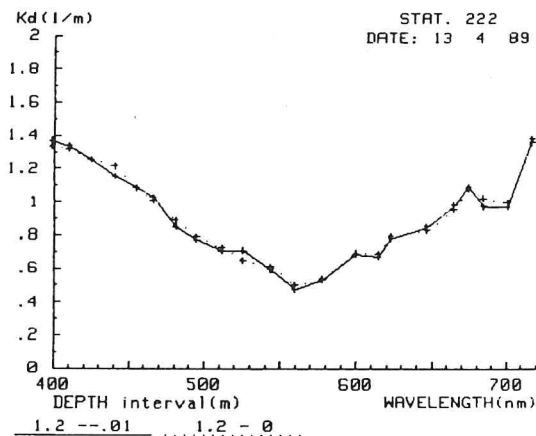
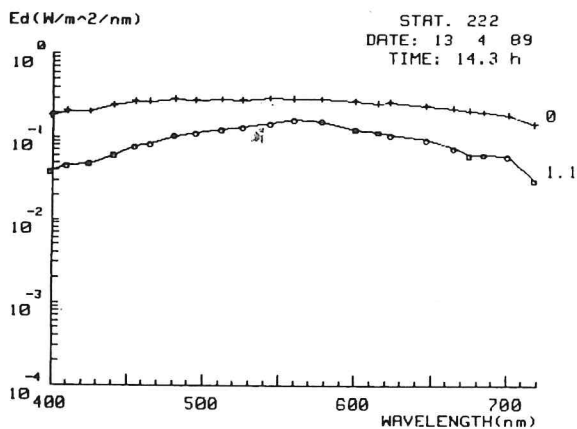
A21



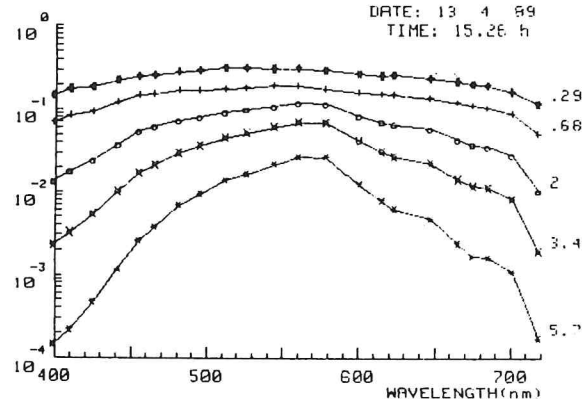
|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 21        |
| Date:                             | 13 -4 -89 |
| Time:                             | 18.30     |
| Latit.: [N]                       | 53 : .44  |
| Longit.: [E]                      | 4 : 41.60 |
| Salinity (o/oo):                  | 31.259    |
| Temp. (°C):                       | 8.0       |
| Co [670nm] (1/m):                 | 2.70      |
| Secchi depth (m):                 | 2.7       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.9       |
| Chloroph. (mg/m <sup>3</sup> ):   | 16.1      |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.1       |



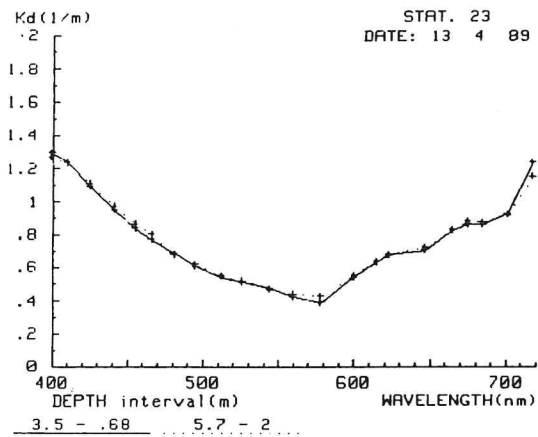
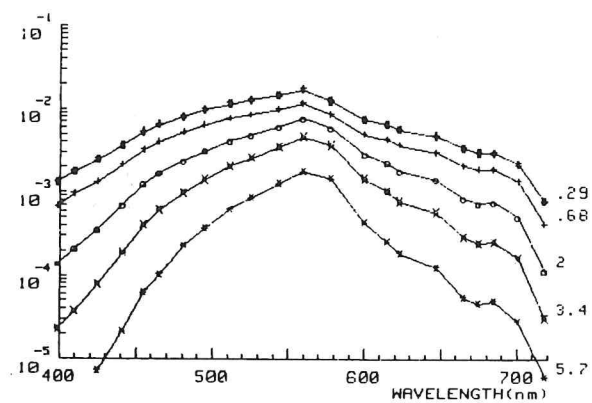
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 22         |
| Date:                             | 13 -4 -89  |
| Time:                             | 14.10      |
| Latit.: [N]                       | 52 : 58.42 |
| Longit.: [E]                      | 4 : 43.66  |
| Salinity (o/oo):                  | 30.852     |
| Temp. (°C):                       | 8.1        |
| Co [670nm] (1/m):                 | 2.90       |
| Secchi depth (m):                 | 2.3        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 8.9        |
| Chloroph. (mg/m <sup>3</sup> ):   | 25.7       |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.2        |



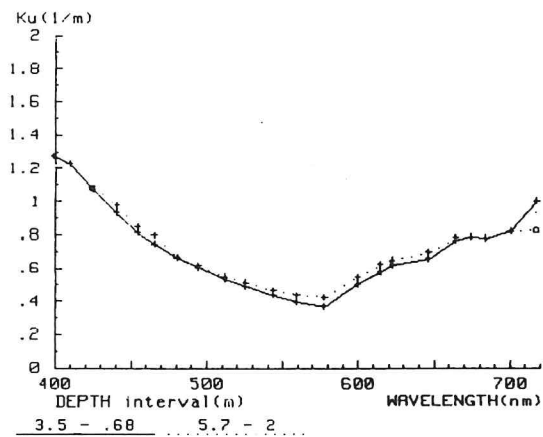
|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 222         |
| Date:                             | 13 - 4 - 89 |
| Time:                             | 14.30       |
| Latit.: [N]                       | 52 : 58.42  |
| Longit.: [E]                      | 4 : 43.66   |
| Salinity (o/oo):                  | 30.863      |
| Temp. (°C):                       | 8.3         |
| Co [670nm] (1/m):                 | 2.30        |
| Secchi depth (m):                 | 2.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.2         |
| Chloroph. (mg/m <sup>3</sup> ):   | 21.4        |
| Yell. Sub. (m-l):                 | 1.1         |

Ed(W/m<sup>2</sup>/nm)

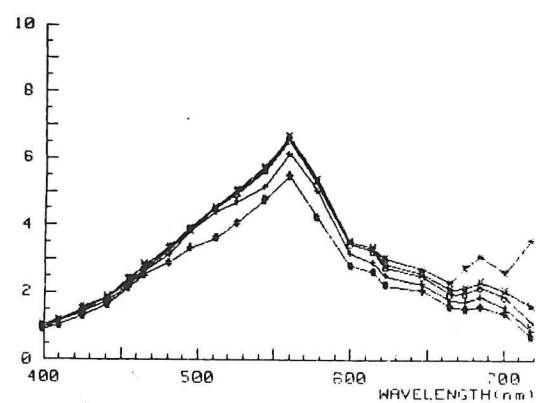
Kd(1/m)

Eu(W/m<sup>2</sup>/nm)

Ku(1/m)

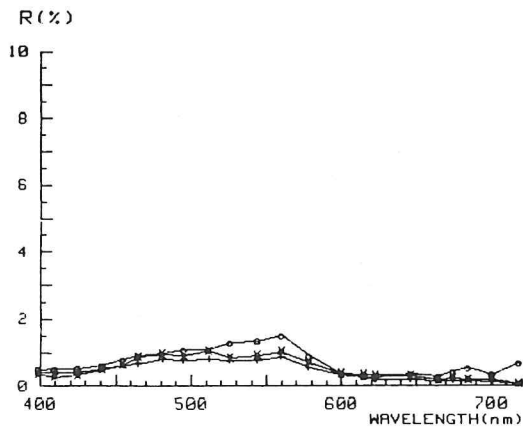
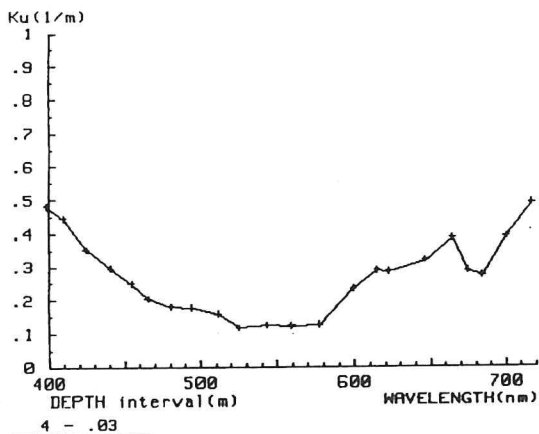
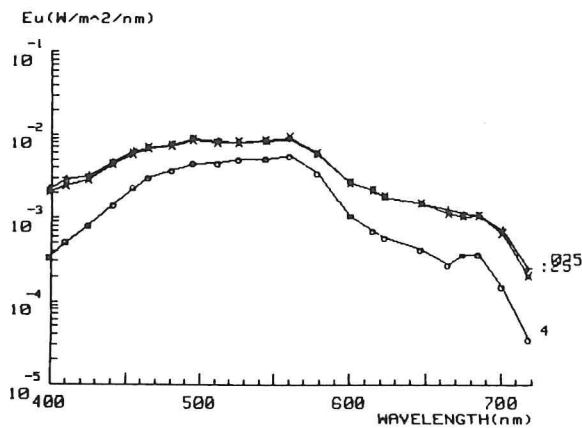
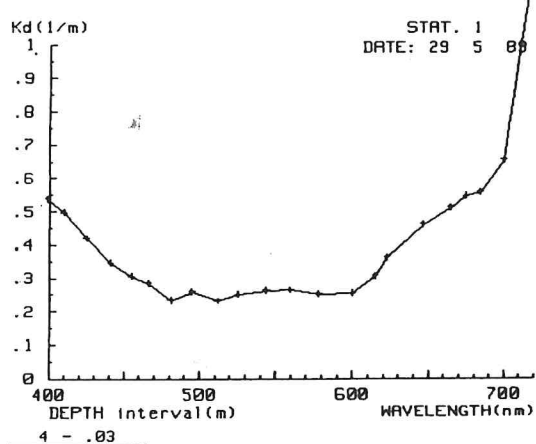
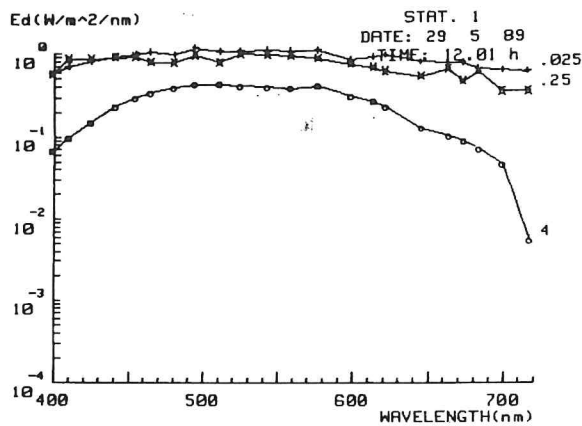


R(%)

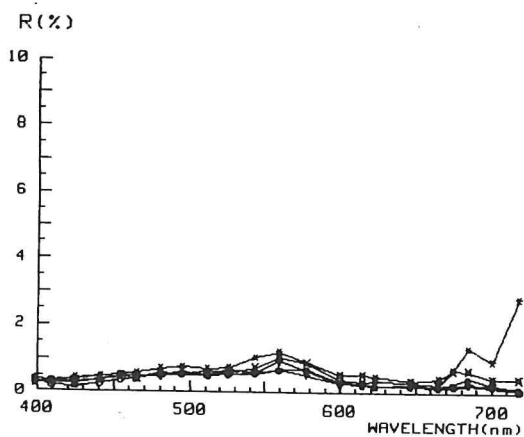
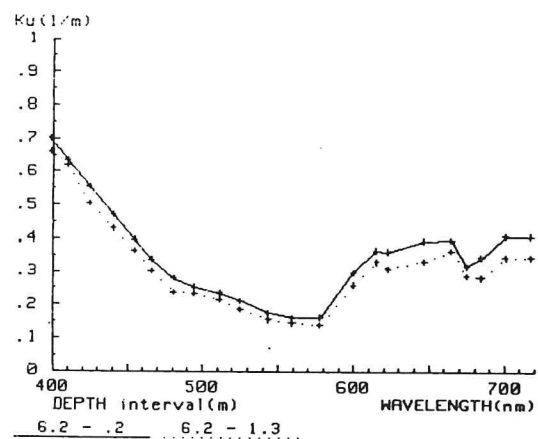
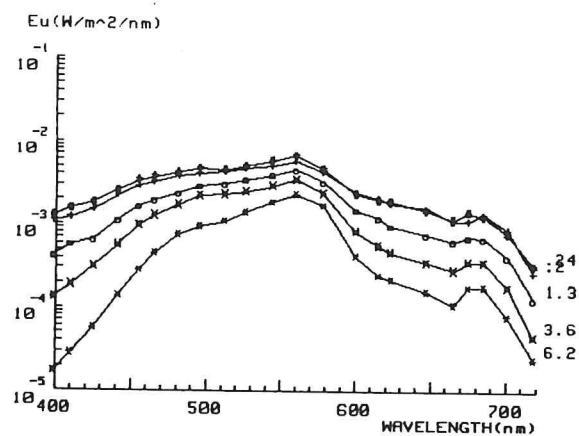
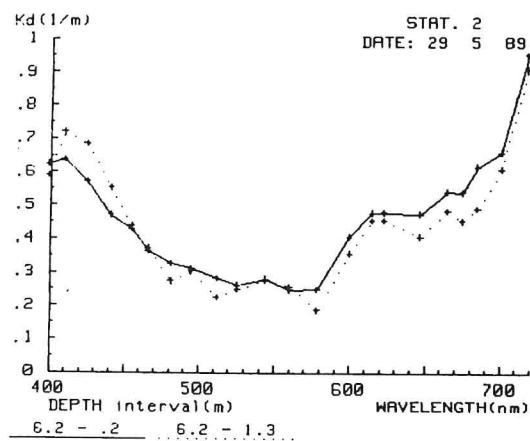
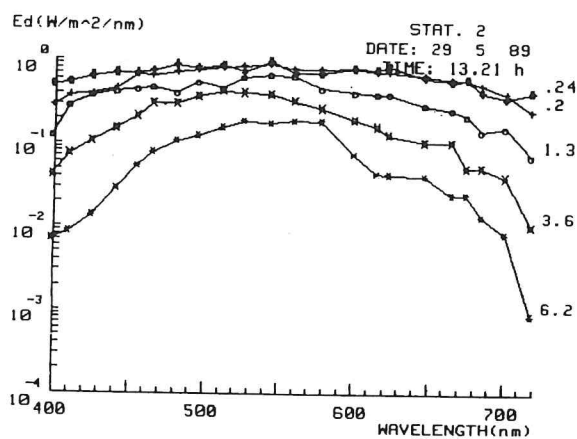


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 23          |
| Date:                             | 13 - 4 - 89 |
| Time:                             | 15.30       |
| Latit.: [N]                       | 53 : 1.66   |
| Longit.: [E]                      | 4 : 51.49   |
| Salinity (o/oo):                  | 29.038      |
| Temp. (°C):                       | 8.2         |
| Co [670nm] (1/m):                 | 2.10        |
| Secchi depth (m):                 | 2.7         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.0         |
| Chloroph. (mg/m <sup>3</sup> ):   | 11.6        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.3         |

B1

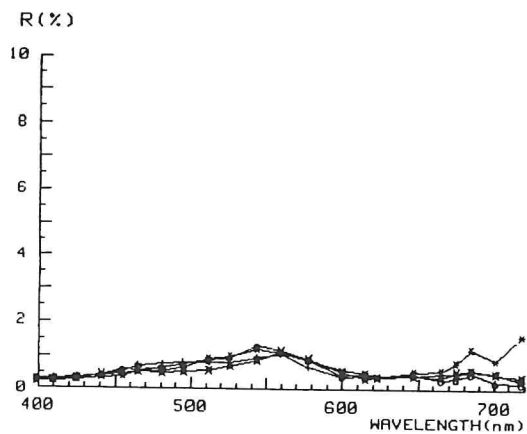
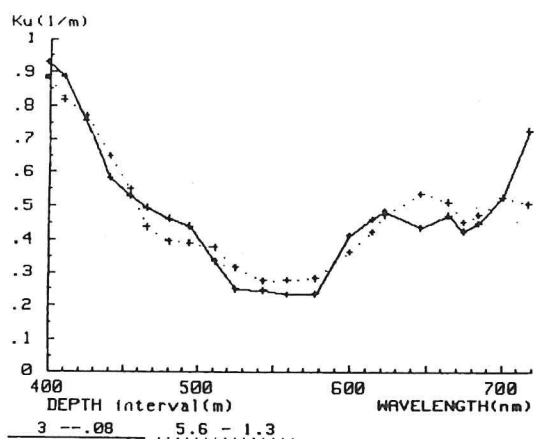
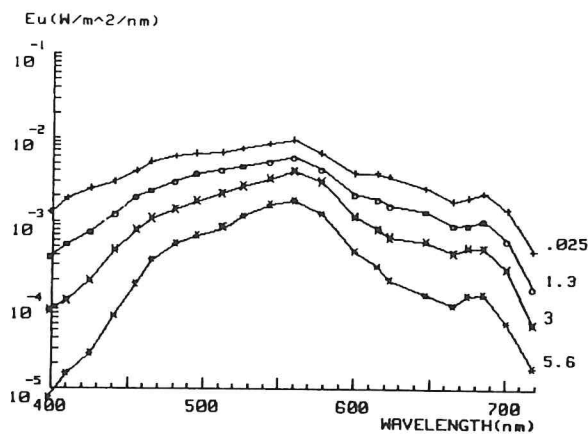
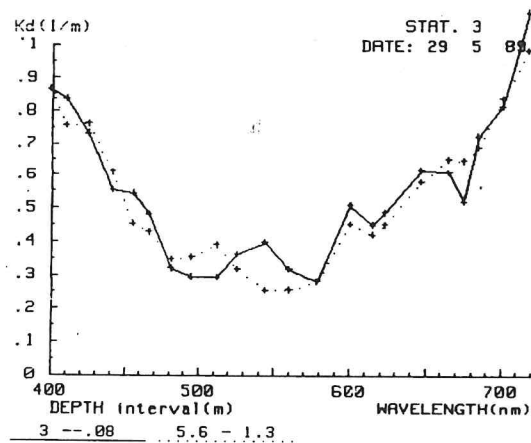
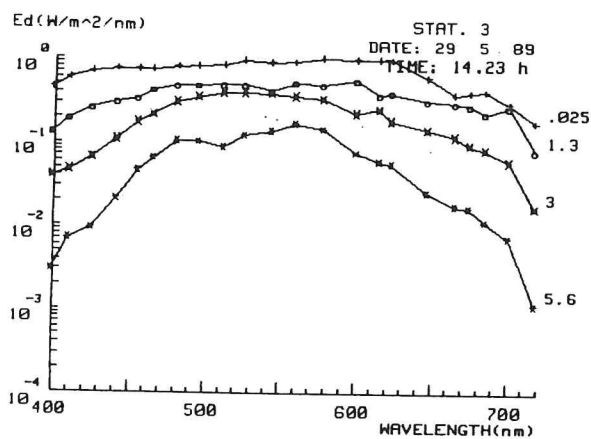


|                      |             |
|----------------------|-------------|
| Station:             | 1           |
| Date:                | 29 - 5 - 89 |
| Time:                | 12.05       |
| Latit.: [N]          | 53 : 17.13  |
| Longit.: [E]         | 4 : 27.39   |
| Salinity(o/oo):      | 33.011      |
| Temp. (°C):          | 13.4        |
| Co [670nm] (1/m):    | .67         |
| Secchi depth(m):     | 10.0        |
| Tot. Sus. M. (g/m³): | 4.2         |
| Chloroph. (mg/m³):   | 3.5         |
| Yell. Sub. (m⁻¹):    | 1.5         |

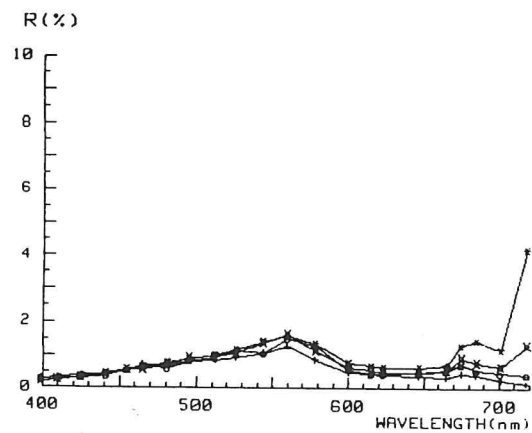
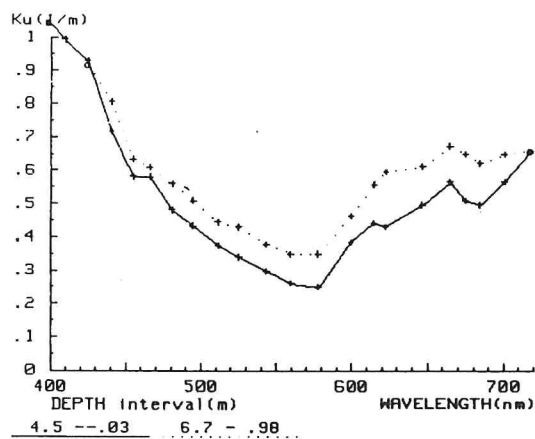
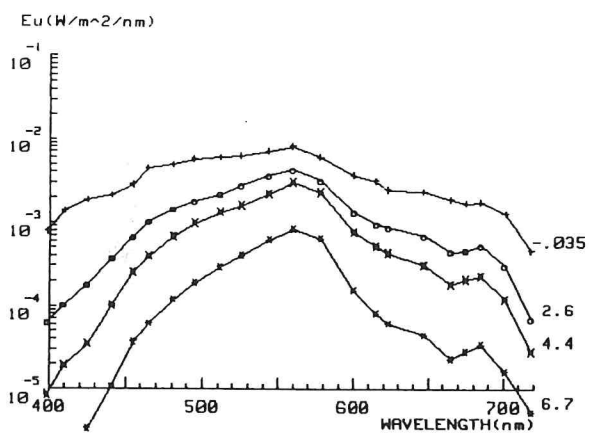
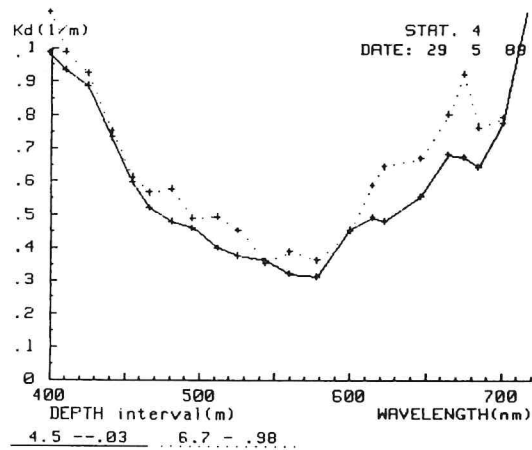
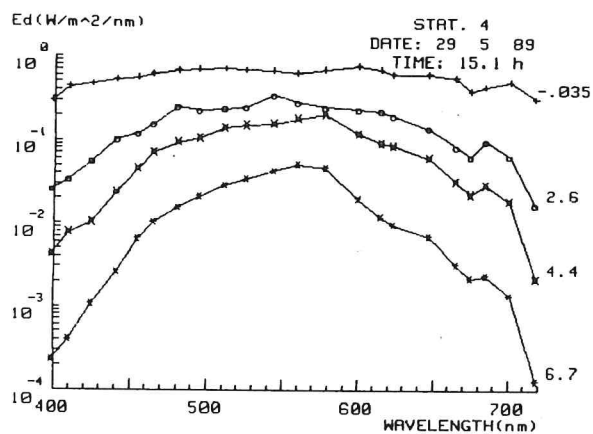


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 2           |
| Date:                             | 29 - 5 - 89 |
| Time:                             | 13.30       |
| Latit.: [N]                       | 53 : 12.00  |
| Longit.: [E]                      | 4 : 32.94   |
| Salinity (o/oo):                  | 31.171      |
| Temp. (°C):                       | 12.8        |
| Co [670nm] (1/m):                 | .77         |
| Secchi depth (m):                 | 7.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.3         |
| Chloroph. (mg/m <sup>3</sup> ):   | 6.3         |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.5         |

B3



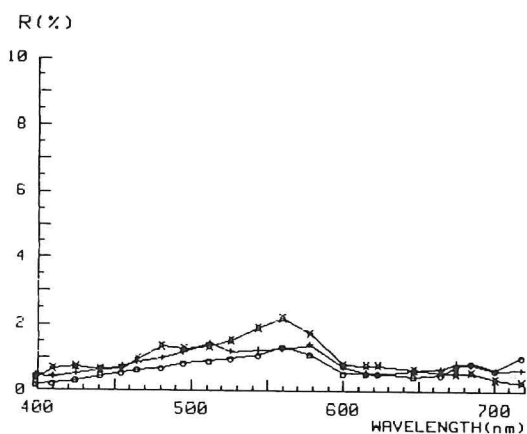
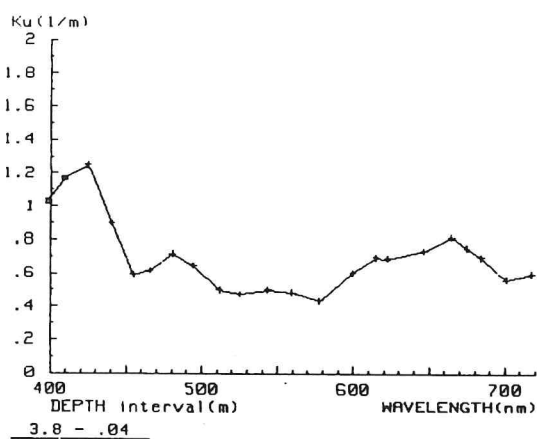
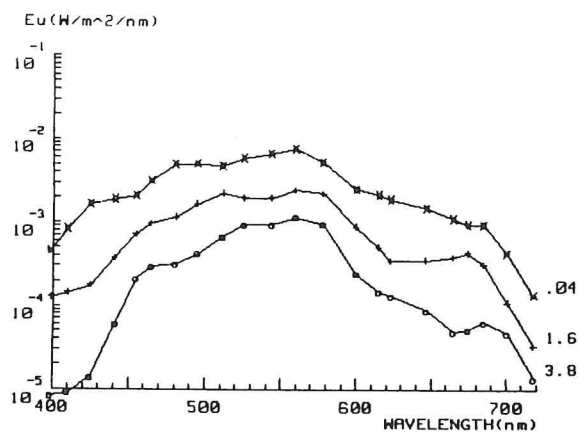
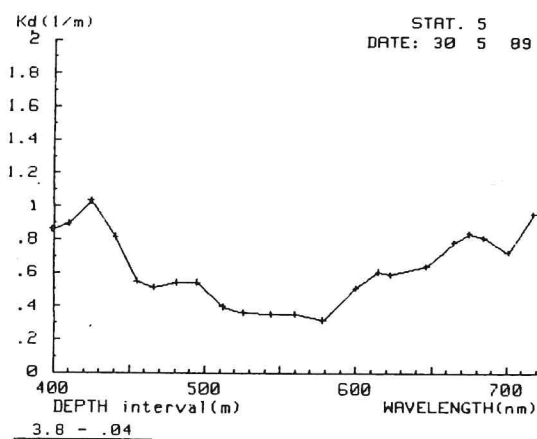
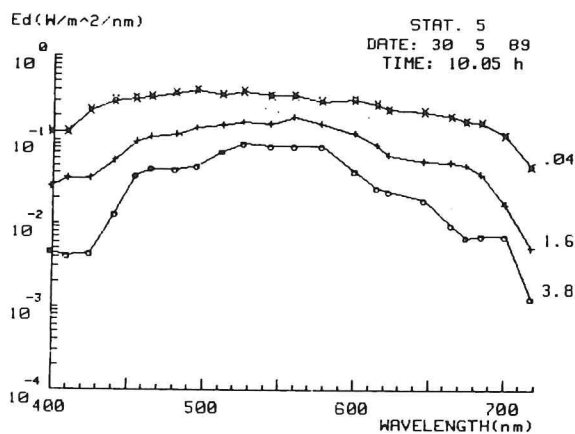
|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 3         |
| Date:                             | 29-5-89   |
| Time:                             | 14.30     |
| Latit.: [N]                       | 53 : 7.73 |
| Longit.: [E]                      | 4 : 37.77 |
| Salinity (o/oo):                  | 32.218    |
| Temp. (°C):                       | 14.2      |
| Co [670nm] (1/m):                 | .90       |
| Secchi depth (m):                 | 7.5       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 1.9       |
| Chloroph. (mg/m <sup>3</sup> ):   | 9.1       |
| Yell. Sub. (m-1):                 | 1.6       |



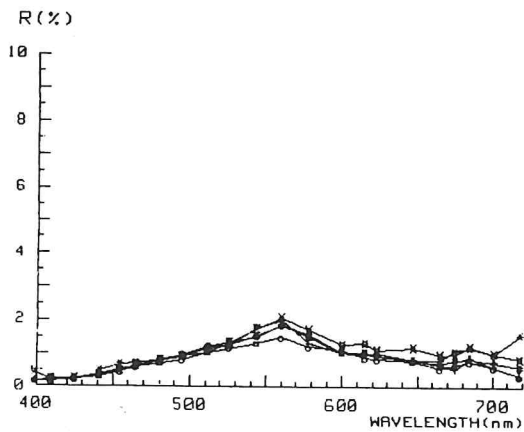
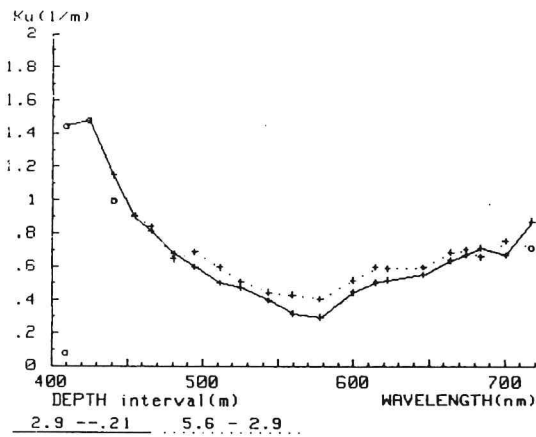
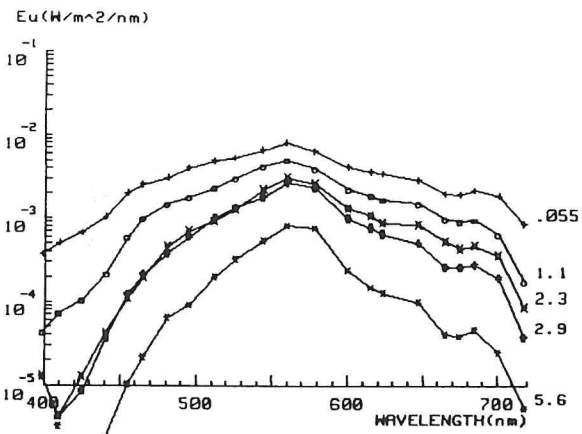
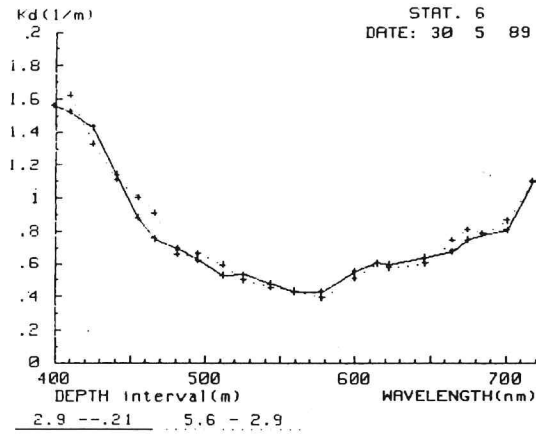
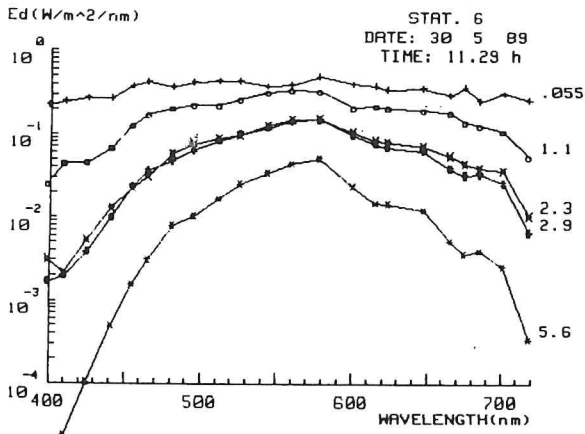
|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 4           |
| Date:                             | 29 - 5 - 89 |
| Time:                             | 15.15       |
| Latit.: [N]                       | 53 : 6.26   |
| Longit.: [E]                      | 4 : 41.70   |
| Salinity (o/oo):                  | 32.408      |
| Temp. (°C):                       | 13.6        |
| Co [670nm] (1/m):                 | .95         |
| Secchi depth (m):                 | 6.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.8         |
| Chloroph. (mg/m <sup>3</sup> ):   | 6.6         |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.5         |



B5

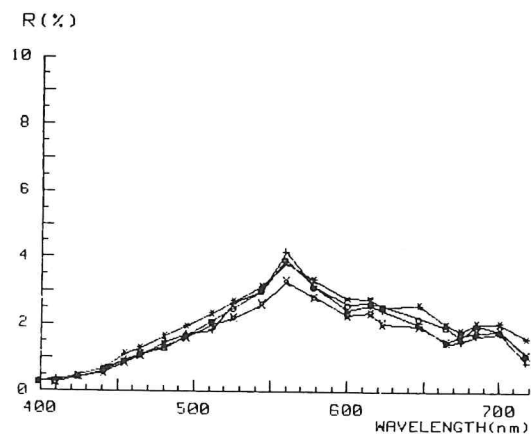
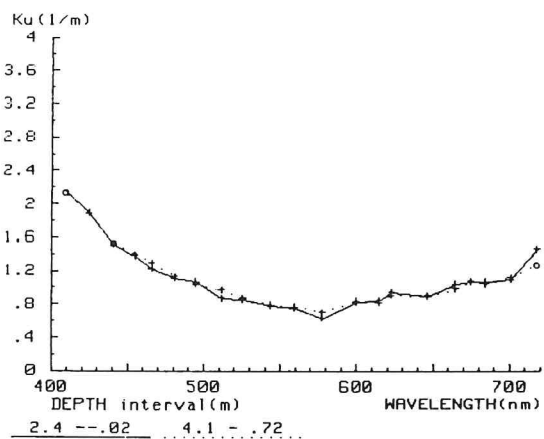
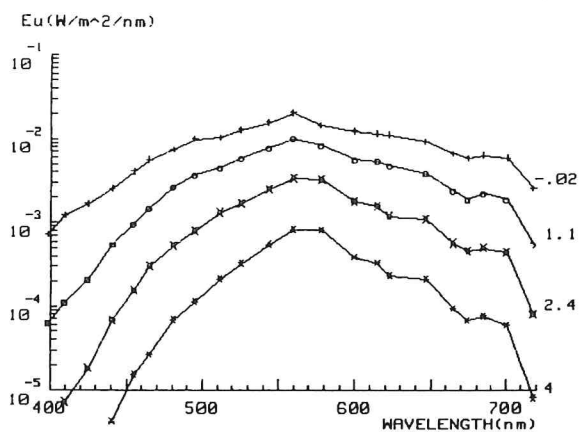
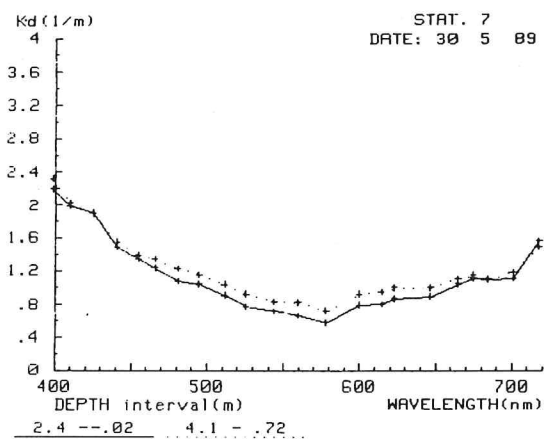
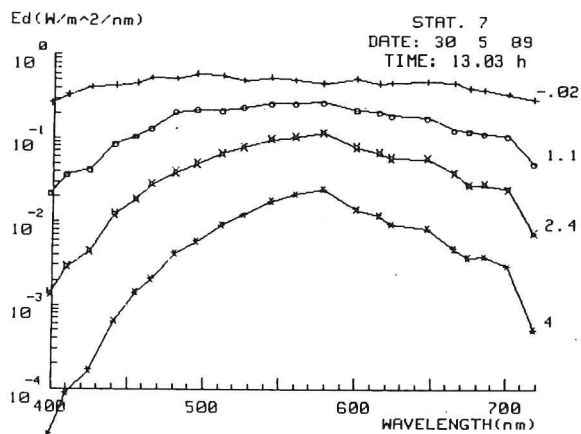


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 5           |
| Date:                             | 30 - 5 - 89 |
| Time:                             | 10.10       |
| Latit.: [N]                       | 53 : 5.59   |
| Longit.: [E]                      | 4 : 35.38   |
| Salinity (o/oo):                  | 32.874      |
| Temp. (°C):                       | 13.0        |
| Co [670nm] (1/m):                 | .83         |
| Secchi depth (m):                 | 6.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.4         |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.5         |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.7         |



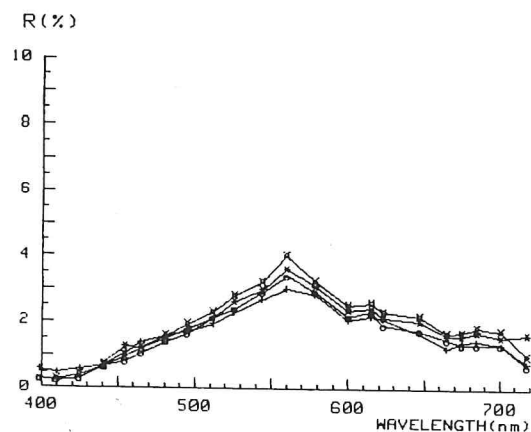
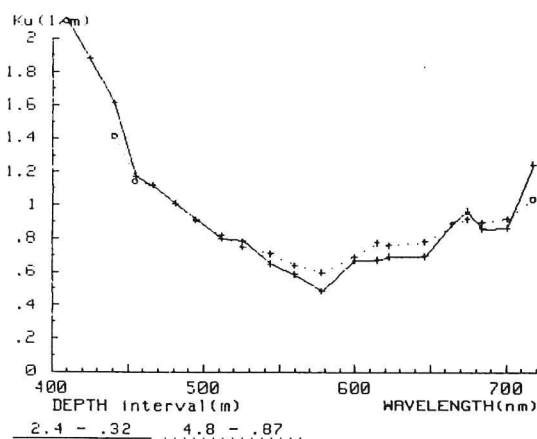
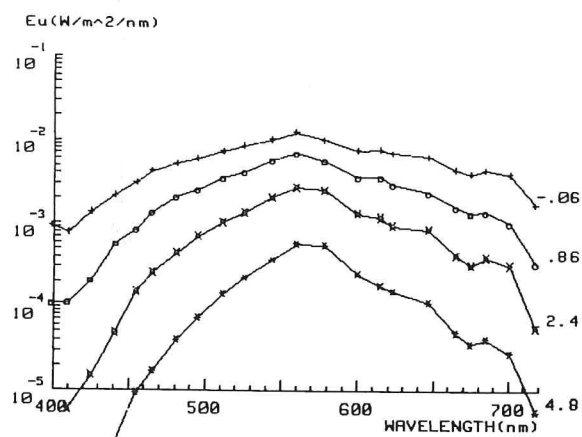
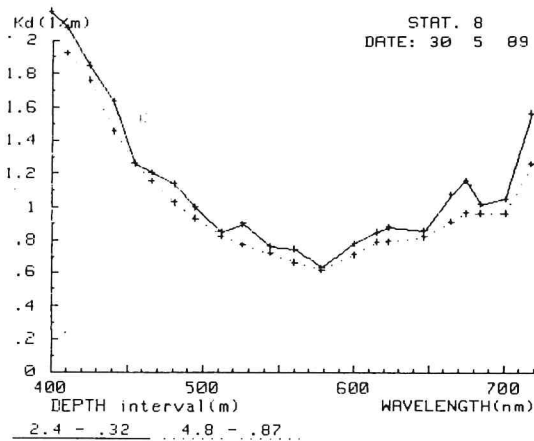
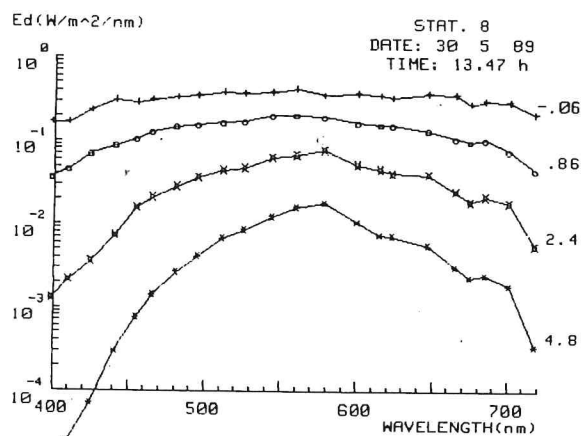
|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 6           |
| Date:                             | 30 - 5 - 89 |
| Time:                             | 11.35       |
| Latit.: [N]                       | 52 : 58.65  |
| Longit.: [E]                      | 4 : 44.98   |
| Salinity (o/oo):                  | 28.298      |
| Temp. (°C):                       | 15.7        |
| Co [670nm] (1/m):                 | 1.20        |
| Secchi depth (m):                 | 4.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.3         |
| Chloroph. (mg/m <sup>3</sup> ):   | 10.5        |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.1         |

B7



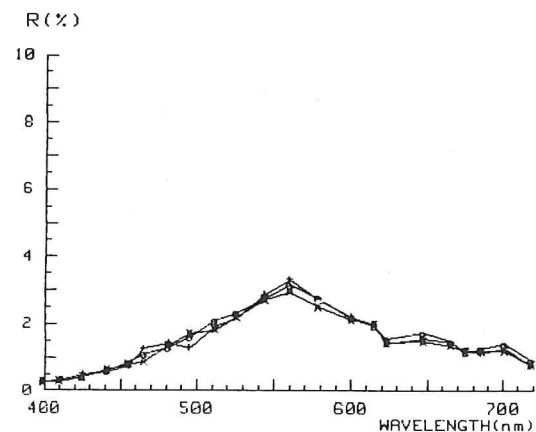
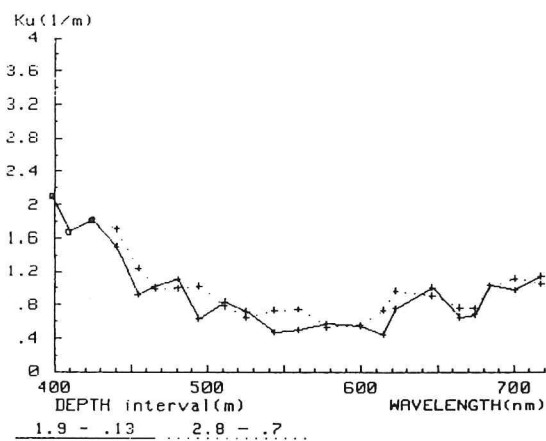
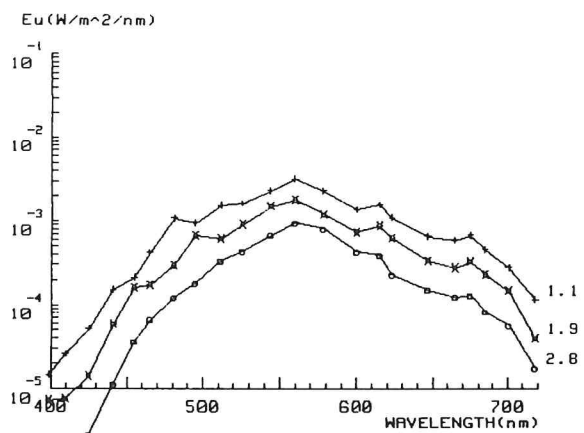
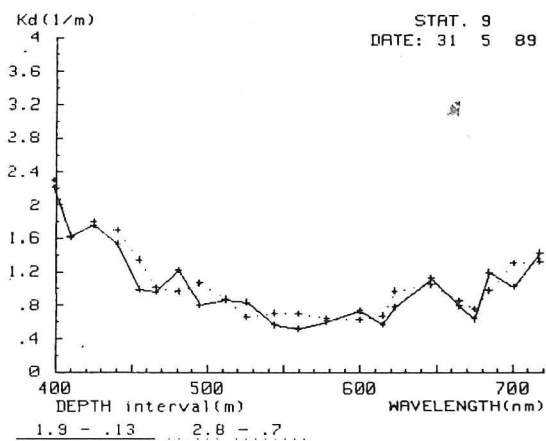
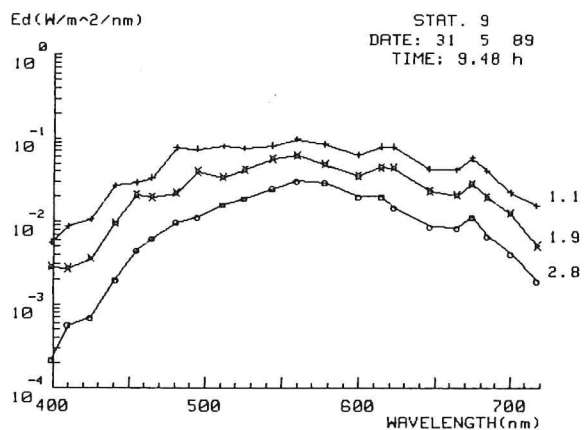
|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 7         |
| Date:                             | 30-5-89   |
| Time:                             | 13.10     |
| Latit.: [N]                       | 53 : .66  |
| Longit.: [E]                      | 4 : 49.10 |
| Salinity (o/oo):                  | 29.538    |
| Temp. (°C):                       | 15.0      |
| Co [670nm] (1/m):                 | 1.85      |
| Secchi depth (m):                 | 2.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 11.7      |
| Chloroph. (mg/m <sup>3</sup> ):   | 12.1      |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.1       |

B8

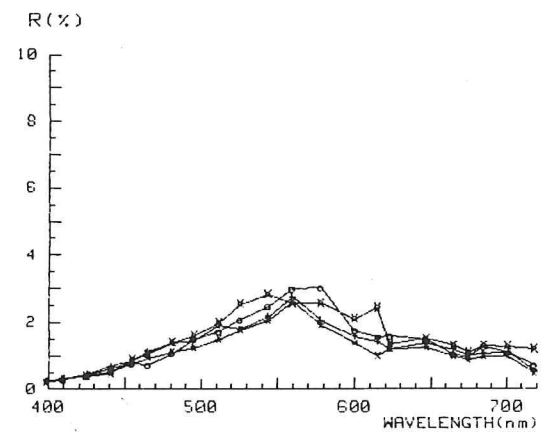
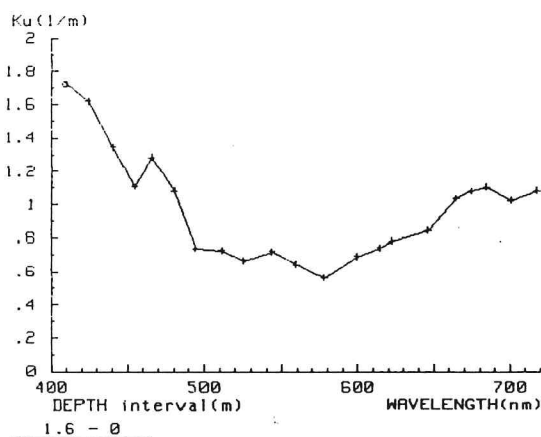
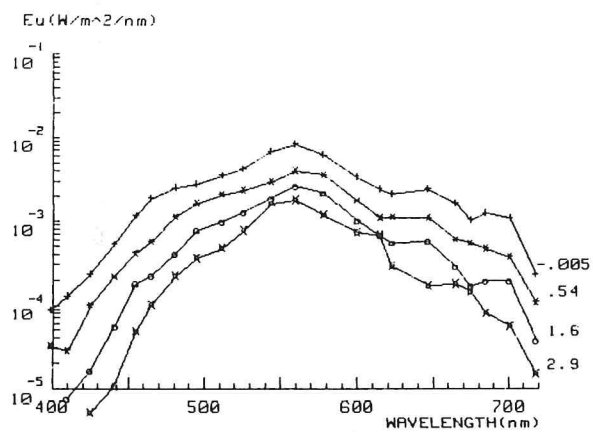
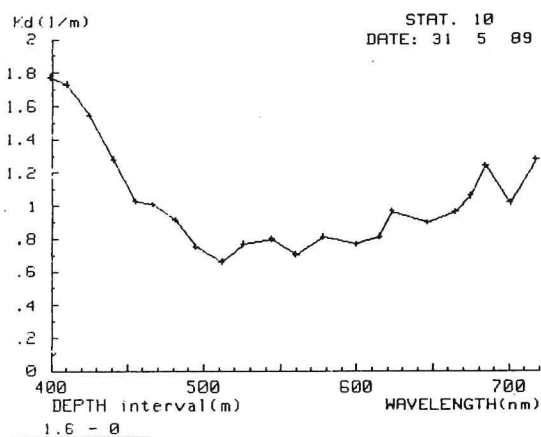
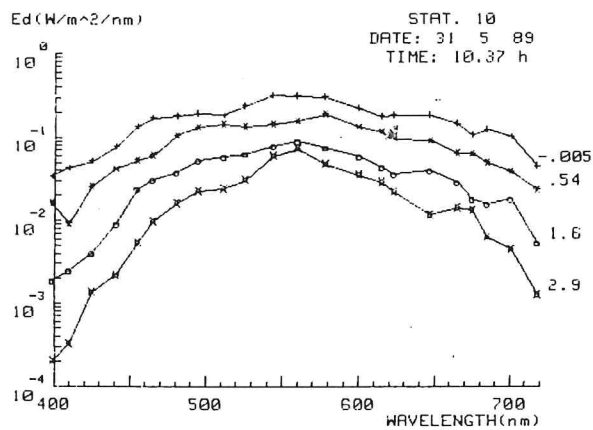


|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 8         |
| Date:                             | 30-5-89   |
| Time:                             | 13.50     |
| Latit.: [N]                       | 53 : 1.55 |
| Longit.: [E]                      | 4 : 51.43 |
| Salinity (o/oo):                  | 29.882    |
| Temp. (°C):                       | 14.8      |
| Co [670nm] (1/m):                 | 1.55      |
| Secchi depth (m):                 | 3.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 6.5       |
| Chloroph. (mg/m <sup>3</sup> ):   | 11.6      |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.1       |

B9

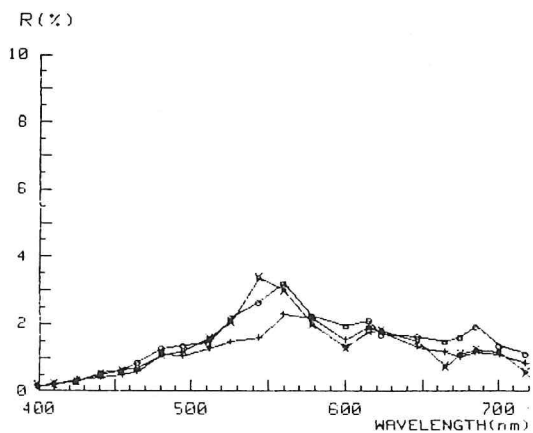
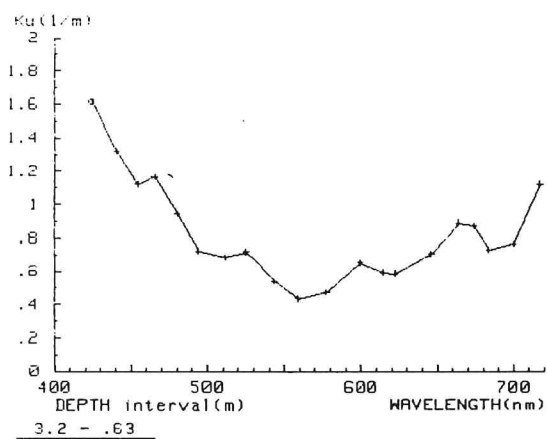
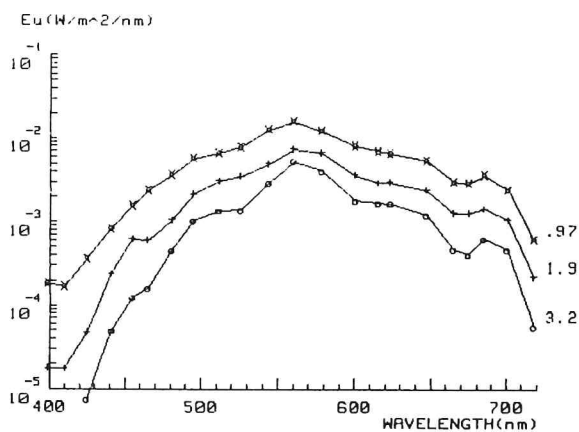
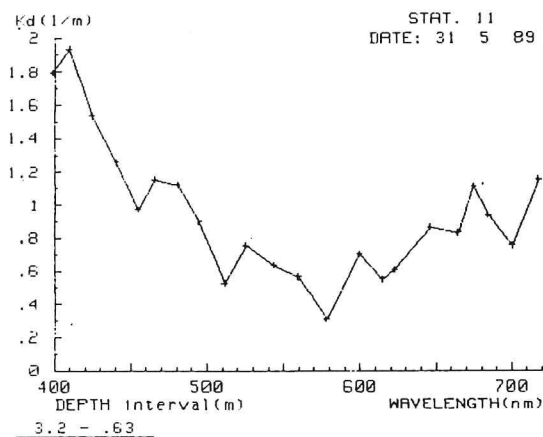
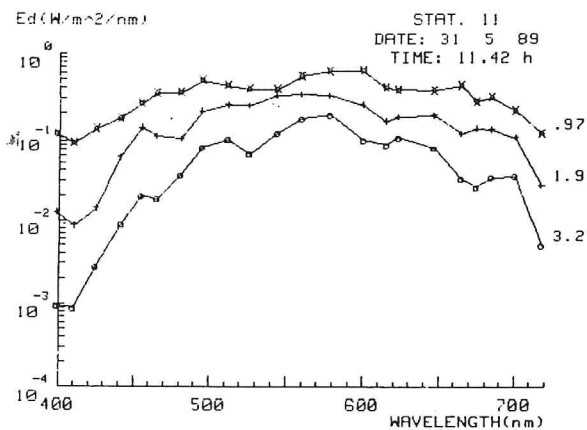


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 9           |
| Date:                             | 31 - 5 - 89 |
| Time:                             | 9.50        |
| Latit.: [N]                       | 52 : 56.76  |
| Longit.: [E]                      | 4 : 41.16   |
| Salinity (o/oo):                  | 29.406      |
| Temp. (°C):                       | 14.6        |
| Co [670nm] (1/m):                 | 1.65        |
| Secchi depth (m):                 | 3.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 9.3         |
| Chloroph. (mg/m <sup>3</sup> ):   | 9.3         |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.9         |



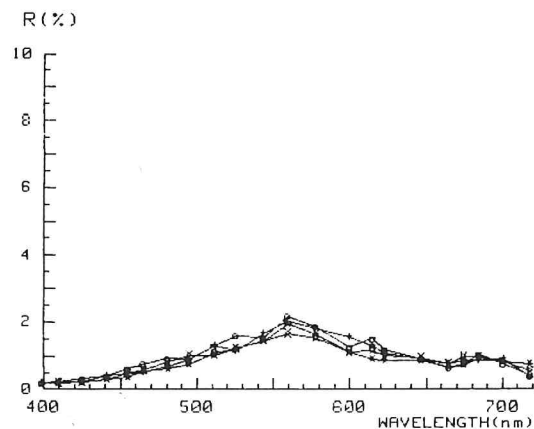
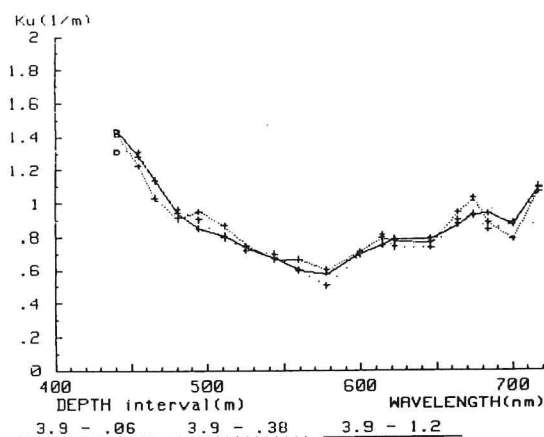
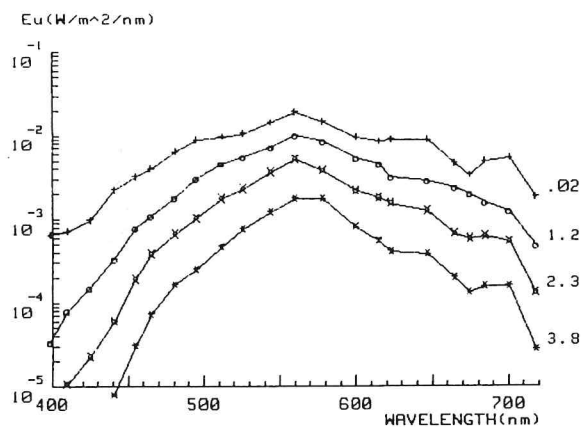
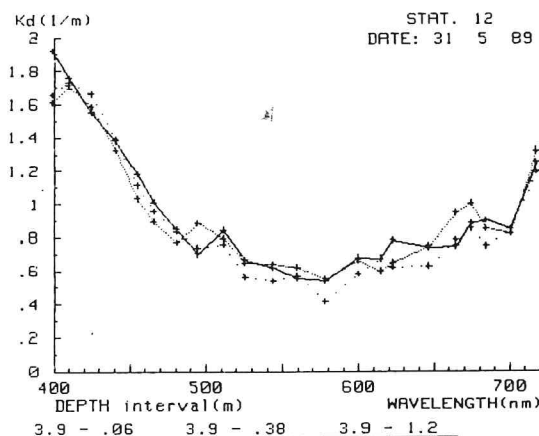
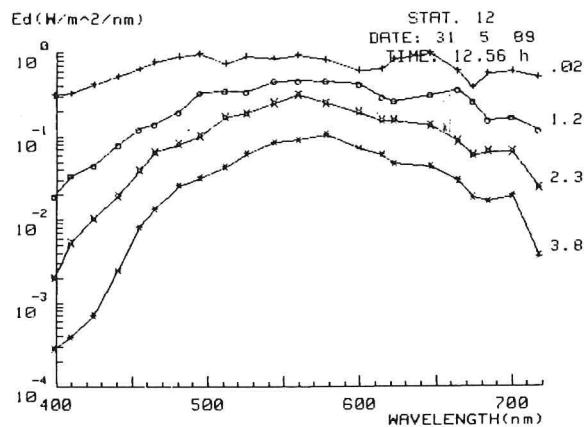
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 10         |
| Date:                             | 31 -5 -89  |
| Time:                             | 10.40      |
| Latit.: [N]                       | 52 : 53.34 |
| Longit.: [E]                      | 4 : 37.76  |
| Salinity (o/oo):                  | 30.498     |
| Temp. (°C):                       | 14.0       |
| Co [670nm] (1/m):                 | 1.41       |
| Secchi depth (m):                 | 3.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.5        |
| Chloroph. (mg/m <sup>3</sup> ):   | 9.0        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.8        |

B11



|                                   |            |
|-----------------------------------|------------|
| Station:                          | 11         |
| Date:                             | 31-5-89    |
| Time:                             | 11.45      |
| Latit.: [N]                       | 52 : 56.69 |
| Longit.: [E]                      | 4 : 41.13  |
| Salinity (o/oo):                  | 28.878     |
| Temp. (°C):                       | 14.8       |
| Co [670nm] (1/m):                 | 1.61       |
| Secchi depth (m):                 | 3.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.1        |
| Chloroph. (mg/m <sup>3</sup> ):   | 13.3       |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.1        |

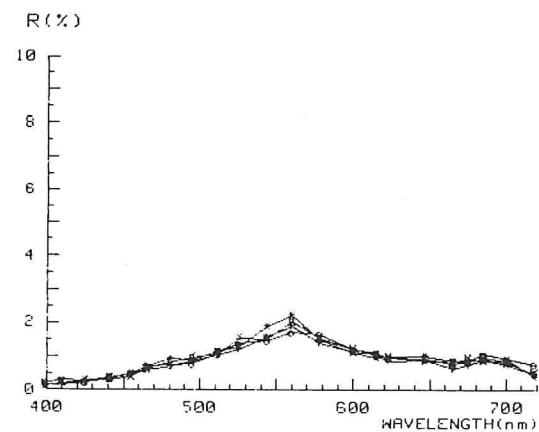
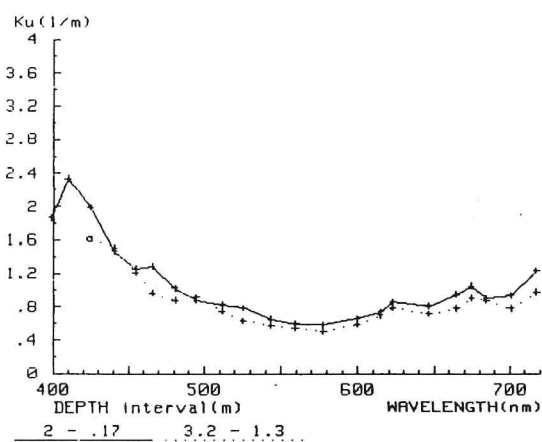
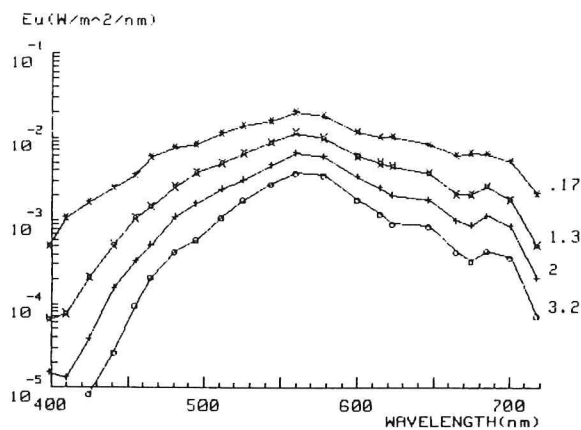
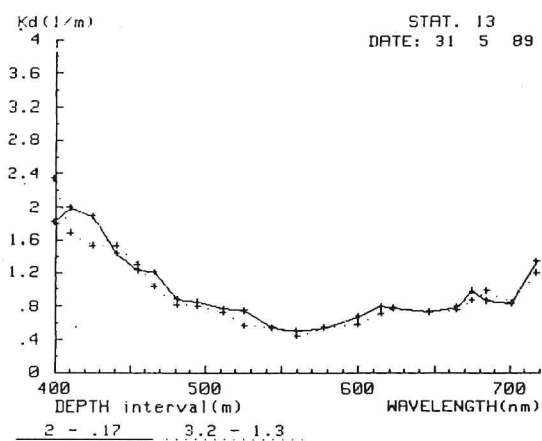
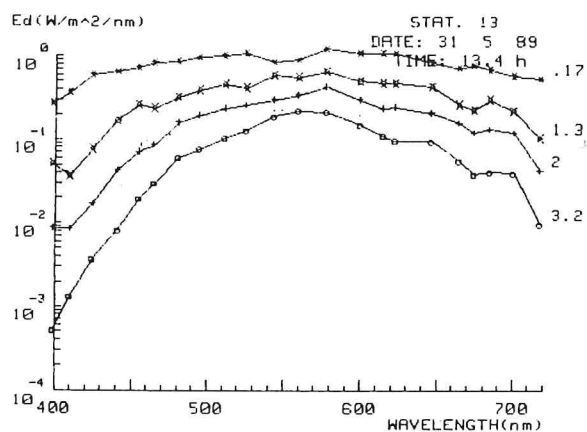
B12



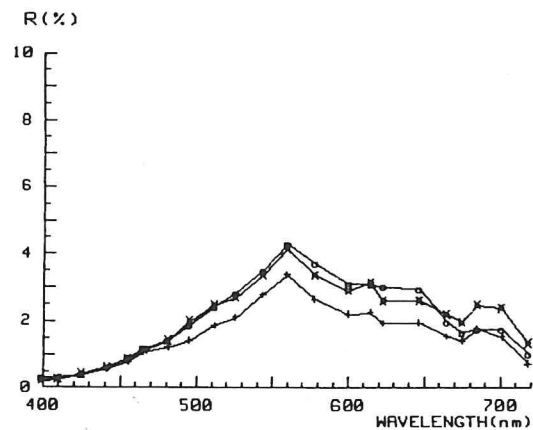
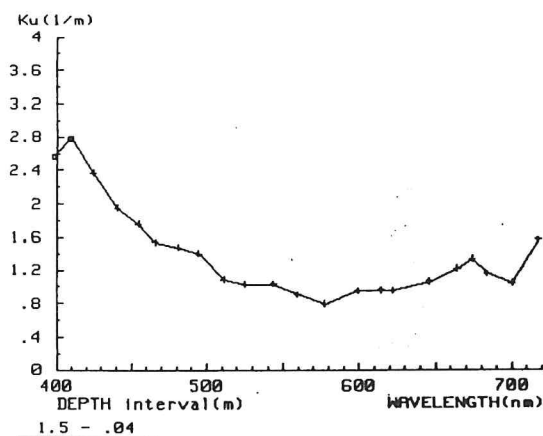
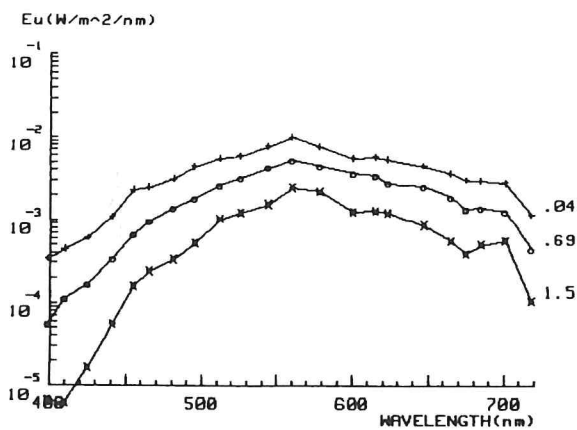
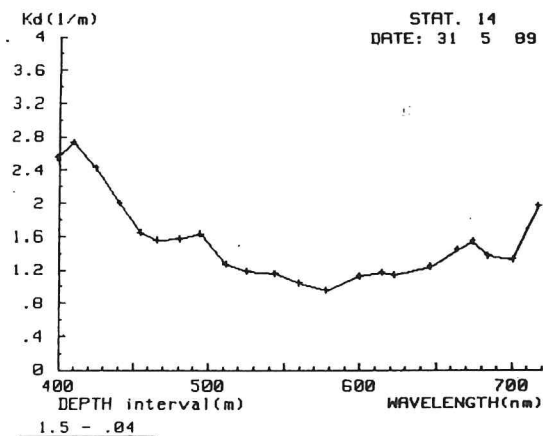
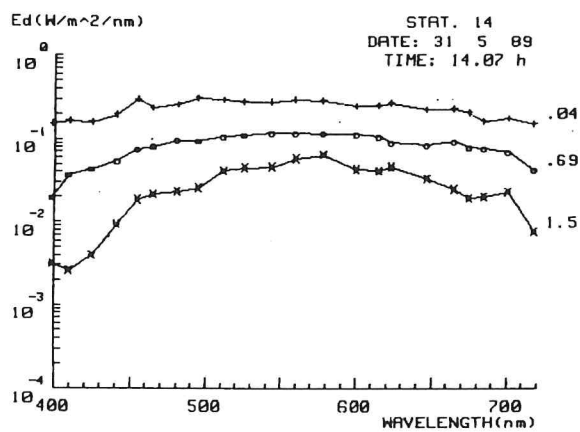
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 12         |
| Date:                             | 31-5-89    |
| Time:                             | 13.05      |
| Latit.: [N]                       | 52 : 57.27 |
| Longit.: [E]                      | 4 : 41.70  |
| Salinity (o/oo):                  | 27.825     |
| Temp. (°C):                       | 15.3       |
| Co [670nm] (1/m):                 | 1.56       |
| Secchi depth (m):                 | 3.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 9.2        |
| Chloroph. (mg/m <sup>3</sup> ):   | 13.5       |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.4        |



B13

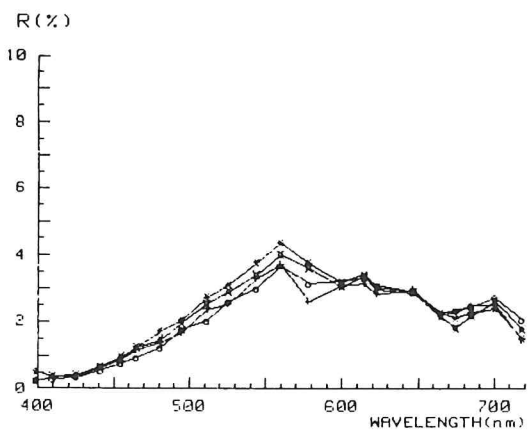
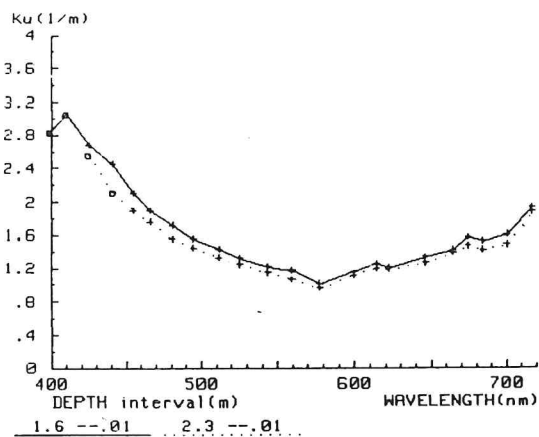
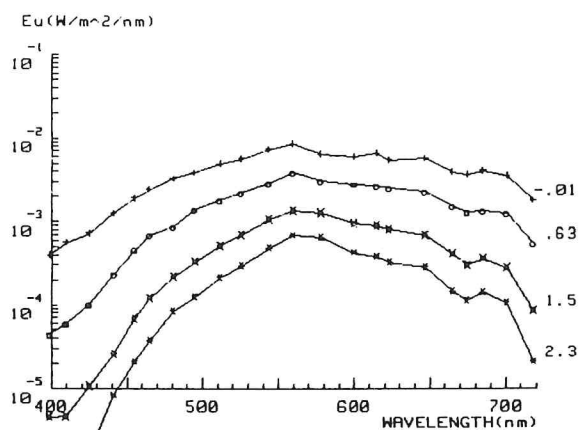
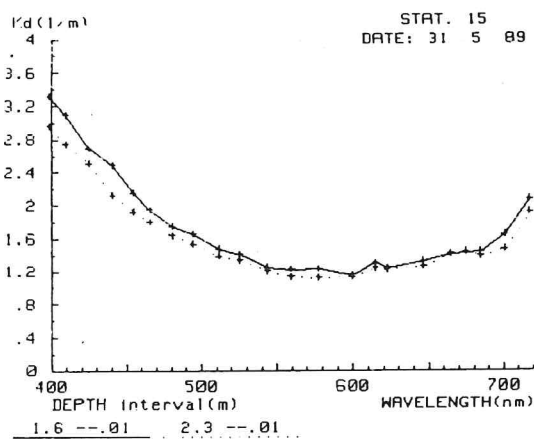
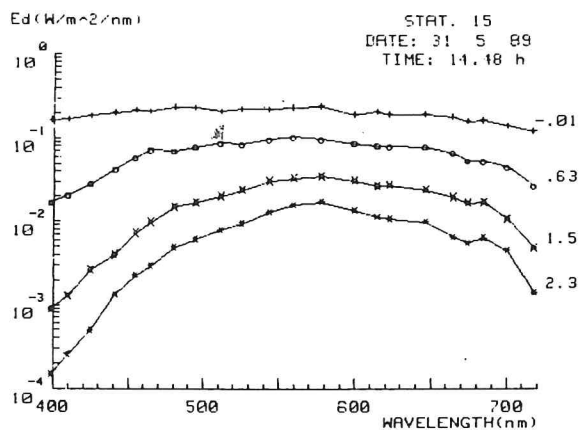


|                      |             |
|----------------------|-------------|
| Station:             | 13          |
| Date:                | 31 - 5 - 89 |
| Time:                | 13.40       |
| Latit.: [N]          | 52 : 58.62  |
| Longit.: [E]         | 4 : 44.98   |
| Salinity (o/oo):     | 27.765      |
| Temp. (°C):          | 15.6        |
| Co [670nm] (1/m):    | 1.50        |
| Secchi depth (m):    | 3.5         |
| Tot. Sus. M. (g/m3): | 4.2         |
| Chloroph. (mg/m3):   | 10.6        |
| Yell. Sub. (m-1):    | 2.5         |



|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 14          |
| Date:                             | 31 - 5 - 89 |
| Time:                             | 14.15       |
| Latit.: [N]                       | 52 : 59.80  |
| Longit.: [E]                      | 4 : 47.99   |
| Salinity (o/oo):                  | 28.486      |
| Temp. (°C):                       | 15.6        |
| Co [670nm] (1/m):                 | 2.57        |
| Secchi depth (m):                 | 2.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 9.3         |
| Chloroph. (mg/m <sup>3</sup> ):   | 15.1        |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.1         |

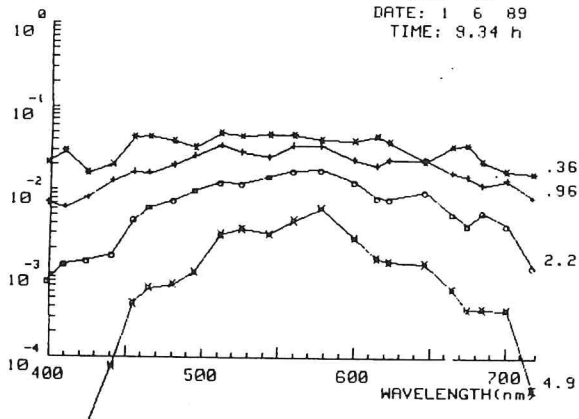
B15



|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 15        |
| Date:                             | 31-5-89   |
| Time:                             | 14.55     |
| Latit.: [N]                       | 53 : 2.14 |
| Longit.: [E]                      | 4 : 52.10 |
| Salinity (o/oo):                  | 28.286    |
| Temp. (°C):                       | 16.0      |
| Co [670nm] (1/m):                 | 2.60      |
| Secchi depth (m):                 | 1.8       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 10.0      |
| Chloroph. (mg/m <sup>3</sup> ):   | 13.4      |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.2       |

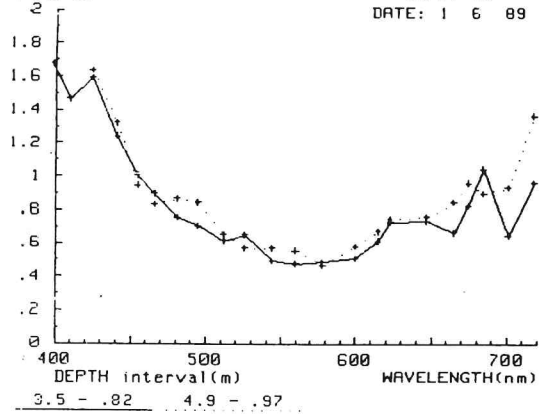
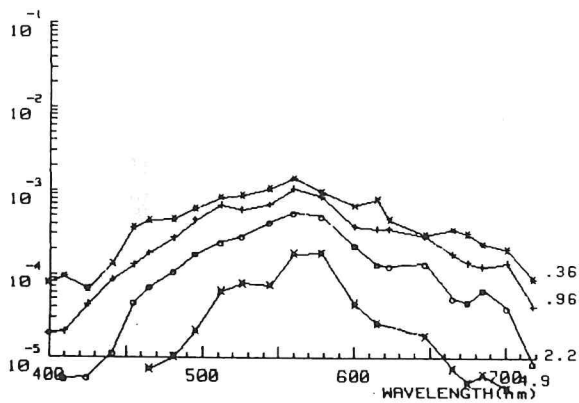
Ed (W/m<sup>2</sup>/nm)

STAT. 16  
DATE: 1 6 89  
TIME: 9.34 h

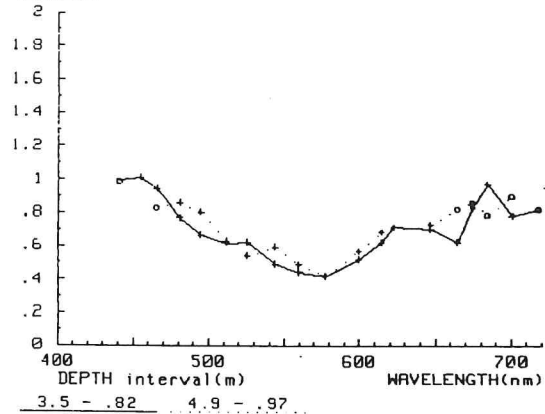


Kd (1/m)

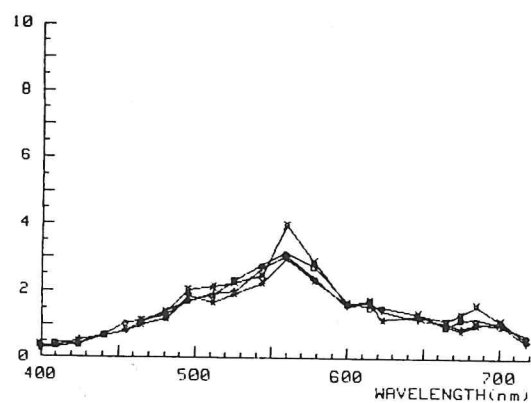
STAT. 16  
DATE: 1 6 89

Eu (W/m<sup>2</sup>/nm)

Ku (1/m)

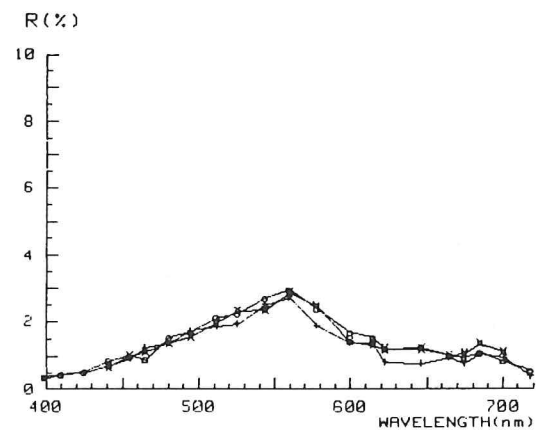
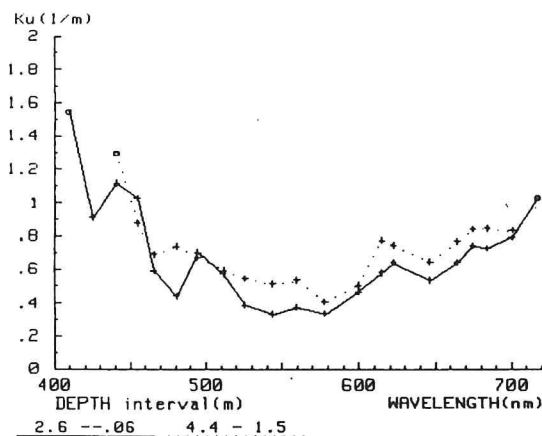
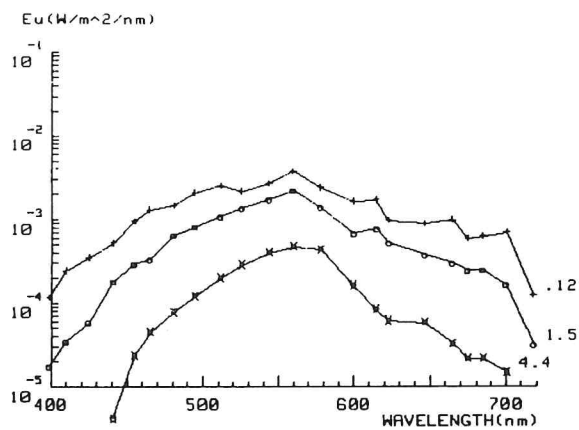
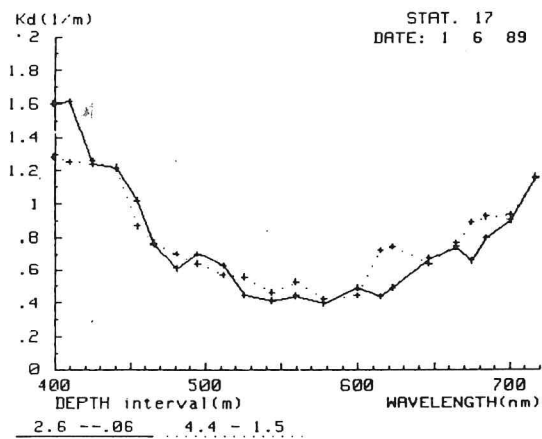
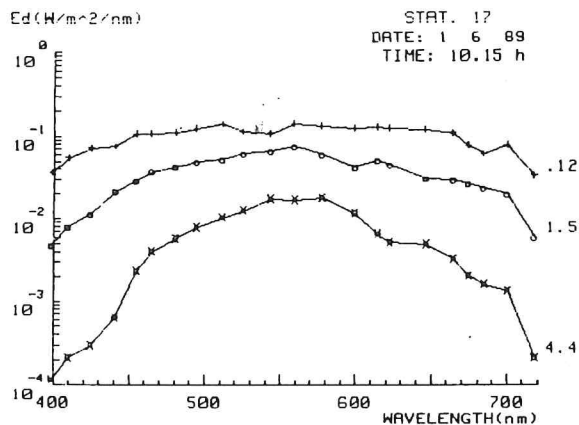


R (%)

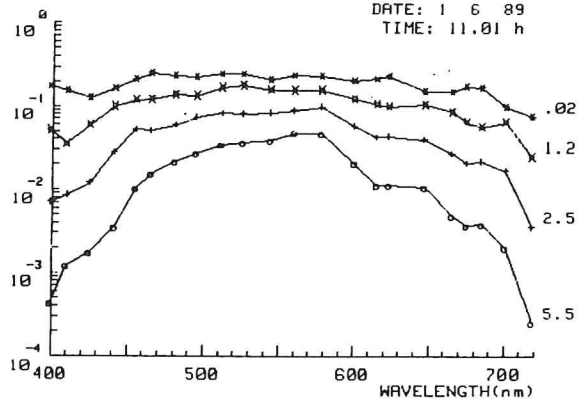


|                                   |            |
|-----------------------------------|------------|
| Station:                          | 16         |
| Date:                             | 1 - 6 - 89 |
| Time:                             | 9.40       |
| Latit.: [N]                       | 53 : 4.26  |
| Longit.: [E]                      | 4 : 41.61  |
| Salinity (o/oo):                  | 30.648     |
| Temp. (°C):                       | 13.8       |
| Co [670nm] (1/m):                 | 1.66       |
| Secchi depth (m):                 | 3.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.8        |
| Chloroph. (mg/m <sup>3</sup> ):   | 10.0       |
| Yell. Sub. (m-1):                 | 2.3        |

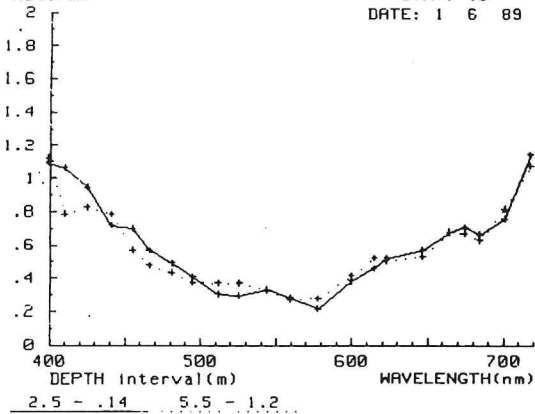
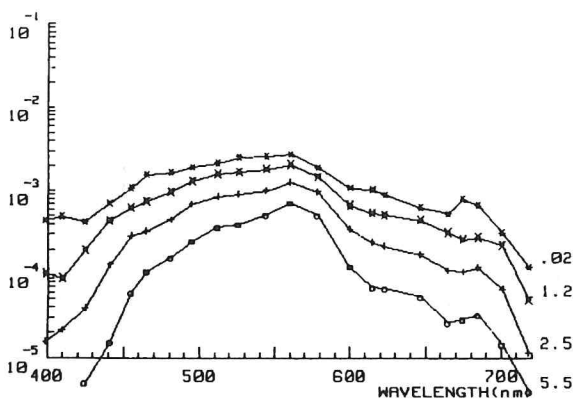
B17



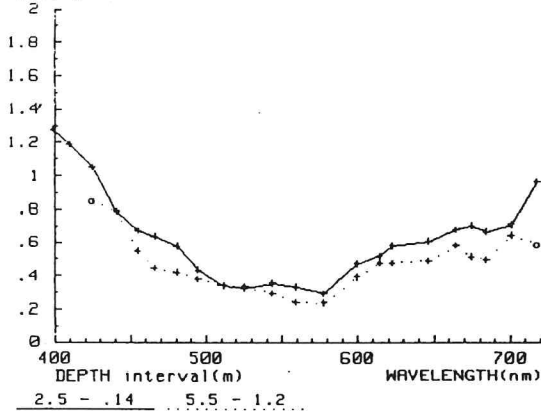
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 17         |
| Date:                             | 1 - 6 - 89 |
| Time:                             | 10.20      |
| Latit.: [N]                       | 53 : 6.03  |
| Longit.: [E]                      | 4 : 41.63  |
| Salinity (o/oo):                  | 31.976     |
| Temp. (°C):                       | 13.2       |
| Co [670nm] (1/m):                 | 1.48       |
| Secchi depth (m):                 | 4.0        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 8.0        |
| Chloroph. (mg/m <sup>3</sup> ):   | 6.5        |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.2        |

Ed(W/m<sup>2</sup>/nm)
 STAT. 18  
 DATE: 1 6 89  
 TIME: 11.01 h


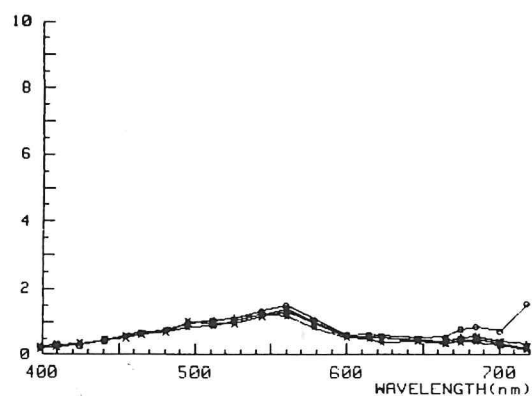
Kd(1/m)

 STAT. 18  
 DATE: 1 6 89
Eu(W/m<sup>2</sup>/nm)

Ku(1/m)

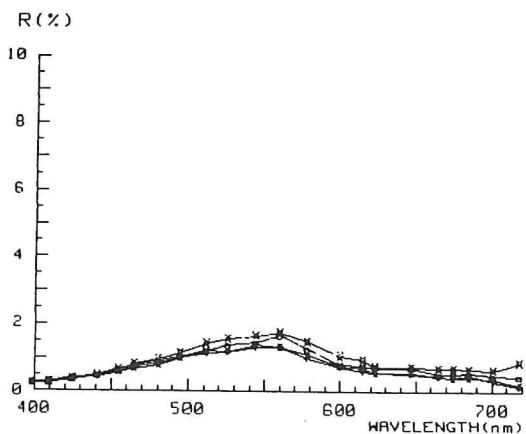
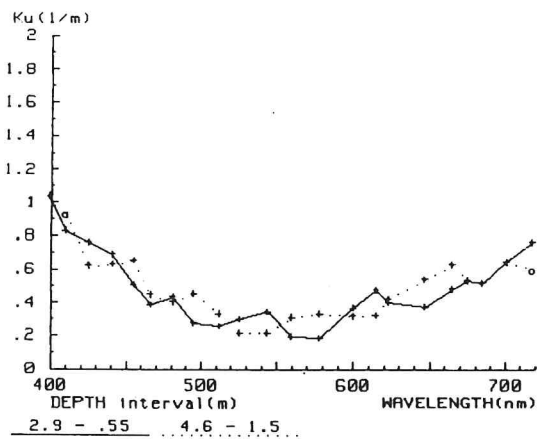
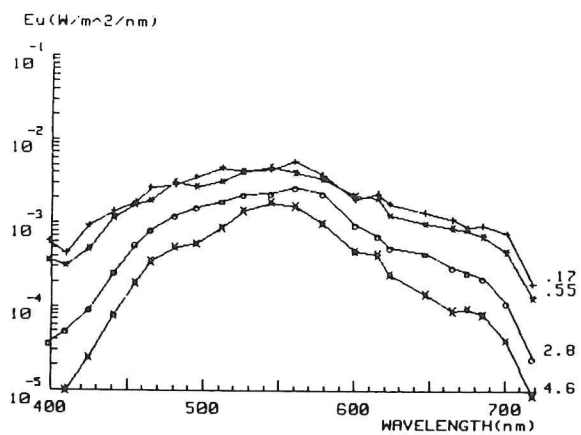
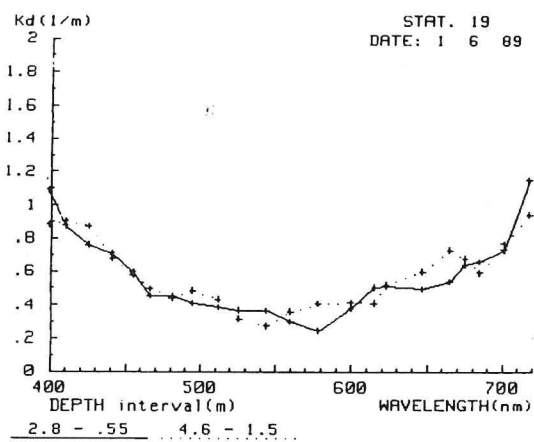
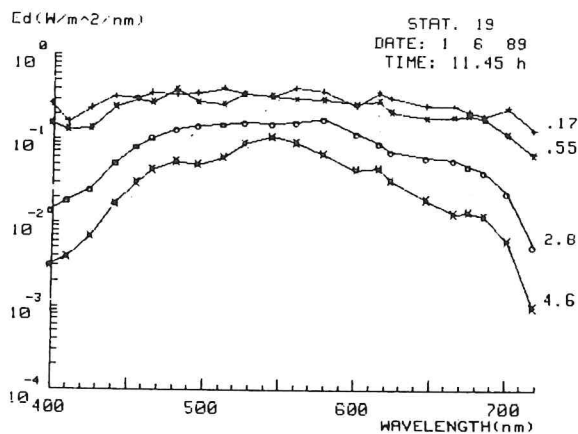


R(%)



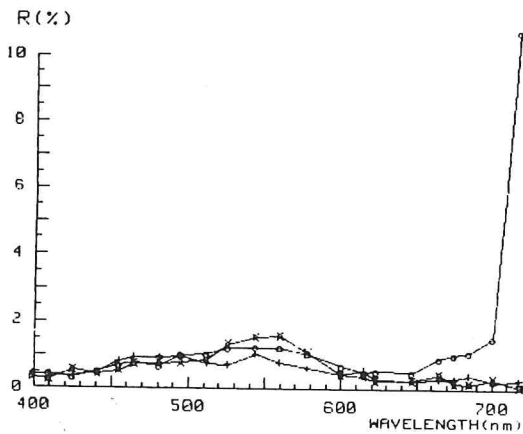
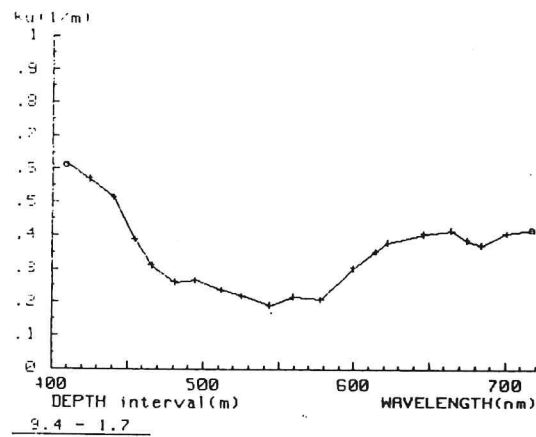
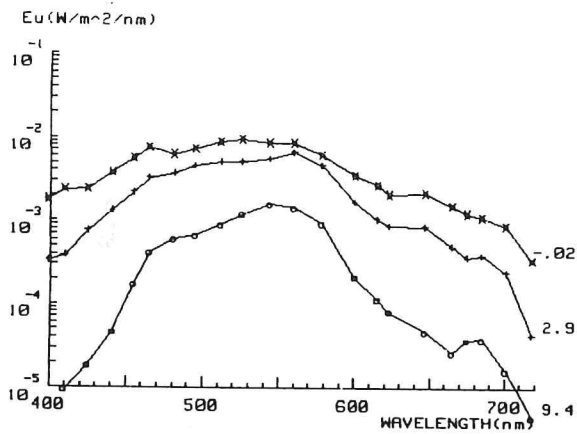
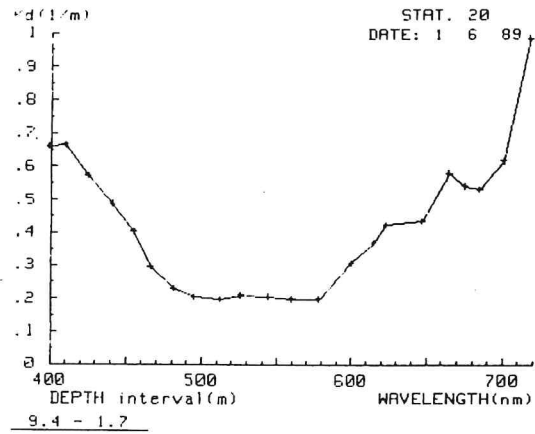
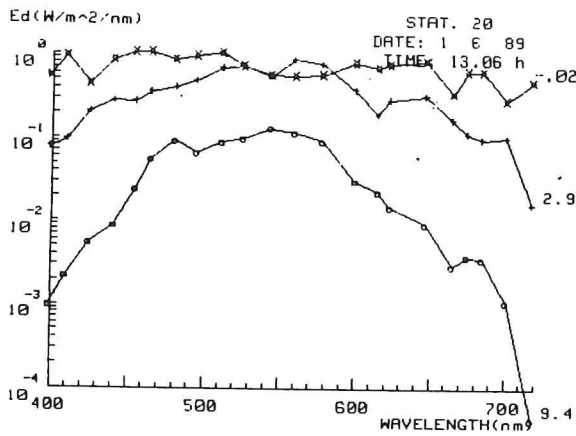
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 18         |
| Date:                             | 1 - 6 - 89 |
| Time:                             | 11.00      |
| Latit.: [N]                       | 53 : 8.30  |
| Longit.: [E]                      | 4 : 41.53  |
| Salinity(o/oo):                   | 32.427     |
| Temp. (°C):                       | 13.0       |
| Co [670nm] (1/m):                 | .82        |
| Secchi depth(m):                  | 7.0        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.0        |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.6        |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.0        |

B19



|                                   |            |
|-----------------------------------|------------|
| Station:                          | 19         |
| Date:                             | 1 - 6 - 89 |
| Time:                             | 11.50      |
| Latit.: [N]                       | 53 : 10.51 |
| Longit.: [E]                      | 4 : 41.11  |
| Salinity (o/oo):                  | 32.785     |
| Temp. (°C):                       | 12.9       |
| Co [670nm] (1/m):                 | .81        |
| Secchi depth (m):                 | 6.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 7.3        |
| Chloroph. (mg/m <sup>3</sup> ):   | 1.6        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.7        |

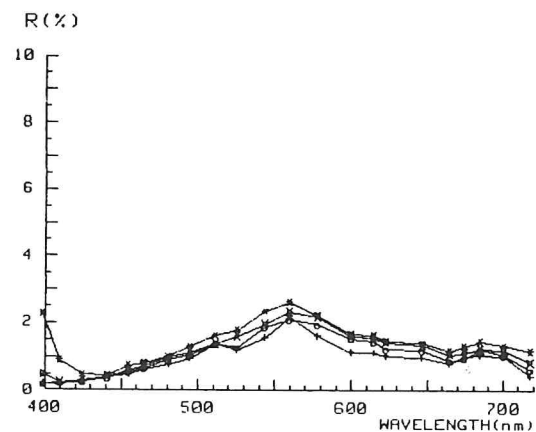
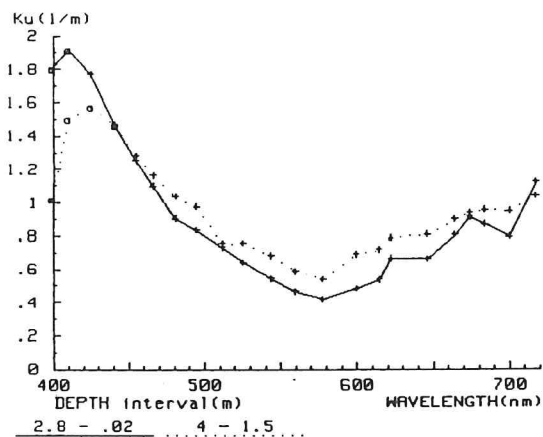
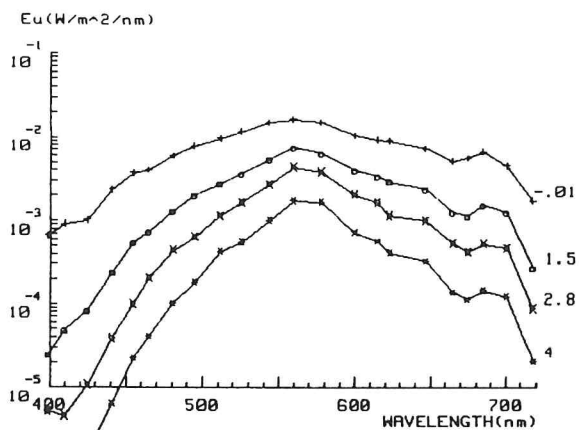
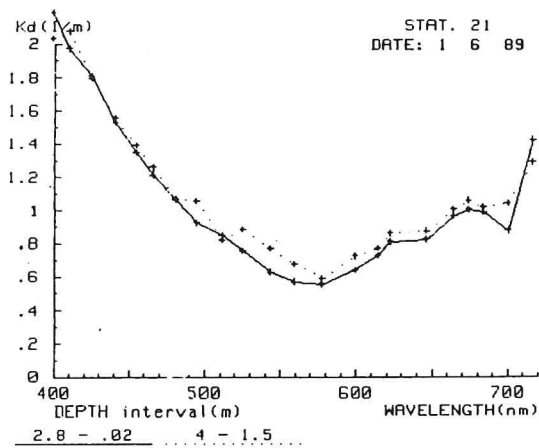
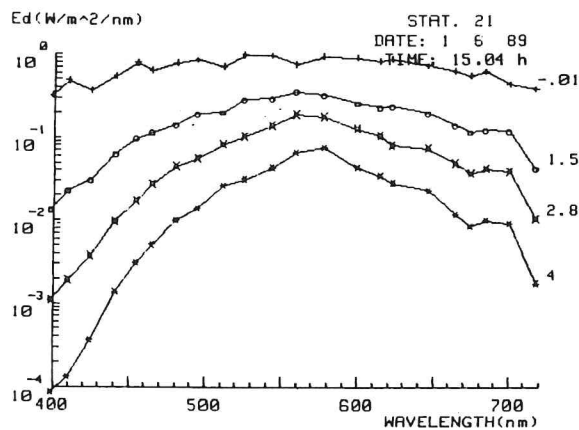
B20



|                                   |            |
|-----------------------------------|------------|
| Station:                          | 20         |
| Date:                             | 1 - 6 - 89 |
| Time:                             | 13.05      |
| Latit.: [N]                       | 53 : 11.73 |
| Longit.: [E]                      | 4 : 32.84  |
| Salinity (o/oo):                  | 33.335     |
| Temp. (°C):                       | 12.4       |
| Co [670nm] (1/m):                 | .68        |
| Secchi depth (m):                 | 8.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 6.4        |
| Chloroph. (mg/m <sup>3</sup> ):   | 1.5        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.0        |

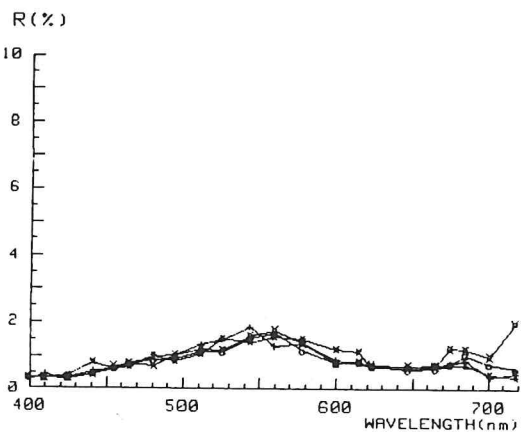
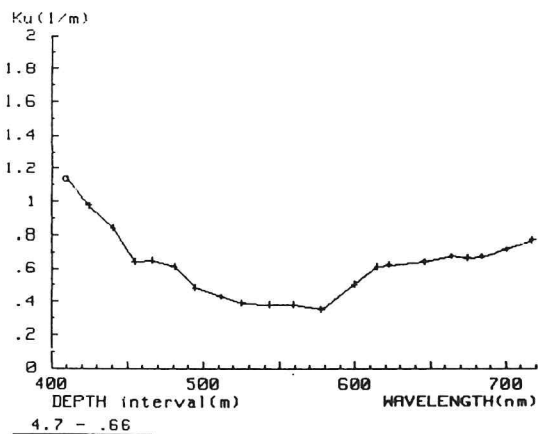
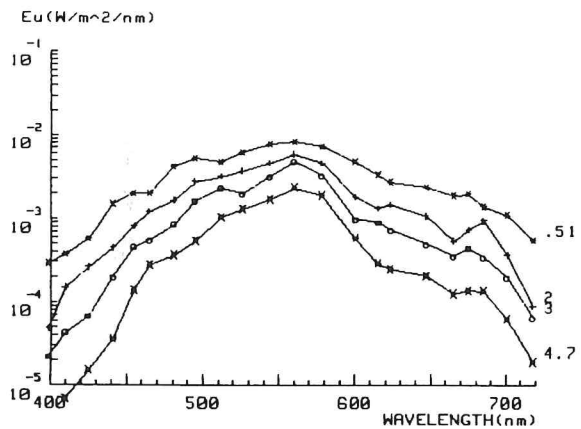
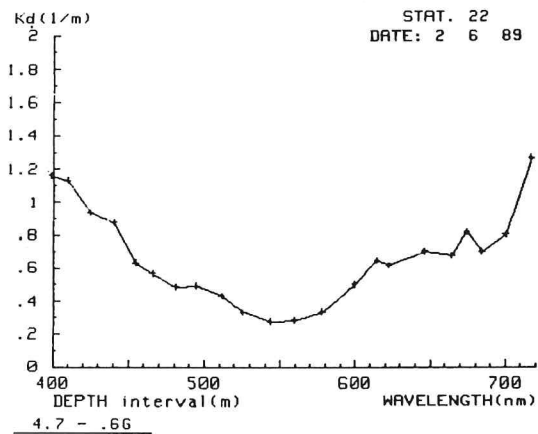
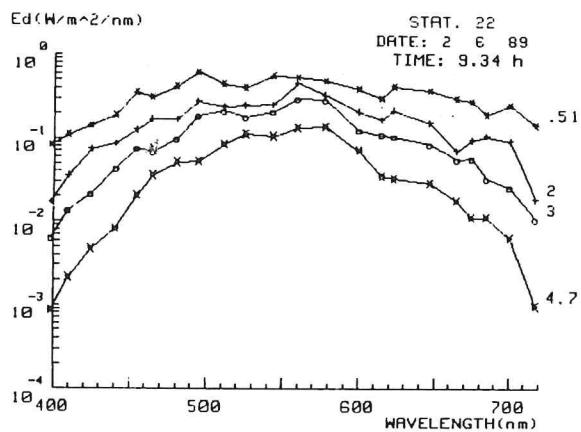


B21



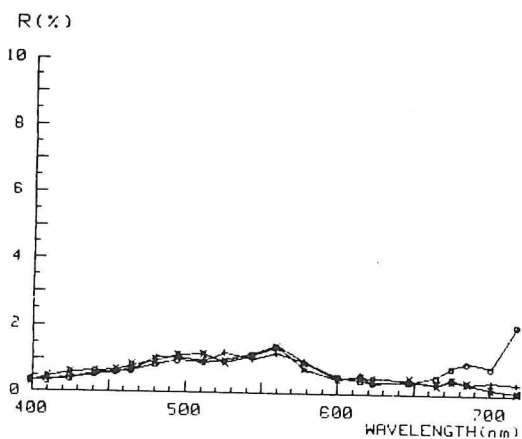
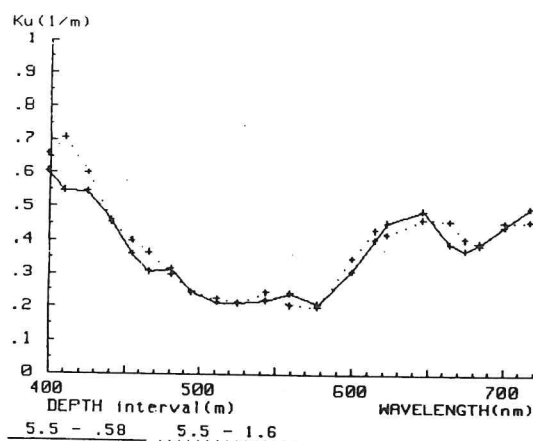
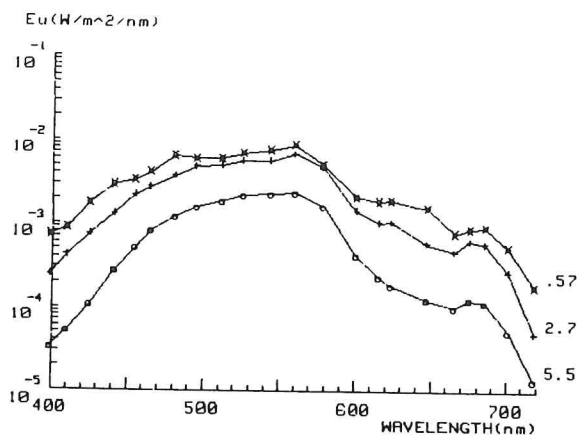
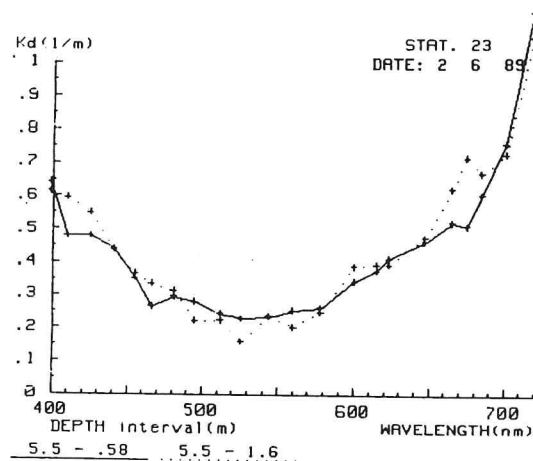
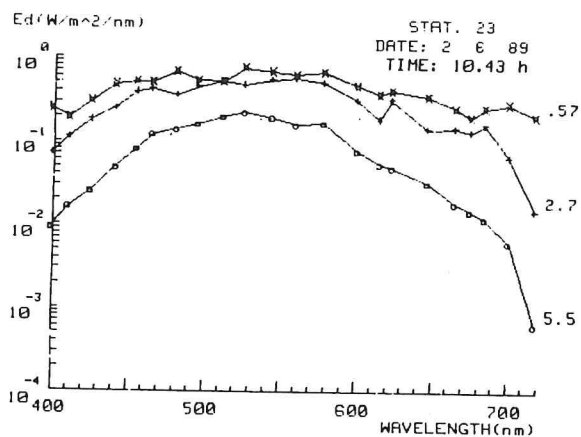
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 21         |
| Date:                             | 1 - 6 - 89 |
| Time:                             | 15.05      |
| Latit.: [N]                       | 52 : 58.66 |
| Longit.: [E]                      | 4 : 44.22  |
| Salinity (o/oo):                  | 28.887     |
| Temp. (°C):                       | 15.3       |
| Co [670nm] (1/m):                 | 1.75       |
| Secchi depth (m):                 | 3.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 8.4        |
| Chloroph. (mg/m <sup>3</sup> ):   | 9.2        |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.9        |

B22

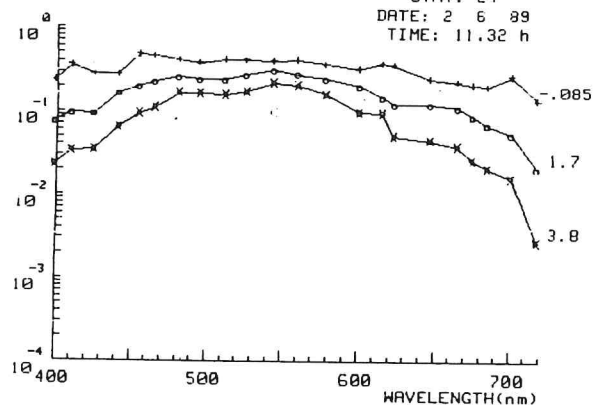


|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 22        |
| Date:                             | 2-6-89    |
| Time:                             | 9.40      |
| Latit.: [N]                       | 53 : 2.81 |
| Longit.: [E]                      | 4 : 38.91 |
| Salinity (o/oo):                  | 31.428    |
| Temp. (°C):                       | 13.6      |
| Co [670nm] (1/m):                 | 1.14      |
| Secchi depth (m):                 | 5.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.4       |
| Chloroph. (mg/m <sup>3</sup> ):   | 5.3       |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.1       |

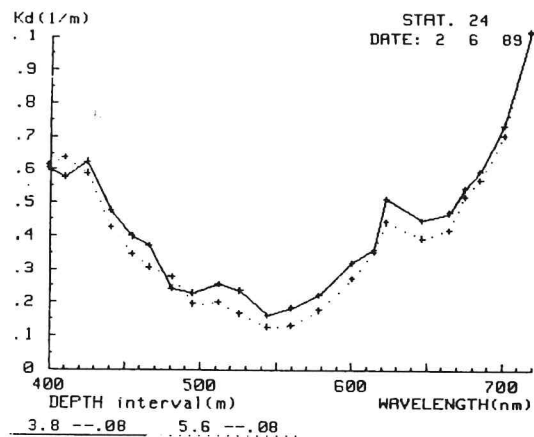
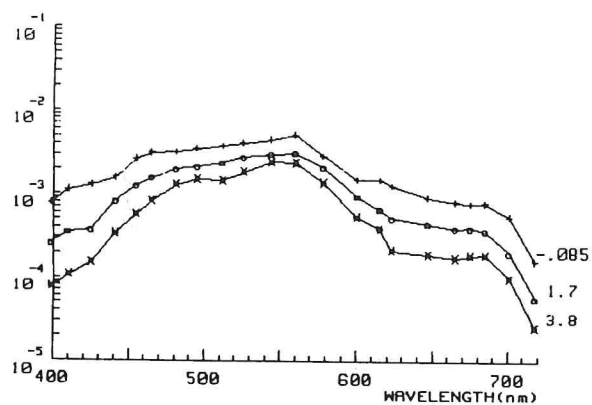
B23



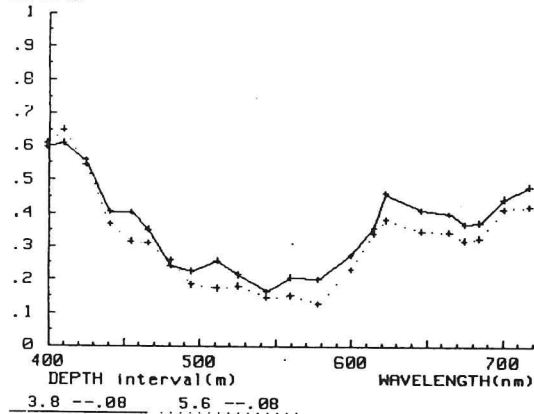
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 23         |
| Date:                             | 2 - 6 - 89 |
| Time:                             | 10.45      |
| Latit.: [N]                       | 53 : 4.85  |
| Longit.: [E]                      | 4 : 29.94  |
| Salinity (o/oo):                  | 33.402     |
| Temp. (°C):                       | 12.7       |
| Co [670nm] (1/m):                 | .73        |
| Secchi depth (m):                 | 10.5       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.9        |
| Chloroph. (mg/m <sup>3</sup> ):   | 2.1        |
| Yell. Sub. (m-l):                 | 1.4        |

Ed (W/m<sup>2</sup>/nm)
 STAT. 24  
 DATE: 2 6 89  
 TIME: 11.32 h


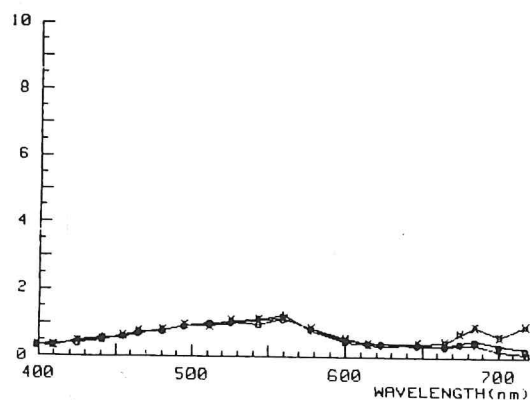
Kd (1/m)

 STAT. 24  
 DATE: 2 6 89
Eu (W/m<sup>2</sup>/nm)

Ku (1/m)

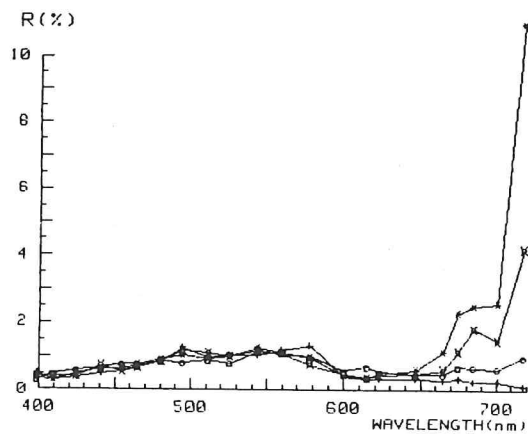
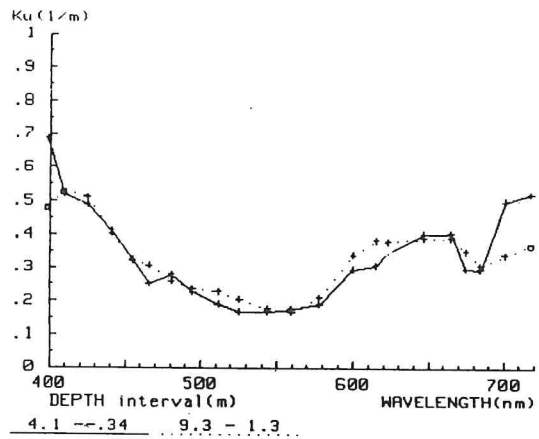
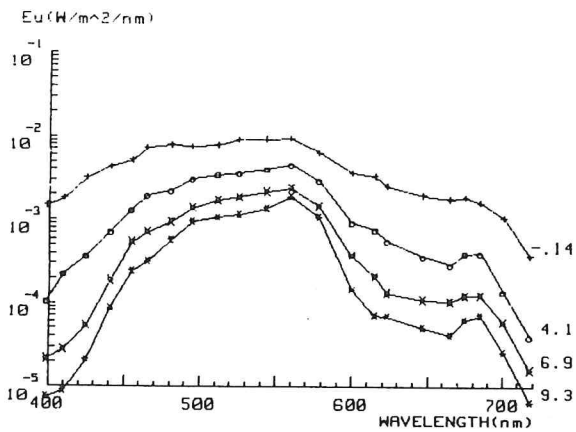
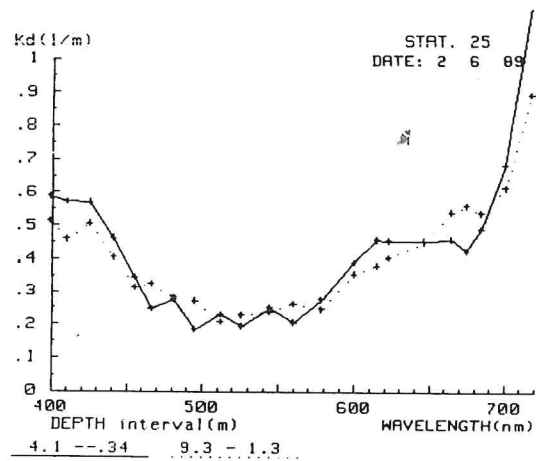
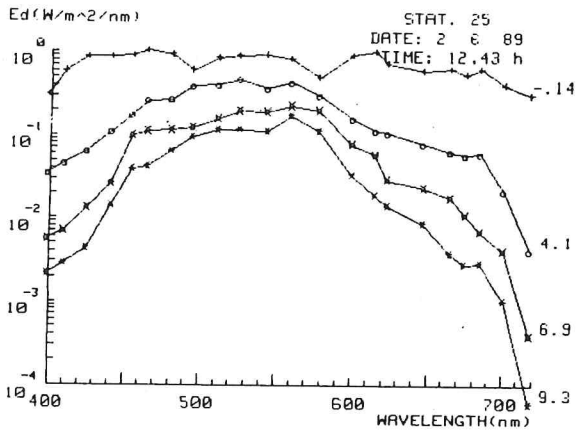


R (%)

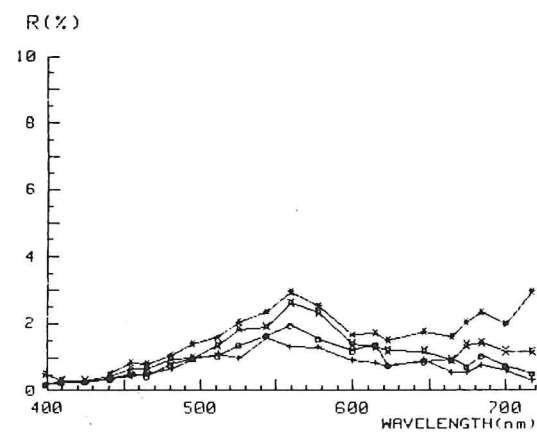
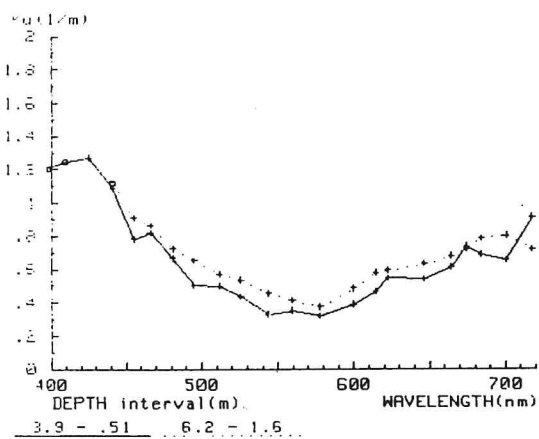
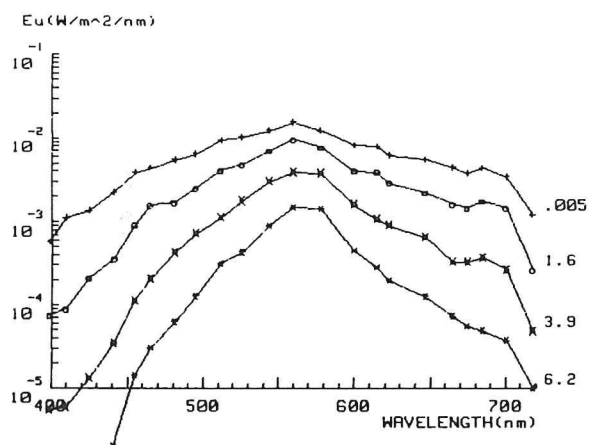
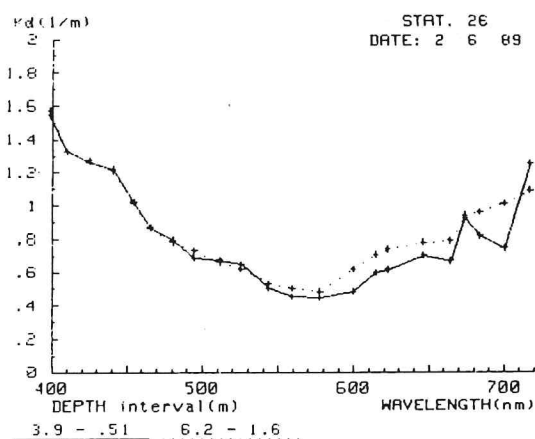
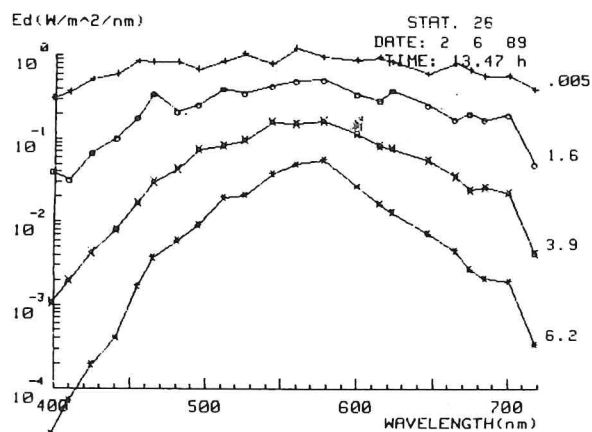


|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 24        |
| Date:                             | 2 -6 -89  |
| Time:                             | 11.35     |
| Latit.: [N]                       | 53 : .17  |
| Longit.: [E]                      | 4 : 28.89 |
| Salinity (o/oo):                  | 33.365    |
| Temp. (°C):                       | 12.7      |
| Co [670nm] (1/m):                 | .74       |
| Secchi depth (m):                 | 9.5       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.0       |
| Chloroph. (mg/m <sup>3</sup> ):   | 2.7       |
| Yell. Sub. (m <sup>-1</sup> ):    | .90       |

B25

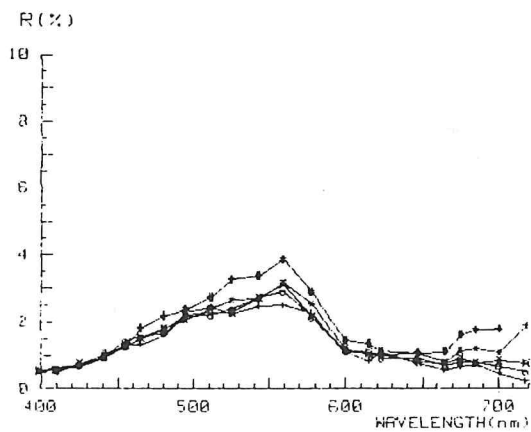
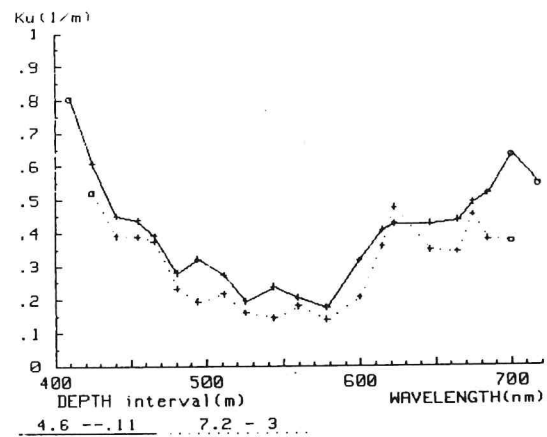
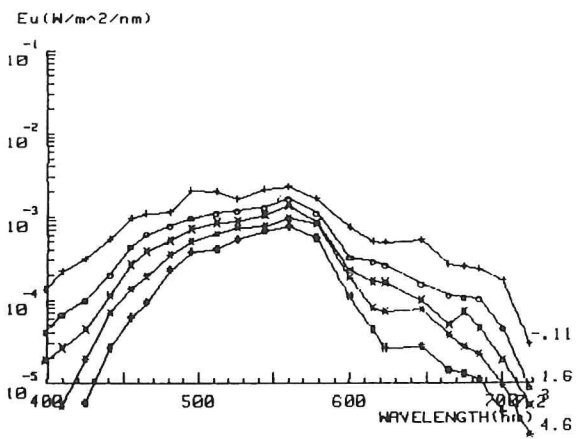
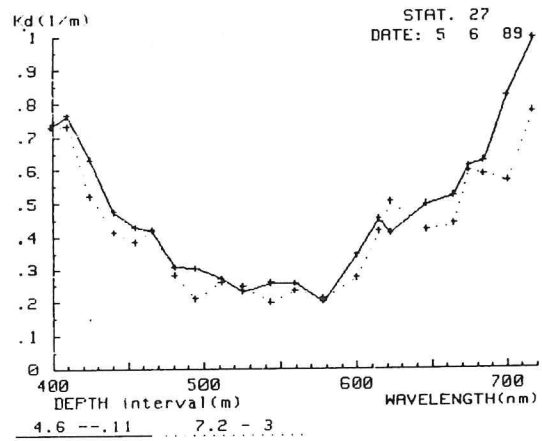
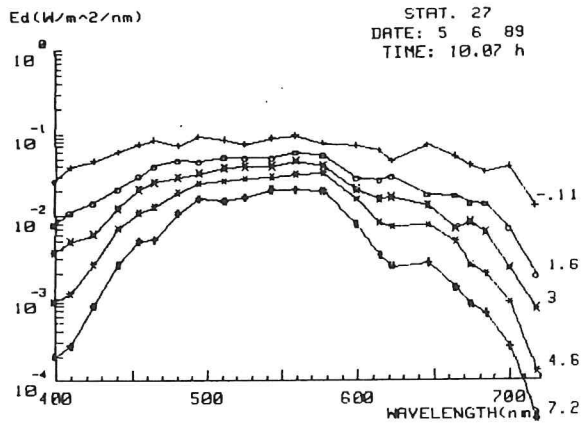


|                                   |            |
|-----------------------------------|------------|
| Station:                          | 25         |
| Date:                             | 2 - 6 - 89 |
| Time:                             | 12.45      |
| Latit.: [N]                       | 52 : 59.80 |
| Longit.: [E]                      | 4 : 28.37  |
| Salinity (o/oo):                  | 33.287     |
| Temp. (°C):                       | 13.2       |
| Co [670nm] (1/m):                 | .77        |
| Secchi depth (m):                 | 10.5       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.5        |
| Chloroph. (mg/m <sup>3</sup> ):   | 2.3        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.0        |

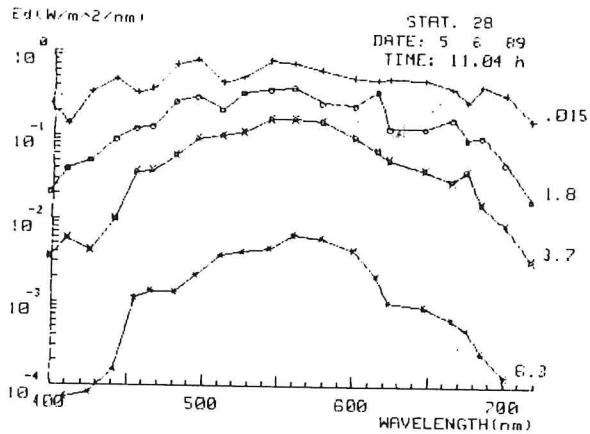


|                                   |            |
|-----------------------------------|------------|
| Station:                          | 26         |
| Date:                             | 2 - 6 - 89 |
| Time:                             | 13.50      |
| Latit.: [N]                       | 52 : 53.04 |
| Longit.: [E]                      | 4 : 36.99  |
| Salinity (o/oo):                  | 30.790     |
| Temp. (°C):                       | 14.1       |
| Co [670nm] (1/m):                 | 1.47       |
| Secchi depth (m):                 | 4.0        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.8        |
| Chloroph. (mg/m <sup>3</sup> ):   | 8.7        |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.5        |

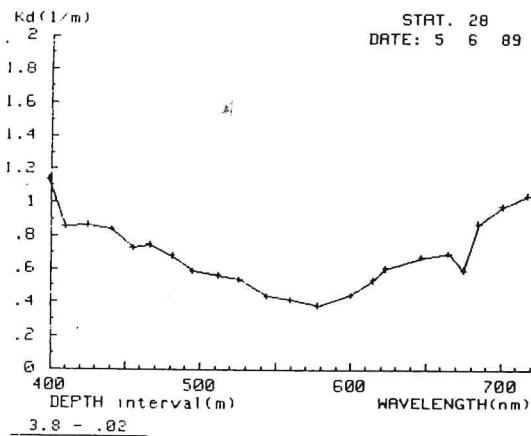
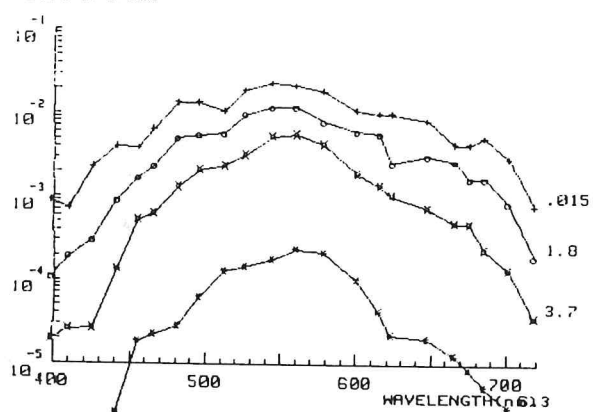
B27



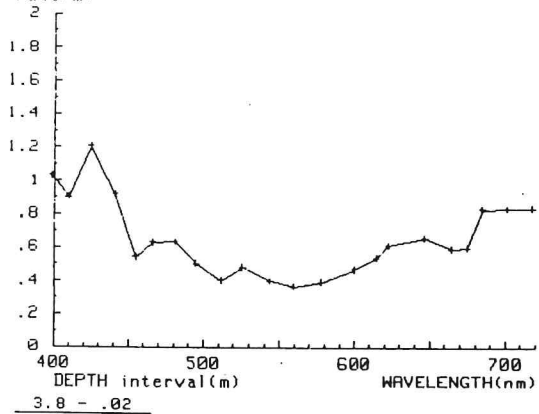
|                   |            |
|-------------------|------------|
| Station:          | 27         |
| Date:             | 5 - 6 - 89 |
| Time:             | 10.10      |
| Latit.: [N]       | 52 : 53.00 |
| Longit.: [E]      | 4 : 37.55  |
| Salinity(o/oo):   | 32.880     |
| Temp. (°C):       | 12.6       |
| Co[670nm](1/m):   | 1.28       |
| Secchi depth(m):  | 5.0        |
| Tot.Sus.M.(g/m3): | 3.2        |
| Chloroph.(mg/m3): | 1.9        |
| Yell.Sub.(m-1):   | 1.2        |

Ed (W/m<sup>2</sup>/nm)

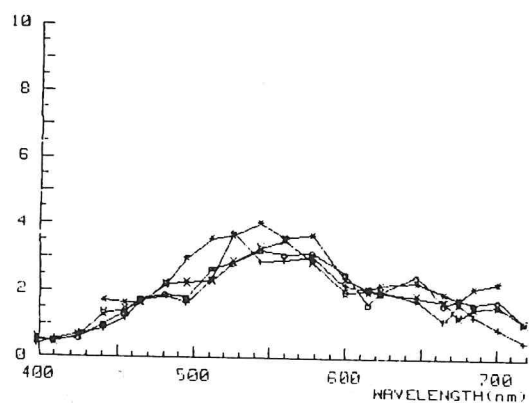
Kd (1/m)

Eu (W/m<sup>2</sup>/nm)

Ku (1/m)



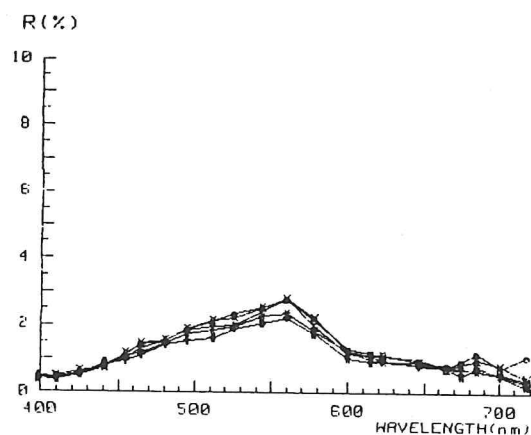
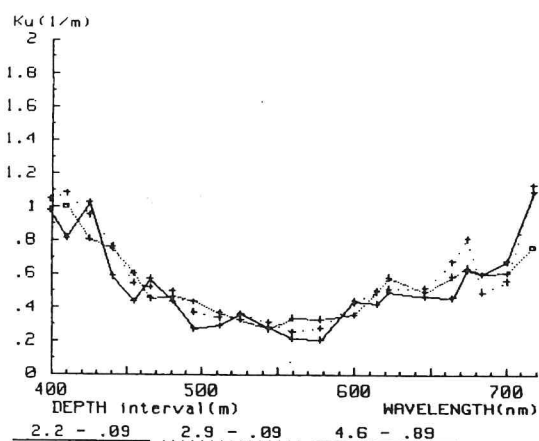
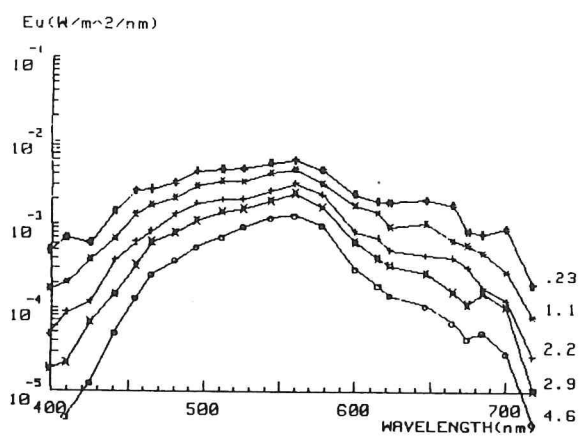
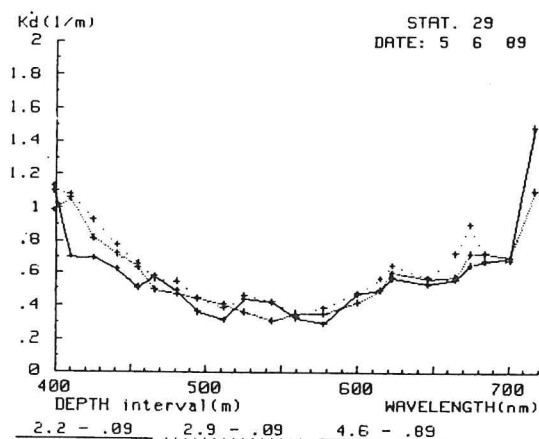
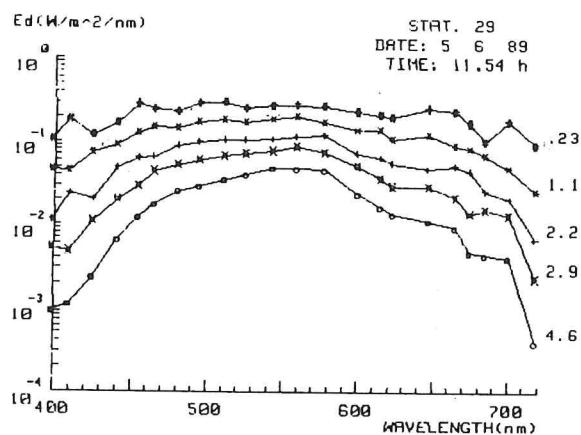
R (%)



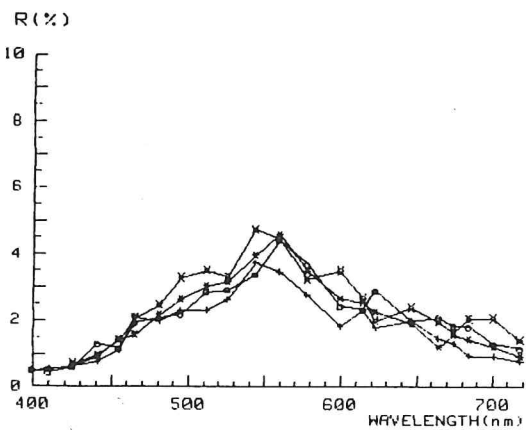
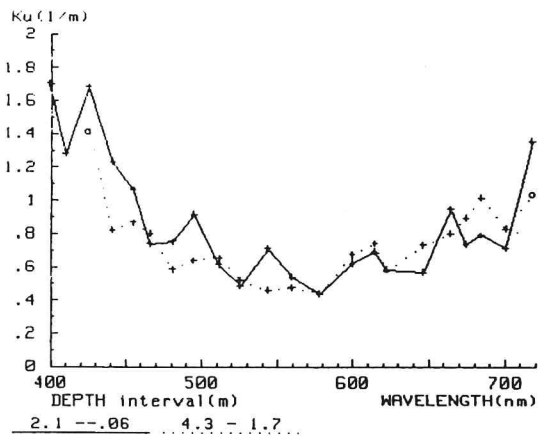
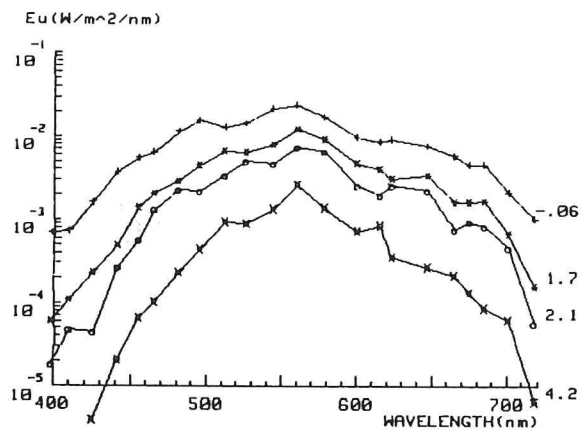
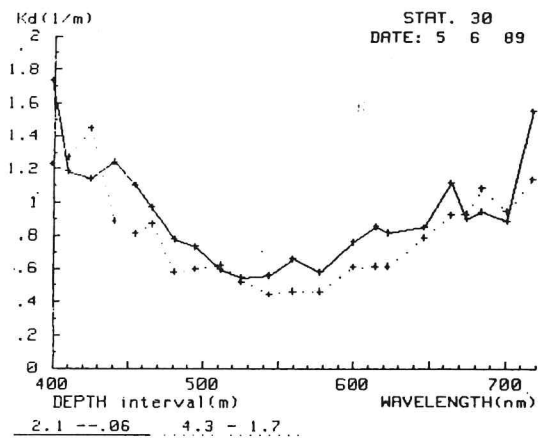
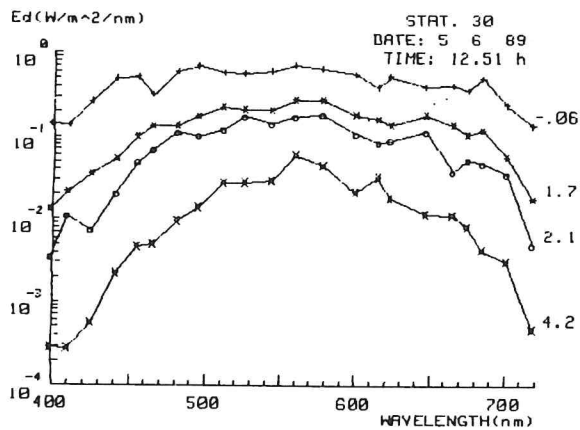
|                      |            |
|----------------------|------------|
| Station:             | 28         |
| Date:                | 5 - 6 - 89 |
| Time:                | 11.10      |
| Latit.: [N]          | 52 : 47.50 |
| Longit.: [E]         | 4 : 35.52  |
| Salinity (o/oo):     | 32.226     |
| Temp. (°C):          | 12.8       |
| Co [670nm] (1/m):    | 1.67       |
| Secchi depth (m):    | 4.0        |
| Tot. Sus. M. (g/m³): | 4.0        |
| Chloroph. (mg/m³):   | 1.9        |
| Yell. Sub. (m⁻¹):    | 2.9        |



B29

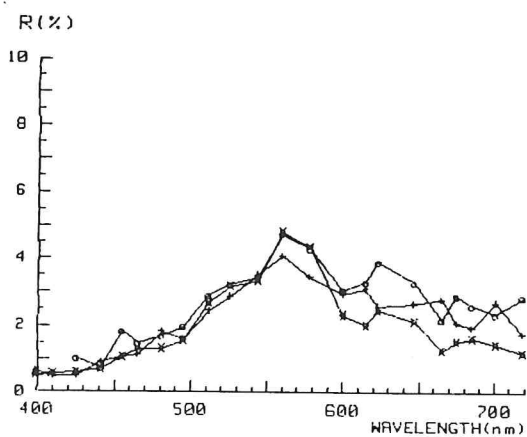
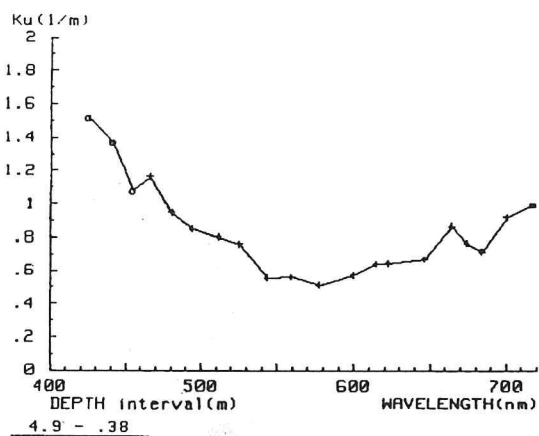
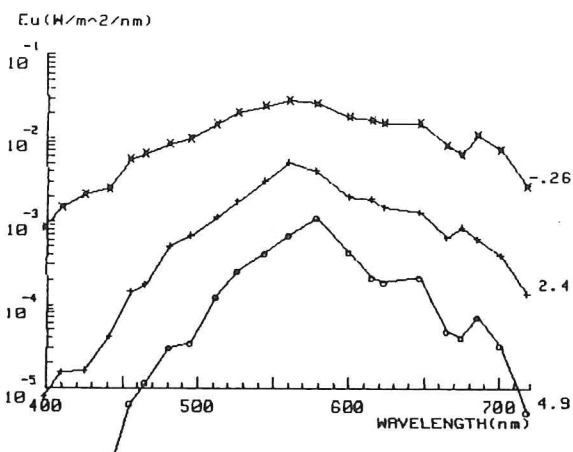
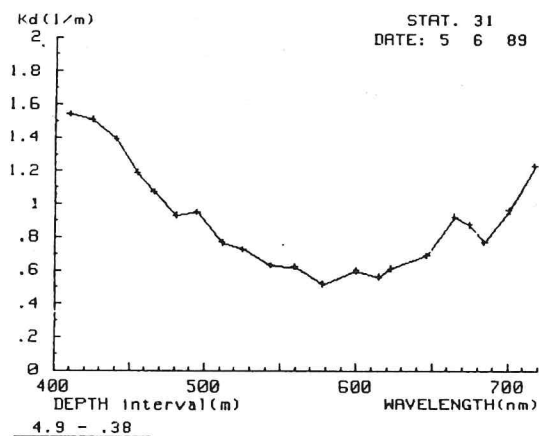
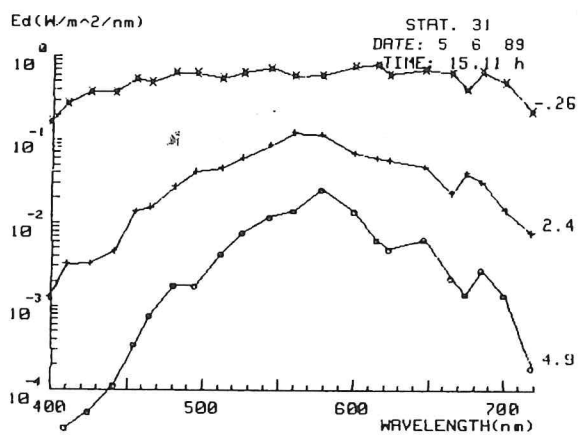


|                                   |            |
|-----------------------------------|------------|
| Station:                          | 29         |
| Date:                             | 5 - 6 - 89 |
| Time:                             | 12.00      |
| Latit.: [N]                       | 52 : 42.49 |
| Longit.: [E]                      | 4 : 33.48  |
| Salinity (o/oo):                  | 31.936     |
| Temp. (°C):                       | 12.9       |
| Co [670nm] (1/m):                 | 1.50       |
| Secchi depth (m):                 | 5.0        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.8        |
| Chloroph. (mg/m <sup>3</sup> ):   | 1.9        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.1        |

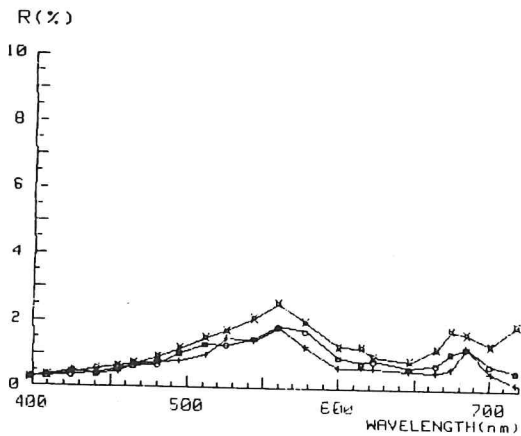
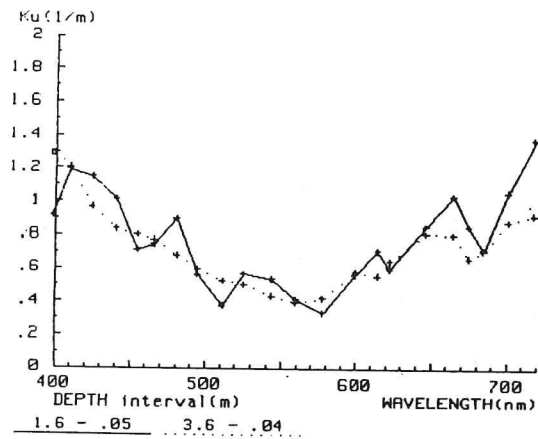
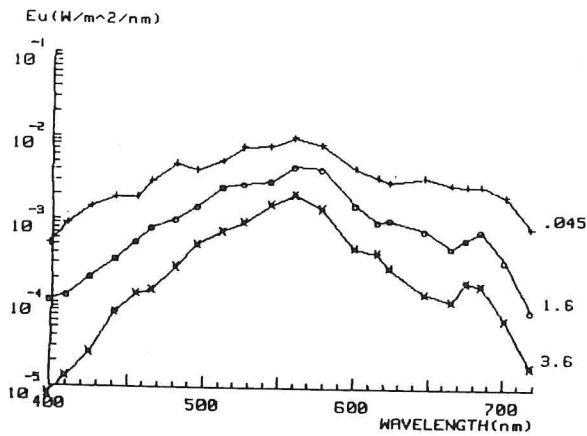
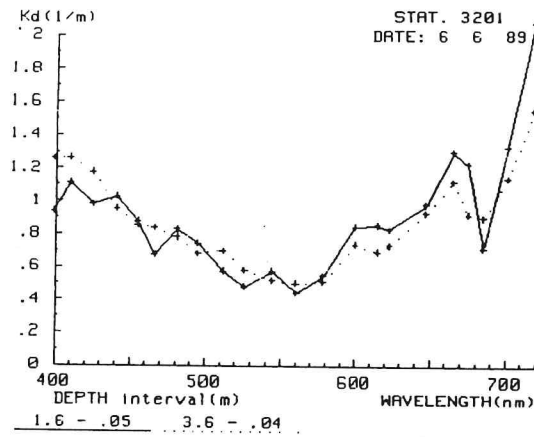
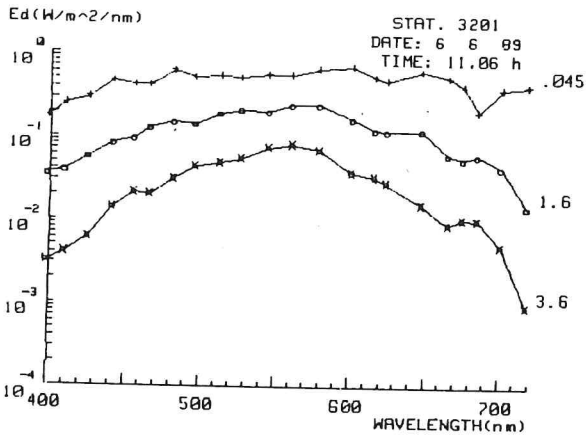


|                                   |            |
|-----------------------------------|------------|
| Station:                          | 30         |
| Date:                             | 5 - 6 - 89 |
| Time:                             | 12.55      |
| Latit.: [N]                       | 52 : 37.17 |
| Longit.: [E]                      | 4 : 31.42  |
| Salinity (o/oo):                  | 31.445     |
| Temp. (°C):                       | 13.0       |
| Co [670nm] (1/m):                 | 1.82       |
| Secchi depth (m):                 | 3.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.3        |
| Chloroph. (mg/m <sup>3</sup> ):   | 1.6        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.4        |

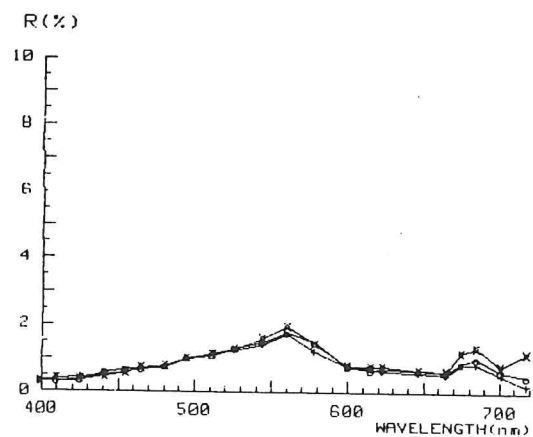
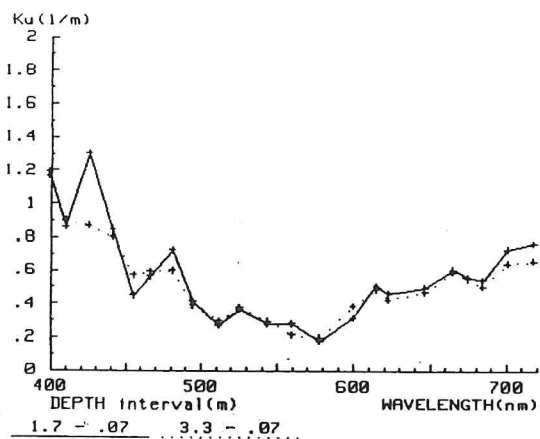
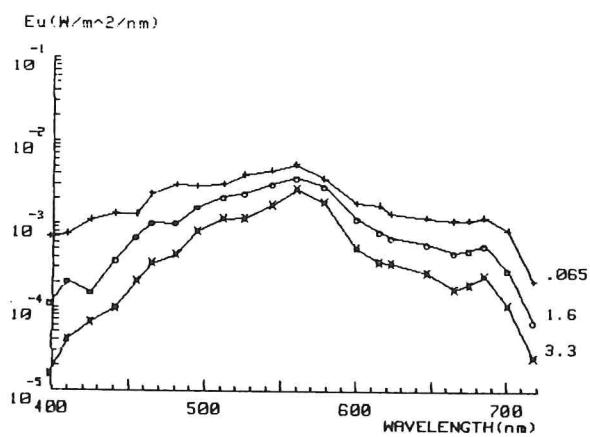
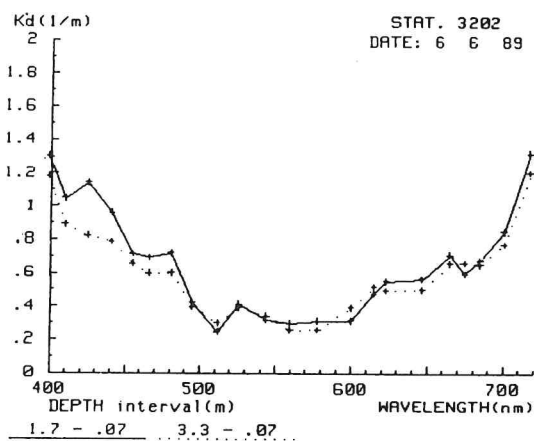
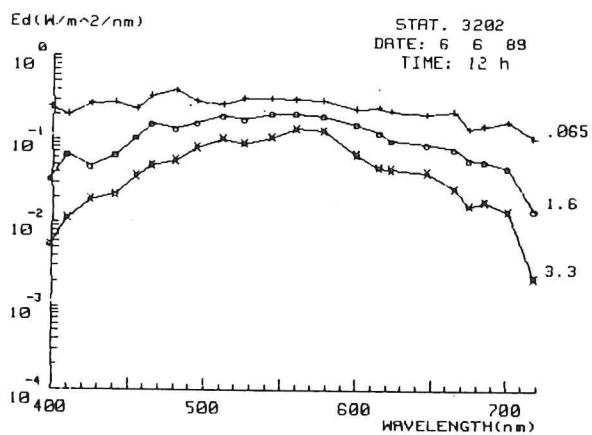
B31



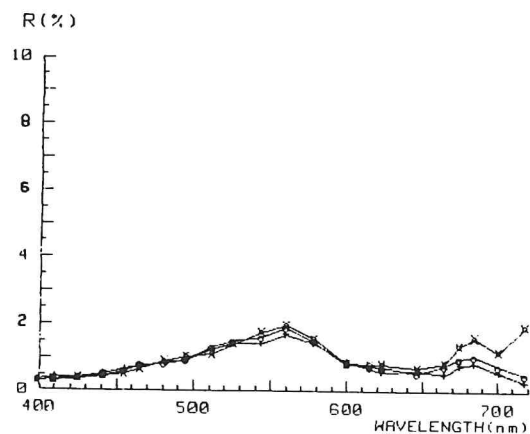
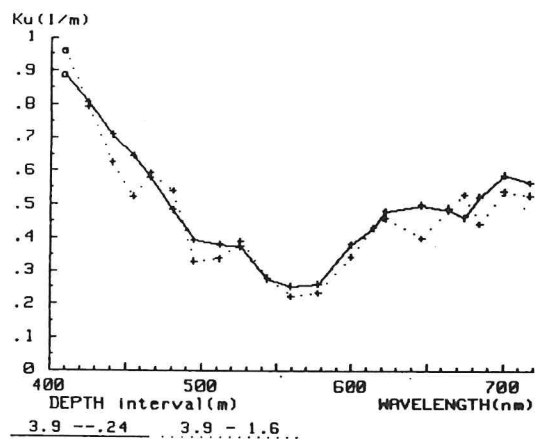
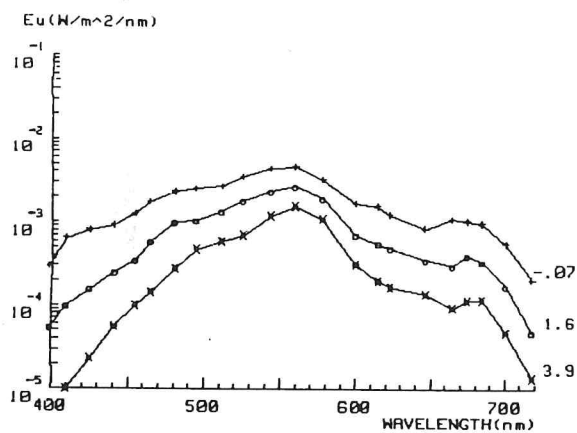
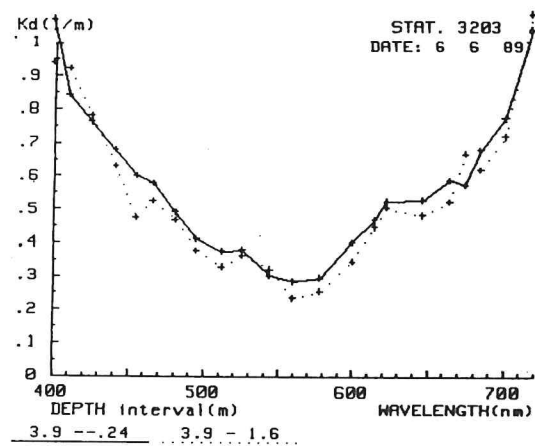
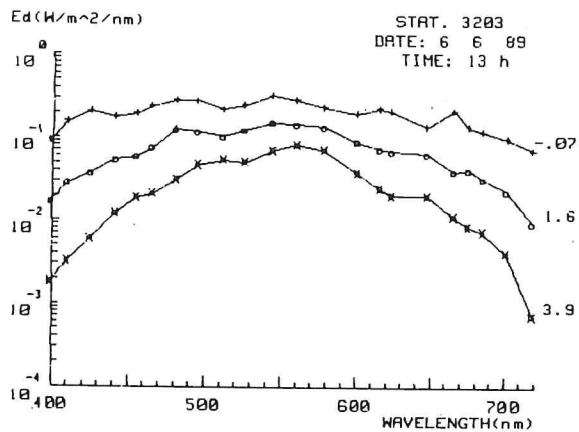
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 31         |
| Date:                             | 5 - 6 - 89 |
| Time:                             | 15.10      |
| Latit.: [N]                       | 52 : 52.51 |
| Longit.: [E]                      | 4 : 37.90  |
| Salinity (o/oo):                  | 31.544     |
| Temp. (°C):                       | 13.3       |
| Co [670nm] (1/m):                 | 3.00       |
| Secchi depth (m):                 | 2.0        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 8.1        |
| Chloroph. (mg/m <sup>3</sup> ):   | 11.8       |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.6        |



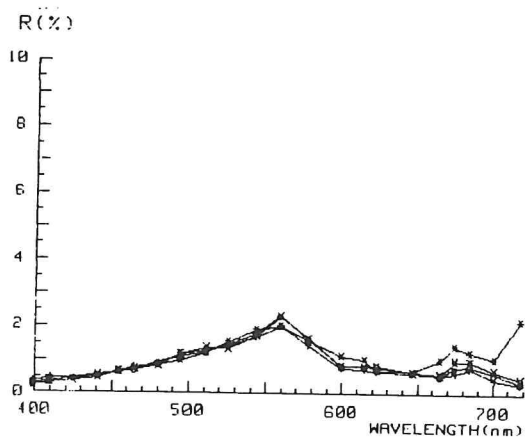
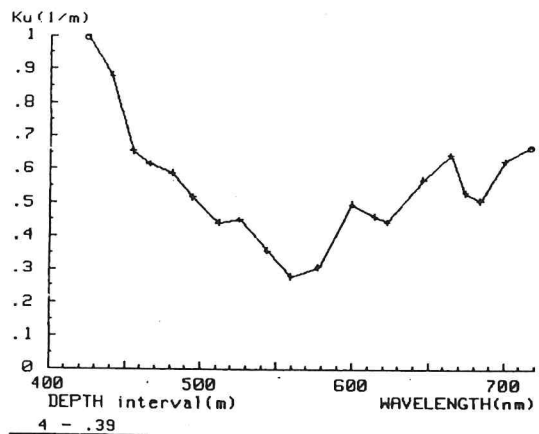
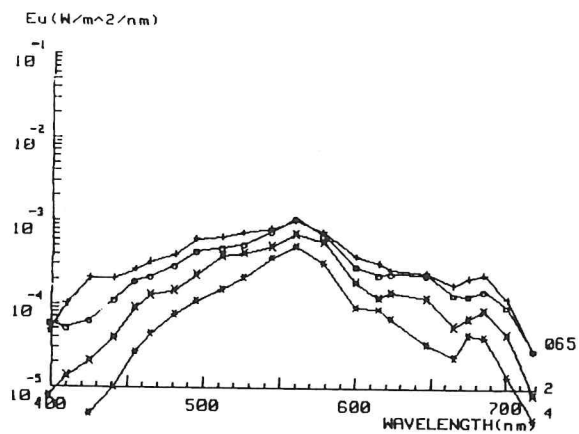
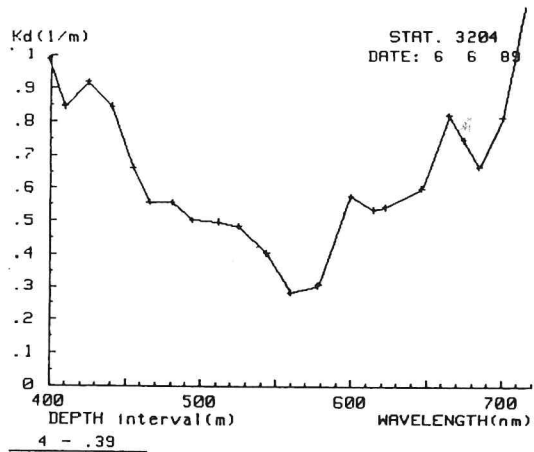
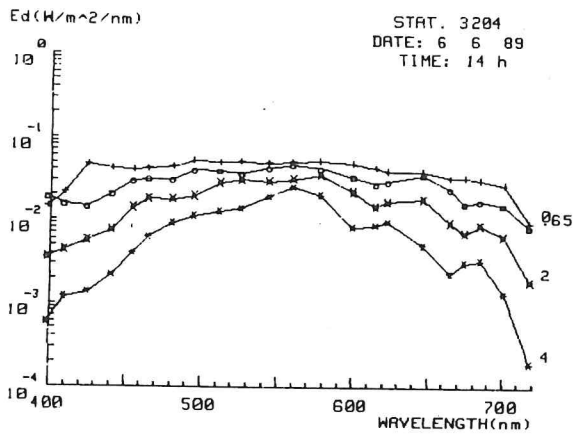
|                      |            |
|----------------------|------------|
| Station:             | 3201       |
| Date:                | 6 - 6 - 89 |
| Time:                | 11.10      |
| Latit.: [N]          | 53 : 7.69  |
| Longit.: [E]         | 4 : 38.05  |
| Salinity (o/oo):     | 32.619     |
| Temp. (°C):          | 13.1       |
| Co [670nm] (1/m):    | 1.45       |
| Secchi depth (m):    | 4.5        |
| Tot. Sus. M. (g/m3): | 3.8        |
| Chloroph. (mg/m3):   | 5.1        |
| Yell. Sub. (m-1):    | 1.1        |



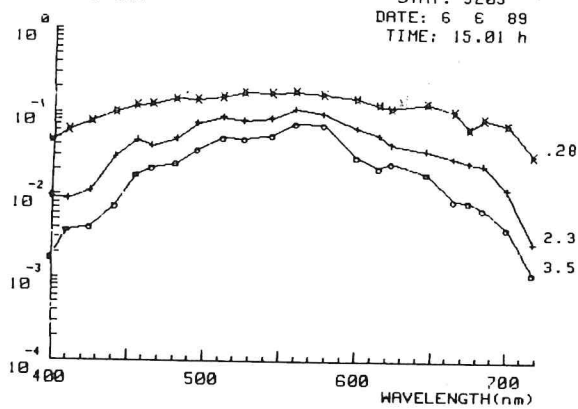
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 3202       |
| Date:                             | 6 - 6 - 89 |
| Time:                             | 12.05      |
| Latit.: [N]                       | 53 : 7.69  |
| Longit.: [E]                      | 4 : 38.05  |
| Salinity (o/oo):                  | 32.588     |
| Temp. (°C):                       | 13.2       |
| Co [670nm] (1/m):                 | 1.37       |
| Secchi depth (m):                 | 4.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.8        |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.1        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.2        |



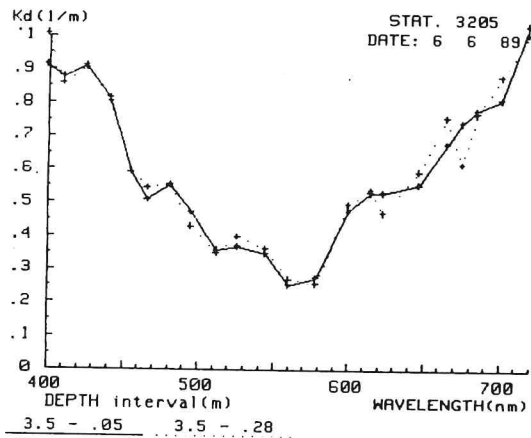
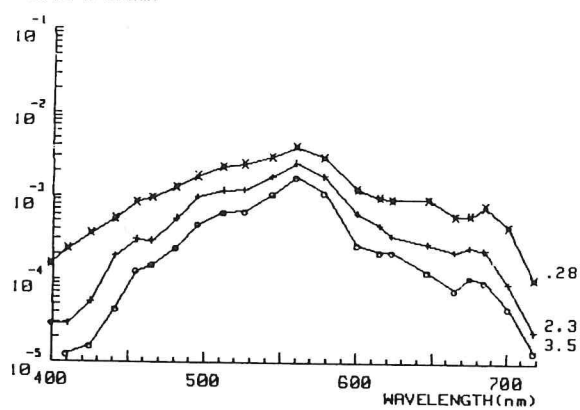
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 3203       |
| Date:                             | 6 - 6 - 89 |
| Time:                             | 13.05      |
| Latit.: [N]                       | 53 : 7.69  |
| Longit.: [E]                      | 4 : 38.05  |
| Salinity (o/oo):                  | 32.486     |
| Temp. (°C):                       | 13.2       |
| Co [670nm] (1/m):                 | 1.36       |
| Secchi depth (m):                 | 5.0        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 1.7        |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.5        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.9        |



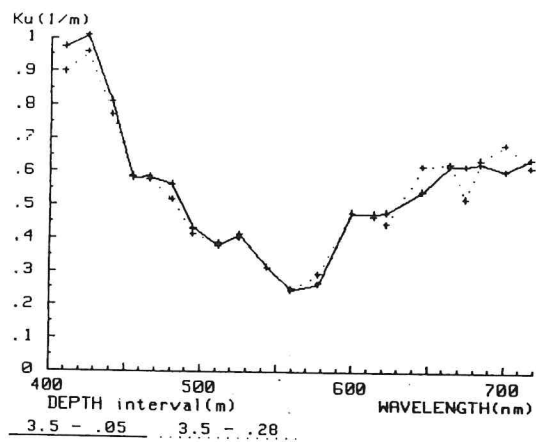
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 3204       |
| Date:                             | 6 - 6 - 89 |
| Time:                             | 14.05      |
| Latit.: [N]                       | 53 : 7.69  |
| Longit.: [E]                      | 4 : 38.05  |
| Salinity (o/oo):                  | 32.445     |
| Temp. (°C):                       | 13.2       |
| Co [670nm] (1/m):                 | 1.37       |
| Secchi depth (m):                 | 4.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.4        |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.4        |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.0        |

Ed(W/m<sup>2</sup>/nm)

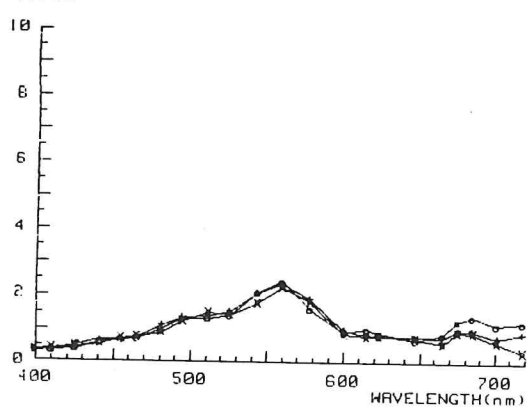
Kd(1/m)

Eu(W/m<sup>2</sup>/nm)

Ku(1/m)

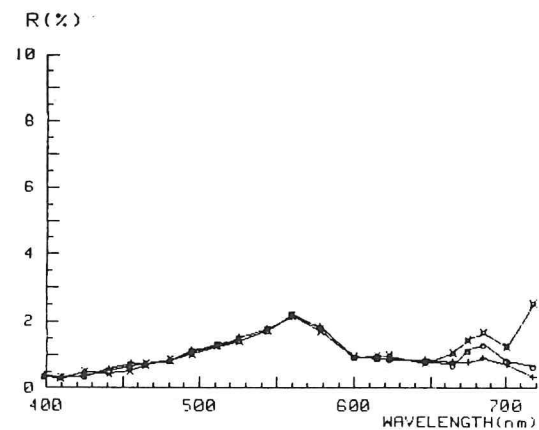
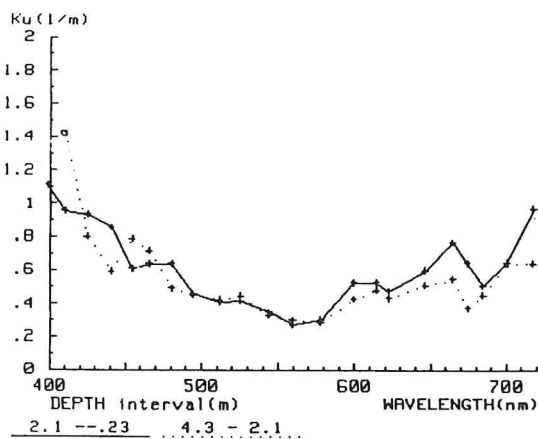
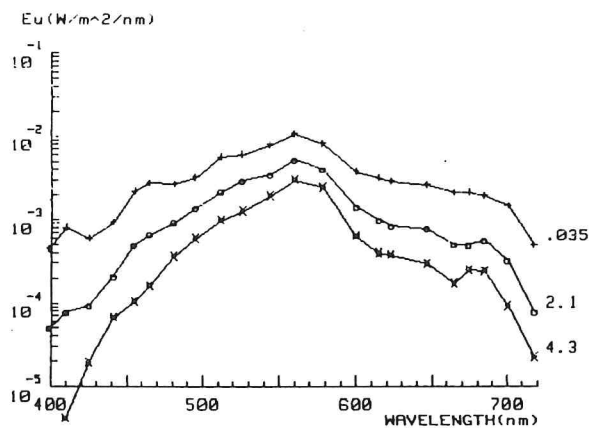
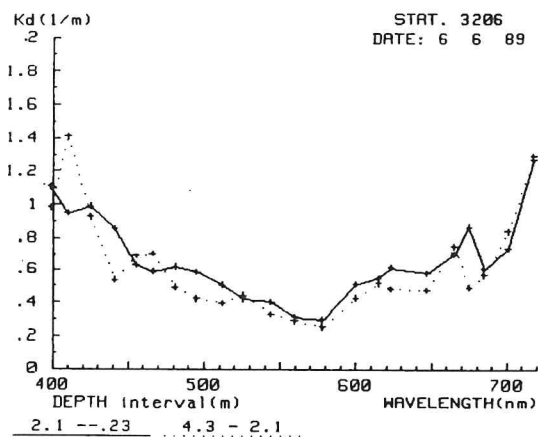
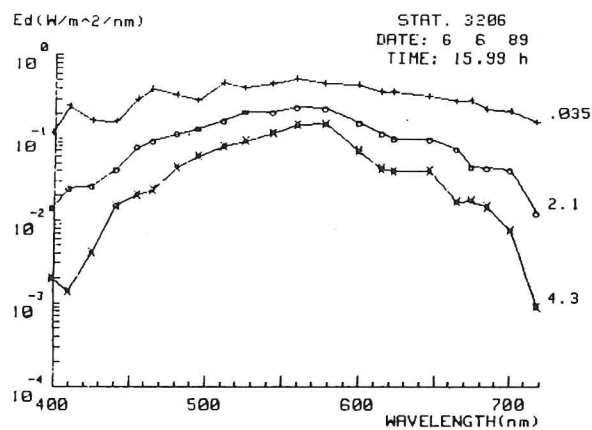


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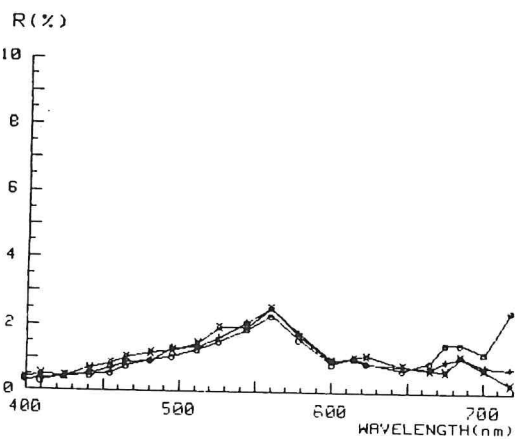
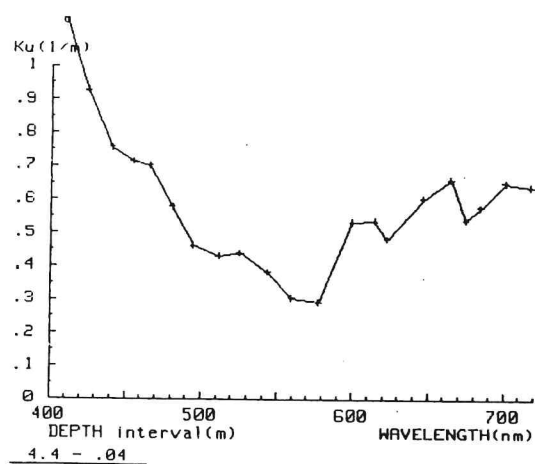
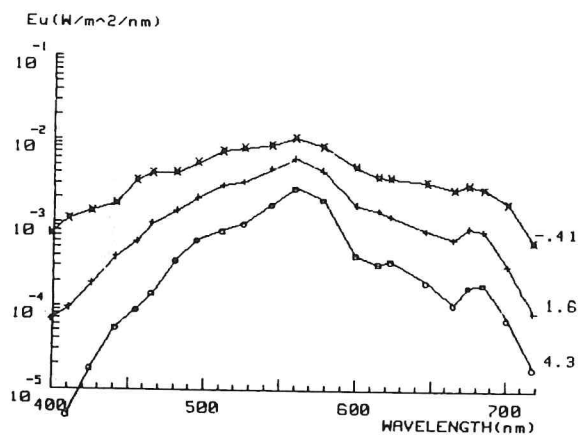
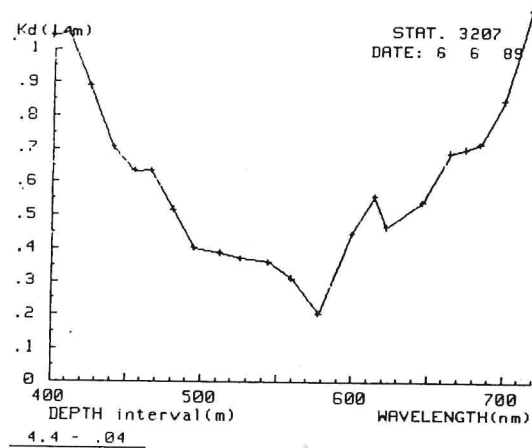
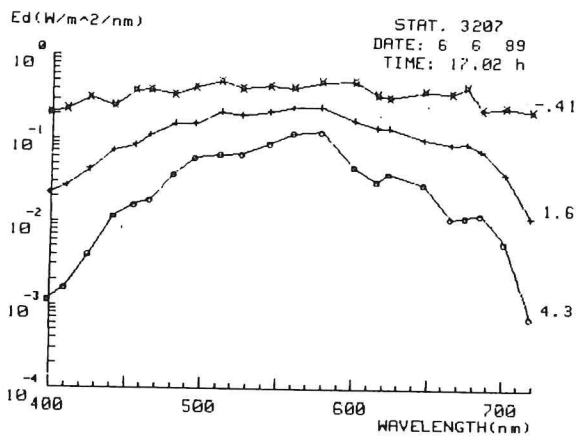


|                      |            |
|----------------------|------------|
| Station:             | 3205       |
| Date:                | 6 - 6 - 89 |
| Time:                | 15.00      |
| Latit.: [N]          | 53 : 7.69  |
| Longit.: [E]         | 4 : 38.05  |
| Salinity (o/oo):     | 32.416     |
| Temp. (°C):          | 13.2       |
| Co [670nm] (1/m):    | 1.42       |
| Secchi depth (m):    | 4.8        |
| Tot. Sus. M. (g/m³): | 4.4        |
| Chloroph. (mg/m³):   | 4.2        |
| Yell. Sub. (m⁻¹):    | 2.1        |

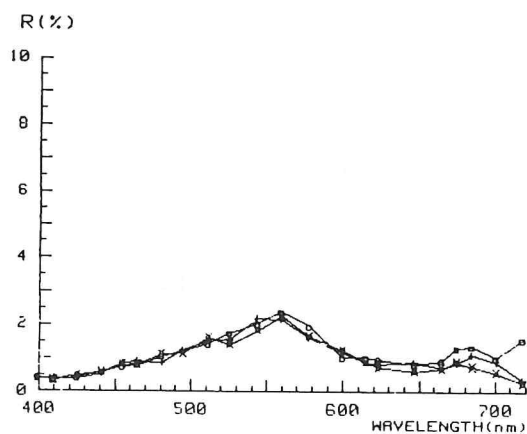
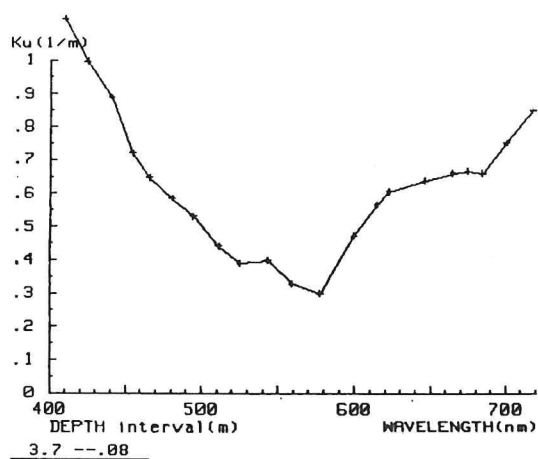
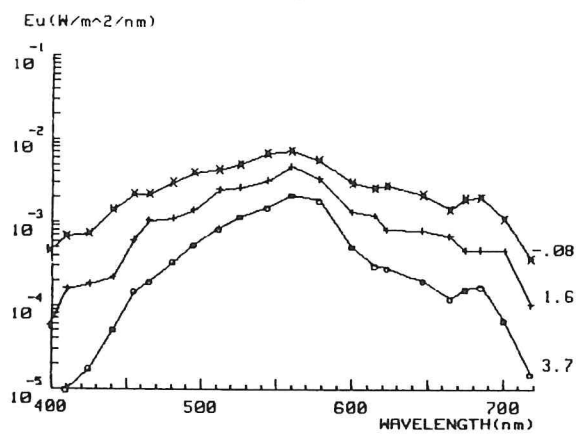
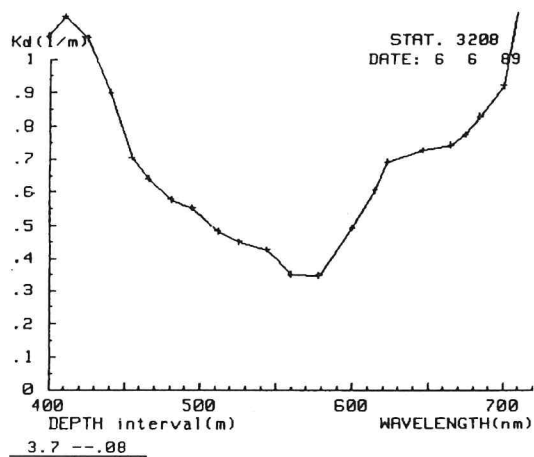
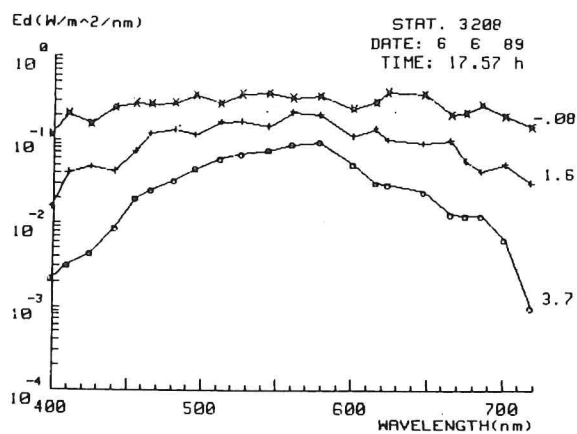




|                                   |            |
|-----------------------------------|------------|
| Station:                          | 3206       |
| Date:                             | 6 - 6 - 89 |
| Time:                             | 16.05      |
| Latit.: [N]                       | 53 : 7.69  |
| Longit.: [E]                      | 4 : 38.05  |
| Salinity (o/oo):                  | 32.367     |
| Temp. (°C):                       | 13.4       |
| Co [670nm] (1/m):                 | 1.48       |
| Secchi depth (m):                 | 4.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 6.0        |
| Chloroph. (mg/m <sup>3</sup> ):   | 5.1        |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.4        |



|                                   |            |
|-----------------------------------|------------|
| Station:                          | 3207       |
| Date:                             | 6 - 6 - 89 |
| Time:                             | 17.05      |
| Latit.: [N]                       | 53 : 7.69  |
| Longit.: [E]                      | 4 : 38.05  |
| Salinity (o/oo):                  | 32.175     |
| Temp. (°C):                       | 13.6       |
| Co [670nm] (1/m):                 | 1.48       |
| Secchi depth (m):                 | 4.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.9        |
| Chloroph. (mg/m <sup>3</sup> ):   | .9         |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.5        |



|                                   |            |
|-----------------------------------|------------|
| Station:                          | 3208       |
| Date:                             | 6 - 6 - 89 |
| Time:                             | 18.00      |
| Latit.: [N]                       | 53 : 7.69  |
| Longit.: [E]                      | 4 : 38.05  |
| Salinity (o/oo):                  | 32.259     |
| Temp. (°C):                       | 13.4       |
| Co [670nm] (1/m):                 | 1.47       |
| Secchi depth (m):                 | 4.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.6        |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.3        |
| Yell. Sub. (m-l):                 | 2.1        |

Due to the low solar altitude no spectral data are presented.

|                   |            |
|-------------------|------------|
| Station:          | 3209       |
| Date:             | 6 - 6 - 89 |
| Time:             | 19.00      |
| Latit.: [N]       | 53 : 7.69  |
| Longit.: [E]      | 4 : 38.05  |
| Salinity(o/oo):   |            |
| Temp. (°C):       | 13.4       |
| Co[670nm](1/m):   | 1.78       |
| Secchi depth(m):  |            |
| Tot.Sus.M.(g/m3): | 3.0        |
| Chloroph.(mg/m3): | 4.3        |
| Yell.Sub.(m-1):   |            |

|                   |            |
|-------------------|------------|
| Station:          | 3210       |
| Date:             | 6 - 6 - 89 |
| Time:             | 20.00      |
| Latit.: [N]       | 53 : 7.69  |
| Longit.: [E]      | 4 : 38.05  |
| Salinity(o/oo):   |            |
| Temp. (°C):       | 13.4       |
| Co[670nm](1/m):   | 1.48       |
| Secchi depth(m):  |            |
| Tot.Sus.M.(g/m3): | 3.7        |
| Chloroph.(mg/m3): | 3.4        |
| Yell.Sub.(m-1):   |            |

|                   |            |
|-------------------|------------|
| Station:          | 3211       |
| Date:             | 6 - 6 - 89 |
| Time:             | 21.00      |
| Latit.: [N]       | 53 : 7.69  |
| Longit.: [E]      | 4 : 38.05  |
| Salinity(o/oo):   |            |
| Temp. (°C):       | 13.2       |
| Co[670nm](1/m):   | 1.50       |
| Secchi depth(m):  |            |
| Tot.Sus.M.(g/m3): | 3.6        |
| Chloroph.(mg/m3): | 4.6        |
| Yell.Sub.(m-1):   |            |

|                   |            |
|-------------------|------------|
| Station:          | 3212       |
| Date:             | 6 - 6 - 89 |
| Time:             | 22.00      |
| Latit.: [N]       | 53 : 7.69  |
| Longit.: [E]      | 4 : 38.05  |
| Salinity(o/oo):   |            |
| Temp. (°C):       | 13.1       |
| Co[670nm](1/m):   | 1.43       |
| Secchi depth(m):  |            |
| Tot.Sus.M.(g/m3): | 4.2        |
| Chloroph.(mg/m3): | 6.1        |
| Yell.Sub.(m-1):   |            |

|                   |            |
|-------------------|------------|
| Station:          | 3213       |
| Date:             | 6 - 6 - 89 |
| Time:             | 23.00      |
| Latit.: [N]       | 53 : 7.69  |
| Longit.: [E]      | 4 : 38.05  |
| Salinity(o/oo):   |            |
| Temp. (°C):       | 13.0       |
| Co[670nm](1/m):   | 1.42       |
| Secchi depth(m):  |            |
| Tot.Sus.M.(g/m3): | 5.0        |
| Chloroph.(mg/m3): | 4.0        |
| Yell.Sub.(m-1):   |            |

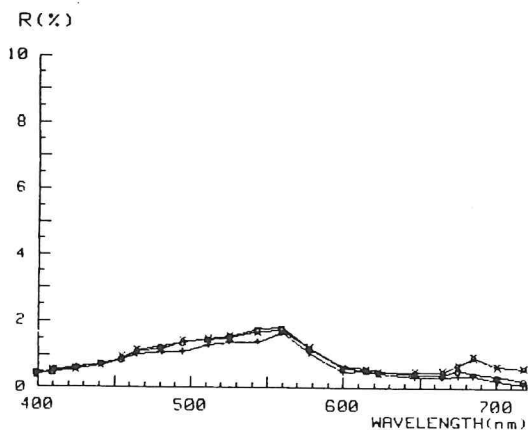
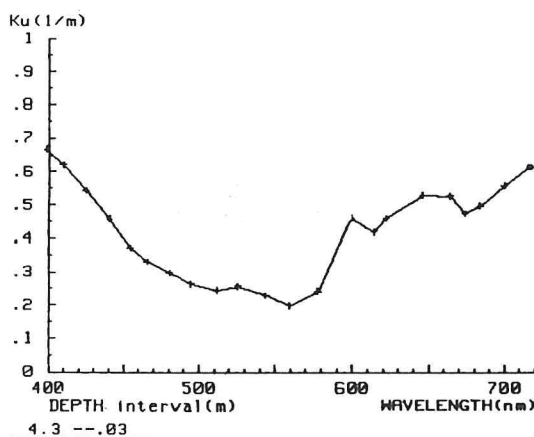
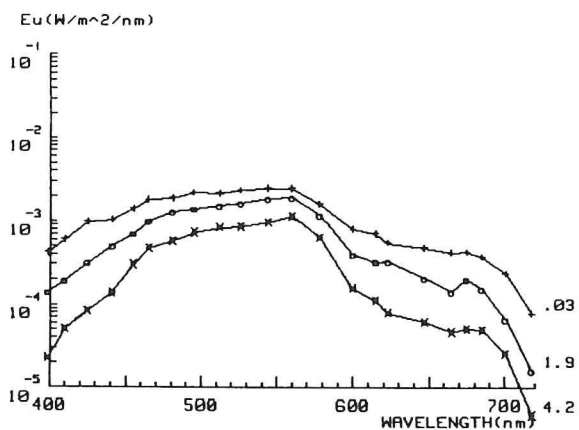
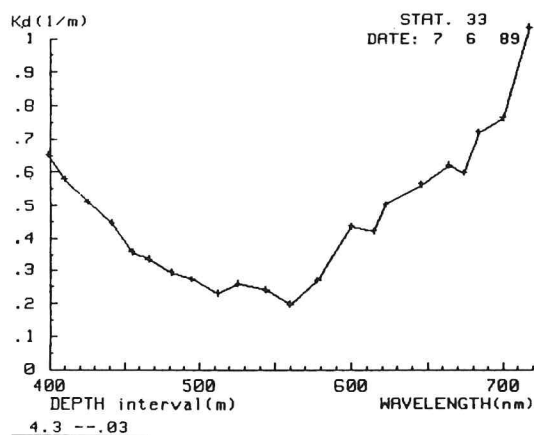
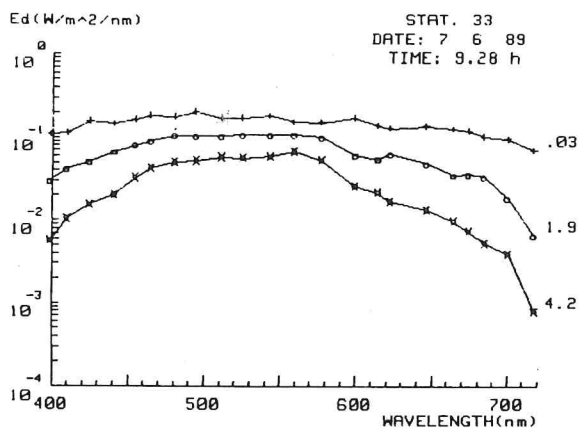
  

|                   |            |
|-------------------|------------|
| Station:          | 3214       |
| Date:             | 6 - 6 - 89 |
| Time:             | 24.00      |
| Latit.: [N]       | 53 : 7.69  |
| Longit.: [E]      | 4 : 38.05  |
| Salinity(o/oo):   |            |
| Temp. (°C):       | 13.1       |
| Co[670nm](1/m):   | 1.43       |
| Secchi depth(m):  |            |
| Tot.Sus.M.(g/m3): | 3.1        |
| Chloroph.(mg/m3): | 6.0        |
| Yell.Sub.(m-1):   |            |

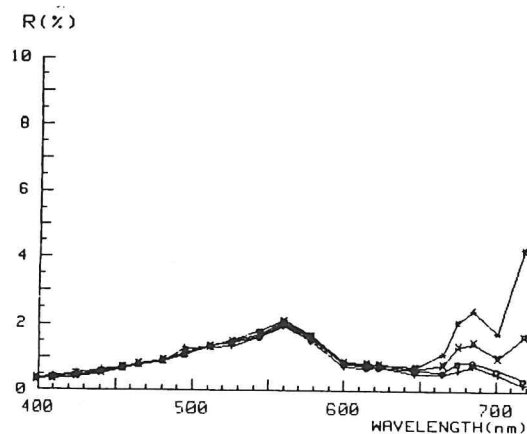
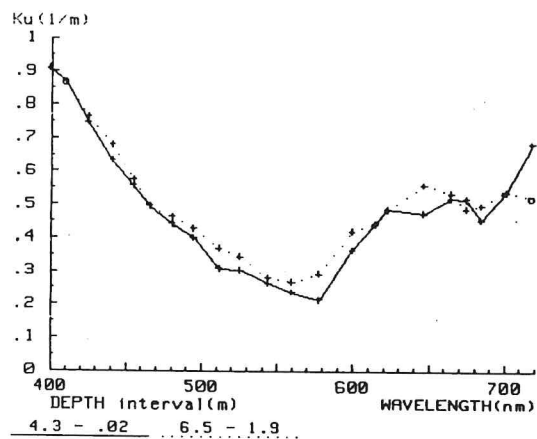
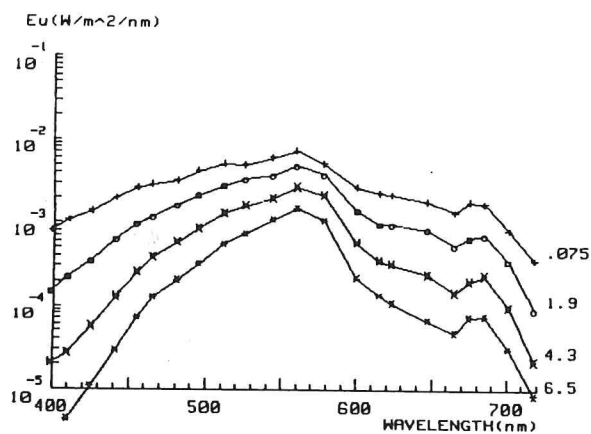
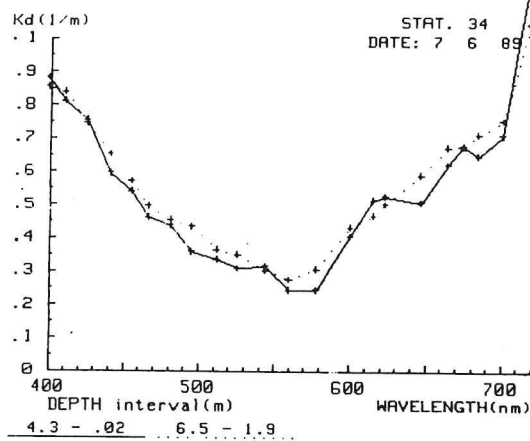
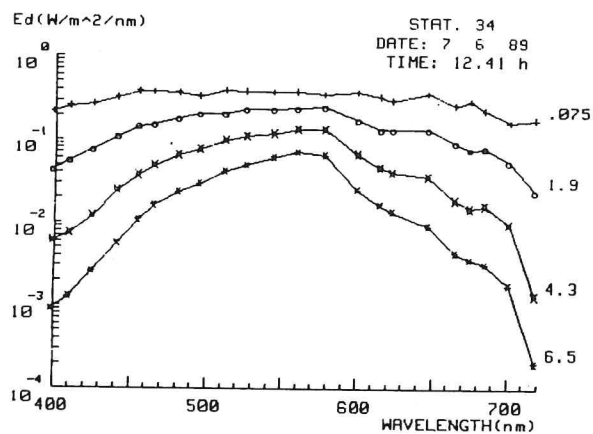
  

|                   |            |
|-------------------|------------|
| Station:          | 3215       |
| Date:             | 6 - 6 - 89 |
| Time:             | 1.00       |
| Latit.: [N]       | 53 : 7.69  |
| Longit.: [E]      | 4 : 38.05  |
| Salinity(o/oo):   |            |
| Temp. (°C):       | 13.0       |
| Co[670nm](1/m):   | 1.42       |
| Secchi depth(m):  |            |
| Tot.Sus.M.(g/m3): | 3.6        |
| Chloroph.(mg/m3): | 5.6        |
| Yell.Sub.(m-1):   |            |

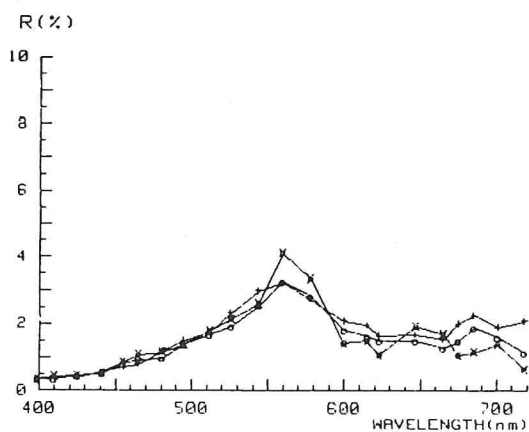
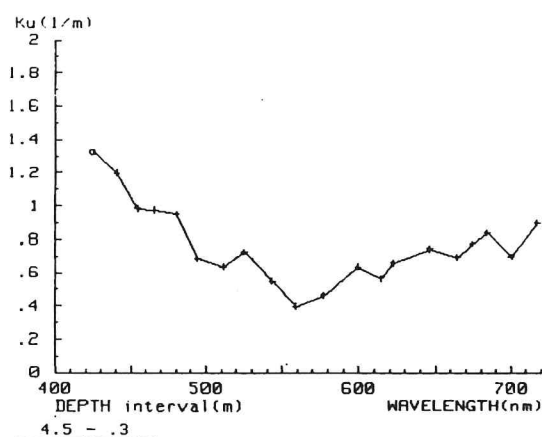
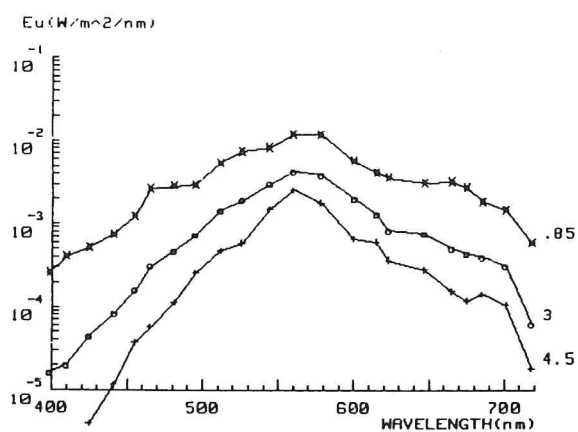
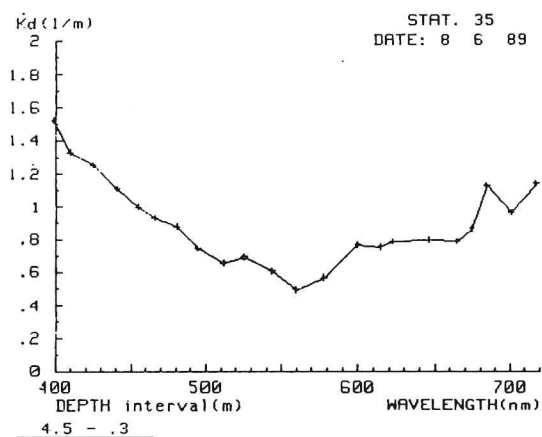
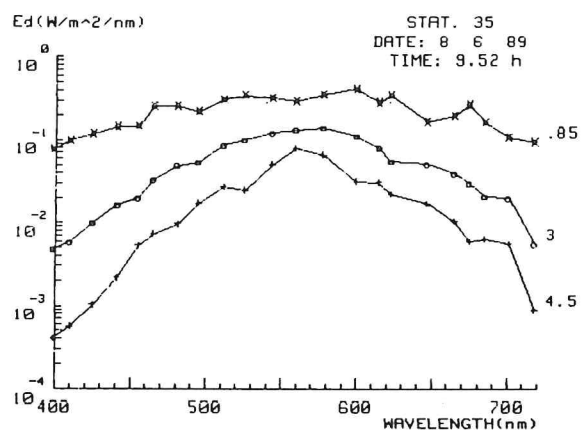
B41



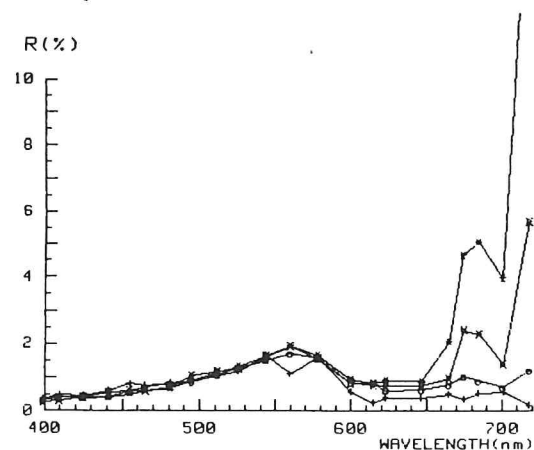
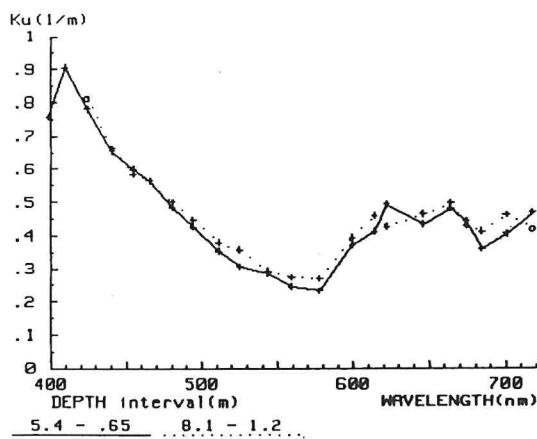
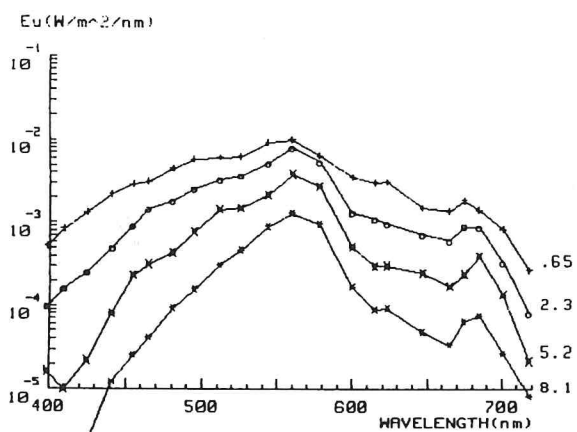
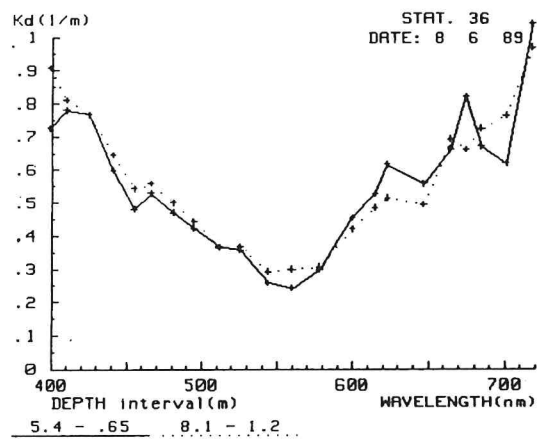
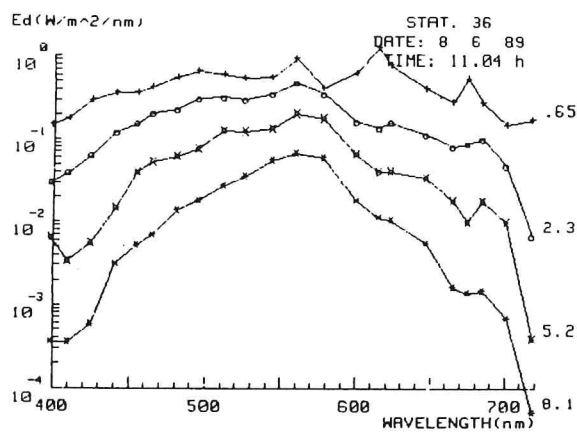
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 33         |
| Date:                             | 7 -6 -89   |
| Time:                             | 9.35       |
| Latit.: [N]                       | 53 : 16.34 |
| Longit.: [E]                      | 4 : 33.94  |
| Salinity (o/oo):                  | 33.327     |
| Temp. (°C):                       | 12.7       |
| Co [670nm] (1/m):                 | 1.00       |
| Secchi depth (m):                 | 7.0        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.0        |
| Chloroph. (mg/m <sup>3</sup> ):   | 1.5        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.1        |



|                                   |            |
|-----------------------------------|------------|
| Station:                          | 34         |
| Date:                             | 7 - 6 - 89 |
| Time:                             | 12.45      |
| Latit.: [N]                       | 53 : 3.38  |
| Longit.: [E]                      | 4 : 38.38  |
| Salinity (o/oo):                  | 32.872     |
| Temp. (°C):                       | 13.0       |
| Co [670nm] (1/m):                 | 1.27       |
| Secchi depth (m):                 | 5.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.9        |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.6        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.2        |



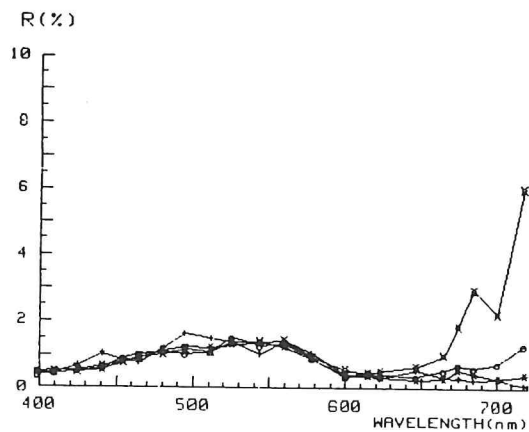
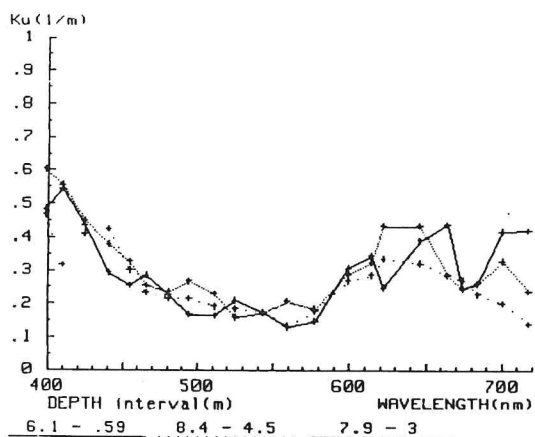
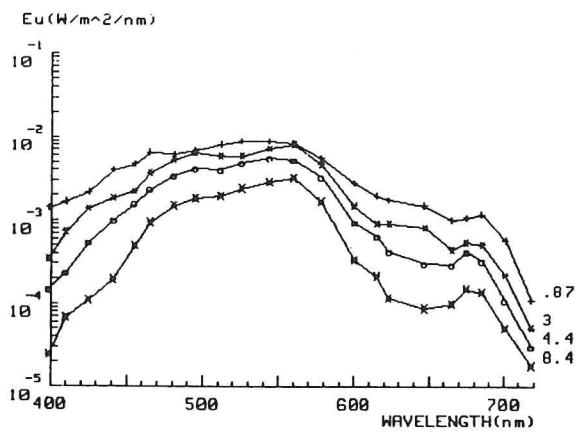
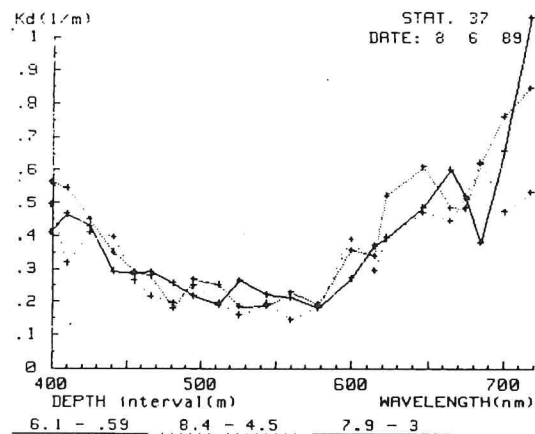
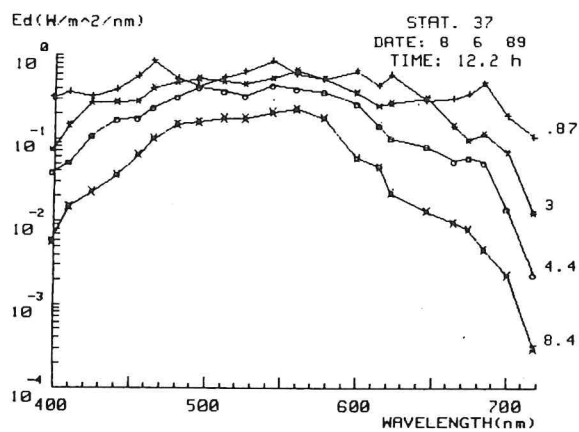
|                      |            |
|----------------------|------------|
| Station:             | 35         |
| Date:                | 8 - 6 - 89 |
| Time:                | 9.55       |
| Latit.: [N]          | 53 : 4.29  |
| Longit.: [E]         | 4 : 41.77  |
| Salinity (o/oo):     | 32.307     |
| Temp. (°C):          | 13.2       |
| Co [670nm] (1/m):    | 2.60       |
| Secchi depth (m):    | 3.0        |
| Tot. Sus. M. (g/m3): | 5.2        |
| Chloroph. (mg/m3):   | 9.3        |
| Yell. Sub. (m-1):    | 1.6        |



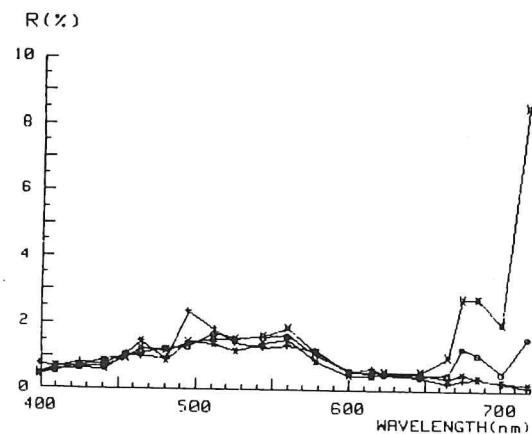
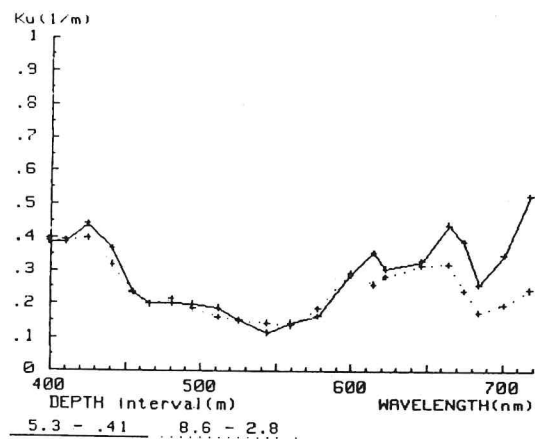
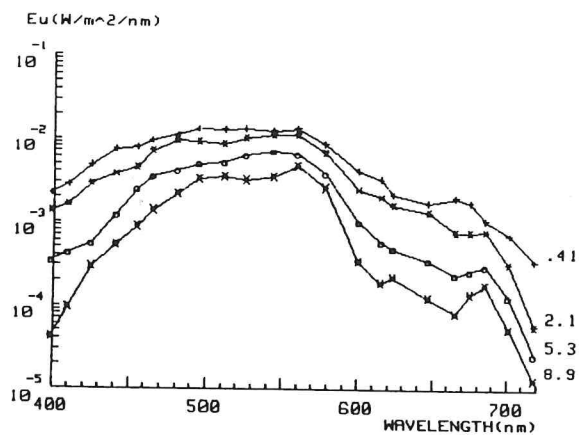
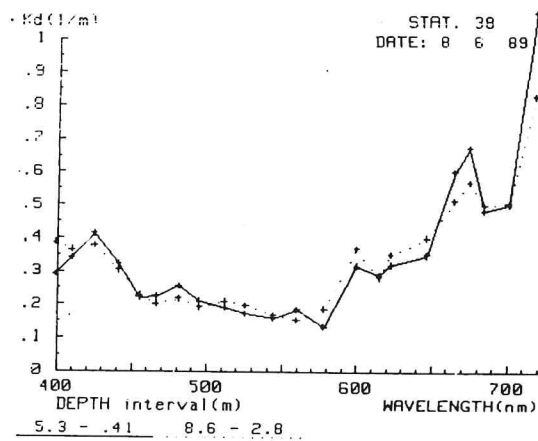
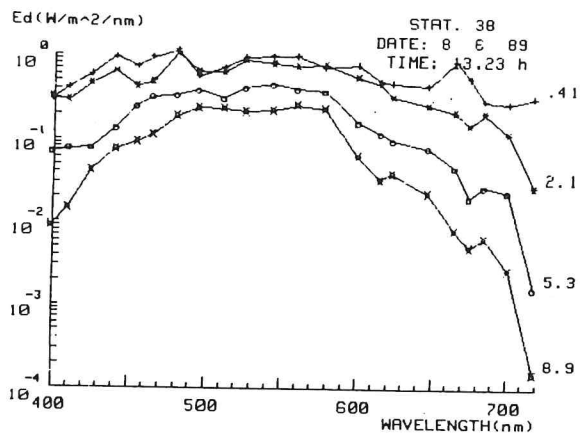
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 36         |
| Date:                             | 8 - 6 - 89 |
| Time:                             | 11.10      |
| Latit.: [N]                       | 53 : 11.47 |
| Longit.: [E]                      | 4 : 37.35  |
| Salinity (‰):                     | 32.800     |
| Temp. (°C):                       | 13.3       |
| Co [670nm] (1/m):                 | 1.29       |
| Secchi depth (m):                 | 6.0        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.5        |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.4        |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.1        |



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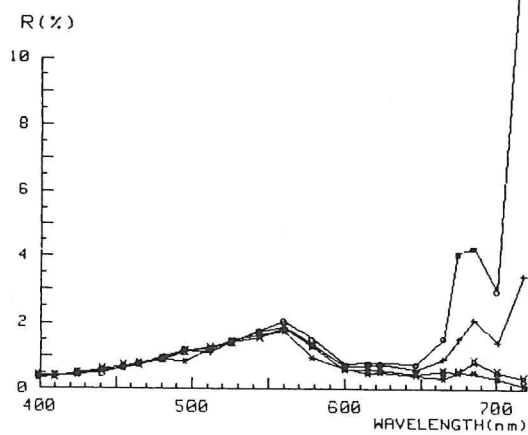
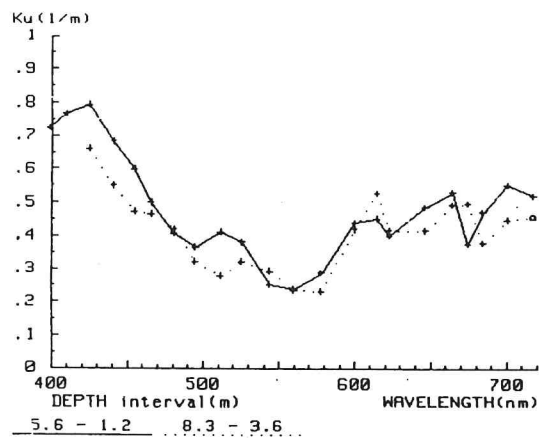
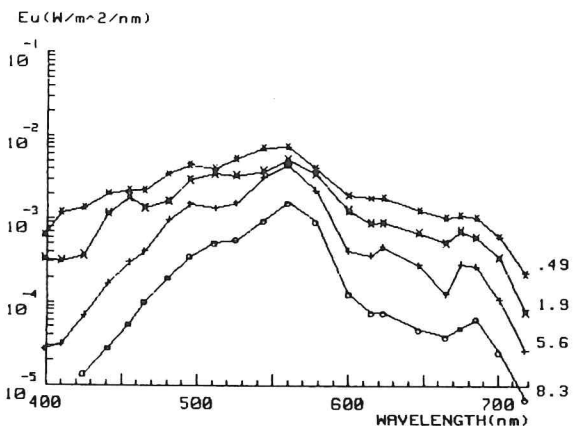
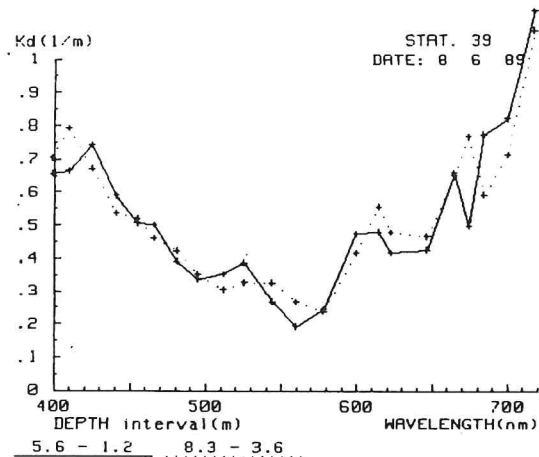
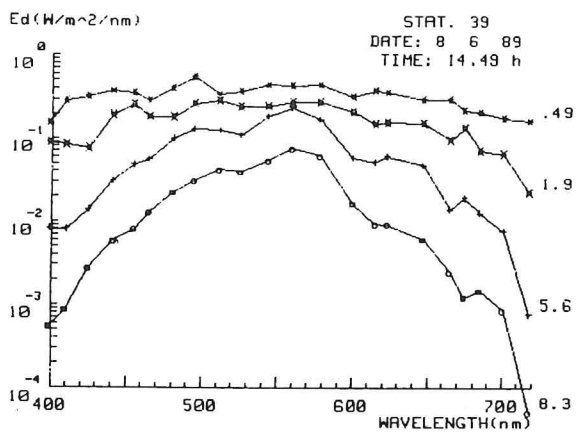


|                                   |            |
|-----------------------------------|------------|
| Station:                          | 37         |
| Date:                             | 8 - 6 - 89 |
| Time:                             | 12.35      |
| Latit.: [N]                       | 53 : 18.31 |
| Longit.: [E]                      | 4 : 32.21  |
| Salinity (o/oo):                  | 33.566     |
| Temp. (°C):                       | 12.8       |
| Co [670nm] (1/m):                 | .87        |
| Secchi depth (m):                 | 8.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.1        |
| Chloroph. (mg/m <sup>3</sup> ):   | .9         |
| Yell. Sub. (m <sup>-1</sup> ):    | .80        |

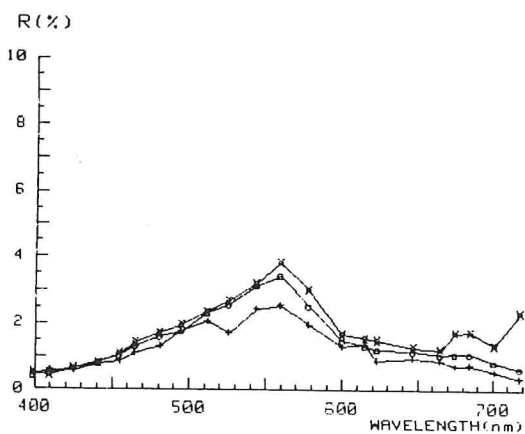
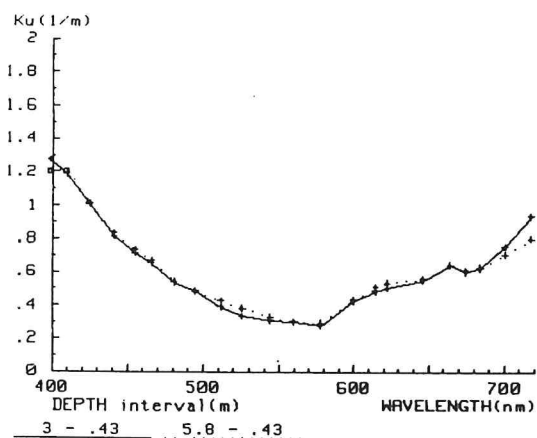
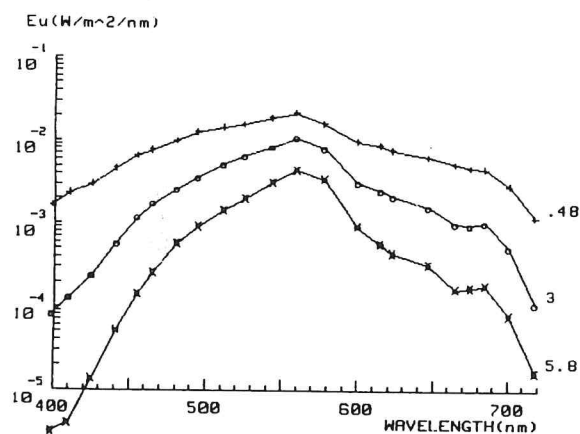
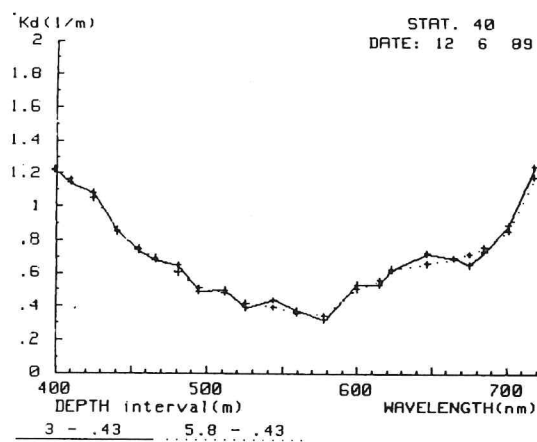
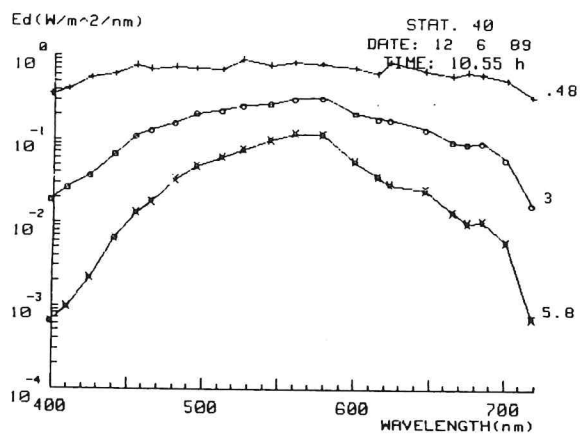


|                                   |            |
|-----------------------------------|------------|
| Station:                          | 38         |
| Date:                             | 8 - 6 - 89 |
| Time:                             | 13.30      |
| Latit.: [N]                       | 53 : 16.98 |
| Longit.: [E]                      | 4 : 27.73  |
| Salinity (o/oo):                  | 33.796     |
| Temp. (°C):                       | 13.0       |
| Co [670nm] (1/m):                 | .93        |
| Secchi depth (m):                 | 8.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.2        |
| Chloroph. (mg/m <sup>3</sup> ):   | .8         |
| Yell. Sub. (m <sup>-1</sup> ):    | .80        |

B47

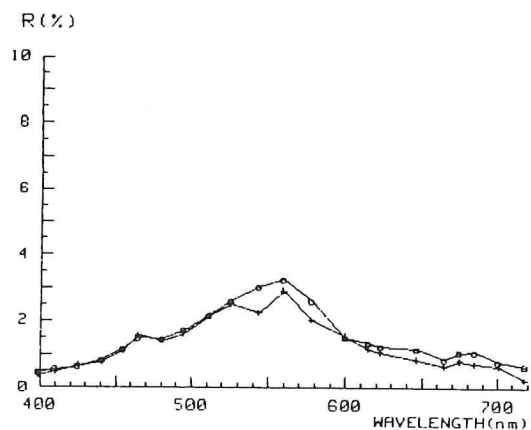
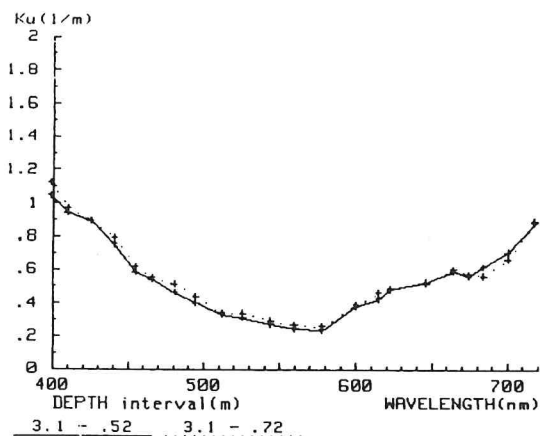
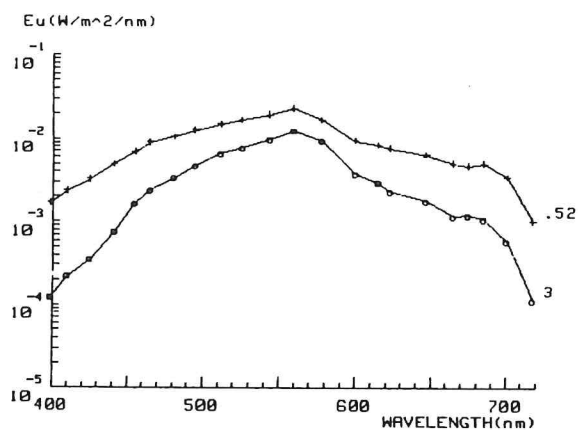
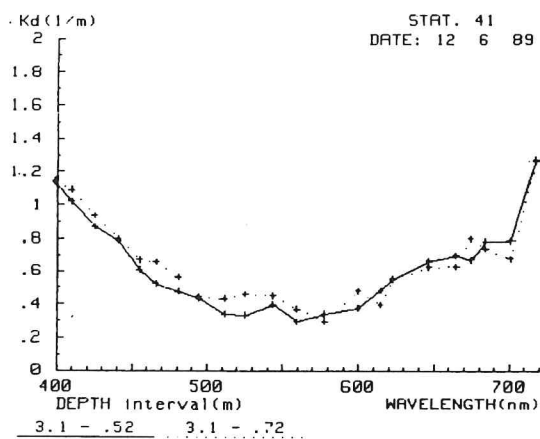
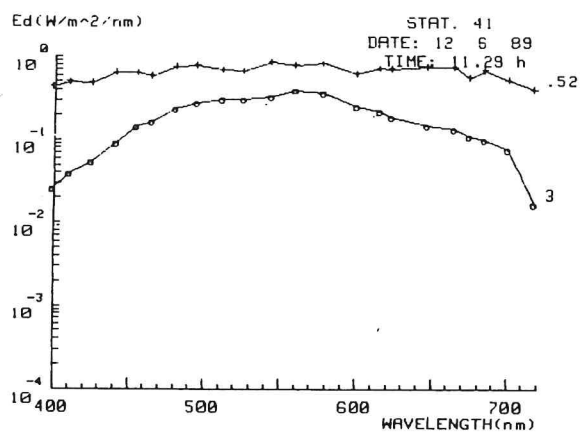


|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 39        |
| Date:                             | 8-6-89    |
| Time:                             | 14.50     |
| Latit.: [N]                       | 53 : 9.74 |
| Longit.: [E]                      | 4 : 35.71 |
| Salinity (o/oo):                  | 33.226    |
| Temp. (°C):                       | 13.1      |
| Co [670nm] (1/m):                 | 1.16      |
| Secchi depth (m):                 | 6.5       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.9       |
| Chloroph. (mg/m <sup>3</sup> ):   | 2.4       |
| Yell. Sub. (m-l):                 | 1.0       |

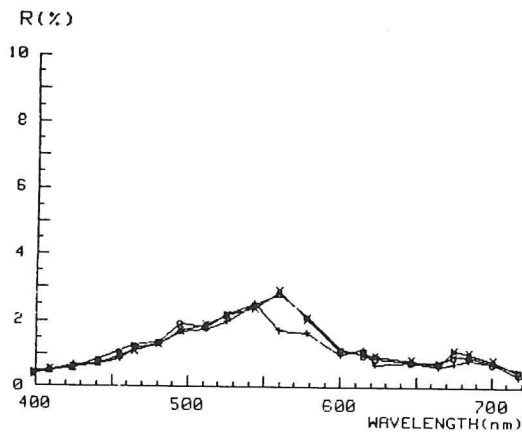
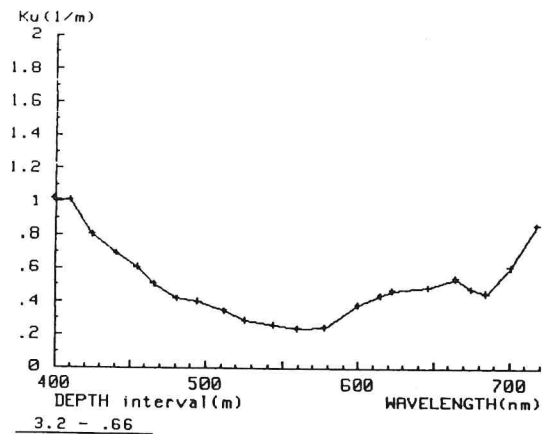
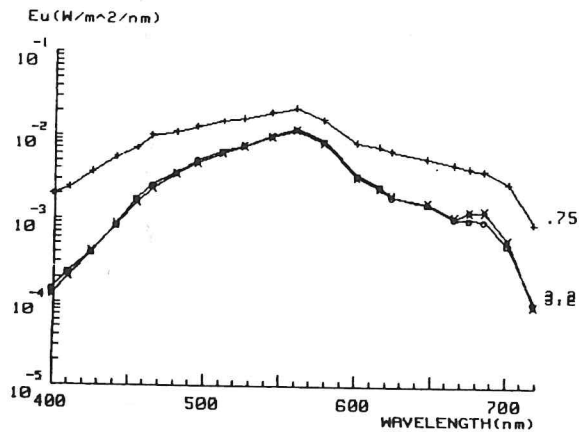
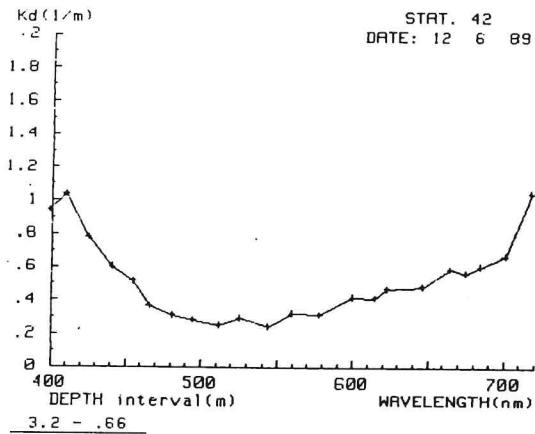
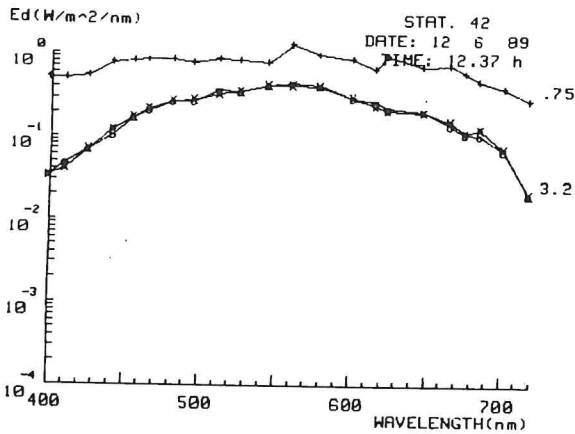


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 40          |
| Date:                             | 12 - 6 - 89 |
| Time:                             | 11.00       |
| Latit.: [N]                       | 53 : 9.63   |
| Longit.: [E]                      | 4 : 41.94   |
| Salinity (o/oo):                  | 32.014      |
| Temp. (°C):                       | 14.7        |
| Co [670nm] (1/m):                 | 1.68        |
| Secchi depth (m):                 | 4.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.9         |
| Chloroph. (mg/m <sup>3</sup> ):   | 5.0         |
| Yell. Sub. (m <sup>-1</sup> ):    | 2.1         |

B49

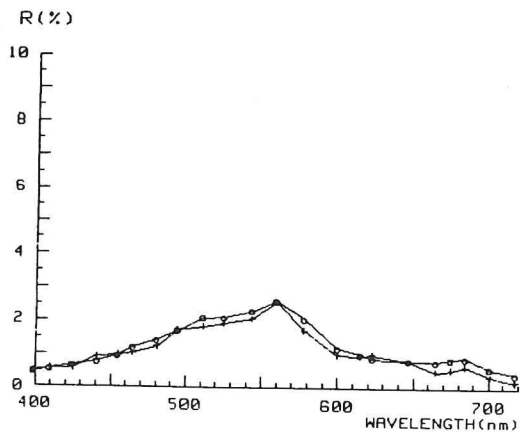
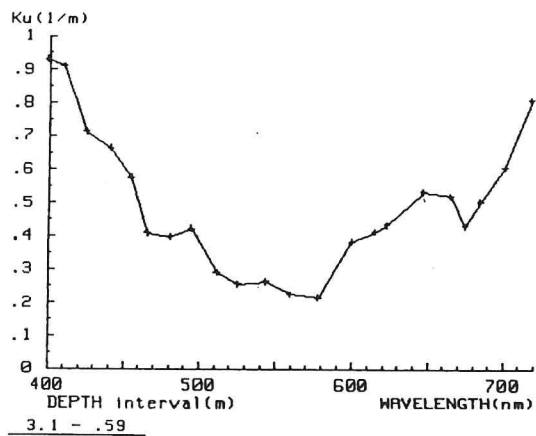
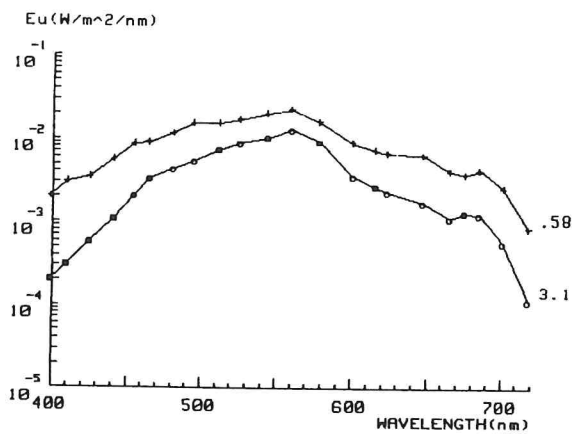
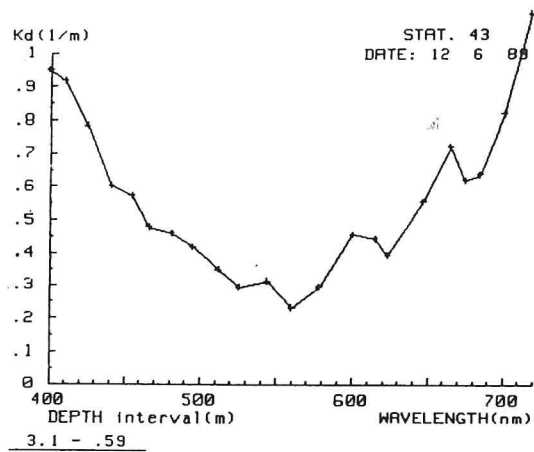
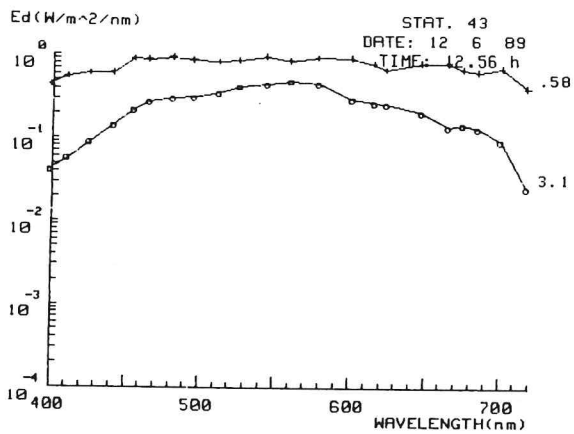


|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 41        |
| Date:                             | 12 -6 -89 |
| Time:                             | 12.00     |
| Latit.: [N]                       | 53 : 3.70 |
| Longit.: [E]                      | 4 : 41.70 |
| Salinity (o/oo):                  | 32.033    |
| Temp. (°C):                       | 14.7      |
| Co [670nm] (1/m):                 | 1.60      |
| Secchi depth (m):                 | 4.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 6.7       |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.8       |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.4       |

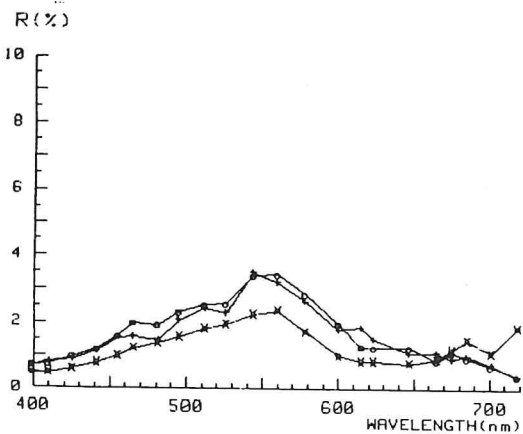
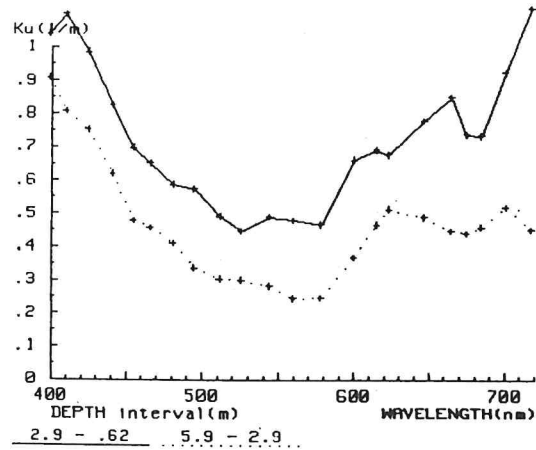
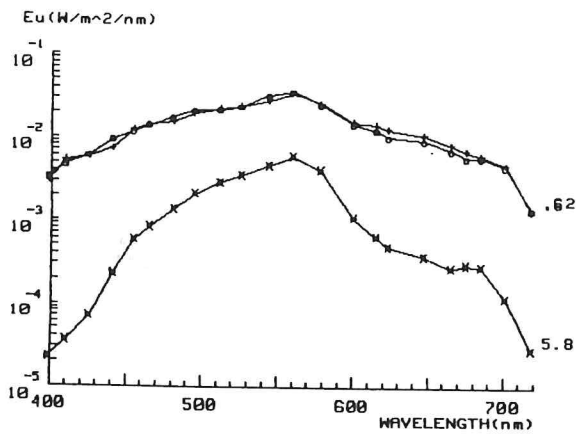
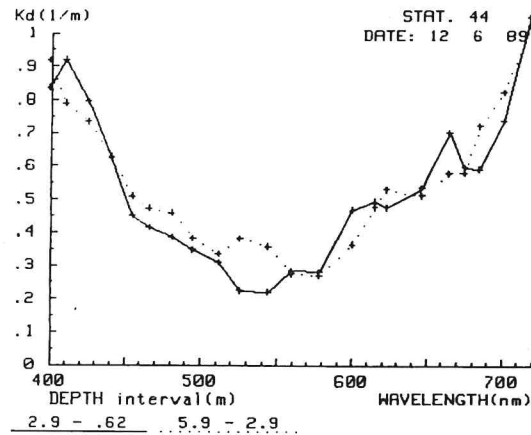
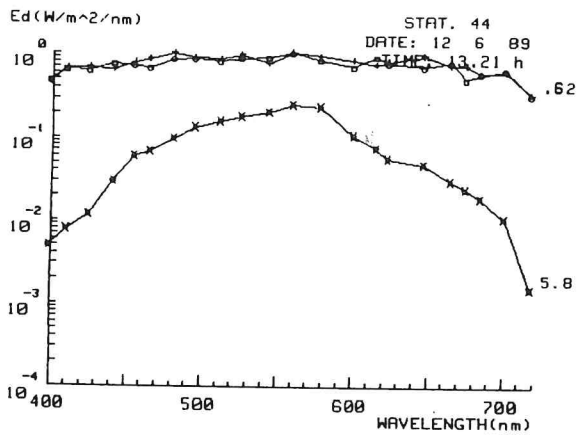


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 42          |
| Date:                             | 12 - 6 - 89 |
| Time:                             | 12.40       |
| Latit.: [N]                       | 53 : 6.09   |
| Longit.: [E]                      | 4 : 41.87   |
| Salinity (o/oo):                  | 32.172      |
| Temp. (°C):                       | 14.4        |
| Co [670nm] (1/m):                 | 1.48        |
| Secchi depth (m):                 | 4.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.5         |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.3         |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.5         |

B51



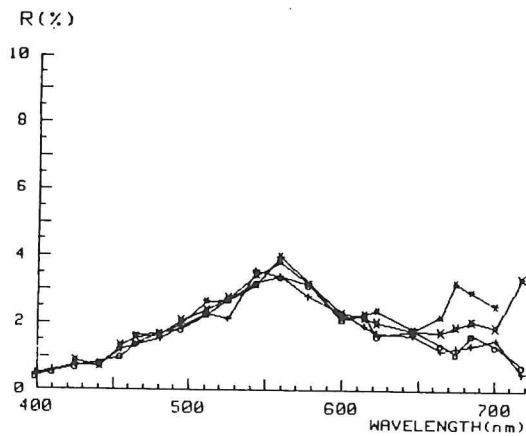
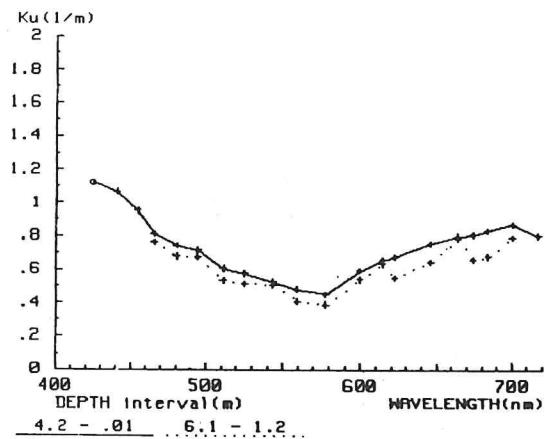
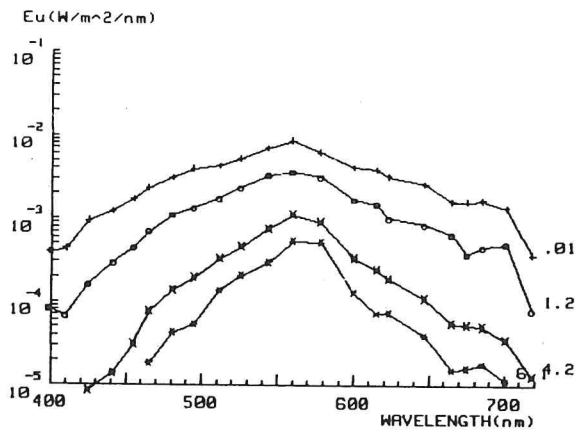
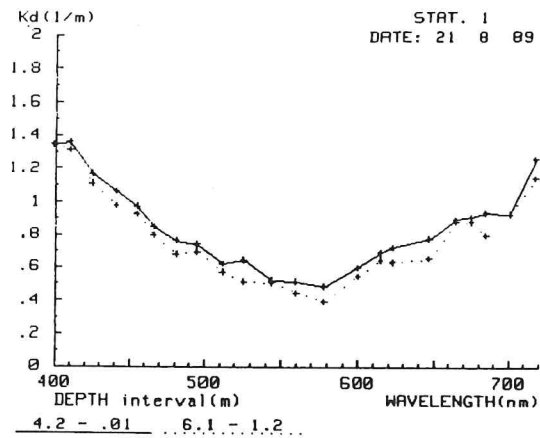
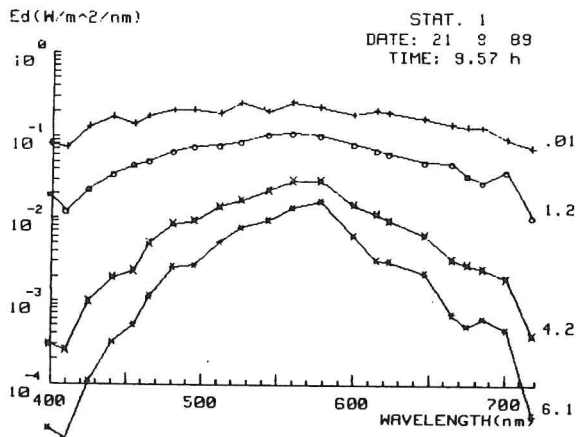
|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 43        |
| Date:                             | 12 -6 -89 |
| Time:                             | 12.55     |
| Latit.: [N]                       | 53 : 8.32 |
| Longit.: [E]                      | 4 : 41.61 |
| Salinity (o/oo):                  | 32.245    |
| Temp. (°C):                       | 14.6      |
| Co [670nm] (1/m):                 | 1.41      |
| Secchi depth (m):                 | 5.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 6.3       |
| Chloroph. (mg/m <sup>3</sup> ):   | 2.2       |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.4       |



|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 44          |
| Date:                             | 12 - 6 - 89 |
| Time:                             | 13.25       |
| Latit.: [N]                       | 53 : 10.49  |
| Longit.: [E]                      | 4 : 41.36   |
| Salinity (o/oo):                  | 32.426      |
| Temp. (°C):                       | 14.6        |
| Co [670nm] (1/m):                 | 1.42        |
| Secchi depth (m):                 | 5.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.2         |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.1         |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.3         |



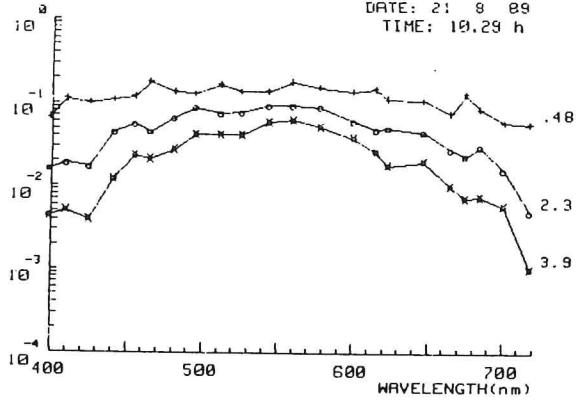
C1



|                      |           |
|----------------------|-----------|
| Station:             | 1         |
| Date:                | 21 -8 -89 |
| Time:                | 9.55      |
| Latit.: [N]          | 53 : 4.36 |
| Longit.: [E]         | 4 : 42.08 |
| Salinity (o/oo):     | 31.307    |
| Temp. (°C):          | 19.2      |
| Co [670nm] (1/m):    | 3.50      |
| Secchi depth (m):    | 3.5       |
| Tot. Sus. M. (g/m3): | 3.1       |
| Chloroph. (mg/m3):   | 14.6      |
| Yell. Sub. (m-1):    | 1.4       |

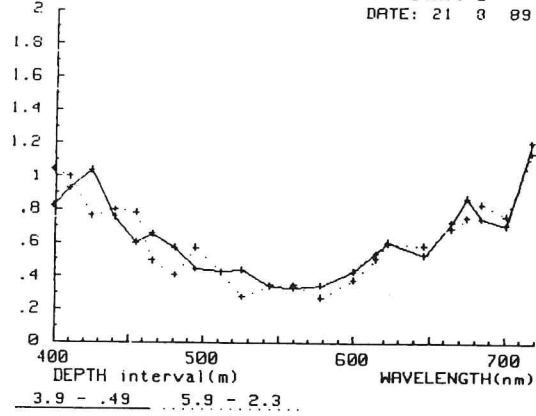
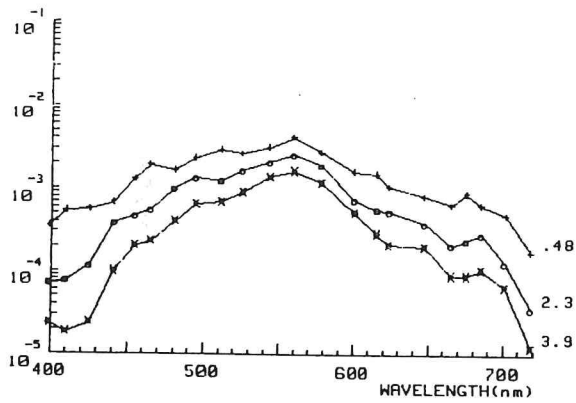
Ed (W/m<sup>2</sup>/nm)

STAT. 2  
DATE: 21 8 89  
TIME: 10.29 h

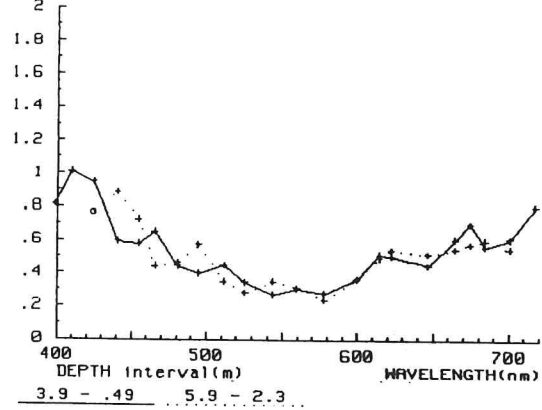


Kd (1/m)

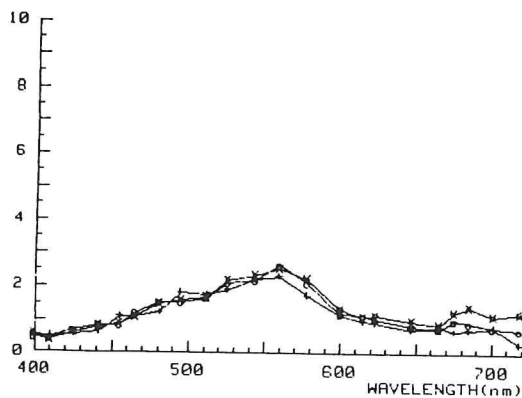
STAT. 2  
DATE: 21 8 89

Eu (W/m<sup>2</sup>/nm)

Ku (1/m)

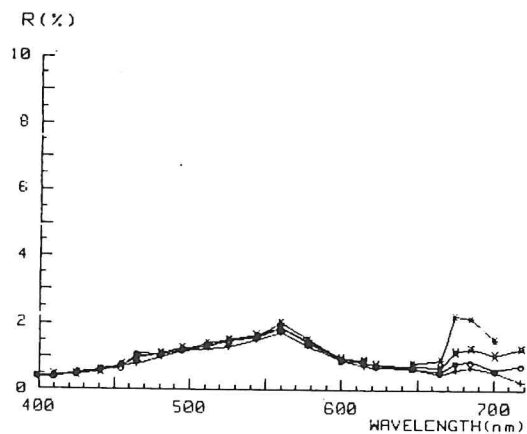
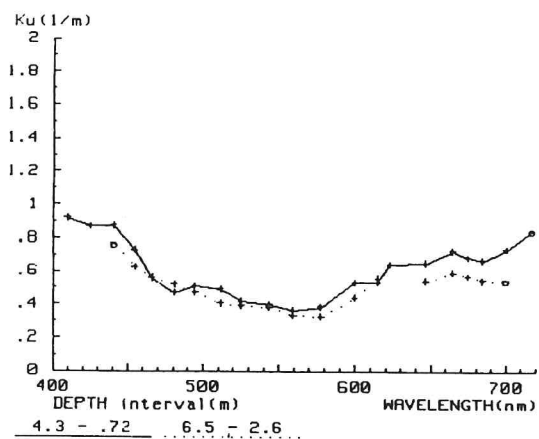
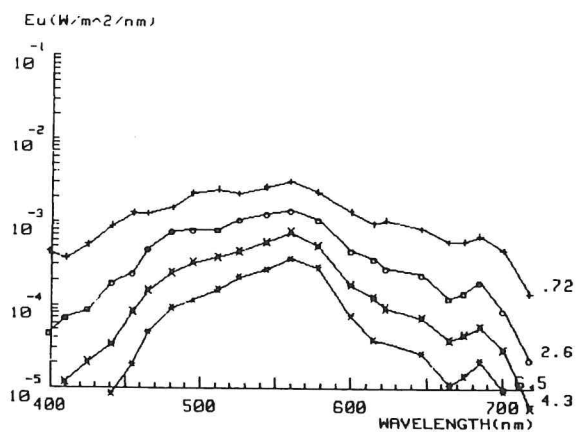
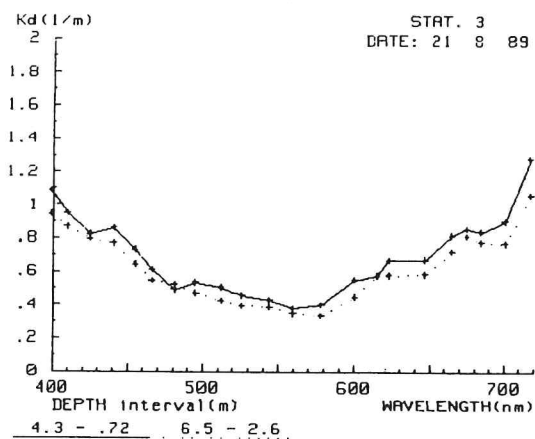
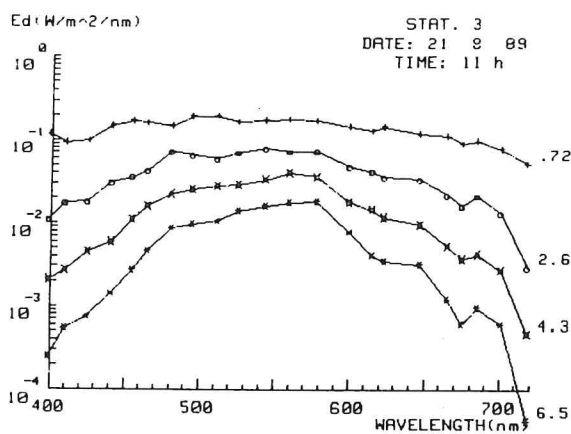


R (%)



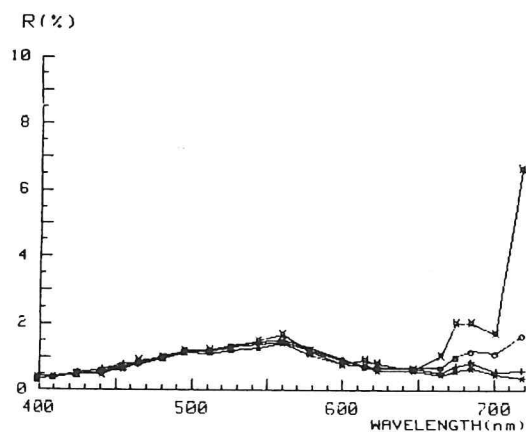
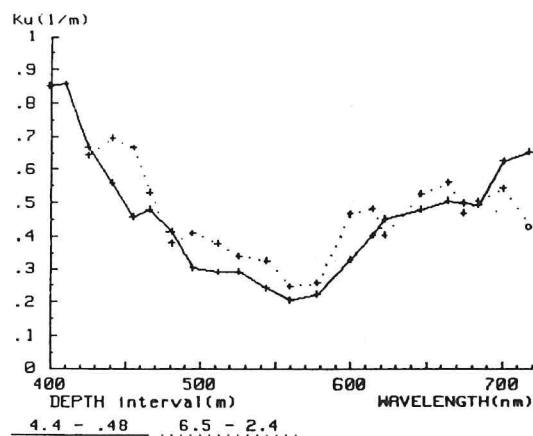
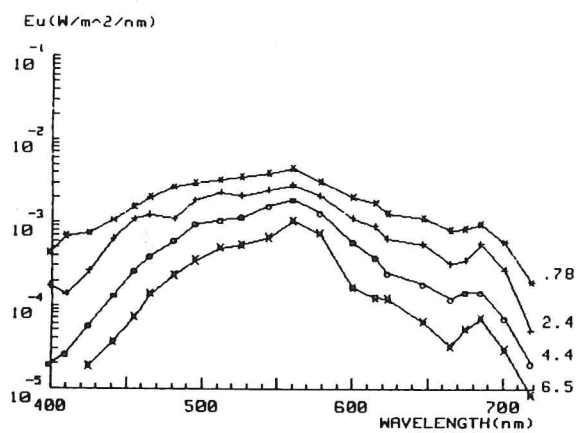
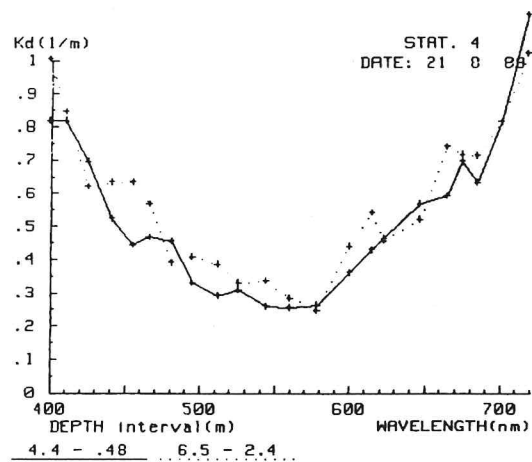
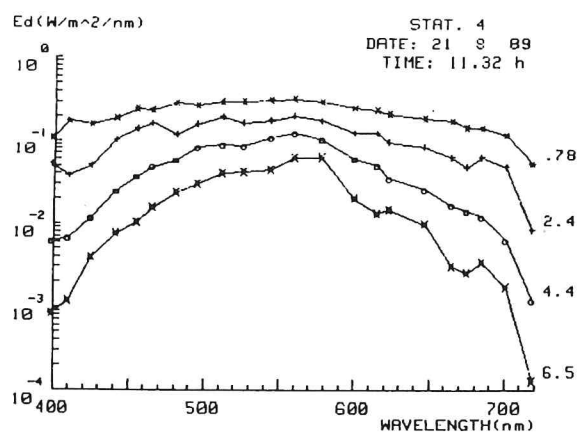
|                      |           |
|----------------------|-----------|
| Station:             | 2         |
| Date:                | 21-8-89   |
| Time:                | 10.30     |
| Latit.: [N]          | 53 : 6.23 |
| Longit.: [E]         | 4 : 41.97 |
| Salinity (o/oo):     | 31.521    |
| Temp. (°C):          | 19.2      |
| Co [670nm] (1/m):    | 1.40      |
| Secchi depth(m):     | 4.5       |
| Tot. Sus. M. (g/m³): | 2.5       |
| Chloroph. (mg/m³):   | 12.9      |
| Yell. Sub. (m⁻¹):    | 1.2       |

C3



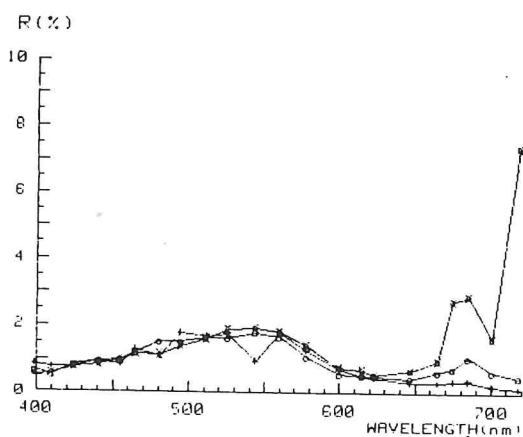
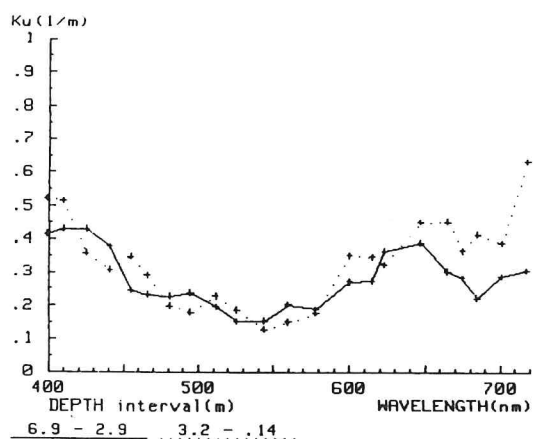
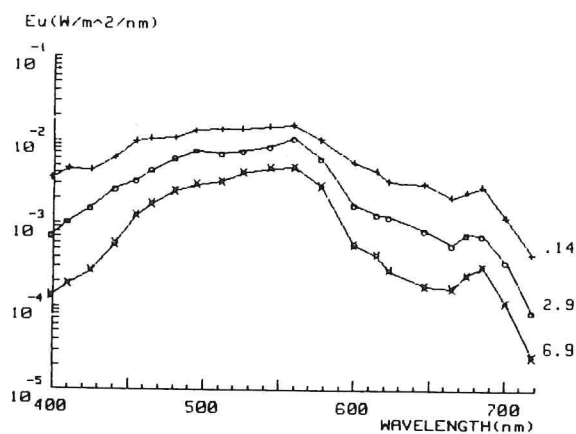
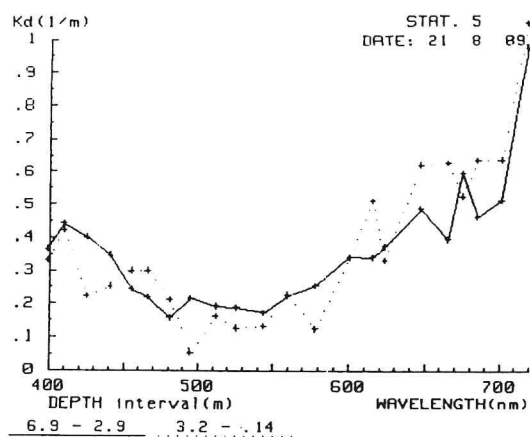
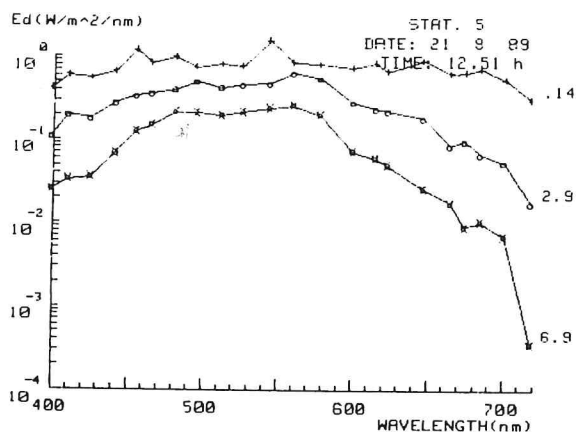
|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 3         |
| Date:                             | 21-8-89   |
| Time:                             | 11.00     |
| Latit.: [N]                       | 53 : 8.38 |
| Longit.: [E]                      | 4 : 41.55 |
| Salinity (o/oo):                  | 31.695    |
| Temp. (°C):                       | 19.2      |
| Co [670nm] (1/m):                 | 1.20      |
| Secchi depth (m):                 | 5.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.2       |
| Chloroph. (mg/m <sup>3</sup> ):   | 12.9      |
| Yell. Sub. (m-l):                 | 1.1       |

C4

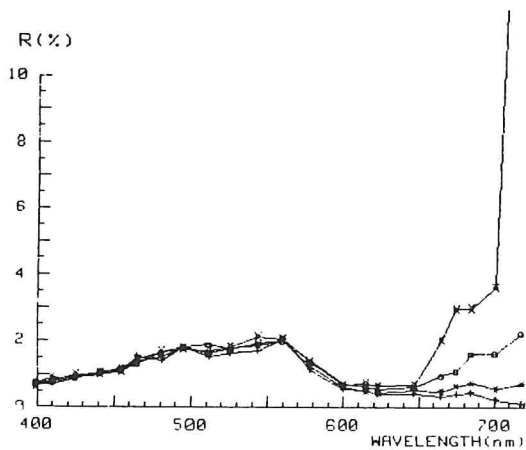
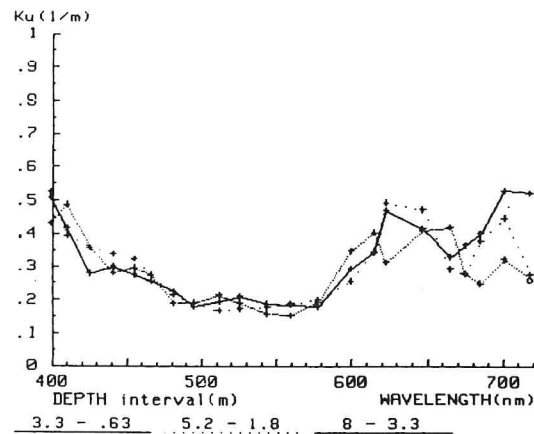
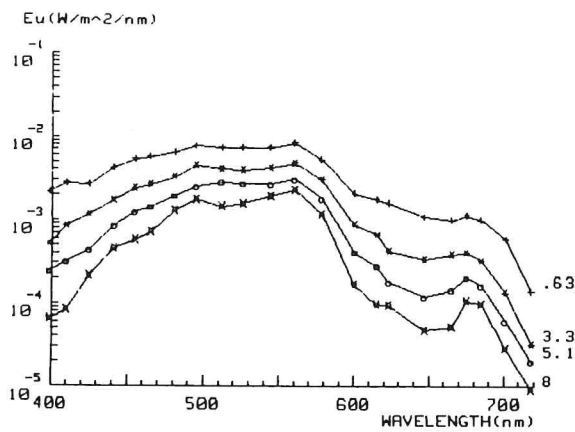
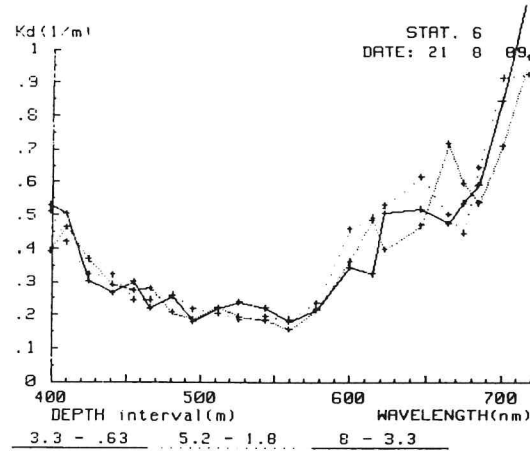
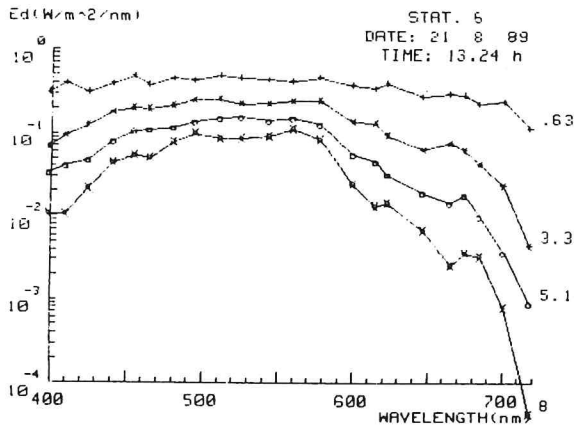


|                                   |            |
|-----------------------------------|------------|
| Station:                          | 4          |
| Date:                             | 21-8-89    |
| Time:                             | 11.30      |
| Latit.: [N]                       | 53 : 10.63 |
| Longit.: [E]                      | 4 : 41.61  |
| Salinity (o/oo):                  | 31.886     |
| Temp. (°C):                       | 19.2       |
| Co [670nm] (1/m):                 | 1.20       |
| Secchi depth (m):                 | 5.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.5        |
| Chloroph. (mg/m <sup>3</sup> ):   | 14.0       |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.0        |

C5

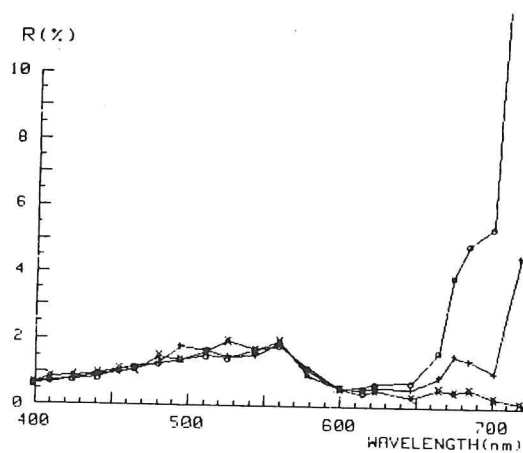
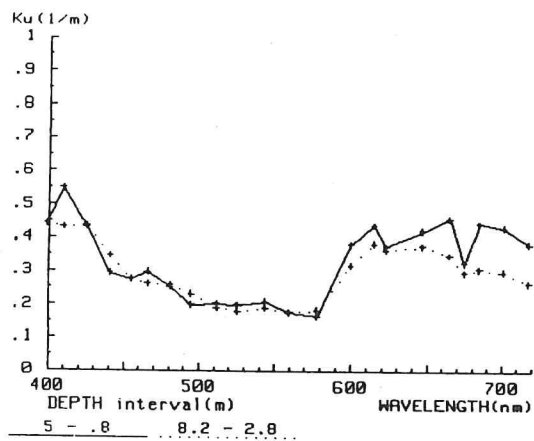
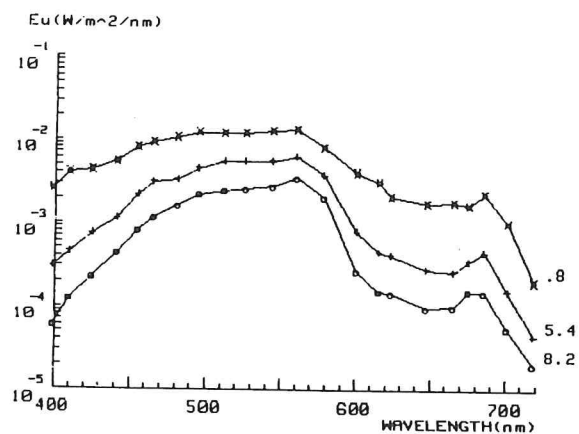
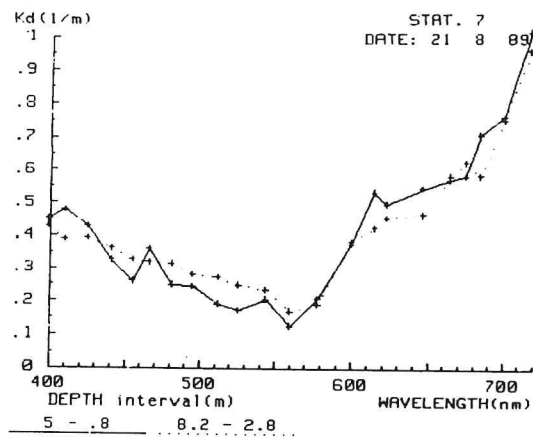
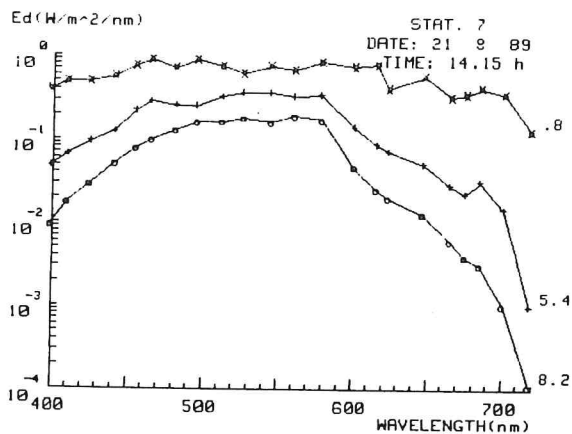


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 5           |
| Date:                             | 21 - 8 - 89 |
| Time:                             | 12.50       |
| Latit.: [N]                       | 53 : 18.43  |
| Longit.: [E]                      | 4 : 32.25   |
| Salinity (o/oo):                  | 34.218      |
| Temp. (°C):                       | 18.5        |
| Co [670nm] (1/m):                 | .86         |
| Secchi depth (m):                 | 7.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 1.4         |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.5         |
| Yell. Sub. (m <sup>-1</sup> ):    | .87         |

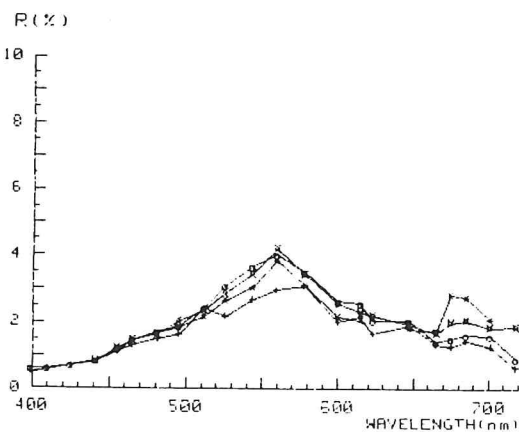
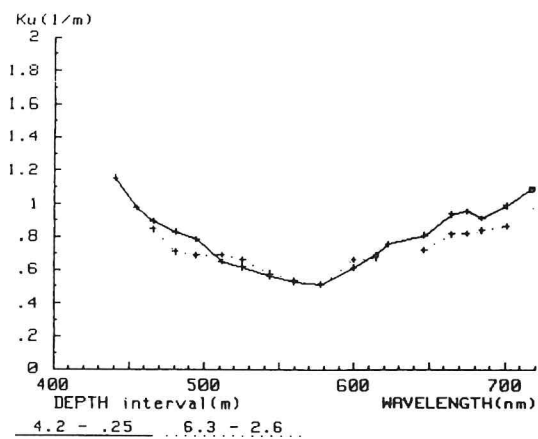
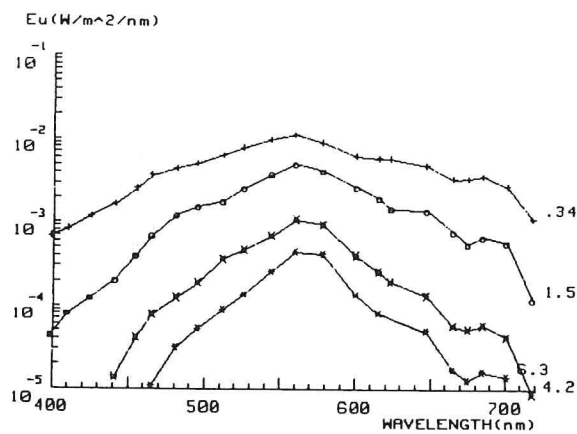
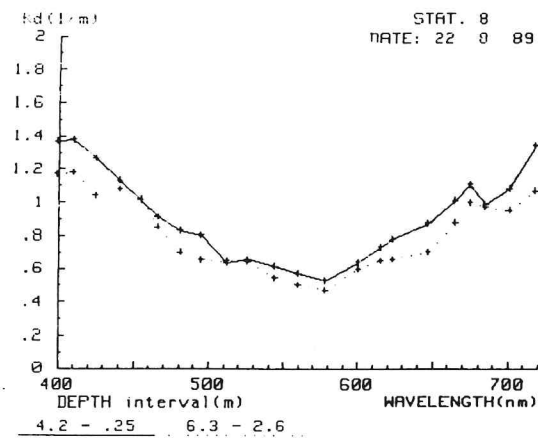
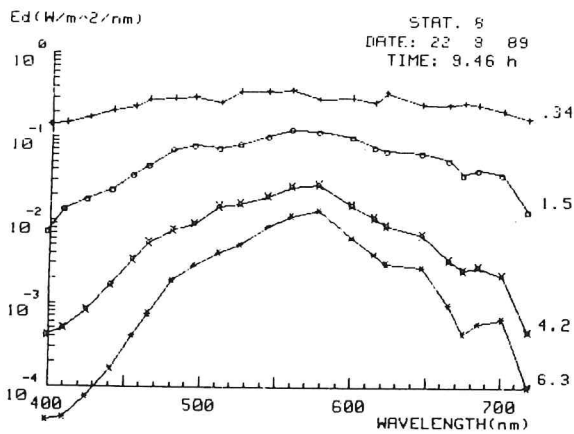


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 6           |
| Date:                             | 21 - 8 - 89 |
| Time:                             | 13.25       |
| Latit.: [N]                       | 53 : 18.03  |
| Longit.: [E]                      | 4 : 30.66   |
| Salinity (o/oo):                  | 34.589      |
| Temp. (°C):                       | 18.4        |
| Co [670nm] (1/m):                 | .82         |
| Secchi depth (m):                 | 8.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 1.8         |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.2         |
| Yell. Sub. (m <sup>-1</sup> ):    | .50         |

C7

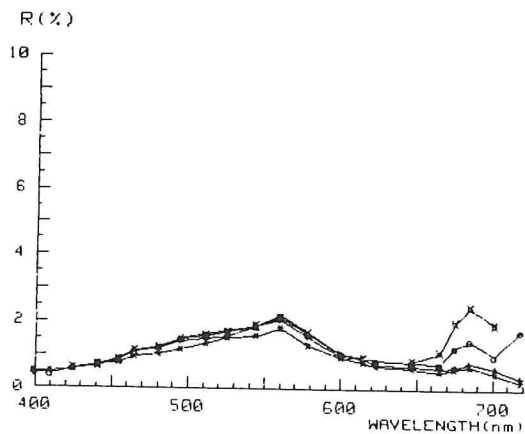
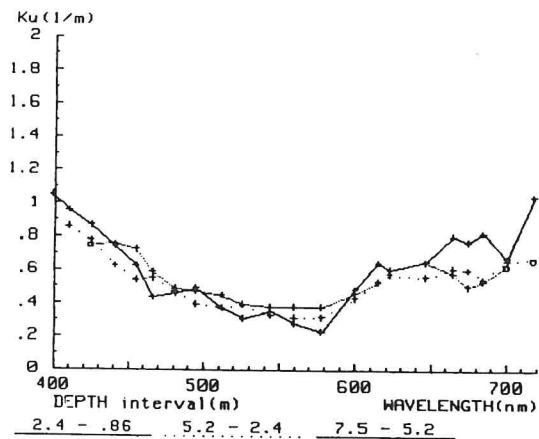
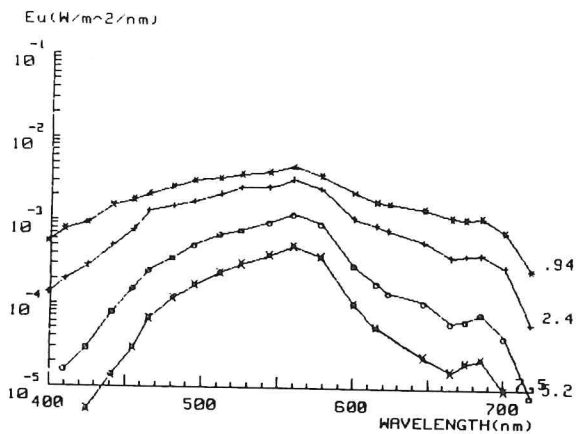
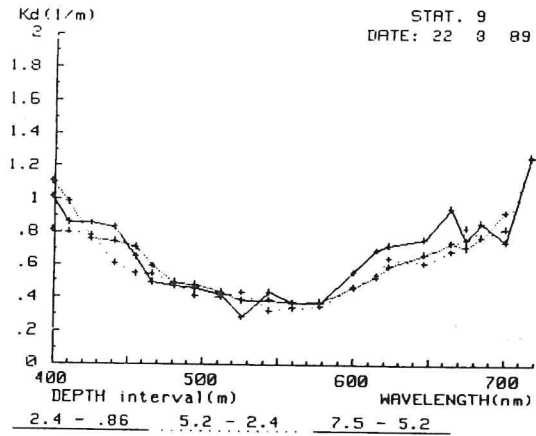
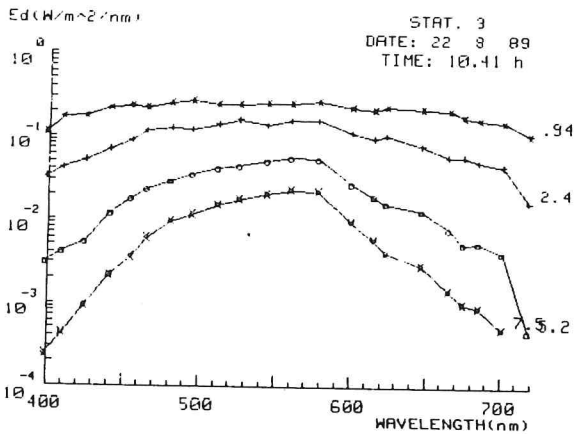


|                                   |            |
|-----------------------------------|------------|
| Station:                          | 7          |
| Date:                             | 21-8-89    |
| Time:                             | 14.00      |
| Latit.: [N]                       | 53 : 15.08 |
| Longit.: [E]                      | 4 : 29.60  |
| Salinity (o/oo):                  | 34.421     |
| Temp. (°C):                       | 18.4       |
| Co [670nm] (1/m):                 | .85        |
| Secchi depth (m):                 | 9.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.1        |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.6        |
| Yell. Sub. (m-1):                 | .62        |

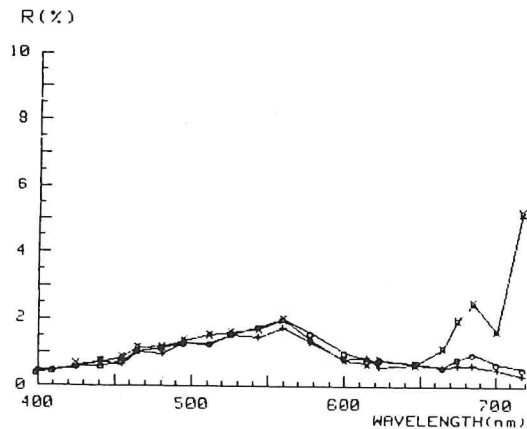
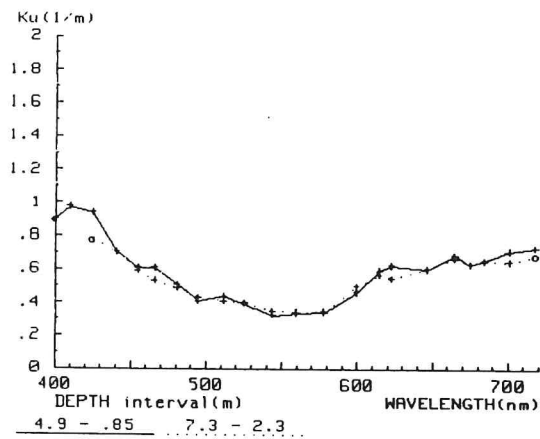
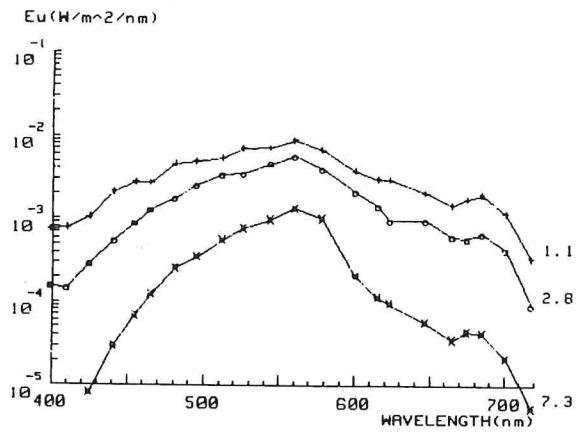
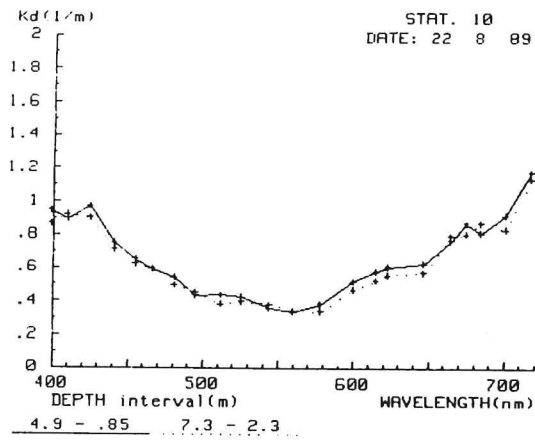
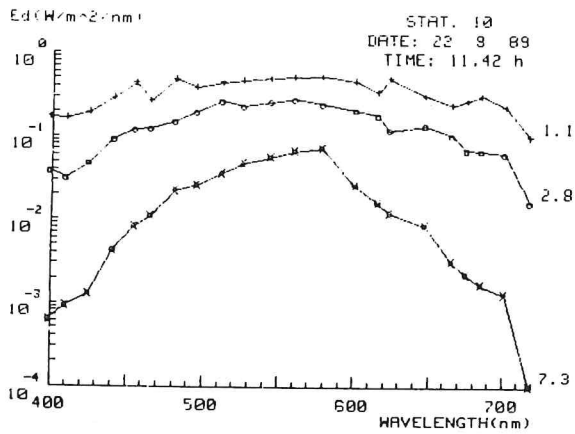


|                      |           |
|----------------------|-----------|
| Station:             | 8         |
| Date:                | 22-8-89   |
| Time:                | 9.45      |
| Latit.: [N]          | 53 : 4.34 |
| Longit.: [E]         | 4 : 41.77 |
| Salinity (‰):        | 31.113    |
| Temp. (°C):          | 19.4      |
| Co [670nm] (1/m):    | 2.40      |
| Secchi depth (m):    | 2.5       |
| Tot. Sus. M. (g/m³): | 4.1       |
| Chloroph. (mg/m³):   | 18.2      |
| Yell. Sub. (m-l):    | 1.2       |



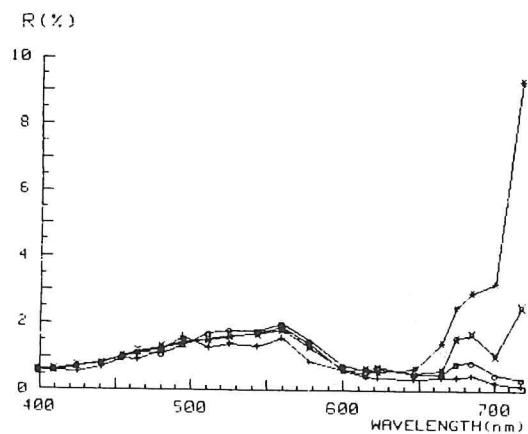
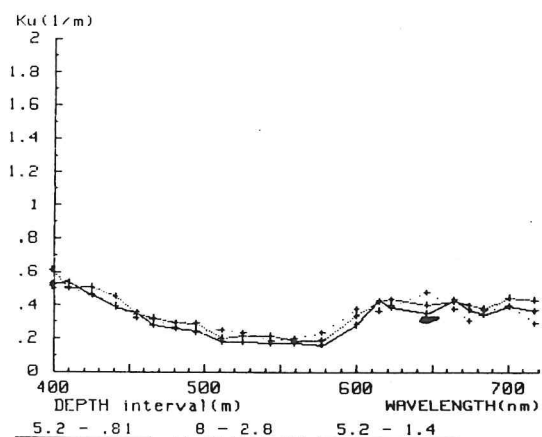
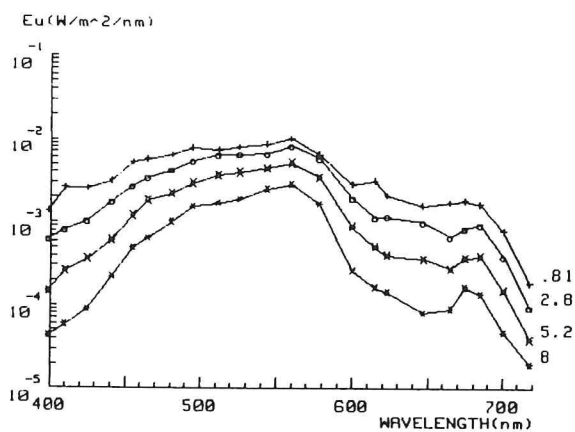
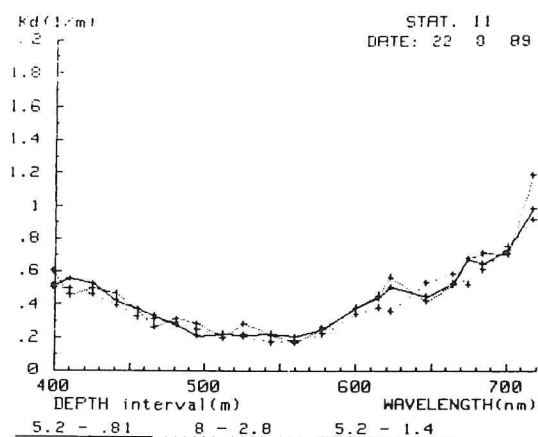
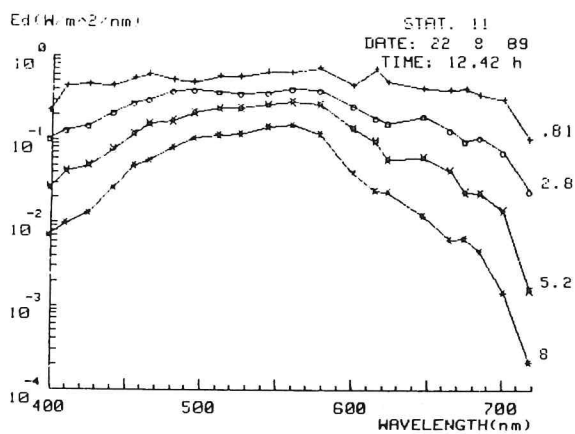


|                      |             |
|----------------------|-------------|
| Station:             | 9           |
| Date:                | 22 - 8 - 89 |
| Time:                | 10.30       |
| Latit.: [N]          | 53 : 7.83   |
| Longit.: [E]         | 4 : 37.69   |
| Salinity (o/oo):     | 31.578      |
| Temp. (°C):          | 19.4        |
| Co [670nm] (1/m):    | 1.30        |
| Secchi depth (m):    | 5.0         |
| Tot. Sus. M. (g/m3): | 2.4         |
| Chloroph. (mg/m3):   | 11.0        |
| Yell. Sub. (m-1):    | .88         |

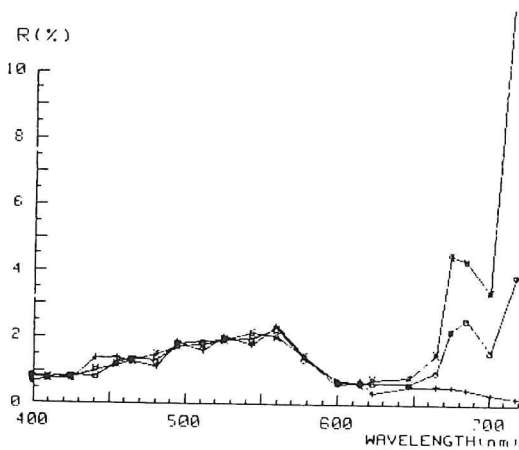
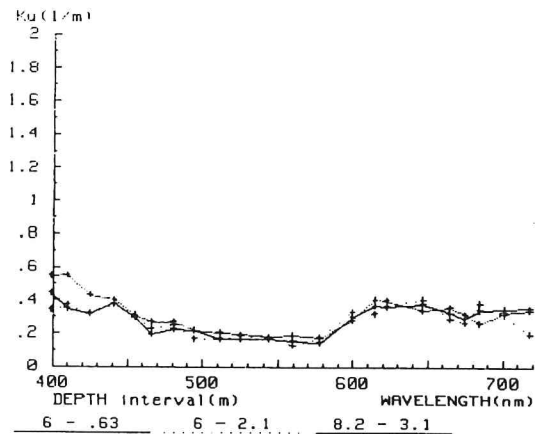
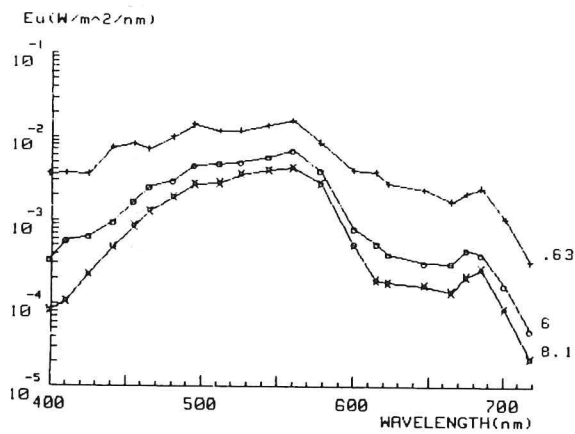
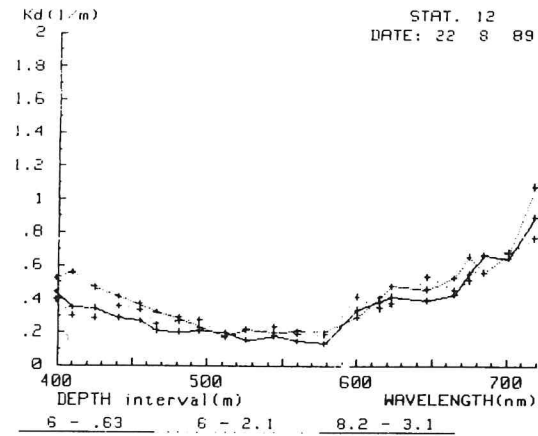
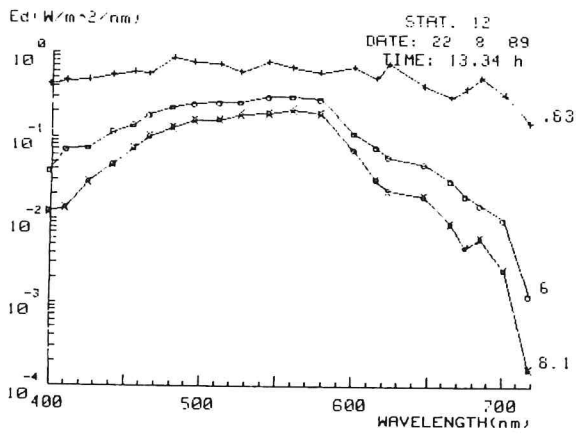


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 10          |
| Date:                             | 22 - 8 - 89 |
| Time:                             | 11.40       |
| Latit.: [N]                       | 53 : 5.00   |
| Longit.: [E]                      | 4 : 30.86   |
| Salinity (o/oo):                  | 31.559      |
| Temp. (°C):                       | 19.2        |
| Co [670nm] (1/m):                 | 1.60        |
| Secchi depth (m):                 | 4.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.7         |
| Chloroph. (mg/m <sup>3</sup> ):   | 12.0        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.1         |

C11

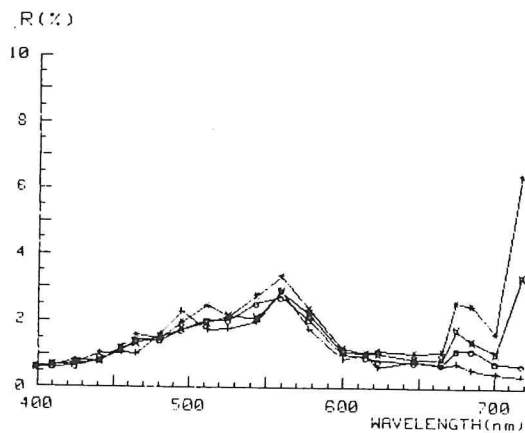
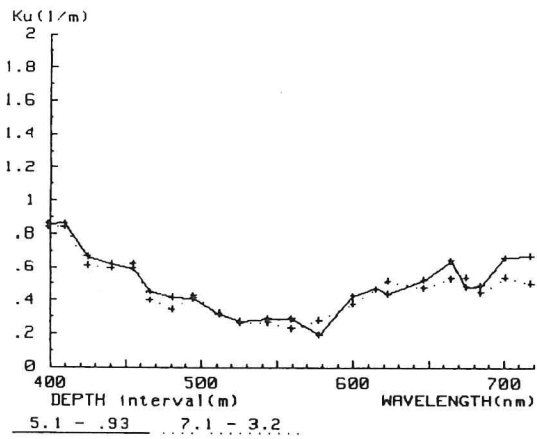
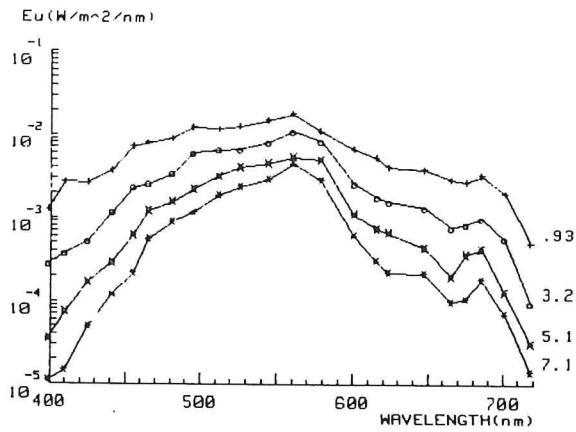
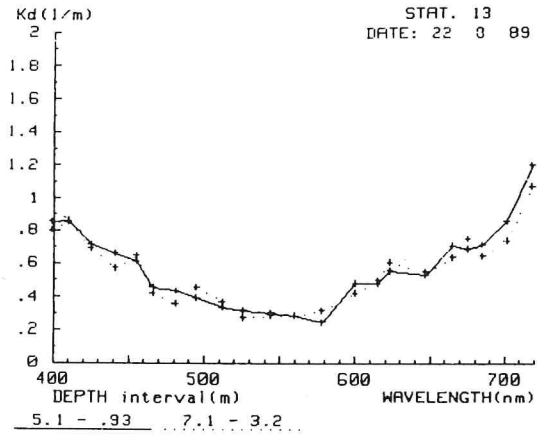
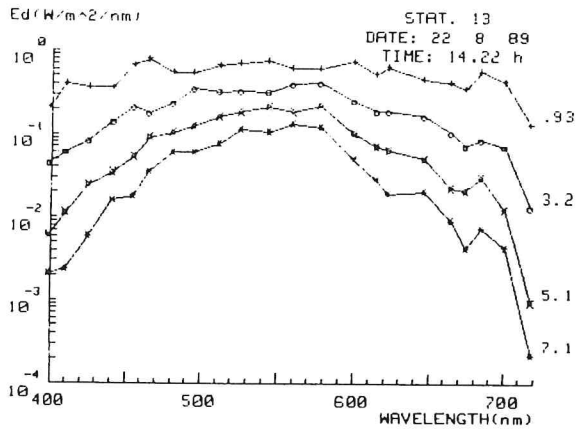


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 11          |
| Date:                             | 22 - 8 - 89 |
| Time:                             | 12.40       |
| Latit.: [N]                       | 53 : .32    |
| Longit.: [E]                      | 4 : 29.30   |
| Salinity (o/oo):                  | 33.779      |
| Temp. (°C):                       | 18.7        |
| Co [670nm] (1/m):                 | 1.00        |
| Secchi depth (m):                 | 7.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 1.7         |
| Chloroph. (mg/m <sup>3</sup> ):   | 5.4         |
| Yell. Sub. (m <sup>-1</sup> ):    | .86         |



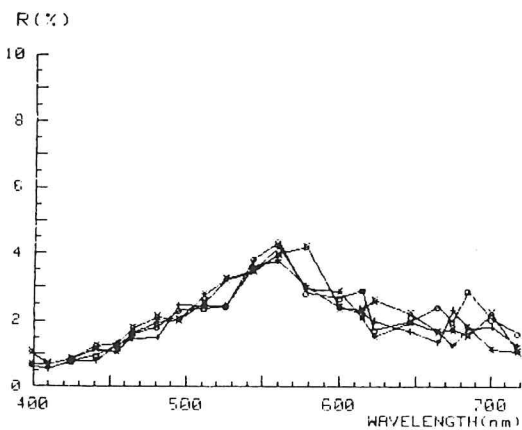
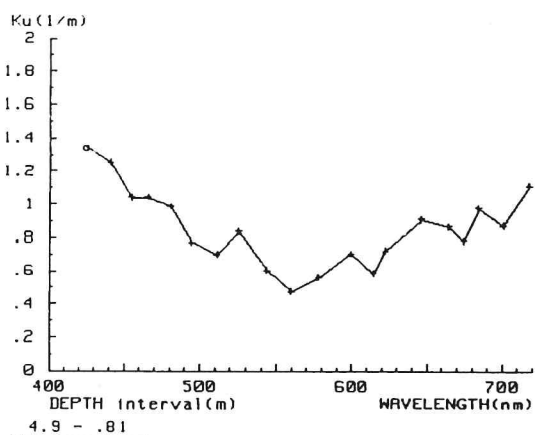
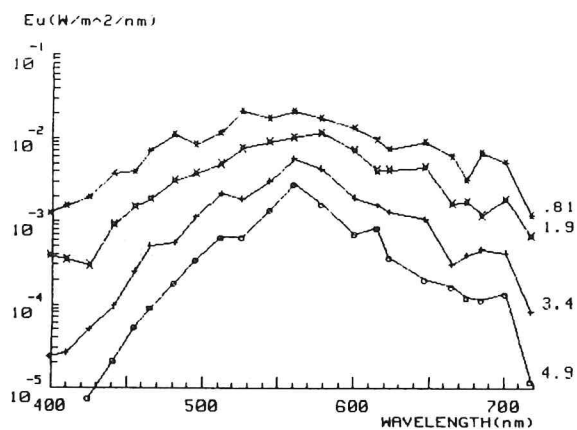
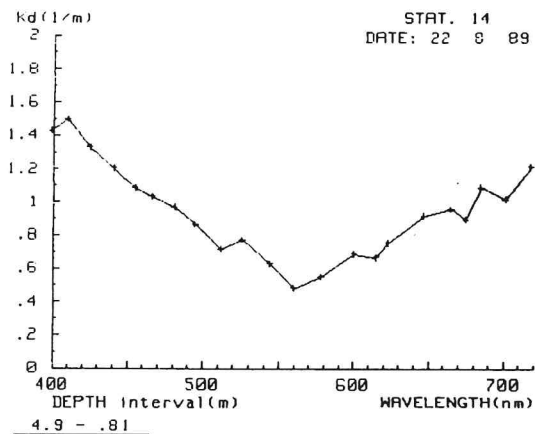
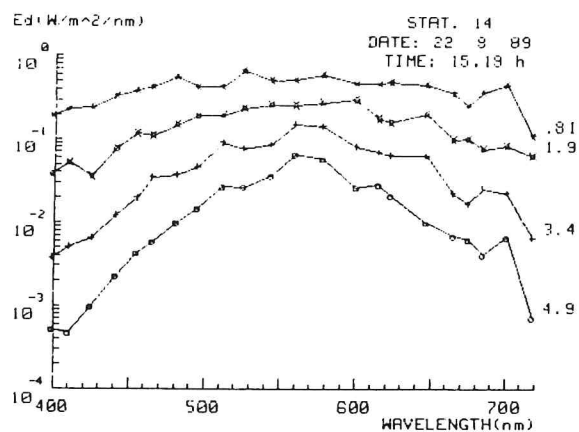
|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 12          |
| Date:                             | 22 - 8 - 89 |
| Time:                             | 13.30       |
| Latit.: [N]                       | 52 : 55.09  |
| Longit.: [E]                      | 4 : 29.85   |
| Salinity (o/oo):                  | 34.434      |
| Temp. (°C):                       | 18.7        |
| Co [670nm] (1/m):                 | 1.00        |
| Secchi depth (m):                 | 7.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 1.4         |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.6         |
| Yell. Sub. (m <sup>-1</sup> ):    | .49         |

C13



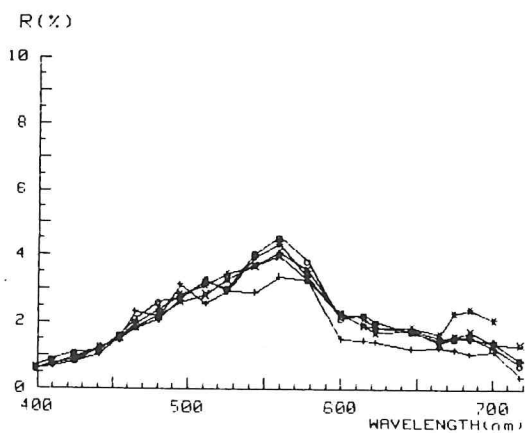
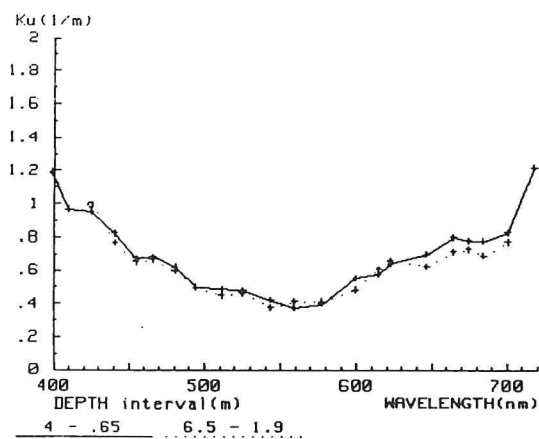
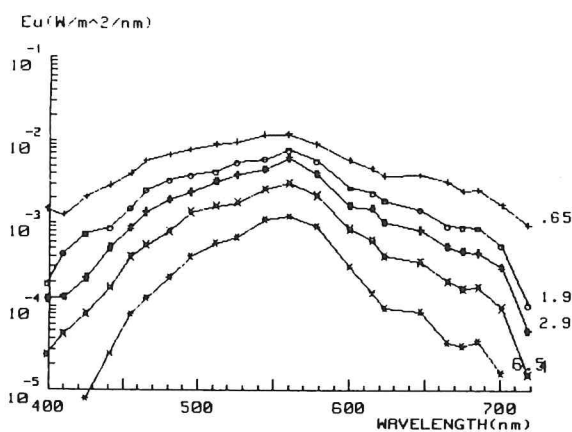
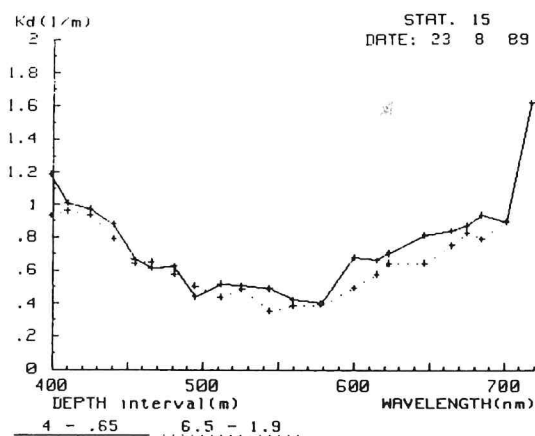
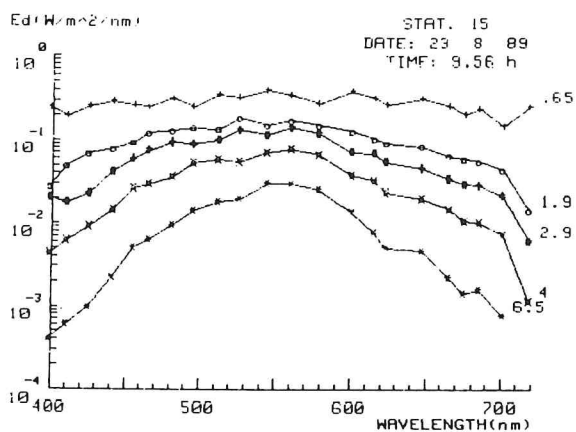
|                      |             |
|----------------------|-------------|
| Station:             | 13          |
| Date:                | 22 - 8 - 89 |
| Time:                | 14.20       |
| Latit.: [N]          | 52 : 53.21  |
| Longit.: [E]         | 4 : 37.26   |
| Salinity (o/oo):     | 31.743      |
| Temp. (°C):          | 19.2        |
| Co [670nm] (1/m):    | 1.30        |
| Secchi depth (m):    | 5.0         |
| Tot. Sus. M. (g/m3): | 2.8         |
| Chloroph. (mg/m3):   | 6.7         |
| Yell. Sub. (m-1):    | 1.5         |

C14

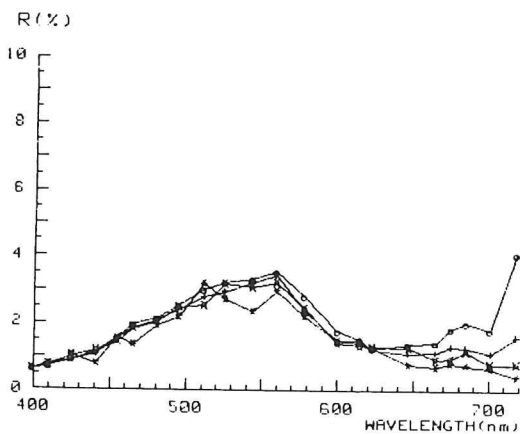
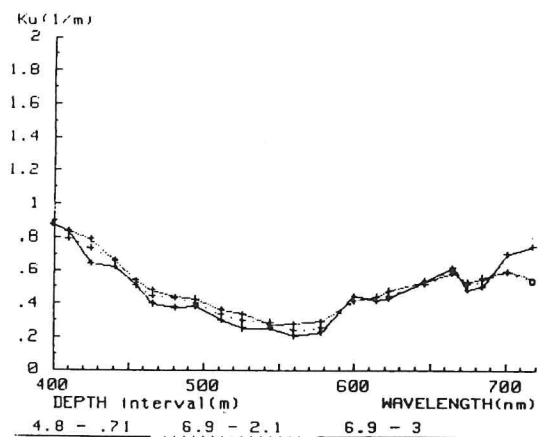
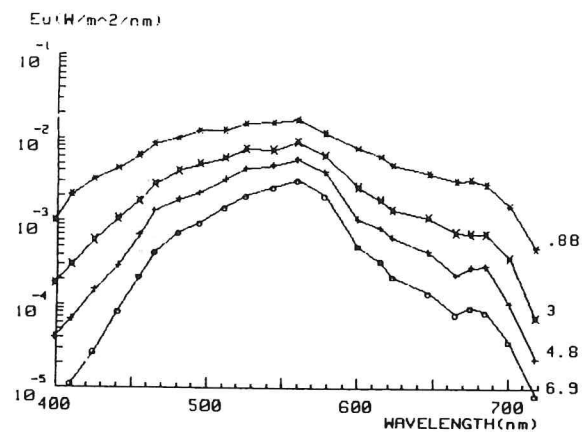
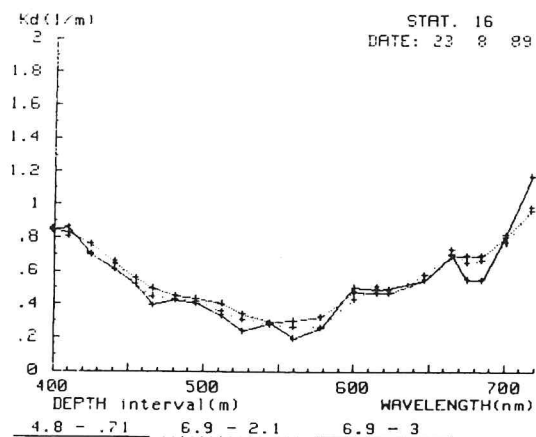
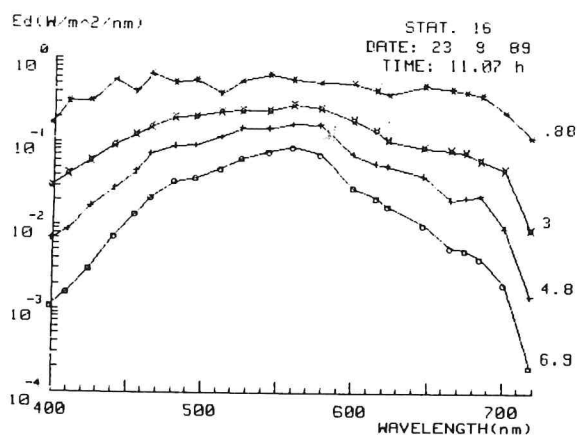


|                                   |            |
|-----------------------------------|------------|
| Station:                          | 14         |
| Date:                             | 22 -8 -89  |
| Time:                             | 15.15      |
| Latit.: [N]                       | 52 : 56.90 |
| Longit.: [E]                      | 4 : 41.22  |
| Salinity (o/oo):                  | 30.860     |
| Temp. (°C):                       | 19.4       |
| Co [670nm] (1/m):                 | 3.20       |
| Secchi depth (m):                 | 2.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 7.5        |
| Chloroph. (mg/m <sup>3</sup> ):   | 21.0       |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.2        |

C15



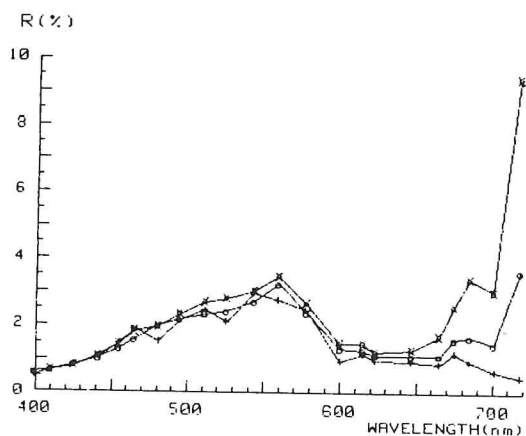
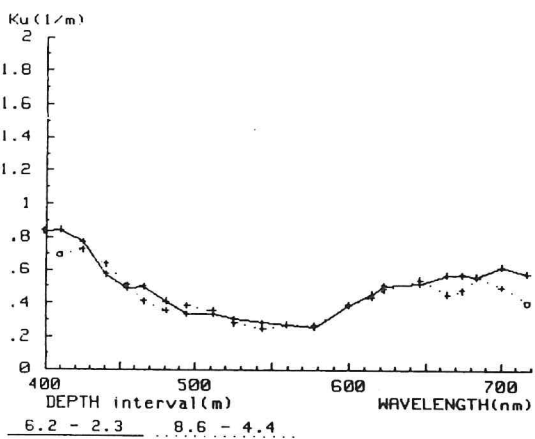
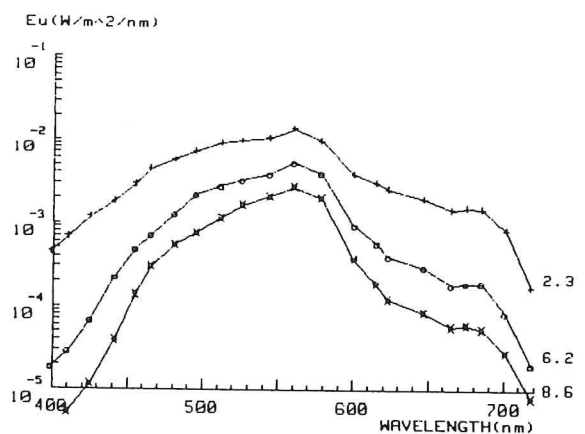
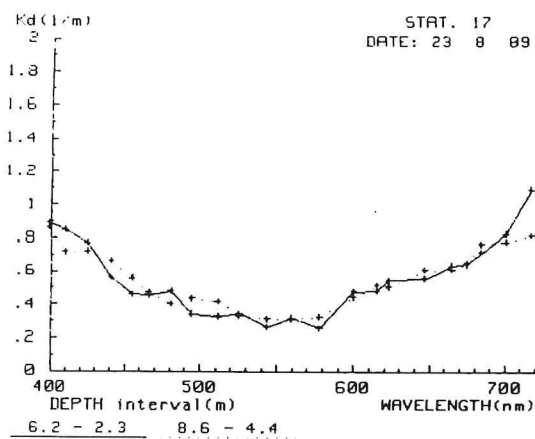
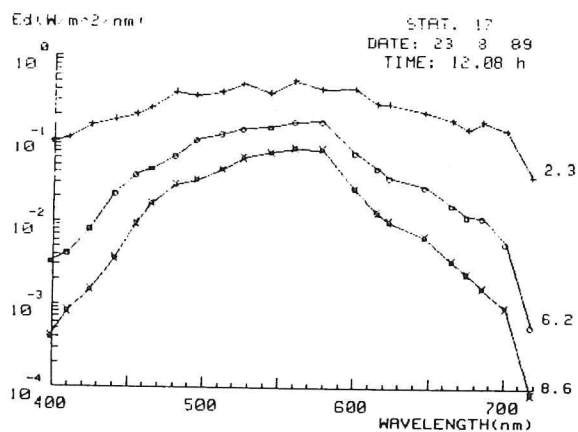
|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 15          |
| Date:                             | 23 - 8 - 89 |
| Time:                             | 9.45        |
| Latit.: [N]                       | 52 : 52.90  |
| Longit.: [E]                      | 4 : 37.36   |
| Salinity (o/oo):                  | 32.082      |
| Temp. (°C):                       | 18.7        |
| Co [670nm] (1/m):                 | 1.60        |
| Secchi depth (m):                 | 4.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 3.3         |
| Chloroph. (mg/m <sup>3</sup> ):   | 8.4         |
| Yell. Sub. (m <sup>-1</sup> ):    | .87         |



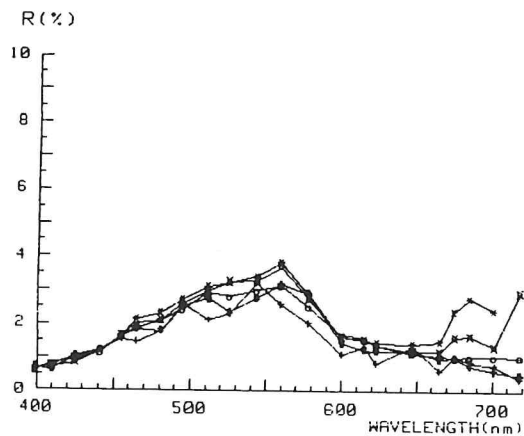
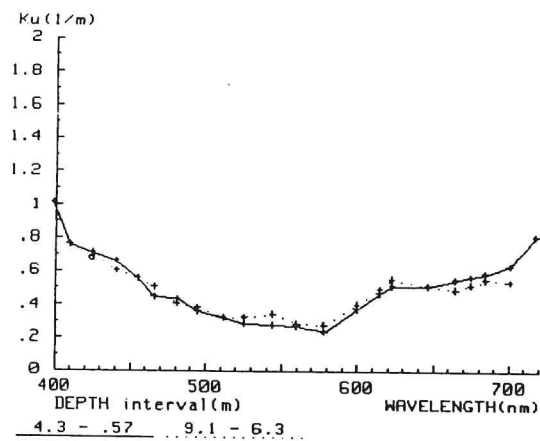
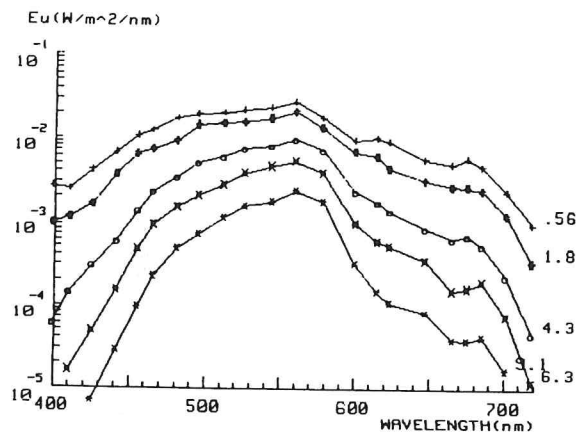
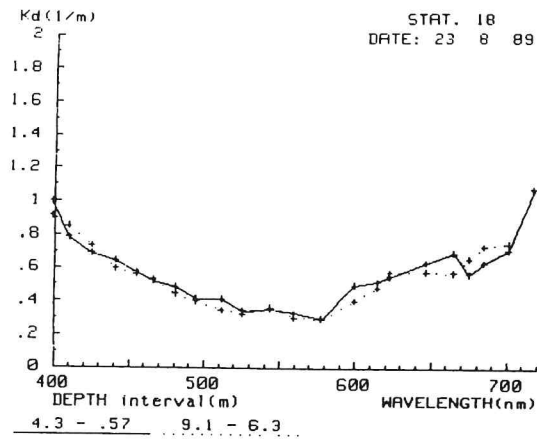
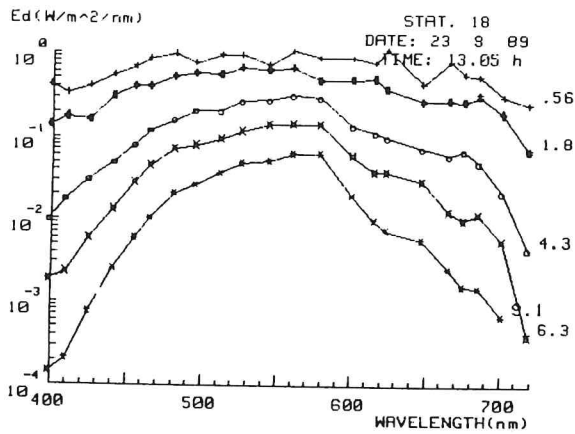
|                                   |            |
|-----------------------------------|------------|
| Station:                          | 16         |
| Date:                             | 23 -8 -89  |
| Time:                             | 11.00      |
| Latit.: [N]                       | 52 : 47.43 |
| Longit.: [E]                      | 4 : 34.79  |
| Salinity (o/oo):                  | 31.562     |
| Temp. (°C):                       | 19.0       |
| Co [670nm] (1/m):                 | 1.40       |
| Secchi depth (m):                 | 4.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.0        |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.8        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.0        |



C17

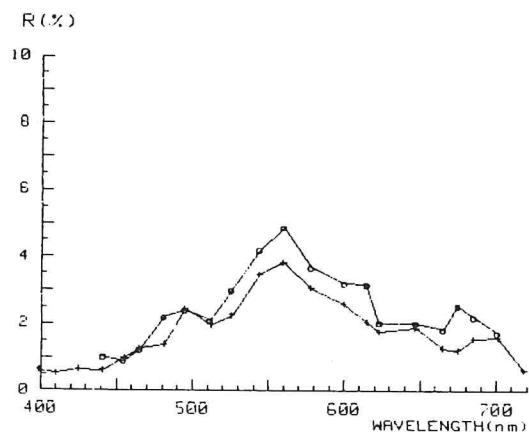
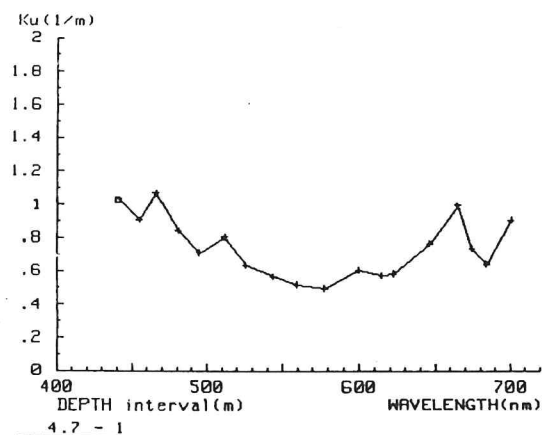
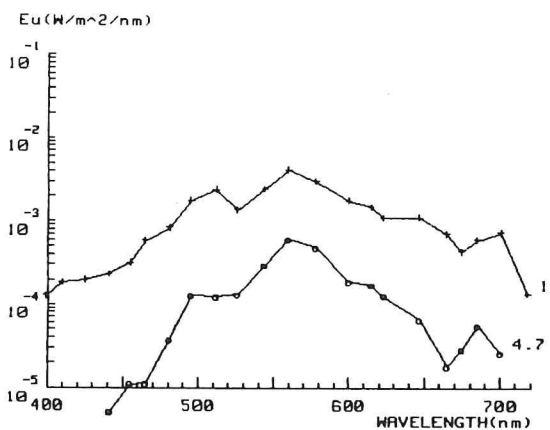
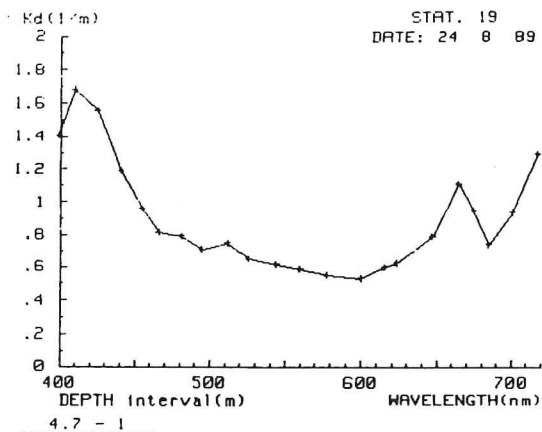
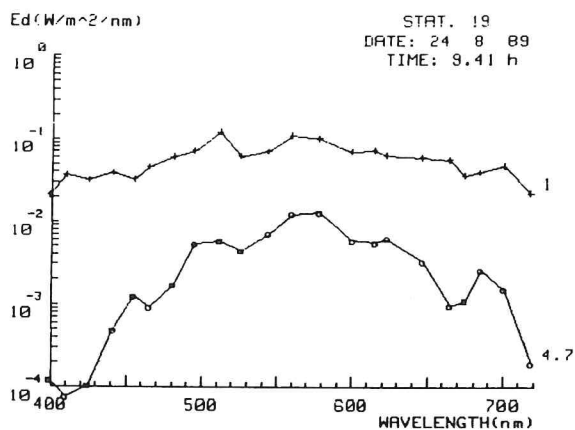


|                      |             |
|----------------------|-------------|
| Station:             | 17          |
| Date:                | 23 - 8 - 89 |
| Time:                | 12.00       |
| Latit.: [N]          | 52 : 42.55  |
| Longit.: [E]         | 4 : 32.38   |
| Salinity (o/oo):     | 31.724      |
| Temp. (°C):          | 19.0        |
| Co [670nm] (1/m):    | 1.30        |
| Secchi depth (m):    | 5.0         |
| Tot. Sus. M. (g/m³): | 2.4         |
| Chloroph. (mg/m³):   | 3.9         |
| Yell. Sub. (m⁻¹):    | 1.2         |

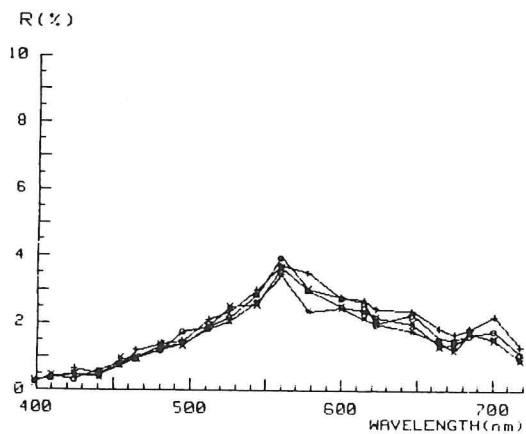
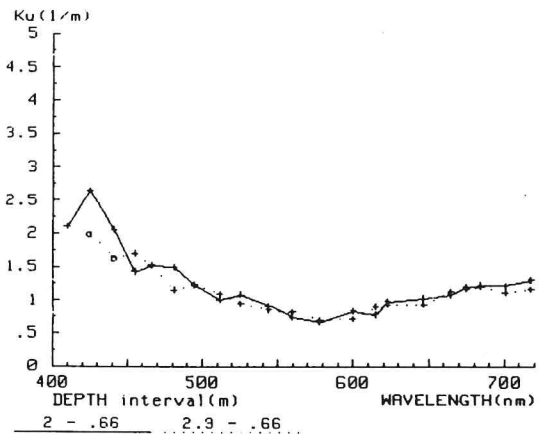
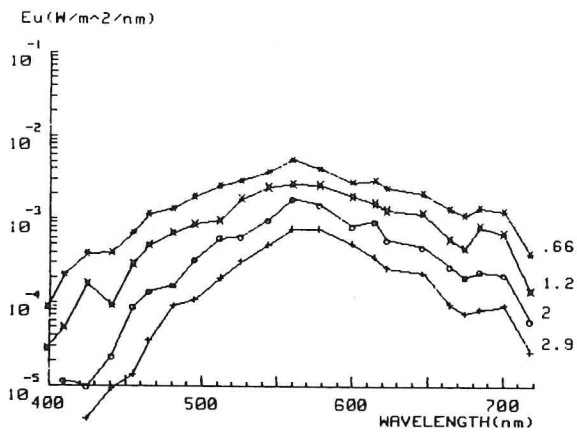
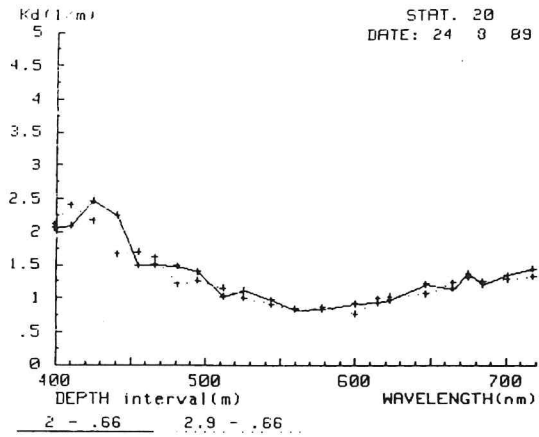
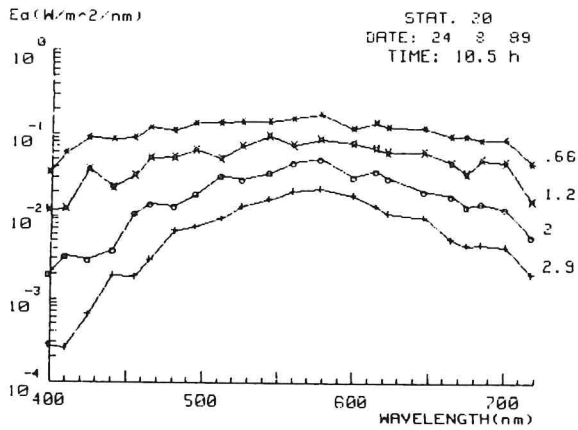


|                      |             |
|----------------------|-------------|
| Station:             | 18          |
| Date:                | 23 - 8 - 89 |
| Time:                | 13.00       |
| Latit.: [N]          | 52 : 37.35  |
| Longit.: [E]         | 4 : 30.84   |
| Salinity (o/oo):     | 31.228      |
| Temp. (°C):          | 19.2        |
| Co [670nm] (1/m):    | 1.40        |
| Secchi depth (m):    | 4.5         |
| Tot. Sus. M. (g/m³): | 3.1         |
| Chloroph. (mg/m³):   | 3.8         |
| Yell. Sub. (m⁻¹):    | .93         |

C19

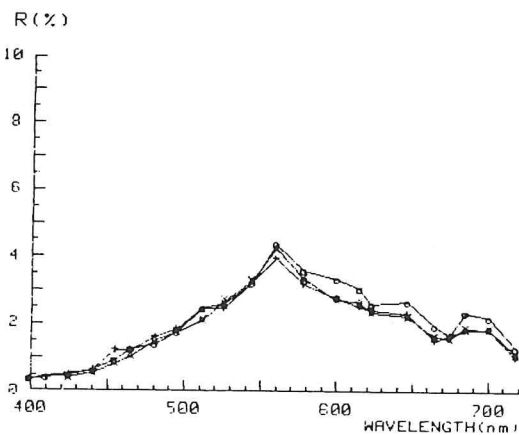
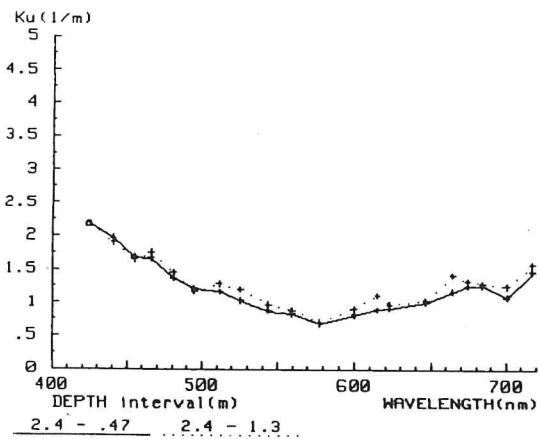
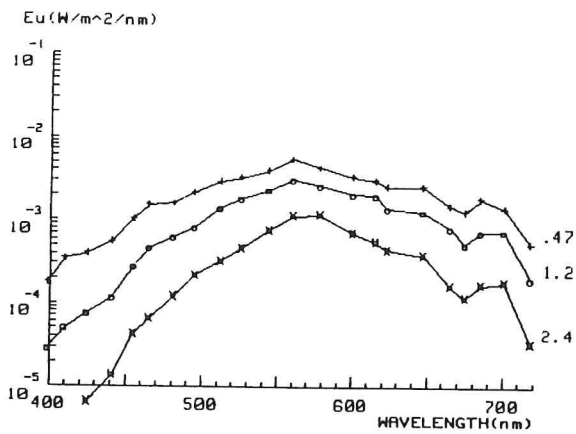
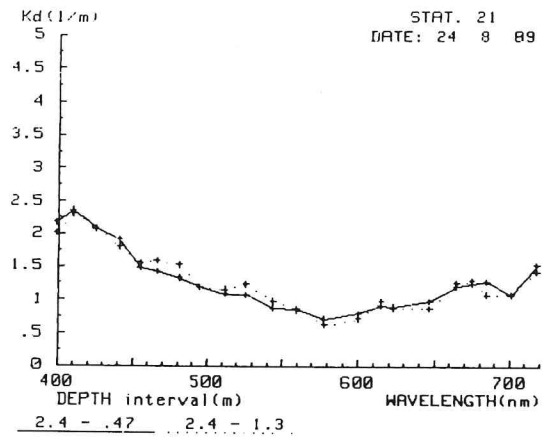
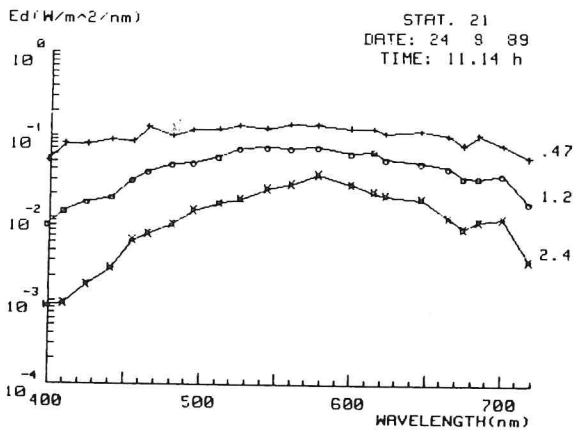


|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 19        |
| Date:                             | 24-8-89   |
| Time:                             | 9.40      |
| Latit.: [N]                       | 53 : 4.61 |
| Longit.: [E]                      | 4 : 41.86 |
| Salinity (o/oo):                  | 31.009    |
| Temp. (°C):                       | 19.0      |
| Co [670nm] (1/m):                 | 3.00      |
| Secchi depth (m):                 | 2.5       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 6.4       |
| Chloroph. (mg/m <sup>3</sup> ):   | 21.5      |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.2       |



|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 20          |
| Date:                             | 24 - 8 - 89 |
| Time:                             | 10.45       |
| Latit.: [N]                       | 52 : 58.44  |
| Longit.: [E]                      | 4 : 44.04   |
| Salinity (o/oo):                  | 29.484      |
| Temp. (°C):                       | 19.5        |
| Co [670nm] (1/m):                 | 3.74        |
| Secchi depth (m):                 | 2.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 6.7         |
| Chloroph. (mg/m <sup>3</sup> ):   | 26.0        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.7         |

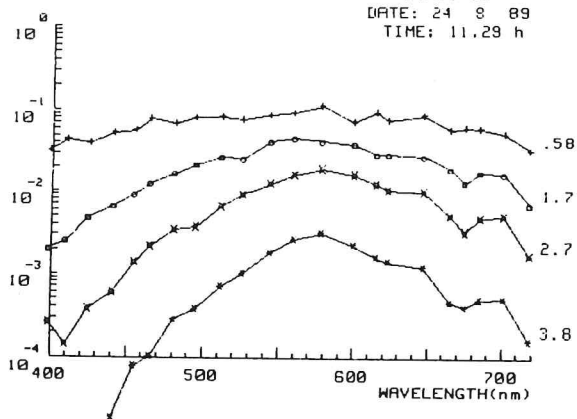
C21



|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 21          |
| Date:                             | 24 - 8 - 89 |
| Time:                             | 11.15       |
| Latit.: [N]                       | 52 : 59.85  |
| Longit.: [E]                      | 4 : 48.10   |
| Salinity (o/oo):                  | 29.262      |
| Temp. (°C):                       | 19.7        |
| Co [670nm] (1/m):                 | 3.50        |
| Secchi depth (m):                 | 2.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 6.4         |
| Chloroph. (mg/m <sup>3</sup> ):   | 28.2        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.7         |

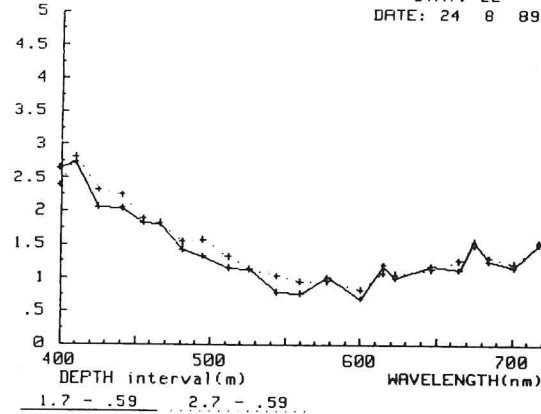
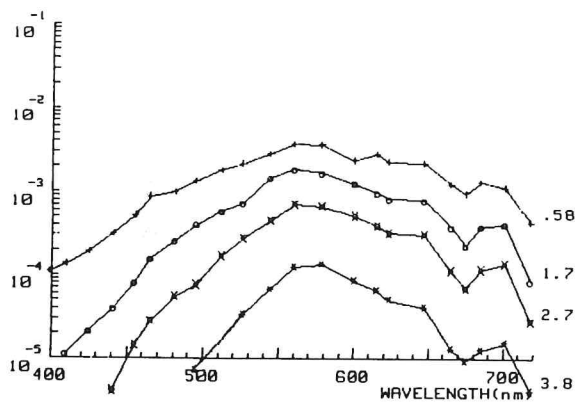
Ed(W/m<sup>2</sup>/nm)

STAT. 22  
DATE: 24 8 89  
TIME: 11.29 h

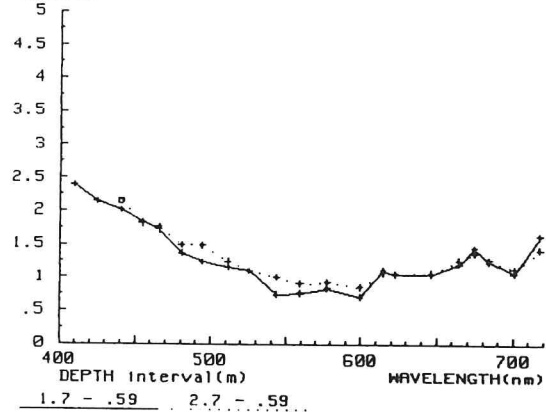


Kd(1/m)

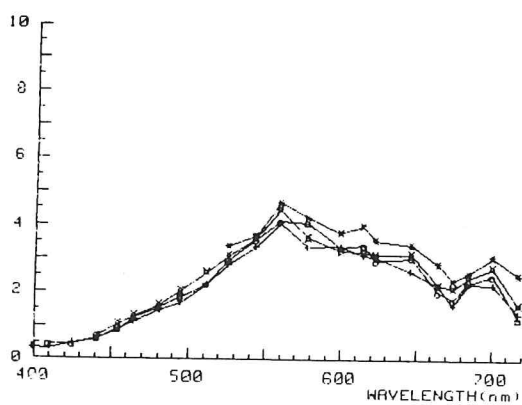
STAT. 22  
DATE: 24 8 89

Eu(W/m<sup>2</sup>/nm)

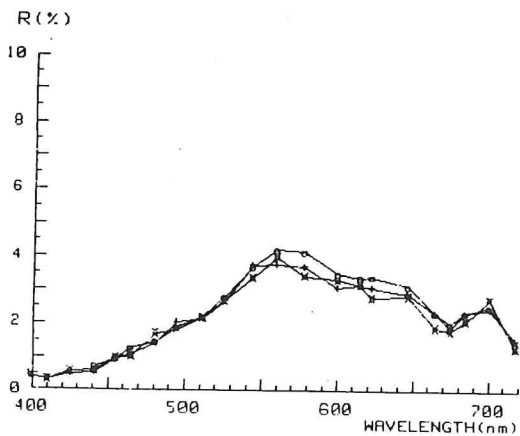
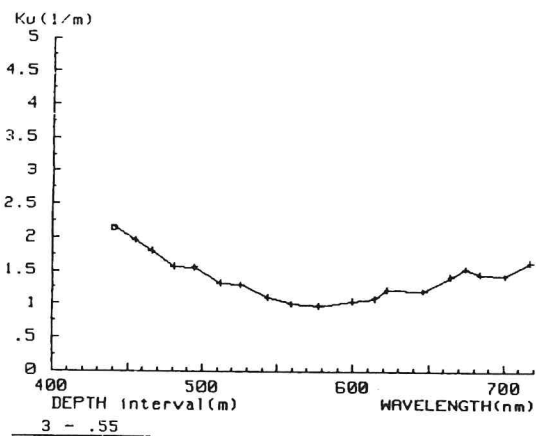
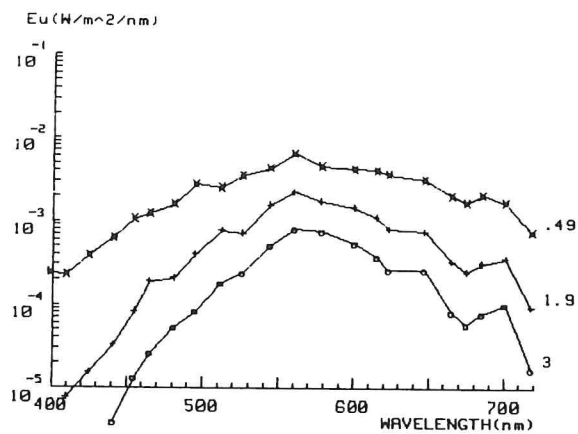
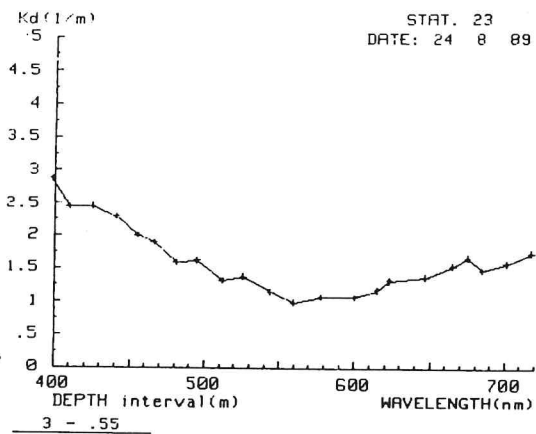
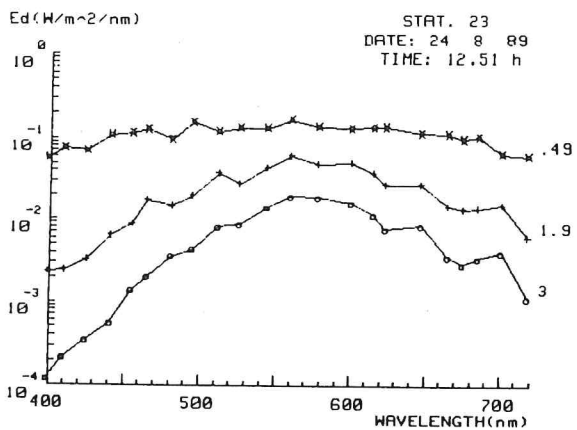
Ku(1/m)



R(%)

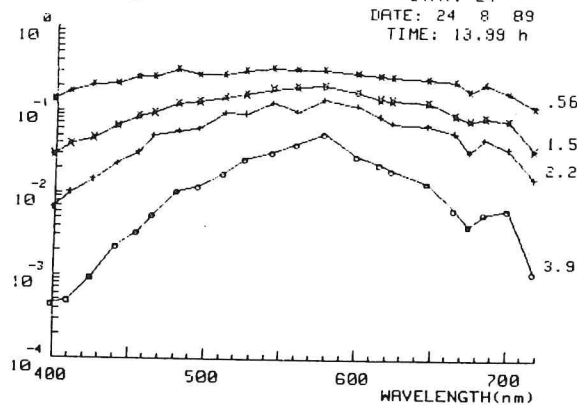


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 22          |
| Date:                             | 24 - 8 - 89 |
| Time:                             | 11.30       |
| Latit.: [N]                       | 53 : .34    |
| Longit.: [E]                      | 4 : 49.32   |
| Salinity (o/oo):                  | -1.000      |
| Temp. (°C):                       | 19.6        |
| Co [670nm] (1/m):                 | 4.20        |
| Secchi depth (m):                 | 2.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 5.6         |
| Chloroph. (mg/m <sup>3</sup> ):   | 25.0        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.7         |

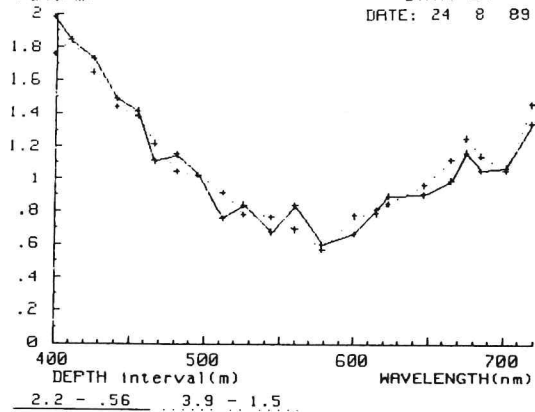
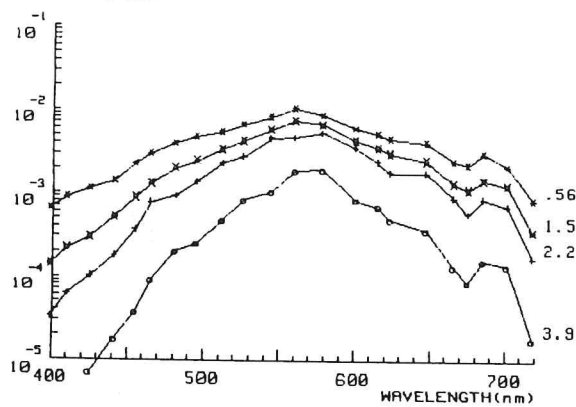


|                      |           |
|----------------------|-----------|
| Station:             | 23        |
| Date:                | 24-8-89   |
| Time:                | 12.45     |
| Latit.: [N]          | 53 : 1.91 |
| Longit.: [E]         | 4 : 52.25 |
| Salinity (‰)         | 29.195    |
| Temp. (°C):          | 19.6      |
| Co [670nm] (1/m):    | 3.60      |
| Secchi depth (m):    | 2.0       |
| Tot. Sus. M. (g/m³): | 5.4       |
| Chloroph. (mg/m³):   | 28.6      |
| Yell. Sub. (m⁻¹):    | 1.7       |

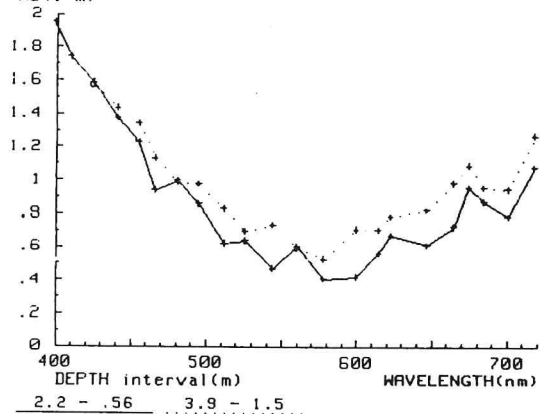
C24

Ed (W/m<sup>2</sup>/nm)
 STAT. 24  
 DATE: 24 8 89  
 TIME: 13.99 h


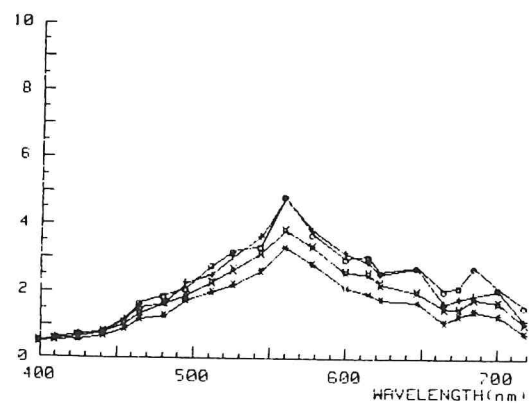
Kd (1/m)

 STAT. 24  
 DATE: 24 8 89
Eu (W/m<sup>2</sup>/nm)

Ku (1/m)



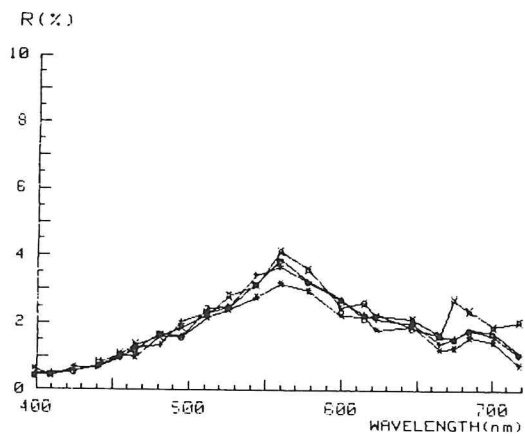
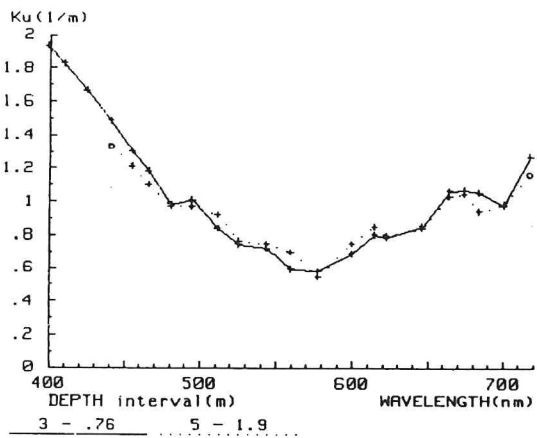
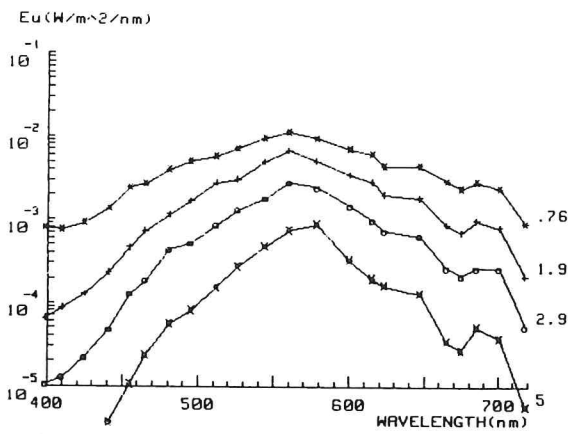
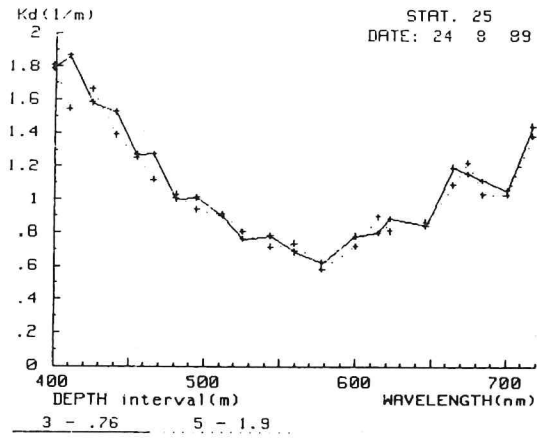
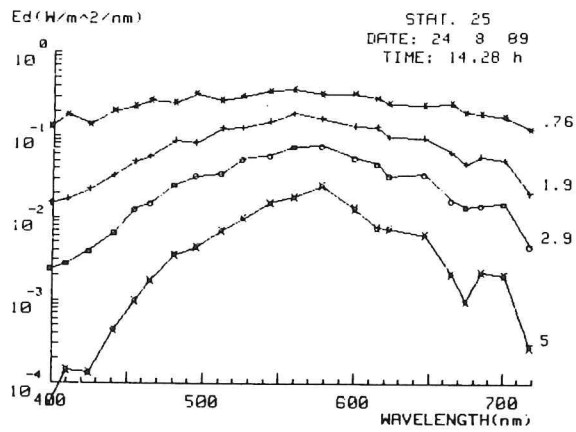
R (%)



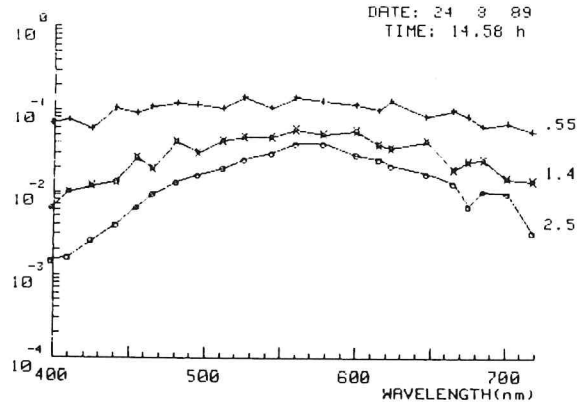
|                      |             |
|----------------------|-------------|
| Station:             | 24          |
| Date:                | 24 - 8 - 89 |
| Time:                | 13.55       |
| Latit.: [N]          | 52 : 58.78  |
| Longit.: [E]         | 4 : 44.86   |
| Salinity (o/oo):     | 31.556      |
| Temp. (°C):          | 19.0        |
| Co [670nm] (1/m):    | 3.90        |
| Secchi depth (m):    | 1.8         |
| Tot. Sus. M. (g/m³): | 7.7         |
| Chloroph. (mg/m³):   | 21.0        |
| Yell. Sub. (m-1):    | 1.1         |



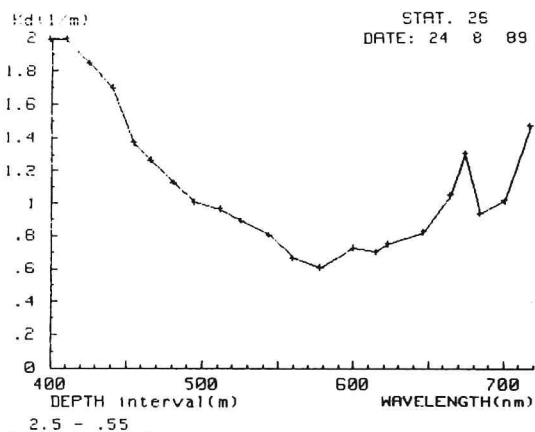
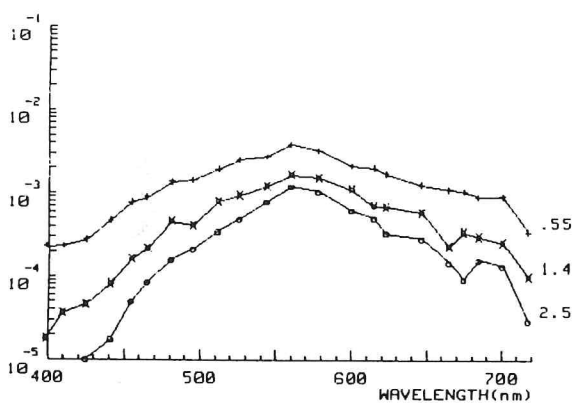
C25



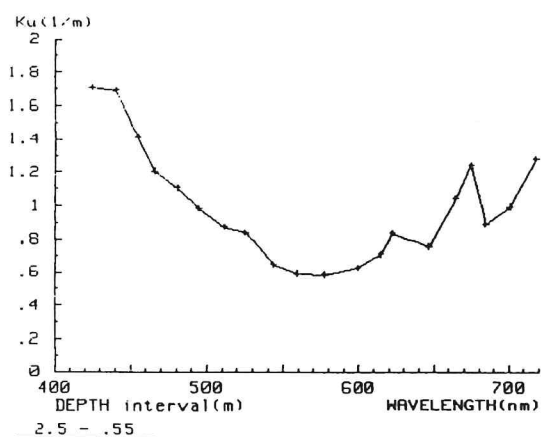
|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 25          |
| Date:                             | 24 - 8 - 89 |
| Time:                             | 14.20       |
| Latit.: [N]                       | 52 : 59.80  |
| Longit.: [E]                      | 4 : 48.05   |
| Salinity (o/oo):                  | 30.833      |
| Temp. (°C):                       | 19.2        |
| Co [670nm] (1/m):                 | 3.10        |
| Secchi depth (m):                 | 2.0         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 8.1         |
| Chloroph. (mg/m <sup>3</sup> ):   | 23.0        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.5         |

Ed (W/m<sup>2</sup>/nm)

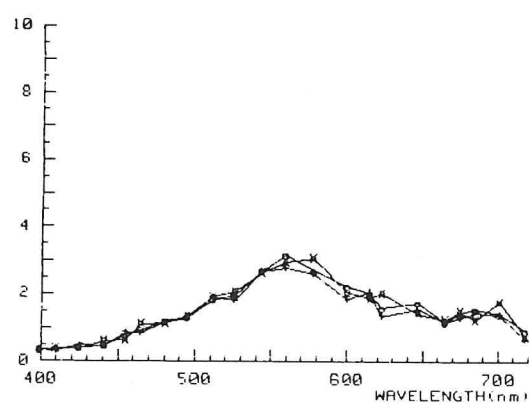
Ed (1/m)

Eu (W/m<sup>2</sup>/nm)

Ku (1/m)

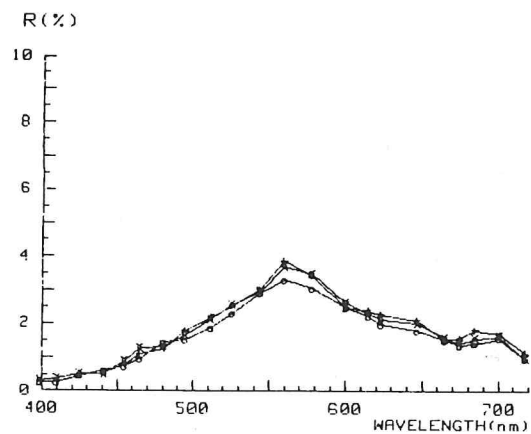
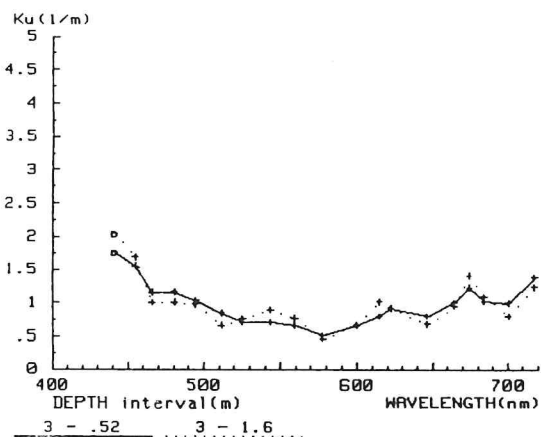
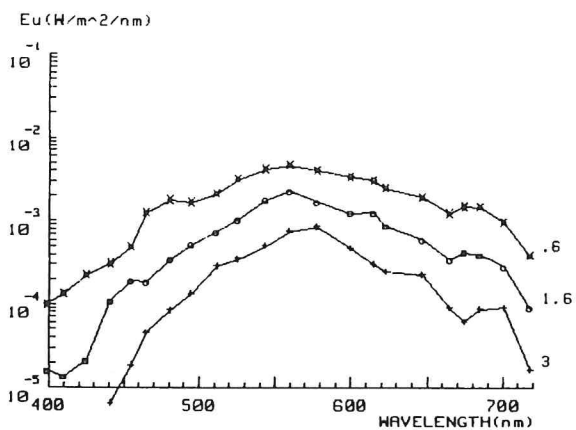
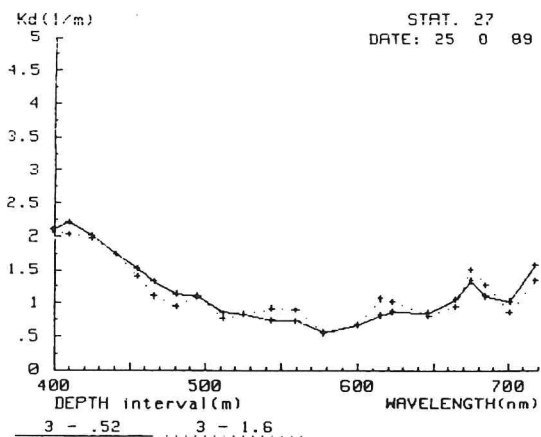
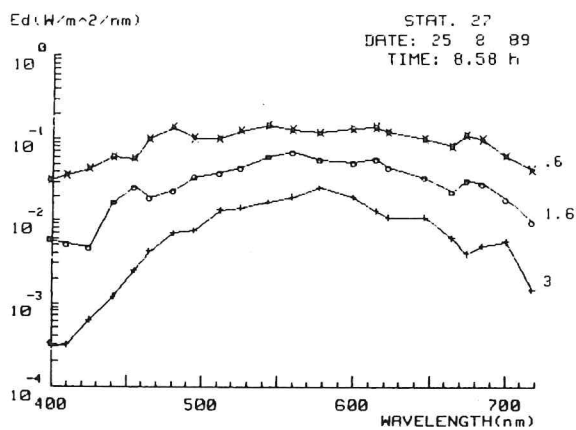


R (%)



|                      |             |
|----------------------|-------------|
| Station:             | 26          |
| Date:                | 24 - 8 - 89 |
| Time:                | 14.55       |
| Latit.: [N]          | 53 : 1.85   |
| Longit.: [E]         | 4 : 51.48   |
| Salinity (o/oo):     | 29.904      |
| Temp. (°C):          | 19.4        |
| Co [670nm] (1/m):    | 3.30        |
| Secchi depth (m):    | 2.0         |
| Tot. Sus. M. (g/m³): | 6.0         |
| Chloroph. (mg/m³):   | 23.3        |
| Yell. Sub. (m⁻¹):    | 1.5         |

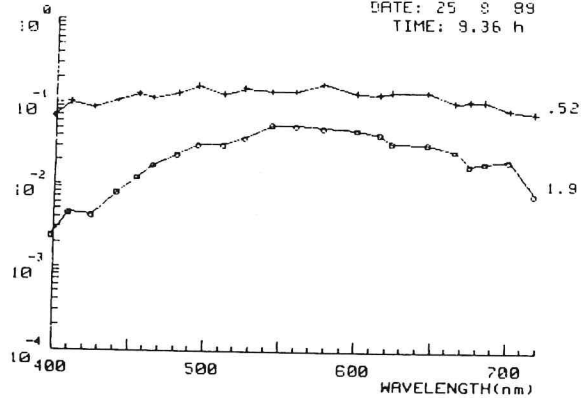
C27



|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 27          |
| Date:                             | 25 - 8 - 89 |
| Time:                             | 8.50        |
| Latit.: [N]                       | 52 : 58.61  |
| Longit.: [E]                      | 4 : 44.39   |
| Salinity (o/oo):                  | 29.205      |
| Temp. (°C):                       | 19.1        |
| Co [670nm] (1/m):                 | 3.20        |
| Secchi depth (m):                 | 2.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.8         |
| Chloroph. (mg/m <sup>3</sup> ):   | 24.1        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.8         |

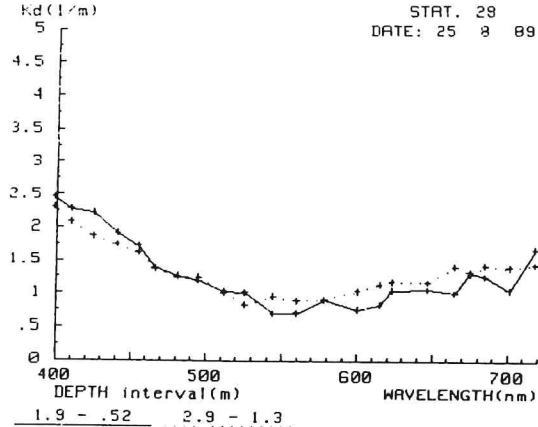
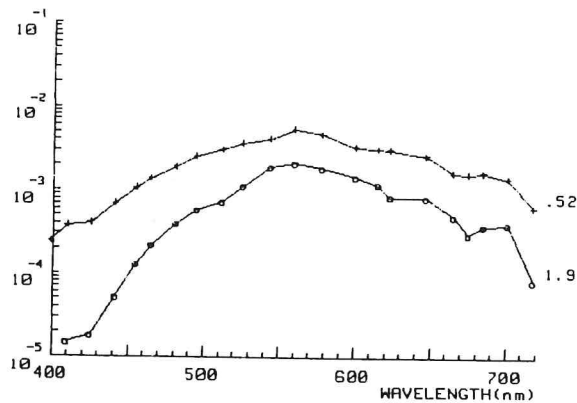
Ed (W/m<sup>2</sup>/nm)

STAT. 28  
DATE: 25 8 89  
TIME: 9.36 h

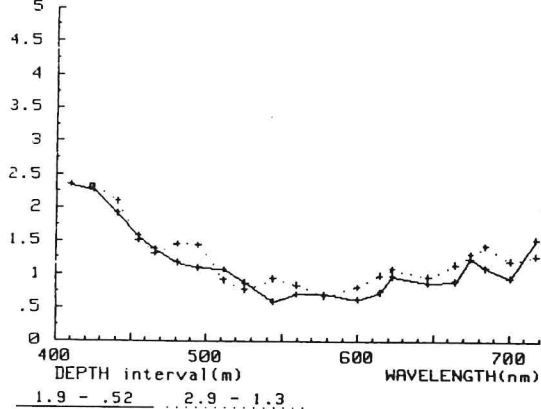


Kd (1/m)

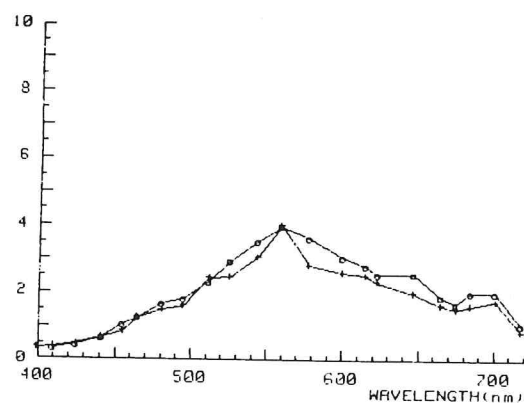
STAT. 29  
DATE: 25 8 89

Eu (W/m<sup>2</sup>/nm)

Ku (1/m)

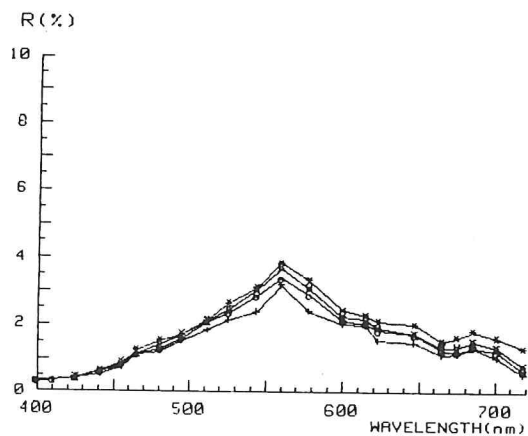
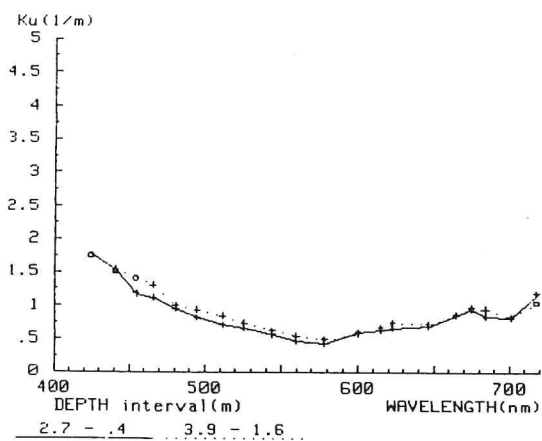
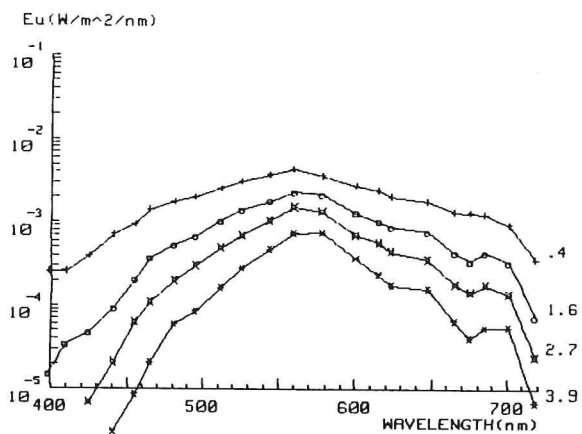
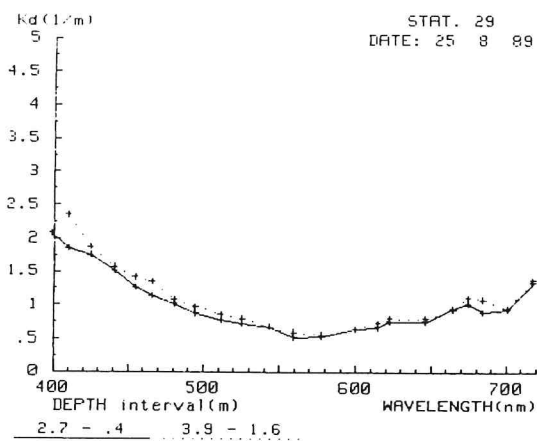
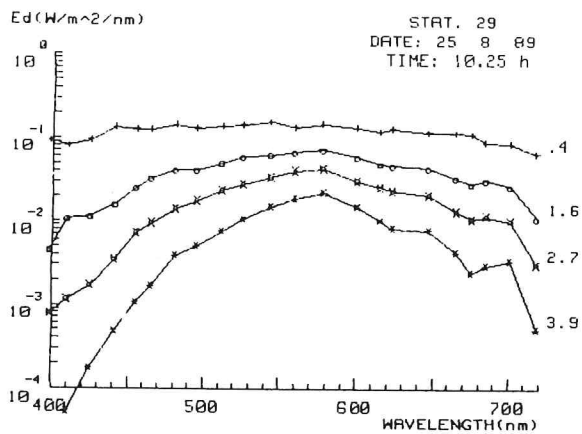


R (%)



|                      |             |
|----------------------|-------------|
| Station:             | 28          |
| Date:                | 25 - 8 - 89 |
| Time:                | 9.35        |
| Latit.: [N]          | 52 : 59.99  |
| Longit.: [E]         | 4 : 48.41   |
| Salinity (o/oo):     | 28.757      |
| Temp. (°C):          | 19.4        |
| Co [670nm] (1/m):    | 2.90        |
| Secchi depth (m):    | 2.0         |
| Tot. Sus. M. (g/m³): | 7.6         |
| Chloroph. (mg/m³):   | 16.2        |
| Yell. Sub. (m⁻¹):    | 1.9         |

C29

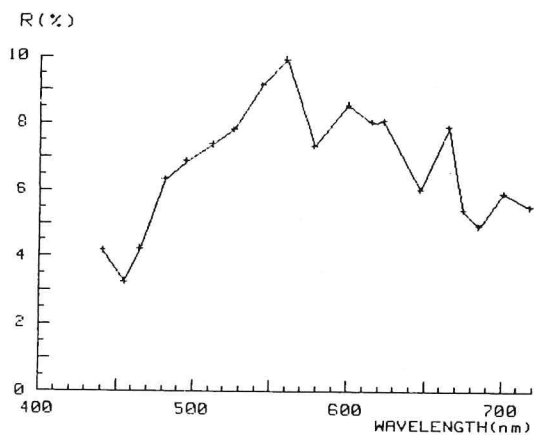
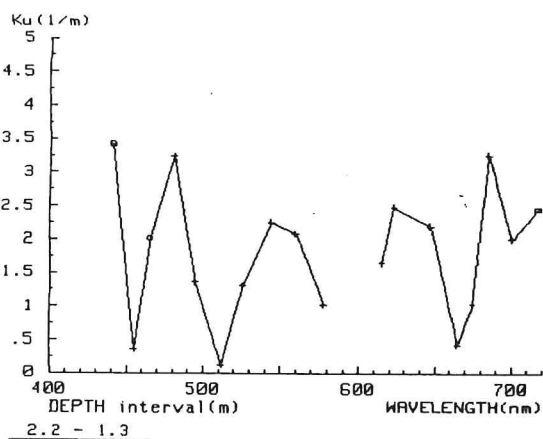
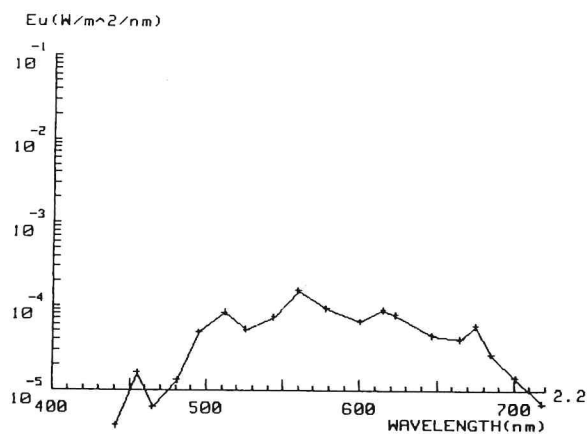
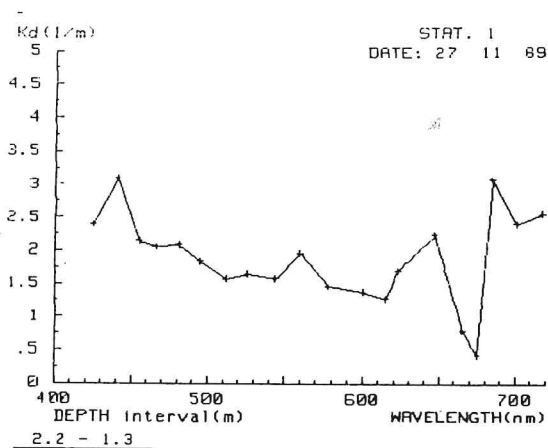
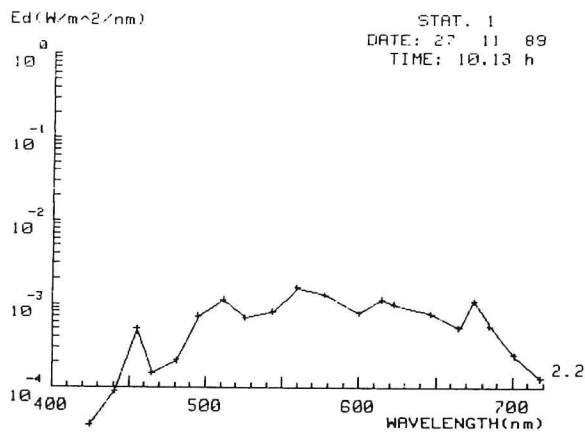


|                                   |             |
|-----------------------------------|-------------|
| Station:                          | 29          |
| Date:                             | 25 - 8 - 89 |
| Time:                             | 10.20       |
| Latit.: [N]                       | 53 : 2.02   |
| Longit.: [E]                      | 4 : 51.95   |
| Salinity (o/oo):                  | 28.717      |
| Temp. (°C):                       | 19.2        |
| Co [670nm] (1/m):                 | 2.70        |
| Secchi depth (m):                 | 2.5         |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.1         |
| Chloroph. (mg/m <sup>3</sup> ):   | 15.0        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.9         |

Due to technical problems no spectral data are presented.

|                      |           |
|----------------------|-----------|
| Station:             | 292       |
| Date:                | 25 -8 -89 |
| Time:                | 10.22     |
| Latit.: [N]          | 53 : 2.02 |
| Longit.: [E]         | 4 : 51.95 |
| Salinity (o/oo):     | 28.717    |
| Temp. (°C):          | 19.2      |
| Co [670nm] (1/m):    | 2.70      |
| Secchi depth (m):    | 2.5       |
| Tot. Sus. M. (g/m3): | 2.7       |
| Chloroph. (mg/m3):   | 15.7      |
| Yell. Sub. (m-1):    | 1.9       |

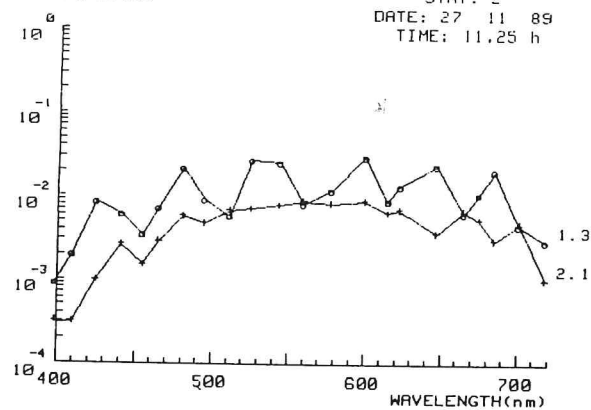
D1



|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 1         |
| Date:                             | 27-11-89  |
| Time:                             | 10.15     |
| Latit.: [N]                       | 53 : 4.26 |
| Longit.: [E]                      | 4 : 41.70 |
| Salinity (o/oo):                  | 31.244    |
| Temp. (°C):                       | 7.4       |
| Co [670nm] (1/m):                 | 9.85      |
| Secchi depth (m):                 | 1.3       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 20.9      |
| Chloroph. (mg/m <sup>3</sup> ):   | 9.7       |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.4       |

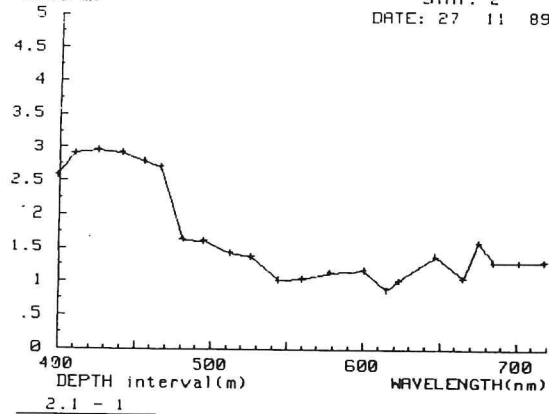
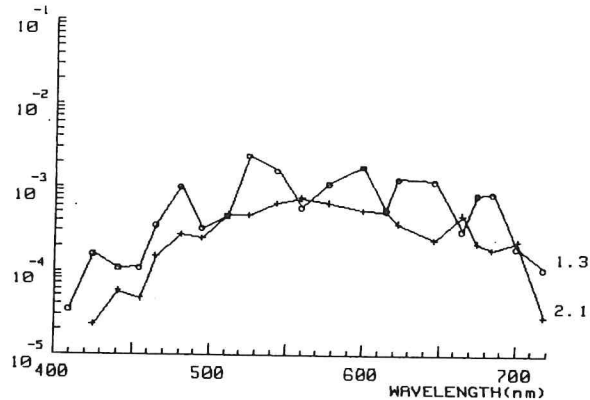
Ed (W/m<sup>2</sup>/nm)

STAT. 2  
DATE: 27 11 89  
TIME: 11.25 h

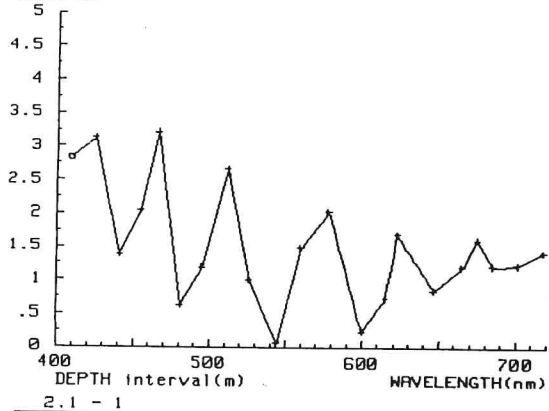


Kd (1/m)

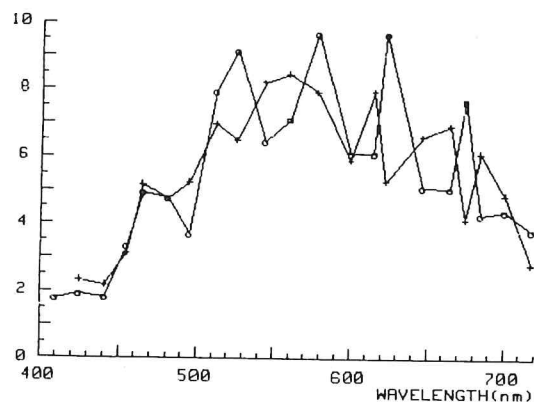
STAT. 2  
DATE: 27 11 89

Eu (W/m<sup>2</sup>/nm)

Ku (1/m)



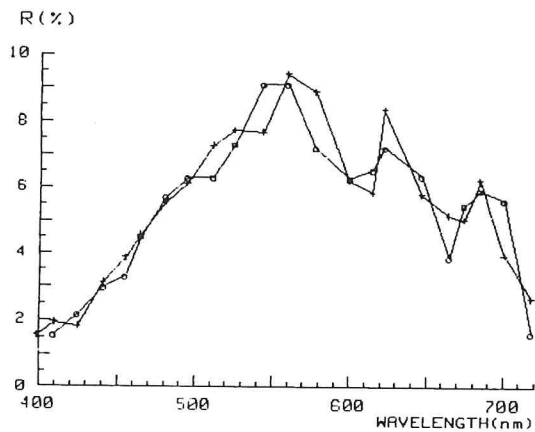
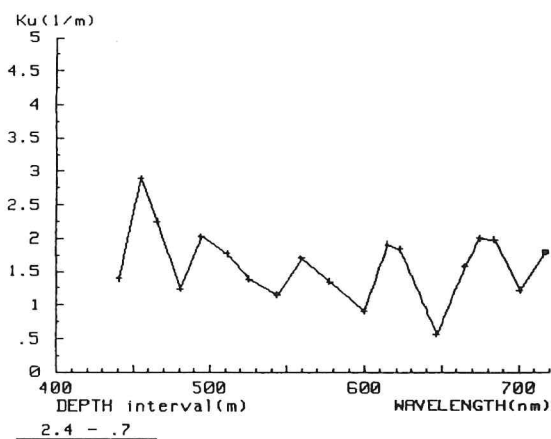
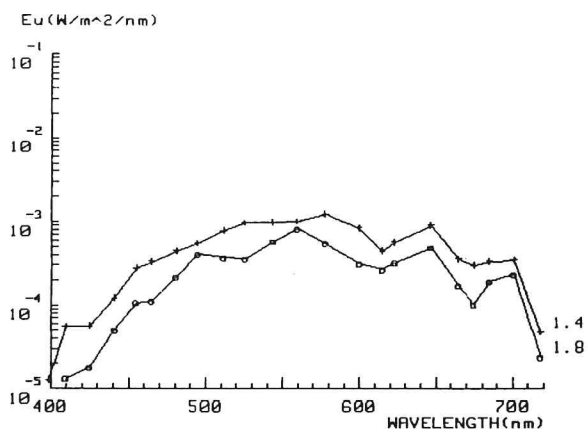
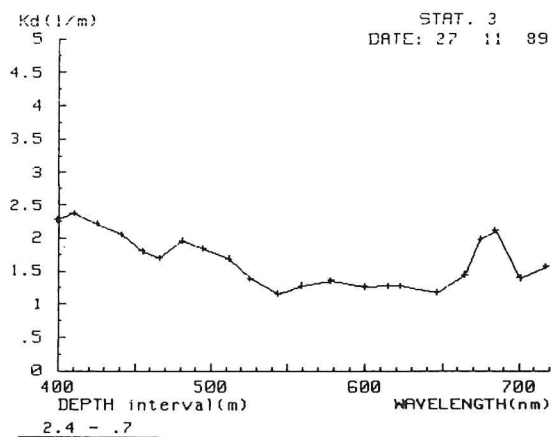
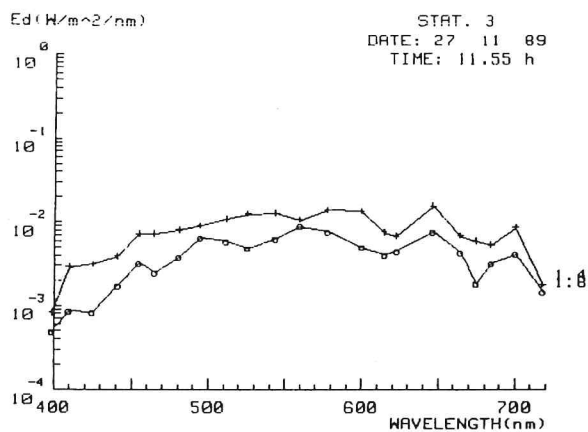
R (%)



|                                   |            |
|-----------------------------------|------------|
| Station:                          | 2          |
| Date:                             | 27-11-89   |
| Time:                             | 11.20      |
| Latit.: [N]                       | 52 : 56.31 |
| Longit.: [E]                      | 4 : 40.45  |
| Salinity (o/oo):                  | 29.304     |
| Temp. (°C):                       | 6.7        |
| Co [670nm] (1/m):                 | 6.45       |
| Secchi depth (m):                 | 1.3        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 22.0       |
| Chloroph. (mg/m <sup>3</sup> ):   | 7.5        |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.1        |



D3

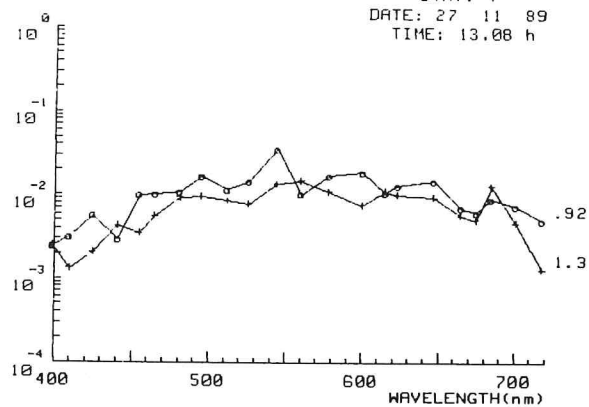


|                                   |              |
|-----------------------------------|--------------|
| Station:                          | 3            |
| Date:                             | 27 - 11 - 89 |
| Time:                             | 11.50        |
| Latit.: [N]                       | 52 : 54.20   |
| Longit.: [E]                      | 4 : 38.58    |
| Salinity (o/oo):                  | 29.817       |
| Temp. (°C):                       | 7.0          |
| Co [670nm] (1/m):                 | 5.40         |
| Secchi depth (m):                 | 1.3          |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 16.7         |
| Chloroph. (mg/m <sup>3</sup> ):   | 5.0          |
| Yell. Sub. (m <sup>-1</sup> ):    | .92          |

D4

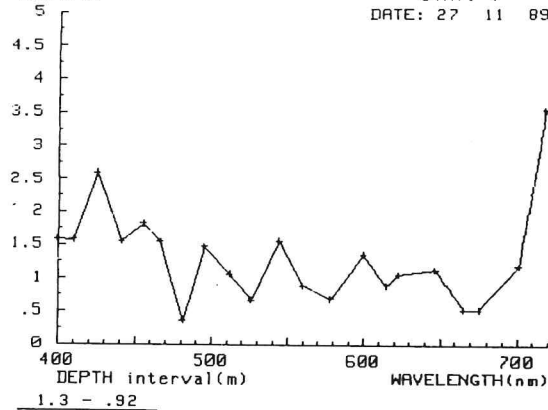
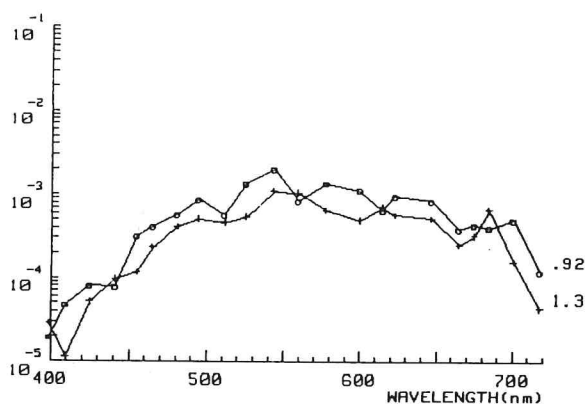
Ed (W/m<sup>2</sup>/nm)

STAT. 4  
DATE: 27 11 89  
TIME: 13.00 h

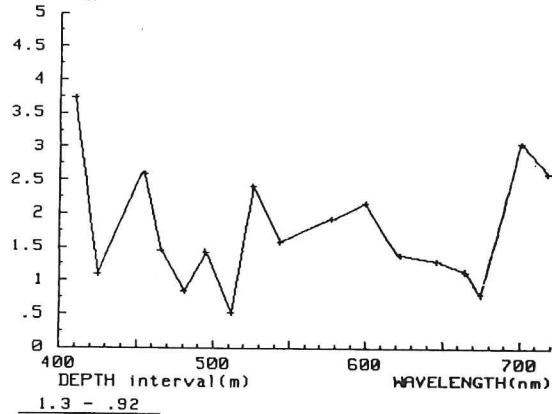


Kd (1/m)

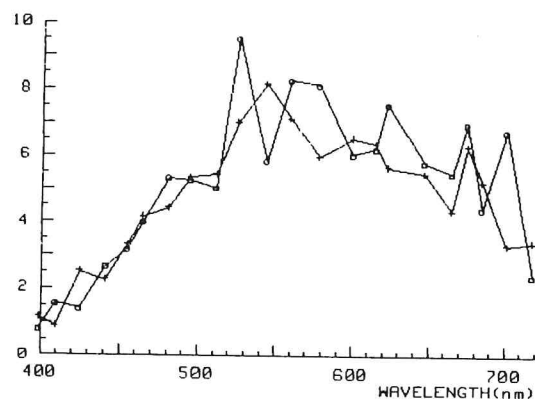
STAT. 4  
DATE: 27 11 89

Eu (W/m<sup>2</sup>/nm)

Ku (1/m)

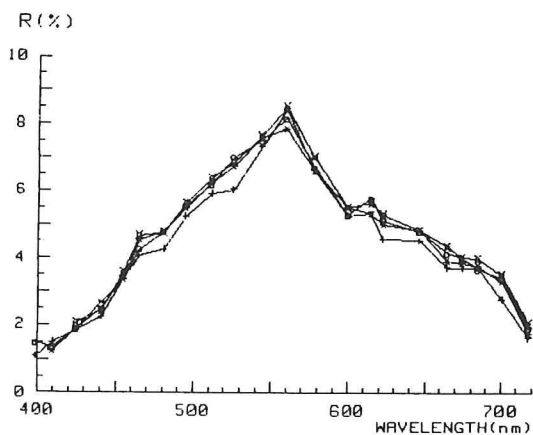
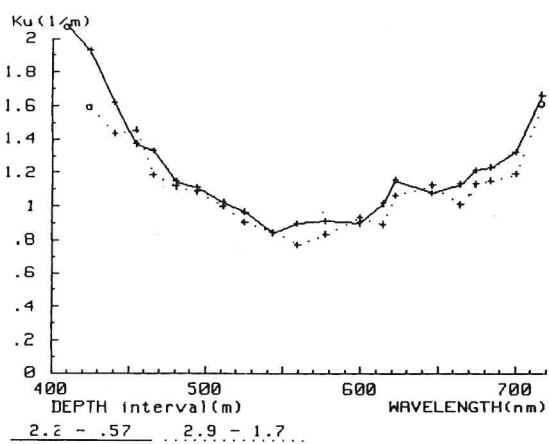
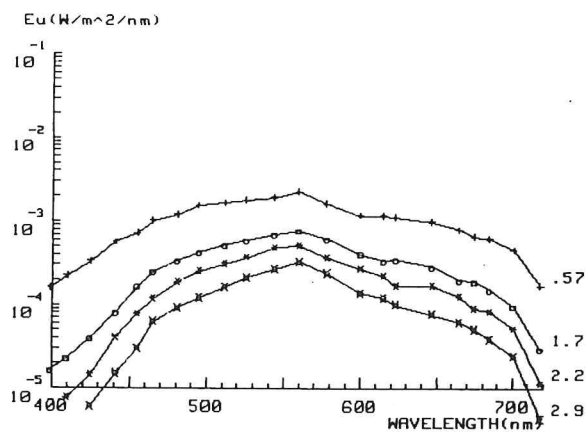
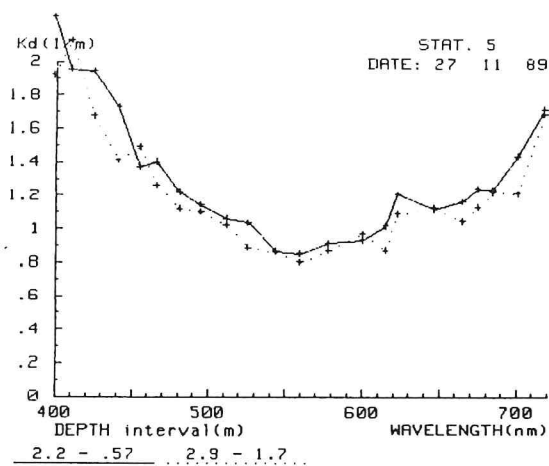
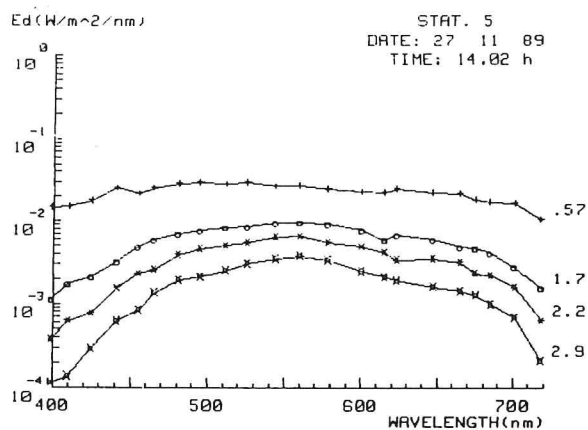


R (%)



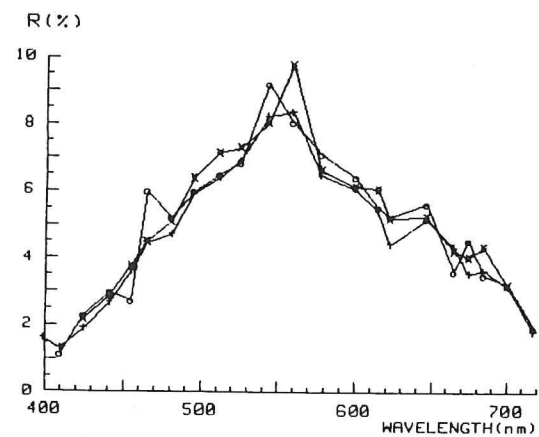
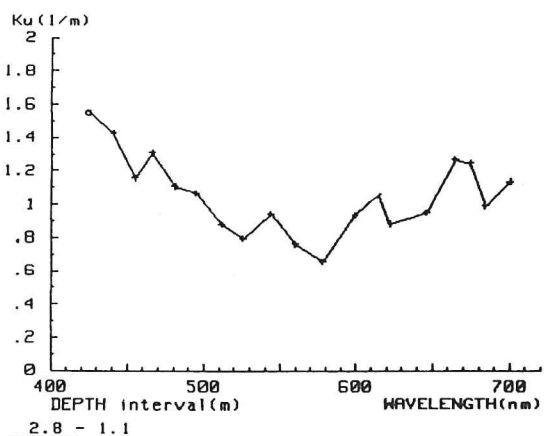
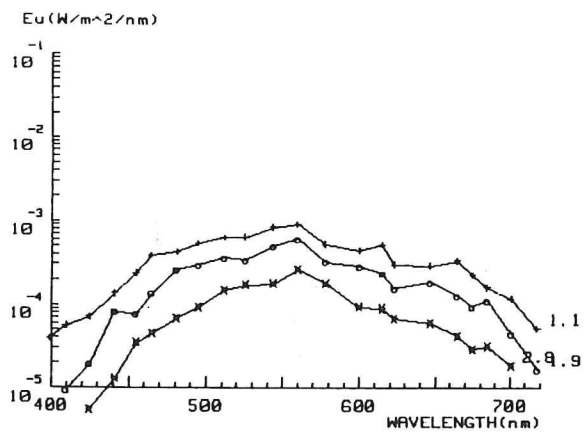
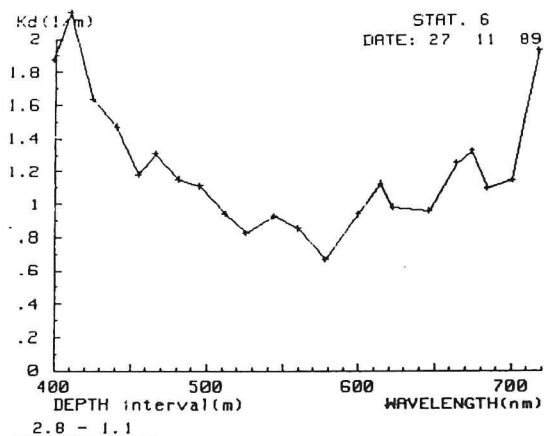
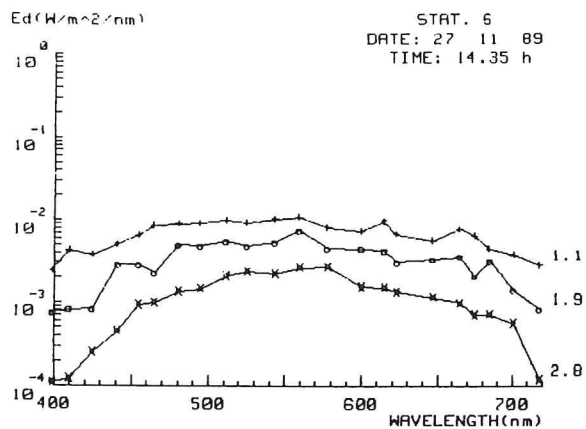
|                      |              |
|----------------------|--------------|
| Station:             | 4            |
| Date:                | 27 - 11 - 89 |
| Time:                | 13.00        |
| Latit.: [N]          | 52 : 58.61   |
| Longit.: [E]         | 4 : 44.73    |
| Salinity (o/oo):     | 28.224       |
| Temp. (°C):          | 5.9          |
| Co [670nm] (1/m):    | 5.55         |
| Secchi depth (m):    | 1.0          |
| Tot. Sus. M. (g/m³): | 25.6         |
| Chloroph. (mg/m³):   | 7.5          |
| Yell. Sub. (m⁻¹):    | 1.3          |

D5



|                      |           |
|----------------------|-----------|
| Station:             | 5         |
| Date:                | 27-11-89  |
| Time:                | 14.00     |
| Latit.: [N]          | 53 : 1.88 |
| Longit.: [E]         | 4 : 51.83 |
| Salinity (o/oo):     | 28.239    |
| Temp. (°C):          | 5.0       |
| Co [670nm] (1/m):    | 3.70      |
| Secchi depth (m):    | 1.8       |
| Tot. Sus. M. (g/m³): | 10.0      |
| Chloroph. (mg/m³):   | 3.7       |
| Yell. Sub. (m⁻¹):    | 1.1       |

D6



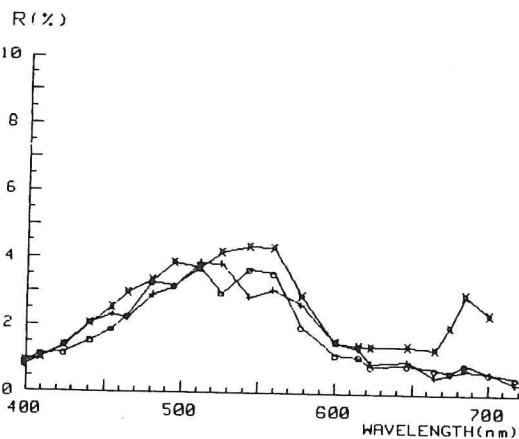
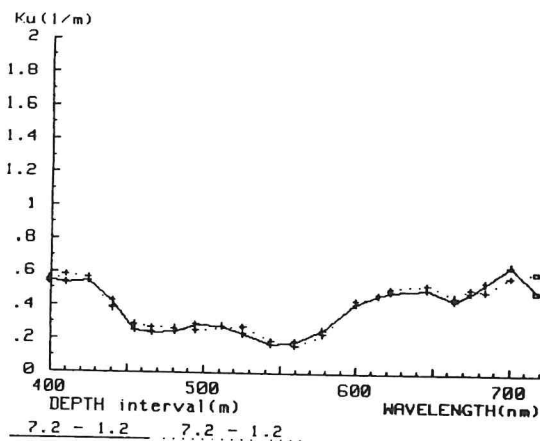
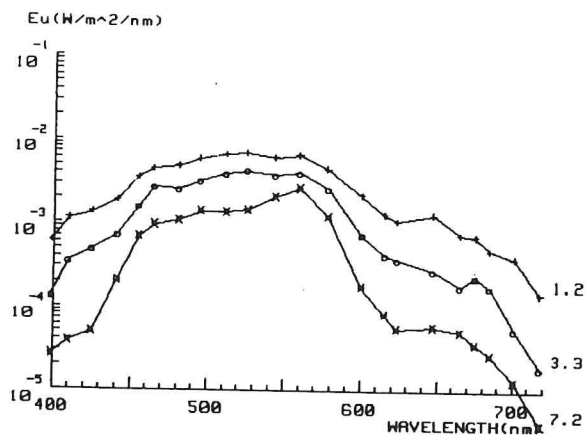
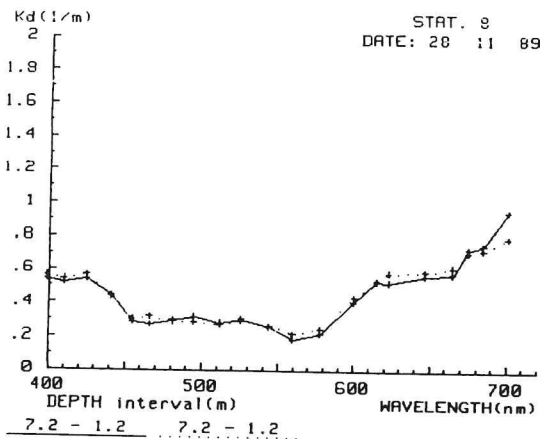
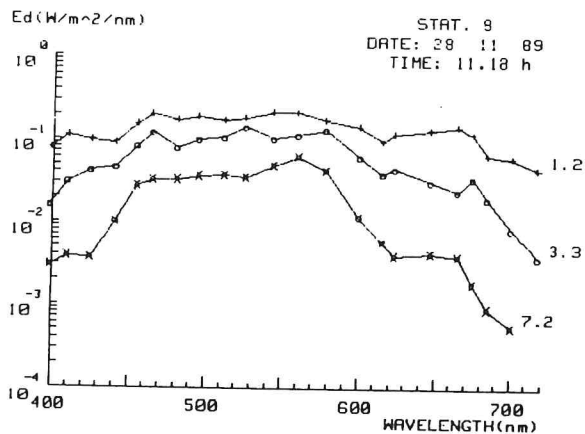
|                                   |              |
|-----------------------------------|--------------|
| Station:                          | 6            |
| Date:                             | 27 - 11 - 89 |
| Time:                             | 14.30        |
| Latit.: [N]                       | 53 : .49     |
| Longit.: [E]                      | 4 : 48.97    |
| Salinity (o/oo):                  | 28.393       |
| Temp. (°C):                       | 5.0          |
| Co [670nm] (1/m):                 | 3.50         |
| Secchi depth (m):                 | 1.8          |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 12.5         |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.7          |
| Yell. Sub. (m-l):                 | 1.2          |

D7

Due to the low solar altitude no spectral data are presented.

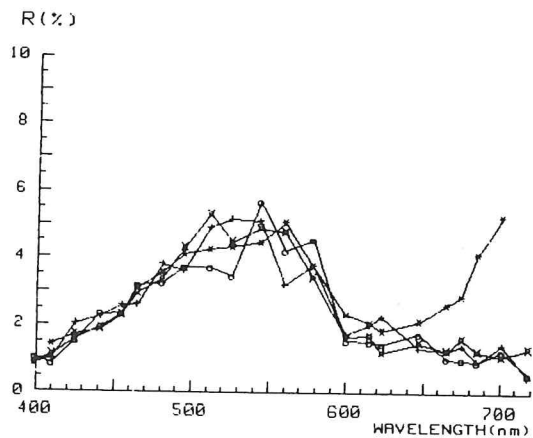
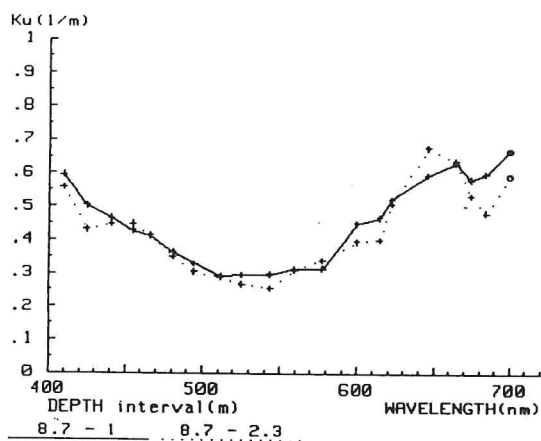
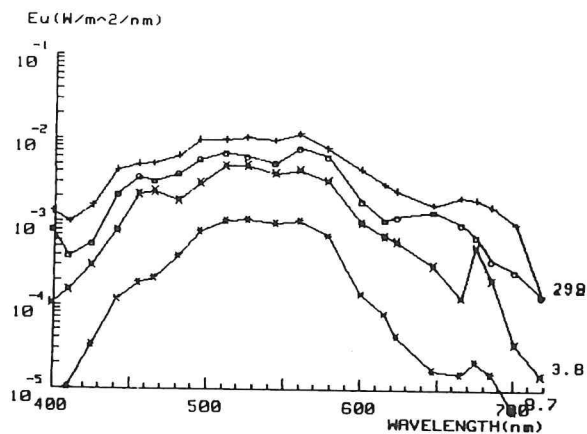
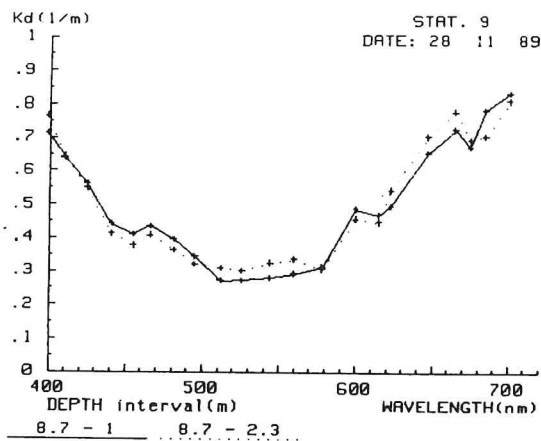
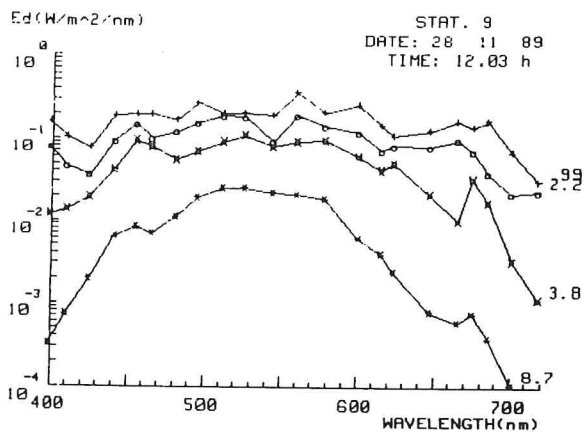
|                      |              |
|----------------------|--------------|
| Station:             | 7            |
| Date:                | 28 - 11 - 89 |
| Time:                | 9.30         |
| Latit.: [N]          | 53 : 9.22    |
| Longit.: [E]         | 4 : 41.71    |
| Salinity (o/oo):     | 30.817       |
| Temp. (°C):          | 7.2          |
| Co [670nm] (1/m):    | 4.35         |
| Secchi depth (m):    | 1.5          |
| Tot. Sus. M. (g/m3): | 11.1         |
| Chloroph. (mg/m3):   | 5.5          |
| Yell. Sub. (m-1):    | 1.5          |

D8

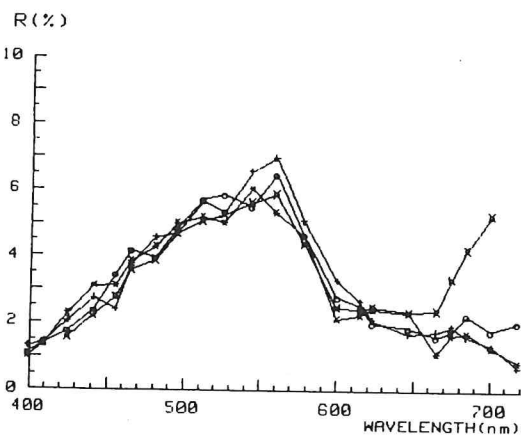
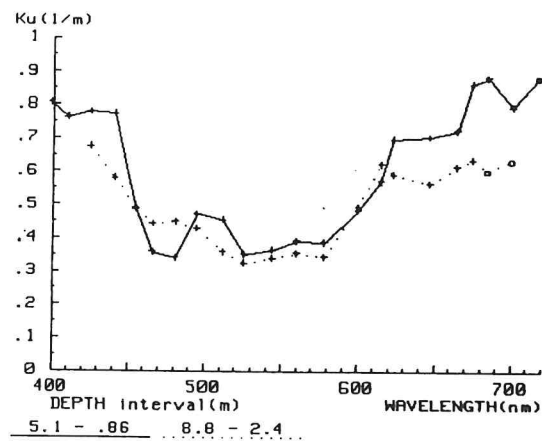
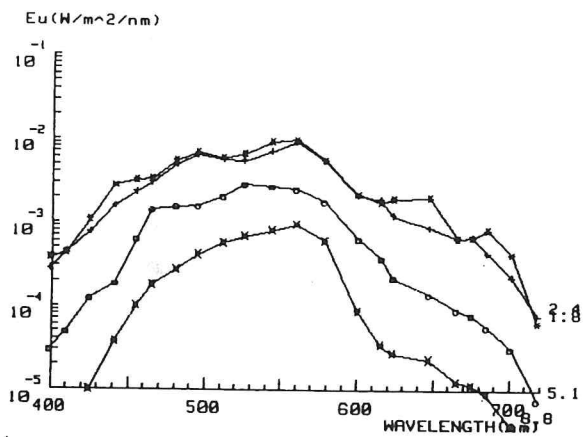
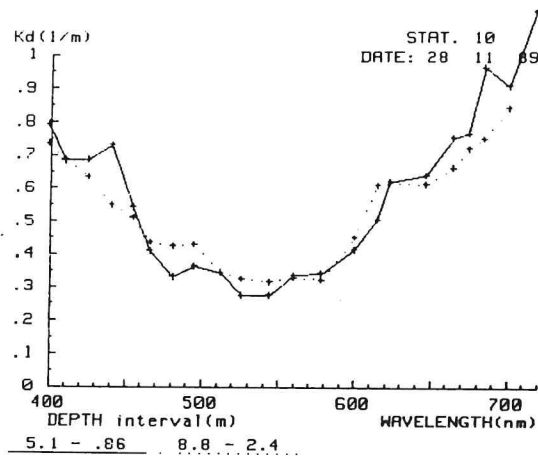
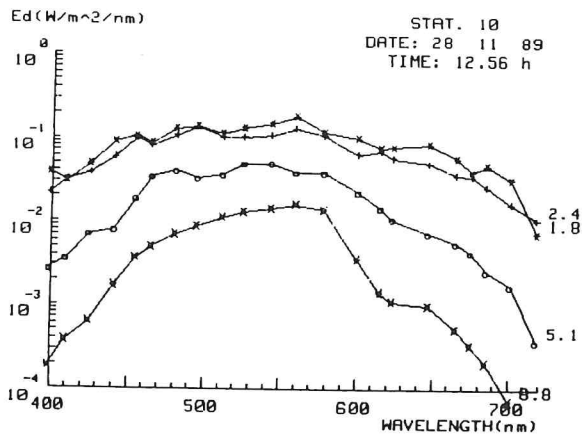


|                      |              |
|----------------------|--------------|
| Station:             | 8            |
| Date:                | 28 - 11 - 89 |
| Time:                | 11.10        |
| Latit.: [N]          | 53 : 14.09   |
| Longit.: [E]         | 4 : 35.15    |
| Salinity (o/oo):     | 33.467       |
| Temp. (°C):          | 9.5          |
| Co [670nm] (1/m):    | .75          |
| Secchi depth (m):    | 7.0          |
| Tot. Sus. M. (g/m3): | 2.4          |
| Chloroph. (mg/m3):   | 2.6          |
| Yell. Sub. (m-1):    | .63          |

D9



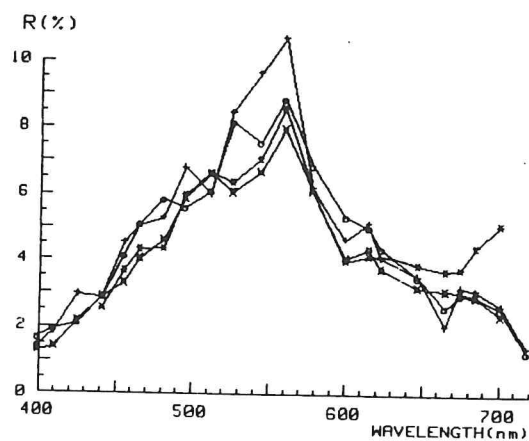
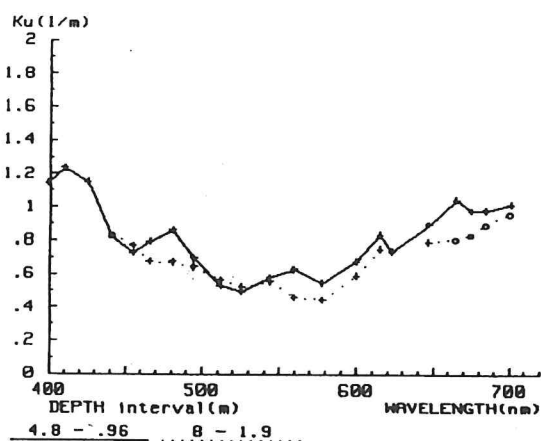
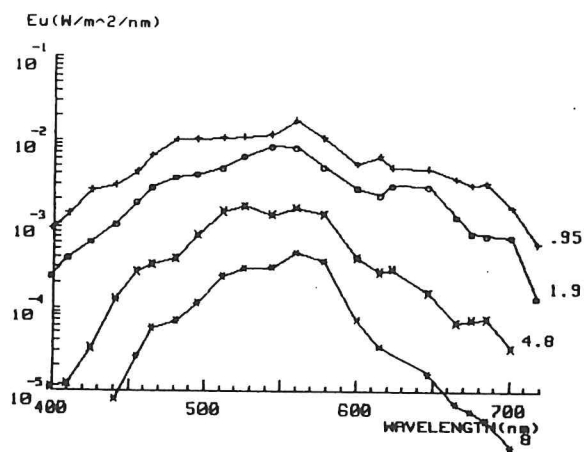
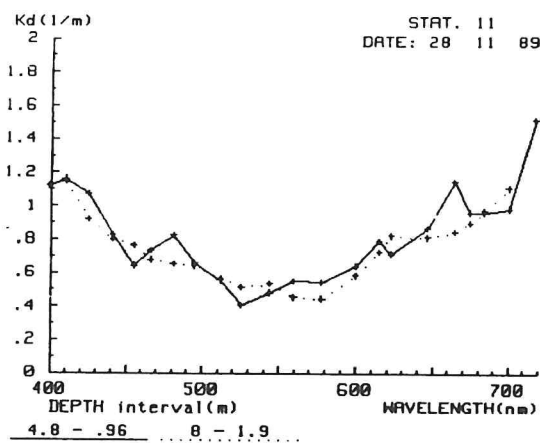
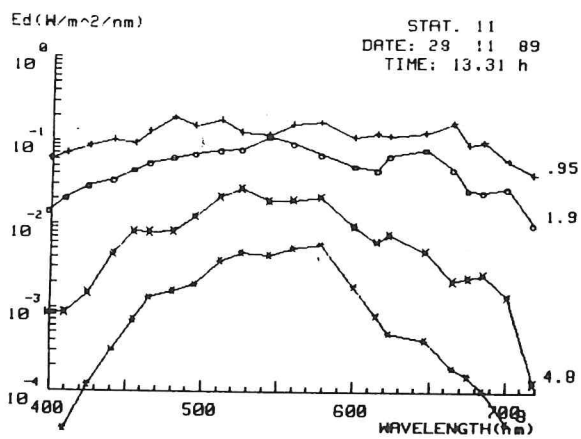
|                      |            |
|----------------------|------------|
| Station:             | 9          |
| Date:                | 28-11-89   |
| Time:                | 11.55      |
| Latit.: [N]          | 53 : 11.38 |
| Longit.: [E]         | 4 : 35.70  |
| Salinity (o/oo):     | 33.164     |
| Temp. (°C):          | 9.4        |
| Co [670nm] (1/m):    | .88        |
| Secchi depth (m):    | 6.0        |
| Tot. Sus. M. (g/m3): | 1.9        |
| Chloroph. (mg/m3):   | 2.9        |
| Yell. Sub. (m-1):    | .78        |



|                      |              |
|----------------------|--------------|
| Station:             | 10           |
| Date:                | 28 - 11 - 89 |
| Time:                | 12.50        |
| Latit.: [N]          | 53 : 9.78    |
| Longit.: [E]         | 4 : 37.68    |
| Salinity (o/oo):     | 32.843       |
| Temp. (°C):          | 9.0          |
| Co [670nm] (1/m):    | 1.15         |
| Secchi depth (m):    | 5.0          |
| Tot. Sus. M. (g/m³): | 3.2          |
| Chloroph. (mg/m³):   | 4.9          |
| Yell. Sub. (m⁻¹):    | .82          |

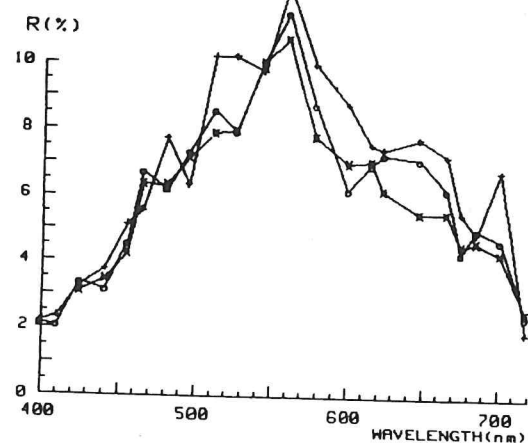
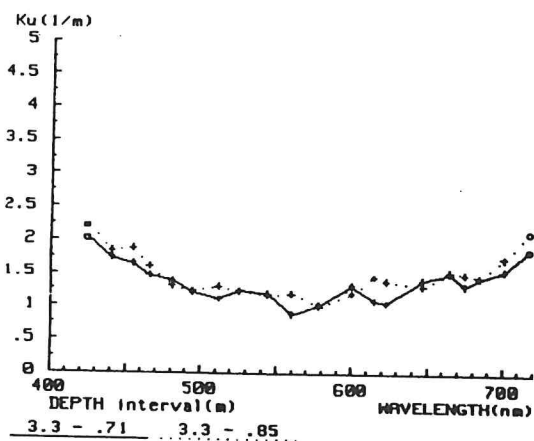
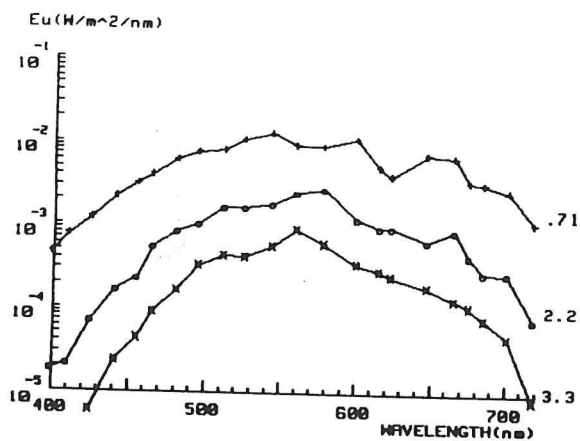
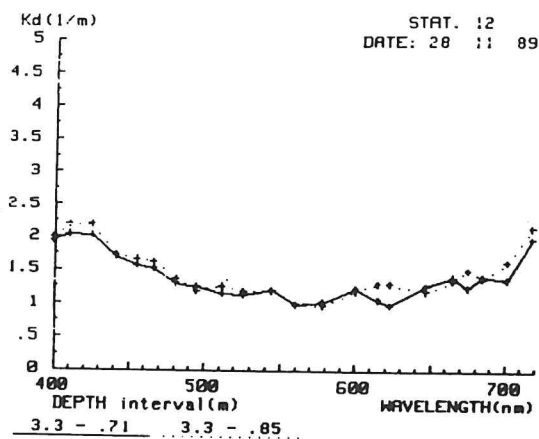
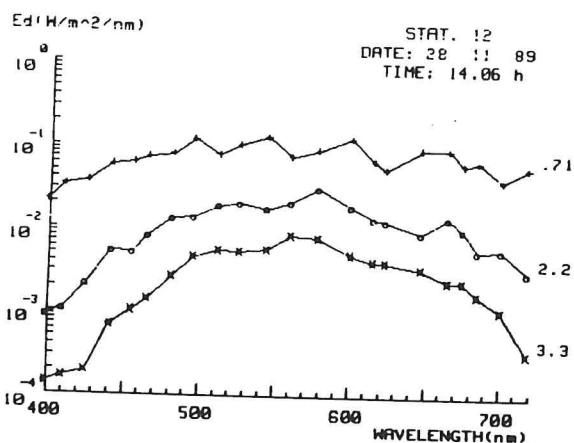


D11



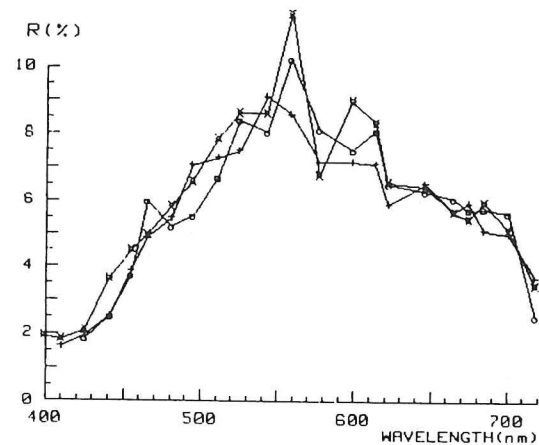
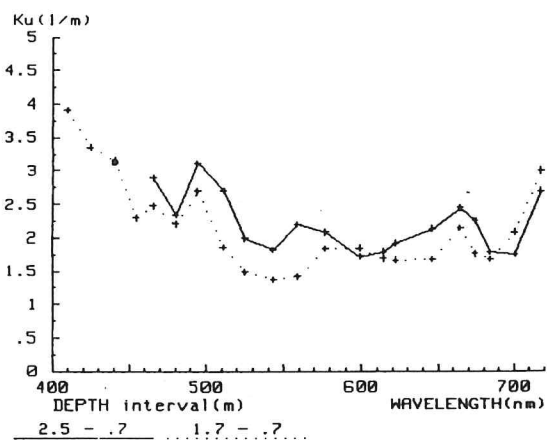
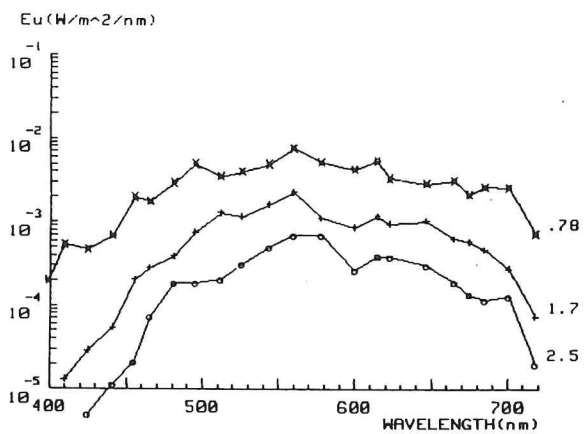
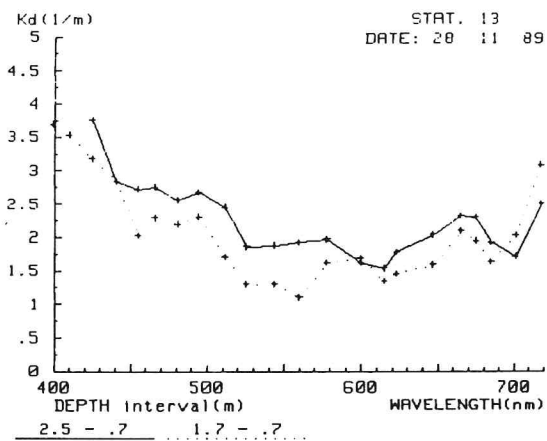
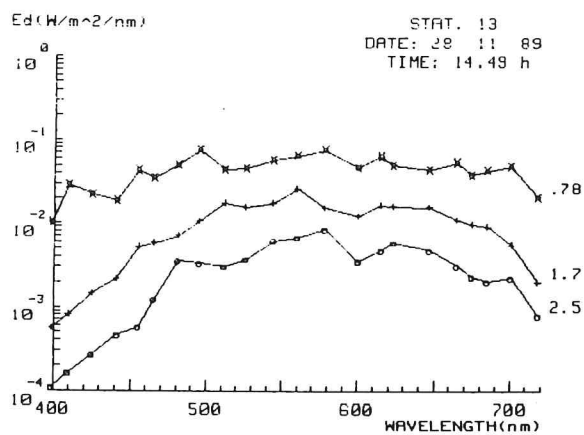
|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 11        |
| Date:                             | 28-11-89  |
| Time:                             | 13.25     |
| Latit.: [N]                       | 53 : 7.75 |
| Longit.: [E]                      | 4 : 38.81 |
| Salinity (o/oo):                  | 32.532    |
| Temp. (°C):                       | 8.6       |
| Co [670nm] (1/m):                 | 1.60      |
| Secchi depth (m):                 | 2.8       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.5       |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.9       |
| Yell. Sub. (m <sup>-1</sup> ):    | .87       |

D12

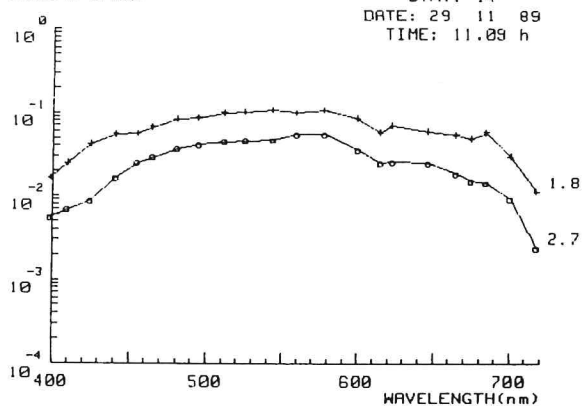


|                                   |              |
|-----------------------------------|--------------|
| Station:                          | 12           |
| Date:                             | 28 - 11 - 89 |
| Time:                             | 14.05        |
| Latit.: [N]                       | 53 : 6.24    |
| Longit.: [E]                      | 4 : 40.28    |
| Salinity (o/oo):                  | 31.706       |
| Temp. (°C):                       | 7.4          |
| Co [670nm] (1/m):                 | 5.10         |
| Secchi depth (m):                 | 1.0          |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 13.0         |
| Chloroph. (mg/m <sup>3</sup> ):   | 7.7          |
| Yell. Sub. (m <sup>-1</sup> ):    | .99          |

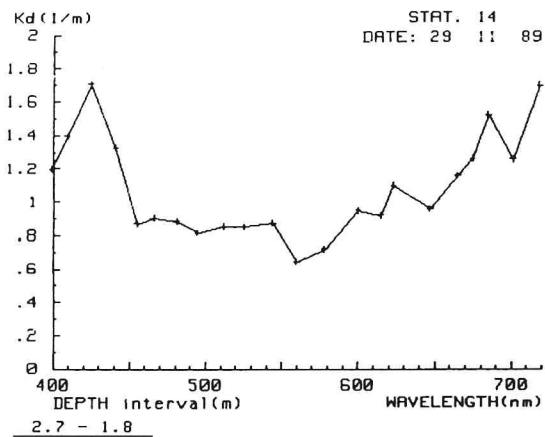
D13



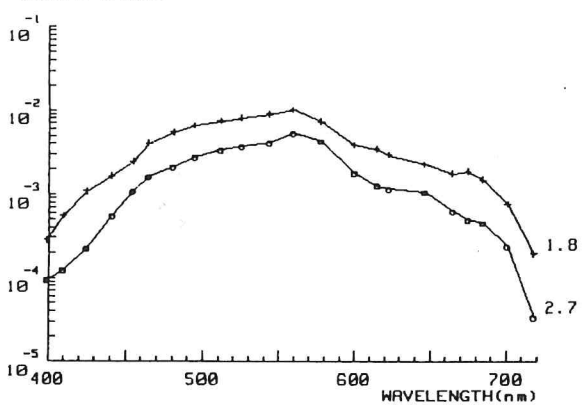
|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 13        |
| Date:                             | 28-11-89  |
| Time:                             | 14.50     |
| Latit.: [N]                       | 53 : 4.49 |
| Longit.: [E]                      | 4 : 41.81 |
| Salinity (o/oo):                  | 30.906    |
| Temp. (°C):                       | 7.2       |
| Co [670nm] (1/m):                 | 8.10      |
| Secchi depth (m):                 | 1.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 14.0      |
| Chloroph. (mg/m <sup>3</sup> ):   | 6.3       |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.3       |

Ed (W/m<sup>2</sup>/nm)

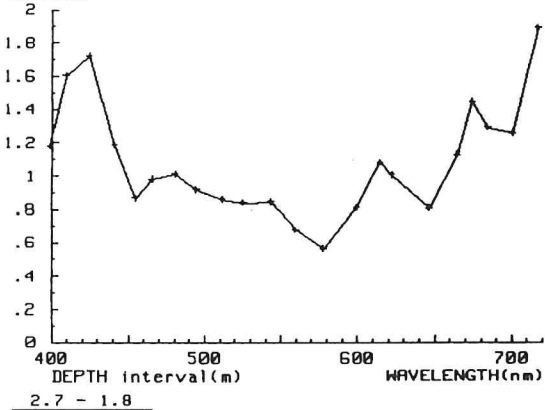
Kd (1/m)



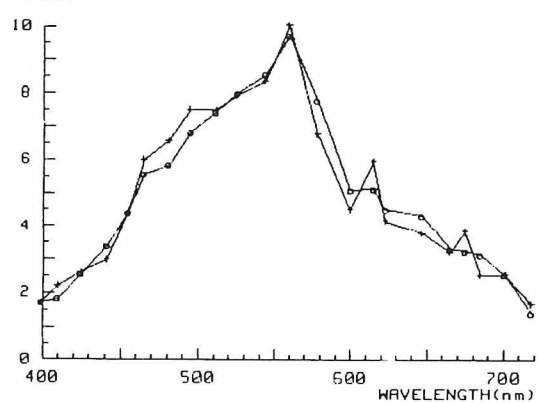
Eu (W/m²/nm)



Ku (1/m)

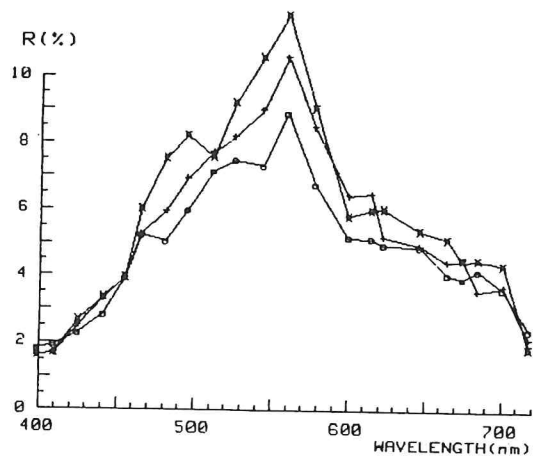
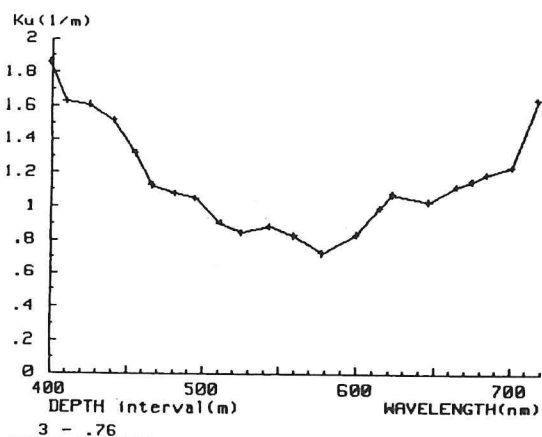
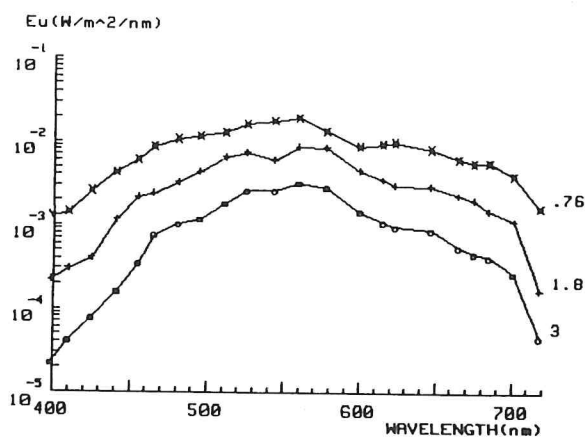
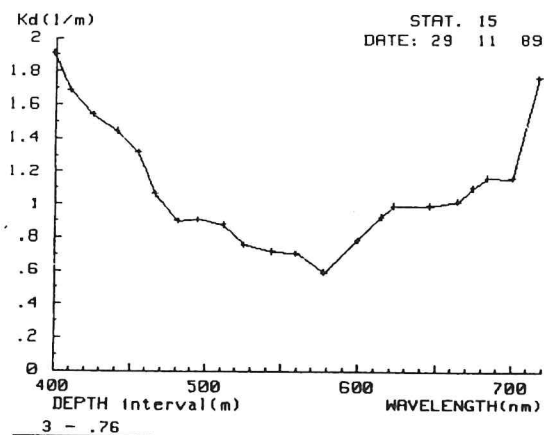
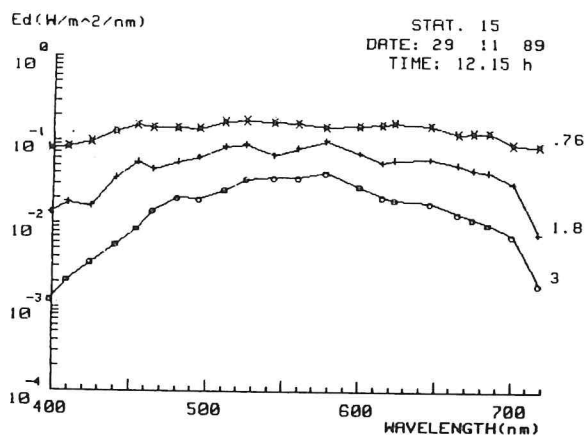


R (%)



|                      |              |
|----------------------|--------------|
| Station:             | 14           |
| Date:                | 29 - 11 - 89 |
| Time:                | 11.00        |
| Latit.: [N]          | 52 : 36.87   |
| Longit.: [E]         | 4 : 30.56    |
| Salinity (o/oo):     | 31.888       |
| Temp. (°C):          | 7.6          |
| Co [670nm] (1/m):    | 1.90         |
| Secchi depth (m):    | 3.0          |
| Tot. Sus. M. (g/m³): | 6.0          |
| Chloroph. (mg/m³):   | 4.3          |
| Yell. Sub. (m⁻¹):    | 1.6          |

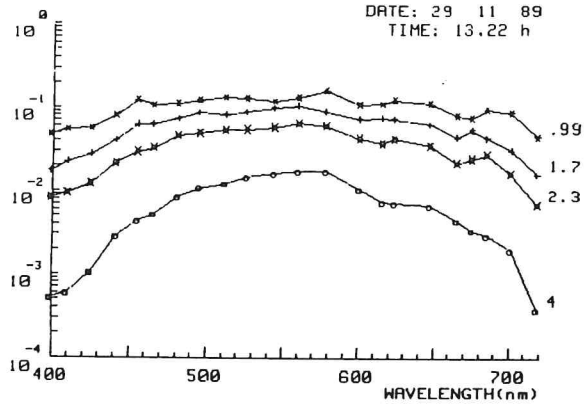
D15



|                                   |              |
|-----------------------------------|--------------|
| Station:                          | 15           |
| Date:                             | 29 - 11 - 89 |
| Time:                             | 12.05        |
| Latit.: [N]                       | 52 : 42.31   |
| Longit.: [E]                      | 4 : 33.06    |
| Salinity (o/oo):                  | 32.299       |
| Temp. (°C):                       | 8.1          |
| Co [670nm] (1/m):                 | 2.50         |
| Secchi depth (m):                 | 2.0          |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 10.3         |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.0          |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.0          |

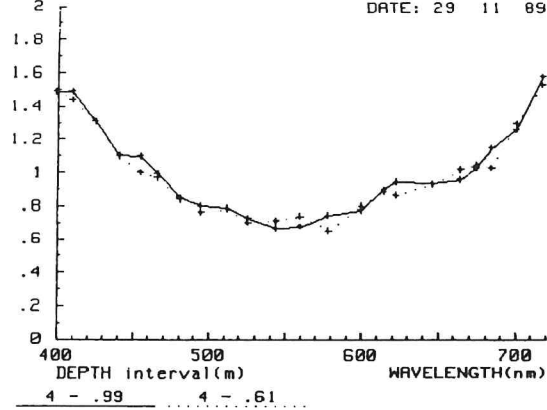
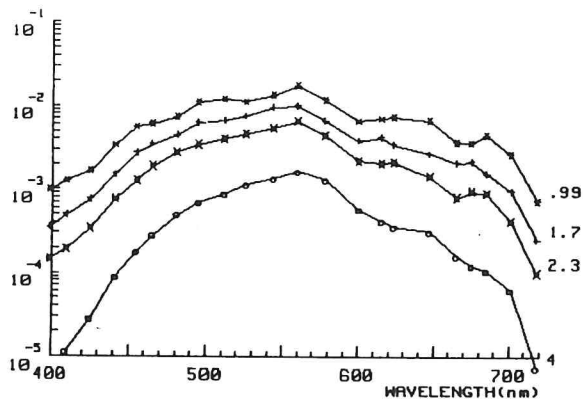
Ed(W/m<sup>2</sup>/nm)

STAT. 16  
DATE: 29 11 89  
TIME: 13.22 h

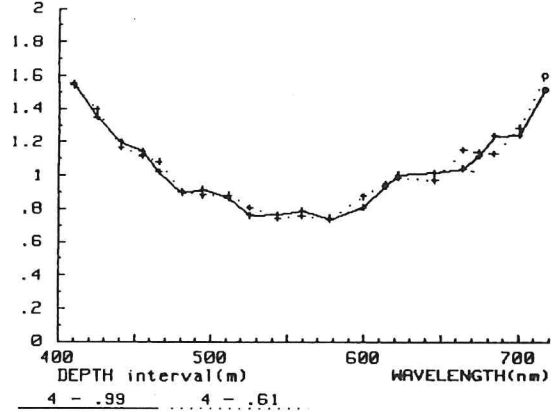


Kd (1/m)

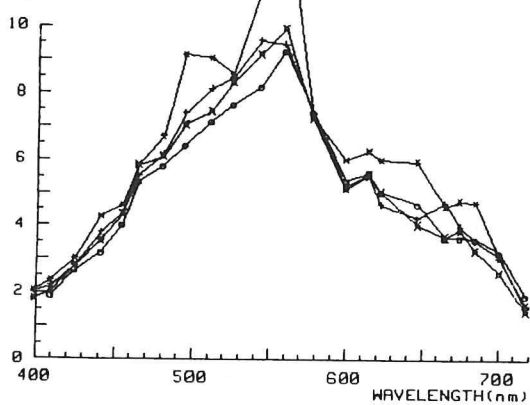
STAT. 16  
DATE: 29 11 89

Eu(W/m<sup>2</sup>/nm)

Ku (1/m)

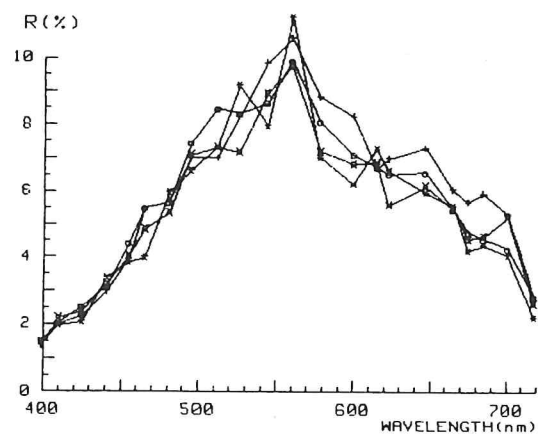
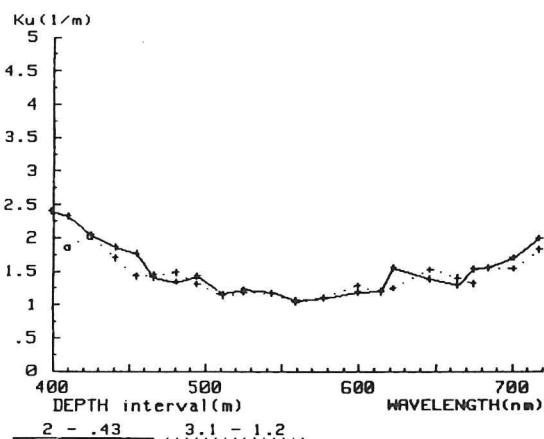
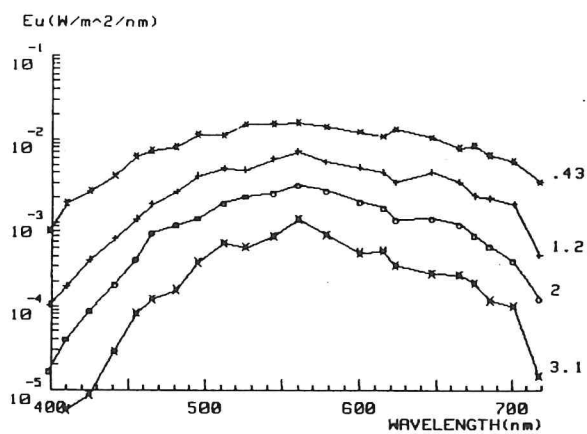
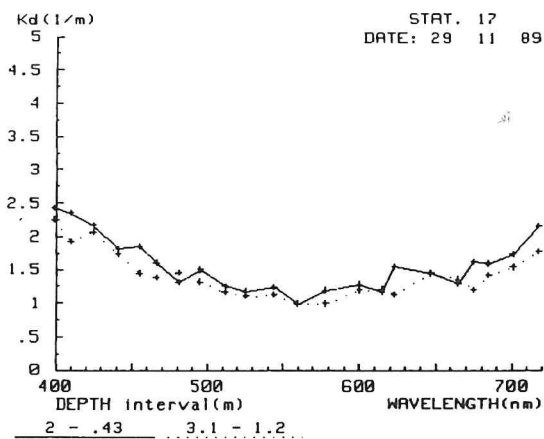
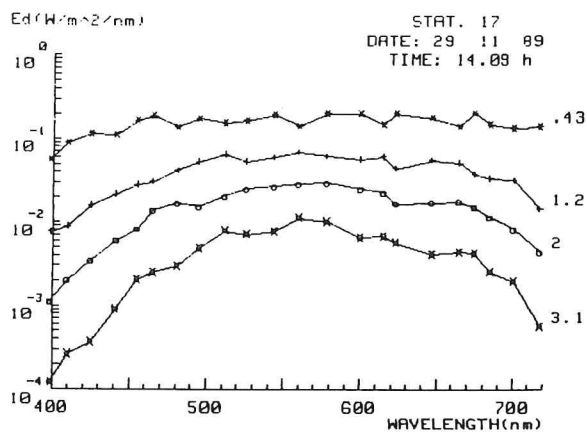


R (%)

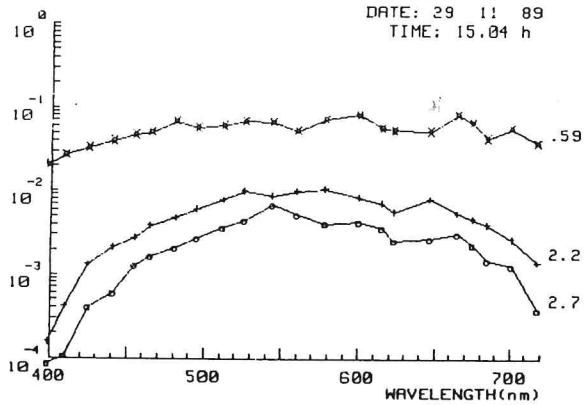


|                                   |              |
|-----------------------------------|--------------|
| Station:                          | 16           |
| Date:                             | 29 - 11 - 89 |
| Time:                             | 13.15        |
| Latit.: [N]                       | 52 : 48.73   |
| Longit.: [E]                      | 4 : 35.44    |
| Salinity (o/oo):                  | 32.568       |
| Temp. (°C):                       | 8.4          |
| Co [670nm] (1/m):                 | 2.50         |
| Secchi depth (m):                 | 2.0          |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 7.9          |
| Chloroph. (mg/m <sup>3</sup> ):   | 3.7          |
| Yell. Sub. (m <sup>-1</sup> ):    | 1.1          |

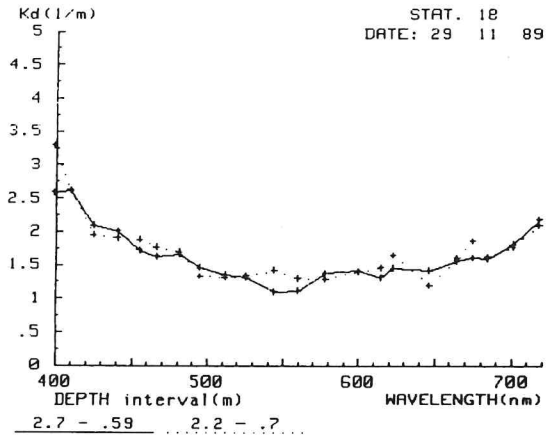
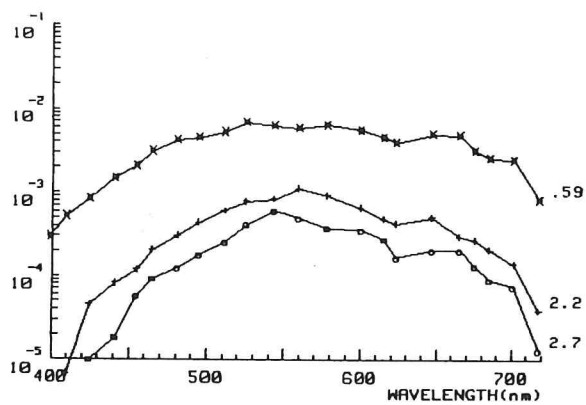
D17



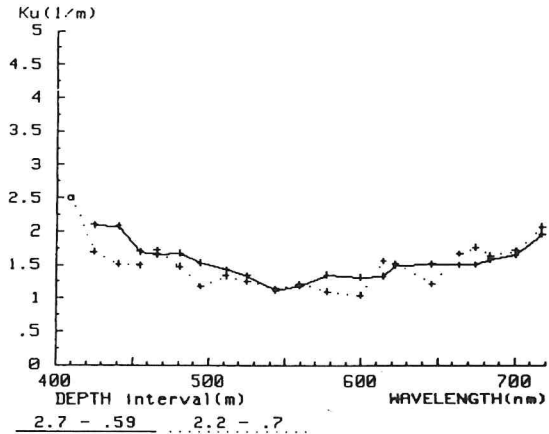
|                      |            |
|----------------------|------------|
| Station:             | 17         |
| Date:                | 29-11-89   |
| Time:                | 14.05      |
| Latit.: [N]          | 52 : 52.85 |
| Longit.: [E]         | 4 : 36.97  |
| Salinity (o/oo):     | 30.557     |
| Temp. (°C):          | 7.2        |
| Co [670nm] (1/m):    | 4.15       |
| Secchi depth (m):    | 1.3        |
| Tot. Sus. M. (g/m3): | 12.3       |
| Chloroph. (mg/m3):   | 4.3        |
| Yell. Sub. (m-1):    | 1.2        |

Ed (W/m<sup>2</sup>/nm)

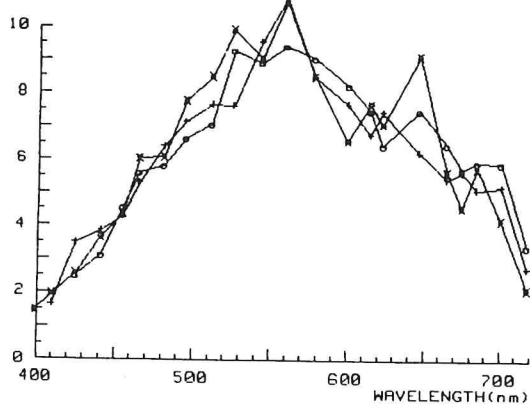
Kd (1/m)

Eu (W/m<sup>2</sup>/nm)

Ku (1/m)



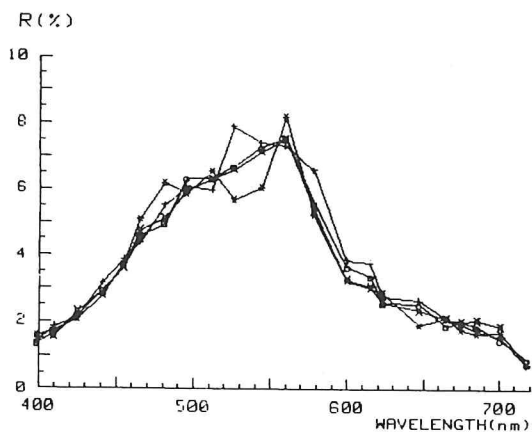
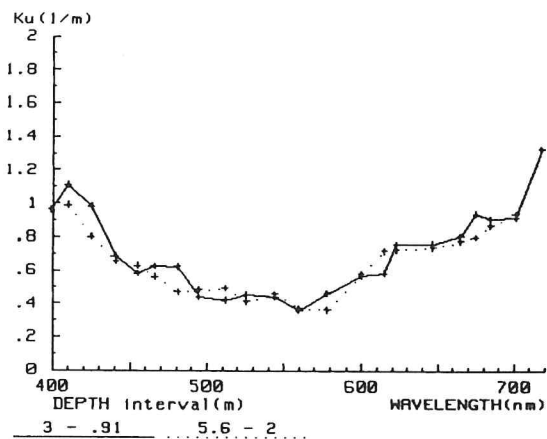
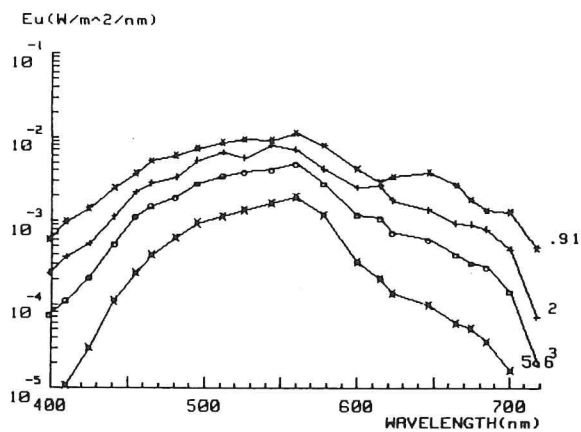
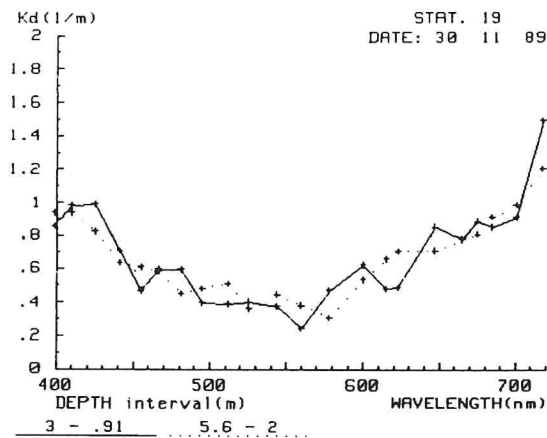
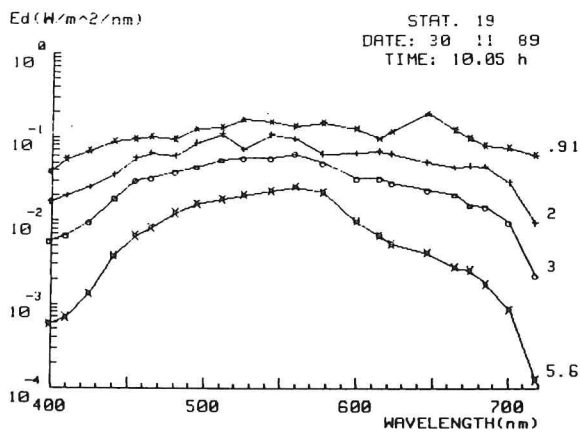
R (%)



|                                   |              |
|-----------------------------------|--------------|
| Station:                          | 18           |
| Date:                             | 29 - 11 - 89 |
| Time:                             | 15.00        |
| Latit.: [N]                       | 52 : 56.32   |
| Longit.: [E]                      | 4 : 40.25    |
| Salinity (o/oo):                  | 28.087       |
| Temp. (°C):                       | 5.4          |
| Co [670nm] (1/m):                 | 3.80         |
| Secchi depth (m):                 | 1.3          |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 13.6         |
| Chloroph. (mg/m <sup>3</sup> ):   | 5.5          |
| Yell. Sub. (m-1):                 | 1.4          |

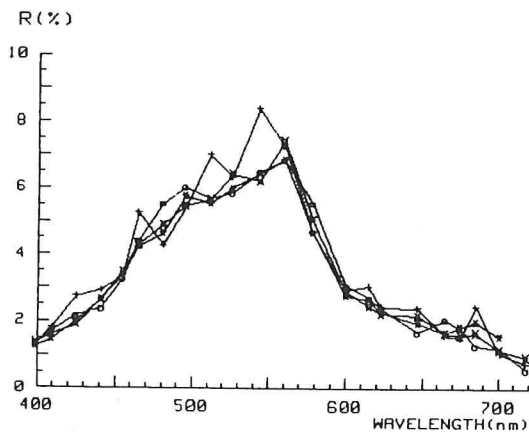
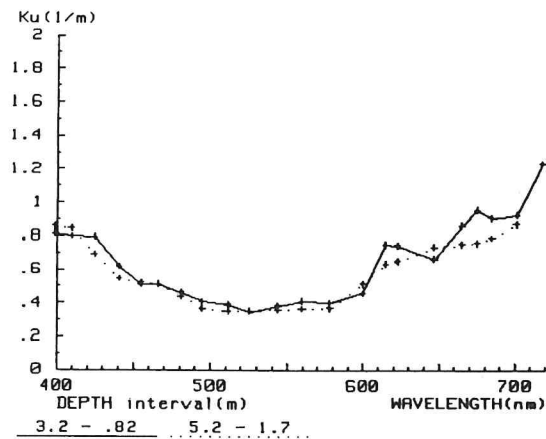
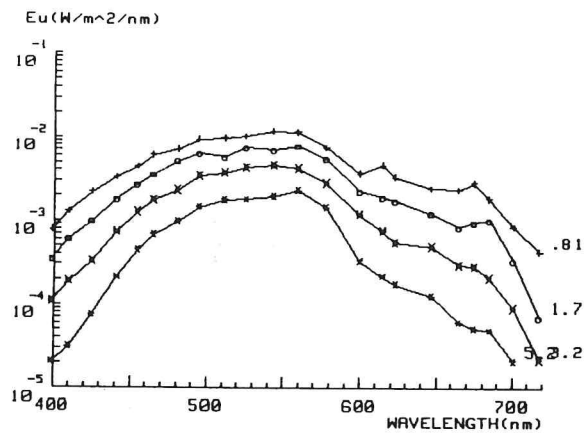
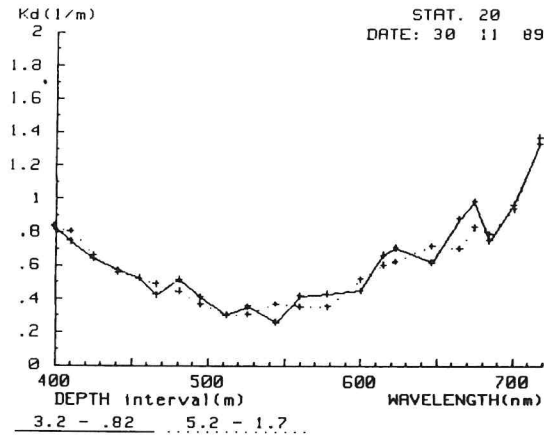
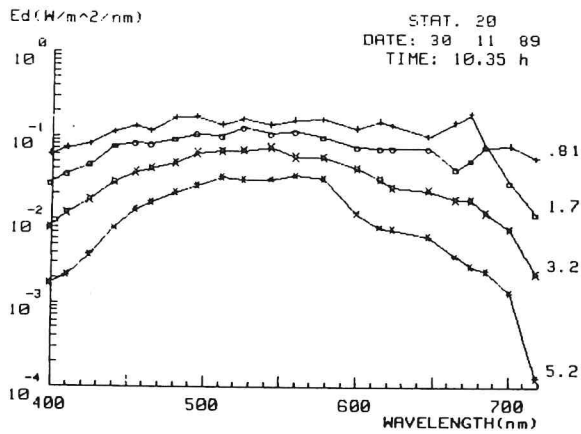


D19



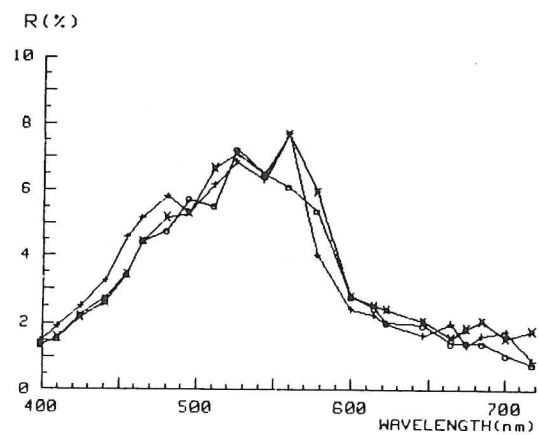
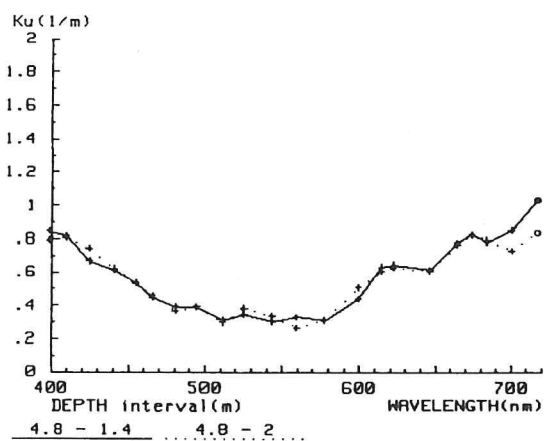
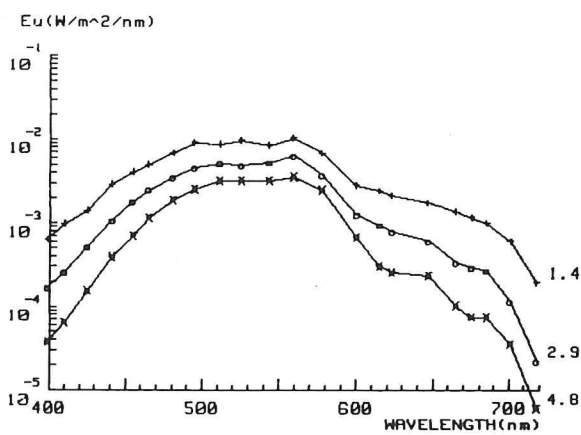
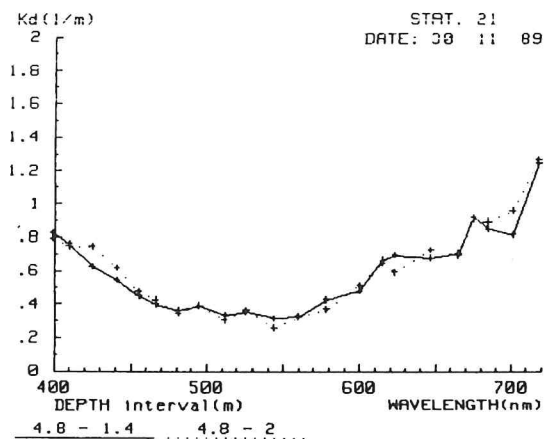
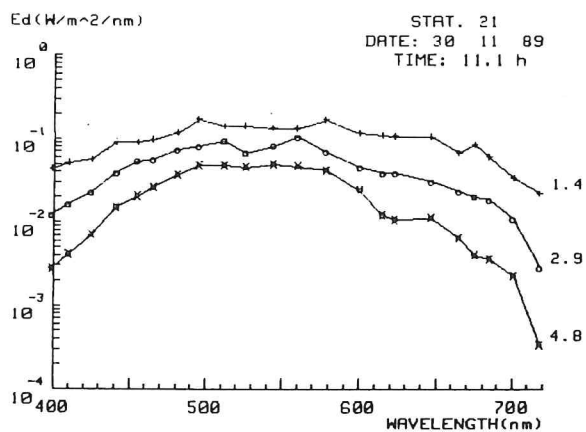
|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 19        |
| Date:                             | 30-11-89  |
| Time:                             | 10.00     |
| Latit.: [N]                       | 53 : 6.18 |
| Longit.: [E]                      | 4 : 39.56 |
| Salinity (o/oo):                  | 31.950    |
| Temp. (°C):                       | 7.6       |
| Co [670nm] (1/m):                 | 1.55      |
| Secchi depth (m):                 | 3.5       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 4.3       |
| Chloroph. (mg/m <sup>3</sup> ):   | 5.7       |
| Yell. Sub. (m <sup>-1</sup> ):    | .71       |

D20

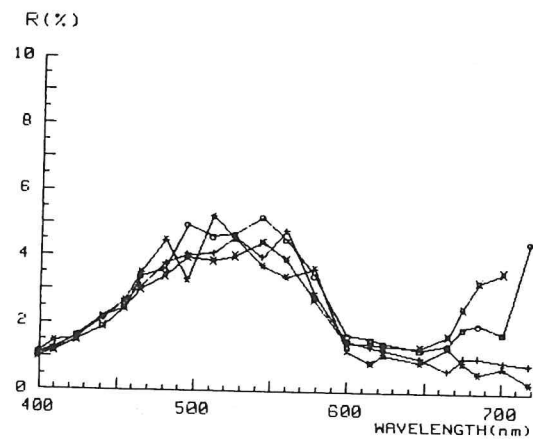
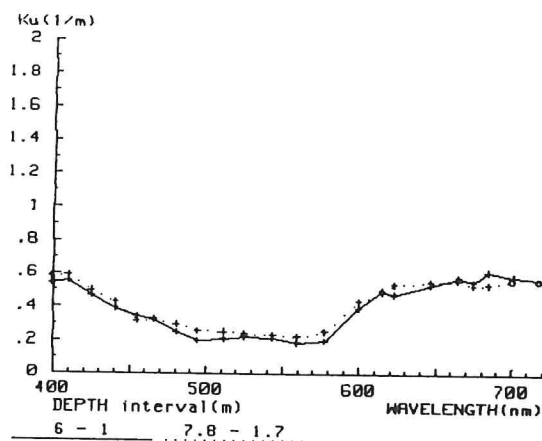
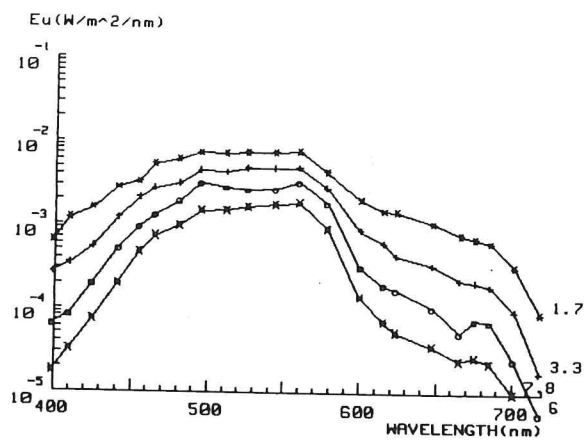
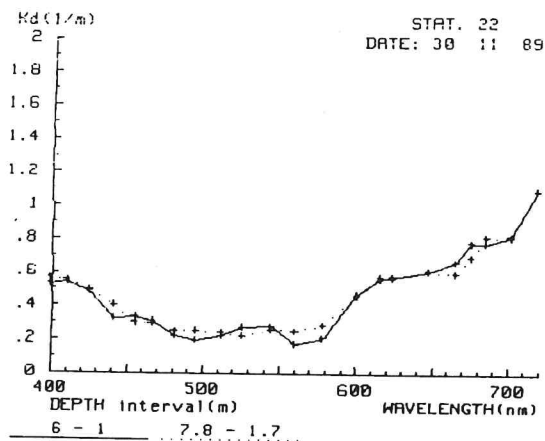
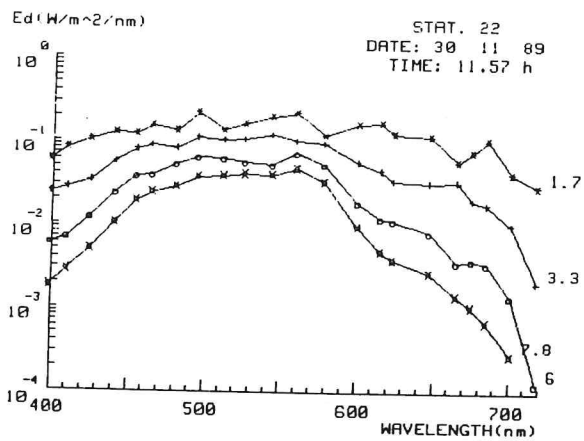


|                                   |              |
|-----------------------------------|--------------|
| Station:                          | 20           |
| Date:                             | 30 - 11 - 89 |
| Time:                             | 10.35        |
| Latit.: [N]                       | 53 : 7.66    |
| Longit.: [E]                      | 4 : 37.59    |
| Salinity (o/oo):                  | 32.338       |
| Temp. (°C):                       | 8.2          |
| Co [670nm] (1/m):                 | 1.29         |
| Secchi depth (m):                 | 4.0          |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.8          |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.6          |
| Yell. Sub. (m <sup>-1</sup> ):    | .73          |

D21

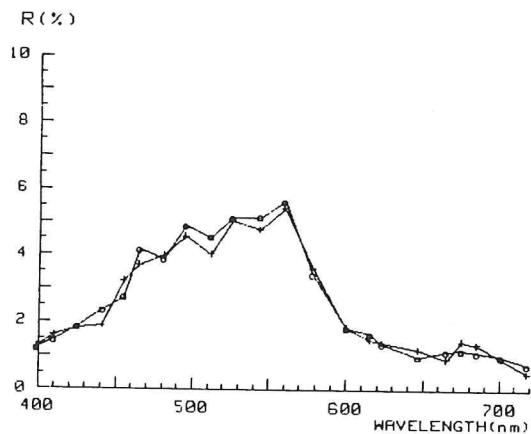
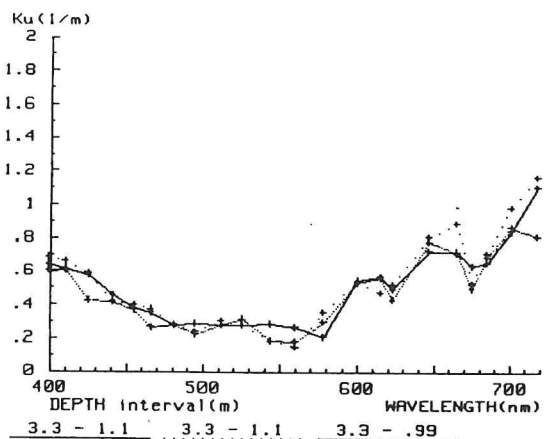
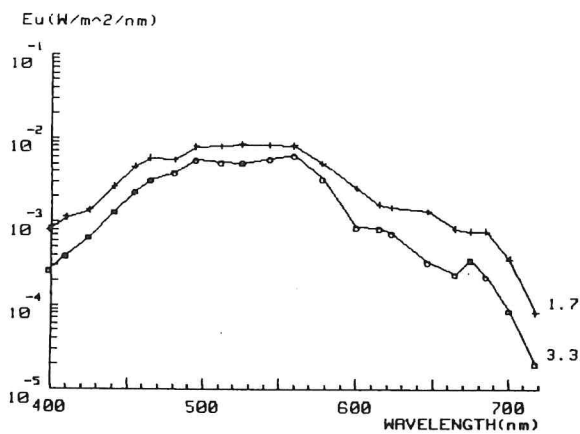
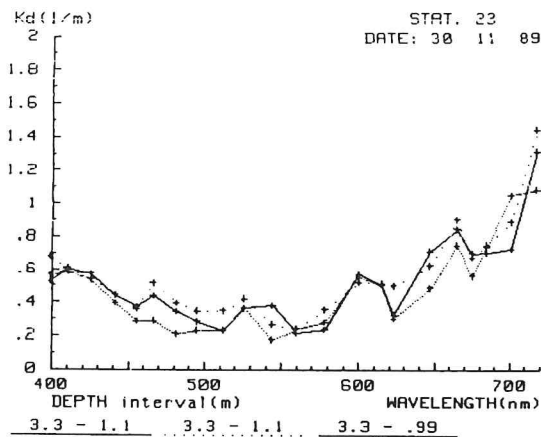
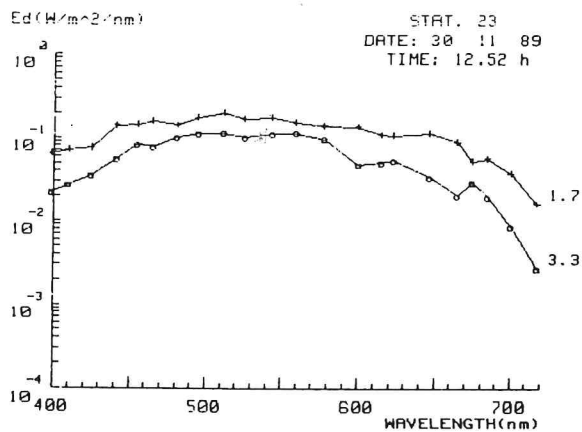


|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 21        |
| Date:                             | 30-11-89  |
| Time:                             | 11.05     |
| Latit.: [N]                       | 53 : 5.69 |
| Longit.: [E]                      | 4 : 35.32 |
| Salinity (o/oo):                  | 32.605    |
| Temp. (°C):                       | 8.4       |
| Co [670nm] (1/m):                 | 1.27      |
| Secchi depth (m):                 | 4.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.6       |
| Chloroph. (mg/m <sup>3</sup> ):   | 2.3       |
| Yell. Sub. (m <sup>-1</sup> ):    | .85       |



|                                   |           |
|-----------------------------------|-----------|
| Station:                          | 22        |
| Date:                             | 30-11-89  |
| Time:                             | 11.50     |
| Latit.: [N]                       | 53 : 5.14 |
| Longit.: [E]                      | 4 : 29.91 |
| Salinity (o/oo):                  | 33.670    |
| Temp. (°C):                       | 9.2       |
| Co [670nm] (1/m):                 | .81       |
| Secchi depth (m):                 | 7.0       |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 1.2       |
| Chloroph. (mg/m <sup>3</sup> ):   | 2.8       |
| Yell. Sub. (m <sup>-1</sup> ):    | .49       |

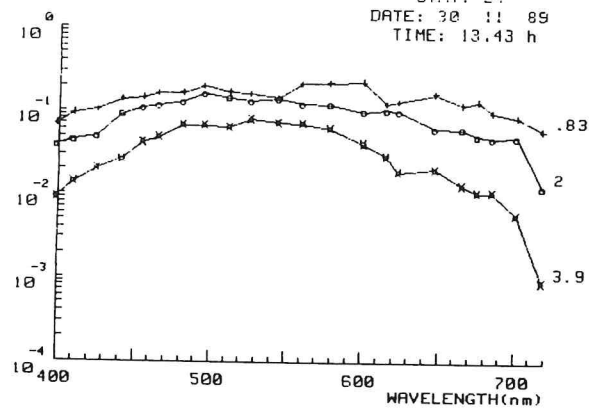
D23



|                                   |              |
|-----------------------------------|--------------|
| Station:                          | 23           |
| Date:                             | 30 - 11 - 89 |
| Time:                             | 12.50        |
| Latit.: [N]                       | 52 : 59.87   |
| Longit.: [E]                      | 4 : 28.83    |
| Salinity(o/oo):                   | 33.408       |
| Temp. (°C):                       | 8.8          |
| Co [670nm] (1/m):                 | .85          |
| Secchi depth(m):                  | 6.0          |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 2.7          |
| Chloroph. (mg/m <sup>3</sup> ):   | 2.6          |
| Yell. Sub. (m-1):                 | .76          |

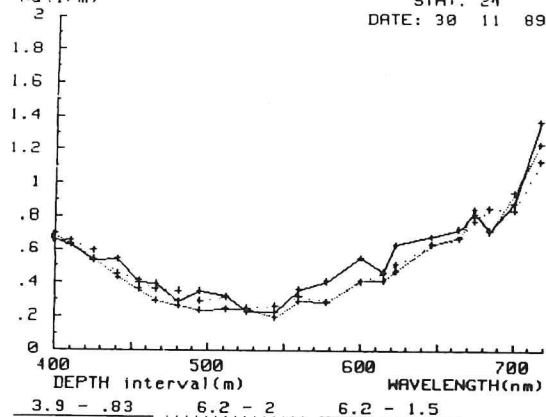
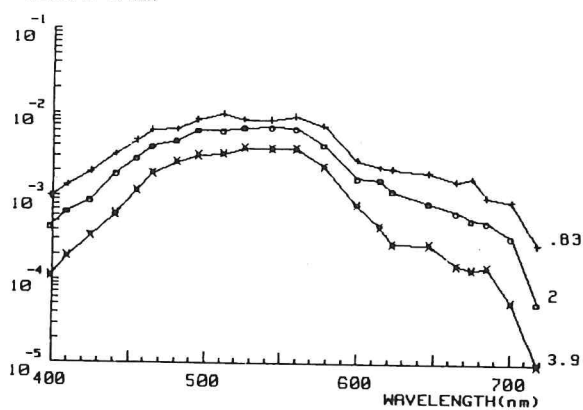
Ed (W/m<sup>2</sup>/nm)

STAT. 24  
DATE: 30 11 89  
TIME: 13.43 h

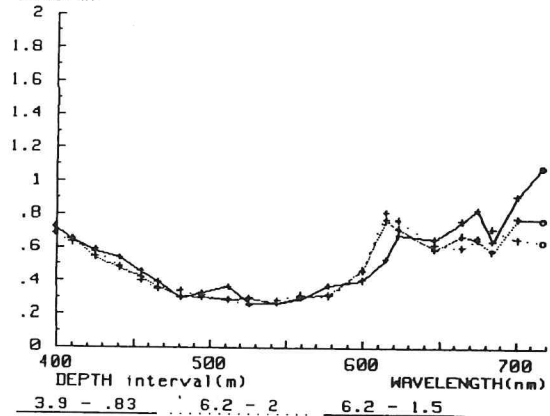


Kd (1/m)

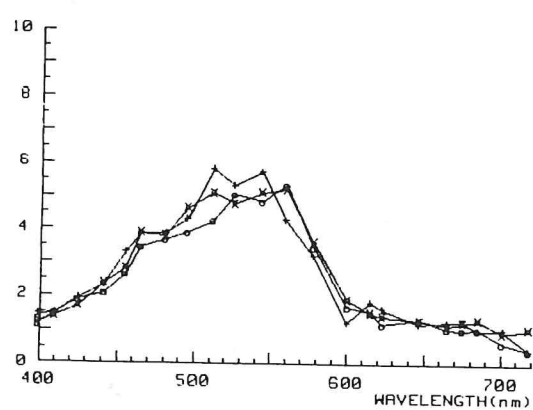
STAT. 24  
DATE: 30 11 89

Eu (W/m<sup>2</sup>/nm)

Ku (1/m)

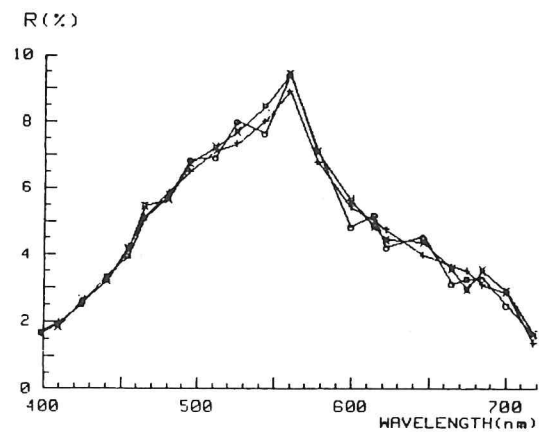
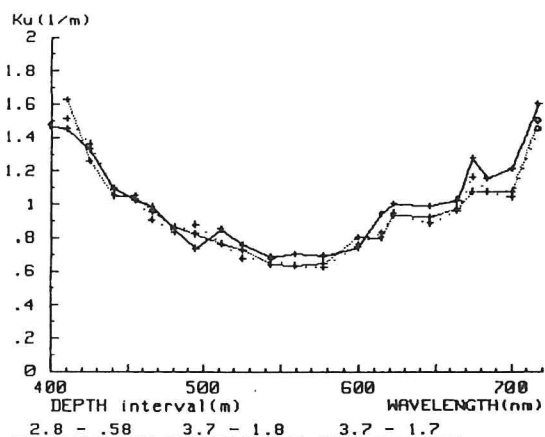
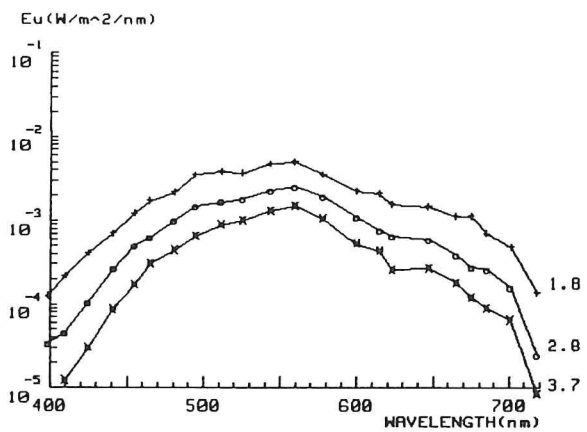
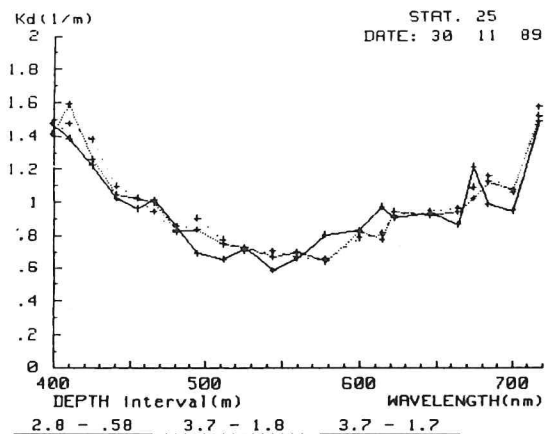
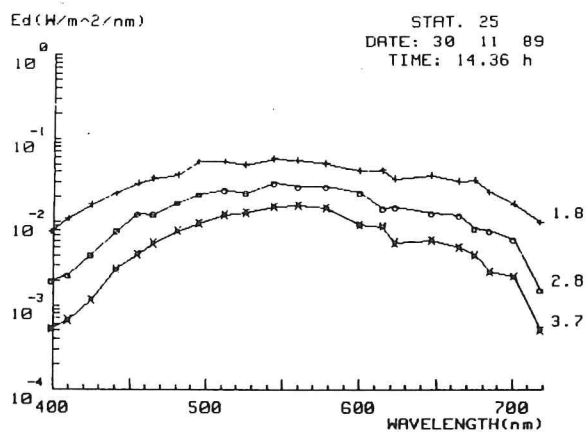


R (%)



|                                   |            |
|-----------------------------------|------------|
| Station:                          | 24         |
| Date:                             | 30-11-89   |
| Time:                             | 13.45      |
| Latit.: [N]                       | 52 : 55.04 |
| Longit.: [E]                      | 4 : 29.00  |
| Salinity (o/oo):                  | 33.023     |
| Temp. (°C):                       | 8.5        |
| Co [670nm] (1/m):                 | 1.02       |
| Secchi depth (m):                 | 5.5        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 1.9        |
| Chloroph. (mg/m <sup>3</sup> ):   | 4.6        |
| Yell. Sub. (m <sup>-1</sup> ):    | .73        |

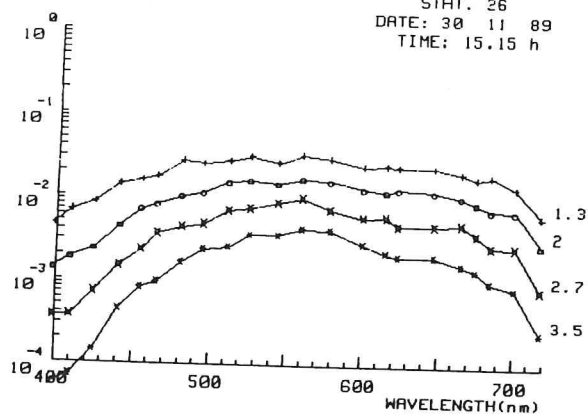
D25



|                                   |            |
|-----------------------------------|------------|
| Station:                          | 25         |
| Date:                             | 30-11-89   |
| Time:                             | 14.35      |
| Latit.: [N]                       | 52 : 54.08 |
| Longit.: [E]                      | 4 : 33.86  |
| Salinity (o/oo):                  | 31.675     |
| Temp. (°C):                       | 7.6        |
| Co [670nm] (1/m):                 | 2.87       |
| Secchi depth (m):                 | 1.8        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 7.4        |
| Chloroph. (mg/m <sup>3</sup> ):   | 5.5        |
| Yell. Sub. (m <sup>-1</sup> ):    | .92        |

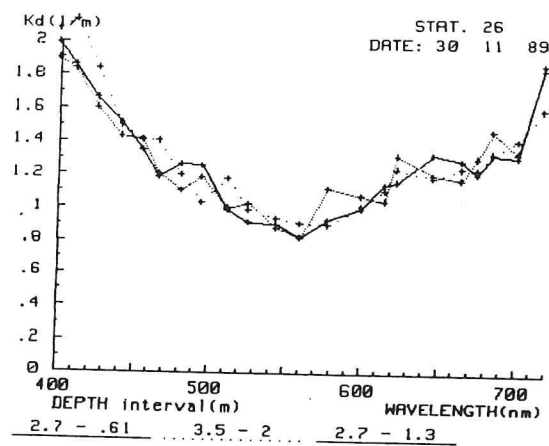
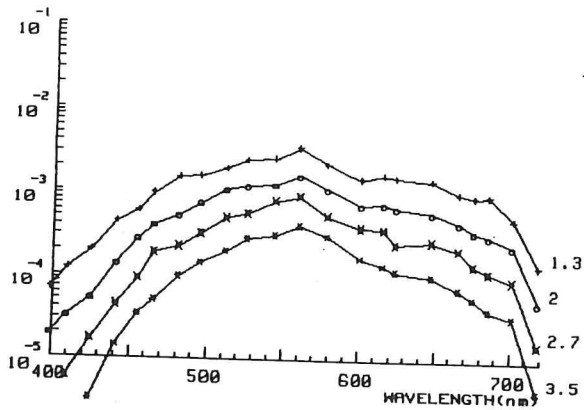
Ed(W/m<sup>2</sup>/nm)

STAT. 26  
DATE: 30 11 89  
TIME: 15.15 h

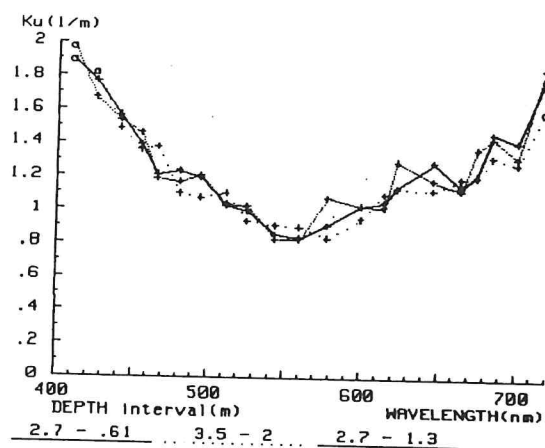


Kd(1/m)

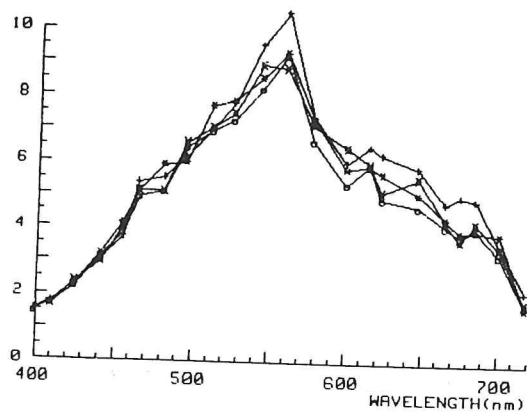
STAT. 26  
DATE: 30 11 89

Eu(W/m<sup>2</sup>/nm)

Ku(1/m)



R(%)



|                                   |            |
|-----------------------------------|------------|
| Station:                          | 26         |
| Date:                             | 30-11-89   |
| Time:                             | 15.15      |
| Latit.: [N]                       | 52 : 53.47 |
| Longit.: [E]                      | 4 : 38.09  |
| Salinity (o/oo):                  | 30.513     |
| Temp. (°C):                       | 6.7        |
| Co [670nm] (1/m):                 | 4.15       |
| Secchi depth (m):                 | 1.3        |
| Tot. Sus. M. (g/m <sup>3</sup> ): | 13.4       |
| Chloroph. (mg/m <sup>3</sup> ):   | 6.6        |
| Yell. Sub. (m <sup>-1</sup> ):    | .99        |





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